| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 883.24 | 9.9280 | 1271.87 | 2.7700 | | |
| 884.68 | 7.9463 | 1274.44 | 4.6195 | | |
| 889.28 | 7.9582 | 1274.54 | 4.6198 | | |
| 894.76 | 8.9690 | 1291.59 | 3.7111 | | |
| 1836.06 | 8.9785 | 1298.22 | 0.0000 | | |
| 903.28 | 3.9973 | 1312.11 | 3.7295 | | |
| 911.20 | 1.0019 | 1332.49 | 2.8107 | | |
| 984.45 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.0404 | 1365.19 | 1.8882 | | |
| 937.49 | 7.0716 | 1368.63 | 0.0000 | | |
| 983.53 | 5.0616 | 1384.29 | 4.7412 | | |
| 946.00 | 6.0775 | 1408.01 | 2.8601 | | |
| 949.00 | 5.0693 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 0.0000 | | |
| 962.31 | 4.0722 | 1489.16 | 2.9119 | | |
| 964.08 | 4.0743 | 1505.03 | 3.8957 | | |
| 966.17 | 3.0577 | 1596.21 | 6.9484 | | |
| 968.97 | 5.1006 | 1620.50 | 2.9926 | | |
| 983.53 | 8.1971 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.0230 | | |
| 996.26 | 5.1427 | 1750.46 | 0.0000 | | |
| 1001.03 | 5.1500 | 1764.49 | 4.1032 | | |
| 1004.73 | 4.1246 | 1770.23 | 5.1345 | | |
| 1021.30 | 0.0000 | 1771.35 | 3.0813 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.0342 | | |
| 1037.84 | 5.2058 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.0788 | | |
| 1046.59 | 5.2190 | | | | |
| 1048.07 | 4.1770 | | | | |
| 1049.04 | 7.3117 | | | | |
| 1050.41 | 8.3598 | | | | |
| 1063.66 | 4.1957 | | | | |
| 1077.00 | 5.2644 | | | | |
| 1077.34 | 4.2119 | | | | |
| 1085.87 | 2.1109 | | | | |
| 1099.45 | 2.1189 | | | | |
| 1112.07 | 5.3157 | | | | |
| 1112.84 | 6.3800 | | | | |
| 1115.54 | 3.1925 | | | | |
| 1120.29 | 6.3932 | | | | |
| 1120.55 | 7.4590 | | | | |
| 1121.30 | 6.3949 | | | | |
| 1808.65 | 4.2729 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1332.49 | 7.5646 | | | | |
| 1177.95 | 4.3279 | | | | |
| 1189.05 | 8.6809 | | | | |
| 1204.77 | 6.5373 | | | | |
| 1221.41 | 5.4707 | | | | |
| 1231.02 | 6.5810 | | | | |
| 1235.36 | 10.9800 | | | | |
| 1238.28 | 7.6918 | | | | |
| 1260.41 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:24:29.71

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146004.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;248
                                        Background date  : 9-FEB-2014 11:20:45.
Sample date      : 7-NOV-2013 09:49:00. Acquisition date : 10-FEB-2014 13:22:34
Sample ID        : G341146004           Sample quantity  : 1.29570E+02 GRAM
Detector name    : GAM04                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.37  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.33* | 10 | 15 | 1.08 | 92.47 | 89 | 7 | 2.70E-03 | 80.3 | |
| 2 | 0 | 186.18* | 9 | 12 | 1.13 | 372.12 | 369 | 7 | 2.39E-03 | 90.0 | |
| 3 | 0 | 226.33 | 16 | 17 | 2.22 | 452.42 | 446 | 10 | 4.41E-03 | 55.2 | |
| 4 | 0 | 238.54* | 11 | 24 | 1.34 | 476.82 | 473 | 8 | 2.96E-03 | 92.4 | |
| 5 | 0 | 291.76 | 17 | 11 | 1.88 | 583.26 | 578 | 9 | 4.80E-03 | 42.2 | |
| 6 | 3 | 295.72 | 24 | 5 | 1.54 | 591.18 | 587 | 21 | 6.70E-03 | 26.9 | 1.43E+00 |
| 7 | 3 | 298.18 | 12 | 4 | 1.37 | 596.08 | 587 | 21 | 3.26E-03 | 48.2 | |
| 8 | 0 | 352.66* | 18 | 9 | 3.08 | 705.04 | 698 | 13 | 5.01E-03 | 46.4 | |
| 9 | 0 | 481.11 | 14 | 19 | 5.69 | 961.93 | 950 | 20 | 3.86E-03 | 82.9 | |
| 10 | 0 | 511.26* | 21 | 12 | 1.97 | 1022.23 | 1014 | 17 | 5.82E-03 | 61.9 | |
| 11 | 0 | 610.11* | 12 | 11 | 1.74 | 1219.93 | 1214 | 9 | 3.26E-03 | 67.5 | |
| 12 | 0 | 830.55 | 7 | 0 | 0.83 | 1660.86 | 1658 | 6 | 1.94E-03 | 37.8 | |
| 13 | 0 | 1461.82* | 8 | 2 | 1.90 | 2923.79 | 2920 | 7 | 2.11E-03 | 51.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:24:31

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146004.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 09:49:00 | Acquisition date | : 10-FEB-2014 13:22:34 |
| Sample ID | : G341146004 | Sample quantity | : 129.57 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA4 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.37 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 8 | 10.66* | 9.620E-01 | 4.282E-01 | 4.282E-01 | 102.10 |
| W-188 | 63.58 | ------ | 0.11 | 1.349E+00 | ------ | Line Not Found | ------ |
| | 227.09 | 16 | 0.22 | 4.116E+00 | 1.010E+01 | 2.601E+01 | 110.45 |
| | 290.67 | 17 | 0.40* | 3.469E+00 | 7.183E+00 | 1.849E+01 | 84.48 |
| PB-210 | 46.54 | 10 | 4.25* | 1.743E-01 | 7.604E+00 | 7.666E+00 | 160.69 |
| ANH-511 | 511.00 | 21 | 100.00* | 2.332E+00 | 5.206E-02 | 5.206E-02 | 123.83 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:24:32.20

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146004.CNF;1    *
* Acquisition date : 10-FEB-2014 13:22:34 Sensitivity     : 3.000          *
* Detector ID      : GAM04                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 09:49:00 Nuclide Library : SOLID          *
* Sample ID        : G341146004           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.2957E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  9-AUG-2013 10:37:36 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_500MLMB.CNF;5       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 4.282E-01 | 4.284E-01 | 5.179E-01 |
| W-188 | 1.849E+01 | 1.531E+01 | 2.293E+01 |
| PB-210 | 7.666E+00 | 1.207E+01 | 2.038E+01 |
| ANH-511 | 5.206E-02 | 6.318E-02 | 4.441E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 1.417E-01 | 9.207E-01 | 1.779E+00 | NOT IDENT. |
| NA-22 | -1.985E-02 | 3.362E-02 | 6.162E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.629E-02 | 2.657E-02 | 1.922E-02 | NOT IDENT. |
| SC-46 | 8.767E-03 | 5.493E-02 | 1.195E-01 | NOT IDENT. |
| V-48 | 7.626E-01 | 1.720E+00 | 3.939E+00 | NOT IDENT. |
| CR-51 | -3.845E-01 | 2.314E+00 | 4.359E+00 | NOT IDENT. |
| MN-54 | -2.820E-02 | 4.669E-02 | 6.674E-02 | NOT IDENT. |
| CO-56 | -2.667E-02 | 7.274E-02 | 1.357E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -8.350E-03 | 2.562E-02 | 4.534E-02 | NOT IDENT. |
| CO-58 | 1.642E-02 | 6.474E-02 | 1.412E-01 | NOT IDENT. |
| FE-59 | 1.005E-01 | 2.415E-01 | 5.458E-01 | NOT IDENT. |
| CO-60 | 6.473E-03 | 2.458E-02 | 6.189E-02 | NOT IDENT. |
| ZN-65 | -8.147E-02 | 7.921E-02 | 1.106E-01 | NOT IDENT. |
| GE-68 | -1.740E-02 | 1.275E+00 | 2.595E+00 | NOT IDENT. |
| AS-73 | 9.695E-01 | 3.203E+00 | 6.270E+00 | NOT IDENT. |
| AS-74 | 6.439E-01 | 1.869E+00 | 3.801E+00 | NOT IDENT. |
| SE-75 | -9.775E-05 | 5.689E-02 | 1.101E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.378E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -6.667E-01 | 1.612E+00 | 3.140E+00 | NOT IDENT. |
| RB-83 | -2.100E-02 | 1.174E-01 | 2.187E-01 | NOT IDENT. |
| KR-85 | 9.315E+00 | 8.330E+00 | 1.637E+01 | NOT IDENT. |
| SR-85 | 1.141E-01 | 1.023E-01 | 2.010E-01 | NOT IDENT. |
| RB-86 | 4.219E+00 | 1.183E+01 | 2.661E+01 | NOT IDENT. |
| Y-88 | -4.960E-02 | 6.887E-02 | 1.122E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 2.194E+01 | 4.214E+01 | 9.553E+01 | NOT IDENT. |
| NB-94 | -5.813E-03 | 2.682E-02 | 5.352E-02 | NOT IDENT. |
| NB-95 | -2.375E-02 | 7.487E-02 | 1.433E-01 | NOT IDENT. |
| NB-95M | 5.297E-02 | 2.289E-01 | 4.089E-01 | NOT IDENT. |
| ZR-95 | 6.386E-02 | 1.130E-01 | 2.672E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.040E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 5.855E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.592E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.079E-02 | 2.194E-02 | 3.817E-02 | NOT IDENT. |
| RH-102 | 1.040E-03 | 4.867E-02 | 9.888E-02 | NOT IDENT. |
| RU-103 | -4.341E-02 | 1.286E-01 | 2.347E-01 | FAIL ABUN |
| RH-106 | 3.768E-02 | 2.657E-01 | 5.435E-01 | NOT IDENT. |
| RU-106 | 3.768E-02 | 2.657E-01 | 5.435E-01 | NOT IDENT. |
| AG-108M | 1.328E-02 | 2.717E-02 | 5.572E-02 | NOT IDENT. |
| CD-109 | -4.676E-01 | 8.172E-01 | 1.420E+00 | NOT IDENT. |
| AG-110M | 7.224E-03 | 4.841E-02 | 1.032E-01 | NOT IDENT. |
| SN-113 | -7.073E-03 | 5.223E-02 | 1.005E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.872E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 7.690E-01 | 2.570E+00 | 4.863E+00 | NOT IDENT. |
| TE-123M | 1.130E-02 | 3.608E-02 | 6.837E-02 | NOT IDENT. |
| SB-124 | 8.446E-02 | 1.672E-01 | 4.575E-01 | NOT IDENT. |
| SB-125 | -8.141E-03 | 7.772E-02 | 1.484E-01 | NOT IDENT. |
| TE-125M | 5.979E+00 | 1.767E+01 | 3.494E+01 | NOT IDENT. |
| I-126 | -4.545E+00 | 1.261E+01 | 2.401E+01 | NOT IDENT. |
| SB-126 | -1.340E-01 | 9.883E+00 | 2.020E+01 | NOT IDENT. |
| SN-126 | -2.061E-02 | 6.879E-02 | 1.237E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.417E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.499E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 2.032E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.378E-02 | 4.906E-02 | 7.731E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.901E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.114E-02 | 3.117E-02 | 7.744E-02 | NOT IDENT. |
| CS-135 | 5.064E-02 | 1.166E-01 | 2.393E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 6.198E+40 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.661E+00 | 6.171E+00 | 1.444E+01 | NOT IDENT. |
| BA-137M | 1.084E-02 | 3.009E-02 | 6.431E-02 | NOT IDENT. |
| CS-137 | 1.145E-02 | 3.179E-02 | 6.794E-02 | NOT IDENT. |
| CE-139 | -3.834E-02 | 3.656E-02 | 5.767E-02 | NOT IDENT. |
| BA-140 | -2.366E+00 | 5.727E+00 | 1.112E+01 | NOT IDENT. |
| LA-140 | -2.366E+00 | 5.727E+00 | 1.112E+01 | NOT IDENT. |
| CE-141 | -2.953E-02 | 2.615E-01 | 4.731E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.886E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.499E-01 | 1.984E-01 | 3.286E-01 | NOT IDENT. |
| PM-144 | 2.189E-02 | 3.173E-02 | 7.196E-02 | NOT IDENT. |
| PR-144 | 1.708E+00 | 2.476E+00 | 5.616E+00 | NOT IDENT. |
| PM-146 | -4.534E-03 | 3.319E-02 | 6.340E-02 | NOT IDENT. |
| ND-147 | 5.700E+01 | 6.503E+01 | 1.476E+02 | NOT IDENT. |
| PM-147 | -4.286E+01 | 6.451E+02 | 1.181E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.889E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 4.899E-04 | 2.426E-02 | 4.647E-02 | NOT IDENT. |
| EU-152 | -2.540E-02 | 8.576E-02 | 1.581E-01 | NOT IDENT. |
| GD-153 | -7.228E-03 | 8.196E-02 | 1.526E-01 | NOT IDENT. |
| EU-154 | -3.690E-02 | 8.792E-02 | 1.712E-01 | NOT IDENT. |
| EU-155 | -6.982E-02 | 8.298E-02 | 1.373E-01 | NOT IDENT. |
| TB-160 | -1.240E-01 | 2.301E-01 | 4.137E-01 | FAIL ABUN |
| HO-166M | 3.570E-02 | 4.754E-02 | 1.098E-01 | NOT IDENT. |
| TM-171 | 1.149E+01 | 3.943E+01 | 7.699E+01 | NOT IDENT. |
| LU-176 | -5.789E-03 | 2.267E-02 | 3.900E-02 | NOT IDENT. |
| HF-181 | 1.948E-01 | 3.165E-01 | 2.675E-01 | FAIL ABUN |
| TA-182 | 9.519E-02 | 1.804E-01 | 4.437E-01 | NOT IDENT. |
| RE-183 | -1.394E-02 | 6.101E-01 | 1.177E+00 | NOT IDENT. |
| RE-184 | -6.540E-02 | 3.884E-01 | 7.944E-01 | NOT IDENT. |
| IR-192 | 9.550E-03 | 6.660E-02 | 1.297E-01 | FAIL ABUN |
| HG-203 | -3.238E-02 | 8.184E-02 | 1.522E-01 | NOT IDENT. |
| BI-207 | -7.566E-03 | 3.684E-02 | 7.327E-02 | NOT IDENT. |
| TL-208 | 2.109E-02 | 3.194E-02 | 6.984E-02 | NOT IDENT. |
| BI-211 | -4.693E-02 | 1.882E-01 | 3.552E-01 | NOT IDENT. |
| PB-211 | 2.168E-01 | 5.559E-01 | 1.150E+00 | FAIL ABUN |
| BI-212 | -2.796E-01 | 3.609E-01 | 6.178E-01 | NOT IDENT. |
| PB-212 | 3.560E-02 | 6.446E-02 | 1.101E-01 | FAIL ABUN |
| BI-214 | 7.320E-02 | 9.690E-02 | 1.742E-01 | FAIL ABUN |
| PB-214 | 9.663E-02 | 8.797E-02 | 1.306E-01 | FAIL ABUN |
| RN-219 | -1.949E-01 | 3.161E-01 | 5.488E-01 | NOT IDENT. |
| RN-222 | 7.320E-02 | 9.690E-02 | 1.742E-01 | FAIL ABUN |
| RA-223 | -3.116E-01 | 4.995E-01 | 8.784E-01 | NOT IDENT. |
| RA-224 | -1.749E-01 | 6.212E-01 | 1.013E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 7.320E-02 | 9.690E-02 | 1.742E-01 | FAIL ABUN |
| AC-227 | -1.274E-01 | 1.909E-01 | 3.382E-01 | NOT IDENT. |
| TH-227 | -1.274E-01 | 1.909E-01 | 3.382E-01 | NOT IDENT. |
| AC-228 | 6.680E-02 | 1.283E-01 | 2.809E-01 | NOT IDENT. |
| RA-228 | 6.680E-02 | 1.283E-01 | 2.809E-01 | NOT IDENT. |
| TH-228 | 3.560E-02 | 6.446E-02 | 1.101E-01 | FAIL ABUN |
| TH-229 | -4.857E-01 | 3.873E-01 | 5.620E-01 | NOT IDENT. |
| TH-230 | 7.319E-02 | 9.689E-02 | 1.742E-01 | FAIL ABUN |
| PA-231 | -2.813E-01 | 1.106E+00 | 2.079E+00 | NOT IDENT. |
| TH-231 | -3.116E-01 | 4.995E-01 | 8.784E-01 | NOT IDENT. |
| TH-232 | 6.680E-02 | 1.283E-01 | 2.809E-01 | NOT IDENT. |
| PA-233 | 4.936E-02 | 5.773E-02 | 1.219E-01 | NOT IDENT. |
| PA-234 | 2.064E-01 | 2.322E-01 | 5.684E-01 | NOT IDENT. |
| PA-234M | 6.867E-01 | 3.042E+00 | 6.959E+00 | NOT IDENT. |
| TH-234 | -9.133E-01 | 1.500E+00 | 2.657E+00 | NOT IDENT. |
| U-234 | 7.319E-02 | 9.689E-02 | 1.742E-01 | FAIL ABUN |
| U-235 | 7.562E-02 | 1.509E-01 | 2.945E-01 | FAIL ABUN |
| NP-237 | 4.936E-02 | 5.773E-02 | 1.219E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.887E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -9.133E-01 | 1.500E+00 | 2.657E+00 | NOT IDENT. |
| NP-239 | 8.654E-02 | 3.247E-01 | 6.207E-01 | NOT IDENT. |
| PU-239 | -9.241E+01 | 2.326E+02 | 4.097E+02 | NOT IDENT. |
| AM-241 | 2.094E-01 | 2.123E-01 | 4.537E-01 | NOT IDENT. |
| AM-243 | -4.961E-02 | 5.054E-02 | 8.245E-02 | NOT IDENT. |
| CM-243 | -1.248E-02 | 7.363E-02 | 1.365E-01 | NOT IDENT. |
| CM-247 | -1.748E-02 | 2.909E-02 | 5.066E-02 | NOT IDENT. |
| CF-249 | -1.379E-02 | 3.045E-02 | 5.485E-02 | NOT IDENT. |
| CF-251 | 3.352E-02 | 1.130E-01 | 2.109E-01 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:24:28.02

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.33 | 14 | 15 | 1.08 | 92.47 | 89 | 7 | 3.76E-03 | 55.6 | |
| 2 | 0 | 186.18 | 20 | 12 | 1.13 | 372.12 | 369 | 7 | 5.59E-03 | 36.3 | |
| 3 | 0 | 226.33 | 16 | 17 | 2.22 | 452.42 | 446 | 10 | 4.41E-03 | 55.2 | |
| 4 | 0 | 238.54 | 20 | 24 | 1.34 | 476.82 | 473 | 8 | 5.45E-03 | 48.9 | |
| 5 | 0 | 291.76 | 17 | 11 | 1.88 | 583.26 | 578 | 9 | 4.80E-03 | 42.2 | |
| 6 | 3 | 295.72 | 24 | 5 | 1.54 | 591.18 | 587 | 21 | 6.70E-03 | 26.9 | 1.43E+00 |
| 7 | 3 | 298.18 | 12 | 4 | 1.37 | 596.08 | 587 | 21 | 3.26E-03 | 48.2 | |
| 8 | 0 | 352.66 | 25 | 9 | 3.08 | 705.04 | 698 | 13 | 6.94E-03 | 32.4 | |
| 9 | 0 | 481.11 | 14 | 19 | 5.69 | 961.93 | 950 | 20 | 3.86E-03 | 82.9 | |
| 10 | 0 | 511.26 | 89 | 12 | 1.97 | 1022.23 | 1014 | 17 | 2.48E-02 | 13.9 | |
| 11 | 0 | 610.11 | 19 | 11 | 1.74 | 1219.93 | 1214 | 9 | 5.21E-03 | 39.7 | |
| 12 | 0 | 830.55 | 7 | 0 | 0.83 | 1660.86 | 1658 | 6 | 1.94E-03 | 37.8 | |
| 13 | 0 | 1461.82 | 9 | 2 | 1.90 | 2923.79 | 2920 | 7 | 2.59E-03 | 40.2 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:24:30.26

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 8 | 10.66* | 9.620E-01 | 4.282E-01 | 4.282E-01 | 102.10 |
| W-188 | 63.58 | ------ | 0.11 | 1.349E+00 | ------ | Line Not Found | ------ |
| | 227.09 | 16 | 0.22 | 4.116E+00 | 1.010E+01 | 2.601E+01 | 110.45 |
| | 290.67 | 17 | 0.40* | 3.469E+00 | 7.183E+00 | 1.849E+01 | 84.48 |
| PB-210 | 46.54 | 10 | 4.25* | 1.743E-01 | 7.604E+00 | 7.666E+00 | 160.69 |
| ANH-511 | 511.00 | 21 | 100.00* | 2.332E+00 | 5.206E-02 | 5.206E-02 | 123.83 |

Flag: "*" = Keyline

Sample ID : G341146004 Acquisition date : 10-FEB-2014 13:22:34

Total number of lines in spectrum 13
Number of unidentified lines 0
Number of lines tentatively identified by NID 13 100.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 4.282E-01 | 4.282E-01 | 4.372E-01 | 102.10 | |
| W-188 | 69.78D | 2.57 | 7.183E+00 | 1.849E+01 | 1.562E+01 | 84.48 | |
| PB-210 | 22.20Y | 1.01 | 7.604E+00 | 7.666E+00 | 12.32E+00 | 160.69 | |
| ANH-511 | 1.00E+09Y | 1.00 | 5.206E-02 | 5.206E-02 | 6.447E-02 | 123.83 | |
| | Total Activity : | | 1.527E+01 | 2.663E+01 | | | |
| | Grand Total Activity : | | 1.527E+01 | 2.663E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146004 Acquisition date : 10-FEB-2014 13:22:34

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 186.18 | 9 | 12 | 1.13 | 372.12 | 369 | 7 | 2.39E-03 | **** | 4.61E+00 | T |
| 0 | 238.54 | 11 | 24 | 1.34 | 476.82 | 473 | 8 | 2.96E-03 | **** | 3.98E+00 | T |
| 3 | 295.72 | 24 | 5 | 1.54 | 591.18 | 587 | 21 | 6.70E-03 | 53.8 | 3.44E+00 | T |
| 3 | 298.18 | 12 | 4 | 1.37 | 596.08 | 587 | 21 | 3.26E-03 | 96.4 | 3.42E+00 | T |
| 0 | 352.66 | 18 | 9 | 3.08 | 705.04 | 698 | 13 | 5.01E-03 | 92.9 | 3.04E+00 | T |
| 0 | 481.11 | 14 | 19 | 5.69 | 961.93 | 950 | 20 | 3.86E-03 | **** | 2.44E+00 | T |
| 0 | 610.11 | 12 | 11 | 1.74 | 1219.93 | 1214 | 9 | 3.26E-03 | **** | 2.04E+00 | T |
| 0 | 830.55 | 7 | 0 | 0.83 | 1660.86 | 1658 | 6 | 1.94E-03 | 75.6 | 1.59E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:24:43.53

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146004.CNF;1       *
* Acquisition date : 10-FEB-2014 13:22:34 Sensitivity     : 3.000                *
* Detector ID      : GAM04                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 09:49:00 Nuclide Library : SOLID                *
* Sample ID        : G341146004           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.2957E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  9-AUG-2013 10:37:36 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_500MLMB.CNF;5              *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 1.825E-01 |
| W-188 | 1.003E+01 |
| PB-210 | 9.166E+00 |
| ANH-511 | 1.885E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.839E-01 | NOT IDENT. |
| NA-22 | 2.307E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 0.000E+00 | NOT IDENT. |
| SC-46 | 4.830E-02 | NOT IDENT. |
| V-48 | 1.615E+00 | NOT IDENT. |
| CR-51 | 1.917E+00 | NOT IDENT. |
| MN-54 | 2.727E-02 | NOT IDENT. |
| CO-56 | 5.609E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.033E-02 | NOT IDENT. |
| CO-58 | 5.830E-02 | NOT IDENT. |
| FE-59 | 2.238E-01 | NOT IDENT. |
| CO-60 | 2.317E-02 | NOT IDENT. |
| ZN-65 | 3.876E-02 | NOT IDENT. |
| GE-68 | 1.052E+00 | NOT IDENT. |
| AS-73 | 2.802E+00 | NOT IDENT. |
| AS-74 | 1.640E+00 | NOT IDENT. |
| SE-75 | 4.887E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.154E+00 | NOT IDENT. |
| RB-83 | 9.313E-02 | NOT IDENT. |
| KR-85 | 7.397E+00 | NOT IDENT. |
| SR-85 | 9.083E-02 | NOT IDENT. |
| RB-86 | 1.084E+01 | NOT IDENT. |
| Y-88 | 3.800E-02 | NOT IDENT. |
| Y-91 | 3.963E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 2.248E-02 | NOT IDENT. |
| NB-95 | 5.875E-02 | NOT IDENT. |
| NB-95M | 1.825E-01 | NOT IDENT. |
| ZR-95 | 1.102E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.667E-02 | NOT IDENT. |
| RH-102 | 4.208E-02 | NOT IDENT. |
| RU-103 | 9.795E-02 | FAIL ABUN |
| RH-106 | 2.250E-01 | NOT IDENT. |
| RU-106 | 2.250E-01 | NOT IDENT. |
| AG-108M | 2.457E-02 | NOT IDENT. |
| CD-109 | 6.425E-01 | NOT IDENT. |
| AG-110M | 4.233E-02 | NOT IDENT. |
| SN-113 | 4.265E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.197E+00 | NOT IDENT. |
| TE-123M | 3.090E-02 | NOT IDENT. |
| SB-124 | 1.713E-01 | NOT IDENT. |
| SB-125 | 6.361E-02 | NOT IDENT. |
| TE-125M | 1.553E+01 | NOT IDENT. |
| I-126 | 9.958E+00 | NOT IDENT. |
| SB-126 | 8.407E+00 | NOT IDENT. |
| SN-126 | 5.595E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.441E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.267E-02 | NOT IDENT. |
| CS-135 | 1.063E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 6.088E+00 | NOT IDENT. |
| BA-137M | 2.760E-02 | NOT IDENT. |
| CS-137 | 2.915E-02 | NOT IDENT. |
| CE-139 | 2.559E-02 | NOT IDENT. |
| BA-140 | 3.941E+00 | NOT IDENT. |
| LA-140 | 3.941E+00 | NOT IDENT. |
| CE-141 | 2.121E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.467E-01 | NOT IDENT. |
| PM-144 | 3.086E-02 | NOT IDENT. |
| PR-144 | 2.408E+00 | NOT IDENT. |
| PM-146 | 2.680E-02 | NOT IDENT. |
| ND-147 | 6.310E+01 | NOT IDENT. |
| PM-147 | 5.315E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.065E-02 | NOT IDENT. |
| EU-152 | 6.941E-02 | NOT IDENT. |
| GD-153 | 6.787E-02 | NOT IDENT. |
| EU-154 | 6.455E-02 | NOT IDENT. |
| EU-155 | 6.024E-02 | NOT IDENT. |
| TB-160 | 1.641E-01 | FAIL ABUN |
| HO-166M | 4.690E-02 | NOT IDENT. |
| TM-171 | 3.447E+01 | NOT IDENT. |
| LU-176 | 1.701E-02 | NOT IDENT. |
| HF-181 | 1.148E-01 | FAIL ABUN |
| TA-182 | 1.761E-01 | NOT IDENT. |
| RE-183 | 5.199E-01 | NOT IDENT. |
| RE-184 | 3.078E-01 | NOT IDENT. |
| IR-192 | 5.782E-02 | FAIL ABUN |
| HG-203 | 6.504E-02 | NOT IDENT. |
| BI-207 | 2.838E-02 | NOT IDENT. |
| TL-208 | 3.057E-02 | NOT IDENT. |
| BI-211 | 1.577E-01 | NOT IDENT. |
| PB-211 | 5.000E-01 | FAIL ABUN |
| BI-212 | 2.429E-01 | NOT IDENT. |
| PB-212 | 5.057E-02 | FAIL ABUN |
| BI-214 | 7.870E-02 | FAIL ABUN |
| PB-214 | 5.807E-02 | FAIL ABUN |
| RN-219 | 2.316E-01 | NOT IDENT. |
| RN-222 | 7.870E-02 | FAIL ABUN |
| RA-223 | 3.784E-01 | NOT IDENT. |
| RA-224 | 4.583E-01 | NOT IDENT. |
| RA-226 | 7.870E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.474E-01 | NOT IDENT. |
| TH-227 | 1.474E-01 | NOT IDENT. |
| AC-228 | 1.198E-01 | NOT IDENT. |
| RA-228 | 1.198E-01 | NOT IDENT. |
| TH-228 | 5.057E-02 | FAIL ABUN |
| TH-229 | 2.417E-01 | NOT IDENT. |
| TH-230 | 7.869E-02 | FAIL ABUN |
| PA-231 | 9.093E-01 | NOT IDENT. |
| TH-231 | 3.784E-01 | NOT IDENT. |
| TH-232 | 1.198E-01 | NOT IDENT. |
| PA-233 | 5.483E-02 | NOT IDENT. |
| PA-234 | 2.384E-01 | NOT IDENT. |
| PA-234M | 2.790E+00 | NOT IDENT. |
| TH-234 | 1.169E+00 | NOT IDENT. |
| U-234 | 7.869E-02 | FAIL ABUN |
| U-235 | 1.331E-01 | FAIL ABUN |
| NP-237 | 5.483E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.169E+00 | NOT IDENT. |
| NP-239 | 2.800E-01 | NOT IDENT. |
| PU-239 | 1.803E+02 | NOT IDENT. |
| AM-241 | 2.046E-01 | NOT IDENT. |
| AM-243 | 3.647E-02 | NOT IDENT. |
| CM-243 | 5.989E-02 | NOT IDENT. |
| CM-247 | 2.140E-02 | NOT IDENT. |
| CF-249 | 2.325E-02 | NOT IDENT. |
| CF-251 | 9.587E-02 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:24:49.31

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146004.CNF;1    *
* Acquisition date : 10-FEB-2014 13:22:34 Sensitivity     : 3.000            *
* Detector ID      : GAM04                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 09:49:00 Nuclide Library : SOLID            *
* Sample ID        : G341146004           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.2957E+02 GRAM  *
*                                         Quantity Err(%) : 1.5436E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  9-AUG-2013 10:37:36 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_500MLMB.CNF;5          *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 4.282E-01 | 4.301E-01 | 4.301E-01 |
| W-188 | 1.849E+01 | 1.549E+01 | 1.549E+01 |
| PB-210 | 7.666E+00 | 1.210E+01 | 1.210E+01 |
| ANH-511 | 5.206E-02 | 6.335E-02 | 6.335E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 1.417E-01 | 9.208E-01 | 9.230E-01 | NOT IDENT. |
| NA-22 | -1.985E-02 | 3.366E-02 | 3.483E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 3.756E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.629E-02 | 2.665E-02 | 2.916E-02 | NOT IDENT. |
| SC-46 | 8.767E-03 | 5.494E-02 | 5.508E-02 | NOT IDENT. |
| V-48 | 7.626E-01 | 1.723E+00 | 1.757E+00 | NOT IDENT. |
| CR-51 | -3.845E-01 | 2.314E+00 | 2.321E+00 | NOT IDENT. |
| MN-54 | -2.820E-02 | 4.679E-02 | 4.849E-02 | NOT IDENT. |
| CO-56 | -2.667E-02 | 7.280E-02 | 7.378E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 2.691E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -8.350E-03 | 2.563E-02 | 2.591E-02 | NOT IDENT. |
| CO-58 | 1.642E-02 | 6.476E-02 | 6.518E-02 | NOT IDENT. |
| FE-59 | 1.005E-01 | 2.420E-01 | 2.462E-01 | NOT IDENT. |
| CO-60 | 6.473E-03 | 2.458E-02 | 2.476E-02 | NOT IDENT. |
| ZN-65 | -8.147E-02 | 8.013E-02 | 8.815E-02 | NOT IDENT. |
| GE-68 | -1.740E-02 | 1.275E+00 | 1.275E+00 | NOT IDENT. |
| AS-73 | 9.695E-01 | 3.210E+00 | 3.239E+00 | NOT IDENT. |
| AS-74 | 6.439E-01 | 1.870E+00 | 1.893E+00 | NOT IDENT. |
| SE-75 | -9.775E-05 | 5.689E-02 | 5.689E-02 | NOT IDENT. |
| BR-77 | 7.613E+10 | 2.505E+11 | 2.529E+11 | SHORT HLIF |
| SR-82 | -6.667E-01 | 1.614E+00 | 1.641E+00 | NOT IDENT. |
| RB-83 | -2.100E-02 | 1.174E-01 | 1.178E-01 | NOT IDENT. |
| KR-85 | 9.315E+00 | 8.370E+00 | 9.364E+00 | NOT IDENT. |
| SR-85 | 1.141E-01 | 1.028E-01 | 1.150E-01 | NOT IDENT. |
| RB-86 | 4.219E+00 | 1.185E+01 | 1.200E+01 | NOT IDENT. |
| Y-88 | -4.960E-02 | 6.898E-02 | 7.251E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 2.194E+01 | 4.219E+01 | 4.333E+01 | NOT IDENT. |
| NB-94 | -5.813E-03 | 2.683E-02 | 2.695E-02 | NOT IDENT. |
| NB-95 | -2.375E-02 | 7.491E-02 | 7.567E-02 | NOT IDENT. |
| NB-95M | 5.297E-02 | 2.290E-01 | 2.302E-01 | NOT IDENT. |
| ZR-95 | 6.386E-02 | 1.131E-01 | 1.167E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 3.826E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 2.384E+40 | 3.048E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -1.029E+09 | 5.856E+09 | 5.874E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.597E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.079E-02 | 2.205E-02 | 2.258E-02 | NOT IDENT. |
| RH-102 | 1.040E-03 | 4.867E-02 | 4.868E-02 | NOT IDENT. |
| RU-103 | -4.341E-02 | 1.286E-01 | 1.301E-01 | FAIL ABUN |
| RH-106 | 3.768E-02 | 2.658E-01 | 2.663E-01 | NOT IDENT. |
| RU-106 | 3.768E-02 | 2.658E-01 | 2.663E-01 | NOT IDENT. |
| AG-108M | 1.328E-02 | 2.720E-02 | 2.785E-02 | NOT IDENT. |
| CD-109 | -4.676E-01 | 8.189E-01 | 8.456E-01 | NOT IDENT. |
| AG-110M | 7.224E-03 | 4.842E-02 | 4.853E-02 | NOT IDENT. |
| SN-113 | -7.073E-03 | 5.223E-02 | 5.233E-02 | NOT IDENT. |
| CD-115 | -6.092E+11 | 5.912E+11 | 6.518E+11 | SHORT HLIF |
| SN-117M | 7.690E-01 | 2.571E+00 | 2.594E+00 | NOT IDENT. |
| TE-123M | 1.130E-02 | 3.610E-02 | 3.646E-02 | NOT IDENT. |
| SB-124 | 8.446E-02 | 1.673E-01 | 1.716E-01 | NOT IDENT. |
| SB-125 | -8.141E-03 | 7.773E-02 | 7.781E-02 | NOT IDENT. |
| TE-125M | 5.979E+00 | 1.768E+01 | 1.788E+01 | NOT IDENT. |
| I-126 | -4.545E+00 | 1.261E+01 | 1.278E+01 | NOT IDENT. |
| SB-126 | -1.340E-01 | 9.883E+00 | 9.883E+00 | NOT IDENT. |
| SN-126 | -2.061E-02 | 6.882E-02 | 6.944E-02 | NOT IDENT. |
| SB-127 | -1.471E+06 | 1.560E+06 | 1.695E+06 | SHORT HLIF |
| I-131 | -2.297E+01 | 7.502E+01 | 7.573E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 1.631E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.601E+06 | 2.033E+07 | 2.040E+07 | SHORT HLIF |
| BA-133 | -1.378E-02 | 4.907E-02 | 4.946E-02 | NOT IDENT. |
| I-133 | 1.476E+30 | 2.902E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.114E-02 | 3.132E-02 | 3.432E-02 | NOT IDENT. |
| CS-135 | 5.064E-02 | 1.167E-01 | 1.189E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.240E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.661E+00 | 6.215E+00 | 6.561E+00 | NOT IDENT. |
| BA-137M | 1.084E-02 | 3.010E-02 | 3.050E-02 | NOT IDENT. |
| CS-137 | 1.145E-02 | 3.180E-02 | 3.222E-02 | NOT IDENT. |
| CE-139 | -3.834E-02 | 3.749E-02 | 4.128E-02 | NOT IDENT. |
| BA-140 | -2.366E+00 | 5.731E+00 | 5.829E+00 | NOT IDENT. |
| LA-140 | -2.366E+00 | 5.731E+00 | 5.829E+00 | NOT IDENT. |
| CE-141 | -2.953E-02 | 2.615E-01 | 2.618E-01 | NOT IDENT. |
| CE-143 | 4.134E+19 | 2.908E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.499E-01 | 1.989E-01 | 2.101E-01 | NOT IDENT. |
| PM-144 | 2.189E-02 | 3.179E-02 | 3.328E-02 | NOT IDENT. |
| PR-144 | 1.708E+00 | 2.481E+00 | 2.597E+00 | NOT IDENT. |
| PM-146 | -4.534E-03 | 3.319E-02 | 3.325E-02 | NOT IDENT. |
| ND-147 | 5.700E+01 | 6.523E+01 | 7.011E+01 | NOT IDENT. |
| PM-147 | -4.286E+01 | 6.452E+02 | 6.454E+02 | NOT IDENT. |
| PM-149 | -7.739E+11 | 5.890E+12 | 5.901E+12 | SHORT HLIF |
| EU-150 | 4.899E-04 | 2.426E-02 | 2.427E-02 | NOT IDENT. |
| EU-152 | -2.540E-02 | 8.579E-02 | 8.655E-02 | NOT IDENT. |
| GD-153 | -7.228E-03 | 8.196E-02 | 8.202E-02 | NOT IDENT. |
| EU-154 | -3.690E-02 | 8.798E-02 | 8.954E-02 | NOT IDENT. |
| EU-155 | -6.982E-02 | 8.328E-02 | 8.903E-02 | NOT IDENT. |
| TB-160 | -1.240E-01 | 2.306E-01 | 2.373E-01 | FAIL ABUN |
| HO-166M | 3.570E-02 | 4.766E-02 | 5.031E-02 | NOT IDENT. |
| TM-171 | 1.149E+01 | 3.945E+01 | 3.979E+01 | NOT IDENT. |
| LU-176 | -5.789E-03 | 2.267E-02 | 2.282E-02 | NOT IDENT. |
| HF-181 | 1.948E-01 | 3.170E-01 | 3.290E-01 | FAIL ABUN |
| TA-182 | 9.519E-02 | 1.806E-01 | 1.856E-01 | NOT IDENT. |
| RE-183 | -1.394E-02 | 6.101E-01 | 6.102E-01 | NOT IDENT. |
| RE-184 | -6.540E-02 | 3.886E-01 | 3.897E-01 | NOT IDENT. |
| IR-192 | 9.550E-03 | 6.660E-02 | 6.674E-02 | FAIL ABUN |
| HG-203 | -3.238E-02 | 8.188E-02 | 8.317E-02 | NOT IDENT. |
| BI-207 | -7.566E-03 | 3.685E-02 | 3.701E-02 | NOT IDENT. |
| TL-208 | 2.109E-02 | 3.199E-02 | 3.338E-02 | NOT IDENT. |
| BI-211 | -4.693E-02 | 1.883E-01 | 1.894E-01 | NOT IDENT. |
| PB-211 | 2.168E-01 | 5.562E-01 | 5.648E-01 | FAIL ABUN |
| BI-212 | -2.796E-01 | 3.619E-01 | 3.832E-01 | NOT IDENT. |
| PB-212 | 3.560E-02 | 6.453E-02 | 6.650E-02 | FAIL ABUN |
| BI-214 | 7.320E-02 | 9.710E-02 | 1.026E-01 | FAIL ABUN |
| PB-214 | 9.663E-02 | 8.835E-02 | 9.851E-02 | FAIL ABUN |
| RN-219 | -1.949E-01 | 3.174E-01 | 3.294E-01 | NOT IDENT. |
| RN-222 | 7.320E-02 | 9.710E-02 | 1.026E-01 | FAIL ABUN |
| RA-223 | -3.116E-01 | 5.004E-01 | 5.197E-01 | NOT IDENT. |
| RA-224 | -1.749E-01 | 6.213E-01 | 6.263E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 7.320E-02 | 9.710E-02 | 1.026E-01 | FAIL ABUN |
| AC-227 | -1.274E-01 | 1.918E-01 | 2.002E-01 | NOT IDENT. |
| TH-227 | -1.274E-01 | 1.918E-01 | 2.002E-01 | NOT IDENT. |
| AC-228 | 6.680E-02 | 1.286E-01 | 1.321E-01 | NOT IDENT. |
| RA-228 | 6.680E-02 | 1.286E-01 | 1.321E-01 | NOT IDENT. |
| TH-228 | 3.560E-02 | 6.453E-02 | 6.650E-02 | FAIL ABUN |
| TH-229 | -4.857E-01 | 3.898E-01 | 4.471E-01 | NOT IDENT. |
| TH-230 | 7.319E-02 | 9.709E-02 | 1.025E-01 | FAIL ABUN |
| PA-231 | -2.813E-01 | 1.107E+00 | 1.114E+00 | NOT IDENT. |
| TH-231 | -3.116E-01 | 5.004E-01 | 5.197E-01 | NOT IDENT. |
| TH-232 | 6.680E-02 | 1.286E-01 | 1.321E-01 | NOT IDENT. |
| PA-233 | 4.936E-02 | 5.787E-02 | 6.200E-02 | NOT IDENT. |
| PA-234 | 2.064E-01 | 3.320E-01 | 3.448E-01 | NOT IDENT. |
| PA-234M | 6.867E-01 | 3.044E+00 | 3.059E+00 | NOT IDENT. |
| TH-234 | -9.133E-01 | 1.515E+00 | 1.570E+00 | NOT IDENT. |
| U-234 | 7.319E-02 | 9.709E-02 | 1.025E-01 | FAIL ABUN |
| U-235 | 7.562E-02 | 1.511E-01 | 1.549E-01 | FAIL ABUN |
| NP-237 | 4.936E-02 | 5.787E-02 | 6.200E-02 | NOT IDENT. |
| NP-238 | 4.578E+11 | 3.888E+12 | 3.893E+12 | SHORT HLIF |
| U-238 | -9.133E-01 | 1.515E+00 | 1.570E+00 | NOT IDENT. |
| NP-239 | 8.654E-02 | 3.248E-01 | 3.272E-01 | NOT IDENT. |
| PU-239 | -9.241E+01 | 2.327E+02 | 2.364E+02 | NOT IDENT. |
| AM-241 | 2.094E-01 | 2.131E-01 | 2.331E-01 | NOT IDENT. |
| AM-243 | -4.961E-02 | 5.076E-02 | 5.547E-02 | NOT IDENT. |
| CM-243 | -1.248E-02 | 7.364E-02 | 7.386E-02 | NOT IDENT. |
| CM-247 | -1.748E-02 | 2.927E-02 | 3.032E-02 | NOT IDENT. |
| CF-249 | -1.379E-02 | 3.049E-02 | 3.112E-02 | NOT IDENT. |
| CF-251 | 3.352E-02 | 1.131E-01 | 1.141E-01 | FAIL ABUN |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 13.4080 | 94.67 | 30.8931 | 193.51 | 29.4740 |
| 45.60 | 24.2716 | 94.87 | 36.8848 | 197.03 | 20.4794 |
| 46.54 | 27.0365 | 97.43 | 23.0268 | 198.01 | 23.9168 |
| 49.72 | 0.0000 | 98.43 | 21.0593 | 201.83 | 25.1531 |
| 51.35 | 27.3747 | 98.44 | 21.0596 | 205.31 | 27.5356 |
| 52.39 | 18.2972 | 99.53 | 22.1019 | 210.85 | 24.2259 |
| 53.44 | 17.4273 | 100.11 | 25.1396 | 215.65 | 15.0670 |
| 57.36 | 0.0000 | 103.18 | 21.2221 | 222.11 | 19.2416 |
| 57.53 | 21.3033 | 103.37 | 19.2068 | 227.09 | 18.2771 |
| 57.98 | 19.4712 | 105.21 | 28.3875 | 227.38 | 22.5010 |
| 59.32 | 16.7412 | 105.31 | 28.3919 | 228.16 | 0.0000 |
| 59.54 | 15.8191 | 106.12 | 19.2905 | 228.18 | 22.5176 |
| 63.29 | 20.6443 | 109.28 | 17.3447 | 117.23 | 22.5176 |
| 63.58 | 17.8405 | 111.00 | 23.5283 | 235.69 | 19.8387 |
| 64.28 | 19.7486 | 111.76 | 0.0000 | 235.96 | 19.8435 |
| 66.73 | 20.7982 | 116.30 | 0.0000 | 238.63 | 26.6400 |
| 67.24 | 25.5527 | 117.23 | 24.7806 | 238.98 | 0.0000 |
| 67.75 | 26.5274 | 121.12 | 28.0360 | 240.99 | 31.3237 |
| 69.67 | 22.8291 | 121.22 | 28.0400 | 242.00 | 24.2265 |
| 70.83 | 29.5578 | 121.78 | 23.9051 | 244.70 | 24.9986 |
| 72.81 | 24.8900 | 122.06 | 30.1532 | 252.40 | 0.0000 |
| 72.87 | 24.8930 | 123.07 | 23.9490 | 252.80 | 13.4867 |
| 74.66 | 28.8252 | 127.23 | 21.9944 | 254.15 | 0.0000 |
| 74.82 | 29.7954 | 129.30 | 23.1076 | 256.23 | 23.4459 |
| 74.97 | 28.8428 | 131.20 | 14.7431 | 260.90 | 0.0000 |
| 77.11 | 25.1017 | 133.02 | 36.9486 | 264.66 | 20.8883 |
| 79.69 | 22.3152 | 133.52 | 34.8607 | 268.22 | 16.3954 |
| 80.12 | 23.3043 | 136.00 | 25.4373 | 269.46 | 14.5886 |
| 80.19 | 0.0000 | 136.47 | 27.5742 | 271.23 | 18.2623 |
| 80.57 | 25.2678 | 140.51 | 0.0000 | 273.65 | 16.4685 |
| 81.00 | 26.2608 | 143.76 | 22.4836 | 276.40 | 9.1696 |
| 81.07 | 26.2642 | 144.24 | 24.6399 | 277.37 | 14.6829 |
| 83.79 | 26.3969 | 145.44 | 26.8234 | 277.60 | 16.5212 |
| 85.43 | 26.4757 | 152.43 | 22.7289 | 278.00 | 18.3627 |
| 86.55 | 29.4769 | 153.25 | 26.0020 | 279.20 | 15.6234 |
| 86.79 | 29.4894 | 323.87 | 31.4559 | 279.54 | 15.6278 |
| 86.94 | 34.4138 | 156.02 | 31.5249 | 280.46 | 11.9594 |
| 87.09 | 34.4229 | 158.56 | 25.0788 | 283.69 | 19.3687 |
| 87.57 | 30.5150 | 159.00 | 25.0919 | 284.31 | 0.0000 |
| 88.03 | 35.4657 | 162.33 | 23.0006 | 285.41 | 16.8881 |
| 88.34 | 33.5139 | 163.33 | 23.0275 | 285.90 | 0.0000 |
| 88.47 | 31.5496 | 165.86 | 32.9935 | 287.50 | 17.7615 |
| 89.96 | 36.5751 | 176.31 | 34.4991 | 290.67 | 16.3219 |
| 91.11 | 34.6673 | 176.60 | 38.9634 | 293.27 | 0.0000 |
| 92.59 | 28.7978 | 177.52 | 28.9736 | 351.93 | 3.7226 |
| 93.35 | 29.8296 | 181.07 | 0.0000 | 295.96 | 13.4090 |
| 94.56 | 30.8873 | 184.41 | 21.8939 | 879.38 | 13.4358 |
| 94.65 | 30.8920 | 143.76 | 24.7357 | 299.98 | 13.4501 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 13.4512 | 487.02 | 10.0876 | 702.65 | 8.3516 |
| 300.13 | 13.4517 | 492.35 | 0.0000 | 706.68 | 13.9417 |
| 301.36 | 13.4642 | 497.08 | 11.6202 | 711.68 | 5.5878 |
| 302.85 | 16.4748 | 505.52 | 5.0928 | 720.70 | 8.4116 |
| 256.23 | 10.4971 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 18.7769 | 511.00 | 10.6400 | 722.78 | 4.6769 |
| 308.46 | 26.3205 | 514.00 | 13.6399 | 722.91 | 4.6771 |
| 311.90 | 16.0210 | 514.00 | 13.6399 | 723.31 | 7.4846 |
| 316.51 | 20.8036 | 520.40 | 12.8291 | 724.19 | 8.4230 |
| 319.41 | 23.6904 | 520.69 | 0.0000 | 727.33 | 10.3074 |
| 320.08 | 19.9096 | 522.65 | 0.0000 | 733.00 | 5.6345 |
| 321.04 | 13.2822 | 527.90 | 0.0000 | 735.93 | 9.4016 |
| 323.87 | 19.9640 | 529.59 | 8.5920 | 333.97 | 8.4665 |
| 325.23 | 17.1288 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 17.1719 | 531.02 | 3.2243 | 747.24 | 9.4424 |
| 333.37 | 22.0135 | 546.56 | 0.0000 | 748.06 | 11.3344 |
| 333.97 | 21.0654 | 552.55 | 11.9477 | 752.31 | 4.7303 |
| 334.37 | 18.1981 | 563.25 | 7.6422 | 753.82 | 6.6262 |
| 338.28 | 14.4061 | 569.33 | 8.7588 | 756.73 | 3.7906 |
| 338.32 | 15.3669 | 946.00 | 8.7595 | 756.80 | 4.7384 |
| 311.90 | 19.2377 | 569.70 | 10.9506 | 884.68 | 5.7013 |
| 340.48 | 19.2377 | 583.19 | 6.6118 | 765.81 | 9.5088 |
| 340.55 | 19.2386 | 584.27 | 6.6151 | 766.42 | 11.4132 |
| 344.28 | 18.3236 | 595.83 | 9.9753 | 766.84 | 12.3662 |
| 345.93 | 18.0227 | 427.87 | 13.3290 | 772.60 | 0.0000 |
| 351.06 | 17.4397 | 602.52 | 0.0000 | 776.52 | 4.7734 |
| 351.93 | 17.4499 | 602.73 | 11.4358 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 10.6831 | 778.90 | 4.7776 |
| 356.01 | 26.4413 | 609.32 | 8.9209 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 5.3550 | 785.37 | 3.8312 |
| 366.42 | 0.0000 | 614.28 | 8.9407 | 792.07 | 10.5615 |
| 375.05 | 11.8123 | 618.01 | 6.7167 | 794.95 | 1.9223 |
| 356.01 | 13.8588 | 620.36 | 5.6030 | 795.86 | 2.8844 |
| 388.16 | 14.8890 | 621.93 | 6.7282 | 810.29 | 4.8324 |
| 388.63 | 10.9220 | 630.19 | 0.0000 | 344.28 | 4.8326 |
| 391.69 | 11.9376 | 631.29 | 10.8094 | 810.76 | 5.7998 |
| 264.66 | 16.0054 | 633.25 | 10.8185 | 815.77 | 8.7152 |
| 401.81 | 16.0168 | 634.78 | 13.5319 | 1048.07 | 3.8772 |
| 402.40 | 16.0225 | 635.95 | 9.9285 | 832.01 | 3.2464 |
| 404.85 | 11.0321 | 636.99 | 0.0000 | 834.85 | 12.9987 |
| 410.95 | 16.1060 | 645.85 | 5.4387 | 835.71 | 8.3588 |
| 413.71 | 12.0996 | 657.76 | 11.8435 | 836.80 | 0.0000 |
| 414.70 | 6.0534 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 14.2284 | 661.66 | 9.1252 | 846.77 | 10.7682 |
| 427.87 | 13.2182 | 664.57 | 0.0000 | 856.80 | 6.8763 |
| 433.94 | 13.2648 | 666.33 | 10.9717 | 860.56 | 2.9507 |
| 439.40 | 20.4718 | 666.50 | 10.9723 | 871.09 | 7.8969 |
| 453.88 | 11.3521 | 667.71 | 0.0000 | 873.19 | 3.9512 |
| 463.37 | 10.3746 | 677.62 | 9.1858 | 875.33 | 0.0000 |
| 468.07 | 10.4013 | 685.70 | 0.0000 | 879.38 | 8.9088 |
| 473.00 | 0.0000 | 695.00 | 5.5507 | 880.51 | 8.9121 |
| 475.06 | 15.0350 | 696.49 | 6.4796 | 883.24 | 1.9823 |
| 476.78 | 18.3930 | 696.51 | 6.4798 | 884.68 | 5.9496 |
| 477.60 | 16.7285 | 697.00 | 7.4068 | 889.28 | 4.9657 |
| 482.18 | 16.7695 | 697.49 | 10.1865 | 894.76 | 7.9596 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 2.9881 | 1298.22 | 0.0000 | | |
| 903.28 | 4.9886 | 1312.11 | 3.7301 | | |
| 911.20 | 7.0022 | 1332.49 | 1.8743 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 2.0105 | 1365.19 | 0.9445 | | |
| 937.49 | 2.0176 | 1368.63 | 0.0000 | | |
| 944.13 | 10.1096 | 1384.29 | 3.7946 | | |
| 946.00 | 3.0346 | 1408.01 | 4.7693 | | |
| 949.00 | 8.1000 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 1.9306 | | |
| 962.31 | 9.1507 | 1489.16 | 5.8281 | | |
| 964.08 | 7.1212 | 1505.03 | 1.9494 | | |
| 966.17 | 8.1438 | 1596.21 | 3.9748 | | |
| 968.97 | 8.1508 | 1620.50 | 0.0000 | | |
| 983.53 | 4.0938 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.0129 | | |
| 1274.44 | 5.1371 | 1750.46 | 0.0000 | | |
| 1001.03 | 3.0867 | 1764.49 | 2.0547 | | |
| 1004.73 | 4.1202 | 1063.66 | 9.2563 | | |
| 507.63 | 0.0000 | 1771.35 | 9.2582 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.1078 | | |
| 1037.84 | 5.2012 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.2059 | | |
| 631.29 | 6.2575 | | | | |
| 1048.07 | 4.1734 | | | | |
| 1049.04 | 7.3056 | | | | |
| 1050.41 | 6.2643 | | | | |
| 1063.66 | 5.2402 | | | | |
| 1077.00 | 4.2084 | | | | |
| 1077.34 | 6.3132 | | | | |
| 1085.87 | 5.2737 | | | | |
| 1099.45 | 4.2352 | | | | |
| 1112.07 | 2.1250 | | | | |
| 1112.84 | 2.1255 | | | | |
| 1115.54 | 8.5082 | | | | |
| 1120.29 | 2.1299 | | | | |
| 1120.55 | 2.1300 | | | | |
| 1221.41 | 3.1957 | | | | |
| 1129.67 | 3.2030 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.4016 | | | | |
| 1177.95 | 2.1633 | | | | |
| 1189.05 | 2.1696 | | | | |
| 1204.77 | 4.3572 | | | | |
| 1221.41 | 2.1880 | | | | |
| 1231.02 | 3.2900 | | | | |
| 1235.36 | 9.8811 | | | | |
| 1238.28 | 3.2962 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.6935 | | | | |
| 1274.44 | 5.5437 | | | | |
| 1274.54 | 6.4679 | | | | |
| 1291.59 | 1.8558 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:25:17.62

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146005.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM12.CNF;298
                                        Background date  : 9-FEB-2014 11:21:22.
Sample date      : 7-NOV-2013 09:53:00. Acquisition date : 10-FEB-2014 13:23:27
Sample ID        : G341146005           Sample quantity  : 1.60130E+02 GRAM
Detector name    : GAM12                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.25  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 52.23 | 18 | 27 | 2.24 | 104.22 | 99 | 9 | 4.99E-03 | 57.2 | 0.00E+00 |
| 2 | 0 | 66.58 | 17 | 25 | 0.76 | 132.90 | 130 | 8 | 4.62E-03 | 58.3 | |
| 3 | 0 | 92.86* | 2 | 45 | 1.31 | 185.46 | 180 | 13 | 4.90E-04 | 923.7 | |
| 4 | 0 | 162.03 | 4 | 25 | 0.56 | 323.74 | 319 | 7 | 1.14E-03 | 211.0 | |
| 5 | 1 | 163.69 | 18 | 7 | 1.37 | 327.07 | 325 | 24 | 4.90E-03 | 30.5 | 2.29E+00 |
| 6 | 1 | 166.16 | 17 | 16 | 1.39 | 332.00 | 325 | 24 | 4.81E-03 | 47.2 | |
| 7 | 1 | 170.16 | 16 | 21 | 1.40 | 340.00 | 325 | 24 | 4.41E-03 | 52.7 | |
| 8 | 0 | 238.90* | 27 | 30 | 1.57 | 477.44 | 471 | 11 | 7.43E-03 | 47.3 | |
| 9 | 0 | 338.76* | 6 | 11 | 0.84 | 677.12 | 674 | 6 | 1.64E-03 | 114.9 | |
| 10 | 0 | 353.16 | 25 | 41 | 0.78 | 705.92 | 700 | 16 | 6.96E-03 | 60.0 | |
| 11 | 0 | 407.93 | 11 | 13 | 2.28 | 815.44 | 810 | 9 | 3.09E-03 | 66.3 | |
| 12 | 0 | 426.29 | 11 | 17 | 1.21 | 852.16 | 846 | 13 | 3.12E-03 | 80.2 | |
| 13 | 0 | 458.48 | 8 | 9 | 0.80 | 916.54 | 912 | 8 | 2.29E-03 | 73.9 | |
| 14 | 0 | 510.73* | 5 | 10 | 2.13 | 1021.04 | 1014 | 17 | 1.50E-03 | 215.5 | |
| 15 | 0 | 546.94 | 12 | 8 | 1.48 | 1093.44 | 1086 | 11 | 3.35E-03 | 54.2 | |
| 16 | 0 | 558.17* | 9 | 6 | 0.62 | 1115.90 | 1109 | 11 | 2.57E-03 | 64.9 | |
| 17 | 0 | 917.09 | 9 | 6 | 3.36 | 1833.83 | 1826 | 11 | 2.36E-03 | 63.5 | |
| 18 | 0 | 1213.29 | 6 | 5 | 1.44 | 2426.44 | 2420 | 9 | 1.79E-03 | 71.2 | |
| 19 | 0 | 1460.31* | 20 | 0 | 2.46 | 2920.75 | 2916 | 10 | 5.67E-03 | 24.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:25:19

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146005.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 09:53:00 | Acquisition date | : 10-FEB-2014 13:23:27 |
| Sample ID | : G341146005 | Sample quantity | : 160.13 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA12 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.25 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 20 | 10.66* | 1.123E+00 | 7.998E-01 | 7.998E-01 | 49.72 |
| AS-73 | 53.44 | 18 | 10.30* | 6.156E-01 | 1.329E+00 | 3.022E+00 | 114.40 |
| CE-139 | 165.86 | 17 | 80.00* | 5.271E+00 | 1.927E-02 | 3.112E-02 | 94.45 |
| TM-171 | 51.35 | 18 | 0.27 | 6.156E-01 | 5.071E+01 | 5.571E+01 | 114.40 |
| | 52.39 | 18 | 0.47* | 6.156E-01 | 2.913E+01 | 3.200E+01 | 114.40 |
| | 66.73 | 17 | 0.14 | 1.855E+00 | 3.003E+01 | 3.299E+01 | 116.59 |
| ANH-511 | 511.00 | 5 | 100.00* | 2.551E+00 | 9.930E-03 | 9.930E-03 | 431.00 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:25:20.40

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146005.CNF;1    *
* Acquisition date : 10-FEB-2014 13:23:27 Sensitivity     : 3.000          *
* Detector ID      : GAM12                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 09:53:00 Nuclide Library : SOLID          *
* Sample ID        : G341146005           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.6013E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 07:07:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM12_500MLMB.CNF;10      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 7.998E-01 | 3.897E-01 | 3.620E-01 |
| AS-73 | 3.022E+00 | 3.389E+00 | 5.122E+00 |
| CE-139 | 3.112E-02 | 2.881E-02 | 4.804E-02 |
| TM-171 | 3.200E+01 | 3.588E+01 | 6.053E+01 |
| ANH-511 | 9.930E-03 | 4.194E-02 | 3.649E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.286E-01 | 6.029E-01 | 1.273E+00 | NOT IDENT. |
| NA-22 | -1.862E-02 | 2.514E-02 | 4.292E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -7.304E-03 | 2.610E-02 | 5.209E-02 | NOT IDENT. |
| SC-46 | 6.225E-02 | 4.915E-02 | 1.206E-01 | NOT IDENT. |
| V-48 | 1.998E-01 | 1.515E+00 | 3.077E+00 | NOT IDENT. |
| CR-51 | 1.321E+00 | 2.082E+00 | 4.224E+00 | NOT IDENT. |
| MN-54 | -2.464E-02 | 2.598E-02 | 3.970E-02 | NOT IDENT. |
| CO-56 | 3.294E-03 | 5.234E-02 | 1.049E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.467E-03 | 1.772E-02 | 3.288E-02 | NOT IDENT. |
| CO-58 | 4.829E-03 | 5.493E-02 | 1.108E-01 | NOT IDENT. |
| FE-59 | 4.587E-02 | 2.129E-01 | 4.495E-01 | NOT IDENT. |
| CO-60 | -1.483E-02 | 2.870E-02 | 5.236E-02 | NOT IDENT. |
| ZN-65 | -1.985E-02 | 7.073E-02 | 1.365E-01 | NOT IDENT. |
| GE-68 | 7.028E-01 | 9.536E-01 | 2.244E+00 | NOT IDENT. |
| AS-74 | 6.661E-01 | 1.495E+00 | 3.095E+00 | NOT IDENT. |
| SE-75 | -4.348E-02 | 4.735E-02 | 7.500E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.292E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.899E+00 | 2.488E+00 | 4.124E+00 | NOT IDENT. |
| RB-83 | -1.664E-03 | 8.684E-02 | 1.703E-01 | NOT IDENT. |
| KR-85 | 4.955E+00 | 5.713E+00 | 1.111E+01 | NOT IDENT. |
| SR-85 | 6.074E-02 | 7.020E-02 | 1.365E-01 | NOT IDENT. |
| RB-86 | 8.121E+00 | 9.262E+00 | 2.246E+01 | NOT IDENT. |
| Y-88 | 1.866E-02 | 3.771E-02 | 1.025E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | -1.552E+01 | 2.402E+01 | 3.912E+01 | NOT IDENT. |
| NB-94 | -1.138E-02 | 2.339E-02 | 4.141E-02 | NOT IDENT. |
| NB-95 | 8.358E-04 | 5.284E-02 | 1.070E-01 | NOT IDENT. |
| NB-95M | 2.012E-02 | 1.997E-01 | 3.241E-01 | NOT IDENT. |
| ZR-95 | -4.089E-02 | 1.374E-01 | 2.499E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.315E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.640E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.263E-02 | 2.233E-02 | 3.838E-02 | NOT IDENT. |
| RH-102 | 1.530E-02 | 4.022E-02 | 8.309E-02 | NOT IDENT. |
| RU-103 | -5.500E-02 | 1.158E-01 | 2.081E-01 | NOT IDENT. |
| RH-106 | -2.582E-01 | 2.556E-01 | 4.041E-01 | NOT IDENT. |
| RU-106 | -2.582E-01 | 2.556E-01 | 4.041E-01 | NOT IDENT. |
| AG-108M | 1.950E-03 | 2.229E-02 | 4.234E-02 | NOT IDENT. |
| CD-109 | -7.065E-01 | 8.983E-01 | 1.289E+00 | NOT IDENT. |
| AG-110M | -2.436E-02 | 4.285E-02 | 7.384E-02 | NOT IDENT. |
| SN-113 | 1.694E-03 | 4.369E-02 | 8.625E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 4.973E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 9.288E-01 | 2.438E+00 | 4.119E+00 | NOT IDENT. |
| TE-123M | 1.401E-02 | 3.508E-02 | 5.919E-02 | NOT IDENT. |
| SB-124 | -1.235E-01 | 1.874E-01 | 3.207E-01 | NOT IDENT. |
| SB-125 | 1.533E-02 | 8.721E-02 | 1.491E-01 | NOT IDENT. |
| TE-125M | -1.459E+01 | 1.952E+01 | 3.200E+01 | NOT IDENT. |
| I-126 | -1.850E-01 | 8.807E+00 | 1.767E+01 | NOT IDENT. |
| SB-126 | -1.582E+00 | 8.710E+00 | 1.644E+01 | NOT IDENT. |
| SN-126 | -7.620E-02 | 8.292E-02 | 1.169E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.279E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.025E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.556E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.226E-02 | 3.616E-02 | 6.607E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.652E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.845E-03 | 2.206E-02 | 4.727E-02 | NOT IDENT. |
| CS-135 | 4.417E-02 | 1.043E-01 | 2.002E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.354E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.199E-01 | 5.255E+00 | 1.078E+01 | NOT IDENT. |
| BA-137M | -5.340E-03 | 2.198E-02 | 4.148E-02 | NOT IDENT. |
| CS-137 | -5.642E-03 | 2.322E-02 | 4.382E-02 | NOT IDENT. |
| BA-140 | -6.222E-01 | 5.003E+00 | 1.029E+01 | NOT IDENT. |
| LA-140 | -6.222E-01 | 5.003E+00 | 1.029E+01 | NOT IDENT. |
| CE-141 | 1.574E-01 | 2.505E-01 | 4.816E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.561E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -4.197E-02 | 1.771E-01 | 3.146E-01 | NOT IDENT. |
| PM-144 | 1.957E-02 | 2.765E-02 | 5.974E-02 | NOT IDENT. |
| PR-144 | 1.527E+00 | 2.158E+00 | 4.662E+00 | NOT IDENT. |
| PM-146 | -1.636E-02 | 3.608E-02 | 5.471E-02 | NOT IDENT. |
| ND-147 | -5.012E+01 | 6.307E+01 | 1.064E+02 | NOT IDENT. |
| PM-147 | 2.520E+01 | 4.372E+02 | 8.289E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 4.600E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.254E-02 | 1.891E-02 | 3.589E-02 | NOT IDENT. |
| EU-152 | -2.258E-02 | 6.708E-02 | 1.204E-01 | NOT IDENT. |
| GD-153 | 1.419E-02 | 8.790E-02 | 1.462E-01 | NOT IDENT. |
| EU-154 | -5.065E-02 | 6.840E-02 | 1.168E-01 | NOT IDENT. |
| EU-155 | 5.008E-02 | 7.629E-02 | 1.510E-01 | NOT IDENT. |
| TB-160 | -9.127E-02 | 1.901E-01 | 3.359E-01 | NOT IDENT. |
| HO-166M | -1.626E-02 | 3.920E-02 | 7.089E-02 | NOT IDENT. |
| LU-176 | 1.709E-02 | 1.636E-02 | 3.573E-02 | NOT IDENT. |
| HF-181 | -9.806E-02 | 1.006E-01 | 1.633E-01 | NOT IDENT. |
| TA-182 | -1.076E-01 | 1.614E-01 | 2.840E-01 | FAIL ABUN |
| RE-183 | 4.700E-02 | 5.879E-01 | 1.096E+00 | FAIL ABUN |
| RE-184 | -6.862E-02 | 3.509E-01 | 6.748E-01 | NOT IDENT. |
| W-188 | 6.861E-01 | 9.768E+00 | 1.822E+01 | NOT IDENT. |
| IR-192 | 1.545E-03 | 5.119E-02 | 9.868E-02 | NOT IDENT. |
| HG-203 | -2.267E-02 | 8.081E-02 | 1.421E-01 | NOT IDENT. |
| BI-207 | 1.562E-02 | 3.391E-02 | 7.546E-02 | NOT IDENT. |
| TL-208 | 1.362E-04 | 2.959E-02 | 5.668E-02 | NOT IDENT. |
| PB-210 | -2.393E+00 | 7.435E+00 | 1.185E+01 | NOT IDENT. |
| BI-211 | 1.729E-01 | 1.863E-01 | 3.514E-01 | NOT IDENT. |
| PB-211 | -4.376E-02 | 5.494E-01 | 9.109E-01 | FAIL ABUN |
| BI-212 | 2.528E-01 | 3.423E-01 | 7.482E-01 | NOT IDENT. |
| PB-212 | 6.518E-02 | 6.047E-02 | 9.656E-02 | FAIL ABUN |
| BI-214 | 3.606E-02 | 6.424E-02 | 1.302E-01 | NOT IDENT. |
| PB-214 | 9.843E-02 | 1.158E-01 | 1.281E-01 | FAIL ABUN |
| RN-219 | 1.717E-02 | 2.766E-01 | 4.798E-01 | NOT IDENT. |
| RN-222 | 3.606E-02 | 6.424E-02 | 1.302E-01 | NOT IDENT. |
| RA-223 | 2.064E-02 | 4.749E-01 | 9.094E-01 | FAIL ABUN |
| RA-224 | 4.913E-01 | 4.993E-01 | 8.995E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 3.606E-02 | 6.424E-02 | 1.302E-01 | NOT IDENT. |
| AC-227 | 9.704E-02 | 1.865E-01 | 3.574E-01 | NOT IDENT. |
| TH-227 | 9.704E-02 | 1.865E-01 | 3.574E-01 | NOT IDENT. |
| AC-228 | 4.024E-02 | 1.150E-01 | 2.135E-01 | FAIL ABUN |
| RA-228 | 4.024E-02 | 1.150E-01 | 2.135E-01 | FAIL ABUN |
| TH-228 | 6.518E-02 | 6.047E-02 | 9.656E-02 | FAIL ABUN |
| TH-229 | -1.098E-01 | 3.266E-01 | 5.725E-01 | NOT IDENT. |
| TH-230 | 3.605E-02 | 6.423E-02 | 1.302E-01 | NOT IDENT. |
| PA-231 | 9.970E-01 | 9.211E-01 | 1.939E+00 | NOT IDENT. |
| TH-231 | 2.064E-02 | 4.749E-01 | 9.094E-01 | FAIL ABUN |
| TH-232 | 4.024E-02 | 1.150E-01 | 2.135E-01 | FAIL ABUN |
| PA-233 | -2.242E-02 | 4.001E-02 | 7.203E-02 | NOT IDENT. |
| PA-234 | -1.316E-01 | 2.218E-01 | 3.773E-01 | NOT IDENT. |
| PA-234M | 1.124E+00 | 3.142E+00 | 7.127E+00 | NOT IDENT. |
| TH-234 | 5.443E-01 | 1.751E+00 | 3.066E+00 | FAIL ABUN |
| U-234 | 3.605E-02 | 6.423E-02 | 1.302E-01 | NOT IDENT. |
| U-235 | -3.433E-02 | 1.620E-01 | 2.820E-01 | FAIL ABUN |
| NP-237 | -2.242E-02 | 4.001E-02 | 7.203E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.385E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.443E-01 | 1.751E+00 | 3.066E+00 | FAIL ABUN |
| NP-239 | -2.287E-02 | 2.582E-01 | 4.741E-01 | NOT IDENT. |
| PU-239 | 2.133E+02 | 2.301E+02 | 4.621E+02 | NOT IDENT. |
| AM-241 | -2.182E-01 | 2.085E-01 | 3.455E-01 | NOT IDENT. |
| AM-243 | 4.285E-02 | 5.148E-02 | 1.008E-01 | NOT IDENT. |
| CM-243 | 4.324E-02 | 7.853E-02 | 1.531E-01 | NOT IDENT. |
| CM-247 | 1.637E-03 | 2.674E-02 | 4.604E-02 | NOT IDENT. |
| CF-249 | -7.513E-03 | 2.546E-02 | 4.753E-02 | NOT IDENT. |
| CF-251 | 2.598E-02 | 9.169E-02 | 1.606E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:25:15.88

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 35.70 | 16 | 3 | 1.36 | 71.17 | 68 | 12 | 4.55E-03 | 36.0 | 2.12E+00 |
| 2 | 1 | 37.24 | 16 | 12 | 1.36 | 74.25 | 68 | 12 | 4.43E-03 | 53.5 | |
| 3 | 0 | 52.23 | 18 | 27 | 2.24 | 104.22 | 99 | 9 | 4.99E-03 | 57.2 | |
| 4 | 0 | 66.58 | 17 | 25 | 0.76 | 132.90 | 130 | 8 | 4.62E-03 | 58.3 | |
| 5 | 0 | 92.86 | 55 | 45 | 1.31 | 185.46 | 180 | 13 | 1.54E-02 | 28.4 | |
| 6 | 0 | 162.03 | 4 | 25 | 0.56 | 323.74 | 319 | 7 | 1.14E-03 | 211.0 | |
| 7 | 1 | 163.69 | 18 | 7 | 1.37 | 327.07 | 325 | 24 | 4.90E-03 | 30.5 | 2.29E+00 |
| 8 | 1 | 166.16 | 17 | 16 | 1.39 | 332.00 | 325 | 24 | 4.81E-03 | 47.2 | |
| 9 | 1 | 170.16 | 16 | 21 | 1.40 | 340.00 | 325 | 24 | 4.41E-03 | 52.7 | |
| 10 | 0 | 185.66 | 36 | 22 | 1.13 | 370.99 | 367 | 8 | 1.01E-02 | 27.9 | |
| 11 | 0 | 238.90 | 39 | 30 | 1.57 | 477.44 | 471 | 11 | 1.07E-02 | 31.9 | |
| 12 | 0 | 338.76 | 12 | 11 | 0.84 | 677.12 | 674 | 6 | 3.32E-03 | 53.6 | |
| 13 | 0 | 353.16 | 25 | 41 | 0.78 | 705.92 | 700 | 16 | 6.96E-03 | 60.0 | |
| 14 | 0 | 407.93 | 11 | 13 | 2.28 | 815.44 | 810 | 9 | 3.09E-03 | 66.3 | |
| 15 | 0 | 426.29 | 11 | 17 | 1.21 | 852.16 | 846 | 13 | 3.12E-03 | 80.2 | |
| 16 | 0 | 458.48 | 8 | 9 | 0.80 | 916.54 | 912 | 8 | 2.29E-03 | 73.9 | |
| 17 | 0 | 510.73 | 74 | 10 | 2.13 | 1021.04 | 1014 | 17 | 2.06E-02 | 14.7 | |
| 18 | 0 | 546.94 | 12 | 8 | 1.48 | 1093.44 | 1086 | 11 | 3.35E-03 | 54.2 | |
| 19 | 0 | 558.17 | 13 | 6 | 0.62 | 1115.90 | 1109 | 11 | 3.71E-03 | 43.7 | |
| 20 | 0 | 917.09 | 9 | 6 | 3.36 | 1833.83 | 1826 | 11 | 2.36E-03 | 63.5 | |
| 21 | 0 | 1213.29 | 6 | 5 | 1.44 | 2426.44 | 2420 | 9 | 1.79E-03 | 71.2 | |
| 22 | 0 | 1460.31 | 24 | 0 | 2.46 | 2920.75 | 2916 | 10 | 6.67E-03 | 20.4 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:25:18.29

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 20 | 10.66* | 1.123E+00 | 7.998E-01 | 7.998E-01 | 49.72 |
| AS-73 | 53.44 | 18 | 10.30* | 6.156E-01 | 1.329E+00 | 3.022E+00 | 114.40 |
| CE-139 | 165.86 | 17 | 80.00* | 5.271E+00 | 1.927E-02 | 3.112E-02 | 94.45 |
| TM-171 | 51.35 | 18 | 0.27 | 6.156E-01 | 5.071E+01 | 5.571E+01 | 114.40 |
| | 52.39 | 18 | 0.47* | 6.156E-01 | 2.913E+01 | 3.200E+01 | 114.40 |
| | 66.73 | 17 | 0.14 | 1.855E+00 | 3.003E+01 | 3.299E+01 | 116.59 |
| ANH-511 | 511.00 | 5 | 100.00* | 2.551E+00 | 9.930E-03 | 9.930E-03 | 431.00 |

Flag: "*" = Keyline

Sample ID : G341146005 Acquisition date : 10-FEB-2014 13:23:27

Total number of lines in spectrum 19
Number of unidentified lines 6
Number of lines tentatively identified by NID 13 68.42%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 7.998E-01 | 7.998E-01 | 3.976E-01 | 49.72 | |
| AS-73 | 80.30D | 2.27 | 1.329E+00 | 3.022E+00 | 3.458E+00 | 114.40 | |
| CE-139 | 137.64D | 1.61 | 1.927E-02 | 3.112E-02 | 2.940E-02 | 94.45 | |
| TM-171 | 1.92Y | 1.10 | 2.913E+01 | 3.200E+01 | 3.661E+01 | 114.40 | |
| ANH-511 | 1.00E+09Y | 1.00 | 9.930E-03 | 9.930E-03 | 42.80E-03 | 431.00 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 3.129E+01 | 3.587E+01 | | | |

Grand Total Activity : 3.129E+01 3.587E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146005 Acquisition date : 10-FEB-2014 13:23:27

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.86 | 2 | 45 | 1.31 | 185.46 | 180 | 13 | 4.90E-04 | **** | 4.11E+00 | T |
| 0 | 162.03 | 4 | 25 | 0.56 | 323.74 | 319 | 7 | 1.14E-03 | **** | 5.31E+00 | T |
| 1 | 163.69 | 18 | 7 | 1.37 | 327.07 | 325 | 24 | 4.90E-03 | 61.1 | 5.29E+00 | T |
| 1 | 170.16 | 16 | 21 | 1.40 | 340.00 | 325 | 24 | 4.41E-03 | **** | 5.23E+00 | |
| 0 | 238.90 | 27 | 30 | 1.57 | 477.44 | 471 | 11 | 7.43E-03 | 94.7 | 4.41E+00 | T |
| 0 | 338.76 | 6 | 11 | 0.84 | 677.12 | 674 | 6 | 1.64E-03 | **** | 3.46E+00 | T |
| 0 | 353.16 | 25 | 41 | 0.78 | 705.92 | 700 | 16 | 6.96E-03 | **** | 3.35E+00 | T |
| 0 | 407.93 | 11 | 13 | 2.28 | 815.44 | 810 | 9 | 3.09E-03 | **** | 3.01E+00 | |
| 0 | 426.29 | 11 | 17 | 1.21 | 852.16 | 846 | 13 | 3.12E-03 | **** | 2.92E+00 | T |
| 0 | 458.48 | 8 | 9 | 0.80 | 916.54 | 912 | 8 | 2.29E-03 | **** | 2.76E+00 | |
| 0 | 546.94 | 12 | 8 | 1.48 | 1093.44 | 1086 | 11 | 3.35E-03 | **** | 2.43E+00 | T |
| 0 | 558.17 | 9 | 6 | 0.62 | 1115.90 | 1109 | 11 | 2.57E-03 | **** | 2.39E+00 | |
| 0 | 917.09 | 9 | 6 | 3.36 | 1833.83 | 1826 | 11 | 2.36E-03 | **** | 1.65E+00 | |
| 0 | 1213.29 | 6 | 5 | 1.44 | 2426.44 | 2420 | 9 | 1.79E-03 | **** | 1.31E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:25:31.96

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146005.CNF;1    *
* Acquisition date : 10-FEB-2014 13:23:27 Sensitivity     : 3.000            *
* Detector ID      : GAM12                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 09:53:00 Nuclide Library : SOLID            *
* Sample ID        : G341146005           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.6013E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 14-NOV-2013 07:07:44 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM12_500MLMB.CNF;10          *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.280E-01 |
| AS-73 | 2.362E+00 |
| CE-139 | 2.160E-02 |
| TM-171 | 2.791E+01 |
| ANH-511 | 1.576E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.583E-01 | NOT IDENT. |
| NA-22 | 1.607E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.923E-02 | NOT IDENT. |
| SC-46 | 5.205E-02 | NOT IDENT. |
| V-48 | 1.285E+00 | NOT IDENT. |
| CR-51 | 1.920E+00 | NOT IDENT. |
| MN-54 | 1.542E-02 | NOT IDENT. |
| CO-56 | 4.395E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.464E-02 | NOT IDENT. |
| CO-58 | 4.649E-02 | NOT IDENT. |
| FE-59 | 1.901E-01 | NOT IDENT. |
| CO-60 | 2.078E-02 | NOT IDENT. |
| ZN-65 | 5.658E-02 | NOT IDENT. |
| GE-68 | 9.486E-01 | NOT IDENT. |
| AS-74 | 1.354E+00 | NOT IDENT. |
| SE-75 | 3.298E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.759E+00 | NOT IDENT. |
| RB-83 | 7.311E-02 | NOT IDENT. |
| KR-85 | 4.973E+00 | NOT IDENT. |
| SR-85 | 6.109E-02 | NOT IDENT. |
| RB-86 | 9.487E+00 | NOT IDENT. |
| Y-88 | 3.837E-02 | NOT IDENT. |
| Y-91 | 1.386E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 1.756E-02 | NOT IDENT. |
| NB-95 | 4.409E-02 | NOT IDENT. |
| NB-95M | 1.460E-01 | NOT IDENT. |
| ZR-95 | 1.078E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.734E-02 | NOT IDENT. |
| RH-102 | 3.611E-02 | NOT IDENT. |
| RU-103 | 8.972E-02 | NOT IDENT. |
| RH-106 | 1.675E-01 | NOT IDENT. |
| RU-106 | 1.675E-01 | NOT IDENT. |
| AG-108M | 1.874E-02 | NOT IDENT. |
| CD-109 | 5.922E-01 | NOT IDENT. |
| AG-110M | 3.021E-02 | NOT IDENT. |
| SN-113 | 3.756E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.884E+00 | NOT IDENT. |
| TE-123M | 2.714E-02 | NOT IDENT. |
| SB-124 | 1.200E-01 | NOT IDENT. |
| SB-125 | 6.676E-02 | NOT IDENT. |
| TE-125M | 1.449E+01 | NOT IDENT. |
| I-126 | 7.327E+00 | NOT IDENT. |
| SB-126 | 6.978E+00 | NOT IDENT. |
| SN-126 | 5.391E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.993E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.922E-02 | NOT IDENT. |
| CS-135 | 9.045E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.589E+00 | NOT IDENT. |
| BA-137M | 1.738E-02 | NOT IDENT. |
| CS-137 | 1.836E-02 | NOT IDENT. |
| BA-140 | 4.019E+00 | NOT IDENT. |
| LA-140 | 4.019E+00 | NOT IDENT. |
| CE-141 | 2.223E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.439E-01 | NOT IDENT. |
| PM-144 | 2.611E-02 | NOT IDENT. |
| PR-144 | 2.038E+00 | NOT IDENT. |
| PM-146 | 2.374E-02 | NOT IDENT. |
| ND-147 | 4.527E+01 | NOT IDENT. |
| PM-147 | 3.689E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.605E-02 | NOT IDENT. |
| EU-152 | 5.312E-02 | NOT IDENT. |
| GD-153 | 6.657E-02 | NOT IDENT. |
| EU-154 | 4.371E-02 | NOT IDENT. |
| EU-155 | 6.896E-02 | NOT IDENT. |
| TB-160 | 1.371E-01 | NOT IDENT. |
| HO-166M | 2.958E-02 | NOT IDENT. |
| LU-176 | 1.605E-02 | NOT IDENT. |
| HF-181 | 6.762E-02 | NOT IDENT. |
| TA-182 | 1.100E-01 | FAIL ABUN |
| RE-183 | 5.031E-01 | FAIL ABUN |
| RE-184 | 2.730E-01 | NOT IDENT. |
| W-188 | 8.062E+00 | NOT IDENT. |
| IR-192 | 4.420E-02 | NOT IDENT. |
| HG-203 | 6.302E-02 | NOT IDENT. |
| BI-207 | 3.190E-02 | NOT IDENT. |
| TL-208 | 2.512E-02 | NOT IDENT. |
| PB-210 | 5.418E+00 | NOT IDENT. |
| BI-211 | 1.612E-01 | NOT IDENT. |
| PB-211 | 4.002E-01 | FAIL ABUN |
| BI-212 | 3.258E-01 | NOT IDENT. |
| PB-212 | 4.501E-02 | FAIL ABUN |
| BI-214 | 5.891E-02 | NOT IDENT. |
| PB-214 | 5.876E-02 | FAIL ABUN |
| RN-219 | 2.084E-01 | NOT IDENT. |
| RN-222 | 5.891E-02 | NOT IDENT. |
| RA-223 | 4.103E-01 | FAIL ABUN |
| RA-224 | 4.147E-01 | NOT IDENT. |
| RA-226 | 5.891E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.629E-01 | NOT IDENT. |
| TH-227 | 1.629E-01 | NOT IDENT. |
| AC-228 | 9.189E-02 | FAIL ABUN |
| RA-228 | 9.189E-02 | FAIL ABUN |
| TH-228 | 4.501E-02 | FAIL ABUN |
| TH-229 | 2.574E-01 | NOT IDENT. |
| TH-230 | 5.890E-02 | NOT IDENT. |
| PA-231 | 8.747E-01 | NOT IDENT. |
| TH-231 | 4.103E-01 | FAIL ABUN |
| TH-232 | 9.189E-02 | FAIL ABUN |
| PA-233 | 3.154E-02 | NOT IDENT. |
| PA-234 | 1.558E-01 | NOT IDENT. |
| PA-234M | 3.073E+00 | NOT IDENT. |
| TH-234 | 1.422E+00 | FAIL ABUN |
| U-234 | 5.890E-02 | NOT IDENT. |
| U-235 | 1.303E-01 | FAIL ABUN |
| NP-237 | 3.154E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.422E+00 | FAIL ABUN |
| NP-239 | 2.137E-01 | NOT IDENT. |
| PU-239 | 2.123E+02 | NOT IDENT. |
| AM-241 | 1.580E-01 | NOT IDENT. |
| AM-243 | 4.685E-02 | NOT IDENT. |
| CM-243 | 7.007E-02 | NOT IDENT. |
| CM-247 | 2.013E-02 | NOT IDENT. |
| CF-249 | 2.070E-02 | NOT IDENT. |
| CF-251 | 7.320E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:25:37.37

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146005.CNF;1    *
* Acquisition date : 10-FEB-2014 13:23:27 Sensitivity     : 3.000          *
* Detector ID      : GAM12                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 09:53:00 Nuclide Library : SOLID          *
* Sample ID        : G341146005           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.6013E+02 GRAM*
*                                         Quantity Err(%) : 1.2490E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 07:07:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM12_500MLMB.CNF;10      *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 7.998E-01 | 3.970E-01 | 3.970E-01 |
| AS-73 | 3.022E+00 | 3.448E+00 | 3.448E+00 |
| CE-139 | 3.112E-02 | 2.957E-02 | 2.957E-02 |
| TM-171 | 3.200E+01 | 3.602E+01 | 3.602E+01 |
| ANH-511 | 9.930E-03 | 4.196E-02 | 4.196E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.286E-01 | 6.038E-01 | 6.217E-01 | NOT IDENT. |
| NA-22 | -1.862E-02 | 2.521E-02 | 2.657E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 2.555E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -7.304E-03 | 2.611E-02 | 2.632E-02 | NOT IDENT. |
| SC-46 | 6.225E-02 | 4.967E-02 | 5.705E-02 | NOT IDENT. |
| V-48 | 1.998E-01 | 1.515E+00 | 1.518E+00 | NOT IDENT. |
| CR-51 | 1.321E+00 | 2.088E+00 | 2.171E+00 | NOT IDENT. |
| MN-54 | -2.464E-02 | 2.612E-02 | 2.839E-02 | NOT IDENT. |
| CO-56 | 3.294E-03 | 5.234E-02 | 5.237E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.588E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.467E-03 | 1.772E-02 | 1.773E-02 | NOT IDENT. |
| CO-58 | 4.829E-03 | 5.494E-02 | 5.498E-02 | NOT IDENT. |
| FE-59 | 4.587E-02 | 2.130E-01 | 2.140E-01 | NOT IDENT. |
| CO-60 | -1.483E-02 | 2.873E-02 | 2.949E-02 | NOT IDENT. |
| ZN-65 | -1.985E-02 | 7.079E-02 | 7.136E-02 | NOT IDENT. |
| GE-68 | 7.028E-01 | 9.587E-01 | 1.010E+00 | NOT IDENT. |
| AS-74 | 6.661E-01 | 1.497E+00 | 1.527E+00 | NOT IDENT. |
| SE-75 | -4.348E-02 | 4.764E-02 | 5.152E-02 | NOT IDENT. |
| BR-77 | 1.393E+11 | 4.041E+11 | 4.090E+11 | SHORT HLIF |
| SR-82 | -1.899E+00 | 2.496E+00 | 2.639E+00 | NOT IDENT. |
| RB-83 | -1.664E-03 | 8.684E-02 | 8.684E-02 | NOT IDENT. |
| KR-85 | 4.955E+00 | 5.736E+00 | 6.155E+00 | NOT IDENT. |
| SR-85 | 6.074E-02 | 7.048E-02 | 7.561E-02 | NOT IDENT. |
| RB-86 | 8.121E+00 | 9.332E+00 | 1.002E+01 | NOT IDENT. |
| Y-88 | 1.866E-02 | 3.774E-02 | 3.867E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | -1.552E+01 | 2.407E+01 | 2.506E+01 | NOT IDENT. |
| NB-94 | -1.138E-02 | 2.342E-02 | 2.397E-02 | NOT IDENT. |
| NB-95 | 8.358E-04 | 5.284E-02 | 5.284E-02 | NOT IDENT. |
| NB-95M | 2.012E-02 | 1.997E-01 | 1.999E-01 | NOT IDENT. |
| ZR-95 | -4.089E-02 | 1.375E-01 | 1.387E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 9.004E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 2.735E+40 | 2.331E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -1.794E+09 | 4.644E+09 | 4.714E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 3.523E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.263E-02 | 2.246E-02 | 2.317E-02 | NOT IDENT. |
| RH-102 | 1.530E-02 | 4.026E-02 | 4.085E-02 | NOT IDENT. |
| RU-103 | -5.500E-02 | 1.159E-01 | 1.185E-01 | NOT IDENT. |
| RH-106 | -2.582E-01 | 2.571E-01 | 2.822E-01 | NOT IDENT. |
| RU-106 | -2.582E-01 | 2.571E-01 | 2.822E-01 | NOT IDENT. |
| AG-108M | 1.950E-03 | 2.230E-02 | 2.231E-02 | NOT IDENT. |
| CD-109 | -7.065E-01 | 9.021E-01 | 9.566E-01 | NOT IDENT. |
| AG-110M | -2.436E-02 | 4.295E-02 | 4.433E-02 | NOT IDENT. |
| SN-113 | 1.694E-03 | 4.369E-02 | 4.370E-02 | NOT IDENT. |
| CD-115 | -1.431E+11 | 4.976E+11 | 5.018E+11 | SHORT HLIF |
| SN-117M | 9.288E-01 | 2.440E+00 | 2.475E+00 | NOT IDENT. |
| TE-123M | 1.401E-02 | 3.510E-02 | 3.566E-02 | NOT IDENT. |
| SB-124 | -1.235E-01 | 1.876E-01 | 1.957E-01 | NOT IDENT. |
| SB-125 | 1.533E-02 | 8.722E-02 | 8.750E-02 | NOT IDENT. |
| TE-125M | -1.459E+01 | 1.957E+01 | 2.064E+01 | NOT IDENT. |
| I-126 | -1.850E-01 | 8.807E+00 | 8.807E+00 | NOT IDENT. |
| SB-126 | -1.582E+00 | 8.713E+00 | 8.742E+00 | NOT IDENT. |
| SN-126 | -7.620E-02 | 8.329E-02 | 9.009E-02 | NOT IDENT. |
| SB-127 | 3.650E+05 | 1.289E+06 | 1.300E+06 | SHORT HLIF |
| I-131 | -6.390E+01 | 8.056E+01 | 8.556E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 1.568E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.855E+06 | 1.556E+07 | 1.558E+07 | SHORT HLIF |
| BA-133 | 2.226E-02 | 3.624E-02 | 3.761E-02 | NOT IDENT. |
| I-133 | -1.614E+31 | 2.815E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.845E-03 | 2.206E-02 | 2.213E-02 | NOT IDENT. |
| CS-135 | 4.417E-02 | 1.045E-01 | 1.064E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.543E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.199E-01 | 5.256E+00 | 5.261E+00 | NOT IDENT. |
| BA-137M | -5.340E-03 | 2.199E-02 | 2.212E-02 | NOT IDENT. |
| CS-137 | -5.642E-03 | 2.323E-02 | 2.337E-02 | NOT IDENT. |
| BA-140 | -6.222E-01 | 5.003E+00 | 5.011E+00 | NOT IDENT. |
| LA-140 | -6.222E-01 | 5.003E+00 | 5.011E+00 | NOT IDENT. |
| CE-141 | 1.574E-01 | 2.508E-01 | 2.607E-01 | NOT IDENT. |
| CE-143 | 9.741E+18 | 2.565E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -4.197E-02 | 1.772E-01 | 1.782E-01 | NOT IDENT. |
| PM-144 | 1.957E-02 | 2.772E-02 | 2.909E-02 | NOT IDENT. |
| PR-144 | 1.527E+00 | 2.163E+00 | 2.270E+00 | NOT IDENT. |
| PM-146 | -1.636E-02 | 3.614E-02 | 3.688E-02 | NOT IDENT. |
| ND-147 | -5.012E+01 | 6.329E+01 | 6.720E+01 | NOT IDENT. |
| PM-147 | 2.520E+01 | 4.372E+02 | 4.374E+02 | NOT IDENT. |
| PM-149 | 2.775E+11 | 4.600E+12 | 4.602E+12 | SHORT HLIF |
| EU-150 | 1.254E-02 | 1.897E-02 | 1.980E-02 | NOT IDENT. |
| EU-152 | -2.258E-02 | 6.713E-02 | 6.790E-02 | NOT IDENT. |
| GD-153 | 1.419E-02 | 8.791E-02 | 8.814E-02 | NOT IDENT. |
| EU-154 | -5.065E-02 | 6.858E-02 | 7.228E-02 | NOT IDENT. |
| EU-155 | 5.008E-02 | 7.644E-02 | 7.971E-02 | NOT IDENT. |
| TB-160 | -9.127E-02 | 1.904E-01 | 1.948E-01 | NOT IDENT. |
| HO-166M | -1.626E-02 | 3.924E-02 | 3.992E-02 | NOT IDENT. |
| LU-176 | 1.709E-02 | 1.650E-02 | 1.821E-02 | NOT IDENT. |
| HF-181 | -9.806E-02 | 1.011E-01 | 1.104E-01 | NOT IDENT. |
| TA-182 | -1.076E-01 | 1.617E-01 | 1.689E-01 | FAIL ABUN |
| RE-183 | 4.700E-02 | 5.879E-01 | 5.883E-01 | FAIL ABUN |
| RE-184 | -6.862E-02 | 3.511E-01 | 3.524E-01 | NOT IDENT. |
| W-188 | 6.861E-01 | 9.768E+00 | 9.773E+00 | NOT IDENT. |
| IR-192 | 1.545E-03 | 5.119E-02 | 5.119E-02 | NOT IDENT. |
| HG-203 | -2.267E-02 | 8.086E-02 | 8.150E-02 | NOT IDENT. |
| BI-207 | 1.562E-02 | 3.398E-02 | 3.470E-02 | NOT IDENT. |
| TL-208 | 1.362E-04 | 2.959E-02 | 2.959E-02 | NOT IDENT. |
| PB-210 | -2.393E+00 | 7.438E+00 | 7.516E+00 | NOT IDENT. |
| BI-211 | 1.729E-01 | 1.874E-01 | 2.029E-01 | NOT IDENT. |
| PB-211 | -4.376E-02 | 5.494E-01 | 5.498E-01 | FAIL ABUN |
| BI-212 | 2.528E-01 | 3.433E-01 | 3.617E-01 | NOT IDENT. |
| PB-212 | 6.518E-02 | 6.091E-02 | 6.763E-02 | FAIL ABUN |
| BI-214 | 3.606E-02 | 6.434E-02 | 6.636E-02 | NOT IDENT. |
| PB-214 | 9.843E-02 | 1.163E-01 | 1.245E-01 | FAIL ABUN |
| RN-219 | 1.717E-02 | 2.766E-01 | 2.767E-01 | NOT IDENT. |
| RN-222 | 3.606E-02 | 6.434E-02 | 6.636E-02 | NOT IDENT. |
| RA-223 | 2.064E-02 | 4.749E-01 | 4.750E-01 | FAIL ABUN |
| RA-224 | 4.913E-01 | 5.024E-01 | 5.491E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 3.606E-02 | 6.434E-02 | 6.636E-02 | NOT IDENT. |
| AC-227 | 9.704E-02 | 1.872E-01 | 1.922E-01 | NOT IDENT. |
| TH-227 | 9.704E-02 | 1.872E-01 | 1.922E-01 | NOT IDENT. |
| AC-228 | 4.024E-02 | 1.151E-01 | 1.165E-01 | FAIL ABUN |
| RA-228 | 4.024E-02 | 1.151E-01 | 1.165E-01 | FAIL ABUN |
| TH-228 | 6.518E-02 | 6.091E-02 | 6.763E-02 | FAIL ABUN |
| TH-229 | -1.098E-01 | 3.267E-01 | 3.304E-01 | NOT IDENT. |
| TH-230 | 3.605E-02 | 6.433E-02 | 6.635E-02 | NOT IDENT. |
| PA-231 | 9.970E-01 | 9.297E-01 | 1.033E+00 | NOT IDENT. |
| TH-231 | 2.064E-02 | 4.749E-01 | 4.750E-01 | FAIL ABUN |
| TH-232 | 4.024E-02 | 1.151E-01 | 1.165E-01 | FAIL ABUN |
| PA-233 | -2.242E-02 | 4.011E-02 | 4.136E-02 | NOT IDENT. |
| PA-234 | -1.316E-01 | 2.685E-01 | 2.750E-01 | NOT IDENT. |
| PA-234M | 1.124E+00 | 3.145E+00 | 3.186E+00 | NOT IDENT. |
| TH-234 | 5.443E-01 | 1.755E+00 | 1.772E+00 | FAIL ABUN |
| U-234 | 3.605E-02 | 6.433E-02 | 6.635E-02 | NOT IDENT. |
| U-235 | -3.433E-02 | 1.621E-01 | 1.628E-01 | FAIL ABUN |
| NP-237 | -2.242E-02 | 4.011E-02 | 4.136E-02 | NOT IDENT. |
| NP-238 | -3.544E+11 | 3.385E+12 | 3.389E+12 | SHORT HLIF |
| U-238 | 5.443E-01 | 1.755E+00 | 1.772E+00 | FAIL ABUN |
| NP-239 | -2.287E-02 | 2.582E-01 | 2.584E-01 | NOT IDENT. |
| PU-239 | 2.133E+02 | 2.308E+02 | 2.500E+02 | NOT IDENT. |
| AM-241 | -2.182E-01 | 2.093E-01 | 2.312E-01 | NOT IDENT. |
| AM-243 | 4.285E-02 | 5.165E-02 | 5.514E-02 | NOT IDENT. |
| CM-243 | 4.324E-02 | 7.868E-02 | 8.106E-02 | NOT IDENT. |
| CM-247 | 1.637E-03 | 2.674E-02 | 2.675E-02 | NOT IDENT. |
| CF-249 | -7.513E-03 | 2.547E-02 | 2.570E-02 | NOT IDENT. |
| CF-251 | 2.598E-02 | 9.176E-02 | 9.250E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 31.8792 | 94.67 | 38.0728 | 193.51 | 31.9009 |
| 45.60 | 39.7609 | 94.87 | 38.0795 | 197.03 | 33.0314 |
| 46.54 | 36.1529 | 97.43 | 31.8047 | 198.01 | 29.8517 |
| 49.72 | 0.0000 | 98.43 | 28.6493 | 201.83 | 32.0535 |
| 51.35 | 41.6853 | 98.44 | 28.6495 | 205.31 | 44.9631 |
| 52.39 | 47.0523 | 99.53 | 34.5182 | 210.85 | 31.1417 |
| 53.44 | 47.1138 | 100.11 | 39.8486 | 215.65 | 27.9936 |
| 57.36 | 0.0000 | 103.18 | 29.9650 | 222.11 | 23.7694 |
| 57.53 | 40.3659 | 103.37 | 29.9699 | 227.09 | 33.5818 |
| 57.98 | 41.0695 | 105.21 | 27.0147 | 227.38 | 24.9194 |
| 59.32 | 57.3966 | 105.31 | 27.0170 | 228.16 | 0.0000 |
| 59.54 | 58.3682 | 106.12 | 30.0391 | 228.18 | 28.1816 |
| 63.29 | 33.8261 | 109.28 | 41.1608 | 117.23 | 28.1816 |
| 63.58 | 26.1469 | 111.00 | 31.1653 | 235.69 | 26.1156 |
| 64.28 | 30.7851 | 111.76 | 0.0000 | 235.96 | 26.1191 |
| 66.73 | 56.9136 | 116.30 | 0.0000 | 238.63 | 30.5141 |
| 67.24 | 48.2586 | 117.23 | 29.3000 | 238.98 | 0.0000 |
| 67.75 | 37.0831 | 121.12 | 21.2816 | 240.99 | 27.9320 |
| 69.67 | 49.5463 | 121.22 | 21.2833 | 242.00 | 33.1865 |
| 70.83 | 51.1572 | 121.78 | 24.3342 | 244.70 | 22.4876 |
| 72.81 | 47.7127 | 122.06 | 23.3252 | 252.40 | 0.0000 |
| 72.87 | 48.5479 | 123.07 | 21.3135 | 252.80 | 29.6340 |
| 74.66 | 41.8282 | 127.23 | 38.6886 | 254.15 | 0.0000 |
| 74.82 | 41.8350 | 129.30 | 27.5317 | 256.23 | 27.4853 |
| 74.97 | 36.0031 | 131.20 | 37.7817 | 260.90 | 0.0000 |
| 77.11 | 49.7335 | 133.02 | 46.0118 | 264.66 | 30.9091 |
| 79.69 | 52.7943 | 133.52 | 42.9600 | 268.22 | 23.2213 |
| 80.12 | 53.7947 | 136.00 | 45.0866 | 269.46 | 23.2350 |
| 80.19 | 0.0000 | 136.47 | 43.0517 | 271.23 | 29.8983 |
| 80.57 | 58.7109 | 140.51 | 0.0000 | 273.65 | 27.7153 |
| 81.00 | 56.7778 | 143.76 | 47.3954 | 276.40 | 23.3107 |
| 81.07 | 56.7818 | 144.24 | 37.1044 | 277.37 | 18.8791 |
| 83.79 | 41.2260 | 145.44 | 37.1354 | 277.60 | 18.8812 |
| 85.43 | 39.3242 | 152.43 | 33.1667 | 278.00 | 24.4388 |
| 86.55 | 59.0485 | 153.25 | 37.3332 | 279.20 | 24.4526 |
| 86.79 | 59.0618 | 323.87 | 41.5079 | 279.54 | 26.6796 |
| 86.94 | 61.4329 | 156.02 | 38.7874 | 280.46 | 32.2515 |
| 87.09 | 61.4414 | 158.56 | 31.6369 | 283.69 | 14.4792 |
| 87.57 | 69.3497 | 159.00 | 33.3118 | 284.31 | 0.0000 |
| 88.03 | 61.4955 | 162.33 | 0.0000 | 285.41 | 16.7198 |
| 88.34 | 61.5131 | 163.33 | 0.0000 | 285.90 | 0.0000 |
| 88.47 | 52.0558 | 165.86 | 26.7678 | 287.50 | 30.1245 |
| 89.96 | 37.9109 | 176.31 | 33.6794 | 290.67 | 18.9945 |
| 91.11 | 36.3694 | 176.60 | 26.9484 | 293.27 | 0.0000 |
| 92.59 | 36.6162 | 177.52 | 30.8959 | 351.93 | 29.1100 |
| 93.35 | 36.6414 | 181.07 | 0.0000 | 295.96 | 23.5196 |
| 94.56 | 38.0689 | 184.41 | 31.7301 | 879.38 | 26.9106 |
| 94.65 | 38.0720 | 143.76 | 33.8721 | 299.98 | 22.4396 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 22.4408 | 487.02 | 11.5548 | 702.65 | 15.3593 |
| 300.13 | 22.4411 | 492.35 | 0.0000 | 706.68 | 8.2000 |
| 301.36 | 26.9440 | 497.08 | 18.3543 | 711.68 | 12.3155 |
| 302.85 | 26.9615 | 505.52 | 12.9149 | 720.70 | 12.3434 |
| 256.23 | 23.6087 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 13.5040 | 511.00 | 13.5839 | 722.78 | 11.3207 |
| 308.46 | 18.0186 | 514.00 | 12.9492 | 722.91 | 9.2626 |
| 311.90 | 23.4590 | 514.00 | 12.9492 | 723.31 | 9.2635 |
| 316.51 | 24.4098 | 520.40 | 12.6506 | 724.19 | 15.4427 |
| 319.41 | 25.3449 | 520.69 | 0.0000 | 727.33 | 8.2424 |
| 320.08 | 24.4467 | 522.65 | 0.0000 | 733.00 | 13.4126 |
| 321.04 | 27.1740 | 527.90 | 0.0000 | 735.93 | 8.2600 |
| 323.87 | 28.1134 | 529.59 | 18.5417 | 333.97 | 12.3946 |
| 325.23 | 31.7593 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 19.9926 | 531.02 | 19.5264 | 747.24 | 9.3182 |
| 333.37 | 24.7135 | 546.56 | 0.0000 | 748.06 | 9.3199 |
| 333.97 | 15.1786 | 552.55 | 22.1100 | 752.31 | 14.5127 |
| 334.37 | 16.6992 | 563.25 | 19.7158 | 753.82 | 7.2591 |
| 338.28 | 23.7206 | 569.33 | 17.7759 | 756.73 | 16.6035 |
| 338.32 | 23.7212 | 946.00 | 15.8016 | 756.80 | 16.6039 |
| 311.90 | 18.2632 | 569.70 | 15.8023 | 884.68 | 9.3557 |
| 340.48 | 18.2632 | 583.19 | 14.8729 | 765.81 | 7.2799 |
| 340.55 | 18.2637 | 584.27 | 16.8610 | 766.42 | 11.4415 |
| 344.28 | 23.3722 | 595.83 | 11.9411 | 766.84 | 10.4026 |
| 345.93 | 25.1676 | 427.87 | 15.9430 | 772.60 | 0.0000 |
| 351.06 | 19.8698 | 602.52 | 0.0000 | 776.52 | 19.8104 |
| 351.93 | 24.4635 | 602.73 | 12.9616 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 23.9426 | 778.90 | 5.2162 |
| 356.01 | 21.4406 | 609.32 | 16.9809 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 15.9867 | 785.37 | 12.5379 |
| 366.42 | 0.0000 | 614.28 | 28.0075 | 792.07 | 7.3252 |
| 375.05 | 15.7375 | 618.01 | 12.0155 | 794.95 | 6.2830 |
| 356.01 | 23.2208 | 620.36 | 15.0293 | 795.86 | 5.2369 |
| 388.16 | 18.6069 | 621.93 | 18.0426 | 810.29 | 9.4581 |
| 388.63 | 13.9576 | 630.19 | 0.0000 | 344.28 | 9.4583 |
| 391.69 | 14.9053 | 631.29 | 11.0545 | 810.76 | 8.4080 |
| 264.66 | 9.3468 | 633.25 | 10.0549 | 815.77 | 5.2611 |
| 401.81 | 14.0261 | 634.78 | 10.0591 | 1048.07 | 14.7403 |
| 402.40 | 15.5878 | 635.95 | 9.0560 | 832.01 | 9.5049 |
| 404.85 | 18.7222 | 636.99 | 0.0000 | 834.85 | 11.6247 |
| 410.95 | 26.5819 | 645.85 | 8.0713 | 835.71 | 11.6268 |
| 413.71 | 12.9129 | 657.76 | 8.0969 | 836.80 | 0.0000 |
| 414.70 | 13.1523 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 14.1542 | 661.66 | 11.1448 | 846.77 | 8.4770 |
| 427.87 | 22.0237 | 664.57 | 0.0000 | 856.80 | 10.6196 |
| 433.94 | 18.9177 | 666.33 | 8.1152 | 860.56 | 12.7544 |
| 439.40 | 16.1106 | 666.50 | 9.1301 | 871.09 | 7.4572 |
| 453.88 | 20.6352 | 667.71 | 0.0000 | 873.19 | 8.5264 |
| 463.37 | 9.5544 | 677.62 | 3.0522 | 875.33 | 0.0000 |
| 468.07 | 24.8803 | 685.70 | 0.0000 | 879.38 | 10.6724 |
| 473.00 | 0.0000 | 695.00 | 14.3076 | 880.51 | 9.6075 |
| 475.06 | 20.1423 | 696.49 | 9.2013 | 883.24 | 9.6133 |
| 476.78 | 14.3954 | 696.51 | 9.2013 | 884.68 | 11.7533 |
| 477.60 | 11.5194 | 697.00 | 7.1574 | 889.28 | 3.2086 |
| 482.18 | 17.3050 | 697.49 | 8.1809 | 894.76 | 10.7080 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 6.4293 | 1298.22 | 0.0000 | | |
| 903.28 | 7.5093 | 1312.11 | 4.8234 | | |
| 911.20 | 7.1637 | 1332.49 | 8.7111 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.4682 | 1365.19 | 4.8649 | | |
| 937.49 | 15.1269 | 1368.63 | 0.0000 | | |
| 944.13 | 8.6559 | 1384.29 | 3.9036 | | |
| 946.00 | 12.9891 | 1408.01 | 1.9591 | | |
| 949.00 | 7.5816 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 1.9751 | | |
| 962.31 | 8.6883 | 1489.16 | 6.9425 | | |
| 964.08 | 11.9507 | 1505.03 | 5.9648 | | |
| 966.17 | 8.6951 | 1596.21 | 5.0370 | | |
| 968.97 | 7.6127 | 1620.50 | 6.0652 | | |
| 983.53 | 7.6351 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 7.1455 | | |
| 1274.44 | 14.2156 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.3781 | 1764.49 | 4.1239 | | |
| 1004.73 | 15.3347 | 1063.66 | 6.1904 | | |
| 507.63 | 0.0000 | 1771.35 | 3.0957 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 4.1478 | | |
| 1037.84 | 6.4312 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.0406 | | |
| 631.29 | 5.5217 | | | | |
| 1048.07 | 10.1259 | | | | |
| 1049.04 | 11.9690 | | | | |
| 1050.41 | 7.3675 | | | | |
| 1063.66 | 6.4631 | | | | |
| 1077.00 | 3.7025 | | | | |
| 1077.34 | 4.6285 | | | | |
| 1085.87 | 7.4173 | | | | |
| 1099.45 | 8.3657 | | | | |
| 1112.07 | 7.4538 | | | | |
| 1112.84 | 6.5229 | | | | |
| 1115.54 | 10.2552 | | | | |
| 1120.29 | 7.4648 | | | | |
| 1120.55 | 7.4652 | | | | |
| 1221.41 | 10.2660 | | | | |
| 1129.67 | 8.4126 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.5365 | | | | |
| 1177.95 | 7.5430 | | | | |
| 1189.05 | 8.5023 | | | | |
| 1204.77 | 5.6838 | | | | |
| 1221.41 | 8.5507 | | | | |
| 1231.02 | 8.5646 | | | | |
| 1235.36 | 6.6665 | | | | |
| 1238.28 | 1.9056 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 6.7078 | | | | |
| 1274.44 | 7.6693 | | | | |
| 1274.54 | 7.6693 | | | | |
| 1291.59 | 7.6911 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:04.69

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146006.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;376
                                        Background date  : 9-FEB-2014 11:20:56.
Sample date      : 7-NOV-2013 09:58:00. Acquisition date : 10-FEB-2014 13:23:49
Sample ID        : G341146006           Sample quantity  : 1.67940E+02 GRAM
Detector name    : GAM06                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.25  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 93.23* | 5 | 49 | 0.81 | 186.04 | 182 | 9 | 1.50E-03 | 270.7 | |
| 2 | 0 | 110.31* | 34 | 26 | 2.57 | 220.18 | 216 | 10 | 9.43E-03 | 34.3 | |
| 3 | 0 | 143.74* | 20 | 56 | 1.36 | 287.03 | 282 | 11 | 5.63E-03 | 77.0 | |
| 4 | 4 | 185.73* | 12 | 20 | 1.45 | 370.98 | 366 | 11 | 3.43E-03 | 93.9 | 2.13E+00 |
| 5 | 0 | 211.78 | 15 | 40 | 1.81 | 423.08 | 416 | 9 | 4.05E-03 | 84.3 | |
| 6 | 0 | 237.93* | 24 | 48 | 4.81 | 475.37 | 468 | 13 | 6.70E-03 | 66.1 | |
| 7 | 0 | 241.91 | 18 | 25 | 1.47 | 483.32 | 481 | 7 | 4.92E-03 | 54.1 | |
| 8 | 0 | 252.40 | 31 | 20 | 4.60 | 504.30 | 499 | 13 | 8.47E-03 | 34.9 | |
| 9 | 0 | 352.30* | 16 | 25 | 0.74 | 704.07 | 699 | 10 | 4.54E-03 | 68.0 | |
| 10 | 0 | 533.32 | 10 | 6 | 1.58 | 1066.11 | 1060 | 9 | 2.67E-03 | 58.0 | |
| 11 | 0 | 554.14 | 20 | 3 | 3.41 | 1107.75 | 1103 | 10 | 5.66E-03 | 26.6 | |
| 12 | 0 | 583.53* | 2 | 5 | 1.30 | 1166.53 | 1161 | 9 | 6.78E-04 | 222.5 | |
| 13 | 0 | 598.02 | 26 | 3 | 2.88 | 1195.51 | 1190 | 11 | 7.33E-03 | 22.9 | |
| 14 | 0 | 609.74* | 10 | 18 | 1.57 | 1218.96 | 1211 | 12 | 2.67E-03 | 101.9 | |
| 15 | 0 | 622.16 | 13 | 3 | 1.64 | 1243.79 | 1239 | 10 | 3.72E-03 | 35.2 | |
| 16 | 0 | 898.47 | 11 | 0 | 0.83 | 1796.55 | 1791 | 10 | 3.06E-03 | 30.2 | |
| 17 | 0 | 1460.43* | 25 | 0 | 1.63 | 2921.10 | 2914 | 14 | 7.00E-03 | 21.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:26:06

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146006.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 09:58:00 | Acquisition date | : 10-FEB-2014 13:23:49 |
| Sample ID | : G341146006 | Sample quantity | : 167.94 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA6 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.25 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 25 | 10.66* | 9.534E-01 | 1.109E+00 | 1.109E+00 | 43.71 |
| RH-106 | 621.93 | 13 | 9.93* | 2.015E+00 | 2.995E-01 | 3.576E-01 | 70.37 |
| | 1050.41 | ------ | 1.56 | 1.283E+00 | ------ | Line Not Found | ------ |
| RU-106 | 621.93 | 13 | 9.93* | 2.015E+00 | 2.995E-01 | 3.576E-01 | 70.37 |
| | 1050.41 | ------ | 1.56 | 1.283E+00 | ------ | Line Not Found | ------ |
| TE-125M | 109.28 | 34 | 0.27* | 5.051E+00 | 1.113E+01 | 3.511E+01 | 68.54 |
| TL-208 | 277.37 | ------ | 6.60 | 3.644E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 2 | 85.00* | 2.120E+00 | 6.055E-03 | 6.055E-03 | 444.92 |
| | 860.56 | ------ | 12.50 | 1.535E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 2.996E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 16 | 12.92* | 3.082E+00 | 1.834E-01 | 1.834E-01 | 135.97 |
| RA-224 | 240.99 | 18 | 4.10* | 3.993E+00 | 4.839E-01 | 4.839E-01 | 108.25 |
| U-235 | 89.96 | ------ | 3.47 | 4.315E+00 | ------ | Line Not Found | ------ |
| | 93.35 | 5 | 5.60 | 4.489E+00 | 9.619E-02 | 9.619E-02 | 541.44 |
| | 143.76 | 20 | 10.96* | 5.147E+00 | 1.606E-01 | 1.606E-01 | 154.09 |
| | 163.33 | ------ | 5.08 | 4.953E+00 | ------ | Line Not Found | ------ |
| | 185.72 | 12 | 57.20 | 4.672E+00 | 2.065E-02 | 2.065E-02 | 187.90 |
| | 205.31 | ------ | 5.01 | 4.421E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:07.15

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146006.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:23:49 | Sensitivity | : 3.000 |
| Detector ID | : GAM06 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.25 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 09:58:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146006 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.6794E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 28-MAY-2013 09:11:59 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.109E+00 | 4.750E-01 | 3.969E-01 |
| RH-106 | 3.576E-01 | 2.466E-01 | 3.975E-01 |
| RU-106 | 3.576E-01 | 2.466E-01 | 3.975E-01 |
| TE-125M | 3.511E+01 | 2.359E+01 | 2.888E+01 |
| TL-208 | 6.055E-03 | 2.640E-02 | 4.427E-02 |
| BI-211 | 1.834E-01 | 2.444E-01 | 3.244E-01 |
| RA-224 | 4.839E-01 | 5.133E-01 | 8.570E-01 |
| U-235 | 1.606E-01 | 2.425E-01 | 2.574E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 5.145E-01 | 7.576E-01 | 1.579E+00 | NOT IDENT. |
| NA-22 | 1.464E-02 | 2.945E-02 | 6.696E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.651E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.640E-02 | 3.117E-02 | 4.078E-02 | NOT IDENT. |
| SC-46 | -5.126E-02 | 5.400E-02 | 8.120E-02 | NOT IDENT. |
| V-48 | -2.509E-01 | 1.250E+00 | 2.551E+00 | NOT IDENT. |
| CR-51 | 1.224E+00 | 2.435E+00 | 4.698E+00 | NOT IDENT. |
| MN-54 | -1.757E-02 | 3.202E-02 | 5.524E-02 | NOT IDENT. |
| CO-56 | -4.992E-02 | 6.779E-02 | 1.114E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.844E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -6.728E-03 | 2.351E-02 | 4.066E-02 | NOT IDENT. |
| CO-58 | 1.251E-02 | 6.081E-02 | 1.243E-01 | NOT IDENT. |
| FE-59 | -9.362E-02 | 2.217E-01 | 3.993E-01 | NOT IDENT. |
| CO-60 | -2.094E-03 | 3.079E-02 | 6.223E-02 | NOT IDENT. |
| ZN-65 | -6.887E-02 | 8.364E-02 | 1.391E-01 | NOT IDENT. |
| GE-68 | 2.811E-01 | 1.086E+00 | 2.330E+00 | NOT IDENT. |
| AS-73 | 6.854E-01 | 1.566E+00 | 3.055E+00 | NOT IDENT. |
| AS-74 | 1.386E+00 | 1.819E+00 | 3.545E+00 | NOT IDENT. |
| SE-75 | -2.565E-02 | 5.895E-02 | 1.040E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.695E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 4.702E-01 | 1.929E+00 | 4.030E+00 | NOT IDENT. |
| RB-83 | -6.272E-02 | 9.159E-02 | 1.606E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | -2.661E+00 | 7.782E+00 | 1.403E+01 | NOT IDENT. |
| SR-85 | -3.294E-02 | 9.562E-02 | 1.723E-01 | NOT IDENT. |
| RB-86 | 3.131E+00 | 1.100E+01 | 2.367E+01 | NOT IDENT. |
| Y-88 | -1.040E-02 | 3.541E-02 | 7.688E-02 | FAIL ABUN |
| Y-91 | 1.397E+01 | 2.766E+01 | 6.616E+01 | NOT IDENT. |
| NB-94 | 1.958E-02 | 2.661E-02 | 5.663E-02 | NOT IDENT. |
| NB-95 | -1.388E-02 | 6.400E-02 | 1.207E-01 | NOT IDENT. |
| NB-95M | 6.288E-02 | 2.255E-01 | 3.855E-01 | NOT IDENT. |
| ZR-95 | -5.597E-02 | 1.332E-01 | 2.379E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 7.838E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.039E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 5.910E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.606E-02 | 2.599E-02 | 4.883E-02 | NOT IDENT. |
| RH-102 | 1.317E-02 | 3.931E-02 | 8.191E-02 | NOT IDENT. |
| RU-103 | -5.063E-02 | 1.263E-01 | 2.322E-01 | FAIL ABUN |
| AG-108M | -1.850E-02 | 2.147E-02 | 3.399E-02 | NOT IDENT. |
| CD-109 | 4.311E-02 | 6.567E-01 | 1.138E+00 | NOT IDENT. |
| AG-110M | 4.581E-02 | 4.118E-02 | 1.001E-01 | NOT IDENT. |
| SN-113 | 1.896E-02 | 5.610E-02 | 1.087E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 6.197E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.027E+00 | 2.242E+00 | 3.751E+00 | NOT IDENT. |
| TE-123M | -2.603E-02 | 3.170E-02 | 5.035E-02 | NOT IDENT. |
| SB-124 | -4.121E-02 | 1.043E-01 | 2.185E-01 | NOT IDENT. |
| SB-125 | -5.375E-03 | 7.915E-02 | 1.442E-01 | NOT IDENT. |
| I-126 | 6.436E-02 | 1.128E+01 | 2.210E+01 | NOT IDENT. |
| SB-126 | -9.185E-01 | 7.538E+00 | 1.480E+01 | NOT IDENT. |
| SN-126 | -2.242E-02 | 5.367E-02 | 9.296E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.726E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.970E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.937E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.792E-02 | 3.921E-02 | 5.462E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.901E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.451E-02 | 3.001E-02 | 6.440E-02 | NOT IDENT. |
| CS-135 | -2.588E-02 | 1.298E-01 | 2.344E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.902E+00 | 4.831E+00 | 1.072E+01 | NOT IDENT. |
| BA-137M | 2.047E-02 | 2.652E-02 | 5.665E-02 | NOT IDENT. |
| CS-137 | 2.162E-02 | 2.802E-02 | 5.984E-02 | NOT IDENT. |
| CE-139 | -1.398E-02 | 3.146E-02 | 5.697E-02 | NOT IDENT. |
| BA-140 | -1.040E+01 | 6.094E+00 | 4.737E+00 | NOT IDENT. |
| LA-140 | -1.040E+01 | 6.094E+00 | 4.737E+00 | NOT IDENT. |
| CE-141 | 9.494E-02 | 3.036E-01 | 4.945E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 3.027E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -3.200E-02 | 1.661E-01 | 2.904E-01 | NOT IDENT. |
| PM-144 | -1.121E-02 | 2.744E-02 | 4.969E-02 | NOT IDENT. |
| PR-144 | -8.657E-01 | 2.143E+00 | 3.885E+00 | NOT IDENT. |
| PM-146 | 2.512E-02 | 3.225E-02 | 6.712E-02 | NOT IDENT. |
| ND-147 | 7.668E-01 | 7.564E+01 | 1.288E+02 | NOT IDENT. |
| PM-147 | -3.540E+02 | 5.977E+02 | 9.974E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.060E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -9.060E-05 | 2.239E-02 | 4.117E-02 | FAIL ABUN |
| EU-152 | -9.063E-03 | 7.814E-02 | 1.423E-01 | NOT IDENT. |
| GD-153 | 4.030E-02 | 7.745E-02 | 1.358E-01 | NOT IDENT. |
| EU-154 | 3.982E-02 | 8.010E-02 | 1.821E-01 | NOT IDENT. |
| EU-155 | -3.934E-02 | 7.337E-02 | 1.175E-01 | NOT IDENT. |
| TB-160 | 7.005E-02 | 1.819E-01 | 3.958E-01 | NOT IDENT. |
| HO-166M | 2.289E-02 | 4.359E-02 | 9.260E-02 | FAIL ABUN |
| TM-171 | 2.058E+01 | 1.824E+01 | 3.793E+01 | NOT IDENT. |
| LU-176 | 1.685E-02 | 2.115E-02 | 4.264E-02 | NOT IDENT. |
| HF-181 | -8.334E-02 | 1.198E-01 | 2.107E-01 | NOT IDENT. |
| TA-182 | 8.194E-02 | 1.569E-01 | 3.754E-01 | NOT IDENT. |
| RE-183 | -1.335E-01 | 3.714E-01 | 6.638E-01 | NOT IDENT. |
| RE-184 | 2.366E-01 | 2.965E-01 | 7.336E-01 | NOT IDENT. |
| W-188 | -3.046E-01 | 1.142E+01 | 2.129E+01 | NOT IDENT. |
| IR-192 | -2.044E-02 | 6.379E-02 | 1.130E-01 | NOT IDENT. |
| HG-203 | 2.363E-02 | 8.722E-02 | 1.688E-01 | NOT IDENT. |
| BI-207 | 3.529E-02 | 3.121E-02 | 8.047E-02 | NOT IDENT. |
| PB-210 | -1.792E+00 | 4.101E+00 | 7.293E+00 | NOT IDENT. |
| PB-211 | -1.498E-02 | 5.991E-01 | 1.095E+00 | NOT IDENT. |
| BI-212 | 2.204E-01 | 3.517E-01 | 7.615E-01 | NOT IDENT. |
| PB-212 | 6.125E-02 | 7.939E-02 | 9.677E-02 | FAIL ABUN |
| BI-214 | 4.620E-02 | 9.230E-02 | 1.402E-01 | FAIL ABUN |
| PB-214 | 6.658E-02 | 8.872E-02 | 1.433E-01 | FAIL ABUN |
| RN-219 | -9.910E-02 | 3.506E-01 | 6.174E-01 | NOT IDENT. |
| RN-222 | 4.620E-02 | 9.230E-02 | 1.402E-01 | FAIL ABUN |
| RA-223 | -1.672E-01 | 5.451E-01 | 9.658E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-226 | 4.620E-02 | 9.230E-02 | 1.402E-01 | FAIL ABUN |
| AC-227 | -3.477E-02 | 1.985E-01 | 3.183E-01 | NOT IDENT. |
| TH-227 | -3.477E-02 | 1.985E-01 | 3.183E-01 | NOT IDENT. |
| AC-228 | -4.085E-02 | 9.830E-02 | 1.979E-01 | NOT IDENT. |
| RA-228 | -4.085E-02 | 9.830E-02 | 1.979E-01 | NOT IDENT. |
| TH-228 | 6.125E-02 | 7.939E-02 | 9.677E-02 | FAIL ABUN |
| TH-229 | -2.060E-01 | 3.869E-01 | 6.880E-01 | FAIL ABUN |
| TH-230 | 4.620E-02 | 9.229E-02 | 1.402E-01 | FAIL ABUN |
| PA-231 | 1.176E-01 | 9.870E-01 | 1.885E+00 | NOT IDENT. |
| TH-231 | -1.672E-01 | 5.451E-01 | 9.658E-01 | FAIL ABUN |
| TH-232 | -4.085E-02 | 9.830E-02 | 1.979E-01 | NOT IDENT. |
| PA-233 | -3.460E-02 | 5.149E-02 | 8.741E-02 | NOT IDENT. |
| PA-234 | 7.641E-02 | 2.151E-01 | 4.665E-01 | FAIL ABUN |
| PA-234M | -1.047E+00 | 2.497E+00 | 4.769E+00 | NOT IDENT. |
| TH-234 | -6.478E-01 | 1.149E+00 | 2.012E+00 | FAIL ABUN |
| U-234 | 4.620E-02 | 9.229E-02 | 1.402E-01 | FAIL ABUN |
| NP-237 | -3.460E-02 | 5.149E-02 | 8.741E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 2.396E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -6.478E-01 | 1.149E+00 | 2.012E+00 | FAIL ABUN |
| NP-239 | -1.722E-02 | 2.792E-01 | 4.990E-01 | NOT IDENT. |
| PU-239 | 3.141E+01 | 2.523E+02 | 4.544E+02 | NOT IDENT. |
| AM-241 | 6.682E-03 | 1.255E-01 | 2.343E-01 | NOT IDENT. |
| AM-243 | -3.977E-03 | 4.150E-02 | 7.450E-02 | NOT IDENT. |
| CM-243 | 2.259E-03 | 7.131E-02 | 1.290E-01 | NOT IDENT. |
| CM-247 | -1.478E-02 | 3.142E-02 | 5.390E-02 | NOT IDENT. |
| CF-249 | 2.357E-03 | 2.802E-02 | 5.318E-02 | FAIL ABUN |
| CF-251 | -4.220E-02 | 9.180E-02 | 1.654E-01 | NOT IDENT. |
| ANH-511 | -4.612E-02 | 3.896E-02 | 8.010E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:03.14

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 93.23 | 38 | 49 | 0.81 | 186.04 | 182 | 9 | 1.06E-02 | 37.0 | |
| 2 | 0 | 110.31 | 39 | 26 | 2.57 | 220.18 | 216 | 10 | 1.09E-02 | 28.9 | |
| 3 | 0 | 143.74 | 27 | 56 | 1.36 | 287.03 | 282 | 11 | 7.62E-03 | 55.8 | |
| 4 | 4 | 185.73 | 34 | 20 | 1.45 | 370.98 | 366 | 11 | 9.46E-03 | 32.2 | 2.13E+00 |
| 5 | 4 | 187.22 | 14 | 14 | 1.25 | 373.96 | 366 | 11 | 4.01E-03 | 58.4 | |
| 6 | 0 | 211.78 | 15 | 40 | 1.81 | 423.08 | 416 | 9 | 4.05E-03 | 84.3 | |
| 7 | 0 | 237.93 | 39 | 48 | 4.81 | 475.37 | 468 | 13 | 1.09E-02 | 40.0 | |
| 8 | 0 | 241.91 | 18 | 25 | 1.47 | 483.32 | 481 | 7 | 4.92E-03 | 54.1 | |
| 9 | 0 | 252.40 | 31 | 20 | 4.60 | 504.30 | 499 | 13 | 8.47E-03 | 34.9 | |
| 10 | 0 | 352.30 | 27 | 25 | 0.74 | 704.07 | 699 | 10 | 7.50E-03 | 39.6 | |
| 11 | 0 | 512.20 | 53 | 37 | 2.47 | 1023.86 | 1017 | 20 | 1.48E-02 | 33.2 | |
| 12 | 0 | 533.32 | 10 | 6 | 1.58 | 1066.11 | 1060 | 9 | 2.67E-03 | 58.0 | |
| 13 | 0 | 554.14 | 20 | 3 | 3.41 | 1107.75 | 1103 | 10 | 5.66E-03 | 26.6 | |
| 14 | 0 | 583.53 | 10 | 5 | 1.30 | 1166.53 | 1161 | 9 | 2.64E-03 | 51.7 | |
| 15 | 0 | 598.02 | 26 | 3 | 2.88 | 1195.51 | 1190 | 11 | 7.33E-03 | 22.9 | |
| 16 | 0 | 609.74 | 19 | 18 | 1.57 | 1218.96 | 1211 | 12 | 5.30E-03 | 50.0 | |
| 17 | 0 | 622.16 | 13 | 3 | 1.64 | 1243.79 | 1239 | 10 | 3.72E-03 | 35.2 | |
| 18 | 0 | 898.47 | 11 | 0 | 0.83 | 1796.55 | 1791 | 10 | 3.06E-03 | 30.2 | |
| 19 | 0 | 1460.43 | 29 | 0 | 1.63 | 2921.10 | 2914 | 14 | 8.06E-03 | 18.6 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:05.26

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 25 | 10.66* | 9.534E-01 | 1.109E+00 | 1.109E+00 | 43.71 |
| RH-106 | 621.93 | 13 | 9.93* | 2.015E+00 | 2.995E-01 | 3.576E-01 | 70.37 |
| | 1050.41 | ------ | 1.56 | 1.283E+00 | ------ | Line Not Found | ------ |
| RU-106 | 621.93 | 13 | 9.93* | 2.015E+00 | 2.995E-01 | 3.576E-01 | 70.37 |
| | 1050.41 | ------ | 1.56 | 1.283E+00 | ------ | Line Not Found | ------ |
| TE-125M | 109.28 | 34 | 0.27* | 5.051E+00 | 1.113E+01 | 3.511E+01 | 68.54 |
| TL-208 | 277.37 | ------ | 6.60 | 3.644E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 2 | 85.00* | 2.120E+00 | 6.055E-03 | 6.055E-03 | 444.92 |
| | 860.56 | ------ | 12.50 | 1.535E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 2.996E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 16 | 12.92* | 3.082E+00 | 1.834E-01 | 1.834E-01 | 135.97 |
| RA-224 | 240.99 | 18 | 4.10* | 3.993E+00 | 4.839E-01 | 4.839E-01 | 108.25 |
| U-235 | 89.96 | ------ | 3.47 | 4.315E+00 | ------ | Line Not Found | ------ |
| | 93.35 | 5 | 5.60 | 4.489E+00 | 9.619E-02 | 9.619E-02 | 541.44 |
| | 143.76 | 20 | 10.96* | 5.147E+00 | 1.606E-01 | 1.606E-01 | 154.09 |
| | 163.33 | ------ | 5.08 | 4.953E+00 | ------ | Line Not Found | ------ |
| | 185.72 | 12 | 57.20 | 4.672E+00 | 2.065E-02 | 2.065E-02 | 187.90 |
| | 205.31 | ------ | 5.01 | 4.421E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341146006 Acquisition date : 10-FEB-2014 13:23:49

Total number of lines in spectrum 17
Number of unidentified lines 3
Number of lines tentatively identified by NID 14 82.35%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.109E+00 | 1.109E+00 | 0.485E+00 | 43.71 | |
| RH-106 | 371.80D | 1.19 | 2.995E-01 | 3.576E-01 | 2.517E-01 | 70.37 | |
| RU-106 | 371.80D | 1.19 | 2.995E-01 | 3.576E-01 | 2.517E-01 | 70.37 | |
| TE-125M | 57.40D | 3.16 | 1.113E+01 | 3.511E+01 | 2.407E+01 | 68.54 | |
| TL-208 | 1.41E+10Y | 1.00 | 6.055E-03 | 6.055E-03 | 26.94E-03 | 444.92 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.834E-01 | 1.834E-01 | 2.494E-01 | 135.97 | |
| RA-224 | 1.41E+10Y | 1.00 | 4.839E-01 | 4.839E-01 | 5.238E-01 | 108.25 | |
| U-235 | 7.04E+08Y | 1.00 | 1.606E-01 | 1.606E-01 | 2.474E-01 | 154.09 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 1.367E+01 | 3.777E+01 | | | |
| | Grand Total Activity : | | 1.367E+01 | 3.777E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146006 Acquisition date : 10-FEB-2014 13:23:49

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 211.78 | 15 | 40 | 1.81 | 423.08 | 416 | 9 | 4.05E-03 | **** | 4.34E+00 | T |
| 0 | 237.93 | 24 | 48 | 4.81 | 475.37 | 468 | 13 | 6.70E-03 | **** | 4.04E+00 | T |
| 0 | 252.40 | 31 | 20 | 4.60 | 504.30 | 499 | 13 | 8.47E-03 | 69.8 | 3.88E+00 | T |
| 0 | 533.32 | 10 | 6 | 1.58 | 1066.11 | 1060 | 9 | 2.67E-03 | **** | 2.27E+00 | |
| 0 | 554.14 | 20 | 3 | 3.41 | 1107.75 | 1103 | 10 | 5.66E-03 | 53.1 | 2.21E+00 | |
| 0 | 598.02 | 26 | 3 | 2.88 | 1195.51 | 1190 | 11 | 7.33E-03 | 45.8 | 2.08E+00 | |
| 0 | 609.74 | 10 | 18 | 1.57 | 1218.96 | 1211 | 12 | 2.67E-03 | **** | 2.05E+00 | T |
| 0 | 898.47 | 11 | 0 | 0.83 | 1796.55 | 1791 | 10 | 3.06E-03 | 60.3 | 1.48E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:18.43

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146006.CNF;1    *
* Acquisition date : 10-FEB-2014 13:23:49 Sensitivity     : 3.000          *
* Detector ID      : GAM06                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 09:58:00 Nuclide Library : SOLID          *
* Sample ID        : G341146006           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.6794E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 1.389E-01 |
| RH-106 | 1.627E-01 |
| RU-106 | 1.627E-01 |
| TE-125M | 1.304E+01 |
| TL-208 | 1.879E-02 |
| BI-211 | 1.471E-01 |
| RA-224 | 3.918E-01 |
| U-235 | 1.180E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.089E-01 | NOT IDENT. |
| NA-22 | 2.745E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.289E-02 | NOT IDENT. |
| SC-46 | 3.169E-02 | NOT IDENT. |
| V-48 | 9.996E-01 | NOT IDENT. |
| CR-51 | 2.150E+00 | NOT IDENT. |
| MN-54 | 2.288E-02 | NOT IDENT. |
| CO-56 | 4.656E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.860E-02 | NOT IDENT. |
| CO-58 | 5.263E-02 | NOT IDENT. |
| FE-59 | 1.614E-01 | NOT IDENT. |
| CO-60 | 2.506E-02 | NOT IDENT. |
| ZN-65 | 5.667E-02 | NOT IDENT. |
| GE-68 | 9.743E-01 | NOT IDENT. |
| AS-73 | 1.394E+00 | NOT IDENT. |
| AS-74 | 1.572E+00 | NOT IDENT. |
| SE-75 | 4.728E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.693E+00 | NOT IDENT. |
| RB-83 | 6.783E-02 | NOT IDENT. |
| KR-85 | 6.410E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SR-85 | 7.874E-02 | NOT IDENT. |
| RB-86 | 9.915E+00 | NOT IDENT. |
| Y-88 | 2.430E-02 | FAIL ABUN |
| Y-91 | 2.674E+01 | NOT IDENT. |
| NB-94 | 2.501E-02 | NOT IDENT. |
| NB-95 | 5.036E-02 | NOT IDENT. |
| NB-95M | 1.760E-01 | NOT IDENT. |
| ZR-95 | 1.008E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.262E-02 | NOT IDENT. |
| RH-102 | 3.528E-02 | NOT IDENT. |
| RU-103 | 1.013E-01 | FAIL ABUN |
| AG-108M | 1.448E-02 | NOT IDENT. |
| CD-109 | 5.243E-01 | NOT IDENT. |
| AG-110M | 4.282E-02 | NOT IDENT. |
| SN-113 | 4.858E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.698E+00 | NOT IDENT. |
| TE-123M | 2.268E-02 | NOT IDENT. |
| SB-124 | 6.434E-02 | NOT IDENT. |
| SB-125 | 6.404E-02 | NOT IDENT. |
| I-126 | 9.469E+00 | NOT IDENT. |
| SB-126 | 6.087E+00 | NOT IDENT. |
| SN-126 | 4.258E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.408E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.751E-02 | NOT IDENT. |
| CS-135 | 1.071E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.478E+00 | NOT IDENT. |
| BA-137M | 2.480E-02 | NOT IDENT. |
| CS-137 | 2.620E-02 | NOT IDENT. |
| CE-139 | 2.602E-02 | NOT IDENT. |
| BA-140 | 1.104E+00 | NOT IDENT. |
| LA-140 | 1.104E+00 | NOT IDENT. |
| CE-141 | 2.288E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.320E-01 | NOT IDENT. |
| PM-144 | 2.089E-02 | NOT IDENT. |
| PR-144 | 1.634E+00 | NOT IDENT. |
| PM-146 | 2.982E-02 | NOT IDENT. |
| ND-147 | 5.620E+01 | NOT IDENT. |
| PM-147 | 4.551E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.862E-02 | FAIL ABUN |
| EU-152 | 6.382E-02 | NOT IDENT. |
| GD-153 | 6.204E-02 | NOT IDENT. |
| EU-154 | 7.468E-02 | NOT IDENT. |
| EU-155 | 5.276E-02 | NOT IDENT. |
| TB-160 | 1.647E-01 | NOT IDENT. |
| HO-166M | 4.012E-02 | FAIL ABUN |
| TM-171 | 1.740E+01 | NOT IDENT. |
| LU-176 | 1.943E-02 | NOT IDENT. |
| HF-181 | 9.088E-02 | NOT IDENT. |
| TA-182 | 1.521E-01 | NOT IDENT. |
| RE-183 | 3.007E-01 | NOT IDENT. |
| RE-184 | 2.973E-01 | NOT IDENT. |
| W-188 | 9.553E+00 | NOT IDENT. |
| IR-192 | 5.113E-02 | NOT IDENT. |
| HG-203 | 7.603E-02 | NOT IDENT. |
| BI-207 | 3.382E-02 | NOT IDENT. |
| PB-210 | 3.331E+00 | NOT IDENT. |
| PB-211 | 4.902E-01 | NOT IDENT. |
| BI-212 | 3.298E-01 | NOT IDENT. |
| PB-212 | 4.496E-02 | FAIL ABUN |
| BI-214 | 6.365E-02 | FAIL ABUN |
| PB-214 | 6.616E-02 | FAIL ABUN |
| RN-219 | 2.761E-01 | NOT IDENT. |
| RN-222 | 6.365E-02 | FAIL ABUN |
| RA-223 | 4.368E-01 | FAIL ABUN |
| RA-226 | 6.365E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.426E-01 | NOT IDENT. |
| TH-227 | 1.426E-01 | NOT IDENT. |
| AC-228 | 8.289E-02 | NOT IDENT. |
| RA-228 | 8.289E-02 | NOT IDENT. |
| TH-228 | 4.496E-02 | FAIL ABUN |
| TH-229 | 3.142E-01 | FAIL ABUN |
| TH-230 | 6.364E-02 | FAIL ABUN |
| PA-231 | 8.435E-01 | NOT IDENT. |
| TH-231 | 4.368E-01 | FAIL ABUN |
| TH-232 | 8.289E-02 | NOT IDENT. |
| PA-233 | 3.905E-02 | NOT IDENT. |
| PA-234 | 1.976E-01 | FAIL ABUN |
| PA-234M | 1.847E+00 | NOT IDENT. |
| TH-234 | 9.249E-01 | FAIL ABUN |
| U-234 | 6.364E-02 | FAIL ABUN |
| NP-237 | 3.905E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 9.249E-01 | FAIL ABUN |
| NP-239 | 2.273E-01 | NOT IDENT. |
| PU-239 | 2.089E+02 | NOT IDENT. |
| AM-241 | 1.067E-01 | NOT IDENT. |
| AM-243 | 3.442E-02 | NOT IDENT. |
| CM-243 | 5.856E-02 | NOT IDENT. |
| CM-247 | 2.396E-02 | NOT IDENT. |
| CF-249 | 2.341E-02 | FAIL ABUN |
| CF-251 | 7.543E-02 | NOT IDENT. |
| ANH-511 | 3.749E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:23.24

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146006.CNF;1    *
* Acquisition date : 10-FEB-2014 13:23:49 Sensitivity     : 3.000            *
* Detector ID      : GAM06                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 09:58:00 Nuclide Library : SOLID            *
* Sample ID        : G341146006           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.6794E+02 GRAM  *
*                                         Quantity Err(%) : 1.1909E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8          *
**************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.109E+00 | 4.848E-01 | 4.848E-01 |
| RH-106 | 3.576E-01 | 2.489E-01 | 2.489E-01 |
| RU-106 | 3.576E-01 | 2.489E-01 | 2.489E-01 |
| TE-125M | 3.511E+01 | 2.382E+01 | 2.382E+01 |
| TL-208 | 6.055E-03 | 2.641E-02 | 2.641E-02 |
| BI-211 | 1.834E-01 | 2.449E-01 | 2.449E-01 |
| RA-224 | 4.839E-01 | 5.151E-01 | 5.151E-01 |
| U-235 | 1.606E-01 | 2.429E-01 | 2.429E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 5.145E-01 | 7.587E-01 | 7.934E-01 | NOT IDENT. |
| NA-22 | 1.464E-02 | 2.947E-02 | 3.020E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.659E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.640E-02 | 3.130E-02 | 3.534E-02 | NOT IDENT. |
| SC-46 | -5.126E-02 | 5.434E-02 | 5.905E-02 | NOT IDENT. |
| V-48 | -2.509E-01 | 1.251E+00 | 1.256E+00 | NOT IDENT. |
| CR-51 | 1.224E+00 | 2.437E+00 | 2.499E+00 | NOT IDENT. |
| MN-54 | -1.757E-02 | 3.207E-02 | 3.304E-02 | NOT IDENT. |
| CO-56 | -4.992E-02 | 6.801E-02 | 7.164E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.847E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -6.728E-03 | 2.352E-02 | 2.372E-02 | NOT IDENT. |
| CO-58 | 1.251E-02 | 6.083E-02 | 6.109E-02 | NOT IDENT. |
| FE-59 | -9.362E-02 | 2.222E-01 | 2.262E-01 | NOT IDENT. |
| CO-60 | -2.094E-03 | 3.079E-02 | 3.080E-02 | NOT IDENT. |
| ZN-65 | -6.887E-02 | 8.427E-02 | 8.981E-02 | NOT IDENT. |
| GE-68 | 2.811E-01 | 1.087E+00 | 1.094E+00 | NOT IDENT. |
| AS-73 | 6.854E-01 | 1.573E+00 | 1.603E+00 | NOT IDENT. |
| AS-74 | 1.386E+00 | 1.825E+00 | 1.929E+00 | NOT IDENT. |
| SE-75 | -2.565E-02 | 5.899E-02 | 6.011E-02 | NOT IDENT. |
| BR-77 | 1.308E+11 | 3.973E+11 | 4.016E+11 | SHORT HLIF |
| SR-82 | 4.702E-01 | 1.930E+00 | 1.941E+00 | NOT IDENT. |
| RB-83 | -6.272E-02 | 9.210E-02 | 9.634E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | -2.661E+00 | 7.785E+00 | 7.876E+00 | NOT IDENT. |
| SR-85 | -3.294E-02 | 9.566E-02 | 9.680E-02 | NOT IDENT. |
| RB-86 | 3.131E+00 | 1.101E+01 | 1.110E+01 | NOT IDENT. |
| Y-88 | -1.040E-02 | 3.542E-02 | 3.573E-02 | FAIL ABUN |
| Y-91 | 1.397E+01 | 2.768E+01 | 2.839E+01 | NOT IDENT. |
| NB-94 | 1.958E-02 | 2.666E-02 | 2.809E-02 | NOT IDENT. |
| NB-95 | -1.388E-02 | 6.401E-02 | 6.431E-02 | NOT IDENT. |
| NB-95M | 6.288E-02 | 2.256E-01 | 2.274E-01 | NOT IDENT. |
| ZR-95 | -5.597E-02 | 1.333E-01 | 1.357E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 7.879E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -5.991E+40 | 3.078E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.934E+09 | 5.913E+09 | 5.977E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 9.785E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.606E-02 | 2.618E-02 | 2.716E-02 | NOT IDENT. |
| RH-102 | 1.317E-02 | 3.934E-02 | 3.978E-02 | NOT IDENT. |
| RU-103 | -5.063E-02 | 1.264E-01 | 1.284E-01 | FAIL ABUN |
| AG-108M | -1.850E-02 | 2.152E-02 | 2.308E-02 | NOT IDENT. |
| CD-109 | 4.311E-02 | 6.567E-01 | 6.570E-01 | NOT IDENT. |
| AG-110M | 4.581E-02 | 4.155E-02 | 4.640E-02 | NOT IDENT. |
| SN-113 | 1.896E-02 | 5.612E-02 | 5.677E-02 | NOT IDENT. |
| CD-115 | 8.683E+10 | 6.198E+11 | 6.210E+11 | SHORT HLIF |
| SN-117M | -1.027E+00 | 2.244E+00 | 2.291E+00 | NOT IDENT. |
| TE-123M | -2.603E-02 | 3.177E-02 | 3.387E-02 | NOT IDENT. |
| SB-124 | -4.121E-02 | 1.043E-01 | 1.060E-01 | NOT IDENT. |
| SB-125 | -5.375E-03 | 7.916E-02 | 7.919E-02 | NOT IDENT. |
| I-126 | 6.436E-02 | 1.128E+01 | 1.128E+01 | NOT IDENT. |
| SB-126 | -9.185E-01 | 7.539E+00 | 7.550E+00 | NOT IDENT. |
| SN-126 | -2.242E-02 | 5.371E-02 | 5.465E-02 | NOT IDENT. |
| SB-127 | -8.572E+04 | 1.726E+06 | 1.727E+06 | SHORT HLIF |
| I-131 | -7.773E+01 | 7.996E+01 | 8.730E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.677E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 8.447E+06 | 1.942E+07 | 1.979E+07 | SHORT HLIF |
| BA-133 | -2.792E-02 | 3.928E-02 | 4.125E-02 | NOT IDENT. |
| I-133 | 4.149E+30 | 2.911E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.451E-02 | 3.005E-02 | 3.075E-02 | NOT IDENT. |
| CS-135 | -2.588E-02 | 1.299E-01 | 1.304E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 3.532E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.902E+00 | 4.841E+00 | 4.916E+00 | NOT IDENT. |
| BA-137M | 2.047E-02 | 2.658E-02 | 2.813E-02 | NOT IDENT. |
| CS-137 | 2.162E-02 | 2.807E-02 | 2.972E-02 | NOT IDENT. |
| CE-139 | -1.398E-02 | 3.160E-02 | 3.222E-02 | NOT IDENT. |
| BA-140 | -1.040E+01 | 6.153E+00 | 7.736E+00 | NOT IDENT. |
| LA-140 | -1.040E+01 | 6.153E+00 | 7.736E+00 | NOT IDENT. |
| CE-141 | 9.494E-02 | 3.038E-01 | 3.068E-01 | NOT IDENT. |
| CE-143 | -1.050E+19 | 3.029E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -3.200E-02 | 1.661E-01 | 1.668E-01 | NOT IDENT. |
| PM-144 | -1.121E-02 | 2.745E-02 | 2.791E-02 | NOT IDENT. |
| PR-144 | -8.657E-01 | 2.144E+00 | 2.179E+00 | NOT IDENT. |
| PM-146 | 2.512E-02 | 3.235E-02 | 3.428E-02 | NOT IDENT. |
| ND-147 | 7.668E-01 | 7.564E+01 | 7.564E+01 | NOT IDENT. |
| PM-147 | -3.540E+02 | 5.987E+02 | 6.196E+02 | NOT IDENT. |
| PM-149 | 3.752E+11 | 5.060E+12 | 5.063E+12 | SHORT HLIF |
| EU-150 | -9.060E-05 | 2.239E-02 | 2.239E-02 | FAIL ABUN |
| EU-152 | -9.063E-03 | 7.815E-02 | 7.825E-02 | NOT IDENT. |
| GD-153 | 4.030E-02 | 7.754E-02 | 7.964E-02 | NOT IDENT. |
| EU-154 | 3.982E-02 | 8.017E-02 | 8.216E-02 | NOT IDENT. |
| EU-155 | -3.934E-02 | 7.348E-02 | 7.559E-02 | NOT IDENT. |
| TB-160 | 7.005E-02 | 1.821E-01 | 1.848E-01 | NOT IDENT. |
| HO-166M | 2.289E-02 | 4.364E-02 | 4.485E-02 | FAIL ABUN |
| TM-171 | 2.058E+01 | 1.836E+01 | 2.057E+01 | NOT IDENT. |
| LU-176 | 1.685E-02 | 2.120E-02 | 2.252E-02 | NOT IDENT. |
| HF-181 | -8.334E-02 | 1.200E-01 | 1.258E-01 | NOT IDENT. |
| TA-182 | 8.194E-02 | 1.571E-01 | 1.613E-01 | NOT IDENT. |
| RE-183 | -1.335E-01 | 3.717E-01 | 3.765E-01 | NOT IDENT. |
| RE-184 | 2.366E-01 | 2.987E-01 | 3.172E-01 | NOT IDENT. |
| W-188 | -3.046E-01 | 1.142E+01 | 1.143E+01 | NOT IDENT. |
| IR-192 | -2.044E-02 | 6.382E-02 | 6.448E-02 | NOT IDENT. |
| HG-203 | 2.363E-02 | 8.725E-02 | 8.790E-02 | NOT IDENT. |
| BI-207 | 3.529E-02 | 3.161E-02 | 3.539E-02 | NOT IDENT. |
| PB-210 | -1.792E+00 | 4.105E+00 | 4.184E+00 | NOT IDENT. |
| PB-211 | -1.498E-02 | 5.991E-01 | 5.991E-01 | NOT IDENT. |
| BI-212 | 2.204E-01 | 3.523E-01 | 3.661E-01 | NOT IDENT. |
| PB-212 | 6.125E-02 | 7.957E-02 | 8.422E-02 | FAIL ABUN |
| BI-214 | 4.620E-02 | 9.237E-02 | 9.469E-02 | FAIL ABUN |
| PB-214 | 6.658E-02 | 8.890E-02 | 9.383E-02 | FAIL ABUN |
| RN-219 | -9.910E-02 | 3.509E-01 | 3.537E-01 | NOT IDENT. |
| RN-222 | 4.620E-02 | 9.237E-02 | 9.469E-02 | FAIL ABUN |
| RA-223 | -1.672E-01 | 5.454E-01 | 5.505E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-226 | 4.620E-02 | 9.237E-02 | 9.469E-02 | FAIL ABUN |
| AC-227 | -3.477E-02 | 1.986E-01 | 1.992E-01 | NOT IDENT. |
| TH-227 | -3.477E-02 | 1.986E-01 | 1.992E-01 | NOT IDENT. |
| AC-228 | -4.085E-02 | 9.844E-02 | 1.001E-01 | NOT IDENT. |
| RA-228 | -4.085E-02 | 9.844E-02 | 1.001E-01 | NOT IDENT. |
| TH-228 | 6.125E-02 | 7.957E-02 | 8.422E-02 | FAIL ABUN |
| TH-229 | -2.060E-01 | 3.873E-01 | 3.983E-01 | FAIL ABUN |
| TH-230 | 4.620E-02 | 9.236E-02 | 9.468E-02 | FAIL ABUN |
| PA-231 | 1.176E-01 | 9.870E-01 | 9.885E-01 | NOT IDENT. |
| TH-231 | -1.672E-01 | 5.454E-01 | 5.505E-01 | FAIL ABUN |
| TH-232 | -4.085E-02 | 9.844E-02 | 1.001E-01 | NOT IDENT. |
| PA-233 | -3.460E-02 | 5.158E-02 | 5.389E-02 | NOT IDENT. |
| PA-234 | 7.641E-02 | 2.324E-01 | 2.349E-01 | FAIL ABUN |
| PA-234M | -1.047E+00 | 2.501E+00 | 2.545E+00 | NOT IDENT. |
| TH-234 | -6.478E-01 | 1.158E+00 | 1.194E+00 | FAIL ABUN |
| U-234 | 4.620E-02 | 9.236E-02 | 9.468E-02 | FAIL ABUN |
| NP-237 | -3.460E-02 | 5.158E-02 | 5.389E-02 | FAIL ABUN |
| NP-238 | 4.059E+11 | 2.397E+12 | 2.404E+12 | SHORT HLIF |
| U-238 | -6.478E-01 | 1.158E+00 | 1.194E+00 | FAIL ABUN |
| NP-239 | -1.722E-02 | 2.792E-01 | 2.793E-01 | NOT IDENT. |
| PU-239 | 3.141E+01 | 2.523E+02 | 2.527E+02 | NOT IDENT. |
| AM-241 | 6.682E-03 | 1.255E-01 | 1.255E-01 | NOT IDENT. |
| AM-243 | -3.977E-03 | 4.151E-02 | 4.154E-02 | NOT IDENT. |
| CM-243 | 2.259E-03 | 7.131E-02 | 7.132E-02 | NOT IDENT. |
| CM-247 | -1.478E-02 | 3.154E-02 | 3.223E-02 | NOT IDENT. |
| CF-249 | 2.357E-03 | 2.802E-02 | 2.804E-02 | FAIL ABUN |
| CF-251 | -4.220E-02 | 9.196E-02 | 9.390E-02 | NOT IDENT. |
| ANH-511 | -4.612E-02 | 3.914E-02 | 4.432E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

## GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 32.5677 | 94.67 | 37.8464 | 193.51 | 46.3791 |
| 45.60 | 38.3959 | 94.87 | 37.8607 | 197.03 | 41.0865 |
| 46.54 | 39.4445 | 97.43 | 28.5315 | 198.01 | 51.1862 |
| 49.72 | 0.0000 | 98.43 | 29.2193 | 201.83 | 40.3896 |
| 51.35 | 35.2394 | 98.44 | 29.2199 | 205.31 | 54.5515 |
| 52.39 | 23.8800 | 99.53 | 38.1888 | 210.85 | 22.2488 |
| 53.44 | 29.6975 | 100.11 | 38.2291 | 215.65 | 32.3019 |
| 57.36 | 0.0000 | 103.18 | 24.5592 | 222.11 | 39.4000 |
| 57.53 | 36.8059 | 103.37 | 27.7719 | 227.09 | 37.7161 |
| 57.98 | 36.8491 | 105.21 | 34.7206 | 227.38 | 34.8978 |
| 59.32 | 29.1927 | 105.31 | 34.7267 | 228.16 | 0.0000 |
| 59.54 | 34.0773 | 106.12 | 22.5400 | 228.18 | 37.7579 |
| 63.29 | 43.2461 | 109.28 | 29.1385 | 117.23 | 37.7579 |
| 63.58 | 38.3591 | 111.00 | 31.3886 | 235.69 | 31.9563 |
| 64.28 | 30.5429 | 111.76 | 0.0000 | 235.96 | 35.0090 |
| 66.73 | 46.5814 | 116.30 | 0.0000 | 238.63 | 38.1537 |
| 67.24 | 45.6455 | 117.23 | 36.0892 | 238.98 | 0.0000 |
| 67.75 | 44.7070 | 121.12 | 44.0194 | 240.99 | 38.2419 |
| 69.67 | 34.9288 | 121.22 | 47.3283 | 242.00 | 47.4665 |
| 70.83 | 48.0300 | 121.78 | 39.6590 | 244.70 | 30.7036 |
| 72.81 | 46.2361 | 122.06 | 44.0851 | 252.40 | 0.0000 |
| 72.87 | 46.2424 | 123.07 | 41.9477 | 252.80 | 27.0735 |
| 74.66 | 51.4737 | 127.23 | 41.1087 | 254.15 | 0.0000 |
| 74.82 | 51.4918 | 129.30 | 41.2392 | 256.23 | 27.9366 |
| 74.97 | 49.4890 | 131.20 | 45.8293 | 260.90 | 0.0000 |
| 77.11 | 45.6619 | 133.02 | 32.5043 | 264.66 | 41.0586 |
| 79.69 | 54.0775 | 133.52 | 37.0152 | 268.22 | 41.1906 |
| 80.12 | 54.1265 | 136.00 | 45.0317 | 269.46 | 37.3094 |
| 80.19 | 0.0000 | 136.47 | 43.9365 | 271.23 | 32.4516 |
| 80.57 | 44.9778 | 140.51 | 0.0000 | 273.65 | 40.4057 |
| 81.00 | 45.0185 | 143.76 | 40.9841 | 276.40 | 29.6370 |
| 81.07 | 45.0250 | 144.24 | 41.0120 | 277.37 | 22.7410 |
| 83.79 | 30.8722 | 145.44 | 44.5046 | 277.60 | 20.7677 |
| 85.43 | 43.3655 | 152.43 | 42.6311 | 278.00 | 18.7965 |
| 86.55 | 46.5678 | 153.25 | 43.8316 | 279.20 | 23.7678 |
| 86.79 | 46.5898 | 323.87 | 39.2686 | 279.54 | 24.7658 |
| 86.94 | 53.8535 | 156.02 | 35.8907 | 280.46 | 27.7599 |
| 87.09 | 53.8697 | 158.56 | 38.3352 | 283.69 | 22.8666 |
| 87.57 | 47.6995 | 159.00 | 41.8444 | 284.31 | 0.0000 |
| 88.03 | 44.8370 | 162.33 | 30.6445 | 285.41 | 21.9050 |
| 88.34 | 44.8644 | 163.33 | 30.6840 | 285.90 | 0.0000 |
| 88.47 | 35.8385 | 165.86 | 44.8565 | 287.50 | 24.9367 |
| 89.96 | 42.1945 | 176.31 | 36.5347 | 290.67 | 26.0040 |
| 91.11 | 51.6864 | 176.60 | 36.5478 | 293.27 | 0.0000 |
| 92.59 | 48.1686 | 177.52 | 43.7281 | 351.93 | 30.1199 |
| 93.35 | 48.2386 | 181.07 | 0.0000 | 295.96 | 33.1526 |
| 94.56 | 37.8386 | 184.41 | 27.3545 | 879.38 | 41.2796 |
| 94.65 | 37.8450 | 143.76 | 32.4435 | 299.98 | 36.2878 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 28.2264 | 487.02 | 16.4927 | 702.65 | 11.2087 |
| 300.13 | 28.2273 | 492.35 | 0.0000 | 706.68 | 18.3731 |
| 301.36 | 24.2194 | 497.08 | 20.2732 | 711.68 | 9.2061 |
| 302.85 | 30.3113 | 505.52 | 32.4058 | 720.70 | 8.2145 |
| 256.23 | 39.4582 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 23.3138 | 511.00 | 22.2883 | 722.78 | 7.1940 |
| 308.46 | 27.4054 | 514.00 | 43.7203 | 722.91 | 7.1943 |
| 311.90 | 33.5891 | 514.00 | 43.7203 | 723.31 | 10.2793 |
| 316.51 | 35.7562 | 520.40 | 16.8025 | 724.19 | 11.3113 |
| 319.41 | 30.7187 | 520.69 | 0.0000 | 727.33 | 8.2373 |
| 320.08 | 30.7349 | 522.65 | 0.0000 | 733.00 | 14.4491 |
| 321.04 | 30.7585 | 527.90 | 0.0000 | 735.93 | 15.4999 |
| 323.87 | 34.9370 | 529.59 | 15.6352 | 333.97 | 14.4758 |
| 325.23 | 38.0597 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 26.8181 | 531.02 | 15.6474 | 747.24 | 13.4958 |
| 333.37 | 27.9488 | 546.56 | 0.0000 | 748.06 | 11.4232 |
| 333.97 | 30.0328 | 552.55 | 14.2430 | 752.31 | 14.5640 |
| 334.37 | 32.1135 | 563.25 | 12.4122 | 753.82 | 7.2864 |
| 338.28 | 20.7800 | 569.33 | 8.6197 | 756.73 | 14.5899 |
| 338.32 | 20.7809 | 946.00 | 9.5781 | 756.80 | 14.5903 |
| 311.90 | 24.9778 | 569.70 | 11.4949 | 884.68 | 10.4517 |
| 340.48 | 24.9778 | 583.19 | 10.6084 | 765.81 | 10.4595 |
| 340.55 | 24.9789 | 584.27 | 11.2574 | 766.42 | 9.4157 |
| 344.28 | 27.1362 | 595.83 | 11.3217 | 766.84 | 10.4639 |
| 345.93 | 25.0796 | 427.87 | 13.6175 | 772.60 | 0.0000 |
| 351.06 | 31.8885 | 602.52 | 0.0000 | 776.52 | 7.3529 |
| 351.93 | 27.2906 | 602.73 | 4.8685 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 9.7463 | 778.90 | 8.4111 |
| 356.01 | 30.3196 | 609.32 | 4.8839 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 8.1439 | 785.37 | 11.5948 |
| 366.42 | 0.0000 | 614.28 | 4.8955 | 792.07 | 16.9094 |
| 375.05 | 29.8812 | 618.01 | 4.9043 | 794.95 | 5.2900 |
| 356.01 | 20.4003 | 620.36 | 3.2731 | 795.86 | 7.4088 |
| 388.16 | 17.2300 | 621.93 | 6.8787 | 810.29 | 8.5143 |
| 388.63 | 16.1584 | 630.19 | 0.0000 | 344.28 | 7.4505 |
| 391.69 | 19.4304 | 631.29 | 9.8699 | 810.76 | 8.5158 |
| 264.66 | 26.0636 | 633.25 | 8.8910 | 815.77 | 12.7980 |
| 401.81 | 28.2570 | 634.78 | 16.8062 | 1048.07 | 8.5408 |
| 402.40 | 28.2681 | 635.95 | 16.8153 | 832.01 | 9.6574 |
| 404.85 | 25.0471 | 636.99 | 0.0000 | 834.85 | 12.8903 |
| 410.95 | 26.2408 | 645.85 | 7.9492 | 835.71 | 10.7454 |
| 413.71 | 20.8114 | 657.76 | 16.9838 | 836.80 | 0.0000 |
| 414.70 | 19.7287 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 24.3049 | 661.66 | 6.0048 | 846.77 | 16.1841 |
| 427.87 | 22.1063 | 664.57 | 0.0000 | 856.80 | 11.9120 |
| 433.94 | 21.0813 | 666.33 | 12.0349 | 860.56 | 9.7596 |
| 439.40 | 18.9266 | 666.50 | 15.0447 | 871.09 | 6.5313 |
| 453.88 | 12.3555 | 667.71 | 0.0000 | 873.19 | 11.9829 |
| 463.37 | 20.7854 | 677.62 | 9.0716 | 875.33 | 0.0000 |
| 468.07 | 11.7811 | 685.70 | 0.0000 | 879.38 | 5.4590 |
| 473.00 | 0.0000 | 695.00 | 14.2188 | 880.51 | 9.8301 |
| 475.06 | 18.1992 | 696.49 | 13.2117 | 883.24 | 5.4664 |
| 476.78 | 17.3064 | 696.51 | 13.2117 | 884.68 | 3.2815 |
| 477.60 | 17.3148 | 697.00 | 14.2311 | 889.28 | 12.0519 |
| 482.18 | 21.0156 | 697.49 | 14.2341 | 894.76 | 3.6592 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 7.6932 | 1298.22 | 0.0000 | | |
| 903.28 | 1.5729 | 1312.11 | 6.2188 | | |
| 911.20 | 8.2806 | 1332.49 | 6.2512 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.4746 | 1365.19 | 1.0505 | | |
| 937.49 | 9.2841 | 1368.63 | 0.0000 | | |
| 944.13 | 4.6525 | 1384.29 | 5.2771 | | |
| 946.00 | 7.4487 | 1408.01 | 3.1847 | | |
| 949.00 | 14.9124 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 1.8428 | | |
| 962.31 | 10.2980 | 1489.16 | 4.3285 | | |
| 964.08 | 8.4305 | 1505.03 | 7.4473 | | |
| 966.17 | 8.4364 | 1596.21 | 11.4007 | | |
| 968.97 | 6.5676 | 1620.50 | 4.7752 | | |
| 983.53 | 5.6564 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.9388 | | |
| 1274.44 | 9.4663 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.6366 | 1764.49 | 2.9520 | | |
| 1004.73 | 4.7461 | 1063.66 | 6.8958 | | |
| 507.63 | 0.0000 | 1771.35 | 2.9560 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 5.9556 | | |
| 1037.84 | 5.7551 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.9958 | | |
| 631.29 | 6.7328 | | | | |
| 1048.07 | 5.7734 | | | | |
| 1049.04 | 5.7754 | | | | |
| 1050.41 | 7.7038 | | | | |
| 1063.66 | 1.9338 | | | | |
| 1077.00 | 6.7958 | | | | |
| 1077.34 | 6.7963 | | | | |
| 1085.87 | 6.8140 | | | | |
| 1099.45 | 7.8190 | | | | |
| 1112.07 | 7.8483 | | | | |
| 1112.84 | 8.8312 | | | | |
| 1115.54 | 13.7488 | | | | |
| 1120.29 | 10.8174 | | | | |
| 1120.55 | 10.8183 | | | | |
| 1221.41 | 8.8531 | | | | |
| 1129.67 | 5.9165 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 4.9925 | | | | |
| 1177.95 | 6.9986 | | | | |
| 1189.05 | 3.0088 | | | | |
| 1204.77 | 3.0219 | | | | |
| 1221.41 | 3.0358 | | | | |
| 1231.02 | 4.0583 | | | | |
| 1235.36 | 6.0945 | | | | |
| 1238.28 | 4.0662 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.0770 | | | | |
| 1274.44 | 2.0527 | | | | |
| 1274.54 | 2.0528 | | | | |
| 1291.59 | 3.0930 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:51.42

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146007.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM07.CNF;364
                                        Background date  : 9-FEB-2014 11:21:01.
Sample date      : 7-NOV-2013 10:04:00. Acquisition date : 10-FEB-2014 13:24:16
Sample ID        : G341146007           Sample quantity  : 1.59240E+02 GRAM
Detector name    : GAM07                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.30  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.77 | 18 | 30 | 1.81 | 107.17 | 103 | 7 | 4.91E-03 | 57.5 | |
| 2 | 0 | 63.36* | 8 | 36 | 1.14 | 126.34 | 122 | 7 | 2.24E-03 | 145.7 | |
| 3 | 4 | 74.30* | 10 | 29 | 1.18 | 148.22 | 146 | 11 | 2.81E-03 | 90.7 | 2.75E+00 |
| 4 | 4 | 76.70* | 17 | 51 | 1.54 | 153.02 | 146 | 11 | 4.85E-03 | 83.7 | |
| 5 | 0 | 130.27 | 24 | 58 | 1.63 | 260.17 | 255 | 12 | 6.76E-03 | 65.4 | |
| 6 | 0 | 185.78* | 6 | 28 | 0.73 | 371.22 | 368 | 7 | 1.59E-03 | 191.4 | |
| 7 | 0 | 238.82* | 40 | 33 | 1.67 | 477.32 | 473 | 8 | 1.12E-02 | 31.3 | |
| 8 | 0 | 282.90 | 5 | 20 | 1.25 | 565.50 | 560 | 8 | 1.39E-03 | 161.2 | |
| 9 | 0 | 295.92* | 31 | 19 | 3.74 | 591.54 | 586 | 11 | 8.64E-03 | 34.2 | |
| 10 | 0 | 352.03* | 20 | 16 | 0.65 | 703.79 | 696 | 13 | 5.42E-03 | 50.2 | |
| 11 | 0 | 496.18 | 8 | 6 | 0.92 | 992.15 | 986 | 9 | 2.22E-03 | 67.5 | |
| 12 | 0 | 502.94 | 12 | 9 | 0.83 | 1005.67 | 1001 | 9 | 3.33E-03 | 53.5 | |
| 13 | 0 | 521.75 | 9 | 4 | 0.71 | 1043.31 | 1039 | 8 | 2.50E-03 | 50.9 | |
| 14 | 0 | 558.59 | 4 | 8 | 1.36 | 1117.00 | 1111 | 8 | 1.11E-03 | 132.3 | |
| 15 | 0 | 583.60* | 7 | 10 | 1.77 | 1167.04 | 1160 | 11 | 2.05E-03 | 105.2 | |
| 16 | 0 | 610.01* | 15 | 15 | 1.45 | 1219.87 | 1214 | 11 | 4.10E-03 | 64.1 | |
| 17 | 0 | 755.80 | 9 | 4 | 1.57 | 1511.53 | 1507 | 8 | 2.61E-03 | 48.8 | |
| 18 | 0 | 911.63* | 7 | 2 | 1.85 | 1823.28 | 1819 | 8 | 2.06E-03 | 57.4 | |
| 19 | 0 | 1181.09 | 8 | 0 | 1.25 | 2362.38 | 2358 | 9 | 2.22E-03 | 35.4 | |
| 20 | 0 | 1413.57 | 6 | 2 | 0.64 | 2827.51 | 2820 | 11 | 1.60E-03 | 68.6 | |
| 21 | 0 | 1461.55* | 18 | 12 | 0.76 | 2923.52 | 2916 | 12 | 4.96E-03 | 47.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:26:53

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146007.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : RXF2
Sample date : 7-NOV-2013 10:04:00 Acquisition date : 10-FEB-2014 13:24:16
Sample ID : G341146007 Sample quantity : 159.24 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA7 Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.30 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| PB-214 | 74.82 | BI-211 | 72.87 |
| PB-214 | 74.82 | AM-243 | 74.66 |
| PB-214 | 74.82 | TH-228 | 74.82 |
| PB-214 | 74.82 | PB-212 | 74.82 |
| PB-214 | 351.93 | BI-211 | 351.06 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10.66* | 1.174E+00 | 6.734E-01 | 6.734E-01 | 95.35 | OK |
| AS-73 | 53.44 | 10.30* | 2.474E+00 | 3.269E-01 | 7.432E-01 | 114.96 | OK |
| RU-103 | 497.08 | 91.00* | 2.803E+00 | 1.479E-02 | 7.936E-02 | 135.06 | OK |
| | 610.33 | 5.76 | 2.391E+00 | 5.050E-01 | 2.710E+00 | 128.13 | OK |
| TL-208 | 277.37 | 6.60 | 4.326E+00 | ----- Line Not Found | ----- | | Absent |
| | 583.19 | 85.00* | 2.474E+00 | 1.651E-02 | 1.651E-02 | 210.45 | OK |
| | 860.56 | 12.50 | 1.824E+00 | ----- Line Not Found | ----- | | Absent |
| PB-212 | 74.82 | 10.28 | 4.881E+00 | ----- Line Not Found | ----- | | <<INT Reject |
| | 77.11 | 17.10 | 5.037E+00 | 9.548E-02 | 9.548E-02 | 167.49 | OK |
| | 238.63 | 43.60* | 4.798E+00 | 9.111E-02 | 9.111E-02 | 62.54 | OK |
| | 300.09 | 3.30 | 4.087E+00 | ----- Line Not Found | ----- | | Absent |
| PB-214 | 74.82 | 5.80 | 4.837E+00 | 1.703E-01 | 1.703E-01 | 181.43 | OK |
| | 77.11 | 9.70 | 5.037E+00 | 1.683E-01 | 1.683E-01 | 167.49 | OK |
| | 87.09 | 3.41 | 5.712E+00 | ----- Line Not Found | ----- | | Absent |
| | 242.00 | 7.25 | 4.755E+00 | ----- Line Not Found | ----- | | Absent |
| | 295.22 | 18.42 | 4.129E+00 | 1.928E-01 | 1.928E-01 | 68.37 | OK |
| | 351.93 | 35.60* | 3.633E+00 | 7.117E-02 | 7.117E-02 | 100.47 | OK |
| TH-228 | 74.82 | 10.28 | 4.881E+00 | ----- Line Not Found | ----- | | <<INT Reject |
| | 77.11 | 17.10 | 5.037E+00 | 9.548E-02 | 9.548E-02 | 167.49 | OK |
| | 238.63 | 43.60* | 4.798E+00 | 9.111E-02 | 9.111E-02 | 62.54 | OK |
| | 300.09 | 3.30 | 4.087E+00 | ----- Line Not Found | ----- | | Absent |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:54.04

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146007.CNF;1    *
* Acquisition date : 10-FEB-2014 13:24:16 Sensitivity     : 3.000          *
* Detector ID      : GAM07                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.30     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:04:00 Nuclide Library : SOLID          *
* Sample ID        : G341146007           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.5924E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JUL-2013 13:45:01 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_500MLMB.CNF;10      *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 6.734E-01 | 6.293E-01 | 5.913E-01 |
| AS-73 | 7.432E-01 | 8.374E-01 | 1.338E+00 |
| RU-103 | 7.936E-02 | 1.050E-01 | 1.285E-01 |
| TL-208 | 1.651E-02 | 3.405E-02 | 3.636E-02 |
| PB-212 | 9.111E-02 | 5.584E-02 | 7.545E-02 |
| PB-214 | 7.117E-02 | 7.008E-02 | 8.095E-02 |
| TH-228 | 9.111E-02 | 5.584E-02 | 7.545E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 6.402E-01 | 6.034E-01 | 1.335E+00 | NOT IDENT. |
| NA-22 | 4.424E-03 | 2.784E-02 | 5.975E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.130E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.027E-03 | 2.106E-02 | 5.022E-02 | NOT IDENT. |
| SC-46 | -9.098E-04 | 5.426E-02 | 1.074E-01 | NOT IDENT. |
| V-48 | 3.643E-01 | 1.402E+00 | 2.985E+00 | NOT IDENT. |
| CR-51 | -6.347E-01 | 1.802E+00 | 3.166E+00 | NOT IDENT. |
| MN-54 | 2.942E-03 | 2.808E-02 | 5.723E-02 | NOT IDENT. |
| CO-56 | -9.934E-03 | 5.558E-02 | 1.073E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.308E-02 | 1.961E-02 | 3.725E-02 | NOT IDENT. |
| CO-58 | -2.297E-02 | 6.625E-02 | 1.231E-01 | NOT IDENT. |
| FE-59 | -1.202E-01 | 2.057E-01 | 3.578E-01 | NOT IDENT. |
| CO-60 | 3.288E-02 | 3.332E-02 | 7.780E-02 | NOT IDENT. |
| ZN-65 | 5.244E-02 | 6.734E-02 | 1.550E-01 | NOT IDENT. |
| GE-68 | 2.271E-01 | 9.120E-01 | 1.951E+00 | NOT IDENT. |
| AS-74 | 6.853E-01 | 1.335E+00 | 2.808E+00 | NOT IDENT. |
| SE-75 | 2.902E-02 | 4.752E-02 | 9.369E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.191E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.224E+00 | 1.986E+00 | 3.551E+00 | NOT IDENT. |
| RB-83 | 7.515E-02 | 7.500E-02 | 1.861E-01 | FAIL ABUN |
| KR-85 | -9.065E+00 | 7.600E+00 | 1.229E+01 | NOT IDENT. |
| SR-85 | -1.117E-01 | 9.339E-02 | 1.509E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 1.737E+00 | 9.025E+00 | 1.916E+01 | NOT IDENT. |
| Y-88 | -1.178E-02 | 5.546E-02 | 1.097E-01 | NOT IDENT. |
| Y-91 | -5.063E-01 | 2.336E+01 | 4.924E+01 | NOT IDENT. |
| NB-94 | -6.712E-03 | 2.466E-02 | 4.451E-02 | NOT IDENT. |
| NB-95 | 4.681E-02 | 7.095E-02 | 1.520E-01 | NOT IDENT. |
| NB-95M | -6.801E-02 | 2.120E-01 | 3.261E-01 | NOT IDENT. |
| ZR-95 | 1.127E-01 | 1.079E-01 | 2.681E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.756E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.903E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 5.982E-03 | 2.248E-02 | 3.680E-02 | NOT IDENT. |
| RH-102 | 1.943E-02 | 3.813E-02 | 7.976E-02 | NOT IDENT. |
| RH-106 | -6.704E-02 | 2.529E-01 | 4.644E-01 | NOT IDENT. |
| RU-106 | -6.704E-02 | 2.529E-01 | 4.644E-01 | NOT IDENT. |
| AG-108M | -1.602E-04 | 1.921E-02 | 3.731E-02 | NOT IDENT. |
| CD-109 | 3.981E-02 | 4.880E-01 | 8.826E-01 | NOT IDENT. |
| AG-110M | 9.179E-03 | 3.829E-02 | 8.114E-02 | NOT IDENT. |
| SN-113 | -4.502E-02 | 5.060E-02 | 8.647E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 4.929E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -4.682E-01 | 1.878E+00 | 3.453E+00 | NOT IDENT. |
| TE-123M | -1.222E-02 | 2.667E-02 | 4.792E-02 | NOT IDENT. |
| SB-124 | -9.128E-02 | 1.892E-01 | 3.437E-01 | NOT IDENT. |
| SB-125 | 4.990E-03 | 6.235E-02 | 1.224E-01 | NOT IDENT. |
| TE-125M | 4.711E+00 | 1.665E+01 | 3.032E+01 | NOT IDENT. |
| I-126 | -3.456E+00 | 1.118E+01 | 2.022E+01 | NOT IDENT. |
| SB-126 | -4.948E+00 | 7.456E+00 | 1.246E+01 | NOT IDENT. |
| SN-126 | 3.494E-03 | 4.294E-02 | 7.759E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.806E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.839E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.575E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 1.397E-02 | 3.063E-02 | 5.462E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.477E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.580E-02 | 3.418E-02 | 7.353E-02 | NOT IDENT. |
| CS-135 | -5.799E-02 | 1.025E-01 | 1.762E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -5.235E-01 | 4.092E+00 | 8.140E+00 | NOT IDENT. |
| BA-137M | -7.552E-03 | 2.396E-02 | 4.348E-02 | NOT IDENT. |
| CS-137 | -7.978E-03 | 2.532E-02 | 4.593E-02 | NOT IDENT. |
| CE-139 | 8.524E-03 | 2.611E-02 | 5.066E-02 | NOT IDENT. |
| BA-140 | -4.042E+00 | 4.735E+00 | 7.442E+00 | NOT IDENT. |
| LA-140 | -4.042E+00 | 4.735E+00 | 7.442E+00 | NOT IDENT. |
| CE-141 | 1.638E-01 | 2.132E-01 | 4.265E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.917E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.535E-02 | 1.822E-01 | 2.935E-01 | NOT IDENT. |
| PM-144 | 8.718E-03 | 2.823E-02 | 5.638E-02 | NOT IDENT. |
| PR-144 | 6.968E-01 | 2.206E+00 | 4.409E+00 | NOT IDENT. |
| PM-146 | 5.935E-04 | 2.974E-02 | 5.754E-02 | NOT IDENT. |
| ND-147 | -9.662E+00 | 6.237E+01 | 1.171E+02 | NOT IDENT. |
| PM-147 | 4.903E+02 | 4.748E+02 | 9.403E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.292E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -6.432E-03 | 1.993E-02 | 3.482E-02 | FAIL ABUN |
| EU-152 | -1.452E-02 | 7.024E-02 | 1.151E-01 | NOT IDENT. |
| GD-153 | -2.062E-03 | 6.380E-02 | 1.136E-01 | NOT IDENT. |
| EU-154 | 1.412E-02 | 7.628E-02 | 1.643E-01 | FAIL ABUN |
| EU-155 | -4.694E-02 | 6.609E-02 | 1.083E-01 | NOT IDENT. |
| TB-160 | -3.475E-02 | 1.769E-01 | 3.451E-01 | NOT IDENT. |
| HO-166M | -4.135E-03 | 4.095E-02 | 7.712E-02 | FAIL ABUN |
| TM-171 | 7.870E+00 | 8.867E+00 | 1.629E+01 | FAIL ABUN |
| LU-176 | -2.084E-03 | 1.859E-02 | 3.364E-02 | NOT IDENT. |
| HF-181 | -2.796E-02 | 1.119E-01 | 2.082E-01 | NOT IDENT. |
| TA-182 | -3.856E-02 | 1.902E-01 | 3.592E-01 | NOT IDENT. |
| RE-183 | 1.604E-02 | 2.050E-01 | 3.625E-01 | NOT IDENT. |
| RE-184 | -1.354E-01 | 3.354E-01 | 6.294E-01 | NOT IDENT. |
| W-188 | -8.508E+00 | 1.326E+01 | 1.909E+01 | FAIL ABUN |
| IR-192 | 3.557E-02 | 4.903E-02 | 9.875E-02 | FAIL ABUN |
| HG-203 | -4.910E-03 | 8.749E-02 | 1.409E-01 | FAIL ABUN |
| BI-207 | 1.682E-02 | 3.291E-02 | 7.268E-02 | FAIL ABUN |
| PB-210 | -3.747E-01 | 1.437E+00 | 2.744E+00 | NOT IDENT. |
| BI-211 | 1.961E-01 | 1.931E-01 | 2.842E-01 | FAIL ABUN |
| PB-211 | 3.342E-02 | 4.134E-01 | 8.215E-01 | NOT IDENT. |
| BI-212 | 6.494E-02 | 3.439E-01 | 6.785E-01 | NOT IDENT. |
| BI-214 | 6.395E-02 | 8.030E-02 | 1.349E-01 | FAIL ABUN |
| RN-219 | 1.743E-01 | 2.072E-01 | 4.657E-01 | NOT IDENT. |
| RN-222 | 6.395E-02 | 8.030E-02 | 1.349E-01 | FAIL ABUN |
| RA-223 | 1.046E-01 | 4.763E-01 | 8.829E-01 | NOT IDENT. |
| RA-224 | 5.644E-01 | 5.062E-01 | 9.233E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 6.395E-02 | 8.030E-02 | 1.349E-01 | FAIL ABUN |
| AC-227 | -4.825E-02 | 1.741E-01 | 3.105E-01 | NOT IDENT. |
| TH-227 | -4.825E-02 | 1.741E-01 | 3.105E-01 | NOT IDENT. |
| AC-228 | 7.795E-02 | 8.765E-02 | 2.093E-01 | FAIL ABUN |
| RA-228 | 7.795E-02 | 8.765E-02 | 2.093E-01 | FAIL ABUN |
| TH-229 | -4.722E-02 | 3.240E-01 | 5.947E-01 | NOT IDENT. |
| TH-230 | 6.395E-02 | 8.030E-02 | 1.349E-01 | FAIL ABUN |
| PA-231 | 3.251E-01 | 1.027E+00 | 1.715E+00 | FAIL ABUN |
| TH-231 | 1.046E-01 | 4.763E-01 | 8.829E-01 | NOT IDENT. |
| TH-232 | 7.795E-02 | 8.765E-02 | 2.093E-01 | FAIL ABUN |
| PA-233 | -1.541E-02 | 4.270E-02 | 7.499E-02 | NOT IDENT. |
| PA-234 | -1.264E-01 | 1.930E-01 | 3.356E-01 | FAIL ABUN |
| PA-234M | -6.985E-01 | 2.553E+00 | 4.905E+00 | NOT IDENT. |
| TH-234 | 2.771E-01 | 7.915E-01 | 1.272E+00 | FAIL ABUN |
| U-234 | 6.395E-02 | 8.030E-02 | 1.349E-01 | FAIL ABUN |
| U-235 | -5.789E-02 | 1.301E-01 | 2.322E-01 | FAIL ABUN |
| NP-237 | -1.541E-02 | 4.270E-02 | 7.499E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 2.627E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.771E-01 | 7.915E-01 | 1.272E+00 | FAIL ABUN |
| NP-239 | -1.605E-02 | 2.364E-01 | 4.183E-01 | NOT IDENT. |
| PU-239 | 2.857E+02 | 3.662E+02 | 4.217E+02 | FAIL ABUN |
| AM-241 | -6.133E-02 | 7.906E-02 | 1.148E-01 | NOT IDENT. |
| AM-243 | 1.469E-02 | 2.613E-02 | 5.524E-02 | FAIL ABUN |
| CM-243 | -3.248E-02 | 6.065E-02 | 1.019E-01 | NOT IDENT. |
| CM-247 | 1.153E-02 | 2.018E-02 | 4.330E-02 | NOT IDENT. |
| CF-249 | -6.200E-03 | 3.042E-02 | 5.676E-02 | NOT IDENT. |
| CF-251 | 6.539E-02 | 7.670E-02 | 1.557E-01 | NOT IDENT. |
| ANH-511 | -3.187E-02 | 3.484E-02 | 7.645E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:49.83

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.58 | 24 | 38 | 0.99 | 92.77 | 90 | 7 | 6.75E-03 | 46.2 | |
| 2 | 0 | 53.77 | 18 | 30 | 1.81 | 107.17 | 103 | 7 | 4.91E-03 | 57.5 | |
| 3 | 0 | 63.36 | 24 | 36 | 1.14 | 126.34 | 122 | 7 | 6.57E-03 | 47.1 | |
| 4 | 4 | 74.30 | 16 | 29 | 1.18 | 148.22 | 146 | 11 | 4.46E-03 | 55.7 | 2.75E+00 |
| 5 | 4 | 76.70 | 27 | 51 | 1.54 | 153.02 | 146 | 11 | 7.52E-03 | 53.1 | |
| 6 | 0 | 93.61 | 22 | 62 | 1.34 | 186.85 | 180 | 9 | 5.98E-03 | 69.8 | |
| 7 | 0 | 130.27 | 24 | 58 | 1.63 | 260.17 | 255 | 12 | 6.76E-03 | 65.4 | |
| 8 | 0 | 185.78 | 32 | 28 | 0.73 | 371.22 | 368 | 7 | 8.89E-03 | 32.6 | |
| 9 | 0 | 238.82 | 51 | 33 | 1.67 | 477.32 | 473 | 8 | 1.40E-02 | 24.4 | |
| 10 | 0 | 282.90 | 5 | 20 | 1.25 | 565.50 | 560 | 8 | 1.39E-03 | 161.2 | |
| 11 | 0 | 295.92 | 37 | 19 | 3.74 | 591.54 | 586 | 11 | 1.03E-02 | 28.2 | |
| 12 | 0 | 352.03 | 25 | 16 | 0.65 | 703.79 | 696 | 13 | 6.84E-03 | 39.4 | |
| 13 | 0 | 496.18 | 8 | 6 | 0.92 | 992.15 | 986 | 9 | 2.22E-03 | 67.5 | |
| 14 | 0 | 502.94 | 12 | 9 | 0.83 | 1005.67 | 1001 | 9 | 3.33E-03 | 53.5 | |
| 15 | 0 | 511.01 | 77 | 18 | 1.72 | 1021.82 | 1015 | 17 | 2.13E-02 | 16.8 | |
| 16 | 0 | 521.75 | 9 | 4 | 0.71 | 1043.31 | 1039 | 8 | 2.50E-03 | 50.9 | |
| 17 | 0 | 558.59 | 4 | 8 | 1.36 | 1117.00 | 1111 | 8 | 1.11E-03 | 132.3 | |
| 18 | 0 | 583.60 | 16 | 10 | 1.77 | 1167.04 | 1160 | 11 | 4.42E-03 | 47.1 | |
| 19 | 0 | 610.01 | 23 | 15 | 1.45 | 1219.87 | 1214 | 11 | 6.35E-03 | 39.9 | |
| 20 | 0 | 755.80 | 9 | 4 | 1.57 | 1511.53 | 1507 | 8 | 2.61E-03 | 48.8 | |
| 21 | 0 | 911.63 | 10 | 2 | 1.85 | 1823.28 | 1819 | 8 | 2.80E-03 | 39.7 | |
| 22 | 0 | 1181.09 | 8 | 0 | 1.25 | 2362.38 | 2358 | 9 | 2.22E-03 | 35.4 | |
| 23 | 0 | 1413.57 | 6 | 2 | 0.64 | 2827.51 | 2820 | 11 | 1.60E-03 | 68.6 | |
| 24 | 0 | 1461.55 | 23 | 12 | 0.76 | 2923.52 | 2916 | 12 | 6.37E-03 | 36.7 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:26:52.07

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 18 | 10.66* | 1.174E+00 | 6.734E-01 | 6.734E-01 | 95.35 |
| AS-73 | 53.44 | 18 | 10.30* | 2.474E+00 | 3.269E-01 | 7.432E-01 | 114.96 |
| RU-103 | 497.08 | 8 | 91.00* | 2.803E+00 | 1.479E-02 | 7.936E-02 | 135.06 |
| | 610.33 | 15 | 5.76 | 2.391E+00 | 5.050E-01 | 2.710E+00 | 128.13 |
| TL-208 | 277.37 | ------ | 6.60 | 4.326E+00 | ------ Line Not Found | | ------ |
| | 583.19 | 7 | 85.00* | 2.474E+00 | 1.651E-02 | 1.651E-02 | 210.45 |
| | 860.56 | ------ | 12.50 | 1.824E+00 | ------ Line Not Found | | ------ |
| BI-211 | 72.87 | 10 | 1.23 | 4.837E+00 | 8.028E-01 | 8.028E-01 | 181.43 |
| | 351.06 | 20 | 12.92* | 3.633E+00 | 1.961E-01 | 1.961E-01 | 100.47 |
| PB-212 | 74.82 | 10 | 10.28 | 4.837E+00 | 9.606E-02 | 9.606E-02 | 181.43 |
| | 77.11 | 17 | 17.10 | 5.037E+00 | 9.548E-02 | 9.548E-02 | 167.49 |
| | 238.63 | 40 | 43.60* | 4.798E+00 | 9.111E-02 | 9.111E-02 | 62.54 |
| | 300.09 | ------ | 3.30 | 4.087E+00 | ------ Line Not Found | | ------ |
| PB-214 | 74.82 | 10 | 5.80 | 4.837E+00 | 1.703E-01 | 1.703E-01 | 181.43 |
| | 77.11 | 17 | 9.70 | 5.037E+00 | 1.683E-01 | 1.683E-01 | 167.49 |
| | 87.09 | ------ | 3.41 | 5.712E+00 | ------ Line Not Found | | ------ |
| | 242.00 | ------ | 7.25 | 4.755E+00 | ------ Line Not Found | | ------ |
| | 295.22 | 31 | 18.42 | 4.129E+00 | 1.928E-01 | 1.928E-01 | 68.37 |
| | 351.93 | 20 | 35.60* | 3.633E+00 | 7.117E-02 | 7.117E-02 | 100.47 |
| TH-228 | 74.82 | 10 | 10.28 | 4.837E+00 | 9.606E-02 | 9.606E-02 | 181.43 |
| | 77.11 | 17 | 17.10 | 5.037E+00 | 9.548E-02 | 9.548E-02 | 167.49 |
| | 238.63 | 40 | 43.60* | 4.798E+00 | 9.111E-02 | 9.111E-02 | 62.54 |
| | 300.09 | ------ | 3.30 | 4.087E+00 | ------ Line Not Found | | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.154E+00 | ------ Line Not Found | | ------ |
| | 74.66 | 10 | 67.20* | 4.837E+00 | 1.469E-02 | 1.469E-02 | 181.43 |

Flag: "*" = Keyline

Sample ID : G341146007 Acquisition date : 10-FEB-2014 13:24:16

Total number of lines in spectrum 21
Number of unidentified lines 4
Number of lines tentatively identified by NID 17 80.95%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 6.734E-01 | 6.734E-01 | 6.421E-01 | 95.35 | |
| AS-73 | 80.30D | 2.27 | 3.269E-01 | 7.432E-01 | 8.544E-01 | 114.96 | |
| RU-103 | 39.26D | 5.37 | 1.479E-02 | 7.936E-02 | 10.72E-02 | 135.06 | |
| TL-208 | 1.41E+10Y | 1.00 | 1.651E-02 | 1.651E-02 | 3.474E-02 | 210.45 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.961E-01 | 1.961E-01 | 1.970E-01 | 100.47 | |
| PB-212 | 1.41E+10Y | 1.00 | 9.111E-02 | 9.111E-02 | 5.698E-02 | 62.54 | |
| PB-214 | 1600.00Y | 1.00 | 7.117E-02 | 7.117E-02 | 7.151E-02 | 100.47 | |
| TH-228 | 1.41E+10Y | 1.00 | 9.111E-02 | 9.111E-02 | 5.698E-02 | 62.54 | |
| AM-243 | 7370.00Y | 1.00 | 1.469E-02 | 1.469E-02 | 2.666E-02 | 181.43 | |
| | Total Activity : | | 1.496E+00 | 1.977E+00 | | | |

Grand Total Activity : 1.496E+00 1.977E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146007 Acquisition date : 10-FEB-2014 13:24:16

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.36 | 8 | 36 | 1.14 | 126.34 | 122 | 7 | 2.24E-03 | **** | 3.71E+00 | T |
| 0 | 130.27 | 24 | 58 | 1.63 | 260.17 | 255 | 12 | 6.76E-03 | **** | 6.36E+00 | T |
| 0 | 185.78 | 6 | 28 | 0.73 | 371.22 | 368 | 7 | 1.59E-03 | **** | 5.59E+00 | T |
| 0 | 282.90 | 5 | 20 | 1.25 | 565.50 | 560 | 8 | 1.39E-03 | **** | 4.27E+00 | T |
| 0 | 502.94 | 12 | 9 | 0.83 | 1005.67 | 1001 | 9 | 3.33E-03 | **** | 2.77E+00 | |
| 0 | 521.75 | 9 | 4 | 0.71 | 1043.31 | 1039 | 8 | 2.50E-03 | **** | 2.70E+00 | T |
| 0 | 558.59 | 4 | 8 | 1.36 | 1117.00 | 1111 | 8 | 1.11E-03 | **** | 2.56E+00 | |
| 0 | 755.80 | 9 | 4 | 1.57 | 1511.53 | 1507 | 8 | 2.61E-03 | 97.7 | 2.02E+00 | T |
| 0 | 911.63 | 7 | 2 | 1.85 | 1823.28 | 1819 | 8 | 2.06E-03 | **** | 1.74E+00 | T |
| 0 | 1181.09 | 8 | 0 | 1.25 | 2362.38 | 2358 | 9 | 2.22E-03 | 70.7 | 1.41E+00 | |
| 0 | 1413.57 | 6 | 2 | 0.64 | 2827.51 | 2820 | 11 | 1.60E-03 | **** | 1.21E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:05.49

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146007.CNF;1       *
* Acquisition date : 10-FEB-2014 13:24:16 Sensitivity     : 3.000                *
* Detector ID      : GAM07                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.30     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:04:00 Nuclide Library : SOLID                *
* Sample ID        : G341146007           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.5924E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 26-JUL-2013 13:45:01 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_500MLMB.CNF;10             *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 2.447E-01 |
| AS-73 | 6.112E-01 |
| RU-103 | 5.084E-02 |
| TL-208 | 1.515E-02 |
| PB-212 | 3.469E-02 |
| PB-214 | 3.556E-02 |
| TH-228 | 3.469E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.947E-01 | NOT IDENT. |
| NA-22 | 2.469E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.857E-02 | NOT IDENT. |
| SC-46 | 4.581E-02 | NOT IDENT. |
| V-48 | 1.250E+00 | NOT IDENT. |
| CR-51 | 1.405E+00 | NOT IDENT. |
| MN-54 | 2.440E-02 | NOT IDENT. |
| CO-56 | 4.557E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.715E-02 | NOT IDENT. |
| CO-58 | 5.308E-02 | NOT IDENT. |
| FE-59 | 1.456E-01 | NOT IDENT. |
| CO-60 | 3.371E-02 | NOT IDENT. |
| ZN-65 | 6.634E-02 | NOT IDENT. |
| GE-68 | 8.093E-01 | NOT IDENT. |
| AS-74 | 1.223E+00 | NOT IDENT. |
| SE-75 | 4.266E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.488E+00 | NOT IDENT. |
| RB-83 | 8.179E-02 | FAIL ABUN |
| KR-85 | 5.597E+00 | NOT IDENT. |
| SR-85 | 6.875E-02 | NOT IDENT. |
| RB-86 | 7.908E+00 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 4.250E-02 | NOT IDENT. |
| Y-91 | 1.915E+01 | NOT IDENT. |
| NB-94 | 1.928E-02 | NOT IDENT. |
| NB-95 | 6.707E-02 | NOT IDENT. |
| NB-95M | 1.482E-01 | NOT IDENT. |
| ZR-95 | 1.178E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.686E-02 | NOT IDENT. |
| RH-102 | 3.476E-02 | NOT IDENT. |
| RH-106 | 1.997E-01 | NOT IDENT. |
| RU-106 | 1.997E-01 | NOT IDENT. |
| AG-108M | 1.639E-02 | NOT IDENT. |
| CD-109 | 4.069E-01 | NOT IDENT. |
| AG-110M | 3.418E-02 | NOT IDENT. |
| SN-113 | 3.806E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.570E+00 | NOT IDENT. |
| TE-123M | 2.177E-02 | NOT IDENT. |
| SB-124 | 1.331E-01 | NOT IDENT. |
| SB-125 | 5.395E-02 | NOT IDENT. |
| TE-125M | 1.399E+01 | NOT IDENT. |
| I-126 | 8.689E+00 | NOT IDENT. |
| SB-126 | 5.051E+00 | NOT IDENT. |
| SN-126 | 3.581E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.442E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.258E-02 | NOT IDENT. |
| CS-135 | 7.911E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.300E+00 | NOT IDENT. |
| BA-137M | 1.857E-02 | NOT IDENT. |
| CS-137 | 1.961E-02 | NOT IDENT. |
| CE-139 | 2.317E-02 | NOT IDENT. |
| BA-140 | 2.637E+00 | NOT IDENT. |
| LA-140 | 2.637E+00 | NOT IDENT. |
| CE-141 | 1.972E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.354E-01 | NOT IDENT. |
| PM-144 | 2.463E-02 | NOT IDENT. |
| PR-144 | 1.927E+00 | NOT IDENT. |
| PM-146 | 2.540E-02 | NOT IDENT. |
| ND-147 | 5.115E+01 | NOT IDENT. |
| PM-147 | 4.329E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.565E-02 | FAIL ABUN |
| EU-152 | 5.100E-02 | NOT IDENT. |
| GD-153 | 5.211E-02 | NOT IDENT. |
| EU-154 | 6.805E-02 | FAIL ABUN |
| EU-155 | 4.919E-02 | NOT IDENT. |
| TB-160 | 1.432E-01 | NOT IDENT. |
| HO-166M | 3.301E-02 | FAIL ABUN |
| TM-171 | 7.496E+00 | FAIL ABUN |
| LU-176 | 1.513E-02 | NOT IDENT. |
| HF-181 | 9.103E-02 | NOT IDENT. |
| TA-182 | 1.489E-01 | NOT IDENT. |
| RE-183 | 1.656E-01 | NOT IDENT. |
| RE-184 | 2.533E-01 | NOT IDENT. |
| W-188 | 8.574E+00 | FAIL ABUN |
| IR-192 | 4.460E-02 | FAIL ABUN |
| HG-203 | 6.299E-02 | FAIL ABUN |
| BI-207 | 3.075E-02 | FAIL ABUN |
| PB-210 | 1.273E+00 | NOT IDENT. |
| BI-211 | 1.286E-01 | FAIL ABUN |
| PB-211 | 3.593E-01 | NOT IDENT. |
| BI-212 | 2.935E-01 | NOT IDENT. |
| BI-214 | 6.163E-02 | FAIL ABUN |
| RN-219 | 2.035E-01 | NOT IDENT. |
| RN-222 | 6.163E-02 | FAIL ABUN |
| RA-223 | 4.003E-01 | NOT IDENT. |
| RA-224 | 4.292E-01 | NOT IDENT. |
| RA-226 | 6.163E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.406E-01 | NOT IDENT. |
| TH-227 | 1.406E-01 | NOT IDENT. |
| AC-228 | 9.047E-02 | FAIL ABUN |
| RA-228 | 9.047E-02 | FAIL ABUN |
| TH-229 | 2.710E-01 | NOT IDENT. |
| TH-230 | 6.163E-02 | FAIL ABUN |
| PA-231 | 7.698E-01 | FAIL ABUN |
| TH-231 | 4.003E-01 | NOT IDENT. |
| TH-232 | 9.047E-02 | FAIL ABUN |
| PA-233 | 3.334E-02 | NOT IDENT. |
| PA-234 | 1.364E-01 | FAIL ABUN |
| PA-234M | 1.982E+00 | NOT IDENT. |
| TH-234 | 5.897E-01 | FAIL ABUN |
| U-234 | 6.163E-02 | FAIL ABUN |
| U-235 | 1.068E-01 | FAIL ABUN |
| NP-237 | 3.334E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.897E-01 | FAIL ABUN |
| NP-239 | 1.903E-01 | NOT IDENT. |
| PU-239 | 1.950E+02 | FAIL ABUN |
| AM-241 | 5.194E-02 | NOT IDENT. |
| AM-243 | 2.568E-02 | FAIL ABUN |
| CM-243 | 4.608E-02 | NOT IDENT. |
| CM-247 | 1.896E-02 | NOT IDENT. |
| CF-249 | 2.553E-02 | NOT IDENT. |
| CF-251 | 7.146E-02 | NOT IDENT. |
| ANH-511 | 3.591E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:10.92

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146007.CNF;1    *
* Acquisition date : 10-FEB-2014 13:24:16 Sensitivity     : 3.000          *
* Detector ID      : GAM07                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.30     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:04:00 Nuclide Library : SOLID          *
* Sample ID        : G341146007           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.5924E+02 GRAM*
*                                         Quantity Err(%) : 1.2560E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 26-JUL-2013 13:45:01 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_500MLMB.CNF;10      *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 6.734E-01 | 6.323E-01 | 6.323E-01 |
| AS-73 | 7.432E-01 | 8.510E-01 | 8.510E-01 |
| RU-103 | 7.936E-02 | 1.053E-01 | 1.053E-01 |
| TL-208 | 1.651E-02 | 3.408E-02 | 3.408E-02 |
| PB-212 | 9.111E-02 | 5.634E-02 | 5.634E-02 |
| PB-214 | 7.117E-02 | 7.032E-02 | 7.032E-02 |
| TH-228 | 9.111E-02 | 5.634E-02 | 5.634E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 6.402E-01 | 6.059E-01 | 6.711E-01 | NOT IDENT. |
| NA-22 | 4.424E-03 | 2.784E-02 | 2.791E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.142E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.027E-03 | 2.106E-02 | 2.110E-02 | NOT IDENT. |
| SC-46 | -9.098E-04 | 5.426E-02 | 5.426E-02 | NOT IDENT. |
| V-48 | 3.643E-01 | 1.402E+00 | 1.412E+00 | NOT IDENT. |
| CR-51 | -6.347E-01 | 1.803E+00 | 1.825E+00 | NOT IDENT. |
| MN-54 | 2.942E-03 | 2.808E-02 | 2.811E-02 | NOT IDENT. |
| CO-56 | -9.934E-03 | 5.559E-02 | 5.577E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 5.740E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.308E-02 | 1.964E-02 | 2.051E-02 | NOT IDENT. |
| CO-58 | -2.297E-02 | 6.629E-02 | 6.709E-02 | NOT IDENT. |
| FE-59 | -1.202E-01 | 2.067E-01 | 2.137E-01 | NOT IDENT. |
| CO-60 | 3.288E-02 | 3.344E-02 | 3.658E-02 | NOT IDENT. |
| ZN-65 | 5.244E-02 | 6.783E-02 | 7.183E-02 | NOT IDENT. |
| GE-68 | 2.271E-01 | 9.126E-01 | 9.183E-01 | NOT IDENT. |
| AS-74 | 6.853E-01 | 1.337E+00 | 1.372E+00 | NOT IDENT. |
| SE-75 | 2.902E-02 | 4.758E-02 | 4.934E-02 | NOT IDENT. |
| BR-77 | 1.943E+11 | 5.469E+11 | 5.539E+11 | SHORT HLIF |
| SR-82 | -1.224E+00 | 1.990E+00 | 2.065E+00 | NOT IDENT. |
| RB-83 | 7.515E-02 | 7.591E-02 | 8.313E-02 | FAIL ABUN |
| KR-85 | -9.065E+00 | 7.640E+00 | 8.664E+00 | NOT IDENT. |
| SR-85 | -1.117E-01 | 9.388E-02 | 1.065E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 1.737E+00 | 9.028E+00 | 9.062E+00 | NOT IDENT. |
| Y-88 | -1.178E-02 | 5.547E-02 | 5.573E-02 | NOT IDENT. |
| Y-91 | -5.063E-01 | 2.336E+01 | 2.336E+01 | NOT IDENT. |
| NB-94 | -6.712E-03 | 2.466E-02 | 2.485E-02 | NOT IDENT. |
| NB-95 | 4.681E-02 | 7.109E-02 | 7.416E-02 | NOT IDENT. |
| NB-95M | -6.801E-02 | 2.121E-01 | 2.143E-01 | NOT IDENT. |
| ZR-95 | 1.127E-01 | 1.084E-01 | 1.197E-01 | FAIL ABUN |
| NB-97 | -1.000E+41 | 4.546E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.000E+41 | 3.854E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.660E+09 | 4.916E+09 | 5.186E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 5.312E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 5.982E-03 | 2.251E-02 | 2.267E-02 | NOT IDENT. |
| RH-102 | 1.943E-02 | 3.819E-02 | 3.918E-02 | NOT IDENT. |
| RH-106 | -6.704E-02 | 2.530E-01 | 2.548E-01 | NOT IDENT. |
| RU-106 | -6.704E-02 | 2.530E-01 | 2.548E-01 | NOT IDENT. |
| AG-108M | -1.602E-04 | 1.921E-02 | 1.921E-02 | NOT IDENT. |
| CD-109 | 3.981E-02 | 4.880E-01 | 4.884E-01 | NOT IDENT. |
| AG-110M | 9.179E-03 | 3.830E-02 | 3.852E-02 | NOT IDENT. |
| SN-113 | -4.502E-02 | 5.073E-02 | 5.464E-02 | NOT IDENT. |
| CD-115 | -2.457E+10 | 4.929E+11 | 4.930E+11 | SHORT HLIF |
| SN-117M | -4.682E-01 | 1.879E+00 | 1.890E+00 | NOT IDENT. |
| TE-123M | -1.222E-02 | 2.668E-02 | 2.725E-02 | NOT IDENT. |
| SB-124 | -9.128E-02 | 1.894E-01 | 1.938E-01 | NOT IDENT. |
| SB-125 | 4.990E-03 | 6.235E-02 | 6.239E-02 | NOT IDENT. |
| TE-125M | 4.711E+00 | 1.665E+01 | 1.679E+01 | NOT IDENT. |
| I-126 | -3.456E+00 | 1.118E+01 | 1.129E+01 | NOT IDENT. |
| SB-126 | -4.948E+00 | 7.486E+00 | 7.811E+00 | NOT IDENT. |
| SN-126 | 3.494E-03 | 4.294E-02 | 4.297E-02 | FAIL ABUN |
| SB-127 | -4.433E+05 | 1.817E+06 | 1.828E+06 | SHORT HLIF |
| I-131 | -1.620E+01 | 8.840E+01 | 8.871E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.656E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.119E+07 | 1.586E+07 | 1.664E+07 | SHORT HLIF |
| BA-133 | 1.397E-02 | 3.065E-02 | 3.129E-02 | NOT IDENT. |
| I-133 | -6.938E+30 | 2.510E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.580E-02 | 3.428E-02 | 3.620E-02 | NOT IDENT. |
| CS-135 | -5.799E-02 | 1.027E-01 | 1.060E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 1.082E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | -5.235E-01 | 4.093E+00 | 4.100E+00 | NOT IDENT. |
| BA-137M | -7.552E-03 | 2.397E-02 | 2.421E-02 | NOT IDENT. |
| CS-137 | -7.978E-03 | 2.532E-02 | 2.558E-02 | NOT IDENT. |
| CE-139 | 8.524E-03 | 2.617E-02 | 2.645E-02 | NOT IDENT. |
| BA-140 | -4.042E+00 | 4.747E+00 | 5.085E+00 | NOT IDENT. |
| LA-140 | -4.042E+00 | 4.747E+00 | 5.085E+00 | NOT IDENT. |
| CE-141 | 1.638E-01 | 2.136E-01 | 2.260E-01 | NOT IDENT. |
| CE-143 | 3.042E+19 | 2.928E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.535E-02 | 1.822E-01 | 1.833E-01 | NOT IDENT. |
| PM-144 | 8.718E-03 | 2.824E-02 | 2.852E-02 | NOT IDENT. |
| PR-144 | 6.968E-01 | 2.207E+00 | 2.229E+00 | NOT IDENT. |
| PM-146 | 5.935E-04 | 2.974E-02 | 2.974E-02 | NOT IDENT. |
| ND-147 | -9.662E+00 | 6.238E+01 | 6.253E+01 | NOT IDENT. |
| PM-147 | 4.903E+02 | 4.765E+02 | 5.253E+02 | NOT IDENT. |
| PM-149 | 2.628E+12 | 5.309E+12 | 5.439E+12 | SHORT HLIF |
| EU-150 | -6.432E-03 | 1.994E-02 | 2.015E-02 | FAIL ABUN |
| EU-152 | -1.452E-02 | 7.025E-02 | 7.055E-02 | NOT IDENT. |
| GD-153 | -2.062E-03 | 6.380E-02 | 6.380E-02 | NOT IDENT. |
| EU-154 | 1.412E-02 | 7.629E-02 | 7.656E-02 | FAIL ABUN |
| EU-155 | -4.694E-02 | 6.625E-02 | 6.955E-02 | NOT IDENT. |
| TB-160 | -3.475E-02 | 1.770E-01 | 1.776E-01 | NOT IDENT. |
| HO-166M | -4.135E-03 | 4.096E-02 | 4.100E-02 | FAIL ABUN |
| TM-171 | 7.870E+00 | 8.892E+00 | 9.574E+00 | FAIL ABUN |
| LU-176 | -2.084E-03 | 1.859E-02 | 1.861E-02 | NOT IDENT. |
| HF-181 | -2.796E-02 | 1.119E-01 | 1.126E-01 | NOT IDENT. |
| TA-182 | -3.856E-02 | 1.903E-01 | 1.910E-01 | NOT IDENT. |
| RE-183 | 1.604E-02 | 2.050E-01 | 2.051E-01 | NOT IDENT. |
| RE-184 | -1.354E-01 | 3.360E-01 | 3.415E-01 | NOT IDENT. |
| W-188 | -8.508E+00 | 1.330E+01 | 1.384E+01 | FAIL ABUN |
| IR-192 | 3.557E-02 | 4.912E-02 | 5.167E-02 | FAIL ABUN |
| HG-203 | -4.910E-03 | 8.749E-02 | 8.752E-02 | FAIL ABUN |
| BI-207 | 1.682E-02 | 3.300E-02 | 3.386E-02 | FAIL ABUN |
| PB-210 | -3.747E-01 | 1.438E+00 | 1.448E+00 | NOT IDENT. |
| BI-211 | 1.961E-01 | 1.938E-01 | 2.130E-01 | FAIL ABUN |
| PB-211 | 3.342E-02 | 4.134E-01 | 4.137E-01 | NOT IDENT. |
| BI-212 | 6.494E-02 | 3.440E-01 | 3.452E-01 | NOT IDENT. |
| BI-214 | 6.395E-02 | 8.049E-02 | 8.550E-02 | FAIL ABUN |
| RN-219 | 1.743E-01 | 2.088E-01 | 2.231E-01 | NOT IDENT. |
| RN-222 | 6.395E-02 | 8.049E-02 | 8.550E-02 | FAIL ABUN |
| RA-223 | 1.046E-01 | 4.764E-01 | 4.788E-01 | NOT IDENT. |
| RA-224 | 5.644E-01 | 5.083E-01 | 5.684E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 6.395E-02 | 8.049E-02 | 8.550E-02 | FAIL ABUN |
| AC-227 | -4.825E-02 | 1.742E-01 | 1.756E-01 | NOT IDENT. |
| TH-227 | -4.825E-02 | 1.742E-01 | 1.756E-01 | NOT IDENT. |
| AC-228 | 7.795E-02 | 8.813E-02 | 9.488E-02 | FAIL ABUN |
| RA-228 | 7.795E-02 | 8.813E-02 | 9.488E-02 | FAIL ABUN |
| TH-229 | -4.722E-02 | 3.240E-01 | 3.247E-01 | NOT IDENT. |
| TH-230 | 6.395E-02 | 8.048E-02 | 8.549E-02 | FAIL ABUN |
| PA-231 | 3.251E-01 | 1.028E+00 | 1.038E+00 | FAIL ABUN |
| TH-231 | 1.046E-01 | 4.764E-01 | 4.788E-01 | NOT IDENT. |
| TH-232 | 7.795E-02 | 8.813E-02 | 9.488E-02 | FAIL ABUN |
| PA-233 | -1.541E-02 | 4.272E-02 | 4.328E-02 | NOT IDENT. |
| PA-234 | -1.264E-01 | 2.416E-01 | 2.482E-01 | FAIL ABUN |
| PA-234M | -6.985E-01 | 2.554E+00 | 2.574E+00 | NOT IDENT. |
| TH-234 | 2.771E-01 | 7.940E-01 | 8.038E-01 | FAIL ABUN |
| U-234 | 6.395E-02 | 8.048E-02 | 8.549E-02 | FAIL ABUN |
| U-235 | -5.789E-02 | 1.301E-01 | 1.327E-01 | FAIL ABUN |
| NP-237 | -1.541E-02 | 4.272E-02 | 4.328E-02 | NOT IDENT. |
| NP-238 | 3.885E+11 | 2.627E+12 | 2.633E+12 | SHORT HLIF |
| U-238 | 2.771E-01 | 7.940E-01 | 8.038E-01 | FAIL ABUN |
| NP-239 | -1.605E-02 | 2.364E-01 | 2.365E-01 | NOT IDENT. |
| PU-239 | 2.857E+02 | 3.669E+02 | 3.888E+02 | FAIL ABUN |
| AM-241 | -6.133E-02 | 7.919E-02 | 8.388E-02 | NOT IDENT. |
| AM-243 | 1.469E-02 | 2.616E-02 | 2.698E-02 | FAIL ABUN |
| CM-243 | -3.248E-02 | 6.077E-02 | 6.251E-02 | NOT IDENT. |
| CM-247 | 1.153E-02 | 2.030E-02 | 2.095E-02 | NOT IDENT. |
| CF-249 | -6.200E-03 | 3.043E-02 | 3.056E-02 | NOT IDENT. |
| CF-251 | 6.539E-02 | 7.715E-02 | 8.259E-02 | NOT IDENT. |
| ANH-511 | -3.187E-02 | 3.495E-02 | 3.779E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 51.8299 | 94.67 | 63.2295 | 193.51 | 37.9251 |
| 45.60 | 31.8868 | 94.87 | 61.0731 | 197.03 | 37.1302 |
| 46.54 | 34.8894 | 97.43 | 41.6489 | 198.01 | 48.6105 |
| 49.72 | 0.0000 | 98.43 | 39.5327 | 201.83 | 48.8253 |
| 51.35 | 33.9294 | 98.44 | 39.5334 | 205.31 | 46.1360 |
| 52.39 | 45.8706 | 99.53 | 28.6111 | 210.85 | 38.6865 |
| 53.44 | 37.5998 | 100.11 | 40.7606 | 215.65 | 33.0579 |
| 57.36 | 0.0000 | 103.18 | 40.9949 | 222.11 | 37.2059 |
| 57.53 | 34.8313 | 103.37 | 38.7927 | 227.09 | 35.4345 |
| 57.98 | 36.0766 | 105.21 | 44.4845 | 227.38 | 35.4455 |
| 59.32 | 37.7163 | 105.31 | 45.6049 | 228.16 | 0.0000 |
| 59.54 | 45.2863 | 106.12 | 40.1023 | 228.18 | 40.4022 |
| 63.29 | 39.6365 | 109.28 | 42.5710 | 117.23 | 40.4022 |
| 63.58 | 36.6148 | 111.00 | 37.0822 | 235.69 | 39.7247 |
| 64.28 | 35.1521 | 111.76 | 0.0000 | 235.96 | 33.3780 |
| 66.73 | 36.9073 | 116.30 | 0.0000 | 238.63 | 43.8281 |
| 67.24 | 38.1856 | 117.23 | 35.2110 | 238.98 | 0.0000 |
| 67.75 | 43.1670 | 121.12 | 33.1544 | 240.99 | 35.1463 |
| 69.67 | 43.3698 | 121.22 | 27.4426 | 242.00 | 41.5787 |
| 70.83 | 38.8308 | 121.78 | 33.1905 | 244.70 | 39.0854 |
| 72.81 | 45.2552 | 122.06 | 33.2058 | 252.40 | 0.0000 |
| 72.87 | 45.2616 | 123.07 | 42.4363 | 252.80 | 27.2756 |
| 74.66 | 54.3314 | 127.23 | 34.6397 | 254.15 | 0.0000 |
| 74.82 | 54.3513 | 129.30 | 42.8629 | 256.23 | 35.4746 |
| 74.97 | 54.3701 | 131.20 | 42.9916 | 260.90 | 0.0000 |
| 77.11 | 50.4329 | 133.02 | 40.2002 | 264.66 | 25.5428 |
| 79.69 | 44.3834 | 133.52 | 41.9806 | 268.22 | 34.8539 |
| 80.12 | 42.8389 | 136.00 | 40.7359 | 269.46 | 27.7099 |
| 80.19 | 0.0000 | 136.47 | 50.3705 | 271.23 | 22.6157 |
| 80.57 | 47.6459 | 140.51 | 0.0000 | 273.65 | 25.7565 |
| 81.00 | 44.5111 | 143.76 | 46.1848 | 276.40 | 23.4113 |
| 81.07 | 44.5180 | 144.24 | 40.8845 | 277.37 | 29.7725 |
| 83.79 | 49.0446 | 145.44 | 36.5044 | 277.60 | 28.1243 |
| 85.43 | 43.8657 | 152.43 | 32.3745 | 278.00 | 28.1343 |
| 86.55 | 43.9687 | 153.25 | 32.4119 | 279.20 | 24.8514 |
| 86.79 | 43.9906 | 323.87 | 32.4553 | 279.54 | 31.4882 |
| 86.94 | 45.0779 | 156.02 | 32.5368 | 280.46 | 24.8796 |
| 87.09 | 45.0920 | 158.56 | 38.0926 | 283.69 | 38.2594 |
| 87.57 | 40.8381 | 159.00 | 40.8379 | 284.31 | 0.0000 |
| 88.03 | 39.8012 | 162.33 | 43.7571 | 285.41 | 23.3239 |
| 88.34 | 45.2086 | 163.33 | 40.1647 | 285.90 | 0.0000 |
| 88.47 | 45.2206 | 165.86 | 32.9727 | 287.50 | 25.0360 |
| 89.96 | 74.5177 | 176.31 | 38.9921 | 290.67 | 33.4746 |
| 91.11 | 47.6291 | 176.60 | 35.2913 | 293.27 | 0.0000 |
| 92.59 | 47.7705 | 177.52 | 27.8941 | 351.93 | 30.4567 |
| 93.35 | 44.5806 | 181.07 | 0.0000 | 295.96 | 30.4762 |
| 94.56 | 55.5864 | 184.41 | 28.5088 | 879.38 | 33.7046 |
| 94.65 | 63.2272 | 143.76 | 43.2075 | 299.98 | 33.7451 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 33.7485 | 487.02 | 16.3575 | 702.65 | 17.1688 |
| 300.13 | 33.7495 | 492.35 | 0.0000 | 706.68 | 17.1992 |
| 301.36 | 28.7170 | 497.08 | 4.8394 | 711.68 | 12.9275 |
| 302.85 | 30.6563 | 505.52 | 68.0800 | 720.70 | 11.8964 |
| 256.23 | 26.4648 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 28.6368 | 511.00 | 12.6829 | 722.78 | 11.9072 |
| 308.46 | 25.4908 | 514.00 | 57.6586 | 722.91 | 11.9077 |
| 311.90 | 26.6293 | 514.00 | 57.6586 | 723.31 | 12.9926 |
| 316.51 | 19.2461 | 520.40 | 12.7502 | 724.19 | 11.9144 |
| 319.41 | 26.7941 | 520.69 | 0.0000 | 727.33 | 11.9303 |
| 320.08 | 25.7366 | 522.65 | 0.0000 | 733.00 | 14.1334 |
| 321.04 | 28.9763 | 527.90 | 0.0000 | 735.93 | 11.9740 |
| 323.87 | 25.8157 | 529.59 | 15.7727 | 333.97 | 11.9818 |
| 325.23 | 31.2280 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 33.4763 | 531.02 | 17.7579 | 747.24 | 7.6561 |
| 333.37 | 34.6826 | 546.56 | 0.0000 | 748.06 | 9.7253 |
| 333.97 | 31.4457 | 552.55 | 16.6353 | 752.31 | 12.7872 |
| 334.37 | 30.3712 | 563.25 | 11.4715 | 753.82 | 12.7952 |
| 338.28 | 21.7603 | 569.33 | 14.0974 | 756.73 | 10.9805 |
| 338.32 | 21.7609 | 946.00 | 14.0984 | 756.80 | 10.9807 |
| 311.90 | 28.3367 | 569.70 | 14.1001 | 884.68 | 14.6842 |
| 340.48 | 28.3367 | 583.19 | 8.4513 | 765.81 | 11.9399 |
| 340.55 | 28.3383 | 584.27 | 8.4560 | 766.42 | 11.9431 |
| 344.28 | 23.3190 | 595.83 | 10.2065 | 766.84 | 11.9450 |
| 345.93 | 14.0092 | 427.87 | 18.4157 | 772.60 | 0.0000 |
| 351.06 | 17.5801 | 602.52 | 0.0000 | 776.52 | 14.7598 |
| 351.93 | 17.5916 | 602.73 | 17.9230 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 13.6693 | 778.90 | 11.0803 |
| 356.01 | 14.1166 | 609.32 | 18.4953 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 11.9937 | 785.37 | 12.0352 |
| 366.42 | 0.0000 | 614.28 | 18.8839 | 792.07 | 19.4935 |
| 375.05 | 22.3682 | 618.01 | 12.3829 | 794.95 | 11.1519 |
| 356.01 | 28.8117 | 620.36 | 8.2646 | 795.86 | 12.0854 |
| 388.16 | 29.8023 | 621.93 | 15.5079 | 810.29 | 15.8943 |
| 388.63 | 28.9090 | 630.19 | 0.0000 | 344.28 | 15.8953 |
| 391.69 | 29.8760 | 631.29 | 10.3855 | 810.76 | 16.8322 |
| 264.66 | 12.7535 | 633.25 | 15.5925 | 815.77 | 13.1173 |
| 401.81 | 8.2051 | 634.78 | 14.5636 | 1048.07 | 12.1933 |
| 402.40 | 10.9446 | 635.95 | 10.4084 | 832.01 | 11.3140 |
| 404.85 | 15.5308 | 636.99 | 0.0000 | 834.85 | 10.3825 |
| 410.95 | 19.2643 | 645.85 | 12.5487 | 835.71 | 9.4417 |
| 413.71 | 19.2999 | 657.76 | 12.6188 | 836.80 | 0.0000 |
| 414.70 | 23.9107 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 13.9078 | 661.66 | 14.7482 | 846.77 | 12.3258 |
| 427.87 | 17.6256 | 664.57 | 0.0000 | 856.80 | 13.3241 |
| 433.94 | 17.6949 | 666.33 | 15.8357 | 860.56 | 8.5774 |
| 439.40 | 19.6260 | 666.50 | 15.8368 | 871.09 | 7.6541 |
| 453.88 | 18.8625 | 667.71 | 0.0000 | 873.19 | 8.6177 |
| 463.37 | 18.0245 | 677.62 | 19.1008 | 875.33 | 0.0000 |
| 468.07 | 18.0762 | 685.70 | 0.0000 | 879.38 | 9.5970 |
| 473.00 | 0.0000 | 695.00 | 10.6943 | 880.51 | 8.6407 |
| 475.06 | 21.9741 | 696.49 | 12.8417 | 883.24 | 9.6104 |
| 476.78 | 14.3458 | 696.51 | 12.8417 | 884.68 | 7.6924 |
| 477.60 | 10.5253 | 697.00 | 13.9150 | 889.28 | 11.5579 |
| 482.18 | 19.1892 | 697.49 | 16.0591 | 894.76 | 9.6507 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 9.6621 | 1298.22 | 0.0000 | | |
| 903.28 | 8.7122 | 1312.11 | 8.4579 | | |
| 911.20 | 7.7660 | 1332.49 | 5.6685 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 5.8561 | 1365.19 | 1.9054 | | |
| 937.49 | 11.7571 | 1368.63 | 0.0000 | | |
| 944.13 | 5.8920 | 1384.29 | 8.6155 | | |
| 946.00 | 11.7917 | 1408.01 | 8.4259 | | |
| 949.00 | 10.8201 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 7.8030 | | |
| 962.31 | 8.8932 | 1489.16 | 5.8918 | | |
| 964.08 | 9.8873 | 1505.03 | 0.0000 | | |
| 966.17 | 12.8625 | 1596.21 | 7.0439 | | |
| 968.97 | 11.8843 | 1620.50 | 4.0467 | | |
| 983.53 | 6.9664 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 7.1899 | | |
| 1274.44 | 8.9947 | 1750.46 | 0.0000 | | |
| 1001.03 | 8.0080 | 1764.49 | 2.0858 | | |
| 1004.73 | 7.0154 | 1063.66 | 5.2206 | | |
| 507.63 | 0.0000 | 1771.35 | 4.1775 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.1044 | | |
| 1037.84 | 8.1038 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.2897 | | |
| 631.29 | 9.1421 | | | | |
| 1048.07 | 7.1139 | | | | |
| 1049.04 | 10.1660 | | | | |
| 1050.41 | 11.1875 | | | | |
| 1063.66 | 6.1277 | | | | |
| 1077.00 | 6.1531 | | | | |
| 1077.34 | 6.1538 | | | | |
| 1085.87 | 4.1133 | | | | |
| 1099.45 | 11.3585 | | | | |
| 1112.07 | 6.2192 | | | | |
| 1112.84 | 8.2943 | | | | |
| 1115.54 | 4.1506 | | | | |
| 1120.29 | 8.3128 | | | | |
| 1120.55 | 8.3135 | | | | |
| 1221.41 | 9.3549 | | | | |
| 1129.67 | 5.2102 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.0658 | | | | |
| 1177.95 | 5.4350 | | | | |
| 1189.05 | 11.5652 | | | | |
| 1204.77 | 4.2596 | | | | |
| 1221.41 | 9.6288 | | | | |
| 1231.02 | 7.5090 | | | | |
| 1235.36 | 6.4441 | | | | |
| 1238.28 | 1.0749 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.8595 | | | | |
| 1274.44 | 6.5129 | | | | |
| 1274.54 | 6.5129 | | | | |
| 1291.59 | 5.6080 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:39.74

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146008.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM09.CNF;208
                                        Background date  : 9-FEB-2014 11:21:12.
Sample date      : 7-NOV-2013 10:09:00. Acquisition date : 10-FEB-2014 13:24:42
Sample ID        : G341146008           Sample quantity  : 1.47960E+02 GRAM
Detector name    : GAM09                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.25  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 92.93* | 12 | 66 | 1.25 | 186.08 | 180 | 11 | 3.21E-03 | 156.0 | |
| 2 | 1 | 98.48* | 27 | 9 | 1.01 | 197.18 | 195 | 29 | 7.42E-03 | 25.0 | 2.83E+00 |
| 3 | 1 | 106.45 | 16 | 21 | 1.02 | 213.09 | 195 | 29 | 4.56E-03 | 46.5 | |
| 4 | 0 | 128.35 | 8 | 20 | 1.18 | 256.84 | 254 | 7 | 2.28E-03 | 95.6 | |
| 5 | 0 | 239.42* | 21 | 28 | 1.03 | 478.73 | 473 | 12 | 5.73E-03 | 60.2 | |
| 6 | 0 | 296.74 | 5 | 15 | 0.55 | 593.23 | 589 | 7 | 1.33E-03 | 139.0 | |
| 7 | 0 | 343.95 | 11 | 8 | 0.72 | 687.55 | 685 | 8 | 3.06E-03 | 53.8 | |
| 8 | 0 | 499.11 | 12 | 6 | 0.89 | 997.54 | 993 | 8 | 3.36E-03 | 45.3 | |
| 9 | 0 | 511.96* | 4 | 21 | 2.40 | 1023.23 | 1015 | 18 | 1.19E-03 | 342.0 | |
| 10 | 0 | 609.88* | 9 | 12 | 1.83 | 1218.86 | 1211 | 13 | 2.62E-03 | 89.3 | |
| 11 | 0 | 652.53 | 9 | 3 | 0.61 | 1304.09 | 1301 | 6 | 2.59E-03 | 43.5 | |
| 12 | 1 | 1036.49 | 11 | 0 | 1.89 | 2071.34 | 2070 | 10 | 2.99E-03 | 20.7 | 1.85E-01 |
| 13 | 1 | 1039.16 | 9 | 0 | 1.55 | 2076.68 | 2070 | 10 | 2.50E-03 | 31.4 | |
| 14 | 0 | 1461.68* | 6 | 3 | 1.36 | 2921.14 | 2915 | 9 | 1.66E-03 | 71.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:27:42

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146008.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:09:00 | Acquisition date | : 10-FEB-2014 13:24:42 |
| Sample ID | : G341146008 | Sample quantity | : 147.96 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA9 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.25 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 6 | 10.66* | 1.163E+00 | 2.446E-01 | 2.446E-01 | 142.05 |
| ANH-511 | 511.00 | 4 | 100.00* | 2.772E+00 | 7.809E-03 | 7.809E-03 | 683.91 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:43.26

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146008.CNF;1    *
* Acquisition date : 10-FEB-2014 13:24:42 Sensitivity     : 3.000            *
* Detector ID      : GAM09                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:09:00 Nuclide Library : SOLID            *
* Sample ID        : G341146008           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.4796E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  5-JUN-2013 11:45:38 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_500MLMB.CNF;10         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 2.446E-01 | 3.406E-01 | 4.845E-01 |
| ANH-511 | 7.809E-03 | 5.234E-02 | 3.351E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.840E-01 | 6.095E-01 | 1.261E+00 | NOT IDENT. |
| NA-22 | 3.197E-04 | 1.547E-02 | 3.801E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.452E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.568E-03 | 1.794E-02 | 3.785E-02 | NOT IDENT. |
| SC-46 | 9.672E-03 | 4.066E-02 | 8.994E-02 | NOT IDENT. |
| V-48 | -5.790E-01 | 1.254E+00 | 2.308E+00 | NOT IDENT. |
| CR-51 | -1.119E+00 | 1.671E+00 | 2.965E+00 | NOT IDENT. |
| MN-54 | 5.465E-03 | 2.486E-02 | 5.333E-02 | NOT IDENT. |
| CO-56 | -2.448E-02 | 5.662E-02 | 1.041E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -6.940E-03 | 2.031E-02 | 3.660E-02 | NOT IDENT. |
| CO-58 | 1.190E-02 | 4.676E-02 | 1.026E-01 | NOT IDENT. |
| FE-59 | 4.659E-02 | 1.834E-01 | 3.974E-01 | NOT IDENT. |
| CO-60 | -1.465E-02 | 2.470E-02 | 4.504E-02 | NOT IDENT. |
| ZN-65 | 3.502E-02 | 5.638E-02 | 1.345E-01 | NOT IDENT. |
| GE-68 | 6.622E-01 | 8.740E-01 | 2.111E+00 | NOT IDENT. |
| AS-73 | -9.867E-01 | 2.158E+00 | 3.546E+00 | NOT IDENT. |
| AS-74 | -1.136E+00 | 1.733E+00 | 2.902E+00 | NOT IDENT. |
| SE-75 | -6.139E-02 | 5.003E-02 | 7.374E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.299E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -3.303E-01 | 1.590E+00 | 3.176E+00 | NOT IDENT. |
| RB-83 | 1.985E-03 | 8.377E-02 | 1.594E-01 | NOT IDENT. |
| KR-85 | 1.148E+01 | 5.939E+00 | 1.350E+01 | NOT IDENT. |
| SR-85 | 1.407E-01 | 7.295E-02 | 1.657E-01 | NOT IDENT. |
| RB-86 | 6.485E+00 | 8.735E+00 | 2.108E+01 | NOT IDENT. |
| Y-88 | 8.778E-03 | 4.329E-02 | 1.043E-01 | NOT IDENT. |
| Y-91 | -2.634E+00 | 1.694E+01 | 3.730E+01 | NOT IDENT. |
| NB-94 | 2.883E-03 | 2.135E-02 | 4.394E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | -4.506E-03 | 5.983E-02 | 1.195E-01 | NOT IDENT. |
| NB-95M | 9.189E-02 | 1.724E-01 | 3.124E-01 | NOT IDENT. |
| ZR-95 | 8.958E-02 | 9.948E-02 | 2.363E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.769E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.037E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.686E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.105E-02 | 2.071E-02 | 3.538E-02 | FAIL ABUN |
| RH-102 | 4.932E-03 | 3.471E-02 | 6.969E-02 | NOT IDENT. |
| RU-103 | 3.795E-02 | 1.120E-01 | 2.082E-01 | FAIL ABUN |
| RH-106 | 9.429E-02 | 2.331E-01 | 4.853E-01 | NOT IDENT. |
| RU-106 | 9.429E-02 | 2.331E-01 | 4.853E-01 | NOT IDENT. |
| AG-108M | 1.465E-03 | 1.730E-02 | 3.453E-02 | NOT IDENT. |
| CD-109 | -2.142E-01 | 6.696E-01 | 1.088E+00 | NOT IDENT. |
| AG-110M | 4.449E-03 | 3.977E-02 | 8.254E-02 | NOT IDENT. |
| SN-113 | -4.142E-02 | 5.526E-02 | 9.145E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.034E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.589E-01 | 2.137E+00 | 3.985E+00 | NOT IDENT. |
| TE-123M | -1.985E-03 | 2.930E-02 | 5.363E-02 | NOT IDENT. |
| SB-124 | 2.568E-03 | 1.234E-01 | 2.917E-01 | NOT IDENT. |
| SB-125 | -3.436E-02 | 6.063E-02 | 1.071E-01 | NOT IDENT. |
| TE-125M | 1.062E+01 | 1.738E+01 | 3.447E+01 | NOT IDENT. |
| I-126 | 6.290E+00 | 9.093E+00 | 2.033E+01 | NOT IDENT. |
| SB-126 | 2.106E+00 | 6.434E+00 | 1.440E+01 | NOT IDENT. |
| SN-126 | -2.847E-02 | 5.844E-02 | 9.279E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.550E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.217E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.564E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -4.665E-03 | 3.039E-02 | 5.718E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.466E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.301E-02 | 2.632E-02 | 5.844E-02 | NOT IDENT. |
| CS-135 | 5.299E-02 | 9.553E-02 | 1.885E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.971E-01 | 5.042E+00 | 9.766E+00 | NOT IDENT. |
| BA-137M | -3.413E-03 | 2.157E-02 | 4.056E-02 | NOT IDENT. |
| CS-137 | -3.605E-03 | 2.279E-02 | 4.284E-02 | NOT IDENT. |
| CE-139 | -7.392E-03 | 3.117E-02 | 5.555E-02 | NOT IDENT. |
| BA-140 | 8.712E-01 | 2.939E+00 | 8.052E+00 | NOT IDENT. |
| LA-140 | 8.712E-01 | 2.939E+00 | 8.052E+00 | NOT IDENT. |
| CE-141 | 3.579E-02 | 2.145E-01 | 4.052E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.668E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.052E-02 | 1.625E-01 | 3.088E-01 | NOT IDENT. |
| PM-144 | 2.614E-03 | 2.426E-02 | 5.015E-02 | NOT IDENT. |
| PR-144 | 2.214E-01 | 1.897E+00 | 3.926E+00 | NOT IDENT. |
| PM-146 | 1.345E-02 | 2.805E-02 | 5.833E-02 | NOT IDENT. |
| ND-147 | 1.936E+01 | 5.651E+01 | 1.161E+02 | NOT IDENT. |
| PM-147 | 9.325E+01 | 5.160E+02 | 9.834E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 4.464E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.936E-02 | 1.596E-02 | 3.602E-02 | NOT IDENT. |
| EU-152 | 5.815E-02 | 6.130E-02 | 1.214E-01 | FAIL ABUN |
| GD-153 | 1.194E-01 | 5.846E-02 | 1.397E-01 | FAIL ABUN |
| EU-154 | -9.551E-03 | 4.673E-02 | 1.034E-01 | NOT IDENT. |
| EU-155 | 7.473E-02 | 6.813E-02 | 1.218E-01 | FAIL ABUN |
| TB-160 | 1.292E-01 | 1.650E-01 | 3.935E-01 | NOT IDENT. |
| HO-166M | 4.941E-03 | 3.479E-02 | 7.331E-02 | NOT IDENT. |
| TM-171 | 2.263E+01 | 2.233E+01 | 4.477E+01 | NOT IDENT. |
| LU-176 | -3.225E-03 | 1.657E-02 | 3.152E-02 | NOT IDENT. |
| HF-181 | 1.820E-02 | 1.111E-01 | 2.193E-01 | NOT IDENT. |
| TA-182 | 1.145E-01 | 1.786E-01 | 4.098E-01 | NOT IDENT. |
| RE-183 | 2.425E-01 | 4.133E-01 | 7.904E-01 | NOT IDENT. |
| RE-184 | -1.336E-01 | 3.389E-01 | 6.380E-01 | NOT IDENT. |
| W-188 | 4.059E+00 | 1.045E+01 | 2.065E+01 | NOT IDENT. |
| IR-192 | -1.122E-02 | 4.780E-02 | 9.010E-02 | FAIL ABUN |
| HG-203 | -5.834E-02 | 9.078E-02 | 1.484E-01 | NOT IDENT. |
| BI-207 | 9.742E-03 | 2.790E-02 | 6.420E-02 | NOT IDENT. |
| TL-208 | -7.438E-04 | 2.622E-02 | 5.193E-02 | NOT IDENT. |
| PB-210 | -4.365E+00 | 5.554E+00 | 8.761E+00 | NOT IDENT. |
| BI-211 | -3.639E-02 | 1.442E-01 | 2.697E-01 | NOT IDENT. |
| PB-211 | -9.792E-03 | 5.039E-01 | 9.628E-01 | NOT IDENT. |
| BI-212 | -4.414E-02 | 2.674E-01 | 5.373E-01 | NOT IDENT. |
| PB-212 | 5.168E-02 | 6.096E-02 | 8.094E-02 | FAIL ABUN |
| BI-214 | 4.318E-02 | 7.556E-02 | 1.127E-01 | FAIL ABUN |
| PB-214 | 8.383E-03 | 5.353E-02 | 1.048E-01 | NOT IDENT. |
| RN-219 | -9.288E-02 | 2.797E-01 | 5.129E-01 | NOT IDENT. |
| RN-222 | 4.318E-02 | 7.556E-02 | 1.127E-01 | FAIL ABUN |
| RA-223 | 4.464E-02 | 3.614E-01 | 7.244E-01 | NOT IDENT. |
| RA-224 | 2.733E-01 | 3.377E-01 | 6.550E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 4.318E-02 | 7.556E-02 | 1.127E-01 | FAIL ABUN |
| AC-227 | -5.235E-03 | 1.543E-01 | 2.818E-01 | NOT IDENT. |
| TH-227 | -5.235E-03 | 1.543E-01 | 2.818E-01 | NOT IDENT. |
| AC-228 | 1.734E-02 | 8.307E-02 | 1.763E-01 | FAIL ABUN |
| RA-228 | 1.734E-02 | 8.307E-02 | 1.763E-01 | FAIL ABUN |
| TH-228 | 5.168E-02 | 6.096E-02 | 8.094E-02 | FAIL ABUN |
| TH-229 | -1.103E-02 | 3.624E-01 | 6.568E-01 | NOT IDENT. |
| TH-230 | 4.318E-02 | 7.555E-02 | 1.127E-01 | FAIL ABUN |
| PA-231 | -5.692E-01 | 1.017E+00 | 1.683E+00 | NOT IDENT. |
| TH-231 | 4.464E-02 | 3.614E-01 | 7.244E-01 | NOT IDENT. |
| TH-232 | 1.734E-02 | 8.307E-02 | 1.763E-01 | NOT IDENT. |
| PA-233 | 3.454E-02 | 4.866E-02 | 9.880E-02 | NOT IDENT. |
| PA-234 | 4.973E-02 | 1.680E-01 | 3.719E-01 | FAIL ABUN |
| PA-234M | 1.369E+00 | 3.038E+00 | 7.017E+00 | NOT IDENT. |
| TH-234 | 1.506E-01 | 1.214E+00 | 2.463E+00 | FAIL ABUN |
| U-234 | 4.318E-02 | 7.555E-02 | 1.127E-01 | FAIL ABUN |
| U-235 | -3.352E-02 | 1.389E-01 | 2.527E-01 | FAIL ABUN |
| NP-237 | 3.454E-02 | 4.866E-02 | 9.880E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 2.489E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.506E-01 | 1.214E+00 | 2.463E+00 | FAIL ABUN |
| NP-239 | 2.124E-01 | 2.852E-01 | 5.678E-01 | FAIL ABUN |
| PU-239 | 1.127E+02 | 2.113E+02 | 3.427E+02 | FAIL ABUN |
| AM-241 | -6.242E-03 | 1.247E-01 | 2.423E-01 | NOT IDENT. |
| AM-243 | 2.698E-02 | 3.757E-02 | 7.616E-02 | NOT IDENT. |
| CM-243 | -1.848E-02 | 6.575E-02 | 1.209E-01 | FAIL ABUN |
| CM-247 | 3.819E-03 | 2.572E-02 | 5.041E-02 | NOT IDENT. |
| CF-249 | 1.071E-02 | 2.758E-02 | 5.574E-02 | NOT IDENT. |
| CF-251 | -3.113E-02 | 7.963E-02 | 1.398E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:37.68

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 64.08 | 18 | 36 | 0.73 | 128.46 | 123 | 7 | 4.88E-03 | 62.0 | |
| 2 | 0 | 92.93 | 65 | 66 | 1.25 | 186.08 | 180 | 11 | 1.81E-02 | 27.1 | |
| 3 | 1 | 98.48 | 30 | 9 | 1.01 | 197.18 | 195 | 29 | 8.32E-03 | 21.4 | 2.83E+00 |
| 4 | 1 | 106.45 | 16 | 21 | 1.02 | 213.09 | 195 | 29 | 4.56E-03 | 46.5 | |
| 5 | 0 | 128.35 | 8 | 20 | 1.18 | 256.84 | 254 | 7 | 2.28E-03 | 95.6 | |
| 6 | 0 | 186.38 | 30 | 45 | 0.73 | 372.77 | 368 | 9 | 8.33E-03 | 44.3 | |
| 7 | 0 | 239.42 | 30 | 28 | 1.03 | 478.73 | 473 | 12 | 8.30E-03 | 40.7 | |
| 8 | 0 | 296.74 | 5 | 15 | 0.55 | 593.23 | 589 | 7 | 1.33E-03 | 139.0 | |
| 9 | 0 | 343.95 | 11 | 8 | 0.72 | 687.55 | 685 | 8 | 3.06E-03 | 53.8 | |
| 10 | 0 | 499.11 | 12 | 6 | 0.89 | 997.54 | 993 | 8 | 3.36E-03 | 45.3 | |
| 11 | 0 | 511.96 | 78 | 21 | 2.40 | 1023.23 | 1015 | 18 | 2.18E-02 | 18.0 | |
| 12 | 0 | 609.88 | 15 | 12 | 1.83 | 1218.86 | 1211 | 13 | 4.06E-03 | 57.0 | |
| 13 | 0 | 652.53 | 9 | 3 | 0.61 | 1304.09 | 1301 | 6 | 2.59E-03 | 43.5 | |
| 14 | 1 | 1036.49 | 11 | 0 | 1.89 | 2071.34 | 2070 | 10 | 2.99E-03 | 20.7 | 1.85E-01 |
| 15 | 1 | 1039.16 | 9 | 0 | 1.55 | 2076.68 | 2070 | 10 | 2.50E-03 | 31.4 | |
| 16 | 0 | 1461.68 | 9 | 3 | 1.36 | 2921.14 | 2915 | 9 | 2.62E-03 | 43.9 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:40.77

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 6 | 10.66* | 1.163E+00 | 2.446E-01 | 2.446E-01 | 142.05 |
| ANH-511 | 511.00 | 4 | 100.00* | 2.772E+00 | 7.809E-03 | 7.809E-03 | 683.91 |

Flag: "*" = Keyline

Sample ID : G341146008 Acquisition date : 10-FEB-2014 13:24:42

Total number of lines in spectrum 14
Number of unidentified lines 3
Number of lines tentatively identified by NID 11 78.57%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 2.446E-01 | 2.446E-01 | 3.475E-01 | 142.05 | |
| ANH-511 | 1.00E+09Y | 1.00 | 7.809E-03 | 7.809E-03 | 53.41E-03 | 683.91 | |
| Total Activity : | | | 2.524E-01 | 2.524E-01 | | | |
| Grand Total Activity : | | | 2.524E-01 | 2.524E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146008 Acquisition date : 10-FEB-2014 13:24:42

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.93 | 12 | 66 | 1.25 | 186.08 | 180 | 11 | 3.21E-03 | **** | 4.84E+00 | T |
| 1 | 98.48 | 27 | 9 | 1.01 | 197.18 | 195 | 29 | 7.42E-03 | 50.0 | 5.15E+00 | T |
| 1 | 106.45 | 16 | 21 | 1.02 | 213.09 | 195 | 29 | 4.56E-03 | 93.0 | 5.48E+00 | T |
| 0 | 128.35 | 8 | 20 | 1.18 | 256.84 | 254 | 7 | 2.28E-03 | **** | 5.86E+00 | T |
| 0 | 239.42 | 21 | 28 | 1.03 | 478.73 | 473 | 12 | 5.73E-03 | **** | 4.64E+00 | T |
| 0 | 296.74 | 5 | 15 | 0.55 | 593.23 | 589 | 7 | 1.33E-03 | **** | 4.04E+00 | T |
| 0 | 343.95 | 11 | 8 | 0.72 | 687.55 | 685 | 8 | 3.06E-03 | **** | 3.66E+00 | T |
| 0 | 499.11 | 12 | 6 | 0.89 | 997.54 | 993 | 8 | 3.36E-03 | 90.7 | 2.82E+00 | |
| 0 | 609.88 | 9 | 12 | 1.83 | 1218.86 | 1211 | 13 | 2.62E-03 | **** | 2.44E+00 | T |
| 0 | 652.53 | 9 | 3 | 0.61 | 1304.09 | 1301 | 6 | 2.59E-03 | 87.0 | 2.31E+00 | |
| 1 | 1036.49 | 11 | 0 | 1.89 | 2071.34 | 2070 | 10 | 2.99E-03 | 41.5 | 1.57E+00 | |
| 1 | 1039.16 | 9 | 0 | 1.55 | 2076.68 | 2070 | 10 | 2.50E-03 | 62.7 | 1.57E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:27:54.76

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146008.CNF;1       *
* Acquisition date : 10-FEB-2014 13:24:42 Sensitivity     : 3.000                *
* Detector ID      : GAM09                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:09:00 Nuclide Library : SOLID                *
* Sample ID        : G341146008           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.4796E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  5-JUN-2013 11:45:38 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_500MLMB.CNF;10             *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.869E-01 |
| ANH-511 | 1.428E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.526E-01 | NOT IDENT. |
| NA-22 | 1.338E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.196E-02 | NOT IDENT. |
| SC-46 | 3.659E-02 | NOT IDENT. |
| V-48 | 8.953E-01 | NOT IDENT. |
| CR-51 | 1.288E+00 | NOT IDENT. |
| MN-54 | 2.220E-02 | NOT IDENT. |
| CO-56 | 4.348E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.655E-02 | NOT IDENT. |
| CO-58 | 4.231E-02 | NOT IDENT. |
| FE-59 | 1.629E-01 | NOT IDENT. |
| CO-60 | 1.688E-02 | NOT IDENT. |
| ZN-65 | 5.520E-02 | NOT IDENT. |
| GE-68 | 8.769E-01 | NOT IDENT. |
| AS-73 | 1.604E+00 | NOT IDENT. |
| AS-74 | 1.260E+00 | NOT IDENT. |
| SE-75 | 3.224E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.284E+00 | NOT IDENT. |
| RB-83 | 6.773E-02 | NOT IDENT. |
| KR-85 | 6.169E+00 | NOT IDENT. |
| SR-85 | 7.575E-02 | NOT IDENT. |
| RB-86 | 8.744E+00 | NOT IDENT. |
| Y-88 | 3.905E-02 | NOT IDENT. |
| Y-91 | 1.272E+01 | NOT IDENT. |
| NB-94 | 1.883E-02 | NOT IDENT. |
| NB-95 | 5.031E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95M | 1.397E-01 | NOT IDENT. |
| ZR-95 | 1.010E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.587E-02 | FAIL ABUN |
| RH-102 | 2.944E-02 | NOT IDENT. |
| RU-103 | 8.985E-02 | FAIL ABUN |
| RH-106 | 2.083E-01 | NOT IDENT. |
| RU-106 | 2.083E-01 | NOT IDENT. |
| AG-108M | 1.484E-02 | NOT IDENT. |
| CD-109 | 4.965E-01 | NOT IDENT. |
| AG-110M | 3.447E-02 | NOT IDENT. |
| SN-113 | 4.014E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.816E+00 | NOT IDENT. |
| TE-123M | 2.433E-02 | NOT IDENT. |
| SB-124 | 1.042E-01 | NOT IDENT. |
| SB-125 | 4.575E-02 | NOT IDENT. |
| TE-125M | 1.580E+01 | NOT IDENT. |
| I-126 | 8.664E+00 | NOT IDENT. |
| SB-126 | 5.958E+00 | NOT IDENT. |
| SN-126 | 4.226E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.545E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.479E-02 | NOT IDENT. |
| CS-135 | 8.437E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.057E+00 | NOT IDENT. |
| BA-137M | 1.693E-02 | NOT IDENT. |
| CS-137 | 1.788E-02 | NOT IDENT. |
| CE-139 | 2.532E-02 | NOT IDENT. |
| BA-140 | 2.853E+00 | NOT IDENT. |
| LA-140 | 2.853E+00 | NOT IDENT. |
| CE-141 | 1.841E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.412E-01 | NOT IDENT. |
| PM-144 | 2.132E-02 | NOT IDENT. |
| PR-144 | 1.670E+00 | NOT IDENT. |
| PM-146 | 2.556E-02 | NOT IDENT. |
| ND-147 | 5.019E+01 | NOT IDENT. |
| PM-147 | 4.475E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.609E-02 | NOT IDENT. |
| EU-152 | 5.358E-02 | FAIL ABUN |
| GD-153 | 6.378E-02 | FAIL ABUN |
| EU-154 | 3.638E-02 | NOT IDENT. |
| EU-155 | 5.472E-02 | FAIL ABUN |
| TB-160 | 1.655E-01 | NOT IDENT. |
| HO-166M | 3.080E-02 | NOT IDENT. |
| TM-171 | 2.039E+01 | NOT IDENT. |
| LU-176 | 1.391E-02 | NOT IDENT. |
| HF-181 | 9.572E-02 | NOT IDENT. |
| TA-182 | 1.717E-01 | NOT IDENT. |
| RE-183 | 3.573E-01 | NOT IDENT. |
| RE-184 | 2.536E-01 | NOT IDENT. |
| W-188 | 9.254E+00 | NOT IDENT. |
| IR-192 | 3.982E-02 | FAIL ABUN |
| HG-203 | 6.596E-02 | NOT IDENT. |
| BI-207 | 2.609E-02 | NOT IDENT. |
| TL-208 | 2.277E-02 | NOT IDENT. |
| PB-210 | 3.944E+00 | NOT IDENT. |
| BI-211 | 1.202E-01 | NOT IDENT. |
| PB-211 | 4.260E-01 | NOT IDENT. |
| BI-212 | 2.203E-01 | NOT IDENT. |
| PB-212 | 3.710E-02 | FAIL ABUN |
| BI-214 | 5.017E-02 | FAIL ABUN |
| PB-214 | 4.709E-02 | NOT IDENT. |
| RN-219 | 2.249E-01 | NOT IDENT. |
| RN-222 | 5.017E-02 | FAIL ABUN |
| RA-223 | 3.171E-01 | NOT IDENT. |
| RA-224 | 2.914E-01 | NOT IDENT. |
| RA-226 | 5.017E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.247E-01 | NOT IDENT. |
| TH-227 | 1.247E-01 | NOT IDENT. |
| AC-228 | 7.305E-02 | FAIL ABUN |
| RA-228 | 7.305E-02 | FAIL ABUN |
| TH-228 | 3.710E-02 | FAIL ABUN |
| TH-229 | 2.989E-01 | NOT IDENT. |
| TH-230 | 5.016E-02 | FAIL ABUN |
| PA-231 | 7.449E-01 | NOT IDENT. |
| TH-231 | 3.171E-01 | NOT IDENT. |
| TH-232 | 7.305E-02 | NOT IDENT. |
| PA-233 | 4.485E-02 | NOT IDENT. |
| PA-234 | 1.525E-01 | FAIL ABUN |
| PA-234M | 3.006E+00 | NOT IDENT. |
| TH-234 | 1.137E+00 | FAIL ABUN |
| U-234 | 5.016E-02 | FAIL ABUN |
| U-235 | 1.157E-01 | FAIL ABUN |
| NP-237 | 4.485E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.137E+00 | FAIL ABUN |
| NP-239 | 2.613E-01 | FAIL ABUN |
| PU-239 | 1.529E+02 | FAIL ABUN |
| AM-241 | 1.086E-01 | NOT IDENT. |
| AM-243 | 3.496E-02 | NOT IDENT. |
| CM-243 | 5.432E-02 | FAIL ABUN |
| CM-247 | 2.231E-02 | NOT IDENT. |
| CF-249 | 2.479E-02 | NOT IDENT. |
| CF-251 | 6.269E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:00.72

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146008.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:24:42 | Sensitivity | : 3.000 |
| Detector ID | : GAM09 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.25 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 10:09:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146008 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.4796E+02 GRAM |
| | | Quantity Err(%) | : 1.3517E-03 % |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 5-JUN-2013 11:45:38 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM09_500MLMB.CNF;10 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 2.446E-01 | 3.412E-01 | 3.412E-01 |
| ANH-511 | 7.809E-03 | 5.235E-02 | 5.235E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.840E-01 | 6.100E-01 | 6.233E-01 | NOT IDENT. |
| NA-22 | 3.197E-04 | 1.547E-02 | 1.547E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.461E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.568E-03 | 1.795E-02 | 1.812E-02 | NOT IDENT. |
| SC-46 | 9.672E-03 | 4.068E-02 | 4.092E-02 | NOT IDENT. |
| V-48 | -5.790E-01 | 1.257E+00 | 1.284E+00 | NOT IDENT. |
| CR-51 | -1.119E+00 | 1.674E+00 | 1.748E+00 | NOT IDENT. |
| MN-54 | 5.465E-03 | 2.487E-02 | 2.499E-02 | NOT IDENT. |
| CO-56 | -2.448E-02 | 5.669E-02 | 5.776E-02 | FAIL ABUN |
| MN-56 | -1.000E+41 | 2.264E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -6.940E-03 | 2.033E-02 | 2.057E-02 | NOT IDENT. |
| CO-58 | 1.190E-02 | 4.678E-02 | 4.708E-02 | NOT IDENT. |
| FE-59 | 4.659E-02 | 1.836E-01 | 1.848E-01 | NOT IDENT. |
| CO-60 | -1.465E-02 | 2.472E-02 | 2.559E-02 | NOT IDENT. |
| ZN-65 | 3.502E-02 | 5.666E-02 | 5.882E-02 | NOT IDENT. |
| GE-68 | 6.622E-01 | 8.800E-01 | 9.293E-01 | NOT IDENT. |
| AS-73 | -9.867E-01 | 2.168E+00 | 2.213E+00 | NOT IDENT. |
| AS-74 | -1.136E+00 | 1.737E+00 | 1.811E+00 | NOT IDENT. |
| SE-75 | -6.139E-02 | 5.027E-02 | 5.739E-02 | NOT IDENT. |
| BR-77 | 1.101E+11 | 3.292E+11 | 3.329E+11 | SHORT HLIF |
| SR-82 | -3.303E-01 | 1.591E+00 | 1.598E+00 | NOT IDENT. |
| RB-83 | 1.985E-03 | 8.377E-02 | 8.377E-02 | NOT IDENT. |
| KR-85 | 1.148E+01 | 6.013E+00 | 7.933E+00 | NOT IDENT. |
| SR-85 | 1.407E-01 | 7.385E-02 | 9.736E-02 | NOT IDENT. |
| RB-86 | 6.485E+00 | 8.793E+00 | 9.266E+00 | NOT IDENT. |
| Y-88 | 8.778E-03 | 4.330E-02 | 4.348E-02 | NOT IDENT. |
| Y-91 | -2.634E+00 | 1.695E+01 | 1.699E+01 | NOT IDENT. |
| NB-94 | 2.883E-03 | 2.136E-02 | 2.140E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | -4.506E-03 | 5.983E-02 | 5.987E-02 | NOT IDENT. |
| NB-95M | 9.189E-02 | 1.726E-01 | 1.775E-01 | NOT IDENT. |
| ZR-95 | 8.958E-02 | 9.988E-02 | 1.077E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.324E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.420E+40 | 1.773E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -4.701E+08 | 4.037E+09 | 4.043E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.691E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.105E-02 | 2.083E-02 | 2.141E-02 | FAIL ABUN |
| RH-102 | 4.932E-03 | 3.472E-02 | 3.479E-02 | NOT IDENT. |
| RU-103 | 3.795E-02 | 1.121E-01 | 1.134E-01 | FAIL ABUN |
| RH-106 | 9.429E-02 | 2.332E-01 | 2.371E-01 | NOT IDENT. |
| RU-106 | 9.429E-02 | 2.332E-01 | 2.371E-01 | NOT IDENT. |
| AG-108M | 1.465E-03 | 1.730E-02 | 1.731E-02 | NOT IDENT. |
| CD-109 | -2.142E-01 | 6.700E-01 | 6.770E-01 | NOT IDENT. |
| AG-110M | 4.449E-03 | 3.978E-02 | 3.983E-02 | NOT IDENT. |
| SN-113 | -4.142E-02 | 5.535E-02 | 5.842E-02 | NOT IDENT. |
| CD-115 | -1.158E+11 | 5.035E+11 | 5.062E+11 | SHORT HLIF |
| SN-117M | 2.589E-01 | 2.138E+00 | 2.141E+00 | NOT IDENT. |
| TE-123M | -1.985E-03 | 2.931E-02 | 2.932E-02 | NOT IDENT. |
| SB-124 | 2.568E-03 | 1.234E-01 | 1.234E-01 | NOT IDENT. |
| SB-125 | -3.436E-02 | 6.069E-02 | 6.264E-02 | NOT IDENT. |
| TE-125M | 1.062E+01 | 1.741E+01 | 1.806E+01 | NOT IDENT. |
| I-126 | 6.290E+00 | 9.114E+00 | 9.544E+00 | NOT IDENT. |
| SB-126 | 2.106E+00 | 6.441E+00 | 6.510E+00 | NOT IDENT. |
| SN-126 | -2.847E-02 | 5.850E-02 | 5.989E-02 | NOT IDENT. |
| SB-127 | -3.991E+05 | 1.560E+06 | 1.570E+06 | SHORT HLIF |
| I-131 | -4.426E+00 | 7.217E+01 | 7.220E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.382E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -6.411E+05 | 1.564E+07 | 1.565E+07 | SHORT HLIF |
| BA-133 | -4.665E-03 | 3.040E-02 | 3.047E-02 | NOT IDENT. |
| I-133 | 3.516E+30 | 2.475E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.301E-02 | 2.636E-02 | 2.700E-02 | NOT IDENT. |
| CS-135 | 5.299E-02 | 9.566E-02 | 9.860E-02 | NOT IDENT. |
| I-135 | -1.000E+41 | 1.083E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.971E-01 | 5.043E+00 | 5.053E+00 | NOT IDENT. |
| BA-137M | -3.413E-03 | 2.157E-02 | 2.163E-02 | NOT IDENT. |
| CS-137 | -3.605E-03 | 2.279E-02 | 2.285E-02 | NOT IDENT. |
| CE-139 | -7.392E-03 | 3.121E-02 | 3.139E-02 | NOT IDENT. |
| BA-140 | 8.712E-01 | 2.940E+00 | 2.966E+00 | NOT IDENT. |
| LA-140 | 8.712E-01 | 2.940E+00 | 2.966E+00 | NOT IDENT. |
| CE-141 | 3.579E-02 | 2.145E-01 | 2.151E-01 | NOT IDENT. |
| CE-143 | -1.468E+19 | 2.671E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.052E-02 | 1.625E-01 | 1.636E-01 | NOT IDENT. |
| PM-144 | 2.614E-03 | 2.426E-02 | 2.429E-02 | NOT IDENT. |
| PR-144 | 2.214E-01 | 1.897E+00 | 1.900E+00 | NOT IDENT. |
| PM-146 | 1.345E-02 | 2.808E-02 | 2.873E-02 | NOT IDENT. |
| ND-147 | 1.936E+01 | 5.653E+01 | 5.720E+01 | NOT IDENT. |
| PM-147 | 9.325E+01 | 5.161E+02 | 5.178E+02 | NOT IDENT. |
| PM-149 | 4.072E+11 | 4.464E+12 | 4.468E+12 | SHORT HLIF |
| EU-150 | 1.936E-02 | 1.603E-02 | 1.826E-02 | NOT IDENT. |
| EU-152 | 5.815E-02 | 6.151E-02 | 6.687E-02 | FAIL ABUN |
| GD-153 | 1.194E-01 | 5.946E-02 | 8.020E-02 | FAIL ABUN |
| EU-154 | -9.551E-03 | 4.674E-02 | 4.694E-02 | NOT IDENT. |
| EU-155 | 7.473E-02 | 6.857E-02 | 7.640E-02 | FAIL ABUN |
| TB-160 | 1.292E-01 | 1.658E-01 | 1.758E-01 | NOT IDENT. |
| HO-166M | 4.941E-03 | 3.479E-02 | 3.486E-02 | NOT IDENT. |
| TM-171 | 2.263E+01 | 2.245E+01 | 2.466E+01 | NOT IDENT. |
| LU-176 | -3.225E-03 | 1.657E-02 | 1.664E-02 | NOT IDENT. |
| HF-181 | 1.820E-02 | 1.111E-01 | 1.114E-01 | NOT IDENT. |
| TA-182 | 1.145E-01 | 1.789E-01 | 1.862E-01 | NOT IDENT. |
| RE-183 | 2.425E-01 | 4.143E-01 | 4.285E-01 | NOT IDENT. |
| RE-184 | -1.336E-01 | 3.396E-01 | 3.449E-01 | NOT IDENT. |
| W-188 | 4.059E+00 | 1.047E+01 | 1.063E+01 | NOT IDENT. |
| IR-192 | -1.122E-02 | 4.781E-02 | 4.807E-02 | FAIL ABUN |
| HG-203 | -5.834E-02 | 9.090E-02 | 9.462E-02 | NOT IDENT. |
| BI-207 | 9.742E-03 | 2.794E-02 | 2.828E-02 | NOT IDENT. |
| TL-208 | -7.438E-04 | 2.622E-02 | 2.622E-02 | NOT IDENT. |
| PB-210 | -4.365E+00 | 5.570E+00 | 5.907E+00 | NOT IDENT. |
| BI-211 | -3.639E-02 | 1.442E-01 | 1.452E-01 | NOT IDENT. |
| PB-211 | -9.792E-03 | 5.039E-01 | 5.039E-01 | NOT IDENT. |
| BI-212 | -4.414E-02 | 2.675E-01 | 2.682E-01 | NOT IDENT. |
| PB-212 | 5.168E-02 | 6.112E-02 | 6.541E-02 | FAIL ABUN |
| BI-214 | 4.318E-02 | 7.564E-02 | 7.811E-02 | FAIL ABUN |
| PB-214 | 8.383E-03 | 5.354E-02 | 5.367E-02 | NOT IDENT. |
| RN-219 | -9.288E-02 | 2.801E-01 | 2.832E-01 | NOT IDENT. |
| RN-222 | 4.318E-02 | 7.564E-02 | 7.811E-02 | FAIL ABUN |
| RA-223 | 4.464E-02 | 3.615E-01 | 3.620E-01 | NOT IDENT. |
| RA-224 | 2.733E-01 | 3.385E-01 | 3.603E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 4.318E-02 | 7.564E-02 | 7.811E-02 | FAIL ABUN |
| AC-227 | -5.235E-03 | 1.543E-01 | 1.543E-01 | NOT IDENT. |
| TH-227 | -5.235E-03 | 1.543E-01 | 1.543E-01 | NOT IDENT. |
| AC-228 | 1.734E-02 | 8.310E-02 | 8.347E-02 | FAIL ABUN |
| RA-228 | 1.734E-02 | 8.310E-02 | 8.347E-02 | FAIL ABUN |
| TH-228 | 5.168E-02 | 6.112E-02 | 6.541E-02 | FAIL ABUN |
| TH-229 | -1.103E-02 | 3.624E-01 | 3.625E-01 | NOT IDENT. |
| TH-230 | 4.318E-02 | 7.564E-02 | 7.810E-02 | FAIL ABUN |
| PA-231 | -5.692E-01 | 1.018E+00 | 1.050E+00 | NOT IDENT. |
| TH-231 | 4.464E-02 | 3.615E-01 | 3.620E-01 | NOT IDENT. |
| TH-232 | 1.734E-02 | 8.310E-02 | 8.347E-02 | NOT IDENT. |
| PA-233 | 3.454E-02 | 4.874E-02 | 5.117E-02 | NOT IDENT. |
| PA-234 | 4.973E-02 | 1.775E-01 | 1.789E-01 | FAIL ABUN |
| PA-234M | 1.369E+00 | 3.044E+00 | 3.106E+00 | NOT IDENT. |
| TH-234 | 1.506E-01 | 1.215E+00 | 1.217E+00 | FAIL ABUN |
| U-234 | 4.318E-02 | 7.564E-02 | 7.810E-02 | FAIL ABUN |
| U-235 | -3.352E-02 | 1.389E-01 | 1.397E-01 | FAIL ABUN |
| NP-237 | 3.454E-02 | 4.874E-02 | 5.117E-02 | FAIL ABUN |
| NP-238 | -7.794E+11 | 2.491E+12 | 2.516E+12 | SHORT HLIF |
| U-238 | 1.506E-01 | 1.215E+00 | 1.217E+00 | FAIL ABUN |
| NP-239 | 2.124E-01 | 2.863E-01 | 3.019E-01 | FAIL ABUN |
| PU-239 | 1.127E+02 | 2.116E+02 | 2.176E+02 | FAIL ABUN |
| AM-241 | -6.242E-03 | 1.247E-01 | 1.247E-01 | NOT IDENT. |
| AM-243 | 2.698E-02 | 3.764E-02 | 3.955E-02 | NOT IDENT. |
| CM-243 | -1.848E-02 | 6.579E-02 | 6.631E-02 | FAIL ABUN |
| CM-247 | 3.819E-03 | 2.573E-02 | 2.579E-02 | NOT IDENT. |
| CF-249 | 1.071E-02 | 2.760E-02 | 2.802E-02 | NOT IDENT. |
| CF-251 | -3.113E-02 | 7.974E-02 | 8.096E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 15.4813 | 94.67 | 23.5630 | 193.51 | 34.8560 |
| 45.60 | 22.7851 | 94.87 | 16.3195 | 197.03 | 36.0662 |
| 46.54 | 36.0883 | 97.43 | 16.4038 | 198.01 | 31.8607 |
| 49.72 | 0.0000 | 98.43 | 26.0243 | 201.83 | 33.0728 |
| 51.35 | 30.5361 | 98.44 | 26.0248 | 205.31 | 29.9947 |
| 52.39 | 19.6053 | 99.53 | 30.1988 | 210.85 | 29.1094 |
| 53.44 | 38.1056 | 100.11 | 30.2332 | 215.65 | 27.1006 |
| 57.36 | 0.0000 | 103.18 | 30.4135 | 222.11 | 26.2046 |
| 57.53 | 28.6119 | 103.37 | 30.4246 | 227.09 | 26.3477 |
| 57.98 | 21.1749 | 105.21 | 30.5311 | 227.38 | 20.8649 |
| 59.32 | 26.6729 | 105.31 | 30.5370 | 228.16 | 0.0000 |
| 59.54 | 25.8552 | 106.12 | 30.5835 | 228.18 | 26.3787 |
| 63.29 | 26.9639 | 109.28 | 30.7638 | 117.23 | 26.3787 |
| 63.58 | 27.8280 | 111.00 | 30.8608 | 235.69 | 16.6193 |
| 64.28 | 31.2592 | 111.76 | 0.0000 | 235.96 | 16.6240 |
| 66.73 | 36.5619 | 116.30 | 0.0000 | 238.63 | 16.6707 |
| 67.24 | 32.3528 | 117.23 | 32.1517 | 238.98 | 0.0000 |
| 67.75 | 31.5426 | 121.12 | 31.4169 | 240.99 | 11.6982 |
| 69.67 | 27.4132 | 121.22 | 31.4223 | 242.00 | 15.0562 |
| 70.83 | 34.3656 | 121.78 | 35.2649 | 244.70 | 20.1308 |
| 72.81 | 36.2599 | 122.06 | 35.2816 | 252.40 | 0.0000 |
| 72.87 | 41.4460 | 123.07 | 37.2526 | 252.80 | 24.8071 |
| 74.66 | 30.3519 | 127.23 | 34.6268 | 254.15 | 0.0000 |
| 74.82 | 31.2310 | 129.30 | 41.9834 | 256.23 | 20.3661 |
| 74.97 | 32.9779 | 131.20 | 37.7570 | 260.90 | 0.0000 |
| 77.11 | 36.6342 | 133.02 | 30.2942 | 264.66 | 34.2249 |
| 79.69 | 29.8339 | 133.52 | 34.0109 | 268.22 | 17.1710 |
| 80.12 | 31.6199 | 136.00 | 27.3161 | 269.46 | 21.7759 |
| 80.19 | 0.0000 | 136.47 | 25.3837 | 271.23 | 21.8122 |
| 80.57 | 26.3770 | 140.51 | 0.0000 | 273.65 | 26.4651 |
| 81.00 | 39.6041 | 143.76 | 32.5824 | 276.40 | 18.4580 |
| 81.07 | 39.6103 | 144.24 | 29.6420 | 277.37 | 27.7119 |
| 83.79 | 39.8520 | 145.44 | 30.6853 | 277.60 | 31.1825 |
| 85.43 | 30.2192 | 152.43 | 31.0038 | 278.00 | 26.5732 |
| 86.55 | 41.8754 | 153.25 | 28.0367 | 279.20 | 31.2292 |
| 86.79 | 41.8969 | 323.87 | 35.0947 | 279.54 | 31.2391 |
| 86.94 | 41.7324 | 156.02 | 36.1912 | 280.46 | 20.8436 |
| 87.09 | 43.8866 | 158.56 | 33.2951 | 283.69 | 27.8745 |
| 87.57 | 44.2000 | 159.00 | 33.3159 | 284.31 | 0.0000 |
| 88.03 | 42.9028 | 162.33 | 38.5427 | 285.41 | 17.4490 |
| 88.34 | 38.9064 | 163.33 | 29.4549 | 285.90 | 0.0000 |
| 88.47 | 38.9172 | 165.86 | 39.7498 | 287.50 | 22.1442 |
| 89.96 | 28.2705 | 176.31 | 28.9397 | 290.67 | 20.0370 |
| 91.11 | 35.9857 | 176.60 | 28.9505 | 293.27 | 0.0000 |
| 92.59 | 36.0966 | 177.52 | 31.0556 | 351.93 | 22.5328 |
| 93.35 | 36.1532 | 181.07 | 0.0000 | 295.96 | 22.9000 |
| 94.56 | 23.5577 | 184.41 | 32.3755 | 879.38 | 31.0750 |
| 94.65 | 23.5621 | 143.76 | 32.4292 | 299.98 | 25.4566 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 25.4588 | 487.02 | 16.1865 | 702.65 | 10.8586 |
| 300.13 | 24.0453 | 492.35 | 0.0000 | 706.68 | 9.9714 |
| 301.36 | 22.2509 | 497.08 | 9.7705 | 711.68 | 8.1767 |
| 302.85 | 18.6086 | 505.52 | 9.8191 | 720.70 | 5.4729 |
| 256.23 | 26.6222 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 21.3398 | 511.00 | 11.2871 | 722.78 | 9.1299 |
| 308.46 | 24.0419 | 514.00 | 11.3067 | 722.91 | 9.1304 |
| 311.90 | 20.5405 | 514.00 | 11.3068 | 723.31 | 7.3057 |
| 316.51 | 22.4144 | 520.40 | 10.6115 | 724.19 | 7.3084 |
| 319.41 | 17.0764 | 520.69 | 0.0000 | 727.33 | 8.2332 |
| 320.08 | 22.4815 | 522.65 | 0.0000 | 733.00 | 10.0877 |
| 321.04 | 17.0996 | 527.90 | 0.0000 | 735.93 | 5.5094 |
| 323.87 | 15.3357 | 529.59 | 15.5562 | 333.97 | 4.5941 |
| 325.23 | 13.5468 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 12.6805 | 531.02 | 10.3790 | 747.24 | 8.3043 |
| 333.37 | 15.4555 | 546.56 | 0.0000 | 748.06 | 6.4612 |
| 333.97 | 10.0055 | 552.55 | 10.5035 | 752.31 | 7.3975 |
| 334.37 | 11.8287 | 563.25 | 11.6207 | 753.82 | 8.3274 |
| 338.28 | 17.3425 | 569.33 | 15.8981 | 756.73 | 4.6321 |
| 338.32 | 17.3431 | 946.00 | 15.8995 | 756.80 | 4.6322 |
| 311.90 | 10.2409 | 569.70 | 15.9013 | 884.68 | 7.4338 |
| 340.48 | 10.2409 | 583.19 | 10.6766 | 765.81 | 10.2295 |
| 340.55 | 10.2414 | 584.27 | 11.7506 | 766.42 | 11.1624 |
| 344.28 | 16.5083 | 595.83 | 22.5676 | 766.84 | 13.0252 |
| 345.93 | 19.1010 | 427.87 | 19.3909 | 772.60 | 0.0000 |
| 351.06 | 21.2063 | 602.52 | 0.0000 | 776.52 | 7.4729 |
| 351.93 | 19.3754 | 602.73 | 27.6078 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 13.8180 | 778.90 | 5.6102 |
| 356.01 | 24.0648 | 609.32 | 15.1484 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 20.7855 | 785.37 | 4.6876 |
| 366.42 | 0.0000 | 614.28 | 12.1492 | 792.07 | 6.5806 |
| 375.05 | 9.3896 | 618.01 | 21.7352 | 794.95 | 7.5295 |
| 356.01 | 21.7359 | 620.36 | 11.9685 | 795.86 | 6.5907 |
| 388.16 | 17.0637 | 621.93 | 8.7109 | 810.29 | 3.7881 |
| 388.63 | 20.8627 | 630.19 | 0.0000 | 344.28 | 3.7883 |
| 391.69 | 19.0079 | 631.29 | 8.7512 | 810.76 | 5.6832 |
| 264.66 | 19.1290 | 633.25 | 10.9494 | 815.77 | 9.4907 |
| 401.81 | 21.0591 | 634.78 | 6.5746 | 1048.07 | 6.6509 |
| 402.40 | 18.1949 | 635.95 | 6.5784 | 832.01 | 8.5966 |
| 404.85 | 20.1444 | 636.99 | 0.0000 | 834.85 | 6.6936 |
| 410.95 | 18.3033 | 645.85 | 12.1182 | 835.71 | 6.6958 |
| 413.71 | 13.5121 | 657.76 | 7.5973 | 836.80 | 0.0000 |
| 414.70 | 13.5213 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 12.6612 | 661.66 | 9.9899 | 846.77 | 12.4884 |
| 427.87 | 17.5399 | 664.57 | 0.0000 | 856.80 | 8.6792 |
| 433.94 | 11.7405 | 666.33 | 5.5621 | 860.56 | 9.6572 |
| 439.40 | 12.7645 | 666.50 | 4.4500 | 871.09 | 5.8175 |
| 453.88 | 11.8932 | 667.71 | 0.0000 | 873.19 | 3.8814 |
| 463.37 | 17.9473 | 677.62 | 12.3011 | 875.33 | 0.0000 |
| 468.07 | 12.0000 | 685.70 | 0.0000 | 879.38 | 3.8904 |
| 473.00 | 0.0000 | 695.00 | 14.4281 | 880.51 | 0.9730 |
| 475.06 | 15.0650 | 696.49 | 9.9261 | 883.24 | 10.7140 |
| 476.78 | 12.0646 | 696.51 | 9.9261 | 884.68 | 7.7961 |
| 477.60 | 12.0707 | 697.00 | 9.9282 | 889.28 | 4.8809 |
| 482.18 | 14.1218 | 697.49 | 9.0278 | 894.76 | 5.8689 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 9.7935 | 1298.22 | 0.0000 | | |
| 903.28 | 7.8498 | 1312.11 | 1.8566 | | |
| 911.20 | 4.9202 | 1332.49 | 6.5334 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.9474 | 1365.19 | 2.8240 | | |
| 937.49 | 7.9469 | 1368.63 | 0.0000 | | |
| 944.13 | 5.9741 | 1384.29 | 5.6758 | | |
| 946.00 | 4.9817 | 1408.01 | 2.8550 | | |
| 949.00 | 10.9713 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 3.8566 | | |
| 962.31 | 7.0142 | 1489.16 | 3.8830 | | |
| 964.08 | 9.0237 | 1505.03 | 1.9489 | | |
| 966.17 | 5.0167 | 1596.21 | 0.9952 | | |
| 968.97 | 7.0302 | 1620.50 | 4.0026 | | |
| 983.53 | 7.0655 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.0323 | | |
| 1274.44 | 8.1096 | 1750.46 | 0.0000 | | |
| 1001.03 | 2.0306 | 1764.49 | 2.0640 | | |
| 1004.73 | 9.1492 | 1063.66 | 4.1330 | | |
| 507.63 | 0.0000 | 1771.35 | 4.1340 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0828 | | |
| 1037.84 | 3.0832 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.0943 | | |
| 631.29 | 5.1533 | | | | |
| 1048.07 | 9.2804 | | | | |
| 1049.04 | 9.2830 | | | | |
| 1050.41 | 6.1916 | | | | |
| 1063.66 | 3.1088 | | | | |
| 1077.00 | 3.1220 | | | | |
| 1077.34 | 3.1225 | | | | |
| 1085.87 | 5.2180 | | | | |
| 1099.45 | 5.2400 | | | | |
| 1112.07 | 8.4168 | | | | |
| 1112.84 | 6.3141 | | | | |
| 1115.54 | 3.1597 | | | | |
| 1120.29 | 10.5474 | | | | |
| 1120.55 | 10.5483 | | | | |
| 1221.41 | 8.4406 | | | | |
| 1129.67 | 6.3466 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 4.2863 | | | | |
| 1177.95 | 3.2191 | | | | |
| 1189.05 | 6.4591 | | | | |
| 1204.77 | 2.1628 | | | | |
| 1221.41 | 4.3463 | | | | |
| 1231.02 | 7.6265 | | | | |
| 1235.36 | 2.1816 | | | | |
| 1238.28 | 6.5505 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 2.7549 | | | | |
| 1274.44 | 2.7567 | | | | |
| 1274.54 | 1.8379 | | | | |
| 1291.59 | 6.4625 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:28.70

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146009.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;376
                                        Background date  : 9-FEB-2014 11:21:17.
Sample date      : 7-NOV-2013 10:12:00. Acquisition date : 10-FEB-2014 13:25:03
Sample ID        : G341146009           Sample quantity  : 1.06520E+02 GRAM
Detector name    : GAM11                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.27  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.56* | 7 | 21 | 1.74 | 93.14 | 90 | 7 | 1.88E-03 | 145.9 | |
| 2 | 0 | 49.93 | 23 | 24 | 1.94 | 99.88 | 97 | 7 | 6.48E-03 | 40.0 | |
| 3 | 0 | 63.42* | 10 | 65 | 1.01 | 126.87 | 122 | 11 | 2.73E-03 | 171.8 | |
| 4 | 4 | 84.05 | 26 | 17 | 1.47 | 168.15 | 165 | 17 | 7.15E-03 | 34.9 | 1.48E+00 |
| 5 | 4 | 87.44 | 26 | 29 | 1.48 | 174.94 | 165 | 17 | 7.34E-03 | 43.1 | |
| 6 | 0 | 92.71* | 11 | 48 | 0.82 | 185.49 | 182 | 8 | 3.18E-03 | 127.5 | |
| 7 | 0 | 102.81 | 17 | 29 | 1.67 | 205.70 | 201 | 9 | 4.59E-03 | 64.0 | |
| 8 | 0 | 185.64* | 13 | 46 | 1.09 | 371.45 | 366 | 11 | 3.62E-03 | 116.3 | |
| 9 | 0 | 238.87* | 29 | 63 | 1.10 | 477.96 | 472 | 13 | 7.95E-03 | 62.1 | |
| 10 | 0 | 328.69 | 13 | 12 | 0.68 | 657.69 | 655 | 6 | 3.61E-03 | 50.4 | |
| 11 | 0 | 351.72* | 17 | 25 | 0.95 | 703.78 | 698 | 11 | 4.84E-03 | 63.8 | |
| 12 | 0 | 373.75 | 23 | 19 | 5.26 | 747.85 | 739 | 15 | 6.48E-03 | 45.4 | |
| 13 | 0 | 393.95 | 4 | 13 | 2.26 | 788.27 | 782 | 9 | 1.21E-03 | 149.4 | |
| 14 | 0 | 402.08 | 15 | 7 | 1.46 | 804.54 | 799 | 10 | 4.07E-03 | 43.5 | |
| 15 | 0 | 464.89 | 9 | 7 | 1.09 | 930.21 | 925 | 9 | 2.63E-03 | 59.0 | |
| 16 | 0 | 583.02* | 21 | 9 | 1.09 | 1166.55 | 1161 | 12 | 5.82E-03 | 39.4 | |
| 17 | 0 | 609.81* | 21 | 15 | 0.89 | 1220.15 | 1215 | 9 | 5.72E-03 | 43.6 | |
| 18 | 0 | 712.04 | 11 | 2 | 2.35 | 1424.68 | 1419 | 9 | 2.94E-03 | 40.2 | |
| 19 | 0 | 731.45 | 12 | 0 | 3.74 | 1463.50 | 1458 | 11 | 3.33E-03 | 28.9 | |
| 20 | 0 | 845.05 | 7 | 7 | 1.34 | 1690.75 | 1685 | 8 | 1.90E-03 | 79.9 | |
| 21 | 0 | 910.88* | 11 | 8 | 2.36 | 1822.44 | 1816 | 16 | 3.18E-03 | 66.9 | |
| 22 | 0 | 1106.05 | 6 | 2 | 1.33 | 2212.83 | 2209 | 7 | 1.77E-03 | 52.2 | |
| 23 | 0 | 1460.54 | 53 | 0 | 1.16 | 2921.79 | 2914 | 13 | 1.47E-02 | 13.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:28:30

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146009.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:12:00 | Acquisition date | : 10-FEB-2014 13:25:03 |
| Sample ID | : G341146009 | Sample quantity | : 106.52 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA11 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.27 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 53 | 10.66* | 1.244E+00 | 2.817E+00 | 2.817E+00 | 27.47 |
| CD-109 | 88.03 | 26 | 3.70* | 5.314E+00 | 9.467E-01 | 1.092E+00 | 86.26 |
| SN-126 | 64.28 | 10 | 9.60 | 2.937E+00 | 2.456E-01 | 2.456E-01 | 343.55 |
| | 86.94 | 26 | 8.90 | 5.314E+00 | 3.936E-01 | 3.936E-01 | 86.26 |
| | 87.57 | 26 | 37.00* | 5.314E+00 | 9.467E-02 | 9.467E-02 | 86.26 |
| TL-208 | 277.37 | ------ | 6.60 | 4.448E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 21 | 85.00* | 2.620E+00 | 6.636E-02 | 6.636E-02 | 78.70 |
| | 860.56 | ------ | 12.50 | 1.938E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 7 | 4.25* | 8.759E-01 | 1.280E+00 | 1.290E+00 | 291.84 |
| BI-211 | 72.87 | ------ | 1.23 | 4.056E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 17 | 12.92* | 3.774E+00 | 2.521E-01 | 2.521E-01 | 127.53 |
| TH-229 | 85.43 | 26 | 14.70 | 5.076E+00 | 2.432E-01 | 2.432E-01 | 69.81 |
| | 88.47 | 26 | 24.00 | 5.314E+00 | 1.460E-01 | 1.460E-01 | 86.26 |
| | 193.51 | ------ | 4.41* | 5.558E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 5.298E+00 | ------ | Line Not Found | ------ |
| TH-234 | 63.29 | 10 | 3.70* | 2.937E+00 | 6.373E-01 | 6.373E-01 | 343.55 |
| | 92.59 | 11 | 4.23 | 5.623E+00 | 3.387E-01 | 3.387E-01 | 255.02 |
| U-238 | 63.29 | 10 | 3.70* | 2.937E+00 | 6.373E-01 | 6.373E-01 | 343.55 |
| | 92.59 | 11 | 4.23 | 5.623E+00 | 3.387E-01 | 3.387E-01 | 255.02 |
| CM-247 | 278.00 | ------ | 3.40 | 4.441E+00 | ------ | Line Not Found | ------ |
| | 287.50 | ------ | 2.00 | 4.341E+00 | ------ | Line Not Found | ------ |
| | 402.40 | 15 | 72.00* | 3.432E+00 | 4.181E-02 | 4.181E-02 | 87.09 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:31.07

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146009.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:25:03 | Sensitivity | : 3.000 |
| Detector ID | : GAM11 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.27 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 10:12:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146009 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.0652E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 11-JUL-2013 12:10:44 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 2.817E+00 | 7.583E-01 | 8.675E-01 |
| CD-109 | 1.092E+00 | 9.233E-01 | 1.215E+00 |
| SN-126 | 9.467E-02 | 8.003E-02 | 1.058E-01 |
| TL-208 | 6.636E-02 | 5.118E-02 | 5.517E-02 |
| PB-210 | 1.290E+00 | 3.690E+00 | 5.085E+00 |
| BI-211 | 2.521E-01 | 3.151E-01 | 3.238E-01 |
| TH-229 | -3.237E-01 | 4.517E-01 | 7.980E-01 |
| TH-234 | 6.373E-01 | 2.146E+00 | 1.937E+00 |
| U-238 | 6.373E-01 | 2.146E+00 | 1.937E+00 |
| CM-247 | 4.181E-02 | 3.569E-02 | 6.169E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 5.265E-01 | 8.756E-01 | 1.799E+00 | NOT IDENT. |
| NA-22 | -6.669E-03 | 3.934E-02 | 7.848E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.512E-02 | 3.411E-02 | 6.318E-02 | NOT IDENT. |
| SC-46 | -3.147E-03 | 6.060E-02 | 1.218E-01 | NOT IDENT. |
| V-48 | -2.158E-01 | 1.877E+00 | 3.688E+00 | NOT IDENT. |
| CR-51 | 1.271E+00 | 2.464E+00 | 4.975E+00 | NOT IDENT. |
| MN-54 | 2.597E-03 | 3.923E-02 | 7.850E-02 | NOT IDENT. |
| CO-56 | 4.571E-02 | 8.764E-02 | 1.689E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.892E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.458E-03 | 2.674E-02 | 4.911E-02 | NOT IDENT. |
| CO-58 | 8.973E-03 | 7.942E-02 | 1.604E-01 | NOT IDENT. |
| FE-59 | -2.033E-02 | 2.690E-01 | 4.979E-01 | NOT IDENT. |
| CO-60 | -2.210E-02 | 3.710E-02 | 7.114E-02 | NOT IDENT. |
| ZN-65 | -7.231E-02 | 8.835E-02 | 1.507E-01 | NOT IDENT. |
| GE-68 | 4.589E-01 | 1.165E+00 | 2.604E+00 | NOT IDENT. |
| AS-73 | 1.137E+00 | 1.615E+00 | 2.983E+00 | NOT IDENT. |
| AS-74 | 2.441E-01 | 2.187E+00 | 4.326E+00 | NOT IDENT. |
| SE-75 | -3.149E-02 | 5.739E-02 | 1.022E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 2.444E+11 | 0.000E+00 | SHORT HLIF |

| | | | | |
|---|---|---|---|---|
| SR-82 | 3.549E-02 | 2.476E+00 | 4.993E+00 | NOT IDENT. |
| RB-83 | 2.502E-04 | 1.321E-01 | 2.482E-01 | NOT IDENT. |
| KR-85 | -2.876E+01 | 1.190E+01 | 1.543E+01 | NOT IDENT. |
| SR-85 | -3.538E-01 | 1.463E-01 | 1.895E-01 | NOT IDENT. |
| RB-86 | 4.613E+00 | 1.171E+01 | 2.617E+01 | NOT IDENT. |
| Y-88 | 1.073E-02 | 5.759E-02 | 1.370E-01 | NOT IDENT. |
| Y-91 | 2.344E+01 | 3.780E+01 | 8.999E+01 | NOT IDENT. |
| NB-94 | -2.002E-02 | 3.291E-02 | 5.795E-02 | NOT IDENT. |
| NB-95 | -6.288E-02 | 8.259E-02 | 1.396E-01 | NOT IDENT. |
| NB-95M | 1.821E-02 | 2.822E-01 | 4.748E-01 | NOT IDENT. |
| ZR-95 | -1.062E-01 | 1.366E-01 | 2.298E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.440E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 4.512E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 6.040E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.500E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.325E-02 | 2.968E-02 | 5.609E-02 | NOT IDENT. |
| RH-102 | -2.653E-02 | 4.499E-02 | 8.100E-02 | NOT IDENT. |
| RU-103 | -9.456E-02 | 1.509E-01 | 2.532E-01 | FAIL ABUN |
| RH-106 | 1.136E-01 | 3.312E-01 | 6.926E-01 | NOT IDENT. |
| RU-106 | 1.136E-01 | 3.312E-01 | 6.926E-01 | NOT IDENT. |
| AG-108M | 3.720E-04 | 2.498E-02 | 4.797E-02 | NOT IDENT. |
| AG-110M | -1.535E-02 | 6.210E-02 | 1.160E-01 | NOT IDENT. |
| SN-113 | 3.854E-02 | 5.780E-02 | 1.148E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 6.708E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.400E+00 | 3.128E+00 | 5.821E+00 | NOT IDENT. |
| TE-123M | 3.141E-02 | 4.268E-02 | 8.197E-02 | NOT IDENT. |
| SB-124 | -4.410E-02 | 1.408E-01 | 2.955E-01 | NOT IDENT. |
| SB-125 | 3.442E-02 | 8.295E-02 | 1.686E-01 | NOT IDENT. |
| TE-125M | 8.299E+00 | 2.018E+01 | 3.883E+01 | NOT IDENT. |
| I-126 | -5.783E+00 | 1.240E+01 | 2.286E+01 | NOT IDENT. |
| SB-126 | -6.021E+00 | 1.068E+01 | 1.908E+01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.926E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.051E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 2.387E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 9.908E-03 | 4.591E-02 | 7.881E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.984E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -7.954E-03 | 3.627E-02 | 6.961E-02 | NOT IDENT. |
| CS-135 | 2.127E-02 | 1.179E-01 | 2.324E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.500E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.282E+00 | 6.120E+00 | 1.117E+01 | NOT IDENT. |
| BA-137M | -1.514E-02 | 3.079E-02 | 6.491E-02 | NOT IDENT. |
| CS-137 | -1.599E-02 | 3.253E-02 | 6.858E-02 | NOT IDENT. |
| CE-139 | -1.474E-02 | 4.126E-02 | 7.042E-02 | NOT IDENT. |
| BA-140 | -3.581E+00 | 6.760E+00 | 1.214E+01 | FAIL ABUN |
| LA-140 | -3.581E+00 | 6.760E+00 | 1.214E+01 | FAIL ABUN |
| CE-141 | 3.851E-01 | 3.498E-01 | 6.848E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 3.754E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.976E-02 | 2.243E-01 | 4.084E-01 | NOT IDENT. |
| PM-144 | -2.525E-02 | 3.770E-02 | 6.572E-02 | NOT IDENT. |
| PR-144 | -1.959E+00 | 2.945E+00 | 5.137E+00 | NOT IDENT. |
| PM-146 | 5.691E-04 | 4.637E-02 | 8.635E-02 | NOT IDENT. |
| ND-147 | -3.129E+01 | 7.488E+01 | 1.315E+02 | NOT IDENT. |
| PM-147 | -1.780E+02 | 7.007E+02 | 1.233E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 7.210E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.860E-03 | 2.663E-02 | 4.913E-02 | FAIL ABUN |
| EU-152 | -4.009E-04 | 9.366E-02 | 1.764E-01 | NOT IDENT. |
| GD-153 | -4.047E-02 | 1.101E-01 | 1.706E-01 | FAIL ABUN |
| EU-154 | -1.519E-02 | 1.078E-01 | 2.162E-01 | NOT IDENT. |
| EU-155 | -6.137E-02 | 9.799E-02 | 1.438E-01 | FAIL ABUN |
| TB-160 | -3.711E-02 | 2.505E-01 | 4.857E-01 | FAIL ABUN |
| HO-166M | 6.122E-02 | 4.822E-02 | 1.103E-01 | FAIL ABUN |
| TM-171 | 5.585E+00 | 1.931E+01 | 3.371E+01 | FAIL ABUN |
| LU-176 | 1.699E-03 | 2.619E-02 | 4.957E-02 | FAIL ABUN |
| HF-181 | -5.849E-02 | 1.677E-01 | 2.961E-01 | NOT IDENT. |
| TA-182 | 7.687E-02 | 2.455E-01 | 5.347E-01 | NOT IDENT. |
| RE-183 | 5.372E-02 | 3.754E-01 | 6.843E-01 | NOT IDENT. |
| RE-184 | 1.112E-01 | 3.467E-01 | 7.916E-01 | NOT IDENT. |
| W-188 | 6.622E-01 | 1.620E+01 | 3.046E+01 | FAIL ABUN |
| IR-192 | 1.240E-02 | 6.426E-02 | 1.255E-01 | NOT IDENT. |
| HG-203 | -3.523E-02 | 1.203E-01 | 2.189E-01 | NOT IDENT. |
| BI-207 | -2.897E-02 | 4.806E-02 | 8.166E-02 | NOT IDENT. |
| PB-211 | 3.868E-02 | 6.409E-01 | 1.096E+00 | NOT IDENT. |
| BI-212 | 1.491E-01 | 4.988E-01 | 9.235E-01 | NOT IDENT. |
| PB-212 | 9.427E-02 | 1.148E-01 | 1.438E-01 | FAIL ABUN |
| BI-214 | 1.260E-01 | 1.077E-01 | 2.019E-01 | FAIL ABUN |
| PB-214 | 9.151E-02 | 1.144E-01 | 1.698E-01 | FAIL ABUN |
| RN-219 | 4.561E-01 | 3.893E-01 | 7.190E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-222 | 1.260E-01 | 1.077E-01 | 2.019E-01 | FAIL ABUN |
| RA-223 | -7.812E-02 | 5.708E-01 | 9.873E-01 | FAIL ABUN |
| RA-224 | 5.098E-01 | 6.160E-01 | 1.143E+00 | NOT IDENT. |
| RA-226 | 1.260E-01 | 1.077E-01 | 2.019E-01 | FAIL ABUN |
| AC-227 | -5.206E-02 | 2.631E-01 | 4.826E-01 | NOT IDENT. |
| TH-227 | -5.206E-02 | 2.631E-01 | 4.826E-01 | NOT IDENT. |
| AC-228 | 1.691E-01 | 2.218E-01 | 3.415E-01 | FAIL ABUN |
| RA-228 | 1.691E-01 | 2.218E-01 | 3.415E-01 | FAIL ABUN |
| TH-228 | 9.427E-02 | 1.148E-01 | 1.438E-01 | FAIL ABUN |
| TH-230 | 1.260E-01 | 1.077E-01 | 2.018E-01 | FAIL ABUN |
| PA-231 | -3.082E-01 | 1.389E+00 | 2.550E+00 | NOT IDENT. |
| TH-231 | -7.812E-02 | 5.708E-01 | 9.873E-01 | FAIL ABUN |
| TH-232 | 1.691E-01 | 2.218E-01 | 3.415E-01 | FAIL ABUN |
| PA-233 | -1.870E-02 | 5.385E-02 | 9.806E-02 | NOT IDENT. |
| PA-234 | 2.043E-02 | 2.862E-01 | 5.711E-01 | NOT IDENT. |
| PA-234M | -1.242E+00 | 3.937E+00 | 7.775E+00 | NOT IDENT. |
| U-234 | 1.260E-01 | 1.077E-01 | 2.018E-01 | FAIL ABUN |
| U-235 | 1.356E-01 | 2.085E-01 | 3.943E-01 | FAIL ABUN |
| NP-237 | -1.870E-02 | 5.385E-02 | 9.806E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 4.006E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.157E-01 | 3.620E-01 | 6.325E-01 | FAIL ABUN |
| PU-239 | -9.522E+01 | 2.999E+02 | 5.216E+02 | FAIL ABUN |
| AM-241 | -1.037E-01 | 1.437E-01 | 2.197E-01 | NOT IDENT. |
| AM-243 | -2.419E-02 | 4.798E-02 | 8.353E-02 | NOT IDENT. |
| CM-243 | 9.285E-02 | 1.166E-01 | 1.707E-01 | FAIL ABUN |
| CF-249 | 4.101E-03 | 3.345E-02 | 5.877E-02 | NOT IDENT. |
| CF-251 | -9.006E-03 | 1.339E-01 | 2.342E-01 | NOT IDENT. |
| ANH-511 | -4.863E-02 | 5.520E-02 | 1.129E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:27.06

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.56 | 24 | 21 | 1.74 | 93.14 | 90 | 7 | 6.65E-03 | 38.5 | |
| 2 | 0 | 49.93 | 23 | 24 | 1.94 | 99.88 | 97 | 7 | 6.48E-03 | 40.0 | |
| 3 | 0 | 63.42 | 39 | 65 | 1.01 | 126.87 | 122 | 11 | 1.09E-02 | 42.5 | |
| 4 | 4 | 84.05 | 26 | 17 | 1.47 | 168.15 | 165 | 17 | 7.15E-03 | 34.9 | 1.48E+00 |
| 5 | 4 | 87.44 | 26 | 29 | 1.48 | 174.94 | 165 | 17 | 7.34E-03 | 43.1 | |
| 6 | 0 | 92.71 | 61 | 48 | 0.82 | 185.49 | 182 | 8 | 1.70E-02 | 23.2 | |
| 7 | 0 | 102.81 | 17 | 29 | 1.67 | 205.70 | 201 | 9 | 4.59E-03 | 64.0 | |
| 8 | 0 | 185.64 | 45 | 46 | 1.09 | 371.45 | 366 | 11 | 1.24E-02 | 33.3 | |
| 9 | 0 | 238.87 | 44 | 63 | 1.10 | 477.96 | 472 | 13 | 1.23E-02 | 39.6 | |
| 10 | 0 | 328.69 | 13 | 12 | 0.68 | 657.69 | 655 | 6 | 3.61E-03 | 50.4 | |
| 11 | 0 | 351.72 | 25 | 25 | 0.95 | 703.78 | 698 | 11 | 7.05E-03 | 42.8 | |
| 12 | 0 | 373.75 | 23 | 19 | 5.26 | 747.85 | 739 | 15 | 6.48E-03 | 45.4 | |
| 13 | 0 | 393.95 | 4 | 13 | 2.26 | 788.27 | 782 | 9 | 1.21E-03 | 149.4 | |
| 14 | 0 | 402.08 | 15 | 7 | 1.46 | 804.54 | 799 | 10 | 4.07E-03 | 43.5 | |
| 15 | 0 | 464.89 | 9 | 7 | 1.09 | 930.21 | 925 | 9 | 2.63E-03 | 59.0 | |
| 16 | 0 | 511.23 | 56 | 41 | 1.59 | 1022.92 | 1016 | 12 | 1.54E-02 | 26.9 | |
| 17 | 0 | 583.02 | 29 | 9 | 1.09 | 1166.55 | 1161 | 12 | 8.02E-03 | 27.9 | |
| 18 | 0 | 609.81 | 27 | 15 | 0.89 | 1220.15 | 1215 | 9 | 7.43E-03 | 32.9 | |
| 19 | 0 | 661.22 | 9 | 2 | 0.98 | 1323.00 | 1319 | 8 | 2.49E-03 | 43.3 | |
| 20 | 0 | 712.04 | 11 | 2 | 2.35 | 1424.68 | 1419 | 9 | 2.94E-03 | 40.2 | |
| 21 | 0 | 731.45 | 12 | 0 | 3.74 | 1463.50 | 1458 | 11 | 3.33E-03 | 28.9 | |
| 22 | 0 | 845.05 | 7 | 7 | 1.34 | 1690.75 | 1685 | 8 | 1.90E-03 | 79.9 | |
| 23 | 0 | 910.88 | 17 | 8 | 2.36 | 1822.44 | 1816 | 16 | 4.59E-03 | 45.7 | |
| 24 | 0 | 1106.05 | 6 | 2 | 1.33 | 2212.83 | 2209 | 7 | 1.77E-03 | 52.2 | |
| 25 | 0 | 1460.54 | 53 | 0 | 1.16 | 2921.79 | 2914 | 13 | 1.47E-02 | 13.7 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:29.22

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 53 | 10.66* | 1.244E+00 | 2.817E+00 | 2.817E+00 | 27.47 |
| CD-109 | 88.03 | 26 | 3.70* | 5.314E+00 | 9.467E-01 | 1.092E+00 | 86.26 |
| SN-126 | 64.28 | 10 | 9.60 | 2.937E+00 | 2.456E-01 | 2.456E-01 | 343.55 |
| | 86.94 | 26 | 8.90 | 5.314E+00 | 3.936E-01 | 3.936E-01 | 86.26 |
| | 87.57 | 26 | 37.00* | 5.314E+00 | 9.467E-02 | 9.467E-02 | 86.26 |
| TL-208 | 277.37 | ------ | 6.60 | 4.448E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 21 | 85.00* | 2.620E+00 | 6.636E-02 | 6.636E-02 | 78.70 |
| | 860.56 | ------ | 12.50 | 1.938E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 7 | 4.25* | 8.759E-01 | 1.280E+00 | 1.290E+00 | 291.84 |
| BI-211 | 72.87 | ------ | 1.23 | 4.056E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 17 | 12.92* | 3.774E+00 | 2.521E-01 | 2.521E-01 | 127.53 |
| TH-229 | 85.43 | 26 | 14.70 | 5.076E+00 | 2.432E-01 | 2.432E-01 | 69.81 |
| | 88.47 | 26 | 24.00 | 5.314E+00 | 1.460E-01 | 1.460E-01 | 86.26 |
| | 193.51 | ------ | 4.41* | 5.558E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 5.298E+00 | ------ | Line Not Found | ------ |
| TH-234 | 63.29 | 10 | 3.70* | 2.937E+00 | 6.373E-01 | 6.373E-01 | 343.55 |
| | 92.59 | 11 | 4.23 | 5.623E+00 | 3.387E-01 | 3.387E-01 | 255.02 |
| U-238 | 63.29 | 10 | 3.70* | 2.937E+00 | 6.373E-01 | 6.373E-01 | 343.55 |
| | 92.59 | 11 | 4.23 | 5.623E+00 | 3.387E-01 | 3.387E-01 | 255.02 |
| CM-247 | 278.00 | ------ | 3.40 | 4.441E+00 | ------ | Line Not Found | ------ |
| | 287.50 | ------ | 2.00 | 4.341E+00 | ------ | Line Not Found | ------ |
| | 402.40 | 15 | 72.00* | 3.432E+00 | 4.181E-02 | 4.181E-02 | 87.09 |

Flag: "*" = Keyline

Sample ID : G341146009 Acquisition date : 10-FEB-2014 13:25:03

Total number of lines in spectrum 23
Number of unidentified lines 5
Number of lines tentatively identified by NID 18 78.26%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 2.817E+00 | 2.817E+00 | 0.774E+00 | 27.47 | |
| CD-109 | 461.40D | 1.15 | 9.467E-01 | 1.092E+00 | 0.942E+00 | 86.26 | |
| SN-126 | 2.30E+05Y | 1.00 | 9.467E-02 | 9.467E-02 | 8.166E-02 | 86.26 | |
| TL-208 | 1.41E+10Y | 1.00 | 6.636E-02 | 6.636E-02 | 5.223E-02 | 78.70 | |
| PB-210 | 22.20Y | 1.01 | 1.280E+00 | 1.290E+00 | 3.766E+00 | 291.84 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.521E-01 | 2.521E-01 | 3.215E-01 | 127.53 | |
| TH-229 | 7340.00Y | 1.00 | 1.460E-01 | 1.460E-01 | 1.259E-01 | 86.26 | K |
| TH-234 | 4.47E+09Y | 1.00 | 6.373E-01 | 6.373E-01 | 21.89E-01 | 343.55 | |
| U-238 | 4.47E+09Y | 1.00 | 6.373E-01 | 6.373E-01 | 21.89E-01 | 343.55 | |
| CM-247 | 1.56E+07Y | 1.00 | 4.181E-02 | 4.181E-02 | 3.641E-02 | 87.09 | |
| | Total Activity : | | 6.919E+00 | 7.075E+00 | | | |
| | Grand Total Activity : | | 6.919E+00 | 7.075E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146009 Acquisition date : 10-FEB-2014 13:25:03

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 49.93 | 23 | 24 | 1.94 | 99.88 | 97 | 7 | 6.48E-03 | 79.9 | 1.24E+00 | T |
| 0 | 102.81 | 17 | 29 | 1.67 | 205.70 | 201 | 9 | 4.59E-03 | **** | 6.03E+00 | T |
| 0 | 185.64 | 13 | 46 | 1.09 | 371.45 | 366 | 11 | 3.62E-03 | **** | 5.68E+00 | T |
| 0 | 238.87 | 29 | 63 | 1.10 | 477.96 | 472 | 13 | 7.95E-03 | **** | 4.91E+00 | T |
| 0 | 328.69 | 13 | 12 | 0.68 | 657.69 | 655 | 6 | 3.61E-03 | **** | 3.96E+00 | T |
| 0 | 373.75 | 23 | 19 | 5.26 | 747.85 | 739 | 15 | 6.48E-03 | 90.8 | 3.62E+00 | T |
| 0 | 393.95 | 4 | 13 | 2.26 | 788.27 | 782 | 9 | 1.21E-03 | **** | 3.48E+00 | |
| 0 | 464.89 | 9 | 7 | 1.09 | 930.21 | 925 | 9 | 2.63E-03 | **** | 3.09E+00 | |
| 0 | 609.81 | 21 | 15 | 0.89 | 1220.15 | 1215 | 9 | 5.72E-03 | 87.2 | 2.53E+00 | T |
| 0 | 712.04 | 11 | 2 | 2.35 | 1424.68 | 1419 | 9 | 2.94E-03 | 80.4 | 2.25E+00 | T |
| 0 | 731.45 | 12 | 0 | 3.74 | 1463.50 | 1458 | 11 | 3.33E-03 | 57.7 | 2.20E+00 | |
| 0 | 845.05 | 7 | 7 | 1.34 | 1690.75 | 1685 | 8 | 1.90E-03 | **** | 1.97E+00 | |
| 0 | 910.88 | 11 | 8 | 2.36 | 1822.44 | 1816 | 16 | 3.18E-03 | **** | 1.85E+00 | T |
| 0 | 1106.05 | 6 | 2 | 1.33 | 2212.83 | 2209 | 7 | 1.77E-03 | **** | 1.57E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:43.51

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                           DETECTOR AND SAMPLE DATA                             *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146009.CNF;1       *
* Acquisition date : 10-FEB-2014 13:25:03 Sensitivity     : 3.000                *
* Detector ID      : GAM11                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.27     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:12:00 Nuclide Library : SOLID                *
* Sample ID        : G341146009           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.0652E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                           CALIBRATION INFORMATION                              *
*                                                                                *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9              *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 3.619E-01 |
| CD-109 | 5.520E-01 |
| SN-126 | 4.809E-02 |
| TL-208 | 2.331E-02 |
| PB-210 | 2.284E+00 |
| BI-211 | 1.424E-01 |
| TH-229 | 3.603E-01 |
| TH-234 | 8.808E-01 |
| U-238 | 8.808E-01 |
| CM-247 | 2.699E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.957E-01 | NOT IDENT. |
| NA-22 | 3.192E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.247E-02 | NOT IDENT. |
| SC-46 | 4.981E-02 | NOT IDENT. |
| V-48 | 1.503E+00 | NOT IDENT. |
| CR-51 | 2.230E+00 | NOT IDENT. |
| MN-54 | 3.333E-02 | NOT IDENT. |
| CO-56 | 7.306E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.232E-02 | NOT IDENT. |
| CO-58 | 6.826E-02 | NOT IDENT. |
| FE-59 | 2.020E-01 | NOT IDENT. |
| CO-60 | 2.823E-02 | NOT IDENT. |
| ZN-65 | 5.958E-02 | NOT IDENT. |
| GE-68 | 1.068E+00 | NOT IDENT. |
| AS-73 | 1.365E+00 | NOT IDENT. |
| AS-74 | 1.907E+00 | NOT IDENT. |
| SE-75 | 4.500E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.092E+00 | NOT IDENT. |

| | | |
|---|---|---|
| RB-83 | 1.081E-01 | NOT IDENT. |
| KR-85 | 6.941E+00 | NOT IDENT. |
| SR-85 | 8.522E-02 | NOT IDENT. |
| RB-86 | 1.073E+01 | NOT IDENT. |
| Y-88 | 5.130E-02 | NOT IDENT. |
| Y-91 | 3.727E+01 | NOT IDENT. |
| NB-94 | 2.478E-02 | NOT IDENT. |
| NB-95 | 5.725E-02 | NOT IDENT. |
| NB-95M | 2.157E-01 | NOT IDENT. |
| ZR-95 | 9.204E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.572E-02 | NOT IDENT. |
| RH-102 | 3.327E-02 | NOT IDENT. |
| RU-103 | 1.076E-01 | FAIL ABUN |
| RH-106 | 3.005E-01 | NOT IDENT. |
| RU-106 | 3.005E-01 | NOT IDENT. |
| AG-108M | 2.075E-02 | NOT IDENT. |
| AG-110M | 4.901E-02 | NOT IDENT. |
| SN-113 | 4.995E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.680E+00 | NOT IDENT. |
| TE-123M | 3.775E-02 | NOT IDENT. |
| SB-124 | 9.341E-02 | NOT IDENT. |
| SB-125 | 7.392E-02 | NOT IDENT. |
| TE-125M | 1.763E+01 | NOT IDENT. |
| I-126 | 9.423E+00 | NOT IDENT. |
| SB-126 | 7.883E+00 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.524E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.891E-02 | NOT IDENT. |
| CS-135 | 1.031E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.498E+00 | NOT IDENT. |
| BA-137M | 2.799E-02 | NOT IDENT. |
| CS-137 | 2.956E-02 | NOT IDENT. |
| CE-139 | 3.201E-02 | NOT IDENT. |
| BA-140 | 4.544E+00 | FAIL ABUN |
| LA-140 | 4.544E+00 | FAIL ABUN |
| CE-141 | 3.185E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.871E-01 | NOT IDENT. |
| PM-144 | 2.785E-02 | NOT IDENT. |
| PR-144 | 2.178E+00 | NOT IDENT. |
| PM-146 | 3.837E-02 | NOT IDENT. |
| ND-147 | 5.523E+01 | NOT IDENT. |
| PM-147 | 5.601E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.202E-02 | FAIL ABUN |
| EU-152 | 7.874E-02 | NOT IDENT. |
| GD-153 | 7.794E-02 | FAIL ABUN |
| EU-154 | 8.818E-02 | NOT IDENT. |
| EU-155 | 6.424E-02 | FAIL ABUN |
| TB-160 | 2.015E-01 | FAIL ABUN |
| HO-166M | 4.732E-02 | FAIL ABUN |
| TM-171 | 1.540E+01 | FAIL ABUN |
| LU-176 | 2.234E-02 | FAIL ABUN |
| HF-181 | 1.294E-01 | NOT IDENT. |
| TA-182 | 2.240E-01 | NOT IDENT. |
| RE-183 | 3.104E-01 | NOT IDENT. |
| RE-184 | 3.093E-01 | NOT IDENT. |
| W-188 | 1.382E+01 | FAIL ABUN |
| IR-192 | 5.582E-02 | NOT IDENT. |
| HG-203 | 9.864E-02 | NOT IDENT. |
| BI-207 | 3.294E-02 | NOT IDENT. |
| PB-211 | 4.744E-01 | NOT IDENT. |
| BI-212 | 3.973E-01 | NOT IDENT. |
| PB-212 | 6.746E-02 | FAIL ABUN |
| BI-214 | 9.270E-02 | FAIL ABUN |
| PB-214 | 7.781E-02 | FAIL ABUN |
| RN-219 | 3.176E-01 | FAIL ABUN |
| RN-222 | 9.270E-02 | FAIL ABUN |

| | | |
|---|---|---|
| RA-223 | 4.341E-01 | FAIL ABUN |
| RA-224 | 5.239E-01 | NOT IDENT. |
| RA-226 | 9.270E-02 | FAIL ABUN |
| AC-227 | 2.200E-01 | NOT IDENT. |
| TH-227 | 2.200E-01 | NOT IDENT. |
| AC-228 | 1.509E-01 | FAIL ABUN |
| RA-228 | 1.509E-01 | FAIL ABUN |
| TH-228 | 6.746E-02 | FAIL ABUN |
| TH-230 | 9.269E-02 | FAIL ABUN |
| PA-231 | 1.148E+00 | NOT IDENT. |
| TH-231 | 4.341E-01 | FAIL ABUN |
| TH-232 | 1.509E-01 | FAIL ABUN |
| PA-233 | 4.301E-02 | NOT IDENT. |
| PA-234 | 2.413E-01 | NOT IDENT. |
| PA-234M | 3.225E+00 | NOT IDENT. |
| U-234 | 9.269E-02 | FAIL ABUN |
| U-235 | 1.833E-01 | FAIL ABUN |
| NP-237 | 4.301E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 2.876E-01 | FAIL ABUN |
| PU-239 | 2.371E+02 | FAIL ABUN |
| AM-241 | 9.898E-02 | NOT IDENT. |
| AM-243 | 3.844E-02 | NOT IDENT. |
| CM-243 | 7.779E-02 | FAIL ABUN |
| CF-249 | 2.529E-02 | NOT IDENT. |
| CF-251 | 1.077E-01 | NOT IDENT. |
| ANH-511 | 5.319E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:28:48.36

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146009.CNF;1    *
* Acquisition date : 10-FEB-2014 13:25:03 Sensitivity     : 3.000          *
* Detector ID      : GAM11                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.27     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:12:00 Nuclide Library : SOLID          *
* Sample ID        : G341146009           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.0652E+02 GRAM   *
*                                         Quantity Err(%) : 1.8776E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 2.817E+00 | 7.987E-01 | 7.987E-01 |
| CD-109 | 1.092E+00 | 9.306E-01 | 9.306E-01 |
| SN-126 | 9.467E-02 | 8.050E-02 | 8.050E-02 |
| TL-208 | 6.636E-02 | 5.148E-02 | 5.148E-02 |
| PB-210 | 1.290E+00 | 3.692E+00 | 3.692E+00 |
| BI-211 | 2.521E-01 | 3.157E-01 | 3.157E-01 |
| TH-229 | -3.237E-01 | 4.524E-01 | 4.524E-01 |
| TH-234 | 6.373E-01 | 2.150E+00 | 2.150E+00 |
| U-238 | 6.373E-01 | 2.150E+00 | 2.150E+00 |
| CM-247 | 4.181E-02 | 3.649E-02 | 3.649E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 5.265E-01 | 8.767E-01 | 9.083E-01 | NOT IDENT. |
| NA-22 | -6.669E-03 | 3.935E-02 | 3.946E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 2.471E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.512E-02 | 3.413E-02 | 3.480E-02 | NOT IDENT. |
| SC-46 | -3.147E-03 | 6.060E-02 | 6.062E-02 | NOT IDENT. |
| V-48 | -2.158E-01 | 1.877E+00 | 1.880E+00 | NOT IDENT. |
| CR-51 | 1.271E+00 | 2.466E+00 | 2.531E+00 | NOT IDENT. |
| MN-54 | 2.597E-03 | 3.923E-02 | 3.925E-02 | NOT IDENT. |
| CO-56 | 4.571E-02 | 8.780E-02 | 9.018E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.896E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.458E-03 | 2.674E-02 | 2.677E-02 | NOT IDENT. |
| CO-58 | 8.973E-03 | 7.942E-02 | 7.953E-02 | NOT IDENT. |
| FE-59 | -2.033E-02 | 2.690E-01 | 2.692E-01 | NOT IDENT. |
| CO-60 | -2.210E-02 | 3.715E-02 | 3.846E-02 | NOT IDENT. |
| ZN-65 | -7.231E-02 | 8.921E-02 | 9.498E-02 | NOT IDENT. |
| GE-68 | 4.589E-01 | 1.167E+00 | 1.185E+00 | NOT IDENT. |
| AS-73 | 1.137E+00 | 1.632E+00 | 1.711E+00 | NOT IDENT. |
| AS-74 | 2.441E-01 | 2.187E+00 | 2.190E+00 | NOT IDENT. |
| SE-75 | -3.149E-02 | 5.744E-02 | 5.917E-02 | FAIL ABUN |
| BR-77 | 2.007E+11 | 6.032E+11 | 6.100E+11 | SHORT HLIF |

| | | | | |
|---|---|---|---|---|
| SR-82 | 3.549E-02 | 2.476E+00 | 2.476E+00 | NOT IDENT. |
| RB-83 | 2.502E-04 | 1.321E-01 | 1.321E-01 | NOT IDENT. |
| KR-85 | -2.876E+01 | 1.214E+01 | 1.776E+01 | NOT IDENT. |
| SR-85 | -3.538E-01 | 1.492E-01 | 2.184E-01 | NOT IDENT. |
| RB-86 | 4.613E+00 | 1.173E+01 | 1.192E+01 | NOT IDENT. |
| Y-88 | 1.073E-02 | 5.760E-02 | 5.780E-02 | NOT IDENT. |
| Y-91 | 2.344E+01 | 3.788E+01 | 3.933E+01 | NOT IDENT. |
| NB-94 | -2.002E-02 | 3.296E-02 | 3.417E-02 | NOT IDENT. |
| NB-95 | -6.288E-02 | 8.282E-02 | 8.754E-02 | NOT IDENT. |
| NB-95M | 1.821E-02 | 2.822E-01 | 2.823E-01 | NOT IDENT. |
| ZR-95 | -1.062E-01 | 1.370E-01 | 1.451E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.442E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -8.943E+40 | 4.573E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -6.326E+09 | 6.074E+09 | 6.711E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.505E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.325E-02 | 2.979E-02 | 3.038E-02 | NOT IDENT. |
| RH-102 | -2.653E-02 | 4.508E-02 | 4.664E-02 | NOT IDENT. |
| RU-103 | -9.456E-02 | 1.511E-01 | 1.570E-01 | FAIL ABUN |
| RH-106 | 1.136E-01 | 3.314E-01 | 3.354E-01 | NOT IDENT. |
| RU-106 | 1.136E-01 | 3.314E-01 | 3.354E-01 | NOT IDENT. |
| AG-108M | 3.720E-04 | 2.498E-02 | 2.498E-02 | NOT IDENT. |
| AG-110M | -1.535E-02 | 6.213E-02 | 6.252E-02 | NOT IDENT. |
| SN-113 | 3.854E-02 | 5.788E-02 | 6.043E-02 | NOT IDENT. |
| CD-115 | -5.239E+11 | 6.732E+11 | 7.134E+11 | SHORT HLIF |
| SN-117M | 1.400E+00 | 3.130E+00 | 3.193E+00 | NOT IDENT. |
| TE-123M | 3.141E-02 | 4.275E-02 | 4.504E-02 | NOT IDENT. |
| SB-124 | -4.410E-02 | 1.409E-01 | 1.423E-01 | NOT IDENT. |
| SB-125 | 3.442E-02 | 8.300E-02 | 8.443E-02 | NOT IDENT. |
| TE-125M | 8.299E+00 | 2.019E+01 | 2.054E+01 | NOT IDENT. |
| I-126 | -5.783E+00 | 1.241E+01 | 1.268E+01 | NOT IDENT. |
| SB-126 | -6.021E+00 | 1.071E+01 | 1.105E+01 | NOT IDENT. |
| SB-127 | 1.279E+06 | 2.008E+06 | 2.089E+06 | SHORT HLIF |
| I-131 | -3.751E+01 | 1.051E+02 | 1.065E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.490E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -5.485E+06 | 2.389E+07 | 2.402E+07 | SHORT HLIF |
| BA-133 | 9.908E-03 | 4.591E-02 | 4.613E-02 | NOT IDENT. |
| I-133 | -4.363E+30 | 2.995E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -7.954E-03 | 3.628E-02 | 3.645E-02 | NOT IDENT. |
| CS-135 | 2.127E-02 | 1.179E-01 | 1.183E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.624E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.282E+00 | 6.133E+00 | 6.219E+00 | NOT IDENT. |
| BA-137M | -1.514E-02 | 3.082E-02 | 3.156E-02 | NOT IDENT. |
| CS-137 | -1.599E-02 | 3.255E-02 | 3.334E-02 | NOT IDENT. |
| CE-139 | -1.474E-02 | 4.138E-02 | 4.191E-02 | NOT IDENT. |
| BA-140 | -3.581E+00 | 6.767E+00 | 6.957E+00 | FAIL ABUN |
| LA-140 | -3.581E+00 | 6.767E+00 | 6.957E+00 | FAIL ABUN |
| CE-141 | 3.851E-01 | 3.512E-01 | 3.918E-01 | NOT IDENT. |
| CE-143 | 9.947E+18 | 3.754E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.976E-02 | 2.243E-01 | 2.247E-01 | NOT IDENT. |
| PM-144 | -2.525E-02 | 3.777E-02 | 3.945E-02 | NOT IDENT. |
| PR-144 | -1.959E+00 | 2.949E+00 | 3.079E+00 | NOT IDENT. |
| PM-146 | 5.691E-04 | 4.637E-02 | 4.637E-02 | NOT IDENT. |
| ND-147 | -3.129E+01 | 7.493E+01 | 7.624E+01 | NOT IDENT. |
| PM-147 | -1.780E+02 | 7.009E+02 | 7.055E+02 | NOT IDENT. |
| PM-149 | -4.840E+12 | 7.250E+12 | 7.571E+12 | SHORT HLIF |
| EU-150 | 2.860E-03 | 2.663E-02 | 2.667E-02 | FAIL ABUN |
| EU-152 | -4.009E-04 | 9.366E-02 | 9.366E-02 | NOT IDENT. |
| GD-153 | -4.047E-02 | 1.101E-01 | 1.116E-01 | FAIL ABUN |
| EU-154 | -1.519E-02 | 1.078E-01 | 1.080E-01 | NOT IDENT. |
| EU-155 | -6.137E-02 | 9.817E-02 | 1.020E-01 | FAIL ABUN |
| TB-160 | -3.711E-02 | 2.506E-01 | 2.511E-01 | FAIL ABUN |
| HO-166M | 6.122E-02 | 4.856E-02 | 5.586E-02 | FAIL ABUN |
| TM-171 | 5.585E+00 | 1.931E+01 | 1.947E+01 | FAIL ABUN |
| LU-176 | 1.699E-03 | 2.619E-02 | 2.620E-02 | FAIL ABUN |
| HF-181 | -5.849E-02 | 1.677E-01 | 1.698E-01 | NOT IDENT. |
| TA-182 | 7.687E-02 | 2.456E-01 | 2.481E-01 | NOT IDENT. |
| RE-183 | 5.372E-02 | 3.754E-01 | 3.762E-01 | NOT IDENT. |
| RE-184 | 1.112E-01 | 3.472E-01 | 3.508E-01 | NOT IDENT. |
| W-188 | 6.622E-01 | 1.620E+01 | 1.621E+01 | FAIL ABUN |
| IR-192 | 1.240E-02 | 6.427E-02 | 6.451E-02 | NOT IDENT. |
| HG-203 | -3.523E-02 | 1.204E-01 | 1.214E-01 | NOT IDENT. |
| BI-207 | -2.897E-02 | 4.828E-02 | 5.002E-02 | NOT IDENT. |
| PB-211 | 3.868E-02 | 6.410E-01 | 6.412E-01 | NOT IDENT. |
| BI-212 | 1.491E-01 | 4.990E-01 | 5.035E-01 | NOT IDENT. |
| PB-212 | 9.427E-02 | 1.151E-01 | 1.226E-01 | FAIL ABUN |
| BI-214 | 1.260E-01 | 1.082E-01 | 1.222E-01 | FAIL ABUN |
| PB-214 | 9.151E-02 | 1.146E-01 | 1.218E-01 | FAIL ABUN |
| RN-219 | 4.561E-01 | 3.948E-01 | 4.451E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-222 | 1.260E-01 | 1.082E-01 | 1.222E-01 | FAIL ABUN |
| RA-223 | -7.812E-02 | 5.709E-01 | 5.720E-01 | FAIL ABUN |
| RA-224 | 5.098E-01 | 6.174E-01 | 6.587E-01 | NOT IDENT. |
| RA-226 | 1.260E-01 | 1.082E-01 | 1.222E-01 | FAIL ABUN |
| AC-227 | -5.206E-02 | 2.632E-01 | 2.642E-01 | NOT IDENT. |
| TH-227 | -5.206E-02 | 2.632E-01 | 2.642E-01 | NOT IDENT. |
| AC-228 | 1.691E-01 | 2.229E-01 | 2.356E-01 | FAIL ABUN |
| RA-228 | 1.691E-01 | 2.229E-01 | 2.356E-01 | FAIL ABUN |
| TH-228 | 9.427E-02 | 1.151E-01 | 1.226E-01 | FAIL ABUN |
| TH-230 | 1.260E-01 | 1.082E-01 | 1.222E-01 | FAIL ABUN |
| PA-231 | -3.082E-01 | 1.389E+00 | 1.396E+00 | NOT IDENT. |
| TH-231 | -7.812E-02 | 5.709E-01 | 5.720E-01 | FAIL ABUN |
| TH-232 | 1.691E-01 | 2.229E-01 | 2.356E-01 | FAIL ABUN |
| PA-233 | -1.870E-02 | 5.387E-02 | 5.453E-02 | NOT IDENT. |
| PA-234 | 2.043E-02 | 2.872E-01 | 2.873E-01 | NOT IDENT. |
| PA-234M | -1.242E+00 | 3.942E+00 | 3.981E+00 | NOT IDENT. |
| U-234 | 1.260E-01 | 1.082E-01 | 1.222E-01 | FAIL ABUN |
| U-235 | 1.356E-01 | 2.088E-01 | 2.176E-01 | FAIL ABUN |
| NP-237 | -1.870E-02 | 5.387E-02 | 5.453E-02 | NOT IDENT. |
| NP-238 | -8.192E+09 | 4.006E+12 | 4.006E+12 | SHORT HLIF |
| NP-239 | -1.157E-01 | 3.622E-01 | 3.660E-01 | FAIL ABUN |
| PU-239 | -9.522E+01 | 3.000E+02 | 3.031E+02 | FAIL ABUN |
| AM-241 | -1.037E-01 | 1.439E-01 | 1.513E-01 | NOT IDENT. |
| AM-243 | -2.419E-02 | 4.802E-02 | 4.925E-02 | NOT IDENT. |
| CM-243 | 9.285E-02 | 1.170E-01 | 1.243E-01 | FAIL ABUN |
| CF-249 | 4.101E-03 | 3.346E-02 | 3.351E-02 | NOT IDENT. |
| CF-251 | -9.006E-03 | 1.340E-01 | 1.340E-01 | NOT IDENT. |
| ANH-511 | -4.863E-02 | 5.535E-02 | 5.953E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 27.5018 | 94.67 | 41.4694 | 193.51 | 40.2630 |
| 45.60 | 37.3424 | 94.87 | 43.0201 | 197.03 | 28.1125 |
| 46.54 | 26.3456 | 97.43 | 40.1216 | 198.01 | 34.2970 |
| 49.72 | 0.0000 | 98.43 | 32.4603 | 201.83 | 45.0269 |
| 51.35 | 39.3195 | 98.44 | 32.4608 | 205.31 | 38.9844 |
| 52.39 | 32.3833 | 99.53 | 32.5199 | 210.85 | 43.6560 |
| 53.44 | 26.8219 | 100.11 | 34.1012 | 215.65 | 40.2821 |
| 57.36 | 0.0000 | 103.18 | 23.3681 | 222.11 | 40.5344 |
| 57.53 | 33.2682 | 103.37 | 23.3754 | 227.09 | 41.6313 |
| 57.98 | 29.6877 | 105.21 | 34.3856 | 227.38 | 43.4531 |
| 59.32 | 37.2264 | 105.31 | 34.3911 | 228.16 | 0.0000 |
| 59.54 | 37.2456 | 106.12 | 29.7398 | 228.18 | 40.7682 |
| 63.29 | 33.7122 | 109.28 | 26.2179 | 117.23 | 40.7682 |
| 63.58 | 33.7340 | 111.00 | 33.6486 | 235.69 | 32.1124 |
| 64.28 | 33.7864 | 111.76 | 0.0000 | 235.96 | 32.1205 |
| 66.73 | 34.9382 | 116.30 | 0.0000 | 238.63 | 28.3569 |
| 67.24 | 45.1781 | 117.23 | 39.2756 | 238.98 | 0.0000 |
| 67.75 | 33.5558 | 121.12 | 37.3661 | 240.99 | 26.4008 |
| 69.67 | 40.0407 | 121.22 | 37.3714 | 242.00 | 29.3608 |
| 70.83 | 36.2218 | 121.78 | 30.9901 | 244.70 | 32.3751 |
| 72.81 | 44.2335 | 122.06 | 32.0717 | 252.40 | 0.0000 |
| 72.87 | 44.2390 | 123.07 | 35.3304 | 252.80 | 25.0113 |
| 74.66 | 48.3460 | 127.23 | 33.3864 | 254.15 | 0.0000 |
| 74.82 | 43.4266 | 129.30 | 38.8839 | 256.23 | 39.0224 |
| 74.97 | 43.4398 | 131.20 | 33.5717 | 260.90 | 0.0000 |
| 77.11 | 44.6159 | 133.02 | 43.4269 | 264.66 | 25.2668 |
| 79.69 | 43.0468 | 133.52 | 38.0245 | 268.22 | 18.7723 |
| 80.12 | 32.9102 | 136.00 | 35.9722 | 269.46 | 26.3081 |
| 80.19 | 0.0000 | 136.47 | 32.7228 | 271.23 | 22.5831 |
| 80.57 | 23.9553 | 140.51 | 0.0000 | 273.65 | 27.3424 |
| 81.00 | 20.9781 | 143.76 | 39.6467 | 276.40 | 35.9091 |
| 81.07 | 20.9809 | 144.24 | 36.3653 | 277.37 | 27.4260 |
| 83.79 | 33.1391 | 145.44 | 37.5254 | 277.60 | 24.5932 |
| 85.43 | 33.2399 | 152.43 | 38.9723 | 278.00 | 26.4935 |
| 86.55 | 33.3080 | 153.25 | 50.1581 | 279.20 | 32.2024 |
| 86.79 | 33.3224 | 323.87 | 49.1021 | 279.54 | 34.1060 |
| 86.94 | 33.3317 | 156.02 | 34.6716 | 280.46 | 27.4946 |
| 87.09 | 33.3407 | 158.56 | 37.0229 | 283.69 | 30.4180 |
| 87.57 | 33.3698 | 159.00 | 32.5527 | 284.31 | 0.0000 |
| 88.03 | 33.3975 | 162.33 | 40.5721 | 285.41 | 39.0268 |
| 88.34 | 33.4161 | 163.33 | 44.0055 | 285.90 | 0.0000 |
| 88.47 | 33.4240 | 165.86 | 39.6100 | 287.50 | 26.6969 |
| 89.96 | 24.3732 | 176.31 | 33.2165 | 290.67 | 31.5428 |
| 91.11 | 24.4227 | 176.60 | 37.8102 | 293.27 | 0.0000 |
| 92.59 | 41.3205 | 177.52 | 44.7311 | 351.93 | 31.6555 |
| 93.35 | 44.4399 | 181.07 | 0.0000 | 295.96 | 29.7541 |
| 94.56 | 41.4616 | 184.41 | 30.0485 | 879.38 | 38.4705 |
| 94.65 | 41.4680 | 143.76 | 30.0913 | 299.98 | 28.8840 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 25.9980 | 487.02 | 17.3552 | 702.65 | 18.2198 |
| 300.13 | 25.9985 | 492.35 | 0.0000 | 706.68 | 9.6050 |
| 301.36 | 29.8785 | 497.08 | 17.4485 | 711.68 | 7.6994 |
| 302.85 | 27.9827 | 505.52 | 31.7657 | 720.70 | 12.5563 |
| 256.23 | 31.8826 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 27.0989 | 511.00 | 27.4620 | 722.78 | 14.5001 |
| 308.46 | 26.1641 | 514.00 | 77.0132 | 722.91 | 12.5674 |
| 311.90 | 21.3739 | 514.00 | 77.0132 | 723.31 | 10.6356 |
| 316.51 | 19.4977 | 520.40 | 15.4531 | 724.19 | 9.6721 |
| 319.41 | 19.5395 | 520.69 | 0.0000 | 727.33 | 9.6841 |
| 320.08 | 18.5715 | 522.65 | 0.0000 | 733.00 | 9.7056 |
| 321.04 | 22.4974 | 527.90 | 0.0000 | 735.93 | 3.2389 |
| 323.87 | 19.6033 | 529.59 | 13.3074 | 333.97 | 5.5557 |
| 325.23 | 18.8379 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 24.5911 | 531.02 | 13.3169 | 747.24 | 11.7111 |
| 333.37 | 26.3171 | 546.56 | 0.0000 | 748.06 | 10.7387 |
| 333.97 | 23.6957 | 552.55 | 11.2161 | 752.31 | 9.7783 |
| 334.37 | 26.6651 | 563.25 | 11.7254 | 753.82 | 8.8055 |
| 338.28 | 26.7392 | 569.33 | 14.4730 | 756.73 | 11.7539 |
| 338.32 | 26.7396 | 946.00 | 14.4742 | 756.80 | 11.7542 |
| 311.90 | 22.8129 | 569.70 | 14.4758 | 884.68 | 9.8218 |
| 340.48 | 22.8129 | 583.19 | 10.0155 | 765.81 | 13.7601 |
| 340.55 | 22.8140 | 584.27 | 10.6279 | 766.42 | 13.7635 |
| 344.28 | 19.8901 | 595.83 | 17.4010 | 766.84 | 11.7990 |
| 345.93 | 25.4883 | 427.87 | 17.4391 | 772.60 | 0.0000 |
| 351.06 | 17.9852 | 602.52 | 0.0000 | 776.52 | 8.8816 |
| 351.93 | 17.9959 | 602.73 | 18.3750 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 24.5221 | 778.90 | 9.8770 |
| 356.01 | 20.8530 | 609.32 | 19.3512 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 21.5110 | 785.37 | 8.9108 |
| 366.42 | 0.0000 | 614.28 | 10.7746 | 792.07 | 7.9402 |
| 375.05 | 22.7435 | 618.01 | 18.5020 | 794.95 | 7.9486 |
| 356.01 | 26.5495 | 620.36 | 12.0386 | 795.86 | 9.9392 |
| 388.16 | 11.4681 | 621.93 | 11.1205 | 810.29 | 8.9923 |
| 388.63 | 11.4717 | 630.19 | 0.0000 | 344.28 | 9.9919 |
| 391.69 | 8.2100 | 631.29 | 12.0970 | 810.76 | 9.9932 |
| 264.66 | 13.2100 | 633.25 | 4.6567 | 815.77 | 9.0101 |
| 401.81 | 14.4586 | 634.78 | 10.2518 | 1048.07 | 12.0252 |
| 402.40 | 16.5303 | 635.95 | 10.2569 | 832.01 | 12.0832 |
| 404.85 | 13.2443 | 636.99 | 0.0000 | 834.85 | 10.0793 |
| 410.95 | 10.3859 | 645.85 | 15.9201 | 835.71 | 10.0825 |
| 413.71 | 16.6453 | 657.76 | 16.9427 | 836.80 | 0.0000 |
| 414.70 | 12.4915 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 10.4871 | 661.66 | 6.5998 | 846.77 | 8.4347 |
| 427.87 | 12.5903 | 664.57 | 0.0000 | 856.80 | 7.1099 |
| 433.94 | 13.6883 | 666.33 | 11.3361 | 860.56 | 7.1189 |
| 439.40 | 16.9006 | 666.50 | 11.3370 | 871.09 | 7.1448 |
| 453.88 | 21.3019 | 667.71 | 0.0000 | 873.19 | 11.2355 |
| 463.37 | 15.4193 | 677.62 | 7.5932 | 875.33 | 0.0000 |
| 468.07 | 18.8950 | 685.70 | 0.0000 | 879.38 | 9.2120 |
| 473.00 | 0.0000 | 695.00 | 14.3394 | 880.51 | 9.2156 |
| 475.06 | 25.8651 | 696.49 | 17.2178 | 883.24 | 7.1743 |
| 476.78 | 14.0234 | 696.51 | 17.2178 | 884.68 | 12.3047 |
| 477.60 | 12.9503 | 697.00 | 16.2646 | 889.28 | 7.1888 |
| 482.18 | 20.5557 | 697.49 | 12.4401 | 894.76 | 1.0289 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 5.1499 | 1298.22 | 0.0000 | | |
| 903.28 | 2.5795 | 1312.11 | 2.8961 | | |
| 911.20 | 9.3103 | 1332.49 | 6.7912 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 5.1982 | 1365.19 | 6.8445 | | |
| 937.49 | 6.2602 | 1368.63 | 0.0000 | | |
| 944.13 | 13.5926 | 1384.29 | 2.9467 | | |
| 946.00 | 9.4159 | 1408.01 | 2.9629 | | |
| 949.00 | 7.3305 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 8.5676 | | |
| 962.31 | 7.3615 | 1489.16 | 4.0236 | | |
| 964.08 | 8.4178 | 1505.03 | 4.0376 | | |
| 966.17 | 14.7407 | 1596.21 | 6.1753 | | |
| 968.97 | 7.3768 | 1620.50 | 2.0688 | | |
| 983.53 | 7.4103 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.0985 | | |
| 1274.44 | 6.3766 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.3858 | 1764.49 | 3.1930 | | |
| 1004.73 | 8.5242 | 1063.66 | 4.2620 | | |
| 507.63 | 0.0000 | 1771.35 | 2.1315 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 4.2931 | | |
| 1037.84 | 8.6094 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.1576 | | |
| 631.29 | 9.7106 | | | | |
| 1048.07 | 8.6352 | | | | |
| 1049.04 | 7.5582 | | | | |
| 1050.41 | 6.4808 | | | | |
| 1063.66 | 10.8433 | | | | |
| 1077.00 | 4.3541 | | | | |
| 1077.34 | 4.3545 | | | | |
| 1085.87 | 6.5479 | | | | |
| 1099.45 | 6.8469 | | | | |
| 1112.07 | 5.4971 | | | | |
| 1112.84 | 5.4983 | | | | |
| 1115.54 | 11.0049 | | | | |
| 1120.29 | 5.5098 | | | | |
| 1120.55 | 5.5100 | | | | |
| 1221.41 | 6.4298 | | | | |
| 1129.67 | 3.6826 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.5215 | | | | |
| 1177.95 | 4.6641 | | | | |
| 1189.05 | 11.2271 | | | | |
| 1204.77 | 3.7580 | | | | |
| 1221.41 | 6.6049 | | | | |
| 1231.02 | 5.6755 | | | | |
| 1235.36 | 4.7349 | | | | |
| 1238.28 | 3.7907 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 5.7349 | | | | |
| 1274.44 | 7.6514 | | | | |
| 1274.54 | 7.6517 | | | | |
| 1291.59 | 4.8027 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:16.07

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146010.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM14.CNF;397
                                        Background date  : 9-FEB-2014 11:21:32.
Sample date      : 7-NOV-2013 10:18:00. Acquisition date : 10-FEB-2014 13:25:23
Sample ID        : G341146010           Sample quantity  : 1.31030E+02 GRAM
Detector name    : GAM14                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.25  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.66* | 21 | 35 | 2.52 | 93.94 | 87 | 12 | 5.84E-03 | 64.7 | |
| 2 | 0 | 112.23 | 12 | 14 | 1.18 | 225.07 | 222 | 6 | 3.44E-03 | 56.2 | |
| 3 | 0 | 164.31 | 34 | 27 | 2.77 | 329.23 | 325 | 10 | 9.42E-03 | 33.6 | |
| 4 | 0 | 239.19* | 18 | 19 | 0.64 | 478.97 | 475 | 9 | 5.06E-03 | 56.0 | |
| 5 | 3 | 516.21 | 10 | 0 | 2.26 | 1032.88 | 1015 | 26 | 2.91E-03 | 54.9 | 2.03E+00 |
| 6 | 0 | 584.61 | 11 | 11 | 2.66 | 1169.64 | 1158 | 14 | 3.10E-03 | 68.7 | |
| 7 | 0 | 626.74 | 6 | 2 | 0.68 | 1253.88 | 1251 | 7 | 1.65E-03 | 56.0 | |
| 8 | 0 | 695.36 | 10 | 1 | 1.90 | 1391.06 | 1388 | 7 | 2.66E-03 | 39.1 | |
| 9 | 0 | 758.85 | 8 | 0 | 1.05 | 1518.00 | 1512 | 9 | 2.22E-03 | 35.4 | |
| 10 | 0 | 761.86 | 8 | 0 | 1.50 | 1524.00 | 1521 | 6 | 2.22E-03 | 35.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:29:17

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146010.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:18:00 | Acquisition date | : 10-FEB-2014 13:25:23 |
| Sample ID | : G341146010 | Sample quantity | : 131.03 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA14 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.25 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PR-144 | 696.51 | 10 | 1.34* | 2.149E+00 | 1.908E+00 | 2.405E+00 | 78.20 |
| | 1489.16 | ------ | 0.28 | 1.125E+00 | ------ | Line Not Found | ------ |
| TL-208 | 277.37 | ------ | 6.60 | 4.162E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 11 | 85.00* | 2.454E+00 | 3.066E-02 | 3.066E-02 | 137.37 |
| | 860.56 | ------ | 12.50 | 1.809E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 21 | 4.25* | 6.497E-01 | 4.363E+00 | 4.399E+00 | 129.31 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:18.25

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146010.CNF;1    *
* Acquisition date : 10-FEB-2014 13:25:23 Sensitivity     : 3.000          *
* Detector ID      : GAM14                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:18:00 Nuclide Library : SOLID          *
* Sample ID        : G341146010           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.3103E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 13:13:25 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_500MLMB.CNF;8       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| PR-144 | 2.405E+00 | 1.843E+00 | 5.024E+00 |
| TL-208 | 3.066E-02 | 4.127E-02 | 5.176E-02 |
| PB-210 | 4.399E+00 | 5.575E+00 | 6.553E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.301E-01 | 8.184E-01 | 1.636E+00 | NOT IDENT. |
| NA-22 | 2.793E-02 | 2.615E-02 | 7.098E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.408E-02 | 4.277E-02 | 7.450E-02 | NOT IDENT. |
| K-40 | -4.637E-02 | 3.098E-01 | 6.630E-01 | NOT IDENT. |
| SC-46 | 3.821E-03 | 5.049E-02 | 1.074E-01 | NOT IDENT. |
| V-48 | 1.392E+00 | 1.698E+00 | 4.001E+00 | NOT IDENT. |
| CR-51 | -5.252E-01 | 2.322E+00 | 4.270E+00 | NOT IDENT. |
| MN-54 | -1.503E-02 | 3.264E-02 | 5.737E-02 | NOT IDENT. |
| CO-56 | -2.570E-02 | 6.368E-02 | 1.134E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -8.479E-03 | 2.998E-02 | 5.170E-02 | NOT IDENT. |
| CO-58 | -4.608E-02 | 7.331E-02 | 1.232E-01 | NOT IDENT. |
| FE-59 | -2.177E-02 | 2.105E-01 | 4.293E-01 | NOT IDENT. |
| CO-60 | -1.921E-02 | 3.737E-02 | 6.728E-02 | NOT IDENT. |
| ZN-65 | -8.716E-02 | 8.042E-02 | 1.231E-01 | NOT IDENT. |
| GE-68 | -2.705E-01 | 8.199E-01 | 1.637E+00 | NOT IDENT. |
| AS-73 | 3.330E-01 | 1.670E+00 | 3.104E+00 | NOT IDENT. |
| AS-74 | 8.842E-01 | 1.660E+00 | 3.479E+00 | NOT IDENT. |
| SE-75 | -3.047E-02 | 6.357E-02 | 1.131E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.216E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -4.385E-01 | 2.454E+00 | 4.577E+00 | NOT IDENT. |
| RB-83 | 3.215E-02 | 8.244E-02 | 1.643E-01 | NOT IDENT. |
| KR-85 | 0.000E+00 | 6.556E+00 | 1.579E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 8.051E-02 | 1.940E-01 | NOT IDENT. |
| RB-86 | -2.718E+00 | 8.239E+00 | 1.645E+01 | NOT IDENT. |
| Y-88 | -7.311E-02 | 7.322E-02 | 1.044E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 9.344E+00 | 3.342E+01 | 7.433E+01 | NOT IDENT. |
| NB-94 | 1.043E-02 | 2.569E-02 | 5.325E-02 | NOT IDENT. |
| NB-95 | 1.540E-03 | 7.540E-02 | 1.465E-01 | NOT IDENT. |
| NB-95M | 4.953E-02 | 2.751E-01 | 4.583E-01 | NOT IDENT. |
| ZR-95 | 5.209E-02 | 1.243E-01 | 2.440E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.584E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 5.220E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.302E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.486E-02 | 2.912E-02 | 5.433E-02 | NOT IDENT. |
| RH-102 | 4.488E-03 | 5.343E-02 | 9.090E-02 | NOT IDENT. |
| RU-103 | 4.820E-02 | 1.078E-01 | 2.303E-01 | NOT IDENT. |
| RH-106 | -2.912E-02 | 3.035E-01 | 5.007E-01 | NOT IDENT. |
| RU-106 | -2.912E-02 | 3.035E-01 | 5.007E-01 | NOT IDENT. |
| AG-108M | -2.266E-03 | 3.005E-02 | 5.562E-02 | NOT IDENT. |
| CD-109 | 9.497E-02 | 7.534E-01 | 1.358E+00 | NOT IDENT. |
| AG-110M | -2.277E-02 | 4.978E-02 | 9.243E-02 | NOT IDENT. |
| SN-113 | -2.004E-02 | 6.726E-02 | 1.214E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 6.538E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 4.396E-01 | 2.969E+00 | 4.965E+00 | NOT IDENT. |
| TE-123M | -2.740E-05 | 4.405E-02 | 6.831E-02 | NOT IDENT. |
| SB-124 | 6.321E-02 | 2.458E-01 | 5.335E-01 | NOT IDENT. |
| SB-125 | 4.186E-02 | 7.834E-02 | 1.607E-01 | NOT IDENT. |
| TE-125M | 9.752E+00 | 2.207E+01 | 3.715E+01 | NOT IDENT. |
| I-126 | -4.763E+00 | 1.193E+01 | 2.218E+01 | NOT IDENT. |
| SB-126 | 1.085E+00 | 1.179E+01 | 2.266E+01 | FAIL ABUN |
| SN-126 | 2.089E-02 | 6.244E-02 | 1.151E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.960E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.065E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 2.075E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 1.300E-03 | 3.858E-02 | 7.280E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 3.012E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.360E-02 | 3.587E-02 | 5.987E-02 | NOT IDENT. |
| CS-135 | -7.339E-02 | 1.317E-01 | 2.324E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -8.943E-01 | 5.078E+00 | 1.014E+01 | NOT IDENT. |
| BA-137M | 1.425E-03 | 2.518E-02 | 4.999E-02 | NOT IDENT. |
| CS-137 | 1.505E-03 | 2.660E-02 | 5.280E-02 | NOT IDENT. |
| CE-139 | 4.057E-02 | 4.382E-02 | 7.650E-02 | NOT IDENT. |
| BA-140 | 3.280E+00 | 6.054E+00 | 1.443E+01 | NOT IDENT. |
| LA-140 | 3.280E+00 | 6.054E+00 | 1.443E+01 | NOT IDENT. |
| CE-141 | 3.528E-01 | 3.121E-01 | 6.089E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.971E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.419E-01 | 2.370E-01 | 3.950E-01 | NOT IDENT. |
| PM-144 | 3.082E-02 | 2.362E-02 | 6.666E-02 | FAIL ABUN |
| PM-146 | 1.688E-02 | 4.504E-02 | 8.758E-02 | NOT IDENT. |
| ND-147 | 3.327E+01 | 7.451E+01 | 1.521E+02 | NOT IDENT. |
| PM-147 | 3.016E+02 | 7.218E+02 | 1.333E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 6.138E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.537E-02 | 2.404E-02 | 3.936E-02 | FAIL ABUN |
| EU-152 | 2.142E-02 | 8.189E-02 | 1.600E-01 | NOT IDENT. |
| GD-153 | 2.034E-02 | 9.987E-02 | 1.808E-01 | NOT IDENT. |
| EU-154 | 6.334E-02 | 7.550E-02 | 1.933E-01 | NOT IDENT. |
| EU-155 | -5.313E-02 | 8.804E-02 | 1.479E-01 | NOT IDENT. |
| TB-160 | 5.168E-02 | 2.318E-01 | 4.865E-01 | FAIL ABUN |
| HO-166M | 7.709E-03 | 4.553E-02 | 9.153E-02 | NOT IDENT. |
| TM-171 | -1.285E+01 | 2.181E+01 | 3.388E+01 | NOT IDENT. |
| LU-176 | 8.766E-03 | 2.266E-02 | 4.461E-02 | NOT IDENT. |
| HF-181 | -9.211E-02 | 1.420E-01 | 2.435E-01 | NOT IDENT. |
| TA-182 | -5.102E-02 | 2.189E-01 | 4.242E-01 | NOT IDENT. |
| RE-183 | -3.525E-01 | 4.380E-01 | 7.278E-01 | NOT IDENT. |
| RE-184 | -1.115E-01 | 4.816E-01 | 9.341E-01 | NOT IDENT. |
| W-188 | -6.350E+00 | 1.372E+01 | 2.447E+01 | NOT IDENT. |
| IR-192 | 8.051E-03 | 5.713E-02 | 1.110E-01 | NOT IDENT. |
| HG-203 | -1.194E-02 | 1.171E-01 | 2.161E-01 | NOT IDENT. |
| BI-207 | 3.129E-02 | 3.693E-02 | 8.883E-02 | NOT IDENT. |
| BI-211 | -7.428E-02 | 1.821E-01 | 3.256E-01 | NOT IDENT. |
| PB-211 | 2.926E-01 | 6.109E-01 | 1.227E+00 | NOT IDENT. |
| BI-212 | 4.044E-01 | 4.746E-01 | 1.006E+00 | NOT IDENT. |
| PB-212 | 5.208E-02 | 5.717E-02 | 1.057E-01 | FAIL ABUN |
| BI-214 | 5.255E-02 | 6.922E-02 | 1.433E-01 | NOT IDENT. |
| PB-214 | -2.991E-03 | 6.481E-02 | 1.213E-01 | NOT IDENT. |
| RN-219 | 9.041E-04 | 3.466E-01 | 6.573E-01 | NOT IDENT. |
| RN-222 | 5.255E-02 | 6.922E-02 | 1.433E-01 | NOT IDENT. |
| RA-223 | -3.273E-02 | 5.875E-01 | 1.094E+00 | NOT IDENT. |
| RA-224 | 3.365E-01 | 5.909E-01 | 1.036E+00 | NOT IDENT. |
| RA-226 | 5.255E-02 | 6.922E-02 | 1.433E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AC-227 | -1.133E-01 | 2.380E-01 | 4.230E-01 | NOT IDENT. |
| TH-227 | -1.133E-01 | 2.380E-01 | 4.230E-01 | NOT IDENT. |
| AC-228 | -6.339E-02 | 1.134E-01 | 2.167E-01 | NOT IDENT. |
| RA-228 | -6.339E-02 | 1.134E-01 | 2.167E-01 | NOT IDENT. |
| TH-228 | 5.208E-02 | 5.717E-02 | 1.057E-01 | FAIL ABUN |
| TH-229 | 1.398E-01 | 4.838E-01 | 9.202E-01 | NOT IDENT. |
| TH-230 | 5.255E-02 | 6.921E-02 | 1.433E-01 | NOT IDENT. |
| PA-231 | -8.572E-01 | 1.277E+00 | 2.220E+00 | NOT IDENT. |
| TH-231 | -3.273E-02 | 5.875E-01 | 1.094E+00 | NOT IDENT. |
| TH-232 | -6.339E-02 | 1.134E-01 | 2.167E-01 | NOT IDENT. |
| PA-233 | -1.016E-02 | 5.344E-02 | 9.891E-02 | NOT IDENT. |
| PA-234 | -7.583E-03 | 2.109E-01 | 4.342E-01 | FAIL ABUN |
| PA-234M | -6.420E+00 | 4.100E+00 | 6.044E+00 | NOT IDENT. |
| TH-234 | 2.003E-01 | 1.359E+00 | 2.462E+00 | NOT IDENT. |
| U-234 | 5.255E-02 | 6.921E-02 | 1.433E-01 | NOT IDENT. |
| U-235 | 6.970E-02 | 1.885E-01 | 3.436E-01 | FAIL ABUN |
| NP-237 | -1.016E-02 | 5.344E-02 | 9.891E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.676E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.003E-01 | 1.359E+00 | 2.462E+00 | NOT IDENT. |
| NP-239 | 1.606E-01 | 3.714E-01 | 6.676E-01 | NOT IDENT. |
| PU-239 | -2.083E+02 | 3.186E+02 | 5.287E+02 | NOT IDENT. |
| AM-241 | -1.521E-01 | 1.589E-01 | 2.598E-01 | NOT IDENT. |
| AM-243 | 2.719E-02 | 4.462E-02 | 8.433E-02 | NOT IDENT. |
| CM-243 | -1.310E-02 | 9.412E-02 | 1.659E-01 | NOT IDENT. |
| CM-247 | -6.641E-03 | 3.225E-02 | 5.939E-02 | NOT IDENT. |
| CF-249 | -1.164E-03 | 3.277E-02 | 6.211E-02 | NOT IDENT. |
| CF-251 | 1.666E-02 | 1.116E-01 | 2.013E-01 | NOT IDENT. |
| ANH-511 | -1.607E-03 | 4.339E-02 | 9.716E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:14.57

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 36.30 | 23 | 25 | 1.90 | 73.23 | 66 | 11 | 6.44E-03 | 48.0 | |
| 2 | 0 | 46.66 | 31 | 35 | 2.52 | 93.94 | 87 | 12 | 8.56E-03 | 42.8 | |
| 3 | 0 | 92.90 | 29 | 59 | 0.88 | 186.43 | 182 | 11 | 8.07E-03 | 54.1 | |
| 4 | 0 | 112.23 | 12 | 14 | 1.18 | 225.07 | 222 | 6 | 3.44E-03 | 56.2 | |
| 5 | 0 | 164.31 | 34 | 27 | 2.77 | 329.23 | 325 | 10 | 9.42E-03 | 33.6 | |
| 6 | 0 | 186.76 | 10 | 31 | 0.78 | 374.13 | 369 | 7 | 2.83E-03 | 94.8 | |
| 7 | 0 | 239.19 | 32 | 19 | 0.64 | 478.97 | 475 | 9 | 8.89E-03 | 30.7 | |
| 8 | 3 | 510.32 | 51 | 0 | 2.25 | 1021.12 | 1015 | 26 | 1.41E-02 | 17.9 | 2.03E+00 |
| 9 | 3 | 516.21 | 10 | 0 | 2.26 | 1032.88 | 1015 | 26 | 2.91E-03 | 54.9 | |
| 10 | 0 | 584.61 | 11 | 11 | 2.66 | 1169.64 | 1158 | 14 | 3.10E-03 | 68.7 | |
| 11 | 0 | 626.74 | 6 | 2 | 0.68 | 1253.88 | 1251 | 7 | 1.65E-03 | 56.0 | |
| 12 | 0 | 695.36 | 10 | 1 | 1.90 | 1391.06 | 1388 | 7 | 2.66E-03 | 39.1 | |
| 13 | 0 | 758.85 | 8 | 0 | 1.05 | 1518.00 | 1512 | 9 | 2.22E-03 | 35.4 | |
| 14 | 0 | 761.86 | 8 | 0 | 1.50 | 1524.00 | 1521 | 6 | 2.22E-03 | 35.4 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:16.54

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PR-144 | 696.51 | 10 | 1.34* | 2.149E+00 | 1.908E+00 | 2.405E+00 | 78.20 |
| | 1489.16 | ------ | 0.28 | 1.125E+00 | ------ | Line Not Found | ------ |
| TL-208 | 277.37 | ------ | 6.60 | 4.162E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 11 | 85.00* | 2.454E+00 | 3.066E-02 | 3.066E-02 | 137.37 |
| | 860.56 | ------ | 12.50 | 1.809E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 21 | 4.25* | 6.497E-01 | 4.363E+00 | 4.399E+00 | 129.31 |

Flag: "*" = Keyline

Sample ID : G341146010 Acquisition date : 10-FEB-2014 13:25:23

Total number of lines in spectrum 10
Number of unidentified lines 4
Number of lines tentatively identified by NID 6 60.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| PR-144 | 284.91D | 1.26 | 1.908E+00 | 2.405E+00 | 1.881E+00 | 78.20 | |
| TL-208 | 1.41E+10Y | 1.00 | 3.066E-02 | 3.066E-02 | 4.211E-02 | 137.37 | |
| PB-210 | 22.20Y | 1.01 | 4.363E+00 | 4.399E+00 | 5.689E+00 | 129.31 | |
| | Total Activity : | | 6.302E+00 | 6.835E+00 | | | |

Grand Total Activity : 6.302E+00 6.835E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146010 Acquisition date : 10-FEB-2014 13:25:23

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 112.23 | 12 | 14 | 1.18 | 225.07 | 222 | 6 | 3.44E-03 | **** | 5.92E+00 | T |
| 0 | 164.31 | 34 | 27 | 2.77 | 329.23 | 325 | 10 | 9.42E-03 | 67.2 | 5.67E+00 | T |
| 0 | 239.19 | 18 | 19 | 0.64 | 478.97 | 475 | 9 | 5.06E-03 | **** | 4.59E+00 | T |
| 3 | 516.21 | 10 | 0 | 2.26 | 1032.88 | 1015 | 26 | 2.91E-03 | **** | 2.69E+00 | |
| 0 | 626.74 | 6 | 2 | 0.68 | 1253.88 | 1251 | 7 | 1.65E-03 | **** | 2.33E+00 | |
| 0 | 758.85 | 8 | 0 | 1.05 | 1518.00 | 1512 | 9 | 2.22E-03 | 70.7 | 2.01E+00 | |
| 0 | 761.86 | 8 | 0 | 1.50 | 1524.00 | 1521 | 6 | 2.22E-03 | 70.7 | 2.00E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:29.12

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146010.CNF;1       *
* Acquisition date : 10-FEB-2014 13:25:23 Sensitivity     : 3.000                *
* Detector ID      : GAM14                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:18:00 Nuclide Library : SOLID                *
* Sample ID        : G341146010           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.3103E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 14-NOV-2013 13:13:25 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_500MLMB.CNF;8              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| PR-144 | 2.173E+00 |
| TL-208 | 2.218E-02 |
| PB-210 | 2.990E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.280E-01 | NOT IDENT. |
| NA-22 | 2.904E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.919E-02 | NOT IDENT. |
| K-40 | 2.679E-01 | NOT IDENT. |
| SC-46 | 4.402E-02 | NOT IDENT. |
| V-48 | 1.703E+00 | NOT IDENT. |
| CR-51 | 1.911E+00 | NOT IDENT. |
| MN-54 | 2.353E-02 | NOT IDENT. |
| CO-56 | 4.676E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.394E-02 | NOT IDENT. |
| CO-58 | 5.119E-02 | NOT IDENT. |
| FE-59 | 1.735E-01 | NOT IDENT. |
| CO-60 | 2.716E-02 | NOT IDENT. |
| ZN-65 | 4.768E-02 | NOT IDENT. |
| GE-68 | 6.127E-01 | NOT IDENT. |
| AS-73 | 1.424E+00 | NOT IDENT. |
| AS-74 | 1.518E+00 | NOT IDENT. |
| SE-75 | 5.128E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.937E+00 | NOT IDENT. |
| RB-83 | 6.833E-02 | NOT IDENT. |
| KR-85 | 7.227E+00 | NOT IDENT. |
| SR-85 | 8.874E-02 | NOT IDENT. |
| RB-86 | 6.158E+00 | NOT IDENT. |
| Y-88 | 3.700E-02 | NOT IDENT. |
| Y-91 | 3.037E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 2.299E-02 | NOT IDENT. |
| NB-95 | 6.232E-02 | NOT IDENT. |
| NB-95M | 2.104E-01 | NOT IDENT. |
| ZR-95 | 1.021E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.518E-02 | NOT IDENT. |
| RH-102 | 3.919E-02 | NOT IDENT. |
| RU-103 | 9.866E-02 | NOT IDENT. |
| RH-106 | 2.106E-01 | NOT IDENT. |
| RU-106 | 2.106E-01 | NOT IDENT. |
| AG-108M | 2.501E-02 | NOT IDENT. |
| CD-109 | 6.308E-01 | NOT IDENT. |
| AG-110M | 3.837E-02 | NOT IDENT. |
| SN-113 | 5.424E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.284E+00 | NOT IDENT. |
| TE-123M | 3.138E-02 | NOT IDENT. |
| SB-124 | 2.187E-01 | NOT IDENT. |
| SB-125 | 7.138E-02 | NOT IDENT. |
| TE-125M | 1.704E+01 | NOT IDENT. |
| I-126 | 9.350E+00 | NOT IDENT. |
| SB-126 | 9.894E+00 | FAIL ABUN |
| SN-126 | 5.338E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.278E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.481E-02 | NOT IDENT. |
| CS-135 | 1.049E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.119E+00 | NOT IDENT. |
| BA-137M | 2.112E-02 | NOT IDENT. |
| CS-137 | 2.231E-02 | NOT IDENT. |
| CE-139 | 3.550E-02 | NOT IDENT. |
| BA-140 | 5.866E+00 | NOT IDENT. |
| LA-140 | 5.866E+00 | NOT IDENT. |
| CE-141 | 2.839E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.829E-01 | NOT IDENT. |
| PM-144 | 2.899E-02 | FAIL ABUN |
| PM-146 | 3.963E-02 | NOT IDENT. |
| ND-147 | 6.695E+01 | NOT IDENT. |
| PM-147 | 6.185E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.747E-02 | FAIL ABUN |
| EU-152 | 7.181E-02 | NOT IDENT. |
| GD-153 | 8.407E-02 | NOT IDENT. |
| EU-154 | 7.908E-02 | NOT IDENT. |
| EU-155 | 6.740E-02 | NOT IDENT. |
| TB-160 | 2.072E-01 | FAIL ABUN |
| HO-166M | 3.899E-02 | NOT IDENT. |
| TM-171 | 1.545E+01 | NOT IDENT. |
| LU-176 | 2.018E-02 | NOT IDENT. |
| HF-181 | 1.056E-01 | NOT IDENT. |
| TA-182 | 1.739E-01 | NOT IDENT. |
| RE-183 | 3.331E-01 | NOT IDENT. |
| RE-184 | 3.917E-01 | NOT IDENT. |
| W-188 | 1.101E+01 | NOT IDENT. |
| IR-192 | 4.947E-02 | NOT IDENT. |
| HG-203 | 9.864E-02 | NOT IDENT. |
| BI-207 | 3.751E-02 | NOT IDENT. |
| BI-211 | 1.459E-01 | NOT IDENT. |
| PB-211 | 5.497E-01 | NOT IDENT. |
| BI-212 | 4.472E-01 | NOT IDENT. |
| PB-212 | 4.902E-02 | FAIL ABUN |
| BI-214 | 6.452E-02 | NOT IDENT. |
| PB-214 | 5.452E-02 | NOT IDENT. |
| RN-219 | 2.923E-01 | NOT IDENT. |
| RN-222 | 6.452E-02 | NOT IDENT. |
| RA-223 | 4.951E-01 | NOT IDENT. |
| RA-224 | 4.767E-01 | NOT IDENT. |
| RA-226 | 6.452E-02 | NOT IDENT. |
| AC-227 | 1.930E-01 | NOT IDENT. |

| | | |
|---|---|---|
| TH-227 | 1.930E-01 | NOT IDENT. |
| AC-228 | 9.096E-02 | NOT IDENT. |
| RA-228 | 9.096E-02 | NOT IDENT. |
| TH-228 | 4.902E-02 | FAIL ABUN |
| TH-229 | 4.267E-01 | NOT IDENT. |
| TH-230 | 6.451E-02 | NOT IDENT. |
| PA-231 | 9.991E-01 | NOT IDENT. |
| TH-231 | 4.951E-01 | NOT IDENT. |
| TH-232 | 9.096E-02 | NOT IDENT. |
| PA-233 | 4.423E-02 | NOT IDENT. |
| PA-234 | 1.785E-01 | FAIL ABUN |
| PA-234M | 2.443E+00 | NOT IDENT. |
| TH-234 | 1.149E+00 | NOT IDENT. |
| U-234 | 6.451E-02 | NOT IDENT. |
| U-235 | 1.599E-01 | FAIL ABUN |
| NP-237 | 4.423E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.149E+00 | NOT IDENT. |
| NP-239 | 3.093E-01 | NOT IDENT. |
| PU-239 | 2.440E+02 | NOT IDENT. |
| AM-241 | 1.195E-01 | NOT IDENT. |
| AM-243 | 3.920E-02 | NOT IDENT. |
| CM-243 | 7.648E-02 | NOT IDENT. |
| CM-247 | 2.635E-02 | NOT IDENT. |
| CF-249 | 2.750E-02 | NOT IDENT. |
| CF-251 | 9.250E-02 | NOT IDENT. |
| ANH-511 | 4.574E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:33.80

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146010.CNF;1    *
* Acquisition date : 10-FEB-2014 13:25:23 Sensitivity     : 3.000            *
* Detector ID      : GAM14                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:18:00 Nuclide Library : SOLID            *
* Sample ID        : G341146010           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.3103E+02 GRAM  *
*                                         Quantity Err(%) : 1.5264E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 14-NOV-2013 13:13:25 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_500MLMB.CNF;8          *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| PR-144 | 2.405E+00 | 1.855E+00 | 1.855E+00 |
| TL-208 | 3.066E-02 | 4.136E-02 | 4.136E-02 |
| PB-210 | 4.399E+00 | 5.587E+00 | 5.587E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.301E-01 | 8.191E-01 | 8.325E-01 | NOT IDENT. |
| NA-22 | 2.793E-02 | 2.626E-02 | 2.913E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.605E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.408E-02 | 4.282E-02 | 4.417E-02 | NOT IDENT. |
| K-40 | -4.637E-02 | 3.098E-01 | 3.105E-01 | NOT IDENT. |
| SC-46 | 3.821E-03 | 5.049E-02 | 5.052E-02 | NOT IDENT. |
| V-48 | 1.392E+00 | 1.708E+00 | 1.820E+00 | NOT IDENT. |
| CR-51 | -5.252E-01 | 2.323E+00 | 2.335E+00 | NOT IDENT. |
| MN-54 | -1.503E-02 | 3.268E-02 | 3.338E-02 | NOT IDENT. |
| CO-56 | -2.570E-02 | 6.374E-02 | 6.479E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 2.543E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -8.479E-03 | 2.999E-02 | 3.023E-02 | NOT IDENT. |
| CO-58 | -4.608E-02 | 7.348E-02 | 7.636E-02 | NOT IDENT. |
| FE-59 | -2.177E-02 | 2.105E-01 | 2.107E-01 | NOT IDENT. |
| CO-60 | -1.921E-02 | 3.741E-02 | 3.840E-02 | NOT IDENT. |
| ZN-65 | -8.716E-02 | 8.144E-02 | 9.043E-02 | NOT IDENT. |
| GE-68 | -2.705E-01 | 8.208E-01 | 8.298E-01 | NOT IDENT. |
| AS-73 | 3.330E-01 | 1.672E+00 | 1.678E+00 | NOT IDENT. |
| AS-74 | 8.842E-01 | 1.662E+00 | 1.710E+00 | NOT IDENT. |
| SE-75 | -3.047E-02 | 6.367E-02 | 6.513E-02 | NOT IDENT. |
| BR-77 | 1.108E+11 | 3.278E+11 | 3.316E+11 | SHORT HLIF |
| SR-82 | -4.385E-01 | 2.455E+00 | 2.463E+00 | NOT IDENT. |
| RB-83 | 3.215E-02 | 8.260E-02 | 8.386E-02 | NOT IDENT. |
| KR-85 | 1.635E+01 | 6.736E+00 | 9.984E+00 | NOT IDENT. |
| SR-85 | 2.005E-01 | 8.272E-02 | 1.225E-01 | NOT IDENT. |
| RB-86 | -2.718E+00 | 8.249E+00 | 8.339E+00 | NOT IDENT. |
| Y-88 | -7.311E-02 | 7.345E-02 | 8.050E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 9.344E+00 | 3.344E+01 | 3.370E+01 | NOT IDENT. |
| NB-94 | 1.043E-02 | 2.571E-02 | 2.614E-02 | NOT IDENT. |
| NB-95 | 1.540E-03 | 7.540E-02 | 7.540E-02 | NOT IDENT. |
| NB-95M | 4.953E-02 | 2.752E-01 | 2.761E-01 | NOT IDENT. |
| ZR-95 | 5.209E-02 | 1.244E-01 | 1.266E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 2.878E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 4.913E+40 | 2.626E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 5.943E+08 | 5.221E+09 | 5.228E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.308E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.486E-02 | 2.926E-02 | 3.002E-02 | NOT IDENT. |
| RH-102 | 4.488E-03 | 5.343E-02 | 5.347E-02 | NOT IDENT. |
| RU-103 | 4.820E-02 | 1.079E-01 | 1.100E-01 | NOT IDENT. |
| RH-106 | -2.912E-02 | 3.035E-01 | 3.038E-01 | NOT IDENT. |
| RU-106 | -2.912E-02 | 3.035E-01 | 3.038E-01 | NOT IDENT. |
| AG-108M | -2.266E-03 | 3.005E-02 | 3.006E-02 | NOT IDENT. |
| CD-109 | 9.497E-02 | 7.535E-01 | 7.547E-01 | NOT IDENT. |
| AG-110M | -2.277E-02 | 4.986E-02 | 5.091E-02 | NOT IDENT. |
| SN-113 | -2.004E-02 | 6.729E-02 | 6.790E-02 | NOT IDENT. |
| CD-115 | -1.579E+11 | 6.541E+11 | 6.580E+11 | SHORT HLIF |
| SN-117M | 4.396E-01 | 2.969E+00 | 2.976E+00 | NOT IDENT. |
| TE-123M | -2.740E-05 | 4.405E-02 | 4.405E-02 | NOT IDENT. |
| SB-124 | 6.321E-02 | 2.458E-01 | 2.475E-01 | NOT IDENT. |
| SB-125 | 4.186E-02 | 7.845E-02 | 8.069E-02 | NOT IDENT. |
| TE-125M | 9.752E+00 | 2.209E+01 | 2.252E+01 | NOT IDENT. |
| I-126 | -4.763E+00 | 1.194E+01 | 1.213E+01 | NOT IDENT. |
| SB-126 | 1.085E+00 | 1.180E+01 | 1.181E+01 | FAIL ABUN |
| SN-126 | 2.089E-02 | 6.247E-02 | 6.317E-02 | NOT IDENT. |
| SB-127 | 1.616E+06 | 2.088E+06 | 2.211E+06 | SHORT HLIF |
| I-131 | 4.606E+01 | 1.066E+02 | 1.086E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.454E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -6.369E+06 | 2.078E+07 | 2.098E+07 | SHORT HLIF |
| BA-133 | 1.300E-03 | 3.858E-02 | 3.859E-02 | NOT IDENT. |
| I-133 | 2.073E+31 | 3.246E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.360E-02 | 3.595E-02 | 3.749E-02 | NOT IDENT. |
| CS-135 | -7.339E-02 | 1.320E-01 | 1.361E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 3.360E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -8.943E-01 | 5.080E+00 | 5.096E+00 | NOT IDENT. |
| BA-137M | 1.425E-03 | 2.518E-02 | 2.519E-02 | NOT IDENT. |
| CS-137 | 1.505E-03 | 2.660E-02 | 2.661E-02 | NOT IDENT. |
| CE-139 | 4.057E-02 | 4.472E-02 | 4.831E-02 | NOT IDENT. |
| BA-140 | 3.280E+00 | 6.060E+00 | 6.238E+00 | NOT IDENT. |
| LA-140 | 3.280E+00 | 6.060E+00 | 6.238E+00 | NOT IDENT. |
| CE-141 | 3.528E-01 | 3.138E-01 | 3.518E-01 | NOT IDENT. |
| CE-143 | 1.125E+18 | 2.971E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.419E-01 | 2.374E-01 | 2.458E-01 | NOT IDENT. |
| PM-144 | 3.082E-02 | 2.377E-02 | 2.753E-02 | FAIL ABUN |
| PM-146 | 1.688E-02 | 4.509E-02 | 4.572E-02 | NOT IDENT. |
| ND-147 | 3.327E+01 | 7.458E+01 | 7.608E+01 | NOT IDENT. |
| PM-147 | 3.016E+02 | 7.223E+02 | 7.350E+02 | NOT IDENT. |
| PM-149 | 1.207E+12 | 6.142E+12 | 6.166E+12 | SHORT HLIF |
| EU-150 | -2.537E-02 | 2.420E-02 | 2.677E-02 | FAIL ABUN |
| EU-152 | 2.142E-02 | 8.193E-02 | 8.250E-02 | NOT IDENT. |
| GD-153 | 2.034E-02 | 9.988E-02 | 1.003E-01 | NOT IDENT. |
| EU-154 | 6.334E-02 | 7.570E-02 | 8.091E-02 | NOT IDENT. |
| EU-155 | -5.313E-02 | 8.819E-02 | 9.138E-02 | NOT IDENT. |
| TB-160 | 5.168E-02 | 2.319E-01 | 2.330E-01 | FAIL ABUN |
| HO-166M | 7.709E-03 | 4.553E-02 | 4.566E-02 | NOT IDENT. |
| TM-171 | -1.285E+01 | 2.184E+01 | 2.259E+01 | NOT IDENT. |
| LU-176 | 8.766E-03 | 2.268E-02 | 2.302E-02 | NOT IDENT. |
| HF-181 | -9.211E-02 | 1.422E-01 | 1.482E-01 | NOT IDENT. |
| TA-182 | -5.102E-02 | 2.189E-01 | 2.201E-01 | NOT IDENT. |
| RE-183 | -3.525E-01 | 4.397E-01 | 4.676E-01 | NOT IDENT. |
| RE-184 | -1.115E-01 | 4.819E-01 | 4.845E-01 | NOT IDENT. |
| W-188 | -6.350E+00 | 1.375E+01 | 1.405E+01 | NOT IDENT. |
| IR-192 | 8.051E-03 | 5.714E-02 | 5.726E-02 | NOT IDENT. |
| HG-203 | -1.194E-02 | 1.171E-01 | 1.172E-01 | NOT IDENT. |
| BI-207 | 3.129E-02 | 3.720E-02 | 3.979E-02 | NOT IDENT. |
| BI-211 | -7.428E-02 | 1.823E-01 | 1.854E-01 | NOT IDENT. |
| PB-211 | 2.926E-01 | 6.117E-01 | 6.257E-01 | NOT IDENT. |
| BI-212 | 4.044E-01 | 4.762E-01 | 5.099E-01 | NOT IDENT. |
| PB-212 | 5.208E-02 | 5.747E-02 | 6.208E-02 | FAIL ABUN |
| BI-214 | 5.255E-02 | 6.938E-02 | 7.331E-02 | NOT IDENT. |
| PB-214 | -2.991E-03 | 6.481E-02 | 6.483E-02 | NOT IDENT. |
| RN-219 | 9.041E-04 | 3.466E-01 | 3.466E-01 | NOT IDENT. |
| RN-222 | 5.255E-02 | 6.938E-02 | 7.331E-02 | NOT IDENT. |
| RA-223 | -3.273E-02 | 5.875E-01 | 5.877E-01 | NOT IDENT. |
| RA-224 | 3.365E-01 | 5.921E-01 | 6.112E-01 | NOT IDENT. |
| RA-226 | 5.255E-02 | 6.938E-02 | 7.331E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AC-227 | -1.133E-01 | 2.387E-01 | 2.441E-01 | NOT IDENT. |
| TH-227 | -1.133E-01 | 2.387E-01 | 2.441E-01 | NOT IDENT. |
| AC-228 | -6.339E-02 | 1.137E-01 | 1.173E-01 | NOT IDENT. |
| RA-228 | -6.339E-02 | 1.137E-01 | 1.173E-01 | NOT IDENT. |
| TH-228 | 5.208E-02 | 5.747E-02 | 6.208E-02 | FAIL ABUN |
| TH-229 | 1.398E-01 | 4.841E-01 | 4.881E-01 | NOT IDENT. |
| TH-230 | 5.255E-02 | 6.937E-02 | 7.330E-02 | NOT IDENT. |
| PA-231 | -8.572E-01 | 1.281E+00 | 1.338E+00 | NOT IDENT. |
| TH-231 | -3.273E-02 | 5.875E-01 | 5.877E-01 | NOT IDENT. |
| TH-232 | -6.339E-02 | 1.137E-01 | 1.173E-01 | NOT IDENT. |
| PA-233 | -1.016E-02 | 5.345E-02 | 5.364E-02 | NOT IDENT. |
| PA-234 | -7.583E-03 | 2.111E-01 | 2.111E-01 | FAIL ABUN |
| PA-234M | -6.420E+00 | 4.193E+00 | 5.095E+00 | NOT IDENT. |
| TH-234 | 2.003E-01 | 1.359E+00 | 1.362E+00 | NOT IDENT. |
| U-234 | 5.255E-02 | 6.937E-02 | 7.330E-02 | NOT IDENT. |
| U-235 | 6.970E-02 | 1.886E-01 | 1.912E-01 | FAIL ABUN |
| NP-237 | -1.016E-02 | 5.345E-02 | 5.364E-02 | NOT IDENT. |
| NP-238 | -6.410E+11 | 3.677E+12 | 3.688E+12 | SHORT HLIF |
| U-238 | 2.003E-01 | 1.359E+00 | 1.362E+00 | NOT IDENT. |
| NP-239 | 1.606E-01 | 3.718E-01 | 3.788E-01 | NOT IDENT. |
| PU-239 | -2.083E+02 | 3.191E+02 | 3.327E+02 | NOT IDENT. |
| AM-241 | -1.521E-01 | 1.593E-01 | 1.735E-01 | NOT IDENT. |
| AM-243 | 2.719E-02 | 4.468E-02 | 4.633E-02 | NOT IDENT. |
| CM-243 | -1.310E-02 | 9.413E-02 | 9.432E-02 | NOT IDENT. |
| CM-247 | -6.641E-03 | 3.227E-02 | 3.241E-02 | NOT IDENT. |
| CF-249 | -1.164E-03 | 3.277E-02 | 3.277E-02 | NOT IDENT. |
| CF-251 | 1.666E-02 | 1.116E-01 | 1.119E-01 | NOT IDENT. |
| ANH-511 | -1.607E-03 | 4.339E-02 | 4.339E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 35.6877 | 94.67 | 63.8390 | 193.51 | 48.8548 |
| 45.60 | 36.5881 | 94.87 | 61.7206 | 197.03 | 47.1291 |
| 46.54 | 36.6280 | 97.43 | 54.3780 | 198.01 | 53.4997 |
| 49.72 | 0.0000 | 98.43 | 46.9499 | 201.83 | 50.8761 |
| 51.35 | 44.1913 | 98.44 | 46.9502 | 205.31 | 43.6831 |
| 52.39 | 47.7915 | 99.53 | 49.1247 | 210.85 | 39.2386 |
| 53.44 | 37.9346 | 100.11 | 53.4197 | 215.65 | 40.2437 |
| 57.36 | 0.0000 | 103.18 | 39.6208 | 222.11 | 34.8622 |
| 57.53 | 52.5124 | 103.37 | 49.2651 | 227.09 | 36.7820 |
| 57.98 | 54.5967 | 105.21 | 52.5487 | 227.38 | 34.9475 |
| 59.32 | 73.2384 | 105.31 | 46.1174 | 228.16 | 0.0000 |
| 59.54 | 63.9688 | 106.12 | 42.9253 | 228.18 | 41.4006 |
| 63.29 | 47.6369 | 109.28 | 32.6972 | 235.69 | 38.4654 |
| 63.58 | 48.6862 | 111.00 | 45.2289 | 235.96 | 41.5478 |
| 64.28 | 46.6459 | 111.76 | 0.0000 | 238.63 | 49.3009 |
| 66.73 | 71.6908 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 60.2908 | 117.23 | 44.4979 | 240.99 | 33.9301 |
| 67.75 | 48.8797 | 121.12 | 46.6290 | 242.00 | 29.3165 |
| 69.67 | 48.9670 | 121.22 | 46.6322 | 244.70 | 32.4412 |
| 70.83 | 46.9331 | 121.78 | 58.5834 | 252.40 | 0.0000 |
| 72.81 | 64.7792 | 122.06 | 58.5943 | 252.80 | 32.5564 |
| 72.87 | 65.8276 | 123.07 | 53.2046 | 254.15 | 0.0000 |
| 74.66 | 46.0482 | 127.23 | 43.5513 | 256.23 | 44.7146 |
| 74.82 | 46.0548 | 129.30 | 62.1440 | 260.90 | 0.0000 |
| 74.97 | 38.7330 | 131.20 | 48.0297 | 264.66 | 39.2658 |
| 77.11 | 52.4401 | 133.02 | 66.6638 | 268.22 | 37.4517 |
| 79.69 | 57.8123 | 133.52 | 65.5916 | 269.46 | 28.1034 |
| 80.12 | 50.4728 | 136.00 | 50.3655 | 271.23 | 32.8116 |
| 80.19 | 0.0000 | 136.47 | 58.0468 | 273.65 | 40.3513 |
| 80.57 | 52.5959 | 140.51 | 0.0000 | 276.40 | 29.1234 |
| 81.00 | 55.7720 | 143.76 | 52.8073 | 277.37 | 31.0148 |
| 81.07 | 46.3040 | 144.24 | 52.8226 | 277.60 | 31.0177 |
| 83.79 | 55.9023 | 145.44 | 40.7471 | 278.00 | 36.6634 |
| 85.43 | 62.3150 | 152.43 | 44.2343 | 279.20 | 38.5626 |
| 86.55 | 47.5720 | 153.25 | 47.5745 | 279.54 | 39.5083 |
| 86.79 | 47.5811 | 154.21 | 36.5311 | 280.46 | 34.8180 |
| 86.94 | 47.5870 | 156.02 | 45.4350 | 283.69 | 37.6904 |
| 87.09 | 46.5352 | 158.56 | 41.4320 | 284.31 | 0.0000 |
| 87.57 | 47.6113 | 159.00 | 42.6267 | 285.41 | 26.4014 |
| 88.03 | 55.0379 | 162.33 | 46.2663 | 285.90 | 0.0000 |
| 88.34 | 70.9319 | 163.33 | 49.8535 | 287.50 | 27.3673 |
| 88.47 | 70.9393 | 165.86 | 35.6602 | 290.67 | 34.0163 |
| 89.96 | 75.2642 | 176.31 | 47.0725 | 293.27 | 0.0000 |
| 91.11 | 54.1124 | 176.60 | 47.0795 | 295.22 | 24.6115 |
| 92.59 | 50.9886 | 177.52 | 40.3739 | 295.96 | 27.4594 |
| 93.35 | 57.3962 | 181.07 | 0.0000 | 298.58 | 27.4877 |
| 94.56 | 56.3863 | 184.41 | 49.5262 | 299.98 | 33.1927 |
| 94.65 | 63.8379 | 185.72 | 45.9557 | 300.09 | 33.1940 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 36.9886 | 497.08 | 8.0965 | 711.68 | 9.6135 |
| 301.36 | 29.4152 | 505.52 | 3.3816 | 720.70 | 14.9847 |
| 302.85 | 24.6851 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 34.2009 | 511.00 | 6.0962 | 722.78 | 17.1332 |
| 306.78 | 24.7225 | 514.00 | 6.1013 | 722.91 | 17.1336 |
| 308.46 | 29.4958 | 514.00 | 6.1013 | 723.31 | 17.1352 |
| 311.90 | 26.6762 | 520.40 | 5.0934 | 724.19 | 13.9252 |
| 316.51 | 20.9967 | 520.69 | 0.0000 | 727.33 | 11.7909 |
| 319.41 | 25.7967 | 522.65 | 0.0000 | 733.00 | 13.9521 |
| 320.08 | 27.7146 | 527.90 | 0.0000 | 735.93 | 10.7395 |
| 321.04 | 27.7245 | 529.59 | 11.2336 | 737.46 | 9.6686 |
| 323.87 | 31.5816 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 30.6402 | 531.02 | 13.2815 | 747.24 | 2.1532 |
| 328.76 | 24.9276 | 546.56 | 0.0000 | 748.06 | 8.6143 |
| 333.37 | 39.3754 | 552.55 | 14.3859 | 752.31 | 5.3889 |
| 333.97 | 36.5026 | 563.25 | 17.5180 | 753.82 | 8.9844 |
| 334.37 | 32.6648 | 569.33 | 18.5779 | 756.73 | 5.3940 |
| 338.28 | 25.0145 | 569.50 | 19.6109 | 756.80 | 5.3942 |
| 338.32 | 25.0148 | 569.70 | 18.5796 | 763.94 | 10.8049 |
| 340.48 | 31.7742 | 583.19 | 12.0844 | 765.81 | 10.8093 |
| 340.55 | 31.7750 | 584.27 | 15.5413 | 766.42 | 11.8916 |
| 344.28 | 22.1760 | 595.83 | 10.3914 | 766.84 | 7.5681 |
| 345.93 | 22.1892 | 600.60 | 16.6461 | 772.60 | 0.0000 |
| 351.06 | 30.9281 | 602.52 | 0.0000 | 776.52 | 11.9174 |
| 351.93 | 27.0703 | 602.73 | 14.5732 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 27.0778 | 778.90 | 8.6715 |
| 356.01 | 27.1093 | 609.32 | 12.5118 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 12.5150 | 785.37 | 14.1105 |
| 366.42 | 0.0000 | 614.28 | 19.8350 | 792.07 | 10.8694 |
| 375.05 | 22.4149 | 618.01 | 12.5388 | 794.95 | 16.3140 |
| 383.85 | 18.5716 | 620.36 | 12.7784 | 795.86 | 14.1416 |
| 388.16 | 20.5560 | 621.93 | 10.4590 | 801.95 | 18.5161 |
| 388.63 | 23.4964 | 630.19 | 0.0000 | 810.29 | 6.5464 |
| 391.69 | 25.4801 | 631.29 | 12.2301 | 810.45 | 14.1845 |
| 400.66 | 26.5379 | 633.25 | 9.3227 | 810.76 | 14.1851 |
| 401.81 | 21.6315 | 634.78 | 10.4919 | 815.77 | 7.6460 |
| 402.40 | 23.6027 | 635.95 | 13.6433 | 818.51 | 9.8363 |
| 404.85 | 18.7003 | 636.99 | 0.0000 | 832.01 | 7.6715 |
| 410.95 | 24.6539 | 645.85 | 10.5200 | 834.85 | 10.9656 |
| 413.71 | 15.7926 | 657.76 | 10.5498 | 835.71 | 9.8706 |
| 414.70 | 14.8101 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 13.8770 | 661.66 | 9.5036 | 846.75 | 0.0000 |
| 427.87 | 14.8716 | 664.57 | 0.0000 | 846.77 | 10.9917 |
| 433.94 | 27.8130 | 666.33 | 10.5710 | 856.80 | 14.6852 |
| 439.40 | 23.8799 | 666.50 | 9.5144 | 860.56 | 5.5110 |
| 453.88 | 24.9844 | 667.71 | 0.0000 | 871.09 | 9.2041 |
| 463.37 | 17.0378 | 677.62 | 9.5390 | 873.19 | 13.8120 |
| 468.07 | 24.0867 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 10.6414 | 879.38 | 9.2190 |
| 475.06 | 28.1589 | 696.49 | 13.8385 | 880.51 | 10.1431 |
| 476.78 | 21.1297 | 696.51 | 13.8385 | 883.24 | 7.3809 |
| 477.60 | 17.1092 | 697.00 | 12.4206 | 884.68 | 11.9971 |
| 482.18 | 22.1705 | 697.49 | 12.4220 | 889.28 | 6.4658 |
| 487.02 | 12.1100 | 702.65 | 9.5939 | 894.76 | 9.2466 |
| 492.35 | 0.0000 | 706.68 | 12.8036 | 898.04 | 5.5515 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 11.1140 | 1312.11 | 6.9439 | | |
| 911.20 | 8.3481 | 1332.49 | 9.9500 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 7.4422 | 1365.19 | 3.9989 | | |
| 937.49 | 5.5931 | 1368.63 | 0.0000 | | |
| 944.13 | 9.3335 | 1384.29 | 6.0149 | | |
| 946.00 | 7.4694 | 1408.01 | 5.0293 | | |
| 949.00 | 1.8684 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.0266 | | |
| 962.31 | 5.6189 | 1489.16 | 3.0518 | | |
| 964.08 | 11.2415 | 1505.03 | 8.1553 | | |
| 966.17 | 10.3087 | 1596.21 | 3.0953 | | |
| 968.97 | 7.5010 | 1620.50 | 1.0350 | | |
| 983.53 | 4.7006 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 5.2214 | | |
| 996.26 | 7.5382 | 1750.46 | 0.0000 | | |
| 1001.03 | 17.9184 | 1764.49 | 6.3220 | | |
| 1004.73 | 5.6622 | 1770.23 | 10.5440 | | |
| 1021.30 | 0.0000 | 1771.35 | 6.3274 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 8.4740 | | |
| 1037.84 | 8.5430 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 8.5016 | | |
| 1046.59 | 9.5068 | | | | |
| 1048.07 | 7.6074 | | | | |
| 1049.04 | 6.6576 | | | | |
| 1050.41 | 6.6591 | | | | |
| 1063.66 | 3.8140 | | | | |
| 1077.00 | 4.7782 | | | | |
| 1077.34 | 4.7786 | | | | |
| 1085.87 | 5.7427 | | | | |
| 1099.45 | 6.7149 | | | | |
| 1112.07 | 3.8452 | | | | |
| 1112.84 | 4.8071 | | | | |
| 1115.54 | 12.5044 | | | | |
| 1120.29 | 3.8504 | | | | |
| 1120.55 | 4.8132 | | | | |
| 1121.30 | 5.7766 | | | | |
| 1129.67 | 4.8206 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 1.9419 | | | | |
| 1177.95 | 3.8867 | | | | |
| 1189.05 | 7.7874 | | | | |
| 1204.77 | 4.8792 | | | | |
| 1221.41 | 8.8055 | | | | |
| 1231.02 | 6.8590 | | | | |
| 1235.36 | 6.8636 | | | | |
| 1238.28 | 10.7905 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 5.9160 | | | | |
| 1274.44 | 1.9728 | | | | |
| 1274.54 | 0.9864 | | | | |
| 1291.59 | 8.9008 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:01.63

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146011.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM17.CNF;353
                                        Background date  : 9-FEB-2014 11:21:42.
Sample date      : 7-NOV-2013 10:22:00. Acquisition date : 10-FEB-2014 13:25:46
Sample ID        : G341146011           Sample quantity  : 1.25390E+02 GRAM
Detector name    : GAM17                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:04.06  0.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.75* | 3 | 70 | 0.82 | 93.33 | 88 | 10 | 7.00E-04 | 688.2 | |
| 2 | 0 | 92.98* | 10 | 32 | 1.18 | 185.81 | 182 | 8 | 2.84E-03 | 124.7 | |
| 3 | 0 | 99.97 | 8 | 28 | 0.81 | 199.81 | 197 | 6 | 2.15E-03 | 116.5 | |
| 4 | 0 | 175.18 | 8 | 23 | 1.21 | 350.25 | 346 | 7 | 2.16E-03 | 108.0 | |
| 5 | 0 | 202.16 | 13 | 40 | 1.10 | 404.23 | 398 | 10 | 3.61E-03 | 95.1 | |
| 6 | 0 | 209.50 | 10 | 17 | 1.36 | 418.91 | 416 | 5 | 2.72E-03 | 72.6 | |
| 7 | 0 | 238.83* | 8 | 33 | 0.73 | 477.58 | 473 | 10 | 2.34E-03 | 143.2 | |
| 8 | 0 | 279.14 | 4 | 16 | 0.56 | 558.23 | 553 | 7 | 1.07E-03 | 184.8 | |
| 9 | 0 | 297.73 | 37 | 28 | 5.82 | 595.42 | 584 | 19 | 1.02E-02 | 38.7 | |
| 10 | 0 | 352.25* | 14 | 18 | 0.91 | 704.50 | 700 | 10 | 3.98E-03 | 65.4 | |
| 11 | 0 | 470.53 | 8 | 1 | 0.70 | 941.14 | 938 | 6 | 2.11E-03 | 44.1 | |
| 12 | 0 | 510.80* | 4 | 23 | 1.51 | 1021.70 | 1013 | 16 | 1.24E-03 | 314.8 | |
| 13 | 0 | 582.92* | 2 | 8 | 0.76 | 1166.00 | 1161 | 10 | 5.18E-04 | 338.0 | |
| 14 | 0 | 609.50* | 7 | 12 | 0.93 | 1219.18 | 1214 | 10 | 1.99E-03 | 111.5 | |
| 15 | 0 | 668.50 | 8 | 5 | 3.82 | 1337.25 | 1331 | 10 | 2.31E-03 | 60.8 | |
| 16 | 0 | 692.60 | 15 | 0 | 1.50 | 1385.47 | 1380 | 11 | 4.17E-03 | 25.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:30:03

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146011.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:22:00 | Acquisition date | : 10-FEB-2014 13:25:46 |
| Sample ID | : G341146011 | Sample quantity | : 125.39 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA17 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:04.06 0.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| HG-203 | 70.83 | ------ | 3.69 | 6.312E+00 | ------ | Line Not Found | ------ |
| | 72.87 | ------ | 6.19 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 279.20 | 4 | 81.56* | 3.638E+00 | 7.768E-03 | 3.200E-02 | 369.62 |
| TL-208 | 277.37 | ------ | 6.60 | 3.657E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 2 | 85.00* | 1.910E+00 | 6.872E-03 | 6.872E-03 | 675.94 |
| | 860.56 | ------ | 12.50 | 1.352E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 3 | 4.25* | 4.676E+00 | 7.591E-02 | 7.653E-02 | 1376.39 |
| BI-211 | 72.87 | ------ | 1.23 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 14 | 12.92* | 2.986E+00 | 2.226E-01 | 2.226E-01 | 130.74 |
| ANH-511 | 511.00 | 4 | 100.00* | 2.149E+00 | 1.241E-02 | 1.241E-02 | 629.65 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:04.04

```
*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146011.CNF;1       *
* Acquisition date : 10-FEB-2014 13:25:46 Sensitivity     : 3.000                *
* Detector ID      : GAM17                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:04.06     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:22:00 Nuclide Library : SOLID                *
* Sample ID        : G341146011           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.2539E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8              *
*********************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| HG-203 | 3.200E-02 | 1.159E-01 | 1.906E-01 |
| TL-208 | 6.872E-03 | 4.552E-02 | 7.322E-02 |
| PB-210 | 7.653E-02 | 1.032E+00 | 8.554E-01 |
| BI-211 | 2.226E-01 | 2.852E-01 | 3.677E-01 |
| ANH-511 | 1.241E-02 | 7.660E-02 | 5.989E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 4.698E-01 | 8.900E-01 | 1.869E+00 | NOT IDENT. |
| NA-22 | -8.548E-03 | 3.714E-02 | 7.344E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.031E-02 | 5.188E-02 | 1.037E-01 | NOT IDENT. |
| K-40 | 9.950E-02 | 3.913E-01 | 8.938E-01 | NOT IDENT. |
| SC-46 | 1.425E-03 | 6.122E-02 | 1.313E-01 | NOT IDENT. |
| V-48 | 3.023E-01 | 2.019E+00 | 4.369E+00 | NOT IDENT. |
| CR-51 | 1.038E+00 | 2.409E+00 | 4.950E+00 | NOT IDENT. |
| MN-54 | -4.960E-04 | 4.709E-02 | 9.424E-02 | NOT IDENT. |
| CO-56 | 1.689E-02 | 8.646E-02 | 1.806E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.280E-02 | 2.205E-02 | 3.878E-02 | NOT IDENT. |
| CO-58 | -3.470E-02 | 7.642E-02 | 1.432E-01 | NOT IDENT. |
| FE-59 | 9.316E-02 | 3.249E-01 | 6.946E-01 | NOT IDENT. |
| CO-60 | -1.772E-02 | 3.333E-02 | 6.293E-02 | NOT IDENT. |
| ZN-65 | 8.806E-03 | 1.039E-01 | 2.153E-01 | NOT IDENT. |
| GE-68 | 9.103E-01 | 1.364E+00 | 3.279E+00 | NOT IDENT. |
| AS-73 | 2.662E-02 | 4.151E-01 | 7.350E-01 | NOT IDENT. |
| AS-74 | -9.058E-02 | 2.400E+00 | 4.531E+00 | NOT IDENT. |
| SE-75 | 4.700E-02 | 6.184E-02 | 1.248E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 1.673E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.153E-01 | 2.715E+00 | 5.664E+00 | NOT IDENT. |
| RB-83 | -5.050E-02 | 1.538E-01 | 2.780E-01 | NOT IDENT. |
| KR-85 | -5.547E-02 | 8.434E+00 | 1.409E+01 | NOT IDENT. |
| SR-85 | -8.747E-04 | 1.036E-01 | 1.730E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 1.046E+01 | 1.410E+01 | 3.405E+01 | NOT IDENT. |
| Y-88 | -4.373E-03 | 7.941E-02 | 1.730E-01 | NOT IDENT. |
| Y-91 | -2.188E+00 | 4.078E+01 | 8.500E+01 | NOT IDENT. |
| NB-94 | -1.837E-02 | 3.358E-02 | 5.703E-02 | NOT IDENT. |
| NB-95 | -2.973E-02 | 1.066E-01 | 2.001E-01 | NOT IDENT. |
| NB-95M | 1.511E-01 | 2.007E-01 | 3.885E-01 | NOT IDENT. |
| ZR-95 | -5.703E-02 | 2.017E-01 | 3.824E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.715E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.097E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 6.958E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -2.136E-02 | 2.255E-02 | 3.765E-02 | NOT IDENT. |
| RH-102 | -7.305E-02 | 5.556E-02 | 7.306E-02 | NOT IDENT. |
| RU-103 | 6.527E-03 | 1.747E-01 | 3.376E-01 | FAIL ABUN |
| RH-106 | 1.913E-01 | 3.920E-01 | 8.161E-01 | NOT IDENT. |
| RU-106 | 1.913E-01 | 3.920E-01 | 8.161E-01 | NOT IDENT. |
| AG-108M | -2.754E-02 | 2.760E-02 | 4.455E-02 | NOT IDENT. |
| CD-109 | -3.418E-01 | 4.982E-01 | 8.324E-01 | NOT IDENT. |
| AG-110M | -5.348E-02 | 4.702E-02 | 6.312E-02 | NOT IDENT. |
| SN-113 | 3.580E-02 | 6.429E-02 | 1.356E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 7.906E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -4.207E-01 | 2.479E+00 | 4.460E+00 | NOT IDENT. |
| TE-123M | 8.621E-03 | 3.491E-02 | 6.586E-02 | NOT IDENT. |
| SB-124 | -2.037E-03 | 2.459E-01 | 5.476E-01 | NOT IDENT. |
| SB-125 | -2.557E-02 | 8.753E-02 | 1.631E-01 | FAIL ABUN |
| TE-125M | 1.330E+01 | 1.663E+01 | 3.397E+01 | NOT IDENT. |
| I-126 | -1.559E+00 | 1.844E+01 | 3.033E+01 | NOT IDENT. |
| SB-126 | 1.023E+01 | 1.198E+01 | 2.802E+01 | NOT IDENT. |
| SN-126 | -3.260E-02 | 4.322E-02 | 7.578E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 2.542E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 9.449E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.191E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 2.232E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 5.117E-04 | 4.322E-02 | 7.564E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 3.930E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.416E-02 | 3.547E-02 | 8.092E-02 | NOT IDENT. |
| CS-135 | -1.072E-02 | 1.343E-01 | 2.422E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.595E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.856E-01 | 7.351E+00 | 1.485E+01 | FAIL ABUN |
| BA-137M | 2.961E-02 | 3.904E-02 | 8.112E-02 | NOT IDENT. |
| CS-137 | 3.128E-02 | 4.124E-02 | 8.570E-02 | NOT IDENT. |
| CE-139 | -1.052E-02 | 3.214E-02 | 5.750E-02 | NOT IDENT. |
| BA-140 | 3.291E-02 | 6.786E+00 | 1.527E+01 | NOT IDENT. |
| LA-140 | 3.291E-02 | 6.786E+00 | 1.527E+01 | NOT IDENT. |
| CE-141 | 3.630E-02 | 2.115E-01 | 4.103E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 3.448E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.269E-01 | 1.680E-01 | 3.415E-01 | NOT IDENT. |
| PM-144 | 1.589E-02 | 3.746E-02 | 7.367E-02 | NOT IDENT. |
| PR-144 | 1.240E+00 | 2.923E+00 | 5.749E+00 | NOT IDENT. |
| PM-146 | 1.588E-02 | 3.282E-02 | 7.191E-02 | NOT IDENT. |
| ND-147 | -1.052E+01 | 9.679E+01 | 1.839E+02 | NOT IDENT. |
| PM-147 | -1.331E+02 | 5.363E+02 | 9.836E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 6.241E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.521E-02 | 2.391E-02 | 4.256E-02 | FAIL ABUN |
| EU-152 | 1.786E-02 | 9.553E-02 | 1.884E-01 | NOT IDENT. |
| GD-153 | -4.433E-02 | 8.381E-02 | 1.188E-01 | NOT IDENT. |
| EU-154 | -6.337E-02 | 1.154E-01 | 1.999E-01 | NOT IDENT. |
| EU-155 | 3.040E-02 | 7.299E-02 | 1.431E-01 | NOT IDENT. |
| TB-160 | 3.397E-01 | 2.817E-01 | 7.028E-01 | FAIL ABUN |
| HO-166M | -1.774E-02 | 4.539E-02 | 8.828E-02 | FAIL ABUN |
| TM-171 | 2.937E+00 | 4.187E+00 | 8.067E+00 | NOT IDENT. |
| LU-176 | 5.302E-03 | 2.527E-02 | 5.002E-02 | FAIL ABUN |
| HF-181 | 1.325E-02 | 1.642E-01 | 3.216E-01 | NOT IDENT. |
| TA-182 | -9.521E-02 | 2.852E-01 | 5.288E-01 | FAIL ABUN |
| RE-183 | -7.837E-03 | 1.290E-01 | 2.246E-01 | NOT IDENT. |
| RE-184 | -7.818E-02 | 6.556E-01 | 1.288E+00 | NOT IDENT. |
| W-188 | 3.547E+00 | 1.450E+01 | 2.497E+01 | NOT IDENT. |
| IR-192 | -3.719E-02 | 5.966E-02 | 1.072E-01 | NOT IDENT. |
| BI-207 | -3.421E-02 | 4.842E-02 | 8.888E-02 | NOT IDENT. |
| PB-211 | 1.379E-01 | 7.205E-01 | 1.421E+00 | NOT IDENT. |
| BI-212 | 4.425E-02 | 4.575E-01 | 9.572E-01 | NOT IDENT. |
| PB-212 | 2.804E-02 | 7.871E-02 | 1.086E-01 | FAIL ABUN |
| BI-214 | 5.141E-02 | 1.124E-01 | 1.837E-01 | FAIL ABUN |
| PB-214 | 8.078E-02 | 1.035E-01 | 1.680E-01 | FAIL ABUN |
| RN-219 | -1.144E-01 | 4.188E-01 | 7.743E-01 | NOT IDENT. |
| RN-222 | 5.141E-02 | 1.124E-01 | 1.837E-01 | FAIL ABUN |
| RA-223 | -2.219E-01 | 5.492E-01 | 1.016E+00 | NOT IDENT. |
| RA-224 | 4.747E-01 | 5.290E-01 | 1.003E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 5.141E-02 | 1.124E-01 | 1.837E-01 | FAIL ABUN |
| AC-227 | -1.164E-01 | 2.183E-01 | 3.677E-01 | NOT IDENT. |
| TH-227 | -1.164E-01 | 2.183E-01 | 3.677E-01 | NOT IDENT. |
| AC-228 | 3.319E-02 | 1.574E-01 | 3.373E-01 | NOT IDENT. |
| RA-228 | 3.319E-02 | 1.574E-01 | 3.373E-01 | NOT IDENT. |
| TH-228 | 2.804E-02 | 7.871E-02 | 1.086E-01 | FAIL ABUN |
| TH-229 | -1.682E-01 | 3.723E-01 | 6.500E-01 | FAIL ABUN |
| TH-230 | 5.140E-02 | 1.123E-01 | 1.836E-01 | FAIL ABUN |
| PA-231 | -2.292E-01 | 1.250E+00 | 2.222E+00 | NOT IDENT. |
| TH-231 | -2.219E-01 | 5.492E-01 | 1.016E+00 | NOT IDENT. |
| TH-232 | 3.319E-02 | 1.574E-01 | 3.373E-01 | NOT IDENT. |
| PA-233 | -1.188E-02 | 5.377E-02 | 1.025E-01 | NOT IDENT. |
| PA-234 | 1.579E-01 | 2.209E-01 | 5.627E-01 | NOT IDENT. |
| PA-234M | 5.697E-01 | 3.936E+00 | 8.496E+00 | NOT IDENT. |
| TH-234 | -2.416E-01 | 5.830E-01 | 1.062E+00 | FAIL ABUN |
| U-234 | 5.140E-02 | 1.123E-01 | 1.836E-01 | FAIL ABUN |
| U-235 | -9.834E-02 | 1.451E-01 | 2.581E-01 | FAIL ABUN |
| NP-237 | -1.188E-02 | 5.377E-02 | 1.025E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.779E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -2.416E-01 | 5.830E-01 | 1.062E+00 | FAIL ABUN |
| NP-239 | -2.374E-01 | 2.729E-01 | 4.655E-01 | FAIL ABUN |
| PU-239 | 4.674E+01 | 2.401E+02 | 4.595E+02 | NOT IDENT. |
| AM-241 | -2.037E-02 | 4.812E-02 | 7.946E-02 | NOT IDENT. |
| AM-243 | -2.114E-02 | 2.505E-02 | 4.474E-02 | NOT IDENT. |
| CM-243 | -1.531E-02 | 8.007E-02 | 1.321E-01 | FAIL ABUN |
| CM-247 | 2.111E-03 | 3.675E-02 | 7.147E-02 | FAIL ABUN |
| CF-249 | -2.101E-02 | 3.453E-02 | 6.121E-02 | NOT IDENT. |
| CF-251 | 3.022E-02 | 1.022E-01 | 1.793E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:29:59.91

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.75 | 42 | 70 | 0.82 | 93.33 | 88 | 10 | 1.18E-02 | 39.9 | |
| 2 | 0 | 63.77 | 28 | 55 | 0.75 | 127.39 | 124 | 8 | 7.70E-03 | 49.9 | |
| 3 | 0 | 92.98 | 56 | 32 | 1.18 | 185.81 | 182 | 8 | 1.57E-02 | 21.9 | |
| 4 | 0 | 99.97 | 8 | 28 | 0.81 | 199.81 | 197 | 6 | 2.15E-03 | 116.5 | |
| 5 | 0 | 175.18 | 8 | 23 | 1.21 | 350.25 | 346 | 7 | 2.16E-03 | 108.0 | |
| 6 | 0 | 185.91 | 18 | 24 | 1.40 | 371.71 | 369 | 7 | 4.93E-03 | 51.0 | |
| 7 | 0 | 202.16 | 13 | 40 | 1.10 | 404.23 | 398 | 10 | 3.61E-03 | 95.1 | |
| 8 | 0 | 209.50 | 10 | 17 | 1.36 | 418.91 | 416 | 5 | 2.72E-03 | 72.6 | |
| 9 | 0 | 238.83 | 24 | 33 | 0.73 | 477.58 | 473 | 10 | 6.70E-03 | 48.7 | |
| 10 | 0 | 279.14 | 4 | 16 | 0.56 | 558.23 | 553 | 7 | 1.07E-03 | 184.8 | |
| 11 | 0 | 297.73 | 37 | 28 | 5.82 | 595.42 | 584 | 19 | 1.02E-02 | 38.7 | |
| 12 | 0 | 352.25 | 22 | 18 | 0.91 | 704.50 | 700 | 10 | 6.20E-03 | 41.0 | |
| 13 | 0 | 470.53 | 8 | 1 | 0.70 | 941.14 | 938 | 6 | 2.11E-03 | 44.1 | |
| 14 | 0 | 510.80 | 66 | 23 | 1.51 | 1021.70 | 1013 | 16 | 1.83E-02 | 20.7 | |
| 15 | 0 | 582.92 | 10 | 8 | 0.76 | 1166.00 | 1161 | 10 | 2.88E-03 | 58.5 | |
| 16 | 0 | 609.50 | 15 | 12 | 0.93 | 1219.18 | 1214 | 10 | 4.09E-03 | 51.8 | |
| 17 | 0 | 668.50 | 8 | 5 | 3.82 | 1337.25 | 1331 | 10 | 2.31E-03 | 60.8 | |
| 18 | 0 | 692.60 | 15 | 0 | 1.50 | 1385.47 | 1380 | 11 | 4.17E-03 | 25.8 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:02.16

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| HG-203 | 70.83 | ------ | 3.69 | 6.312E+00 | ------ | Line Not Found | ------ |
| | 72.87 | ------ | 6.19 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 279.20 | 4 | 81.56* | 3.638E+00 | 7.768E-03 | 3.200E-02 | 369.62 |
| TL-208 | 277.37 | ------ | 6.60 | 3.657E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 2 | 85.00* | 1.910E+00 | 6.872E-03 | 6.872E-03 | 675.94 |
| | 860.56 | ------ | 12.50 | 1.352E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 3 | 4.25* | 4.676E+00 | 7.591E-02 | 7.653E-02 | 1376.39 |
| BI-211 | 72.87 | ------ | 1.23 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 14 | 12.92* | 2.986E+00 | 2.226E-01 | 2.226E-01 | 130.74 |
| ANH-511 | 511.00 | 4 | 100.00* | 2.149E+00 | 1.241E-02 | 1.241E-02 | 629.65 |

Flag: "*" = Keyline

Sample ID : G341146011 Acquisition date : 10-FEB-2014 13:25:46

Total number of lines in spectrum 16
Number of unidentified lines 2
Number of lines tentatively identified by NID 14 87.50%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| HG-203 | 46.59D | 4.12 | 7.768E-03 | 3.200E-02 | 11.83E-02 | 369.62 | |
| TL-208 | 1.41E+10Y | 1.00 | 6.872E-03 | 6.872E-03 | 46.45E-03 | 675.94 | |
| PB-210 | 22.20Y | 1.01 | 7.591E-02 | 7.653E-02 | 105.3E-02 | 1376.39 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.226E-01 | 2.226E-01 | 2.910E-01 | 130.74 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.241E-02 | 1.241E-02 | 7.816E-02 | 629.65 | |
| | Total Activity : | | 3.255E-01 | 3.504E-01 | | | |

Grand Total Activity : 3.255E-01 3.504E-01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146011 Acquisition date : 10-FEB-2014 13:25:46

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.98 | 10 | 32 | 1.18 | 185.81 | 182 | 8 | 2.84E-03 | **** | 6.54E+00 | T |
| 0 | 99.97 | 8 | 28 | 0.81 | 199.81 | 197 | 6 | 2.15E-03 | **** | 6.50E+00 | T |
| 0 | 175.18 | 8 | 23 | 1.21 | 350.25 | 346 | 7 | 2.16E-03 | **** | 5.14E+00 | T |
| 0 | 202.16 | 13 | 40 | 1.10 | 404.23 | 398 | 10 | 3.61E-03 | **** | 4.67E+00 | T |
| 0 | 209.50 | 10 | 17 | 1.36 | 418.91 | 416 | 5 | 2.72E-03 | **** | 4.55E+00 | T |
| 0 | 238.83 | 8 | 33 | 0.73 | 477.58 | 473 | 10 | 2.34E-03 | **** | 4.12E+00 | T |
| 0 | 297.73 | 37 | 28 | 5.82 | 595.42 | 584 | 19 | 1.02E-02 | 77.4 | 3.45E+00 | T |
| 0 | 470.53 | 8 | 1 | 0.70 | 941.14 | 938 | 6 | 2.11E-03 | 88.1 | 2.31E+00 | |
| 0 | 609.50 | 7 | 12 | 0.93 | 1219.18 | 1214 | 10 | 1.99E-03 | **** | 1.84E+00 | T |
| 0 | 668.50 | 8 | 5 | 3.82 | 1337.25 | 1331 | 10 | 2.31E-03 | **** | 1.69E+00 | T |
| 0 | 692.60 | 15 | 0 | 1.50 | 1385.47 | 1380 | 11 | 4.17E-03 | 51.6 | 1.64E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:14.56

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146011.CNF;1    *
* Acquisition date : 10-FEB-2014 13:25:46 Sensitivity     : 3.000            *
* Detector ID      : GAM17                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:04.06     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:22:00 Nuclide Library : SOLID            *
* Sample ID        : G341146011           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.2539E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8          *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| HG-203 | 8.411E-02 |
| TL-208 | 3.163E-02 |
| PB-210 | 3.866E-01 |
| BI-211 | 1.630E-01 |
| ANH-511 | 2.618E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 8.176E-01 | NOT IDENT. |
| NA-22 | 2.763E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.018E-02 | NOT IDENT. |
| K-40 | 3.571E-01 | NOT IDENT. |
| SC-46 | 5.212E-02 | NOT IDENT. |
| V-48 | 1.766E+00 | NOT IDENT. |
| CR-51 | 2.203E+00 | NOT IDENT. |
| MN-54 | 3.992E-02 | NOT IDENT. |
| CO-56 | 7.644E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.744E-02 | NOT IDENT. |
| CO-58 | 5.709E-02 | NOT IDENT. |
| FE-59 | 2.894E-01 | NOT IDENT. |
| CO-60 | 2.233E-02 | NOT IDENT. |
| ZN-65 | 8.815E-02 | NOT IDENT. |
| GE-68 | 1.351E+00 | NOT IDENT. |
| AS-73 | 3.342E-01 | NOT IDENT. |
| AS-74 | 1.966E+00 | NOT IDENT. |
| SE-75 | 5.617E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.343E+00 | NOT IDENT. |
| RB-83 | 1.207E-01 | NOT IDENT. |
| KR-85 | 6.158E+00 | NOT IDENT. |
| SR-85 | 7.563E-02 | NOT IDENT. |
| RB-86 | 1.412E+01 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 6.440E-02 | NOT IDENT. |
| Y-91 | 3.293E+01 | NOT IDENT. |
| NB-94 | 2.350E-02 | NOT IDENT. |
| NB-95 | 8.489E-02 | NOT IDENT. |
| NB-95M | 1.723E-01 | NOT IDENT. |
| ZR-95 | 1.637E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.676E-02 | NOT IDENT. |
| RH-102 | 2.800E-02 | NOT IDENT. |
| RU-103 | 1.472E-01 | FAIL ABUN |
| RH-106 | 3.542E-01 | NOT IDENT. |
| RU-106 | 3.542E-01 | NOT IDENT. |
| AG-108M | 1.868E-02 | NOT IDENT. |
| CD-109 | 3.778E-01 | NOT IDENT. |
| AG-110M | 2.055E-02 | NOT IDENT. |
| SN-113 | 5.968E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.012E+00 | NOT IDENT. |
| TE-123M | 2.987E-02 | NOT IDENT. |
| SB-124 | 2.050E-01 | NOT IDENT. |
| SB-125 | 7.005E-02 | FAIL ABUN |
| TE-125M | 1.551E+01 | NOT IDENT. |
| I-126 | 1.279E+01 | NOT IDENT. |
| SB-126 | 1.203E+01 | NOT IDENT. |
| SN-126 | 3.456E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.334E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.333E-02 | NOT IDENT. |
| CS-135 | 1.077E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 6.088E+00 | FAIL ABUN |
| BA-137M | 3.526E-02 | NOT IDENT. |
| CS-137 | 3.725E-02 | NOT IDENT. |
| CE-139 | 2.568E-02 | NOT IDENT. |
| BA-140 | 5.717E+00 | NOT IDENT. |
| LA-140 | 5.717E+00 | NOT IDENT. |
| CE-141 | 1.829E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.553E-01 | NOT IDENT. |
| PM-144 | 3.085E-02 | NOT IDENT. |
| PR-144 | 2.408E+00 | NOT IDENT. |
| PM-146 | 3.057E-02 | NOT IDENT. |
| ND-147 | 7.987E+01 | NOT IDENT. |
| PM-147 | 4.428E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.858E-02 | FAIL ABUN |
| EU-152 | 8.412E-02 | NOT IDENT. |
| GD-153 | 5.378E-02 | NOT IDENT. |
| EU-154 | 7.520E-02 | NOT IDENT. |
| EU-155 | 6.541E-02 | NOT IDENT. |
| TB-160 | 3.010E-01 | FAIL ABUN |
| HO-166M | 3.478E-02 | FAIL ABUN |
| TM-171 | 3.675E+00 | NOT IDENT. |
| LU-176 | 2.244E-02 | FAIL ABUN |
| HF-181 | 1.398E-01 | NOT IDENT. |
| TA-182 | 2.106E-01 | FAIL ABUN |
| RE-183 | 1.017E-01 | NOT IDENT. |
| RE-184 | 5.385E-01 | NOT IDENT. |
| W-188 | 1.102E+01 | NOT IDENT. |
| IR-192 | 4.629E-02 | NOT IDENT. |
| BI-207 | 3.471E-02 | NOT IDENT. |
| PB-211 | 6.296E-01 | NOT IDENT. |
| BI-212 | 4.013E-01 | NOT IDENT. |
| PB-212 | 4.983E-02 | FAIL ABUN |
| BI-214 | 8.216E-02 | FAIL ABUN |
| PB-214 | 7.641E-02 | FAIL ABUN |
| RN-219 | 3.412E-01 | NOT IDENT. |
| RN-222 | 8.216E-02 | FAIL ABUN |
| RA-223 | 4.447E-01 | NOT IDENT. |
| RA-224 | 4.534E-01 | NOT IDENT. |
| RA-226 | 8.216E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.620E-01 | NOT IDENT. |
| TH-227 | 1.620E-01 | NOT IDENT. |
| AC-228 | 1.443E-01 | NOT IDENT. |
| RA-228 | 1.443E-01 | NOT IDENT. |
| TH-228 | 4.983E-02 | FAIL ABUN |
| TH-229 | 2.870E-01 | FAIL ABUN |
| TH-230 | 8.215E-02 | FAIL ABUN |
| PA-231 | 9.787E-01 | NOT IDENT. |
| TH-231 | 4.447E-01 | NOT IDENT. |
| TH-232 | 1.443E-01 | NOT IDENT. |
| PA-233 | 4.493E-02 | NOT IDENT. |
| PA-234 | 2.271E-01 | NOT IDENT. |
| PA-234M | 3.433E+00 | NOT IDENT. |
| TH-234 | 4.950E-01 | FAIL ABUN |
| U-234 | 8.215E-02 | FAIL ABUN |
| U-235 | 1.162E-01 | FAIL ABUN |
| NP-237 | 4.493E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 4.950E-01 | FAIL ABUN |
| NP-239 | 2.082E-01 | FAIL ABUN |
| PU-239 | 2.086E+02 | NOT IDENT. |
| AM-241 | 3.585E-02 | NOT IDENT. |
| AM-243 | 2.050E-02 | NOT IDENT. |
| CM-243 | 6.004E-02 | FAIL ABUN |
| CM-247 | 3.151E-02 | FAIL ABUN |
| CF-249 | 2.614E-02 | NOT IDENT. |
| CF-251 | 8.048E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:19.39

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146011.CNF;1    *
* Acquisition date : 10-FEB-2014 13:25:46 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.06     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:22:00 Nuclide Library : SOLID          *
* Sample ID        : G341146011           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.2539E+02 GRAM   *
*                                         Quantity Err(%) : 1.5950E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| HG-203 | 3.200E-02 | 1.159E-01 | 1.159E-01 |
| TL-208 | 6.872E-03 | 4.552E-02 | 4.552E-02 |
| PB-210 | 7.653E-02 | 1.032E+00 | 1.032E+00 |
| BI-211 | 2.226E-01 | 2.857E-01 | 2.857E-01 |
| ANH-511 | 1.241E-02 | 7.660E-02 | 7.660E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 4.698E-01 | 8.909E-01 | 9.157E-01 | NOT IDENT. |
| NA-22 | -8.548E-03 | 3.715E-02 | 3.735E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 6.254E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.031E-02 | 5.189E-02 | 5.210E-02 | NOT IDENT. |
| K-40 | 9.950E-02 | 3.915E-01 | 3.940E-01 | NOT IDENT. |
| SC-46 | 1.425E-03 | 6.122E-02 | 6.123E-02 | NOT IDENT. |
| V-48 | 3.023E-01 | 2.019E+00 | 2.023E+00 | NOT IDENT. |
| CR-51 | 1.038E+00 | 2.410E+00 | 2.455E+00 | NOT IDENT. |
| MN-54 | -4.960E-04 | 4.709E-02 | 4.709E-02 | NOT IDENT. |
| CO-56 | 1.689E-02 | 8.648E-02 | 8.681E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 5.243E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.280E-02 | 2.208E-02 | 2.283E-02 | NOT IDENT. |
| CO-58 | -3.470E-02 | 7.650E-02 | 7.808E-02 | NOT IDENT. |
| FE-59 | 9.316E-02 | 3.251E-01 | 3.278E-01 | NOT IDENT. |
| CO-60 | -1.772E-02 | 3.337E-02 | 3.431E-02 | NOT IDENT. |
| ZN-65 | 8.806E-03 | 1.039E-01 | 1.039E-01 | NOT IDENT. |
| GE-68 | 9.103E-01 | 1.369E+00 | 1.429E+00 | NOT IDENT. |
| AS-73 | 2.662E-02 | 4.151E-01 | 4.153E-01 | NOT IDENT. |
| AS-74 | -9.058E-02 | 2.400E+00 | 2.400E+00 | NOT IDENT. |
| SE-75 | 4.700E-02 | 6.197E-02 | 6.549E-02 | FAIL ABUN |
| BR-77 | 5.959E+10 | 2.341E+11 | 2.356E+11 | SHORT HLIF |
| SR-82 | 1.153E-01 | 2.715E+00 | 2.715E+00 | NOT IDENT. |
| RB-83 | -5.050E-02 | 1.540E-01 | 1.556E-01 | NOT IDENT. |
| KR-85 | -5.547E-02 | 8.434E+00 | 8.434E+00 | NOT IDENT. |
| SR-85 | -8.747E-04 | 1.036E-01 | 1.036E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 1.046E+01 | 1.415E+01 | 1.492E+01 | NOT IDENT. |
| Y-88 | -4.373E-03 | 7.941E-02 | 7.943E-02 | NOT IDENT. |
| Y-91 | -2.188E+00 | 4.078E+01 | 4.079E+01 | NOT IDENT. |
| NB-94 | -1.837E-02 | 3.362E-02 | 3.462E-02 | NOT IDENT. |
| NB-95 | -2.973E-02 | 1.066E-01 | 1.075E-01 | NOT IDENT. |
| NB-95M | 1.511E-01 | 2.013E-01 | 2.125E-01 | NOT IDENT. |
| ZR-95 | -5.703E-02 | 2.017E-01 | 2.034E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.717E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 4.781E+40 | 3.124E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -5.012E+09 | 6.976E+09 | 7.333E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.033E+42 | 0.000E+00 | SHORT HLIF |
| RH-101 | -2.136E-02 | 2.293E-02 | 2.487E-02 | NOT IDENT. |
| RH-102 | -7.305E-02 | 5.615E-02 | 6.509E-02 | NOT IDENT. |
| RU-103 | 6.527E-03 | 1.747E-01 | 1.747E-01 | FAIL ABUN |
| RH-106 | 1.913E-01 | 3.924E-01 | 4.018E-01 | NOT IDENT. |
| RU-106 | 1.913E-01 | 3.924E-01 | 4.018E-01 | NOT IDENT. |
| AG-108M | -2.754E-02 | 2.769E-02 | 3.034E-02 | NOT IDENT. |
| CD-109 | -3.418E-01 | 4.995E-01 | 5.228E-01 | NOT IDENT. |
| AG-110M | -5.348E-02 | 4.734E-02 | 5.312E-02 | NOT IDENT. |
| SN-113 | 3.580E-02 | 6.435E-02 | 6.634E-02 | NOT IDENT. |
| CD-115 | 4.284E+11 | 7.920E+11 | 8.152E+11 | SHORT HLIF |
| SN-117M | -4.207E-01 | 2.479E+00 | 2.486E+00 | NOT IDENT. |
| TE-123M | 8.621E-03 | 3.492E-02 | 3.514E-02 | NOT IDENT. |
| SB-124 | -2.037E-03 | 2.459E-01 | 2.459E-01 | NOT IDENT. |
| SB-125 | -2.557E-02 | 8.756E-02 | 8.831E-02 | FAIL ABUN |
| TE-125M | 1.330E+01 | 1.667E+01 | 1.772E+01 | NOT IDENT. |
| I-126 | -1.559E+00 | 1.844E+01 | 1.846E+01 | NOT IDENT. |
| SB-126 | 1.023E+01 | 1.206E+01 | 1.291E+01 | NOT IDENT. |
| SN-126 | -3.260E-02 | 4.333E-02 | 4.575E-02 | NOT IDENT. |
| SB-127 | -8.093E+04 | 2.542E+06 | 2.542E+06 | SHORT HLIF |
| I-131 | 4.896E+01 | 9.458E+01 | 9.712E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 5.985E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.231E+07 | 2.241E+07 | 2.309E+07 | SHORT HLIF |
| BA-133 | 5.117E-04 | 4.322E-02 | 4.322E-02 | NOT IDENT. |
| I-133 | 7.748E+30 | 3.956E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.416E-02 | 3.549E-02 | 3.606E-02 | NOT IDENT. |
| CS-135 | -1.072E-02 | 1.343E-01 | 1.344E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.679E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.856E-01 | 7.351E+00 | 7.352E+00 | FAIL ABUN |
| BA-137M | 2.961E-02 | 3.912E-02 | 4.133E-02 | NOT IDENT. |
| CS-137 | 3.128E-02 | 4.133E-02 | 4.366E-02 | NOT IDENT. |
| CE-139 | -1.052E-02 | 3.222E-02 | 3.256E-02 | NOT IDENT. |
| BA-140 | 3.291E-02 | 6.786E+00 | 6.786E+00 | NOT IDENT. |
| LA-140 | 3.291E-02 | 6.786E+00 | 6.786E+00 | NOT IDENT. |
| CE-141 | 3.630E-02 | 2.116E-01 | 2.122E-01 | NOT IDENT. |
| CE-143 | -1.518E+18 | 3.448E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.269E-01 | 1.684E-01 | 1.779E-01 | NOT IDENT. |
| PM-144 | 1.589E-02 | 3.749E-02 | 3.817E-02 | NOT IDENT. |
| PR-144 | 1.240E+00 | 2.925E+00 | 2.978E+00 | NOT IDENT. |
| PM-146 | 1.588E-02 | 3.286E-02 | 3.363E-02 | NOT IDENT. |
| ND-147 | -1.052E+01 | 9.680E+01 | 9.692E+01 | NOT IDENT. |
| PM-147 | -1.331E+02 | 5.365E+02 | 5.398E+02 | NOT IDENT. |
| PM-149 | 5.576E+11 | 6.241E+12 | 6.246E+12 | SHORT HLIF |
| EU-150 | -1.521E-02 | 2.394E-02 | 2.490E-02 | FAIL ABUN |
| EU-152 | 1.786E-02 | 9.554E-02 | 9.588E-02 | NOT IDENT. |
| GD-153 | -4.433E-02 | 8.391E-02 | 8.626E-02 | NOT IDENT. |
| EU-154 | -6.337E-02 | 1.155E-01 | 1.190E-01 | NOT IDENT. |
| EU-155 | 3.040E-02 | 7.305E-02 | 7.433E-02 | NOT IDENT. |
| TB-160 | 3.397E-01 | 2.840E-01 | 3.226E-01 | FAIL ABUN |
| HO-166M | -1.774E-02 | 4.543E-02 | 4.612E-02 | FAIL ABUN |
| TM-171 | 2.937E+00 | 4.196E+00 | 4.400E+00 | NOT IDENT. |
| LU-176 | 5.302E-03 | 2.527E-02 | 2.539E-02 | FAIL ABUN |
| HF-181 | 1.325E-02 | 1.642E-01 | 1.643E-01 | NOT IDENT. |
| TA-182 | -9.521E-02 | 2.853E-01 | 2.885E-01 | FAIL ABUN |
| RE-183 | -7.837E-03 | 1.290E-01 | 1.291E-01 | NOT IDENT. |
| RE-184 | -7.818E-02 | 6.557E-01 | 6.566E-01 | NOT IDENT. |
| W-188 | 3.547E+00 | 1.450E+01 | 1.459E+01 | NOT IDENT. |
| IR-192 | -3.719E-02 | 5.974E-02 | 6.204E-02 | NOT IDENT. |
| BI-207 | -3.421E-02 | 4.858E-02 | 5.097E-02 | NOT IDENT. |
| PB-211 | 1.379E-01 | 7.206E-01 | 7.233E-01 | NOT IDENT. |
| BI-212 | 4.425E-02 | 4.575E-01 | 4.580E-01 | NOT IDENT. |
| PB-212 | 2.804E-02 | 7.874E-02 | 7.975E-02 | FAIL ABUN |
| BI-214 | 5.141E-02 | 1.124E-01 | 1.148E-01 | FAIL ABUN |
| PB-214 | 8.078E-02 | 1.037E-01 | 1.099E-01 | FAIL ABUN |
| RN-219 | -1.144E-01 | 4.191E-01 | 4.222E-01 | NOT IDENT. |
| RN-222 | 5.141E-02 | 1.124E-01 | 1.148E-01 | FAIL ABUN |
| RA-223 | -2.219E-01 | 5.496E-01 | 5.586E-01 | NOT IDENT. |
| RA-224 | 4.747E-01 | 5.306E-01 | 5.721E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 5.141E-02 | 1.124E-01 | 1.148E-01 | FAIL ABUN |
| AC-227 | -1.164E-01 | 2.189E-01 | 2.251E-01 | NOT IDENT. |
| TH-227 | -1.164E-01 | 2.189E-01 | 2.251E-01 | NOT IDENT. |
| AC-228 | 3.319E-02 | 1.575E-01 | 1.582E-01 | NOT IDENT. |
| RA-228 | 3.319E-02 | 1.575E-01 | 1.582E-01 | NOT IDENT. |
| TH-228 | 2.804E-02 | 7.874E-02 | 7.975E-02 | FAIL ABUN |
| TH-229 | -1.682E-01 | 3.726E-01 | 3.802E-01 | FAIL ABUN |
| TH-230 | 5.140E-02 | 1.124E-01 | 1.148E-01 | FAIL ABUN |
| PA-231 | -2.292E-01 | 1.250E+00 | 1.254E+00 | NOT IDENT. |
| TH-231 | -2.219E-01 | 5.496E-01 | 5.586E-01 | NOT IDENT. |
| TH-232 | 3.319E-02 | 1.575E-01 | 1.582E-01 | NOT IDENT. |
| PA-233 | -1.188E-02 | 5.378E-02 | 5.405E-02 | NOT IDENT. |
| PA-234 | 1.579E-01 | 2.857E-01 | 2.944E-01 | NOT IDENT. |
| PA-234M | 5.697E-01 | 3.937E+00 | 3.945E+00 | NOT IDENT. |
| TH-234 | -2.416E-01 | 5.856E-01 | 5.956E-01 | FAIL ABUN |
| U-234 | 5.140E-02 | 1.124E-01 | 1.148E-01 | FAIL ABUN |
| U-235 | -9.834E-02 | 1.454E-01 | 1.520E-01 | FAIL ABUN |
| NP-237 | -1.188E-02 | 5.378E-02 | 5.405E-02 | NOT IDENT. |
| NP-238 | 1.915E+12 | 3.785E+12 | 3.882E+12 | SHORT HLIF |
| U-238 | -2.416E-01 | 5.856E-01 | 5.956E-01 | FAIL ABUN |
| NP-239 | -2.374E-01 | 2.742E-01 | 2.944E-01 | FAIL ABUN |
| PU-239 | 4.674E+01 | 2.401E+02 | 2.410E+02 | NOT IDENT. |
| AM-241 | -2.037E-02 | 4.815E-02 | 4.901E-02 | NOT IDENT. |
| AM-243 | -2.114E-02 | 2.511E-02 | 2.686E-02 | NOT IDENT. |
| CM-243 | -1.531E-02 | 8.009E-02 | 8.039E-02 | FAIL ABUN |
| CM-247 | 2.111E-03 | 3.676E-02 | 3.677E-02 | FAIL ABUN |
| CF-249 | -2.101E-02 | 3.460E-02 | 3.588E-02 | NOT IDENT. |
| CF-251 | 3.022E-02 | 1.023E-01 | 1.032E-01 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 17.2033 | 94.67 | 28.1893 | 193.51 | 25.0952 |
| 45.60 | 29.5336 | 94.87 | 28.2010 | 197.03 | 14.1774 |
| 46.54 | 29.6271 | 97.43 | 41.3988 | 198.01 | 17.3486 |
| 49.72 | 0.0000 | 98.43 | 40.5807 | 201.83 | 24.2950 |
| 51.35 | 36.1105 | 98.44 | 40.5817 | 205.31 | 38.1852 |
| 52.39 | 24.1518 | 99.53 | 28.0174 | 210.85 | 25.6230 |
| 53.44 | 32.7102 | 100.11 | 36.1934 | 215.65 | 25.7651 |
| 57.36 | 0.0000 | 103.18 | 36.8681 | 222.11 | 25.9541 |
| 57.53 | 36.7905 | 103.37 | 36.8817 | 227.09 | 29.3601 |
| 57.98 | 31.9265 | 105.21 | 26.5034 | 227.38 | 27.1940 |
| 59.32 | 35.7475 | 105.31 | 26.5084 | 228.16 | 0.0000 |
| 59.54 | 35.7699 | 106.12 | 33.8738 | 228.18 | 34.8389 |
| 63.29 | 37.3916 | 109.28 | 24.8669 | 235.69 | 11.5249 |
| 63.58 | 31.1842 | 111.00 | 36.9580 | 235.96 | 18.1157 |
| 64.28 | 34.9927 | 111.76 | 0.0000 | 238.63 | 22.0209 |
| 66.73 | 44.4468 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 39.4676 | 117.23 | 33.6407 | 240.99 | 16.5569 |
| 67.75 | 36.9977 | 121.12 | 31.0493 | 242.00 | 16.5746 |
| 69.67 | 25.3511 | 121.22 | 31.0547 | 244.70 | 25.4859 |
| 70.83 | 36.4437 | 121.78 | 36.7367 | 252.40 | 0.0000 |
| 72.81 | 43.4388 | 122.06 | 35.8121 | 252.80 | 15.6428 |
| 72.87 | 43.4453 | 123.07 | 23.6017 | 254.15 | 0.0000 |
| 74.66 | 46.2038 | 127.23 | 36.1291 | 256.23 | 25.7880 |
| 74.82 | 46.2217 | 129.30 | 29.5759 | 260.90 | 0.0000 |
| 74.97 | 46.2387 | 131.20 | 36.3687 | 264.66 | 16.9595 |
| 77.11 | 40.4528 | 133.02 | 19.1984 | 268.22 | 22.6912 |
| 79.69 | 44.1633 | 133.52 | 23.0569 | 269.46 | 20.4467 |
| 80.12 | 45.0744 | 136.00 | 26.0431 | 271.23 | 19.3439 |
| 80.19 | 0.0000 | 136.47 | 25.0973 | 273.65 | 23.9510 |
| 80.57 | 39.0475 | 140.51 | 0.0000 | 276.40 | 17.1527 |
| 81.00 | 38.2176 | 143.76 | 27.3386 | 277.37 | 24.0356 |
| 81.07 | 39.9613 | 144.24 | 30.2901 | 277.60 | 27.4751 |
| 83.79 | 41.0839 | 145.44 | 20.5569 | 278.00 | 28.6311 |
| 85.43 | 36.8483 | 152.43 | 24.7307 | 279.20 | 18.9177 |
| 86.55 | 34.3011 | 153.25 | 25.7511 | 279.54 | 18.9237 |
| 86.79 | 36.9589 | 154.21 | 27.7710 | 280.46 | 18.9402 |
| 86.94 | 36.9713 | 156.02 | 22.8720 | 283.69 | 20.7246 |
| 87.09 | 44.9085 | 158.56 | 27.9467 | 284.31 | 0.0000 |
| 87.57 | 49.3632 | 159.00 | 24.9680 | 285.41 | 17.2980 |
| 88.03 | 44.4714 | 162.33 | 32.1107 | 285.90 | 0.0000 |
| 88.34 | 44.5014 | 163.33 | 25.1218 | 287.50 | 17.3312 |
| 88.47 | 44.5140 | 165.86 | 28.2358 | 290.67 | 15.6437 |
| 89.96 | 37.2144 | 176.31 | 29.1506 | 293.27 | 0.0000 |
| 91.11 | 25.3148 | 176.60 | 29.1619 | 295.22 | 19.7808 |
| 92.59 | 40.0960 | 177.52 | 21.5138 | 295.96 | 19.7939 |
| 93.35 | 40.1598 | 181.07 | 0.0000 | 298.58 | 22.7583 |
| 94.56 | 28.1829 | 184.41 | 21.7077 | 299.98 | 26.6431 |
| 94.65 | 28.1881 | 185.72 | 33.1341 | 300.09 | 30.8526 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 30.8537 | 497.08 | 15.1643 | 711.68 | 7.2285 |
| 301.36 | 18.2517 | 505.52 | 9.7541 | 720.70 | 5.4432 |
| 302.85 | 15.4642 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 24.6380 | 511.00 | 16.3093 | 722.78 | 10.8964 |
| 306.78 | 22.9242 | 514.00 | 16.3379 | 722.91 | 10.8970 |
| 308.46 | 14.1277 | 514.00 | 16.3379 | 723.31 | 10.8990 |
| 311.90 | 19.4836 | 520.40 | 18.4488 | 724.19 | 9.0859 |
| 316.51 | 20.4503 | 520.69 | 0.0000 | 727.33 | 6.3690 |
| 319.41 | 16.9355 | 522.65 | 0.0000 | 733.00 | 10.0335 |
| 320.08 | 16.9451 | 527.90 | 0.0000 | 735.93 | 8.2198 |
| 321.04 | 16.9590 | 529.59 | 12.3644 | 737.46 | 7.3113 |
| 323.87 | 21.4728 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 20.6016 | 531.02 | 13.4055 | 747.24 | 3.6712 |
| 328.76 | 9.8820 | 546.56 | 0.0000 | 748.06 | 4.5906 |
| 333.37 | 25.2502 | 552.55 | 9.3933 | 752.31 | 14.7168 |
| 333.97 | 23.4582 | 563.25 | 10.4984 | 753.82 | 2.7612 |
| 334.37 | 24.3682 | 569.33 | 5.2664 | 756.73 | 14.7445 |
| 338.28 | 21.7299 | 569.50 | 5.2669 | 756.80 | 14.7449 |
| 338.32 | 21.7306 | 569.70 | 5.2675 | 763.94 | 15.7142 |
| 340.48 | 25.3968 | 583.19 | 13.5820 | 765.81 | 12.0263 |
| 340.55 | 25.3981 | 584.27 | 8.4934 | 766.42 | 12.9548 |
| 344.28 | 20.9255 | 595.83 | 14.9536 | 766.84 | 8.3296 |
| 345.93 | 21.8643 | 600.60 | 10.7077 | 772.60 | 0.0000 |
| 351.06 | 20.4897 | 602.52 | 0.0000 | 776.52 | 7.4342 |
| 351.93 | 22.8836 | 602.73 | 14.7008 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 6.8674 | 778.90 | 10.2322 |
| 356.01 | 16.1616 | 609.32 | 11.8312 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 6.8871 | 785.37 | 11.1923 |
| 366.42 | 0.0000 | 614.28 | 8.6262 | 792.07 | 10.2881 |
| 375.05 | 10.2492 | 618.01 | 10.8029 | 794.95 | 6.5546 |
| 383.85 | 12.1921 | 620.36 | 6.4894 | 795.86 | 4.6836 |
| 388.16 | 17.8757 | 621.93 | 9.7419 | 801.95 | 12.2078 |
| 388.63 | 18.8229 | 630.19 | 0.0000 | 810.29 | 11.3068 |
| 391.69 | 12.2621 | 631.29 | 15.2249 | 810.45 | 10.3654 |
| 400.66 | 18.9865 | 633.25 | 8.7083 | 810.76 | 8.4817 |
| 401.81 | 21.8524 | 634.78 | 8.7148 | 815.77 | 8.4988 |
| 402.40 | 18.0595 | 635.95 | 8.7200 | 818.51 | 2.8361 |
| 404.85 | 18.0908 | 636.99 | 0.0000 | 832.01 | 6.6531 |
| 410.95 | 13.3873 | 645.85 | 12.0480 | 834.85 | 10.4664 |
| 413.71 | 15.3291 | 657.76 | 13.2188 | 835.71 | 9.5183 |
| 414.70 | 16.2983 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 12.5697 | 661.66 | 7.3576 | 846.75 | 0.0000 |
| 427.87 | 15.4785 | 664.57 | 0.0000 | 846.77 | 8.6036 |
| 433.94 | 19.4272 | 666.33 | 10.6184 | 856.80 | 8.6370 |
| 439.40 | 17.5482 | 666.50 | 17.6987 | 860.56 | 5.7664 |
| 453.88 | 6.8891 | 667.71 | 0.0000 | 871.09 | 6.7544 |
| 463.37 | 6.9310 | 677.62 | 7.7838 | 873.19 | 5.7942 |
| 468.07 | 12.7115 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 12.5545 | 879.38 | 2.9038 |
| 475.06 | 7.9796 | 696.49 | 5.3842 | 880.51 | 3.8734 |
| 476.78 | 12.9806 | 696.51 | 5.3842 | 883.24 | 8.7242 |
| 477.60 | 10.9893 | 697.00 | 1.7951 | 884.68 | 7.7590 |
| 482.18 | 14.0258 | 697.49 | 7.8556 | 889.28 | 4.8578 |
| 487.02 | 13.0627 | 702.65 | 12.3733 | 894.76 | 8.7618 |
| 492.35 | 0.0000 | 706.68 | 6.3106 | 898.04 | 8.7726 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 9.7661 | 1312.11 | 7.4004 | | |
| 911.20 | 5.8768 | 1332.49 | 4.6505 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 7.8793 | 1365.19 | 4.6906 | | |
| 937.49 | 10.8770 | 1368.63 | 0.0000 | | |
| 944.13 | 4.9558 | 1384.29 | 0.9427 | | |
| 946.00 | 1.9836 | 1408.01 | 4.7424 | | |
| 949.00 | 2.9786 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 3.8442 | | |
| 962.31 | 3.9900 | 1489.16 | 4.8385 | | |
| 964.08 | 7.9852 | 1505.03 | 4.8570 | | |
| 966.17 | 7.9910 | 1596.21 | 2.9768 | | |
| 968.97 | 3.9993 | 1620.50 | 2.9932 | | |
| 983.53 | 5.0244 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.0400 | | |
| 996.26 | 7.0648 | 1750.46 | 0.0000 | | |
| 1001.03 | 5.0544 | 1764.49 | 6.1758 | | |
| 1004.73 | 6.0729 | 1770.23 | 1.0305 | | |
| 1021.30 | 0.0000 | 1771.35 | 1.0308 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 5.1935 | | |
| 1037.84 | 7.1634 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.1334 | | |
| 1046.59 | 7.1839 | | | | |
| 1048.07 | 7.1876 | | | | |
| 1049.04 | 4.1084 | | | | |
| 1050.41 | 5.1379 | | | | |
| 1063.66 | 6.1919 | | | | |
| 1077.00 | 3.1091 | | | | |
| 1077.34 | 3.1094 | | | | |
| 1085.87 | 5.1965 | | | | |
| 1099.45 | 6.2625 | | | | |
| 1112.07 | 7.3350 | | | | |
| 1112.84 | 7.3367 | | | | |
| 1115.54 | 6.2938 | | | | |
| 1120.29 | 6.3029 | | | | |
| 1120.55 | 6.3035 | | | | |
| 1121.30 | 7.3558 | | | | |
| 1129.67 | 5.2676 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.4046 | | | | |
| 1177.95 | 3.2067 | | | | |
| 1189.05 | 3.2172 | | | | |
| 1204.77 | 4.3092 | | | | |
| 1221.41 | 7.5773 | | | | |
| 1231.02 | 5.4272 | | | | |
| 1235.36 | 3.2603 | | | | |
| 1238.28 | 6.5262 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.3918 | | | | |
| 1274.44 | 6.5924 | | | | |
| 1274.54 | 4.3949 | | | | |
| 1291.59 | 7.3594 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:46.62

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146012.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM19.CNF;420
                                        Background date  : 9-FEB-2014 11:21:52.
Sample date      : 7-NOV-2013 10:26:00. Acquisition date : 10-FEB-2014 13:26:14
Sample ID        : G341146012           Sample quantity  : 1.06430E+02 GRAM
Detector name    : GAM19                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.37  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 71.98 | 27 | 35 | 1.89 | 144.89 | 142 | 8 | 7.37E-03 | 43.0 | |
| 2 | 0 | 92.73* | 18 | 57 | 1.38 | 186.39 | 179 | 12 | 5.10E-03 | 94.6 | |
| 3 | 0 | 96.19 | 15 | 36 | 0.61 | 193.31 | 191 | 7 | 4.12E-03 | 70.4 | |
| 4 | 0 | 113.74 | 16 | 38 | 1.31 | 228.42 | 221 | 9 | 4.56E-03 | 72.2 | |
| 5 | 0 | 143.89* | 40 | 75 | 4.96 | 288.71 | 279 | 19 | 1.11E-02 | 55.3 | |
| 6 | 1 | 190.89 | 19 | 43 | 1.53 | 382.72 | 369 | 27 | 5.16E-03 | 66.5 | 4.03E+00 |
| 7 | 1 | 193.39 | 24 | 36 | 1.53 | 387.72 | 369 | 27 | 6.65E-03 | 53.9 | |
| 8 | 4 | 218.59 | 14 | 11 | 1.19 | 438.14 | 437 | 24 | 3.90E-03 | 37.6 | 1.87E+00 |
| 9 | 4 | 221.68* | 9 | 42 | 2.08 | 444.32 | 437 | 24 | 2.58E-03 | 156.3 | |
| 10 | 0 | 295.36 | 19 | 31 | 0.91 | 591.70 | 587 | 11 | 5.38E-03 | 59.6 | |
| 11 | 0 | 353.02* | 2 | 48 | 1.58 | 707.02 | 698 | 12 | 5.29E-04 | 770.4 | |
| 12 | 0 | 689.29 | 20 | 3 | 1.94 | 1379.67 | 1373 | 12 | 5.54E-03 | 28.4 | |
| 13 | 0 | 723.10* | 8 | 3 | 1.32 | 1447.29 | 1444 | 6 | 2.26E-03 | 59.9 | |
| 14 | 0 | 768.13 | 8 | 10 | 1.90 | 1537.38 | 1530 | 10 | 2.22E-03 | 82.0 | |
| 15 | 0 | 826.32 | 9 | 6 | 0.90 | 1653.77 | 1648 | 8 | 2.47E-03 | 58.4 | |
| 16 | 7 | 872.96 | 11 | 4 | 2.44 | 1747.07 | 1744 | 12 | 3.15E-03 | 37.6 | 8.45E-01 |
| 17 | 7 | 876.10 | 10 | 3 | 1.33 | 1753.35 | 1744 | 12 | 2.74E-03 | 38.7 | |
| 18 | 0 | 911.58* | 4 | 3 | 0.52 | 1824.32 | 1820 | 7 | 1.13E-03 | 109.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:30:48

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146012.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:26:00 | Acquisition date | : 10-FEB-2014 13:26:14 |
| Sample ID | : G341146012 | Sample quantity | : 106.43 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA19 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.37 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:48.88

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146012.CNF;1    *
* Acquisition date : 10-FEB-2014 13:26:14 Sensitivity     : 3.000            *
* Detector ID      : GAM19                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:26:00 Nuclide Library : SOLID            *
* Sample ID        : G341146012           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.0643E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 12-JUN-2013 07:52:05 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_500MLMB.CNF;9          *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 5.615E-01 | 1.118E+00 | 2.220E+00 | NOT IDENT. |
| NA-22 | 8.515E-03 | 3.498E-02 | 7.785E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.038E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.100E-03 | 3.449E-02 | 8.371E-02 | NOT IDENT. |
| K-40 | 1.152E-01 | 3.726E-01 | 8.802E-01 | NOT IDENT. |
| SC-46 | -3.745E-02 | 7.359E-02 | 1.340E-01 | NOT IDENT. |
| V-48 | 3.670E-01 | 2.430E+00 | 4.941E+00 | NOT IDENT. |
| CR-51 | -2.999E+00 | 3.358E+00 | 5.744E+00 | NOT IDENT. |
| MN-54 | 1.027E-02 | 5.459E-02 | 1.056E-01 | NOT IDENT. |
| CO-56 | -4.180E-02 | 1.087E-01 | 1.985E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 4.259E-03 | 3.601E-02 | 6.616E-02 | NOT IDENT. |
| CO-58 | 1.540E-03 | 8.644E-02 | 1.731E-01 | NOT IDENT. |
| FE-59 | 1.439E-01 | 2.449E-01 | 5.725E-01 | NOT IDENT. |
| CO-60 | 6.653E-03 | 4.171E-02 | 8.743E-02 | NOT IDENT. |
| ZN-65 | -6.308E-02 | 1.089E-01 | 1.913E-01 | NOT IDENT. |
| GE-68 | -1.752E-01 | 9.323E-01 | 1.943E+00 | NOT IDENT. |
| AS-73 | -3.752E-01 | 2.066E+00 | 3.818E+00 | NOT IDENT. |
| AS-74 | -9.211E-01 | 2.699E+00 | 4.795E+00 | NOT IDENT. |
| SE-75 | 1.047E-01 | 9.137E-02 | 1.799E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.486E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -2.303E+00 | 3.287E+00 | 5.414E+00 | NOT IDENT. |
| RB-83 | -6.486E-02 | 1.365E-01 | 2.422E-01 | NOT IDENT. |
| KR-85 | -1.839E-01 | 1.133E+01 | 2.058E+01 | NOT IDENT. |
| SR-85 | -2.863E-03 | 1.392E-01 | 2.528E-01 | NOT IDENT. |
| RB-86 | -1.760E+00 | 9.367E+00 | 1.953E+01 | NOT IDENT. |
| Y-88 | 5.651E-04 | 6.264E-02 | 1.414E-01 | NOT IDENT. |
| Y-91 | 2.456E+01 | 3.754E+01 | 9.047E+01 | NOT IDENT. |
| NB-94 | 3.330E-03 | 3.794E-02 | 7.214E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | 3.154E-02 | 1.325E-01 | 2.241E-01 | NOT IDENT. |
| NB-95M | -3.329E-01 | 3.443E-01 | 5.540E-01 | NOT IDENT. |
| ZR-95 | 6.230E-02 | 1.679E-01 | 3.442E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 4.342E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 9.094E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.157E-02 | 3.524E-02 | 6.618E-02 | NOT IDENT. |
| RH-102 | -2.562E-02 | 5.873E-02 | 1.040E-01 | FAIL ABUN |
| RU-103 | -1.259E-01 | 1.860E-01 | 3.187E-01 | NOT IDENT. |
| RH-106 | -2.019E-02 | 4.325E-01 | 8.072E-01 | NOT IDENT. |
| RU-106 | -2.019E-02 | 4.325E-01 | 8.072E-01 | NOT IDENT. |
| AG-108M | -8.860E-03 | 3.707E-02 | 6.862E-02 | FAIL ABUN |
| CD-109 | -1.236E-01 | 9.855E-01 | 1.575E+00 | NOT IDENT. |
| AG-110M | -5.440E-04 | 6.065E-02 | 1.217E-01 | NOT IDENT. |
| SN-113 | 3.706E-02 | 9.616E-02 | 1.856E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 9.751E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 9.030E-01 | 3.604E+00 | 6.657E+00 | NOT IDENT. |
| TE-123M | -2.912E-02 | 5.289E-02 | 9.063E-02 | NOT IDENT. |
| SB-124 | 3.132E-03 | 1.604E-01 | 3.872E-01 | FAIL ABUN |
| SB-125 | 8.839E-02 | 1.107E-01 | 2.279E-01 | NOT IDENT. |
| TE-125M | -2.417E+01 | 3.353E+01 | 4.904E+01 | NOT IDENT. |
| I-126 | 8.059E-02 | 1.825E+01 | 3.434E+01 | NOT IDENT. |
| SB-126 | -3.370E+00 | 1.960E+01 | 3.014E+01 | NOT IDENT. |
| SN-126 | -1.596E-02 | 8.795E-02 | 1.394E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 3.210E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.404E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.234E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 3.113E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -3.256E-02 | 6.261E-02 | 9.407E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 4.762E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.134E-03 | 4.415E-02 | 9.057E-02 | NOT IDENT. |
| CS-135 | -1.459E-01 | 1.939E-01 | 3.171E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.409E+00 | 5.357E+00 | 1.241E+01 | NOT IDENT. |
| BA-137M | -1.367E-02 | 3.838E-02 | 6.850E-02 | NOT IDENT. |
| CS-137 | -1.444E-02 | 4.055E-02 | 7.236E-02 | NOT IDENT. |
| CE-139 | -1.272E-03 | 5.091E-02 | 9.154E-02 | NOT IDENT. |
| BA-140 | -3.072E+00 | 3.926E+00 | 5.758E+00 | NOT IDENT. |
| LA-140 | -3.072E+00 | 3.926E+00 | 5.758E+00 | NOT IDENT. |
| CE-141 | 2.198E-01 | 3.546E-01 | 6.816E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 5.090E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 9.714E-03 | 2.796E-01 | 5.079E-01 | NOT IDENT. |
| PM-144 | -4.650E-02 | 4.732E-02 | 7.094E-02 | NOT IDENT. |
| PR-144 | -3.617E+00 | 3.695E+00 | 5.544E+00 | NOT IDENT. |
| PM-146 | -2.657E-02 | 4.928E-02 | 8.385E-02 | NOT IDENT. |
| ND-147 | 4.731E+01 | 1.114E+02 | 2.189E+02 | NOT IDENT. |
| PM-147 | 3.204E+02 | 9.132E+02 | 1.709E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 9.104E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.880E-02 | 3.150E-02 | 5.358E-02 | NOT IDENT. |
| EU-152 | -1.460E-02 | 1.101E-01 | 1.942E-01 | NOT IDENT. |
| GD-153 | 8.770E-02 | 1.211E-01 | 2.351E-01 | FAIL ABUN |
| EU-154 | 2.932E-02 | 9.705E-02 | 2.177E-01 | FAIL ABUN |
| EU-155 | 3.110E-02 | 1.167E-01 | 2.192E-01 | NOT IDENT. |
| TB-160 | 7.862E-03 | 3.395E-01 | 5.871E-01 | NOT IDENT. |
| HO-166M | -6.624E-02 | 8.007E-02 | 1.300E-01 | NOT IDENT. |
| TM-171 | 2.339E+01 | 2.375E+01 | 4.841E+01 | NOT IDENT. |
| LU-176 | -3.492E-02 | 2.984E-02 | 4.938E-02 | NOT IDENT. |
| HF-181 | -2.873E-02 | 2.020E-01 | 3.719E-01 | NOT IDENT. |
| TA-182 | 9.960E-02 | 1.475E-01 | 4.022E-01 | FAIL ABUN |
| RE-183 | 3.027E-01 | 4.785E-01 | 9.520E-01 | NOT IDENT. |
| RE-184 | 1.867E-01 | 6.253E-01 | 1.302E+00 | NOT IDENT. |
| W-188 | -1.719E+00 | 2.109E+01 | 3.248E+01 | NOT IDENT. |
| IR-192 | 5.198E-03 | 9.833E-02 | 1.841E-01 | FAIL ABUN |
| HG-203 | -1.497E-01 | 1.590E-01 | 2.533E-01 | FAIL ABUN |
| BI-207 | -5.482E-02 | 1.367E-01 | 3.206E-01 | FAIL ABUN |
| TL-208 | -1.991E-02 | 4.381E-02 | 8.026E-02 | NOT IDENT. |
| PB-210 | -2.119E+00 | 4.488E+00 | 8.103E+00 | NOT IDENT. |
| BI-211 | 1.738E-01 | 2.777E-01 | 5.469E-01 | FAIL ABUN |
| PB-211 | 1.438E-01 | 8.290E-01 | 1.590E+00 | NOT IDENT. |
| BI-212 | 1.967E-02 | 5.656E-01 | 9.570E-01 | NOT IDENT. |
| PB-212 | 6.484E-03 | 6.978E-02 | 1.267E-01 | NOT IDENT. |
| BI-214 | 5.583E-02 | 9.364E-02 | 1.850E-01 | NOT IDENT. |
| PB-214 | 1.036E-02 | 1.564E-01 | 2.006E-01 | FAIL ABUN |
| RN-219 | -1.665E-01 | 4.382E-01 | 7.924E-01 | NOT IDENT. |
| RN-222 | 5.583E-02 | 9.364E-02 | 1.850E-01 | NOT IDENT. |
| RA-223 | 4.724E-01 | 7.193E-01 | 1.445E+00 | FAIL ABUN |
| RA-224 | -1.671E-01 | 7.367E-01 | 1.265E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 5.583E-02 | 9.364E-02 | 1.850E-01 | NOT IDENT. |
| AC-227 | -8.585E-02 | 3.151E-01 | 5.455E-01 | NOT IDENT. |
| TH-227 | -8.585E-02 | 3.151E-01 | 5.455E-01 | NOT IDENT. |
| AC-228 | 6.205E-02 | 1.333E-01 | 3.334E-01 | FAIL ABUN |
| RA-228 | 6.205E-02 | 1.333E-01 | 3.334E-01 | FAIL ABUN |
| TH-228 | 6.484E-03 | 6.978E-02 | 1.267E-01 | NOT IDENT. |
| TH-229 | 7.188E-01 | 7.589E-01 | 1.100E+00 | FAIL ABUN |
| TH-230 | 5.582E-02 | 9.363E-02 | 1.850E-01 | NOT IDENT. |
| PA-231 | 7.043E-01 | 1.797E+00 | 3.331E+00 | NOT IDENT. |
| TH-231 | 4.724E-01 | 7.193E-01 | 1.445E+00 | FAIL ABUN |
| TH-232 | 6.205E-02 | 1.333E-01 | 3.334E-01 | FAIL ABUN |
| PA-233 | 4.710E-02 | 8.406E-02 | 1.645E-01 | NOT IDENT. |
| PA-234 | -2.146E-01 | 3.116E-01 | 5.411E-01 | NOT IDENT. |
| PA-234M | -3.121E-01 | 4.043E+00 | 8.484E+00 | NOT IDENT. |
| TH-234 | -1.097E+00 | 1.468E+00 | 2.598E+00 | FAIL ABUN |
| U-234 | 5.582E-02 | 9.363E-02 | 1.850E-01 | NOT IDENT. |
| U-235 | 0.000E+00 | 4.692E-01 | 4.055E-01 | FAIL ABUN |
| NP-237 | 4.710E-02 | 8.406E-02 | 1.645E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 4.853E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -1.097E+00 | 1.468E+00 | 2.598E+00 | FAIL ABUN |
| NP-239 | -1.304E-01 | 5.037E-01 | 8.268E-01 | NOT IDENT. |
| PU-239 | -2.902E+02 | 3.834E+02 | 6.497E+02 | NOT IDENT. |
| AM-241 | -3.635E-02 | 1.629E-01 | 2.999E-01 | NOT IDENT. |
| AM-243 | 1.273E-02 | 6.197E-02 | 1.042E-01 | NOT IDENT. |
| CM-243 | -1.578E-01 | 1.174E-01 | 1.885E-01 | NOT IDENT. |
| CM-247 | -1.932E-02 | 4.117E-02 | 7.348E-02 | NOT IDENT. |
| CF-249 | 5.696E-03 | 5.194E-02 | 9.793E-02 | NOT IDENT. |
| CF-251 | -9.036E-02 | 1.517E-01 | 2.577E-01 | NOT IDENT. |
| ANH-511 | -6.609E-02 | 5.611E-02 | 1.115E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:45.07

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 71.98 | 27 | 35 | 1.89 | 144.89 | 142 | 8 | 7.37E-03 | 43.0 | |
| 2 | 0 | 92.73 | 59 | 57 | 1.38 | 186.39 | 179 | 12 | 1.65E-02 | 28.6 | |
| 3 | 0 | 96.19 | 15 | 36 | 0.61 | 193.31 | 191 | 7 | 4.12E-03 | 70.4 | |
| 4 | 0 | 113.74 | 16 | 38 | 1.31 | 228.42 | 221 | 9 | 4.56E-03 | 72.2 | |
| 5 | 0 | 143.89 | 48 | 75 | 4.96 | 288.71 | 279 | 19 | 1.33E-02 | 46.1 | |
| 6 | 1 | 190.89 | 19 | 43 | 1.53 | 382.72 | 369 | 27 | 5.16E-03 | 66.5 | 4.03E+00 |
| 7 | 1 | 193.39 | 24 | 36 | 1.53 | 387.72 | 369 | 27 | 6.65E-03 | 53.9 | |
| 8 | 4 | 218.59 | 14 | 11 | 1.19 | 438.14 | 437 | 24 | 3.90E-03 | 37.6 | 1.87E+00 |
| 9 | 4 | 221.68 | 18 | 42 | 2.08 | 444.32 | 437 | 24 | 5.00E-03 | 78.9 | |
| 10 | 0 | 295.36 | 19 | 31 | 0.91 | 591.70 | 587 | 11 | 5.38E-03 | 59.6 | |
| 11 | 0 | 353.02 | 14 | 48 | 1.58 | 707.02 | 698 | 12 | 3.86E-03 | 103.2 | |
| 12 | 0 | 511.59 | 72 | 30 | 1.60 | 1024.21 | 1016 | 17 | 1.99E-02 | 21.1 | |
| 13 | 0 | 569.72 | 121 | 20 | 1.25 | 1140.49 | 1133 | 13 | 3.35E-02 | 11.8 | |
| 14 | 0 | 689.29 | 20 | 3 | 1.94 | 1379.67 | 1373 | 12 | 5.54E-03 | 28.4 | |
| 15 | 0 | 723.10 | 12 | 3 | 1.32 | 1447.29 | 1444 | 6 | 3.35E-03 | 36.6 | |
| 16 | 0 | 768.13 | 8 | 10 | 1.90 | 1537.38 | 1530 | 10 | 2.22E-03 | 82.0 | |
| 17 | 0 | 826.32 | 9 | 6 | 0.90 | 1653.77 | 1648 | 8 | 2.47E-03 | 58.4 | |
| 18 | 7 | 872.96 | 11 | 4 | 2.44 | 1747.07 | 1744 | 12 | 3.15E-03 | 37.6 | 8.45E-01 |
| 19 | 7 | 876.10 | 10 | 3 | 1.33 | 1753.35 | 1744 | 12 | 2.74E-03 | 38.7 | |
| 20 | 0 | 911.58 | 8 | 3 | 0.52 | 1824.32 | 1820 | 7 | 2.15E-03 | 53.6 | |
| 21 | 0 | 1063.71 | 116 | 0 | 1.16 | 2128.64 | 2122 | 11 | 3.22E-02 | 9.3 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:30:47.17

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : G341146012 Acquisition date : 10-FEB-2014 13:26:14

| | | |
|---|---|---|
| Total number of lines in spectrum | 18 | |
| Number of unidentified lines | 5 | |
| Number of lines tentatively identified by NID | 13 | 72.22% |

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146012 Acquisition date : 10-FEB-2014 13:26:14

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 71.98 | 27 | 35 | 1.89 | 144.89 | 142 | 8 | 7.37E-03 | 85.9 | 3.55E+00 | T |
| 0 | 92.73 | 18 | 57 | 1.38 | 186.39 | 179 | 12 | 5.10E-03 | **** | 5.24E+00 | T |
| 0 | 96.19 | 15 | 36 | 0.61 | 193.31 | 191 | 7 | 4.12E-03 | **** | 5.41E+00 | T |
| 0 | 113.74 | 16 | 38 | 1.31 | 228.42 | 221 | 9 | 4.56E-03 | **** | 5.93E+00 | |
| 0 | 143.89 | 40 | 75 | 4.96 | 288.71 | 279 | 19 | 1.11E-02 | **** | 5.96E+00 | T |
| 1 | 190.89 | 19 | 43 | 1.53 | 382.72 | 369 | 27 | 5.16E-03 | **** | 5.36E+00 | |
| 1 | 193.39 | 24 | 36 | 1.53 | 387.72 | 369 | 27 | 6.65E-03 | **** | 5.33E+00 | T |
| 4 | 218.59 | 14 | 11 | 1.19 | 438.14 | 437 | 24 | 3.90E-03 | 75.1 | 4.98E+00 | |
| 4 | 221.68 | 9 | 42 | 2.08 | 444.32 | 437 | 24 | 2.58E-03 | **** | 4.94E+00 | T |
| 0 | 295.36 | 19 | 31 | 0.91 | 591.70 | 587 | 11 | 5.38E-03 | **** | 4.11E+00 | T |
| 0 | 353.02 | 2 | 48 | 1.58 | 707.02 | 698 | 12 | 5.29E-04 | **** | 3.64E+00 | T |
| 0 | 689.29 | 20 | 3 | 1.94 | 1379.67 | 1373 | 12 | 5.54E-03 | 56.8 | 2.24E+00 | |
| 0 | 723.10 | 8 | 3 | 1.32 | 1447.29 | 1444 | 6 | 2.26E-03 | **** | 2.16E+00 | T |
| 0 | 768.13 | 8 | 10 | 1.90 | 1537.38 | 1530 | 10 | 2.22E-03 | **** | 2.06E+00 | T |
| 0 | 826.32 | 9 | 6 | 0.90 | 1653.77 | 1648 | 8 | 2.47E-03 | **** | 1.94E+00 | |
| 7 | 872.96 | 11 | 4 | 2.44 | 1747.07 | 1744 | 12 | 3.15E-03 | 75.2 | 1.85E+00 | T |
| 7 | 876.10 | 10 | 3 | 1.33 | 1753.35 | 1744 | 12 | 2.74E-03 | 77.3 | 1.85E+00 | T |
| 0 | 911.58 | 4 | 3 | 0.52 | 1824.32 | 1820 | 7 | 1.13E-03 | **** | 1.79E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:00.54

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146012.CNF;1    *
* Acquisition date : 10-FEB-2014 13:26:14 Sensitivity     : 3.000          *
* Detector ID      : GAM19                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:26:00 Nuclide Library : SOLID          *
* Sample ID        : G341146012           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.0643E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-JUN-2013 07:52:05 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_500MLMB.CNF;9       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 1.004E+00 | NOT IDENT. |
| NA-22 | 3.128E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.243E-02 | NOT IDENT. |
| K-40 | 3.651E-01 | NOT IDENT. |
| SC-46 | 5.553E-02 | NOT IDENT. |
| V-48 | 2.117E+00 | NOT IDENT. |
| CR-51 | 2.606E+00 | NOT IDENT. |
| MN-54 | 4.670E-02 | NOT IDENT. |
| CO-56 | 8.748E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 3.073E-02 | NOT IDENT. |
| CO-58 | 7.420E-02 | NOT IDENT. |
| FE-59 | 2.374E-01 | NOT IDENT. |
| CO-60 | 3.605E-02 | NOT IDENT. |
| ZN-65 | 7.921E-02 | NOT IDENT. |
| GE-68 | 7.275E-01 | NOT IDENT. |
| AS-73 | 1.753E+00 | NOT IDENT. |
| AS-74 | 2.134E+00 | NOT IDENT. |
| SE-75 | 8.365E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.289E+00 | NOT IDENT. |
| RB-83 | 1.047E-01 | NOT IDENT. |
| KR-85 | 9.496E+00 | NOT IDENT. |
| SR-85 | 1.166E-01 | NOT IDENT. |
| RB-86 | 7.310E+00 | NOT IDENT. |
| Y-88 | 5.295E-02 | NOT IDENT. |
| Y-91 | 3.718E+01 | NOT IDENT. |
| NB-94 | 3.175E-02 | NOT IDENT. |
| NB-95 | 9.911E-02 | NOT IDENT. |
| NB-95M | 2.544E-01 | NOT IDENT. |

| | | |
|---|---|---|
| ZR-95 | 1.485E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.065E-02 | NOT IDENT. |
| RH-102 | 4.455E-02 | FAIL ABUN |
| RU-103 | 1.398E-01 | NOT IDENT. |
| RH-106 | 3.565E-01 | NOT IDENT. |
| RU-106 | 3.565E-01 | NOT IDENT. |
| AG-108M | 3.098E-02 | FAIL ABUN |
| CD-109 | 7.277E-01 | NOT IDENT. |
| AG-110M | 5.153E-02 | NOT IDENT. |
| SN-113 | 8.514E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.087E+00 | NOT IDENT. |
| TE-123M | 4.193E-02 | NOT IDENT. |
| SB-124 | 1.372E-01 | FAIL ABUN |
| SB-125 | 1.033E-01 | NOT IDENT. |
| TE-125M | 2.262E+01 | NOT IDENT. |
| I-126 | 1.511E+01 | NOT IDENT. |
| SB-126 | 1.337E+01 | NOT IDENT. |
| SN-126 | 6.450E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 4.273E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.921E-02 | NOT IDENT. |
| CS-135 | 1.450E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.076E+00 | NOT IDENT. |
| BA-137M | 2.965E-02 | NOT IDENT. |
| CS-137 | 3.132E-02 | NOT IDENT. |
| CE-139 | 4.242E-02 | NOT IDENT. |
| BA-140 | 1.289E+00 | NOT IDENT. |
| LA-140 | 1.289E+00 | NOT IDENT. |
| CE-141 | 3.157E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.361E-01 | NOT IDENT. |
| PM-144 | 3.031E-02 | NOT IDENT. |
| PR-144 | 2.369E+00 | NOT IDENT. |
| PM-146 | 3.698E-02 | NOT IDENT. |
| ND-147 | 9.865E+01 | NOT IDENT. |
| PM-147 | 7.953E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.416E-02 | NOT IDENT. |
| EU-152 | 8.732E-02 | NOT IDENT. |
| GD-153 | 1.097E-01 | FAIL ABUN |
| EU-154 | 8.806E-02 | FAIL ABUN |
| EU-155 | 1.015E-01 | NOT IDENT. |
| TB-160 | 2.508E-01 | NOT IDENT. |
| HO-166M | 5.696E-02 | NOT IDENT. |
| TM-171 | 2.239E+01 | NOT IDENT. |
| LU-176 | 2.215E-02 | NOT IDENT. |
| HF-181 | 1.669E-01 | NOT IDENT. |
| TA-182 | 1.558E-01 | FAIL ABUN |
| RE-183 | 4.381E-01 | NOT IDENT. |
| RE-184 | 5.614E-01 | NOT IDENT. |
| W-188 | 1.478E+01 | NOT IDENT. |
| IR-192 | 8.491E-02 | FAIL ABUN |
| HG-203 | 1.154E-01 | FAIL ABUN |
| BI-207 | 1.521E-01 | FAIL ABUN |
| TL-208 | 3.574E-02 | NOT IDENT. |
| PB-210 | 3.708E+00 | NOT IDENT. |
| BI-211 | 2.534E-01 | FAIL ABUN |
| PB-211 | 7.193E-01 | NOT IDENT. |
| BI-212 | 4.121E-01 | NOT IDENT. |
| PB-212 | 5.872E-02 | NOT IDENT. |
| BI-214 | 8.404E-02 | NOT IDENT. |
| PB-214 | 9.298E-02 | FAIL ABUN |
| RN-219 | 3.530E-01 | NOT IDENT. |
| RN-222 | 8.404E-02 | NOT IDENT. |
| RA-223 | 6.611E-01 | FAIL ABUN |
| RA-224 | 5.831E-01 | NOT IDENT. |
| RA-226 | 8.404E-02 | NOT IDENT. |
| AC-227 | 2.506E-01 | NOT IDENT. |

| | | |
|---|---|---|
| TH-227 | 2.506E-01 | NOT IDENT. |
| AC-228 | 1.461E-01 | FAIL ABUN |
| RA-228 | 1.461E-01 | FAIL ABUN |
| TH-228 | 5.872E-02 | NOT IDENT. |
| TH-229 | 5.096E-01 | FAIL ABUN |
| TH-230 | 8.404E-02 | NOT IDENT. |
| PA-231 | 1.533E+00 | NOT IDENT. |
| TH-231 | 6.611E-01 | FAIL ABUN |
| TH-232 | 1.461E-01 | FAIL ABUN |
| PA-233 | 7.605E-02 | NOT IDENT. |
| PA-234 | 2.247E-01 | NOT IDENT. |
| PA-234M | 3.554E+00 | NOT IDENT. |
| TH-234 | 1.198E+00 | FAIL ABUN |
| U-234 | 8.404E-02 | NOT IDENT. |
| U-235 | 1.882E-01 | FAIL ABUN |
| NP-237 | 7.605E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.198E+00 | FAIL ABUN |
| NP-239 | 3.832E-01 | NOT IDENT. |
| PU-239 | 2.999E+02 | NOT IDENT. |
| AM-241 | 1.371E-01 | NOT IDENT. |
| AM-243 | 4.842E-02 | NOT IDENT. |
| CM-243 | 8.623E-02 | NOT IDENT. |
| CM-247 | 3.277E-02 | NOT IDENT. |
| CF-249 | 4.474E-02 | NOT IDENT. |
| CF-251 | 1.190E-01 | NOT IDENT. |
| ANH-511 | 5.240E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:05.32

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146012.CNF;1    *
* Acquisition date : 10-FEB-2014 13:26:14 Sensitivity     : 3.000          *
* Detector ID      : GAM19                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:26:00 Nuclide Library : SOLID          *
* Sample ID        : G341146012           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.0643E+02 GRAM*
*                                         Quantity Err(%) : 1.8792E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-JUN-2013 07:52:05 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_500MLMB.CNF;9       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 5.615E-01 | 1.119E+00 | 1.148E+00 | NOT IDENT. |
| NA-22 | 8.515E-03 | 3.499E-02 | 3.520E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.050E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.100E-03 | 3.449E-02 | 3.454E-02 | NOT IDENT. |
| K-40 | 1.152E-01 | 3.727E-01 | 3.763E-01 | NOT IDENT. |
| SC-46 | -3.745E-02 | 7.374E-02 | 7.565E-02 | NOT IDENT. |
| V-48 | 3.670E-01 | 2.431E+00 | 2.437E+00 | NOT IDENT. |
| CR-51 | -2.999E+00 | 3.366E+00 | 3.628E+00 | NOT IDENT. |
| MN-54 | 1.027E-02 | 5.461E-02 | 5.480E-02 | NOT IDENT. |
| CO-56 | -4.180E-02 | 1.088E-01 | 1.104E-01 | NOT IDENT. |
| MN-56 | -1.000E+41 | 2.558E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 4.259E-03 | 3.602E-02 | 3.607E-02 | NOT IDENT. |
| CO-58 | 1.540E-03 | 8.644E-02 | 8.644E-02 | NOT IDENT. |
| FE-59 | 1.439E-01 | 2.461E-01 | 2.545E-01 | NOT IDENT. |
| CO-60 | 6.653E-03 | 4.171E-02 | 4.182E-02 | NOT IDENT. |
| ZN-65 | -6.308E-02 | 1.094E-01 | 1.130E-01 | NOT IDENT. |
| GE-68 | -1.752E-01 | 9.327E-01 | 9.360E-01 | NOT IDENT. |
| AS-73 | -3.752E-01 | 2.067E+00 | 2.074E+00 | NOT IDENT. |
| AS-74 | -9.211E-01 | 2.701E+00 | 2.733E+00 | NOT IDENT. |
| SE-75 | 1.047E-01 | 9.177E-02 | 1.032E-01 | NOT IDENT. |
| BR-77 | 1.676E+10 | 1.556E+11 | 1.558E+11 | SHORT HLIF |
| SR-82 | -2.303E+00 | 3.296E+00 | 3.455E+00 | NOT IDENT. |
| RB-83 | -6.486E-02 | 1.368E-01 | 1.399E-01 | NOT IDENT. |
| KR-85 | -1.839E-01 | 1.133E+01 | 1.133E+01 | NOT IDENT. |
| SR-85 | -2.863E-03 | 1.392E-01 | 1.392E-01 | NOT IDENT. |
| RB-86 | -1.760E+00 | 9.371E+00 | 9.405E+00 | NOT IDENT. |
| Y-88 | 5.651E-04 | 6.264E-02 | 6.264E-02 | NOT IDENT. |
| Y-91 | 2.456E+01 | 3.761E+01 | 3.920E+01 | NOT IDENT. |
| NB-94 | 3.330E-03 | 3.794E-02 | 3.797E-02 | NOT IDENT. |
| NB-95 | 3.154E-02 | 1.326E-01 | 1.333E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95M | -3.329E-01 | 3.461E-01 | 3.772E-01 | NOT IDENT. |
| ZR-95 | 6.230E-02 | 1.680E-01 | 1.704E-01 | FAIL ABUN |
| NB-97 | -1.000E+41 | 7.108E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.000E+41 | 4.416E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 3.146E+09 | 9.100E+09 | 9.210E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 2.736E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.157E-02 | 3.531E-02 | 3.570E-02 | NOT IDENT. |
| RH-102 | -2.562E-02 | 5.880E-02 | 5.992E-02 | FAIL ABUN |
| RU-103 | -1.259E-01 | 1.863E-01 | 1.948E-01 | NOT IDENT. |
| RH-106 | -2.019E-02 | 4.325E-01 | 4.326E-01 | NOT IDENT. |
| RU-106 | -2.019E-02 | 4.325E-01 | 4.326E-01 | NOT IDENT. |
| AG-108M | -8.860E-03 | 3.708E-02 | 3.729E-02 | FAIL ABUN |
| CD-109 | -1.236E-01 | 9.856E-01 | 9.872E-01 | NOT IDENT. |
| AG-110M | -5.440E-04 | 6.065E-02 | 6.065E-02 | NOT IDENT. |
| SN-113 | 3.706E-02 | 9.620E-02 | 9.764E-02 | NOT IDENT. |
| CD-115 | 6.739E+11 | 9.777E+11 | 1.024E+12 | SHORT HLIF |
| SN-117M | 9.030E-01 | 3.605E+00 | 3.628E+00 | NOT IDENT. |
| TE-123M | -2.912E-02 | 5.295E-02 | 5.455E-02 | NOT IDENT. |
| SB-124 | 3.132E-03 | 1.604E-01 | 1.604E-01 | FAIL ABUN |
| SB-125 | 8.839E-02 | 1.110E-01 | 1.179E-01 | NOT IDENT. |
| TE-125M | -2.417E+01 | 3.362E+01 | 3.534E+01 | NOT IDENT. |
| I-126 | 8.059E-02 | 1.825E+01 | 1.825E+01 | NOT IDENT. |
| SB-126 | -3.370E+00 | 1.961E+01 | 1.967E+01 | NOT IDENT. |
| SN-126 | -1.596E-02 | 8.797E-02 | 8.826E-02 | NOT IDENT. |
| SB-127 | -9.849E+04 | 3.211E+06 | 3.211E+06 | SHORT HLIF |
| I-131 | 2.460E+01 | 1.405E+02 | 1.409E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 5.993E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 6.265E+06 | 3.114E+07 | 3.127E+07 | SHORT HLIF |
| BA-133 | -3.256E-02 | 6.266E-02 | 6.436E-02 | NOT IDENT. |
| I-133 | 1.106E+31 | 4.806E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.134E-03 | 4.417E-02 | 4.436E-02 | NOT IDENT. |
| CS-135 | -1.459E-01 | 1.944E-01 | 2.052E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 3.194E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.409E+00 | 5.372E+00 | 5.481E+00 | NOT IDENT. |
| BA-137M | -1.367E-02 | 3.840E-02 | 3.889E-02 | NOT IDENT. |
| CS-137 | -1.444E-02 | 4.056E-02 | 4.108E-02 | NOT IDENT. |
| CE-139 | -1.272E-03 | 5.091E-02 | 5.091E-02 | NOT IDENT. |
| BA-140 | -3.072E+00 | 3.934E+00 | 4.170E+00 | NOT IDENT. |
| LA-140 | -3.072E+00 | 3.934E+00 | 4.170E+00 | NOT IDENT. |
| CE-141 | 2.198E-01 | 3.551E-01 | 3.686E-01 | NOT IDENT. |
| CE-143 | 1.013E+19 | 5.091E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 9.714E-03 | 2.796E-01 | 2.796E-01 | NOT IDENT. |
| PM-144 | -4.650E-02 | 4.749E-02 | 5.191E-02 | NOT IDENT. |
| PR-144 | -3.617E+00 | 3.708E+00 | 4.050E+00 | NOT IDENT. |
| PM-146 | -2.657E-02 | 4.935E-02 | 5.078E-02 | NOT IDENT. |
| ND-147 | 4.731E+01 | 1.114E+02 | 1.134E+02 | NOT IDENT. |
| PM-147 | 3.204E+02 | 9.136E+02 | 9.250E+02 | NOT IDENT. |
| PM-149 | -1.984E+12 | 9.110E+12 | 9.153E+12 | SHORT HLIF |
| EU-150 | -2.880E-02 | 3.158E-02 | 3.415E-02 | NOT IDENT. |
| EU-152 | -1.460E-02 | 1.101E-01 | 1.103E-01 | NOT IDENT. |
| GD-153 | 8.770E-02 | 1.215E-01 | 1.277E-01 | FAIL ABUN |
| EU-154 | 2.932E-02 | 9.709E-02 | 9.798E-02 | FAIL ABUN |
| EU-155 | 3.110E-02 | 1.167E-01 | 1.176E-01 | NOT IDENT. |
| TB-160 | 7.862E-03 | 3.395E-01 | 3.395E-01 | NOT IDENT. |
| HO-166M | -6.624E-02 | 8.031E-02 | 8.569E-02 | NOT IDENT. |
| TM-171 | 2.339E+01 | 2.390E+01 | 2.612E+01 | NOT IDENT. |
| LU-176 | -3.492E-02 | 2.997E-02 | 3.385E-02 | NOT IDENT. |
| HF-181 | -2.873E-02 | 2.020E-01 | 2.024E-01 | NOT IDENT. |
| TA-182 | 9.960E-02 | 1.478E-01 | 1.545E-01 | FAIL ABUN |
| RE-183 | 3.027E-01 | 4.802E-01 | 4.992E-01 | NOT IDENT. |
| RE-184 | 1.867E-01 | 6.260E-01 | 6.316E-01 | NOT IDENT. |
| W-188 | -1.719E+00 | 2.109E+01 | 2.111E+01 | NOT IDENT. |
| IR-192 | 5.198E-03 | 9.833E-02 | 9.836E-02 | FAIL ABUN |
| HG-203 | -1.497E-01 | 1.594E-01 | 1.731E-01 | FAIL ABUN |
| BI-207 | -5.482E-02 | 1.369E-01 | 1.391E-01 | FAIL ABUN |
| TL-208 | -1.991E-02 | 4.384E-02 | 4.475E-02 | NOT IDENT. |
| PB-210 | -2.119E+00 | 4.493E+00 | 4.593E+00 | NOT IDENT. |
| BI-211 | 1.738E-01 | 2.781E-01 | 2.889E-01 | FAIL ABUN |
| PB-211 | 1.438E-01 | 8.291E-01 | 8.316E-01 | NOT IDENT. |
| BI-212 | 1.967E-02 | 5.656E-01 | 5.657E-01 | NOT IDENT. |
| PB-212 | 6.484E-03 | 6.978E-02 | 6.985E-02 | NOT IDENT. |
| BI-214 | 5.583E-02 | 9.375E-02 | 9.707E-02 | NOT IDENT. |
| PB-214 | 1.036E-02 | 1.564E-01 | 1.565E-01 | FAIL ABUN |
| RN-219 | -1.665E-01 | 4.388E-01 | 4.452E-01 | NOT IDENT. |
| RN-222 | 5.583E-02 | 9.375E-02 | 9.707E-02 | NOT IDENT. |
| RA-223 | 4.724E-01 | 7.206E-01 | 7.514E-01 | FAIL ABUN |
| RA-224 | -1.671E-01 | 7.369E-01 | 7.407E-01 | NOT IDENT. |
| RA-226 | 5.583E-02 | 9.375E-02 | 9.707E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AC-227 | -8.585E-02 | 3.153E-01 | 3.177E-01 | NOT IDENT. |
| TH-227 | -8.585E-02 | 3.153E-01 | 3.177E-01 | NOT IDENT. |
| AC-228 | 6.205E-02 | 1.335E-01 | 1.364E-01 | FAIL ABUN |
| RA-228 | 6.205E-02 | 1.335E-01 | 1.364E-01 | FAIL ABUN |
| TH-228 | 6.484E-03 | 6.978E-02 | 6.985E-02 | NOT IDENT. |
| TH-229 | 7.188E-01 | 7.613E-01 | 8.274E-01 | FAIL ABUN |
| TH-230 | 5.582E-02 | 9.374E-02 | 9.705E-02 | NOT IDENT. |
| PA-231 | 7.043E-01 | 1.798E+00 | 1.826E+00 | NOT IDENT. |
| TH-231 | 4.724E-01 | 7.206E-01 | 7.514E-01 | FAIL ABUN |
| TH-232 | 6.205E-02 | 1.335E-01 | 1.364E-01 | FAIL ABUN |
| PA-233 | 4.710E-02 | 8.415E-02 | 8.679E-02 | NOT IDENT. |
| PA-234 | -2.146E-01 | 3.977E-01 | 4.093E-01 | NOT IDENT. |
| PA-234M | -3.121E-01 | 4.043E+00 | 4.045E+00 | NOT IDENT. |
| TH-234 | -1.097E+00 | 1.491E+00 | 1.571E+00 | FAIL ABUN |
| U-234 | 5.582E-02 | 9.374E-02 | 9.705E-02 | NOT IDENT. |
| U-235 | 4.332E-01 | 4.708E-01 | 5.097E-01 | FAIL ABUN |
| NP-237 | 4.710E-02 | 8.415E-02 | 8.679E-02 | NOT IDENT. |
| NP-238 | 9.532E+11 | 4.855E+12 | 4.874E+12 | SHORT HLIF |
| U-238 | -1.097E+00 | 1.491E+00 | 1.571E+00 | FAIL ABUN |
| NP-239 | -1.304E-01 | 5.040E-01 | 5.074E-01 | NOT IDENT. |
| PU-239 | -2.902E+02 | 3.842E+02 | 4.059E+02 | NOT IDENT. |
| AM-241 | -3.635E-02 | 1.629E-01 | 1.638E-01 | NOT IDENT. |
| AM-243 | 1.273E-02 | 6.199E-02 | 6.226E-02 | NOT IDENT. |
| CM-243 | -1.578E-01 | 1.190E-01 | 1.387E-01 | NOT IDENT. |
| CM-247 | -1.932E-02 | 4.132E-02 | 4.223E-02 | NOT IDENT. |
| CF-249 | 5.696E-03 | 5.195E-02 | 5.201E-02 | NOT IDENT. |
| CF-251 | -9.036E-02 | 1.522E-01 | 1.575E-01 | NOT IDENT. |
| ANH-511 | -6.609E-02 | 5.636E-02 | 6.375E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 43.0086 | 94.67 | 22.6922 | 193.51 | 40.7121 |
| 45.60 | 48.1494 | 94.87 | 22.6979 | 197.03 | 43.5497 |
| 46.54 | 47.3621 | 97.43 | 62.2427 | 198.01 | 35.2022 |
| 49.72 | 0.0000 | 98.43 | 44.0805 | 201.83 | 47.2889 |
| 51.35 | 31.8661 | 98.44 | 44.0811 | 205.31 | 45.3106 |
| 52.39 | 33.7009 | 99.53 | 44.1409 | 210.85 | 49.7378 |
| 53.44 | 45.3168 | 100.11 | 44.1726 | 215.65 | 40.7854 |
| 57.36 | 0.0000 | 103.18 | 71.6683 | 222.11 | 43.7577 |
| 57.53 | 35.8012 | 103.37 | 64.9943 | 227.09 | 43.9178 |
| 57.98 | 34.0375 | 105.21 | 46.9379 | 227.38 | 43.9272 |
| 59.32 | 43.0936 | 105.31 | 46.9435 | 228.16 | 0.0000 |
| 59.54 | 42.2116 | 106.12 | 48.2219 | 228.18 | 41.1656 |
| 63.29 | 46.9950 | 109.28 | 64.6829 | 235.69 | 62.5135 |
| 63.58 | 46.1131 | 111.00 | 55.5535 | 235.96 | 58.2138 |
| 64.28 | 44.3552 | 111.76 | 0.0000 | 238.63 | 42.1227 |
| 66.73 | 42.5824 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 42.4435 | 117.23 | 59.5751 | 240.99 | 47.6020 |
| 67.75 | 43.6912 | 121.12 | 52.6786 | 242.00 | 55.2139 |
| 69.67 | 54.0475 | 121.22 | 52.6843 | 244.70 | 36.8786 |
| 70.83 | 40.9736 | 121.78 | 53.6927 | 252.40 | 0.0000 |
| 72.81 | 67.5162 | 122.06 | 54.6858 | 252.80 | 43.6282 |
| 72.87 | 67.5221 | 123.07 | 61.5890 | 254.15 | 0.0000 |
| 74.66 | 47.0975 | 127.23 | 46.1528 | 256.23 | 48.1023 |
| 74.82 | 47.1086 | 129.30 | 63.9681 | 260.90 | 0.0000 |
| 74.97 | 33.8669 | 131.20 | 46.3463 | 264.66 | 36.2796 |
| 77.11 | 53.1754 | 133.02 | 54.3374 | 268.22 | 52.8933 |
| 79.69 | 63.0097 | 133.52 | 57.3309 | 269.46 | 45.2166 |
| 80.12 | 67.6840 | 136.00 | 63.4224 | 271.23 | 41.9562 |
| 80.19 | 0.0000 | 136.47 | 55.5211 | 273.65 | 44.2334 |
| 80.57 | 57.5217 | 140.51 | 0.0000 | 276.40 | 38.7726 |
| 81.00 | 51.9865 | 143.76 | 40.9465 | 277.37 | 36.5797 |
| 81.07 | 51.9916 | 144.24 | 40.9659 | 277.60 | 45.4537 |
| 83.79 | 54.9850 | 145.44 | 41.0141 | 278.00 | 48.7924 |
| 85.43 | 46.0797 | 152.43 | 51.3611 | 279.20 | 53.2683 |
| 86.55 | 59.8699 | 153.25 | 53.4165 | 279.54 | 48.8400 |
| 86.79 | 52.4030 | 154.21 | 49.4299 | 280.46 | 39.9831 |
| 86.94 | 53.9112 | 156.02 | 51.5346 | 283.69 | 37.8391 |
| 87.09 | 53.9222 | 158.56 | 49.6307 | 284.31 | 0.0000 |
| 87.57 | 55.4557 | 159.00 | 62.8231 | 285.41 | 42.3360 |
| 88.03 | 52.4906 | 162.33 | 52.8510 | 285.90 | 0.0000 |
| 88.34 | 52.5124 | 163.33 | 51.8817 | 287.50 | 39.0450 |
| 88.47 | 52.5214 | 165.86 | 54.0392 | 290.67 | 35.7681 |
| 89.96 | 58.6397 | 176.31 | 54.5378 | 293.27 | 0.0000 |
| 91.11 | 54.2109 | 176.60 | 58.6686 | 295.22 | 28.0220 |
| 92.59 | 54.3155 | 177.52 | 60.7749 | 295.96 | 28.0348 |
| 93.35 | 22.6537 | 181.07 | 0.0000 | 298.58 | 35.9419 |
| 94.56 | 22.6890 | 184.41 | 46.4177 | 299.98 | 32.3750 |
| 94.65 | 22.6916 | 185.72 | 39.8303 | 300.09 | 30.5784 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 30.5792 | 497.08 | 25.8175 | 711.68 | 27.9627 |
| 301.36 | 30.0016 | 505.52 | 34.8782 | 720.70 | 23.3710 |
| 302.85 | 25.0241 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 35.1686 | 511.00 | 25.9691 | 722.78 | 16.1906 |
| 306.78 | 44.2459 | 514.00 | 48.0023 | 722.91 | 16.1913 |
| 308.46 | 45.1941 | 514.00 | 48.0035 | 723.31 | 14.0344 |
| 311.90 | 39.8519 | 520.40 | 19.0515 | 724.19 | 12.9586 |
| 316.51 | 46.3165 | 520.69 | 0.0000 | 727.33 | 10.8098 |
| 319.41 | 47.3046 | 522.65 | 0.0000 | 733.00 | 15.1611 |
| 320.08 | 47.3224 | 527.90 | 0.0000 | 735.93 | 15.1754 |
| 321.04 | 41.8857 | 529.59 | 25.1624 | 737.46 | 13.0140 |
| 323.87 | 28.2731 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 34.6847 | 531.02 | 22.1558 | 747.24 | 17.4059 |
| 328.76 | 32.9251 | 546.56 | 0.0000 | 748.06 | 16.3224 |
| 333.37 | 37.5962 | 552.55 | 16.2523 | 752.31 | 11.9859 |
| 333.97 | 43.1124 | 563.25 | 27.5412 | 753.82 | 18.5323 |
| 334.37 | 41.2872 | 569.33 | 18.4039 | 756.73 | 9.8202 |
| 338.28 | 27.5848 | 569.50 | 18.4052 | 756.80 | 9.8205 |
| 338.32 | 27.5856 | 569.70 | 18.4065 | 763.94 | 12.7587 |
| 340.48 | 28.5391 | 583.19 | 20.5576 | 765.81 | 16.4136 |
| 340.55 | 28.5403 | 584.27 | 23.6508 | 766.42 | 16.4165 |
| 344.28 | 28.8300 | 595.83 | 26.8525 | 766.84 | 16.4187 |
| 345.93 | 29.2406 | 600.60 | 23.7962 | 772.60 | 0.0000 |
| 351.06 | 29.6313 | 602.52 | 0.0000 | 776.52 | 17.5656 |
| 351.93 | 29.6453 | 602.73 | 27.9571 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 34.1948 | 778.90 | 9.8879 |
| 356.01 | 43.3279 | 609.32 | 20.7593 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 25.9586 | 785.37 | 13.7604 |
| 366.42 | 0.0000 | 614.28 | 32.2352 | 792.07 | 15.6269 |
| 375.05 | 30.9484 | 618.01 | 23.9490 | 794.95 | 15.6407 |
| 383.85 | 36.7410 | 620.36 | 19.8006 | 795.86 | 11.9637 |
| 388.16 | 35.8778 | 621.93 | 19.8122 | 801.95 | 13.8297 |
| 388.63 | 32.1087 | 630.19 | 0.0000 | 810.29 | 12.0158 |
| 391.69 | 34.9960 | 631.29 | 16.7402 | 810.45 | 12.0164 |
| 400.66 | 28.5022 | 633.25 | 9.4230 | 810.76 | 12.0174 |
| 401.81 | 27.5677 | 634.78 | 16.7609 | 815.77 | 12.0354 |
| 402.40 | 29.4776 | 635.95 | 17.8160 | 818.51 | 11.1187 |
| 404.85 | 27.6091 | 636.99 | 0.0000 | 832.01 | 20.0931 |
| 410.95 | 38.1953 | 645.85 | 18.9303 | 834.85 | 16.7582 |
| 413.71 | 21.0356 | 657.76 | 17.9533 | 835.71 | 24.2121 |
| 414.70 | 18.1757 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 25.0199 | 661.66 | 17.9774 | 846.75 | 0.0000 |
| 427.87 | 20.2158 | 664.57 | 0.0000 | 846.77 | 23.3556 |
| 433.94 | 25.1009 | 666.33 | 18.0065 | 856.80 | 13.1170 |
| 439.40 | 26.1325 | 666.50 | 18.0077 | 860.56 | 12.1931 |
| 453.88 | 24.3581 | 667.71 | 0.0000 | 871.09 | 16.1269 |
| 463.37 | 19.5698 | 677.62 | 12.7597 | 873.19 | 20.9776 |
| 468.07 | 29.4163 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 14.2607 | 879.38 | 11.3152 |
| 475.06 | 34.4249 | 696.49 | 23.7798 | 880.51 | 11.3188 |
| 476.78 | 31.4980 | 696.51 | 23.7798 | 883.24 | 7.5516 |
| 477.60 | 22.6474 | 697.00 | 22.4755 | 884.68 | 10.3877 |
| 482.18 | 27.6257 | 697.49 | 20.3383 | 889.28 | 12.2922 |
| 487.02 | 22.7403 | 702.65 | 17.1566 | 894.76 | 11.3638 |
| 492.35 | 0.0000 | 706.68 | 19.3267 | 898.04 | 13.2700 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 10.4414 | 1312.11 | 7.3219 | | |
| 911.20 | 11.4153 | 1332.49 | 6.3022 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 12.4181 | 1365.19 | 4.2295 | | |
| 937.49 | 10.5388 | 1368.63 | 0.0000 | | |
| 944.13 | 7.6781 | 1384.29 | 4.2456 | | |
| 946.00 | 14.4037 | 1408.01 | 3.1992 | | |
| 949.00 | 6.7270 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.1547 | | |
| 962.31 | 8.6794 | 1489.16 | 5.4156 | | |
| 964.08 | 8.6834 | 1505.03 | 5.5869 | | |
| 966.17 | 12.5496 | 1596.21 | 2.8401 | | |
| 968.97 | 3.8643 | 1620.50 | 5.7047 | | |
| 983.53 | 10.6670 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.9249 | | |
| 996.26 | 11.6748 | 1750.46 | 0.0000 | | |
| 1001.03 | 5.8445 | 1764.49 | 4.8717 | | |
| 1004.73 | 9.7500 | 1770.23 | 4.8762 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.9263 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.9628 | | |
| 1037.84 | 10.8142 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.9570 | | |
| 1046.59 | 10.8375 | | | | |
| 1048.07 | 3.9424 | | | | |
| 1049.04 | 2.9575 | | | | |
| 1050.41 | 6.9032 | | | | |
| 1063.66 | 5.9363 | | | | |
| 1077.00 | 3.9702 | | | | |
| 1077.34 | 3.9705 | | | | |
| 1085.87 | 4.9733 | | | | |
| 1099.45 | 3.9917 | | | | |
| 1112.07 | 6.0054 | | | | |
| 1112.84 | 8.0085 | | | | |
| 1115.54 | 13.0222 | | | | |
| 1120.29 | 12.0337 | | | | |
| 1120.55 | 12.0347 | | | | |
| 1121.30 | 12.0366 | | | | |
| 1129.67 | 6.0300 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 3.0453 | | | | |
| 1177.95 | 1.0162 | | | | |
| 1189.05 | 10.1868 | | | | |
| 1204.77 | 3.0668 | | | | |
| 1221.41 | 1.0260 | | | | |
| 1231.02 | 0.0000 | | | | |
| 1235.36 | 9.2622 | | | | |
| 1238.28 | 10.2979 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.1117 | | | | |
| 1274.44 | 4.1510 | | | | |
| 1274.54 | 4.1512 | | | | |
| 1291.59 | 4.1662 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:32.19

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146013.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM20.CNF;376
Background date : 9-FEB-2014 11:21:58.
Sample date : 7-NOV-2013 10:29:00. Acquisition date : 10-FEB-2014 13:26:39
Sample ID : G341146013 Sample quantity : 1.44720E+02 GRAM
Detector name : GAM20 Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:15.70 0.4%
Energy tolerance : 1.50000 keV Analyst Initials : RXF2
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 1359492 Detector SN# :
Matrix Spike ID : LCS ID : 1605

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 26.70* | 4 | 2 | 1.37 | 53.68 | 50 | 29 | 1.00E-03 | 213.3 | 2.11E+00 |
| 2 | 3 | 32.24* | 3 | 11 | 1.39 | 64.75 | 50 | 29 | 7.00E-04 | 376.4 | |
| 3 | 3 | 34.72* | 3 | 14 | 1.40 | 69.70 | 50 | 29 | 7.99E-04 | 318.4 | |
| 4 | 0 | 64.04* | 13 | 78 | 1.46 | 128.29 | 122 | 14 | 3.73E-03 | 149.9 | |
| 5 | 0 | 92.83* | 9 | 55 | 1.12 | 185.82 | 182 | 11 | 2.49E-03 | 186.7 | |
| 6 | 0 | 119.66 | 18 | 16 | 1.90 | 239.42 | 237 | 6 | 5.05E-03 | 41.4 | |
| 7 | 0 | 179.15 | 10 | 19 | 1.14 | 358.30 | 355 | 7 | 2.80E-03 | 78.5 | |
| 8 | 0 | 230.75 | 23 | 18 | 3.97 | 461.43 | 456 | 12 | 6.39E-03 | 42.4 | |
| 9 | 0 | 239.06* | 7 | 40 | 1.20 | 478.05 | 471 | 10 | 1.91E-03 | 189.0 | |
| 10 | 0 | 352.20* | 21 | 16 | 0.83 | 704.20 | 698 | 12 | 5.78E-03 | 48.5 | |
| 11 | 0 | 419.87* | 14 | 11 | 3.35 | 839.47 | 834 | 11 | 3.80E-03 | 56.9 | |
| 12 | 0 | 517.03 | 9 | 2 | 0.50 | 1033.74 | 1031 | 6 | 2.42E-03 | 45.1 | |
| 13 | 0 | 555.95 | 15 | 3 | 3.33 | 1111.55 | 1105 | 12 | 4.17E-03 | 34.6 | |
| 14 | 0 | 609.98* | 38 | 0 | 1.16 | 1219.60 | 1215 | 12 | 1.06E-02 | 17.8 | |
| 15 | 0 | 803.42* | 4 | 4 | 0.61 | 1606.51 | 1600 | 8 | 1.01E-03 | 133.7 | |
| 16 | 0 | 1099.16 | 8 | 0 | 0.74 | 2198.25 | 2193 | 10 | 2.22E-03 | 35.4 | |
| 17 | 0 | 1461.39* | 1 | 4 | 0.62 | 2923.38 | 2917 | 9 | 2.17E-04 | 621.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:31:33

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146013.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:29:00 | Acquisition date | : 10-FEB-2014 13:26:39 |
| Sample ID | : G341146013 | Sample quantity | : 144.72 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA20 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:15.70 0.4% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 1 | 10.66* | 1.331E+00 | 2.857E-02 | 2.857E-02 | 1242.26 |
| BI-211 | 72.87 | ------ | 1.23 | 4.898E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 21 | 12.92* | 4.029E+00 | 2.074E-01 | 2.074E-01 | 97.08 |
| TH-234 | 63.29 | 13 | 3.70* | 3.830E+00 | 4.918E-01 | 4.918E-01 | 299.90 |
| | 92.59 | 9 | 4.23 | 6.361E+00 | 1.729E-01 | 1.729E-01 | 373.47 |
| U-238 | 63.29 | 13 | 3.70* | 3.830E+00 | 4.918E-01 | 4.918E-01 | 299.90 |
| | 92.59 | 9 | 4.23 | 6.361E+00 | 1.729E-01 | 1.729E-01 | 373.47 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:34.44

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146013.CNF;1    *
* Acquisition date : 10-FEB-2014 13:26:39 Sensitivity     : 3.000            *
* Detector ID      : GAM20                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:15.70     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:29:00 Nuclide Library : SOLID            *
* Sample ID        : G341146013           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.4472E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 11-JUN-2013 12:34:02 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM20_500MLMB.CNF;6          *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 2.857E-02 | 3.478E-01 | 4.763E-01 |
| BI-211 | 2.074E-01 | 1.973E-01 | 2.053E-01 |
| TH-234 | 4.918E-01 | 1.445E+00 | 1.144E+00 |
| U-238 | 4.918E-01 | 1.445E+00 | 1.144E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.215E-01 | 5.324E-01 | 1.122E+00 | NOT IDENT. |
| NA-22 | -1.040E-02 | 1.859E-02 | 3.438E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.342E-03 | 2.880E-02 | 5.898E-02 | NOT IDENT. |
| SC-46 | -3.019E-02 | 4.097E-02 | 6.779E-02 | NOT IDENT. |
| V-48 | -9.698E-01 | 1.283E+00 | 2.085E+00 | NOT IDENT. |
| CR-51 | -9.259E-01 | 1.836E+00 | 3.173E+00 | NOT IDENT. |
| MN-54 | 2.382E-02 | 2.376E-02 | 5.671E-02 | NOT IDENT. |
| CO-56 | 8.978E-03 | 5.374E-02 | 1.084E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.019E-02 | 1.998E-02 | 3.090E-02 | NOT IDENT. |
| CO-58 | -1.521E-03 | 6.115E-02 | 1.181E-01 | NOT IDENT. |
| FE-59 | 1.912E-01 | 1.325E-01 | 3.792E-01 | FAIL ABUN |
| CO-60 | 1.375E-02 | 2.237E-02 | 5.464E-02 | NOT IDENT. |
| ZN-65 | -6.200E-02 | 7.236E-02 | 1.134E-01 | NOT IDENT. |
| GE-68 | 1.847E-01 | 9.794E-01 | 2.007E+00 | NOT IDENT. |
| AS-73 | -2.091E-01 | 8.863E-01 | 1.548E+00 | NOT IDENT. |
| AS-74 | 6.593E-01 | 1.235E+00 | 2.657E+00 | NOT IDENT. |
| SE-75 | 8.460E-04 | 4.798E-02 | 8.895E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | 1.235E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.028E+00 | 1.463E+00 | 2.484E+00 | NOT IDENT. |
| RB-83 | -1.748E-02 | 7.940E-02 | 1.322E-01 | NOT IDENT. |
| KR-85 | -2.105E+01 | 9.860E+00 | 1.146E+01 | NOT IDENT. |
| SR-85 | -2.590E-01 | 1.211E-01 | 1.407E-01 | NOT IDENT. |
| RB-86 | 2.658E+00 | 1.003E+01 | 2.077E+01 | NOT IDENT. |
| Y-88 | 1.692E-02 | 3.447E-02 | 9.345E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | -1.108E+01 | 2.422E+01 | 4.603E+01 | NOT IDENT. |
| NB-94 | -6.501E-03 | 2.055E-02 | 3.818E-02 | NOT IDENT. |
| NB-95 | -2.109E-02 | 5.303E-02 | 9.864E-02 | NOT IDENT. |
| NB-95M | 1.632E-02 | 2.388E-01 | 2.907E-01 | NOT IDENT. |
| ZR-95 | 3.476E-02 | 1.042E-01 | 2.184E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.495E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.231E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.069E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.513E-03 | 1.784E-02 | 3.256E-02 | NOT IDENT. |
| RH-102 | 1.161E-02 | 3.904E-02 | 7.945E-02 | NOT IDENT. |
| RU-103 | -4.783E-03 | 1.053E-01 | 2.055E-01 | FAIL ABUN |
| RH-106 | -1.030E-01 | 2.034E-01 | 3.693E-01 | NOT IDENT. |
| RU-106 | -1.030E-01 | 2.034E-01 | 3.693E-01 | NOT IDENT. |
| AG-108M | -3.488E-03 | 1.914E-02 | 3.469E-02 | NOT IDENT. |
| CD-109 | 6.002E-02 | 5.446E-01 | 8.679E-01 | NOT IDENT. |
| AG-110M | 7.645E-03 | 3.141E-02 | 6.820E-02 | NOT IDENT. |
| SN-113 | -2.914E-02 | 4.545E-02 | 7.611E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 4.643E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.615E-01 | 1.925E+00 | 3.576E+00 | NOT IDENT. |
| TE-123M | 5.080E-03 | 2.573E-02 | 4.941E-02 | NOT IDENT. |
| SB-124 | 5.426E-02 | 1.085E-01 | 2.959E-01 | NOT IDENT. |
| SB-125 | 6.552E-03 | 6.607E-02 | 1.242E-01 | NOT IDENT. |
| TE-125M | 5.384E+00 | 1.457E+01 | 2.853E+01 | NOT IDENT. |
| I-126 | -1.976E+00 | 9.145E+00 | 1.751E+01 | NOT IDENT. |
| SB-126 | -1.186E+00 | 6.646E+00 | 1.297E+01 | NOT IDENT. |
| SN-126 | -6.918E-04 | 4.471E-02 | 7.484E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.453E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.194E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.511E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.277E-02 | 3.310E-02 | 4.601E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.252E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.529E-02 | 3.040E-02 | 5.257E-02 | FAIL ABUN |
| CS-135 | 5.802E-03 | 9.818E-02 | 1.836E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.497E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.036E+00 | 4.127E+00 | 9.554E+00 | NOT IDENT. |
| BA-137M | -5.987E-03 | 2.004E-02 | 3.783E-02 | NOT IDENT. |
| CS-137 | -6.324E-03 | 2.117E-02 | 3.996E-02 | NOT IDENT. |
| CE-139 | 1.338E-02 | 2.403E-02 | 4.814E-02 | NOT IDENT. |
| BA-140 | -3.138E+00 | 4.318E+00 | 7.181E+00 | NOT IDENT. |
| LA-140 | -3.138E+00 | 4.318E+00 | 7.181E+00 | NOT IDENT. |
| CE-141 | -7.446E-03 | 2.212E-01 | 4.064E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.449E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -5.343E-02 | 1.314E-01 | 2.383E-01 | NOT IDENT. |
| PM-144 | 8.080E-03 | 2.471E-02 | 5.113E-02 | NOT IDENT. |
| PR-144 | 6.068E-01 | 1.924E+00 | 3.975E+00 | NOT IDENT. |
| PM-146 | -1.029E-03 | 3.110E-02 | 5.704E-02 | NOT IDENT. |
| ND-147 | -1.726E+01 | 5.575E+01 | 1.021E+02 | NOT IDENT. |
| PM-147 | -8.435E+01 | 5.223E+02 | 8.513E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 4.233E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 7.834E-04 | 1.883E-02 | 3.488E-02 | NOT IDENT. |
| EU-152 | -2.052E-02 | 5.421E-02 | 9.636E-02 | NOT IDENT. |
| GD-153 | -3.089E-02 | 8.070E-02 | 1.194E-01 | NOT IDENT. |
| EU-154 | -3.238E-02 | 4.897E-02 | 8.636E-02 | NOT IDENT. |
| EU-155 | -2.150E-02 | 6.316E-02 | 1.157E-01 | NOT IDENT. |
| TB-160 | 3.875E-03 | 1.595E-01 | 3.240E-01 | NOT IDENT. |
| HO-166M | 1.617E-02 | 4.499E-02 | 9.093E-02 | NOT IDENT. |
| TM-171 | 2.342E+00 | 9.716E+00 | 1.794E+01 | NOT IDENT. |
| LU-176 | -2.720E-03 | 1.633E-02 | 2.984E-02 | NOT IDENT. |
| HF-181 | -5.806E-02 | 9.553E-02 | 1.717E-01 | NOT IDENT. |
| TA-182 | 1.661E-01 | 1.766E-01 | 4.191E-01 | NOT IDENT. |
| RE-183 | 7.812E-02 | 2.410E-01 | 4.270E-01 | NOT IDENT. |
| RE-184 | 2.516E-02 | 4.033E-01 | 7.978E-01 | NOT IDENT. |
| W-188 | -1.321E+01 | 1.027E+01 | 1.569E+01 | FAIL ABUN |
| IR-192 | 7.235E-03 | 4.845E-02 | 9.176E-02 | NOT IDENT. |
| HG-203 | 1.987E-02 | 6.945E-02 | 1.361E-01 | NOT IDENT. |
| BI-207 | -1.415E-02 | 2.503E-02 | 4.329E-02 | NOT IDENT. |
| TL-208 | -2.584E-02 | 2.323E-02 | 4.085E-02 | NOT IDENT. |
| PB-210 | -3.803E-01 | 1.742E+00 | 3.122E+00 | NOT IDENT. |
| PB-211 | 6.276E-03 | 4.019E-01 | 7.629E-01 | NOT IDENT. |
| BI-212 | 2.006E-01 | 2.645E-01 | 6.121E-01 | NOT IDENT. |
| PB-212 | 1.570E-02 | 5.818E-02 | 8.385E-02 | FAIL ABUN |
| BI-214 | 0.000E+00 | 5.597E-02 | 1.294E-01 | FAIL ABUN |
| PB-214 | 7.527E-02 | 7.161E-02 | 1.112E-01 | FAIL ABUN |
| RN-219 | 2.197E-02 | 2.320E-01 | 4.455E-01 | NOT IDENT. |
| RN-222 | 0.000E+00 | 5.597E-02 | 1.294E-01 | FAIL ABUN |
| RA-223 | 3.414E-01 | 4.122E-01 | 8.456E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 2.844E-01 | 4.326E-01 | 7.724E-01 | NOT IDENT. |
| RA-226 | 0.000E+00 | 5.597E-02 | 1.294E-01 | FAIL ABUN |
| AC-227 | 6.703E-02 | 1.614E-01 | 3.144E-01 | NOT IDENT. |
| TH-227 | 6.703E-02 | 1.614E-01 | 3.144E-01 | NOT IDENT. |
| AC-228 | 1.475E-02 | 8.768E-02 | 1.884E-01 | NOT IDENT. |
| RA-228 | 1.475E-02 | 8.768E-02 | 1.884E-01 | NOT IDENT. |
| TH-228 | 1.570E-02 | 5.818E-02 | 8.385E-02 | FAIL ABUN |
| TH-229 | -1.138E-01 | 3.217E-01 | 5.767E-01 | NOT IDENT. |
| TH-230 | 0.000E+00 | 5.596E-02 | 1.294E-01 | FAIL ABUN |
| PA-231 | -5.488E-01 | 8.638E-01 | 1.475E+00 | NOT IDENT. |
| TH-231 | 3.414E-01 | 4.122E-01 | 8.456E-01 | NOT IDENT. |
| TH-232 | 1.475E-02 | 8.768E-02 | 1.884E-01 | NOT IDENT. |
| PA-233 | -3.444E-04 | 3.924E-02 | 7.345E-02 | NOT IDENT. |
| PA-234 | 5.648E-02 | 2.072E-01 | 4.240E-01 | NOT IDENT. |
| PA-234M | -6.663E-01 | 2.908E+00 | 5.806E+00 | NOT IDENT. |
| U-234 | 0.000E+00 | 5.596E-02 | 1.294E-01 | FAIL ABUN |
| U-235 | -1.616E-02 | 1.226E-01 | 2.364E-01 | FAIL ABUN |
| NP-237 | -3.444E-04 | 3.924E-02 | 7.345E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 2.397E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | 1.120E-02 | 2.242E-01 | 3.832E-01 | NOT IDENT. |
| PU-239 | -2.318E+01 | 1.776E+02 | 3.331E+02 | NOT IDENT. |
| AM-241 | 2.478E-02 | 8.756E-02 | 1.455E-01 | NOT IDENT. |
| AM-243 | -2.098E-02 | 3.175E-02 | 5.206E-02 | NOT IDENT. |
| CM-243 | -1.192E-02 | 6.307E-02 | 1.172E-01 | NOT IDENT. |
| CM-247 | -8.111E-03 | 2.186E-02 | 3.860E-02 | NOT IDENT. |
| CF-249 | 9.041E-03 | 2.528E-02 | 4.969E-02 | NOT IDENT. |
| CF-251 | 6.388E-02 | 8.422E-02 | 1.543E-01 | NOT IDENT. |
| ANH-511 | -3.542E-02 | 3.475E-02 | 7.558E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:30.60

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 26.70 | 22 | 2 | 1.37 | 53.68 | 50 | 29 | 6.08E-03 | 34.2 | 2.11E+00 |
| 2 | 3 | 29.46 | 22 | 6 | 1.38 | 59.18 | 50 | 29 | 6.11E-03 | 38.3 | |
| 3 | 3 | 32.24 | 25 | 11 | 1.39 | 64.75 | 50 | 29 | 6.91E-03 | 34.8 | |
| 4 | 3 | 34.72 | 13 | 14 | 1.40 | 69.70 | 50 | 29 | 3.67E-03 | 66.4 | |
| 5 | 0 | 64.04 | 48 | 78 | 1.46 | 128.29 | 122 | 14 | 1.33E-02 | 41.5 | |
| 6 | 0 | 92.83 | 72 | 55 | 1.12 | 185.82 | 182 | 11 | 2.00E-02 | 22.9 | |
| 7 | 0 | 119.66 | 18 | 16 | 1.90 | 239.42 | 237 | 6 | 5.05E-03 | 41.4 | |
| 8 | 0 | 179.15 | 10 | 19 | 1.14 | 358.30 | 355 | 7 | 2.80E-03 | 78.5 | |
| 9 | 0 | 185.77 | 40 | 26 | 0.94 | 371.54 | 368 | 7 | 1.12E-02 | 26.2 | |
| 10 | 0 | 230.75 | 23 | 18 | 3.97 | 461.43 | 456 | 12 | 6.39E-03 | 42.4 | |
| 11 | 0 | 239.06 | 20 | 40 | 1.20 | 478.05 | 471 | 10 | 5.56E-03 | 63.2 | |
| 12 | 0 | 352.20 | 28 | 16 | 0.83 | 704.20 | 698 | 12 | 7.68E-03 | 35.8 | |
| 13 | 0 | 419.87 | 17 | 11 | 3.35 | 839.47 | 834 | 11 | 4.72E-03 | 44.9 | |
| 14 | 0 | 511.13 | 82 | 15 | 2.19 | 1021.93 | 1016 | 15 | 2.28E-02 | 15.1 | |
| 15 | 0 | 517.03 | 9 | 2 | 0.50 | 1033.74 | 1031 | 6 | 2.42E-03 | 45.1 | |
| 16 | 0 | 555.95 | 15 | 3 | 3.33 | 1111.55 | 1105 | 12 | 4.17E-03 | 34.6 | |
| 17 | 0 | 609.98 | 42 | 0 | 1.16 | 1219.60 | 1215 | 12 | 1.17E-02 | 15.4 | |
| 18 | 0 | 803.42 | 7 | 4 | 0.61 | 1606.51 | 1600 | 8 | 1.84E-03 | 65.7 | |
| 19 | 0 | 1099.16 | 8 | 0 | 0.74 | 2198.25 | 2193 | 10 | 2.22E-03 | 35.4 | |
| 20 | 0 | 1461.39 | 7 | 4 | 0.62 | 2923.38 | 2917 | 9 | 1.87E-03 | 68.3 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:32.71

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 1 | 10.66* | 1.331E+00 | 2.857E-02 | 2.857E-02 | 1242.26 |
| BI-211 | 72.87 | ------ | 1.23 | 4.898E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 21 | 12.92* | 4.029E+00 | 2.074E-01 | 2.074E-01 | 97.08 |
| TH-234 | 63.29 | 13 | 3.70* | 3.830E+00 | 4.918E-01 | 4.918E-01 | 299.90 |
| | 92.59 | 9 | 4.23 | 6.361E+00 | 1.729E-01 | 1.729E-01 | 373.47 |
| U-238 | 63.29 | 13 | 3.70* | 3.830E+00 | 4.918E-01 | 4.918E-01 | 299.90 |
| | 92.59 | 9 | 4.23 | 6.361E+00 | 1.729E-01 | 1.729E-01 | 373.47 |

Flag: "*" = Keyline

Sample ID : G341146013 Acquisition date : 10-FEB-2014 13:26:39

Total number of lines in spectrum 17
Number of unidentified lines 8
Number of lines tentatively identified by NID 9 52.94%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 2.857E-02 | 2.857E-02 | 35.49E-02 | 1242.26 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.074E-01 | 2.074E-01 | 2.013E-01 | 97.08 | |
| TH-234 | 4.47E+09Y | 1.00 | 4.918E-01 | 4.918E-01 | 14.75E-01 | 299.90 | |
| U-238 | 4.47E+09Y | 1.00 | 4.918E-01 | 4.918E-01 | 14.75E-01 | 299.90 | |
| | Total Activity : | | 1.220E+00 | 1.220E+00 | | | |
| | Grand Total Activity : | | 1.220E+00 | 1.220E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146013 Acquisition date : 10-FEB-2014 13:26:39

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 26.70 | 4 | 2 | 1.37 | 53.68 | 50 | 29 | 1.00E-03 | **** | 1.91E-02 | |
| 3 | 32.24 | 3 | 11 | 1.39 | 64.75 | 50 | 29 | 7.00E-04 | **** | 1.25E-01 | |
| 3 | 34.72 | 3 | 14 | 1.40 | 69.70 | 50 | 29 | 7.99E-04 | **** | 2.29E-01 | |
| 0 | 119.66 | 18 | 16 | 1.90 | 239.42 | 237 | 6 | 5.05E-03 | 82.7 | 6.87E+00 | T |
| 0 | 179.15 | 10 | 19 | 1.14 | 358.30 | 355 | 7 | 2.80E-03 | **** | 6.13E+00 | |
| 0 | 230.75 | 23 | 18 | 3.97 | 461.43 | 456 | 12 | 6.39E-03 | 84.8 | 5.32E+00 | |
| 0 | 239.06 | 7 | 40 | 1.20 | 478.05 | 471 | 10 | 1.91E-03 | **** | 5.21E+00 | T |
| 0 | 419.87 | 14 | 11 | 3.35 | 839.47 | 834 | 11 | 3.80E-03 | **** | 3.57E+00 | |
| 0 | 517.03 | 9 | 2 | 0.50 | 1033.74 | 1031 | 6 | 2.42E-03 | 90.2 | 3.07E+00 | |
| 0 | 555.95 | 15 | 3 | 3.33 | 1111.55 | 1105 | 12 | 4.17E-03 | 69.2 | 2.91E+00 | |
| 0 | 609.98 | 38 | 0 | 1.16 | 1219.60 | 1215 | 12 | 1.06E-02 | 35.6 | 2.72E+00 | T |
| 0 | 803.42 | 4 | 4 | 0.61 | 1606.51 | 1600 | 8 | 1.01E-03 | **** | 2.19E+00 | T |
| 0 | 1099.16 | 8 | 0 | 0.74 | 2198.25 | 2193 | 10 | 2.22E-03 | 70.7 | 1.69E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:44.93

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146013.CNF;1       *
* Acquisition date : 10-FEB-2014 13:26:39 Sensitivity     : 3.000                *
* Detector ID      : GAM20                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:15.70     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:29:00 Nuclide Library : SOLID                *
* Sample ID        : G341146013           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.4472E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 11-JUN-2013 12:34:02 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM20_500MLMB.CNF;6              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 1.887E-01 |
| BI-211 | 8.922E-02 |
| TH-234 | 5.215E-01 |
| U-238 | 5.215E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 4.898E-01 | NOT IDENT. |
| NA-22 | 1.214E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.327E-02 | NOT IDENT. |
| SC-46 | 2.626E-02 | NOT IDENT. |
| V-48 | 8.078E-01 | NOT IDENT. |
| CR-51 | 1.409E+00 | NOT IDENT. |
| MN-54 | 2.428E-02 | NOT IDENT. |
| CO-56 | 4.637E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.393E-02 | NOT IDENT. |
| CO-58 | 5.087E-02 | NOT IDENT. |
| FE-59 | 1.573E-01 | FAIL ABUN |
| CO-60 | 2.227E-02 | NOT IDENT. |
| ZN-65 | 4.584E-02 | NOT IDENT. |
| GE-68 | 8.419E-01 | NOT IDENT. |
| AS-73 | 7.068E-01 | NOT IDENT. |
| AS-74 | 1.153E+00 | NOT IDENT. |
| SE-75 | 4.026E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 9.640E-01 | NOT IDENT. |
| RB-83 | 5.517E-02 | NOT IDENT. |
| KR-85 | 5.199E+00 | NOT IDENT. |
| SR-85 | 6.383E-02 | NOT IDENT. |
| RB-86 | 8.762E+00 | NOT IDENT. |
| Y-88 | 3.498E-02 | NOT IDENT. |
| Y-91 | 1.769E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 1.622E-02 | NOT IDENT. |
| NB-95 | 4.069E-02 | NOT IDENT. |
| NB-95M | 1.303E-01 | NOT IDENT. |
| ZR-95 | 9.353E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.469E-02 | NOT IDENT. |
| RH-102 | 3.477E-02 | NOT IDENT. |
| RU-103 | 8.972E-02 | FAIL ABUN |
| RH-106 | 1.532E-01 | NOT IDENT. |
| RU-106 | 1.532E-01 | NOT IDENT. |
| AG-108M | 1.512E-02 | NOT IDENT. |
| CD-109 | 3.984E-01 | NOT IDENT. |
| AG-110M | 2.791E-02 | NOT IDENT. |
| SN-113 | 3.295E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.629E+00 | NOT IDENT. |
| TE-123M | 2.247E-02 | NOT IDENT. |
| SB-124 | 1.108E-01 | NOT IDENT. |
| SB-125 | 5.497E-02 | NOT IDENT. |
| TE-125M | 1.306E+01 | NOT IDENT. |
| I-126 | 7.378E+00 | NOT IDENT. |
| SB-126 | 5.350E+00 | NOT IDENT. |
| SN-126 | 3.432E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.014E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.224E-02 | FAIL ABUN |
| CS-135 | 8.279E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.031E+00 | NOT IDENT. |
| BA-137M | 1.585E-02 | NOT IDENT. |
| CS-137 | 1.674E-02 | NOT IDENT. |
| CE-139 | 2.185E-02 | NOT IDENT. |
| BA-140 | 2.544E+00 | NOT IDENT. |
| LA-140 | 2.544E+00 | NOT IDENT. |
| CE-141 | 1.867E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.075E-01 | NOT IDENT. |
| PM-144 | 2.213E-02 | NOT IDENT. |
| PR-144 | 1.719E+00 | NOT IDENT. |
| PM-146 | 2.522E-02 | NOT IDENT. |
| ND-147 | 4.382E+01 | NOT IDENT. |
| PM-147 | 3.874E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.569E-02 | NOT IDENT. |
| EU-152 | 4.166E-02 | NOT IDENT. |
| GD-153 | 5.487E-02 | NOT IDENT. |
| EU-154 | 2.945E-02 | NOT IDENT. |
| EU-155 | 5.272E-02 | NOT IDENT. |
| TB-160 | 1.335E-01 | NOT IDENT. |
| HO-166M | 4.011E-02 | NOT IDENT. |
| TM-171 | 8.208E+00 | NOT IDENT. |
| LU-176 | 1.323E-02 | NOT IDENT. |
| HF-181 | 7.307E-02 | NOT IDENT. |
| TA-182 | 1.797E-01 | NOT IDENT. |
| RE-183 | 1.959E-01 | NOT IDENT. |
| RE-184 | 3.395E-01 | NOT IDENT. |
| W-188 | 6.869E+00 | FAIL ABUN |
| IR-192 | 4.111E-02 | NOT IDENT. |
| HG-203 | 6.055E-02 | NOT IDENT. |
| BI-207 | 1.620E-02 | NOT IDENT. |
| TL-208 | 1.749E-02 | NOT IDENT. |
| PB-210 | 1.437E+00 | NOT IDENT. |
| PB-211 | 3.308E-01 | NOT IDENT. |
| BI-212 | 2.618E-01 | NOT IDENT. |
| PB-212 | 3.886E-02 | FAIL ABUN |
| BI-214 | 5.907E-02 | FAIL ABUN |
| PB-214 | 5.075E-02 | FAIL ABUN |
| RN-219 | 1.939E-01 | NOT IDENT. |
| RN-222 | 5.907E-02 | FAIL ABUN |
| RA-223 | 3.818E-01 | NOT IDENT. |
| RA-224 | 3.533E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 5.907E-02 | FAIL ABUN |
| AC-227 | 1.425E-01 | NOT IDENT. |
| TH-227 | 1.425E-01 | NOT IDENT. |
| AC-228 | 8.048E-02 | NOT IDENT. |
| RA-228 | 8.048E-02 | NOT IDENT. |
| TH-228 | 3.886E-02 | FAIL ABUN |
| TH-229 | 2.615E-01 | NOT IDENT. |
| TH-230 | 5.907E-02 | FAIL ABUN |
| PA-231 | 6.493E-01 | NOT IDENT. |
| TH-231 | 3.818E-01 | NOT IDENT. |
| TH-232 | 8.048E-02 | NOT IDENT. |
| PA-233 | 3.257E-02 | NOT IDENT. |
| PA-234 | 1.816E-01 | NOT IDENT. |
| PA-234M | 2.447E+00 | NOT IDENT. |
| U-234 | 5.907E-02 | FAIL ABUN |
| U-235 | 1.087E-01 | FAIL ABUN |
| NP-237 | 3.257E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 1.722E-01 | NOT IDENT. |
| PU-239 | 1.503E+02 | NOT IDENT. |
| AM-241 | 6.667E-02 | NOT IDENT. |
| AM-243 | 2.398E-02 | NOT IDENT. |
| CM-243 | 5.356E-02 | NOT IDENT. |
| CM-247 | 1.665E-02 | NOT IDENT. |
| CF-249 | 2.203E-02 | NOT IDENT. |
| CF-251 | 7.062E-02 | NOT IDENT. |
| ANH-511 | 3.554E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:31:49.65

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146013.CNF;1    *
* Acquisition date : 10-FEB-2014 13:26:39 Sensitivity     : 3.000          *
* Detector ID      : GAM20                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:15.70     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:29:00 Nuclide Library : SOLID          *
* Sample ID        : G341146013           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.4472E+02 GRAM   *
*                                         Quantity Err(%) : 1.3820E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 12:34:02 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM20_500MLMB.CNF;6       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 2.857E-02 | 3.478E-01 | 3.478E-01 |
| BI-211 | 2.074E-01 | 1.980E-01 | 1.980E-01 |
| TH-234 | 4.918E-01 | 1.450E+00 | 1.450E+00 |
| U-238 | 4.918E-01 | 1.450E+00 | 1.450E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.215E-01 | 5.328E-01 | 5.420E-01 | NOT IDENT. |
| NA-22 | -1.040E-02 | 1.861E-02 | 1.919E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.433E+42 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.342E-03 | 2.880E-02 | 2.882E-02 | NOT IDENT. |
| SC-46 | -3.019E-02 | 4.118E-02 | 4.337E-02 | NOT IDENT. |
| V-48 | -9.698E-01 | 1.291E+00 | 1.363E+00 | NOT IDENT. |
| CR-51 | -9.259E-01 | 1.837E+00 | 1.884E+00 | NOT IDENT. |
| MN-54 | 2.382E-02 | 2.395E-02 | 2.624E-02 | NOT IDENT. |
| CO-56 | 8.978E-03 | 5.375E-02 | 5.391E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 5.703E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.019E-02 | 2.000E-02 | 2.052E-02 | NOT IDENT. |
| CO-58 | -1.521E-03 | 6.115E-02 | 6.115E-02 | NOT IDENT. |
| FE-59 | 1.912E-01 | 1.366E-01 | 1.615E-01 | FAIL ABUN |
| CO-60 | 1.375E-02 | 2.240E-02 | 2.324E-02 | NOT IDENT. |
| ZN-65 | -6.200E-02 | 7.307E-02 | 7.823E-02 | NOT IDENT. |
| GE-68 | 1.847E-01 | 9.798E-01 | 9.834E-01 | NOT IDENT. |
| AS-73 | -2.091E-01 | 8.873E-01 | 8.923E-01 | NOT IDENT. |
| AS-74 | 6.593E-01 | 1.237E+00 | 1.272E+00 | NOT IDENT. |
| SE-75 | 8.460E-04 | 4.798E-02 | 4.798E-02 | FAIL ABUN |
| BR-77 | 3.333E+10 | 1.537E+11 | 1.545E+11 | SHORT HLIF |
| SR-82 | -1.028E+00 | 1.467E+00 | 1.538E+00 | NOT IDENT. |
| RB-83 | -1.748E-02 | 7.945E-02 | 7.984E-02 | NOT IDENT. |
| KR-85 | -2.105E+01 | 1.001E+01 | 1.380E+01 | NOT IDENT. |
| SR-85 | -2.590E-01 | 1.230E-01 | 1.696E-01 | NOT IDENT. |
| RB-86 | 2.658E+00 | 1.004E+01 | 1.011E+01 | NOT IDENT. |
| Y-88 | 1.692E-02 | 3.450E-02 | 3.533E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | -1.108E+01 | 2.424E+01 | 2.475E+01 | NOT IDENT. |
| NB-94 | -6.501E-03 | 2.056E-02 | 2.077E-02 | NOT IDENT. |
| NB-95 | -2.109E-02 | 5.307E-02 | 5.392E-02 | NOT IDENT. |
| NB-95M | 1.632E-02 | 2.388E-01 | 2.390E-01 | NOT IDENT. |
| ZR-95 | 3.476E-02 | 1.043E-01 | 1.055E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 3.373E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -4.667E+40 | 2.525E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 3.840E+09 | 4.251E+09 | 4.590E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.075E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.513E-03 | 1.789E-02 | 1.812E-02 | NOT IDENT. |
| RH-102 | 1.161E-02 | 3.906E-02 | 3.941E-02 | NOT IDENT. |
| RU-103 | -4.783E-03 | 1.053E-01 | 1.053E-01 | FAIL ABUN |
| RH-106 | -1.030E-01 | 2.037E-01 | 2.089E-01 | NOT IDENT. |
| RU-106 | -1.030E-01 | 2.037E-01 | 2.089E-01 | NOT IDENT. |
| AG-108M | -3.488E-03 | 1.915E-02 | 1.921E-02 | NOT IDENT. |
| CD-109 | 6.002E-02 | 5.447E-01 | 5.454E-01 | NOT IDENT. |
| AG-110M | 7.645E-03 | 3.143E-02 | 3.162E-02 | NOT IDENT. |
| SN-113 | -2.914E-02 | 4.551E-02 | 4.737E-02 | NOT IDENT. |
| CD-115 | 1.328E+11 | 4.645E+11 | 4.684E+11 | SHORT HLIF |
| SN-117M | -1.615E-01 | 1.925E+00 | 1.926E+00 | NOT IDENT. |
| TE-123M | 5.080E-03 | 2.573E-02 | 2.583E-02 | NOT IDENT. |
| SB-124 | 5.426E-02 | 1.086E-01 | 1.113E-01 | NOT IDENT. |
| SB-125 | 6.552E-03 | 6.607E-02 | 6.614E-02 | NOT IDENT. |
| TE-125M | 5.384E+00 | 1.457E+01 | 1.477E+01 | NOT IDENT. |
| I-126 | -1.976E+00 | 9.147E+00 | 9.191E+00 | NOT IDENT. |
| SB-126 | -1.186E+00 | 6.649E+00 | 6.670E+00 | NOT IDENT. |
| SN-126 | -6.918E-04 | 4.471E-02 | 4.471E-02 | FAIL ABUN |
| SB-127 | -1.292E+06 | 1.563E+06 | 1.668E+06 | SHORT HLIF |
| I-131 | -4.375E+00 | 6.194E+01 | 6.197E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.274E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 8.779E+06 | 1.518E+07 | 1.568E+07 | SHORT HLIF |
| BA-133 | -2.277E-02 | 3.315E-02 | 3.470E-02 | NOT IDENT. |
| I-133 | 1.292E+31 | 2.374E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.529E-02 | 3.045E-02 | 3.122E-02 | FAIL ABUN |
| CS-135 | 5.802E-03 | 9.818E-02 | 9.821E-02 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.622E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.036E+00 | 4.161E+00 | 4.380E+00 | NOT IDENT. |
| BA-137M | -5.987E-03 | 2.005E-02 | 2.023E-02 | NOT IDENT. |
| CS-137 | -6.324E-03 | 2.118E-02 | 2.137E-02 | NOT IDENT. |
| CE-139 | 1.338E-02 | 2.419E-02 | 2.493E-02 | NOT IDENT. |
| BA-140 | -3.138E+00 | 4.326E+00 | 4.551E+00 | NOT IDENT. |
| LA-140 | -3.138E+00 | 4.326E+00 | 4.551E+00 | NOT IDENT. |
| CE-141 | -7.446E-03 | 2.212E-01 | 2.212E-01 | NOT IDENT. |
| CE-143 | 2.845E+19 | 2.461E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -5.343E-02 | 1.315E-01 | 1.337E-01 | NOT IDENT. |
| PM-144 | 8.080E-03 | 2.472E-02 | 2.499E-02 | NOT IDENT. |
| PR-144 | 6.068E-01 | 1.925E+00 | 1.944E+00 | NOT IDENT. |
| PM-146 | -1.029E-03 | 3.110E-02 | 3.110E-02 | NOT IDENT. |
| ND-147 | -1.726E+01 | 5.577E+01 | 5.631E+01 | NOT IDENT. |
| PM-147 | -8.435E+01 | 5.223E+02 | 5.237E+02 | NOT IDENT. |
| PM-149 | 3.851E+12 | 4.277E+12 | 4.616E+12 | SHORT HLIF |
| EU-150 | 7.834E-04 | 1.883E-02 | 1.883E-02 | NOT IDENT. |
| EU-152 | -2.052E-02 | 5.424E-02 | 5.502E-02 | NOT IDENT. |
| GD-153 | -3.089E-02 | 8.075E-02 | 8.194E-02 | NOT IDENT. |
| EU-154 | -3.238E-02 | 4.905E-02 | 5.117E-02 | NOT IDENT. |
| EU-155 | -2.150E-02 | 6.320E-02 | 6.394E-02 | NOT IDENT. |
| TB-160 | 3.875E-03 | 1.595E-01 | 1.595E-01 | NOT IDENT. |
| HO-166M | 1.617E-02 | 4.502E-02 | 4.560E-02 | NOT IDENT. |
| TM-171 | 2.342E+00 | 9.719E+00 | 9.776E+00 | NOT IDENT. |
| LU-176 | -2.720E-03 | 1.633E-02 | 1.638E-02 | NOT IDENT. |
| HF-181 | -5.806E-02 | 9.566E-02 | 9.917E-02 | NOT IDENT. |
| TA-182 | 1.661E-01 | 1.772E-01 | 1.924E-01 | NOT IDENT. |
| RE-183 | 7.812E-02 | 2.412E-01 | 2.437E-01 | NOT IDENT. |
| RE-184 | 2.516E-02 | 4.034E-01 | 4.035E-01 | NOT IDENT. |
| W-188 | -1.321E+01 | 1.041E+01 | 1.200E+01 | FAIL ABUN |
| IR-192 | 7.235E-03 | 4.846E-02 | 4.857E-02 | NOT IDENT. |
| HG-203 | 1.987E-02 | 6.946E-02 | 7.004E-02 | NOT IDENT. |
| BI-207 | -1.415E-02 | 2.513E-02 | 2.592E-02 | NOT IDENT. |
| TL-208 | -2.584E-02 | 2.334E-02 | 2.608E-02 | NOT IDENT. |
| PB-210 | -3.803E-01 | 1.743E+00 | 1.751E+00 | NOT IDENT. |
| PB-211 | 6.276E-03 | 4.019E-01 | 4.019E-01 | NOT IDENT. |
| BI-212 | 2.006E-01 | 2.653E-01 | 2.803E-01 | NOT IDENT. |
| PB-212 | 1.570E-02 | 5.819E-02 | 5.862E-02 | FAIL ABUN |
| BI-214 | 1.605E-01 | 5.756E-02 | 9.247E-02 | FAIL ABUN |
| PB-214 | 7.527E-02 | 7.186E-02 | 7.947E-02 | FAIL ABUN |
| RN-219 | 2.197E-02 | 2.320E-01 | 2.322E-01 | NOT IDENT. |
| RN-222 | 1.605E-01 | 5.756E-02 | 9.247E-02 | FAIL ABUN |
| RA-223 | 3.414E-01 | 4.133E-01 | 4.411E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 2.844E-01 | 4.332E-01 | 4.518E-01 | NOT IDENT. |
| RA-226 | 1.605E-01 | 5.756E-02 | 9.247E-02 | FAIL ABUN |
| AC-227 | 6.703E-02 | 1.617E-01 | 1.645E-01 | NOT IDENT. |
| TH-227 | 6.703E-02 | 1.617E-01 | 1.645E-01 | NOT IDENT. |
| AC-228 | 1.475E-02 | 8.771E-02 | 8.796E-02 | NOT IDENT. |
| RA-228 | 1.475E-02 | 8.771E-02 | 8.796E-02 | NOT IDENT. |
| TH-228 | 1.570E-02 | 5.819E-02 | 5.862E-02 | FAIL ABUN |
| TH-229 | -1.138E-01 | 3.218E-01 | 3.259E-01 | NOT IDENT. |
| TH-230 | 1.605E-01 | 5.755E-02 | 9.246E-02 | FAIL ABUN |
| PA-231 | -5.488E-01 | 8.649E-01 | 8.996E-01 | NOT IDENT. |
| TH-231 | 3.414E-01 | 4.133E-01 | 4.411E-01 | NOT IDENT. |
| TH-232 | 1.475E-02 | 8.771E-02 | 8.796E-02 | NOT IDENT. |
| PA-233 | -3.444E-04 | 3.924E-02 | 3.924E-02 | NOT IDENT. |
| PA-234 | 5.648E-02 | 2.172E-01 | 2.187E-01 | NOT IDENT. |
| PA-234M | -6.663E-01 | 2.910E+00 | 2.926E+00 | NOT IDENT. |
| U-234 | 1.605E-01 | 5.755E-02 | 9.246E-02 | FAIL ABUN |
| U-235 | -1.616E-02 | 1.226E-01 | 1.228E-01 | FAIL ABUN |
| NP-237 | -3.444E-04 | 3.924E-02 | 3.924E-02 | NOT IDENT. |
| NP-238 | -5.754E+11 | 2.399E+12 | 2.413E+12 | SHORT HLIF |
| NP-239 | 1.120E-02 | 2.242E-01 | 2.243E-01 | NOT IDENT. |
| PU-239 | -2.318E+01 | 1.776E+02 | 1.779E+02 | NOT IDENT. |
| AM-241 | 2.478E-02 | 8.759E-02 | 8.830E-02 | NOT IDENT. |
| AM-243 | -2.098E-02 | 3.180E-02 | 3.317E-02 | NOT IDENT. |
| CM-243 | -1.192E-02 | 6.309E-02 | 6.332E-02 | NOT IDENT. |
| CM-247 | -8.111E-03 | 2.191E-02 | 2.222E-02 | NOT IDENT. |
| CF-249 | 9.041E-03 | 2.530E-02 | 2.562E-02 | NOT IDENT. |
| CF-251 | 6.388E-02 | 8.463E-02 | 8.939E-02 | NOT IDENT. |
| ANH-511 | -3.542E-02 | 3.488E-02 | 3.836E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 38.5865 | 94.67 | 41.7889 | 193.51 | 37.4269 |
| 45.60 | 31.2113 | 94.87 | 41.7995 | 197.03 | 34.6443 |
| 46.54 | 37.7376 | 97.43 | 47.1744 | 198.01 | 35.6343 |
| 49.72 | 0.0000 | 98.43 | 34.9872 | 201.83 | 35.7407 |
| 51.35 | 32.6395 | 98.44 | 45.4837 | 205.31 | 33.8996 |
| 52.39 | 34.8811 | 99.53 | 41.0400 | 210.85 | 27.2342 |
| 53.44 | 41.4992 | 100.11 | 35.9354 | 215.65 | 18.5469 |
| 57.36 | 0.0000 | 103.18 | 41.3466 | 222.11 | 26.4817 |
| 57.53 | 34.3165 | 103.37 | 41.3561 | 227.09 | 26.7742 |
| 57.98 | 35.6634 | 105.21 | 41.4463 | 227.38 | 26.7798 |
| 59.32 | 34.7510 | 105.31 | 41.4511 | 228.16 | 0.0000 |
| 59.54 | 34.7639 | 106.12 | 30.8972 | 228.18 | 20.4904 |
| 63.29 | 35.5331 | 109.28 | 33.6688 | 117.23 | 20.4904 |
| 63.58 | 35.5496 | 111.00 | 34.6229 | 235.69 | 23.7687 |
| 64.28 | 35.5895 | 111.76 | 0.0000 | 235.96 | 19.8109 |
| 66.73 | 38.5182 | 116.30 | 0.0000 | 238.63 | 39.6957 |
| 67.24 | 40.2248 | 117.23 | 25.7466 | 238.98 | 0.0000 |
| 67.75 | 35.2244 | 121.12 | 37.3474 | 240.99 | 27.0373 |
| 69.67 | 55.5155 | 121.22 | 37.3514 | 242.00 | 23.8731 |
| 70.83 | 40.4456 | 121.78 | 40.2488 | 244.70 | 35.8761 |
| 72.81 | 47.3258 | 122.06 | 37.3852 | 252.40 | 0.0000 |
| 72.87 | 43.9494 | 123.07 | 27.3495 | 252.80 | 35.0709 |
| 74.66 | 59.8830 | 127.23 | 34.3373 | 254.15 | 0.0000 |
| 74.82 | 59.8970 | 129.30 | 30.7889 | 256.23 | 25.1080 |
| 74.97 | 48.6062 | 131.20 | 29.0347 | 260.90 | 0.0000 |
| 77.11 | 41.9528 | 133.02 | 36.3608 | 264.66 | 30.2962 |
| 79.69 | 51.2100 | 133.52 | 34.5604 | 268.22 | 27.3296 |
| 80.12 | 52.3794 | 136.00 | 33.7351 | 269.46 | 33.4290 |
| 80.19 | 0.0000 | 136.47 | 34.6631 | 271.23 | 31.4390 |
| 80.57 | 42.1576 | 140.51 | 0.0000 | 273.65 | 26.4086 |
| 81.00 | 38.7626 | 143.76 | 32.1561 | 276.40 | 25.4372 |
| 81.07 | 38.7664 | 144.24 | 26.6561 | 277.37 | 27.4886 |
| 83.79 | 52.6442 | 145.44 | 40.4903 | 277.60 | 27.4927 |
| 85.43 | 40.1440 | 152.43 | 37.9796 | 278.00 | 22.4072 |
| 86.55 | 41.3527 | 153.25 | 27.8112 | 279.20 | 18.3469 |
| 86.79 | 41.3657 | 323.87 | 32.4752 | 279.54 | 22.4287 |
| 86.94 | 40.2249 | 156.02 | 31.6000 | 280.46 | 27.5420 |
| 87.09 | 40.2329 | 158.56 | 36.3313 | 283.69 | 26.5753 |
| 87.57 | 41.4086 | 159.00 | 30.7542 | 284.31 | 0.0000 |
| 88.03 | 39.7073 | 162.33 | 34.5853 | 285.41 | 19.4410 |
| 88.34 | 39.7234 | 163.33 | 33.6808 | 285.90 | 0.0000 |
| 88.47 | 38.0028 | 165.86 | 24.3796 | 287.50 | 17.4169 |
| 89.96 | 43.2690 | 176.31 | 36.3334 | 290.67 | 34.9012 |
| 91.11 | 27.7334 | 176.60 | 36.3425 | 293.27 | 0.0000 |
| 92.59 | 39.3635 | 177.52 | 25.7625 | 351.93 | 18.5282 |
| 93.35 | 39.4016 | 181.07 | 0.0000 | 295.96 | 24.7152 |
| 94.56 | 41.7832 | 184.41 | 34.8382 | 879.38 | 45.3824 |
| 94.65 | 41.7878 | 143.76 | 42.9136 | 299.98 | 24.7745 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 24.7764 | 487.02 | 10.8809 | 702.65 | 13.7536 |
| 300.13 | 24.7767 | 492.35 | 0.0000 | 706.68 | 15.7391 |
| 301.36 | 25.8282 | 497.08 | 16.3909 | 711.68 | 14.7792 |
| 302.85 | 21.7149 | 505.52 | 31.0698 | 720.70 | 8.8934 |
| 256.23 | 25.8762 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 22.8016 | 511.00 | 15.2649 | 722.78 | 8.8994 |
| 308.46 | 20.7492 | 514.00 | 85.5882 | 722.91 | 9.8884 |
| 311.90 | 20.7907 | 514.00 | 85.5882 | 723.31 | 9.8899 |
| 316.51 | 22.9309 | 520.40 | 10.7264 | 724.19 | 12.8604 |
| 319.41 | 26.1009 | 520.69 | 0.0000 | 727.33 | 3.9610 |
| 320.08 | 28.1997 | 522.65 | 0.0000 | 733.00 | 9.9204 |
| 321.04 | 29.2604 | 527.90 | 0.0000 | 735.93 | 8.9367 |
| 323.87 | 17.7938 | 529.59 | 9.2283 | 333.97 | 13.9081 |
| 325.23 | 17.8073 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 32.5368 | 531.02 | 14.7738 | 747.24 | 5.9791 |
| 333.37 | 17.8884 | 546.56 | 0.0000 | 748.06 | 5.9805 |
| 333.97 | 26.3153 | 552.55 | 12.4167 | 752.31 | 8.9826 |
| 334.37 | 29.4800 | 563.25 | 8.3121 | 753.82 | 10.9839 |
| 338.28 | 21.1026 | 569.33 | 14.9965 | 756.73 | 8.9949 |
| 338.32 | 21.1029 | 946.00 | 14.9977 | 756.80 | 8.9952 |
| 311.90 | 20.0715 | 569.70 | 14.9984 | 884.68 | 10.0168 |
| 340.48 | 20.0715 | 583.19 | 16.0176 | 765.81 | 8.0180 |
| 340.55 | 20.0724 | 584.27 | 12.2535 | 766.42 | 12.0293 |
| 344.28 | 17.9958 | 595.83 | 9.4663 | 766.84 | 12.0308 |
| 345.93 | 13.5619 | 427.87 | 18.0175 | 772.60 | 0.0000 |
| 351.06 | 14.8744 | 602.52 | 0.0000 | 776.52 | 9.0499 |
| 351.93 | 14.8812 | 602.73 | 14.7630 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 9.4973 | 778.90 | 9.0565 |
| 356.01 | 27.2707 | 609.32 | 7.9277 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 8.5649 | 785.37 | 11.0905 |
| 366.42 | 0.0000 | 614.28 | 11.1187 | 792.07 | 8.0822 |
| 375.05 | 9.6828 | 618.01 | 9.5430 | 794.95 | 11.2348 |
| 356.01 | 19.4521 | 620.36 | 9.5510 | 795.86 | 11.3785 |
| 388.16 | 16.2451 | 621.93 | 12.4233 | 810.29 | 12.1890 |
| 388.63 | 17.3323 | 630.19 | 0.0000 | 344.28 | 13.2053 |
| 391.69 | 21.6983 | 631.29 | 13.4237 | 810.76 | 13.2066 |
| 264.66 | 16.3458 | 633.25 | 13.4330 | 815.77 | 8.1391 |
| 401.81 | 14.1743 | 634.78 | 14.4001 | 1048.07 | 11.2003 |
| 402.40 | 17.4502 | 635.95 | 15.3664 | 832.01 | 12.2666 |
| 404.85 | 14.1951 | 636.99 | 0.0000 | 834.85 | 4.0922 |
| 410.95 | 17.5225 | 645.85 | 6.7462 | 835.71 | 4.0932 |
| 413.71 | 15.7911 | 657.76 | 12.5804 | 836.80 | 0.0000 |
| 414.70 | 15.7986 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 19.8641 | 661.66 | 11.6282 | 846.77 | 10.2656 |
| 427.87 | 18.7673 | 664.57 | 0.0000 | 856.80 | 7.2064 |
| 433.94 | 17.7131 | 666.33 | 11.6467 | 860.56 | 9.2751 |
| 439.40 | 18.8674 | 666.50 | 11.6473 | 871.09 | 5.1681 |
| 453.88 | 20.1088 | 667.71 | 0.0000 | 873.19 | 8.2738 |
| 463.37 | 16.8281 | 677.62 | 12.6655 | 875.33 | 0.0000 |
| 468.07 | 19.1113 | 685.70 | 0.0000 | 879.38 | 7.2521 |
| 473.00 | 0.0000 | 695.00 | 9.7993 | 880.51 | 4.1453 |
| 475.06 | 13.5315 | 696.49 | 10.7844 | 883.24 | 6.2227 |
| 476.78 | 9.0277 | 696.51 | 10.7846 | 884.68 | 5.1876 |
| 477.60 | 11.7401 | 697.00 | 16.6696 | 889.28 | 9.3496 |
| 482.18 | 17.1925 | 697.49 | 12.7493 | 894.76 | 9.3636 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 9.3720 | 1298.22 | 0.0000 | | |
| 903.28 | 10.4282 | 1312.11 | 5.7397 | | |
| 911.20 | 5.2253 | 1332.49 | 2.8818 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.2962 | 1365.19 | 4.8346 | | |
| 937.49 | 12.6293 | 1368.63 | 0.0000 | | |
| 944.13 | 7.3799 | 1384.29 | 5.8235 | | |
| 946.00 | 9.4933 | 1408.01 | 2.9253 | | |
| 949.00 | 8.4451 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 4.9249 | | |
| 962.31 | 9.5337 | 1489.16 | 1.9805 | | |
| 964.08 | 11.6577 | 1505.03 | 3.9725 | | |
| 966.17 | 8.4828 | 1596.21 | 6.0576 | | |
| 968.97 | 8.4891 | 1620.50 | 0.0000 | | |
| 983.53 | 9.5858 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.0262 | | |
| 1274.44 | 8.5484 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.4189 | 1764.49 | 2.0775 | | |
| 1004.73 | 9.6374 | 1063.66 | 8.3177 | | |
| 507.63 | 0.0000 | 1771.35 | 5.1996 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 5.2307 | | |
| 1037.84 | 8.6371 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.0507 | | |
| 631.29 | 10.8198 | | | | |
| 1048.07 | 4.3295 | | | | |
| 1049.04 | 3.2479 | | | | |
| 1050.41 | 5.4148 | | | | |
| 1063.66 | 6.5186 | | | | |
| 1077.00 | 7.6292 | | | | |
| 1077.34 | 7.6299 | | | | |
| 1085.87 | 9.8301 | | | | |
| 1099.45 | 5.4785 | | | | |
| 1112.07 | 4.3957 | | | | |
| 1112.84 | 3.2974 | | | | |
| 1115.54 | 13.1982 | | | | |
| 1120.29 | 7.3402 | | | | |
| 1120.55 | 4.5880 | | | | |
| 1221.41 | 3.6711 | | | | |
| 1129.67 | 6.4366 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.4290 | | | | |
| 1177.95 | 11.1553 | | | | |
| 1189.05 | 7.4554 | | | | |
| 1204.77 | 6.5460 | | | | |
| 1221.41 | 4.6926 | | | | |
| 1231.02 | 0.9405 | | | | |
| 1235.36 | 8.4723 | | | | |
| 1238.28 | 8.4774 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 10.4356 | | | | |
| 1274.44 | 4.7459 | | | | |
| 1274.54 | 4.7461 | | | | |
| 1291.59 | 0.9526 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:32:16.37

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146014.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM24.CNF;189
                                      Background date  : 9-FEB-2014 11:22:18.
Sample date      : 7-NOV-2013 10:33:00. Acquisition date : 10-FEB-2014 13:27:00
Sample ID        : G341146014           Sample quantity  : 1.56910E+02 GRAM
Detector name    : GAM24                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:05.42  0.2%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 92.83* | 19 | 57 | 1.50 | 184.90 | 178 | 13 | 5.15E-03 | 99.0 | |
| 2 | 0 | 239.94* | 22 | 59 | 0.81 | 479.13 | 472 | 14 | 6.05E-03 | 80.0 | |
| 3 | 0 | 255.63 | 15 | 51 | 3.14 | 510.51 | 499 | 13 | 4.23E-03 | 100.7 | |
| 4 | 0 | 286.79 | 11 | 15 | 1.67 | 572.83 | 569 | 6 | 2.95E-03 | 59.2 | |
| 5 | 0 | 352.20* | 16 | 25 | 0.86 | 703.67 | 698 | 10 | 4.56E-03 | 64.9 | |
| 6 | 0 | 440.81 | 9 | 7 | 1.36 | 880.92 | 877 | 7 | 2.43E-03 | 60.7 | |
| 7 | 0 | 492.12 | 7 | 5 | 0.76 | 983.54 | 979 | 7 | 1.98E-03 | 64.6 | |
| 8 | 0 | 495.26 | 10 | 2 | 0.70 | 989.83 | 987 | 7 | 2.75E-03 | 39.1 | |
| 9 | 0 | 532.69 | 12 | 2 | 1.62 | 1064.70 | 1059 | 10 | 3.27E-03 | 38.2 | |
| 10 | 0 | 574.13 | 8 | 9 | 1.31 | 1147.61 | 1142 | 8 | 2.12E-03 | 83.7 | |
| 11 | 0 | 584.20* | 3 | 19 | 4.73 | 1167.74 | 1158 | 13 | 7.36E-04 | 370.2 | |
| 12 | 0 | 610.71 | 13 | 21 | 1.35 | 1220.77 | 1213 | 13 | 3.50E-03 | 82.3 | |
| 13 | 0 | 669.19 | 6 | 5 | 1.46 | 1337.77 | 1334 | 7 | 1.68E-03 | 74.3 | |
| 14 | 0 | 727.08 | 7 | 12 | 1.19 | 1453.57 | 1447 | 12 | 1.94E-03 | 105.9 | |
| 15 | 0 | 1036.80 | 7 | 1 | 1.23 | 2073.19 | 2070 | 6 | 1.84E-03 | 48.3 | |
| 16 | 0 | 1211.33 | 8 | 0 | 1.07 | 2422.38 | 2419 | 7 | 2.22E-03 | 35.4 | |
| 17 | 0 | 1459.11* | 3 | 6 | 2.01 | 2918.16 | 2913 | 9 | 7.47E-04 | 216.6 | |
| 18 | 0 | 1762.99* | 3 | 2 | 1.42 | 3526.26 | 3522 | 8 | 9.25E-04 | 116.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:32:17

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146014.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:33:00 | Acquisition date | : 10-FEB-2014 13:27:00 |
| Sample ID | : G341146014 | Sample quantity | : 156.91 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA24 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:05.42 0.2% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TL-208 | 277.37 | ------ | 6.60 | 4.945E+00 | ------ Line Not Found | | ------ |
| | 583.19 | 3 | 85.00* | 2.945E+00 | 5.066E-03 | 5.066E-03 | 740.35 |
| | 860.56 | ------ | 12.50 | 2.171E+00 | ------ Line Not Found | | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 5.423E+00 | ------ Line Not Found | | ------ |
| | 351.06 | 16 | 12.92* | 4.220E+00 | 1.441E-01 | 1.441E-01 | 129.82 |
| BI-214 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.661E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ Line Not Found | | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.670E-02 | 232.06 |
| RN-222 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.661E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ Line Not Found | | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.670E-02 | 232.06 |
| RA-224 | 240.99 | 22 | 4.10* | 5.418E+00 | 4.694E-01 | 4.694E-01 | 160.04 |
| RA-226 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.661E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ Line Not Found | | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.670E-02 | 232.06 |
| TH-230 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.660E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ Line Not Found | | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.669E-02 | 232.06 |
| U-234 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.660E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ Line Not Found | | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.669E-02 | 232.06 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:32:18.64

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146014.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:27:00 | Sensitivity | : 3.000 |
| Detector ID | : GAM24 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:05.42 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 10:33:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146014 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.5691E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 6-JUN-2013 10:31:48 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM24_500MLMB.CNF;5 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| TL-208 | 5.066E-03 | 3.676E-02 | 3.884E-02 |
| BI-211 | 1.441E-01 | 1.833E-01 | 1.931E-01 |
| BI-214 | 4.661E-02 | 7.522E-02 | 8.156E-02 |
| RN-222 | 4.661E-02 | 7.522E-02 | 8.156E-02 |
| RA-224 | 4.694E-01 | 7.361E-01 | 6.390E-01 |
| RA-226 | 4.661E-02 | 7.522E-02 | 8.156E-02 |
| TH-230 | 4.660E-02 | 7.521E-02 | 8.155E-02 |
| U-234 | 4.660E-02 | 7.521E-02 | 8.155E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.423E-01 | 5.852E-01 | 1.141E+00 | NOT IDENT. |
| NA-22 | 5.428E-03 | 2.329E-02 | 5.069E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.045E-03 | 2.394E-02 | 5.114E-02 | NOT IDENT. |
| K-40 | -2.377E-04 | 4.342E-01 | 7.878E-01 | NOT IDENT. |
| SC-46 | 9.951E-03 | 4.750E-02 | 9.549E-02 | NOT IDENT. |
| V-48 | -4.423E-01 | 9.792E-01 | 1.767E+00 | NOT IDENT. |
| CR-51 | -4.367E-01 | 1.554E+00 | 2.768E+00 | NOT IDENT. |
| MN-54 | 1.332E-03 | 2.542E-02 | 4.988E-02 | NOT IDENT. |
| CO-56 | 1.281E-02 | 5.885E-02 | 1.151E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -8.982E-03 | 1.687E-02 | 2.997E-02 | NOT IDENT. |
| CO-58 | -2.354E-02 | 4.786E-02 | 8.490E-02 | NOT IDENT. |
| FE-59 | 1.202E-02 | 1.390E-01 | 3.002E-01 | NOT IDENT. |
| CO-60 | -4.377E-03 | 1.866E-02 | 3.788E-02 | NOT IDENT. |
| ZN-65 | 1.764E-02 | 6.568E-02 | 1.370E-01 | NOT IDENT. |
| GE-68 | -1.457E-01 | 7.032E-01 | 1.382E+00 | NOT IDENT. |
| AS-73 | -2.573E-01 | 7.038E-01 | 1.205E+00 | NOT IDENT. |
| AS-74 | 2.277E-01 | 1.380E+00 | 2.704E+00 | NOT IDENT. |
| SE-75 | -4.455E-04 | 4.352E-02 | 7.989E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.468E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -4.062E-01 | 2.038E+00 | 3.771E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | -3.020E-02 | 7.896E-02 | 1.453E-01 | NOT IDENT. |
| KR-85 | -6.864E+00 | 6.888E+00 | 1.158E+01 | NOT IDENT. |
| SR-85 | -8.453E-02 | 8.462E-02 | 1.423E-01 | NOT IDENT. |
| RB-86 | -3.999E-01 | 6.826E+00 | 1.397E+01 | NOT IDENT. |
| Y-88 | 6.304E-04 | 5.010E-02 | 1.038E-01 | NOT IDENT. |
| Y-91 | -3.718E+00 | 2.199E+01 | 4.174E+01 | NOT IDENT. |
| NB-94 | 2.610E-03 | 2.306E-02 | 4.445E-02 | NOT IDENT. |
| NB-95 | -5.137E-03 | 4.890E-02 | 9.492E-02 | NOT IDENT. |
| NB-95M | 9.800E-02 | 1.792E-01 | 3.131E-01 | NOT IDENT. |
| ZR-95 | 7.209E-02 | 9.271E-02 | 2.067E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 7.453E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.599E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.028E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 8.242E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.437E-02 | 1.843E-02 | 3.829E-02 | NOT IDENT. |
| RH-102 | -7.153E-03 | 3.712E-02 | 6.941E-02 | NOT IDENT. |
| RU-103 | 1.938E-02 | 1.023E-01 | 1.821E-01 | FAIL ABUN |
| RH-106 | -8.034E-02 | 2.221E-01 | 4.065E-01 | NOT IDENT. |
| RU-106 | -8.034E-02 | 2.221E-01 | 4.065E-01 | NOT IDENT. |
| AG-108M | 1.957E-02 | 1.594E-02 | 3.588E-02 | NOT IDENT. |
| CD-109 | -3.860E-01 | 5.120E-01 | 7.700E-01 | NOT IDENT. |
| AG-110M | 2.225E-04 | 3.502E-02 | 6.898E-02 | NOT IDENT. |
| SN-113 | 5.415E-03 | 4.303E-02 | 8.083E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 4.483E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -2.186E+00 | 1.830E+00 | 2.978E+00 | NOT IDENT. |
| TE-123M | -3.411E-02 | 2.679E-02 | 4.327E-02 | NOT IDENT. |
| SB-124 | 4.544E-02 | 1.367E-01 | 3.182E-01 | NOT IDENT. |
| SB-125 | -4.572E-02 | 5.947E-02 | 9.592E-02 | NOT IDENT. |
| TE-125M | -6.475E-01 | 1.510E+01 | 2.799E+01 | NOT IDENT. |
| I-126 | -9.615E+00 | 1.297E+01 | 1.798E+01 | NOT IDENT. |
| SB-126 | 4.404E+00 | 7.725E+00 | 1.503E+01 | NOT IDENT. |
| SN-126 | -8.739E-03 | 4.319E-02 | 6.973E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.333E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.416E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.457E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.491E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.740E-02 | 3.667E-02 | 5.325E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.996E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.746E-02 | 2.477E-02 | 5.712E-02 | NOT IDENT. |
| CS-135 | -3.301E-02 | 8.775E-02 | 1.546E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.756E+00 | 3.092E+00 | 5.705E+00 | NOT IDENT. |
| BA-137M | 8.082E-03 | 2.128E-02 | 4.358E-02 | NOT IDENT. |
| CS-137 | 8.538E-03 | 2.248E-02 | 4.604E-02 | NOT IDENT. |
| CE-139 | 3.453E-03 | 2.884E-02 | 5.344E-02 | NOT IDENT. |
| BA-140 | 4.285E+00 | 3.868E+00 | 1.043E+01 | NOT IDENT. |
| LA-140 | 4.285E+00 | 3.868E+00 | 1.043E+01 | NOT IDENT. |
| CE-141 | 1.787E-01 | 2.109E-01 | 4.161E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.569E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -3.497E-02 | 1.398E-01 | 2.539E-01 | NOT IDENT. |
| PM-144 | -1.760E-02 | 2.560E-02 | 4.377E-02 | NOT IDENT. |
| PR-144 | -1.380E+00 | 1.997E+00 | 3.412E+00 | NOT IDENT. |
| PM-146 | 9.933E-03 | 2.461E-02 | 5.061E-02 | NOT IDENT. |
| ND-147 | -6.592E+00 | 5.097E+01 | 8.546E+01 | NOT IDENT. |
| PM-147 | 7.503E+01 | 4.147E+02 | 7.924E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 3.500E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 3.090E-03 | 1.807E-02 | 3.355E-02 | FAIL ABUN |
| EU-152 | 1.135E-02 | 5.743E-02 | 1.089E-01 | NOT IDENT. |
| GD-153 | -4.797E-02 | 5.985E-02 | 8.853E-02 | NOT IDENT. |
| EU-154 | 3.385E-02 | 5.919E-02 | 1.394E-01 | NOT IDENT. |
| EU-155 | -3.192E-02 | 5.655E-02 | 1.006E-01 | NOT IDENT. |
| TB-160 | -4.581E-02 | 1.500E-01 | 2.788E-01 | NOT IDENT. |
| HO-166M | -7.324E-04 | 3.870E-02 | 7.414E-02 | NOT IDENT. |
| TM-171 | 8.904E-01 | 7.469E+00 | 1.356E+01 | NOT IDENT. |
| LU-176 | -4.792E-03 | 1.746E-02 | 3.085E-02 | NOT IDENT. |
| HF-181 | -5.232E-02 | 1.026E-01 | 1.848E-01 | NOT IDENT. |
| TA-182 | 3.635E-02 | 1.652E-01 | 3.463E-01 | NOT IDENT. |
| RE-183 | 1.119E-01 | 1.870E-01 | 3.529E-01 | NOT IDENT. |
| RE-184 | -1.063E-01 | 2.919E-01 | 5.373E-01 | NOT IDENT. |
| W-188 | -7.800E+00 | 1.191E+01 | 1.694E+01 | NOT IDENT. |
| IR-192 | -1.078E-02 | 4.181E-02 | 7.478E-02 | NOT IDENT. |
| HG-203 | 3.873E-02 | 7.754E-02 | 1.500E-01 | NOT IDENT. |
| BI-207 | 2.252E-02 | 2.710E-02 | 6.421E-02 | NOT IDENT. |
| PB-210 | -1.949E-01 | 1.249E+00 | 2.434E+00 | NOT IDENT. |
| PB-211 | -7.207E-02 | 4.094E-01 | 7.374E-01 | NOT IDENT. |
| BI-212 | 2.018E-01 | 4.191E-01 | 6.335E-01 | FAIL ABUN |
| PB-212 | 4.414E-02 | 6.923E-02 | 7.957E-02 | FAIL ABUN |
| PB-214 | 5.230E-02 | 6.654E-02 | 1.067E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | -1.592E-01 | 2.418E-01 | 4.002E-01 | NOT IDENT. |
| RA-223 | 2.171E-02 | 3.775E-01 | 7.011E-01 | NOT IDENT. |
| AC-227 | 1.472E-01 | 2.905E-01 | 2.906E-01 | FAIL ABUN |
| TH-227 | 1.472E-01 | 2.905E-01 | 2.906E-01 | FAIL ABUN |
| AC-228 | -3.322E-03 | 1.024E-01 | 1.973E-01 | NOT IDENT. |
| RA-228 | -3.322E-03 | 1.024E-01 | 1.973E-01 | NOT IDENT. |
| TH-228 | 4.414E-02 | 6.923E-02 | 7.957E-02 | FAIL ABUN |
| TH-229 | -9.083E-02 | 3.024E-01 | 5.410E-01 | NOT IDENT. |
| PA-231 | 1.469E-01 | 9.708E-01 | 1.607E+00 | NOT IDENT. |
| TH-231 | 2.171E-02 | 3.775E-01 | 7.011E-01 | NOT IDENT. |
| TH-232 | -3.322E-03 | 1.024E-01 | 1.973E-01 | NOT IDENT. |
| PA-233 | -4.604E-03 | 4.171E-02 | 7.531E-02 | NOT IDENT. |
| PA-234 | -2.872E-02 | 1.463E-01 | 2.813E-01 | NOT IDENT. |
| PA-234M | -1.464E+00 | 2.817E+00 | 5.226E+00 | NOT IDENT. |
| TH-234 | -5.305E-01 | 6.330E-01 | 1.103E+00 | FAIL ABUN |
| U-235 | 6.527E-02 | 1.190E-01 | 2.302E-01 | FAIL ABUN |
| NP-237 | -4.604E-03 | 4.171E-02 | 7.531E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 2.061E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -5.305E-01 | 6.330E-01 | 1.103E+00 | FAIL ABUN |
| NP-239 | 7.764E-02 | 2.209E-01 | 4.265E-01 | NOT IDENT. |
| PU-239 | -4.225E+01 | 1.978E+02 | 3.603E+02 | NOT IDENT. |
| AM-241 | -4.303E-02 | 7.087E-02 | 1.171E-01 | NOT IDENT. |
| AM-243 | 1.903E-02 | 3.018E-02 | 5.543E-02 | NOT IDENT. |
| CM-243 | -7.391E-02 | 5.867E-02 | 9.688E-02 | NOT IDENT. |
| CM-247 | -4.226E-03 | 2.193E-02 | 3.932E-02 | FAIL ABUN |
| CF-249 | -1.048E-03 | 2.244E-02 | 4.139E-02 | NOT IDENT. |
| CF-251 | 4.786E-02 | 7.891E-02 | 1.532E-01 | FAIL ABUN |
| ANH-511 | -5.312E-02 | 3.442E-02 | 6.963E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:32:14.77

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 92.83 | 68 | 57 | 1.50 | 184.90 | 178 | 13 | 1.90E-02 | 26.0 | |
| 2 | 0 | 187.01 | 18 | 64 | 1.79 | 373.27 | 367 | 11 | 5.11E-03 | 89.4 | |
| 3 | 0 | 239.94 | 30 | 59 | 0.81 | 479.13 | 472 | 14 | 8.34E-03 | 57.4 | |
| 4 | 0 | 255.63 | 15 | 51 | 3.14 | 510.51 | 499 | 13 | 4.23E-03 | 100.7 | |
| 5 | 0 | 286.79 | 11 | 15 | 1.67 | 572.83 | 569 | 6 | 2.95E-03 | 59.2 | |
| 6 | 0 | 352.20 | 22 | 25 | 0.86 | 703.67 | 698 | 10 | 6.19E-03 | 47.0 | |
| 7 | 0 | 440.81 | 9 | 7 | 1.36 | 880.92 | 877 | 7 | 2.43E-03 | 60.7 | |
| 8 | 0 | 492.12 | 7 | 5 | 0.76 | 983.54 | 979 | 7 | 1.98E-03 | 64.6 | |
| 9 | 0 | 495.26 | 10 | 2 | 0.70 | 989.83 | 987 | 7 | 2.75E-03 | 39.1 | |
| 10 | 0 | 511.09 | 60 | 52 | 1.46 | 1021.49 | 1014 | 15 | 1.67E-02 | 29.2 | |
| 11 | 0 | 532.69 | 12 | 2 | 1.62 | 1064.70 | 1059 | 10 | 3.27E-03 | 38.2 | |
| 12 | 0 | 574.13 | 8 | 9 | 1.31 | 1147.61 | 1142 | 8 | 2.12E-03 | 83.7 | |
| 13 | 0 | 584.20 | 10 | 19 | 4.73 | 1167.74 | 1158 | 13 | 2.81E-03 | 95.1 | |
| 14 | 0 | 610.71 | 13 | 21 | 1.35 | 1220.77 | 1213 | 13 | 3.50E-03 | 82.3 | |
| 15 | 0 | 669.19 | 6 | 5 | 1.46 | 1337.77 | 1334 | 7 | 1.68E-03 | 74.3 | |
| 16 | 0 | 727.08 | 7 | 12 | 1.19 | 1453.57 | 1447 | 12 | 1.94E-03 | 105.9 | |
| 17 | 0 | 1036.80 | 7 | 1 | 1.23 | 2073.19 | 2070 | 6 | 1.84E-03 | 48.3 | |
| 18 | 0 | 1211.33 | 8 | 0 | 1.07 | 2422.38 | 2419 | 7 | 2.22E-03 | 35.4 | |
| 19 | 0 | 1459.11 | 11 | 6 | 2.01 | 2918.16 | 2913 | 9 | 2.98E-03 | 52.8 | |
| 20 | 0 | 1762.99 | 8 | 2 | 1.42 | 3526.26 | 3522 | 8 | 2.26E-03 | 45.9 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:32:16.89

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TL-208 | 277.37 | ------ | 6.60 | 4.945E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 3 | 85.00* | 2.945E+00 | 5.066E-03 | 5.066E-03 | 740.35 |
| | 860.56 | ------ | 12.50 | 2.171E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 5.423E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 16 | 12.92* | 4.220E+00 | 1.441E-01 | 1.441E-01 | 129.82 |
| BI-214 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.661E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ | Line Not Found | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.670E-02 | 232.06 |
| RN-222 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.661E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ | Line Not Found | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.670E-02 | 232.06 |
| RA-224 | 240.99 | 22 | 4.10* | 5.418E+00 | 4.694E-01 | 4.694E-01 | 160.04 |
| RA-226 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.661E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ | Line Not Found | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.670E-02 | 232.06 |
| TH-230 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.660E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ | Line Not Found | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.669E-02 | 232.06 |
| U-234 | 609.32 | 13 | 45.49* | 2.848E+00 | 4.660E-02 | 4.660E-02 | 164.68 |
| | 1120.29 | ------ | 14.92 | 1.739E+00 | ------ | Line Not Found | ------ |
| | 1764.49 | 3 | 15.30 | 1.202E+00 | 8.669E-02 | 8.669E-02 | 232.06 |

Flag: "*" = Keyline

Sample ID : G341146014 Acquisition date : 10-FEB-2014 13:27:00

Total number of lines in spectrum 18
Number of unidentified lines 5
Number of lines tentatively identified by NID 13 72.22%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TL-208 | 1.41E+10Y | 1.00 | 5.066E-03 | 5.066E-03 | 37.51E-03 | 740.35 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.441E-01 | 1.441E-01 | 1.871E-01 | 129.82 | |
| BI-214 | 1600.00Y | 1.00 | 4.660E-02 | 4.661E-02 | 7.675E-02 | 164.68 | |
| RN-222 | 1600.00Y | 1.00 | 4.660E-02 | 4.661E-02 | 7.675E-02 | 164.68 | |
| RA-224 | 1.41E+10Y | 1.00 | 4.694E-01 | 4.694E-01 | 7.512E-01 | 160.04 | |
| RA-226 | 1600.00Y | 1.00 | 4.660E-02 | 4.661E-02 | 7.675E-02 | 164.68 | |
| TH-230 | 7.54E+04Y | 1.00 | 4.660E-02 | 4.660E-02 | 7.675E-02 | 164.68 | |
| U-234 | 2.45E+05Y | 1.00 | 4.660E-02 | 4.660E-02 | 7.675E-02 | 164.68 | |
| Total Activity : | | | 8.515E-01 | 8.516E-01 | | | |
| Grand Total Activity : | | | 8.515E-01 | 8.516E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146014 Acquisition date : 10-FEB-2014 13:27:00

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.83 | 19 | 57 | 1.50 | 184.90 | 178 | 13 | 5.15E-03 | **** | 6.78E+00 | T |
| 0 | 255.63 | 15 | 51 | 3.14 | 510.51 | 499 | 13 | 4.23E-03 | **** | 5.21E+00 | T |
| 0 | 286.79 | 11 | 15 | 1.67 | 572.83 | 569 | 6 | 2.95E-03 | **** | 4.84E+00 | T |
| 0 | 440.81 | 9 | 7 | 1.36 | 880.92 | 877 | 7 | 2.43E-03 | **** | 3.61E+00 | T |
| 0 | 492.12 | 7 | 5 | 0.76 | 983.54 | 979 | 7 | 1.98E-03 | **** | 3.34E+00 | T |
| 0 | 495.26 | 10 | 2 | 0.70 | 989.83 | 987 | 7 | 2.75E-03 | 78.3 | 3.32E+00 | |
| 0 | 532.69 | 12 | 2 | 1.62 | 1064.70 | 1059 | 10 | 3.27E-03 | 76.4 | 3.15E+00 | |
| 0 | 574.13 | 8 | 9 | 1.31 | 1147.61 | 1142 | 8 | 2.12E-03 | **** | 2.98E+00 | |
| 0 | 669.19 | 6 | 5 | 1.46 | 1337.77 | 1334 | 7 | 1.68E-03 | **** | 2.65E+00 | T |
| 0 | 727.08 | 7 | 12 | 1.19 | 1453.57 | 1447 | 12 | 1.94E-03 | **** | 2.49E+00 | T |
| 0 | 1036.80 | 7 | 1 | 1.23 | 2073.19 | 2070 | 6 | 1.84E-03 | 96.7 | 1.86E+00 | T |
| 0 | 1211.33 | 8 | 0 | 1.07 | 2422.38 | 2419 | 7 | 2.22E-03 | 70.7 | 1.63E+00 | |
| 0 | 1459.11 | 3 | 6 | 2.01 | 2918.16 | 2913 | 9 | 7.47E-04 | **** | 1.39E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:32:29.99

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146014.CNF;1    *
* Acquisition date : 10-FEB-2014 13:27:00 Sensitivity     : 3.000            *
* Detector ID      : GAM24                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:05.42     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:33:00 Nuclide Library : SOLID            *
* Sample ID        : G341146014           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.5691E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  6-JUN-2013 10:31:48 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_500MLMB.CNF;5          *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| TL-208 | 1.684E-02 |
| BI-211 | 8.474E-02 |
| BI-214 | 3.581E-02 |
| RN-222 | 3.581E-02 |
| RA-224 | 2.904E-01 |
| RA-226 | 3.581E-02 |
| TH-230 | 3.580E-02 |
| U-234 | 3.580E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.082E-01 | NOT IDENT. |
| NA-22 | 2.089E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.008E-02 | NOT IDENT. |
| K-40 | 3.504E-01 | NOT IDENT. |
| SC-46 | 4.103E-02 | NOT IDENT. |
| V-48 | 6.767E-01 | NOT IDENT. |
| CR-51 | 1.227E+00 | NOT IDENT. |
| MN-54 | 2.136E-02 | NOT IDENT. |
| CO-56 | 5.068E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.365E-02 | NOT IDENT. |
| CO-58 | 3.522E-02 | NOT IDENT. |
| FE-59 | 1.216E-01 | NOT IDENT. |
| CO-60 | 1.448E-02 | NOT IDENT. |
| ZN-65 | 5.893E-02 | NOT IDENT. |
| GE-68 | 5.484E-01 | NOT IDENT. |
| AS-73 | 5.517E-01 | NOT IDENT. |
| AS-74 | 1.198E+00 | NOT IDENT. |
| SE-75 | 3.622E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.641E+00 | NOT IDENT. |
| RB-83 | 6.305E-02 | NOT IDENT. |

| | | |
|---|---|---|
| KR-85 | 5.325E+00 | NOT IDENT. |
| SR-85 | 6.541E-02 | NOT IDENT. |
| RB-86 | 5.554E+00 | NOT IDENT. |
| Y-88 | 4.152E-02 | NOT IDENT. |
| Y-91 | 1.617E+01 | NOT IDENT. |
| NB-94 | 1.970E-02 | NOT IDENT. |
| NB-95 | 3.986E-02 | NOT IDENT. |
| NB-95M | 1.433E-01 | NOT IDENT. |
| ZR-95 | 8.953E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.775E-02 | NOT IDENT. |
| RH-102 | 3.035E-02 | NOT IDENT. |
| RU-103 | 7.959E-02 | FAIL ABUN |
| RH-106 | 1.756E-01 | NOT IDENT. |
| RU-106 | 1.756E-01 | NOT IDENT. |
| AG-108M | 1.599E-02 | NOT IDENT. |
| CD-109 | 3.544E-01 | NOT IDENT. |
| AG-110M | 2.903E-02 | NOT IDENT. |
| SN-113 | 3.593E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.348E+00 | NOT IDENT. |
| TE-123M | 1.965E-02 | NOT IDENT. |
| SB-124 | 1.263E-01 | NOT IDENT. |
| SB-125 | 4.169E-02 | NOT IDENT. |
| TE-125M | 1.294E+01 | NOT IDENT. |
| I-126 | 7.783E+00 | NOT IDENT. |
| SB-126 | 6.517E+00 | NOT IDENT. |
| SN-126 | 3.220E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.410E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.500E-02 | NOT IDENT. |
| CS-135 | 6.932E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.193E+00 | NOT IDENT. |
| BA-137M | 1.909E-02 | NOT IDENT. |
| CS-137 | 2.017E-02 | NOT IDENT. |
| CE-139 | 2.475E-02 | NOT IDENT. |
| BA-140 | 4.292E+00 | NOT IDENT. |
| LA-140 | 4.292E+00 | NOT IDENT. |
| CE-141 | 1.935E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.166E-01 | NOT IDENT. |
| PM-144 | 1.886E-02 | NOT IDENT. |
| PR-144 | 1.470E+00 | NOT IDENT. |
| PM-146 | 2.240E-02 | NOT IDENT. |
| ND-147 | 3.639E+01 | NOT IDENT. |
| PM-147 | 3.624E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.523E-02 | FAIL ABUN |
| EU-152 | 4.870E-02 | NOT IDENT. |
| GD-153 | 4.005E-02 | NOT IDENT. |
| EU-154 | 5.760E-02 | NOT IDENT. |
| EU-155 | 4.584E-02 | NOT IDENT. |
| TB-160 | 1.143E-01 | NOT IDENT. |
| HO-166M | 3.235E-02 | NOT IDENT. |
| TM-171 | 6.207E+00 | NOT IDENT. |
| LU-176 | 1.393E-02 | NOT IDENT. |
| HF-181 | 8.120E-02 | NOT IDENT. |
| TA-182 | 1.468E-01 | NOT IDENT. |
| RE-183 | 1.627E-01 | NOT IDENT. |
| RE-184 | 2.162E-01 | NOT IDENT. |
| W-188 | 7.609E+00 | NOT IDENT. |
| IR-192 | 3.318E-02 | NOT IDENT. |
| HG-203 | 6.841E-02 | NOT IDENT. |
| BI-207 | 2.731E-02 | NOT IDENT. |
| PB-210 | 1.128E+00 | NOT IDENT. |
| PB-211 | 3.242E-01 | NOT IDENT. |
| BI-212 | 2.778E-01 | FAIL ABUN |
| PB-212 | 3.707E-02 | FAIL ABUN |
| PB-214 | 4.908E-02 | FAIL ABUN |
| RN-219 | 1.747E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-223 | 3.143E-01 | NOT IDENT. |
| AC-227 | 1.323E-01 | FAIL ABUN |
| TH-227 | 1.323E-01 | FAIL ABUN |
| AC-228 | 8.654E-02 | NOT IDENT. |
| RA-228 | 8.654E-02 | NOT IDENT. |
| TH-228 | 3.707E-02 | FAIL ABUN |
| TH-229 | 2.467E-01 | NOT IDENT. |
| PA-231 | 7.259E-01 | NOT IDENT. |
| TH-231 | 3.143E-01 | NOT IDENT. |
| TH-232 | 8.654E-02 | NOT IDENT. |
| PA-233 | 3.400E-02 | NOT IDENT. |
| PA-234 | 1.138E-01 | NOT IDENT. |
| PA-234M | 2.211E+00 | NOT IDENT. |
| TH-234 | 5.106E-01 | FAIL ABUN |
| U-235 | 1.067E-01 | FAIL ABUN |
| NP-237 | 3.400E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.106E-01 | FAIL ABUN |
| NP-239 | 1.962E-01 | NOT IDENT. |
| PU-239 | 1.658E+02 | NOT IDENT. |
| AM-241 | 5.375E-02 | NOT IDENT. |
| AM-243 | 2.601E-02 | NOT IDENT. |
| CM-243 | 4.405E-02 | NOT IDENT. |
| CM-247 | 1.733E-02 | FAIL ABUN |
| CF-249 | 1.822E-02 | NOT IDENT. |
| CF-251 | 7.080E-02 | FAIL ABUN |
| ANH-511 | 3.284E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:32:34.74

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146014.CNF;1    *
* Acquisition date : 10-FEB-2014 13:27:00 Sensitivity     : 3.000          *
* Detector ID      : GAM24                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:05.42     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 10:33:00 Nuclide Library : SOLID          *
* Sample ID        : G341146014           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.5691E+02 GRAM   *
*                                         Quantity Err(%) : 1.2746E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-JUN-2013 10:31:48 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_500MLMB.CNF;5       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| TL-208 | 5.066E-03 | 3.676E-02 | 3.676E-02 |
| BI-211 | 1.441E-01 | 1.837E-01 | 1.837E-01 |
| BI-214 | 4.661E-02 | 7.532E-02 | 7.532E-02 |
| RN-222 | 4.661E-02 | 7.532E-02 | 7.532E-02 |
| RA-224 | 4.694E-01 | 7.372E-01 | 7.372E-01 |
| RA-226 | 4.661E-02 | 7.532E-02 | 7.532E-02 |
| TH-230 | 4.660E-02 | 7.531E-02 | 7.531E-02 |
| U-234 | 4.660E-02 | 7.531E-02 | 7.531E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.423E-01 | 5.855E-01 | 5.956E-01 | NOT IDENT. |
| NA-22 | 5.428E-03 | 2.330E-02 | 2.343E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 6.707E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.045E-03 | 2.394E-02 | 2.394E-02 | NOT IDENT. |
| K-40 | -2.377E-04 | 4.342E-01 | 4.342E-01 | NOT IDENT. |
| SC-46 | 9.951E-03 | 4.751E-02 | 4.773E-02 | NOT IDENT. |
| V-48 | -4.423E-01 | 9.814E-01 | 1.001E+00 | NOT IDENT. |
| CR-51 | -4.367E-01 | 1.554E+00 | 1.566E+00 | NOT IDENT. |
| MN-54 | 1.332E-03 | 2.542E-02 | 2.543E-02 | NOT IDENT. |
| CO-56 | 1.281E-02 | 5.887E-02 | 5.915E-02 | FAIL ABUN |
| MN-56 | 1.000E+41 | 4.667E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -8.982E-03 | 1.689E-02 | 1.737E-02 | NOT IDENT. |
| CO-58 | -2.354E-02 | 4.793E-02 | 4.909E-02 | NOT IDENT. |
| FE-59 | 1.202E-02 | 1.391E-01 | 1.392E-01 | NOT IDENT. |
| CO-60 | -4.377E-03 | 1.866E-02 | 1.877E-02 | NOT IDENT. |
| ZN-65 | 1.764E-02 | 6.576E-02 | 6.624E-02 | NOT IDENT. |
| GE-68 | -1.457E-01 | 7.037E-01 | 7.068E-01 | NOT IDENT. |
| AS-73 | -2.573E-01 | 7.058E-01 | 7.153E-01 | NOT IDENT. |
| AS-74 | 2.277E-01 | 1.380E+00 | 1.384E+00 | NOT IDENT. |
| SE-75 | -4.455E-04 | 4.352E-02 | 4.352E-02 | NOT IDENT. |
| BR-77 | 9.363E+10 | 2.962E+11 | 2.992E+11 | SHORT HLIF |
| SR-82 | -4.062E-01 | 2.039E+00 | 2.047E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | -3.020E-02 | 7.910E-02 | 8.026E-02 | NOT IDENT. |
| KR-85 | -6.864E+00 | 6.910E+00 | 7.572E+00 | NOT IDENT. |
| SR-85 | -8.453E-02 | 8.490E-02 | 9.306E-02 | NOT IDENT. |
| RB-86 | -3.999E-01 | 6.826E+00 | 6.828E+00 | NOT IDENT. |
| Y-88 | 6.304E-04 | 5.010E-02 | 5.010E-02 | NOT IDENT. |
| Y-91 | -3.718E+00 | 2.200E+01 | 2.206E+01 | NOT IDENT. |
| NB-94 | 2.610E-03 | 2.306E-02 | 2.309E-02 | NOT IDENT. |
| NB-95 | -5.137E-03 | 4.890E-02 | 4.895E-02 | NOT IDENT. |
| NB-95M | 9.800E-02 | 1.795E-01 | 1.848E-01 | NOT IDENT. |
| ZR-95 | 7.209E-02 | 9.298E-02 | 9.850E-02 | NOT IDENT. |
| NB-97 | -1.000E+41 | 7.497E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -2.161E+40 | 2.605E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.218E+09 | 4.030E+09 | 4.067E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 8.330E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.437E-02 | 1.903E-02 | 2.197E-02 | NOT IDENT. |
| RH-102 | -7.153E-03 | 3.713E-02 | 3.727E-02 | NOT IDENT. |
| RU-103 | 1.938E-02 | 1.023E-01 | 1.027E-01 | FAIL ABUN |
| RH-106 | -8.034E-02 | 2.222E-01 | 2.251E-01 | NOT IDENT. |
| RU-106 | -8.034E-02 | 2.222E-01 | 2.251E-01 | NOT IDENT. |
| AG-108M | 1.957E-02 | 1.602E-02 | 1.828E-02 | NOT IDENT. |
| CD-109 | -3.860E-01 | 5.136E-01 | 5.423E-01 | NOT IDENT. |
| AG-110M | 2.225E-04 | 3.502E-02 | 3.502E-02 | NOT IDENT. |
| SN-113 | 5.415E-03 | 4.303E-02 | 4.310E-02 | NOT IDENT. |
| CD-115 | -2.595E+11 | 4.492E+11 | 4.641E+11 | SHORT HLIF |
| SN-117M | -2.186E+00 | 1.840E+00 | 2.087E+00 | NOT IDENT. |
| TE-123M | -3.411E-02 | 2.693E-02 | 3.101E-02 | NOT IDENT. |
| SB-124 | 4.544E-02 | 1.368E-01 | 1.383E-01 | NOT IDENT. |
| SB-125 | -4.572E-02 | 5.958E-02 | 6.304E-02 | NOT IDENT. |
| TE-125M | -6.475E-01 | 1.510E+01 | 1.510E+01 | NOT IDENT. |
| I-126 | -9.615E+00 | 1.300E+01 | 1.371E+01 | NOT IDENT. |
| SB-126 | 4.404E+00 | 7.748E+00 | 7.998E+00 | NOT IDENT. |
| SN-126 | -8.739E-03 | 4.320E-02 | 4.338E-02 | NOT IDENT. |
| SB-127 | 1.198E+06 | 1.435E+06 | 1.534E+06 | SHORT HLIF |
| I-131 | -1.409E+01 | 7.417E+01 | 7.444E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.043E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.089E+07 | 1.502E+07 | 1.580E+07 | SHORT HLIF |
| BA-133 | -1.740E-02 | 3.670E-02 | 3.753E-02 | NOT IDENT. |
| I-133 | -1.632E+31 | 2.210E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.746E-02 | 2.494E-02 | 2.784E-02 | NOT IDENT. |
| CS-135 | -3.301E-02 | 8.780E-02 | 8.905E-02 | NOT IDENT. |
| I-135 | -1.000E+41 | 7.426E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.756E+00 | 3.109E+00 | 3.208E+00 | NOT IDENT. |
| BA-137M | 8.082E-03 | 2.129E-02 | 2.160E-02 | NOT IDENT. |
| CS-137 | 8.538E-03 | 2.249E-02 | 2.282E-02 | NOT IDENT. |
| CE-139 | 3.453E-03 | 2.885E-02 | 2.889E-02 | NOT IDENT. |
| BA-140 | 4.285E+00 | 3.885E+00 | 4.339E+00 | NOT IDENT. |
| LA-140 | 4.285E+00 | 3.885E+00 | 4.339E+00 | NOT IDENT. |
| CE-141 | 1.787E-01 | 2.114E-01 | 2.263E-01 | NOT IDENT. |
| CE-143 | 2.975E+18 | 2.569E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -3.497E-02 | 1.399E-01 | 1.408E-01 | NOT IDENT. |
| PM-144 | -1.760E-02 | 2.565E-02 | 2.685E-02 | NOT IDENT. |
| PR-144 | -1.380E+00 | 2.000E+00 | 2.095E+00 | NOT IDENT. |
| PM-146 | 9.933E-03 | 2.463E-02 | 2.504E-02 | NOT IDENT. |
| ND-147 | -6.592E+00 | 5.098E+01 | 5.106E+01 | NOT IDENT. |
| PM-147 | 7.503E+01 | 4.147E+02 | 4.161E+02 | NOT IDENT. |
| PM-149 | 3.016E+12 | 3.532E+12 | 3.785E+12 | SHORT HLIF |
| EU-150 | 3.090E-03 | 1.807E-02 | 1.813E-02 | FAIL ABUN |
| EU-152 | 1.135E-02 | 5.743E-02 | 5.766E-02 | NOT IDENT. |
| GD-153 | -4.797E-02 | 6.000E-02 | 6.378E-02 | NOT IDENT. |
| EU-154 | 3.385E-02 | 5.928E-02 | 6.121E-02 | NOT IDENT. |
| EU-155 | -3.192E-02 | 5.664E-02 | 5.843E-02 | NOT IDENT. |
| TB-160 | -4.581E-02 | 1.501E-01 | 1.515E-01 | NOT IDENT. |
| HO-166M | -7.324E-04 | 3.870E-02 | 3.870E-02 | NOT IDENT. |
| TM-171 | 8.904E-01 | 7.469E+00 | 7.480E+00 | NOT IDENT. |
| LU-176 | -4.792E-03 | 1.746E-02 | 1.759E-02 | NOT IDENT. |
| HF-181 | -5.232E-02 | 1.027E-01 | 1.054E-01 | NOT IDENT. |
| TA-182 | 3.635E-02 | 1.652E-01 | 1.660E-01 | NOT IDENT. |
| RE-183 | 1.119E-01 | 1.874E-01 | 1.941E-01 | NOT IDENT. |
| RE-184 | -1.063E-01 | 2.924E-01 | 2.963E-01 | NOT IDENT. |
| W-188 | -7.800E+00 | 1.195E+01 | 1.246E+01 | NOT IDENT. |
| IR-192 | -1.078E-02 | 4.182E-02 | 4.210E-02 | NOT IDENT. |
| HG-203 | 3.873E-02 | 7.760E-02 | 7.954E-02 | NOT IDENT. |
| BI-207 | 2.252E-02 | 2.738E-02 | 2.920E-02 | NOT IDENT. |
| PB-210 | -1.949E-01 | 1.249E+00 | 1.252E+00 | NOT IDENT. |
| PB-211 | -7.207E-02 | 4.095E-01 | 4.108E-01 | NOT IDENT. |
| BI-212 | 2.018E-01 | 4.196E-01 | 4.293E-01 | FAIL ABUN |
| PB-212 | 4.414E-02 | 6.932E-02 | 7.212E-02 | FAIL ABUN |
| PB-214 | 5.230E-02 | 6.667E-02 | 7.071E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | -1.592E-01 | 2.429E-01 | 2.533E-01 | NOT IDENT. |
| RA-223 | 2.171E-02 | 3.775E-01 | 3.776E-01 | NOT IDENT. |
| AC-227 | 1.472E-01 | 2.913E-01 | 2.988E-01 | FAIL ABUN |
| TH-227 | 1.472E-01 | 2.913E-01 | 2.988E-01 | FAIL ABUN |
| AC-228 | -3.322E-03 | 1.024E-01 | 1.024E-01 | NOT IDENT. |
| RA-228 | -3.322E-03 | 1.024E-01 | 1.024E-01 | NOT IDENT. |
| TH-228 | 4.414E-02 | 6.932E-02 | 7.212E-02 | FAIL ABUN |
| TH-229 | -9.083E-02 | 3.025E-01 | 3.053E-01 | NOT IDENT. |
| PA-231 | 1.469E-01 | 9.709E-01 | 9.732E-01 | NOT IDENT. |
| TH-231 | 2.171E-02 | 3.775E-01 | 3.776E-01 | NOT IDENT. |
| TH-232 | -3.322E-03 | 1.024E-01 | 1.024E-01 | NOT IDENT. |
| PA-233 | -4.604E-03 | 4.171E-02 | 4.176E-02 | NOT IDENT. |
| PA-234 | -2.872E-02 | 1.500E-01 | 1.506E-01 | NOT IDENT. |
| PA-234M | -1.464E+00 | 2.826E+00 | 2.902E+00 | NOT IDENT. |
| TH-234 | -5.305E-01 | 6.442E-01 | 6.871E-01 | FAIL ABUN |
| U-235 | 6.527E-02 | 1.192E-01 | 1.227E-01 | FAIL ABUN |
| NP-237 | -4.604E-03 | 4.171E-02 | 4.176E-02 | NOT IDENT. |
| NP-238 | -1.503E+12 | 2.074E+12 | 2.182E+12 | SHORT HLIF |
| U-238 | -5.305E-01 | 6.442E-01 | 6.871E-01 | FAIL ABUN |
| NP-239 | 7.764E-02 | 2.211E-01 | 2.238E-01 | NOT IDENT. |
| PU-239 | -4.225E+01 | 1.979E+02 | 1.988E+02 | NOT IDENT. |
| AM-241 | -4.303E-02 | 7.096E-02 | 7.356E-02 | NOT IDENT. |
| AM-243 | 1.903E-02 | 3.022E-02 | 3.142E-02 | NOT IDENT. |
| CM-243 | -7.391E-02 | 5.928E-02 | 6.800E-02 | NOT IDENT. |
| CM-247 | -4.226E-03 | 2.195E-02 | 2.203E-02 | FAIL ABUN |
| CF-249 | -1.048E-03 | 2.244E-02 | 2.244E-02 | NOT IDENT. |
| CF-251 | 4.786E-02 | 7.915E-02 | 8.204E-02 | FAIL ABUN |
| ANH-511 | -5.312E-02 | 3.470E-02 | 4.216E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 55.7569 | 94.67 | 32.6588 | 193.51 | 41.0586 |
| 45.60 | 38.4205 | 94.87 | 28.4060 | 197.03 | 40.1923 |
| 46.54 | 29.6924 | 97.43 | 45.5938 | 198.01 | 40.2233 |
| 49.72 | 0.0000 | 98.43 | 32.0972 | 201.83 | 50.1821 |
| 51.35 | 27.7400 | 98.44 | 32.0977 | 205.31 | 46.3700 |
| 52.39 | 31.1269 | 99.53 | 32.1402 | 210.85 | 43.5921 |
| 53.44 | 40.0951 | 100.11 | 36.6298 | 215.65 | 38.7768 |
| 57.36 | 0.0000 | 103.18 | 50.2147 | 222.11 | 35.9635 |
| 57.53 | 41.5009 | 103.37 | 56.5042 | 227.09 | 45.1154 |
| 57.98 | 35.9198 | 105.21 | 44.9417 | 227.38 | 43.1191 |
| 59.32 | 46.1253 | 105.31 | 44.9469 | 228.16 | 0.0000 |
| 59.54 | 54.0200 | 106.12 | 44.0896 | 228.18 | 32.1069 |
| 63.29 | 44.1595 | 109.28 | 51.4749 | 235.69 | 29.0494 |
| 63.58 | 37.3830 | 111.00 | 47.0514 | 235.96 | 29.0549 |
| 64.28 | 38.5586 | 111.76 | 0.0000 | 238.63 | 33.3535 |
| 66.73 | 50.0908 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 47.8516 | 117.23 | 38.2671 | 240.99 | 33.4079 |
| 67.75 | 55.8704 | 121.12 | 35.6835 | 242.00 | 32.4177 |
| 69.67 | 42.3111 | 121.22 | 35.6874 | 244.70 | 29.2298 |
| 70.83 | 61.8588 | 121.78 | 44.8648 | 252.40 | 0.0000 |
| 72.81 | 66.6356 | 122.06 | 43.9623 | 252.80 | 29.5932 |
| 72.87 | 73.5355 | 123.07 | 48.5939 | 254.15 | 0.0000 |
| 74.66 | 52.9912 | 127.23 | 30.3887 | 256.23 | 22.9101 |
| 74.82 | 53.0036 | 129.30 | 48.9104 | 260.90 | 0.0000 |
| 74.97 | 46.1001 | 131.20 | 48.0811 | 264.66 | 31.8808 |
| 77.11 | 73.9857 | 133.02 | 48.1700 | 268.22 | 30.9229 |
| 79.69 | 45.2483 | 133.52 | 47.2674 | 269.46 | 33.0103 |
| 80.12 | 45.2753 | 136.00 | 47.3849 | 271.23 | 28.9164 |
| 80.19 | 0.0000 | 136.47 | 49.2662 | 273.65 | 21.7207 |
| 80.57 | 42.9802 | 140.51 | 0.0000 | 276.40 | 30.0470 |
| 81.00 | 58.1156 | 143.76 | 43.0646 | 277.37 | 26.9549 |
| 81.07 | 58.1212 | 144.24 | 42.1477 | 277.60 | 23.8483 |
| 83.79 | 53.3780 | 145.44 | 42.1961 | 278.00 | 28.0028 |
| 85.43 | 42.0945 | 152.43 | 46.2493 | 279.20 | 28.0234 |
| 86.55 | 47.7781 | 153.25 | 42.5061 | 279.54 | 28.0296 |
| 86.79 | 47.7930 | 154.21 | 38.7619 | 280.46 | 27.0069 |
| 86.94 | 53.4264 | 156.02 | 31.2502 | 283.69 | 26.6441 |
| 87.09 | 53.4368 | 158.56 | 51.2549 | 284.31 | 0.0000 |
| 87.57 | 53.4704 | 159.00 | 56.0228 | 285.41 | 28.1309 |
| 88.03 | 61.9505 | 162.33 | 37.1424 | 285.90 | 0.0000 |
| 88.34 | 61.9754 | 163.33 | 45.7544 | 287.50 | 25.0375 |
| 88.47 | 56.3508 | 165.86 | 50.6329 | 290.67 | 38.4644 |
| 89.96 | 40.9333 | 176.31 | 42.4138 | 293.27 | 0.0000 |
| 91.11 | 37.9900 | 176.60 | 38.5675 | 295.22 | 27.2505 |
| 92.59 | 38.0615 | 177.52 | 38.5974 | 295.96 | 30.4085 |
| 93.35 | 38.0981 | 181.07 | 0.0000 | 298.58 | 47.2591 |
| 94.56 | 32.6543 | 184.41 | 35.9067 | 299.98 | 39.9407 |
| 94.65 | 32.6579 | 185.72 | 38.8596 | 300.09 | 38.8922 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 38.8930 | 497.08 | 13.8997 | 711.68 | 16.0355 |
| 301.36 | 31.5578 | 505.52 | 45.5655 | 720.70 | 8.3761 |
| 302.85 | 29.4800 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 40.0474 | 511.00 | 33.5520 | 722.78 | 10.0579 |
| 306.78 | 33.7690 | 514.00 | 63.4532 | 722.91 | 10.0583 |
| 308.46 | 27.4639 | 514.00 | 63.4532 | 723.31 | 15.0894 |
| 311.90 | 30.6939 | 520.40 | 18.7114 | 724.19 | 18.4479 |
| 316.51 | 24.4080 | 520.69 | 0.0000 | 727.33 | 20.1450 |
| 319.41 | 27.6373 | 522.65 | 0.0000 | 733.00 | 3.3635 |
| 320.08 | 24.4575 | 527.90 | 0.0000 | 735.93 | 16.1598 |
| 321.04 | 20.2150 | 529.59 | 14.0852 | 737.46 | 13.1362 |
| 323.87 | 24.5101 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 25.5952 | 531.02 | 12.5273 | 747.24 | 10.1357 |
| 328.76 | 26.7143 | 546.56 | 0.0000 | 748.06 | 13.1796 |
| 333.37 | 33.2104 | 552.55 | 16.1081 | 752.31 | 17.2577 |
| 333.97 | 30.0063 | 563.25 | 14.2716 | 753.82 | 9.1408 |
| 334.37 | 28.9409 | 569.33 | 11.1258 | 756.73 | 7.1159 |
| 338.28 | 27.9289 | 569.50 | 15.8952 | 756.80 | 7.1160 |
| 338.32 | 27.9297 | 569.70 | 15.8964 | 763.94 | 11.2068 |
| 340.48 | 20.4339 | 583.19 | 14.3793 | 765.81 | 10.1938 |
| 340.55 | 20.4348 | 584.27 | 14.3851 | 766.42 | 10.1958 |
| 344.28 | 21.5536 | 595.83 | 18.2991 | 766.84 | 11.2167 |
| 345.93 | 24.4493 | 600.60 | 19.2959 | 772.60 | 0.0000 |
| 351.06 | 17.3057 | 602.52 | 0.0000 | 776.52 | 17.3860 |
| 351.93 | 28.1348 | 602.73 | 24.8285 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 32.2078 | 778.90 | 12.2815 |
| 356.01 | 39.9075 | 609.32 | 17.4212 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 17.4278 | 785.37 | 13.3307 |
| 366.42 | 0.0000 | 614.28 | 12.9277 | 792.07 | 13.3577 |
| 375.05 | 22.9989 | 618.01 | 17.4757 | 794.95 | 12.3407 |
| 383.85 | 23.1011 | 620.36 | 16.5186 | 795.86 | 6.1720 |
| 388.16 | 18.7411 | 621.93 | 17.5003 | 801.95 | 16.4883 |
| 388.63 | 18.7455 | 630.19 | 0.0000 | 810.29 | 12.3967 |
| 391.69 | 19.8781 | 631.29 | 18.5338 | 810.45 | 12.3973 |
| 400.66 | 23.2930 | 633.25 | 13.6657 | 810.76 | 12.3984 |
| 401.81 | 24.4160 | 634.78 | 11.7199 | 815.77 | 3.1042 |
| 402.40 | 21.0926 | 635.95 | 15.6328 | 818.51 | 7.2488 |
| 404.85 | 20.0061 | 636.99 | 0.0000 | 832.01 | 7.2772 |
| 410.95 | 27.8675 | 645.85 | 13.7259 | 834.85 | 11.4447 |
| 413.71 | 14.5101 | 657.76 | 23.6268 | 835.71 | 17.6919 |
| 414.70 | 20.1003 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 23.5872 | 661.66 | 12.8150 | 846.75 | 0.0000 |
| 427.87 | 24.7195 | 664.57 | 0.0000 | 846.77 | 15.6595 |
| 433.94 | 9.0140 | 666.33 | 24.6832 | 856.80 | 8.3756 |
| 439.40 | 24.3989 | 666.50 | 24.6844 | 860.56 | 7.3363 |
| 453.88 | 15.4627 | 667.71 | 0.0000 | 871.09 | 12.6138 |
| 463.37 | 17.3544 | 677.62 | 12.8838 | 873.19 | 3.1553 |
| 468.07 | 14.6442 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 14.9520 | 879.38 | 9.4819 |
| 475.06 | 22.0330 | 696.49 | 20.9431 | 880.51 | 8.4311 |
| 476.78 | 20.2120 | 696.51 | 20.9431 | 883.24 | 11.6013 |
| 477.60 | 15.6237 | 697.00 | 23.9385 | 884.68 | 9.4959 |
| 482.18 | 23.9421 | 697.49 | 22.9450 | 889.28 | 10.5642 |
| 487.02 | 16.9169 | 702.65 | 18.9865 | 894.76 | 7.4061 |
| 492.35 | 0.0000 | 706.68 | 20.0117 | 898.04 | 10.5896 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.4836 | 1312.11 | 6.8066 | | |
| 911.20 | 12.7526 | 1332.49 | 4.8818 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 8.5365 | 1365.19 | 3.9312 | | |
| 937.49 | 7.4912 | 1368.63 | 0.0000 | | |
| 944.13 | 9.6484 | 1384.29 | 4.9325 | | |
| 946.00 | 7.5079 | 1408.01 | 3.9642 | | |
| 949.00 | 6.4405 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 13.7288 | | |
| 962.31 | 11.8484 | 1489.16 | 6.0381 | | |
| 964.08 | 6.4657 | 1505.03 | 4.0373 | | |
| 966.17 | 7.5474 | 1596.21 | 1.0260 | | |
| 968.97 | 10.7898 | 1620.50 | 6.1819 | | |
| 983.53 | 6.4979 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.1282 | | |
| 996.26 | 8.6918 | 1750.46 | 0.0000 | | |
| 1001.03 | 9.7899 | 1764.49 | 3.6187 | | |
| 1004.73 | 8.7104 | 1770.23 | 2.1129 | | |
| 1021.30 | 0.0000 | 1771.35 | 4.2266 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 4.2518 | | |
| 1037.84 | 9.8793 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.3379 | | |
| 1046.59 | 5.5002 | | | | |
| 1048.07 | 7.3363 | | | | |
| 1049.04 | 6.4207 | | | | |
| 1050.41 | 6.4229 | | | | |
| 1063.66 | 4.6025 | | | | |
| 1077.00 | 4.6171 | | | | |
| 1077.34 | 5.5410 | | | | |
| 1085.87 | 7.4030 | | | | |
| 1099.45 | 5.5698 | | | | |
| 1112.07 | 9.3103 | | | | |
| 1112.84 | 6.5184 | | | | |
| 1115.54 | 10.2494 | | | | |
| 1120.29 | 12.1267 | | | | |
| 1120.55 | 12.1272 | | | | |
| 1121.30 | 6.5312 | | | | |
| 1129.67 | 12.1526 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.5524 | | | | |
| 1177.95 | 2.8351 | | | | |
| 1189.05 | 6.6314 | | | | |
| 1204.77 | 5.0699 | | | | |
| 1221.41 | 8.5862 | | | | |
| 1231.02 | 9.5601 | | | | |
| 1235.36 | 3.8276 | | | | |
| 1238.28 | 2.8724 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.8216 | | | | |
| 1274.44 | 3.8594 | | | | |
| 1274.54 | 5.7891 | | | | |
| 1291.59 | 10.6509 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:33:46.68

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146015.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM25.CNF;228
                                    Background date  : 9-FEB-2014 11:22:24.
Sample date      : 7-NOV-2013 10:37:00. Acquisition date : 10-FEB-2014 13:27:28
Sample ID        : G341146015           Sample quantity  : 1.31770E+02 GRAM
Detector name    : GAM25                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.32  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.03* | 20 | 47 | 0.80 | 125.73 | 121 | 9 | 5.65E-03 | 74.8 | |
| 2 | 0 | 66.37* | 9 | 24 | 0.80 | 132.40 | 130 | 6 | 2.44E-03 | 104.4 | |
| 3 | 0 | 75.84 | 6 | 33 | 1.24 | 151.32 | 147 | 6 | 1.53E-03 | 168.1 | |
| 4 | 0 | 92.32* | 1 | 52 | 0.98 | 184.26 | 179 | 11 | 2.77E-04 | ***** | |
| 5 | 0 | 130.50 | 20 | 27 | 0.80 | 260.53 | 257 | 9 | 5.43E-03 | 54.3 | |
| 6 | 0 | 157.18 | 19 | 15 | 1.39 | 313.83 | 311 | 7 | 5.16E-03 | 42.2 | |
| 7 | 0 | 179.73 | 3 | 14 | 0.88 | 358.89 | 357 | 5 | 9.15E-04 | 193.0 | |
| 8 | 3 | 182.58 | 20 | 10 | 1.65 | 364.59 | 361 | 24 | 5.47E-03 | 41.6 | 1.09E+00 |
| 9 | 3 | 185.40* | 14 | 17 | 1.65 | 370.22 | 361 | 24 | 3.86E-03 | 87.6 | |
| 10 | 0 | 414.53 | 19 | 3 | 3.42 | 828.10 | 822 | 11 | 5.33E-03 | 28.3 | |
| 11 | 0 | 511.00* | 18 | 30 | 1.77 | 1020.90 | 1012 | 17 | 4.87E-03 | 93.0 | |
| 12 | 0 | 567.67 | 6 | 2 | 1.23 | 1134.17 | 1130 | 7 | 1.79E-03 | 51.7 | |
| 13 | 0 | 576.58 | 14 | 5 | 0.80 | 1152.00 | 1148 | 10 | 3.89E-03 | 40.1 | |
| 14 | 0 | 622.94 | 9 | 3 | 1.53 | 1244.65 | 1241 | 9 | 2.60E-03 | 44.1 | |
| 15 | 0 | 711.13* | 6 | 3 | 1.00 | 1420.94 | 1414 | 10 | 1.60E-03 | 77.5 | |
| 16 | 0 | 723.02 | 9 | 9 | 0.88 | 1444.72 | 1437 | 10 | 2.41E-03 | 75.7 | |
| 17 | 0 | 826.54 | 9 | 0 | 0.73 | 1651.67 | 1648 | 7 | 2.50E-03 | 33.3 | |
| 18 | 0 | 1347.87 | 6 | 0 | 0.99 | 2694.17 | 2690 | 8 | 1.67E-03 | 40.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:33:48

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146015.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:37:00 | Acquisition date | : 10-FEB-2014 13:27:28 |
| Sample ID | : G341146015 | Sample quantity | : 131.77 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA25 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.32 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| RH-106 | 621.93 | 9 | 9.93* | 2.199E+00 | 2.446E-01 | 2.921E-01 | 88.12 |
| | 1050.41 | ------ | 1.56 | 1.415E+00 | ------ Line Not Found | | ------ |
| RU-106 | 621.93 | 9 | 9.93* | 2.199E+00 | 2.446E-01 | 2.921E-01 | 88.12 |
| | 1050.41 | ------ | 1.56 | 1.415E+00 | ------ Line Not Found | | ------ |
| SN-117M | 156.02 | 19 | 2.11 | 6.127E+00 | 8.192E-01 | 1.045E+02 | 84.42 |
| | 158.56 | 19 | 86.40* | 6.127E+00 | 2.000E-02 | 2.553E+00 | 84.42 |
| TH-234 | 63.29 | 20 | 3.70* | 6.944E+00 | 4.509E-01 | 4.509E-01 | 149.68 |
| | 92.59 | 1 | 4.23 | 7.292E+00 | 1.842E-02 | 1.842E-02 | 3422.42 |
| U-238 | 63.29 | 20 | 3.70* | 6.944E+00 | 4.509E-01 | 4.509E-01 | 149.68 |
| | 92.59 | 1 | 4.23 | 7.292E+00 | 1.842E-02 | 1.842E-02 | 3422.42 |
| PU-239 | 129.30 | 20 | 0.01* | 6.676E+00 | 2.645E+02 | 2.645E+02 | 108.64 |
| | 375.05 | ------ | 0.00 | 3.346E+00 | ------ Line Not Found | | ------ |
| | 413.71 | 19 | 0.00 | 3.085E+00 | 2.417E+03 | 2.417E+03 | 56.69 |
| AM-243 | 43.53 | ------ | 5.90 | 5.420E+00 | ------ Line Not Found | | ------ |
| | 74.66 | 6 | 67.20* | 7.272E+00 | 6.442E-03 | 6.442E-03 | 336.15 |
| ANH-511 | 511.00 | 18 | 100.00* | 2.595E+00 | 3.845E-02 | 3.845E-02 | 186.03 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:33:49.17

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146015.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:27:28 | Sensitivity | : 3.000 |
| Detector ID | : GAM25 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.32 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 10:37:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146015 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.3177E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 8-NOV-2013 08:03:16 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM25_500MLMB.CNF;8 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| RH-106 | 2.921E-01 | 2.522E-01 | 5.512E-01 |
| RU-106 | 2.921E-01 | 2.522E-01 | 5.512E-01 |
| SN-117M | 2.553E+00 | 2.112E+00 | 3.351E+00 |
| TH-234 | 4.509E-01 | 6.614E-01 | 6.362E-01 |
| U-238 | 4.509E-01 | 6.614E-01 | 6.362E-01 |
| PU-239 | 2.645E+02 | 2.816E+02 | 4.035E+02 |
| AM-243 | 6.442E-03 | 2.122E-02 | 3.964E-02 |
| ANH-511 | 3.845E-02 | 7.010E-02 | 4.510E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -1.002E-01 | 6.715E-01 | 1.291E+00 | NOT IDENT. |
| NA-22 | 2.121E-02 | 3.108E-02 | 7.650E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.031E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.299E-03 | 2.738E-02 | 6.018E-02 | NOT IDENT. |
| K-40 | -1.522E-01 | 4.170E-01 | 8.176E-01 | NOT IDENT. |
| SC-46 | 2.747E-02 | 5.471E-02 | 1.247E-01 | NOT IDENT. |
| V-48 | -2.042E-01 | 1.817E+00 | 3.595E+00 | NOT IDENT. |
| CR-51 | -6.512E-01 | 2.041E+00 | 3.626E+00 | NOT IDENT. |
| MN-54 | -2.395E-03 | 3.413E-02 | 6.811E-02 | NOT IDENT. |
| CO-56 | 3.170E-02 | 7.070E-02 | 1.518E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.371E-02 | 2.008E-02 | 3.287E-02 | NOT IDENT. |
| CO-58 | 1.425E-02 | 6.554E-02 | 1.392E-01 | NOT IDENT. |
| FE-59 | -1.087E-01 | 2.185E-01 | 3.917E-01 | NOT IDENT. |
| CO-60 | -3.927E-02 | 2.721E-02 | 1.385E-02 | NOT IDENT. |
| ZN-65 | -1.620E-02 | 9.121E-02 | 1.741E-01 | NOT IDENT. |
| GE-68 | 1.105E-01 | 1.342E+00 | 2.715E+00 | NOT IDENT. |
| AS-73 | -1.196E-01 | 3.322E-01 | 5.816E-01 | NOT IDENT. |
| AS-74 | -1.955E-01 | 1.986E+00 | 3.721E+00 | NOT IDENT. |
| SE-75 | -1.401E-02 | 5.398E-02 | 9.721E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.019E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -9.480E-01 | 2.214E+00 | 4.149E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | 4.093E-02 | 9.666E-02 | 2.054E-01 | NOT IDENT. |
| KR-85 | 1.383E+01 | 8.474E+00 | 1.719E+01 | NOT IDENT. |
| SR-85 | 1.695E-01 | 1.041E-01 | 2.110E-01 | NOT IDENT. |
| RB-86 | 1.111E+00 | 1.349E+01 | 2.728E+01 | NOT IDENT. |
| Y-88 | -2.044E-02 | 7.351E-02 | 1.473E-01 | NOT IDENT. |
| Y-91 | 3.184E+00 | 3.626E+01 | 7.578E+01 | NOT IDENT. |
| NB-94 | 5.479E-03 | 2.857E-02 | 5.545E-02 | NOT IDENT. |
| NB-95 | 5.319E-02 | 7.325E-02 | 1.665E-01 | NOT IDENT. |
| NB-95M | -5.349E-02 | 2.031E-01 | 3.667E-01 | NOT IDENT. |
| ZR-95 | -5.954E-03 | 1.070E-01 | 2.229E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.005E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 5.439E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 9.982E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.038E-02 | 2.330E-02 | 3.980E-02 | NOT IDENT. |
| RH-102 | -5.532E-02 | 4.164E-02 | 5.531E-02 | NOT IDENT. |
| RU-103 | 7.209E-02 | 1.188E-01 | 2.578E-01 | NOT IDENT. |
| AG-108M | 4.956E-03 | 2.637E-02 | 5.193E-02 | FAIL ABUN |
| CD-109 | 7.945E-02 | 4.992E-01 | 8.261E-01 | NOT IDENT. |
| AG-110M | -2.847E-02 | 5.253E-02 | 9.422E-02 | NOT IDENT. |
| SN-113 | -4.791E-02 | 5.586E-02 | 9.575E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.257E+11 | 0.000E+00 | SHORT HLIF |
| TE-123M | 1.947E-02 | 3.003E-02 | 5.588E-02 | NOT IDENT. |
| SB-124 | -7.255E-02 | 2.227E-01 | 4.288E-01 | FAIL ABUN |
| SB-125 | -3.722E-02 | 8.373E-02 | 1.462E-01 | NOT IDENT. |
| TE-125M | -2.061E+00 | 1.639E+01 | 2.895E+01 | NOT IDENT. |
| I-126 | 2.835E-01 | 1.130E+01 | 2.248E+01 | NOT IDENT. |
| SB-126 | 1.131E+01 | 1.274E+01 | 2.719E+01 | FAIL ABUN |
| SN-126 | 2.456E-02 | 4.327E-02 | 7.526E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.754E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.158E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.220E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.584E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.428E-02 | 3.584E-02 | 5.921E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.649E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.311E-03 | 3.964E-02 | 7.989E-02 | NOT IDENT. |
| CS-135 | 4.137E-02 | 1.142E-01 | 2.223E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.818E+00 | 5.302E+00 | 1.168E+01 | NOT IDENT. |
| BA-137M | 1.942E-02 | 2.922E-02 | 6.294E-02 | NOT IDENT. |
| CS-137 | 2.052E-02 | 3.087E-02 | 6.649E-02 | NOT IDENT. |
| CE-139 | 1.882E-02 | 2.710E-02 | 5.565E-02 | NOT IDENT. |
| BA-140 | 2.262E+00 | 7.403E+00 | 1.627E+01 | NOT IDENT. |
| LA-140 | 2.262E+00 | 7.403E+00 | 1.627E+01 | NOT IDENT. |
| CE-141 | -1.151E-01 | 2.011E-01 | 3.617E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.761E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -9.368E-02 | 1.716E-01 | 2.460E-01 | NOT IDENT. |
| PM-144 | -1.035E-03 | 3.613E-02 | 6.840E-02 | NOT IDENT. |
| PR-144 | -4.871E-02 | 2.826E+00 | 5.358E+00 | NOT IDENT. |
| PM-146 | -8.417E-03 | 3.319E-02 | 6.247E-02 | NOT IDENT. |
| ND-147 | -3.163E+00 | 6.638E+01 | 1.295E+02 | FAIL ABUN |
| PM-147 | 7.556E+01 | 4.833E+02 | 8.877E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.075E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 5.072E-03 | 2.315E-02 | 4.364E-02 | NOT IDENT. |
| EU-152 | -5.240E-03 | 7.751E-02 | 1.421E-01 | NOT IDENT. |
| GD-153 | -1.542E-02 | 7.456E-02 | 1.169E-01 | NOT IDENT. |
| EU-154 | 5.771E-02 | 8.454E-02 | 2.081E-01 | FAIL ABUN |
| EU-155 | -1.016E-02 | 5.816E-02 | 1.036E-01 | NOT IDENT. |
| TB-160 | 2.069E-01 | 2.550E-01 | 5.764E-01 | NOT IDENT. |
| HO-166M | 3.081E-02 | 4.682E-02 | 9.706E-02 | FAIL ABUN |
| TM-171 | -2.282E+00 | 3.440E+00 | 5.811E+00 | FAIL ABUN |
| LU-176 | -4.413E-03 | 2.044E-02 | 3.685E-02 | NOT IDENT. |
| HF-181 | 1.384E-02 | 1.224E-01 | 2.449E-01 | NOT IDENT. |
| TA-182 | 4.920E-02 | 1.788E-01 | 4.193E-01 | FAIL ABUN |
| RE-183 | -5.143E-02 | 1.182E-01 | 1.836E-01 | FAIL ABUN |
| RE-184 | 1.002E-01 | 5.390E-01 | 1.106E+00 | NOT IDENT. |
| W-188 | -1.126E+01 | 1.200E+01 | 1.933E+01 | FAIL ABUN |
| IR-192 | 3.932E-03 | 5.187E-02 | 9.861E-02 | NOT IDENT. |
| HG-203 | -1.036E-02 | 8.730E-02 | 1.611E-01 | NOT IDENT. |
| BI-207 | -1.516E-02 | 3.724E-02 | 6.891E-02 | FAIL ABUN |
| TL-208 | -4.466E-02 | 3.162E-02 | 4.123E-02 | NOT IDENT. |
| PB-210 | -4.110E-01 | 4.653E-01 | 9.137E-01 | NOT IDENT. |
| BI-211 | 1.093E-01 | 1.744E-01 | 3.526E-01 | NOT IDENT. |
| PB-211 | 2.481E-01 | 5.122E-01 | 1.075E+00 | NOT IDENT. |
| BI-212 | 2.630E-01 | 3.496E-01 | 7.572E-01 | NOT IDENT. |
| PB-212 | -1.080E-02 | 4.778E-02 | 8.765E-02 | FAIL ABUN |
| BI-214 | 6.634E-02 | 6.288E-02 | 1.377E-01 | NOT IDENT. |
| PB-214 | 5.800E-03 | 6.453E-02 | 1.222E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | 1.727E-01 | 2.794E-01 | 6.015E-01 | NOT IDENT. |
| RN-222 | 6.634E-02 | 6.288E-02 | 1.377E-01 | NOT IDENT. |
| RA-223 | 1.128E-01 | 5.012E-01 | 9.571E-01 | NOT IDENT. |
| RA-224 | -4.953E-02 | 4.487E-01 | 8.236E-01 | NOT IDENT. |
| RA-226 | 6.634E-02 | 6.288E-02 | 1.377E-01 | NOT IDENT. |
| AC-227 | -1.166E-01 | 2.032E-01 | 3.505E-01 | NOT IDENT. |
| TH-227 | -1.166E-01 | 2.032E-01 | 3.505E-01 | NOT IDENT. |
| AC-228 | -2.559E-02 | 1.450E-01 | 2.764E-01 | NOT IDENT. |
| RA-228 | -2.559E-02 | 1.450E-01 | 2.764E-01 | NOT IDENT. |
| TH-228 | -1.080E-02 | 4.778E-02 | 8.765E-02 | FAIL ABUN |
| TH-229 | -2.033E-01 | 4.119E-01 | 6.287E-01 | NOT IDENT. |
| TH-230 | 6.633E-02 | 6.288E-02 | 1.377E-01 | NOT IDENT. |
| PA-231 | -4.819E-01 | 1.055E+00 | 1.846E+00 | NOT IDENT. |
| TH-231 | 1.128E-01 | 5.012E-01 | 9.571E-01 | NOT IDENT. |
| TH-232 | -2.559E-02 | 1.450E-01 | 2.764E-01 | NOT IDENT. |
| PA-233 | -7.413E-03 | 4.725E-02 | 8.634E-02 | NOT IDENT. |
| PA-234 | 3.062E-02 | 1.799E-01 | 4.018E-01 | FAIL ABUN |
| PA-234M | -7.570E-01 | 3.573E+00 | 7.300E+00 | NOT IDENT. |
| U-234 | 6.633E-02 | 6.288E-02 | 1.377E-01 | NOT IDENT. |
| U-235 | -1.175E-01 | 1.279E-01 | 2.288E-01 | FAIL ABUN |
| NP-237 | -7.413E-03 | 4.725E-02 | 8.634E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 4.207E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.256E-01 | 2.386E-01 | 4.012E-01 | NOT IDENT. |
| AM-241 | -1.681E-02 | 4.118E-02 | 6.420E-02 | NOT IDENT. |
| CM-243 | 1.836E-02 | 5.897E-02 | 1.111E-01 | NOT IDENT. |
| CM-247 | 8.293E-03 | 2.745E-02 | 5.609E-02 | NOT IDENT. |
| CF-249 | 8.463E-03 | 3.192E-02 | 6.412E-02 | NOT IDENT. |
| CF-251 | 1.851E-03 | 1.035E-01 | 1.721E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:33:45.14

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.51 | 32 | 41 | 0.64 | 92.72 | 89 | 8 | 8.88E-03 | 39.2 | |
| 2 | 0 | 63.03 | 72 | 47 | 0.80 | 125.73 | 121 | 9 | 1.99E-02 | 20.9 | |
| 3 | 0 | 66.37 | 14 | 24 | 0.80 | 132.40 | 130 | 6 | 3.82E-03 | 64.4 | |
| 4 | 0 | 75.84 | 6 | 33 | 1.24 | 151.32 | 147 | 6 | 1.53E-03 | 168.1 | |
| 5 | 0 | 92.32 | 79 | 52 | 0.98 | 184.26 | 179 | 11 | 2.19E-02 | 21.0 | |
| 6 | 0 | 130.50 | 20 | 27 | 0.80 | 260.53 | 257 | 9 | 5.43E-03 | 54.3 | |
| 7 | 0 | 157.18 | 19 | 15 | 1.39 | 313.83 | 311 | 7 | 5.16E-03 | 42.2 | |
| 8 | 0 | 179.73 | 3 | 14 | 0.88 | 358.89 | 357 | 5 | 9.15E-04 | 193.0 | |
| 9 | 3 | 182.58 | 20 | 10 | 1.65 | 364.59 | 361 | 24 | 5.47E-03 | 41.6 | 1.09E+00 |
| 10 | 3 | 185.40 | 53 | 17 | 1.65 | 370.22 | 361 | 24 | 1.46E-02 | 22.2 | |
| 11 | 0 | 238.58 | 10 | 21 | 1.14 | 476.50 | 473 | 6 | 2.78E-03 | 79.1 | |
| 12 | 0 | 414.53 | 19 | 3 | 3.42 | 828.10 | 822 | 11 | 5.33E-03 | 28.3 | |
| 13 | 0 | 511.00 | 94 | 30 | 1.77 | 1020.90 | 1012 | 17 | 2.62E-02 | 16.8 | |
| 14 | 0 | 567.67 | 6 | 2 | 1.23 | 1134.17 | 1130 | 7 | 1.79E-03 | 51.7 | |
| 15 | 0 | 576.58 | 14 | 5 | 0.80 | 1152.00 | 1148 | 10 | 3.89E-03 | 40.1 | |
| 16 | 0 | 622.94 | 9 | 3 | 1.53 | 1244.65 | 1241 | 9 | 2.60E-03 | 44.1 | |
| 17 | 0 | 711.13 | 8 | 3 | 1.00 | 1420.94 | 1414 | 10 | 2.29E-03 | 50.5 | |
| 18 | 0 | 723.02 | 9 | 9 | 0.88 | 1444.72 | 1437 | 10 | 2.41E-03 | 75.7 | |
| 19 | 0 | 826.54 | 9 | 0 | 0.73 | 1651.67 | 1648 | 7 | 2.50E-03 | 33.3 | |
| 20 | 0 | 1347.87 | 6 | 0 | 0.99 | 2694.17 | 2690 | 8 | 1.67E-03 | 40.8 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:33:47.30

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| RH-106 | 621.93 | 9 | 9.93* | 2.199E+00 | 2.446E-01 | 2.921E-01 | 88.12 |
| | 1050.41 | ------ | 1.56 | 1.415E+00 | ------ Line Not Found | | ------ |
| RU-106 | 621.93 | 9 | 9.93* | 2.199E+00 | 2.446E-01 | 2.921E-01 | 88.12 |
| | 1050.41 | ------ | 1.56 | 1.415E+00 | ------ Line Not Found | | ------ |
| SN-117M | 156.02 | 19 | 2.11 | 6.127E+00 | 8.192E-01 | 1.045E+02 | 84.42 |
| | 158.56 | 19 | 86.40* | 6.127E+00 | 2.000E-02 | 2.553E+00 | 84.42 |
| TH-234 | 63.29 | 20 | 3.70* | 6.944E+00 | 4.509E-01 | 4.509E-01 | 149.68 |
| | 92.59 | 1 | 4.23 | 7.292E+00 | 1.842E-02 | 1.842E-02 | 3422.42 |
| U-238 | 63.29 | 20 | 3.70* | 6.944E+00 | 4.509E-01 | 4.509E-01 | 149.68 |
| | 92.59 | 1 | 4.23 | 7.292E+00 | 1.842E-02 | 1.842E-02 | 3422.42 |
| PU-239 | 129.30 | 20 | 0.01* | 6.676E+00 | 2.645E+02 | 2.645E+02 | 108.64 |
| | 375.05 | ------ | 0.00 | 3.346E+00 | ------ Line Not Found | | ------ |
| | 413.71 | 19 | 0.00 | 3.085E+00 | 2.417E+03 | 2.417E+03 | 56.69 |
| AM-243 | 43.53 | ------ | 5.90 | 5.420E+00 | ------ Line Not Found | | ------ |
| | 74.66 | 6 | 67.20* | 7.272E+00 | 6.442E-03 | 6.442E-03 | 336.15 |
| ANH-511 | 511.00 | 18 | 100.00* | 2.595E+00 | 3.845E-02 | 3.845E-02 | 186.03 |

Flag: "*" = Keyline

Sample ID : G341146015 Acquisition date : 10-FEB-2014 13:27:28

Total number of lines in spectrum 18
Number of unidentified lines 5
Number of lines tentatively identified by NID 13 72.22%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| RH-106 | 371.80D | 1.19 | 2.446E-01 | 2.921E-01 | 2.574E-01 | 88.12 | |
| RU-106 | 371.80D | 1.19 | 2.446E-01 | 2.921E-01 | 2.574E-01 | 88.12 | |
| SN-117M | 13.60D | 128. | 2.000E-02 | 2.553E+00 | 2.155E+00 | 84.42 | |
| TH-234 | 4.47E+09Y | 1.00 | 4.509E-01 | 4.509E-01 | 6.749E-01 | 149.68 | |
| U-238 | 4.47E+09Y | 1.00 | 4.509E-01 | 4.509E-01 | 6.749E-01 | 149.68 | |
| PU-239 | 24110.00Y | 1.00 | 2.645E+02 | 2.645E+02 | 2.873E+02 | 108.64 | |
| AM-243 | 7370.00Y | 1.00 | 6.442E-03 | 6.442E-03 | 21.66E-03 | 336.15 | |
| ANH-511 | 1.00E+09Y | 1.00 | 3.845E-02 | 3.845E-02 | 7.153E-02 | 186.03 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 2.659E+02 | 2.685E+02 | | | |

Grand Total Activity : 2.659E+02 2.685E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146015 Acquisition date : 10-FEB-2014 13:27:28

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 66.37 | 9 | 24 | 0.80 | 132.40 | 130 | 6 | 2.44E-03 | **** | 7.07E+00 | T |
| 0 | 179.73 | 3 | 14 | 0.88 | 358.89 | 357 | 5 | 9.15E-04 | **** | 5.69E+00 | T |
| 3 | 182.58 | 20 | 10 | 1.65 | 364.59 | 361 | 24 | 5.47E-03 | 83.2 | 5.63E+00 | |
| 3 | 185.40 | 14 | 17 | 1.65 | 370.22 | 361 | 24 | 3.86E-03 | **** | 5.58E+00 | T |
| 0 | 567.67 | 6 | 2 | 1.23 | 1134.17 | 1130 | 7 | 1.79E-03 | **** | 2.38E+00 | |
| 0 | 576.58 | 14 | 5 | 0.80 | 1152.00 | 1148 | 10 | 3.89E-03 | 80.2 | 2.35E+00 | |
| 0 | 711.13 | 6 | 3 | 1.00 | 1420.94 | 1414 | 10 | 1.60E-03 | **** | 1.97E+00 | T |
| 0 | 723.02 | 9 | 9 | 0.88 | 1444.72 | 1437 | 10 | 2.41E-03 | **** | 1.94E+00 | T |
| 0 | 826.54 | 9 | 0 | 0.73 | 1651.67 | 1648 | 7 | 2.50E-03 | 66.7 | 1.73E+00 | |
| 0 | 1347.87 | 6 | 0 | 0.99 | 2694.17 | 2690 | 8 | 1.67E-03 | 81.6 | 1.14E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:34:01.63

```
*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146015.CNF;1       *
* Acquisition date : 10-FEB-2014 13:27:28 Sensitivity     : 3.000                *
* Detector ID      : GAM25                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.32     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:37:00 Nuclide Library : SOLID                *
* Sample ID        : G341146015           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.3177E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  8-NOV-2013 08:03:16 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM25_500MLMB.CNF;8              *
*********************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| RH-106 | 2.336E-01 |
| RU-106 | 2.336E-01 |
| SN-117M | 1.490E+00 |
| TH-234 | 2.883E-01 |
| U-238 | 2.883E-01 |
| PU-239 | 1.836E+02 |
| AM-243 | 1.825E-02 |
| ANH-511 | 1.959E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.529E-01 | NOT IDENT. |
| NA-22 | 3.136E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.132E-02 | NOT IDENT. |
| K-40 | 3.410E-01 | NOT IDENT. |
| SC-46 | 5.196E-02 | NOT IDENT. |
| V-48 | 1.478E+00 | NOT IDENT. |
| CR-51 | 1.592E+00 | NOT IDENT. |
| MN-54 | 2.852E-02 | NOT IDENT. |
| CO-56 | 6.524E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.476E-02 | NOT IDENT. |
| CO-58 | 5.848E-02 | NOT IDENT. |
| FE-59 | 1.517E-01 | NOT IDENT. |
| CO-60 | 0.000E+00 | NOT IDENT. |
| ZN-65 | 7.222E-02 | NOT IDENT. |
| GE-68 | 1.138E+00 | NOT IDENT. |
| AS-73 | 2.643E-01 | NOT IDENT. |
| AS-74 | 1.627E+00 | NOT IDENT. |
| SE-75 | 4.345E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.698E+00 | NOT IDENT. |
| RB-83 | 8.831E-02 | NOT IDENT. |

| | | |
|---|---|---|
| KR-85 | 7.899E+00 | NOT IDENT. |
| SR-85 | 9.697E-02 | NOT IDENT. |
| RB-86 | 1.143E+01 | NOT IDENT. |
| Y-88 | 5.706E-02 | NOT IDENT. |
| Y-91 | 3.062E+01 | NOT IDENT. |
| NB-94 | 2.385E-02 | NOT IDENT. |
| NB-95 | 7.155E-02 | NOT IDENT. |
| NB-95M | 1.652E-01 | NOT IDENT. |
| ZR-95 | 9.023E-02 | FAIL ABUN |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.813E-02 | NOT IDENT. |
| RH-102 | 2.102E-02 | NOT IDENT. |
| RU-103 | 1.118E-01 | NOT IDENT. |
| AG-108M | 2.311E-02 | FAIL ABUN |
| CD-109 | 3.804E-01 | NOT IDENT. |
| AG-110M | 3.868E-02 | NOT IDENT. |
| SN-113 | 4.137E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| TE-123M | 2.533E-02 | NOT IDENT. |
| SB-124 | 1.626E-01 | FAIL ABUN |
| SB-125 | 6.395E-02 | NOT IDENT. |
| TE-125M | 1.321E+01 | NOT IDENT. |
| I-126 | 9.393E+00 | NOT IDENT. |
| SB-126 | 1.206E+01 | FAIL ABUN |
| SN-126 | 3.480E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.599E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.446E-02 | NOT IDENT. |
| CS-135 | 1.001E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.824E+00 | NOT IDENT. |
| BA-137M | 2.736E-02 | NOT IDENT. |
| CS-137 | 2.890E-02 | NOT IDENT. |
| CE-139 | 2.522E-02 | NOT IDENT. |
| BA-140 | 6.689E+00 | NOT IDENT. |
| LA-140 | 6.689E+00 | NOT IDENT. |
| CE-141 | 1.619E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.098E-01 | NOT IDENT. |
| PM-144 | 2.957E-02 | NOT IDENT. |
| PR-144 | 2.318E+00 | NOT IDENT. |
| PM-146 | 2.696E-02 | NOT IDENT. |
| ND-147 | 5.529E+01 | FAIL ABUN |
| PM-147 | 4.018E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.963E-02 | NOT IDENT. |
| EU-152 | 6.288E-02 | NOT IDENT. |
| GD-153 | 5.367E-02 | NOT IDENT. |
| EU-154 | 8.532E-02 | FAIL ABUN |
| EU-155 | 4.649E-02 | NOT IDENT. |
| TB-160 | 2.495E-01 | NOT IDENT. |
| HO-166M | 4.130E-02 | FAIL ABUN |
| TM-171 | 2.621E+00 | FAIL ABUN |
| LU-176 | 1.633E-02 | NOT IDENT. |
| HF-181 | 1.058E-01 | NOT IDENT. |
| TA-182 | 1.689E-01 | FAIL ABUN |
| RE-183 | 8.321E-02 | FAIL ABUN |
| RE-184 | 4.721E-01 | NOT IDENT. |
| W-188 | 8.459E+00 | FAIL ABUN |
| IR-192 | 4.337E-02 | NOT IDENT. |
| HG-203 | 7.133E-02 | NOT IDENT. |
| BI-207 | 2.704E-02 | FAIL ABUN |
| TL-208 | 1.672E-02 | NOT IDENT. |
| PB-210 | 4.254E-01 | NOT IDENT. |
| BI-211 | 1.594E-01 | NOT IDENT. |
| PB-211 | 4.730E-01 | NOT IDENT. |
| BI-212 | 3.188E-01 | NOT IDENT. |
| PB-212 | 4.010E-02 | FAIL ABUN |
| BI-214 | 6.131E-02 | NOT IDENT. |
| PB-214 | 5.496E-02 | FAIL ABUN |
| RN-219 | 2.639E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RN-222 | 6.131E-02 | NOT IDENT. |
| RA-223 | 4.273E-01 | NOT IDENT. |
| RA-224 | 3.719E-01 | NOT IDENT. |
| RA-226 | 6.131E-02 | NOT IDENT. |
| AC-227 | 1.572E-01 | NOT IDENT. |
| TH-227 | 1.572E-01 | NOT IDENT. |
| AC-228 | 1.195E-01 | NOT IDENT. |
| RA-228 | 1.195E-01 | NOT IDENT. |
| TH-228 | 4.010E-02 | FAIL ABUN |
| TH-229 | 2.823E-01 | NOT IDENT. |
| TH-230 | 6.130E-02 | NOT IDENT. |
| PA-231 | 8.142E-01 | NOT IDENT. |
| TH-231 | 4.273E-01 | NOT IDENT. |
| TH-232 | 1.195E-01 | NOT IDENT. |
| PA-233 | 3.801E-02 | NOT IDENT. |
| PA-234 | 1.594E-01 | FAIL ABUN |
| PA-234M | 3.028E+00 | NOT IDENT. |
| U-234 | 6.130E-02 | NOT IDENT. |
| U-235 | 1.035E-01 | FAIL ABUN |
| NP-237 | 3.801E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 1.796E-01 | NOT IDENT. |
| AM-241 | 2.895E-02 | NOT IDENT. |
| CM-243 | 5.041E-02 | NOT IDENT. |
| CM-247 | 2.467E-02 | NOT IDENT. |
| CF-249 | 2.848E-02 | NOT IDENT. |
| CF-251 | 7.828E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:34:10.74

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146015.CNF;1       *
* Acquisition date : 10-FEB-2014 13:27:28 Sensitivity     : 3.000                *
* Detector ID      : GAM25                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.32     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 10:37:00 Nuclide Library : SOLID                *
* Sample ID        : G341146015           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.3177E+02 GRAM      *
*                                         Quantity Err(%) : 1.5178E-03 %         *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  8-NOV-2013 08:03:16 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM25_500MLMB.CNF;8              *
*********************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| RH-106 | 2.921E-01 | 2.539E-01 | 2.539E-01 |
| RU-106 | 2.921E-01 | 2.539E-01 | 2.539E-01 |
| SN-117M | 2.553E+00 | 2.125E+00 | 2.125E+00 |
| TH-234 | 4.509E-01 | 6.697E-01 | 6.697E-01 |
| U-238 | 4.509E-01 | 6.697E-01 | 6.697E-01 |
| PU-239 | 2.645E+02 | 2.829E+02 | 2.829E+02 |
| AM-243 | 6.442E-03 | 2.123E-02 | 2.123E-02 |
| ANH-511 | 3.845E-02 | 7.018E-02 | 7.018E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -1.002E-01 | 6.716E-01 | 6.731E-01 | NOT IDENT. |
| NA-22 | 2.121E-02 | 3.113E-02 | 3.257E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.043E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.299E-03 | 2.739E-02 | 2.749E-02 | NOT IDENT. |
| K-40 | -1.522E-01 | 4.173E-01 | 4.229E-01 | NOT IDENT. |
| SC-46 | 2.747E-02 | 5.480E-02 | 5.618E-02 | NOT IDENT. |
| V-48 | -2.042E-01 | 1.817E+00 | 1.819E+00 | NOT IDENT. |
| CR-51 | -6.512E-01 | 2.042E+00 | 2.063E+00 | NOT IDENT. |
| MN-54 | -2.395E-03 | 3.413E-02 | 3.415E-02 | NOT IDENT. |
| CO-56 | 3.170E-02 | 7.078E-02 | 7.221E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 2.213E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.371E-02 | 2.014E-02 | 2.106E-02 | NOT IDENT. |
| CO-58 | 1.425E-02 | 6.556E-02 | 6.587E-02 | NOT IDENT. |
| FE-59 | -1.087E-01 | 2.191E-01 | 2.245E-01 | NOT IDENT. |
| CO-60 | -3.927E-02 | 2.741E-02 | 3.263E-02 | NOT IDENT. |
| ZN-65 | -1.620E-02 | 9.124E-02 | 9.153E-02 | NOT IDENT. |
| GE-68 | 1.105E-01 | 1.343E+00 | 1.343E+00 | NOT IDENT. |
| AS-73 | -1.196E-01 | 3.332E-01 | 3.375E-01 | NOT IDENT. |
| AS-74 | -1.955E-01 | 1.986E+00 | 1.988E+00 | NOT IDENT. |
| SE-75 | -1.401E-02 | 5.400E-02 | 5.437E-02 | NOT IDENT. |
| BR-77 | -1.883E+10 | 1.142E+11 | 1.146E+11 | SHORT HLIF |
| SR-82 | -9.480E-01 | 2.216E+00 | 2.256E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | 4.093E-02 | 9.688E-02 | 9.862E-02 | NOT IDENT. |
| KR-85 | 1.383E+01 | 8.564E+00 | 1.059E+01 | NOT IDENT. |
| SR-85 | 1.695E-01 | 1.052E-01 | 1.300E-01 | NOT IDENT. |
| RB-86 | 1.111E+00 | 1.349E+01 | 1.350E+01 | NOT IDENT. |
| Y-88 | -2.044E-02 | 7.352E-02 | 7.410E-02 | NOT IDENT. |
| Y-91 | 3.184E+00 | 3.626E+01 | 3.629E+01 | NOT IDENT. |
| NB-94 | 5.479E-03 | 2.858E-02 | 2.868E-02 | NOT IDENT. |
| NB-95 | 5.319E-02 | 7.344E-02 | 7.725E-02 | NOT IDENT. |
| NB-95M | -5.349E-02 | 2.032E-01 | 2.046E-01 | NOT IDENT. |
| ZR-95 | -5.954E-03 | 1.070E-01 | 1.071E-01 | FAIL ABUN |
| NB-97 | -1.000E+41 | 2.327E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 4.674E+40 | 3.033E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.215E+09 | 5.449E+09 | 5.639E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.007E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.038E-02 | 2.339E-02 | 2.386E-02 | NOT IDENT. |
| RH-102 | -5.532E-02 | 4.211E-02 | 4.894E-02 | NOT IDENT. |
| RU-103 | 7.209E-02 | 1.190E-01 | 1.233E-01 | NOT IDENT. |
| AG-108M | 4.956E-03 | 2.637E-02 | 2.646E-02 | FAIL ABUN |
| CD-109 | 7.945E-02 | 4.993E-01 | 5.005E-01 | NOT IDENT. |
| AG-110M | -2.847E-02 | 5.263E-02 | 5.417E-02 | NOT IDENT. |
| SN-113 | -4.791E-02 | 5.600E-02 | 6.002E-02 | NOT IDENT. |
| CD-115 | 4.033E+11 | 5.277E+11 | 5.581E+11 | SHORT HLIF |
| TE-123M | 1.947E-02 | 3.007E-02 | 3.133E-02 | NOT IDENT. |
| SB-124 | -7.255E-02 | 2.228E-01 | 2.252E-01 | FAIL ABUN |
| SB-125 | -3.722E-02 | 8.379E-02 | 8.546E-02 | NOT IDENT. |
| TE-125M | -2.061E+00 | 1.639E+01 | 1.642E+01 | NOT IDENT. |
| I-126 | 2.835E-01 | 1.130E+01 | 1.130E+01 | NOT IDENT. |
| SB-126 | 1.131E+01 | 1.283E+01 | 1.381E+01 | FAIL ABUN |
| SN-126 | 2.456E-02 | 4.333E-02 | 4.472E-02 | FAIL ABUN |
| SB-127 | 2.419E+06 | 2.059E+06 | 2.330E+06 | SHORT HLIF |
| I-131 | -5.216E+01 | 8.174E+01 | 8.505E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 5.990E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.710E+06 | 1.587E+07 | 1.601E+07 | SHORT HLIF |
| BA-133 | -2.428E-02 | 3.591E-02 | 3.754E-02 | NOT IDENT. |
| I-133 | 1.754E+31 | 2.839E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.311E-03 | 3.964E-02 | 3.969E-02 | NOT IDENT. |
| CS-135 | 4.137E-02 | 1.143E-01 | 1.159E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.325E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.818E+00 | 5.309E+00 | 5.372E+00 | NOT IDENT. |
| BA-137M | 1.942E-02 | 2.927E-02 | 3.055E-02 | NOT IDENT. |
| CS-137 | 2.052E-02 | 3.092E-02 | 3.227E-02 | NOT IDENT. |
| CE-139 | 1.882E-02 | 2.740E-02 | 2.868E-02 | NOT IDENT. |
| BA-140 | 2.262E+00 | 7.405E+00 | 7.475E+00 | NOT IDENT. |
| LA-140 | 2.262E+00 | 7.405E+00 | 7.475E+00 | NOT IDENT. |
| CE-141 | -1.151E-01 | 2.014E-01 | 2.080E-01 | NOT IDENT. |
| CE-143 | -1.213E+19 | 2.764E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -9.368E-02 | 1.719E-01 | 1.770E-01 | NOT IDENT. |
| PM-144 | -1.035E-03 | 3.613E-02 | 3.614E-02 | NOT IDENT. |
| PR-144 | -4.871E-02 | 2.826E+00 | 2.826E+00 | NOT IDENT. |
| PM-146 | -8.417E-03 | 3.320E-02 | 3.341E-02 | NOT IDENT. |
| ND-147 | -3.163E+00 | 6.638E+01 | 6.640E+01 | FAIL ABUN |
| PM-147 | 7.556E+01 | 4.834E+02 | 4.846E+02 | NOT IDENT. |
| PM-149 | 3.565E+12 | 5.115E+12 | 5.362E+12 | SHORT HLIF |
| EU-150 | 5.072E-03 | 2.315E-02 | 2.327E-02 | NOT IDENT. |
| EU-152 | -5.240E-03 | 7.751E-02 | 7.755E-02 | NOT IDENT. |
| GD-153 | -1.542E-02 | 7.457E-02 | 7.489E-02 | NOT IDENT. |
| EU-154 | 5.771E-02 | 8.470E-02 | 8.861E-02 | FAIL ABUN |
| EU-155 | -1.016E-02 | 5.817E-02 | 5.835E-02 | NOT IDENT. |
| TB-160 | 2.069E-01 | 2.561E-01 | 2.726E-01 | NOT IDENT. |
| HO-166M | 3.081E-02 | 4.692E-02 | 4.894E-02 | FAIL ABUN |
| TM-171 | -2.282E+00 | 3.449E+00 | 3.599E+00 | FAIL ABUN |
| LU-176 | -4.413E-03 | 2.044E-02 | 2.054E-02 | NOT IDENT. |
| HF-181 | 1.384E-02 | 1.224E-01 | 1.226E-01 | NOT IDENT. |
| TA-182 | 4.920E-02 | 1.789E-01 | 1.803E-01 | FAIL ABUN |
| RE-183 | -5.143E-02 | 1.184E-01 | 1.207E-01 | FAIL ABUN |
| RE-184 | 1.002E-01 | 5.392E-01 | 5.411E-01 | NOT IDENT. |
| W-188 | -1.126E+01 | 1.213E+01 | 1.315E+01 | FAIL ABUN |
| IR-192 | 3.932E-03 | 5.187E-02 | 5.190E-02 | NOT IDENT. |
| HG-203 | -1.036E-02 | 8.731E-02 | 8.744E-02 | NOT IDENT. |
| BI-207 | -1.516E-02 | 3.730E-02 | 3.792E-02 | FAIL ABUN |
| TL-208 | -4.466E-02 | 3.187E-02 | 3.770E-02 | NOT IDENT. |
| PB-210 | -4.110E-01 | 4.672E-01 | 5.026E-01 | NOT IDENT. |
| BI-211 | 1.093E-01 | 1.747E-01 | 1.815E-01 | NOT IDENT. |
| PB-211 | 2.481E-01 | 5.127E-01 | 5.247E-01 | NOT IDENT. |
| BI-212 | 2.630E-01 | 3.506E-01 | 3.701E-01 | NOT IDENT. |
| PB-212 | -1.080E-02 | 4.780E-02 | 4.804E-02 | FAIL ABUN |
| BI-214 | 6.634E-02 | 6.317E-02 | 6.989E-02 | NOT IDENT. |
| PB-214 | 5.800E-03 | 6.454E-02 | 6.459E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | 1.727E-01 | 2.805E-01 | 2.911E-01 | NOT IDENT. |
| RN-222 | 6.634E-02 | 6.317E-02 | 6.989E-02 | NOT IDENT. |
| RA-223 | 1.128E-01 | 5.014E-01 | 5.040E-01 | NOT IDENT. |
| RA-224 | -4.953E-02 | 4.487E-01 | 4.493E-01 | NOT IDENT. |
| RA-226 | 6.634E-02 | 6.317E-02 | 6.989E-02 | NOT IDENT. |
| AC-227 | -1.166E-01 | 2.041E-01 | 2.108E-01 | NOT IDENT. |
| TH-227 | -1.166E-01 | 2.041E-01 | 2.108E-01 | NOT IDENT. |
| AC-228 | -2.559E-02 | 1.450E-01 | 1.455E-01 | NOT IDENT. |
| RA-228 | -2.559E-02 | 1.450E-01 | 1.455E-01 | NOT IDENT. |
| TH-228 | -1.080E-02 | 4.780E-02 | 4.804E-02 | FAIL ABUN |
| TH-229 | -2.033E-01 | 4.123E-01 | 4.224E-01 | NOT IDENT. |
| TH-230 | 6.633E-02 | 6.316E-02 | 6.988E-02 | NOT IDENT. |
| PA-231 | -4.819E-01 | 1.057E+00 | 1.079E+00 | NOT IDENT. |
| TH-231 | 1.128E-01 | 5.014E-01 | 5.040E-01 | NOT IDENT. |
| TH-232 | -2.559E-02 | 1.450E-01 | 1.455E-01 | NOT IDENT. |
| PA-233 | -7.413E-03 | 4.725E-02 | 4.737E-02 | NOT IDENT. |
| PA-234 | 3.062E-02 | 1.833E-01 | 1.839E-01 | FAIL ABUN |
| PA-234M | -7.570E-01 | 3.574E+00 | 3.590E+00 | NOT IDENT. |
| U-234 | 6.633E-02 | 6.316E-02 | 6.988E-02 | NOT IDENT. |
| U-235 | -1.175E-01 | 1.285E-01 | 1.390E-01 | FAIL ABUN |
| NP-237 | -7.413E-03 | 4.725E-02 | 4.737E-02 | NOT IDENT. |
| NP-238 | -4.803E+11 | 4.207E+12 | 4.213E+12 | SHORT HLIF |
| NP-239 | -1.256E-01 | 2.392E-01 | 2.458E-01 | NOT IDENT. |
| AM-241 | -1.681E-02 | 4.121E-02 | 4.190E-02 | NOT IDENT. |
| CM-243 | 1.836E-02 | 5.901E-02 | 5.959E-02 | NOT IDENT. |
| CM-247 | 8.293E-03 | 2.750E-02 | 2.775E-02 | NOT IDENT. |
| CF-249 | 8.463E-03 | 3.193E-02 | 3.216E-02 | NOT IDENT. |
| CF-251 | 1.851E-03 | 1.035E-01 | 1.035E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 52.3594 | 94.67 | 36.9775 | 193.51 | 34.6227 |
| 45.60 | 28.2529 | 94.87 | 43.4266 | 197.03 | 30.2388 |
| 46.54 | 31.1779 | 97.43 | 40.4236 | 198.01 | 25.5449 |
| 49.72 | 0.0000 | 98.43 | 35.6456 | 201.83 | 38.0212 |
| 51.35 | 34.5531 | 98.44 | 35.6463 | 205.31 | 23.8632 |
| 52.39 | 32.7407 | 99.53 | 33.5602 | 210.85 | 31.7069 |
| 53.44 | 32.8479 | 100.11 | 37.9348 | 215.65 | 18.3578 |
| 57.36 | 0.0000 | 103.18 | 29.4435 | 222.11 | 14.6004 |
| 57.53 | 41.0809 | 103.37 | 27.2728 | 227.09 | 19.5760 |
| 57.98 | 39.6658 | 105.21 | 28.4661 | 227.38 | 25.4571 |
| 59.32 | 32.4464 | 105.31 | 28.4716 | 228.16 | 0.0000 |
| 59.54 | 35.4185 | 106.12 | 34.0002 | 228.18 | 21.5596 |
| 63.29 | 31.3205 | 109.28 | 38.6202 | 235.69 | 31.6179 |
| 63.58 | 35.8234 | 111.00 | 33.2103 | 235.96 | 31.6272 |
| 64.28 | 35.8923 | 111.76 | 0.0000 | 238.63 | 32.7092 |
| 66.73 | 45.1630 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 36.1793 | 117.23 | 32.4728 | 240.99 | 30.8042 |
| 67.75 | 34.7186 | 121.12 | 24.8057 | 242.00 | 35.8110 |
| 69.67 | 30.3421 | 121.22 | 28.1933 | 244.70 | 28.9301 |
| 70.83 | 31.9542 | 121.78 | 32.7364 | 252.40 | 0.0000 |
| 72.81 | 35.1735 | 122.06 | 37.2700 | 252.80 | 25.1499 |
| 72.87 | 35.1789 | 123.07 | 37.3358 | 254.15 | 0.0000 |
| 74.66 | 45.0662 | 127.23 | 27.3480 | 256.23 | 34.3236 |
| 74.82 | 45.0838 | 129.30 | 34.3048 | 260.90 | 0.0000 |
| 74.97 | 39.9756 | 131.20 | 28.6784 | 264.66 | 27.4882 |
| 77.11 | 34.0022 | 133.02 | 31.0660 | 268.22 | 22.4763 |
| 79.69 | 43.5430 | 133.52 | 32.8189 | 269.46 | 24.5493 |
| 80.12 | 45.6626 | 136.00 | 23.5867 | 271.23 | 24.5918 |
| 80.19 | 0.0000 | 136.47 | 33.5557 | 273.65 | 17.4599 |
| 80.57 | 35.3221 | 140.51 | 0.0000 | 276.40 | 25.7442 |
| 81.00 | 32.2377 | 143.76 | 35.1163 | 277.37 | 19.5839 |
| 81.07 | 32.2431 | 144.24 | 31.6283 | 277.60 | 20.6189 |
| 83.79 | 34.5392 | 145.44 | 32.5672 | 278.00 | 23.7209 |
| 85.43 | 46.2236 | 152.43 | 30.8388 | 279.20 | 21.6828 |
| 86.55 | 40.4420 | 153.25 | 31.3513 | 279.54 | 21.6899 |
| 86.79 | 40.4633 | 154.21 | 32.8230 | 280.46 | 13.4388 |
| 86.94 | 42.6905 | 156.02 | 21.4636 | 283.69 | 24.8859 |
| 87.09 | 44.2864 | 158.56 | 21.5433 | 284.31 | 0.0000 |
| 87.57 | 34.8336 | 159.00 | 21.5568 | 285.41 | 24.9258 |
| 88.03 | 38.0389 | 162.33 | 31.9747 | 285.90 | 0.0000 |
| 88.34 | 38.0649 | 163.33 | 34.3441 | 287.50 | 13.5278 |
| 88.47 | 38.0757 | 165.86 | 21.7685 | 290.67 | 29.2224 |
| 89.96 | 49.3412 | 176.31 | 39.7489 | 293.27 | 0.0000 |
| 91.11 | 39.3584 | 176.60 | 41.2371 | 295.22 | 12.5760 |
| 92.59 | 39.4834 | 177.52 | 33.9149 | 295.96 | 14.6821 |
| 93.35 | 36.8749 | 181.07 | 0.0000 | 298.58 | 26.2802 |
| 94.56 | 36.9689 | 184.41 | 26.7838 | 299.98 | 27.3659 |
| 94.65 | 36.9760 | 185.72 | 26.8293 | 300.09 | 25.2631 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 25.2642 | 497.08 | 8.7518 | 711.68 | 9.0607 |
| 301.36 | 20.0228 | 505.52 | 13.0316 | 720.70 | 10.9170 |
| 302.85 | 16.8838 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 13.7383 | 511.00 | 14.7083 | 722.78 | 12.7485 |
| 306.78 | 23.2964 | 514.00 | 16.3716 | 722.91 | 12.7490 |
| 308.46 | 19.0890 | 514.00 | 16.3716 | 723.31 | 5.4648 |
| 311.90 | 20.2101 | 520.40 | 8.8739 | 724.19 | 5.4670 |
| 316.51 | 17.0872 | 520.69 | 0.0000 | 727.33 | 3.6497 |
| 319.41 | 22.4830 | 522.65 | 0.0000 | 733.00 | 8.7814 |
| 320.08 | 21.4246 | 527.90 | 0.0000 | 735.93 | 2.1982 |
| 321.04 | 19.2980 | 529.59 | 4.9562 | 737.46 | 8.7986 |
| 323.87 | 20.4191 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 25.8223 | 531.02 | 11.9045 | 747.24 | 11.0454 |
| 328.76 | 26.9783 | 546.56 | 0.0000 | 748.06 | 11.0493 |
| 333.37 | 20.5824 | 552.55 | 12.0501 | 752.31 | 8.3022 |
| 333.97 | 23.8440 | 563.25 | 11.7846 | 753.82 | 8.3077 |
| 334.37 | 29.2725 | 569.33 | 18.2421 | 756.73 | 6.4696 |
| 338.28 | 26.1039 | 569.50 | 18.2439 | 756.80 | 6.4698 |
| 338.32 | 26.1050 | 569.70 | 18.2461 | 763.94 | 13.9063 |
| 340.48 | 21.7926 | 583.19 | 14.5860 | 765.81 | 6.4947 |
| 340.55 | 18.5247 | 584.27 | 11.3512 | 766.42 | 5.5684 |
| 344.28 | 20.7668 | 595.83 | 17.4736 | 766.84 | 4.6411 |
| 345.93 | 22.9832 | 600.60 | 12.3647 | 772.60 | 0.0000 |
| 351.06 | 16.4841 | 602.52 | 0.0000 | 776.52 | 10.2523 |
| 351.93 | 20.8943 | 602.73 | 17.5362 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 23.7496 | 778.90 | 13.0615 |
| 356.01 | 26.4781 | 609.32 | 10.3506 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 13.4627 | 785.37 | 13.0968 |
| 366.42 | 0.0000 | 614.28 | 20.7534 | 792.07 | 15.0094 |
| 375.05 | 17.9131 | 618.01 | 10.3965 | 794.95 | 10.3313 |
| 383.85 | 23.4409 | 620.36 | 10.4089 | 795.86 | 12.2145 |
| 388.16 | 18.0891 | 621.93 | 10.4170 | 801.95 | 10.3611 |
| 388.63 | 17.1907 | 630.19 | 0.0000 | 810.29 | 7.5610 |
| 391.69 | 23.5768 | 631.29 | 14.6525 | 810.45 | 7.5615 |
| 400.66 | 13.6904 | 633.25 | 11.5240 | 810.76 | 7.5625 |
| 401.81 | 10.9614 | 634.78 | 5.2422 | 815.77 | 6.6306 |
| 402.40 | 14.6215 | 635.95 | 3.1471 | 818.51 | 5.6897 |
| 404.85 | 12.8162 | 636.99 | 0.0000 | 832.01 | 10.0108 |
| 410.95 | 16.8556 | 645.85 | 10.5415 | 834.85 | 9.5449 |
| 413.71 | 13.8177 | 657.76 | 14.8439 | 835.71 | 8.5933 |
| 414.70 | 12.2909 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 18.5945 | 661.66 | 8.4980 | 846.75 | 0.0000 |
| 427.87 | 19.5347 | 664.57 | 0.0000 | 846.77 | 8.6307 |
| 433.94 | 19.6152 | 666.33 | 8.5172 | 856.80 | 15.4036 |
| 439.40 | 20.6245 | 666.50 | 8.5178 | 860.56 | 6.7489 |
| 453.88 | 16.0898 | 667.71 | 0.0000 | 871.09 | 9.6804 |
| 463.37 | 10.4750 | 677.62 | 8.5627 | 873.19 | 11.6257 |
| 468.07 | 18.1472 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 11.8693 | 879.38 | 6.7976 |
| 475.06 | 11.5121 | 696.49 | 14.0372 | 880.51 | 9.7152 |
| 476.78 | 18.2471 | 696.51 | 14.0372 | 883.24 | 12.6427 |
| 477.60 | 13.4521 | 697.00 | 14.0404 | 884.68 | 11.6765 |
| 482.18 | 12.5268 | 697.49 | 10.8027 | 889.28 | 4.8737 |
| 487.02 | 10.6313 | 702.65 | 10.8284 | 894.76 | 10.7440 |
| 492.35 | 0.0000 | 706.68 | 12.6562 | 898.04 | 6.8455 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 9.7984 | 1312.11 | 4.7768 | | |
| 911.20 | 11.7925 | 1332.49 | 7.6847 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 2.9647 | 1365.19 | 3.8757 | | |
| 937.49 | 1.9843 | 1368.63 | 0.0000 | | |
| 944.13 | 2.9835 | 1384.29 | 7.7899 | | |
| 946.00 | 3.9807 | 1408.01 | 3.9188 | | |
| 949.00 | 4.9812 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 7.9420 | | |
| 962.31 | 8.0075 | 1489.16 | 2.9990 | | |
| 964.08 | 4.0063 | 1505.03 | 8.0279 | | |
| 966.17 | 3.0069 | 1596.21 | 5.1257 | | |
| 968.97 | 6.0197 | 1620.50 | 4.1233 | | |
| 983.53 | 8.0671 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 5.2352 | | |
| 996.26 | 4.0512 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.0867 | 1764.49 | 3.1908 | | |
| 1004.73 | 6.0944 | 1770.23 | 5.3244 | | |
| 1021.30 | 0.0000 | 1771.35 | 5.3256 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.8176 | | |
| 1037.84 | 10.2702 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.6667 | | |
| 1046.59 | 9.2699 | | | | |
| 1048.07 | 5.1524 | | | | |
| 1049.04 | 3.0924 | | | | |
| 1050.41 | 6.1877 | | | | |
| 1063.66 | 7.2501 | | | | |
| 1077.00 | 8.3216 | | | | |
| 1077.34 | 8.3223 | | | | |
| 1085.87 | 12.5176 | | | | |
| 1099.45 | 7.3333 | | | | |
| 1112.07 | 7.3623 | | | | |
| 1112.84 | 6.3120 | | | | |
| 1115.54 | 9.4761 | | | | |
| 1120.29 | 8.4355 | | | | |
| 1120.55 | 8.4362 | | | | |
| 1121.30 | 9.4929 | | | | |
| 1129.67 | 9.5175 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.4292 | | | | |
| 1177.95 | 8.5843 | | | | |
| 1189.05 | 6.4592 | | | | |
| 1204.77 | 5.4075 | | | | |
| 1221.41 | 2.7944 | | | | |
| 1231.02 | 1.8681 | | | | |
| 1235.36 | 4.6760 | | | | |
| 1238.28 | 4.6800 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.7243 | | | | |
| 1274.44 | 2.8366 | | | | |
| 1274.54 | 2.8367 | | | | |
| 1291.59 | 4.7501 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:34:44.55

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146016.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM27.CNF;190
                                        Background date  : 9-FEB-2014 11:22:29.
Sample date      : 7-NOV-2013 10:42:00. Acquisition date : 10-FEB-2014 13:27:51
Sample ID        : G341146016           Sample quantity  : 1.26050E+02 GRAM
Detector name    : GAM27                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.52  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 74.64* | 17 | 52 | 1.29 | 148.64 | 145 | 18 | 4.79E-03 | 77.2 | 3.13E+00 |
| 2 | 3 | 77.65* | 19 | 39 | 1.30 | 154.65 | 145 | 18 | 5.34E-03 | 70.0 | |
| 3 | 0 | 119.35 | 23 | 50 | 2.68 | 238.07 | 233 | 9 | 6.28E-03 | 60.9 | |
| 4 | 0 | 144.42* | 20 | 39 | 1.57 | 288.23 | 283 | 10 | 5.51E-03 | 68.8 | |
| 5 | 1 | 187.69 | 16 | 26 | 1.26 | 374.77 | 364 | 14 | 4.57E-03 | 58.4 | 2.64E+00 |
| 6 | 0 | 205.26* | 29 | 45 | 1.31 | 409.93 | 404 | 12 | 8.11E-03 | 50.6 | |
| 7 | 0 | 239.23* | 1 | 53 | 0.87 | 477.88 | 473 | 10 | 2.59E-04 | ***** | |
| 8 | 0 | 321.57* | 8 | 18 | 0.87 | 642.60 | 638 | 7 | 2.24E-03 | 101.9 | |
| 9 | 0 | 402.96 | 8 | 12 | 1.24 | 805.43 | 800 | 8 | 2.28E-03 | 80.9 | |
| 10 | 0 | 471.19 | 15 | 12 | 1.59 | 941.95 | 938 | 10 | 4.17E-03 | 50.9 | |
| 11 | 0 | 549.21 | 6 | 7 | 1.05 | 1098.02 | 1094 | 7 | 1.58E-03 | 93.5 | |
| 12 | 0 | 599.83 | 13 | 7 | 1.98 | 1199.31 | 1196 | 7 | 3.61E-03 | 43.7 | |
| 13 | 0 | 609.78* | 8 | 12 | 0.75 | 1219.21 | 1214 | 10 | 2.22E-03 | 103.9 | |
| 14 | 0 | 660.70 | 15 | 2 | 0.87 | 1321.09 | 1316 | 9 | 4.07E-03 | 32.1 | |
| 15 | 0 | 702.38 | 15 | 2 | 1.36 | 1404.49 | 1401 | 8 | 4.26E-03 | 29.8 | |
| 16 | 0 | 858.75 | 11 | 0 | 1.85 | 1717.36 | 1714 | 7 | 3.06E-03 | 30.2 | |
| 17 | 0 | 911.40* | 6 | 8 | 1.59 | 1822.70 | 1815 | 10 | 1.71E-03 | 101.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:34:46

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146016.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 10:42:00 | Acquisition date | : 10-FEB-2014 13:27:51 |
| Sample ID | : G341146016 | Sample quantity | : 126.05 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA27 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.52 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CR-51 | 320.08 | 8 | 9.91* | 4.650E+00 | 1.043E-01 | 1.128E+00 | 203.76 |
| BA-137M | 661.66 | 15 | 89.90* | 2.810E+00 | 3.454E-02 | 3.474E-02 | 64.14 |
| CS-137 | 661.66 | 15 | 85.10* | 2.810E+00 | 3.648E-02 | 3.670E-02 | 64.14 |
| CE-141 | 145.44 | 20 | 48.29* | 7.170E+00 | 3.411E-02 | 2.593E-01 | 137.60 |
| PB-212 | 74.82 | 17 | 10.28 | 5.829E+00 | 1.713E-01 | 1.713E-01 | 154.37 |
| | 77.11 | 19 | 17.10 | 6.099E+00 | 1.098E-01 | 1.098E-01 | 140.00 |
| | 238.63 | 1 | 43.60* | 5.613E+00 | 2.266E-03 | 2.266E-03 | 3117.19 |
| | 300.09 | ------ | 3.30 | 4.865E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | 17 | 10.28 | 5.829E+00 | 1.713E-01 | 1.713E-01 | 154.37 |
| | 77.11 | 19 | 17.10 | 6.099E+00 | 1.098E-01 | 1.098E-01 | 140.00 |
| | 238.63 | 1 | 43.60* | 5.613E+00 | 2.266E-03 | 2.266E-03 | 3117.19 |
| | 300.09 | ------ | 3.30 | 4.865E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.434E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 17 | 67.20* | 5.829E+00 | 2.620E-02 | 2.620E-02 | 154.37 |
| CM-247 | 278.00 | ------ | 3.40 | 5.111E+00 | ------ | Line Not Found | ------ |
| | 287.50 | ------ | 2.00 | 5.002E+00 | ------ | Line Not Found | ------ |
| | 402.40 | 8 | 72.00* | 3.997E+00 | 1.697E-02 | 1.697E-02 | 161.79 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:34:47.31

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146016.CNF;1    *
* Acquisition date : 10-FEB-2014 13:27:51 Sensitivity     : 3.000            *
* Detector ID      : GAM27                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.52     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 10:42:00 Nuclide Library : SOLID            *
* Sample ID        : G341146016           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.2605E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7          *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CR-51 | 1.128E+00 | 2.252E+00 | 3.574E+00 |
| BA-137M | 3.474E-02 | 2.184E-02 | 4.040E-02 |
| CS-137 | 3.670E-02 | 2.307E-02 | 4.268E-02 |
| CE-141 | 2.593E-01 | 3.497E-01 | 4.406E-01 |
| PB-212 | 2.266E-03 | 6.923E-02 | 7.471E-02 |
| TH-228 | 2.266E-03 | 6.923E-02 | 7.471E-02 |
| AM-243 | 2.620E-02 | 3.964E-02 | 4.288E-02 |
| CM-247 | 1.697E-02 | 2.691E-02 | 4.928E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -1.240E-01 | 6.228E-01 | 1.049E+00 | NOT IDENT. |
| NA-22 | -3.403E-03 | 2.460E-02 | 5.040E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -8.694E-04 | 1.755E-02 | 4.233E-02 | NOT IDENT. |
| K-40 | 2.298E-01 | 4.044E-01 | 9.090E-01 | NOT IDENT. |
| SC-46 | 2.846E-02 | 5.355E-02 | 1.148E-01 | NOT IDENT. |
| V-48 | -8.541E-01 | 1.268E+00 | 2.121E+00 | NOT IDENT. |
| MN-54 | 5.975E-03 | 2.475E-02 | 5.228E-02 | NOT IDENT. |
| CO-56 | 5.107E-03 | 6.658E-02 | 1.290E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.240E-02 | 2.665E-02 | 3.999E-02 | NOT IDENT. |
| CO-58 | -1.156E-02 | 6.121E-02 | 1.158E-01 | NOT IDENT. |
| FE-59 | -7.054E-03 | 1.922E-01 | 3.934E-01 | NOT IDENT. |
| CO-60 | 8.188E-03 | 2.390E-02 | 5.482E-02 | NOT IDENT. |
| ZN-65 | -4.544E-03 | 6.795E-02 | 1.371E-01 | NOT IDENT. |
| GE-68 | -3.040E-01 | 1.219E+00 | 2.223E+00 | NOT IDENT. |
| AS-73 | 2.436E-01 | 8.026E-01 | 1.532E+00 | NOT IDENT. |
| AS-74 | -4.718E-01 | 1.668E+00 | 2.682E+00 | NOT IDENT. |
| SE-75 | -2.040E-02 | 5.138E-02 | 9.261E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.466E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.604E-01 | 2.240E+00 | 4.396E+00 | NOT IDENT. |
| RB-83 | -9.712E-02 | 9.875E-02 | 1.523E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | -1.349E+01 | 8.714E+00 | 1.296E+01 | NOT IDENT. |
| SR-85 | -1.662E-01 | 1.070E-01 | 1.591E-01 | NOT IDENT. |
| RB-86 | -3.901E+00 | 1.208E+01 | 2.172E+01 | NOT IDENT. |
| Y-88 | -7.403E-03 | 3.856E-02 | 8.489E-02 | NOT IDENT. |
| Y-91 | -1.058E+01 | 3.190E+01 | 6.092E+01 | NOT IDENT. |
| NB-94 | 3.415E-02 | 1.998E-02 | 5.036E-02 | FAIL ABUN |
| NB-95 | 1.125E-02 | 6.906E-02 | 1.360E-01 | NOT IDENT. |
| NB-95M | -5.042E-02 | 2.271E-01 | 3.651E-01 | NOT IDENT. |
| ZR-95 | -2.402E-02 | 1.048E-01 | 2.002E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.298E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.406E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.806E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -2.079E-02 | 2.375E-02 | 3.873E-02 | NOT IDENT. |
| RH-102 | 4.863E-03 | 3.876E-02 | 7.800E-02 | NOT IDENT. |
| RU-103 | -1.298E-01 | 1.255E-01 | 1.934E-01 | FAIL ABUN |
| RH-106 | 9.841E-02 | 2.806E-01 | 5.707E-01 | NOT IDENT. |
| RU-106 | 9.841E-02 | 2.806E-01 | 5.707E-01 | NOT IDENT. |
| AG-108M | 1.438E-02 | 2.167E-02 | 4.425E-02 | NOT IDENT. |
| CD-109 | -1.516E-01 | 5.457E-01 | 9.657E-01 | NOT IDENT. |
| AG-110M | 1.700E-03 | 4.520E-02 | 8.873E-02 | NOT IDENT. |
| SN-113 | -3.992E-02 | 5.875E-02 | 9.943E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.659E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.371E+00 | 2.353E+00 | 4.773E+00 | NOT IDENT. |
| TE-123M | 4.184E-02 | 3.375E-02 | 6.714E-02 | NOT IDENT. |
| SB-124 | -2.811E-02 | 1.040E-01 | 2.213E-01 | NOT IDENT. |
| SB-125 | -1.468E-02 | 7.282E-02 | 1.320E-01 | FAIL ABUN |
| TE-125M | 8.270E+00 | 1.918E+01 | 3.578E+01 | NOT IDENT. |
| I-126 | -6.499E+00 | 1.144E+01 | 1.889E+01 | NOT IDENT. |
| SB-126 | 1.070E+00 | 8.107E+00 | 1.644E+01 | NOT IDENT. |
| SN-126 | -1.491E-04 | 4.823E-02 | 8.742E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.501E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.055E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.599E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -6.743E-03 | 3.383E-02 | 6.137E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.641E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.233E-02 | 3.000E-02 | 4.953E-02 | NOT IDENT. |
| CS-135 | 1.271E-01 | 1.107E-01 | 2.317E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.356E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.240E-01 | 5.496E+00 | 1.035E+01 | NOT IDENT. |
| CE-139 | -8.910E-03 | 3.487E-02 | 5.999E-02 | NOT IDENT. |
| BA-140 | 1.480E+00 | 5.084E+00 | 1.137E+01 | NOT IDENT. |
| LA-140 | 1.480E+00 | 5.084E+00 | 1.137E+01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.941E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.171E-02 | 1.756E-01 | 3.182E-01 | NOT IDENT. |
| PM-144 | 2.195E-02 | 3.193E-02 | 6.333E-02 | NOT IDENT. |
| PR-144 | 1.713E+00 | 2.492E+00 | 4.942E+00 | NOT IDENT. |
| PM-146 | 1.302E-02 | 3.017E-02 | 6.040E-02 | NOT IDENT. |
| ND-147 | -2.625E+01 | 6.506E+01 | 1.132E+02 | NOT IDENT. |
| PM-147 | -2.343E+02 | 6.677E+02 | 1.019E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.170E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.206E-02 | 2.069E-02 | 3.410E-02 | NOT IDENT. |
| EU-152 | -3.120E-02 | 7.018E-02 | 1.243E-01 | NOT IDENT. |
| GD-153 | -3.421E-02 | 7.136E-02 | 1.219E-01 | NOT IDENT. |
| EU-154 | -8.361E-03 | 6.719E-02 | 1.380E-01 | NOT IDENT. |
| EU-155 | -2.903E-03 | 7.389E-02 | 1.334E-01 | NOT IDENT. |
| TB-160 | 8.154E-02 | 2.130E-01 | 4.407E-01 | NOT IDENT. |
| HO-166M | 4.981E-03 | 4.568E-02 | 8.993E-02 | NOT IDENT. |
| TM-171 | 1.355E+00 | 9.214E+00 | 1.733E+01 | NOT IDENT. |
| LU-176 | -4.364E-03 | 2.001E-02 | 3.654E-02 | NOT IDENT. |
| HF-181 | -1.874E-03 | 1.050E-01 | 1.990E-01 | NOT IDENT. |
| TA-182 | -1.220E-01 | 1.749E-01 | 3.044E-01 | NOT IDENT. |
| RE-183 | -2.364E-01 | 2.094E-01 | 3.456E-01 | NOT IDENT. |
| RE-184 | 3.760E-01 | 4.296E-01 | 9.243E-01 | NOT IDENT. |
| W-188 | -1.807E+00 | 1.208E+01 | 2.224E+01 | NOT IDENT. |
| IR-192 | -3.051E-02 | 6.848E-02 | 1.041E-01 | NOT IDENT. |
| HG-203 | -8.771E-02 | 8.943E-02 | 1.490E-01 | NOT IDENT. |
| BI-207 | -8.833E-03 | 4.118E-02 | 7.568E-02 | FAIL ABUN |
| TL-208 | 1.600E-02 | 3.208E-02 | 6.520E-02 | NOT IDENT. |
| PB-210 | -1.021E+00 | 1.580E+00 | 2.980E+00 | NOT IDENT. |
| BI-211 | 1.823E-02 | 1.751E-01 | 3.282E-01 | NOT IDENT. |
| PB-211 | -1.825E-01 | 5.842E-01 | 8.989E-01 | NOT IDENT. |
| BI-212 | 5.813E-02 | 3.903E-01 | 7.896E-01 | NOT IDENT. |
| BI-214 | 3.512E-02 | 7.150E-02 | 1.273E-01 | FAIL ABUN |
| PB-214 | 6.368E-02 | 6.412E-02 | 1.303E-01 | FAIL ABUN |
| RN-219 | 1.852E-01 | 2.936E-01 | 5.326E-01 | FAIL ABUN |
| RN-222 | 3.512E-02 | 7.150E-02 | 1.273E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | 1.031E-01 | 4.843E-01 | 8.295E-01 | FAIL ABUN |
| RA-224 | 3.813E-02 | 4.564E-01 | 7.703E-01 | NOT IDENT. |
| RA-226 | 3.512E-02 | 7.150E-02 | 1.273E-01 | FAIL ABUN |
| AC-227 | 7.052E-02 | 1.785E-01 | 3.506E-01 | NOT IDENT. |
| TH-227 | 7.052E-02 | 1.785E-01 | 3.506E-01 | NOT IDENT. |
| AC-228 | 6.513E-02 | 1.295E-01 | 2.371E-01 | FAIL ABUN |
| RA-228 | 6.513E-02 | 1.295E-01 | 2.371E-01 | FAIL ABUN |
| TH-229 | 1.296E-01 | 3.874E-01 | 7.087E-01 | NOT IDENT. |
| TH-230 | 3.512E-02 | 7.150E-02 | 1.273E-01 | FAIL ABUN |
| PA-231 | -6.956E-02 | 1.068E+00 | 1.991E+00 | NOT IDENT. |
| TH-231 | 1.031E-01 | 4.843E-01 | 8.295E-01 | FAIL ABUN |
| TH-232 | 6.513E-02 | 1.295E-01 | 2.371E-01 | FAIL ABUN |
| PA-233 | -3.894E-02 | 5.417E-02 | 9.277E-02 | NOT IDENT. |
| PA-234 | 6.320E-02 | 2.053E-01 | 4.266E-01 | NOT IDENT. |
| PA-234M | 1.163E+00 | 3.755E+00 | 7.652E+00 | NOT IDENT. |
| TH-234 | -3.646E-01 | 7.992E-01 | 1.522E+00 | NOT IDENT. |
| U-234 | 3.512E-02 | 7.150E-02 | 1.273E-01 | FAIL ABUN |
| U-235 | 1.503E-01 | 2.027E-01 | 2.902E-01 | FAIL ABUN |
| NP-237 | -3.894E-02 | 5.417E-02 | 9.277E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 2.477E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -3.646E-01 | 7.992E-01 | 1.522E+00 | NOT IDENT. |
| NP-239 | 1.641E-01 | 3.223E-01 | 5.518E-01 | NOT IDENT. |
| PU-239 | 1.394E+02 | 2.390E+02 | 4.538E+02 | NOT IDENT. |
| AM-241 | -2.359E-02 | 7.423E-02 | 1.337E-01 | NOT IDENT. |
| CM-243 | -1.348E-02 | 7.127E-02 | 1.270E-01 | NOT IDENT. |
| CF-249 | 1.741E-02 | 3.214E-02 | 6.337E-02 | NOT IDENT. |
| CF-251 | -4.559E-02 | 9.591E-02 | 1.608E-01 | NOT IDENT. |
| ANH-511 | -4.248E-02 | 4.186E-02 | 8.605E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:34:42.87

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.61 | 22 | 44 | 1.08 | 92.57 | 89 | 6 | 6.20E-03 | 51.3 | |
| 2 | 0 | 63.74 | 29 | 50 | 1.18 | 126.83 | 123 | 7 | 7.93E-03 | 46.2 | |
| 3 | 3 | 74.64 | 22 | 52 | 1.29 | 148.64 | 145 | 18 | 5.98E-03 | 60.4 | 3.13E+00 |
| 4 | 3 | 77.65 | 26 | 39 | 1.30 | 154.65 | 145 | 18 | 7.34E-03 | 50.2 | |
| 5 | 0 | 93.13 | 61 | 70 | 1.22 | 185.63 | 181 | 10 | 1.70E-02 | 28.8 | |
| 6 | 0 | 119.35 | 23 | 50 | 2.68 | 238.07 | 233 | 9 | 6.28E-03 | 60.9 | |
| 7 | 0 | 144.42 | 32 | 39 | 1.57 | 288.23 | 283 | 10 | 9.00E-03 | 41.1 | |
| 8 | 1 | 185.88 | 36 | 42 | 1.26 | 371.15 | 364 | 14 | 1.00E-02 | 34.6 | 2.64E+00 |
| 9 | 1 | 187.69 | 16 | 26 | 1.26 | 374.77 | 364 | 14 | 4.57E-03 | 58.4 | |
| 10 | 0 | 205.26 | 33 | 45 | 1.31 | 409.93 | 404 | 12 | 9.26E-03 | 43.8 | |
| 11 | 0 | 239.23 | 17 | 53 | 0.87 | 477.88 | 473 | 10 | 4.77E-03 | 82.6 | |
| 12 | 0 | 321.57 | 11 | 18 | 0.87 | 642.60 | 638 | 7 | 2.95E-03 | 74.7 | |
| 13 | 0 | 402.96 | 8 | 12 | 1.24 | 805.43 | 800 | 8 | 2.28E-03 | 80.9 | |
| 14 | 0 | 471.19 | 15 | 12 | 1.59 | 941.95 | 938 | 10 | 4.17E-03 | 50.9 | |
| 15 | 0 | 511.29 | 95 | 19 | 2.63 | 1022.16 | 1016 | 16 | 2.64E-02 | 14.7 | |
| 16 | 0 | 549.21 | 6 | 7 | 1.05 | 1098.02 | 1094 | 7 | 1.58E-03 | 93.5 | |
| 17 | 0 | 599.83 | 13 | 7 | 1.98 | 1199.31 | 1196 | 7 | 3.61E-03 | 43.7 | |
| 18 | 0 | 609.78 | 20 | 12 | 0.75 | 1219.21 | 1214 | 10 | 5.49E-03 | 40.2 | |
| 19 | 0 | 660.70 | 15 | 2 | 0.87 | 1321.09 | 1316 | 9 | 4.07E-03 | 32.1 | |
| 20 | 0 | 702.38 | 15 | 2 | 1.36 | 1404.49 | 1401 | 8 | 4.26E-03 | 29.8 | |
| 21 | 0 | 858.75 | 11 | 0 | 1.85 | 1717.36 | 1714 | 7 | 3.06E-03 | 30.2 | |
| 22 | 0 | 911.40 | 9 | 8 | 1.59 | 1822.70 | 1815 | 10 | 2.58E-03 | 64.3 | |
| 23 | 0 | 1461.22 | 7 | 8 | 1.13 | 2922.98 | 2918 | 8 | 2.04E-03 | 80.7 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:34:45.12

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CR-51 | 320.08 | 8 | 9.91* | 4.650E+00 | 1.043E-01 | 1.128E+00 | 203.76 |
| BA-137M | 661.66 | 15 | 89.90* | 2.810E+00 | 3.454E-02 | 3.474E-02 | 64.14 |
| CS-137 | 661.66 | 15 | 85.10* | 2.810E+00 | 3.648E-02 | 3.670E-02 | 64.14 |
| CE-141 | 145.44 | 20 | 48.29* | 7.170E+00 | 3.411E-02 | 2.593E-01 | 137.60 |
| PB-212 | 74.82 | 17 | 10.28 | 5.829E+00 | 1.713E-01 | 1.713E-01 | 154.37 |
| | 77.11 | 19 | 17.10 | 6.099E+00 | 1.098E-01 | 1.098E-01 | 140.00 |
| | 238.63 | 1 | 43.60* | 5.613E+00 | 2.266E-03 | 2.266E-03 | 3117.19 |
| | 300.09 | ------ | 3.30 | 4.865E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | 17 | 10.28 | 5.829E+00 | 1.713E-01 | 1.713E-01 | 154.37 |
| | 77.11 | 19 | 17.10 | 6.099E+00 | 1.098E-01 | 1.098E-01 | 140.00 |
| | 238.63 | 1 | 43.60* | 5.613E+00 | 2.266E-03 | 2.266E-03 | 3117.19 |
| | 300.09 | ------ | 3.30 | 4.865E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.434E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 17 | 67.20* | 5.829E+00 | 2.620E-02 | 2.620E-02 | 154.37 |
| CM-247 | 278.00 | ------ | 3.40 | 5.111E+00 | ------ | Line Not Found | ------ |
| | 287.50 | ------ | 2.00 | 5.002E+00 | ------ | Line Not Found | ------ |
| | 402.40 | 8 | 72.00* | 3.997E+00 | 1.697E-02 | 1.697E-02 | 161.79 |

Flag: "*" = Keyline

Sample ID : G341146016 Acquisition date : 10-FEB-2014 13:27:51

Total number of lines in spectrum 17
Number of unidentified lines 5
Number of lines tentatively identified by NID 12 70.59%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CR-51 | 27.70D | 10.8 | 1.043E-01 | 1.128E+00 | 2.298E+00 | 203.76 | |
| BA-137M | 30.08Y | 1.01 | 3.454E-02 | 3.474E-02 | 2.228E-02 | 64.14 | |
| CS-137 | 30.08Y | 1.01 | 3.648E-02 | 3.670E-02 | 2.354E-02 | 64.14 | |
| CE-141 | 32.51D | 7.60 | 3.411E-02 | 2.593E-01 | 3.568E-01 | 137.60 | |
| PB-212 | 1.41E+10Y | 1.00 | 2.266E-03 | 2.266E-03 | 70.64E-03 | 3117.19 | |
| TH-228 | 1.41E+10Y | 1.00 | 2.266E-03 | 2.266E-03 | 70.64E-03 | 3117.19 | |
| AM-243 | 7370.00Y | 1.00 | 2.620E-02 | 2.620E-02 | 4.045E-02 | 154.37 | |
| CM-247 | 1.56E+07Y | 1.00 | 1.697E-02 | 1.697E-02 | 2.746E-02 | 161.79 | |
| | Total Activity : | | 2.572E-01 | 1.506E+00 | | | |

Grand Total Activity : 2.572E-01 1.506E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146016 Acquisition date : 10-FEB-2014 13:27:51

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 119.35 | 23 | 50 | 2.68 | 238.07 | 233 | 9 | 6.28E-03 | **** | 7.41E+00 | |
| 1 | 187.69 | 16 | 26 | 1.26 | 374.77 | 364 | 14 | 4.57E-03 | **** | 6.44E+00 | |
| 0 | 205.26 | 29 | 45 | 1.31 | 409.93 | 404 | 12 | 8.11E-03 | **** | 6.14E+00 | T |
| 0 | 471.19 | 15 | 12 | 1.59 | 941.95 | 938 | 10 | 4.17E-03 | **** | 3.59E+00 | |
| 0 | 549.21 | 6 | 7 | 1.05 | 1098.02 | 1094 | 7 | 1.58E-03 | **** | 3.22E+00 | |
| 0 | 599.83 | 13 | 7 | 1.98 | 1199.31 | 1196 | 7 | 3.61E-03 | 87.4 | 3.02E+00 | T |
| 0 | 609.78 | 8 | 12 | 0.75 | 1219.21 | 1214 | 10 | 2.22E-03 | **** | 2.98E+00 | T |
| 0 | 702.38 | 15 | 2 | 1.36 | 1404.49 | 1401 | 8 | 4.26E-03 | 59.7 | 2.68E+00 | T |
| 0 | 858.75 | 11 | 0 | 1.85 | 1717.36 | 1714 | 7 | 3.06E-03 | 60.3 | 2.29E+00 | |
| 0 | 911.40 | 6 | 8 | 1.59 | 1822.70 | 1815 | 10 | 1.71E-03 | **** | 2.19E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:00.42

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146016.CNF;1    *
* Acquisition date : 10-FEB-2014 13:27:51 Sensitivity     : 3.000           *
* Detector ID      : GAM27                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.52     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 10:42:00 Nuclide Library : SOLID           *
* Sample ID        : G341146016           Analyst initials: RXF2            *
* Batch Number     : 1359492              Sample Quantity : 1.2605E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| CR-51 | 1.599E+00 |
| BA-137M | 1.699E-02 |
| CS-137 | 1.795E-02 |
| CE-141 | 2.027E-01 |
| PB-212 | 3.408E-02 |
| TH-228 | 3.408E-02 |
| AM-243 | 1.939E-02 |
| CM-247 | 2.185E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 4.495E-01 | NOT IDENT. |
| NA-22 | 1.997E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.461E-02 | NOT IDENT. |
| K-40 | 4.032E-01 | NOT IDENT. |
| SC-46 | 4.946E-02 | NOT IDENT. |
| V-48 | 8.167E-01 | NOT IDENT. |
| MN-54 | 2.190E-02 | NOT IDENT. |
| CO-56 | 5.638E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.838E-02 | NOT IDENT. |
| CO-58 | 4.934E-02 | NOT IDENT. |
| FE-59 | 1.632E-01 | NOT IDENT. |
| CO-60 | 2.217E-02 | NOT IDENT. |
| ZN-65 | 5.728E-02 | NOT IDENT. |
| GE-68 | 9.443E-01 | NOT IDENT. |
| AS-73 | 7.069E-01 | NOT IDENT. |
| AS-74 | 1.157E+00 | NOT IDENT. |
| SE-75 | 4.182E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.908E+00 | NOT IDENT. |
| RB-83 | 6.465E-02 | NOT IDENT. |
| KR-85 | 5.923E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SR-85 | 7.270E-02 | NOT IDENT. |
| RB-86 | 9.179E+00 | NOT IDENT. |
| Y-88 | 3.008E-02 | NOT IDENT. |
| Y-91 | 2.494E+01 | NOT IDENT. |
| NB-94 | 2.218E-02 | FAIL ABUN |
| NB-95 | 5.900E-02 | NOT IDENT. |
| NB-95M | 1.666E-01 | NOT IDENT. |
| ZR-95 | 8.376E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.767E-02 | NOT IDENT. |
| RH-102 | 3.382E-02 | NOT IDENT. |
| RU-103 | 8.299E-02 | FAIL ABUN |
| RH-106 | 2.525E-01 | NOT IDENT. |
| RU-106 | 2.525E-01 | NOT IDENT. |
| AG-108M | 1.979E-02 | NOT IDENT. |
| CD-109 | 4.461E-01 | NOT IDENT. |
| AG-110M | 3.793E-02 | NOT IDENT. |
| SN-113 | 4.433E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.216E+00 | NOT IDENT. |
| TE-123M | 3.118E-02 | NOT IDENT. |
| SB-124 | 7.169E-02 | NOT IDENT. |
| SB-125 | 5.849E-02 | FAIL ABUN |
| TE-125M | 1.662E+01 | NOT IDENT. |
| I-126 | 8.010E+00 | NOT IDENT. |
| SB-126 | 7.036E+00 | NOT IDENT. |
| SN-126 | 4.051E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.766E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.055E-02 | NOT IDENT. |
| CS-135 | 1.063E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.401E+00 | NOT IDENT. |
| CE-139 | 2.762E-02 | NOT IDENT. |
| BA-140 | 4.597E+00 | NOT IDENT. |
| LA-140 | 4.597E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.466E-01 | NOT IDENT. |
| PM-144 | 2.808E-02 | NOT IDENT. |
| PR-144 | 2.191E+00 | NOT IDENT. |
| PM-146 | 2.673E-02 | NOT IDENT. |
| ND-147 | 4.905E+01 | NOT IDENT. |
| PM-147 | 4.689E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.520E-02 | NOT IDENT. |
| EU-152 | 5.527E-02 | NOT IDENT. |
| GD-153 | 5.588E-02 | NOT IDENT. |
| EU-154 | 5.478E-02 | NOT IDENT. |
| EU-155 | 6.133E-02 | NOT IDENT. |
| TB-160 | 1.908E-01 | NOT IDENT. |
| HO-166M | 3.937E-02 | NOT IDENT. |
| TM-171 | 8.001E+00 | NOT IDENT. |
| LU-176 | 1.648E-02 | NOT IDENT. |
| HF-181 | 8.608E-02 | NOT IDENT. |
| TA-182 | 1.212E-01 | NOT IDENT. |
| RE-183 | 1.567E-01 | NOT IDENT. |
| RE-184 | 4.004E-01 | NOT IDENT. |
| W-188 | 1.008E+01 | NOT IDENT. |
| IR-192 | 4.702E-02 | NOT IDENT. |
| HG-203 | 6.653E-02 | NOT IDENT. |
| BI-207 | 3.220E-02 | FAIL ABUN |
| TL-208 | 2.954E-02 | NOT IDENT. |
| PB-210 | 1.389E+00 | NOT IDENT. |
| BI-211 | 1.499E-01 | NOT IDENT. |
| PB-211 | 3.961E-01 | NOT IDENT. |
| BI-212 | 3.487E-01 | NOT IDENT. |
| BI-214 | 5.775E-02 | FAIL ABUN |
| PB-214 | 6.002E-02 | FAIL ABUN |
| RN-219 | 2.359E-01 | FAIL ABUN |
| RN-222 | 5.775E-02 | FAIL ABUN |
| RA-223 | 3.713E-01 | FAIL ABUN |

| | | |
|---|---|---|
| RA-224 | 3.502E-01 | NOT IDENT. |
| RA-226 | 5.775E-02 | FAIL ABUN |
| AC-227 | 1.596E-01 | NOT IDENT. |
| TH-227 | 1.596E-01 | NOT IDENT. |
| AC-228 | 1.043E-01 | FAIL ABUN |
| RA-228 | 1.043E-01 | FAIL ABUN |
| TH-229 | 3.257E-01 | NOT IDENT. |
| TH-230 | 5.774E-02 | FAIL ABUN |
| PA-231 | 9.018E-01 | NOT IDENT. |
| TH-231 | 3.713E-01 | FAIL ABUN |
| TH-232 | 1.043E-01 | FAIL ABUN |
| PA-233 | 4.199E-02 | NOT IDENT. |
| PA-234 | 1.817E-01 | NOT IDENT. |
| PA-234M | 3.353E+00 | NOT IDENT. |
| TH-234 | 7.132E-01 | NOT IDENT. |
| U-234 | 5.774E-02 | FAIL ABUN |
| U-235 | 1.349E-01 | FAIL ABUN |
| NP-237 | 4.199E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 7.132E-01 | NOT IDENT. |
| NP-239 | 2.553E-01 | NOT IDENT. |
| PU-239 | 2.096E+02 | NOT IDENT. |
| AM-241 | 6.123E-02 | NOT IDENT. |
| CM-243 | 5.823E-02 | NOT IDENT. |
| CF-249 | 2.872E-02 | NOT IDENT. |
| CF-251 | 7.337E-02 | NOT IDENT. |
| ANH-511 | 4.067E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:05.21

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146016.CNF;1  *
* Acquisition date : 10-FEB-2014 13:27:51 Sensitivity     : 3.000           *
* Detector ID      : GAM27                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.52     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 10:42:00 Nuclide Library : SOLID           *
* Sample ID        : G341146016           Analyst initials: RXF2            *
* Batch Number     : 1359492              Sample Quantity : 1.2605E+02 GRAM *
*                                         Quantity Err(%) : 1.5867E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CR-51 | 1.128E+00 | 2.254E+00 | 2.254E+00 |
| BA-137M | 3.474E-02 | 2.202E-02 | 2.202E-02 |
| CS-137 | 3.670E-02 | 2.326E-02 | 2.326E-02 |
| CE-141 | 2.593E-01 | 3.503E-01 | 3.503E-01 |
| PB-212 | 2.266E-03 | 6.923E-02 | 6.923E-02 |
| TH-228 | 2.266E-03 | 6.923E-02 | 6.923E-02 |
| AM-243 | 2.620E-02 | 3.970E-02 | 3.970E-02 |
| CM-247 | 1.697E-02 | 2.710E-02 | 2.710E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -1.240E-01 | 6.229E-01 | 6.254E-01 | NOT IDENT. |
| NA-22 | -3.403E-03 | 2.460E-02 | 2.465E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.874E+42 | 0.000E+00 | SHORT HLIF |
| AL-26 | -8.694E-04 | 1.755E-02 | 1.755E-02 | NOT IDENT. |
| K-40 | 2.298E-01 | 4.049E-01 | 4.180E-01 | NOT IDENT. |
| SC-46 | 2.846E-02 | 5.367E-02 | 5.518E-02 | NOT IDENT. |
| V-48 | -8.541E-01 | 1.274E+00 | 1.331E+00 | NOT IDENT. |
| MN-54 | 5.975E-03 | 2.476E-02 | 2.491E-02 | NOT IDENT. |
| CO-56 | 5.107E-03 | 6.658E-02 | 6.662E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.517E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.240E-02 | 2.666E-02 | 2.724E-02 | NOT IDENT. |
| CO-58 | -1.156E-02 | 6.123E-02 | 6.145E-02 | NOT IDENT. |
| FE-59 | -7.054E-03 | 1.922E-01 | 1.922E-01 | NOT IDENT. |
| CO-60 | 8.188E-03 | 2.391E-02 | 2.419E-02 | NOT IDENT. |
| ZN-65 | -4.544E-03 | 6.796E-02 | 6.799E-02 | NOT IDENT. |
| GE-68 | -3.040E-01 | 1.220E+00 | 1.228E+00 | NOT IDENT. |
| AS-73 | 2.436E-01 | 8.041E-01 | 8.116E-01 | NOT IDENT. |
| AS-74 | -4.718E-01 | 1.669E+00 | 1.683E+00 | NOT IDENT. |
| SE-75 | -2.040E-02 | 5.141E-02 | 5.222E-02 | NOT IDENT. |
| BR-77 | 4.799E+09 | 1.472E+11 | 1.472E+11 | SHORT HLIF |
| SR-82 | 1.604E-01 | 2.240E+00 | 2.241E+00 | NOT IDENT. |
| RB-83 | -9.712E-02 | 9.996E-02 | 1.091E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | -1.349E+01 | 8.801E+00 | 1.070E+01 | NOT IDENT. |
| SR-85 | -1.662E-01 | 1.081E-01 | 1.315E-01 | NOT IDENT. |
| RB-86 | -3.901E+00 | 1.210E+01 | 1.222E+01 | NOT IDENT. |
| Y-88 | -7.403E-03 | 3.857E-02 | 3.871E-02 | NOT IDENT. |
| Y-91 | -1.058E+01 | 3.192E+01 | 3.227E+01 | NOT IDENT. |
| NB-94 | 3.415E-02 | 2.020E-02 | 2.540E-02 | FAIL ABUN |
| NB-95 | 1.125E-02 | 6.906E-02 | 6.925E-02 | NOT IDENT. |
| NB-95M | -5.042E-02 | 2.272E-01 | 2.283E-01 | NOT IDENT. |
| ZR-95 | -2.402E-02 | 1.048E-01 | 1.054E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 5.735E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -7.657E+40 | 3.372E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.474E+08 | 4.406E+09 | 4.407E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.810E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -2.079E-02 | 2.408E-02 | 2.584E-02 | NOT IDENT. |
| RH-102 | 4.863E-03 | 3.877E-02 | 3.883E-02 | NOT IDENT. |
| RU-103 | -1.298E-01 | 1.261E-01 | 1.390E-01 | FAIL ABUN |
| RH-106 | 9.841E-02 | 2.808E-01 | 2.842E-01 | NOT IDENT. |
| RU-106 | 9.841E-02 | 2.808E-01 | 2.842E-01 | NOT IDENT. |
| AG-108M | 1.438E-02 | 2.171E-02 | 2.266E-02 | NOT IDENT. |
| CD-109 | -1.516E-01 | 5.460E-01 | 5.502E-01 | NOT IDENT. |
| AG-110M | 1.700E-03 | 4.520E-02 | 4.521E-02 | NOT IDENT. |
| SN-113 | -3.992E-02 | 5.886E-02 | 6.155E-02 | NOT IDENT. |
| CD-115 | 9.731E+09 | 5.659E+11 | 5.659E+11 | SHORT HLIF |
| SN-117M | 3.371E+00 | 2.370E+00 | 2.816E+00 | NOT IDENT. |
| TE-123M | 4.184E-02 | 3.391E-02 | 3.880E-02 | NOT IDENT. |
| SB-124 | -2.811E-02 | 1.041E-01 | 1.048E-01 | NOT IDENT. |
| SB-125 | -1.468E-02 | 7.283E-02 | 7.313E-02 | FAIL ABUN |
| TE-125M | 8.270E+00 | 1.920E+01 | 1.955E+01 | NOT IDENT. |
| I-126 | -6.499E+00 | 1.146E+01 | 1.183E+01 | NOT IDENT. |
| SB-126 | 1.070E+00 | 8.109E+00 | 8.123E+00 | NOT IDENT. |
| SN-126 | -1.491E-04 | 4.823E-02 | 4.823E-02 | NOT IDENT. |
| SB-127 | -6.494E+05 | 1.529E+06 | 1.557E+06 | SHORT HLIF |
| I-131 | -4.933E+01 | 8.068E+01 | 8.369E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.317E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -2.196E+06 | 1.600E+07 | 1.603E+07 | SHORT HLIF |
| BA-133 | -6.743E-03 | 3.383E-02 | 3.397E-02 | NOT IDENT. |
| I-133 | 3.564E+30 | 2.649E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.233E-02 | 3.009E-02 | 3.173E-02 | NOT IDENT. |
| CS-135 | 1.271E-01 | 1.114E-01 | 1.253E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.544E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.240E-01 | 5.497E+00 | 5.504E+00 | NOT IDENT. |
| CE-139 | -8.910E-03 | 3.492E-02 | 3.515E-02 | NOT IDENT. |
| BA-140 | 1.480E+00 | 5.085E+00 | 5.129E+00 | NOT IDENT. |
| LA-140 | 1.480E+00 | 5.085E+00 | 5.129E+00 | NOT IDENT. |
| CE-143 | -4.298E+18 | 2.941E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.171E-02 | 1.756E-01 | 1.758E-01 | NOT IDENT. |
| PM-144 | 2.195E-02 | 3.199E-02 | 3.349E-02 | NOT IDENT. |
| PR-144 | 1.713E+00 | 2.496E+00 | 2.613E+00 | NOT IDENT. |
| PM-146 | 1.302E-02 | 3.021E-02 | 3.077E-02 | NOT IDENT. |
| ND-147 | -2.625E+01 | 6.511E+01 | 6.617E+01 | NOT IDENT. |
| PM-147 | -2.343E+02 | 6.679E+02 | 6.762E+02 | NOT IDENT. |
| PM-149 | -2.165E+12 | 5.182E+12 | 5.273E+12 | SHORT HLIF |
| EU-150 | -2.206E-02 | 2.078E-02 | 2.304E-02 | NOT IDENT. |
| EU-152 | -3.120E-02 | 7.025E-02 | 7.164E-02 | NOT IDENT. |
| GD-153 | -3.421E-02 | 7.143E-02 | 7.307E-02 | NOT IDENT. |
| EU-154 | -8.361E-03 | 6.719E-02 | 6.730E-02 | NOT IDENT. |
| EU-155 | -2.903E-03 | 7.389E-02 | 7.390E-02 | NOT IDENT. |
| TB-160 | 8.154E-02 | 2.133E-01 | 2.164E-01 | NOT IDENT. |
| HO-166M | 4.981E-03 | 4.568E-02 | 4.574E-02 | NOT IDENT. |
| TM-171 | 1.355E+00 | 9.214E+00 | 9.235E+00 | NOT IDENT. |
| LU-176 | -4.364E-03 | 2.001E-02 | 2.011E-02 | NOT IDENT. |
| HF-181 | -1.874E-03 | 1.050E-01 | 1.050E-01 | NOT IDENT. |
| TA-182 | -1.220E-01 | 1.753E-01 | 1.837E-01 | NOT IDENT. |
| RE-183 | -2.364E-01 | 2.110E-01 | 2.364E-01 | NOT IDENT. |
| RE-184 | 3.760E-01 | 4.338E-01 | 4.657E-01 | NOT IDENT. |
| W-188 | -1.807E+00 | 1.208E+01 | 1.211E+01 | NOT IDENT. |
| IR-192 | -3.051E-02 | 6.853E-02 | 6.990E-02 | NOT IDENT. |
| HG-203 | -8.771E-02 | 8.974E-02 | 9.807E-02 | NOT IDENT. |
| BI-207 | -8.833E-03 | 4.120E-02 | 4.139E-02 | FAIL ABUN |
| TL-208 | 1.600E-02 | 3.211E-02 | 3.291E-02 | NOT IDENT. |
| PB-210 | -1.021E+00 | 1.582E+00 | 1.648E+00 | NOT IDENT. |
| BI-211 | 1.823E-02 | 1.751E-01 | 1.753E-01 | NOT IDENT. |
| PB-211 | -1.825E-01 | 5.845E-01 | 5.903E-01 | NOT IDENT. |
| BI-212 | 5.813E-02 | 3.904E-01 | 3.912E-01 | NOT IDENT. |
| BI-214 | 3.512E-02 | 7.157E-02 | 7.330E-02 | FAIL ABUN |
| PB-214 | 6.368E-02 | 6.437E-02 | 7.049E-02 | FAIL ABUN |
| RN-219 | 1.852E-01 | 2.949E-01 | 3.065E-01 | FAIL ABUN |
| RN-222 | 3.512E-02 | 7.157E-02 | 7.330E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | 1.031E-01 | 4.845E-01 | 4.867E-01 | FAIL ABUN |
| RA-224 | 3.813E-02 | 4.564E-01 | 4.567E-01 | NOT IDENT. |
| RA-226 | 3.512E-02 | 7.157E-02 | 7.330E-02 | FAIL ABUN |
| AC-227 | 7.052E-02 | 1.789E-01 | 1.817E-01 | NOT IDENT. |
| TH-227 | 7.052E-02 | 1.789E-01 | 1.817E-01 | NOT IDENT. |
| AC-228 | 6.513E-02 | 1.298E-01 | 1.331E-01 | FAIL ABUN |
| RA-228 | 6.513E-02 | 1.298E-01 | 1.331E-01 | FAIL ABUN |
| TH-229 | 1.296E-01 | 3.876E-01 | 3.919E-01 | NOT IDENT. |
| TH-230 | 3.512E-02 | 7.156E-02 | 7.329E-02 | FAIL ABUN |
| PA-231 | -6.956E-02 | 1.068E+00 | 1.069E+00 | NOT IDENT. |
| TH-231 | 1.031E-01 | 4.845E-01 | 4.867E-01 | FAIL ABUN |
| TH-232 | 6.513E-02 | 1.298E-01 | 1.331E-01 | FAIL ABUN |
| PA-233 | -3.894E-02 | 5.429E-02 | 5.705E-02 | NOT IDENT. |
| PA-234 | 6.320E-02 | 2.178E-01 | 2.196E-01 | NOT IDENT. |
| PA-234M | 1.163E+00 | 3.759E+00 | 3.795E+00 | NOT IDENT. |
| TH-234 | -3.646E-01 | 8.034E-01 | 8.200E-01 | NOT IDENT. |
| U-234 | 3.512E-02 | 7.156E-02 | 7.329E-02 | FAIL ABUN |
| U-235 | 1.503E-01 | 2.031E-01 | 2.141E-01 | FAIL ABUN |
| NP-237 | -3.894E-02 | 5.429E-02 | 5.705E-02 | NOT IDENT. |
| NP-238 | -6.275E+11 | 2.478E+12 | 2.494E+12 | SHORT HLIF |
| U-238 | -3.646E-01 | 8.034E-01 | 8.200E-01 | NOT IDENT. |
| NP-239 | 1.641E-01 | 3.227E-01 | 3.311E-01 | NOT IDENT. |
| PU-239 | 1.394E+02 | 2.393E+02 | 2.474E+02 | NOT IDENT. |
| AM-241 | -2.359E-02 | 7.425E-02 | 7.501E-02 | NOT IDENT. |
| CM-243 | -1.348E-02 | 7.128E-02 | 7.154E-02 | NOT IDENT. |
| CF-249 | 1.741E-02 | 3.221E-02 | 3.315E-02 | NOT IDENT. |
| CF-251 | -4.559E-02 | 9.609E-02 | 9.826E-02 | NOT IDENT. |
| ANH-511 | -4.248E-02 | 4.204E-02 | 4.619E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 55.6273 | 94.67 | 84.7148 | 193.51 | 37.0264 |
| 45.60 | 43.3307 | 94.87 | 84.7455 | 197.03 | 38.3311 |
| 46.54 | 42.5437 | 97.43 | 46.6217 | 198.01 | 41.8605 |
| 49.72 | 0.0000 | 98.43 | 38.5818 | 201.83 | 32.2255 |
| 51.35 | 44.0353 | 98.44 | 38.5823 | 205.31 | 44.8262 |
| 52.39 | 45.9984 | 99.53 | 39.6736 | 210.85 | 41.2560 |
| 53.44 | 42.4365 | 100.11 | 38.6956 | 215.65 | 39.9799 |
| 57.36 | 0.0000 | 103.18 | 44.0196 | 222.11 | 32.1932 |
| 57.53 | 48.4793 | 103.37 | 44.0341 | 227.09 | 39.5423 |
| 57.98 | 51.3338 | 105.21 | 44.1716 | 227.38 | 35.0587 |
| 59.32 | 46.8225 | 105.31 | 44.1791 | 228.16 | 0.0000 |
| 59.54 | 44.9740 | 106.12 | 45.2680 | 228.18 | 33.2871 |
| 63.29 | 47.2730 | 109.28 | 48.6088 | 235.69 | 40.5986 |
| 63.58 | 43.5209 | 111.00 | 46.6715 | 235.96 | 40.6092 |
| 64.28 | 49.2784 | 111.76 | 0.0000 | 238.63 | 36.3507 |
| 66.73 | 40.0278 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 36.2576 | 117.23 | 40.8527 | 240.99 | 32.0601 |
| 67.75 | 39.1653 | 121.12 | 52.1650 | 242.00 | 27.7144 |
| 69.67 | 44.8986 | 121.22 | 52.1730 | 244.70 | 28.0284 |
| 70.83 | 46.1677 | 121.78 | 55.3823 | 252.40 | 0.0000 |
| 72.81 | 47.8159 | 122.06 | 53.8230 | 252.80 | 27.6244 |
| 72.87 | 47.8220 | 123.07 | 33.2946 | 254.15 | 0.0000 |
| 74.66 | 30.0639 | 127.23 | 53.1788 | 256.23 | 28.6339 |
| 74.82 | 30.0741 | 129.30 | 38.4055 | 260.90 | 0.0000 |
| 74.97 | 30.0838 | 131.20 | 52.4194 | 264.66 | 35.3641 |
| 77.11 | 30.2189 | 133.02 | 49.3397 | 268.22 | 23.3387 |
| 79.69 | 30.3794 | 133.52 | 44.0079 | 269.46 | 31.7749 |
| 80.12 | 29.4250 | 136.00 | 38.7777 | 271.23 | 43.9915 |
| 80.19 | 0.0000 | 136.47 | 42.0374 | 273.65 | 30.0142 |
| 80.57 | 29.4518 | 140.51 | 0.0000 | 276.40 | 28.2047 |
| 81.00 | 39.7943 | 143.76 | 51.1748 | 277.37 | 43.2822 |
| 81.07 | 39.7998 | 144.24 | 51.2078 | 277.60 | 41.4091 |
| 83.79 | 41.4976 | 145.44 | 44.1980 | 278.00 | 39.5397 |
| 85.43 | 39.6482 | 152.43 | 44.0592 | 279.20 | 31.0986 |
| 86.55 | 52.6477 | 153.25 | 33.0798 | 279.54 | 32.0504 |
| 86.79 | 57.6407 | 154.21 | 38.6412 | 280.46 | 26.4149 |
| 86.94 | 57.6575 | 156.02 | 50.9044 | 283.69 | 32.1624 |
| 87.09 | 54.6909 | 158.56 | 29.9759 | 284.31 | 0.0000 |
| 87.57 | 53.7457 | 159.00 | 33.3252 | 285.41 | 35.0505 |
| 88.03 | 54.7891 | 162.33 | 49.0820 | 285.90 | 0.0000 |
| 88.34 | 52.8277 | 163.33 | 45.7926 | 287.50 | 32.2646 |
| 88.47 | 52.8410 | 165.86 | 50.4181 | 290.67 | 34.2521 |
| 89.96 | 86.9827 | 176.31 | 37.4416 | 293.27 | 0.0000 |
| 91.11 | 60.1169 | 176.60 | 34.0494 | 295.22 | 31.5146 |
| 92.59 | 53.2485 | 177.52 | 45.4484 | 295.96 | 30.5776 |
| 93.35 | 46.2803 | 181.07 | 0.0000 | 298.58 | 32.5577 |
| 94.56 | 64.5319 | 184.41 | 44.6673 | 299.98 | 40.2639 |
| 94.65 | 84.7118 | 185.72 | 44.7339 | 300.09 | 40.2671 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 38.3508 | 497.08 | 25.0990 | 711.68 | 15.4629 |
| 301.36 | 32.6304 | 505.52 | 25.2145 | 720.70 | 10.6702 |
| 302.85 | 23.0607 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 29.8260 | 511.00 | 24.1896 | 722.78 | 18.4461 |
| 306.78 | 31.8076 | 514.00 | 70.4824 | 722.91 | 17.4762 |
| 308.46 | 27.0237 | 514.00 | 70.4824 | 723.31 | 18.4503 |
| 311.90 | 42.5807 | 520.40 | 22.1008 | 724.19 | 15.5426 |
| 316.51 | 37.2943 | 520.69 | 0.0000 | 727.33 | 12.6445 |
| 319.41 | 28.0332 | 522.65 | 0.0000 | 733.00 | 20.4724 |
| 320.08 | 24.3469 | 527.90 | 0.0000 | 735.93 | 14.6407 |
| 321.04 | 24.3649 | 529.59 | 13.3246 | 737.46 | 10.7430 |
| 323.87 | 18.7523 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 28.1575 | 531.02 | 18.8905 | 747.24 | 5.8828 |
| 328.76 | 19.6060 | 546.56 | 0.0000 | 748.06 | 5.8847 |
| 333.37 | 32.4612 | 552.55 | 16.1789 | 752.31 | 10.8069 |
| 333.97 | 33.4599 | 563.25 | 18.9769 | 753.82 | 5.8982 |
| 334.37 | 32.4854 | 569.33 | 23.5657 | 756.73 | 10.8257 |
| 323.87 | 25.6683 | 569.50 | 23.5676 | 756.80 | 10.8260 |
| 338.32 | 25.6691 | 569.70 | 21.7570 | 763.94 | 15.7910 |
| 340.48 | 22.7431 | 583.19 | 17.3380 | 765.81 | 10.8644 |
| 340.55 | 29.6667 | 584.27 | 22.8253 | 766.42 | 10.8668 |
| 344.28 | 27.7642 | 595.83 | 16.8317 | 766.84 | 10.8687 |
| 345.93 | 23.8260 | 600.60 | 16.5630 | 772.60 | 0.0000 |
| 351.06 | 29.8924 | 602.52 | 0.0000 | 776.52 | 13.8848 |
| 351.93 | 22.9319 | 602.73 | 16.1191 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 18.4390 | 778.90 | 15.8828 |
| 356.01 | 30.9976 | 609.32 | 11.0874 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 13.8658 | 785.37 | 10.9466 |
| 366.42 | 0.0000 | 614.28 | 18.5215 | 792.07 | 11.9725 |
| 375.05 | 28.3696 | 618.01 | 17.6260 | 794.95 | 11.9854 |
| 383.85 | 24.4611 | 620.36 | 12.0729 | 795.86 | 11.9895 |
| 388.16 | 23.5092 | 621.93 | 15.7993 | 801.95 | 16.0227 |
| 388.63 | 20.4492 | 630.19 | 0.0000 | 810.29 | 14.0639 |
| 391.69 | 32.7847 | 631.29 | 13.0669 | 810.45 | 13.0600 |
| 400.66 | 21.4351 | 633.25 | 12.1443 | 810.76 | 13.0616 |
| 401.81 | 20.6259 | 634.78 | 14.0222 | 815.77 | 7.0463 |
| 402.40 | 20.6335 | 635.95 | 14.9652 | 818.51 | 11.0838 |
| 404.85 | 23.1461 | 636.99 | 0.0000 | 832.01 | 12.1518 |
| 410.95 | 16.5974 | 645.85 | 17.8501 | 834.85 | 7.0959 |
| 413.71 | 17.6654 | 657.76 | 17.3151 | 835.71 | 6.0841 |
| 414.70 | 22.8755 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 19.9089 | 661.66 | 9.4607 | 846.75 | 0.0000 |
| 427.87 | 23.0635 | 664.57 | 0.0000 | 846.77 | 15.2710 |
| 433.94 | 15.7837 | 666.33 | 16.5904 | 856.80 | 15.3259 |
| 439.40 | 25.3374 | 666.50 | 16.5912 | 860.56 | 6.8206 |
| 453.88 | 14.9079 | 667.71 | 0.0000 | 871.09 | 14.3767 |
| 463.37 | 18.2028 | 677.62 | 11.4319 | 873.19 | 13.3599 |
| 468.07 | 24.0499 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 9.5972 | 879.38 | 10.2991 |
| 475.06 | 8.6235 | 696.49 | 12.3471 | 880.51 | 12.3636 |
| 476.78 | 12.0847 | 696.51 | 12.3471 | 946.00 | 13.4069 |
| 477.60 | 14.3933 | 697.00 | 12.8073 | 884.68 | 11.3499 |
| 482.18 | 14.0698 | 697.49 | 16.0124 | 889.28 | 8.2676 |
| 487.02 | 18.4487 | 702.65 | 15.4051 | 894.76 | 10.3540 |
| 492.35 | 0.0000 | 706.68 | 17.6812 | 898.04 | 7.2560 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 5.9339 | 1332.49 | 3.9198 | | |
| 911.20 | 12.1477 | 1362.66 | 0.0000 | | |
| 923.98 | 0.0000 | 1365.19 | 6.9148 | | |
| 926.50 | 10.4663 | 1368.63 | 0.0000 | | |
| 937.49 | 10.5046 | 884.68 | 10.9167 | | |
| 944.13 | 13.6859 | 1408.01 | 7.9844 | | |
| 946.00 | 8.4273 | 1457.56 | 0.0000 | | |
| 949.00 | 14.7622 | 1460.82 | 6.0627 | | |
| 954.55 | 0.0000 | 1489.16 | 6.1021 | | |
| 962.31 | 12.7084 | 1505.03 | 2.0413 | | |
| 964.08 | 14.8350 | 1596.21 | 4.1649 | | |
| 879.38 | 11.6641 | 1620.50 | 0.0000 | | |
| 968.97 | 12.7359 | 1678.03 | 0.0000 | | |
| 983.53 | 8.5303 | 1690.97 | 2.1239 | | |
| 984.45 | 0.0000 | 507.63 | 0.0000 | | |
| 996.26 | 18.2003 | 1764.49 | 5.3886 | | |
| 1001.03 | 9.6500 | 1770.23 | 3.2367 | | |
| 1004.73 | 18.2489 | 1771.35 | 3.2374 | | |
| 1021.30 | 0.0000 | 1260.41 | 0.0000 | | |
| 1025.87 | 0.0000 | 1808.65 | 1.8634 | | |
| 1028.54 | 0.0000 | 1810.72 | 0.0000 | | |
| 1037.84 | 11.9297 | 1836.06 | 2.8098 | | |
| 1038.76 | 0.0000 | | | | |
| 1046.59 | 15.2236 | | | | |
| 1048.07 | 11.9668 | | | | |
| 1049.04 | 6.5291 | | | | |
| 1050.41 | 3.2660 | | | | |
| 1063.66 | 13.1162 | | | | |
| 1077.00 | 13.1684 | | | | |
| 1077.34 | 13.1695 | | | | |
| 1085.87 | 10.0856 | | | | |
| 1099.45 | 8.2844 | | | | |
| 344.28 | 8.3148 | | | | |
| 1112.84 | 6.4685 | | | | |
| 1115.54 | 9.2480 | | | | |
| 1120.29 | 10.1867 | | | | |
| 1120.55 | 9.2611 | | | | |
| 1121.30 | 8.3368 | | | | |
| 1129.67 | 8.3569 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.6396 | | | | |
| 1177.95 | 6.5881 | | | | |
| 1189.05 | 4.7203 | | | | |
| 1204.77 | 9.4808 | | | | |
| 1221.41 | 10.4754 | | | | |
| 1235.36 | 6.6910 | | | | |
| 1238.28 | 3.8263 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 2.8950 | | | | |
| 1274.44 | 5.7939 | | | | |
| 1274.54 | 5.7939 | | | | |
| 1291.59 | 6.7892 | | | | |
| 1298.22 | 0.0000 | | | | |
| 1312.11 | 3.8999 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:33.01

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146017.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM28.CNF;115
                                        Background date  : 9-FEB-2014 11:22:34.
Sample date      : 7-NOV-2013 11:00:00. Acquisition date : 10-FEB-2014 13:28:12
Sample ID        : G341146017           Sample quantity  : 1.23810E+02 GRAM
Detector name    : GAM28                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.19  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 45.80* | 31 | 39 | 2.37 | 92.25 | 86 | 12 | 8.51E-03 | 47.2 | |
| 2 | 2 | 56.89 | 12 | 26 | 1.25 | 114.44 | 111 | 26 | 3.40E-03 | 76.2 | 1.69E+00 |
| 3 | 2 | 63.21* | 8 | 21 | 1.27 | 127.07 | 111 | 26 | 2.30E-03 | 130.9 | |
| 4 | 2 | 66.17* | 16 | 13 | 1.06 | 133.00 | 111 | 26 | 4.49E-03 | 52.6 | |
| 5 | 0 | 78.18 | 12 | 39 | 0.49 | 157.02 | 153 | 9 | 3.46E-03 | 94.0 | |
| 6 | 0 | 85.36* | 25 | 51 | 4.83 | 171.37 | 161 | 16 | 7.05E-03 | 68.2 | |
| 7 | 3 | 94.32 | 18 | 28 | 1.48 | 189.29 | 181 | 22 | 5.03E-03 | 73.4 | 3.24E+00 |
| 8 | 3 | 96.05 | 14 | 24 | 1.49 | 192.74 | 181 | 22 | 4.02E-03 | 80.1 | |
| 9 | 3 | 97.81 | 24 | 19 | 1.49 | 196.26 | 181 | 22 | 6.61E-03 | 47.9 | |
| 10 | 3 | 99.68 | 15 | 8 | 1.12 | 200.00 | 181 | 22 | 4.18E-03 | 42.7 | |
| 11 | 0 | 118.89 | 10 | 22 | 1.20 | 238.41 | 236 | 6 | 2.91E-03 | 76.1 | |
| 12 | 0 | 185.61* | 8 | 49 | 1.48 | 371.84 | 366 | 11 | 2.23E-03 | 194.5 | |
| 13 | 0 | 475.69 | 24 | 14 | 3.33 | 951.96 | 945 | 14 | 6.67E-03 | 38.9 | |
| 14 | 0 | 499.26 | 12 | 4 | 0.93 | 999.09 | 996 | 7 | 3.19E-03 | 40.0 | |
| 15 | 0 | 511.13* | 13 | 20 | 2.30 | 1022.82 | 1016 | 15 | 3.64E-03 | 111.8 | |
| 16 | 0 | 564.86 | 15 | 2 | 1.95 | 1130.28 | 1125 | 10 | 4.06E-03 | 33.0 | |
| 17 | 0 | 569.43* | 7 | 2 | 1.18 | 1139.42 | 1136 | 8 | 1.86E-03 | 69.8 | |
| 18 | 0 | 583.06* | 6 | 8 | 0.83 | 1166.67 | 1163 | 8 | 1.57E-03 | 110.9 | |
| 19 | 0 | 610.76 | 11 | 22 | 2.95 | 1222.06 | 1214 | 11 | 3.10E-03 | 86.6 | |
| 20 | 0 | 615.86 | 14 | 3 | 2.42 | 1232.26 | 1229 | 7 | 3.91E-03 | 34.2 | |
| 21 | 0 | 709.78 | 8 | 5 | 0.93 | 1420.10 | 1412 | 11 | 2.12E-03 | 69.6 | |
| 22 | 0 | 795.74 | 8 | 0 | 1.05 | 1592.00 | 1588 | 7 | 2.22E-03 | 35.4 | |
| 23 | 0 | 860.09 | 7 | 2 | 1.20 | 1720.70 | 1717 | 7 | 2.05E-03 | 47.0 | |
| 24 | 0 | 1762.48 | 7 | 0 | 0.56 | 3525.43 | 3522 | 8 | 1.94E-03 | 37.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:35:34

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146017.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:00:00 | Acquisition date | : 10-FEB-2014 13:28:12 |
| Sample ID | : G341146017 | Sample quantity | : 123.81 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA28 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.19 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TL-208 | 277.37 | ------ | 6.60 | 4.547E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 6 | 85.00* | 2.789E+00 | 1.443E-02 | 1.443E-02 | 221.78 |
| | 860.56 | 7 | 12.50 | 2.078E+00 | 1.725E-01 | 1.725E-01 | 94.01 |
| PB-210 | 46.54 | 31 | 4.25* | 4.242E-01 | 1.030E+01 | 1.039E+01 | 94.40 |
| ANH-511 | 511.00 | 13 | 100.00* | 3.056E+00 | 2.601E-02 | 2.601E-02 | 223.61 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:35.57

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146017.CNF;1    *
* Acquisition date : 10-FEB-2014 13:28:12 Sensitivity     : 3.000            *
* Detector ID      : GAM28                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.19     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 11:00:00 Nuclide Library : SOLID            *
* Sample ID        : G341146017           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.2381E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4          *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| TL-208 | 1.443E-02 | 3.137E-02 | 5.389E-02 |
| PB-210 | 1.039E+01 | 9.610E+00 | 8.333E+00 |
| ANH-511 | 2.601E-02 | 5.699E-02 | 4.228E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 8.735E-01 | 8.269E-01 | 1.664E+00 | NOT IDENT. |
| NA-22 | 2.909E-03 | 3.090E-02 | 6.993E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.023E-03 | 7.923E-03 | 3.345E-02 | NOT IDENT. |
| K-40 | 9.242E-02 | 3.395E-01 | 7.719E-01 | NOT IDENT. |
| SC-46 | -4.673E-02 | 5.835E-02 | 9.316E-02 | NOT IDENT. |
| V-48 | -9.149E-01 | 1.738E+00 | 3.162E+00 | NOT IDENT. |
| CR-51 | -7.228E-02 | 2.236E+00 | 4.118E+00 | NOT IDENT. |
| MN-54 | -1.666E-02 | 3.070E-02 | 5.312E-02 | NOT IDENT. |
| CO-56 | 2.548E-02 | 7.078E-02 | 1.428E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.744E-02 | 2.758E-02 | 4.767E-02 | NOT IDENT. |
| CO-58 | 4.483E-02 | 5.409E-02 | 1.266E-01 | NOT IDENT. |
| FE-59 | -5.578E-02 | 2.268E-01 | 4.366E-01 | NOT IDENT. |
| CO-60 | 4.759E-04 | 2.503E-02 | 5.384E-02 | NOT IDENT. |
| ZN-65 | 5.483E-02 | 7.251E-02 | 1.686E-01 | NOT IDENT. |
| GE-68 | -6.425E-01 | 8.901E-01 | 1.526E+00 | NOT IDENT. |
| AS-73 | 9.884E-01 | 2.045E+00 | 3.632E+00 | NOT IDENT. |
| AS-74 | 1.658E+00 | 1.700E+00 | 3.721E+00 | NOT IDENT. |
| SE-75 | 3.104E-02 | 5.214E-02 | 1.047E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.081E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.555E-02 | 1.965E+00 | 3.916E+00 | NOT IDENT. |
| RB-83 | 6.422E-02 | 9.759E-02 | 2.104E-01 | NOT IDENT. |
| KR-85 | 1.391E+01 | 7.667E+00 | 1.591E+01 | NOT IDENT. |
| SR-85 | 1.702E-01 | 9.413E-02 | 1.953E-01 | NOT IDENT. |
| RB-86 | -2.791E+00 | 8.421E+00 | 1.651E+01 | NOT IDENT. |
| Y-88 | -1.474E-03 | 5.510E-02 | 1.197E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 3.230E+01 | 3.498E+01 | 8.360E+01 | NOT IDENT. |
| NB-94 | -9.352E-03 | 3.356E-02 | 5.175E-02 | NOT IDENT. |
| NB-95 | 0.000E+00 | 6.783E-02 | 1.327E-01 | NOT IDENT. |
| NB-95M | 8.651E-02 | 2.311E-01 | 4.420E-01 | NOT IDENT. |
| ZR-95 | -6.949E-02 | 1.206E-01 | 2.088E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.052E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.452E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 5.072E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 9.049E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 6.070E-03 | 2.477E-02 | 4.807E-02 | NOT IDENT. |
| RH-102 | 2.585E-02 | 4.129E-02 | 8.922E-02 | FAIL ABUN |
| RU-103 | 4.628E-02 | 1.348E-01 | 2.478E-01 | FAIL ABUN |
| RH-106 | 2.127E-01 | 2.797E-01 | 5.903E-01 | NOT IDENT. |
| RU-106 | 2.127E-01 | 2.797E-01 | 5.903E-01 | NOT IDENT. |
| AG-108M | 4.850E-03 | 2.285E-02 | 4.584E-02 | NOT IDENT. |
| CD-109 | 4.619E-01 | 6.909E-01 | 1.064E+00 | NOT IDENT. |
| AG-110M | 4.851E-03 | 5.352E-02 | 1.039E-01 | NOT IDENT. |
| SN-113 | -6.071E-03 | 5.971E-02 | 1.084E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.334E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.196E+00 | 2.311E+00 | 4.590E+00 | NOT IDENT. |
| TE-123M | 2.302E-02 | 3.321E-02 | 6.677E-02 | NOT IDENT. |
| SB-124 | -6.010E-02 | 1.223E-01 | 2.379E-01 | NOT IDENT. |
| SB-125 | 9.195E-03 | 7.567E-02 | 1.496E-01 | NOT IDENT. |
| TE-125M | 3.631E+00 | 2.001E+01 | 3.644E+01 | NOT IDENT. |
| I-126 | -3.358E+00 | 1.316E+01 | 2.424E+01 | NOT IDENT. |
| SB-126 | 6.102E+00 | 9.645E+00 | 2.065E+01 | NOT IDENT. |
| SN-126 | 7.288E-03 | 7.547E-02 | 9.780E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.758E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.360E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.669E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -8.601E-03 | 3.721E-02 | 6.613E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.507E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.800E-02 | 1.941E-02 | 5.844E-02 | FAIL ABUN |
| CS-135 | -1.361E-01 | 1.267E-01 | 2.033E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.942E-01 | 5.915E+00 | 1.164E+01 | NOT IDENT. |
| BA-137M | -3.344E-02 | 3.238E-02 | 5.801E-02 | NOT IDENT. |
| CS-137 | -3.532E-02 | 3.420E-02 | 6.128E-02 | NOT IDENT. |
| CE-139 | -9.357E-03 | 3.261E-02 | 5.959E-02 | NOT IDENT. |
| BA-140 | -1.437E+00 | 4.869E+00 | 9.898E+00 | NOT IDENT. |
| LA-140 | -1.437E+00 | 4.869E+00 | 9.898E+00 | NOT IDENT. |
| CE-141 | -2.911E-02 | 2.583E-01 | 4.815E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 3.170E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.201E-02 | 1.891E-01 | 3.657E-01 | NOT IDENT. |
| PM-144 | -2.184E-04 | 3.659E-02 | 6.907E-02 | FAIL ABUN |
| PR-144 | -7.750E-03 | 2.857E+00 | 5.395E+00 | NOT IDENT. |
| PM-146 | 1.275E-02 | 2.875E-02 | 6.094E-02 | NOT IDENT. |
| ND-147 | 3.189E+00 | 6.357E+01 | 1.260E+02 | NOT IDENT. |
| PM-147 | 9.504E+00 | 7.062E+02 | 1.115E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.141E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 4.701E-03 | 2.294E-02 | 4.322E-02 | FAIL ABUN |
| EU-152 | -7.855E-03 | 7.860E-02 | 1.434E-01 | NOT IDENT. |
| GD-153 | 1.187E-01 | 1.115E-01 | 1.764E-01 | FAIL ABUN |
| EU-154 | -6.560E-03 | 8.672E-02 | 1.883E-01 | NOT IDENT. |
| EU-155 | 1.498E-03 | 9.106E-02 | 1.621E-01 | FAIL ABUN |
| TB-160 | -4.359E-02 | 2.209E-01 | 4.120E-01 | FAIL ABUN |
| HO-166M | 4.229E-02 | 3.908E-02 | 8.910E-02 | FAIL ABUN |
| TM-171 | 1.099E+01 | 2.646E+01 | 4.594E+01 | FAIL ABUN |
| LU-176 | -5.325E-03 | 2.052E-02 | 3.684E-02 | NOT IDENT. |
| HF-181 | -7.117E-02 | 1.265E-01 | 1.881E-01 | FAIL ABUN |
| TA-182 | 5.114E-02 | 2.273E-01 | 4.697E-01 | FAIL ABUN |
| RE-183 | 3.802E-01 | 5.679E-01 | 8.737E-01 | FAIL ABUN |
| RE-184 | 1.848E-01 | 4.204E-01 | 9.015E-01 | NOT IDENT. |
| W-188 | -4.030E+00 | 1.289E+01 | 2.292E+01 | FAIL ABUN |
| IR-192 | -2.536E-02 | 6.421E-02 | 1.122E-01 | NOT IDENT. |
| HG-203 | 2.410E-02 | 8.868E-02 | 1.722E-01 | NOT IDENT. |
| BI-207 | -1.034E-02 | 3.476E-02 | 6.791E-02 | FAIL ABUN |
| BI-211 | 2.015E-02 | 1.737E-01 | 3.267E-01 | NOT IDENT. |
| PB-211 | 1.912E-01 | 6.310E-01 | 1.201E+00 | NOT IDENT. |
| BI-212 | -5.067E-01 | 4.009E-01 | 5.992E-01 | NOT IDENT. |
| PB-212 | -3.283E-03 | 5.007E-02 | 9.487E-02 | FAIL ABUN |
| BI-214 | 5.516E-02 | 9.362E-02 | 1.443E-01 | FAIL ABUN |
| PB-214 | 1.555E-02 | 6.168E-02 | 1.183E-01 | FAIL ABUN |
| RN-219 | 7.829E-02 | 3.691E-01 | 6.878E-01 | NOT IDENT. |
| RN-222 | 5.516E-02 | 9.362E-02 | 1.443E-01 | FAIL ABUN |
| RA-223 | -1.408E-01 | 5.849E-01 | 1.038E+00 | FAIL ABUN |
| RA-224 | -2.376E-01 | 4.851E-01 | 8.488E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 5.516E-02 | 9.362E-02 | 1.443E-01 | FAIL ABUN |
| AC-227 | -5.120E-02 | 1.783E-01 | 3.225E-01 | NOT IDENT. |
| TH-227 | -5.120E-02 | 1.783E-01 | 3.225E-01 | NOT IDENT. |
| AC-228 | -1.645E-02 | 1.043E-01 | 2.067E-01 | FAIL ABUN |
| RA-228 | -1.645E-02 | 1.043E-01 | 2.067E-01 | FAIL ABUN |
| TH-228 | -3.283E-03 | 5.007E-02 | 9.487E-02 | FAIL ABUN |
| TH-229 | 2.757E-01 | 4.036E-01 | 8.031E-01 | FAIL ABUN |
| TH-230 | 5.515E-02 | 9.361E-02 | 1.443E-01 | FAIL ABUN |
| PA-231 | -1.045E-01 | 1.013E+00 | 1.878E+00 | NOT IDENT. |
| TH-231 | -1.408E-01 | 5.849E-01 | 1.038E+00 | FAIL ABUN |
| TH-232 | -1.645E-02 | 1.043E-01 | 2.067E-01 | NOT IDENT. |
| PA-233 | 2.498E-03 | 5.380E-02 | 9.992E-02 | NOT IDENT. |
| PA-234 | 3.943E-02 | 1.932E-01 | 4.172E-01 | FAIL ABUN |
| PA-234M | -2.225E+00 | 3.563E+00 | 7.146E+00 | NOT IDENT. |
| TH-234 | 6.072E-01 | 1.558E+00 | 2.702E+00 | FAIL ABUN |
| U-234 | 5.515E-02 | 9.361E-02 | 1.443E-01 | FAIL ABUN |
| U-235 | -4.551E-02 | 1.531E-01 | 2.758E-01 | FAIL ABUN |
| NP-237 | 2.498E-03 | 5.380E-02 | 9.992E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 3.474E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 6.072E-01 | 1.558E+00 | 2.702E+00 | FAIL ABUN |
| NP-239 | -2.501E-01 | 4.019E-01 | 5.693E-01 | FAIL ABUN |
| PU-239 | -1.102E+02 | 2.476E+02 | 4.498E+02 | NOT IDENT. |
| AM-241 | 1.287E-02 | 1.379E-01 | 2.576E-01 | NOT IDENT. |
| AM-243 | 3.302E-02 | 4.390E-02 | 7.921E-02 | NOT IDENT. |
| CM-243 | 3.737E-02 | 9.396E-02 | 1.587E-01 | FAIL ABUN |
| CM-247 | -1.133E-02 | 3.505E-02 | 6.061E-02 | NOT IDENT. |
| CF-249 | 8.564E-03 | 3.121E-02 | 6.021E-02 | NOT IDENT. |
| CF-251 | 1.925E-02 | 9.985E-02 | 1.903E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:30.68

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 45.80 | 46 | 39 | 2.37 | 92.25 | 86 | 12 | 1.28E-02 | 30.8 | |
| 2 | 2 | 56.89 | 12 | 26 | 1.25 | 114.44 | 111 | 26 | 3.40E-03 | 76.2 | 1.69E+00 |
| 3 | 2 | 63.21 | 25 | 21 | 1.27 | 127.07 | 111 | 26 | 6.95E-03 | 41.4 | |
| 4 | 2 | 66.17 | 20 | 13 | 1.06 | 133.00 | 111 | 26 | 5.52E-03 | 41.4 | |
| 5 | 0 | 78.18 | 12 | 39 | 0.49 | 157.02 | 153 | 9 | 3.46E-03 | 94.0 | |
| 6 | 0 | 85.36 | 32 | 51 | 4.83 | 171.37 | 161 | 16 | 8.91E-03 | 53.2 | |
| 7 | 3 | 92.49 | 48 | 37 | 1.48 | 185.63 | 181 | 22 | 1.32E-02 | 27.5 | 3.24E+00 |
| 8 | 3 | 94.32 | 18 | 28 | 1.48 | 189.29 | 181 | 22 | 5.03E-03 | 73.4 | |
| 9 | 3 | 96.05 | 14 | 24 | 1.49 | 192.74 | 181 | 22 | 4.02E-03 | 80.1 | |
| 10 | 3 | 97.81 | 24 | 19 | 1.49 | 196.26 | 181 | 22 | 6.61E-03 | 47.9 | |
| 11 | 3 | 99.68 | 15 | 8 | 1.12 | 200.00 | 181 | 22 | 4.18E-03 | 42.7 | |
| 12 | 0 | 118.89 | 10 | 22 | 1.20 | 238.41 | 236 | 6 | 2.91E-03 | 76.1 | |
| 13 | 0 | 185.61 | 46 | 49 | 1.48 | 371.84 | 366 | 11 | 1.27E-02 | 33.3 | |
| 14 | 0 | 475.69 | 24 | 14 | 3.33 | 951.96 | 945 | 14 | 6.67E-03 | 38.9 | |
| 15 | 0 | 499.26 | 12 | 4 | 0.93 | 999.09 | 996 | 7 | 3.19E-03 | 40.0 | |
| 16 | 0 | 511.13 | 107 | 20 | 2.30 | 1022.82 | 1016 | 15 | 2.98E-02 | 13.1 | |
| 17 | 0 | 564.86 | 15 | 2 | 1.95 | 1130.28 | 1125 | 10 | 4.06E-03 | 33.0 | |
| 18 | 0 | 569.43 | 12 | 2 | 1.18 | 1139.42 | 1136 | 8 | 3.25E-03 | 36.2 | |
| 19 | 0 | 583.06 | 12 | 8 | 0.83 | 1166.67 | 1163 | 8 | 3.33E-03 | 50.0 | |
| 20 | 0 | 610.76 | 11 | 22 | 2.95 | 1222.06 | 1214 | 11 | 3.10E-03 | 86.6 | |
| 21 | 0 | 615.86 | 14 | 3 | 2.42 | 1232.26 | 1229 | 7 | 3.91E-03 | 34.2 | |
| 22 | 0 | 709.78 | 8 | 5 | 0.93 | 1420.10 | 1412 | 11 | 2.12E-03 | 69.6 | |
| 23 | 0 | 795.74 | 8 | 0 | 1.05 | 1592.00 | 1588 | 7 | 2.22E-03 | 35.4 | |
| 24 | 0 | 860.09 | 7 | 2 | 1.20 | 1720.70 | 1717 | 7 | 2.05E-03 | 47.0 | |
| 25 | 0 | 1762.48 | 7 | 0 | 0.56 | 3525.43 | 3522 | 8 | 1.94E-03 | 37.8 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:33.73

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TL-208 | 277.37 | ------ | 6.60 | 4.547E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 6 | 85.00* | 2.789E+00 | 1.443E-02 | 1.443E-02 | 221.78 |
| | 860.56 | 7 | 12.50 | 2.078E+00 | 1.725E-01 | 1.725E-01 | 94.01 |
| PB-210 | 46.54 | 31 | 4.25* | 4.242E-01 | 1.030E+01 | 1.039E+01 | 94.40 |
| ANH-511 | 511.00 | 13 | 100.00* | 3.056E+00 | 2.601E-02 | 2.601E-02 | 223.61 |

Flag: "*" = Keyline

Sample ID : G341146017 Acquisition date : 10-FEB-2014 13:28:12

Total number of lines in spectrum 24
Number of unidentified lines 7
Number of lines tentatively identified by NID 17 70.83%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TL-208 | 1.41E+10Y | 1.00 | 1.443E-02 | 1.443E-02 | 3.201E-02 | 221.78 | |
| PB-210 | 22.20Y | 1.01 | 1.030E+01 | 1.039E+01 | 0.981E+01 | 94.40 | |
| ANH-511 | 1.00E+09Y | 1.00 | 2.601E-02 | 2.601E-02 | 5.816E-02 | 223.61 | |
| | Total Activity : | | 1.034E+01 | 1.043E+01 | | | |
| | Grand Total Activity : | | 1.034E+01 | 1.043E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146017 Acquisition date : 10-FEB-2014 13:28:12

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 56.89 | 12 | 26 | 1.25 | 114.44 | 111 | 26 | 3.40E-03 | **** | 1.46E+00 | T |
| 2 | 63.21 | 8 | 21 | 1.27 | 127.07 | 111 | 26 | 2.30E-03 | **** | 2.23E+00 | T |
| 2 | 66.17 | 16 | 13 | 1.06 | 133.00 | 111 | 26 | 4.49E-03 | **** | 2.60E+00 | T |
| 0 | 78.18 | 12 | 39 | 0.49 | 157.02 | 153 | 9 | 3.46E-03 | **** | 4.00E+00 | T |
| 0 | 85.36 | 25 | 51 | 4.83 | 171.37 | 161 | 16 | 7.05E-03 | **** | 4.67E+00 | T |
| 3 | 94.32 | 18 | 28 | 1.48 | 189.29 | 181 | 22 | 5.03E-03 | **** | 5.32E+00 | T |
| 3 | 96.05 | 14 | 24 | 1.49 | 192.74 | 181 | 22 | 4.02E-03 | **** | 5.42E+00 | |
| 3 | 97.81 | 24 | 19 | 1.49 | 196.26 | 181 | 22 | 6.61E-03 | 95.8 | 5.51E+00 | T |
| 3 | 99.68 | 15 | 8 | 1.12 | 200.00 | 181 | 22 | 4.18E-03 | 85.4 | 5.60E+00 | T |
| 0 | 118.89 | 10 | 22 | 1.20 | 238.41 | 236 | 6 | 2.91E-03 | **** | 6.15E+00 | |
| 0 | 185.61 | 8 | 49 | 1.48 | 371.84 | 366 | 11 | 2.23E-03 | **** | 5.71E+00 | T |
| 0 | 475.69 | 24 | 14 | 3.33 | 951.96 | 945 | 14 | 6.67E-03 | 77.7 | 3.21E+00 | T |
| 0 | 499.26 | 12 | 4 | 0.93 | 999.09 | 996 | 7 | 3.19E-03 | 79.9 | 3.11E+00 | |
| 0 | 564.86 | 15 | 2 | 1.95 | 1130.28 | 1125 | 10 | 4.06E-03 | 66.0 | 2.85E+00 | |
| 0 | 569.43 | 7 | 2 | 1.18 | 1139.42 | 1136 | 8 | 1.86E-03 | **** | 2.84E+00 | T |
| 0 | 610.76 | 11 | 22 | 2.95 | 1222.06 | 1214 | 11 | 3.10E-03 | **** | 2.70E+00 | T |
| 0 | 615.86 | 14 | 3 | 2.42 | 1232.26 | 1229 | 7 | 3.91E-03 | 68.4 | 2.68E+00 | |
| 0 | 709.78 | 8 | 5 | 0.93 | 1420.10 | 1412 | 11 | 2.12E-03 | **** | 2.42E+00 | |
| 0 | 795.74 | 8 | 0 | 1.05 | 1592.00 | 1588 | 7 | 2.22E-03 | 70.7 | 2.21E+00 | T |
| 0 | 1762.48 | 7 | 0 | 0.56 | 3525.43 | 3522 | 8 | 1.94E-03 | 75.6 | 1.14E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:47.40

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146017.CNF;1       *
* Acquisition date : 10-FEB-2014 13:28:12 Sensitivity     : 3.000                *
* Detector ID      : GAM28                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.19     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 11:00:00 Nuclide Library : SOLID                *
* Sample ID        : G341146017           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.2381E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4              *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| TL-208 | 2.349E-02 |
| PB-210 | 3.757E+00 |
| ANH-511 | 1.846E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.474E-01 | NOT IDENT. |
| NA-22 | 2.906E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.404E-03 | NOT IDENT. |
| K-40 | 3.279E-01 | NOT IDENT. |
| SC-46 | 3.767E-02 | NOT IDENT. |
| V-48 | 1.307E+00 | NOT IDENT. |
| CR-51 | 1.844E+00 | NOT IDENT. |
| MN-54 | 2.180E-02 | NOT IDENT. |
| CO-56 | 6.228E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.187E-02 | NOT IDENT. |
| CO-58 | 5.370E-02 | NOT IDENT. |
| FE-59 | 1.806E-01 | NOT IDENT. |
| CO-60 | 2.099E-02 | NOT IDENT. |
| ZN-65 | 7.161E-02 | NOT IDENT. |
| GE-68 | 5.740E-01 | NOT IDENT. |
| AS-73 | 1.649E+00 | NOT IDENT. |
| AS-74 | 1.654E+00 | NOT IDENT. |
| SE-75 | 4.721E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.633E+00 | NOT IDENT. |
| RB-83 | 9.228E-02 | NOT IDENT. |
| KR-85 | 7.327E+00 | NOT IDENT. |
| SR-85 | 8.991E-02 | NOT IDENT. |
| RB-86 | 6.359E+00 | NOT IDENT. |
| Y-88 | 4.605E-02 | NOT IDENT. |
| Y-91 | 3.557E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 2.251E-02 | NOT IDENT. |
| NB-95 | 5.624E-02 | NOT IDENT. |
| NB-95M | 2.026E-01 | NOT IDENT. |
| ZR-95 | 8.606E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.200E-02 | NOT IDENT. |
| RH-102 | 3.879E-02 | FAIL ABUN |
| RU-103 | 1.084E-01 | FAIL ABUN |
| RH-106 | 2.582E-01 | NOT IDENT. |
| RU-106 | 2.582E-01 | NOT IDENT. |
| AG-108M | 2.027E-02 | NOT IDENT. |
| CD-109 | 4.800E-01 | NOT IDENT. |
| AG-110M | 4.474E-02 | NOT IDENT. |
| SN-113 | 4.807E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.096E+00 | NOT IDENT. |
| TE-123M | 3.059E-02 | NOT IDENT. |
| SB-124 | 7.520E-02 | NOT IDENT. |
| SB-125 | 6.628E-02 | NOT IDENT. |
| TE-125M | 1.662E+01 | NOT IDENT. |
| I-126 | 1.051E+01 | NOT IDENT. |
| SB-126 | 9.000E+00 | NOT IDENT. |
| SN-126 | 4.435E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.961E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.449E-02 | FAIL ABUN |
| CS-135 | 9.063E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.951E+00 | NOT IDENT. |
| BA-137M | 2.541E-02 | NOT IDENT. |
| CS-137 | 2.684E-02 | NOT IDENT. |
| CE-139 | 2.704E-02 | NOT IDENT. |
| BA-140 | 3.720E+00 | NOT IDENT. |
| LA-140 | 3.720E+00 | NOT IDENT. |
| CE-141 | 2.200E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.680E-01 | NOT IDENT. |
| PM-144 | 3.051E-02 | FAIL ABUN |
| PR-144 | 2.384E+00 | NOT IDENT. |
| PM-146 | 2.654E-02 | NOT IDENT. |
| ND-147 | 5.451E+01 | NOT IDENT. |
| PM-147 | 5.077E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.950E-02 | FAIL ABUN |
| EU-152 | 6.385E-02 | NOT IDENT. |
| GD-153 | 8.148E-02 | FAIL ABUN |
| EU-154 | 7.807E-02 | NOT IDENT. |
| EU-155 | 7.415E-02 | FAIL ABUN |
| TB-160 | 1.728E-01 | FAIL ABUN |
| HO-166M | 3.827E-02 | FAIL ABUN |
| TM-171 | 2.100E+01 | FAIL ABUN |
| LU-176 | 1.637E-02 | NOT IDENT. |
| HF-181 | 7.888E-02 | FAIL ABUN |
| TA-182 | 1.999E-01 | FAIL ABUN |
| RE-183 | 3.984E-01 | FAIL ABUN |
| RE-184 | 3.814E-01 | NOT IDENT. |
| W-188 | 1.028E+01 | FAIL ABUN |
| IR-192 | 5.034E-02 | NOT IDENT. |
| HG-203 | 7.700E-02 | NOT IDENT. |
| BI-207 | 2.760E-02 | FAIL ABUN |
| BI-211 | 1.472E-01 | NOT IDENT. |
| PB-211 | 5.398E-01 | NOT IDENT. |
| BI-212 | 2.478E-01 | NOT IDENT. |
| PB-212 | 4.368E-02 | FAIL ABUN |
| BI-214 | 6.552E-02 | FAIL ABUN |
| PB-214 | 5.327E-02 | FAIL ABUN |
| RN-219 | 3.094E-01 | NOT IDENT. |
| RN-222 | 6.552E-02 | FAIL ABUN |
| RA-223 | 4.692E-01 | FAIL ABUN |
| RA-224 | 3.842E-01 | NOT IDENT. |
| RA-226 | 6.552E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.432E-01 | NOT IDENT. |
| TH-227 | 1.432E-01 | NOT IDENT. |
| AC-228 | 8.734E-02 | FAIL ABUN |
| RA-228 | 8.734E-02 | FAIL ABUN |
| TH-228 | 4.368E-02 | FAIL ABUN |
| TH-229 | 3.685E-01 | FAIL ABUN |
| TH-230 | 6.551E-02 | FAIL ABUN |
| PA-231 | 8.316E-01 | NOT IDENT. |
| TH-231 | 4.692E-01 | FAIL ABUN |
| TH-232 | 8.734E-02 | NOT IDENT. |
| PA-233 | 4.493E-02 | NOT IDENT. |
| PA-234 | 1.731E-01 | FAIL ABUN |
| PA-234M | 3.041E+00 | NOT IDENT. |
| TH-234 | 1.253E+00 | FAIL ABUN |
| U-234 | 6.551E-02 | FAIL ABUN |
| U-235 | 1.259E-01 | FAIL ABUN |
| NP-237 | 4.493E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.253E+00 | FAIL ABUN |
| NP-239 | 2.593E-01 | FAIL ABUN |
| PU-239 | 2.041E+02 | NOT IDENT. |
| AM-241 | 1.160E-01 | NOT IDENT. |
| AM-243 | 3.625E-02 | NOT IDENT. |
| CM-243 | 7.253E-02 | FAIL ABUN |
| CM-247 | 2.714E-02 | NOT IDENT. |
| CF-249 | 2.673E-02 | NOT IDENT. |
| CF-251 | 8.704E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:35:53.00

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146017.CNF;1    *
* Acquisition date : 10-FEB-2014 13:28:12 Sensitivity     : 3.000          *
* Detector ID      : GAM28                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.19     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:00:00 Nuclide Library : SOLID          *
* Sample ID        : G341146017           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.2381E+02 GRAM*
*                                         Quantity Err(%) : 1.6154E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| TL-208 | 1.443E-02 | 3.139E-02 | 3.139E-02 |
| PB-210 | 1.039E+01 | 9.661E+00 | 9.661E+00 |
| ANH-511 | 2.601E-02 | 5.704E-02 | 5.704E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 8.735E-01 | 8.304E-01 | 9.190E-01 | NOT IDENT. |
| NA-22 | 2.909E-03 | 3.090E-02 | 3.093E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 3.239E+42 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.023E-03 | 7.927E-03 | 8.043E-03 | NOT IDENT. |
| K-40 | 9.242E-02 | 3.396E-01 | 3.421E-01 | NOT IDENT. |
| SC-46 | -4.673E-02 | 5.868E-02 | 6.234E-02 | NOT IDENT. |
| V-48 | -9.149E-01 | 1.743E+00 | 1.792E+00 | NOT IDENT. |
| CR-51 | -7.228E-02 | 2.236E+00 | 2.236E+00 | NOT IDENT. |
| MN-54 | -1.666E-02 | 3.076E-02 | 3.166E-02 | NOT IDENT. |
| CO-56 | 2.548E-02 | 7.085E-02 | 7.177E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 2.754E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.744E-02 | 2.763E-02 | 2.873E-02 | NOT IDENT. |
| CO-58 | 4.483E-02 | 5.432E-02 | 5.796E-02 | NOT IDENT. |
| FE-59 | -5.578E-02 | 2.270E-01 | 2.284E-01 | NOT IDENT. |
| CO-60 | 4.759E-04 | 2.503E-02 | 2.503E-02 | NOT IDENT. |
| ZN-65 | 5.483E-02 | 7.310E-02 | 7.716E-02 | NOT IDENT. |
| GE-68 | -6.425E-01 | 8.962E-01 | 9.419E-01 | NOT IDENT. |
| AS-73 | 9.884E-01 | 2.055E+00 | 2.103E+00 | NOT IDENT. |
| AS-74 | 1.658E+00 | 1.710E+00 | 1.866E+00 | NOT IDENT. |
| SE-75 | 3.104E-02 | 5.220E-02 | 5.404E-02 | NOT IDENT. |
| BR-77 | -3.071E+10 | 1.371E+11 | 1.378E+11 | SHORT HLIF |
| SR-82 | 2.555E-02 | 1.965E+00 | 1.965E+00 | NOT IDENT. |
| RB-83 | 6.422E-02 | 9.810E-02 | 1.023E-01 | NOT IDENT. |
| KR-85 | 1.391E+01 | 7.760E+00 | 9.977E+00 | NOT IDENT. |
| SR-85 | 1.702E-01 | 9.526E-02 | 1.223E-01 | NOT IDENT. |
| RB-86 | -2.791E+00 | 8.434E+00 | 8.527E+00 | NOT IDENT. |
| Y-88 | -1.474E-03 | 5.510E-02 | 5.510E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 3.230E+01 | 3.512E+01 | 3.801E+01 | NOT IDENT. |
| NB-94 | -9.352E-03 | 3.357E-02 | 3.384E-02 | NOT IDENT. |
| NB-95 | 0.000E+00 | 6.783E-02 | 0.000E+00 | NOT IDENT. |
| NB-95M | 8.651E-02 | 2.312E-01 | 2.345E-01 | NOT IDENT. |
| ZR-95 | -6.949E-02 | 1.208E-01 | 1.248E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.055E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 3.534E+40 | 2.471E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.302E+09 | 5.078E+09 | 5.183E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 9.136E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 6.070E-03 | 2.480E-02 | 2.495E-02 | NOT IDENT. |
| RH-102 | 2.585E-02 | 4.138E-02 | 4.299E-02 | FAIL ABUN |
| RU-103 | 4.628E-02 | 1.349E-01 | 1.365E-01 | FAIL ABUN |
| RH-106 | 2.127E-01 | 2.804E-01 | 2.963E-01 | NOT IDENT. |
| RU-106 | 2.127E-01 | 2.804E-01 | 2.963E-01 | NOT IDENT. |
| AG-108M | 4.850E-03 | 2.285E-02 | 2.296E-02 | NOT IDENT. |
| CD-109 | 4.619E-01 | 6.927E-01 | 7.233E-01 | NOT IDENT. |
| AG-110M | 4.851E-03 | 5.352E-02 | 5.357E-02 | NOT IDENT. |
| SN-113 | -6.071E-03 | 5.971E-02 | 5.978E-02 | NOT IDENT. |
| CD-115 | -6.623E+10 | 5.335E+11 | 5.343E+11 | SHORT HLIF |
| SN-117M | 1.196E+00 | 2.314E+00 | 2.376E+00 | NOT IDENT. |
| TE-123M | 2.302E-02 | 3.328E-02 | 3.486E-02 | NOT IDENT. |
| SB-124 | -6.010E-02 | 1.224E-01 | 1.253E-01 | NOT IDENT. |
| SB-125 | 9.195E-03 | 7.568E-02 | 7.579E-02 | NOT IDENT. |
| TE-125M | 3.631E+00 | 2.001E+01 | 2.008E+01 | NOT IDENT. |
| I-126 | -3.358E+00 | 1.316E+01 | 1.325E+01 | NOT IDENT. |
| SB-126 | 6.102E+00 | 9.681E+00 | 1.006E+01 | NOT IDENT. |
| SN-126 | 7.288E-03 | 7.547E-02 | 7.555E-02 | FAIL ABUN |
| SB-127 | -1.562E+06 | 1.889E+06 | 2.016E+06 | SHORT HLIF |
| I-131 | 4.337E+01 | 8.369E+01 | 8.594E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 1.598E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.685E+05 | 1.669E+07 | 1.669E+07 | SHORT HLIF |
| BA-133 | -8.601E-03 | 3.721E-02 | 3.741E-02 | NOT IDENT. |
| I-133 | 1.920E+30 | 2.509E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.800E-02 | 1.964E-02 | 2.335E-02 | FAIL ABUN |
| CS-135 | -1.361E-01 | 1.273E-01 | 1.413E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 3.939E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.942E-01 | 5.916E+00 | 5.918E+00 | NOT IDENT. |
| BA-137M | -3.344E-02 | 3.248E-02 | 3.581E-02 | NOT IDENT. |
| CS-137 | -3.532E-02 | 3.432E-02 | 3.783E-02 | NOT IDENT. |
| CE-139 | -9.357E-03 | 3.267E-02 | 3.294E-02 | NOT IDENT. |
| BA-140 | -1.437E+00 | 4.870E+00 | 4.913E+00 | NOT IDENT. |
| LA-140 | -1.437E+00 | 4.870E+00 | 4.913E+00 | NOT IDENT. |
| CE-141 | -2.911E-02 | 2.583E-01 | 2.586E-01 | NOT IDENT. |
| CE-143 | 3.043E+17 | 3.170E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.201E-02 | 1.892E-01 | 1.907E-01 | NOT IDENT. |
| PM-144 | -2.184E-04 | 3.659E-02 | 3.659E-02 | FAIL ABUN |
| PR-144 | -7.750E-03 | 2.857E+00 | 2.857E+00 | NOT IDENT. |
| PM-146 | 1.275E-02 | 2.878E-02 | 2.935E-02 | NOT IDENT. |
| ND-147 | 3.189E+00 | 6.357E+01 | 6.359E+01 | NOT IDENT. |
| PM-147 | 9.504E+00 | 7.062E+02 | 7.063E+02 | NOT IDENT. |
| PM-149 | -8.440E+11 | 5.142E+12 | 5.156E+12 | SHORT HLIF |
| EU-150 | 4.701E-03 | 2.294E-02 | 2.304E-02 | FAIL ABUN |
| EU-152 | -7.855E-03 | 7.860E-02 | 7.868E-02 | NOT IDENT. |
| GD-153 | 1.187E-01 | 1.120E-01 | 1.241E-01 | FAIL ABUN |
| EU-154 | -6.560E-03 | 8.672E-02 | 8.677E-02 | NOT IDENT. |
| EU-155 | 1.498E-03 | 9.106E-02 | 9.106E-02 | FAIL ABUN |
| TB-160 | -4.359E-02 | 2.210E-01 | 2.219E-01 | FAIL ABUN |
| HO-166M | 4.229E-02 | 3.928E-02 | 4.367E-02 | FAIL ABUN |
| TM-171 | 1.099E+01 | 2.648E+01 | 2.694E+01 | FAIL ABUN |
| LU-176 | -5.325E-03 | 2.052E-02 | 2.066E-02 | NOT IDENT. |
| HF-181 | -7.117E-02 | 1.266E-01 | 1.306E-01 | FAIL ABUN |
| TA-182 | 5.114E-02 | 2.274E-01 | 2.286E-01 | FAIL ABUN |
| RE-183 | 3.802E-01 | 5.696E-01 | 5.949E-01 | FAIL ABUN |
| RE-184 | 1.848E-01 | 4.215E-01 | 4.297E-01 | NOT IDENT. |
| W-188 | -4.030E+00 | 1.290E+01 | 1.303E+01 | FAIL ABUN |
| IR-192 | -2.536E-02 | 6.424E-02 | 6.525E-02 | NOT IDENT. |
| HG-203 | 2.410E-02 | 8.870E-02 | 8.937E-02 | NOT IDENT. |
| BI-207 | -1.034E-02 | 3.479E-02 | 3.511E-02 | FAIL ABUN |
| BI-211 | 2.015E-02 | 1.738E-01 | 1.740E-01 | NOT IDENT. |
| PB-211 | 1.912E-01 | 6.313E-01 | 6.371E-01 | NOT IDENT. |
| BI-212 | -5.067E-01 | 4.039E-01 | 4.640E-01 | NOT IDENT. |
| PB-212 | -3.283E-03 | 5.007E-02 | 5.009E-02 | FAIL ABUN |
| BI-214 | 5.516E-02 | 9.373E-02 | 9.697E-02 | FAIL ABUN |
| PB-214 | 1.555E-02 | 6.170E-02 | 6.209E-02 | FAIL ABUN |
| RN-219 | 7.829E-02 | 3.693E-01 | 3.710E-01 | NOT IDENT. |
| RN-222 | 5.516E-02 | 9.373E-02 | 9.697E-02 | FAIL ABUN |
| RA-223 | -1.408E-01 | 5.850E-01 | 5.885E-01 | FAIL ABUN |
| RA-224 | -2.376E-01 | 4.855E-01 | 4.972E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 5.516E-02 | 9.373E-02 | 9.697E-02 | FAIL ABUN |
| AC-227 | -5.120E-02 | 1.784E-01 | 1.799E-01 | NOT IDENT. |
| TH-227 | -5.120E-02 | 1.784E-01 | 1.799E-01 | NOT IDENT. |
| AC-228 | -1.645E-02 | 1.043E-01 | 1.046E-01 | FAIL ABUN |
| RA-228 | -1.645E-02 | 1.043E-01 | 1.046E-01 | FAIL ABUN |
| TH-228 | -3.283E-03 | 5.007E-02 | 5.009E-02 | FAIL ABUN |
| TH-229 | 2.757E-01 | 4.044E-01 | 4.230E-01 | FAIL ABUN |
| TH-230 | 5.515E-02 | 9.372E-02 | 9.696E-02 | FAIL ABUN |
| PA-231 | -1.045E-01 | 1.013E+00 | 1.014E+00 | NOT IDENT. |
| TH-231 | -1.408E-01 | 5.850E-01 | 5.885E-01 | FAIL ABUN |
| TH-232 | -1.645E-02 | 1.043E-01 | 1.046E-01 | NOT IDENT. |
| PA-233 | 2.498E-03 | 5.380E-02 | 5.381E-02 | NOT IDENT. |
| PA-234 | 3.943E-02 | 1.984E-01 | 1.992E-01 | FAIL ABUN |
| PA-234M | -2.225E+00 | 3.579E+00 | 3.717E+00 | NOT IDENT. |
| TH-234 | 6.072E-01 | 1.564E+00 | 1.588E+00 | FAIL ABUN |
| U-234 | 5.515E-02 | 9.372E-02 | 9.696E-02 | FAIL ABUN |
| U-235 | -4.551E-02 | 1.532E-01 | 1.546E-01 | FAIL ABUN |
| NP-237 | 2.498E-03 | 5.380E-02 | 5.381E-02 | FAIL ABUN |
| NP-238 | -5.025E+10 | 3.474E+12 | 3.474E+12 | SHORT HLIF |
| U-238 | 6.072E-01 | 1.564E+00 | 1.588E+00 | FAIL ABUN |
| NP-239 | -2.501E-01 | 4.029E-01 | 4.183E-01 | FAIL ABUN |
| PU-239 | -1.102E+02 | 2.478E+02 | 2.528E+02 | NOT IDENT. |
| AM-241 | 1.287E-02 | 1.379E-01 | 1.380E-01 | NOT IDENT. |
| AM-243 | 3.302E-02 | 4.399E-02 | 4.644E-02 | NOT IDENT. |
| CM-243 | 3.737E-02 | 9.406E-02 | 9.556E-02 | FAIL ABUN |
| CM-247 | -1.133E-02 | 3.511E-02 | 3.548E-02 | NOT IDENT. |
| CF-249 | 8.564E-03 | 3.122E-02 | 3.146E-02 | NOT IDENT. |
| CF-251 | 1.925E-02 | 9.988E-02 | 1.003E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 28.5928 | 94.67 | 30.0780 | 193.51 | 30.2839 |
| 45.60 | 28.2447 | 94.87 | 30.0878 | 197.03 | 33.2397 |
| 46.54 | 28.3132 | 97.43 | 30.2124 | 198.01 | 37.0749 |
| 49.72 | 0.0000 | 98.43 | 30.2607 | 201.83 | 51.5277 |
| 51.35 | 35.6124 | 98.44 | 30.2612 | 205.31 | 51.7023 |
| 52.39 | 30.7770 | 99.53 | 21.8931 | 210.85 | 30.8013 |
| 53.44 | 24.6828 | 100.11 | 28.6556 | 215.65 | 33.8416 |
| 57.36 | 0.0000 | 103.18 | 35.5676 | 222.11 | 25.2901 |
| 57.53 | 25.9541 | 103.37 | 30.4954 | 227.09 | 24.4274 |
| 57.98 | 25.9802 | 105.21 | 39.6426 | 227.38 | 24.4339 |
| 59.32 | 26.0575 | 105.31 | 38.5158 | 228.16 | 0.0000 |
| 59.54 | 26.0701 | 106.12 | 40.8316 | 228.18 | 25.4295 |
| 63.29 | 26.2816 | 109.28 | 33.0482 | 235.69 | 34.4609 |
| 63.58 | 26.2977 | 111.00 | 43.4147 | 235.96 | 33.4841 |
| 64.28 | 26.3364 | 111.76 | 0.0000 | 238.63 | 32.5750 |
| 66.73 | 31.7642 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 33.3872 | 117.23 | 48.4177 | 240.99 | 38.5766 |
| 67.75 | 35.0132 | 121.12 | 39.9891 | 242.00 | 29.7002 |
| 69.67 | 19.1720 | 121.22 | 34.7778 | 244.70 | 33.7383 |
| 70.83 | 33.3076 | 121.78 | 29.5841 | 252.40 | 0.0000 |
| 72.81 | 38.5805 | 122.06 | 29.5955 | 252.80 | 25.9770 |
| 72.87 | 37.2987 | 123.07 | 38.3533 | 254.15 | 0.0000 |
| 74.66 | 25.8118 | 127.23 | 35.0638 | 256.23 | 25.0491 |
| 74.82 | 25.8196 | 129.30 | 39.5557 | 260.90 | 0.0000 |
| 74.97 | 25.8269 | 131.20 | 42.2988 | 264.66 | 20.1779 |
| 77.11 | 37.2759 | 133.02 | 38.8666 | 268.22 | 39.4594 |
| 79.69 | 32.5684 | 133.52 | 38.0079 | 269.46 | 33.4220 |
| 80.12 | 32.5938 | 136.00 | 35.4694 | 271.23 | 31.4404 |
| 80.19 | 0.0000 | 136.47 | 40.8143 | 273.65 | 32.5171 |
| 80.57 | 32.6205 | 140.51 | 0.0000 | 276.40 | 26.4773 |
| 81.00 | 32.6459 | 143.76 | 34.0264 | 277.37 | 30.5736 |
| 81.07 | 32.6500 | 144.24 | 31.3588 | 277.60 | 29.5598 |
| 83.79 | 22.9662 | 145.44 | 39.4806 | 278.00 | 31.6083 |
| 85.43 | 23.0324 | 152.43 | 34.3856 | 279.20 | 20.4117 |
| 86.55 | 28.0224 | 153.25 | 40.7593 | 279.54 | 25.5211 |
| 86.79 | 26.3849 | 154.21 | 36.2714 | 280.46 | 22.4747 |
| 86.94 | 26.3917 | 156.02 | 36.3486 | 283.69 | 21.5066 |
| 87.09 | 26.3986 | 158.56 | 29.1648 | 284.31 | 0.0000 |
| 87.57 | 29.7230 | 159.00 | 29.1797 | 285.41 | 29.7390 |
| 88.03 | 16.5257 | 162.33 | 32.0370 | 285.90 | 0.0000 |
| 88.34 | 29.7621 | 163.33 | 38.4884 | 287.50 | 16.4338 |
| 88.47 | 29.7687 | 165.86 | 36.7599 | 290.67 | 29.8580 |
| 89.96 | 29.8439 | 176.31 | 37.1838 | 293.27 | 0.0000 |
| 91.11 | 28.2406 | 176.60 | 35.3357 | 295.22 | 19.6291 |
| 92.59 | 29.9754 | 177.52 | 35.3705 | 295.96 | 19.6401 |
| 93.35 | 30.0130 | 181.07 | 0.0000 | 298.58 | 35.2140 |
| 94.56 | 30.0726 | 184.41 | 36.5661 | 299.98 | 26.9561 |
| 94.65 | 30.0770 | 185.72 | 36.6158 | 300.09 | 23.8479 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 23.8486 | 497.08 | 12.4663 | 711.68 | 3.4264 |
| 301.36 | 28.0213 | 505.52 | 11.2676 | 720.70 | 9.2834 |
| 302.85 | 18.7015 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 19.7642 | 511.00 | 16.0063 | 722.78 | 9.2909 |
| 306.78 | 25.0067 | 514.00 | 15.7157 | 722.91 | 7.2266 |
| 308.46 | 28.1667 | 514.00 | 15.7158 | 723.31 | 9.2929 |
| 311.90 | 26.1452 | 520.40 | 10.4054 | 724.19 | 11.3617 |
| 316.51 | 31.4777 | 520.69 | 0.0000 | 727.33 | 16.5461 |
| 319.41 | 30.4912 | 522.65 | 0.0000 | 733.00 | 10.3635 |
| 320.08 | 25.2458 | 527.90 | 0.0000 | 735.93 | 14.5250 |
| 321.04 | 27.3683 | 529.59 | 13.3027 | 737.46 | 8.3047 |
| 323.87 | 33.7510 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 30.6156 | 531.02 | 13.3120 | 747.24 | 7.2933 |
| 328.76 | 39.1572 | 546.56 | 0.0000 | 748.06 | 9.3799 |
| 333.37 | 30.7882 | 552.55 | 17.2920 | 752.31 | 11.4826 |
| 333.97 | 25.4905 | 563.25 | 11.2636 | 753.82 | 9.3999 |
| 334.37 | 29.7470 | 569.33 | 12.9089 | 756.73 | 12.5467 |
| 338.28 | 23.4348 | 569.50 | 12.9102 | 756.80 | 12.5473 |
| 338.32 | 23.4354 | 569.70 | 14.5250 | 763.94 | 10.4834 |
| 340.48 | 28.8037 | 583.19 | 15.5887 | 765.81 | 10.4905 |
| 340.55 | 28.8049 | 584.27 | 9.7478 | 766.42 | 10.4929 |
| 344.28 | 23.5294 | 595.83 | 10.7782 | 766.84 | 11.5441 |
| 345.93 | 26.7673 | 600.60 | 21.6015 | 772.60 | 0.0000 |
| 351.06 | 21.4868 | 602.52 | 0.0000 | 776.52 | 8.4252 |
| 351.93 | 19.3491 | 602.73 | 18.2522 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 8.1972 | 778.90 | 8.4324 |
| 356.01 | 28.0237 | 609.32 | 26.2839 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 29.5825 | 785.37 | 10.5652 |
| 366.42 | 0.0000 | 614.28 | 29.6331 | 792.07 | 10.5903 |
| 375.05 | 24.0027 | 618.01 | 8.2448 | 794.95 | 10.6013 |
| 383.85 | 14.2614 | 620.36 | 13.2051 | 795.86 | 10.6047 |
| 388.16 | 17.5989 | 621.93 | 8.6716 | 801.95 | 8.2658 |
| 388.63 | 13.2030 | 630.19 | 0.0000 | 810.29 | 5.3293 |
| 391.69 | 22.0462 | 631.29 | 8.9552 | 810.45 | 5.3296 |
| 400.66 | 22.1655 | 633.25 | 15.9332 | 810.76 | 4.2642 |
| 401.81 | 21.0717 | 634.78 | 16.9402 | 815.77 | 8.5432 |
| 402.40 | 26.6265 | 635.95 | 18.9425 | 818.51 | 9.6203 |
| 404.85 | 19.9990 | 636.99 | 0.0000 | 832.01 | 6.4434 |
| 410.95 | 15.6107 | 645.85 | 11.0124 | 834.85 | 11.8245 |
| 413.71 | 13.4022 | 657.76 | 23.1398 | 835.71 | 9.6774 |
| 414.70 | 16.7626 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.3068 | 661.66 | 18.1384 | 846.75 | 0.0000 |
| 427.87 | 18.9169 | 664.57 | 0.0000 | 846.77 | 11.8725 |
| 433.94 | 17.1742 | 666.33 | 17.1631 | 856.80 | 3.6099 |
| 439.40 | 13.6002 | 666.50 | 18.1740 | 860.56 | 5.4216 |
| 453.88 | 10.9674 | 667.71 | 0.0000 | 871.09 | 10.8811 |
| 463.37 | 18.3730 | 677.62 | 10.1423 | 873.19 | 7.6221 |
| 468.07 | 19.5704 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 23.4891 | 879.38 | 10.9109 |
| 475.06 | 19.4119 | 696.49 | 19.4152 | 880.51 | 13.0978 |
| 476.78 | 20.0462 | 696.51 | 19.4156 | 883.24 | 10.9246 |
| 477.60 | 12.3415 | 697.00 | 19.4193 | 884.68 | 12.0227 |
| 482.18 | 15.4637 | 697.49 | 15.3340 | 889.28 | 13.1355 |
| 487.02 | 14.8826 | 702.65 | 18.7791 | 894.76 | 7.6759 |
| 492.35 | 0.0000 | 706.68 | 11.9692 | 898.04 | 7.6841 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 6.5975 | 1312.11 | 5.1267 | | |
| 911.20 | 8.2678 | 1332.49 | 4.1213 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 12.9233 | 1365.19 | 2.0764 | | |
| 937.49 | 7.4103 | 1368.63 | 0.0000 | | |
| 944.13 | 9.2820 | 1384.29 | 0.0000 | | |
| 946.00 | 6.5011 | 1408.01 | 4.1934 | | |
| 949.00 | 7.4367 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 3.1820 | | |
| 962.31 | 3.7336 | 1489.16 | 3.2017 | | |
| 964.08 | 8.4051 | 1505.03 | 7.4959 | | |
| 966.17 | 15.8867 | 1596.21 | 4.6770 | | |
| 968.97 | 6.5471 | 1620.50 | 2.8199 | | |
| 983.53 | 12.2124 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.8594 | | |
| 996.26 | 7.5439 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.5545 | 1764.49 | 1.6914 | | |
| 1004.73 | 14.1803 | 1770.23 | 3.8701 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.9032 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.0000 | | |
| 1037.84 | 11.4541 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.9171 | | |
| 1046.59 | 11.4829 | | | | |
| 1048.07 | 11.4878 | | | | |
| 1049.04 | 8.6184 | | | | |
| 1050.41 | 10.5376 | | | | |
| 1063.66 | 6.7308 | | | | |
| 1077.00 | 5.7910 | | | | |
| 1077.34 | 7.7220 | | | | |
| 1085.87 | 5.8052 | | | | |
| 1099.45 | 9.7119 | | | | |
| 1112.07 | 6.8217 | | | | |
| 1112.84 | 3.8989 | | | | |
| 1115.54 | 4.8773 | | | | |
| 1120.29 | 8.7905 | | | | |
| 1120.55 | 10.7444 | | | | |
| 1121.30 | 9.7697 | | | | |
| 1129.67 | 8.8125 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 4.9526 | | | | |
| 1177.95 | 8.9257 | | | | |
| 1189.05 | 9.9459 | | | | |
| 1204.77 | 3.9945 | | | | |
| 1221.41 | 9.0256 | | | | |
| 1231.02 | 5.0262 | | | | |
| 1235.36 | 1.0063 | | | | |
| 1238.28 | 7.0496 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 8.1237 | | | | |
| 1274.44 | 4.0645 | | | | |
| 1274.54 | 3.0483 | | | | |
| 1291.59 | 3.0610 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:36:21.77

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146018.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;215
                                       Background date  : 9-FEB-2014 11:22:39.
Sample date      : 7-NOV-2013 11:10:00. Acquisition date : 10-FEB-2014 13:28:32
Sample ID        : G341146018           Sample quantity  : 1.51950E+02 GRAM
Detector name    : GAM29                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.77  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 36.05 | 29 | 55 | 1.80 | 72.15 | 68 | 9 | 7.98E-03 | 50.5 | |
| 2 | 0 | 77.21 | 45 | 105 | 2.76 | 154.35 | 148 | 17 | 1.24E-02 | 55.1 | |
| 3 | 6 | 90.21 | 10 | 19 | 1.17 | 180.31 | 179 | 10 | 2.81E-03 | 61.3 | 3.18E+00 |
| 4 | 6 | 92.52* | 2 | 41 | 1.44 | 184.91 | 179 | 10 | 6.54E-04 | 592.5 | |
| 5 | 0 | 122.46 | 18 | 56 | 1.52 | 244.70 | 237 | 11 | 4.90E-03 | 90.6 | |
| 6 | 0 | 136.82 | 13 | 60 | 3.40 | 273.38 | 265 | 12 | 3.61E-03 | 122.4 | |
| 7 | 0 | 144.17* | 1 | 41 | 1.22 | 288.06 | 285 | 6 | 2.71E-04 | ***** | |
| 8 | 0 | 186.42* | 0 | 68 | 1.49 | 372.44 | 367 | 12 | 5.76E-05 | ***** | |
| 9 | 0 | 238.57* | 30 | 22 | 1.09 | 476.61 | 473 | 8 | 8.21E-03 | 37.2 | |
| 10 | 0 | 249.01 | 12 | 27 | 0.66 | 497.45 | 494 | 8 | 3.44E-03 | 77.0 | |
| 11 | 0 | 328.87 | 26 | 11 | 0.70 | 656.98 | 651 | 12 | 7.17E-03 | 33.1 | |
| 12 | 6 | 335.62 | 10 | 4 | 1.00 | 670.46 | 669 | 10 | 2.81E-03 | 30.8 | 1.89E+00 |
| 13 | 6 | 338.01 | 16 | 13 | 1.66 | 675.24 | 669 | 10 | 4.40E-03 | 48.0 | |
| 14 | 0 | 352.21* | 19 | 23 | 1.13 | 703.60 | 700 | 9 | 5.15E-03 | 55.3 | |
| 15 | 0 | 371.95 | 16 | 9 | 2.22 | 743.03 | 739 | 7 | 4.50E-03 | 39.2 | |
| 16 | 0 | 404.97 | 16 | 10 | 1.19 | 809.00 | 805 | 8 | 4.41E-03 | 42.7 | |
| 17 | 0 | 416.07 | 12 | 18 | 0.74 | 831.18 | 827 | 8 | 3.22E-03 | 72.1 | |
| 18 | 0 | 437.95* | 14 | 7 | 2.06 | 874.91 | 870 | 9 | 3.83E-03 | 46.3 | |
| 19 | 0 | 534.07 | 14 | 7 | 3.14 | 1066.97 | 1062 | 12 | 3.98E-03 | 43.6 | |
| 20 | 0 | 559.19 | 12 | 8 | 2.33 | 1117.17 | 1113 | 8 | 3.33E-03 | 50.0 | |
| 21 | 0 | 571.22* | 9 | 11 | 1.45 | 1141.22 | 1136 | 9 | 2.56E-03 | 77.7 | |
| 22 | 0 | 582.47* | 15 | 5 | 2.34 | 1163.70 | 1159 | 9 | 4.10E-03 | 43.8 | |
| 23 | 0 | 586.10 | 9 | 4 | 0.57 | 1170.94 | 1168 | 7 | 2.36E-03 | 50.1 | |
| 24 | 0 | 597.17 | 11 | 14 | 3.29 | 1193.07 | 1186 | 12 | 3.03E-03 | 76.8 | |
| 25 | 0 | 609.55* | 14 | 20 | 1.43 | 1217.81 | 1212 | 10 | 3.95E-03 | 68.8 | |
| 26 | 0 | 666.04 | 8 | 11 | 0.60 | 1330.72 | 1326 | 13 | 2.25E-03 | 87.8 | |
| 27 | 0 | 678.55 | 9 | 1 | 1.07 | 1355.73 | 1353 | 6 | 2.43E-03 | 40.0 | |
| 28 | 0 | 786.96 | 8 | 6 | 1.31 | 1572.42 | 1566 | 8 | 2.10E-03 | 67.3 | |
| 29 | 0 | 901.97 | 7 | 6 | 2.87 | 1802.38 | 1794 | 11 | 1.81E-03 | 80.1 | |
| 30 | 0 | 911.24* | 4 | 6 | 0.52 | 1820.91 | 1817 | 10 | 1.11E-03 | 136.9 | |
| 31 | 0 | 982.94 | 7 | 0 | 1.05 | 1964.29 | 1961 | 6 | 1.94E-03 | 37.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:36:23

```
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146018.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title     : RXF2
Sample date      : 7-NOV-2013 11:10:00  Acquisition date : 10-FEB-2014 13:28:32
Sample ID        : G341146018           Sample quantity  : 151.95 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA29              Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.77   0.0%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00
```

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| U-235 | 143.76 | CE-141 | 145.44 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 85.60* | 6.864E+00 | 1.484E-02 | 1.892E-02 | 181.14 | OK |
| | 136.47 | 10.68 | 6.872E+00 | 8.752E-02 | 1.115E-01 | 244.71 | OK |
| AS-74 | 595.83 | 59.00* | 2.936E+00 | 3.109E-02 | 1.270E+00 | 153.52 | OK |
| | 634.78 | 15.40 | 2.808E+00 | ----- Line Not Found | | ----- | Absent |
| PM-147 | 121.22 | 0.00* | 6.864E+00 | 4.458E+02 | 4.775E+02 | 181.14 | OK |
| TL-208 | 277.37 | 6.60 | 4.962E+00 | ----- Line Not Found | | ----- | Absent |
| | 583.19 | 85.00* | 2.990E+00 | 2.872E-02 | 2.872E-02 | 87.54 | OK |
| | 860.56 | 12.50 | 2.221E+00 | ----- Line Not Found | | ----- | Absent |
| BI-211 | 72.87 | 1.23 | 4.149E+00 | ----- Line Not Found | | ----- | Absent |
| | 351.06 | 12.92* | 4.238E+00 | 1.673E-01 | 1.673E-01 | 110.61 | OK |
| PB-212 | 74.82 | 10.28 | 4.379E+00 | ----- Line Not Found | | ----- | Absent |
| | 77.11 | 17.10 | 4.646E+00 | 2.769E-01 | 2.769E-01 | 110.16 | OK |
| | 238.63 | 43.60* | 5.453E+00 | 6.139E-02 | 6.139E-02 | 74.46 | OK |
| | 300.09 | 3.30 | 4.714E+00 | ----- Line Not Found | | ----- | Absent |
| TH-228 | 74.82 | 10.28 | 4.379E+00 | ----- Line Not Found | | ----- | Absent |
| | 77.11 | 17.10 | 4.646E+00 | 2.769E-01 | 2.769E-01 | 110.16 | OK |
| | 238.63 | 43.60* | 5.453E+00 | 6.139E-02 | 6.139E-02 | 74.46 | OK |
| | 300.09 | 3.30 | 4.714E+00 | ----- Line Not Found | | ----- | Absent |
| U-235 | 89.96 | 3.47 | 5.795E+00 | 2.487E-01 | 2.487E-01 | 122.62 | OK |
| | 93.35 | 5.60 | 5.947E+00 | 3.492E-02 | 3.492E-02 | 1184.94 | OK |
| | 143.76 | 10.96* | 6.822E+00 | 6.455E-03 | 6.455E-03 | 2246.09 | OK |
| | 163.33 | 5.08 | 6.596E+00 | ----- Line Not Found | | ----- | Absent |
| | 185.72 | 57.20 | 6.243E+00 | 2.867E-04 | 2.867E-04 | ******* | OK |
| | 205.31 | 5.01 | 5.944E+00 | ----- Line Not Found | | ----- | Absent |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:36:24.64

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146018.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:28:32 | Sensitivity | : 3.000 |
| Detector ID | : GAM29 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.77 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:10:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146018 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.5195E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 11-JUN-2013 10:30:59 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CO-57 | 1.892E-02 | 3.358E-02 | 3.647E-02 |
| AS-74 | 1.270E+00 | 1.911E+00 | 2.343E+00 |
| PM-147 | 4.775E+02 | 8.477E+02 | 9.212E+02 |
| TL-208 | 2.872E-02 | 2.464E-02 | 2.405E-02 |
| BI-211 | 1.673E-01 | 1.813E-01 | 2.522E-01 |
| PB-212 | 6.139E-02 | 4.480E-02 | 6.686E-02 |
| TH-228 | 6.139E-02 | 4.480E-02 | 6.686E-02 |
| U-235 | 6.455E-03 | 1.421E-01 | 2.416E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 1.152E-01 | 6.051E-01 | 1.165E+00 | NOT IDENT. |
| NA-22 | 4.368E-03 | 2.238E-02 | 4.828E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.490E-02 | 2.208E-02 | 3.877E-02 | NOT IDENT. |
| K-40 | 1.250E-01 | 2.738E-01 | 6.341E-01 | NOT IDENT. |
| SC-46 | 6.208E-03 | 4.362E-02 | 8.996E-02 | NOT IDENT. |
| V-48 | 1.078E+00 | 7.987E-01 | 2.567E+00 | FAIL ABUN |
| CR-51 | -7.714E-01 | 1.740E+00 | 3.104E+00 | NOT IDENT. |
| MN-54 | -8.689E-04 | 2.718E-02 | 5.339E-02 | NOT IDENT. |
| CO-56 | -8.693E-05 | 4.303E-02 | 8.732E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | 4.567E-02 | 4.639E-02 | 1.088E-01 | NOT IDENT. |
| FE-59 | -6.760E-02 | 1.364E-01 | 2.498E-01 | NOT IDENT. |
| CO-60 | -1.082E-02 | 2.779E-02 | 5.053E-02 | NOT IDENT. |
| ZN-65 | -7.201E-03 | 4.645E-02 | 9.362E-02 | NOT IDENT. |
| GE-68 | 2.736E-01 | 6.734E-01 | 1.550E+00 | NOT IDENT. |
| AS-73 | -5.814E-01 | 1.390E+00 | 2.407E+00 | NOT IDENT. |
| SE-75 | 5.073E-02 | 5.000E-02 | 1.015E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 9.435E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -3.122E-01 | 1.652E+00 | 3.220E+00 | NOT IDENT. |
| RB-83 | -9.887E-03 | 9.683E-02 | 1.776E-01 | NOT IDENT. |
| KR-85 | -1.140E+01 | 7.614E+00 | 1.167E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | -1.403E-01 | 9.352E-02 | 1.432E-01 | NOT IDENT. |
| RB-86 | 2.078E+00 | 6.554E+00 | 1.494E+01 | NOT IDENT. |
| Y-88 | 1.965E-02 | 3.809E-02 | 9.718E-02 | NOT IDENT. |
| Y-91 | 1.512E+00 | 2.987E+01 | 5.990E+01 | NOT IDENT. |
| NB-94 | 1.476E-02 | 2.013E-02 | 4.252E-02 | NOT IDENT. |
| NB-95 | -5.426E-03 | 5.611E-02 | 1.100E-01 | NOT IDENT. |
| NB-95M | -4.327E-02 | 1.875E-01 | 3.013E-01 | NOT IDENT. |
| ZR-95 | -1.584E-02 | 9.701E-02 | 1.894E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.420E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.652E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 3.900E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.120E-03 | 1.998E-02 | 3.443E-02 | NOT IDENT. |
| RH-102 | -7.219E-03 | 3.653E-02 | 6.649E-02 | NOT IDENT. |
| RU-103 | -2.328E-02 | 1.017E-01 | 1.857E-01 | FAIL ABUN |
| RH-106 | 3.409E-02 | 2.201E-01 | 4.284E-01 | NOT IDENT. |
| RU-106 | 3.409E-02 | 2.201E-01 | 4.284E-01 | NOT IDENT. |
| AG-108M | 2.257E-03 | 2.110E-02 | 3.565E-02 | NOT IDENT. |
| CD-109 | -6.865E-01 | 6.629E-01 | 9.277E-01 | NOT IDENT. |
| AG-110M | 7.483E-03 | 3.063E-02 | 6.614E-02 | FAIL ABUN |
| SN-113 | -3.039E-03 | 4.863E-02 | 9.028E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 4.020E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.069E+00 | 2.152E+00 | 3.583E+00 | NOT IDENT. |
| TE-123M | -1.571E-02 | 3.052E-02 | 5.071E-02 | NOT IDENT. |
| SB-124 | 7.610E-03 | 9.511E-02 | 2.348E-01 | NOT IDENT. |
| SB-125 | -1.764E-02 | 5.678E-02 | 1.030E-01 | NOT IDENT. |
| TE-125M | -2.579E+00 | 1.714E+01 | 3.003E+01 | NOT IDENT. |
| I-126 | 7.362E+00 | 1.267E+01 | 1.909E+01 | FAIL ABUN |
| SB-126 | -6.165E+00 | 6.986E+00 | 1.188E+01 | FAIL ABUN |
| SN-126 | -5.393E-02 | 5.903E-02 | 8.419E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.552E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.765E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.367E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.647E-03 | 3.347E-02 | 5.414E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.892E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.668E-03 | 2.208E-02 | 4.840E-02 | NOT IDENT. |
| CS-135 | -5.551E-02 | 1.010E-01 | 1.785E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.867E+00 | 4.021E+00 | 8.789E+00 | NOT IDENT. |
| BA-137M | 2.956E-03 | 2.380E-02 | 4.064E-02 | NOT IDENT. |
| CS-137 | 3.123E-03 | 2.514E-02 | 4.293E-02 | NOT IDENT. |
| CE-139 | 6.918E-04 | 3.117E-02 | 5.465E-02 | NOT IDENT. |
| BA-140 | 4.823E+00 | 3.573E+00 | 1.034E+01 | FAIL ABUN |
| LA-140 | 4.823E+00 | 3.573E+00 | 1.034E+01 | FAIL ABUN |
| CE-141 | 1.113E-02 | 2.451E-01 | 4.386E-01 | FAIL ABUN |
| CE-143 | 0.000E+00 | 2.441E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -4.482E-02 | 1.581E-01 | 2.402E-01 | NOT IDENT. |
| PM-144 | -5.040E-04 | 2.648E-02 | 4.918E-02 | NOT IDENT. |
| PR-144 | -3.225E-02 | 2.068E+00 | 3.842E+00 | NOT IDENT. |
| PM-146 | 5.849E-03 | 2.654E-02 | 5.181E-02 | NOT IDENT. |
| ND-147 | -2.666E+00 | 4.413E+01 | 7.544E+01 | FAIL ABUN |
| PM-149 | 0.000E+00 | 4.715E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.031E-02 | 1.980E-02 | 3.259E-02 | FAIL ABUN |
| EU-152 | -1.906E-02 | 6.572E-02 | 1.188E-01 | FAIL ABUN |
| GD-153 | -4.366E-02 | 7.441E-02 | 1.160E-01 | NOT IDENT. |
| EU-154 | 8.270E-03 | 5.983E-02 | 1.280E-01 | FAIL ABUN |
| EU-155 | -6.524E-02 | 7.124E-02 | 1.148E-01 | NOT IDENT. |
| TB-160 | -2.697E-02 | 1.509E-01 | 2.970E-01 | NOT IDENT. |
| HO-166M | 6.000E-03 | 3.513E-02 | 6.888E-02 | NOT IDENT. |
| TM-171 | -8.474E+00 | 1.569E+01 | 2.699E+01 | NOT IDENT. |
| LU-176 | 7.904E-03 | 1.478E-02 | 3.000E-02 | NOT IDENT. |
| HF-181 | -7.938E-02 | 9.541E-02 | 1.563E-01 | NOT IDENT. |
| TA-182 | 1.494E-02 | 1.785E-01 | 3.562E-01 | NOT IDENT. |
| RE-183 | -1.999E-01 | 3.055E-01 | 5.186E-01 | NOT IDENT. |
| RE-184 | 2.539E-01 | 3.988E-01 | 7.360E-01 | FAIL ABUN |
| W-188 | -6.849E+00 | 1.064E+01 | 1.853E+01 | NOT IDENT. |
| IR-192 | 2.265E-02 | 4.767E-02 | 9.416E-02 | NOT IDENT. |
| HG-203 | -7.191E-02 | 8.178E-02 | 1.378E-01 | NOT IDENT. |
| BI-207 | 1.056E-02 | 2.689E-02 | 5.920E-02 | NOT IDENT. |
| PB-210 | -2.889E+00 | 3.108E+00 | 5.343E+00 | NOT IDENT. |
| PB-211 | 5.384E-01 | 4.506E-01 | 9.037E-01 | FAIL ABUN |
| BI-212 | 3.125E-01 | 3.294E-01 | 7.230E-01 | NOT IDENT. |
| BI-214 | 5.336E-02 | 7.196E-02 | 1.183E-01 | FAIL ABUN |
| PB-214 | 6.071E-02 | 6.581E-02 | 1.083E-01 | FAIL ABUN |
| RN-219 | -5.793E-02 | 2.590E-01 | 4.135E-01 | NOT IDENT. |
| RN-222 | 5.336E-02 | 7.196E-02 | 1.183E-01 | FAIL ABUN |
| RA-223 | -4.071E-02 | 4.612E-01 | 7.511E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 1.421E-01 | 4.115E-01 | 7.143E-01 | NOT IDENT. |
| RA-226 | 5.336E-02 | 7.196E-02 | 1.183E-01 | FAIL ABUN |
| AC-227 | 3.967E-02 | 1.566E-01 | 3.026E-01 | FAIL ABUN |
| TH-227 | 3.967E-02 | 1.566E-01 | 3.026E-01 | FAIL ABUN |
| AC-228 | 3.606E-02 | 9.672E-02 | 1.872E-01 | FAIL ABUN |
| RA-228 | 3.606E-02 | 9.672E-02 | 1.872E-01 | FAIL ABUN |
| TH-229 | 7.332E-02 | 3.283E-01 | 6.192E-01 | NOT IDENT. |
| TH-230 | 5.335E-02 | 7.195E-02 | 1.183E-01 | FAIL ABUN |
| PA-231 | 4.218E-01 | 9.544E-01 | 1.866E+00 | NOT IDENT. |
| TH-231 | -4.071E-02 | 4.612E-01 | 7.511E-01 | FAIL ABUN |
| TH-232 | 3.606E-02 | 9.672E-02 | 1.872E-01 | FAIL ABUN |
| PA-233 | -4.105E-02 | 4.031E-02 | 6.649E-02 | NOT IDENT. |
| PA-234 | -7.301E-02 | 1.709E-01 | 3.157E-01 | NOT IDENT. |
| PA-234M | -3.137E-01 | 2.321E+00 | 4.935E+00 | NOT IDENT. |
| TH-234 | -1.038E+00 | 1.029E+00 | 1.751E+00 | FAIL ABUN |
| U-234 | 5.335E-02 | 7.195E-02 | 1.183E-01 | FAIL ABUN |
| NP-237 | -4.105E-02 | 4.031E-02 | 6.649E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 2.780E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -1.038E+00 | 1.029E+00 | 1.751E+00 | FAIL ABUN |
| NP-239 | 9.409E-02 | 2.967E-01 | 4.895E-01 | NOT IDENT. |
| PU-239 | -4.212E+01 | 2.255E+02 | 3.722E+02 | NOT IDENT. |
| AM-241 | 2.873E-02 | 1.038E-01 | 1.941E-01 | NOT IDENT. |
| AM-243 | -1.136E-02 | 4.491E-02 | 6.870E-02 | NOT IDENT. |
| CM-243 | 5.907E-02 | 6.849E-02 | 1.329E-01 | NOT IDENT. |
| CM-247 | -2.035E-02 | 2.575E-02 | 3.573E-02 | NOT IDENT. |
| CF-249 | -3.662E-03 | 2.601E-02 | 4.797E-02 | NOT IDENT. |
| CF-251 | -1.046E-02 | 7.998E-02 | 1.390E-01 | NOT IDENT. |
| ANH-511 | -3.706E-02 | 3.525E-02 | 7.325E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:36:20.04

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 36.05 | 29 | 55 | 1.80 | 72.15 | 68 | 9 | 7.98E-03 | 50.5 | |
| 2 | 0 | 77.21 | 45 | 105 | 2.76 | 154.35 | 148 | 17 | 1.24E-02 | 55.1 | |
| 3 | 6 | 90.21 | 10 | 19 | 1.17 | 180.31 | 179 | 10 | 2.81E-03 | 61.3 | 3.18E+00 |
| 4 | 6 | 92.52 | 62 | 41 | 1.44 | 184.91 | 179 | 10 | 1.72E-02 | 21.2 | |
| 5 | 0 | 122.46 | 18 | 56 | 1.52 | 244.70 | 237 | 11 | 4.90E-03 | 90.6 | |
| 6 | 0 | 136.82 | 13 | 60 | 3.40 | 273.38 | 265 | 12 | 3.61E-03 | 122.4 | |
| 7 | 0 | 144.17 | 9 | 41 | 1.22 | 288.06 | 285 | 6 | 2.55E-03 | 114.5 | |
| 8 | 0 | 186.42 | 42 | 68 | 1.49 | 372.44 | 367 | 12 | 1.15E-02 | 42.9 | |
| 9 | 0 | 238.57 | 47 | 22 | 1.09 | 476.61 | 473 | 8 | 1.30E-02 | 22.7 | |
| 10 | 0 | 249.01 | 12 | 27 | 0.66 | 497.45 | 494 | 8 | 3.44E-03 | 77.0 | |
| 11 | 0 | 328.87 | 26 | 11 | 0.70 | 656.98 | 651 | 12 | 7.17E-03 | 33.1 | |
| 12 | 6 | 335.62 | 10 | 4 | 1.00 | 670.46 | 669 | 10 | 2.81E-03 | 30.8 | 1.89E+00 |
| 13 | 6 | 338.01 | 16 | 13 | 1.66 | 675.24 | 669 | 10 | 4.40E-03 | 48.0 | |
| 14 | 0 | 352.21 | 25 | 23 | 1.13 | 703.60 | 700 | 9 | 6.90E-03 | 40.0 | |
| 15 | 0 | 371.95 | 16 | 9 | 2.22 | 743.03 | 739 | 7 | 4.50E-03 | 39.2 | |
| 16 | 0 | 404.97 | 16 | 10 | 1.19 | 809.00 | 805 | 8 | 4.41E-03 | 42.7 | |
| 17 | 0 | 416.07 | 12 | 18 | 0.74 | 831.18 | 827 | 8 | 3.22E-03 | 72.1 | |
| 18 | 0 | 437.95 | 16 | 7 | 2.06 | 874.91 | 870 | 9 | 4.55E-03 | 37.7 | |
| 19 | 0 | 510.81 | 92 | 27 | 2.24 | 1020.49 | 1013 | 14 | 2.55E-02 | 16.1 | |
| 20 | 0 | 534.07 | 14 | 7 | 3.14 | 1066.97 | 1062 | 12 | 3.98E-03 | 43.6 | |
| 21 | 0 | 559.19 | 12 | 8 | 2.33 | 1117.17 | 1113 | 8 | 3.33E-03 | 50.0 | |
| 22 | 0 | 571.22 | 12 | 11 | 1.45 | 1141.22 | 1136 | 9 | 3.29E-03 | 58.8 | |
| 23 | 0 | 582.47 | 22 | 5 | 2.34 | 1163.70 | 1159 | 9 | 5.97E-03 | 28.0 | |
| 24 | 0 | 586.10 | 9 | 4 | 0.57 | 1170.94 | 1168 | 7 | 2.36E-03 | 50.1 | |
| 25 | 0 | 597.17 | 11 | 14 | 3.29 | 1193.07 | 1186 | 12 | 3.03E-03 | 76.8 | |
| 26 | 0 | 609.55 | 21 | 20 | 1.43 | 1217.81 | 1212 | 10 | 5.83E-03 | 45.4 | |
| 27 | 0 | 666.04 | 8 | 11 | 0.60 | 1330.72 | 1326 | 13 | 2.25E-03 | 87.8 | |
| 28 | 0 | 678.55 | 9 | 1 | 1.07 | 1355.73 | 1353 | 6 | 2.43E-03 | 40.0 | |
| 29 | 0 | 786.96 | 8 | 6 | 1.31 | 1572.42 | 1566 | 8 | 2.10E-03 | 67.3 | |
| 30 | 0 | 901.97 | 7 | 6 | 2.87 | 1802.38 | 1794 | 11 | 1.81E-03 | 80.1 | |
| 31 | 0 | 911.24 | 9 | 6 | 0.52 | 1820.91 | 1817 | 10 | 2.56E-03 | 57.0 | |
| 32 | 0 | 982.94 | 7 | 0 | 1.05 | 1964.29 | 1961 | 6 | 1.94E-03 | 37.8 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:36:22.28

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 18 | 85.60* | 6.864E+00 | 1.484E-02 | 1.892E-02 | 181.14 |
| | 136.47 | 13 | 10.68 | 6.872E+00 | 8.752E-02 | 1.115E-01 | 244.71 |
| AS-74 | 595.83 | 11 | 59.00* | 2.936E+00 | 3.109E-02 | 1.270E+00 | 153.52 |
| | 634.78 | ------ | 15.40 | 2.808E+00 | ------ | Line Not Found | ------ |
| CE-141 | 145.44 | 1 | 48.29* | 6.822E+00 | 1.465E-03 | 1.113E-02 | 2246.09 |
| PM-147 | 121.22 | 18 | 0.00* | 6.864E+00 | 4.458E+02 | 4.775E+02 | 181.14 |
| TL-208 | 277.37 | ------ | 6.60 | 4.962E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 15 | 85.00* | 2.990E+00 | 2.872E-02 | 2.872E-02 | 87.54 |
| | 860.56 | ------ | 12.50 | 2.221E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 4.149E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 19 | 12.92* | 4.238E+00 | 1.673E-01 | 1.673E-01 | 110.61 |
| PB-212 | 74.82 | ------ | 10.28 | 4.379E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 45 | 17.10 | 4.646E+00 | 2.769E-01 | 2.769E-01 | 110.16 |
| | 238.63 | 30 | 43.60* | 5.453E+00 | 6.139E-02 | 6.139E-02 | 74.46 |
| | 300.09 | ------ | 3.30 | 4.714E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 4.379E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 45 | 17.10 | 4.646E+00 | 2.769E-01 | 2.769E-01 | 110.16 |
| | 238.63 | 30 | 43.60* | 5.453E+00 | 6.139E-02 | 6.139E-02 | 74.46 |
| | 300.09 | ------ | 3.30 | 4.714E+00 | ------ | Line Not Found | ------ |
| U-235 | 89.96 | 10 | 3.47 | 5.795E+00 | 2.487E-01 | 2.487E-01 | 122.62 |
| | 93.35 | 2 | 5.60 | 5.947E+00 | 3.492E-02 | 3.492E-02 | 1184.94 |
| | 143.76 | 1 | 10.96* | 6.822E+00 | 6.455E-03 | 6.455E-03 | 2246.09 |
| | 163.33 | ------ | 5.08 | 6.596E+00 | ------ | Line Not Found | ------ |
| | 185.72 | 0 | 57.20 | 6.243E+00 | 2.867E-04 | 2.867E-04 | 17619.05 |
| | 205.31 | ------ | 5.01 | 5.944E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341146018 Acquisition date : 10-FEB-2014 13:28:32

Total number of lines in spectrum 31
Number of unidentified lines 8
Number of lines tentatively identified by NID 23 74.19%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CO-57 | 271.74D | 1.27 | 1.484E-02 | 1.892E-02 | 3.427E-02 | 181.14 | |
| AS-74 | 17.77D | 40.9 | 3.109E-02 | 1.270E+00 | 1.950E+00 | 153.52 | |
| CE-141 | 32.51D | 7.60 | 1.465E-03 | 1.113E-02 | 25.01E-02 | 2246.09 | |
| PM-147 | 2.62Y | 1.07 | 4.458E+02 | 4.775E+02 | 8.650E+02 | 181.14 | |
| TL-208 | 1.41E+10Y | 1.00 | 2.872E-02 | 2.872E-02 | 2.514E-02 | 87.54 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.673E-01 | 1.673E-01 | 1.850E-01 | 110.61 | |
| PB-212 | 1.41E+10Y | 1.00 | 6.139E-02 | 6.139E-02 | 4.572E-02 | 74.46 | |
| TH-228 | 1.41E+10Y | 1.00 | 6.139E-02 | 6.139E-02 | 4.572E-02 | 74.46 | |
| U-235 | 7.04E+08Y | 1.00 | 6.455E-03 | 6.455E-03 | 145.0E-03 | 2246.09 | |
| | Total Activity : | | 4.461E+02 | 4.791E+02 | | | |

Grand Total Activity : 4.461E+02 4.791E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146018 Acquisition date : 10-FEB-2014 13:28:32

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 36.05 | 29 | 55 | 1.80 | 72.15 | 68 | 9 | 7.98E-03 | **** | 1.20E-01 | |
| 0 | 249.01 | 12 | 27 | 0.66 | 497.45 | 494 | 8 | 3.44E-03 | **** | 5.31E+00 | |
| 0 | 328.87 | 26 | 11 | 0.70 | 656.98 | 651 | 12 | 7.17E-03 | 66.2 | 4.44E+00 | T |
| 6 | 335.62 | 10 | 4 | 1.00 | 670.46 | 669 | 10 | 2.81E-03 | 61.7 | 4.38E+00 | T |
| 6 | 338.01 | 16 | 13 | 1.66 | 675.24 | 669 | 10 | 4.40E-03 | 96.1 | 4.36E+00 | T |
| 0 | 371.95 | 16 | 9 | 2.22 | 743.03 | 739 | 7 | 4.50E-03 | 78.4 | 4.09E+00 | |
| 0 | 404.97 | 16 | 10 | 1.19 | 809.00 | 805 | 8 | 4.41E-03 | 85.4 | 3.86E+00 | T |
| 0 | 416.07 | 12 | 18 | 0.74 | 831.18 | 827 | 8 | 3.22E-03 | **** | 3.79E+00 | T |
| 0 | 437.95 | 14 | 7 | 2.06 | 874.91 | 870 | 9 | 3.83E-03 | 92.6 | 3.65E+00 | T |
| 0 | 534.07 | 14 | 7 | 3.14 | 1066.97 | 1062 | 12 | 3.98E-03 | 87.1 | 3.18E+00 | |
| 0 | 559.19 | 12 | 8 | 2.33 | 1117.17 | 1113 | 8 | 3.33E-03 | **** | 3.08E+00 | |
| 0 | 571.22 | 9 | 11 | 1.45 | 1141.22 | 1136 | 9 | 2.56E-03 | **** | 3.03E+00 | |
| 0 | 586.10 | 9 | 4 | 0.57 | 1170.94 | 1168 | 7 | 2.36E-03 | **** | 2.98E+00 | |
| 0 | 609.55 | 14 | 20 | 1.43 | 1217.81 | 1212 | 10 | 3.95E-03 | **** | 2.89E+00 | T |
| 0 | 666.04 | 8 | 11 | 0.60 | 1330.72 | 1326 | 13 | 2.25E-03 | **** | 2.71E+00 | T |
| 0 | 678.55 | 9 | 1 | 1.07 | 1355.73 | 1353 | 6 | 2.43E-03 | 80.0 | 2.67E+00 | T |
| 0 | 786.96 | 8 | 6 | 1.31 | 1572.42 | 1566 | 8 | 2.10E-03 | **** | 2.38E+00 | |
| 0 | 901.97 | 7 | 6 | 2.87 | 1802.38 | 1794 | 11 | 1.81E-03 | **** | 2.14E+00 | T |
| 0 | 911.24 | 4 | 6 | 0.52 | 1820.91 | 1817 | 10 | 1.11E-03 | **** | 2.12E+00 | T |
| 0 | 982.94 | 7 | 0 | 1.05 | 1964.29 | 1961 | 6 | 1.94E-03 | 75.6 | 1.99E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:36:37.69

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146018.CNF;1    *
* Acquisition date : 10-FEB-2014 13:28:32 Sensitivity     : 3.000            *
* Detector ID      : GAM29                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.77     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 11:10:00 Nuclide Library : SOLID            *
* Sample ID        : G341146018           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.5195E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7          *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| CO-57 | 1.679E-02 |
| AS-74 | 1.015E+00 |
| PM-147 | 4.241E+02 |
| TL-208 | 9.392E-03 |
| BI-211 | 1.140E-01 |
| PB-212 | 3.063E-02 |
| TH-228 | 3.063E-02 |
| U-235 | 1.119E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.185E-01 | NOT IDENT. |
| NA-22 | 1.966E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.381E-02 | NOT IDENT. |
| K-40 | 2.731E-01 | NOT IDENT. |
| SC-46 | 3.820E-02 | NOT IDENT. |
| V-48 | 1.076E+00 | FAIL ABUN |
| CR-51 | 1.391E+00 | NOT IDENT. |
| MN-54 | 2.307E-02 | NOT IDENT. |
| CO-56 | 3.669E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-58 | 4.709E-02 | NOT IDENT. |
| FE-59 | 9.618E-02 | NOT IDENT. |
| CO-60 | 2.077E-02 | NOT IDENT. |
| ZN-65 | 3.715E-02 | NOT IDENT. |
| GE-68 | 6.316E-01 | NOT IDENT. |
| AS-73 | 1.109E+00 | NOT IDENT. |
| SE-75 | 4.694E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.363E+00 | NOT IDENT. |
| RB-83 | 7.900E-02 | NOT IDENT. |
| KR-85 | 5.356E+00 | NOT IDENT. |
| SR-85 | 6.576E-02 | NOT IDENT. |

| | | |
|---|---|---|
| RB-86 | 6.029E+00 | NOT IDENT. |
| Y-88 | 3.808E-02 | NOT IDENT. |
| Y-91 | 2.523E+01 | NOT IDENT. |
| NB-94 | 1.870E-02 | NOT IDENT. |
| NB-95 | 4.730E-02 | NOT IDENT. |
| NB-95M | 1.370E-01 | NOT IDENT. |
| ZR-95 | 8.070E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.571E-02 | NOT IDENT. |
| RH-102 | 2.881E-02 | NOT IDENT. |
| RU-103 | 8.110E-02 | FAIL ABUN |
| RH-106 | 1.861E-01 | NOT IDENT. |
| RU-106 | 1.861E-01 | NOT IDENT. |
| AG-108M | 1.582E-02 | NOT IDENT. |
| CD-109 | 4.271E-01 | NOT IDENT. |
| AG-110M | 2.756E-02 | FAIL ABUN |
| SN-113 | 4.053E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.644E+00 | NOT IDENT. |
| TE-123M | 2.329E-02 | NOT IDENT. |
| SB-124 | 8.419E-02 | NOT IDENT. |
| SB-125 | 4.506E-02 | NOT IDENT. |
| TE-125M | 1.385E+01 | NOT IDENT. |
| I-126 | 8.320E+00 | FAIL ABUN |
| SB-126 | 4.929E+00 | FAIL ABUN |
| SN-126 | 3.889E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.448E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.060E-02 | NOT IDENT. |
| CS-135 | 8.106E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.732E+00 | NOT IDENT. |
| BA-137M | 1.758E-02 | NOT IDENT. |
| CS-137 | 1.857E-02 | NOT IDENT. |
| CE-139 | 2.528E-02 | NOT IDENT. |
| BA-140 | 4.241E+00 | FAIL ABUN |
| LA-140 | 4.241E+00 | FAIL ABUN |
| CE-141 | 2.039E-01 | FAIL ABUN |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.091E-01 | NOT IDENT. |
| PM-144 | 2.152E-02 | NOT IDENT. |
| PR-144 | 1.681E+00 | NOT IDENT. |
| PM-146 | 2.294E-02 | NOT IDENT. |
| ND-147 | 3.126E+01 | FAIL ABUN |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.471E-02 | FAIL ABUN |
| EU-152 | 5.353E-02 | FAIL ABUN |
| GD-153 | 5.313E-02 | NOT IDENT. |
| EU-154 | 5.180E-02 | FAIL ABUN |
| EU-155 | 5.239E-02 | NOT IDENT. |
| TB-160 | 1.232E-01 | NOT IDENT. |
| HO-166M | 2.965E-02 | NOT IDENT. |
| TM-171 | 1.240E+01 | NOT IDENT. |
| LU-176 | 1.347E-02 | NOT IDENT. |
| HF-181 | 6.667E-02 | NOT IDENT. |
| TA-182 | 1.516E-01 | NOT IDENT. |
| RE-183 | 2.362E-01 | NOT IDENT. |
| RE-184 | 3.152E-01 | FAIL ABUN |
| W-188 | 8.382E+00 | NOT IDENT. |
| IR-192 | 4.276E-02 | NOT IDENT. |
| HG-203 | 6.208E-02 | NOT IDENT. |
| BI-207 | 2.477E-02 | NOT IDENT. |
| PB-210 | 2.467E+00 | NOT IDENT. |
| PB-211 | 4.062E-01 | FAIL ABUN |
| BI-212 | 3.221E-01 | NOT IDENT. |
| BI-214 | 5.411E-02 | FAIL ABUN |
| PB-214 | 4.977E-02 | FAIL ABUN |
| RN-219 | 1.807E-01 | NOT IDENT. |
| RN-222 | 5.411E-02 | FAIL ABUN |
| RA-223 | 3.383E-01 | FAIL ABUN |
| RA-224 | 3.272E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 5.411E-02 | FAIL ABUN |
| AC-227 | 1.379E-01 | FAIL ABUN |
| TH-227 | 1.379E-01 | FAIL ABUN |
| AC-228 | 8.139E-02 | FAIL ABUN |
| RA-228 | 8.139E-02 | FAIL ABUN |
| TH-229 | 2.850E-01 | NOT IDENT. |
| TH-230 | 5.410E-02 | FAIL ABUN |
| PA-231 | 8.530E-01 | NOT IDENT. |
| TH-231 | 3.383E-01 | FAIL ABUN |
| TH-232 | 8.139E-02 | FAIL ABUN |
| PA-233 | 2.948E-02 | NOT IDENT. |
| PA-234 | 1.308E-01 | NOT IDENT. |
| PA-234M | 2.062E+00 | NOT IDENT. |
| TH-234 | 8.134E-01 | FAIL ABUN |
| U-234 | 5.410E-02 | FAIL ABUN |
| NP-237 | 2.948E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 8.134E-01 | FAIL ABUN |
| NP-239 | 2.262E-01 | NOT IDENT. |
| PU-239 | 1.708E+02 | NOT IDENT. |
| AM-241 | 8.927E-02 | NOT IDENT. |
| AM-243 | 3.208E-02 | NOT IDENT. |
| CM-243 | 6.150E-02 | NOT IDENT. |
| CM-247 | 1.547E-02 | NOT IDENT. |
| CF-249 | 2.144E-02 | NOT IDENT. |
| CF-251 | 6.349E-02 | NOT IDENT. |
| ANH-511 | 3.460E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:36:44.21

```
**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146018.CNF;1    *
* Acquisition date : 10-FEB-2014 13:28:32 Sensitivity     : 3.000            *
* Detector ID      : GAM29                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.77     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 11:10:00 Nuclide Library : SOLID            *
* Sample ID        : G341146018           Analyst initials: RXF2             *
* Batch Number     : 1359492              Sample Quantity : 1.5195E+02 GRAM  *
*                                         Quantity Err(%) : 1.3162E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7          *
**************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CO-57 | 1.892E-02 | 3.362E-02 | 3.362E-02 |
| AS-74 | 1.270E+00 | 1.916E+00 | 1.916E+00 |
| PM-147 | 4.775E+02 | 8.487E+02 | 8.487E+02 |
| TL-208 | 2.872E-02 | 2.476E-02 | 2.476E-02 |
| BI-211 | 1.673E-01 | 1.818E-01 | 1.818E-01 |
| PB-212 | 6.139E-02 | 4.507E-02 | 4.507E-02 |
| TH-228 | 6.139E-02 | 4.507E-02 | 4.507E-02 |
| U-235 | 6.455E-03 | 1.421E-01 | 1.421E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 1.152E-01 | 6.052E-01 | 6.074E-01 | NOT IDENT. |
| NA-22 | 4.368E-03 | 2.238E-02 | 2.247E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 2.119E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.490E-02 | 2.211E-02 | 2.311E-02 | NOT IDENT. |
| K-40 | 1.250E-01 | 2.740E-01 | 2.797E-01 | NOT IDENT. |
| SC-46 | 6.208E-03 | 4.363E-02 | 4.372E-02 | NOT IDENT. |
| V-48 | 1.078E+00 | 8.170E-01 | 9.506E-01 | FAIL ABUN |
| CR-51 | -7.714E-01 | 1.741E+00 | 1.776E+00 | NOT IDENT. |
| MN-54 | -8.689E-04 | 2.718E-02 | 2.718E-02 | NOT IDENT. |
| CO-56 | -8.693E-05 | 4.303E-02 | 4.303E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.321E+43 | 0.000E+00 | SHORT HLIF |
| CO-58 | 4.567E-02 | 4.671E-02 | 5.105E-02 | NOT IDENT. |
| FE-59 | -6.760E-02 | 1.370E-01 | 1.403E-01 | NOT IDENT. |
| CO-60 | -1.082E-02 | 2.780E-02 | 2.823E-02 | NOT IDENT. |
| ZN-65 | -7.201E-03 | 4.647E-02 | 4.658E-02 | NOT IDENT. |
| GE-68 | 2.736E-01 | 6.751E-01 | 6.862E-01 | NOT IDENT. |
| AS-73 | -5.814E-01 | 1.395E+00 | 1.419E+00 | NOT IDENT. |
| SE-75 | 5.073E-02 | 5.015E-02 | 5.512E-02 | FAIL ABUN |
| BR-77 | 1.293E+11 | 3.674E+11 | 3.720E+11 | SHORT HLIF |
| SR-82 | -3.122E-01 | 1.652E+00 | 1.658E+00 | NOT IDENT. |
| RB-83 | -9.887E-03 | 9.685E-02 | 9.695E-02 | NOT IDENT. |
| KR-85 | -1.140E+01 | 7.675E+00 | 9.237E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | -1.403E-01 | 9.427E-02 | 1.135E-01 | NOT IDENT. |
| RB-86 | 2.078E+00 | 6.564E+00 | 6.631E+00 | NOT IDENT. |
| Y-88 | 1.965E-02 | 3.812E-02 | 3.914E-02 | NOT IDENT. |
| Y-91 | 1.512E+00 | 2.987E+01 | 2.987E+01 | NOT IDENT. |
| NB-94 | 1.476E-02 | 2.018E-02 | 2.124E-02 | NOT IDENT. |
| NB-95 | -5.426E-03 | 5.611E-02 | 5.616E-02 | NOT IDENT. |
| NB-95M | -4.327E-02 | 1.876E-01 | 1.886E-01 | NOT IDENT. |
| ZR-95 | -1.584E-02 | 9.703E-02 | 9.729E-02 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.422E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -4.520E+40 | 2.680E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -5.645E+09 | 3.947E+09 | 4.696E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.309E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.120E-03 | 2.001E-02 | 2.020E-02 | NOT IDENT. |
| RH-102 | -7.219E-03 | 3.653E-02 | 3.668E-02 | NOT IDENT. |
| RU-103 | -2.328E-02 | 1.017E-01 | 1.022E-01 | FAIL ABUN |
| RH-106 | 3.409E-02 | 2.201E-01 | 2.206E-01 | NOT IDENT. |
| RU-106 | 3.409E-02 | 2.201E-01 | 2.206E-01 | NOT IDENT. |
| AG-108M | 2.257E-03 | 2.110E-02 | 2.112E-02 | NOT IDENT. |
| CD-109 | -6.865E-01 | 6.669E-01 | 7.353E-01 | NOT IDENT. |
| AG-110M | 7.483E-03 | 3.065E-02 | 3.084E-02 | FAIL ABUN |
| SN-113 | -3.039E-03 | 4.863E-02 | 4.865E-02 | NOT IDENT. |
| CD-115 | -3.247E+10 | 4.020E+11 | 4.023E+11 | SHORT HLIF |
| SN-117M | -1.069E+00 | 2.153E+00 | 2.207E+00 | NOT IDENT. |
| TE-123M | -1.571E-02 | 3.055E-02 | 3.136E-02 | NOT IDENT. |
| SB-124 | 7.610E-03 | 9.512E-02 | 9.518E-02 | NOT IDENT. |
| SB-125 | -1.764E-02 | 5.680E-02 | 5.736E-02 | NOT IDENT. |
| TE-125M | -2.579E+00 | 1.715E+01 | 1.718E+01 | NOT IDENT. |
| I-126 | 7.362E+00 | 1.270E+01 | 1.312E+01 | FAIL ABUN |
| SB-126 | -6.165E+00 | 7.038E+00 | 7.567E+00 | FAIL ABUN |
| SN-126 | -5.393E-02 | 5.924E-02 | 6.404E-02 | NOT IDENT. |
| SB-127 | -3.769E+05 | 1.561E+06 | 1.570E+06 | SHORT HLIF |
| I-131 | -2.986E+01 | 6.770E+01 | 6.902E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 9.416E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.029E+06 | 1.367E+07 | 1.368E+07 | SHORT HLIF |
| BA-133 | -2.647E-03 | 3.347E-02 | 3.349E-02 | NOT IDENT. |
| I-133 | -4.637E+30 | 1.912E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.668E-03 | 2.211E-02 | 2.253E-02 | NOT IDENT. |
| CS-135 | -5.551E-02 | 1.012E-01 | 1.042E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 6.245E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.867E+00 | 4.035E+00 | 4.122E+00 | NOT IDENT. |
| BA-137M | 2.956E-03 | 2.380E-02 | 2.384E-02 | NOT IDENT. |
| CS-137 | 3.123E-03 | 2.515E-02 | 2.519E-02 | NOT IDENT. |
| CE-139 | 6.918E-04 | 3.117E-02 | 3.117E-02 | NOT IDENT. |
| BA-140 | 4.823E+00 | 3.596E+00 | 4.202E+00 | FAIL ABUN |
| LA-140 | 4.823E+00 | 3.596E+00 | 4.202E+00 | FAIL ABUN |
| CE-141 | 1.113E-02 | 2.451E-01 | 2.451E-01 | FAIL ABUN |
| CE-143 | 1.867E+19 | 2.446E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -4.482E-02 | 1.581E-01 | 1.594E-01 | NOT IDENT. |
| PM-144 | -5.040E-04 | 2.648E-02 | 2.648E-02 | NOT IDENT. |
| PR-144 | -3.225E-02 | 2.068E+00 | 2.068E+00 | NOT IDENT. |
| PM-146 | 5.849E-03 | 2.655E-02 | 2.668E-02 | NOT IDENT. |
| ND-147 | -2.666E+00 | 4.413E+01 | 4.414E+01 | FAIL ABUN |
| PM-149 | 2.574E+12 | 4.732E+12 | 4.872E+12 | SHORT HLIF |
| EU-150 | 2.031E-02 | 1.986E-02 | 2.187E-02 | FAIL ABUN |
| EU-152 | -1.906E-02 | 6.574E-02 | 6.630E-02 | FAIL ABUN |
| GD-153 | -4.366E-02 | 7.451E-02 | 7.707E-02 | NOT IDENT. |
| EU-154 | 8.270E-03 | 5.984E-02 | 5.995E-02 | FAIL ABUN |
| EU-155 | -6.524E-02 | 7.152E-02 | 7.733E-02 | NOT IDENT. |
| TB-160 | -2.697E-02 | 1.510E-01 | 1.515E-01 | NOT IDENT. |
| HO-166M | 6.000E-03 | 3.513E-02 | 3.524E-02 | NOT IDENT. |
| TM-171 | -8.474E+00 | 1.571E+01 | 1.616E+01 | NOT IDENT. |
| LU-176 | 7.904E-03 | 1.479E-02 | 1.522E-02 | NOT IDENT. |
| HF-181 | -7.938E-02 | 9.565E-02 | 1.021E-01 | NOT IDENT. |
| TA-182 | 1.494E-02 | 1.785E-01 | 1.786E-01 | NOT IDENT. |
| RE-183 | -1.999E-01 | 3.064E-01 | 3.194E-01 | NOT IDENT. |
| RE-184 | 2.539E-01 | 4.012E-01 | 4.172E-01 | FAIL ABUN |
| W-188 | -6.849E+00 | 1.067E+01 | 1.111E+01 | NOT IDENT. |
| IR-192 | 2.265E-02 | 4.771E-02 | 4.879E-02 | NOT IDENT. |
| HG-203 | -7.191E-02 | 8.196E-02 | 8.814E-02 | NOT IDENT. |
| BI-207 | 1.056E-02 | 2.695E-02 | 2.737E-02 | NOT IDENT. |
| PB-210 | -2.889E+00 | 3.119E+00 | 3.380E+00 | NOT IDENT. |
| PB-211 | 5.384E-01 | 4.531E-01 | 5.140E-01 | FAIL ABUN |
| BI-212 | 3.125E-01 | 3.308E-01 | 3.596E-01 | NOT IDENT. |
| BI-214 | 5.336E-02 | 7.210E-02 | 7.600E-02 | FAIL ABUN |
| PB-214 | 6.071E-02 | 6.600E-02 | 7.145E-02 | FAIL ABUN |
| RN-219 | -5.793E-02 | 2.591E-01 | 2.604E-01 | NOT IDENT. |
| RN-222 | 5.336E-02 | 7.210E-02 | 7.600E-02 | FAIL ABUN |
| RA-223 | -4.071E-02 | 4.612E-01 | 4.615E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 1.421E-01 | 4.116E-01 | 4.166E-01 | NOT IDENT. |
| RA-226 | 5.336E-02 | 7.210E-02 | 7.600E-02 | FAIL ABUN |
| AC-227 | 3.967E-02 | 1.567E-01 | 1.578E-01 | FAIL ABUN |
| TH-227 | 3.967E-02 | 1.567E-01 | 1.578E-01 | FAIL ABUN |
| AC-228 | 3.606E-02 | 9.688E-02 | 9.823E-02 | FAIL ABUN |
| RA-228 | 3.606E-02 | 9.688E-02 | 9.823E-02 | FAIL ABUN |
| TH-229 | 7.332E-02 | 3.283E-01 | 3.300E-01 | NOT IDENT. |
| TH-230 | 5.335E-02 | 7.209E-02 | 7.600E-02 | FAIL ABUN |
| PA-231 | 4.218E-01 | 9.549E-01 | 9.737E-01 | NOT IDENT. |
| TH-231 | -4.071E-02 | 4.612E-01 | 4.615E-01 | FAIL ABUN |
| TH-232 | 3.606E-02 | 9.688E-02 | 9.823E-02 | FAIL ABUN |
| PA-233 | -4.105E-02 | 4.045E-02 | 4.448E-02 | NOT IDENT. |
| PA-234 | -7.301E-02 | 1.905E-01 | 1.934E-01 | NOT IDENT. |
| PA-234M | -3.137E-01 | 2.321E+00 | 2.326E+00 | NOT IDENT. |
| TH-234 | -1.038E+00 | 1.055E+00 | 1.154E+00 | FAIL ABUN |
| U-234 | 5.335E-02 | 7.209E-02 | 7.600E-02 | FAIL ABUN |
| NP-237 | -4.105E-02 | 4.045E-02 | 4.448E-02 | NOT IDENT. |
| NP-238 | 1.010E+12 | 2.785E+12 | 2.822E+12 | SHORT HLIF |
| U-238 | -1.038E+00 | 1.055E+00 | 1.154E+00 | FAIL ABUN |
| NP-239 | 9.409E-02 | 2.969E-01 | 2.999E-01 | NOT IDENT. |
| PU-239 | -4.212E+01 | 2.255E+02 | 2.263E+02 | NOT IDENT. |
| AM-241 | 2.873E-02 | 1.039E-01 | 1.047E-01 | NOT IDENT. |
| AM-243 | -1.136E-02 | 4.492E-02 | 4.521E-02 | NOT IDENT. |
| CM-243 | 5.907E-02 | 6.882E-02 | 7.379E-02 | NOT IDENT. |
| CM-247 | -2.035E-02 | 2.602E-02 | 2.759E-02 | NOT IDENT. |
| CF-249 | -3.662E-03 | 2.601E-02 | 2.607E-02 | NOT IDENT. |
| CF-251 | -1.046E-02 | 7.999E-02 | 8.013E-02 | NOT IDENT. |
| ANH-511 | -3.706E-02 | 3.539E-02 | 3.913E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 49.6668 | 94.67 | 27.3397 | 193.51 | 37.0861 |
| 45.60 | 52.8536 | 94.87 | 33.7807 | 197.03 | 37.1858 |
| 46.54 | 47.9510 | 97.43 | 47.7604 | 198.01 | 31.0114 |
| 49.72 | 0.0000 | 98.43 | 49.5399 | 201.83 | 39.0979 |
| 51.35 | 56.4274 | 98.44 | 45.2328 | 205.31 | 43.6533 |
| 52.39 | 53.5008 | 99.53 | 39.8989 | 210.85 | 42.9364 |
| 53.44 | 48.5408 | 100.11 | 46.4003 | 215.65 | 39.4950 |
| 57.36 | 0.0000 | 103.18 | 35.7359 | 222.11 | 29.7572 |
| 57.53 | 47.8543 | 103.37 | 35.7438 | 227.09 | 32.5753 |
| 57.98 | 46.8702 | 105.21 | 54.2704 | 227.38 | 33.4866 |
| 59.32 | 38.8026 | 105.31 | 54.2765 | 228.16 | 0.0000 |
| 59.54 | 38.8162 | 106.12 | 41.2879 | 228.18 | 31.6942 |
| 63.29 | 56.5125 | 109.28 | 50.1562 | 235.69 | 37.8644 |
| 63.58 | 60.6494 | 111.00 | 42.6043 | 235.96 | 40.7846 |
| 64.28 | 61.7435 | 111.76 | 0.0000 | 238.63 | 40.1281 |
| 66.73 | 53.7091 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 46.5143 | 117.23 | 42.8903 | 240.99 | 33.6145 |
| 67.75 | 51.7214 | 121.12 | 45.2738 | 242.00 | 33.6372 |
| 69.67 | 72.6144 | 121.22 | 45.2783 | 244.70 | 38.0926 |
| 70.83 | 49.8762 | 121.78 | 45.3046 | 252.40 | 0.0000 |
| 72.81 | 48.4543 | 122.06 | 45.3178 | 252.80 | 36.8213 |
| 72.87 | 46.8951 | 123.07 | 38.1727 | 254.15 | 0.0000 |
| 74.66 | 68.9528 | 127.23 | 42.2229 | 256.23 | 31.3670 |
| 74.82 | 68.9679 | 129.30 | 45.4280 | 260.90 | 0.0000 |
| 74.97 | 62.7112 | 131.20 | 40.1591 | 264.66 | 32.4622 |
| 77.11 | 56.6068 | 133.02 | 41.9071 | 268.22 | 41.8298 |
| 79.69 | 56.8048 | 133.52 | 38.5732 | 269.46 | 30.6988 |
| 80.12 | 56.8375 | 136.00 | 36.9850 | 271.23 | 36.3197 |
| 80.19 | 0.0000 | 136.47 | 37.0015 | 273.65 | 41.0372 |
| 80.57 | 56.8716 | 140.51 | 0.0000 | 276.40 | 31.7635 |
| 81.00 | 55.3233 | 143.76 | 53.0634 | 277.37 | 31.7821 |
| 81.07 | 55.3286 | 144.24 | 53.0868 | 277.60 | 36.4613 |
| 83.79 | 63.4589 | 145.44 | 47.4922 | 278.00 | 35.5351 |
| 85.43 | 43.4555 | 152.43 | 47.7947 | 279.20 | 40.2397 |
| 86.55 | 61.1370 | 153.25 | 52.3850 | 279.54 | 37.4402 |
| 86.79 | 60.5187 | 154.21 | 51.2901 | 280.46 | 37.4609 |
| 86.94 | 70.0877 | 156.02 | 37.6732 | 283.69 | 30.9652 |
| 87.09 | 70.1012 | 158.56 | 51.4870 | 284.31 | 0.0000 |
| 87.57 | 65.3613 | 159.00 | 52.6512 | 285.41 | 34.7541 |
| 88.03 | 63.8040 | 162.33 | 44.7680 | 285.90 | 0.0000 |
| 88.34 | 63.8290 | 163.33 | 52.8487 | 287.50 | 37.6184 |
| 88.47 | 55.8595 | 165.86 | 50.6602 | 290.67 | 40.5152 |
| 89.96 | 38.3751 | 176.31 | 39.4882 | 293.27 | 0.0000 |
| 91.11 | 48.0373 | 176.60 | 39.4975 | 295.22 | 34.0104 |
| 92.59 | 48.1247 | 177.52 | 39.5273 | 295.96 | 40.6406 |
| 93.35 | 46.5637 | 181.07 | 0.0000 | 298.58 | 33.1297 |
| 94.56 | 27.3360 | 184.41 | 33.6674 | 299.98 | 24.6305 |
| 94.65 | 27.3390 | 185.72 | 41.2501 | 300.09 | 26.5269 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 26.5277 | 497.08 | 18.7419 | 711.68 | 11.2390 |
| 301.36 | 27.4946 | 505.52 | 37.6117 | 720.70 | 16.2299 |
| 302.85 | 34.1603 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 27.5437 | 511.00 | 24.0827 | 722.78 | 9.9247 |
| 306.78 | 19.0204 | 514.00 | 74.4305 | 722.91 | 9.9252 |
| 308.46 | 19.0384 | 514.00 | 74.4305 | 723.31 | 15.3407 |
| 311.90 | 35.2893 | 520.40 | 23.1212 | 724.19 | 16.2479 |
| 316.51 | 25.8180 | 520.69 | 0.0000 | 727.33 | 11.7460 |
| 319.41 | 35.4367 | 522.65 | 0.0000 | 733.00 | 16.2918 |
| 320.08 | 31.6173 | 527.90 | 0.0000 | 735.93 | 9.0593 |
| 321.04 | 27.7999 | 529.59 | 10.1256 | 737.46 | 9.9698 |
| 323.87 | 29.1870 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 18.4477 | 531.02 | 8.4429 | 747.24 | 12.7268 |
| 328.76 | 25.0288 | 546.56 | 0.0000 | 748.06 | 10.0023 |
| 333.37 | 15.4407 | 552.55 | 17.0254 | 752.31 | 12.7466 |
| 333.97 | 11.5842 | 563.25 | 13.6750 | 753.82 | 8.1980 |
| 334.37 | 15.4490 | 569.33 | 17.1323 | 756.73 | 12.7634 |
| 338.28 | 23.2218 | 569.50 | 17.1333 | 756.80 | 14.5871 |
| 338.32 | 23.2222 | 569.70 | 15.4208 | 763.94 | 13.7047 |
| 340.48 | 27.8987 | 583.19 | 4.3048 | 765.81 | 13.7124 |
| 340.55 | 27.8996 | 584.27 | 4.3065 | 766.42 | 17.3723 |
| 344.28 | 32.0312 | 595.83 | 14.0545 | 766.84 | 19.2035 |
| 345.93 | 29.1440 | 600.60 | 20.7926 | 772.60 | 0.0000 |
| 351.06 | 29.6114 | 602.52 | 0.0000 | 776.52 | 11.9219 |
| 351.93 | 28.0657 | 602.73 | 19.5079 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 24.2936 | 778.90 | 17.3348 |
| 356.01 | 31.2495 | 609.32 | 17.3809 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 8.6936 | 785.37 | 13.7919 |
| 366.42 | 0.0000 | 614.28 | 17.4111 | 792.07 | 8.1890 |
| 375.05 | 25.2402 | 618.01 | 9.8064 | 794.95 | 11.9866 |
| 383.85 | 19.8041 | 620.36 | 18.5388 | 795.86 | 7.3783 |
| 388.16 | 25.7993 | 621.93 | 13.0931 | 801.95 | 6.4673 |
| 388.63 | 26.7977 | 630.19 | 0.0000 | 810.29 | 2.7784 |
| 391.69 | 26.8373 | 631.29 | 16.4195 | 810.45 | 3.7047 |
| 400.66 | 20.7629 | 633.25 | 20.8120 | 810.76 | 5.5575 |
| 401.81 | 19.1763 | 634.78 | 14.2473 | 815.77 | 12.9859 |
| 402.40 | 25.5754 | 635.95 | 17.5420 | 818.51 | 8.3547 |
| 404.85 | 18.0033 | 636.99 | 0.0000 | 832.01 | 11.1820 |
| 410.95 | 24.0729 | 645.85 | 14.3009 | 834.85 | 13.9889 |
| 413.71 | 19.2829 | 657.76 | 18.7758 | 835.71 | 10.2609 |
| 414.70 | 9.6459 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 22.2306 | 661.66 | 12.3860 | 846.75 | 0.0000 |
| 427.87 | 20.2167 | 664.57 | 0.0000 | 846.77 | 9.3569 |
| 433.94 | 19.4610 | 666.33 | 13.2913 | 856.80 | 13.1359 |
| 439.40 | 17.8825 | 666.50 | 13.2920 | 860.56 | 8.4533 |
| 453.88 | 17.3829 | 667.71 | 0.0000 | 871.09 | 14.1292 |
| 463.37 | 24.6409 | 677.62 | 12.2290 | 873.19 | 8.4823 |
| 468.07 | 23.6615 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 16.7697 | 879.38 | 9.4407 |
| 475.06 | 22.6996 | 696.49 | 16.7775 | 880.51 | 4.7218 |
| 476.78 | 21.6832 | 696.51 | 16.7775 | 883.24 | 11.3405 |
| 477.60 | 19.6251 | 697.00 | 12.3055 | 884.68 | 6.6179 |
| 482.18 | 20.6973 | 697.49 | 15.6641 | 889.28 | 9.4658 |
| 487.02 | 18.6649 | 702.65 | 10.0863 | 894.76 | 12.6396 |
| 492.35 | 0.0000 | 706.68 | 12.3434 | 898.04 | 6.3254 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 4.7506 | 1312.11 | 3.1296 | | |
| 911.20 | 7.6168 | 1332.49 | 10.4746 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 2.8677 | 1365.19 | 8.4336 | | |
| 937.49 | 7.6689 | 1368.63 | 0.0000 | | |
| 944.13 | 5.7615 | 1384.29 | 3.1742 | | |
| 946.00 | 11.5286 | 1408.01 | 3.1885 | | |
| 949.00 | 7.6916 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 3.2202 | | |
| 962.31 | 13.5058 | 1489.16 | 4.3158 | | |
| 964.08 | 12.5468 | 1505.03 | 2.1641 | | |
| 966.17 | 13.5191 | 1596.21 | 0.0000 | | |
| 968.97 | 8.6968 | 1620.50 | 1.8402 | | |
| 983.53 | 3.8793 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.8620 | | |
| 996.26 | 10.7019 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.8701 | 1764.49 | 5.6526 | | |
| 1004.73 | 8.7741 | 1770.23 | 6.6007 | | |
| 1021.30 | 0.0000 | 1771.35 | 4.7156 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 5.6921 | | |
| 1037.84 | 11.7926 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.9054 | | |
| 1046.59 | 6.8934 | | | | |
| 1048.07 | 6.8958 | | | | |
| 1049.04 | 8.8682 | | | | |
| 1050.41 | 7.8852 | | | | |
| 1063.66 | 5.9323 | | | | |
| 1077.00 | 3.9674 | | | | |
| 1077.34 | 3.9676 | | | | |
| 1085.87 | 3.9754 | | | | |
| 1099.45 | 6.9788 | | | | |
| 1112.07 | 2.9994 | | | | |
| 1112.84 | 4.0000 | | | | |
| 1115.54 | 6.0035 | | | | |
| 1120.29 | 3.0050 | | | | |
| 1120.55 | 3.0053 | | | | |
| 1121.30 | 4.0076 | | | | |
| 1129.67 | 3.0114 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.0943 | | | | |
| 1177.95 | 7.1015 | | | | |
| 1189.05 | 7.1186 | | | | |
| 1204.77 | 9.1837 | | | | |
| 1221.41 | 10.2397 | | | | |
| 1231.02 | 12.3129 | | | | |
| 1235.36 | 5.1350 | | | | |
| 1238.28 | 9.2487 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 2.0695 | | | | |
| 1274.44 | 5.1765 | | | | |
| 1274.54 | 5.1768 | | | | |
| 1291.59 | 7.2724 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:12.63

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146019.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM30.CNF;165
                                        Background date  : 9-FEB-2014 11:22:44.
Sample date      : 7-NOV-2013 11:15:00. Acquisition date : 10-FEB-2014 13:28:54
Sample ID        : G341146019           Sample quantity  : 1.35790E+02 GRAM
Detector name    : GAM30                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:01.08  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 74.74* | 11 | 19 | 1.22 | 149.22 | 148 | 12 | 3.00E-03 | 64.4 | 5.39E+00 |
| 2 | 1 | 77.24 | 22 | 34 | 1.23 | 154.22 | 148 | 12 | 5.98E-03 | 48.6 | |
| 3 | 0 | 93.25* | 10 | 56 | 1.13 | 186.26 | 180 | 11 | 2.65E-03 | 170.9 | |
| 4 | 0 | 174.49 | 11 | 23 | 0.89 | 348.75 | 344 | 7 | 3.13E-03 | 76.2 | |
| 5 | 0 | 186.47* | 16 | 49 | 1.15 | 372.71 | 367 | 12 | 4.40E-03 | 100.6 | |
| 6 | 0 | 239.25* | 39 | 26 | 2.14 | 478.30 | 472 | 15 | 1.09E-02 | 34.4 | |
| 7 | 0 | 245.47 | 14 | 14 | 1.41 | 490.73 | 487 | 7 | 3.81E-03 | 52.8 | |
| 8 | 0 | 352.28* | 15 | 23 | 1.14 | 704.41 | 699 | 11 | 4.27E-03 | 68.5 | |
| 9 | 0 | 377.10 | 10 | 9 | 1.11 | 754.06 | 750 | 7 | 2.79E-03 | 61.0 | |
| 10 | 0 | 417.89 | 7 | 10 | 1.68 | 835.66 | 831 | 7 | 1.96E-03 | 84.3 | |
| 11 | 0 | 444.16 | 14 | 10 | 3.37 | 888.21 | 883 | 10 | 3.89E-03 | 50.0 | |
| 12 | 0 | 447.97 | 9 | 5 | 0.78 | 895.83 | 893 | 7 | 2.57E-03 | 52.1 | |
| 13 | 0 | 570.57 | 8 | 12 | 0.68 | 1141.10 | 1137 | 10 | 2.28E-03 | 87.3 | |
| 14 | 0 | 583.08* | 11 | 13 | 0.88 | 1166.12 | 1161 | 13 | 3.07E-03 | 78.3 | |
| 15 | 0 | 592.85 | 9 | 5 | 1.39 | 1185.68 | 1179 | 10 | 2.52E-03 | 56.7 | |
| 16 | 0 | 609.10* | 13 | 19 | 0.84 | 1218.17 | 1212 | 15 | 3.60E-03 | 81.6 | |
| 17 | 0 | 662.44* | 4 | 11 | 0.48 | 1324.89 | 1319 | 9 | 1.00E-03 | 189.7 | |
| 18 | 0 | 715.17 | 6 | 7 | 0.61 | 1430.39 | 1423 | 10 | 1.57E-03 | 99.7 | |
| 19 | 0 | 765.16 | 14 | 3 | 2.24 | 1530.40 | 1524 | 11 | 3.91E-03 | 35.2 | |
| 20 | 0 | 866.80 | 12 | 2 | 3.87 | 1733.76 | 1728 | 10 | 3.25E-03 | 38.4 | |
| 21 | 0 | 910.80* | 3 | 4 | 1.58 | 1821.80 | 1816 | 9 | 9.46E-04 | 150.1 | |
| 22 | 0 | 1060.08 | 8 | 2 | 2.39 | 2120.49 | 2115 | 9 | 2.15E-03 | 50.1 | |
| 23 | 0 | 1460.24* | 10 | 0 | 0.83 | 2921.25 | 2917 | 9 | 2.72E-03 | 43.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:37:14

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146019.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:15:00 | Acquisition date | : 10-FEB-2014 13:28:54 |
| Sample ID | : G341146019 | Sample quantity | : 135.79 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA30 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:01.08 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.331E+00 | 3.821E-01 | 3.821E-01 | 87.57 |
| NB-95 | 765.81 | 14 | 99.81* | 2.284E+00 | 3.417E-02 | 9.567E-02 | 70.36 |
| BA-137M | 661.66 | 4 | 89.90* | 2.559E+00 | 8.681E-03 | 8.734E-03 | 379.41 |
| CS-137 | 661.66 | 4 | 85.10* | 2.559E+00 | 9.171E-03 | 9.226E-03 | 379.41 |
| TL-208 | 277.37 | ------ | 6.60 | 4.769E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 11 | 85.00* | 2.821E+00 | 2.544E-02 | 2.544E-02 | 156.53 |
| | 860.56 | ------ | 12.50 | 2.076E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 4.427E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 15 | 12.92* | 4.056E+00 | 1.622E-01 | 1.622E-01 | 137.02 |
| PB-212 | 74.82 | 11 | 10.28 | 4.631E+00 | 1.253E-01 | 1.253E-01 | 128.74 |
| | 77.11 | 22 | 17.10 | 4.886E+00 | 1.425E-01 | 1.425E-01 | 97.17 |
| | 238.63 | 39 | 43.60* | 5.244E+00 | 9.509E-02 | 9.509E-02 | 68.87 |
| | 300.09 | ------ | 3.30 | 4.526E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | 11 | 10.28 | 4.631E+00 | 1.253E-01 | 1.253E-01 | 128.74 |
| | 77.11 | 22 | 17.10 | 4.886E+00 | 1.425E-01 | 1.425E-01 | 97.17 |
| | 238.63 | 39 | 43.60* | 5.244E+00 | 9.509E-02 | 9.509E-02 | 68.87 |
| | 300.09 | ------ | 3.30 | 4.526E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 7.037E-01 | ------ | Line Not Found | ------ |
| | 74.66 | 11 | 67.20* | 4.631E+00 | 1.916E-02 | 1.916E-02 | 128.74 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:14.99

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146019.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:28:54 | Sensitivity | : 3.000 |
| Detector ID | : GAM30 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:01.08 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:15:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146019 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.3579E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 6-JUN-2013 10:02:25 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM30_500MLMB.CNF;4 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 3.821E-01 | 3.279E-01 | 4.172E-01 |
| NB-95 | 9.567E-02 | 6.596E-02 | 1.095E-01 |
| BA-137M | 8.734E-03 | 3.247E-02 | 4.311E-02 |
| CS-137 | 9.226E-03 | 3.430E-02 | 4.554E-02 |
| TL-208 | 2.544E-02 | 3.903E-02 | 3.906E-02 |
| BI-211 | 1.622E-01 | 2.178E-01 | 2.485E-01 |
| PB-212 | 9.509E-02 | 6.418E-02 | 5.725E-02 |
| TH-228 | 9.509E-02 | 6.418E-02 | 5.725E-02 |
| AM-243 | 1.916E-02 | 2.418E-02 | 6.235E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -1.872E-01 | 5.750E-01 | 1.022E+00 | NOT IDENT. |
| NA-22 | -1.913E-02 | 2.220E-02 | 3.575E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 5.535E-03 | 2.236E-02 | 5.423E-02 | NOT IDENT. |
| SC-46 | -2.634E-02 | 4.495E-02 | 7.834E-02 | NOT IDENT. |
| V-48 | -7.278E-01 | 1.437E+00 | 2.536E+00 | NOT IDENT. |
| CR-51 | 2.435E-01 | 1.761E+00 | 3.370E+00 | NOT IDENT. |
| MN-54 | 1.883E-03 | 2.748E-02 | 5.530E-02 | NOT IDENT. |
| CO-56 | -1.037E-02 | 4.978E-02 | 9.546E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.074E-02 | 1.996E-02 | 3.580E-02 | NOT IDENT. |
| CO-58 | -7.113E-03 | 5.256E-02 | 1.026E-01 | NOT IDENT. |
| FE-59 | -6.744E-02 | 1.825E-01 | 3.339E-01 | NOT IDENT. |
| CO-60 | -3.574E-03 | 2.517E-02 | 5.166E-02 | NOT IDENT. |
| ZN-65 | 1.572E-02 | 4.263E-02 | 1.033E-01 | NOT IDENT. |
| GE-68 | 2.173E-01 | 7.282E-01 | 1.665E+00 | NOT IDENT. |
| AS-73 | -1.793E-01 | 1.022E+00 | 1.821E+00 | NOT IDENT. |
| AS-74 | -5.872E-02 | 1.424E+00 | 2.457E+00 | NOT IDENT. |
| SE-75 | -1.531E-02 | 4.822E-02 | 8.643E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.350E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.202E-01 | 1.769E+00 | 3.648E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | -1.821E-02 | 9.652E-02 | 1.839E-01 | NOT IDENT. |
| KR-85 | -1.377E+01 | 8.095E+00 | 1.270E+01 | NOT IDENT. |
| SR-85 | -1.694E-01 | 9.942E-02 | 1.559E-01 | NOT IDENT. |
| RB-86 | 2.053E+00 | 7.265E+00 | 1.658E+01 | NOT IDENT. |
| Y-88 | -1.944E-02 | 2.694E-02 | 2.507E-02 | NOT IDENT. |
| Y-91 | -6.141E+00 | 2.962E+01 | 5.918E+01 | NOT IDENT. |
| NB-94 | -1.722E-02 | 2.475E-02 | 4.256E-02 | NOT IDENT. |
| NB-95M | -9.805E-02 | 2.120E-01 | 3.206E-01 | NOT IDENT. |
| ZR-95 | 8.774E-03 | 1.241E-01 | 2.395E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.946E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.895E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.763E-03 | 1.998E-02 | 3.759E-02 | NOT IDENT. |
| RH-102 | -4.786E-03 | 3.896E-02 | 7.399E-02 | NOT IDENT. |
| RU-103 | 9.476E-02 | 1.161E-01 | 2.510E-01 | FAIL ABUN |
| RH-106 | 4.197E-02 | 1.736E-01 | 3.800E-01 | NOT IDENT. |
| RU-106 | 4.197E-02 | 1.736E-01 | 3.800E-01 | NOT IDENT. |
| AG-108M | -5.292E-03 | 1.920E-02 | 3.447E-02 | NOT IDENT. |
| CD-109 | -2.860E-01 | 6.629E-01 | 9.755E-01 | NOT IDENT. |
| AG-110M | 4.037E-03 | 4.248E-02 | 8.543E-02 | FAIL ABUN |
| SN-113 | 3.668E-03 | 4.456E-02 | 8.536E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.362E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.596E+00 | 2.131E+00 | 4.267E+00 | NOT IDENT. |
| TE-123M | 1.190E-02 | 2.945E-02 | 5.736E-02 | NOT IDENT. |
| SB-124 | 2.704E-02 | 1.536E-01 | 3.519E-01 | NOT IDENT. |
| SB-125 | 3.906E-02 | 6.227E-02 | 1.287E-01 | NOT IDENT. |
| TE-125M | -6.853E+00 | 1.697E+01 | 2.855E+01 | NOT IDENT. |
| I-126 | 1.314E+00 | 8.985E+00 | 1.683E+01 | NOT IDENT. |
| SB-126 | -5.751E-01 | 6.856E+00 | 1.341E+01 | NOT IDENT. |
| SN-126 | -1.199E-02 | 5.463E-02 | 8.324E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.816E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.333E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.549E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -4.742E-03 | 3.193E-02 | 5.071E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.716E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.916E-02 | 2.517E-02 | 4.203E-02 | FAIL ABUN |
| CS-135 | -3.015E-02 | 1.057E-01 | 1.898E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.239E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -7.020E-01 | 4.392E+00 | 8.494E+00 | NOT IDENT. |
| CE-139 | 8.966E-03 | 2.670E-02 | 5.217E-02 | NOT IDENT. |
| BA-140 | 2.320E+00 | 5.334E+00 | 1.225E+01 | NOT IDENT. |
| LA-140 | 2.320E+00 | 5.334E+00 | 1.225E+01 | NOT IDENT. |
| CE-141 | 7.186E-02 | 2.005E-01 | 3.938E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.662E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.075E-01 | 1.614E-01 | 3.212E-01 | NOT IDENT. |
| PM-144 | -1.859E-02 | 3.329E-02 | 5.854E-02 | NOT IDENT. |
| PR-144 | -1.434E+00 | 2.601E+00 | 4.578E+00 | NOT IDENT. |
| PM-146 | 2.251E-02 | 2.281E-02 | 5.171E-02 | NOT IDENT. |
| ND-147 | 1.036E+01 | 6.738E+01 | 1.334E+02 | NOT IDENT. |
| PM-147 | 1.899E+02 | 4.974E+02 | 9.770E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 4.923E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.296E-02 | 2.028E-02 | 3.432E-02 | FAIL ABUN |
| EU-152 | -1.488E-02 | 5.990E-02 | 1.088E-01 | FAIL ABUN |
| GD-153 | -9.714E-03 | 7.098E-02 | 1.103E-01 | NOT IDENT. |
| EU-154 | -5.422E-02 | 5.963E-02 | 9.341E-02 | NOT IDENT. |
| EU-155 | 1.311E-02 | 6.623E-02 | 1.212E-01 | NOT IDENT. |
| TB-160 | 1.620E-02 | 2.046E-01 | 4.071E-01 | NOT IDENT. |
| HO-166M | -6.934E-03 | 4.417E-02 | 7.291E-02 | NOT IDENT. |
| TM-171 | -3.003E+00 | 1.177E+01 | 2.078E+01 | NOT IDENT. |
| LU-176 | 1.239E-03 | 1.961E-02 | 3.655E-02 | NOT IDENT. |
| HF-181 | 7.953E-02 | 1.020E-01 | 2.188E-01 | NOT IDENT. |
| TA-182 | -3.665E-02 | 1.542E-01 | 3.091E-01 | NOT IDENT. |
| RE-183 | 1.113E-01 | 2.751E-01 | 5.195E-01 | NOT IDENT. |
| RE-184 | 9.569E-02 | 3.044E-01 | 6.577E-01 | NOT IDENT. |
| W-188 | -3.531E+00 | 1.151E+01 | 2.052E+01 | NOT IDENT. |
| IR-192 | -3.883E-02 | 4.984E-02 | 8.283E-02 | NOT IDENT. |
| HG-203 | -1.629E-02 | 8.298E-02 | 1.511E-01 | NOT IDENT. |
| BI-207 | 1.780E-03 | 3.319E-02 | 5.975E-02 | FAIL ABUN |
| PB-210 | -2.300E+00 | 2.107E+00 | 3.396E+00 | NOT IDENT. |
| PB-211 | -1.252E-01 | 3.985E-01 | 7.187E-01 | NOT IDENT. |
| BI-212 | -8.401E-02 | 2.901E-01 | 5.443E-01 | NOT IDENT. |
| BI-214 | 5.767E-02 | 9.226E-02 | 1.254E-01 | FAIL ABUN |
| PB-214 | 5.887E-02 | 7.905E-02 | 1.287E-01 | FAIL ABUN |
| RN-219 | -4.432E-02 | 2.221E-01 | 4.108E-01 | NOT IDENT. |
| RN-222 | 5.767E-02 | 9.226E-02 | 1.254E-01 | FAIL ABUN |
| RA-223 | -3.364E-01 | 4.595E-01 | 7.688E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 4.802E-01 | 4.271E-01 | 8.204E-01 | NOT IDENT. |
| RA-226 | 5.767E-02 | 9.226E-02 | 1.254E-01 | FAIL ABUN |
| AC-227 | -2.389E-01 | 1.767E-01 | 2.730E-01 | NOT IDENT. |
| TH-227 | -2.389E-01 | 1.767E-01 | 2.730E-01 | NOT IDENT. |
| AC-228 | 3.686E-02 | 1.084E-01 | 2.136E-01 | FAIL ABUN |
| RA-228 | 3.686E-02 | 1.084E-01 | 2.136E-01 | FAIL ABUN |
| TH-229 | 1.214E-01 | 3.290E-01 | 6.404E-01 | NOT IDENT. |
| TH-230 | 5.767E-02 | 9.225E-02 | 1.253E-01 | FAIL ABUN |
| PA-231 | 3.546E-01 | 9.382E-01 | 1.840E+00 | NOT IDENT. |
| TH-231 | -3.364E-01 | 4.595E-01 | 7.688E-01 | NOT IDENT. |
| TH-232 | 3.686E-02 | 1.084E-01 | 2.136E-01 | FAIL ABUN |
| PA-233 | 2.318E-02 | 4.463E-02 | 8.853E-02 | NOT IDENT. |
| PA-234 | 1.489E-01 | 2.058E-01 | 4.599E-01 | FAIL ABUN |
| PA-234M | -4.170E-01 | 3.143E+00 | 6.126E+00 | FAIL ABUN |
| TH-234 | -3.828E-01 | 8.427E-01 | 1.463E+00 | FAIL ABUN |
| U-234 | 5.767E-02 | 9.225E-02 | 1.253E-01 | FAIL ABUN |
| U-235 | -4.563E-02 | 1.302E-01 | 2.331E-01 | FAIL ABUN |
| NP-237 | 2.318E-02 | 4.463E-02 | 8.853E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 2.768E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -3.828E-01 | 8.427E-01 | 1.463E+00 | FAIL ABUN |
| NP-239 | -5.392E-02 | 2.585E-01 | 4.799E-01 | NOT IDENT. |
| PU-239 | -6.462E+01 | 2.219E+02 | 4.066E+02 | NOT IDENT. |
| AM-241 | 7.226E-02 | 9.397E-02 | 1.841E-01 | NOT IDENT. |
| CM-243 | 1.104E-02 | 6.619E-02 | 1.206E-01 | NOT IDENT. |
| CM-247 | -7.638E-03 | 1.967E-02 | 3.510E-02 | NOT IDENT. |
| CF-249 | 4.544E-03 | 2.660E-02 | 5.108E-02 | NOT IDENT. |
| CF-251 | 8.132E-04 | 9.801E-02 | 1.614E-01 | NOT IDENT. |
| ANH-511 | -3.589E-02 | 4.033E-02 | 8.495E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:10.59

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 74.74 | 13 | 19 | 1.22 | 149.22 | 148 | 12 | 3.73E-03 | 47.9 | 5.39E+00 |
| 2 | 1 | 77.24 | 22 | 34 | 1.23 | 154.22 | 148 | 12 | 5.98E-03 | 48.6 | |
| 3 | 0 | 93.25 | 42 | 56 | 1.13 | 186.26 | 180 | 11 | 1.15E-02 | 38.6 | |
| 4 | 0 | 174.49 | 11 | 23 | 0.89 | 348.75 | 344 | 7 | 3.13E-03 | 76.2 | |
| 5 | 0 | 186.47 | 39 | 49 | 1.15 | 372.71 | 367 | 12 | 1.08E-02 | 39.8 | |
| 6 | 0 | 239.25 | 54 | 26 | 2.14 | 478.30 | 472 | 15 | 1.51E-02 | 24.6 | |
| 7 | 0 | 245.47 | 14 | 14 | 1.41 | 490.73 | 487 | 7 | 3.81E-03 | 52.8 | |
| 8 | 0 | 352.28 | 23 | 23 | 1.14 | 704.41 | 699 | 11 | 6.51E-03 | 44.0 | |
| 9 | 0 | 377.10 | 10 | 9 | 1.11 | 754.06 | 750 | 7 | 2.79E-03 | 61.0 | |
| 10 | 0 | 417.89 | 7 | 10 | 1.68 | 835.66 | 831 | 7 | 1.96E-03 | 84.3 | |
| 11 | 0 | 444.16 | 14 | 10 | 3.37 | 888.21 | 883 | 10 | 3.89E-03 | 50.0 | |
| 12 | 0 | 447.97 | 9 | 5 | 0.78 | 895.83 | 893 | 7 | 2.57E-03 | 52.1 | |
| 13 | 0 | 512.14 | 54 | 66 | 1.70 | 1024.20 | 1012 | 19 | 1.50E-02 | 38.7 | |
| 14 | 0 | 570.57 | 8 | 12 | 0.68 | 1141.10 | 1137 | 10 | 2.28E-03 | 87.3 | |
| 15 | 0 | 583.08 | 17 | 13 | 0.88 | 1166.12 | 1161 | 13 | 4.72E-03 | 50.0 | |
| 16 | 0 | 592.85 | 9 | 5 | 1.39 | 1185.68 | 1179 | 10 | 2.52E-03 | 56.7 | |
| 17 | 0 | 609.10 | 19 | 19 | 0.84 | 1218.17 | 1212 | 15 | 5.21E-03 | 55.5 | |
| 18 | 0 | 662.44 | 7 | 11 | 0.48 | 1324.89 | 1319 | 9 | 1.91E-03 | 95.9 | |
| 19 | 0 | 715.17 | 6 | 7 | 0.61 | 1430.39 | 1423 | 10 | 1.57E-03 | 99.7 | |
| 20 | 0 | 765.16 | 14 | 3 | 2.24 | 1530.40 | 1524 | 11 | 3.91E-03 | 35.2 | |
| 21 | 0 | 866.80 | 12 | 2 | 3.87 | 1733.76 | 1728 | 10 | 3.25E-03 | 38.4 | |
| 22 | 0 | 910.80 | 9 | 4 | 1.58 | 1821.80 | 1816 | 9 | 2.41E-03 | 55.3 | |
| 23 | 0 | 1060.08 | 8 | 2 | 2.39 | 2120.49 | 2115 | 9 | 2.15E-03 | 50.1 | |
| 24 | 0 | 1460.24 | 16 | 0 | 0.83 | 2921.25 | 2917 | 9 | 4.44E-03 | 25.0 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:13.15

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.331E+00 | 3.821E-01 | 3.821E-01 | 87.57 |
| NB-95 | 765.81 | 14 | 99.81* | 2.284E+00 | 3.417E-02 | 9.567E-02 | 70.36 |
| BA-137M | 661.66 | 4 | 89.90* | 2.559E+00 | 8.681E-03 | 8.734E-03 | 379.41 |
| CS-137 | 661.66 | 4 | 85.10* | 2.559E+00 | 9.171E-03 | 9.226E-03 | 379.41 |
| TL-208 | 277.37 | ------ | 6.60 | 4.769E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 11 | 85.00* | 2.821E+00 | 2.544E-02 | 2.544E-02 | 156.53 |
| | 860.56 | ------ | 12.50 | 2.076E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 4.427E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 15 | 12.92* | 4.056E+00 | 1.622E-01 | 1.622E-01 | 137.02 |
| PB-212 | 74.82 | 11 | 10.28 | 4.631E+00 | 1.253E-01 | 1.253E-01 | 128.74 |
| | 77.11 | 22 | 17.10 | 4.886E+00 | 1.425E-01 | 1.425E-01 | 97.17 |
| | 238.63 | 39 | 43.60* | 5.244E+00 | 9.509E-02 | 9.509E-02 | 68.87 |
| | 300.09 | ------ | 3.30 | 4.526E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | 11 | 10.28 | 4.631E+00 | 1.253E-01 | 1.253E-01 | 128.74 |
| | 77.11 | 22 | 17.10 | 4.886E+00 | 1.425E-01 | 1.425E-01 | 97.17 |
| | 238.63 | 39 | 43.60* | 5.244E+00 | 9.509E-02 | 9.509E-02 | 68.87 |
| | 300.09 | ------ | 3.30 | 4.526E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 7.037E-01 | ------ | Line Not Found | ------ |
| | 74.66 | 11 | 67.20* | 4.631E+00 | 1.916E-02 | 1.916E-02 | 128.74 |

Flag: "*" = Keyline

Sample ID : G341146019 Acquisition date : 10-FEB-2014 13:28:54

Total number of lines in spectrum 23
Number of unidentified lines 9
Number of lines tentatively identified by NID 14 60.87%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 3.821E-01 | 3.821E-01 | 3.346E-01 | 87.57 | |
| NB-95 | 64.03D | 2.80 | 3.417E-02 | 9.567E-02 | 6.731E-02 | 70.36 | |
| BA-137M | 30.08Y | 1.01 | 8.681E-03 | 8.734E-03 | 33.14E-03 | 379.41 | |
| CS-137 | 30.08Y | 1.01 | 9.171E-03 | 9.226E-03 | 35.00E-03 | 379.41 | |
| TL-208 | 1.41E+10Y | 1.00 | 2.544E-02 | 2.544E-02 | 3.983E-02 | 156.53 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.622E-01 | 1.622E-01 | 2.222E-01 | 137.02 | |
| PB-212 | 1.41E+10Y | 1.00 | 9.509E-02 | 9.509E-02 | 6.549E-02 | 68.87 | |
| TH-228 | 1.41E+10Y | 1.00 | 9.509E-02 | 9.509E-02 | 6.549E-02 | 68.87 | |
| AM-243 | 7370.00Y | 1.00 | 1.916E-02 | 1.916E-02 | 2.467E-02 | 128.74 | |
| | Total Activity : | | 8.311E-01 | 8.927E-01 | | | |

Grand Total Activity : 8.311E-01 8.927E-01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146019 Acquisition date : 10-FEB-2014 13:28:54

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 93.25 | 10 | 56 | 1.13 | 186.26 | 180 | 11 | 2.65E-03 | **** | 6.07E+00 | T |
| 0 | 174.49 | 11 | 23 | 0.89 | 348.75 | 344 | 7 | 3.13E-03 | **** | 6.23E+00 | |
| 0 | 186.47 | 16 | 49 | 1.15 | 372.71 | 367 | 12 | 4.40E-03 | **** | 6.04E+00 | T |
| 0 | 245.47 | 14 | 14 | 1.41 | 490.73 | 487 | 7 | 3.81E-03 | **** | 5.16E+00 | T |
| 0 | 377.10 | 10 | 9 | 1.11 | 754.06 | 750 | 7 | 2.79E-03 | **** | 3.87E+00 | |
| 0 | 417.89 | 7 | 10 | 1.68 | 835.66 | 831 | 7 | 1.96E-03 | **** | 3.60E+00 | |
| 0 | 444.16 | 14 | 10 | 3.37 | 888.21 | 883 | 10 | 3.89E-03 | **** | 3.44E+00 | |
| 0 | 447.97 | 9 | 5 | 0.78 | 895.83 | 893 | 7 | 2.57E-03 | **** | 3.42E+00 | |
| 0 | 570.57 | 8 | 12 | 0.68 | 1141.10 | 1137 | 10 | 2.28E-03 | **** | 2.87E+00 | T |
| 0 | 592.85 | 9 | 5 | 1.39 | 1185.68 | 1179 | 10 | 2.52E-03 | **** | 2.79E+00 | |
| 0 | 609.10 | 13 | 19 | 0.84 | 1218.17 | 1212 | 15 | 3.60E-03 | **** | 2.73E+00 | T |
| 0 | 715.17 | 6 | 7 | 0.61 | 1430.39 | 1423 | 10 | 1.57E-03 | **** | 2.41E+00 | |
| 0 | 866.80 | 12 | 2 | 3.87 | 1733.76 | 1728 | 10 | 3.25E-03 | 76.8 | 2.06E+00 | |
| 0 | 910.80 | 3 | 4 | 1.58 | 1821.80 | 1816 | 9 | 9.46E-04 | **** | 1.98E+00 | T |
| 0 | 1060.08 | 8 | 2 | 2.39 | 2120.49 | 2115 | 9 | 2.15E-03 | **** | 1.74E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:25.61

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146019.CNF;1       *
* Acquisition date : 10-FEB-2014 13:28:54 Sensitivity     : 3.000                *
* Detector ID      : GAM30                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:01.08     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 11:15:00 Nuclide Library : SOLID                *
* Sample ID        : G341146019           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.3579E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  6-JUN-2013 10:02:25 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_500MLMB.CNF;4              *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 1.558E-01 |
| NB-95 | 4.557E-02 |
| BA-137M | 1.829E-02 |
| CS-137 | 1.932E-02 |
| TL-208 | 1.641E-02 |
| BI-211 | 1.101E-01 |
| PB-212 | 2.537E-02 |
| TH-228 | 2.537E-02 |
| AM-243 | 2.878E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 4.356E-01 | NOT IDENT. |
| NA-22 | 1.249E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.048E-02 | NOT IDENT. |
| SC-46 | 3.104E-02 | NOT IDENT. |
| V-48 | 1.018E+00 | NOT IDENT. |
| CR-51 | 1.497E+00 | NOT IDENT. |
| MN-54 | 2.332E-02 | NOT IDENT. |
| CO-56 | 3.939E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.626E-02 | NOT IDENT. |
| CO-58 | 4.255E-02 | NOT IDENT. |
| FE-59 | 1.325E-01 | NOT IDENT. |
| CO-60 | 2.044E-02 | NOT IDENT. |
| ZN-65 | 4.003E-02 | NOT IDENT. |
| GE-68 | 6.603E-01 | NOT IDENT. |
| AS-73 | 8.227E-01 | NOT IDENT. |
| AS-74 | 1.042E+00 | NOT IDENT. |
| SE-75 | 3.875E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.528E+00 | NOT IDENT. |
| RB-83 | 8.035E-02 | NOT IDENT. |

| | | |
|---|---|---|
| KR-85 | 5.785E+00 | NOT IDENT. |
| SR-85 | 7.103E-02 | NOT IDENT. |
| RB-86 | 6.560E+00 | NOT IDENT. |
| Y-88 | 0.000E+00 | NOT IDENT. |
| Y-91 | 2.392E+01 | NOT IDENT. |
| NB-94 | 1.822E-02 | NOT IDENT. |
| NB-95M | 1.444E-01 | NOT IDENT. |
| ZR-95 | 1.031E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.708E-02 | NOT IDENT. |
| RH-102 | 3.173E-02 | NOT IDENT. |
| RU-103 | 1.117E-01 | FAIL ABUN |
| RH-106 | 1.565E-01 | NOT IDENT. |
| RU-106 | 1.565E-01 | NOT IDENT. |
| AG-108M | 1.488E-02 | NOT IDENT. |
| CD-109 | 4.475E-01 | NOT IDENT. |
| AG-110M | 3.612E-02 | FAIL ABUN |
| SN-113 | 3.727E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.964E+00 | NOT IDENT. |
| TE-123M | 2.630E-02 | NOT IDENT. |
| SB-124 | 1.363E-01 | NOT IDENT. |
| SB-125 | 5.680E-02 | NOT IDENT. |
| TE-125M | 1.296E+01 | NOT IDENT. |
| I-126 | 6.954E+00 | NOT IDENT. |
| SB-126 | 5.496E+00 | NOT IDENT. |
| SN-126 | 3.811E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.232E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.670E-02 | FAIL ABUN |
| CS-135 | 8.533E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.452E+00 | NOT IDENT. |
| CE-139 | 2.372E-02 | NOT IDENT. |
| BA-140 | 5.014E+00 | NOT IDENT. |
| LA-140 | 5.014E+00 | NOT IDENT. |
| CE-141 | 1.792E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.480E-01 | NOT IDENT. |
| PM-144 | 2.561E-02 | NOT IDENT. |
| PR-144 | 2.004E+00 | NOT IDENT. |
| PM-146 | 2.236E-02 | NOT IDENT. |
| ND-147 | 5.907E+01 | NOT IDENT. |
| PM-147 | 4.470E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.531E-02 | FAIL ABUN |
| EU-152 | 4.751E-02 | FAIL ABUN |
| GD-153 | 4.977E-02 | NOT IDENT. |
| EU-154 | 3.206E-02 | NOT IDENT. |
| EU-155 | 5.498E-02 | NOT IDENT. |
| TB-160 | 1.733E-01 | NOT IDENT. |
| HO-166M | 3.075E-02 | NOT IDENT. |
| TM-171 | 9.382E+00 | NOT IDENT. |
| LU-176 | 1.649E-02 | NOT IDENT. |
| HF-181 | 9.588E-02 | NOT IDENT. |
| TA-182 | 1.227E-01 | NOT IDENT. |
| RE-183 | 2.375E-01 | NOT IDENT. |
| RE-184 | 2.655E-01 | NOT IDENT. |
| W-188 | 9.228E+00 | NOT IDENT. |
| IR-192 | 3.637E-02 | NOT IDENT. |
| HG-203 | 6.760E-02 | NOT IDENT. |
| BI-207 | 2.408E-02 | FAIL ABUN |
| PB-210 | 1.523E+00 | NOT IDENT. |
| PB-211 | 3.056E-01 | NOT IDENT. |
| BI-212 | 2.251E-01 | NOT IDENT. |
| BI-214 | 5.667E-02 | FAIL ABUN |
| PB-214 | 5.922E-02 | FAIL ABUN |
| RN-219 | 1.748E-01 | NOT IDENT. |
| RN-222 | 5.667E-02 | FAIL ABUN |
| RA-223 | 3.409E-01 | FAIL ABUN |
| RA-224 | 3.754E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 5.667E-02 | FAIL ABUN |
| AC-227 | 1.209E-01 | NOT IDENT. |
| TH-227 | 1.209E-01 | NOT IDENT. |
| AC-228 | 9.219E-02 | FAIL ABUN |
| RA-228 | 9.219E-02 | FAIL ABUN |
| TH-229 | 2.917E-01 | NOT IDENT. |
| TH-230 | 5.667E-02 | FAIL ABUN |
| PA-231 | 8.267E-01 | NOT IDENT. |
| TH-231 | 3.409E-01 | NOT IDENT. |
| TH-232 | 9.219E-02 | FAIL ABUN |
| PA-233 | 3.988E-02 | NOT IDENT. |
| PA-234 | 1.975E-01 | FAIL ABUN |
| PA-234M | 2.577E+00 | FAIL ABUN |
| TH-234 | 6.692E-01 | FAIL ABUN |
| U-234 | 5.667E-02 | FAIL ABUN |
| U-235 | 1.063E-01 | FAIL ABUN |
| NP-237 | 3.988E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 6.692E-01 | FAIL ABUN |
| NP-239 | 2.189E-01 | NOT IDENT. |
| PU-239 | 1.858E+02 | NOT IDENT. |
| AM-241 | 8.440E-02 | NOT IDENT. |
| CM-243 | 5.474E-02 | NOT IDENT. |
| CM-247 | 1.474E-02 | NOT IDENT. |
| CF-249 | 2.256E-02 | NOT IDENT. |
| CF-251 | 7.373E-02 | NOT IDENT. |
| ANH-511 | 4.009E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:30.54

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146019.CNF;1    *
* Acquisition date : 10-FEB-2014 13:28:54 Sensitivity     : 3.000          *
* Detector ID      : GAM30                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:01.08     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:15:00 Nuclide Library : SOLID           *
* Sample ID        : G341146019           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.3579E+02 GRAM*
*                                         Quantity Err(%) : 1.4729E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-JUN-2013 10:02:25 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_500MLMB.CNF;4       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 3.821E-01 | 3.297E-01 | 3.297E-01 |
| NB-95 | 9.567E-02 | 6.658E-02 | 6.658E-02 |
| BA-137M | 8.734E-03 | 3.248E-02 | 3.248E-02 |
| CS-137 | 9.226E-03 | 3.431E-02 | 3.431E-02 |
| TL-208 | 2.544E-02 | 3.908E-02 | 3.908E-02 |
| BI-211 | 1.622E-01 | 2.182E-01 | 2.182E-01 |
| PB-212 | 9.509E-02 | 6.465E-02 | 6.465E-02 |
| TH-228 | 9.509E-02 | 6.465E-02 | 6.465E-02 |
| AM-243 | 1.916E-02 | 2.423E-02 | 2.423E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -1.872E-01 | 5.752E-01 | 5.813E-01 | NOT IDENT. |
| NA-22 | -1.913E-02 | 2.226E-02 | 2.388E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 2.628E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 5.535E-03 | 2.237E-02 | 2.251E-02 | NOT IDENT. |
| SC-46 | -2.634E-02 | 4.505E-02 | 4.659E-02 | NOT IDENT. |
| V-48 | -7.278E-01 | 1.441E+00 | 1.477E+00 | NOT IDENT. |
| CR-51 | 2.435E-01 | 1.762E+00 | 1.765E+00 | NOT IDENT. |
| MN-54 | 1.883E-03 | 2.748E-02 | 2.749E-02 | NOT IDENT. |
| CO-56 | -1.037E-02 | 4.979E-02 | 5.001E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 4.685E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.074E-02 | 1.998E-02 | 2.056E-02 | NOT IDENT. |
| CO-58 | -7.113E-03 | 5.257E-02 | 5.267E-02 | NOT IDENT. |
| FE-59 | -6.744E-02 | 1.828E-01 | 1.853E-01 | NOT IDENT. |
| CO-60 | -3.574E-03 | 2.517E-02 | 2.522E-02 | NOT IDENT. |
| ZN-65 | 1.572E-02 | 4.271E-02 | 4.329E-02 | NOT IDENT. |
| GE-68 | 2.173E-01 | 7.289E-01 | 7.355E-01 | NOT IDENT. |
| AS-73 | -1.793E-01 | 1.022E+00 | 1.025E+00 | NOT IDENT. |
| AS-74 | -5.872E-02 | 1.424E+00 | 1.425E+00 | NOT IDENT. |
| SE-75 | -1.531E-02 | 4.823E-02 | 4.872E-02 | NOT IDENT. |
| BR-77 | 2.001E+11 | 5.658E+11 | 5.730E+11 | SHORT HLIF |
| SR-82 | 2.202E-01 | 1.770E+00 | 1.772E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | -1.821E-02 | 9.656E-02 | 9.691E-02 | NOT IDENT. |
| KR-85 | -1.377E+01 | 8.172E+00 | 1.026E+01 | NOT IDENT. |
| SR-85 | -1.694E-01 | 1.004E-01 | 1.261E-01 | NOT IDENT. |
| RB-86 | 2.053E+00 | 7.272E+00 | 7.331E+00 | NOT IDENT. |
| Y-88 | -1.944E-02 | 2.699E-02 | 2.837E-02 | NOT IDENT. |
| Y-91 | -6.141E+00 | 2.962E+01 | 2.975E+01 | NOT IDENT. |
| NB-94 | -1.722E-02 | 2.479E-02 | 2.598E-02 | NOT IDENT. |
| NB-95M | -9.805E-02 | 2.123E-01 | 2.168E-01 | NOT IDENT. |
| ZR-95 | 8.774E-03 | 1.241E-01 | 1.242E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 4.021E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -4.280E+40 | 2.966E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 9.402E+08 | 4.896E+09 | 4.914E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 2.954E+42 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.763E-03 | 1.998E-02 | 2.000E-02 | NOT IDENT. |
| RH-102 | -4.786E-03 | 3.896E-02 | 3.902E-02 | NOT IDENT. |
| RU-103 | 9.476E-02 | 1.164E-01 | 1.240E-01 | FAIL ABUN |
| RH-106 | 4.197E-02 | 1.736E-01 | 1.746E-01 | NOT IDENT. |
| RU-106 | 4.197E-02 | 1.736E-01 | 1.746E-01 | NOT IDENT. |
| AG-108M | -5.292E-03 | 1.921E-02 | 1.935E-02 | NOT IDENT. |
| CD-109 | -2.860E-01 | 6.636E-01 | 6.760E-01 | NOT IDENT. |
| AG-110M | 4.037E-03 | 4.249E-02 | 4.253E-02 | FAIL ABUN |
| SN-113 | 3.668E-03 | 4.456E-02 | 4.459E-02 | NOT IDENT. |
| CD-115 | 1.736E+11 | 5.365E+11 | 5.422E+11 | SHORT HLIF |
| SN-117M | 1.596E+00 | 2.136E+00 | 2.254E+00 | NOT IDENT. |
| TE-123M | 1.190E-02 | 2.947E-02 | 2.995E-02 | NOT IDENT. |
| SB-124 | 2.704E-02 | 1.537E-01 | 1.541E-01 | NOT IDENT. |
| SB-125 | 3.906E-02 | 6.235E-02 | 6.479E-02 | NOT IDENT. |
| TE-125M | -6.853E+00 | 1.698E+01 | 1.726E+01 | NOT IDENT. |
| I-126 | 1.314E+00 | 8.986E+00 | 9.006E+00 | NOT IDENT. |
| SB-126 | -5.751E-01 | 6.857E+00 | 6.862E+00 | NOT IDENT. |
| SN-126 | -1.199E-02 | 5.464E-02 | 5.491E-02 | NOT IDENT. |
| SB-127 | 4.702E+05 | 1.828E+06 | 1.841E+06 | SHORT HLIF |
| I-131 | 5.305E+01 | 8.344E+01 | 8.680E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.241E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -8.398E+05 | 1.549E+07 | 1.550E+07 | SHORT HLIF |
| BA-133 | -4.742E-03 | 3.193E-02 | 3.200E-02 | NOT IDENT. |
| I-133 | 3.824E+30 | 2.725E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.916E-02 | 2.524E-02 | 2.668E-02 | FAIL ABUN |
| CS-135 | -3.015E-02 | 1.057E-01 | 1.066E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.483E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -7.020E-01 | 4.394E+00 | 4.405E+00 | NOT IDENT. |
| CE-139 | 8.966E-03 | 2.677E-02 | 2.707E-02 | NOT IDENT. |
| BA-140 | 2.320E+00 | 5.337E+00 | 5.439E+00 | NOT IDENT. |
| LA-140 | 2.320E+00 | 5.337E+00 | 5.439E+00 | NOT IDENT. |
| CE-141 | 7.186E-02 | 2.006E-01 | 2.032E-01 | NOT IDENT. |
| CE-143 | 3.027E+18 | 2.663E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.075E-01 | 1.616E-01 | 1.688E-01 | NOT IDENT. |
| PM-144 | -1.859E-02 | 3.333E-02 | 3.437E-02 | NOT IDENT. |
| PR-144 | -1.434E+00 | 2.603E+00 | 2.682E+00 | NOT IDENT. |
| PM-146 | 2.251E-02 | 2.292E-02 | 2.507E-02 | NOT IDENT. |
| ND-147 | 1.036E+01 | 6.739E+01 | 6.755E+01 | NOT IDENT. |
| PM-147 | 1.899E+02 | 4.977E+02 | 5.050E+02 | NOT IDENT. |
| PM-149 | -3.925E+12 | 4.962E+12 | 5.268E+12 | SHORT HLIF |
| EU-150 | -1.296E-02 | 2.030E-02 | 2.112E-02 | FAIL ABUN |
| EU-152 | -1.488E-02 | 5.992E-02 | 6.029E-02 | FAIL ABUN |
| GD-153 | -9.714E-03 | 7.098E-02 | 7.112E-02 | NOT IDENT. |
| EU-154 | -5.422E-02 | 5.984E-02 | 6.464E-02 | NOT IDENT. |
| EU-155 | 1.311E-02 | 6.624E-02 | 6.651E-02 | NOT IDENT. |
| TB-160 | 1.620E-02 | 2.046E-01 | 2.047E-01 | NOT IDENT. |
| HO-166M | -6.934E-03 | 4.418E-02 | 4.429E-02 | NOT IDENT. |
| TM-171 | -3.003E+00 | 1.177E+01 | 1.185E+01 | NOT IDENT. |
| LU-176 | 1.239E-03 | 1.961E-02 | 1.962E-02 | NOT IDENT. |
| HF-181 | 7.953E-02 | 1.022E-01 | 1.084E-01 | NOT IDENT. |
| TA-182 | -3.665E-02 | 1.543E-01 | 1.551E-01 | NOT IDENT. |
| RE-183 | 1.113E-01 | 2.754E-01 | 2.799E-01 | NOT IDENT. |
| RE-184 | 9.569E-02 | 3.048E-01 | 3.078E-01 | NOT IDENT. |
| W-188 | -3.531E+00 | 1.151E+01 | 1.162E+01 | NOT IDENT. |
| IR-192 | -3.883E-02 | 4.993E-02 | 5.291E-02 | NOT IDENT. |
| HG-203 | -1.629E-02 | 8.299E-02 | 8.332E-02 | NOT IDENT. |
| BI-207 | 1.780E-03 | 3.319E-02 | 3.320E-02 | FAIL ABUN |
| PB-210 | -2.300E+00 | 2.117E+00 | 2.357E+00 | NOT IDENT. |
| PB-211 | -1.252E-01 | 3.986E-01 | 4.026E-01 | NOT IDENT. |
| BI-212 | -8.401E-02 | 2.902E-01 | 2.927E-01 | NOT IDENT. |
| BI-214 | 5.767E-02 | 9.238E-02 | 9.597E-02 | FAIL ABUN |
| PB-214 | 5.887E-02 | 7.919E-02 | 8.351E-02 | FAIL ABUN |
| RN-219 | -4.432E-02 | 2.222E-01 | 2.231E-01 | NOT IDENT. |
| RN-222 | 5.767E-02 | 9.238E-02 | 9.597E-02 | FAIL ABUN |
| RA-223 | -3.364E-01 | 4.605E-01 | 4.849E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 4.802E-01 | 4.289E-01 | 4.804E-01 | NOT IDENT. |
| RA-226 | 5.767E-02 | 9.238E-02 | 9.597E-02 | FAIL ABUN |
| AC-227 | -2.389E-01 | 1.802E-01 | 2.099E-01 | NOT IDENT. |
| TH-227 | -2.389E-01 | 1.802E-01 | 2.099E-01 | NOT IDENT. |
| AC-228 | 3.686E-02 | 1.085E-01 | 1.098E-01 | FAIL ABUN |
| RA-228 | 3.686E-02 | 1.085E-01 | 1.098E-01 | FAIL ABUN |
| TH-229 | 1.214E-01 | 3.292E-01 | 3.337E-01 | NOT IDENT. |
| TH-230 | 5.767E-02 | 9.237E-02 | 9.596E-02 | FAIL ABUN |
| PA-231 | 3.546E-01 | 9.386E-01 | 9.521E-01 | NOT IDENT. |
| TH-231 | -3.364E-01 | 4.605E-01 | 4.849E-01 | NOT IDENT. |
| TH-232 | 3.686E-02 | 1.085E-01 | 1.098E-01 | FAIL ABUN |
| PA-233 | 2.318E-02 | 4.467E-02 | 4.587E-02 | NOT IDENT. |
| PA-234 | 1.489E-01 | 2.678E-01 | 2.760E-01 | FAIL ABUN |
| PA-234M | -4.170E-01 | 3.143E+00 | 3.149E+00 | FAIL ABUN |
| TH-234 | -3.828E-01 | 8.471E-01 | 8.645E-01 | FAIL ABUN |
| U-234 | 5.767E-02 | 9.237E-02 | 9.596E-02 | FAIL ABUN |
| U-235 | -4.563E-02 | 1.302E-01 | 1.318E-01 | FAIL ABUN |
| NP-237 | 2.318E-02 | 4.467E-02 | 4.587E-02 | FAIL ABUN |
| NP-238 | -5.422E+11 | 2.769E+12 | 2.779E+12 | SHORT HLIF |
| U-238 | -3.828E-01 | 8.471E-01 | 8.645E-01 | FAIL ABUN |
| NP-239 | -5.392E-02 | 2.585E-01 | 2.597E-01 | NOT IDENT. |
| PU-239 | -6.462E+01 | 2.220E+02 | 2.239E+02 | NOT IDENT. |
| AM-241 | 7.226E-02 | 9.415E-02 | 9.963E-02 | NOT IDENT. |
| CM-243 | 1.104E-02 | 6.621E-02 | 6.639E-02 | NOT IDENT. |
| CM-247 | -7.638E-03 | 1.972E-02 | 2.002E-02 | NOT IDENT. |
| CF-249 | 4.544E-03 | 2.660E-02 | 2.668E-02 | NOT IDENT. |
| CF-251 | 8.132E-04 | 9.801E-02 | 9.801E-02 | NOT IDENT. |
| ANH-511 | -3.589E-02 | 4.043E-02 | 4.355E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 33.6500 | 94.67 | 27.4147 | 193.51 | 29.3735 |
| 45.60 | 29.5695 | 94.87 | 27.4219 | 197.03 | 36.1100 |
| 46.54 | 35.9740 | 97.43 | 30.9516 | 198.01 | 34.2370 |
| 49.72 | 0.0000 | 98.43 | 24.7930 | 201.83 | 40.0662 |
| 51.35 | 27.7685 | 98.44 | 24.7933 | 205.31 | 32.5248 |
| 52.39 | 33.1734 | 99.53 | 32.1839 | 210.85 | 32.6664 |
| 53.44 | 32.1660 | 100.11 | 32.2074 | 215.65 | 31.8235 |
| 57.36 | 0.0000 | 103.18 | 30.0215 | 222.11 | 32.9492 |
| 57.53 | 35.6452 | 103.37 | 30.0285 | 227.09 | 30.1538 |
| 57.98 | 31.3493 | 105.21 | 28.9388 | 227.38 | 29.1872 |
| 59.32 | 26.0051 | 105.31 | 28.9424 | 228.16 | 0.0000 |
| 59.54 | 28.1829 | 106.12 | 26.6532 | 228.18 | 30.1781 |
| 63.29 | 35.9994 | 109.28 | 39.5503 | 117.23 | 30.1781 |
| 63.58 | 33.8339 | 111.00 | 29.1405 | 235.69 | 36.0214 |
| 64.28 | 31.6878 | 111.76 | 0.0000 | 235.96 | 39.1614 |
| 66.73 | 37.3003 | 116.30 | 0.0000 | 238.63 | 20.4031 |
| 67.24 | 42.8209 | 117.23 | 39.6248 | 238.98 | 0.0000 |
| 67.75 | 40.6581 | 121.12 | 33.6079 | 240.99 | 20.4375 |
| 69.67 | 38.5780 | 121.22 | 32.7272 | 242.00 | 11.7993 |
| 70.83 | 30.4767 | 121.78 | 41.5983 | 244.70 | 29.9489 |
| 72.81 | 48.1810 | 122.06 | 41.6112 | 252.40 | 0.0000 |
| 72.87 | 48.1855 | 123.07 | 38.9988 | 252.80 | 21.7962 |
| 74.66 | 48.3169 | 127.23 | 34.7246 | 254.15 | 0.0000 |
| 74.82 | 48.3284 | 129.30 | 42.8331 | 256.23 | 40.7160 |
| 74.97 | 48.3395 | 131.20 | 38.4494 | 260.90 | 0.0000 |
| 77.11 | 53.5107 | 133.02 | 41.2109 | 264.66 | 29.9625 |
| 79.69 | 40.2849 | 133.52 | 34.9581 | 268.22 | 31.0345 |
| 80.12 | 50.3874 | 136.00 | 46.7314 | 269.46 | 21.0407 |
| 80.19 | 0.0000 | 136.47 | 49.4514 | 271.23 | 24.0743 |
| 80.57 | 58.8235 | 140.51 | 0.0000 | 273.65 | 24.1128 |
| 81.00 | 50.4513 | 143.76 | 36.2323 | 276.40 | 21.1365 |
| 81.07 | 50.4564 | 144.24 | 29.9060 | 277.37 | 21.1496 |
| 83.79 | 39.3958 | 145.44 | 29.0344 | 277.60 | 21.1528 |
| 85.43 | 43.9988 | 152.43 | 30.1469 | 278.00 | 25.1884 |
| 86.55 | 45.1969 | 153.25 | 38.3993 | 279.20 | 27.2245 |
| 86.79 | 52.8978 | 323.87 | 43.9252 | 279.54 | 28.2393 |
| 86.94 | 52.9087 | 156.02 | 33.0007 | 280.46 | 22.2011 |
| 87.09 | 44.7782 | 158.56 | 32.1609 | 283.69 | 21.2358 |
| 87.57 | 44.1287 | 159.00 | 34.0128 | 284.31 | 0.0000 |
| 88.03 | 50.9498 | 162.33 | 43.3396 | 285.41 | 35.4315 |
| 88.34 | 42.4761 | 163.33 | 30.4579 | 285.90 | 0.0000 |
| 88.47 | 42.4835 | 165.86 | 28.6784 | 287.50 | 20.2734 |
| 89.96 | 44.2721 | 176.31 | 41.8339 | 290.67 | 31.4867 |
| 91.11 | 40.9296 | 176.60 | 44.8334 | 293.27 | 0.0000 |
| 92.59 | 34.1750 | 177.52 | 37.3911 | 351.93 | 21.3903 |
| 93.35 | 34.2093 | 181.07 | 0.0000 | 295.96 | 24.4574 |
| 94.56 | 27.4108 | 184.41 | 37.6135 | 879.38 | 31.6419 |
| 94.65 | 27.4141 | 143.76 | 33.8898 | 299.98 | 22.4750 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 22.4763 | 487.02 | 13.4969 | 702.65 | 19.5386 |
| 300.13 | 22.4770 | 492.35 | 0.0000 | 706.68 | 10.8694 |
| 301.36 | 24.5387 | 497.08 | 12.6523 | 711.68 | 11.4320 |
| 302.85 | 26.6078 | 505.52 | 32.6522 | 720.70 | 7.6441 |
| 256.23 | 23.5615 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 27.6975 | 511.00 | 23.6372 | 722.78 | 6.8845 |
| 308.46 | 29.7793 | 514.00 | 68.2704 | 722.91 | 6.8846 |
| 311.90 | 20.5798 | 514.00 | 68.2704 | 723.31 | 7.8693 |
| 316.51 | 27.8590 | 520.40 | 18.2544 | 724.19 | 7.8715 |
| 319.41 | 18.6045 | 520.69 | 0.0000 | 727.33 | 7.8797 |
| 320.08 | 19.6456 | 522.65 | 0.0000 | 733.00 | 4.9338 |
| 321.04 | 21.7261 | 527.90 | 0.0000 | 735.93 | 13.8281 |
| 323.87 | 31.0886 | 529.59 | 18.3242 | 333.97 | 13.8349 |
| 325.23 | 25.9274 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 23.9019 | 531.02 | 18.3350 | 747.24 | 7.9307 |
| 333.37 | 32.3013 | 546.56 | 0.0000 | 748.06 | 8.9242 |
| 333.97 | 32.3122 | 552.55 | 12.9469 | 752.31 | 11.9153 |
| 334.37 | 30.2346 | 563.25 | 13.0020 | 753.82 | 8.9407 |
| 338.28 | 17.7629 | 569.33 | 12.4124 | 756.73 | 12.1530 |
| 338.32 | 17.7634 | 946.00 | 12.4134 | 756.80 | 12.1533 |
| 311.90 | 21.9698 | 569.70 | 12.4144 | 884.68 | 8.3051 |
| 340.48 | 21.9698 | 583.19 | 9.3596 | 765.81 | 8.3099 |
| 340.55 | 21.9706 | 584.27 | 9.3633 | 766.42 | 9.9739 |
| 344.28 | 18.8715 | 595.83 | 10.9722 | 766.84 | 8.3126 |
| 345.93 | 15.3909 | 427.87 | 13.1903 | 772.60 | 0.0000 |
| 351.06 | 20.2055 | 602.52 | 0.0000 | 776.52 | 8.0043 |
| 351.93 | 17.8988 | 602.73 | 12.5723 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 22.0180 | 778.90 | 9.0116 |
| 356.01 | 20.2603 | 609.32 | 12.2881 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 12.2929 | 785.37 | 8.0264 |
| 366.42 | 0.0000 | 614.28 | 9.4700 | 792.07 | 7.0376 |
| 375.05 | 22.1736 | 618.01 | 9.4829 | 794.95 | 10.0625 |
| 356.01 | 20.3478 | 620.36 | 8.5421 | 795.86 | 11.0720 |
| 388.16 | 17.1733 | 621.93 | 5.6979 | 810.29 | 10.1096 |
| 388.63 | 18.2511 | 630.19 | 0.0000 | 344.28 | 10.1101 |
| 391.69 | 15.0538 | 631.29 | 9.5291 | 810.76 | 9.1000 |
| 264.66 | 15.1224 | 633.25 | 13.3502 | 815.77 | 9.1136 |
| 401.81 | 12.9694 | 634.78 | 14.3119 | 1048.07 | 12.1614 |
| 402.40 | 12.9732 | 635.95 | 8.5906 | 832.01 | 7.1229 |
| 404.85 | 14.0716 | 636.99 | 0.0000 | 834.85 | 9.1657 |
| 410.95 | 17.3713 | 645.85 | 10.5370 | 835.71 | 11.2052 |
| 413.71 | 22.6135 | 657.76 | 16.0331 | 836.80 | 0.0000 |
| 414.70 | 20.8843 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 17.5083 | 661.66 | 10.5964 | 846.77 | 9.1978 |
| 427.87 | 12.0415 | 664.57 | 0.0000 | 856.80 | 6.1497 |
| 433.94 | 16.4678 | 666.33 | 6.4325 | 860.56 | 10.2607 |
| 439.40 | 7.0444 | 666.50 | 6.4328 | 871.09 | 6.8612 |
| 453.88 | 5.0658 | 667.71 | 0.0000 | 873.19 | 14.1599 |
| 463.37 | 14.4685 | 677.62 | 10.6552 | 875.33 | 0.0000 |
| 468.07 | 12.2686 | 685.70 | 0.0000 | 879.38 | 10.3162 |
| 473.00 | 0.0000 | 695.00 | 23.3859 | 880.51 | 14.4474 |
| 475.06 | 10.0694 | 696.49 | 23.3977 | 883.24 | 4.1310 |
| 476.78 | 19.0345 | 696.51 | 23.3982 | 884.68 | 9.2986 |
| 477.60 | 14.5611 | 697.00 | 18.5264 | 889.28 | 9.3107 |
| 482.18 | 8.9788 | 697.49 | 11.7029 | 894.76 | 3.1083 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 8.2965 | 1298.22 | 0.0000 | | |
| 903.28 | 3.8947 | 1312.11 | 8.5931 | | |
| 911.20 | 5.2043 | 1332.49 | 5.7532 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.2714 | 1365.19 | 5.7920 | | |
| 937.49 | 9.4353 | 1368.63 | 0.0000 | | |
| 944.13 | 8.4020 | 1384.29 | 4.8452 | | |
| 946.00 | 6.3047 | 1408.01 | 2.9209 | | |
| 949.00 | 9.4647 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 2.9512 | | |
| 962.31 | 7.3876 | 1489.16 | 2.9673 | | |
| 964.08 | 9.5027 | 1505.03 | 3.9683 | | |
| 966.17 | 14.7902 | 1596.21 | 4.0353 | | |
| 968.97 | 10.5723 | 1620.50 | 4.0529 | | |
| 983.53 | 9.5515 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.0773 | | |
| 1274.44 | 5.3240 | 1750.46 | 0.0000 | | |
| 1001.03 | 8.5289 | 1764.49 | 2.0771 | | |
| 1004.73 | 7.4698 | 1063.66 | 4.1582 | | |
| 507.63 | 0.0000 | 1771.35 | 4.1590 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0922 | | |
| 1037.84 | 9.6851 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.1016 | | |
| 631.29 | 5.3923 | | | | |
| 1048.07 | 7.5520 | | | | |
| 1049.04 | 7.5541 | | | | |
| 1050.41 | 4.3180 | | | | |
| 1063.66 | 5.4153 | | | | |
| 1077.00 | 3.2597 | | | | |
| 1077.34 | 3.2600 | | | | |
| 1085.87 | 4.3557 | | | | |
| 1099.45 | 7.6474 | | | | |
| 1112.07 | 5.4790 | | | | |
| 1112.84 | 5.4800 | | | | |
| 1115.54 | 2.1935 | | | | |
| 1120.29 | 2.1959 | | | | |
| 1120.55 | 1.0980 | | | | |
| 1221.41 | 1.0982 | | | | |
| 1129.67 | 0.9170 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 2.7788 | | | | |
| 1177.95 | 6.4910 | | | | |
| 1189.05 | 4.6480 | | | | |
| 1204.77 | 7.4632 | | | | |
| 1221.41 | 6.5545 | | | | |
| 1231.02 | 7.5068 | | | | |
| 1235.36 | 2.8177 | | | | |
| 1238.28 | 2.8195 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.7868 | | | | |
| 1274.44 | 6.6306 | | | | |
| 1274.54 | 6.6306 | | | | |
| 1291.59 | 4.7534 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:57.68

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146020.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM32.CNF;136
                                        Background date  : 9-FEB-2014 11:22:55.
Sample date      : 7-NOV-2013 11:20:00. Acquisition date : 10-FEB-2014 13:29:16
Sample ID        : G341146020           Sample quantity  : 1.32430E+02 GRAM
Detector name    : GAM32                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.30  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 59.16 | 15 | 14 | 0.72 | 119.85 | 118 | 5 | 4.16E-03 | 45.4 | |
| 2 | 0 | 63.04* | 12 | 43 | 1.53 | 127.60 | 124 | 9 | 3.27E-03 | 113.0 | |
| 3 | 0 | 185.86* | 10 | 35 | 1.18 | 373.21 | 367 | 11 | 2.84E-03 | 130.9 | |
| 4 | 6 | 235.77 | 15 | 5 | 1.26 | 473.01 | 471 | 11 | 4.20E-03 | 35.0 | 1.44E+01 |
| 5 | 6 | 237.52* | 1 | 18 | 1.49 | 476.52 | 471 | 11 | 2.73E-04 | ***** | |
| 6 | 6 | 238.79* | 27 | 13 | 1.50 | 479.05 | 471 | 11 | 7.46E-03 | 28.1 | |
| 7 | 0 | 330.90 | 8 | 15 | 1.04 | 663.25 | 657 | 8 | 2.28E-03 | 90.3 | |
| 8 | 0 | 351.56* | 23 | 18 | 1.15 | 704.55 | 698 | 12 | 6.27E-03 | 45.4 | |
| 9 | 3 | 507.04 | 14 | 0 | 1.90 | 1015.48 | 1011 | 22 | 3.76E-03 | 37.0 | 1.11E+00 |
| 10 | 0 | 529.76 | 15 | 3 | 2.47 | 1060.91 | 1055 | 11 | 4.25E-03 | 33.0 | |
| 11 | 0 | 548.15 | 20 | 3 | 4.81 | 1097.69 | 1091 | 13 | 5.51E-03 | 29.2 | |
| 12 | 0 | 597.78 | 8 | 15 | 1.11 | 1196.94 | 1191 | 10 | 2.22E-03 | 97.2 | |
| 13 | 0 | 662.03* | 10 | 4 | 1.55 | 1325.40 | 1321 | 8 | 2.91E-03 | 51.0 | |
| 14 | 0 | 746.96 | 6 | 4 | 0.83 | 1495.25 | 1492 | 6 | 1.60E-03 | 71.2 | |
| 15 | 0 | 797.02 | 6 | 4 | 1.46 | 1595.35 | 1590 | 8 | 1.75E-03 | 67.3 | |
| 16 | 0 | 803.08* | 8 | 0 | 0.62 | 1607.46 | 1604 | 8 | 2.33E-03 | 45.7 | |
| 17 | 0 | 968.27 | 11 | 3 | 4.00 | 1937.81 | 1931 | 11 | 3.08E-03 | 41.9 | |
| 18 | 0 | 1460.43* | 10 | 2 | 1.14 | 2922.00 | 2916 | 10 | 2.88E-03 | 49.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:37:59

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146020.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:20:00 | Acquisition date | : 10-FEB-2014 13:29:16 |
| Sample ID | : G341146020 | Sample quantity | : 132.43 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA32 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.30 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.141E+00 | 4.840E-01 | 4.840E-01 | 99.10 |
| NB-95M | 235.69 | 15 | 24.80* | 4.489E+00 | 7.695E-02 | 2.154E-01 | 70.03 |
| BA-137M | 661.66 | 10 | 89.90* | 2.236E+00 | 2.954E-02 | 2.972E-02 | 101.91 |
| CS-137 | 661.66 | 10 | 85.10* | 2.236E+00 | 3.120E-02 | 3.139E-02 | 101.91 |
| BI-211 | 72.87 | ------ | 1.23 | 2.567E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 23 | 12.92* | 3.468E+00 | 2.855E-01 | 2.855E-01 | 90.88 |
| AM-241 | 59.54 | 15 | 35.90* | 1.103E+00 | 2.145E-01 | 2.146E-01 | 90.72 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:59.94

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146020.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:29:16 | Sensitivity | : 3.000 |
| Detector ID | : GAM32 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.30 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:20:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146020 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.3243E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 23-AUG-2013 13:31:39 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM32_500MLMB.CNF;3 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 4.840E-01 | 4.701E-01 | 6.008E-01 |
| NB-95M | 2.154E-01 | 1.479E-01 | 3.710E-01 |
| BA-137M | 2.972E-02 | 2.968E-02 | 4.750E-02 |
| CS-137 | 3.139E-02 | 3.135E-02 | 5.018E-02 |
| BI-211 | 2.855E-01 | 2.543E-01 | 3.215E-01 |
| AM-241 | 2.146E-01 | 1.908E-01 | 3.363E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -5.352E-02 | 7.346E-01 | 1.378E+00 | NOT IDENT. |
| NA-22 | -1.166E-02 | 3.647E-02 | 6.748E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.155E-02 | 1.600E-02 | 1.579E-02 | NOT IDENT. |
| SC-46 | 4.022E-03 | 3.993E-02 | 8.870E-02 | NOT IDENT. |
| V-48 | 3.722E-01 | 1.585E+00 | 3.406E+00 | NOT IDENT. |
| CR-51 | 1.138E+00 | 2.350E+00 | 4.669E+00 | NOT IDENT. |
| MN-54 | -4.687E-03 | 3.420E-02 | 6.648E-02 | NOT IDENT. |
| CO-56 | -5.703E-02 | 6.154E-02 | 9.991E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.079E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.275E-02 | 2.386E-02 | 4.012E-02 | NOT IDENT. |
| CO-58 | -3.674E-03 | 7.542E-02 | 1.473E-01 | NOT IDENT. |
| FE-59 | -7.935E-02 | 1.981E-01 | 3.621E-01 | NOT IDENT. |
| CO-60 | 1.390E-02 | 2.549E-02 | 6.284E-02 | NOT IDENT. |
| ZN-65 | 3.280E-02 | 6.808E-02 | 1.559E-01 | NOT IDENT. |
| GE-68 | -4.865E-01 | 1.083E+00 | 1.974E+00 | NOT IDENT. |
| AS-73 | 3.387E-01 | 2.999E+00 | 5.642E+00 | NOT IDENT. |
| AS-74 | 1.497E+00 | 1.984E+00 | 3.808E+00 | NOT IDENT. |
| SE-75 | -4.842E-02 | 5.131E-02 | 8.563E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 9.077E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -2.283E-02 | 1.666E+00 | 3.518E+00 | NOT IDENT. |
| RB-83 | 2.986E-02 | 1.089E-01 | 2.160E-01 | FAIL ABUN |
| KR-85 | 6.136E+00 | 6.851E+00 | 1.311E+01 | NOT IDENT. |
| SR-85 | 7.509E-02 | 8.412E-02 | 1.610E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -2.102E+00 | 1.077E+01 | 2.104E+01 | NOT IDENT. |
| Y-88 | 1.102E-02 | 3.718E-02 | 1.018E-01 | NOT IDENT. |
| Y-91 | -5.829E+01 | 3.994E+01 | 4.706E+01 | NOT IDENT. |
| NB-94 | -1.984E-03 | 2.830E-02 | 5.504E-02 | NOT IDENT. |
| NB-95 | 3.134E-02 | 6.037E-02 | 1.364E-01 | NOT IDENT. |
| ZR-95 | -4.717E-02 | 1.285E-01 | 2.411E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.768E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 5.146E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.348E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.384E-02 | 2.560E-02 | 4.289E-02 | NOT IDENT. |
| RH-102 | 3.442E-02 | 3.603E-02 | 8.633E-02 | NOT IDENT. |
| RU-103 | -3.591E-02 | 1.260E-01 | 2.287E-01 | NOT IDENT. |
| RH-106 | 1.322E-01 | 2.771E-01 | 5.764E-01 | NOT IDENT. |
| RU-106 | 1.322E-01 | 2.771E-01 | 5.764E-01 | NOT IDENT. |
| AG-108M | 4.395E-03 | 2.218E-02 | 4.383E-02 | NOT IDENT. |
| CD-109 | 3.964E-01 | 7.687E-01 | 1.462E+00 | NOT IDENT. |
| AG-110M | -6.330E-03 | 3.962E-02 | 7.941E-02 | NOT IDENT. |
| SN-113 | 3.638E-03 | 5.445E-02 | 1.050E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 6.252E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.133E-01 | 2.800E+00 | 4.917E+00 | NOT IDENT. |
| TE-123M | -2.982E-02 | 4.195E-02 | 6.786E-02 | NOT IDENT. |
| SB-124 | -6.792E-02 | 9.414E-02 | 9.471E-02 | NOT IDENT. |
| SB-125 | 4.615E-03 | 8.347E-02 | 1.581E-01 | NOT IDENT. |
| TE-125M | 1.301E+01 | 2.259E+01 | 4.291E+01 | NOT IDENT. |
| I-126 | 3.036E+00 | 1.155E+01 | 2.209E+01 | NOT IDENT. |
| SB-126 | -6.625E+00 | 8.004E+00 | 1.354E+01 | NOT IDENT. |
| SN-126 | 2.136E-02 | 7.297E-02 | 1.346E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.779E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 9.120E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.704E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -7.129E-03 | 4.226E-02 | 6.746E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.668E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.360E-02 | 3.115E-02 | 6.641E-02 | FAIL ABUN |
| CS-135 | 6.405E-02 | 1.069E-01 | 2.202E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.296E+00 | 5.142E+00 | 1.102E+01 | NOT IDENT. |
| CE-139 | 4.194E-03 | 3.967E-02 | 7.055E-02 | NOT IDENT. |
| BA-140 | -2.088E+00 | 4.462E+00 | 8.631E+00 | NOT IDENT. |
| LA-140 | -2.088E+00 | 4.462E+00 | 8.631E+00 | NOT IDENT. |
| CE-141 | 7.844E-02 | 2.833E-01 | 5.183E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.679E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 6.555E-02 | 2.000E-01 | 3.698E-01 | NOT IDENT. |
| PM-144 | 1.481E-02 | 3.061E-02 | 6.546E-02 | NOT IDENT. |
| PR-144 | 1.136E+00 | 2.385E+00 | 5.096E+00 | NOT IDENT. |
| PM-146 | -8.227E-03 | 3.622E-02 | 6.601E-02 | FAIL ABUN |
| ND-147 | 1.021E+02 | 6.608E+01 | 1.442E+02 | FAIL ABUN |
| PM-147 | -4.269E+02 | 5.900E+02 | 9.646E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 5.048E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.622E-02 | 2.408E-02 | 3.468E-02 | FAIL ABUN |
| EU-152 | 1.396E-02 | 7.701E-02 | 1.456E-01 | NOT IDENT. |
| GD-153 | -3.366E-02 | 8.469E-02 | 1.465E-01 | NOT IDENT. |
| EU-154 | -2.105E-02 | 9.457E-02 | 1.805E-01 | NOT IDENT. |
| EU-155 | -2.256E-02 | 9.998E-02 | 1.746E-01 | NOT IDENT. |
| TB-160 | -1.630E-01 | 2.052E-01 | 3.386E-01 | NOT IDENT. |
| HO-166M | -3.819E-02 | 4.803E-02 | 8.249E-02 | FAIL ABUN |
| TM-171 | -3.213E+01 | 3.656E+01 | 6.040E+01 | NOT IDENT. |
| LU-176 | -3.786E-03 | 2.017E-02 | 3.747E-02 | NOT IDENT. |
| HF-181 | 7.482E-02 | 1.284E-01 | 2.665E-01 | NOT IDENT. |
| TA-182 | 5.935E-02 | 1.988E-01 | 4.314E-01 | NOT IDENT. |
| RE-183 | 5.758E-01 | 5.119E-01 | 1.247E+00 | FAIL ABUN |
| RE-184 | -1.045E-01 | 3.378E-01 | 6.613E-01 | NOT IDENT. |
| W-188 | -6.076E+00 | 1.096E+01 | 1.940E+01 | FAIL ABUN |
| IR-192 | 1.266E-02 | 6.872E-02 | 1.308E-01 | NOT IDENT. |
| HG-203 | 6.758E-03 | 9.195E-02 | 1.769E-01 | NOT IDENT. |
| BI-207 | 3.002E-02 | 3.462E-02 | 8.442E-02 | NOT IDENT. |
| TL-208 | 1.022E-02 | 2.911E-02 | 5.921E-02 | NOT IDENT. |
| PB-210 | -4.770E+00 | 8.379E+00 | 1.455E+01 | NOT IDENT. |
| PB-211 | -9.066E-03 | 4.623E-01 | 8.967E-01 | NOT IDENT. |
| BI-212 | -6.876E-03 | 3.384E-01 | 6.858E-01 | NOT IDENT. |
| PB-212 | 7.838E-02 | 4.318E-02 | 1.031E-01 | FAIL ABUN |
| BI-214 | 2.777E-02 | 6.838E-02 | 1.377E-01 | NOT IDENT. |
| PB-214 | 1.036E-01 | 9.229E-02 | 1.399E-01 | FAIL ABUN |
| RN-219 | -2.711E-02 | 2.587E-01 | 4.957E-01 | NOT IDENT. |
| RN-222 | 2.777E-02 | 6.838E-02 | 1.377E-01 | NOT IDENT. |
| RA-223 | -1.763E-01 | 5.629E-01 | 9.790E-01 | NOT IDENT. |
| RA-224 | 1.366E-01 | 6.015E-01 | 1.020E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.777E-02 | 6.838E-02 | 1.377E-01 | NOT IDENT. |
| AC-227 | 4.252E-02 | 1.911E-01 | 3.730E-01 | FAIL ABUN |
| TH-227 | 4.252E-02 | 1.911E-01 | 3.730E-01 | FAIL ABUN |
| AC-228 | -3.190E-02 | 7.989E-02 | 1.668E-01 | FAIL ABUN |
| RA-228 | -3.190E-02 | 7.989E-02 | 1.668E-01 | FAIL ABUN |
| TH-228 | 7.838E-02 | 4.318E-02 | 1.031E-01 | FAIL ABUN |
| TH-229 | -1.442E-01 | 4.512E-01 | 8.058E-01 | NOT IDENT. |
| TH-230 | 2.776E-02 | 6.837E-02 | 1.377E-01 | NOT IDENT. |
| PA-231 | -7.169E-01 | 1.106E+00 | 1.925E+00 | NOT IDENT. |
| TH-231 | -1.763E-01 | 5.629E-01 | 9.790E-01 | NOT IDENT. |
| TH-232 | -3.190E-02 | 7.989E-02 | 1.668E-01 | FAIL ABUN |
| PA-233 | -4.022E-02 | 5.602E-02 | 9.591E-02 | NOT IDENT. |
| PA-234 | -5.008E-02 | 1.581E-01 | 3.116E-01 | NOT IDENT. |
| PA-234M | -1.409E+00 | 2.960E+00 | 5.659E+00 | NOT IDENT. |
| TH-234 | 1.207E+00 | 2.673E+00 | 3.811E+00 | FAIL ABUN |
| U-234 | 2.776E-02 | 6.837E-02 | 1.377E-01 | NOT IDENT. |
| U-235 | -1.660E-01 | 1.804E-01 | 2.887E-01 | FAIL ABUN |
| NP-237 | -4.022E-02 | 5.602E-02 | 9.591E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.203E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.207E+00 | 2.673E+00 | 3.811E+00 | FAIL ABUN |
| NP-239 | 2.037E-01 | 3.130E-01 | 6.089E-01 | NOT IDENT. |
| PU-239 | 3.465E+01 | 2.495E+02 | 4.579E+02 | NOT IDENT. |
| AM-243 | -9.403E-03 | 5.008E-02 | 8.937E-02 | NOT IDENT. |
| CM-243 | 4.391E-02 | 1.022E-01 | 1.906E-01 | NOT IDENT. |
| CM-247 | -5.271E-03 | 2.421E-02 | 4.532E-02 | NOT IDENT. |
| CF-249 | -2.034E-02 | 3.079E-02 | 5.259E-02 | NOT IDENT. |
| CF-251 | 3.707E-02 | 9.834E-02 | 1.938E-01 | NOT IDENT. |
| ANH-511 | -1.677E-04 | 4.444E-02 | 9.730E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:56.14

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 59.16 | 15 | 14 | 0.72 | 119.85 | 118 | 5 | 4.16E-03 | 45.4 | |
| 2 | 0 | 63.04 | 26 | 43 | 1.53 | 127.60 | 124 | 9 | 7.25E-03 | 48.5 | |
| 3 | 0 | 92.94 | 43 | 39 | 0.86 | 187.39 | 183 | 9 | 1.18E-02 | 31.3 | |
| 4 | 0 | 185.86 | 39 | 35 | 1.18 | 373.21 | 367 | 11 | 1.09E-02 | 33.6 | |
| 5 | 6 | 235.77 | 15 | 5 | 1.26 | 473.01 | 471 | 11 | 4.20E-03 | 35.0 | 1.44E+01 |
| 6 | 6 | 237.52 | 13 | 18 | 1.49 | 476.52 | 471 | 11 | 3.49E-03 | 81.4 | |
| 7 | 6 | 238.79 | 38 | 13 | 1.50 | 479.05 | 471 | 11 | 1.07E-02 | 18.3 | |
| 8 | 0 | 330.90 | 8 | 15 | 1.04 | 663.25 | 657 | 8 | 2.28E-03 | 90.3 | |
| 9 | 0 | 351.56 | 28 | 18 | 1.15 | 704.55 | 698 | 12 | 7.78E-03 | 35.7 | |
| 10 | 3 | 507.04 | 14 | 0 | 1.90 | 1015.48 | 1011 | 22 | 3.76E-03 | 37.0 | 1.11E+00 |
| 11 | 3 | 510.98 | 70 | 3 | 1.91 | 1023.36 | 1011 | 22 | 1.94E-02 | 14.4 | |
| 12 | 0 | 529.76 | 15 | 3 | 2.47 | 1060.91 | 1055 | 11 | 4.25E-03 | 33.0 | |
| 13 | 0 | 548.15 | 20 | 3 | 4.81 | 1097.69 | 1091 | 13 | 5.51E-03 | 29.2 | |
| 14 | 0 | 597.78 | 8 | 15 | 1.11 | 1196.94 | 1191 | 10 | 2.22E-03 | 97.2 | |
| 15 | 0 | 662.03 | 12 | 4 | 1.55 | 1325.40 | 1321 | 8 | 3.42E-03 | 39.8 | |
| 16 | 0 | 746.96 | 6 | 4 | 0.83 | 1495.25 | 1492 | 6 | 1.60E-03 | 71.2 | |
| 17 | 0 | 797.02 | 6 | 4 | 1.46 | 1595.35 | 1590 | 8 | 1.75E-03 | 67.3 | |
| 18 | 0 | 803.08 | 13 | 0 | 0.62 | 1607.46 | 1604 | 8 | 3.61E-03 | 27.7 | |
| 19 | 0 | 968.27 | 11 | 3 | 4.00 | 1937.81 | 1931 | 11 | 3.08E-03 | 41.9 | |
| 20 | 0 | 1460.43 | 17 | 2 | 1.14 | 2922.00 | 2916 | 10 | 4.71E-03 | 29.7 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:37:58.18

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.141E+00 | 4.840E-01 | 4.840E-01 | 99.10 |
| NB-95M | 235.69 | 15 | 24.80* | 4.489E+00 | 7.695E-02 | 2.154E-01 | 70.03 |
| BA-137M | 661.66 | 10 | 89.90* | 2.236E+00 | 2.954E-02 | 2.972E-02 | 101.91 |
| CS-137 | 661.66 | 10 | 85.10* | 2.236E+00 | 3.120E-02 | 3.139E-02 | 101.91 |
| BI-211 | 72.87 | ------ | 1.23 | 2.567E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 23 | 12.92* | 3.468E+00 | 2.855E-01 | 2.855E-01 | 90.88 |
| AM-241 | 59.54 | 15 | 35.90* | 1.103E+00 | 2.145E-01 | 2.146E-01 | 90.72 |

Flag: "*" = Keyline

Sample ID : G341146020 Acquisition date : 10-FEB-2014 13:29:16

Total number of lines in spectrum 18
Number of unidentified lines 4
Number of lines tentatively identified by NID 14 77.78%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 4.840E-01 | 4.840E-01 | 4.797E-01 | 99.10 | |
| NB-95M | 64.03D | 2.80 | 7.695E-02 | 2.154E-01 | 1.509E-01 | 70.03 | |
| BA-137M | 30.08Y | 1.01 | 2.954E-02 | 2.972E-02 | 3.028E-02 | 101.91 | |
| CS-137 | 30.08Y | 1.01 | 3.120E-02 | 3.139E-02 | 3.199E-02 | 101.91 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.855E-01 | 2.855E-01 | 2.595E-01 | 90.88 | |
| AM-241 | 432.60Y | 1.00 | 2.145E-01 | 2.146E-01 | 1.947E-01 | 90.72 | |
| | Total Activity : | | 1.122E+00 | 1.261E+00 | | | |
| | Grand Total Activity : | | 1.122E+00 | 1.261E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.04 | 12 | 43 | 1.53 | 127.60 | 124 | 9 | 3.27E-03 | **** | 1.49E+00 | T |
| 0 | 185.86 | 10 | 35 | 1.18 | 373.21 | 367 | 11 | 2.84E-03 | **** | 5.12E+00 | T |
| 6 | 237.52 | 1 | 18 | 1.49 | 476.52 | 471 | 11 | 2.73E-04 | **** | 4.47E+00 | |
| 6 | 238.79 | 27 | 13 | 1.50 | 479.05 | 471 | 11 | 7.46E-03 | 56.2 | 4.45E+00 | T |
| 0 | 330.90 | 8 | 15 | 1.04 | 663.25 | 657 | 8 | 2.28E-03 | **** | 3.61E+00 | |
| 3 | 507.04 | 14 | 0 | 1.90 | 1015.48 | 1011 | 22 | 3.76E-03 | 73.9 | 2.71E+00 | T |
| 0 | 529.76 | 15 | 3 | 2.47 | 1060.91 | 1055 | 11 | 4.25E-03 | 66.1 | 2.63E+00 | T |
| 0 | 548.15 | 20 | 3 | 4.81 | 1097.69 | 1091 | 13 | 5.51E-03 | 58.4 | 2.57E+00 | |
| 0 | 597.78 | 8 | 15 | 1.11 | 1196.94 | 1191 | 10 | 2.22E-03 | **** | 2.41E+00 | |
| 0 | 746.96 | 6 | 4 | 0.83 | 1495.25 | 1492 | 6 | 1.60E-03 | **** | 2.04E+00 | T |
| 0 | 797.02 | 6 | 4 | 1.46 | 1595.35 | 1590 | 8 | 1.75E-03 | **** | 1.93E+00 | T |
| 0 | 803.08 | 8 | 0 | 0.62 | 1607.46 | 1604 | 8 | 2.33E-03 | 91.5 | 1.92E+00 | T |
| 0 | 968.27 | 11 | 3 | 4.00 | 1937.81 | 1931 | 11 | 3.08E-03 | 83.9 | 1.64E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:38:11.71

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146020.CNF;1       *
* Acquisition date : 10-FEB-2014 13:29:16 Sensitivity     : 3.000                *
* Detector ID      : GAM32                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.30     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 11:20:00 Nuclide Library : SOLID                 *
* Sample ID        : G341146020           Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.3243E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 23-AUG-2013 13:31:39 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_500MLMB.CNF;3              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 2.374E-01 |
| NB-95M | 1.663E-01 |
| BA-137M | 1.992E-02 |
| CS-137 | 2.104E-02 |
| BI-211 | 1.437E-01 |
| AM-241 | 1.495E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.994E-01 | NOT IDENT. |
| NA-22 | 2.734E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 0.000E+00 | NOT IDENT. |
| SC-46 | 3.480E-02 | NOT IDENT. |
| V-48 | 1.409E+00 | NOT IDENT. |
| CR-51 | 2.109E+00 | NOT IDENT. |
| MN-54 | 2.815E-02 | NOT IDENT. |
| CO-56 | 4.016E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.798E-02 | NOT IDENT. |
| CO-58 | 6.342E-02 | NOT IDENT. |
| FE-59 | 1.403E-01 | NOT IDENT. |
| CO-60 | 2.499E-02 | NOT IDENT. |
| ZN-65 | 6.420E-02 | NOT IDENT. |
| GE-68 | 7.835E-01 | NOT IDENT. |
| AS-73 | 2.547E+00 | NOT IDENT. |
| AS-74 | 1.685E+00 | NOT IDENT. |
| SE-75 | 3.742E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.412E+00 | NOT IDENT. |
| RB-83 | 9.427E-02 | FAIL ABUN |
| KR-85 | 5.890E+00 | NOT IDENT. |
| SR-85 | 7.229E-02 | NOT IDENT. |
| RB-86 | 8.476E+00 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 3.608E-02 | NOT IDENT. |
| Y-91 | 1.678E+01 | NOT IDENT. |
| NB-94 | 2.393E-02 | NOT IDENT. |
| NB-95 | 5.743E-02 | NOT IDENT. |
| ZR-95 | 1.010E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.930E-02 | NOT IDENT. |
| RH-102 | 3.697E-02 | NOT IDENT. |
| RU-103 | 9.795E-02 | NOT IDENT. |
| RH-106 | 2.489E-01 | NOT IDENT. |
| RU-106 | 2.489E-01 | NOT IDENT. |
| AG-108M | 1.911E-02 | NOT IDENT. |
| CD-109 | 6.717E-01 | NOT IDENT. |
| AG-110M | 3.196E-02 | NOT IDENT. |
| SN-113 | 4.603E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.252E+00 | NOT IDENT. |
| TE-123M | 3.103E-02 | NOT IDENT. |
| SB-124 | 0.000E+00 | NOT IDENT. |
| SB-125 | 7.006E-02 | NOT IDENT. |
| TE-125M | 1.974E+01 | NOT IDENT. |
| I-126 | 9.333E+00 | NOT IDENT. |
| SB-126 | 5.355E+00 | NOT IDENT. |
| SN-126 | 6.211E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.008E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.815E-02 | FAIL ABUN |
| CS-135 | 9.858E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.570E+00 | NOT IDENT. |
| CE-139 | 3.241E-02 | NOT IDENT. |
| BA-140 | 2.984E+00 | NOT IDENT. |
| LA-140 | 2.984E+00 | NOT IDENT. |
| CE-141 | 2.375E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.693E-01 | NOT IDENT. |
| PM-144 | 2.844E-02 | NOT IDENT. |
| PR-144 | 2.214E+00 | NOT IDENT. |
| PM-146 | 2.885E-02 | FAIL ABUN |
| ND-147 | 6.309E+01 | FAIL ABUN |
| PM-147 | 4.297E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.511E-02 | FAIL ABUN |
| EU-152 | 6.453E-02 | NOT IDENT. |
| GD-153 | 6.582E-02 | NOT IDENT. |
| EU-154 | 7.285E-02 | NOT IDENT. |
| EU-155 | 7.986E-02 | NOT IDENT. |
| TB-160 | 1.337E-01 | NOT IDENT. |
| HO-166M | 3.455E-02 | FAIL ABUN |
| TM-171 | 2.689E+01 | NOT IDENT. |
| LU-176 | 1.658E-02 | NOT IDENT. |
| HF-181 | 1.172E-01 | NOT IDENT. |
| TA-182 | 1.778E-01 | NOT IDENT. |
| RE-183 | 5.662E-01 | FAIL ABUN |
| RE-184 | 2.562E-01 | NOT IDENT. |
| W-188 | 8.452E+00 | FAIL ABUN |
| IR-192 | 5.934E-02 | NOT IDENT. |
| HG-203 | 7.891E-02 | NOT IDENT. |
| BI-207 | 3.536E-02 | NOT IDENT. |
| TL-208 | 2.594E-02 | NOT IDENT. |
| PB-210 | 6.459E+00 | NOT IDENT. |
| PB-211 | 3.842E-01 | NOT IDENT. |
| BI-212 | 2.877E-01 | NOT IDENT. |
| PB-212 | 4.760E-02 | FAIL ABUN |
| BI-214 | 6.181E-02 | NOT IDENT. |
| PB-214 | 6.375E-02 | FAIL ABUN |
| RN-219 | 2.113E-01 | NOT IDENT. |
| RN-222 | 6.181E-02 | NOT IDENT. |
| RA-223 | 4.372E-01 | NOT IDENT. |
| RA-224 | 4.679E-01 | NOT IDENT. |
| RA-226 | 6.181E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.676E-01 | FAIL ABUN |
| TH-227 | 1.676E-01 | FAIL ABUN |
| AC-228 | 6.619E-02 | FAIL ABUN |
| RA-228 | 6.619E-02 | FAIL ABUN |
| TH-228 | 4.760E-02 | FAIL ABUN |
| TH-229 | 3.684E-01 | NOT IDENT. |
| TH-230 | 6.180E-02 | NOT IDENT. |
| PA-231 | 8.499E-01 | NOT IDENT. |
| TH-231 | 4.372E-01 | NOT IDENT. |
| TH-232 | 6.619E-02 | FAIL ABUN |
| PA-233 | 4.266E-02 | NOT IDENT. |
| PA-234 | 1.176E-01 | NOT IDENT. |
| PA-234M | 2.256E+00 | NOT IDENT. |
| TH-234 | 1.770E+00 | FAIL ABUN |
| U-234 | 6.180E-02 | NOT IDENT. |
| U-235 | 1.318E-01 | FAIL ABUN |
| NP-237 | 4.266E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.770E+00 | FAIL ABUN |
| NP-239 | 2.775E-01 | NOT IDENT. |
| PU-239 | 2.071E+02 | NOT IDENT. |
| AM-243 | 4.057E-02 | NOT IDENT. |
| CM-243 | 8.788E-02 | NOT IDENT. |
| CM-247 | 1.931E-02 | NOT IDENT. |
| CF-249 | 2.272E-02 | NOT IDENT. |
| CF-251 | 8.847E-02 | NOT IDENT. |
| ANH-511 | 4.583E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:38:16.95

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146020.CNF;1    *
* Acquisition date : 10-FEB-2014 13:29:16 Sensitivity     : 3.000          *
* Detector ID      : GAM32                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.30     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:20:00 Nuclide Library : SOLID          *
* Sample ID        : G341146020           Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.3243E+02 GRAM*
*                                         Quantity Err(%) : 1.5102E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 23-AUG-2013 13:31:39 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_500MLMB.CNF;3       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 4.840E-01 | 4.720E-01 | 4.720E-01 |
| NB-95M | 2.154E-01 | 1.496E-01 | 1.496E-01 |
| BA-137M | 2.972E-02 | 2.977E-02 | 2.977E-02 |
| CS-137 | 3.139E-02 | 3.145E-02 | 3.145E-02 |
| BI-211 | 2.855E-01 | 2.554E-01 | 2.554E-01 |
| AM-241 | 2.146E-01 | 1.920E-01 | 1.920E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -5.352E-02 | 7.346E-01 | 7.350E-01 | NOT IDENT. |
| NA-22 | -1.166E-02 | 3.648E-02 | 3.686E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.009E+42 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.155E-02 | 1.603E-02 | 1.685E-02 | NOT IDENT. |
| SC-46 | 4.022E-03 | 3.993E-02 | 3.998E-02 | NOT IDENT. |
| V-48 | 3.722E-01 | 1.586E+00 | 1.595E+00 | NOT IDENT. |
| CR-51 | 1.138E+00 | 2.352E+00 | 2.407E+00 | NOT IDENT. |
| MN-54 | -4.687E-03 | 3.421E-02 | 3.427E-02 | NOT IDENT. |
| CO-56 | -5.703E-02 | 6.194E-02 | 6.706E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.086E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.275E-02 | 2.389E-02 | 2.457E-02 | NOT IDENT. |
| CO-58 | -3.674E-03 | 7.542E-02 | 7.544E-02 | NOT IDENT. |
| FE-59 | -7.935E-02 | 1.985E-01 | 2.017E-01 | NOT IDENT. |
| CO-60 | 1.390E-02 | 2.551E-02 | 2.627E-02 | NOT IDENT. |
| ZN-65 | 3.280E-02 | 6.828E-02 | 6.986E-02 | NOT IDENT. |
| GE-68 | -4.865E-01 | 1.086E+00 | 1.108E+00 | NOT IDENT. |
| AS-73 | 3.387E-01 | 3.000E+00 | 3.004E+00 | NOT IDENT. |
| AS-74 | 1.497E+00 | 1.991E+00 | 2.102E+00 | NOT IDENT. |
| SE-75 | -4.842E-02 | 5.146E-02 | 5.590E-02 | NOT IDENT. |
| BR-77 | 1.647E+11 | 4.615E+11 | 4.674E+11 | SHORT HLIF |
| SR-82 | -2.283E-02 | 1.666E+00 | 1.666E+00 | NOT IDENT. |
| RB-83 | 2.986E-02 | 1.090E-01 | 1.098E-01 | FAIL ABUN |
| KR-85 | 6.136E+00 | 6.870E+00 | 7.406E+00 | NOT IDENT. |
| SR-85 | 7.509E-02 | 8.435E-02 | 9.089E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -2.102E+00 | 1.078E+01 | 1.082E+01 | NOT IDENT. |
| Y-88 | 1.102E-02 | 3.719E-02 | 3.752E-02 | NOT IDENT. |
| Y-91 | -5.829E+01 | 4.027E+01 | 4.808E+01 | NOT IDENT. |
| NB-94 | -1.984E-03 | 2.830E-02 | 2.832E-02 | NOT IDENT. |
| NB-95 | 3.134E-02 | 6.045E-02 | 6.208E-02 | NOT IDENT. |
| ZR-95 | -4.717E-02 | 1.286E-01 | 1.303E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 4.683E+42 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 2.441E+40 | 1.780E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -4.716E+08 | 5.146E+09 | 5.150E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.354E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.384E-02 | 2.574E-02 | 2.649E-02 | NOT IDENT. |
| RH-102 | 3.442E-02 | 3.622E-02 | 3.941E-02 | NOT IDENT. |
| RU-103 | -3.591E-02 | 1.260E-01 | 1.271E-01 | NOT IDENT. |
| RH-106 | 1.322E-01 | 2.774E-01 | 2.837E-01 | NOT IDENT. |
| RU-106 | 1.322E-01 | 2.774E-01 | 2.837E-01 | NOT IDENT. |
| AG-108M | 4.395E-03 | 2.218E-02 | 2.227E-02 | NOT IDENT. |
| CD-109 | 3.964E-01 | 7.702E-01 | 7.907E-01 | NOT IDENT. |
| AG-110M | -6.330E-03 | 3.963E-02 | 3.973E-02 | NOT IDENT. |
| SN-113 | 3.638E-03 | 5.445E-02 | 5.447E-02 | NOT IDENT. |
| CD-115 | 2.383E+11 | 6.257E+11 | 6.349E+11 | SHORT HLIF |
| SN-117M | -1.133E-01 | 2.800E+00 | 2.801E+00 | NOT IDENT. |
| TE-123M | -2.982E-02 | 4.204E-02 | 4.414E-02 | NOT IDENT. |
| SB-124 | -6.792E-02 | 9.430E-02 | 9.915E-02 | NOT IDENT. |
| SB-125 | 4.615E-03 | 8.347E-02 | 8.349E-02 | NOT IDENT. |
| TE-125M | 1.301E+01 | 2.262E+01 | 2.337E+01 | NOT IDENT. |
| I-126 | 3.036E+00 | 1.155E+01 | 1.163E+01 | NOT IDENT. |
| SB-126 | -6.625E+00 | 8.055E+00 | 8.591E+00 | NOT IDENT. |
| SN-126 | 2.136E-02 | 7.301E-02 | 7.364E-02 | FAIL ABUN |
| SB-127 | -5.176E+05 | 1.794E+06 | 1.809E+06 | SHORT HLIF |
| I-131 | 5.929E+01 | 9.134E+01 | 9.517E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.748E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.284E+06 | 1.704E+07 | 1.705E+07 | SHORT HLIF |
| BA-133 | -7.129E-03 | 4.226E-02 | 4.238E-02 | NOT IDENT. |
| I-133 | 4.121E+31 | 3.587E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.360E-02 | 3.126E-02 | 3.302E-02 | FAIL ABUN |
| CS-135 | 6.405E-02 | 1.071E-01 | 1.109E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 8.850E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.296E+00 | 5.147E+00 | 5.180E+00 | NOT IDENT. |
| CE-139 | 4.194E-03 | 3.968E-02 | 3.972E-02 | NOT IDENT. |
| BA-140 | -2.088E+00 | 4.465E+00 | 4.563E+00 | NOT IDENT. |
| LA-140 | -2.088E+00 | 4.465E+00 | 4.563E+00 | NOT IDENT. |
| CE-141 | 7.844E-02 | 2.834E-01 | 2.856E-01 | NOT IDENT. |
| CE-143 | 1.166E+19 | 2.681E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 6.555E-02 | 2.001E-01 | 2.023E-01 | NOT IDENT. |
| PM-144 | 1.481E-02 | 3.064E-02 | 3.136E-02 | NOT IDENT. |
| PR-144 | 1.136E+00 | 2.387E+00 | 2.441E+00 | NOT IDENT. |
| PM-146 | -8.227E-03 | 3.623E-02 | 3.641E-02 | FAIL ABUN |
| ND-147 | 1.021E+02 | 6.666E+01 | 8.100E+01 | FAIL ABUN |
| PM-147 | -4.269E+02 | 5.914E+02 | 6.219E+02 | NOT IDENT. |
| PM-149 | 1.887E+12 | 5.057E+12 | 5.128E+12 | SHORT HLIF |
| EU-150 | -1.622E-02 | 2.411E-02 | 2.520E-02 | FAIL ABUN |
| EU-152 | 1.396E-02 | 7.702E-02 | 7.728E-02 | NOT IDENT. |
| GD-153 | -3.366E-02 | 8.475E-02 | 8.610E-02 | NOT IDENT. |
| EU-154 | -2.105E-02 | 9.459E-02 | 9.506E-02 | NOT IDENT. |
| EU-155 | -2.256E-02 | 1.000E-01 | 1.005E-01 | NOT IDENT. |
| TB-160 | -1.630E-01 | 2.064E-01 | 2.191E-01 | NOT IDENT. |
| HO-166M | -3.819E-02 | 4.817E-02 | 5.115E-02 | FAIL ABUN |
| TM-171 | -3.213E+01 | 3.677E+01 | 3.952E+01 | NOT IDENT. |
| LU-176 | -3.786E-03 | 2.017E-02 | 2.024E-02 | NOT IDENT. |
| HF-181 | 7.482E-02 | 1.285E-01 | 1.329E-01 | NOT IDENT. |
| TA-182 | 5.935E-02 | 1.989E-01 | 2.007E-01 | NOT IDENT. |
| RE-183 | 5.758E-01 | 5.172E-01 | 5.787E-01 | FAIL ABUN |
| RE-184 | -1.045E-01 | 3.383E-01 | 3.415E-01 | NOT IDENT. |
| W-188 | -6.076E+00 | 1.098E+01 | 1.132E+01 | FAIL ABUN |
| IR-192 | 1.266E-02 | 6.873E-02 | 6.896E-02 | NOT IDENT. |
| HG-203 | 6.758E-03 | 9.195E-02 | 9.200E-02 | NOT IDENT. |
| BI-207 | 3.002E-02 | 3.493E-02 | 3.746E-02 | NOT IDENT. |
| TL-208 | 1.022E-02 | 2.912E-02 | 2.948E-02 | NOT IDENT. |
| PB-210 | -4.770E+00 | 8.393E+00 | 8.664E+00 | NOT IDENT. |
| PB-211 | -9.066E-03 | 4.623E-01 | 4.623E-01 | NOT IDENT. |
| BI-212 | -6.876E-03 | 3.384E-01 | 3.384E-01 | NOT IDENT. |
| PB-212 | 7.838E-02 | 4.373E-02 | 5.622E-02 | FAIL ABUN |
| BI-214 | 2.777E-02 | 6.842E-02 | 6.955E-02 | NOT IDENT. |
| PB-214 | 1.036E-01 | 9.267E-02 | 1.038E-01 | FAIL ABUN |
| RN-219 | -2.711E-02 | 2.588E-01 | 2.591E-01 | NOT IDENT. |
| RN-222 | 2.777E-02 | 6.842E-02 | 6.955E-02 | NOT IDENT. |
| RA-223 | -1.763E-01 | 5.632E-01 | 5.687E-01 | NOT IDENT. |
| RA-224 | 1.366E-01 | 6.016E-01 | 6.048E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.777E-02 | 6.842E-02 | 6.955E-02 | NOT IDENT. |
| AC-227 | 4.252E-02 | 1.912E-01 | 1.922E-01 | FAIL ABUN |
| TH-227 | 4.252E-02 | 1.912E-01 | 1.922E-01 | FAIL ABUN |
| AC-228 | -3.190E-02 | 8.001E-02 | 8.130E-02 | FAIL ABUN |
| RA-228 | -3.190E-02 | 8.001E-02 | 8.130E-02 | FAIL ABUN |
| TH-228 | 7.838E-02 | 4.373E-02 | 5.622E-02 | FAIL ABUN |
| TH-229 | -1.442E-01 | 4.514E-01 | 4.561E-01 | NOT IDENT. |
| TH-230 | 2.776E-02 | 6.841E-02 | 6.955E-02 | NOT IDENT. |
| PA-231 | -7.169E-01 | 1.107E+00 | 1.153E+00 | NOT IDENT. |
| TH-231 | -1.763E-01 | 5.632E-01 | 5.687E-01 | NOT IDENT. |
| TH-232 | -3.190E-02 | 8.001E-02 | 8.130E-02 | FAIL ABUN |
| PA-233 | -4.022E-02 | 5.611E-02 | 5.897E-02 | NOT IDENT. |
| PA-234 | -5.008E-02 | 1.683E-01 | 1.698E-01 | NOT IDENT. |
| PA-234M | -1.409E+00 | 2.968E+00 | 3.035E+00 | NOT IDENT. |
| TH-234 | 1.207E+00 | 2.688E+00 | 2.742E+00 | FAIL ABUN |
| U-234 | 2.776E-02 | 6.841E-02 | 6.955E-02 | NOT IDENT. |
| U-235 | -1.660E-01 | 1.811E-01 | 1.960E-01 | FAIL ABUN |
| NP-237 | -4.022E-02 | 5.611E-02 | 5.897E-02 | NOT IDENT. |
| NP-238 | 5.945E+11 | 3.204E+12 | 3.215E+12 | SHORT HLIF |
| U-238 | 1.207E+00 | 2.688E+00 | 2.742E+00 | FAIL ABUN |
| NP-239 | 2.037E-01 | 3.138E-01 | 3.270E-01 | NOT IDENT. |
| PU-239 | 3.465E+01 | 2.495E+02 | 2.500E+02 | NOT IDENT. |
| AM-243 | -9.403E-03 | 5.009E-02 | 5.027E-02 | NOT IDENT. |
| CM-243 | 4.391E-02 | 1.023E-01 | 1.042E-01 | NOT IDENT. |
| CM-247 | -5.271E-03 | 2.423E-02 | 2.435E-02 | NOT IDENT. |
| CF-249 | -2.034E-02 | 3.087E-02 | 3.220E-02 | NOT IDENT. |
| CF-251 | 3.707E-02 | 9.848E-02 | 9.988E-02 | NOT IDENT. |
| ANH-511 | -1.677E-04 | 4.444E-02 | 4.444E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 25.7757 | 94.67 | 63.5872 | 193.51 | 42.0552 |
| 45.60 | 28.8737 | 94.87 | 63.6040 | 197.03 | 25.1270 |
| 46.54 | 28.9291 | 97.43 | 32.4489 | 198.01 | 22.4529 |
| 49.72 | 0.0000 | 98.43 | 29.2416 | 201.83 | 43.2437 |
| 51.35 | 36.2534 | 98.44 | 29.2420 | 205.31 | 34.3302 |
| 52.39 | 35.3161 | 99.53 | 37.9592 | 210.85 | 40.8331 |
| 53.44 | 27.2976 | 100.11 | 36.9020 | 215.65 | 30.0566 |
| 57.36 | 0.0000 | 103.18 | 34.8656 | 222.11 | 24.7137 |
| 57.53 | 29.0300 | 103.37 | 39.2331 | 227.09 | 20.2126 |
| 57.98 | 29.0532 | 105.21 | 42.5993 | 227.38 | 23.8928 |
| 59.32 | 22.9910 | 105.31 | 42.6047 | 228.16 | 0.0000 |
| 59.54 | 21.4666 | 106.12 | 41.5534 | 228.18 | 26.6656 |
| 63.29 | 34.9797 | 109.28 | 34.0291 | 117.23 | 26.6656 |
| 63.58 | 34.9968 | 111.00 | 39.5989 | 235.69 | 25.1491 |
| 64.28 | 47.9194 | 111.76 | 0.0000 | 235.96 | 28.1134 |
| 66.73 | 45.0094 | 116.30 | 0.0000 | 238.63 | 44.4756 |
| 67.24 | 38.8334 | 117.23 | 25.4843 | 238.98 | 0.0000 |
| 67.75 | 51.3024 | 121.12 | 42.2912 | 240.99 | 37.1262 |
| 69.67 | 47.8221 | 121.22 | 33.3916 | 242.00 | 23.7779 |
| 70.83 | 34.3701 | 121.78 | 30.0714 | 244.70 | 42.8081 |
| 72.81 | 44.9238 | 122.06 | 33.4232 | 252.40 | 0.0000 |
| 72.87 | 44.9279 | 123.07 | 31.2301 | 252.80 | 29.0138 |
| 74.66 | 35.6221 | 127.23 | 35.8556 | 254.15 | 0.0000 |
| 74.82 | 35.6308 | 129.30 | 28.0752 | 256.23 | 23.4538 |
| 74.97 | 38.7835 | 131.20 | 40.5110 | 260.90 | 0.0000 |
| 77.11 | 36.8056 | 133.02 | 29.3148 | 264.66 | 28.3067 |
| 79.69 | 31.6681 | 133.52 | 33.8425 | 268.22 | 17.0244 |
| 80.12 | 31.6881 | 136.00 | 33.9310 | 269.46 | 24.6115 |
| 80.19 | 0.0000 | 136.47 | 40.7369 | 271.23 | 26.5358 |
| 80.57 | 35.9367 | 140.51 | 0.0000 | 273.65 | 20.8828 |
| 81.00 | 39.1320 | 143.76 | 46.7431 | 276.40 | 26.6260 |
| 81.07 | 39.1360 | 144.24 | 35.3597 | 277.37 | 29.4977 |
| 83.79 | 43.5362 | 145.44 | 35.4023 | 277.60 | 29.5019 |
| 85.43 | 32.9938 | 152.43 | 27.5977 | 278.00 | 25.7022 |
| 86.55 | 36.2435 | 153.25 | 35.6754 | 279.20 | 21.9113 |
| 86.79 | 37.3217 | 323.87 | 36.8604 | 279.54 | 20.9634 |
| 86.94 | 43.7289 | 156.02 | 34.6167 | 280.46 | 20.9758 |
| 87.09 | 43.7381 | 158.56 | 40.4841 | 283.69 | 27.7079 |
| 87.57 | 42.6996 | 159.00 | 52.0724 | 284.31 | 0.0000 |
| 88.03 | 34.1813 | 162.33 | 44.1099 | 285.41 | 19.1299 |
| 88.34 | 42.7450 | 163.33 | 42.9890 | 285.90 | 0.0000 |
| 88.47 | 40.6149 | 165.86 | 40.7607 | 287.50 | 16.2820 |
| 89.96 | 79.2532 | 176.31 | 37.0317 | 290.67 | 22.0731 |
| 91.11 | 40.7610 | 176.60 | 37.0410 | 293.27 | 0.0000 |
| 92.59 | 30.0939 | 177.52 | 30.8926 | 351.93 | 24.0612 |
| 93.35 | 30.1244 | 181.07 | 0.0000 | 295.96 | 24.0723 |
| 94.56 | 43.1036 | 184.41 | 32.8538 | 879.38 | 27.0049 |
| 94.65 | 63.5854 | 143.76 | 32.8907 | 299.98 | 24.1325 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 24.1341 | 487.02 | 9.5717 | 702.65 | 15.7125 |
| 300.13 | 27.0310 | 492.35 | 0.0000 | 706.68 | 13.8827 |
| 301.36 | 28.0176 | 497.08 | 14.9549 | 711.68 | 16.6874 |
| 302.85 | 23.2083 | 505.52 | 8.5769 | 720.70 | 11.1583 |
| 256.23 | 23.2317 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 22.2949 | 511.00 | 10.7462 | 722.78 | 9.3052 |
| 308.46 | 19.4067 | 514.00 | 13.7727 | 722.91 | 9.3054 |
| 311.90 | 32.0876 | 514.00 | 13.7727 | 723.31 | 9.3066 |
| 316.51 | 29.2511 | 520.40 | 12.9467 | 724.19 | 8.3784 |
| 319.41 | 23.4412 | 520.69 | 0.0000 | 727.33 | 9.3191 |
| 320.08 | 22.4736 | 522.65 | 0.0000 | 733.00 | 7.4691 |
| 321.04 | 26.3969 | 527.90 | 0.0000 | 735.93 | 9.3455 |
| 323.87 | 27.9798 | 529.59 | 7.5813 | 333.97 | 13.0901 |
| 325.23 | 26.6580 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 18.8561 | 531.02 | 3.4678 | 747.24 | 11.2556 |
| 333.37 | 28.3597 | 546.56 | 0.0000 | 748.06 | 14.0731 |
| 333.97 | 25.2172 | 552.55 | 8.7461 | 752.31 | 8.2206 |
| 334.37 | 33.1052 | 563.25 | 15.3710 | 753.82 | 5.6398 |
| 338.28 | 14.8123 | 569.33 | 13.2070 | 756.73 | 12.2310 |
| 338.32 | 14.8125 | 946.00 | 13.2078 | 756.80 | 12.2310 |
| 311.90 | 23.7294 | 569.70 | 13.2089 | 884.68 | 14.1449 |
| 340.48 | 23.7294 | 583.19 | 9.9591 | 765.81 | 5.6613 |
| 340.55 | 26.6964 | 584.27 | 9.9632 | 766.42 | 6.6062 |
| 344.28 | 18.1183 | 595.83 | 10.6746 | 766.84 | 5.6632 |
| 345.93 | 17.4550 | 427.87 | 16.0409 | 772.60 | 0.0000 |
| 351.06 | 23.8704 | 602.52 | 0.0000 | 776.52 | 5.6805 |
| 351.93 | 23.8821 | 602.73 | 19.6217 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 22.3138 | 778.90 | 9.4746 |
| 356.01 | 25.5316 | 609.32 | 13.4114 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 12.2985 | 785.37 | 8.5443 |
| 366.42 | 0.0000 | 614.28 | 13.4363 | 792.07 | 9.5134 |
| 375.05 | 17.1297 | 618.01 | 13.4550 | 794.95 | 3.1740 |
| 356.01 | 15.1845 | 620.36 | 8.9778 | 795.86 | 4.7623 |
| 388.16 | 21.3060 | 621.93 | 8.9832 | 810.29 | 10.5233 |
| 388.63 | 19.2815 | 630.19 | 0.0000 | 344.28 | 10.5239 |
| 391.69 | 16.2627 | 631.29 | 4.5070 | 810.76 | 13.3954 |
| 264.66 | 12.2529 | 633.25 | 14.4328 | 815.77 | 9.5825 |
| 401.81 | 12.2600 | 634.78 | 13.5381 | 1048.07 | 8.6315 |
| 402.40 | 13.2856 | 635.95 | 8.1264 | 832.01 | 9.6294 |
| 404.85 | 12.2789 | 636.99 | 0.0000 | 834.85 | 11.5649 |
| 410.95 | 20.5270 | 645.85 | 8.1556 | 835.71 | 10.6039 |
| 413.71 | 21.5832 | 657.76 | 7.5836 | 836.80 | 0.0000 |
| 414.70 | 17.4807 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 22.7593 | 661.66 | 9.1128 | 846.77 | 13.5403 |
| 427.87 | 19.6630 | 664.57 | 0.0000 | 856.80 | 6.7900 |
| 433.94 | 13.4931 | 666.33 | 7.6066 | 860.56 | 4.8553 |
| 439.40 | 12.4876 | 666.50 | 7.6070 | 871.09 | 7.7922 |
| 453.88 | 18.8589 | 667.71 | 0.0000 | 873.19 | 8.7715 |
| 463.37 | 21.0458 | 677.62 | 13.7457 | 875.33 | 0.0000 |
| 468.07 | 14.7637 | 685.70 | 0.0000 | 879.38 | 9.7634 |
| 473.00 | 0.0000 | 695.00 | 12.9063 | 880.51 | 6.8366 |
| 475.06 | 15.8681 | 696.49 | 10.1457 | 883.24 | 5.8645 |
| 476.78 | 14.8218 | 696.51 | 10.1457 | 884.68 | 6.8447 |
| 477.60 | 15.8862 | 697.00 | 14.7602 | 889.28 | 3.9164 |
| 482.18 | 11.6737 | 697.49 | 13.8398 | 894.76 | 5.8837 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 7.8521 | 1298.22 | 0.0000 | | |
| 903.28 | 5.8978 | 1312.11 | 2.1700 | | |
| 911.20 | 3.9405 | 1332.49 | 2.1793 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 8.9038 | 1365.19 | 8.7762 | | |
| 937.49 | 12.8997 | 1368.63 | 0.0000 | | |
| 944.13 | 7.9527 | 1384.29 | 2.7532 | | |
| 946.00 | 4.9729 | 1408.01 | 4.6106 | | |
| 949.00 | 2.9862 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 4.7917 | | |
| 962.31 | 4.9948 | 1489.16 | 4.6840 | | |
| 964.08 | 6.6628 | 1505.03 | 4.6983 | | |
| 966.17 | 8.3331 | 1596.21 | 3.8224 | | |
| 968.97 | 6.6715 | 1620.50 | 0.9598 | | |
| 983.53 | 6.0275 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.9434 | | |
| 1274.44 | 6.0476 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.0551 | 1764.49 | 1.9679 | | |
| 1004.73 | 9.0912 | 1063.66 | 1.9697 | | |
| 507.63 | 0.0000 | 1771.35 | 2.9552 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.9823 | | |
| 1037.84 | 3.0561 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 0.9956 | | |
| 631.29 | 7.1466 | | | | |
| 1048.07 | 6.1280 | | | | |
| 1049.04 | 3.0647 | | | | |
| 1050.41 | 3.0658 | | | | |
| 1063.66 | 3.0759 | | | | |
| 1077.00 | 7.2006 | | | | |
| 1077.34 | 8.2301 | | | | |
| 1085.87 | 4.1236 | | | | |
| 1099.45 | 5.1716 | | | | |
| 1112.07 | 7.2622 | | | | |
| 1112.84 | 7.2635 | | | | |
| 1115.54 | 4.1533 | | | | |
| 1120.29 | 3.1185 | | | | |
| 1120.55 | 4.1582 | | | | |
| 1221.41 | 6.2385 | | | | |
| 1129.67 | 6.2508 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 4.2098 | | | | |
| 1177.95 | 3.1607 | | | | |
| 1189.05 | 5.2813 | | | | |
| 1204.77 | 13.7801 | | | | |
| 1221.41 | 5.3198 | | | | |
| 1231.02 | 7.4635 | | | | |
| 1235.36 | 5.3362 | | | | |
| 1238.28 | 8.5434 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 9.6820 | | | | |
| 1274.44 | 7.5346 | | | | |
| 1274.54 | 8.6109 | | | | |
| 1291.59 | 4.3213 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:09.64

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017834.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM33.CNF;115
                                        Background date  : 9-FEB-2014 11:23:00.
Sample date      : 17-JAN-2014 00:00:00 Acquisition date : 10-FEB-2014 13:21:18
Sample ID        : G1203017834          Sample quantity  : 1.67940E+02 GRAM
Detector name    : GAM33                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.42  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 30.32 | 19 | 15 | 0.90 | 60.84 | 58 | 10 | 5.25E-03 | 40.2 | 2.68E+00 |
| 2 | 1 | 31.82 | 14 | 15 | 0.90 | 63.84 | 58 | 10 | 3.84E-03 | 57.4 | |
| 3 | 0 | 47.36 | 23 | 20 | 1.03 | 94.91 | 91 | 9 | 6.46E-03 | 40.5 | |
| 4 | 0 | 63.56* | 13 | 47 | 1.32 | 127.32 | 122 | 12 | 3.69E-03 | 116.1 | |
| 5 | 2 | 90.31 | 14 | 12 | 1.15 | 180.82 | 179 | 12 | 3.97E-03 | 37.9 | 1.61E+00 |
| 6 | 2 | 92.50* | 9 | 22 | 1.16 | 185.19 | 179 | 12 | 2.62E-03 | 139.0 | |
| 7 | 0 | 114.31 | 12 | 25 | 0.58 | 228.82 | 225 | 9 | 3.19E-03 | 85.5 | |
| 8 | 0 | 143.64* | 7 | 23 | 0.71 | 287.48 | 283 | 8 | 1.90E-03 | 140.4 | |
| 9 | 0 | 162.80* | 12 | 17 | 0.68 | 325.80 | 322 | 8 | 3.21E-03 | 79.5 | |
| 10 | 0 | 166.27 | 14 | 15 | 1.10 | 332.74 | 330 | 7 | 3.95E-03 | 51.4 | |
| 11 | 0 | 185.76* | 10 | 34 | 0.75 | 371.73 | 367 | 10 | 2.82E-03 | 137.0 | |
| 12 | 0 | 197.03* | 17 | 28 | 1.93 | 394.26 | 390 | 10 | 4.70E-03 | 67.8 | |
| 13 | 0 | 204.88* | 8 | 9 | 1.31 | 409.97 | 408 | 6 | 2.30E-03 | 71.4 | |
| 14 | 0 | 226.84 | 9 | 23 | 1.33 | 453.89 | 446 | 9 | 2.61E-03 | 96.6 | |
| 15 | 2 | 238.18* | 3 | 15 | 1.39 | 476.57 | 474 | 12 | 7.65E-04 | 243.7 | 5.78E+00 |
| 16 | 2 | 241.09 | 12 | 26 | 1.40 | 482.39 | 474 | 12 | 3.21E-03 | 78.4 | |
| 17 | 0 | 252.91 | 16 | 5 | 2.01 | 506.03 | 503 | 7 | 4.33E-03 | 35.3 | |
| 18 | 0 | 285.32 | 38 | 32 | 8.40 | 570.86 | 560 | 21 | 1.07E-02 | 39.9 | |
| 19 | 0 | 660.34 | 10 | 5 | 0.62 | 1320.97 | 1314 | 10 | 2.74E-03 | 53.1 | |
| 20 | 0 | 664.14 | 7 | 0 | 0.73 | 1328.57 | 1326 | 6 | 1.94E-03 | 37.8 | |
| 21 | 0 | 1267.09 | 6 | 0 | 0.96 | 2534.67 | 2531 | 7 | 1.67E-03 | 40.8 | |
| 22 | 0 | 1405.81 | 6 | 0 | 0.99 | 2812.17 | 2808 | 7 | 1.67E-03 | 40.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:22:11

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017834.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 17-JAN-2014 00:00:00 | Acquisition date | : 10-FEB-2014 13:21:18 |
| Sample ID | : G1203017834 | Sample quantity | : 167.94 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA33 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.42 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-132 | 49.72 | ------ | 15.00 | 5.609E-01 | ------ | Line Not Found | ------ |
| | 111.76 | ------ | 1.74 | 5.531E+00 | ------ | Line Not Found | ------ |
| | 116.30 | ------ | 1.96 | 5.626E+00 | ------ | Line Not Found | ------ |
| | 228.16 | 9 | 88.00* | 4.720E+00 | 1.012E-02 | 2.077E+00 | 193.27 |
| BA-137M | 661.66 | 10 | 89.90* | 2.292E+00 | 2.141E-02 | 2.144E-02 | 106.30 |
| CS-137 | 661.66 | 10 | 85.10* | 2.292E+00 | 2.262E-02 | 2.265E-02 | 106.30 |
| CE-139 | 165.86 | 14 | 80.00* | 5.518E+00 | 1.440E-02 | 1.630E-02 | 102.84 |
| PB-210 | 46.54 | 23 | 4.25* | 4.042E-01 | 6.052E+00 | 6.064E+00 | 80.93 |
| RA-224 | 240.99 | 12 | 4.10* | 4.547E+00 | 2.769E-01 | 2.769E-01 | 156.84 |
| TH-234 | 63.29 | 13 | 3.70* | 1.926E+00 | 8.333E-01 | 8.333E-01 | 232.16 |
| | 92.59 | 9 | 4.23 | 4.712E+00 | 2.113E-01 | 2.113E-01 | 278.09 |
| U-235 | 89.96 | 14 | 3.47 | 4.567E+00 | 4.033E-01 | 4.033E-01 | 75.73 |
| | 93.35 | 9 | 5.60 | 4.712E+00 | 1.596E-01 | 1.596E-01 | 278.09 |
| | 143.76 | 7 | 10.96* | 5.733E+00 | 4.867E-02 | 4.867E-02 | 280.86 |
| | 163.33 | 12 | 5.08 | 5.559E+00 | 1.829E-01 | 1.829E-01 | 158.93 |
| | 185.72 | 10 | 57.20 | 5.264E+00 | 1.510E-02 | 1.510E-02 | 274.06 |
| | 205.31 | 8 | 5.01 | 5.005E+00 | 1.474E-01 | 1.474E-01 | 142.80 |
| U-238 | 63.29 | 13 | 3.70* | 1.926E+00 | 8.333E-01 | 8.333E-01 | 232.16 |
| | 92.59 | 9 | 4.23 | 4.712E+00 | 2.113E-01 | 2.113E-01 | 278.09 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:12.53

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017834.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:21:18 | Sensitivity | : 3.000 |
| Detector ID | : GAM33 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.42 | Half life ratio | : ***** |
| Sample date | : 17-JAN-2014 00:00:00 | Nuclide Library | : SOLID |
| Sample ID | : G1203017834 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.6794E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | |
|---|---|
| Eff. Cal. date | : 23-AUG-2013 07:35:09 |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM33_500MLMB.CNF;5 |
| Eff. Geometry | : 500MLMB |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| TE-132 | 2.077E+00 | 3.933E+00 | 5.816E+00 |
| BA-137M | 2.144E-02 | 2.234E-02 | 5.898E-03 |
| CS-137 | 2.265E-02 | 2.360E-02 | 6.230E-03 |
| CE-139 | 1.630E-02 | 1.643E-02 | 1.958E-02 |
| PB-210 | 6.064E+00 | 4.810E+00 | 7.304E+00 |
| RA-224 | 2.769E-01 | 4.255E-01 | 5.512E-01 |
| TH-234 | 8.333E-01 | 1.896E+00 | 1.607E+00 |
| U-235 | 4.867E-02 | 1.340E-01 | 1.942E-01 |
| U-238 | 8.333E-01 | 1.896E+00 | 1.607E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -4.346E-03 | 1.901E-01 | 3.707E-01 | NOT IDENT. |
| NA-22 | 9.942E-03 | 1.531E-02 | 4.113E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.385E+10 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.486E-02 | 1.593E-02 | 4.985E-02 | NOT IDENT. |
| K-40 | 3.243E-02 | 2.440E-01 | 5.618E-01 | NOT IDENT. |
| SC-46 | -1.570E-02 | 2.074E-02 | 3.495E-02 | NOT IDENT. |
| V-48 | -1.613E-02 | 4.865E-02 | 9.368E-02 | NOT IDENT. |
| CR-51 | 2.106E-02 | 2.796E-01 | 5.429E-01 | NOT IDENT. |
| MN-54 | -1.019E-02 | 2.382E-02 | 4.361E-02 | NOT IDENT. |
| CO-56 | -1.814E-02 | 2.361E-02 | 4.008E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.312E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 5.230E-03 | 1.372E-02 | 2.681E-02 | NOT IDENT. |
| CO-58 | -9.105E-03 | 2.255E-02 | 4.236E-02 | NOT IDENT. |
| FE-59 | 1.433E-02 | 4.856E-02 | 1.086E-01 | NOT IDENT. |
| CO-60 | 7.945E-03 | 1.668E-02 | 4.278E-02 | NOT IDENT. |
| ZN-65 | 2.542E-02 | 4.781E-02 | 1.070E-01 | NOT IDENT. |
| GE-68 | 2.646E-02 | 4.849E-01 | 1.083E+00 | NOT IDENT. |
| AS-73 | 8.858E-01 | 7.279E-01 | 1.633E+00 | NOT IDENT. |
| AS-74 | -2.819E-02 | 7.990E-02 | 1.428E-01 | NOT IDENT. |
| SE-75 | 9.451E-03 | 2.569E-02 | 5.209E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 7.204E+01 | 0.000E+00 | SHORT HLIF |

| | | | | |
|---|---|---|---|---|
| SR-82 | 1.141E-01 | 1.729E-01 | 4.257E-01 | NOT IDENT. |
| RB-83 | -6.307E-03 | 3.686E-02 | 7.057E-02 | NOT IDENT. |
| KR-85 | -1.183E+01 | 6.933E+00 | 1.014E+01 | NOT IDENT. |
| SR-85 | -6.933E-02 | 4.057E-02 | 5.930E-02 | NOT IDENT. |
| RB-86 | 1.101E-01 | 3.871E-01 | 9.450E-01 | NOT IDENT. |
| Y-88 | -6.016E-03 | 2.800E-02 | 5.701E-02 | NOT IDENT. |
| Y-91 | -3.804E+00 | 8.322E+00 | 1.530E+01 | NOT IDENT. |
| NB-94 | 7.689E-03 | 1.923E-02 | 4.092E-02 | NOT IDENT. |
| NB-95 | 7.729E-03 | 2.665E-02 | 5.566E-02 | NOT IDENT. |
| NB-95M | -8.783E-03 | 7.987E-02 | 1.260E-01 | NOT IDENT. |
| ZR-95 | 2.289E-02 | 3.973E-02 | 9.049E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.868E+10 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.727E+01 | 7.199E+01 | 1.526E+02 | NOT IDENT. |
| TC-99M | 0.000E+00 | 4.823E+27 | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.829E-03 | 1.523E-02 | 2.979E-02 | FAIL ABUN |
| RH-102 | -6.793E-03 | 2.912E-02 | 5.399E-02 | NOT IDENT. |
| RU-103 | -1.746E-03 | 2.262E-02 | 4.423E-02 | NOT IDENT. |
| RH-106 | -1.073E-01 | 1.913E-01 | 3.255E-01 | NOT IDENT. |
| RU-106 | -1.073E-01 | 1.913E-01 | 3.255E-01 | NOT IDENT. |
| AG-108M | 2.207E-03 | 1.699E-02 | 3.351E-02 | NOT IDENT. |
| CD-109 | -6.353E-02 | 4.895E-01 | 8.079E-01 | NOT IDENT. |
| AG-110M | 1.126E-02 | 2.535E-02 | 5.738E-02 | NOT IDENT. |
| SN-113 | -4.055E-04 | 2.772E-02 | 5.326E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.417E+02 | 0.000E+00 | SHORT HLIF |
| SN-117M | -3.173E-02 | 5.665E-02 | 8.382E-02 | NOT IDENT. |
| TE-123M | -5.598E-03 | 1.778E-02 | 2.762E-02 | NOT IDENT. |
| SB-124 | -3.561E-02 | 4.029E-02 | 3.200E-02 | NOT IDENT. |
| SB-125 | 2.892E-02 | 5.732E-02 | 1.172E-01 | NOT IDENT. |
| TE-125M | 3.847E+00 | 6.761E+00 | 1.291E+01 | NOT IDENT. |
| I-126 | 1.677E-02 | 1.738E-01 | 3.173E-01 | NOT IDENT. |
| SB-126 | 1.560E-02 | 1.582E-01 | 3.171E-01 | NOT IDENT. |
| SN-126 | 1.247E-02 | 4.417E-02 | 7.803E-02 | FAIL ABUN |
| SB-127 | -4.981E-01 | 3.392E+00 | 6.860E+00 | FAIL ABUN |
| I-131 | 5.713E-02 | 1.382E-01 | 2.866E-01 | FAIL ABUN |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| BA-133 | 8.403E-04 | 2.203E-02 | 4.324E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 7.276E+06 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.448E-03 | 2.326E-02 | 4.944E-02 | NOT IDENT. |
| CS-135 | -6.398E-02 | 7.667E-02 | 1.330E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 5.324E+25 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.863E-02 | 7.842E-02 | 1.426E-01 | NOT IDENT. |
| BA-140 | -1.499E-02 | 9.429E-02 | 1.941E-01 | NOT IDENT. |
| LA-140 | -1.499E-02 | 9.429E-02 | 1.941E-01 | NOT IDENT. |
| CE-141 | 2.804E-02 | 3.935E-02 | 7.387E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | 9.536E+03 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.381E-02 | 1.063E-01 | 2.007E-01 | NOT IDENT. |
| PM-144 | 1.122E-02 | 1.916E-02 | 4.226E-02 | NOT IDENT. |
| PR-144 | 8.501E-01 | 1.443E+00 | 3.182E+00 | NOT IDENT. |
| PM-146 | -1.546E-02 | 2.646E-02 | 4.592E-02 | NOT IDENT. |
| ND-147 | -1.179E-01 | 6.493E-01 | 1.200E+00 | FAIL ABUN |
| PM-147 | 2.000E+02 | 3.933E+02 | 7.800E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.352E+03 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.278E-03 | 1.335E-02 | 2.554E-02 | NOT IDENT. |
| EU-152 | 1.181E-02 | 5.165E-02 | 1.039E-01 | NOT IDENT. |
| GD-153 | 1.244E-02 | 5.221E-02 | 9.269E-02 | NOT IDENT. |
| EU-154 | 2.803E-02 | 4.318E-02 | 1.160E-01 | NOT IDENT. |
| EU-155 | -4.541E-02 | 5.472E-02 | 9.197E-02 | NOT IDENT. |
| TB-160 | -2.355E-02 | 7.818E-02 | 1.496E-01 | FAIL ABUN |
| HO-166M | 1.300E-02 | 3.278E-02 | 7.092E-02 | FAIL ABUN |
| TM-171 | 9.017E+00 | 1.556E+01 | 3.153E+01 | NOT IDENT. |
| LU-176 | -2.733E-03 | 1.449E-02 | 2.746E-02 | NOT IDENT. |
| HF-181 | -2.459E-03 | 2.660E-02 | 5.127E-02 | NOT IDENT. |
| TA-182 | -4.362E-02 | 6.618E-02 | 1.086E-01 | NOT IDENT. |
| RE-183 | 9.567E-02 | 1.629E-01 | 3.275E-01 | FAIL ABUN |
| RE-184 | 6.403E-02 | 6.558E-02 | 1.684E-01 | NOT IDENT. |
| W-188 | 1.022E+00 | 5.318E+00 | 9.302E+00 | FAIL ABUN |
| IR-192 | -1.961E-02 | 2.224E-02 | 3.778E-02 | NOT IDENT. |
| HG-203 | -9.871E-03 | 2.468E-02 | 3.938E-02 | NOT IDENT. |
| BI-207 | 6.555E-03 | 3.065E-02 | 6.408E-02 | NOT IDENT. |
| TL-208 | 1.086E-02 | 2.096E-02 | 4.562E-02 | NOT IDENT. |
| BI-211 | 1.017E-02 | 1.172E-01 | 2.302E-01 | NOT IDENT. |
| PB-211 | -2.971E-01 | 3.971E-01 | 6.753E-01 | NOT IDENT. |
| BI-212 | -2.846E-02 | 2.902E-01 | 5.725E-01 | NOT IDENT. |
| PB-212 | 6.162E-03 | 2.943E-02 | 6.443E-02 | FAIL ABUN |
| BI-214 | 2.601E-02 | 5.034E-02 | 1.024E-01 | NOT IDENT. |
| PB-214 | -8.544E-03 | 4.274E-02 | 8.076E-02 | FAIL ABUN |
| RN-219 | 3.400E-02 | 2.036E-01 | 4.108E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 2.601E-02 | 5.034E-02 | 1.024E-01 | NOT IDENT. |
| RA-223 | -9.821E-02 | 4.072E-01 | 7.546E-01 | FAIL ABUN |
| RA-226 | 2.601E-02 | 5.034E-02 | 1.024E-01 | NOT IDENT. |
| AC-227 | 2.944E-02 | 1.489E-01 | 2.657E-01 | NOT IDENT. |
| TH-227 | 2.944E-02 | 1.489E-01 | 2.657E-01 | NOT IDENT. |
| AC-228 | 9.876E-03 | 6.887E-02 | 1.563E-01 | NOT IDENT. |
| RA-228 | 9.876E-03 | 6.887E-02 | 1.563E-01 | NOT IDENT. |
| TH-228 | 6.162E-03 | 2.943E-02 | 6.443E-02 | FAIL ABUN |
| TH-229 | 2.837E-01 | 2.455E-01 | 5.039E-01 | NOT IDENT. |
| TH-230 | 2.601E-02 | 5.034E-02 | 1.024E-01 | NOT IDENT. |
| PA-231 | 1.210E-01 | 7.892E-01 | 1.562E+00 | NOT IDENT. |
| TH-231 | -9.821E-02 | 4.072E-01 | 7.546E-01 | FAIL ABUN |
| TH-232 | 9.876E-03 | 6.887E-02 | 1.563E-01 | NOT IDENT. |
| PA-233 | 8.059E-03 | 3.885E-02 | 7.658E-02 | NOT IDENT. |
| PA-234 | 1.055E-01 | 1.741E-01 | 3.905E-01 | NOT IDENT. |
| PA-234M | -1.310E+00 | 2.816E+00 | 5.665E+00 | NOT IDENT. |
| U-234 | 2.601E-02 | 5.034E-02 | 1.024E-01 | NOT IDENT. |
| NP-237 | 8.059E-03 | 3.885E-02 | 7.658E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 2.035E+02 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.757E-01 | 2.045E-01 | 2.859E-01 | FAIL ABUN |
| PU-239 | -2.444E+01 | 1.618E+02 | 2.978E+02 | NOT IDENT. |
| AM-241 | 4.843E-02 | 1.203E-01 | 2.288E-01 | NOT IDENT. |
| AM-243 | -5.474E-03 | 3.415E-02 | 6.340E-02 | NOT IDENT. |
| CM-243 | 2.136E-02 | 5.269E-02 | 1.051E-01 | FAIL ABUN |
| CM-247 | 5.221E-03 | 1.980E-02 | 4.013E-02 | NOT IDENT. |
| CF-249 | 4.481E-03 | 2.075E-02 | 4.195E-02 | FAIL ABUN |
| CF-251 | 6.799E-03 | 7.147E-02 | 1.322E-01 | FAIL ABUN |
| ANH-511 | -4.735E-02 | 3.405E-02 | 7.145E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:07.88

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 30.32 | 19 | 15 | 0.90 | 60.84 | 58 | 10 | 5.25E-03 | 40.2 | 2.68E+00 |
| 2 | 1 | 31.82 | 14 | 15 | 0.90 | 63.84 | 58 | 10 | 3.84E-03 | 57.4 | |
| 3 | 0 | 47.36 | 23 | 20 | 1.03 | 94.91 | 91 | 9 | 6.46E-03 | 40.5 | |
| 4 | 0 | 63.56 | 40 | 47 | 1.32 | 127.32 | 122 | 12 | 1.12E-02 | 37.8 | |
| 5 | 2 | 90.31 | 14 | 12 | 1.15 | 180.82 | 179 | 12 | 3.97E-03 | 37.9 | 1.61E+00 |
| 6 | 2 | 92.50 | 87 | 22 | 1.16 | 185.19 | 179 | 12 | 2.42E-02 | 14.2 | |
| 7 | 0 | 114.31 | 12 | 25 | 0.58 | 228.82 | 225 | 9 | 3.19E-03 | 85.5 | |
| 8 | 0 | 143.64 | 16 | 23 | 0.71 | 287.48 | 283 | 8 | 4.42E-03 | 58.6 | |
| 9 | 0 | 162.80 | 22 | 17 | 0.68 | 325.80 | 322 | 8 | 6.07E-03 | 39.6 | |
| 10 | 0 | 166.27 | 14 | 15 | 1.10 | 332.74 | 330 | 7 | 3.95E-03 | 51.4 | |
| 11 | 0 | 185.76 | 61 | 34 | 0.75 | 371.73 | 367 | 10 | 1.70E-02 | 22.1 | |
| 12 | 0 | 197.03 | 26 | 28 | 1.93 | 394.26 | 390 | 10 | 7.29E-03 | 42.2 | |
| 13 | 0 | 204.88 | 12 | 9 | 1.31 | 409.97 | 408 | 6 | 3.19E-03 | 48.6 | |
| 14 | 0 | 226.84 | 9 | 23 | 1.33 | 453.89 | 446 | 9 | 2.61E-03 | 96.6 | |
| 15 | 2 | 238.18 | 18 | 15 | 1.39 | 476.57 | 474 | 12 | 4.97E-03 | 34.5 | 5.78E+00 |
| 16 | 2 | 241.09 | 12 | 26 | 1.40 | 482.39 | 474 | 12 | 3.21E-03 | 78.4 | |
| 17 | 0 | 252.91 | 16 | 5 | 2.01 | 506.03 | 503 | 7 | 4.33E-03 | 35.3 | |
| 18 | 0 | 285.32 | 38 | 32 | 8.40 | 570.86 | 560 | 21 | 1.07E-02 | 39.9 | |
| 19 | 0 | 510.52 | 72 | 27 | 1.42 | 1021.30 | 1013 | 16 | 1.99E-02 | 20.3 | |
| 20 | 0 | 660.34 | 10 | 5 | 0.62 | 1320.97 | 1314 | 10 | 2.74E-03 | 53.1 | |
| 21 | 0 | 664.14 | 7 | 0 | 0.73 | 1328.57 | 1326 | 6 | 1.94E-03 | 37.8 | |
| 22 | 0 | 1267.09 | 6 | 0 | 0.96 | 2534.67 | 2531 | 7 | 1.67E-03 | 40.8 | |
| 23 | 0 | 1405.81 | 6 | 0 | 0.99 | 2812.17 | 2808 | 7 | 1.67E-03 | 40.8 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:10.21

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-132 | 49.72 | ------ | 15.00 | 5.609E-01 | ------ Line Not Found | | ------ |
| | 111.76 | ------ | 1.74 | 5.531E+00 | ------ Line Not Found | | ------ |
| | 116.30 | ------ | 1.96 | 5.626E+00 | ------ Line Not Found | | ------ |
| | 228.16 | 9 | 88.00* | 4.720E+00 | 1.012E-02 | 2.077E+00 | 193.27 |
| BA-137M | 661.66 | 10 | 89.90* | 2.292E+00 | 2.141E-02 | 2.144E-02 | 106.30 |
| CS-137 | 661.66 | 10 | 85.10* | 2.292E+00 | 2.262E-02 | 2.265E-02 | 106.30 |
| CE-139 | 165.86 | 14 | 80.00* | 5.518E+00 | 1.440E-02 | 1.630E-02 | 102.84 |
| PB-210 | 46.54 | 23 | 4.25* | 4.042E-01 | 6.052E+00 | 6.064E+00 | 80.93 |
| RA-224 | 240.99 | 12 | 4.10* | 4.547E+00 | 2.769E-01 | 2.769E-01 | 156.84 |
| TH-234 | 63.29 | 13 | 3.70* | 1.926E+00 | 8.333E-01 | 8.333E-01 | 232.16 |
| | 92.59 | 9 | 4.23 | 4.712E+00 | 2.113E-01 | 2.113E-01 | 278.09 |
| U-235 | 89.96 | 14 | 3.47 | 4.567E+00 | 4.033E-01 | 4.033E-01 | 75.73 |
| | 93.35 | 9 | 5.60 | 4.712E+00 | 1.596E-01 | 1.596E-01 | 278.09 |
| | 143.76 | 7 | 10.96* | 5.733E+00 | 4.867E-02 | 4.867E-02 | 280.86 |
| | 163.33 | 12 | 5.08 | 5.559E+00 | 1.829E-01 | 1.829E-01 | 158.93 |
| | 185.72 | 10 | 57.20 | 5.264E+00 | 1.510E-02 | 1.510E-02 | 274.06 |
| | 205.31 | 8 | 5.01 | 5.005E+00 | 1.474E-01 | 1.474E-01 | 142.80 |
| U-238 | 63.29 | 13 | 3.70* | 1.926E+00 | 8.333E-01 | 8.333E-01 | 232.16 |
| | 92.59 | 9 | 4.23 | 4.712E+00 | 2.113E-01 | 2.113E-01 | 278.09 |

Flag: "*" = Keyline

Sample ID : G1203017834 Acquisition date : 10-FEB-2014 13:21:18

Total number of lines in spectrum 22
Number of unidentified lines 5
Number of lines tentatively identified by NID 17 77.27%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TE-132 | 3.20D | 205. | 1.012E-02 | 2.077E+00 | 4.014E+00 | 193.27 | |
| BA-137M | 30.08Y | 1.00 | 2.141E-02 | 2.144E-02 | 2.279E-02 | 106.30 | |
| CS-137 | 30.08Y | 1.00 | 2.262E-02 | 2.265E-02 | 2.408E-02 | 106.30 | |
| CE-139 | 137.64D | 1.13 | 1.440E-02 | 1.630E-02 | 1.676E-02 | 102.84 | |
| PB-210 | 22.20Y | 1.00 | 6.052E+00 | 6.064E+00 | 4.908E+00 | 80.93 | |
| RA-224 | 1.41E+10Y | 1.00 | 2.769E-01 | 2.769E-01 | 4.342E-01 | 156.84 | |
| TH-234 | 4.47E+09Y | 1.00 | 8.333E-01 | 8.333E-01 | 19.35E-01 | 232.16 | |
| U-235 | 7.04E+08Y | 1.00 | 4.867E-02 | 4.867E-02 | 13.67E-02 | 280.86 | |
| U-238 | 4.47E+09Y | 1.00 | 8.333E-01 | 8.333E-01 | 19.35E-01 | 232.16 | |
| | Total Activity : | | 8.112E+00 | 1.019E+01 | | | |

Grand Total Activity : 8.112E+00 1.019E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203017834 Acquisition date : 10-FEB-2014 13:21:18

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30.32 | 19 | 15 | 0.90 | 60.84 | 58 | 10 | 5.25E-03 | 80.5 | 3.44E-03 | |
| 1 | 31.82 | 14 | 15 | 0.90 | 63.84 | 58 | 10 | 3.84E-03 | **** | 6.92E-03 | |
| 0 | 114.31 | 12 | 25 | 0.58 | 228.82 | 225 | 9 | 3.19E-03 | **** | 5.59E+00 | |
| 0 | 197.03 | 17 | 28 | 1.93 | 394.26 | 390 | 10 | 4.70E-03 | **** | 5.11E+00 | T |
| 2 | 238.18 | 3 | 15 | 1.39 | 476.57 | 474 | 12 | 7.65E-04 | **** | 4.58E+00 | T |
| 0 | 252.91 | 16 | 5 | 2.01 | 506.03 | 503 | 7 | 4.33E-03 | 70.6 | 4.41E+00 | T |
| 0 | 285.32 | 38 | 32 | 8.40 | 570.86 | 560 | 21 | 1.07E-02 | 79.8 | 4.08E+00 | T |
| 0 | 664.14 | 7 | 0 | 0.73 | 1328.57 | 1326 | 6 | 1.94E-03 | 75.6 | 2.28E+00 | T |
| 0 | 1267.09 | 6 | 0 | 0.96 | 2534.67 | 2531 | 7 | 1.67E-03 | 81.6 | 1.34E+00 | |
| 0 | 1405.81 | 6 | 0 | 0.99 | 2812.17 | 2808 | 7 | 1.67E-03 | 81.6 | 1.22E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:23.98

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017834.CNF;1   *
* Acquisition date : 10-FEB-2014 13:21:18 Sensitivity     : 3.000       *
* Detector ID      : GAM33                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****       *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203017834          Analyst initials: RXF2        *
* Batch Number     : 1359492              Sample Quantity : 1.6794E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 23-AUG-2013 07:35:09 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_500MLMB.CNF;5     *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| TE-132 | 2.609E+00 |
| BA-137M | 0.000E+00 |
| CS-137 | 0.000E+00 |
| CE-139 | 8.245E-03 |
| PB-210 | 3.254E+00 |
| RA-224 | 2.432E-01 |
| TH-234 | 7.176E-01 |
| U-235 | 8.749E-02 |
| U-238 | 7.176E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 1.578E-01 | NOT IDENT. |
| NA-22 | 1.593E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.891E-02 | NOT IDENT. |
| K-40 | 2.330E-01 | NOT IDENT. |
| SC-46 | 1.339E-02 | NOT IDENT. |
| V-48 | 3.629E-02 | NOT IDENT. |
| CR-51 | 2.417E-01 | NOT IDENT. |
| MN-54 | 1.846E-02 | NOT IDENT. |
| CO-56 | 1.604E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.209E-02 | NOT IDENT. |
| CO-58 | 1.723E-02 | NOT IDENT. |
| FE-59 | 4.391E-02 | NOT IDENT. |
| CO-60 | 1.662E-02 | NOT IDENT. |
| ZN-65 | 4.492E-02 | NOT IDENT. |
| GE-68 | 4.116E-01 | NOT IDENT. |
| AS-73 | 7.327E-01 | NOT IDENT. |
| AS-74 | 6.059E-02 | NOT IDENT. |
| SE-75 | 2.329E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.741E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RB-83 | 2.928E-02 | NOT IDENT. |
| KR-85 | 4.562E+00 | NOT IDENT. |
| SR-85 | 2.668E-02 | NOT IDENT. |
| RB-86 | 3.592E-01 | NOT IDENT. |
| Y-88 | 2.134E-02 | NOT IDENT. |
| Y-91 | 5.420E+00 | NOT IDENT. |
| NB-94 | 1.770E-02 | NOT IDENT. |
| NB-95 | 2.397E-02 | NOT IDENT. |
| NB-95M | 5.612E-02 | NOT IDENT. |
| ZR-95 | 3.823E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 6.464E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.333E-02 | FAIL ABUN |
| RH-102 | 2.239E-02 | NOT IDENT. |
| RU-103 | 1.847E-02 | NOT IDENT. |
| RH-106 | 1.362E-01 | NOT IDENT. |
| RU-106 | 1.362E-01 | NOT IDENT. |
| AG-108M | 1.459E-02 | NOT IDENT. |
| CD-109 | 3.656E-01 | NOT IDENT. |
| AG-110M | 2.380E-02 | NOT IDENT. |
| SN-113 | 2.337E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.756E-02 | NOT IDENT. |
| TE-123M | 1.233E-02 | NOT IDENT. |
| SB-124 | 0.000E+00 | NOT IDENT. |
| SB-125 | 5.199E-02 | NOT IDENT. |
| TE-125M | 5.905E+00 | NOT IDENT. |
| I-126 | 1.285E-01 | NOT IDENT. |
| SB-126 | 1.378E-01 | NOT IDENT. |
| SN-126 | 3.529E-02 | FAIL ABUN |
| SB-127 | 2.815E+00 | FAIL ABUN |
| I-131 | 1.255E-01 | FAIL ABUN |
| I-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 1.885E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.108E-02 | NOT IDENT. |
| CS-135 | 5.762E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.380E-02 | NOT IDENT. |
| BA-140 | 7.521E-02 | NOT IDENT. |
| LA-140 | 7.521E-02 | NOT IDENT. |
| CE-141 | 3.326E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 9.036E-02 | NOT IDENT. |
| PM-144 | 1.824E-02 | NOT IDENT. |
| PR-144 | 1.374E+00 | NOT IDENT. |
| PM-146 | 1.983E-02 | NOT IDENT. |
| ND-147 | 5.192E-01 | FAIL ABUN |
| PM-147 | 3.522E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.106E-02 | NOT IDENT. |
| EU-152 | 4.562E-02 | NOT IDENT. |
| GD-153 | 4.189E-02 | NOT IDENT. |
| EU-154 | 4.493E-02 | NOT IDENT. |
| EU-155 | 4.058E-02 | NOT IDENT. |
| TB-160 | 6.092E-02 | FAIL ABUN |
| HO-166M | 3.031E-02 | FAIL ABUN |
| TM-171 | 1.406E+01 | NOT IDENT. |
| LU-176 | 1.208E-02 | NOT IDENT. |
| HF-181 | 2.173E-02 | NOT IDENT. |
| TA-182 | 3.543E-02 | NOT IDENT. |
| RE-183 | 1.466E-01 | FAIL ABUN |
| RE-184 | 6.985E-02 | NOT IDENT. |
| W-188 | 4.177E+00 | FAIL ABUN |
| IR-192 | 1.648E-02 | NOT IDENT. |
| HG-203 | 1.711E-02 | NOT IDENT. |
| BI-207 | 2.683E-02 | NOT IDENT. |
| TL-208 | 1.998E-02 | NOT IDENT. |
| BI-211 | 1.020E-01 | NOT IDENT. |
| PB-211 | 2.883E-01 | NOT IDENT. |
| BI-212 | 2.437E-01 | NOT IDENT. |
| PB-212 | 2.920E-02 | FAIL ABUN |
| BI-214 | 4.573E-02 | NOT IDENT. |
| PB-214 | 3.561E-02 | FAIL ABUN |
| RN-219 | 1.773E-01 | NOT IDENT. |
| RN-222 | 4.573E-02 | NOT IDENT. |

| | | |
|---|---|---|
| RA-223 | 3.371E-01 | FAIL ABUN |
| RA-226 | 4.573E-02 | NOT IDENT. |
| AC-227 | 1.183E-01 | NOT IDENT. |
| TH-227 | 1.183E-01 | NOT IDENT. |
| AC-228 | 6.498E-02 | NOT IDENT. |
| RA-228 | 6.498E-02 | NOT IDENT. |
| TH-228 | 2.920E-02 | FAIL ABUN |
| TH-229 | 2.255E-01 | NOT IDENT. |
| TH-230 | 4.573E-02 | NOT IDENT. |
| PA-231 | 6.944E-01 | NOT IDENT. |
| TH-231 | 3.371E-01 | FAIL ABUN |
| TH-232 | 6.498E-02 | NOT IDENT. |
| PA-233 | 3.422E-02 | NOT IDENT. |
| PA-234 | 1.660E-01 | NOT IDENT. |
| PA-234M | 2.394E+00 | NOT IDENT. |
| U-234 | 4.573E-02 | NOT IDENT. |
| NP-237 | 3.422E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 1.226E-01 | FAIL ABUN |
| PU-239 | 1.323E+02 | NOT IDENT. |
| AM-241 | 1.030E-01 | NOT IDENT. |
| AM-243 | 2.888E-02 | NOT IDENT. |
| CM-243 | 4.705E-02 | FAIL ABUN |
| CM-247 | 1.749E-02 | NOT IDENT. |
| CF-249 | 1.823E-02 | FAIL ABUN |
| CF-251 | 5.960E-02 | FAIL ABUN |
| ANH-511 | 3.355E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:28.86

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017834.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:21:18 | Sensitivity | : 3.000 |
| Detector ID | : GAM33 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.42 | Half life ratio | : ***** |
| Sample date | : 17-JAN-2014 00:00:00 | Nuclide Library | : SOLID |
| Sample ID | : G1203017834 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.6794E+02 GRAM |
| | | Quantity Err(%) | : 1.1909E-03 % |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 23-AUG-2013 07:35:09 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM33_500MLMB.CNF;5 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| TE-132 | 2.077E+00 | 3.941E+00 | 3.941E+00 |
| BA-137M | 2.144E-02 | 2.240E-02 | 2.240E-02 |
| CS-137 | 2.265E-02 | 2.366E-02 | 2.366E-02 |
| CE-139 | 1.630E-02 | 1.680E-02 | 1.680E-02 |
| PB-210 | 6.064E+00 | 4.840E+00 | 4.840E+00 |
| RA-224 | 2.769E-01 | 4.263E-01 | 4.263E-01 |
| TH-234 | 8.333E-01 | 1.905E+00 | 1.905E+00 |
| U-235 | 4.867E-02 | 1.340E-01 | 1.340E-01 |
| U-238 | 8.333E-01 | 1.905E+00 | 1.905E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -4.346E-03 | 1.901E-01 | 1.901E-01 | NOT IDENT. |
| NA-22 | 9.942E-03 | 1.534E-02 | 1.598E-02 | NOT IDENT. |
| NA-24 | -6.433E+09 | 1.386E+10 | 1.416E+10 | SHORT HLIF |
| AL-26 | 1.486E-02 | 1.598E-02 | 1.732E-02 | NOT IDENT. |
| K-40 | 3.243E-02 | 2.440E-01 | 2.444E-01 | NOT IDENT. |
| SC-46 | -1.570E-02 | 2.083E-02 | 2.200E-02 | NOT IDENT. |
| V-48 | -1.613E-02 | 4.870E-02 | 4.924E-02 | NOT IDENT. |
| CR-51 | 2.106E-02 | 2.796E-01 | 2.797E-01 | NOT IDENT. |
| MN-54 | -1.019E-02 | 2.385E-02 | 2.429E-02 | NOT IDENT. |
| CO-56 | -1.814E-02 | 2.370E-02 | 2.507E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.317E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 5.230E-03 | 1.373E-02 | 1.393E-02 | NOT IDENT. |
| CO-58 | -9.105E-03 | 2.257E-02 | 2.294E-02 | NOT IDENT. |
| FE-59 | 1.433E-02 | 4.862E-02 | 4.905E-02 | NOT IDENT. |
| CO-60 | 7.945E-03 | 1.670E-02 | 1.708E-02 | NOT IDENT. |
| ZN-65 | 2.542E-02 | 4.798E-02 | 4.933E-02 | NOT IDENT. |
| GE-68 | 2.646E-02 | 4.849E-01 | 4.851E-01 | NOT IDENT. |
| AS-73 | 8.858E-01 | 7.510E-01 | 8.505E-01 | NOT IDENT. |
| AS-74 | -2.819E-02 | 7.995E-02 | 8.096E-02 | NOT IDENT. |
| SE-75 | 9.451E-03 | 2.570E-02 | 2.605E-02 | NOT IDENT. |
| BR-77 | 1.509E+01 | 7.284E+01 | 7.316E+01 | SHORT HLIF |

| | | | | |
|---|---|---|---|---|
| SR-82 | 1.141E-01 | 1.733E-01 | 1.807E-01 | NOT IDENT. |
| RB-83 | -6.307E-03 | 3.688E-02 | 3.699E-02 | NOT IDENT. |
| KR-85 | -1.183E+01 | 7.012E+00 | 8.808E+00 | NOT IDENT. |
| SR-85 | -6.933E-02 | 4.103E-02 | 5.158E-02 | NOT IDENT. |
| RB-86 | 1.101E-01 | 3.875E-01 | 3.907E-01 | NOT IDENT. |
| Y-88 | -6.016E-03 | 2.801E-02 | 2.814E-02 | NOT IDENT. |
| Y-91 | -3.804E+00 | 8.329E+00 | 8.504E+00 | NOT IDENT. |
| NB-94 | 7.689E-03 | 1.925E-02 | 1.955E-02 | NOT IDENT. |
| NB-95 | 7.729E-03 | 2.666E-02 | 2.689E-02 | NOT IDENT. |
| NB-95M | -8.783E-03 | 7.988E-02 | 7.998E-02 | NOT IDENT. |
| ZR-95 | 2.289E-02 | 3.979E-02 | 4.111E-02 | NOT IDENT. |
| NB-97 | -1.000E+41 | 6.506E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -3.792E+10 | 1.898E+10 | 2.555E+10 | SHORT HLIF |
| MO-99 | 1.727E+01 | 7.201E+01 | 7.243E+01 | NOT IDENT. |
| TC-99M | -1.385E+26 | 4.823E+27 | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.829E-03 | 1.525E-02 | 1.541E-02 | FAIL ABUN |
| RH-102 | -6.793E-03 | 2.913E-02 | 2.929E-02 | NOT IDENT. |
| RU-103 | -1.746E-03 | 2.262E-02 | 2.263E-02 | NOT IDENT. |
| RH-106 | -1.073E-01 | 1.916E-01 | 1.976E-01 | NOT IDENT. |
| RU-106 | -1.073E-01 | 1.916E-01 | 1.976E-01 | NOT IDENT. |
| AG-108M | 2.207E-03 | 1.699E-02 | 1.702E-02 | NOT IDENT. |
| CD-109 | -6.353E-02 | 4.895E-01 | 4.904E-01 | NOT IDENT. |
| AG-110M | 1.126E-02 | 2.539E-02 | 2.589E-02 | NOT IDENT. |
| SN-113 | -4.055E-04 | 2.772E-02 | 2.772E-02 | NOT IDENT. |
| CD-115 | 5.865E+01 | 1.418E+02 | 1.443E+02 | SHORT HLIF |
| SN-117M | -3.173E-02 | 5.672E-02 | 5.849E-02 | NOT IDENT. |
| TE-123M | -5.598E-03 | 1.779E-02 | 1.797E-02 | NOT IDENT. |
| SB-124 | -3.561E-02 | 4.040E-02 | 4.347E-02 | NOT IDENT. |
| SB-125 | 2.892E-02 | 5.738E-02 | 5.884E-02 | NOT IDENT. |
| TE-125M | 3.847E+00 | 6.770E+00 | 6.988E+00 | NOT IDENT. |
| I-126 | 1.677E-02 | 1.738E-01 | 1.740E-01 | NOT IDENT. |
| SB-126 | 1.560E-02 | 1.582E-01 | 1.583E-01 | NOT IDENT. |
| SN-126 | 1.247E-02 | 4.418E-02 | 4.454E-02 | FAIL ABUN |
| SB-127 | -4.981E-01 | 3.393E+00 | 3.401E+00 | FAIL ABUN |
| I-131 | 5.713E-02 | 1.383E-01 | 1.406E-01 | FAIL ABUN |
| I-132 | 1.000E+41 | 6.073E+41 | 0.000E+00 | SHORT HLIF |
| BA-133 | 8.403E-04 | 2.203E-02 | 2.203E-02 | NOT IDENT. |
| I-133 | 2.462E+06 | 7.289E+06 | 7.373E+06 | SHORT HLIF |
| CS-134 | 7.448E-03 | 2.327E-02 | 2.351E-02 | NOT IDENT. |
| CS-135 | -6.398E-02 | 7.691E-02 | 8.214E-02 | NOT IDENT. |
| I-135 | 2.953E+25 | 5.579E+25 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.863E-02 | 7.868E-02 | 8.059E-02 | NOT IDENT. |
| BA-140 | -1.499E-02 | 9.429E-02 | 9.454E-02 | NOT IDENT. |
| LA-140 | -1.499E-02 | 9.429E-02 | 9.454E-02 | NOT IDENT. |
| CE-141 | 2.804E-02 | 3.943E-02 | 4.141E-02 | NOT IDENT. |
| CE-143 | -1.012E+03 | 9.536E+03 | 9.547E+03 | SHORT HLIF |
| CE-144 | 1.381E-02 | 1.063E-01 | 1.065E-01 | NOT IDENT. |
| PM-144 | 1.122E-02 | 1.919E-02 | 1.984E-02 | NOT IDENT. |
| PR-144 | 8.501E-01 | 1.445E+00 | 1.494E+00 | NOT IDENT. |
| PM-146 | -1.546E-02 | 2.651E-02 | 2.741E-02 | NOT IDENT. |
| ND-147 | -1.179E-01 | 6.494E-01 | 6.515E-01 | FAIL ABUN |
| PM-147 | 2.000E+02 | 3.937E+02 | 4.039E+02 | NOT IDENT. |
| PM-149 | 3.006E+03 | 2.395E+03 | 2.752E+03 | SHORT HLIF |
| EU-150 | -2.278E-03 | 1.335E-02 | 1.339E-02 | NOT IDENT. |
| EU-152 | 1.181E-02 | 5.166E-02 | 5.194E-02 | NOT IDENT. |
| GD-153 | 1.244E-02 | 5.222E-02 | 5.252E-02 | NOT IDENT. |
| EU-154 | 2.803E-02 | 4.325E-02 | 4.506E-02 | NOT IDENT. |
| EU-155 | -4.541E-02 | 5.490E-02 | 5.859E-02 | NOT IDENT. |
| TB-160 | -2.355E-02 | 7.824E-02 | 7.895E-02 | FAIL ABUN |
| HO-166M | 1.300E-02 | 3.280E-02 | 3.332E-02 | FAIL ABUN |
| TM-171 | 9.017E+00 | 1.558E+01 | 1.610E+01 | NOT IDENT. |
| LU-176 | -2.733E-03 | 1.449E-02 | 1.454E-02 | NOT IDENT. |
| HF-181 | -2.459E-03 | 2.660E-02 | 2.662E-02 | NOT IDENT. |
| TA-182 | -4.362E-02 | 6.630E-02 | 6.915E-02 | NOT IDENT. |
| RE-183 | 9.567E-02 | 1.633E-01 | 1.689E-01 | FAIL ABUN |
| RE-184 | 6.403E-02 | 6.620E-02 | 7.222E-02 | NOT IDENT. |
| W-188 | 1.022E+00 | 5.319E+00 | 5.339E+00 | FAIL ABUN |
| IR-192 | -1.961E-02 | 2.230E-02 | 2.399E-02 | NOT IDENT. |
| HG-203 | -9.871E-03 | 2.469E-02 | 2.509E-02 | NOT IDENT. |
| BI-207 | 6.555E-03 | 3.067E-02 | 3.081E-02 | NOT IDENT. |
| TL-208 | 1.086E-02 | 2.098E-02 | 2.154E-02 | NOT IDENT. |
| BI-211 | 1.017E-02 | 1.172E-01 | 1.173E-01 | NOT IDENT. |
| PB-211 | -2.971E-01 | 3.981E-01 | 4.200E-01 | NOT IDENT. |
| BI-212 | -2.846E-02 | 2.902E-01 | 2.905E-01 | NOT IDENT. |
| PB-212 | 6.162E-03 | 2.943E-02 | 2.956E-02 | FAIL ABUN |
| BI-214 | 2.601E-02 | 5.039E-02 | 5.173E-02 | NOT IDENT. |
| PB-214 | -8.544E-03 | 4.275E-02 | 4.292E-02 | FAIL ABUN |
| RN-219 | 3.400E-02 | 2.037E-01 | 2.043E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 2.601E-02 | 5.039E-02 | 5.173E-02 | NOT IDENT. |
| RA-223 | -9.821E-02 | 4.074E-01 | 4.098E-01 | FAIL ABUN |
| RA-226 | 2.601E-02 | 5.039E-02 | 5.173E-02 | NOT IDENT. |
| AC-227 | 2.944E-02 | 1.490E-01 | 1.496E-01 | NOT IDENT. |
| TH-227 | 2.944E-02 | 1.490E-01 | 1.496E-01 | NOT IDENT. |
| AC-228 | 9.876E-03 | 6.888E-02 | 6.902E-02 | NOT IDENT. |
| RA-228 | 9.876E-03 | 6.888E-02 | 6.902E-02 | NOT IDENT. |
| TH-228 | 6.162E-03 | 2.943E-02 | 2.956E-02 | FAIL ABUN |
| TH-229 | 2.837E-01 | 2.468E-01 | 2.780E-01 | NOT IDENT. |
| TH-230 | 2.601E-02 | 5.039E-02 | 5.173E-02 | NOT IDENT. |
| PA-231 | 1.210E-01 | 7.893E-01 | 7.912E-01 | NOT IDENT. |
| TH-231 | -9.821E-02 | 4.074E-01 | 4.098E-01 | FAIL ABUN |
| TH-232 | 9.876E-03 | 6.888E-02 | 6.902E-02 | NOT IDENT. |
| PA-233 | 8.059E-03 | 3.886E-02 | 3.902E-02 | NOT IDENT. |
| PA-234 | 1.055E-01 | 2.123E-01 | 2.176E-01 | NOT IDENT. |
| PA-234M | -1.310E+00 | 2.822E+00 | 2.884E+00 | NOT IDENT. |
| U-234 | 2.601E-02 | 5.039E-02 | 5.173E-02 | NOT IDENT. |
| NP-237 | 8.059E-03 | 3.886E-02 | 3.902E-02 | NOT IDENT. |
| NP-238 | 5.914E+01 | 2.036E+02 | 2.054E+02 | SHORT HLIF |
| NP-239 | -1.757E-01 | 2.054E-01 | 2.201E-01 | FAIL ABUN |
| PU-239 | -2.444E+01 | 1.618E+02 | 1.622E+02 | NOT IDENT. |
| AM-241 | 4.843E-02 | 1.204E-01 | 1.224E-01 | NOT IDENT. |
| AM-243 | -5.474E-03 | 3.415E-02 | 3.424E-02 | NOT IDENT. |
| CM-243 | 2.136E-02 | 5.275E-02 | 5.362E-02 | FAIL ABUN |
| CM-247 | 5.221E-03 | 1.982E-02 | 1.996E-02 | NOT IDENT. |
| CF-249 | 4.481E-03 | 2.075E-02 | 2.085E-02 | FAIL ABUN |
| CF-251 | 6.799E-03 | 7.148E-02 | 7.155E-02 | FAIL ABUN |
| ANH-511 | -4.735E-02 | 3.431E-02 | 4.040E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 20.5032 | 94.67 | 24.4586 | 193.51 | 9.8922 |
| 45.60 | 23.2063 | 94.87 | 27.3458 | 197.03 | 24.2735 |
| 46.54 | 22.4071 | 97.43 | 20.2413 | 198.01 | 23.1948 |
| 49.72 | 19.5634 | 98.43 | 21.2425 | 201.83 | 9.9814 |
| 51.35 | 22.2697 | 98.44 | 21.2428 | 205.31 | 25.6017 |
| 52.39 | 15.7633 | 99.53 | 25.1529 | 210.85 | 23.5105 |
| 53.44 | 11.4160 | 100.11 | 30.9884 | 215.65 | 27.0012 |
| 57.36 | 0.0000 | 103.18 | 22.3902 | 222.11 | 33.9709 |
| 57.53 | 18.6344 | 103.37 | 19.4760 | 227.09 | 27.3101 |
| 57.98 | 17.0562 | 105.21 | 30.2813 | 227.38 | 27.3179 |
| 59.32 | 17.3797 | 105.31 | 30.2864 | 228.16 | 25.6300 |
| 59.54 | 18.7267 | 106.12 | 25.4357 | 228.18 | 25.6304 |
| 63.29 | 23.3937 | 109.28 | 22.4214 | 235.69 | 24.0952 |
| 63.58 | 23.4095 | 111.00 | 32.5424 | 235.96 | 25.8229 |
| 64.28 | 23.4477 | 111.76 | 38.5063 | 238.63 | 25.3128 |
| 66.73 | 28.5674 | 116.30 | 22.3754 | 238.98 | 0.0000 |
| 67.24 | 32.6860 | 117.23 | 23.9016 | 240.99 | 19.0268 |
| 67.75 | 32.7233 | 121.12 | 18.0336 | 242.00 | 17.3134 |
| 69.67 | 22.8216 | 121.22 | 22.0444 | 244.70 | 20.8281 |
| 70.83 | 25.6249 | 121.78 | 23.0660 | 252.40 | 22.1406 |
| 72.81 | 36.7635 | 122.06 | 23.0757 | 252.80 | 22.1487 |
| 72.87 | 36.7682 | 123.07 | 25.1205 | 254.15 | 0.0000 |
| 74.66 | 30.4489 | 127.23 | 20.2208 | 256.23 | 19.6444 |
| 74.82 | 28.6131 | 129.30 | 23.3243 | 260.90 | 0.0000 |
| 74.97 | 28.6221 | 131.20 | 24.4053 | 264.66 | 19.4380 |
| 77.11 | 37.0961 | 133.02 | 25.4885 | 268.22 | 23.9295 |
| 79.69 | 26.1039 | 133.52 | 25.5066 | 269.46 | 22.1809 |
| 80.12 | 27.9926 | 136.00 | 27.6438 | 271.23 | 19.5488 |
| 80.19 | 27.9965 | 136.47 | 32.7845 | 273.65 | 22.2607 |
| 80.57 | 28.0177 | 140.51 | 29.3625 | 276.40 | 24.9901 |
| 81.00 | 32.7155 | 143.76 | 27.9404 | 277.37 | 18.5793 |
| 81.07 | 33.6548 | 144.24 | 26.4050 | 277.60 | 18.5831 |
| 83.79 | 20.6771 | 145.44 | 17.1131 | 278.00 | 20.0190 |
| 85.43 | 35.8285 | 152.43 | 26.1688 | 279.20 | 20.0394 |
| 86.55 | 34.0155 | 153.25 | 35.6273 | 279.54 | 22.9086 |
| 86.79 | 29.7772 | 154.21 | 32.5238 | 280.46 | 20.0604 |
| 86.94 | 29.7857 | 156.02 | 29.4447 | 283.69 | 19.7556 |
| 87.09 | 31.2129 | 158.56 | 34.8144 | 284.31 | 19.7656 |
| 87.57 | 25.5611 | 159.00 | 28.5002 | 285.41 | 19.7838 |
| 88.03 | 32.6898 | 162.33 | 14.3096 | 285.90 | 0.0000 |
| 88.34 | 32.7087 | 163.33 | 9.5515 | 287.50 | 19.8177 |
| 88.47 | 32.7168 | 165.86 | 9.5812 | 290.67 | 23.1207 |
| 89.96 | 34.2343 | 176.31 | 28.0268 | 293.27 | 0.0000 |
| 91.11 | 25.7304 | 176.60 | 32.3495 | 295.22 | 29.0073 |
| 92.59 | 25.8002 | 177.52 | 26.9869 | 295.96 | 26.3038 |
| 93.35 | 25.8357 | 181.07 | 21.1363 | 298.58 | 29.0859 |
| 94.56 | 24.4537 | 184.41 | 26.1133 | 299.98 | 17.2889 |
| 94.65 | 24.4577 | 185.72 | 18.5242 | 300.09 | 17.2906 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 17.2909 | 497.08 | 9.3138 | 711.68 | 8.2433 |
| 301.36 | 23.6847 | 505.52 | 24.9507 | 720.70 | 13.7897 |
| 302.85 | 19.1524 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 23.7434 | 511.00 | 20.8533 | 722.78 | 15.6416 |
| 306.78 | 20.1268 | 514.00 | 58.4814 | 722.91 | 14.7223 |
| 308.46 | 21.0691 | 514.00 | 58.4814 | 723.31 | 13.8043 |
| 311.90 | 21.1256 | 520.40 | 9.4307 | 724.19 | 17.4915 |
| 316.51 | 26.7313 | 520.69 | 0.0000 | 727.33 | 11.9831 |
| 319.41 | 19.4001 | 522.65 | 0.0000 | 733.00 | 8.3149 |
| 320.08 | 21.2586 | 527.90 | 0.0000 | 735.93 | 9.2498 |
| 321.04 | 23.1239 | 529.59 | 13.6875 | 737.46 | 8.3298 |
| 323.87 | 26.8808 | 529.87 | 0.0000 | 739.50 | 8.3366 |
| 325.23 | 15.7741 | 531.02 | 15.8052 | 747.24 | 11.1498 |
| 328.76 | 14.8853 | 546.56 | 0.0000 | 748.06 | 9.2944 |
| 333.37 | 14.0028 | 552.55 | 13.8486 | 752.31 | 9.3101 |
| 333.97 | 15.8768 | 563.25 | 9.6389 | 753.82 | 9.3157 |
| 334.37 | 17.7499 | 569.33 | 11.8161 | 756.73 | 5.5957 |
| 338.28 | 17.8006 | 569.50 | 9.6685 | 756.80 | 6.5285 |
| 338.32 | 17.8012 | 569.70 | 9.6693 | 763.94 | 7.4820 |
| 340.48 | 17.8290 | 583.19 | 5.4071 | 765.81 | 10.2953 |
| 340.55 | 17.8299 | 584.27 | 6.4920 | 766.42 | 8.4254 |
| 344.28 | 15.0552 | 595.83 | 14.1434 | 766.84 | 8.4267 |
| 345.93 | 17.8992 | 600.60 | 11.9947 | 772.60 | 0.0000 |
| 351.06 | 14.1829 | 602.52 | 0.0000 | 776.52 | 2.8194 |
| 351.93 | 16.0838 | 602.73 | 16.3724 | 777.92 | 4.7015 |
| 355.39 | 0.0000 | 604.72 | 20.7581 | 778.90 | 9.4065 |
| 356.01 | 15.1812 | 609.32 | 10.9485 | 783.70 | 7.5391 |
| 364.49 | 12.4077 | 610.33 | 13.1444 | 785.37 | 6.6008 |
| 366.42 | 17.2027 | 614.28 | 15.3633 | 792.07 | 9.4539 |
| 375.05 | 12.4973 | 618.01 | 12.0920 | 794.95 | 9.4641 |
| 383.85 | 11.6039 | 620.36 | 8.8037 | 795.86 | 8.5206 |
| 388.16 | 12.6068 | 621.93 | 14.3159 | 801.95 | 8.5401 |
| 388.63 | 10.6705 | 630.19 | 0.0000 | 810.29 | 9.5183 |
| 391.69 | 17.4960 | 631.29 | 9.9533 | 810.45 | 9.5190 |
| 400.66 | 10.7543 | 633.25 | 9.9621 | 810.76 | 9.5200 |
| 401.81 | 11.7405 | 634.78 | 12.1843 | 815.77 | 7.6302 |
| 402.40 | 12.7237 | 635.95 | 14.4072 | 818.51 | 7.6379 |
| 404.85 | 19.6054 | 636.99 | 7.7614 | 832.01 | 9.5945 |
| 410.95 | 15.7451 | 645.85 | 12.2448 | 834.85 | 14.4067 |
| 413.71 | 13.8009 | 657.76 | 8.9521 | 835.71 | 11.5289 |
| 414.70 | 13.8094 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.9036 | 661.66 | 0.0000 | 846.75 | 0.0000 |
| 427.87 | 14.9167 | 664.57 | 0.0000 | 846.77 | 11.5749 |
| 433.94 | 13.9735 | 666.33 | 5.3914 | 856.80 | 7.7441 |
| 439.40 | 8.0111 | 666.50 | 3.5945 | 860.56 | 5.8159 |
| 453.88 | 20.1999 | 667.71 | 0.0000 | 871.09 | 6.8103 |
| 463.37 | 13.2023 | 677.62 | 3.6117 | 873.19 | 3.8944 |
| 468.07 | 13.2378 | 685.70 | 8.1545 | 875.33 | 0.0000 |
| 473.00 | 8.1692 | 695.00 | 10.0055 | 879.38 | 8.7815 |
| 475.06 | 14.3127 | 696.49 | 8.1916 | 880.51 | 11.7132 |
| 476.78 | 7.1633 | 696.51 | 8.1916 | 883.24 | 0.9770 |
| 477.60 | 11.2617 | 697.00 | 9.1038 | 884.68 | 4.8876 |
| 482.18 | 11.2905 | 697.49 | 14.5688 | 889.28 | 8.8115 |
| 487.02 | 12.3501 | 702.65 | 10.0375 | 894.76 | 5.8854 |
| 492.35 | 0.0000 | 706.68 | 9.1404 | 898.04 | 5.8920 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 1.9675 | 1312.11 | 5.5383 | | |
| 911.20 | 2.9592 | 1332.49 | 1.8555 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.9404 | 1365.19 | 2.8055 | | |
| 937.49 | 12.9362 | 1368.63 | 0.0000 | | |
| 944.13 | 7.9781 | 1384.29 | 4.6975 | | |
| 946.00 | 5.9873 | 1408.01 | 3.2394 | | |
| 949.00 | 10.9874 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.8695 | | |
| 962.31 | 7.0222 | 1489.16 | 6.7388 | | |
| 964.08 | 11.0414 | 1505.03 | 4.8305 | | |
| 966.17 | 11.0486 | 1596.21 | 4.9274 | | |
| 968.97 | 2.0106 | 1620.50 | 3.9622 | | |
| 983.53 | 6.0601 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.0151 | | |
| 996.26 | 8.1125 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.0935 | 1764.49 | 7.1390 | | |
| 1004.73 | 8.1342 | 1770.23 | 3.0630 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.0424 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.0000 | | |
| 1037.84 | 12.3258 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 4.1359 | | |
| 1046.59 | 10.2988 | | | | |
| 1048.07 | 6.1822 | | | | |
| 1049.04 | 3.0920 | | | | |
| 1050.41 | 4.1242 | | | | |
| 1063.66 | 7.2461 | | | | |
| 1077.00 | 2.0785 | | | | |
| 1077.34 | 3.1181 | | | | |
| 1085.87 | 2.0840 | | | | |
| 1099.45 | 4.1844 | | | | |
| 1112.07 | 6.2994 | | | | |
| 1112.84 | 9.4513 | | | | |
| 1115.54 | 5.2549 | | | | |
| 1120.29 | 6.3144 | | | | |
| 1120.55 | 6.3146 | | | | |
| 1121.30 | 6.3161 | | | | |
| 1129.67 | 7.3862 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 3.2042 | | | | |
| 1177.95 | 8.5559 | | | | |
| 1189.05 | 3.2181 | | | | |
| 1204.77 | 4.3090 | | | | |
| 1221.41 | 4.3283 | | | | |
| 1231.02 | 3.2544 | | | | |
| 1235.36 | 5.4304 | | | | |
| 1238.28 | 3.2607 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.6548 | | | | |
| 1274.44 | 1.0972 | | | | |
| 1274.54 | 1.0972 | | | | |
| 1291.59 | 0.9183 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:56.56

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017835.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM40.CNF;32
                                      Background date  : 9-FEB-2014 11:23:11.
Sample date      : 7-NOV-2013 09:30:00. Acquisition date : 10-FEB-2014 13:21:47
Sample ID        : G1203017835          Sample quantity  : 1.46340E+02 GRAM
Detector name    : GAM40                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.36  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.98* | 2 | 22 | 0.91 | 127.93 | 125 | 5 | 5.19E-04 | 429.6 | |
| 2 | 4 | 92.84* | 12 | 18 | 1.13 | 185.65 | 181 | 8 | 3.43E-03 | 85.4 | 3.48E+00 |
| 3 | 1 | 173.89 | 10 | 26 | 1.22 | 347.78 | 344 | 20 | 2.89E-03 | 82.5 | 1.07E+01 |
| 4 | 1 | 176.11 | 13 | 23 | 1.22 | 352.22 | 344 | 20 | 3.70E-03 | 61.3 | |
| 5 | 1 | 177.39 | 11 | 22 | 1.22 | 354.78 | 344 | 20 | 3.17E-03 | 72.6 | |
| 6 | 0 | 185.90* | 16 | 29 | 1.44 | 371.81 | 367 | 9 | 4.50E-03 | 72.9 | |
| 7 | 0 | 191.09 | 16 | 14 | 1.03 | 382.19 | 379 | 7 | 4.44E-03 | 46.1 | |
| 8 | 0 | 196.31* | 12 | 40 | 1.34 | 392.63 | 386 | 13 | 3.44E-03 | 111.3 | |
| 9 | 0 | 239.56* | 43 | 39 | 1.33 | 479.15 | 471 | 15 | 1.20E-02 | 36.7 | |
| 10 | 6 | 295.43 | 18 | 19 | 2.18 | 590.90 | 586 | 14 | 4.92E-03 | 50.0 | 3.44E+00 |
| 11 | 6 | 298.48 | 10 | 12 | 1.57 | 596.99 | 586 | 14 | 2.68E-03 | 65.9 | |
| 12 | 0 | 302.25 | 23 | 9 | 2.26 | 604.54 | 600 | 9 | 6.25E-03 | 31.8 | |
| 13 | 0 | 354.43 | 37 | 26 | 7.67 | 708.92 | 700 | 20 | 1.03E-02 | 39.2 | |
| 14 | 0 | 409.47 | 7 | 8 | 0.72 | 819.01 | 815 | 7 | 2.03E-03 | 75.4 | |
| 15 | 0 | 425.65 | 8 | 15 | 4.21 | 851.37 | 841 | 12 | 2.26E-03 | 101.2 | |
| 16 | 0 | 481.46 | 8 | 12 | 0.58 | 963.02 | 957 | 10 | 2.17E-03 | 91.5 | |
| 17 | 0 | 510.85* | 21 | 8 | 2.90 | 1021.80 | 1013 | 18 | 5.91E-03 | 57.2 | |
| 18 | 0 | 518.62 | 9 | 3 | 0.93 | 1037.35 | 1034 | 6 | 2.55E-03 | 44.3 | |
| 19 | 0 | 609.03* | 17 | 10 | 0.93 | 1218.19 | 1212 | 10 | 4.58E-03 | 46.0 | |
| 20 | 0 | 637.17 | 10 | 7 | 0.83 | 1274.49 | 1269 | 10 | 2.76E-03 | 60.1 | |
| 21 | 0 | 713.52 | 12 | 2 | 0.64 | 1427.21 | 1422 | 10 | 3.24E-03 | 38.5 | |
| 22 | 0 | 1460.34* | 27 | 0 | 0.87 | 2921.13 | 2915 | 12 | 7.54E-03 | 21.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 14:22:58

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017835.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 09:30:00 | Acquisition date | : 10-FEB-2014 13:21:47 |
| Sample ID | : G1203017835 | Sample quantity | : 146.34 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA40 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.36 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 27 | 10.66* | 1.017E+00 | 1.284E+00 | 1.284E+00 | 42.87 |
| RA-224 | 240.99 | 43 | 4.10* | 4.085E+00 | 1.325E+00 | 1.325E+00 | 73.43 |
| PA-231 | 283.69 | ------ | 1.70* | 3.653E+00 | ------ | Line Not Found | ------ |
| | 301.36 | 23 | 5.35 | 3.500E+00 | 6.165E-01 | 6.165E-01 | 63.63 |
| TH-234 | 63.29 | 2 | 3.70* | 1.550E+00 | 1.673E-01 | 1.673E-01 | 859.26 |
| | 92.59 | 12 | 4.23 | 4.146E+00 | 3.612E-01 | 3.612E-01 | 170.82 |
| U-238 | 63.29 | 2 | 3.70* | 1.550E+00 | 1.673E-01 | 1.673E-01 | 859.26 |
| | 92.59 | 12 | 4.23 | 4.146E+00 | 3.612E-01 | 3.612E-01 | 170.82 |
| ANH-511 | 511.00 | 21 | 100.00* | 2.435E+00 | 4.484E-02 | 4.484E-02 | 114.39 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:58.85

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017835.CNF;1 | | |
| Acquisition date | : 10-FEB-2014 13:21:47 | Sensitivity | : 3.000 |
| Detector ID | : GAM40 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.36 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 09:30:00 | Nuclide Library | : SOLID |
| Sample ID | : G1203017835 | Analyst initials | : RXF2 |
| Batch Number | : 1359492 | Sample Quantity | : 1.4634E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 27-AUG-2013 12:36:50 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM40_500MLMB.CNF;1 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.284E+00 | 5.395E-01 | 4.076E-01 |
| RA-224 | 1.325E+00 | 9.538E-01 | 6.217E-01 |
| PA-231 | -6.873E-02 | 8.454E-01 | 1.652E+00 |
| TH-234 | 1.673E-01 | 1.408E+00 | 2.417E+00 |
| U-238 | 1.673E-01 | 1.408E+00 | 2.417E+00 |
| ANH-511 | 4.484E-02 | 5.027E-02 | 3.964E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -4.821E-01 | 7.870E-01 | 1.120E+00 | NOT IDENT. |
| NA-22 | 3.020E-02 | 3.092E-02 | 7.796E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.827E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.595E-03 | 2.217E-02 | 6.079E-02 | NOT IDENT. |
| SC-46 | -2.535E-02 | 5.861E-02 | 1.081E-01 | NOT IDENT. |
| V-48 | -1.247E+00 | 1.752E+00 | 2.977E+00 | NOT IDENT. |
| CR-51 | -1.027E+00 | 1.952E+00 | 3.495E+00 | NOT IDENT. |
| MN-54 | 4.664E-03 | 2.423E-02 | 5.365E-02 | NOT IDENT. |
| CO-56 | 1.739E-02 | 5.303E-02 | 1.170E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 7.135E-03 | 2.144E-02 | 4.123E-02 | NOT IDENT. |
| CO-58 | -2.299E-02 | 5.903E-02 | 1.114E-01 | NOT IDENT. |
| FE-59 | -1.649E-01 | 2.024E-01 | 3.238E-01 | NOT IDENT. |
| CO-60 | -1.676E-02 | 2.674E-02 | 4.480E-02 | NOT IDENT. |
| ZN-65 | -7.507E-02 | 7.506E-02 | 1.119E-01 | NOT IDENT. |
| GE-68 | -2.296E-01 | 9.911E-01 | 1.944E+00 | NOT IDENT. |
| AS-73 | 3.313E-01 | 1.945E+00 | 3.920E+00 | NOT IDENT. |
| AS-74 | -1.883E+00 | 1.872E+00 | 2.886E+00 | NOT IDENT. |
| SE-75 | 2.563E-03 | 5.498E-02 | 1.058E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 1.925E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.025E+00 | 1.914E+00 | 3.509E+00 | NOT IDENT. |
| RB-83 | 1.202E-01 | 1.093E-01 | 2.318E-01 | NOT IDENT. |
| KR-85 | 8.250E+00 | 6.031E+00 | 1.187E+01 | NOT IDENT. |
| SR-85 | 1.011E-01 | 7.410E-02 | 1.458E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 2.079E-01 | 9.768E+00 | 2.054E+01 | NOT IDENT. |
| Y-88 | -1.152E-02 | 4.933E-02 | 1.039E-01 | NOT IDENT. |
| Y-91 | -2.376E+01 | 4.112E+01 | 7.096E+01 | NOT IDENT. |
| NB-94 | 1.192E-02 | 2.455E-02 | 5.314E-02 | NOT IDENT. |
| NB-95 | 4.475E-02 | 5.635E-02 | 1.359E-01 | NOT IDENT. |
| NB-95M | -1.200E-01 | 2.353E-01 | 3.666E-01 | NOT IDENT. |
| ZR-95 | 3.444E-02 | 1.171E-01 | 2.524E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.620E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 4.471E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -3.239E-03 | 2.470E-02 | 4.441E-02 | NOT IDENT. |
| RH-102 | -9.226E-03 | 4.292E-02 | 6.866E-02 | NOT IDENT. |
| RU-103 | -1.321E-02 | 1.073E-01 | 2.062E-01 | FAIL ABUN |
| RH-106 | -1.028E-01 | 2.960E-01 | 5.270E-01 | NOT IDENT. |
| RU-106 | -1.028E-01 | 2.960E-01 | 5.270E-01 | NOT IDENT. |
| AG-108M | -1.243E-02 | 1.924E-02 | 3.316E-02 | NOT IDENT. |
| CD-109 | 6.466E-01 | 6.917E-01 | 1.310E+00 | NOT IDENT. |
| AG-110M | 2.930E-02 | 4.618E-02 | 1.046E-01 | NOT IDENT. |
| SN-113 | 1.270E-02 | 5.611E-02 | 1.108E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 5.241E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -7.126E-01 | 2.339E+00 | 4.059E+00 | NOT IDENT. |
| TE-123M | 1.641E-02 | 3.125E-02 | 6.029E-02 | NOT IDENT. |
| SB-124 | 1.041E-01 | 1.541E-01 | 4.237E-01 | NOT IDENT. |
| SB-125 | -8.967E-03 | 8.740E-02 | 1.433E-01 | FAIL ABUN |
| TE-125M | 1.831E+01 | 1.970E+01 | 3.973E+01 | NOT IDENT. |
| I-126 | -1.795E+00 | 1.125E+01 | 2.107E+01 | NOT IDENT. |
| SB-126 | -5.267E+00 | 7.378E+00 | 1.297E+01 | NOT IDENT. |
| SN-126 | 2.301E-02 | 5.955E-02 | 1.104E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.623E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.191E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.802E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 8.362E-03 | 3.290E-02 | 6.510E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | 2.623E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 6.682E-03 | 2.643E-02 | 5.809E-02 | NOT IDENT. |
| CS-135 | -4.554E-03 | 1.186E-01 | 2.257E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.812E-01 | 5.073E+00 | 1.007E+01 | FAIL ABUN |
| BA-137M | 5.687E-03 | 2.415E-02 | 4.938E-02 | NOT IDENT. |
| CS-137 | 6.008E-03 | 2.552E-02 | 5.217E-02 | NOT IDENT. |
| CE-139 | -2.813E-03 | 2.867E-02 | 5.187E-02 | NOT IDENT. |
| BA-140 | 1.299E+00 | 4.441E+00 | 1.111E+01 | NOT IDENT. |
| LA-140 | 1.299E+00 | 4.441E+00 | 1.111E+01 | NOT IDENT. |
| CE-141 | 7.122E-04 | 2.427E-01 | 4.423E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.944E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -2.578E-02 | 1.894E-01 | 3.384E-01 | NOT IDENT. |
| PM-144 | 6.079E-04 | 2.755E-02 | 5.619E-02 | NOT IDENT. |
| PR-144 | 5.744E-02 | 2.152E+00 | 4.392E+00 | NOT IDENT. |
| PM-146 | -4.961E-03 | 3.594E-02 | 6.695E-02 | NOT IDENT. |
| ND-147 | -4.353E+01 | 6.469E+01 | 1.087E+02 | NOT IDENT. |
| PM-147 | -8.180E+01 | 5.599E+02 | 1.013E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 4.719E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.938E-02 | 2.036E-02 | 3.381E-02 | NOT IDENT. |
| EU-152 | 2.467E-03 | 5.716E-02 | 1.143E-01 | NOT IDENT. |
| GD-153 | -6.505E-02 | 7.350E-02 | 1.212E-01 | NOT IDENT. |
| EU-154 | 8.478E-02 | 8.490E-02 | 2.142E-01 | NOT IDENT. |
| EU-155 | 1.001E-02 | 7.759E-02 | 1.462E-01 | NOT IDENT. |
| TB-160 | -1.039E-02 | 2.138E-01 | 4.295E-01 | FAIL ABUN |
| HO-166M | -8.599E-03 | 5.613E-02 | 9.395E-02 | FAIL ABUN |
| TM-171 | -1.247E+01 | 2.600E+01 | 4.710E+01 | NOT IDENT. |
| LU-176 | 1.158E-02 | 2.388E-02 | 4.335E-02 | NOT IDENT. |
| HF-181 | 9.312E-02 | 1.670E-01 | 2.576E-01 | FAIL ABUN |
| TA-182 | 4.571E-02 | 2.146E-01 | 4.511E-01 | NOT IDENT. |
| RE-183 | 2.034E-01 | 5.682E-01 | 1.117E+00 | NOT IDENT. |
| RE-184 | 7.344E-02 | 3.922E-01 | 8.453E-01 | NOT IDENT. |
| W-188 | -3.815E+00 | 1.273E+01 | 2.048E+01 | FAIL ABUN |
| IR-192 | 2.176E-02 | 5.499E-02 | 1.111E-01 | FAIL ABUN |
| HG-203 | 1.908E-02 | 8.637E-02 | 1.718E-01 | NOT IDENT. |
| BI-207 | 6.380E-03 | 3.926E-02 | 8.422E-02 | NOT IDENT. |
| TL-208 | 2.207E-03 | 3.117E-02 | 6.224E-02 | NOT IDENT. |
| PB-210 | 2.240E+00 | 8.226E+00 | 1.583E+01 | NOT IDENT. |
| BI-211 | 1.283E-01 | 1.980E-01 | 3.740E-01 | NOT IDENT. |
| PB-211 | -3.716E-02 | 5.583E-01 | 9.376E-01 | FAIL ABUN |
| BI-212 | -3.833E-02 | 3.303E-01 | 6.626E-01 | NOT IDENT. |
| PB-212 | 0.000E+00 | 8.969E-02 | 1.125E-01 | FAIL ABUN |
| BI-214 | 8.693E-02 | 7.844E-02 | 1.492E-01 | FAIL ABUN |
| PB-214 | 3.830E-02 | 6.684E-02 | 1.351E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | 1.864E-02 | 2.909E-01 | 5.679E-01 | NOT IDENT. |
| RN-222 | 8.693E-02 | 7.844E-02 | 1.492E-01 | FAIL ABUN |
| RA-223 | -2.683E-01 | 4.591E-01 | 8.130E-01 | NOT IDENT. |
| RA-226 | 8.693E-02 | 7.844E-02 | 1.492E-01 | FAIL ABUN |
| AC-227 | -6.059E-02 | 2.042E-01 | 3.767E-01 | NOT IDENT. |
| TH-227 | -6.059E-02 | 2.042E-01 | 3.767E-01 | NOT IDENT. |
| AC-228 | -5.104E-02 | 1.255E-01 | 2.407E-01 | NOT IDENT. |
| RA-228 | -5.104E-02 | 1.255E-01 | 2.407E-01 | NOT IDENT. |
| TH-228 | 0.000E+00 | 8.969E-02 | 1.125E-01 | FAIL ABUN |
| TH-229 | 4.121E-01 | 4.289E-01 | 7.069E-01 | NOT IDENT. |
| TH-230 | 8.692E-02 | 7.843E-02 | 1.492E-01 | FAIL ABUN |
| TH-231 | -2.683E-01 | 4.591E-01 | 8.130E-01 | NOT IDENT. |
| TH-232 | -5.104E-02 | 1.255E-01 | 2.407E-01 | NOT IDENT. |
| PA-233 | -3.374E-02 | 5.045E-02 | 8.822E-02 | NOT IDENT. |
| PA-234 | 1.687E-01 | 1.571E-01 | 4.262E-01 | NOT IDENT. |
| PA-234M | -2.086E+00 | 3.500E+00 | 6.131E+00 | NOT IDENT. |
| U-234 | 8.692E-02 | 7.843E-02 | 1.492E-01 | FAIL ABUN |
| U-235 | -2.924E-02 | 1.479E-01 | 2.663E-01 | FAIL ABUN |
| NP-237 | -3.374E-02 | 5.045E-02 | 8.822E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.948E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | 1.373E-01 | 2.926E-01 | 5.677E-01 | NOT IDENT. |
| PU-239 | 3.442E+01 | 2.560E+02 | 4.733E+02 | NOT IDENT. |
| AM-241 | 2.389E-01 | 1.897E-01 | 3.955E-01 | NOT IDENT. |
| AM-243 | -8.820E-03 | 5.024E-02 | 9.112E-02 | NOT IDENT. |
| CM-243 | 3.137E-02 | 7.543E-02 | 1.473E-01 | NOT IDENT. |
| CM-247 | -6.669E-04 | 2.627E-02 | 5.069E-02 | NOT IDENT. |
| CF-249 | 2.075E-02 | 3.461E-02 | 7.030E-02 | NOT IDENT. |
| CF-251 | 7.001E-02 | 9.959E-02 | 1.695E-01 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:54.96

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.98 | 9 | 22 | 0.91 | 127.93 | 125 | 5 | 2.60E-03 | 82.1 | |
| 2 | 4 | 91.11 | 12 | 6 | 1.46 | 182.21 | 181 | 8 | 3.30E-03 | 34.4 | 3.48E+00 |
| 3 | 4 | 92.84 | 40 | 18 | 1.13 | 185.65 | 181 | 8 | 1.12E-02 | 24.8 | |
| 4 | 1 | 173.89 | 10 | 26 | 1.22 | 347.78 | 344 | 20 | 2.89E-03 | 82.5 | 1.07E+01 |
| 5 | 1 | 176.11 | 13 | 23 | 1.22 | 352.22 | 344 | 20 | 3.70E-03 | 61.3 | |
| 6 | 1 | 177.39 | 11 | 22 | 1.22 | 354.78 | 344 | 20 | 3.17E-03 | 72.6 | |
| 7 | 0 | 185.90 | 36 | 29 | 1.44 | 371.81 | 367 | 9 | 1.00E-02 | 31.8 | |
| 8 | 0 | 191.09 | 16 | 14 | 1.03 | 382.19 | 379 | 7 | 4.44E-03 | 46.1 | |
| 9 | 0 | 196.31 | 18 | 40 | 1.34 | 392.63 | 386 | 13 | 4.96E-03 | 76.1 | |
| 10 | 0 | 239.56 | 52 | 39 | 1.33 | 479.15 | 471 | 15 | 1.46E-02 | 29.9 | |
| 11 | 6 | 295.43 | 18 | 19 | 2.18 | 590.90 | 586 | 14 | 4.92E-03 | 50.0 | 3.44E+00 |
| 12 | 6 | 298.48 | 10 | 12 | 1.57 | 596.99 | 586 | 14 | 2.68E-03 | 65.9 | |
| 13 | 0 | 302.25 | 23 | 9 | 2.26 | 604.54 | 600 | 9 | 6.25E-03 | 31.8 | |
| 14 | 0 | 354.43 | 37 | 26 | 7.67 | 708.92 | 700 | 20 | 1.03E-02 | 39.2 | |
| 15 | 0 | 409.47 | 7 | 8 | 0.72 | 819.01 | 815 | 7 | 2.03E-03 | 75.4 | |
| 16 | 0 | 425.65 | 8 | 15 | 4.21 | 851.37 | 841 | 12 | 2.26E-03 | 101.2 | |
| 17 | 0 | 481.46 | 8 | 12 | 0.58 | 963.02 | 957 | 10 | 2.17E-03 | 91.5 | |
| 18 | 0 | 510.85 | 89 | 8 | 2.90 | 1021.80 | 1013 | 18 | 2.46E-02 | 13.2 | |
| 19 | 0 | 518.62 | 9 | 3 | 0.93 | 1037.35 | 1034 | 6 | 2.55E-03 | 44.3 | |
| 20 | 0 | 609.03 | 20 | 10 | 0.93 | 1218.19 | 1212 | 10 | 5.68E-03 | 36.3 | |
| 21 | 0 | 637.17 | 10 | 7 | 0.83 | 1274.49 | 1269 | 10 | 2.76E-03 | 60.1 | |
| 22 | 0 | 713.52 | 12 | 2 | 0.64 | 1427.21 | 1422 | 10 | 3.24E-03 | 38.5 | |
| 23 | 0 | 1460.34 | 32 | 0 | 0.87 | 2921.13 | 2915 | 12 | 8.89E-03 | 17.7 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:22:57.10

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 27 | 10.66* | 1.017E+00 | 1.284E+00 | 1.284E+00 | 42.87 |
| RA-224 | 240.99 | 43 | 4.10* | 4.085E+00 | 1.325E+00 | 1.325E+00 | 73.43 |
| PA-231 | 283.69 | ------ | 1.70* | 3.653E+00 | ------ | Line Not Found | ------ |
| | 301.36 | 23 | 5.35 | 3.500E+00 | 6.165E-01 | 6.165E-01 | 63.63 |
| TH-234 | 63.29 | 2 | 3.70* | 1.550E+00 | 1.673E-01 | 1.673E-01 | 859.26 |
| | 92.59 | 12 | 4.23 | 4.146E+00 | 3.612E-01 | 3.612E-01 | 170.82 |
| U-238 | 63.29 | 2 | 3.70* | 1.550E+00 | 1.673E-01 | 1.673E-01 | 859.26 |
| | 92.59 | 12 | 4.23 | 4.146E+00 | 3.612E-01 | 3.612E-01 | 170.82 |
| ANH-511 | 511.00 | 21 | 100.00* | 2.435E+00 | 4.484E-02 | 4.484E-02 | 114.39 |

Flag: "*" = Keyline

Sample ID : G1203017835 Acquisition date : 10-FEB-2014 13:21:47

Total number of lines in spectrum 22
Number of unidentified lines 4
Number of lines tentatively identified by NID 18 81.82%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.284E+00 | 1.284E+00 | 0.550E+00 | 42.87 | |
| RA-224 | 1.41E+10Y | 1.00 | 1.325E+00 | 1.325E+00 | 0.973E+00 | 73.43 | |
| PA-231 | 7.04E+08Y | 1.00 | 6.165E-01 | 6.165E-01 | 3.923E-01 | 63.63 | K |
| TH-234 | 4.47E+09Y | 1.00 | 1.673E-01 | 1.673E-01 | 14.37E-01 | 859.26 | |
| U-238 | 4.47E+09Y | 1.00 | 1.673E-01 | 1.673E-01 | 14.37E-01 | 859.26 | |
| ANH-511 | 1.00E+09Y | 1.00 | 4.484E-02 | 4.484E-02 | 5.129E-02 | 114.39 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 3.605E+00 | 3.605E+00 | | | |
| | Grand Total Activity : | | 3.605E+00 | 3.605E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203017835 Acquisition date : 10-FEB-2014 13:21:47

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 173.89 | 10 | 26 | 1.22 | 347.78 | 344 | 20 | 2.89E-03 | **** | 4.89E+00 | |
| 1 | 176.11 | 13 | 23 | 1.22 | 352.22 | 344 | 20 | 3.70E-03 | **** | 4.86E+00 | T |
| 1 | 177.39 | 11 | 22 | 1.22 | 354.78 | 344 | 20 | 3.17E-03 | **** | 4.84E+00 | T |
| 0 | 185.90 | 16 | 29 | 1.44 | 371.81 | 367 | 9 | 4.50E-03 | **** | 4.74E+00 | T |
| 0 | 191.09 | 16 | 14 | 1.03 | 382.19 | 379 | 7 | 4.44E-03 | 92.3 | 4.67E+00 | |
| 0 | 196.31 | 12 | 40 | 1.34 | 392.63 | 386 | 13 | 3.44E-03 | **** | 4.60E+00 | T |
| 6 | 295.43 | 18 | 19 | 2.18 | 590.90 | 586 | 14 | 4.92E-03 | **** | 3.55E+00 | T |
| 6 | 298.48 | 10 | 12 | 1.57 | 596.99 | 586 | 14 | 2.68E-03 | **** | 3.53E+00 | T |
| 0 | 354.43 | 37 | 26 | 7.67 | 708.92 | 700 | 20 | 1.03E-02 | 78.4 | 3.14E+00 | T |
| 0 | 409.47 | 7 | 8 | 0.72 | 819.01 | 815 | 7 | 2.03E-03 | **** | 2.84E+00 | T |
| 0 | 425.65 | 8 | 15 | 4.21 | 851.37 | 841 | 12 | 2.26E-03 | **** | 2.77E+00 | T |
| 0 | 481.46 | 8 | 12 | 0.58 | 963.02 | 957 | 10 | 2.17E-03 | **** | 2.54E+00 | T |
| 0 | 518.62 | 9 | 3 | 0.93 | 1037.35 | 1034 | 6 | 2.55E-03 | 88.6 | 2.41E+00 | |
| 0 | 609.03 | 17 | 10 | 0.93 | 1218.19 | 1212 | 10 | 4.58E-03 | 92.1 | 2.14E+00 | T |
| 0 | 637.17 | 10 | 7 | 0.83 | 1274.49 | 1269 | 10 | 2.76E-03 | **** | 2.07E+00 | T |
| 0 | 713.52 | 12 | 2 | 0.64 | 1427.21 | 1422 | 10 | 3.24E-03 | 77.1 | 1.90E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:23:09.93

```
*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                           DETECTOR AND SAMPLE DATA                             *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017835.CNF;1     *
* Acquisition date : 10-FEB-2014 13:21:47 Sensitivity     : 3.000                *
* Detector ID      : GAM40                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 09:30:00 Nuclide Library : SOLID                *
* Sample ID        : G1203017835          Analyst initials: RXF2                 *
* Batch Number     : 1359492              Sample Quantity : 1.4634E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                           CALIBRATION INFORMATION                              *
*                                                                                *
* Eff. Cal. date   : 27-AUG-2013 12:36:50 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM40_500MLMB.CNF;1              *
*********************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.397E-01 |
| RA-224 | 2.693E-01 |
| PA-231 | 7.146E-01 |
| TH-234 | 1.082E+00 |
| U-238 | 1.082E+00 |
| ANH-511 | 1.697E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 4.704E-01 | NOT IDENT. |
| NA-22 | 3.249E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.236E-02 | NOT IDENT. |
| SC-46 | 4.440E-02 | NOT IDENT. |
| V-48 | 1.190E+00 | NOT IDENT. |
| CR-51 | 1.523E+00 | NOT IDENT. |
| MN-54 | 2.168E-02 | NOT IDENT. |
| CO-56 | 4.858E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.860E-02 | NOT IDENT. |
| CO-58 | 4.536E-02 | NOT IDENT. |
| FE-59 | 1.205E-01 | NOT IDENT. |
| CO-60 | 1.587E-02 | NOT IDENT. |
| ZN-65 | 4.202E-02 | NOT IDENT. |
| GE-68 | 7.659E-01 | NOT IDENT. |
| AS-73 | 1.710E+00 | NOT IDENT. |
| AS-74 | 1.222E+00 | NOT IDENT. |
| SE-75 | 4.758E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.404E+00 | NOT IDENT. |
| RB-83 | 1.021E-01 | NOT IDENT. |
| KR-85 | 5.267E+00 | NOT IDENT. |
| SR-85 | 6.467E-02 | NOT IDENT. |
| RB-86 | 8.196E+00 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 3.681E-02 | NOT IDENT. |
| Y-91 | 2.864E+01 | NOT IDENT. |
| NB-94 | 2.295E-02 | NOT IDENT. |
| NB-95 | 5.706E-02 | NOT IDENT. |
| NB-95M | 1.644E-01 | NOT IDENT. |
| ZR-95 | 1.065E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.013E-02 | NOT IDENT. |
| RH-102 | 2.810E-02 | NOT IDENT. |
| RU-103 | 8.664E-02 | FAIL ABUN |
| RH-106 | 2.240E-01 | NOT IDENT. |
| RU-106 | 2.240E-01 | NOT IDENT. |
| AG-108M | 1.377E-02 | NOT IDENT. |
| CD-109 | 5.987E-01 | NOT IDENT. |
| AG-110M | 4.447E-02 | NOT IDENT. |
| SN-113 | 4.897E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.827E+00 | NOT IDENT. |
| TE-123M | 2.731E-02 | NOT IDENT. |
| SB-124 | 1.637E-01 | NOT IDENT. |
| SB-125 | 6.267E-02 | FAIL ABUN |
| TE-125M | 1.821E+01 | NOT IDENT. |
| I-126 | 8.801E+00 | NOT IDENT. |
| SB-126 | 5.054E+00 | NOT IDENT. |
| SN-126 | 5.029E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.893E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.394E-02 | NOT IDENT. |
| CS-135 | 1.015E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.079E+00 | FAIL ABUN |
| BA-137M | 2.083E-02 | NOT IDENT. |
| CS-137 | 2.201E-02 | NOT IDENT. |
| CE-139 | 2.313E-02 | NOT IDENT. |
| BA-140 | 4.196E+00 | NOT IDENT. |
| LA-140 | 4.196E+00 | NOT IDENT. |
| CE-141 | 2.001E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.541E-01 | NOT IDENT. |
| PM-144 | 2.377E-02 | NOT IDENT. |
| PR-144 | 1.859E+00 | NOT IDENT. |
| PM-146 | 2.932E-02 | NOT IDENT. |
| ND-147 | 4.525E+01 | NOT IDENT. |
| PM-147 | 4.558E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.469E-02 | NOT IDENT. |
| EU-152 | 4.892E-02 | NOT IDENT. |
| GD-153 | 5.345E-02 | NOT IDENT. |
| EU-154 | 8.942E-02 | NOT IDENT. |
| EU-155 | 6.591E-02 | NOT IDENT. |
| TB-160 | 1.788E-01 | FAIL ABUN |
| HO-166M | 4.023E-02 | FAIL ABUN |
| TM-171 | 2.054E+01 | NOT IDENT. |
| LU-176 | 1.954E-02 | NOT IDENT. |
| HF-181 | 1.127E-01 | FAIL ABUN |
| TA-182 | 1.871E-01 | NOT IDENT. |
| RE-183 | 5.056E-01 | NOT IDENT. |
| RE-184 | 3.473E-01 | NOT IDENT. |
| W-188 | 9.005E+00 | FAIL ABUN |
| IR-192 | 4.953E-02 | FAIL ABUN |
| HG-203 | 7.642E-02 | NOT IDENT. |
| BI-207 | 3.518E-02 | NOT IDENT. |
| TL-208 | 2.744E-02 | NOT IDENT. |
| PB-210 | 7.191E+00 | NOT IDENT. |
| BI-211 | 1.701E-01 | NOT IDENT. |
| PB-211 | 4.048E-01 | FAIL ABUN |
| BI-212 | 2.756E-01 | NOT IDENT. |
| PB-212 | 5.236E-02 | FAIL ABUN |
| BI-214 | 6.750E-02 | FAIL ABUN |
| PB-214 | 6.139E-02 | FAIL ABUN |
| RN-219 | 2.475E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RN-222 | 6.750E-02 | FAIL ABUN |
| RA-223 | 3.545E-01 | NOT IDENT. |
| RA-226 | 6.750E-02 | FAIL ABUN |
| AC-227 | 1.697E-01 | NOT IDENT. |
| TH-227 | 1.697E-01 | NOT IDENT. |
| AC-228 | 1.030E-01 | NOT IDENT. |
| RA-228 | 1.030E-01 | NOT IDENT. |
| TH-228 | 5.236E-02 | FAIL ABUN |
| TH-229 | 3.196E-01 | NOT IDENT. |
| TH-230 | 6.749E-02 | FAIL ABUN |
| TH-231 | 3.545E-01 | NOT IDENT. |
| TH-232 | 1.030E-01 | NOT IDENT. |
| PA-233 | 3.886E-02 | NOT IDENT. |
| PA-234 | 1.745E-01 | NOT IDENT. |
| PA-234M | 2.485E+00 | NOT IDENT. |
| U-234 | 6.749E-02 | FAIL ABUN |
| U-235 | 1.210E-01 | FAIL ABUN |
| NP-237 | 3.886E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 2.579E-01 | NOT IDENT. |
| PU-239 | 2.155E+02 | NOT IDENT. |
| AM-241 | 1.805E-01 | NOT IDENT. |
| AM-243 | 4.168E-02 | NOT IDENT. |
| CM-243 | 6.653E-02 | NOT IDENT. |
| CM-247 | 2.200E-02 | NOT IDENT. |
| CF-249 | 3.159E-02 | NOT IDENT. |
| CF-251 | 7.651E-02 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 14:23:14.72

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017835.CNF;1   *
* Acquisition date : 10-FEB-2014 13:21:47 Sensitivity     : 3.000          *
* Detector ID      : GAM40                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 09:30:00 Nuclide Library : SOLID          *
* Sample ID        : G1203017835          Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.4634E+02 GRAM   *
*                                         Quantity Err(%) : 1.3667E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 27-AUG-2013 12:36:50 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM40_500MLMB.CNF;1       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.284E+00 | 5.510E-01 | 5.510E-01 |
| RA-224 | 1.325E+00 | 9.612E-01 | 9.612E-01 |
| PA-231 | -6.873E-02 | 8.454E-01 | 8.454E-01 |
| TH-234 | 1.673E-01 | 1.409E+00 | 1.409E+00 |
| U-238 | 1.673E-01 | 1.409E+00 | 1.409E+00 |
| ANH-511 | 4.484E-02 | 5.043E-02 | 5.043E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -4.821E-01 | 7.882E-01 | 8.176E-01 | NOT IDENT. |
| NA-22 | 3.020E-02 | 3.102E-02 | 3.388E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.834E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.595E-03 | 2.219E-02 | 2.261E-02 | NOT IDENT. |
| SC-46 | -2.535E-02 | 5.869E-02 | 5.980E-02 | NOT IDENT. |
| V-48 | -1.247E+00 | 1.760E+00 | 1.847E+00 | NOT IDENT. |
| CR-51 | -1.027E+00 | 1.954E+00 | 2.008E+00 | NOT IDENT. |
| MN-54 | 4.664E-03 | 2.424E-02 | 2.433E-02 | NOT IDENT. |
| CO-56 | 1.739E-02 | 5.307E-02 | 5.364E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 3.005E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 7.135E-03 | 2.145E-02 | 2.169E-02 | NOT IDENT. |
| CO-58 | -2.299E-02 | 5.908E-02 | 5.998E-02 | NOT IDENT. |
| FE-59 | -1.649E-01 | 2.040E-01 | 2.171E-01 | NOT IDENT. |
| CO-60 | -1.676E-02 | 2.677E-02 | 2.782E-02 | NOT IDENT. |
| ZN-65 | -7.507E-02 | 7.582E-02 | 8.303E-02 | NOT IDENT. |
| GE-68 | -2.296E-01 | 9.916E-01 | 9.970E-01 | NOT IDENT. |
| AS-73 | 3.313E-01 | 1.947E+00 | 1.952E+00 | NOT IDENT. |
| AS-74 | -1.883E+00 | 1.883E+00 | 2.066E+00 | NOT IDENT. |
| SE-75 | 2.563E-03 | 5.498E-02 | 5.499E-02 | NOT IDENT. |
| BR-77 | 2.675E+11 | 7.600E+11 | 7.695E+11 | SHORT HLIF |
| SR-82 | -1.025E+00 | 1.917E+00 | 1.972E+00 | NOT IDENT. |
| RB-83 | 1.202E-01 | 1.109E-01 | 1.235E-01 | NOT IDENT. |
| KR-85 | 8.250E+00 | 6.076E+00 | 7.124E+00 | NOT IDENT. |
| SR-85 | 1.011E-01 | 7.464E-02 | 8.745E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 2.079E-01 | 9.768E+00 | 9.768E+00 | NOT IDENT. |
| Y-88 | -1.152E-02 | 4.934E-02 | 4.961E-02 | NOT IDENT. |
| Y-91 | -2.376E+01 | 4.117E+01 | 4.254E+01 | NOT IDENT. |
| NB-94 | 1.192E-02 | 2.457E-02 | 2.515E-02 | NOT IDENT. |
| NB-95 | 4.475E-02 | 5.652E-02 | 6.001E-02 | NOT IDENT. |
| NB-95M | -1.200E-01 | 2.357E-01 | 2.418E-01 | NOT IDENT. |
| ZR-95 | 3.444E-02 | 1.172E-01 | 1.182E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 7.075E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 2.269E+40 | 2.628E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -2.501E+09 | 4.478E+09 | 4.618E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.363E+42 | 0.000E+00 | SHORT HLIF |
| RH-101 | -3.239E-03 | 2.471E-02 | 2.475E-02 | NOT IDENT. |
| RH-102 | -9.226E-03 | 4.293E-02 | 4.314E-02 | NOT IDENT. |
| RU-103 | -1.321E-02 | 1.073E-01 | 1.075E-01 | FAIL ABUN |
| RH-106 | -1.028E-01 | 2.962E-01 | 2.998E-01 | NOT IDENT. |
| RU-106 | -1.028E-01 | 2.962E-01 | 2.998E-01 | NOT IDENT. |
| AG-108M | -1.243E-02 | 1.928E-02 | 2.007E-02 | NOT IDENT. |
| CD-109 | 6.466E-01 | 6.955E-01 | 7.541E-01 | NOT IDENT. |
| AG-110M | 2.930E-02 | 4.632E-02 | 4.817E-02 | NOT IDENT. |
| SN-113 | 1.270E-02 | 5.612E-02 | 5.641E-02 | NOT IDENT. |
| CD-115 | 3.776E+11 | 5.258E+11 | 5.527E+11 | SHORT HLIF |
| SN-117M | -7.126E-01 | 2.340E+00 | 2.362E+00 | NOT IDENT. |
| TE-123M | 1.641E-02 | 3.128E-02 | 3.215E-02 | NOT IDENT. |
| SB-124 | 1.041E-01 | 1.543E-01 | 1.613E-01 | NOT IDENT. |
| SB-125 | -8.967E-03 | 8.740E-02 | 8.750E-02 | FAIL ABUN |
| TE-125M | 1.831E+01 | 1.977E+01 | 2.142E+01 | NOT IDENT. |
| I-126 | -1.795E+00 | 1.125E+01 | 1.128E+01 | NOT IDENT. |
| SB-126 | -5.267E+00 | 7.412E+00 | 7.783E+00 | NOT IDENT. |
| SN-126 | 2.301E-02 | 5.960E-02 | 6.049E-02 | FAIL ABUN |
| SB-127 | 1.091E+06 | 1.694E+06 | 1.764E+06 | SHORT HLIF |
| I-131 | 1.954E+01 | 7.194E+01 | 7.247E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.394E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 2.489E+06 | 1.803E+07 | 1.806E+07 | SHORT HLIF |
| BA-133 | 8.362E-03 | 3.291E-02 | 3.313E-02 | FAIL ABUN |
| I-133 | -1.210E+31 | 2.716E+31 | 0.000E+00 | SHORT HLIF |
| CS-134 | 6.682E-03 | 2.644E-02 | 2.661E-02 | NOT IDENT. |
| CS-135 | -4.554E-03 | 1.186E-01 | 1.186E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.968E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.812E-01 | 5.074E+00 | 5.083E+00 | FAIL ABUN |
| BA-137M | 5.687E-03 | 2.416E-02 | 2.429E-02 | NOT IDENT. |
| CS-137 | 6.008E-03 | 2.552E-02 | 2.566E-02 | NOT IDENT. |
| CE-139 | -2.813E-03 | 2.868E-02 | 2.871E-02 | NOT IDENT. |
| BA-140 | 1.299E+00 | 4.442E+00 | 4.480E+00 | NOT IDENT. |
| LA-140 | 1.299E+00 | 4.442E+00 | 4.480E+00 | NOT IDENT. |
| CE-141 | 7.122E-04 | 2.427E-01 | 2.427E-01 | NOT IDENT. |
| CE-143 | 3.159E+19 | 2.956E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -2.578E-02 | 1.894E-01 | 1.898E-01 | NOT IDENT. |
| PM-144 | 6.079E-04 | 2.755E-02 | 2.755E-02 | NOT IDENT. |
| PR-144 | 5.744E-02 | 2.152E+00 | 2.152E+00 | NOT IDENT. |
| PM-146 | -4.961E-03 | 3.594E-02 | 3.601E-02 | NOT IDENT. |
| ND-147 | -4.353E+01 | 6.481E+01 | 6.771E+01 | NOT IDENT. |
| PM-147 | -8.180E+01 | 5.600E+02 | 5.612E+02 | NOT IDENT. |
| PM-149 | 3.779E+11 | 4.720E+12 | 4.723E+12 | SHORT HLIF |
| EU-150 | -1.938E-02 | 2.043E-02 | 2.222E-02 | NOT IDENT. |
| EU-152 | 2.467E-03 | 5.716E-02 | 5.717E-02 | NOT IDENT. |
| GD-153 | -6.505E-02 | 7.374E-02 | 7.936E-02 | NOT IDENT. |
| EU-154 | 8.478E-02 | 8.520E-02 | 9.338E-02 | NOT IDENT. |
| EU-155 | 1.001E-02 | 7.760E-02 | 7.773E-02 | NOT IDENT. |
| TB-160 | -1.039E-02 | 2.138E-01 | 2.138E-01 | FAIL ABUN |
| HO-166M | -8.599E-03 | 5.613E-02 | 5.627E-02 | FAIL ABUN |
| TM-171 | -1.247E+01 | 2.604E+01 | 2.664E+01 | NOT IDENT. |
| LU-176 | 1.158E-02 | 2.390E-02 | 2.446E-02 | NOT IDENT. |
| HF-181 | 9.312E-02 | 1.672E-01 | 1.724E-01 | FAIL ABUN |
| TA-182 | 4.571E-02 | 2.146E-01 | 2.156E-01 | NOT IDENT. |
| RE-183 | 2.034E-01 | 5.687E-01 | 5.761E-01 | NOT IDENT. |
| RE-184 | 7.344E-02 | 3.924E-01 | 3.938E-01 | NOT IDENT. |
| W-188 | -3.815E+00 | 1.274E+01 | 1.286E+01 | FAIL ABUN |
| IR-192 | 2.176E-02 | 5.502E-02 | 5.589E-02 | FAIL ABUN |
| HG-203 | 1.908E-02 | 8.638E-02 | 8.681E-02 | NOT IDENT. |
| BI-207 | 6.380E-03 | 3.927E-02 | 3.938E-02 | NOT IDENT. |
| TL-208 | 2.207E-03 | 3.117E-02 | 3.119E-02 | NOT IDENT. |
| PB-210 | 2.240E+00 | 8.229E+00 | 8.291E+00 | NOT IDENT. |
| BI-211 | 1.283E-01 | 1.983E-01 | 2.066E-01 | NOT IDENT. |
| PB-211 | -3.716E-02 | 5.583E-01 | 5.585E-01 | FAIL ABUN |
| BI-212 | -3.833E-02 | 3.303E-01 | 3.307E-01 | NOT IDENT. |
| PB-212 | 1.246E-01 | 9.038E-02 | 1.064E-01 | FAIL ABUN |
| BI-214 | 8.693E-02 | 7.878E-02 | 8.799E-02 | FAIL ABUN |
| PB-214 | 3.830E-02 | 6.692E-02 | 6.912E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | 1.864E-02 | 2.909E-01 | 2.910E-01 | NOT IDENT. |
| RN-222 | 8.693E-02 | 7.878E-02 | 8.799E-02 | FAIL ABUN |
| RA-223 | -2.683E-01 | 4.598E-01 | 4.754E-01 | NOT IDENT. |
| RA-226 | 8.693E-02 | 7.878E-02 | 8.799E-02 | FAIL ABUN |
| AC-227 | -6.059E-02 | 2.044E-01 | 2.062E-01 | NOT IDENT. |
| TH-227 | -6.059E-02 | 2.044E-01 | 2.062E-01 | NOT IDENT. |
| AC-228 | -5.104E-02 | 1.257E-01 | 1.278E-01 | NOT IDENT. |
| RA-228 | -5.104E-02 | 1.257E-01 | 1.278E-01 | NOT IDENT. |
| TH-228 | 1.246E-01 | 9.038E-02 | 1.064E-01 | FAIL ABUN |
| TH-229 | 4.121E-01 | 4.305E-01 | 4.689E-01 | NOT IDENT. |
| TH-230 | 8.692E-02 | 7.877E-02 | 8.798E-02 | FAIL ABUN |
| TH-231 | -2.683E-01 | 4.598E-01 | 4.754E-01 | NOT IDENT. |
| TH-232 | -5.104E-02 | 1.257E-01 | 1.278E-01 | NOT IDENT. |
| PA-233 | -3.374E-02 | 5.054E-02 | 5.278E-02 | NOT IDENT. |
| PA-234 | 1.687E-01 | 2.497E-01 | 2.610E-01 | NOT IDENT. |
| PA-234M | -2.086E+00 | 3.511E+00 | 3.635E+00 | NOT IDENT. |
| U-234 | 8.692E-02 | 7.877E-02 | 8.798E-02 | FAIL ABUN |
| U-235 | -2.924E-02 | 1.479E-01 | 1.485E-01 | FAIL ABUN |
| NP-237 | -3.374E-02 | 5.054E-02 | 5.278E-02 | NOT IDENT. |
| NP-238 | -4.161E+12 | 3.985E+12 | 4.405E+12 | SHORT HLIF |
| NP-239 | 1.373E-01 | 2.930E-01 | 2.994E-01 | NOT IDENT. |
| PU-239 | 3.442E+01 | 2.560E+02 | 2.565E+02 | NOT IDENT. |
| AM-241 | 2.389E-01 | 1.909E-01 | 2.192E-01 | NOT IDENT. |
| AM-243 | -8.820E-03 | 5.024E-02 | 5.040E-02 | NOT IDENT. |
| CM-243 | 3.137E-02 | 7.552E-02 | 7.683E-02 | NOT IDENT. |
| CM-247 | -6.669E-04 | 2.627E-02 | 2.627E-02 | NOT IDENT. |
| CF-249 | 2.075E-02 | 3.469E-02 | 3.593E-02 | NOT IDENT. |
| CF-251 | 7.001E-02 | 1.000E-01 | 1.049E-01 | FAIL ABUN |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 34.4757 | 94.67 | 12.0403 | 193.51 | 13.5798 |
| 45.60 | 23.7123 | 94.87 | 18.0662 | 197.03 | 27.2524 |
| 46.54 | 23.7676 | 97.43 | 31.2382 | 198.01 | 34.0976 |
| 49.72 | 0.0000 | 98.43 | 24.2216 | 201.83 | 41.0665 |
| 51.35 | 23.1172 | 98.44 | 24.2220 | 205.31 | 13.7336 |
| 52.39 | 21.3188 | 99.53 | 19.2077 | 210.85 | 19.5563 |
| 53.44 | 13.9368 | 100.11 | 21.2482 | 215.65 | 20.7973 |
| 57.36 | 0.0000 | 103.18 | 26.4287 | 222.11 | 30.2148 |
| 57.53 | 24.3763 | 103.37 | 23.3859 | 227.09 | 26.2621 |
| 57.98 | 25.3382 | 105.21 | 24.4691 | 227.38 | 26.2688 |
| 59.32 | 21.6461 | 105.31 | 26.5120 | 228.16 | 0.0000 |
| 59.54 | 18.0783 | 106.12 | 39.8153 | 228.18 | 28.0396 |
| 63.29 | 24.6719 | 109.28 | 25.6393 | 117.23 | 28.0396 |
| 63.58 | 26.5854 | 111.00 | 39.0673 | 235.69 | 33.8654 |
| 64.28 | 35.6557 | 111.76 | 0.0000 | 235.96 | 33.8730 |
| 66.73 | 31.5303 | 116.30 | 0.0000 | 238.63 | 22.1027 |
| 67.24 | 30.9880 | 117.23 | 25.9260 | 238.98 | 0.0000 |
| 67.75 | 32.5506 | 121.12 | 30.2327 | 240.99 | 14.1738 |
| 69.67 | 31.7108 | 121.22 | 29.1940 | 242.00 | 17.0229 |
| 70.83 | 40.4480 | 121.78 | 27.1290 | 244.70 | 35.5441 |
| 72.81 | 32.8656 | 122.06 | 24.0077 | 252.40 | 0.0000 |
| 72.87 | 31.9025 | 123.07 | 22.9947 | 252.80 | 23.2572 |
| 74.66 | 41.7074 | 127.23 | 33.6292 | 254.15 | 0.0000 |
| 74.82 | 47.5410 | 129.30 | 32.6651 | 256.23 | 32.2916 |
| 74.97 | 47.5540 | 131.20 | 35.9133 | 260.90 | 0.0000 |
| 77.11 | 33.1246 | 133.02 | 37.0547 | 264.66 | 26.1870 |
| 79.69 | 50.8937 | 133.52 | 37.0778 | 268.22 | 27.1651 |
| 80.12 | 43.0963 | 136.00 | 26.5661 | 269.46 | 29.0039 |
| 80.19 | 0.0000 | 136.47 | 34.0244 | 271.23 | 24.5054 |
| 80.57 | 38.2292 | 140.51 | 0.0000 | 273.65 | 25.4604 |
| 81.00 | 30.4100 | 143.76 | 26.8178 | 276.40 | 24.6026 |
| 81.07 | 30.4138 | 144.24 | 22.5398 | 277.37 | 18.2376 |
| 83.79 | 34.4989 | 145.44 | 30.0961 | 277.60 | 20.0647 |
| 85.43 | 32.6178 | 152.43 | 30.3422 | 278.00 | 20.9834 |
| 86.55 | 34.6595 | 153.25 | 31.4553 | 279.20 | 19.1761 |
| 86.79 | 32.6920 | 323.87 | 26.0603 | 279.54 | 19.1809 |
| 86.94 | 32.7002 | 156.02 | 28.2902 | 280.46 | 18.2803 |
| 87.09 | 32.7083 | 158.56 | 28.3709 | 283.69 | 14.6597 |
| 87.57 | 28.5681 | 159.00 | 19.6511 | 284.31 | 0.0000 |
| 88.03 | 22.3358 | 162.33 | 17.5321 | 285.41 | 17.4304 |
| 88.34 | 17.8778 | 163.33 | 24.1330 | 285.90 | 0.0000 |
| 88.47 | 17.8816 | 165.86 | 24.1997 | 287.50 | 12.8635 |
| 89.96 | 32.8627 | 176.31 | 26.6938 | 290.67 | 22.1030 |
| 91.11 | 35.9171 | 176.60 | 26.7019 | 293.27 | 0.0000 |
| 92.59 | 39.0026 | 177.52 | 26.7273 | 351.93 | 19.2197 |
| 93.35 | 21.0268 | 181.07 | 0.0000 | 295.96 | 19.2299 |
| 94.56 | 12.0383 | 184.41 | 23.5515 | 879.38 | 11.1152 |
| 94.65 | 12.0400 | 143.76 | 25.8284 | 299.98 | 11.1264 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 11.1272 | 487.02 | 7.1073 | 702.65 | 9.1091 |
| 300.13 | 11.1275 | 492.35 | 0.0000 | 706.68 | 10.2634 |
| 301.36 | 11.1374 | 497.08 | 10.4170 | 711.68 | 13.7106 |
| 302.85 | 23.7848 | 505.52 | 10.0419 | 720.70 | 9.1714 |
| 256.23 | 23.8129 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 20.8698 | 511.00 | 11.9867 | 722.78 | 9.1785 |
| 308.46 | 16.7901 | 514.00 | 4.2014 | 722.91 | 10.0969 |
| 311.90 | 27.1163 | 514.00 | 4.2014 | 723.31 | 10.0985 |
| 316.51 | 17.8226 | 520.40 | 6.7430 | 724.19 | 8.2650 |
| 319.41 | 19.7378 | 520.69 | 0.0000 | 727.33 | 9.1941 |
| 320.08 | 21.6278 | 522.65 | 0.0000 | 733.00 | 5.5280 |
| 321.04 | 14.1142 | 527.90 | 0.0000 | 735.93 | 6.4564 |
| 323.87 | 22.6263 | 529.59 | 12.6984 | 333.97 | 5.5371 |
| 325.23 | 23.5909 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 17.0258 | 531.02 | 14.8250 | 747.24 | 9.2615 |
| 333.37 | 24.6686 | 546.56 | 0.0000 | 748.06 | 11.1173 |
| 333.97 | 26.5768 | 552.55 | 12.8350 | 752.31 | 6.4950 |
| 334.37 | 23.7354 | 563.25 | 10.7477 | 753.82 | 12.0688 |
| 338.28 | 14.2781 | 569.33 | 8.6218 | 756.73 | 7.4348 |
| 338.32 | 14.2786 | 946.00 | 8.6223 | 756.80 | 7.4350 |
| 311.90 | 21.9247 | 569.70 | 10.7791 | 884.68 | 10.2491 |
| 340.48 | 21.9247 | 583.19 | 11.9279 | 765.81 | 3.7295 |
| 340.55 | 21.9257 | 584.27 | 16.2730 | 766.42 | 4.6628 |
| 344.28 | 11.4673 | 595.83 | 21.8073 | 766.84 | 5.5963 |
| 345.93 | 18.5860 | 427.87 | 10.9259 | 772.60 | 0.0000 |
| 351.06 | 16.8924 | 602.52 | 0.0000 | 776.52 | 9.3591 |
| 351.93 | 18.2462 | 602.73 | 15.7478 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 7.0051 | 778.90 | 5.6202 |
| 356.01 | 18.2938 | 609.32 | 15.7922 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 17.5542 | 785.37 | 9.3884 |
| 366.42 | 0.0000 | 614.28 | 13.1880 | 792.07 | 8.4694 |
| 375.05 | 12.6658 | 618.01 | 13.2085 | 794.95 | 9.4197 |
| 356.01 | 20.5693 | 620.36 | 14.3235 | 795.86 | 5.6536 |
| 388.16 | 18.6582 | 621.93 | 14.3330 | 810.29 | 9.4695 |
| 388.63 | 19.6457 | 630.19 | 0.0000 | 344.28 | 9.4700 |
| 391.69 | 16.7292 | 631.29 | 8.8547 | 810.76 | 9.4712 |
| 264.66 | 16.8174 | 633.25 | 10.6342 | 815.77 | 5.6924 |
| 401.81 | 14.8487 | 634.78 | 8.8674 | 1048.07 | 9.4961 |
| 402.40 | 14.8537 | 635.95 | 7.0973 | 832.01 | 7.6314 |
| 404.85 | 14.2798 | 636.99 | 0.0000 | 834.85 | 4.7742 |
| 410.95 | 9.5533 | 645.85 | 7.7943 | 835.71 | 4.7755 |
| 413.71 | 9.3026 | 657.76 | 7.8318 | 836.80 | 0.0000 |
| 414.70 | 5.6986 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 16.0674 | 661.66 | 7.8440 | 846.77 | 5.7517 |
| 427.87 | 17.6816 | 664.57 | 0.0000 | 856.80 | 8.6561 |
| 433.94 | 14.1119 | 666.33 | 10.1039 | 860.56 | 4.8148 |
| 439.40 | 11.1212 | 666.50 | 13.4729 | 871.09 | 8.6963 |
| 453.88 | 18.3400 | 667.71 | 0.0000 | 873.19 | 6.7684 |
| 463.37 | 9.2159 | 677.62 | 10.8258 | 875.33 | 0.0000 |
| 468.07 | 11.2915 | 685.70 | 0.0000 | 879.38 | 8.7196 |
| 473.00 | 0.0000 | 695.00 | 10.8990 | 880.51 | 8.7227 |
| 475.06 | 10.9888 | 696.49 | 9.9964 | 883.24 | 6.7903 |
| 476.78 | 9.8987 | 696.51 | 9.9964 | 884.68 | 5.8229 |
| 477.60 | 16.5046 | 697.00 | 9.9983 | 889.28 | 10.6909 |
| 482.18 | 13.2346 | 697.49 | 10.9093 | 894.76 | 8.7623 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 7.7969 | 1298.22 | 0.0000 | | |
| 903.28 | 5.8573 | 1312.11 | 6.5388 | | |
| 911.20 | 11.7437 | 1332.49 | 5.4746 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 10.8160 | 1365.19 | 0.9193 | | |
| 937.49 | 3.9464 | 1368.63 | 0.0000 | | |
| 944.13 | 5.9314 | 1384.29 | 7.3857 | | |
| 946.00 | 0.9891 | 1408.01 | 5.5686 | | |
| 949.00 | 6.9303 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 1.6094 | | |
| 962.31 | 6.9580 | 1489.16 | 3.7778 | | |
| 964.08 | 9.9453 | 1505.03 | 2.8428 | | |
| 966.17 | 9.9514 | 1596.21 | 1.9307 | | |
| 968.97 | 7.9678 | 1620.50 | 4.8501 | | |
| 983.53 | 11.0030 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 0.9833 | | |
| 1274.44 | 6.0240 | 1750.46 | 0.0000 | | |
| 1001.03 | 11.0591 | 1764.49 | 3.9875 | | |
| 1004.73 | 8.0518 | 1063.66 | 3.9917 | | |
| 507.63 | 0.0000 | 1771.35 | 3.9925 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.0049 | | |
| 1037.84 | 4.0641 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.0294 | | |
| 631.29 | 6.1110 | | | | |
| 1048.07 | 7.1323 | | | | |
| 1049.04 | 5.0959 | | | | |
| 1050.41 | 3.0587 | | | | |
| 1063.66 | 4.0934 | | | | |
| 1077.00 | 5.1355 | | | | |
| 1077.34 | 6.1632 | | | | |
| 1085.87 | 3.0886 | | | | |
| 1099.45 | 8.2668 | | | | |
| 1112.07 | 3.1104 | | | | |
| 1112.84 | 3.1112 | | | | |
| 1115.54 | 10.3779 | | | | |
| 1120.29 | 6.2347 | | | | |
| 1120.55 | 5.1958 | | | | |
| 1221.41 | 5.1970 | | | | |
| 1129.67 | 4.1668 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 3.1605 | | | | |
| 1177.95 | 8.4383 | | | | |
| 1189.05 | 9.5194 | | | | |
| 1204.77 | 10.6191 | | | | |
| 1221.41 | 6.3979 | | | | |
| 1231.02 | 11.7573 | | | | |
| 1235.36 | 5.3499 | | | | |
| 1238.28 | 8.5660 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 7.5564 | | | | |
| 1274.44 | 2.1603 | | | | |
| 1274.54 | 2.1604 | | | | |
| 1291.59 | 5.4226 | | | | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 11:31:18.84

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017836.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;215
                                        Background date  : 9-FEB-2014 11:22:39.
Sample date      : 17-JAN-2014 00:00:00 Acquisition date : 10-FEB-2014 11:15:33
Sample ID        : G1203017836          Sample quantity  : 1.67940E+02 GRAM
Detector name    : GAM29                Detector geometry: 500MLMB
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:11.71  1.3%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359492              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.52* | 6885 | 8271 | 1.03 | 93.06 | 88 | 11 | 7.65E+00 | 2.8 | |
| 2 | 7 | 57.97 | 1376 | 5357 | 1.99 | 115.93 | 112 | 15 | 1.53E+00 | 11.6 | 4.24E+00 |
| 3 | 7 | 59.61 | 15605 | 3202 | 0.94 | 119.21 | 112 | 15 | 1.73E+01 | 1.0 | |
| 4 | 3 | 86.36* | 196 | 1707 | 1.16 | 172.61 | 171 | 10 | 2.18E-01 | 26.9 | 1.88E+00 |
| 5 | 3 | 88.10* | 20320 | 2481 | 0.98 | 176.09 | 171 | 10 | 2.26E+01 | 0.8 | |
| 6 | 0 | 100.30 | 103 | 1713 | 1.68 | 200.46 | 199 | 7 | 1.15E-01 | 67.1 | |
| 7 | 1 | 120.21 | 161 | 1696 | 1.22 | 240.22 | 237 | 11 | 1.79E-01 | 49.9 | 2.49E+00 |
| 8 | 1 | 122.09 | 6522 | 1329 | 1.00 | 243.97 | 237 | 11 | 7.25E+00 | 1.5 | |
| 9 | 0 | 136.48 | 810 | 1810 | 1.07 | 272.71 | 269 | 9 | 9.00E-01 | 10.1 | |
| 10 | 0 | 165.95 | 1577 | 2007 | 1.13 | 331.56 | 326 | 11 | 1.75E+00 | 6.1 | |
| 11 | 0 | 175.38 | 65 | 971 | 0.63 | 350.39 | 349 | 6 | 7.24E-02 | 76.7 | |
| 12 | 0 | 199.82* | 119 | 1231 | 1.01 | 399.21 | 396 | 7 | 1.32E-01 | 49.9 | |
| 13 | 0 | 300.53 | 94 | 770 | 1.61 | 600.37 | 598 | 6 | 1.05E-01 | 47.6 | |
| 14 | 0 | 391.99 | 871 | 1425 | 1.22 | 783.07 | 777 | 13 | 9.68E-01 | 9.6 | |
| 15 | 0 | 425.00 | 34 | 1093 | 2.24 | 849.03 | 845 | 9 | 3.82E-02 | 173.9 | |
| 16 | 0 | 511.17* | 430 | 1176 | 2.42 | 1021.22 | 1015 | 14 | 4.78E-01 | 17.6 | |
| 17 | 0 | 520.21 | 54 | 520 | 0.54 | 1039.28 | 1037 | 7 | 6.00E-02 | 71.4 | |
| 18 | 0 | 551.97 | 68 | 601 | 1.09 | 1102.75 | 1097 | 9 | 7.56E-02 | 66.9 | |
| 19 | 0 | 555.03 | 50 | 437 | 1.47 | 1108.86 | 1105 | 7 | 5.53E-02 | 70.9 | |
| 20 | 0 | 661.73 | 17763 | 993 | 1.42 | 1322.11 | 1316 | 14 | 1.97E+01 | 0.8 | |
| 21 | 0 | 682.99 | 81 | 307 | 1.87 | 1364.61 | 1362 | 6 | 8.97E-02 | 36.1 | |
| 22 | 0 | 762.88 | 84 | 506 | 1.39 | 1524.30 | 1520 | 9 | 9.38E-02 | 49.2 | |
| 23 | 0 | 838.51 | 58 | 546 | 1.45 | 1675.49 | 1671 | 8 | 6.42E-02 | 71.3 | |
| 24 | 0 | 898.11 | 684 | 1084 | 1.65 | 1794.66 | 1789 | 12 | 7.60E-01 | 10.4 | |
| 25 | 0 | 925.69 | 37 | 694 | 1.29 | 1849.80 | 1846 | 8 | 4.12E-02 | 124.3 | |
| 26 | 0 | 995.29 | 36 | 511 | 1.47 | 1988.99 | 1983 | 8 | 4.06E-02 | 108.6 | |
| 27 | 0 | 1042.77 | 103 | 478 | 2.37 | 2083.94 | 2081 | 9 | 1.15E-01 | 39.3 | |
| 28 | 0 | 1115.90 | 3490 | 844 | 1.58 | 2230.20 | 2223 | 16 | 3.88E+00 | 2.5 | |
| 29 | 0 | 1173.56 | 16669 | 433 | 1.71 | 2345.54 | 2337 | 17 | 1.85E+01 | 0.8 | |
| 30 | 0 | 1297.08 | 14 | 101 | 0.74 | 2592.66 | 2585 | 10 | 1.61E-02 | 132.9 | |
| 31 | 0 | 1332.87 | 15041 | 198 | 1.76 | 2664.28 | 2655 | 19 | 1.67E+01 | 0.8 | |
| 32 | 0 | 1363.47 | 38 | 56 | 5.32 | 2725.50 | 2717 | 16 | 4.21E-02 | 47.1 | |
| 33 | 0 | 1644.61 | 16 | 46 | 4.21 | 3288.21 | 3279 | 15 | 1.82E-02 | 92.8 | |
| 34 | 0 | 1652.50 | 17 | 18 | 2.35 | 3304.00 | 3300 | 8 | 1.92E-02 | 48.8 | |

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 0 | 1747.31 | 10 | 27 | 0.77 | 3493.84 | 3485 | 14 | 1.15E-02 | 112.5 | |
| 36 | 0 | 1802.63 | 31 | 6 | 3.54 | 3604.60 | 3598 | 13 | 3.44E-02 | 24.6 | |
| 37 | 0 | 1836.26 | 390 | 44 | 1.74 | 3671.95 | 3663 | 19 | 4.34E-01 | 6.5 | |
| 38 | 0 | 1910.95 | 8 | 14 | 1.45 | 3821.53 | 3816 | 7 | 8.46E-03 | 92.5 | |
| 39 | 0 | 1913.20 | 6 | 10 | 1.53 | 3826.03 | 3822 | 8 | 7.19E-03 | 92.8 | |
| 40 | 0 | 1928.95 | 14 | 19 | 4.65 | 3857.57 | 3850 | 15 | 1.54E-02 | 73.3 | |
| 41 | 0 | 2041.43 | 25 | 14 | 0.67 | 4082.88 | 4077 | 14 | 2.78E-02 | 37.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-FEB-2014 11:31:20

```
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017836.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4
Sample title     : RXF2
Sample date      : 17-JAN-2014 00:00:00 Acquisition date : 10-FEB-2014 11:15:33
Sample ID        : G1203017836          Sample quantity  : 167.94 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA29              Detector geometry: 500MLMB
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:11.71   1.3%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00
```

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 6522 | 85.60* | 6.861E+00 | 1.986E+01 | 2.114E+01 | 3.06 |
| | 136.47 | 810 | 10.68 | 6.873E+00 | 1.973E+01 | 2.100E+01 | 20.22 |
| CO-60 | 1173.23 | 16669 | 99.85 | 1.715E+00 | 1.741E+02 | 1.756E+02 | 1.65 |
| | 1332.49 | 15041 | 99.98* | 1.538E+00 | 1.749E+02 | 1.764E+02 | 1.69 |
| ZN-65 | 1115.54 | 3490 | 50.60* | 1.790E+00 | 6.889E+01 | 7.385E+01 | 5.05 |
| Y-88 | 898.04 | 684 | 93.70 | 2.145E+00 | 6.088E+00 | 7.138E+00 | 20.72 |
| | 1836.06 | 390 | 99.20* | 1.189E+00 | 5.919E+00 | 6.939E+00 | 12.93 |
| CD-109 | 88.03 | 20320 | 3.70* | 5.643E+00 | 1.740E+03 | 1.805E+03 | 1.61 |
| SN-113 | 391.69 | 871 | 64.94* | 3.943E+00 | 6.084E+00 | 7.050E+00 | 19.10 |
| SN-126 | 64.28 | ------ | 9.60 | 3.031E+00 | ------ Line Not Found | | ------ |
| | 86.94 | 196 | 8.90 | 5.508E+00 | 7.144E+00 | 7.144E+00 | 53.81 |
| | 87.57 | 20320 | 37.00* | 5.643E+00 | 1.740E+02 | 1.740E+02 | 1.61 |
| BA-137M | 661.66 | 17763 | 89.90* | 2.722E+00 | 1.298E+02 | 1.300E+02 | 1.68 |
| CS-137 | 661.66 | 17763 | 85.10* | 2.722E+00 | 1.371E+02 | 1.373E+02 | 1.68 |
| CE-139 | 165.86 | 1577 | 80.00* | 6.558E+00 | 5.376E+00 | 6.081E+00 | 12.11 |
| PM-147 | 121.22 | 6522 | 0.00* | 6.861E+00 | 5.964E+05 | 6.071E+05 | 3.06 |
| PB-210 | 46.54 | 6885 | 4.25* | 7.711E-01 | 3.757E+03 | 3.765E+03 | 5.69 |
| TH-229 | 85.43 | 196 | 14.70 | 5.508E+00 | 4.325E+00 | 4.325E+00 | 53.81 |
| | 88.47 | 20320 | 24.00 | 5.643E+00 | 2.683E+02 | 2.683E+02 | 1.61 |
| | 193.51 | ------ | 4.41* | 6.130E+00 | ------ Line Not Found | | ------ |
| | 210.85 | ------ | 2.80 | 5.859E+00 | ------ Line Not Found | | ------ |
| PA-231 | 283.69 | ------ | 1.70* | 4.890E+00 | ------ Line Not Found | | ------ |
| | 301.36 | 94 | 5.35 | 4.710E+00 | 6.693E+00 | 6.693E+00 | 95.17 |
| AM-241 | 59.54 | 15605 | 35.90* | 2.384E+00 | 3.260E+02 | 3.261E+02 | 2.01 |
| ANH-511 | 511.00 | 430 | 100.00* | 3.282E+00 | 2.345E+00 | 2.345E+00 | 35.26 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 11:31:21.27

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017836.CNF;1  *
* Acquisition date : 10-FEB-2014 11:15:33 Sensitivity     : 3.000        *
* Detector ID      : GAM29                Energy tolerance: 1.500        *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:15:11.71     Half life ratio : *****        *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1203017836          Analyst initials: RXF2         *
* Batch Number     : 1359492              Sample Quantity : 1.6794E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB      *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CO-57 | 2.114E+01 | 6.344E-01 | 6.073E-01 |
| CO-60 | 1.764E+02 | 2.925E+00 | 6.355E-01 |
| ZN-65 | 7.385E+01 | 3.653E+00 | 2.397E+00 |
| Y-88 | 6.939E+00 | 8.795E-01 | 5.117E-01 |
| CD-109 | 1.805E+03 | 2.848E+01 | 2.208E+01 |
| SN-113 | 7.050E+00 | 1.320E+00 | 1.184E+00 |
| SN-126 | 1.740E+02 | 2.746E+00 | 2.141E+00 |
| BA-137M | 1.300E+02 | 2.143E+00 | 8.635E-01 |
| CS-137 | 1.373E+02 | 2.264E+00 | 9.122E-01 |
| CE-139 | 6.081E+00 | 7.216E-01 | 6.410E-01 |
| PM-147 | 6.071E+05 | 1.822E+04 | 1.745E+04 |
| PB-210 | 3.765E+03 | 2.099E+02 | 1.744E+02 |
| TH-229 | 4.588E+00 | 6.471E+00 | 1.150E+01 |
| PA-231 | 9.937E+00 | 1.922E+01 | 3.367E+01 |
| AM-241 | 3.261E+02 | 6.422E+00 | 5.775E+00 |
| ANH-511 | 2.345E+00 | 8.105E-01 | 6.931E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 4.110E+00 | 5.968E+00 | 1.027E+01 | NOT IDENT. |
| NA-22 | -7.090E-02 | 3.402E-01 | 5.887E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.729E+11 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.614E-01 | 2.601E-01 | 4.614E-01 | NOT IDENT. |
| K-40 | -2.733E-01 | 2.501E+00 | 4.421E+00 | NOT IDENT. |
| SC-46 | -1.205E-01 | 7.853E-01 | 1.358E+00 | NOT IDENT. |
| V-48 | -2.123E-01 | 1.896E+00 | 3.265E+00 | NOT IDENT. |
| CR-51 | -2.899E+00 | 6.336E+00 | 1.084E+01 | NOT IDENT. |
| MN-54 | -6.031E-01 | 6.897E-01 | 1.014E+00 | NOT IDENT. |
| CO-56 | -2.906E-02 | 7.375E-01 | 1.283E+00 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | -1.189E-01 | 6.825E-01 | 1.188E+00 | NOT IDENT. |
| FE-59 | 1.119E+00 | 1.754E+00 | 3.067E+00 | NOT IDENT. |
| GE-68 | -1.596E+00 | 2.226E+01 | 3.822E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-73 | 3.109E+01 | 2.826E+01 | 4.329E+01 | NOT IDENT. |
| AS-74 | -6.164E-01 | 1.905E+00 | 3.175E+00 | NOT IDENT. |
| SE-75 | -8.280E-02 | 6.458E-01 | 1.119E+00 | FAIL ABUN |
| BR-77 | 0.000E+00 | 1.775E+03 | 0.000E+00 | SHORT HLIF |
| SR-82 | -2.599E-01 | 6.472E+00 | 1.134E+01 | NOT IDENT. |
| RB-83 | 8.054E-01 | 1.127E+00 | 1.852E+00 | FAIL ABUN |
| KR-85 | 0.000E+00 | 1.090E+02 | 1.707E+02 | NOT IDENT. |
| SR-85 | 0.000E+00 | 6.373E-01 | 9.981E-01 | NOT IDENT. |
| RB-86 | -5.420E+00 | 1.949E+01 | 3.327E+01 | NOT IDENT. |
| Y-91 | -2.381E+01 | 2.313E+02 | 3.991E+02 | NOT IDENT. |
| NB-94 | -1.188E-01 | 4.637E-01 | 7.679E-01 | NOT IDENT. |
| NB-95 | -1.137E-01 | 7.258E-01 | 1.103E+00 | NOT IDENT. |
| NB-95M | -7.850E-01 | 1.694E+00 | 2.930E+00 | NOT IDENT. |
| ZR-95 | 2.542E-01 | 1.281E+00 | 2.064E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | 5.797E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.607E+11 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.772E+02 | 1.844E+03 | 3.228E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | 8.084E+28 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.704E-01 | 4.150E-01 | 6.826E-01 | NOT IDENT. |
| RH-102 | -1.430E-01 | 8.065E-01 | 1.346E+00 | NOT IDENT. |
| RU-103 | -1.693E-01 | 7.092E-01 | 1.195E+00 | NOT IDENT. |
| RH-106 | 2.687E+00 | 4.611E+00 | 7.876E+00 | NOT IDENT. |
| RU-106 | 2.687E+00 | 4.611E+00 | 7.876E+00 | NOT IDENT. |
| AG-108M | 9.552E-02 | 4.682E-01 | 8.009E-01 | NOT IDENT. |
| AG-110M | 2.336E-01 | 9.286E-01 | 1.622E+00 | FAIL ABUN |
| CD-115 | 0.000E+00 | 2.966E+03 | 0.000E+00 | SHORT HLIF |
| SN-117M | 4.949E-01 | 1.115E+00 | 1.853E+00 | NOT IDENT. |
| TE-123M | -9.918E-03 | 3.807E-01 | 6.264E-01 | NOT IDENT. |
| SB-124 | -3.089E-01 | 6.268E-01 | 1.116E+00 | NOT IDENT. |
| SB-125 | -4.720E-01 | 1.642E+00 | 2.431E+00 | FAIL ABUN |
| TE-125M | 6.098E+01 | 1.529E+02 | 2.563E+02 | NOT IDENT. |
| I-126 | 1.571E+00 | 5.545E+00 | 8.205E+00 | NOT IDENT. |
| SB-126 | -1.854E+00 | 3.397E+00 | 5.899E+00 | NOT IDENT. |
| SB-127 | 2.130E+01 | 1.119E+02 | 1.646E+02 | NOT IDENT. |
| I-131 | -1.104E+00 | 3.644E+00 | 6.219E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.122E+01 | 7.271E+01 | 1.266E+02 | NOT IDENT. |
| BA-133 | -1.117E-01 | 5.766E-01 | 9.874E-01 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.501E+08 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.700E-01 | 6.261E-01 | 1.108E+00 | NOT IDENT. |
| CS-135 | -1.305E+00 | 2.039E+00 | 3.500E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | 8.861E+26 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.979E+00 | 3.350E+00 | 5.122E+00 | FAIL ABUN |
| BA-140 | -7.803E-01 | 1.090E+00 | 1.792E+00 | NOT IDENT. |
| LA-140 | -7.803E-01 | 1.090E+00 | 1.792E+00 | NOT IDENT. |
| CE-141 | -3.179E-01 | 9.537E-01 | 1.564E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.759E+05 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.698E+00 | 2.951E+00 | 4.413E+00 | NOT IDENT. |
| PM-144 | 2.301E-01 | 4.824E-01 | 8.177E-01 | NOT IDENT. |
| PR-144 | 1.763E+01 | 3.629E+01 | 6.152E+01 | NOT IDENT. |
| PM-146 | 3.322E-01 | 6.895E-01 | 1.184E+00 | NOT IDENT. |
| ND-147 | -6.021E-01 | 1.478E+01 | 2.498E+01 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.270E+04 | 0.000E+00 | SHORT HLIF |
| EU-150 | 4.791E-02 | 3.686E-01 | 6.371E-01 | NOT IDENT. |
| EU-152 | -6.257E-01 | 1.344E+00 | 2.291E+00 | FAIL ABUN |
| GD-153 | 7.978E-01 | 1.364E+00 | 2.059E+00 | NOT IDENT. |
| EU-154 | -1.678E-01 | 9.614E-01 | 1.667E+00 | FAIL ABUN |
| EU-155 | -1.265E+00 | 1.705E+00 | 2.486E+00 | FAIL ABUN |
| TB-160 | 3.764E-01 | 2.666E+00 | 4.645E+00 | FAIL ABUN |
| HO-166M | -8.946E-01 | 8.561E-01 | 1.381E+00 | NOT IDENT. |
| TM-171 | 2.391E+02 | 5.024E+02 | 8.524E+02 | NOT IDENT. |
| LU-176 | -1.660E-01 | 3.663E-01 | 6.274E-01 | FAIL ABUN |
| HF-181 | -1.374E-01 | 8.087E-01 | 1.366E+00 | FAIL ABUN |
| TA-182 | 1.534E-01 | 1.762E+00 | 3.078E+00 | FAIL ABUN |
| RE-183 | 0.000E+00 | 9.644E+00 | 1.553E+01 | FAIL ABUN |
| RE-184 | 1.960E+00 | 3.220E+00 | 4.944E+00 | NOT IDENT. |
| W-188 | 1.161E+01 | 1.055E+02 | 1.832E+02 | NOT IDENT. |
| IR-192 | -1.720E-01 | 5.230E-01 | 8.972E-01 | NOT IDENT. |
| HG-203 | -8.172E-02 | 5.815E-01 | 1.006E+00 | NOT IDENT. |
| BI-207 | 3.622E-01 | 8.821E-01 | 1.536E+00 | NOT IDENT. |
| TL-208 | -1.093E-01 | 4.943E-01 | 8.281E-01 | NOT IDENT. |
| BI-211 | -1.316E-01 | 2.719E+00 | 4.676E+00 | NOT IDENT. |
| PB-211 | -2.570E+00 | 1.046E+01 | 1.778E+01 | NOT IDENT. |
| BI-212 | -7.018E-01 | 7.039E+00 | 1.236E+01 | NOT IDENT. |
| PB-212 | -1.386E-01 | 7.450E-01 | 1.295E+00 | FAIL ABUN |
| BI-214 | 2.126E-01 | 9.543E-01 | 1.616E+00 | NOT IDENT. |
| PB-214 | -2.054E-01 | 9.874E-01 | 1.692E+00 | FAIL ABUN |
| RN-219 | -1.427E+00 | 5.837E+00 | 9.930E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 2.126E-01 | 9.543E-01 | 1.616E+00 | NOT IDENT. |
| RA-223 | -1.552E+00 | 8.601E+00 | 1.479E+01 | NOT IDENT. |
| RA-224 | 5.129E+00 | 7.945E+00 | 1.400E+01 | NOT IDENT. |
| RA-226 | 2.126E-01 | 9.543E-01 | 1.616E+00 | NOT IDENT. |
| AC-227 | 8.364E-01 | 3.497E+00 | 6.107E+00 | FAIL ABUN |
| TH-227 | 8.364E-01 | 3.497E+00 | 6.107E+00 | FAIL ABUN |
| AC-228 | -3.743E-01 | 2.563E+00 | 4.427E+00 | NOT IDENT. |
| RA-228 | -3.743E-01 | 2.563E+00 | 4.427E+00 | NOT IDENT. |
| TH-228 | -1.386E-01 | 7.450E-01 | 1.295E+00 | FAIL ABUN |
| TH-230 | 2.126E-01 | 9.543E-01 | 1.616E+00 | NOT IDENT. |
| TH-231 | -1.552E+00 | 8.601E+00 | 1.479E+01 | NOT IDENT. |
| TH-232 | -3.743E-01 | 2.563E+00 | 4.427E+00 | NOT IDENT. |
| PA-233 | 1.762E-01 | 8.994E-01 | 1.560E+00 | FAIL ABUN |
| PA-234 | -7.077E-01 | 5.894E+00 | 1.016E+01 | FAIL ABUN |
| PA-234M | 4.272E+01 | 7.787E+01 | 1.364E+02 | NOT IDENT. |
| TH-234 | -6.155E+01 | 2.583E+01 | 3.712E+01 | NOT IDENT. |
| U-234 | 2.126E-01 | 9.543E-01 | 1.616E+00 | NOT IDENT. |
| U-235 | 1.615E+00 | 2.455E+00 | 4.113E+00 | NOT IDENT. |
| NP-237 | 1.762E-01 | 8.994E-01 | 1.560E+00 | FAIL ABUN |
| NP-238 | 0.000E+00 | 7.782E+03 | 0.000E+00 | SHORT HLIF |
| U-238 | -6.155E+01 | 2.583E+01 | 3.712E+01 | NOT IDENT. |
| NP-239 | -5.251E+00 | 6.690E+00 | 9.703E+00 | FAIL ABUN |
| PU-239 | 9.352E+02 | 4.374E+03 | 7.280E+03 | NOT IDENT. |
| AM-243 | -4.682E-01 | 9.514E-01 | 1.585E+00 | NOT IDENT. |
| CM-243 | 1.096E+00 | 1.700E+00 | 2.564E+00 | FAIL ABUN |
| CM-247 | -4.846E-01 | 5.426E-01 | 9.092E-01 | NOT IDENT. |
| CF-249 | 1.507E-01 | 6.539E-01 | 9.900E-01 | NOT IDENT. |
| CF-251 | 5.114E-01 | 1.798E+00 | 2.641E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 11:31:17.31

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.52 | 6890 | 8271 | 1.03 | 93.06 | 88 | 11 | 7.66E+00 | 2.8 | |
| 2 | 7 | 57.97 | 1376 | 5357 | 1.99 | 115.93 | 112 | 15 | 1.53E+00 | 11.6 | 4.24E+00 |
| 3 | 7 | 59.61 | 15605 | 3202 | 0.94 | 119.21 | 112 | 15 | 1.73E+01 | 1.0 | |
| 4 | 3 | 86.36 | 197 | 1707 | 1.16 | 172.61 | 171 | 10 | 2.19E-01 | 26.7 | 1.88E+00 |
| 5 | 3 | 88.10 | 20321 | 2481 | 0.98 | 176.09 | 171 | 10 | 2.26E+01 | 0.8 | |
| 6 | 0 | 100.30 | 103 | 1713 | 1.68 | 200.46 | 199 | 7 | 1.15E-01 | 67.1 | |
| 7 | 1 | 120.21 | 161 | 1696 | 1.22 | 240.22 | 237 | 11 | 1.79E-01 | 49.9 | 2.49E+00 |
| 8 | 1 | 122.09 | 6522 | 1329 | 1.00 | 243.97 | 237 | 11 | 7.25E+00 | 1.5 | |
| 9 | 0 | 136.48 | 810 | 1810 | 1.07 | 272.71 | 269 | 9 | 9.00E-01 | 10.1 | |
| 10 | 0 | 165.95 | 1577 | 2007 | 1.13 | 331.56 | 326 | 11 | 1.75E+00 | 6.1 | |
| 11 | 0 | 175.38 | 65 | 971 | 0.63 | 350.39 | 349 | 6 | 7.24E-02 | 76.7 | |
| 12 | 0 | 199.82 | 120 | 1231 | 1.01 | 399.21 | 396 | 7 | 1.33E-01 | 49.5 | |
| 13 | 0 | 300.53 | 94 | 770 | 1.61 | 600.37 | 598 | 6 | 1.05E-01 | 47.6 | |
| 14 | 0 | 391.99 | 871 | 1425 | 1.22 | 783.07 | 777 | 13 | 9.68E-01 | 9.6 | |
| 15 | 0 | 425.00 | 34 | 1093 | 2.24 | 849.03 | 845 | 9 | 3.82E-02 | 173.9 | |
| 16 | 0 | 511.17 | 455 | 1176 | 2.42 | 1021.22 | 1015 | 14 | 5.06E-01 | 16.7 | |
| 17 | 0 | 520.21 | 54 | 520 | 0.54 | 1039.28 | 1037 | 7 | 6.00E-02 | 71.4 | |
| 18 | 0 | 551.97 | 68 | 601 | 1.09 | 1102.75 | 1097 | 9 | 7.56E-02 | 66.9 | |
| 19 | 0 | 555.03 | 50 | 437 | 1.47 | 1108.86 | 1105 | 7 | 5.53E-02 | 70.9 | |
| 20 | 0 | 661.73 | 17763 | 993 | 1.42 | 1322.11 | 1316 | 14 | 1.97E+01 | 0.8 | |
| 21 | 0 | 682.99 | 81 | 307 | 1.87 | 1364.61 | 1362 | 6 | 8.97E-02 | 36.1 | |
| 22 | 0 | 762.88 | 84 | 506 | 1.39 | 1524.30 | 1520 | 9 | 9.38E-02 | 49.2 | |
| 23 | 0 | 838.51 | 58 | 546 | 1.45 | 1675.49 | 1671 | 8 | 6.42E-02 | 71.3 | |
| 24 | 0 | 898.11 | 684 | 1084 | 1.65 | 1794.66 | 1789 | 12 | 7.60E-01 | 10.4 | |
| 25 | 0 | 925.69 | 37 | 694 | 1.29 | 1849.80 | 1846 | 8 | 4.12E-02 | 124.3 | |
| 26 | 0 | 995.29 | 36 | 511 | 1.47 | 1988.99 | 1983 | 8 | 4.06E-02 | 108.6 | |
| 27 | 0 | 1042.77 | 103 | 478 | 2.37 | 2083.94 | 2081 | 9 | 1.15E-01 | 39.3 | |
| 28 | 0 | 1115.90 | 3490 | 844 | 1.58 | 2230.20 | 2223 | 16 | 3.88E+00 | 2.5 | |
| 29 | 0 | 1173.56 | 16669 | 433 | 1.71 | 2345.54 | 2337 | 17 | 1.85E+01 | 0.8 | |
| 30 | 0 | 1297.08 | 14 | 101 | 0.74 | 2592.66 | 2585 | 10 | 1.61E-02 | 132.9 | |
| 31 | 0 | 1332.87 | 15041 | 198 | 1.76 | 2664.28 | 2655 | 19 | 1.67E+01 | 0.8 | |
| 32 | 0 | 1363.47 | 38 | 56 | 5.32 | 2725.50 | 2717 | 16 | 4.21E-02 | 47.1 | |
| 33 | 0 | 1644.61 | 16 | 46 | 4.21 | 3288.21 | 3279 | 15 | 1.82E-02 | 92.8 | |
| 34 | 0 | 1652.50 | 17 | 18 | 2.35 | 3304.00 | 3300 | 8 | 1.92E-02 | 48.8 | |
| 35 | 0 | 1747.31 | 10 | 27 | 0.77 | 3493.84 | 3485 | 14 | 1.15E-02 | 112.5 | |
| 36 | 0 | 1802.63 | 31 | 6 | 3.54 | 3604.60 | 3598 | 13 | 3.44E-02 | 24.6 | |
| 37 | 0 | 1836.26 | 390 | 44 | 1.74 | 3671.95 | 3663 | 19 | 4.34E-01 | 6.5 | |
| 38 | 0 | 1910.95 | 8 | 14 | 1.45 | 3821.53 | 3816 | 7 | 8.46E-03 | 92.5 | |
| 39 | 0 | 1913.20 | 6 | 10 | 1.53 | 3826.03 | 3822 | 8 | 7.19E-03 | 92.8 | |
| 40 | 0 | 1928.95 | 14 | 19 | 4.65 | 3857.57 | 3850 | 15 | 1.54E-02 | 73.3 | |
| 41 | 0 | 2041.43 | 25 | 14 | 0.67 | 4082.88 | 4077 | 14 | 2.78E-02 | 37.5 | |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 11:31:19.36

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 6522 | 85.60* | 6.861E+00 | 1.986E+01 | 2.114E+01 | 3.06 |
| | 136.47 | 810 | 10.68 | 6.873E+00 | 1.973E+01 | 2.100E+01 | 20.22 |
| CO-60 | 1173.23 | 16669 | 99.85 | 1.715E+00 | 1.741E+02 | 1.756E+02 | 1.65 |
| | 1332.49 | 15041 | 99.98* | 1.538E+00 | 1.749E+02 | 1.764E+02 | 1.69 |
| ZN-65 | 1115.54 | 3490 | 50.60* | 1.790E+00 | 6.889E+01 | 7.385E+01 | 5.05 |
| Y-88 | 898.04 | 684 | 93.70 | 2.145E+00 | 6.088E+00 | 7.138E+00 | 20.72 |
| | 1836.06 | 390 | 99.20* | 1.189E+00 | 5.919E+00 | 6.939E+00 | 12.93 |
| CD-109 | 88.03 | 20320 | 3.70* | 5.643E+00 | 1.740E+03 | 1.805E+03 | 1.61 |
| SN-113 | 391.69 | 871 | 64.94* | 3.943E+00 | 6.084E+00 | 7.050E+00 | 19.10 |
| SN-126 | 64.28 | ------ | 9.60 | 3.031E+00 | ------ Line Not Found | | ------ |
| | 86.94 | 196 | 8.90 | 5.508E+00 | 7.144E+00 | 7.144E+00 | 53.81 |
| | 87.57 | 20320 | 37.00* | 5.643E+00 | 1.740E+02 | 1.740E+02 | 1.61 |
| BA-137M | 661.66 | 17763 | 89.90* | 2.722E+00 | 1.298E+02 | 1.300E+02 | 1.68 |
| CS-137 | 661.66 | 17763 | 85.10* | 2.722E+00 | 1.371E+02 | 1.373E+02 | 1.68 |
| CE-139 | 165.86 | 1577 | 80.00* | 6.558E+00 | 5.376E+00 | 6.081E+00 | 12.11 |
| PM-147 | 121.22 | 6522 | 0.00* | 6.861E+00 | 5.964E+05 | 6.071E+05 | 3.06 |
| PB-210 | 46.54 | 6885 | 4.25* | 7.711E-01 | 3.757E+03 | 3.765E+03 | 5.69 |
| TH-229 | 85.43 | 196 | 14.70 | 5.508E+00 | 4.325E+00 | 4.325E+00 | 53.81 |
| | 88.47 | 20320 | 24.00 | 5.643E+00 | 2.683E+02 | 2.683E+02 | 1.61 |
| | 193.51 | ------ | 4.41* | 6.130E+00 | ------ Line Not Found | | ------ |
| | 210.85 | ------ | 2.80 | 5.859E+00 | ------ Line Not Found | | ------ |
| PA-231 | 283.69 | ------ | 1.70* | 4.890E+00 | ------ Line Not Found | | ------ |
| | 301.36 | 94 | 5.35 | 4.710E+00 | 6.693E+00 | 6.693E+00 | 95.17 |
| AM-241 | 59.54 | 15605 | 35.90* | 2.384E+00 | 3.260E+02 | 3.261E+02 | 2.01 |
| ANH-511 | 511.00 | 430 | 100.00* | 3.282E+00 | 2.345E+00 | 2.345E+00 | 35.26 |

Flag: "*" = Keyline

Sample ID : G1203017836 Acquisition date : 10-FEB-2014 11:15:33

Total number of lines in spectrum 41
Number of unidentified lines 14
Number of lines tentatively identified by NID 27 65.85%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CO-57 | 271.74D | 1.06 | 1.986E+01 | 2.114E+01 | 0.065E+01 | 3.06 | |
| CO-60 | 5.27Y | 1.01 | 1.749E+02 | 1.764E+02 | 0.030E+02 | 1.69 | |
| ZN-65 | 244.06D | 1.07 | 6.889E+01 | 7.385E+01 | 0.373E+01 | 5.05 | |
| Y-88 | 106.63D | 1.17 | 5.919E+00 | 6.939E+00 | 0.897E+00 | 12.93 | |
| CD-109 | 461.40D | 1.04 | 1.740E+03 | 1.805E+03 | 0.029E+03 | 1.61 | |
| SN-113 | 115.09D | 1.16 | 6.084E+00 | 7.050E+00 | 1.347E+00 | 19.10 | |
| SN-126 | 2.30E+05Y | 1.00 | 1.740E+02 | 1.740E+02 | 0.028E+02 | 1.61 | |
| BA-137M | 30.08Y | 1.00 | 1.298E+02 | 1.300E+02 | 0.022E+02 | 1.68 | |
| CS-137 | 30.08Y | 1.00 | 1.371E+02 | 1.373E+02 | 0.023E+02 | 1.68 | |
| CE-139 | 137.64D | 1.13 | 5.376E+00 | 6.081E+00 | 0.736E+00 | 12.11 | |
| PM-147 | 2.62Y | 1.02 | 5.964E+05 | 6.071E+05 | 0.186E+05 | 3.06 | |
| PB-210 | 22.20Y | 1.00 | 3.757E+03 | 3.765E+03 | 0.214E+03 | 5.69 | |
| TH-229 | 7340.00Y | 1.00 | 2.683E+02 | 2.683E+02 | 0.043E+02 | 1.61 | K |
| PA-231 | 7.04E+08Y | 1.00 | 6.693E+00 | 6.693E+00 | 6.369E+00 | 95.17 | K |
| AM-241 | 432.60Y | 1.00 | 3.260E+02 | 3.261E+02 | 0.066E+02 | 2.01 | |
| ANH-511 | 1.00E+09Y | 1.00 | 2.345E+00 | 2.345E+00 | 0.827E+00 | 35.26 | |
| Total Activity : | | | 6.032E+05 | 6.140E+05 | | | |

Grand Total Activity : 6.032E+05 6.140E+05

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 57.97 | 1376 | 5357 | 1.99 | 115.93 | 112 | 15 | 1.53E+00 | 23.2 | 2.16E+00 | T |
| 0 | 100.30 | 103 | 1713 | 1.68 | 200.46 | 199 | 7 | 1.15E-01 | **** | 6.36E+00 | T |
| 1 | 120.21 | 161 | 1696 | 1.22 | 240.22 | 237 | 11 | 1.79E-01 | 99.8 | 6.84E+00 | T |
| 0 | 175.38 | 65 | 971 | 0.63 | 350.39 | 349 | 6 | 7.24E-02 | **** | 6.42E+00 | T |
| 0 | 199.82 | 119 | 1231 | 1.01 | 399.21 | 396 | 7 | 1.32E-01 | 99.8 | 6.03E+00 | |
| 0 | 425.00 | 34 | 1093 | 2.24 | 849.03 | 845 | 9 | 3.82E-02 | **** | 3.73E+00 | |
| 0 | 520.21 | 54 | 520 | 0.54 | 1039.28 | 1037 | 7 | 6.00E-02 | **** | 3.24E+00 | T |
| 0 | 551.97 | 68 | 601 | 1.09 | 1102.75 | 1097 | 9 | 7.56E-02 | **** | 3.11E+00 | T |
| 0 | 555.03 | 50 | 437 | 1.47 | 1108.86 | 1105 | 7 | 5.53E-02 | **** | 3.10E+00 | |
| 0 | 682.99 | 81 | 307 | 1.87 | 1364.61 | 1362 | 6 | 8.97E-02 | 72.2 | 2.66E+00 | |
| 0 | 762.88 | 84 | 506 | 1.39 | 1524.30 | 1520 | 9 | 9.38E-02 | 98.5 | 2.44E+00 | T |
| 0 | 838.51 | 58 | 546 | 1.45 | 1675.49 | 1671 | 8 | 6.42E-02 | **** | 2.27E+00 | |
| 0 | 925.69 | 37 | 694 | 1.29 | 1849.80 | 1846 | 8 | 4.12E-02 | **** | 2.09E+00 | T |
| 0 | 995.29 | 36 | 511 | 1.47 | 1988.99 | 1983 | 8 | 4.06E-02 | **** | 1.97E+00 | T |
| 0 | 1042.77 | 103 | 478 | 2.37 | 2083.94 | 2081 | 9 | 1.15E-01 | 78.5 | 1.90E+00 | |
| 0 | 1297.08 | 14 | 101 | 0.74 | 2592.66 | 2585 | 10 | 1.61E-02 | **** | 1.57E+00 | T |
| 0 | 1363.47 | 38 | 56 | 5.32 | 2725.50 | 2717 | 16 | 4.21E-02 | 94.2 | 1.51E+00 | T |
| 0 | 1644.61 | 16 | 46 | 4.21 | 3288.21 | 3279 | 15 | 1.82E-02 | **** | 1.29E+00 | |
| 0 | 1652.50 | 17 | 18 | 2.35 | 3304.00 | 3300 | 8 | 1.92E-02 | 97.6 | 1.29E+00 | |
| 0 | 1747.31 | 10 | 27 | 0.77 | 3493.84 | 3485 | 14 | 1.15E-02 | **** | 1.23E+00 | |
| 0 | 1802.63 | 31 | 6 | 3.54 | 3604.60 | 3598 | 13 | 3.44E-02 | 49.3 | 1.20E+00 | |
| 0 | 1910.95 | 8 | 14 | 1.45 | 3821.53 | 3816 | 7 | 8.46E-03 | **** | 1.16E+00 | |
| 0 | 1913.20 | 6 | 10 | 1.53 | 3826.03 | 3822 | 8 | 7.19E-03 | **** | 1.15E+00 | |
| 0 | 1928.95 | 14 | 19 | 4.65 | 3857.57 | 3850 | 15 | 1.54E-02 | **** | 1.15E+00 | |
| 0 | 2041.43 | 25 | 14 | 0.67 | 4082.88 | 4077 | 14 | 2.78E-02 | 75.0 | 1.11E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 11:31:32.00

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017836.CNF;1   *
* Acquisition date : 10-FEB-2014 11:15:33 Sensitivity     : 3.000          *
* Detector ID      : GAM29                Energy tolerance: 1.500          *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:15:11.71     Half life ratio : *****          *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID          *
* Sample ID        : G1203017836          Analyst initials: RXF2           *
* Batch Number     : 1359492              Sample Quantity : 1.6794E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| CO-57 | 2.994E-01 |
| CO-60 | 3.020E-01 |
| ZN-65 | 1.170E+00 |
| Y-88 | 2.319E-01 |
| CD-109 | 1.092E+01 |
| SN-113 | 5.813E-01 |
| SN-126 | 1.059E+00 |
| BA-137M | 4.221E-01 |
| CS-137 | 4.459E-01 |
| CE-139 | 3.155E-01 |
| PM-147 | 8.605E+03 |
| PB-210 | 8.649E+01 |
| TH-229 | 5.666E+00 |
| PA-231 | 1.655E+01 |
| AM-241 | 2.861E+00 |
| ANH-511 | 3.394E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.045E+00 | NOT IDENT. |
| NA-22 | 2.791E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.106E-01 | NOT IDENT. |
| K-40 | 2.052E+00 | NOT IDENT. |
| SC-46 | 6.656E-01 | NOT IDENT. |
| V-48 | 1.598E+00 | NOT IDENT. |
| CR-51 | 5.322E+00 | NOT IDENT. |
| MN-54 | 4.958E-01 | NOT IDENT. |
| CO-56 | 6.286E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-58 | 5.810E-01 | NOT IDENT. |
| FE-59 | 1.500E+00 | NOT IDENT. |
| GE-68 | 1.869E+01 | NOT IDENT. |
| AS-73 | 2.147E+01 | NOT IDENT. |

| | | |
|---|---|---|
| AS-74 | 1.552E+00 | NOT IDENT. |
| SE-75 | 5.507E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 5.543E+00 | NOT IDENT. |
| RB-83 | 9.061E-01 | FAIL ABUN |
| KR-85 | 8.370E+01 | NOT IDENT. |
| SR-85 | 4.893E-01 | NOT IDENT. |
| RB-86 | 1.627E+01 | NOT IDENT. |
| Y-91 | 1.922E+02 | NOT IDENT. |
| NB-94 | 3.748E-01 | NOT IDENT. |
| NB-95 | 5.390E-01 | NOT IDENT. |
| NB-95M | 1.443E+00 | NOT IDENT. |
| ZR-95 | 1.009E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.576E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.363E-01 | NOT IDENT. |
| RH-102 | 6.579E-01 | NOT IDENT. |
| RU-103 | 5.856E-01 | NOT IDENT. |
| RH-106 | 3.851E+00 | NOT IDENT. |
| RU-106 | 3.851E+00 | NOT IDENT. |
| AG-108M | 3.934E-01 | NOT IDENT. |
| AG-110M | 7.949E-01 | FAIL ABUN |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 9.124E-01 | NOT IDENT. |
| TE-123M | 3.084E-01 | NOT IDENT. |
| SB-124 | 5.048E-01 | NOT IDENT. |
| SB-125 | 1.194E+00 | FAIL ABUN |
| TE-125M | 1.264E+02 | NOT IDENT. |
| I-126 | 4.004E+00 | NOT IDENT. |
| SB-126 | 2.881E+00 | NOT IDENT. |
| SB-127 | 8.031E+01 | NOT IDENT. |
| I-131 | 3.052E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 6.235E+01 | NOT IDENT. |
| BA-133 | 4.847E-01 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 5.418E-01 | NOT IDENT. |
| CS-135 | 1.721E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.504E+00 | FAIL ABUN |
| BA-140 | 8.239E-01 | NOT IDENT. |
| LA-140 | 8.239E-01 | NOT IDENT. |
| CE-141 | 7.701E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.174E+00 | NOT IDENT. |
| PM-144 | 3.993E-01 | NOT IDENT. |
| PR-144 | 3.005E+01 | NOT IDENT. |
| PM-146 | 5.816E-01 | NOT IDENT. |
| ND-147 | 1.222E+01 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 3.130E-01 | NOT IDENT. |
| EU-152 | 1.125E+00 | FAIL ABUN |
| GD-153 | 1.015E+00 | NOT IDENT. |
| EU-154 | 7.905E-01 | FAIL ABUN |
| EU-155 | 1.226E+00 | FAIL ABUN |
| TB-160 | 2.277E+00 | FAIL ABUN |
| HO-166M | 6.733E-01 | NOT IDENT. |
| TM-171 | 4.228E+02 | NOT IDENT. |
| LU-176 | 3.083E-01 | FAIL ABUN |
| HF-181 | 6.701E-01 | FAIL ABUN |
| TA-182 | 1.477E+00 | FAIL ABUN |
| RE-183 | 7.726E+00 | FAIL ABUN |
| RE-184 | 2.426E+00 | NOT IDENT. |
| W-188 | 9.007E+01 | NOT IDENT. |
| IR-192 | 4.408E-01 | NOT IDENT. |
| HG-203 | 4.948E-01 | NOT IDENT. |
| BI-207 | 7.508E-01 | NOT IDENT. |
| TL-208 | 4.047E-01 | NOT IDENT. |
| BI-211 | 2.295E+00 | NOT IDENT. |
| PB-211 | 8.730E+00 | NOT IDENT. |
| BI-212 | 6.040E+00 | NOT IDENT. |
| PB-212 | 6.378E-01 | FAIL ABUN |
| BI-214 | 7.899E-01 | NOT IDENT. |
| PB-214 | 8.304E-01 | FAIL ABUN |
| RN-219 | 4.873E+00 | NOT IDENT. |
| RN-222 | 7.899E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-223 | 7.263E+00 | NOT IDENT. |
| RA-224 | 6.895E+00 | NOT IDENT. |
| RA-226 | 7.899E-01 | NOT IDENT. |
| AC-227 | 3.006E+00 | FAIL ABUN |
| TH-227 | 3.006E+00 | FAIL ABUN |
| AC-228 | 2.170E+00 | NOT IDENT. |
| RA-228 | 2.170E+00 | NOT IDENT. |
| TH-228 | 6.378E-01 | FAIL ABUN |
| TH-230 | 7.898E-01 | NOT IDENT. |
| TH-231 | 7.263E+00 | NOT IDENT. |
| TH-232 | 2.170E+00 | NOT IDENT. |
| PA-233 | 7.668E-01 | FAIL ABUN |
| PA-234 | 4.983E+00 | FAIL ABUN |
| PA-234M | 6.675E+01 | NOT IDENT. |
| TH-234 | 1.835E+01 | NOT IDENT. |
| U-234 | 7.898E-01 | NOT IDENT. |
| U-235 | 2.025E+00 | NOT IDENT. |
| NP-237 | 7.668E-01 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.835E+01 | NOT IDENT. |
| NP-239 | 4.787E+00 | FAIL ABUN |
| PU-239 | 3.587E+03 | NOT IDENT. |
| AM-243 | 7.847E-01 | NOT IDENT. |
| CM-243 | 1.265E+00 | FAIL ABUN |
| CM-247 | 4.462E-01 | NOT IDENT. |
| CF-249 | 4.860E-01 | NOT IDENT. |
| CF-251 | 1.299E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 10-FEB-2014 11:31:36.78

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017836.CNF;1  *
* Acquisition date : 10-FEB-2014 11:15:33 Sensitivity     : 3.000       *
* Detector ID      : GAM29                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:15:11.71     Half life ratio : *****       *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203017836          Analyst initials: RXF2        *
* Batch Number     : 1359492              Sample Quantity : 1.6794E+02 GRAM  *
*                                         Quantity Err(%) : 1.1909E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7     *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CO-57 | 2.114E+01 | 1.960E+00 | 1.960E+00 |
| CO-60 | 1.764E+02 | 1.537E+01 | 1.537E+01 |
| ZN-65 | 7.385E+01 | 1.373E+01 | 1.373E+01 |
| Y-88 | 6.939E+00 | 1.037E+00 | 1.037E+00 |
| CD-109 | 1.805E+03 | 1.953E+02 | 1.953E+02 |
| SN-113 | 7.050E+00 | 1.442E+00 | 1.442E+00 |
| SN-126 | 1.740E+02 | 1.642E+01 | 1.642E+01 |
| BA-137M | 1.300E+02 | 1.062E+01 | 1.062E+01 |
| CS-137 | 1.373E+02 | 1.121E+01 | 1.121E+01 |
| CE-139 | 6.081E+00 | 1.472E+00 | 1.472E+00 |
| PM-147 | 6.071E+05 | 5.625E+04 | 5.625E+04 |
| PB-210 | 3.765E+03 | 4.106E+02 | 4.106E+02 |
| TH-229 | 4.588E+00 | 6.481E+00 | 6.481E+00 |
| PA-231 | 9.937E+00 | 1.923E+01 | 1.923E+01 |
| AM-241 | 3.261E+02 | 2.647E+01 | 2.647E+01 |
| ANH-511 | 2.345E+00 | 8.343E-01 | 8.343E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 4.110E+00 | 5.978E+00 | 6.259E+00 | NOT IDENT. |
| NA-22 | -7.090E-02 | 3.403E-01 | 3.418E-01 | NOT IDENT. |
| NA-24 | 1.110E+11 | 1.732E+11 | 1.803E+11 | SHORT HLIF |
| AL-26 | 1.614E-01 | 2.604E-01 | 2.704E-01 | NOT IDENT. |
| K-40 | -2.733E-01 | 2.501E+00 | 2.504E+00 | NOT IDENT. |
| SC-46 | -1.205E-01 | 7.855E-01 | 7.873E-01 | NOT IDENT. |
| V-48 | -2.123E-01 | 1.896E+00 | 1.898E+00 | NOT IDENT. |
| CR-51 | -2.899E+00 | 6.340E+00 | 6.474E+00 | NOT IDENT. |
| MN-54 | -6.031E-01 | 6.939E-01 | 7.453E-01 | NOT IDENT. |
| CO-56 | -2.906E-02 | 7.375E-01 | 7.376E-01 | NOT IDENT. |
| MN-56 | -1.000E+41 | 2.609E+42 | 0.000E+00 | SHORT HLIF |
| CO-58 | -1.189E-01 | 6.826E-01 | 6.847E-01 | NOT IDENT. |
| FE-59 | 1.119E+00 | 1.767E+00 | 1.838E+00 | NOT IDENT. |
| GE-68 | -1.596E+00 | 2.227E+01 | 2.228E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-73 | 3.109E+01 | 2.898E+01 | 3.219E+01 | NOT IDENT. |
| AS-74 | -6.164E-01 | 1.906E+00 | 1.926E+00 | NOT IDENT. |
| SE-75 | -8.280E-02 | 6.458E-01 | 6.469E-01 | FAIL ABUN |
| BR-77 | -6.891E+02 | 1.842E+03 | 1.868E+03 | SHORT HLIF |
| SR-82 | -2.599E-01 | 6.472E+00 | 6.473E+00 | NOT IDENT. |
| RB-83 | 8.054E-01 | 1.134E+00 | 1.190E+00 | FAIL ABUN |
| KR-85 | 1.756E+02 | 1.100E+02 | 1.355E+02 | NOT IDENT. |
| SR-85 | 1.024E+00 | 6.432E-01 | 7.918E-01 | NOT IDENT. |
| RB-86 | -5.420E+00 | 1.951E+01 | 1.967E+01 | NOT IDENT. |
| Y-91 | -2.381E+01 | 2.313E+02 | 2.316E+02 | NOT IDENT. |
| NB-94 | -1.188E-01 | 4.638E-01 | 4.669E-01 | NOT IDENT. |
| NB-95 | -1.137E-01 | 7.259E-01 | 7.277E-01 | NOT IDENT. |
| NB-95M | -7.850E-01 | 1.696E+00 | 1.732E+00 | NOT IDENT. |
| ZR-95 | 2.542E-01 | 1.282E+00 | 1.287E+00 | NOT IDENT. |
| NB-97 | 1.000E+41 | 5.852E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.046E+11 | 2.609E+11 | 2.651E+11 | SHORT HLIF |
| MO-99 | -3.772E+02 | 1.845E+03 | 1.853E+03 | NOT IDENT. |
| TC-99M | -1.071E+28 | 8.086E+28 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.704E-01 | 4.163E-01 | 4.234E-01 | NOT IDENT. |
| RH-102 | -1.430E-01 | 8.067E-01 | 8.093E-01 | NOT IDENT. |
| RU-103 | -1.693E-01 | 7.094E-01 | 7.135E-01 | NOT IDENT. |
| RH-106 | 2.687E+00 | 4.618E+00 | 4.774E+00 | NOT IDENT. |
| RU-106 | 2.687E+00 | 4.618E+00 | 4.774E+00 | NOT IDENT. |
| AG-108M | 9.552E-02 | 4.683E-01 | 4.703E-01 | NOT IDENT. |
| AG-110M | 2.336E-01 | 9.292E-01 | 9.352E-01 | FAIL ABUN |
| CD-115 | -6.455E+02 | 2.967E+03 | 2.981E+03 | SHORT HLIF |
| SN-117M | 4.949E-01 | 1.116E+00 | 1.138E+00 | NOT IDENT. |
| TE-123M | -9.918E-03 | 3.807E-01 | 3.807E-01 | NOT IDENT. |
| SB-124 | -3.089E-01 | 6.273E-01 | 6.426E-01 | NOT IDENT. |
| SB-125 | -4.720E-01 | 1.643E+00 | 1.656E+00 | FAIL ABUN |
| TE-125M | 6.098E+01 | 1.530E+02 | 1.554E+02 | NOT IDENT. |
| I-126 | 1.571E+00 | 5.547E+00 | 5.592E+00 | NOT IDENT. |
| SB-126 | -1.854E+00 | 3.405E+00 | 3.506E+00 | NOT IDENT. |
| SB-127 | 2.130E+01 | 1.120E+02 | 1.124E+02 | NOT IDENT. |
| I-131 | -1.104E+00 | 3.645E+00 | 3.679E+00 | NOT IDENT. |
| I-132 | 1.000E+41 | 3.128E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.122E+01 | 7.272E+01 | 7.289E+01 | NOT IDENT. |
| BA-133 | -1.117E-01 | 5.767E-01 | 5.789E-01 | NOT IDENT. |
| I-133 | 4.033E+06 | 1.501E+08 | 1.501E+08 | SHORT HLIF |
| CS-134 | 2.700E-01 | 6.268E-01 | 6.385E-01 | NOT IDENT. |
| CS-135 | -1.305E+00 | 2.043E+00 | 2.126E+00 | NOT IDENT. |
| I-135 | 9.120E+25 | 8.875E+26 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.979E+00 | 3.370E+00 | 3.486E+00 | FAIL ABUN |
| BA-140 | -7.803E-01 | 1.092E+00 | 1.147E+00 | NOT IDENT. |
| LA-140 | -7.803E-01 | 1.092E+00 | 1.147E+00 | NOT IDENT. |
| CE-141 | -3.179E-01 | 9.541E-01 | 9.648E-01 | NOT IDENT. |
| CE-143 | 4.561E+04 | 1.760E+05 | 1.771E+05 | SHORT HLIF |
| CE-144 | 1.698E+00 | 2.955E+00 | 3.053E+00 | NOT IDENT. |
| PM-144 | 2.301E-01 | 4.828E-01 | 4.938E-01 | NOT IDENT. |
| PR-144 | 1.763E+01 | 3.632E+01 | 3.718E+01 | NOT IDENT. |
| PM-146 | 3.322E-01 | 6.904E-01 | 7.064E-01 | NOT IDENT. |
| ND-147 | -6.021E-01 | 1.478E+01 | 1.479E+01 | NOT IDENT. |
| PM-149 | -1.831E+04 | 2.286E+04 | 2.431E+04 | SHORT HLIF |
| EU-150 | 4.791E-02 | 3.686E-01 | 3.693E-01 | NOT IDENT. |
| EU-152 | -6.257E-01 | 1.345E+00 | 1.375E+00 | FAIL ABUN |
| GD-153 | 7.978E-01 | 1.366E+00 | 1.412E+00 | NOT IDENT. |
| EU-154 | -1.678E-01 | 9.615E-01 | 9.645E-01 | FAIL ABUN |
| EU-155 | -1.265E+00 | 1.710E+00 | 1.802E+00 | FAIL ABUN |
| TB-160 | 3.764E-01 | 2.667E+00 | 2.672E+00 | FAIL ABUN |
| HO-166M | -8.946E-01 | 8.606E-01 | 9.504E-01 | NOT IDENT. |
| TM-171 | 2.391E+02 | 5.029E+02 | 5.143E+02 | NOT IDENT. |
| LU-176 | -1.660E-01 | 3.665E-01 | 3.741E-01 | FAIL ABUN |
| HF-181 | -1.374E-01 | 8.088E-01 | 8.111E-01 | FAIL ABUN |
| TA-182 | 1.534E-01 | 1.762E+00 | 1.764E+00 | FAIL ABUN |
| RE-183 | 4.237E+01 | 1.067E+01 | 2.188E+01 | FAIL ABUN |
| RE-184 | 1.960E+00 | 3.235E+00 | 3.353E+00 | NOT IDENT. |
| W-188 | 1.161E+01 | 1.055E+02 | 1.057E+02 | NOT IDENT. |
| IR-192 | -1.720E-01 | 5.232E-01 | 5.289E-01 | NOT IDENT. |
| HG-203 | -8.172E-02 | 5.816E-01 | 5.827E-01 | NOT IDENT. |
| BI-207 | 3.622E-01 | 8.843E-01 | 8.992E-01 | NOT IDENT. |
| TL-208 | -1.093E-01 | 4.944E-01 | 4.968E-01 | NOT IDENT. |
| BI-211 | -1.316E-01 | 2.719E+00 | 2.720E+00 | NOT IDENT. |
| PB-211 | -2.570E+00 | 1.046E+01 | 1.053E+01 | NOT IDENT. |
| BI-212 | -7.018E-01 | 7.039E+00 | 7.046E+00 | NOT IDENT. |
| PB-212 | -1.386E-01 | 7.451E-01 | 7.477E-01 | FAIL ABUN |
| BI-214 | 2.126E-01 | 9.545E-01 | 9.593E-01 | NOT IDENT. |
| PB-214 | -2.054E-01 | 9.875E-01 | 9.918E-01 | FAIL ABUN |
| RN-219 | -1.427E+00 | 5.841E+00 | 5.876E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 2.126E-01 | 9.545E-01 | 9.593E-01 | NOT IDENT. |
| RA-223 | -1.552E+00 | 8.602E+00 | 8.630E+00 | NOT IDENT. |
| RA-224 | 5.129E+00 | 7.956E+00 | 8.285E+00 | NOT IDENT. |
| RA-226 | 2.126E-01 | 9.545E-01 | 9.593E-01 | NOT IDENT. |
| AC-227 | 8.364E-01 | 3.499E+00 | 3.519E+00 | FAIL ABUN |
| TH-227 | 8.364E-01 | 3.499E+00 | 3.519E+00 | FAIL ABUN |
| AC-228 | -3.743E-01 | 2.563E+00 | 2.569E+00 | NOT IDENT. |
| RA-228 | -3.743E-01 | 2.563E+00 | 2.569E+00 | NOT IDENT. |
| TH-228 | -1.386E-01 | 7.451E-01 | 7.477E-01 | FAIL ABUN |
| TH-230 | 2.126E-01 | 9.545E-01 | 9.593E-01 | NOT IDENT. |
| TH-231 | -1.552E+00 | 8.602E+00 | 8.630E+00 | NOT IDENT. |
| TH-232 | -3.743E-01 | 2.563E+00 | 2.569E+00 | NOT IDENT. |
| PA-233 | 1.762E-01 | 8.995E-01 | 9.030E-01 | FAIL ABUN |
| PA-234 | -7.077E-01 | 5.950E+00 | 5.959E+00 | FAIL ABUN |
| PA-234M | 4.272E+01 | 7.818E+01 | 8.052E+01 | NOT IDENT. |
| TH-234 | -6.155E+01 | 2.933E+01 | 4.037E+01 | NOT IDENT. |
| U-234 | 2.126E-01 | 9.545E-01 | 9.593E-01 | NOT IDENT. |
| U-235 | 1.615E+00 | 2.459E+00 | 2.564E+00 | NOT IDENT. |
| NP-237 | 1.762E-01 | 8.995E-01 | 9.030E-01 | FAIL ABUN |
| NP-238 | -1.027E+03 | 7.784E+03 | 7.798E+03 | SHORT HLIF |
| U-238 | -6.155E+01 | 2.933E+01 | 4.037E+01 | NOT IDENT. |
| NP-239 | -5.251E+00 | 6.715E+00 | 7.120E+00 | FAIL ABUN |
| PU-239 | 9.352E+02 | 4.375E+03 | 4.395E+03 | NOT IDENT. |
| AM-243 | -4.682E-01 | 9.522E-01 | 9.753E-01 | NOT IDENT. |
| CM-243 | 1.096E+00 | 1.705E+00 | 1.775E+00 | FAIL ABUN |
| CM-247 | -4.846E-01 | 5.498E-01 | 5.916E-01 | NOT IDENT. |
| CF-249 | 1.507E-01 | 6.541E-01 | 6.577E-01 | NOT IDENT. |
| CF-251 | 5.114E-01 | 1.799E+00 | 1.814E+00 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 5045.1587 | 94.67 | 1651.1010 | 193.51 | 1285.6527 |
| 45.60 | 4640.1489 | 94.87 | 1672.9486 | 197.03 | 1371.2704 |
| 46.54 | 4648.2549 | 97.43 | 1608.6848 | 198.01 | 1343.9451 |
| 49.72 | 4331.4688 | 98.43 | 1650.9723 | 201.83 | 1349.2319 |
| 51.35 | 4384.7104 | 98.44 | 1663.9193 | 205.31 | 1305.1456 |
| 52.39 | 4306.3096 | 99.53 | 1560.9099 | 210.85 | 1387.3824 |
| 53.44 | 4244.2837 | 100.11 | 1594.3350 | 215.65 | 1442.4650 |
| 57.36 | 0.0000 | 103.18 | 1630.8566 | 222.11 | 1365.2244 |
| 57.53 | 3423.1067 | 103.37 | 1606.8458 | 227.09 | 1395.3081 |
| 57.98 | 3425.6033 | 105.21 | 1720.9153 | 227.38 | 1385.6232 |
| 59.32 | 3433.0078 | 105.31 | 1721.1088 | 228.16 | 1370.9767 |
| 59.54 | 3434.2131 | 106.12 | 1709.0997 | 228.18 | 1370.9999 |
| 63.29 | 2593.9241 | 109.28 | 1607.1794 | 235.69 | 1359.8418 |
| 63.58 | 2595.0767 | 111.00 | 1674.6759 | 235.96 | 1363.7341 |
| 64.28 | 2716.7126 | 111.76 | 1744.9431 | 238.63 | 1342.4678 |
| 66.73 | 2694.7512 | 116.30 | 1676.0265 | 238.98 | 0.0000 |
| 67.24 | 2659.5833 | 117.23 | 1804.6927 | 240.99 | 1292.5132 |
| 67.75 | 2735.0300 | 121.12 | 1575.7474 | 242.00 | 1334.5201 |
| 69.67 | 3021.7959 | 121.22 | 1575.9071 | 244.70 | 1305.7705 |
| 70.83 | 3042.4495 | 121.78 | 1576.8217 | 252.40 | 1331.6678 |
| 72.81 | 3042.7212 | 122.06 | 1577.2789 | 252.80 | 1307.1558 |
| 72.87 | 3041.9316 | 123.07 | 1442.2648 | 254.15 | 0.0000 |
| 74.66 | 3131.0820 | 127.23 | 1436.6908 | 256.23 | 1260.2140 |
| 74.82 | 3107.7336 | 129.30 | 1381.7682 | 260.90 | 0.0000 |
| 74.97 | 3115.7007 | 131.20 | 1436.3557 | 264.66 | 1209.4473 |
| 77.11 | 3124.9041 | 133.02 | 1398.0215 | 268.22 | 1185.1765 |
| 79.69 | 3228.4067 | 133.52 | 1345.0291 | 269.46 | 1178.6487 |
| 80.12 | 3236.5796 | 136.00 | 1464.2704 | 271.23 | 1131.4984 |
| 80.19 | 3236.8767 | 136.47 | 1400.4495 | 273.65 | 1124.7915 |
| 80.57 | 3272.2205 | 140.51 | 1332.1238 | 276.40 | 1128.5370 |
| 81.00 | 3336.2583 | 143.76 | 1256.5859 | 277.37 | 1095.5490 |
| 81.07 | 3336.5803 | 144.24 | 1270.6947 | 277.60 | 1087.2957 |
| 83.79 | 3374.4250 | 145.44 | 1339.9598 | 278.00 | 1077.2754 |
| 85.43 | 3546.9243 | 152.43 | 1295.0099 | 279.20 | 1121.0959 |
| 86.55 | 3687.3259 | 153.25 | 1307.3470 | 279.54 | 1146.6057 |
| 86.79 | 3688.4568 | 154.21 | 1343.8014 | 280.46 | 1096.6689 |
| 86.94 | 2784.3948 | 156.02 | 1240.9320 | 283.69 | 1048.1249 |
| 87.09 | 2784.9282 | 158.56 | 1268.8677 | 284.31 | 1056.9480 |
| 87.57 | 2786.6218 | 159.00 | 1294.5339 | 285.41 | 1107.4353 |
| 88.03 | 2788.2356 | 162.33 | 1403.3058 | 285.90 | 0.0000 |
| 88.34 | 2789.3291 | 163.33 | 1344.1956 | 287.50 | 1059.8987 |
| 88.47 | 2789.7825 | 165.86 | 1237.7197 | 290.67 | 1069.4139 |
| 89.96 | 1722.0808 | 176.31 | 1203.2288 | 293.27 | 0.0000 |
| 91.11 | 1750.1576 | 176.60 | 1203.5133 | 295.22 | 1027.8691 |
| 92.59 | 1702.0100 | 177.52 | 1157.9169 | 295.96 | 1024.5203 |
| 93.35 | 1748.2255 | 181.07 | 1267.3374 | 298.58 | 1014.7163 |
| 94.56 | 1650.8817 | 184.41 | 1178.3584 | 299.98 | 1054.3746 |
| 94.65 | 1651.0619 | 185.72 | 1280.5098 | 300.09 | 1058.2321 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 1058.2661 | 497.08 | 793.4051 | 711.68 | 578.8092 |
| 301.36 | 1025.8330 | 505.52 | 768.9502 | 720.70 | 615.8339 |
| 302.85 | 1018.7372 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 1019.6874 | 511.00 | 717.2452 | 722.78 | 572.0240 |
| 306.78 | 1079.4069 | 514.00 | 669.2455 | 722.91 | 572.0550 |
| 308.46 | 1067.1018 | 514.00 | 669.2455 | 723.31 | 581.1408 |
| 311.90 | 1046.2811 | 520.40 | 698.8913 | 724.19 | 589.4377 |
| 316.51 | 1033.6765 | 520.69 | 0.0000 | 727.33 | 608.9860 |
| 319.41 | 1016.1711 | 522.65 | 0.0000 | 733.00 | 605.5136 |
| 320.08 | 1003.1301 | 527.90 | 0.0000 | 735.93 | 589.7621 |
| 321.04 | 995.0457 | 529.59 | 680.3128 | 737.46 | 593.6577 |
| 323.87 | 990.8214 | 529.87 | 0.0000 | 739.50 | 586.7860 |
| 325.23 | 945.4424 | 531.02 | 691.2601 | 747.24 | 569.9791 |
| 328.76 | 949.1694 | 546.56 | 0.0000 | 748.06 | 583.7717 |
| 333.37 | 964.0771 | 552.55 | 400.0967 | 752.31 | 598.1812 |
| 333.97 | 992.3770 | 563.25 | 555.5469 | 753.82 | 618.4934 |
| 334.37 | 994.5278 | 569.33 | 580.3575 | 756.73 | 604.3069 |
| 338.28 | 998.5375 | 569.50 | 580.3906 | 756.80 | 599.1134 |
| 338.32 | 998.5532 | 569.70 | 565.4312 | 763.94 | 583.2116 |
| 340.48 | 1027.7952 | 583.19 | 624.1974 | 765.81 | 595.7277 |
| 340.55 | 1027.8275 | 584.27 | 654.5908 | 766.42 | 589.7435 |
| 344.28 | 991.9962 | 595.83 | 644.3450 | 766.84 | 579.1536 |
| 345.93 | 975.3519 | 600.60 | 604.2843 | 772.60 | 0.0000 |
| 351.06 | 919.5127 | 602.52 | 0.0000 | 776.52 | 617.1851 |
| 351.93 | 923.8284 | 602.73 | 624.2520 | 777.92 | 613.7781 |
| 355.39 | 0.0000 | 604.72 | 593.2399 | 778.90 | 615.7932 |
| 356.01 | 933.5792 | 609.32 | 607.2438 | 783.70 | 584.4958 |
| 364.49 | 921.9131 | 610.33 | 618.3326 | 785.37 | 632.5872 |
| 366.42 | 893.3652 | 614.28 | 602.8605 | 792.07 | 615.4048 |
| 375.05 | 921.8601 | 618.01 | 590.5630 | 794.95 | 639.8998 |
| 383.85 | 984.2626 | 620.36 | 605.2359 | 795.86 | 631.7687 |
| 388.16 | 914.4844 | 621.93 | 585.9180 | 801.95 | 611.6227 |
| 388.63 | 882.9351 | 630.19 | 0.0000 | 810.29 | 658.4734 |
| 391.69 | 954.2139 | 631.29 | 620.6581 | 810.45 | 664.0652 |
| 400.66 | 880.4254 | 633.25 | 587.1169 | 810.76 | 660.4128 |
| 401.81 | 918.8629 | 634.78 | 592.9075 | 815.77 | 643.7291 |
| 402.40 | 970.0666 | 635.95 | 626.0298 | 818.51 | 738.9235 |
| 404.85 | 957.1752 | 636.99 | 627.3531 | 832.01 | 689.5586 |
| 410.95 | 983.9788 | 645.85 | 646.8395 | 834.85 | 732.0853 |
| 413.71 | 972.1801 | 657.76 | 622.0328 | 835.71 | 713.6016 |
| 414.70 | 1026.8811 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 1047.6686 | 661.66 | 614.8782 | 846.75 | 0.0000 |
| 427.87 | 1004.3644 | 664.57 | 0.0000 | 846.77 | 746.6833 |
| 433.94 | 973.0518 | 666.33 | 512.1566 | 856.80 | 775.9586 |
| 439.40 | 1036.3733 | 666.50 | 512.1848 | 860.56 | 711.0181 |
| 453.88 | 989.8013 | 667.71 | 0.0000 | 871.09 | 770.5097 |
| 463.37 | 1057.5040 | 677.62 | 557.7682 | 873.19 | 786.9712 |
| 468.07 | 1043.1655 | 685.70 | 513.6187 | 875.33 | 0.0000 |
| 473.00 | 1043.2699 | 695.00 | 556.7545 | 879.38 | 797.7369 |
| 475.06 | 1030.7676 | 696.49 | 537.9984 | 880.51 | 776.2642 |
| 476.78 | 954.0593 | 696.51 | 537.9984 | 883.24 | 808.0126 |
| 477.60 | 944.0687 | 697.00 | 553.7480 | 884.68 | 775.2363 |
| 482.18 | 897.2291 | 697.49 | 549.3632 | 889.28 | 810.2742 |
| 487.02 | 873.1048 | 702.65 | 564.8313 | 894.76 | 853.1763 |
| 492.35 | 0.0000 | 706.68 | 573.4091 | 898.04 | 875.7458 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 807.6038 | 1312.11 | 121.0127 | | |
| 911.20 | 824.5182 | 1332.49 | 122.5529 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 836.4197 | 1365.19 | 68.5229 | | |
| 937.49 | 912.6045 | 1368.63 | 0.0000 | | |
| 944.13 | 902.6387 | 1384.29 | 63.4834 | | |
| 946.00 | 882.8997 | 1408.01 | 56.3306 | | |
| 949.00 | 872.0353 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 56.8896 | | |
| 962.31 | 905.8508 | 1489.16 | 58.2636 | | |
| 964.08 | 836.7735 | 1505.03 | 42.1992 | | |
| 966.17 | 825.6302 | 1596.21 | 58.2741 | | |
| 968.97 | 745.9902 | 1620.50 | 54.2850 | | |
| 983.53 | 707.0019 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 38.1706 | | |
| 996.26 | 698.8668 | 1750.46 | 0.0000 | | |
| 1001.03 | 658.4398 | 1764.49 | 25.4366 | | |
| 1004.73 | 680.4819 | 1770.23 | 39.6040 | | |
| 1021.30 | 0.0000 | 1771.35 | 39.6108 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 26.0212 | | |
| 1037.84 | 633.8511 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 31.4397 | | |
| 1046.59 | 612.1960 | | | | |
| 1048.07 | 581.2134 | | | | |
| 1049.04 | 575.7268 | | | | |
| 1050.41 | 577.1497 | | | | |
| 1063.66 | 600.1535 | | | | |
| 1077.00 | 648.6671 | | | | |
| 1077.34 | 632.8287 | | | | |
| 1085.87 | 658.9210 | | | | |
| 1099.45 | 592.2018 | | | | |
| 1112.07 | 626.5443 | | | | |
| 1112.84 | 590.0000 | | | | |
| 1115.54 | 565.3311 | | | | |
| 1120.29 | 462.4331 | | | | |
| 1120.55 | 447.4518 | | | | |
| 1121.30 | 449.1871 | | | | |
| 1129.67 | 408.5501 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 331.4068 | | | | |
| 1177.95 | 270.5338 | | | | |
| 1189.05 | 238.9817 | | | | |
| 1204.77 | 231.6331 | | | | |
| 1221.41 | 184.3154 | | | | |
| 1231.02 | 148.7808 | | | | |
| 1235.36 | 149.9423 | | | | |
| 1238.28 | 168.5324 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 110.7199 | | | | |
| 1274.44 | 116.9892 | | | | |
| 1274.54 | 116.9947 | | | | |
| 1291.59 | 136.7906 | | | | |
| 1298.22 | 0.0000 | | | | |

Radiochemistry Batch Checklist

03-May-2010



Batch# 1361908 Product GAMMA Date: 2/14/14

| Criteria | Yes | No | Comments |
|---|---|---|---|
| Sample Solids are less than or equal to 100 mg for GAB. | NA | | |
| Samples have been blank corrected (if required).<br>Blank correction reported included (if required). | NA | | |
| If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity.<br>If greater than $10^x$ MDA/ MDC, error is 40% or less.<br>If below the MDA/ MDC, error is okay. | ✓ | | |
| Instrument source check is within limits.<br>Instrument bkg check is within limits. | ✓ | | |
| Method RDL/ LLD has been met. | ✓ | | |
| If duplicate activities are:<br>Less than $5^x$ MDA/ MDC, then RPD is 100% or less,<br>If greater $5^x$ MDA/ MDC, then RPD 20% or less,<br>If below the MDA/ MDC, the RPD is 0%,<br>Or meets the client's required RER acceptance criteria. | ✓ | | |
| Tracer yield is 15-125% . Carrier yield 25-125%.<br>(Or meets the client's contract acceptance criteria). | NA | | |
| Method blank is less than the RDL/ LLD.<br>(If rad samples, < 5% of lowest activity) | ✓ | | |
| Sample was run within hold time. | ✓ | | |
| Sample was correctly preserved if required. | NA | | |
| Smears Taken for Radioactive batches. | NA | | |
| Method Spike and LCS are within 75-125%<br>(or meets the client's contract acceptance criteria). | ✓ | | |
| No blank spaces on data forms.<br>All line outs initialed and dated.<br>No transcription errors are apparent. | ✓ | | |
| Aux data is correct. | NA | | |
| Client Special requirements page has been checked. | ✓ | | |
| Raw Data and/ or spectrum are included and properly statused. | ✓ | | |
| MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified | ✓ | | |
| Hit notification complete (if necessary) | NA | | |
| Batch entered into Case Narrative. | ✓ | | |
| Batch Data Exception Reports (DER) completed, if applicable. | NA | | |
| Batch Data Exception Reports (DER) second reviewed.<br>Disposition verified to be completed. | NA | | |
| Aliquot Correction completed if required. | NA | | |
| Review sample historical results if available<br>(If REMP, results above MDC have been verified by historical results, recount or re-analysis.) | NA | | |

Primary Review Performed By: [signature] NA 2/14/14

Secondary Review Performed By: [signature] 2/14/14

DCN: ITSI-0808-0004-0076, 8 May 2019

# Gamma Spec Queue Sheet I.G. = 2/12/14

01/22/2014

Batch #:1361908 Analyst: RXF2 First Client DueDate:02/17/2014 Internal Due Date: 02/06/2014

Gamma LCS Isotope: Mixed Gamma LCS Code: 1605 Expiration Date: 9/6/39 Vol: 1.0

Initials: RF Prep Date: 1/22/14 Library: SOIL Balance ID: LL4

| Sample ID | Client Description / Container ID | Type | Hazard Code | Client | Matrix | Collect Date | Geometry | Wet/Dry Aliquot (I (g) F) | Detector | Sealing Date/Time (if Applicable) |
|---|---|---|---|---|---|---|---|---|---|---|
| 341140021-1 | 04-PDV-RT1300-06-0021 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:35:00 | 500mmB | 102.375 g | 17 | 1/22/14 |
| 341140022-1 | 04-PDV-RT1300-06-0022 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:38:00 | | 113.572 g | 19 | |
| 341140023-1 | 04-PDV-RT1300-06-0023 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:41:00 | | 122.654 g | 24 | |
| 341140024-1 | 04-PDV-RT1300-06-0024 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:44:00 | | 129.155 g | 28 | |
| 341140025-1 | 04-PDV-RT1300-06-0025 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:47:00 | | 130.479 g | 32 | |
| 341140026-1 | 04-PDV-RT1300-06-0026 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:49:00 | | 109.734 g | 7 | |
| 341146021-1 | 04-PDV-RT1300-08-0021 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:53:00 | Jar | 57.245 g | 14 | |
| 341146022-1 | 04-PDV-RT1300-08-0022 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:58:00 | | 46.646 g | 22 ~~27~~ | 2/12 |
| 341146023-1 | 04-PDV-RT1300-08-0023 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:02:00 | | 72.393 g | 18 | |
| 341146024-1 | 04-PDV-RT1300-08-0024 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:06:00 | | 56.35 g | 4 ~~10~~ | 2/12 |
| 341147021-1 | 04-PDV-RT1300-09-0021 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:00:00 | 500mmD | 123.737 g | 1 | |
| 341147022-1 | 04-PDV-RT1300-09-0022 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:55:00 | | 78.22 g | 3 | |
| 341147023-1 | 04-PDV-RT1300-09-0023 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:45:00 | Jar | 43.788 g | 5 | |
| 341147024-1 | 04-PDV-RT1300-09-0024 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:48:00 | | 61.108 g | 6 | |
| 341148019-1 | 04-PDV-RT1300-07-0021 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:35:00 | | 55.756 g | 7 | |
| 341148020-1 | 04-PDV-RT1300-07-0022 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:40:00 | 500mmC | 116.529 g | 9 | |
| 341148021-1 | 04-PDV-RT1300-07-0023 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:45:00 | Jar | 73.76 g | 11 | |
| 341148022-1 | 04-PDV-RT1300-07-0024 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:50:00 | 500mmB | 116.437 g | 12 | |
| 1203023699-1 | MB | MB | | QC ACCOUNT | SOLID | 1/22/14 | | 130.479 | 27 ~~13~~ | 2/12/14 |
| 1203023700-1 | DUP 04-PDV-RT1300-06-0021(341140021) | DUP | | QC ACCOUNT | SOLID | 06-NOV-13 14:35:00 | | 102.375 | 28 | |
| 1203023701-1 | LCS | LCS | | QC ACCOUNT | SOLID | 1/22/14 | | 130.479 | 11 | |

*GEL Laboratories LLC, Radiochemistry Division*

Data Reviewed By: 2/14/14

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:22.34

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM17.CNF;353
                                    Background date  : 9-FEB-2014 11:21:42.
Sample date      : 6-NOV-2013 14:35:00. Acquisition date : 12-FEB-2014 11:48:57
Sample ID        : G341140021           Sample quantity  : 1.02375E+02 GRAM
Detector name    : GAM17                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:04.15  0.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.50 | 30 | 23 | 0.96 | 106.84 | 104 | 8 | 8.29E-03 | 33.0 | |
| 2 | 0 | 77.11* | 24 | 41 | 2.73 | 154.07 | 150 | 8 | 6.53E-03 | 54.3 | |
| 3 | 0 | 93.05* | 4 | 49 | 1.23 | 185.96 | 182 | 9 | 1.16E-03 | 348.0 | |
| 4 | 0 | 140.81* | 9 | 29 | 1.81 | 281.49 | 275 | 9 | 2.50E-03 | 119.6 | |
| 5 | 1 | 185.65* | 4 | 23 | 1.14 | 371.21 | 367 | 12 | 9.81E-04 | 293.1 | 8.58E-01 |
| 6 | 1 | 187.45 | 15 | 18 | 1.14 | 374.79 | 367 | 12 | 4.10E-03 | 66.3 | |
| 7 | 0 | 238.90* | 3 | 29 | 1.08 | 477.72 | 474 | 8 | 9.02E-04 | 324.8 | |
| 8 | 0 | 251.12 | 9 | 11 | 1.39 | 502.17 | 499 | 7 | 2.49E-03 | 71.9 | |
| 9 | 0 | 278.87 | 8 | 23 | 1.13 | 557.69 | 553 | 8 | 2.18E-03 | 110.5 | |
| 10 | 1 | 292.41 | 14 | 15 | 1.28 | 584.77 | 582 | 18 | 3.86E-03 | 45.5 | 6.60E+00 |
| 11 | 1 | 295.14* | 8 | 15 | 1.28 | 590.23 | 582 | 18 | 2.25E-03 | 89.7 | |
| 12 | 1 | 297.90 | 14 | 10 | 1.28 | 595.77 | 582 | 18 | 4.00E-03 | 48.7 | |
| 13 | 0 | 305.66 | 9 | 22 | 2.29 | 611.29 | 604 | 14 | 2.56E-03 | 110.8 | |
| 14 | 0 | 323.96 | 7 | 13 | 0.60 | 647.89 | 646 | 7 | 2.04E-03 | 87.6 | |
| 15 | 0 | 361.82 | 8 | 9 | 1.37 | 723.64 | 720 | 6 | 2.08E-03 | 72.4 | |
| 16 | 0 | 440.43 | 10 | 3 | 0.52 | 880.92 | 877 | 7 | 2.74E-03 | 44.4 | |
| 17 | 0 | 482.94 | 7 | 9 | 0.69 | 965.97 | 960 | 8 | 1.82E-03 | 91.4 | |
| 18 | 0 | 599.41 | 6 | 4 | 1.29 | 1199.00 | 1195 | 8 | 1.67E-03 | 70.7 | |
| 19 | 0 | 609.07* | 8 | 6 | 1.05 | 1218.33 | 1214 | 10 | 2.20E-03 | 79.0 | |
| 20 | 0 | 673.30 | 10 | 2 | 1.11 | 1346.86 | 1342 | 8 | 2.74E-03 | 40.5 | |
| 21 | 0 | 835.68 | 7 | 3 | 0.96 | 1671.77 | 1668 | 7 | 1.97E-03 | 56.6 | |
| 22 | 0 | 1063.77* | 3 | 2 | 0.76 | 2128.23 | 2123 | 8 | 8.55E-04 | 117.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 12:49:23

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 6-NOV-2013 14:35:00 | Acquisition date | : 12-FEB-2014 11:48:57 |
| Sample ID | : G341140021 | Sample quantity | : 102.38 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA17 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:04.15 0.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| MN-54 | 834.85 | 7 | 99.98* | 1.387E+00 | 3.754E-02 | 4.666E-02 | 113.12 |
| AS-73 | 53.44 | 30 | 10.30* | 5.352E+00 | 3.969E-01 | 9.241E-01 | 66.01 |
| HG-203 | 70.83 | ------ | 3.69 | 6.312E+00 | ------ | Line Not Found | ------ |
| | 72.87 | ------ | 6.19 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 279.20 | 8 | 81.56* | 3.641E+00 | 1.936E-02 | 8.307E-02 | 220.96 |
| PB-212 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:24.78

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:48:57 Sensitivity     : 3.000            *
* Detector ID      : GAM17                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:04.15     Half life ratio : *****            *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID            *
* Sample ID        : G341140021           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8          *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| MN-54 | 4.666E-02 | 5.173E-02 | 1.020E-01 |
| AS-73 | 9.241E-01 | 5.978E-01 | 7.571E-01 |
| HG-203 | 8.307E-02 | 1.799E-01 | 3.107E-01 |
| PB-212 | 1.324E-02 | 8.431E-02 | 1.182E-01 |
| TH-228 | 1.324E-02 | 8.431E-02 | 1.182E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.243E-01 | 9.549E-01 | 1.864E+00 | NOT IDENT. |
| NA-22 | -3.788E-02 | 4.915E-02 | 7.659E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.760E-03 | 4.709E-02 | 1.139E-01 | NOT IDENT. |
| K-40 | 1.817E-01 | 5.868E-01 | 1.290E+00 | NOT IDENT. |
| SC-46 | -1.289E-03 | 1.019E-01 | 2.056E-01 | NOT IDENT. |
| V-48 | 4.129E+00 | 3.528E+00 | 8.514E+00 | NOT IDENT. |
| CR-51 | 2.598E-01 | 3.645E+00 | 6.346E+00 | NOT IDENT. |
| CO-56 | 8.882E-03 | 1.112E-01 | 2.267E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -2.009E-02 | 2.580E-02 | 4.425E-02 | NOT IDENT. |
| CO-58 | -4.123E-02 | 9.682E-02 | 1.826E-01 | NOT IDENT. |
| FE-59 | 1.499E-01 | 4.231E-01 | 9.124E-01 | NOT IDENT. |
| CO-60 | -4.825E-03 | 4.165E-02 | 9.056E-02 | NOT IDENT. |
| ZN-65 | 1.170E-02 | 1.382E-01 | 2.823E-01 | NOT IDENT. |
| GE-68 | -1.962E-02 | 1.496E+00 | 3.191E+00 | NOT IDENT. |
| AS-74 | 1.171E-01 | 2.874E+00 | 5.020E+00 | NOT IDENT. |
| SE-75 | -4.908E-02 | 7.341E-02 | 1.205E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 4.004E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 6.855E-01 | 3.925E+00 | 8.248E+00 | NOT IDENT. |
| RB-83 | 8.582E-02 | 1.546E-01 | 3.328E-01 | NOT IDENT. |
| KR-85 | -2.219E+01 | 1.254E+01 | 1.777E+01 | NOT IDENT. |
| SR-85 | -2.811E-01 | 1.586E-01 | 2.245E-01 | NOT IDENT. |
| RB-86 | -3.448E+00 | 1.750E+01 | 3.504E+01 | NOT IDENT. |
| Y-88 | -3.352E-02 | 1.050E-01 | 2.062E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 1.584E+01 | 5.112E+01 | 1.174E+02 | NOT IDENT. |
| NB-94 | 1.930E-02 | 3.839E-02 | 8.236E-02 | NOT IDENT. |
| NB-95 | -5.609E-02 | 1.139E-01 | 2.061E-01 | NOT IDENT. |
| NB-95M | 1.421E-01 | 2.974E-01 | 5.322E-01 | NOT IDENT. |
| ZR-95 | -2.771E-02 | 1.941E-01 | 3.906E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 5.572E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.494E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.380E-02 | 2.650E-02 | 5.303E-02 | FAIL ABUN |
| RH-102 | -1.030E-01 | 6.905E-02 | 8.327E-02 | NOT IDENT. |
| RU-103 | -1.624E-01 | 1.921E-01 | 3.146E-01 | FAIL ABUN |
| RH-106 | 1.475E-01 | 4.419E-01 | 9.139E-01 | NOT IDENT. |
| RU-106 | 1.475E-01 | 4.419E-01 | 9.139E-01 | NOT IDENT. |
| AG-108M | 6.794E-03 | 3.076E-02 | 6.304E-02 | NOT IDENT. |
| CD-109 | -1.304E-01 | 5.852E-01 | 1.036E+00 | NOT IDENT. |
| AG-110M | 2.158E-02 | 6.728E-02 | 1.506E-01 | NOT IDENT. |
| SN-113 | -4.920E-02 | 8.046E-02 | 1.423E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.993E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 6.418E-01 | 3.361E+00 | 6.328E+00 | NOT IDENT. |
| TE-123M | -1.906E-02 | 4.397E-02 | 7.649E-02 | NOT IDENT. |
| SB-124 | 1.921E-01 | 2.827E-01 | 7.725E-01 | NOT IDENT. |
| SB-125 | -4.794E-02 | 1.043E-01 | 1.889E-01 | FAIL ABUN |
| TE-125M | -5.969E+00 | 1.967E+01 | 3.614E+01 | NOT IDENT. |
| I-126 | -2.069E+01 | 2.175E+01 | 3.279E+01 | NOT IDENT. |
| SB-126 | 4.046E+00 | 1.804E+01 | 3.805E+01 | NOT IDENT. |
| SN-126 | -1.748E-03 | 4.929E-02 | 9.313E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 5.020E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.289E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 3.706E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.171E-02 | 4.462E-02 | 8.216E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 3.374E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.352E-03 | 4.777E-02 | 1.028E-01 | NOT IDENT. |
| CS-135 | 9.916E-03 | 1.635E-01 | 3.012E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.350E+00 | 1.037E+01 | 1.951E+01 | NOT IDENT. |
| BA-137M | 2.568E-02 | 4.381E-02 | 9.389E-02 | NOT IDENT. |
| CS-137 | 2.713E-02 | 4.628E-02 | 9.919E-02 | NOT IDENT. |
| CE-139 | 2.621E-02 | 4.209E-02 | 8.359E-02 | NOT IDENT. |
| BA-140 | -9.189E-01 | 1.080E+01 | 2.307E+01 | NOT IDENT. |
| LA-140 | -9.189E-01 | 1.080E+01 | 2.307E+01 | NOT IDENT. |
| CE-141 | -7.570E-02 | 3.154E-01 | 5.735E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.555E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.690E-02 | 1.982E-01 | 3.702E-01 | NOT IDENT. |
| PM-144 | 3.605E-03 | 5.535E-02 | 1.062E-01 | NOT IDENT. |
| PR-144 | 2.817E-01 | 4.326E+00 | 8.297E+00 | NOT IDENT. |
| PM-146 | 4.277E-02 | 4.333E-02 | 1.002E-01 | NOT IDENT. |
| ND-147 | -4.587E+01 | 1.075E+02 | 1.985E+02 | NOT IDENT. |
| PM-147 | -2.736E+02 | 6.327E+02 | 1.137E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.825E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | 6.558E-03 | 3.369E-02 | 6.602E-02 | FAIL ABUN |
| EU-152 | 8.146E-02 | 1.115E-01 | 2.354E-01 | NOT IDENT. |
| GD-153 | 1.406E-02 | 7.591E-02 | 1.352E-01 | NOT IDENT. |
| EU-154 | -1.275E-01 | 1.420E-01 | 2.081E-01 | NOT IDENT. |
| EU-155 | -1.623E-02 | 8.896E-02 | 1.646E-01 | NOT IDENT. |
| TB-160 | 6.135E-02 | 3.285E-01 | 7.098E-01 | FAIL ABUN |
| HO-166M | -3.233E-02 | 7.791E-02 | 1.460E-01 | FAIL ABUN |
| TM-171 | 9.582E+00 | 6.199E+00 | 9.599E+00 | FAIL ABUN |
| LU-176 | 2.143E-02 | 4.655E-02 | 4.687E-02 | FAIL ABUN |
| HF-181 | 1.312E-01 | 2.351E-01 | 4.255E-01 | FAIL ABUN |
| TA-182 | 5.043E-02 | 2.282E-01 | 5.451E-01 | NOT IDENT. |
| RE-183 | 8.428E-02 | 1.660E-01 | 2.914E-01 | NOT IDENT. |
| RE-184 | -2.045E-01 | 7.761E-01 | 1.496E+00 | NOT IDENT. |
| W-188 | 1.565E+01 | 1.798E+01 | 3.468E+01 | NOT IDENT. |
| IR-192 | 2.341E-02 | 7.724E-02 | 1.577E-01 | FAIL ABUN |
| BI-207 | 2.714E-02 | 6.253E-02 | 1.398E-01 | FAIL ABUN |
| TL-208 | -3.052E-02 | 5.728E-02 | 1.057E-01 | FAIL ABUN |
| PB-210 | -7.215E-01 | 8.024E-01 | 1.446E+00 | NOT IDENT. |
| BI-211 | -9.370E-02 | 2.362E-01 | 4.495E-01 | NOT IDENT. |
| PB-211 | -4.851E-01 | 7.193E-01 | 1.255E+00 | NOT IDENT. |
| BI-212 | 2.530E-01 | 5.786E-01 | 1.272E+00 | NOT IDENT. |
| BI-214 | 6.955E-02 | 1.077E-01 | 2.109E-01 | FAIL ABUN |
| PB-214 | -8.446E-02 | 8.375E-02 | 1.464E-01 | FAIL ABUN |
| RN-219 | -2.777E-01 | 4.781E-01 | 8.464E-01 | NOT IDENT. |
| RN-222 | 6.955E-02 | 1.077E-01 | 2.109E-01 | FAIL ABUN |
| RA-223 | 4.209E-01 | 7.225E-01 | 1.374E+00 | FAIL ABUN |
| RA-224 | 3.428E-02 | 6.760E-01 | 1.113E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 6.955E-02 | 1.077E-01 | 2.109E-01 | FAIL ABUN |
| AC-227 | 1.550E-01 | 2.558E-01 | 5.105E-01 | FAIL ABUN |
| TH-227 | 1.550E-01 | 2.558E-01 | 5.105E-01 | FAIL ABUN |
| AC-228 | -6.449E-02 | 1.885E-01 | 3.685E-01 | FAIL ABUN |
| RA-228 | -6.449E-02 | 1.885E-01 | 3.685E-01 | FAIL ABUN |
| TH-229 | 1.832E-01 | 4.798E-01 | 9.322E-01 | NOT IDENT. |
| TH-230 | 6.954E-02 | 1.076E-01 | 2.109E-01 | FAIL ABUN |
| PA-231 | -5.067E-01 | 1.711E+00 | 2.962E+00 | NOT IDENT. |
| TH-231 | 4.209E-01 | 7.225E-01 | 1.374E+00 | FAIL ABUN |
| TH-232 | -6.449E-02 | 1.885E-01 | 3.685E-01 | NOT IDENT. |
| PA-233 | -2.867E-02 | 7.014E-02 | 1.193E-01 | NOT IDENT. |
| PA-234 | -1.940E-01 | 2.708E-01 | 4.566E-01 | NOT IDENT. |
| PA-234M | 1.588E+00 | 5.479E+00 | 1.184E+01 | NOT IDENT. |
| TH-234 | -8.972E-02 | 7.160E-01 | 1.337E+00 | FAIL ABUN |
| U-234 | 6.954E-02 | 1.076E-01 | 2.109E-01 | FAIL ABUN |
| U-235 | -4.918E-02 | 1.916E-01 | 3.273E-01 | FAIL ABUN |
| NP-237 | -2.867E-02 | 7.014E-02 | 1.193E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.658E+13 | 0.000E+00 | SHORT HLIF |
| U-238 | -8.972E-02 | 7.160E-01 | 1.337E+00 | FAIL ABUN |
| NP-239 | -1.393E-01 | 3.433E-01 | 6.196E-01 | FAIL ABUN |
| PU-239 | -5.705E+01 | 2.596E+02 | 4.795E+02 | NOT IDENT. |
| AM-241 | -1.726E-02 | 6.197E-02 | 1.042E-01 | NOT IDENT. |
| AM-243 | -1.106E-02 | 3.309E-02 | 5.621E-02 | NOT IDENT. |
| CM-243 | 7.453E-03 | 7.967E-02 | 1.531E-01 | FAIL ABUN |
| CM-247 | 1.129E-03 | 3.983E-02 | 7.839E-02 | FAIL ABUN |
| CF-249 | 2.270E-02 | 4.688E-02 | 9.664E-02 | NOT IDENT. |
| CF-251 | 3.299E-02 | 1.240E-01 | 2.364E-01 | NOT IDENT. |
| ANH-511 | -3.810E-02 | 6.228E-02 | 1.346E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:20.82

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.50 | 30 | 23 | 0.96 | 106.84 | 104 | 8 | 8.29E-03 | 33.0 | |
| 2 | 0 | 64.60 | 28 | 74 | 0.94 | 129.05 | 124 | 11 | 7.86E-03 | 61.9 | |
| 3 | 0 | 77.11 | 33 | 41 | 2.73 | 154.07 | 150 | 8 | 9.20E-03 | 38.0 | |
| 4 | 0 | 93.05 | 50 | 49 | 1.23 | 185.96 | 182 | 9 | 1.40E-02 | 28.1 | |
| 5 | 0 | 140.81 | 16 | 29 | 1.81 | 281.49 | 275 | 9 | 4.44E-03 | 65.9 | |
| 6 | 1 | 185.65 | 34 | 23 | 1.14 | 371.21 | 367 | 12 | 9.52E-03 | 28.7 | 8.58E-01 |
| 7 | 1 | 187.45 | 15 | 18 | 1.14 | 374.79 | 367 | 12 | 4.10E-03 | 66.3 | |
| 8 | 0 | 238.90 | 19 | 29 | 1.08 | 477.72 | 474 | 8 | 5.27E-03 | 53.8 | |
| 9 | 0 | 251.12 | 9 | 11 | 1.39 | 502.17 | 499 | 7 | 2.49E-03 | 71.9 | |
| 10 | 0 | 278.87 | 8 | 23 | 1.13 | 557.69 | 553 | 8 | 2.18E-03 | 110.5 | |
| 11 | 1 | 292.41 | 14 | 15 | 1.28 | 584.77 | 582 | 18 | 3.86E-03 | 45.5 | 6.60E+00 |
| 12 | 1 | 295.14 | 10 | 15 | 1.28 | 590.23 | 582 | 18 | 2.88E-03 | 67.5 | |
| 13 | 1 | 297.90 | 14 | 10 | 1.28 | 595.77 | 582 | 18 | 4.00E-03 | 48.7 | |
| 14 | 0 | 305.66 | 9 | 22 | 2.29 | 611.29 | 604 | 14 | 2.56E-03 | 110.8 | |
| 15 | 0 | 323.96 | 7 | 13 | 0.60 | 647.89 | 646 | 7 | 2.04E-03 | 87.6 | |
| 16 | 0 | 361.82 | 8 | 9 | 1.37 | 723.64 | 720 | 6 | 2.08E-03 | 72.4 | |
| 17 | 0 | 440.43 | 10 | 3 | 0.52 | 880.92 | 877 | 7 | 2.74E-03 | 44.4 | |
| 18 | 0 | 482.94 | 7 | 9 | 0.69 | 965.97 | 960 | 8 | 1.82E-03 | 91.4 | |
| 19 | 0 | 510.80 | 56 | 22 | 1.64 | 1021.71 | 1014 | 17 | 1.56E-02 | 23.0 | |
| 20 | 0 | 599.41 | 6 | 4 | 1.29 | 1199.00 | 1195 | 8 | 1.67E-03 | 70.7 | |
| 21 | 0 | 609.07 | 15 | 6 | 1.05 | 1218.33 | 1214 | 10 | 4.30E-03 | 37.4 | |
| 22 | 0 | 673.30 | 10 | 2 | 1.11 | 1346.86 | 1342 | 8 | 2.74E-03 | 40.5 | |
| 23 | 0 | 835.68 | 7 | 3 | 0.96 | 1671.77 | 1668 | 7 | 1.97E-03 | 56.6 | |
| 24 | 0 | 1063.77 | 6 | 2 | 0.76 | 2128.23 | 2123 | 8 | 1.65E-03 | 58.3 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:22.83

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| MN-54 | 834.85 | 7 | 99.98* | 1.387E+00 | 3.754E-02 | 4.666E-02 | 113.12 |
| AS-73 | 53.44 | 30 | 10.30* | 5.352E+00 | 3.969E-01 | 9.241E-01 | 66.01 |
| HG-203 | 70.83 | ------ | 3.69 | 6.312E+00 | ------ | Line Not Found | ------ |
| | 72.87 | ------ | 6.19 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 279.20 | 8 | 81.56* | 3.641E+00 | 1.936E-02 | 8.307E-02 | 220.96 |
| PB-212 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341140021 Acquisition date : 12-FEB-2014 11:48:57

Total number of lines in spectrum 22
Number of unidentified lines 3
Number of lines tentatively identified by NID 19 86.36%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| MN-54 | 312.05D | 1.24 | 3.754E-02 | 4.666E-02 | 5.278E-02 | 113.12 | |
| AS-73 | 80.30D | 2.33 | 3.969E-01 | 9.241E-01 | 6.100E-01 | 66.01 | |
| HG-203 | 46.59D | 4.29 | 1.936E-02 | 8.307E-02 | 18.35E-02 | 220.96 | |
| PB-212 | 1.41E+10Y | 1.00 | 1.324E-02 | 1.324E-02 | 8.603E-02 | 649.60 | |
| TH-228 | 1.41E+10Y | 1.00 | 1.324E-02 | 1.324E-02 | 8.603E-02 | 649.60 | |
| | Total Activity : | | 4.803E-01 | 1.080E+00 | | | |
| | Grand Total Activity : | | 4.803E-01 | 1.080E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341140021 Acquisition date : 12-FEB-2014 11:48:57

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 93.05 | 4 | 49 | 1.23 | 185.96 | 182 | 9 | 1.16E-03 | **** | 6.54E+00 | T |
| 0 | 140.81 | 9 | 29 | 1.81 | 281.49 | 275 | 9 | 2.50E-03 | **** | 5.81E+00 | T |
| 1 | 185.65 | 4 | 23 | 1.14 | 371.21 | 367 | 12 | 9.81E-04 | **** | 4.95E+00 | T |
| 1 | 187.45 | 15 | 18 | 1.14 | 374.79 | 367 | 12 | 4.10E-03 | **** | 4.92E+00 | |
| 0 | 251.12 | 9 | 11 | 1.39 | 502.17 | 499 | 7 | 2.49E-03 | **** | 3.96E+00 | T |
| 1 | 292.41 | 14 | 15 | 1.28 | 584.77 | 582 | 18 | 3.86E-03 | 91.0 | 3.50E+00 | T |
| 1 | 295.14 | 8 | 15 | 1.28 | 590.23 | 582 | 18 | 2.25E-03 | **** | 3.47E+00 | T |
| 1 | 297.90 | 14 | 10 | 1.28 | 595.77 | 582 | 18 | 4.00E-03 | 97.3 | 3.45E+00 | T |
| 0 | 305.66 | 9 | 22 | 2.29 | 611.29 | 604 | 14 | 2.56E-03 | **** | 3.37E+00 | T |
| 0 | 323.96 | 7 | 13 | 0.60 | 647.89 | 646 | 7 | 2.04E-03 | **** | 3.21E+00 | T |
| 0 | 361.82 | 8 | 9 | 1.37 | 723.64 | 720 | 6 | 2.08E-03 | **** | 2.92E+00 | |
| 0 | 440.43 | 10 | 3 | 0.52 | 880.92 | 877 | 7 | 2.74E-03 | 88.8 | 2.45E+00 | T |
| 0 | 482.94 | 7 | 9 | 0.69 | 965.97 | 960 | 8 | 1.82E-03 | **** | 2.26E+00 | T |
| 0 | 599.41 | 6 | 4 | 1.29 | 1199.00 | 1195 | 8 | 1.67E-03 | **** | 1.86E+00 | T |
| 0 | 609.07 | 8 | 6 | 1.05 | 1218.33 | 1214 | 10 | 2.20E-03 | **** | 1.84E+00 | T |
| 0 | 673.30 | 10 | 2 | 1.11 | 1346.86 | 1342 | 8 | 2.74E-03 | 81.0 | 1.68E+00 | |
| 0 | 1063.77 | 3 | 2 | 0.76 | 2128.23 | 2123 | 8 | 8.55E-04 | **** | 1.12E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:35.19

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:48:57 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.15     Half life ratio : *****          *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341140021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| MN-54 | 4.215E-02 |
| AS-73 | 3.368E-01 |
| HG-203 | 1.411E-01 |
| PB-212 | 5.358E-02 |
| TH-228 | 5.358E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 7.832E-01 | NOT IDENT. |
| NA-22 | 2.714E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.262E-02 | NOT IDENT. |
| K-40 | 5.353E-01 | NOT IDENT. |
| SC-46 | 8.586E-02 | NOT IDENT. |
| V-48 | 3.679E+00 | NOT IDENT. |
| CR-51 | 2.816E+00 | NOT IDENT. |
| CO-56 | 9.597E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.972E-02 | NOT IDENT. |
| CO-58 | 7.307E-02 | NOT IDENT. |
| FE-59 | 3.822E-01 | NOT IDENT. |
| CO-60 | 3.409E-02 | NOT IDENT. |
| ZN-65 | 1.171E-01 | NOT IDENT. |
| GE-68 | 1.239E+00 | NOT IDENT. |
| AS-74 | 2.102E+00 | NOT IDENT. |
| SE-75 | 5.243E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 3.479E+00 | NOT IDENT. |
| RB-83 | 1.435E-01 | NOT IDENT. |
| KR-85 | 7.798E+00 | NOT IDENT. |
| SR-85 | 9.853E-02 | NOT IDENT. |
| RB-86 | 1.357E+01 | NOT IDENT. |
| Y-88 | 7.550E-02 | NOT IDENT. |
| Y-91 | 4.659E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 3.505E-02 | NOT IDENT. |
| NB-95 | 8.394E-02 | NOT IDENT. |
| NB-95M | 2.385E-01 | NOT IDENT. |
| ZR-95 | 1.606E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.399E-02 | FAIL ABUN |
| RH-102 | 3.117E-02 | NOT IDENT. |
| RU-103 | 1.294E-01 | FAIL ABUN |
| RH-106 | 3.905E-01 | NOT IDENT. |
| RU-106 | 3.905E-01 | NOT IDENT. |
| AG-108M | 2.711E-02 | NOT IDENT. |
| CD-109 | 4.708E-01 | NOT IDENT. |
| AG-110M | 6.176E-02 | NOT IDENT. |
| SN-113 | 6.104E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.856E+00 | NOT IDENT. |
| TE-123M | 3.443E-02 | NOT IDENT. |
| SB-124 | 2.993E-01 | NOT IDENT. |
| SB-125 | 8.032E-02 | FAIL ABUN |
| TE-125M | 1.620E+01 | NOT IDENT. |
| I-126 | 1.301E+01 | NOT IDENT. |
| SB-126 | 1.619E+01 | NOT IDENT. |
| SN-126 | 4.249E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.559E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.265E-02 | NOT IDENT. |
| CS-135 | 1.342E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.864E+00 | NOT IDENT. |
| BA-137M | 4.045E-02 | NOT IDENT. |
| CS-137 | 4.273E-02 | NOT IDENT. |
| CE-139 | 3.799E-02 | NOT IDENT. |
| BA-140 | 8.804E+00 | NOT IDENT. |
| LA-140 | 8.804E+00 | NOT IDENT. |
| CE-141 | 2.579E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.661E-01 | NOT IDENT. |
| PM-144 | 4.572E-02 | NOT IDENT. |
| PR-144 | 3.573E+00 | NOT IDENT. |
| PM-146 | 4.352E-02 | NOT IDENT. |
| ND-147 | 8.163E+01 | NOT IDENT. |
| PM-147 | 5.085E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.970E-02 | FAIL ABUN |
| EU-152 | 1.053E-01 | NOT IDENT. |
| GD-153 | 6.066E-02 | NOT IDENT. |
| EU-154 | 7.372E-02 | NOT IDENT. |
| EU-155 | 7.474E-02 | NOT IDENT. |
| TB-160 | 2.914E-01 | FAIL ABUN |
| HO-166M | 6.155E-02 | FAIL ABUN |
| TM-171 | 4.359E+00 | FAIL ABUN |
| LU-176 | 2.029E-02 | FAIL ABUN |
| HF-181 | 1.858E-01 | FAIL ABUN |
| TA-182 | 2.056E-01 | NOT IDENT. |
| RE-183 | 1.324E-01 | NOT IDENT. |
| RE-184 | 6.116E-01 | NOT IDENT. |
| W-188 | 1.549E+01 | NOT IDENT. |
| IR-192 | 6.967E-02 | FAIL ABUN |
| BI-207 | 5.801E-02 | FAIL ABUN |
| TL-208 | 4.675E-02 | FAIL ABUN |
| PB-210 | 6.725E-01 | NOT IDENT. |
| BI-211 | 1.992E-01 | NOT IDENT. |
| PB-211 | 5.285E-01 | NOT IDENT. |
| BI-212 | 5.411E-01 | NOT IDENT. |
| BI-214 | 9.361E-02 | FAIL ABUN |
| PB-214 | 6.387E-02 | FAIL ABUN |
| RN-219 | 3.668E-01 | NOT IDENT. |
| RN-222 | 9.361E-02 | FAIL ABUN |
| RA-223 | 6.096E-01 | FAIL ABUN |
| RA-224 | 4.975E-01 | NOT IDENT. |
| RA-226 | 9.361E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 2.286E-01 | FAIL ABUN |
| TH-227 | 2.286E-01 | FAIL ABUN |
| AC-228 | 1.544E-01 | FAIL ABUN |
| RA-228 | 1.544E-01 | FAIL ABUN |
| TH-229 | 4.196E-01 | NOT IDENT. |
| TH-230 | 9.360E-02 | FAIL ABUN |
| PA-231 | 1.319E+00 | NOT IDENT. |
| TH-231 | 6.096E-01 | FAIL ABUN |
| TH-232 | 1.544E-01 | NOT IDENT. |
| PA-233 | 5.191E-02 | NOT IDENT. |
| PA-234 | 1.618E-01 | NOT IDENT. |
| PA-234M | 4.922E+00 | NOT IDENT. |
| TH-234 | 6.242E-01 | FAIL ABUN |
| U-234 | 9.360E-02 | FAIL ABUN |
| U-235 | 1.480E-01 | FAIL ABUN |
| NP-237 | 5.191E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 6.242E-01 | FAIL ABUN |
| NP-239 | 2.798E-01 | FAIL ABUN |
| PU-239 | 2.138E+02 | NOT IDENT. |
| AM-241 | 4.734E-02 | NOT IDENT. |
| AM-243 | 2.582E-02 | NOT IDENT. |
| CM-243 | 6.918E-02 | FAIL ABUN |
| CM-247 | 3.402E-02 | FAIL ABUN |
| CF-249 | 4.285E-02 | NOT IDENT. |
| CF-251 | 1.070E-01 | NOT IDENT. |
| ANH-511 | 6.273E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:39.85

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:48:57 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.15     Half life ratio : *****          *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341140021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM*
*                                         Quantity Err(%) : 1.9536E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| MN-54 | 4.666E-02 | 5.192E-02 | 5.192E-02 |
| AS-73 | 9.241E-01 | 6.275E-01 | 6.275E-01 |
| HG-203 | 8.307E-02 | 1.800E-01 | 1.800E-01 |
| PB-212 | 1.324E-02 | 8.431E-02 | 8.431E-02 |
| TH-228 | 1.324E-02 | 8.431E-02 | 8.431E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.243E-01 | 9.553E-01 | 9.665E-01 | NOT IDENT. |
| NA-22 | -3.788E-02 | 4.926E-02 | 5.214E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.333E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.760E-03 | 4.709E-02 | 4.730E-02 | NOT IDENT. |
| K-40 | 1.817E-01 | 5.870E-01 | 5.927E-01 | NOT IDENT. |
| SC-46 | -1.289E-03 | 1.019E-01 | 1.019E-01 | NOT IDENT. |
| V-48 | 4.129E+00 | 3.556E+00 | 4.014E+00 | NOT IDENT. |
| CR-51 | 2.598E-01 | 3.645E+00 | 3.647E+00 | NOT IDENT. |
| CO-56 | 8.882E-03 | 1.112E-01 | 1.113E-01 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.328E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | -2.009E-02 | 2.587E-02 | 2.741E-02 | NOT IDENT. |
| CO-58 | -4.123E-02 | 9.690E-02 | 9.866E-02 | NOT IDENT. |
| FE-59 | 1.499E-01 | 4.236E-01 | 4.289E-01 | NOT IDENT. |
| CO-60 | -4.825E-03 | 4.165E-02 | 4.171E-02 | NOT IDENT. |
| ZN-65 | 1.170E-02 | 1.383E-01 | 1.384E-01 | NOT IDENT. |
| GE-68 | -1.962E-02 | 1.496E+00 | 1.496E+00 | NOT IDENT. |
| AS-74 | 1.171E-01 | 2.874E+00 | 2.875E+00 | NOT IDENT. |
| SE-75 | -4.908E-02 | 7.352E-02 | 7.678E-02 | FAIL ABUN |
| BR-77 | 6.290E+10 | 4.381E+11 | 4.390E+11 | SHORT HLIF |
| SR-82 | 6.855E-01 | 3.925E+00 | 3.938E+00 | NOT IDENT. |
| RB-83 | 8.582E-02 | 1.551E-01 | 1.599E-01 | NOT IDENT. |
| KR-85 | -2.219E+01 | 1.268E+01 | 1.615E+01 | NOT IDENT. |
| SR-85 | -2.811E-01 | 1.604E-01 | 2.044E-01 | NOT IDENT. |
| RB-86 | -3.448E+00 | 1.751E+01 | 1.758E+01 | NOT IDENT. |
| Y-88 | -3.352E-02 | 1.050E-01 | 1.061E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 1.584E+01 | 5.114E+01 | 5.164E+01 | NOT IDENT. |
| NB-94 | 1.930E-02 | 3.843E-02 | 3.940E-02 | NOT IDENT. |
| NB-95 | -5.609E-02 | 1.140E-01 | 1.168E-01 | NOT IDENT. |
| NB-95M | 1.421E-01 | 2.977E-01 | 3.046E-01 | NOT IDENT. |
| ZR-95 | -2.771E-02 | 1.942E-01 | 1.946E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 5.671E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.000E+41 | 5.636E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 4.676E+09 | 1.494E+10 | 1.509E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.348E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.380E-02 | 2.663E-02 | 2.735E-02 | FAIL ABUN |
| RH-102 | -1.030E-01 | 6.999E-02 | 8.399E-02 | NOT IDENT. |
| RU-103 | -1.624E-01 | 1.927E-01 | 2.061E-01 | FAIL ABUN |
| RH-106 | 1.475E-01 | 4.422E-01 | 4.471E-01 | NOT IDENT. |
| RU-106 | 1.475E-01 | 4.422E-01 | 4.471E-01 | NOT IDENT. |
| AG-108M | 6.794E-03 | 3.076E-02 | 3.092E-02 | NOT IDENT. |
| CD-109 | -1.304E-01 | 5.854E-01 | 5.883E-01 | NOT IDENT. |
| AG-110M | 2.158E-02 | 6.732E-02 | 6.802E-02 | NOT IDENT. |
| SN-113 | -4.920E-02 | 8.055E-02 | 8.355E-02 | NOT IDENT. |
| CD-115 | 2.048E+11 | 1.993E+12 | 1.995E+12 | SHORT HLIF |
| SN-117M | 6.418E-01 | 3.361E+00 | 3.374E+00 | NOT IDENT. |
| TE-123M | -1.906E-02 | 4.399E-02 | 4.482E-02 | NOT IDENT. |
| SB-124 | 1.921E-01 | 2.831E-01 | 2.961E-01 | NOT IDENT. |
| SB-125 | -4.794E-02 | 1.043E-01 | 1.066E-01 | FAIL ABUN |
| TE-125M | -5.969E+00 | 1.968E+01 | 1.987E+01 | NOT IDENT. |
| I-126 | -2.069E+01 | 2.186E+01 | 2.376E+01 | NOT IDENT. |
| SB-126 | 4.046E+00 | 1.805E+01 | 1.814E+01 | NOT IDENT. |
| SN-126 | -1.748E-03 | 4.929E-02 | 4.930E-02 | NOT IDENT. |
| SB-127 | -8.362E+05 | 5.035E+06 | 5.049E+06 | SHORT HLIF |
| I-131 | 3.115E+01 | 1.289E+02 | 1.297E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 8.244E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.216E+07 | 3.711E+07 | 3.752E+07 | SHORT HLIF |
| BA-133 | -1.171E-02 | 4.463E-02 | 4.494E-02 | NOT IDENT. |
| I-133 | 3.111E+31 | 3.379E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.352E-03 | 4.778E-02 | 4.796E-02 | NOT IDENT. |
| CS-135 | 9.916E-03 | 1.635E-01 | 1.636E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 8.433E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.350E+00 | 1.038E+01 | 1.049E+01 | NOT IDENT. |
| BA-137M | 2.568E-02 | 4.387E-02 | 4.537E-02 | NOT IDENT. |
| CS-137 | 2.713E-02 | 4.634E-02 | 4.793E-02 | NOT IDENT. |
| CE-139 | 2.621E-02 | 4.245E-02 | 4.406E-02 | NOT IDENT. |
| BA-140 | -9.189E-01 | 1.080E+01 | 1.081E+01 | NOT IDENT. |
| LA-140 | -9.189E-01 | 1.080E+01 | 1.081E+01 | NOT IDENT. |
| CE-141 | -7.570E-02 | 3.155E-01 | 3.174E-01 | NOT IDENT. |
| CE-143 | 1.744E+20 | 1.562E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.690E-02 | 1.982E-01 | 1.984E-01 | NOT IDENT. |
| PM-144 | 3.605E-03 | 5.535E-02 | 5.538E-02 | NOT IDENT. |
| PR-144 | 2.817E-01 | 4.326E+00 | 4.328E+00 | NOT IDENT. |
| PM-146 | 4.277E-02 | 4.355E-02 | 4.762E-02 | NOT IDENT. |
| ND-147 | -4.587E+01 | 1.075E+02 | 1.095E+02 | NOT IDENT. |
| PM-147 | -2.736E+02 | 6.332E+02 | 6.451E+02 | NOT IDENT. |
| PM-149 | -8.057E+12 | 1.830E+13 | 1.866E+13 | SHORT HLIF |
| EU-150 | 6.558E-03 | 3.370E-02 | 3.383E-02 | FAIL ABUN |
| EU-152 | 8.146E-02 | 1.117E-01 | 1.176E-01 | NOT IDENT. |
| GD-153 | 1.406E-02 | 7.592E-02 | 7.619E-02 | NOT IDENT. |
| EU-154 | -1.275E-01 | 1.424E-01 | 1.536E-01 | NOT IDENT. |
| EU-155 | -1.623E-02 | 8.898E-02 | 8.928E-02 | NOT IDENT. |
| TB-160 | 6.135E-02 | 3.286E-01 | 3.297E-01 | FAIL ABUN |
| HO-166M | -3.233E-02 | 7.797E-02 | 7.932E-02 | FAIL ABUN |
| TM-171 | 9.582E+00 | 6.259E+00 | 7.605E+00 | FAIL ABUN |
| LU-176 | 2.143E-02 | 4.658E-02 | 4.757E-02 | FAIL ABUN |
| HF-181 | 1.312E-01 | 2.353E-01 | 2.426E-01 | FAIL ABUN |
| TA-182 | 5.043E-02 | 2.283E-01 | 2.294E-01 | NOT IDENT. |
| RE-183 | 8.428E-02 | 1.663E-01 | 1.706E-01 | NOT IDENT. |
| RE-184 | -2.045E-01 | 7.766E-01 | 7.821E-01 | NOT IDENT. |
| W-188 | 1.565E+01 | 1.809E+01 | 1.942E+01 | NOT IDENT. |
| IR-192 | 2.341E-02 | 7.726E-02 | 7.798E-02 | FAIL ABUN |
| BI-207 | 2.714E-02 | 6.262E-02 | 6.380E-02 | FAIL ABUN |
| TL-208 | -3.052E-02 | 5.735E-02 | 5.897E-02 | FAIL ABUN |
| PB-210 | -7.215E-01 | 8.049E-01 | 8.682E-01 | NOT IDENT. |
| BI-211 | -9.370E-02 | 2.363E-01 | 2.401E-01 | NOT IDENT. |
| PB-211 | -4.851E-01 | 7.204E-01 | 7.529E-01 | NOT IDENT. |
| BI-212 | 2.530E-01 | 5.790E-01 | 5.902E-01 | NOT IDENT. |
| BI-214 | 6.955E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| PB-214 | -8.446E-02 | 8.403E-02 | 9.225E-02 | FAIL ABUN |
| RN-219 | -2.777E-01 | 4.797E-01 | 4.958E-01 | NOT IDENT. |
| RN-222 | 6.955E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| RA-223 | 4.209E-01 | 7.235E-01 | 7.480E-01 | FAIL ABUN |
| RA-224 | 3.428E-02 | 6.760E-01 | 6.762E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 6.955E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| AC-227 | 1.550E-01 | 2.569E-01 | 2.662E-01 | FAIL ABUN |
| TH-227 | 1.550E-01 | 2.569E-01 | 2.662E-01 | FAIL ABUN |
| AC-228 | -6.449E-02 | 1.886E-01 | 1.908E-01 | FAIL ABUN |
| RA-228 | -6.449E-02 | 1.886E-01 | 1.908E-01 | FAIL ABUN |
| TH-229 | 1.832E-01 | 4.800E-01 | 4.871E-01 | NOT IDENT. |
| TH-230 | 6.954E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| PA-231 | -5.067E-01 | 1.711E+00 | 1.726E+00 | NOT IDENT. |
| TH-231 | 4.209E-01 | 7.235E-01 | 7.480E-01 | FAIL ABUN |
| TH-232 | -6.449E-02 | 1.886E-01 | 1.908E-01 | NOT IDENT. |
| PA-233 | -2.867E-02 | 7.018E-02 | 7.136E-02 | NOT IDENT. |
| PA-234 | -1.940E-01 | 3.507E-01 | 3.614E-01 | NOT IDENT. |
| PA-234M | 1.588E+00 | 5.482E+00 | 5.529E+00 | NOT IDENT. |
| TH-234 | -8.972E-02 | 7.163E-01 | 7.174E-01 | FAIL ABUN |
| U-234 | 6.954E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| U-235 | -4.918E-02 | 1.917E-01 | 1.929E-01 | FAIL ABUN |
| NP-237 | -2.867E-02 | 7.018E-02 | 7.136E-02 | NOT IDENT. |
| NP-238 | 5.758E+12 | 1.659E+13 | 1.679E+13 | SHORT HLIF |
| U-238 | -8.972E-02 | 7.163E-01 | 7.174E-01 | FAIL ABUN |
| NP-239 | -1.393E-01 | 3.436E-01 | 3.493E-01 | FAIL ABUN |
| PU-239 | -5.705E+01 | 2.597E+02 | 2.610E+02 | NOT IDENT. |
| AM-241 | -1.726E-02 | 6.199E-02 | 6.247E-02 | NOT IDENT. |
| AM-243 | -1.106E-02 | 3.311E-02 | 3.348E-02 | NOT IDENT. |
| CM-243 | 7.453E-03 | 7.968E-02 | 7.975E-02 | FAIL ABUN |
| CM-247 | 1.129E-03 | 3.983E-02 | 3.983E-02 | FAIL ABUN |
| CF-249 | 2.270E-02 | 4.694E-02 | 4.804E-02 | NOT IDENT. |
| CF-251 | 3.299E-02 | 1.241E-01 | 1.250E-01 | NOT IDENT. |
| ANH-511 | -3.810E-02 | 6.236E-02 | 6.469E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 23.4591 | 94.67 | 25.5046 | 193.51 | 21.9583 |
| 45.60 | 35.4403 | 94.87 | 25.5152 | 197.03 | 38.8567 |
| 46.54 | 39.1078 | 97.43 | 22.9493 | 198.01 | 32.5944 |
| 49.72 | 0.0000 | 98.43 | 21.6431 | 201.83 | 42.2522 |
| 51.35 | 20.8638 | 98.44 | 21.6436 | 205.31 | 25.4568 |
| 52.39 | 14.4911 | 99.53 | 24.4023 | 210.85 | 30.9612 |
| 53.44 | 21.8068 | 100.11 | 27.1451 | 215.65 | 26.8387 |
| 57.36 | 0.0000 | 103.18 | 30.0407 | 222.11 | 19.4656 |
| 57.53 | 26.1621 | 103.37 | 28.2305 | 227.09 | 23.9231 |
| 57.98 | 24.5589 | 105.21 | 31.0729 | 227.38 | 23.9307 |
| 59.32 | 38.2129 | 105.31 | 31.0788 | 228.16 | 0.0000 |
| 59.54 | 38.2368 | 106.12 | 25.6342 | 228.18 | 15.2420 |
| 63.29 | 34.8988 | 109.28 | 29.4718 | 235.69 | 18.1105 |
| 63.58 | 31.1842 | 111.00 | 17.5551 | 235.96 | 19.7626 |
| 64.28 | 26.2445 | 111.76 | 0.0000 | 238.63 | 31.9303 |
| 66.73 | 32.7061 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 30.2305 | 117.23 | 31.7718 | 240.99 | 23.1796 |
| 67.75 | 29.4300 | 121.12 | 30.1084 | 242.00 | 19.8895 |
| 69.67 | 32.1114 | 121.22 | 30.1136 | 244.70 | 22.1617 |
| 70.83 | 38.1388 | 121.78 | 33.9108 | 252.40 | 0.0000 |
| 72.81 | 35.7731 | 122.06 | 33.9272 | 252.80 | 18.4361 |
| 72.87 | 35.7784 | 123.07 | 24.5457 | 254.15 | 0.0000 |
| 74.66 | 39.7866 | 127.23 | 22.8184 | 256.23 | 16.8182 |
| 74.82 | 39.8020 | 129.30 | 25.7596 | 260.90 | 0.0000 |
| 74.97 | 39.8167 | 131.20 | 27.7551 | 264.66 | 23.7433 |
| 77.11 | 39.5921 | 133.02 | 21.1182 | 268.22 | 21.5567 |
| 79.69 | 31.1741 | 133.52 | 26.8997 | 269.46 | 21.5826 |
| 80.12 | 28.6049 | 136.00 | 27.4899 | 271.23 | 27.3091 |
| 80.19 | 0.0000 | 136.47 | 26.0626 | 273.65 | 25.6618 |
| 80.57 | 37.7459 | 140.51 | 0.0000 | 276.40 | 18.8680 |
| 81.00 | 37.7833 | 143.76 | 23.4331 | 277.37 | 24.0356 |
| 81.07 | 40.3956 | 144.24 | 19.0535 | 277.60 | 20.6063 |
| 83.79 | 33.2168 | 145.44 | 30.3460 | 278.00 | 19.4691 |
| 85.43 | 38.6029 | 152.43 | 13.8492 | 279.20 | 32.6760 |
| 86.55 | 38.6987 | 153.25 | 14.8564 | 279.54 | 32.6864 |
| 86.79 | 32.5591 | 154.21 | 27.7710 | 280.46 | 27.5493 |
| 86.94 | 32.5700 | 156.02 | 25.8553 | 283.69 | 26.4814 |
| 87.09 | 36.1029 | 158.56 | 22.9562 | 284.31 | 0.0000 |
| 87.57 | 37.0224 | 159.00 | 30.9603 | 285.41 | 23.0640 |
| 88.03 | 37.0595 | 162.33 | 29.1003 | 285.90 | 0.0000 |
| 88.34 | 41.3228 | 163.33 | 28.1364 | 287.50 | 18.4867 |
| 88.47 | 41.3344 | 165.86 | 24.2021 | 290.67 | 12.1673 |
| 89.96 | 38.5435 | 176.31 | 31.7076 | 293.27 | 0.0000 |
| 91.11 | 34.6413 | 176.60 | 31.7199 | 295.22 | 16.2900 |
| 92.59 | 31.1858 | 177.52 | 26.6361 | 295.96 | 16.3009 |
| 93.35 | 31.2354 | 181.07 | 0.0000 | 298.58 | 11.6709 |
| 94.56 | 25.4988 | 184.41 | 20.1572 | 299.98 | 10.5170 |
| 94.65 | 25.5036 | 185.72 | 21.7443 | 300.09 | 10.5179 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 10.5183 | 497.08 | 15.1643 | 711.68 | 13.5535 |
| 301.36 | 10.5298 | 505.52 | 20.3210 | 720.70 | 9.0720 |
| 302.85 | 9.3722 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 10.5591 | 511.00 | 12.2320 | 722.78 | 15.4365 |
| 306.78 | 10.5804 | 514.00 | 44.9292 | 722.91 | 14.5293 |
| 308.46 | 18.3660 | 514.00 | 44.9292 | 723.31 | 14.5320 |
| 311.90 | 20.0741 | 520.40 | 8.1995 | 724.19 | 12.7203 |
| 316.51 | 16.0046 | 520.69 | 0.0000 | 727.33 | 5.4592 |
| 319.41 | 19.3549 | 522.65 | 0.0000 | 733.00 | 8.2092 |
| 320.08 | 19.9773 | 527.90 | 0.0000 | 735.93 | 6.3931 |
| 321.04 | 24.2781 | 529.59 | 8.2429 | 737.46 | 3.6557 |
| 323.87 | 21.4728 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 15.7647 | 531.02 | 8.2495 | 747.24 | 7.3424 |
| 328.76 | 21.5607 | 546.56 | 0.0000 | 748.06 | 6.4268 |
| 333.37 | 16.2323 | 552.55 | 9.3933 | 752.31 | 4.5990 |
| 333.97 | 24.3604 | 563.25 | 9.4485 | 753.82 | 5.5223 |
| 334.37 | 20.7581 | 569.33 | 11.5861 | 756.73 | 8.2938 |
| 338.28 | 15.3920 | 569.50 | 11.5871 | 756.80 | 10.1371 |
| 338.32 | 15.3925 | 569.70 | 9.4815 | 763.94 | 3.6975 |
| 340.48 | 27.2108 | 583.19 | 18.0386 | 765.81 | 9.2510 |
| 340.55 | 27.2122 | 584.27 | 18.0485 | 766.42 | 12.9548 |
| 344.28 | 15.4667 | 595.83 | 8.5449 | 766.84 | 14.8082 |
| 345.93 | 20.0422 | 600.60 | 13.7059 | 772.60 | 0.0000 |
| 351.06 | 17.3797 | 602.52 | 0.0000 | 776.52 | 8.3635 |
| 351.93 | 20.1376 | 602.73 | 8.5754 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 5.7228 | 778.90 | 9.3020 |
| 356.01 | 14.6924 | 609.32 | 18.2845 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 15.4960 | 785.37 | 9.3269 |
| 366.42 | 0.0000 | 614.28 | 5.1757 | 792.07 | 10.2881 |
| 375.05 | 20.4984 | 618.01 | 9.7226 | 794.95 | 7.4910 |
| 383.85 | 14.0678 | 620.36 | 7.5710 | 795.86 | 6.5570 |
| 388.16 | 15.0532 | 621.93 | 8.6594 | 801.95 | 8.4516 |
| 388.63 | 12.2349 | 630.19 | 0.0000 | 810.29 | 9.4224 |
| 391.69 | 18.8647 | 631.29 | 16.3124 | 810.45 | 8.4808 |
| 400.66 | 17.0879 | 633.25 | 9.7968 | 810.76 | 8.4817 |
| 401.81 | 20.9023 | 634.78 | 8.7148 | 815.77 | 4.7216 |
| 402.40 | 14.2575 | 635.95 | 4.3600 | 818.51 | 4.7268 |
| 404.85 | 16.1865 | 636.99 | 0.0000 | 832.01 | 9.5044 |
| 410.95 | 14.3436 | 645.85 | 5.4764 | 834.85 | 7.6119 |
| 413.71 | 13.4130 | 657.76 | 12.1172 | 835.71 | 8.5665 |
| 414.70 | 16.2983 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 16.4374 | 661.66 | 7.7255 | 846.75 | 0.0000 |
| 427.87 | 15.4785 | 664.57 | 0.0000 | 846.77 | 9.5596 |
| 433.94 | 10.6850 | 666.33 | 13.2729 | 856.80 | 4.7983 |
| 439.40 | 14.6235 | 666.50 | 11.3778 | 860.56 | 5.7664 |
| 453.88 | 5.9050 | 667.71 | 0.0000 | 871.09 | 6.7544 |
| 463.37 | 17.8226 | 677.62 | 7.1166 | 873.19 | 5.7942 |
| 468.07 | 10.9240 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 7.8466 | 879.38 | 5.8077 |
| 475.06 | 7.9796 | 696.49 | 12.3387 | 880.51 | 7.7469 |
| 476.78 | 9.5856 | 696.51 | 12.3387 | 883.24 | 6.7855 |
| 477.60 | 6.3938 | 697.00 | 12.3414 | 884.68 | 4.8494 |
| 482.18 | 7.0129 | 697.49 | 11.2222 | 889.28 | 8.7440 |
| 487.02 | 9.3783 | 702.65 | 6.7491 | 894.76 | 8.7618 |
| 492.35 | 0.0000 | 706.68 | 10.8182 | 898.04 | 4.8737 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.7895 | 1312.11 | 0.9250 | | |
| 911.20 | 7.8357 | 1332.49 | 3.7204 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 946.00 | 11.8189 | 1365.19 | 6.5668 | | |
| 937.49 | 3.9553 | 1368.63 | 0.0000 | | |
| 944.13 | 1.9823 | 1384.29 | 0.9427 | | |
| 946.00 | 5.9509 | 344.28 | 2.8455 | | |
| 949.00 | 3.9715 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 5.7664 | | |
| 962.31 | 4.9875 | 1489.16 | 3.8708 | | |
| 964.08 | 4.9907 | 884.68 | 0.9714 | | |
| 966.17 | 4.9944 | 1596.21 | 3.9691 | | |
| 968.97 | 6.9988 | 1620.50 | 0.0000 | | |
| 983.53 | 4.0195 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.0133 | | |
| 996.26 | 9.0833 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.0653 | 1764.49 | 2.0586 | | |
| 1004.73 | 7.0851 | 1770.23 | 0.0000 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.0615 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0774 | | |
| 1037.84 | 8.1867 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 4.1779 | | |
| 1046.59 | 6.1576 | | | | |
| 1048.07 | 8.2145 | | | | |
| 1049.04 | 8.2168 | | | | |
| 1050.41 | 5.1379 | | | | |
| 1063.66 | 3.0959 | | | | |
| 1077.00 | 5.1819 | | | | |
| 1077.34 | 4.1459 | | | | |
| 1085.87 | 5.1965 | | | | |
| 1099.45 | 6.2625 | | | | |
| 1112.07 | 5.2393 | | | | |
| 1112.84 | 1.0481 | | | | |
| 1115.54 | 7.3428 | | | | |
| 1120.29 | 4.2020 | | | | |
| 1120.55 | 3.1518 | | | | |
| 1121.30 | 3.1525 | | | | |
| 1129.67 | 2.1070 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 1.0674 | | | | |
| 879.38 | 5.3445 | | | | |
| 1189.05 | 7.5069 | | | | |
| 1204.77 | 3.2319 | | | | |
| 1221.41 | 2.1649 | | | | |
| 1231.02 | 6.5127 | | | | |
| 1235.36 | 3.2603 | | | | |
| 1238.28 | 4.3508 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.3918 | | | | |
| 1274.44 | 7.6911 | | | | |
| 1274.54 | 6.5924 | | | | |
| 1291.59 | 5.5195 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:46:28.04

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146021.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM14.CNF;397
                                        Background date  : 9-FEB-2014 11:21:32.
Sample date      : 7-NOV-2013 14:53:00. Acquisition date : 12-FEB-2014 11:46:00
Sample ID        : G341146021           Sample quantity  : 5.72450E+01 GRAM
Detector name    : GAM14                Detector geometry: JAR
Elapsed live time: 0 04:00:00.00        Elapsed real time: 0 04:00:00.99  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 35.63 | 92 | 22 | 1.78 | 71.89 | 65 | 33 | 6.37E-03 | 22.4 | 5.94E+00 |
| 2 | 3 | 46.24* | 70 | 121 | 1.81 | 93.10 | 65 | 33 | 4.87E-03 | 33.9 | |
| 3 | 1 | 59.33 | 40 | 34 | 1.41 | 119.28 | 118 | 13 | 2.80E-03 | 20.5 | 1.54E+00 |
| 4 | 1 | 63.05* | 7 | 153 | 1.52 | 126.72 | 118 | 13 | 5.03E-04 | 387.5 | |
| 5 | 0 | 92.91* | 34 | 262 | 1.46 | 186.44 | 179 | 15 | 2.37E-03 | 125.0 | |
| 6 | 0 | 185.84* | 8 | 176 | 1.11 | 372.28 | 367 | 10 | 5.72E-04 | 360.5 | |
| 7 | 4 | 506.55 | 35 | 72 | 2.48 | 1013.57 | 1005 | 33 | 2.43E-03 | 57.0 | 1.80E+00 |
| 8 | 0 | 640.77 | 34 | 25 | 3.64 | 1281.93 | 1277 | 11 | 2.33E-03 | 34.6 | |
| 9 | 0 | 671.97 | 18 | 26 | 1.12 | 1344.31 | 1339 | 9 | 1.25E-03 | 56.9 | |
| 10 | 0 | 677.51 | 9 | 24 | 0.69 | 1355.39 | 1350 | 7 | 6.50E-04 | 93.0 | |
| 11 | 0 | 693.66 | 17 | 27 | 0.77 | 1387.66 | 1383 | 8 | 1.21E-03 | 57.4 | |
| 12 | 0 | 714.59 | 17 | 21 | 1.35 | 1429.52 | 1427 | 8 | 1.19E-03 | 51.6 | |
| 13 | 0 | 719.05 | 24 | 24 | 2.19 | 1438.42 | 1434 | 8 | 1.67E-03 | 40.8 | |
| 14 | 4 | 738.44 | 18 | 12 | 2.60 | 1477.18 | 1475 | 12 | 1.25E-03 | 30.3 | 5.63E+00 |
| 15 | 4 | 742.09 | 11 | 12 | 1.26 | 1484.48 | 1475 | 12 | 7.68E-04 | 51.2 | |
| 16 | 0 | 882.73 | 8 | 25 | 0.58 | 1765.63 | 1758 | 10 | 5.56E-04 | 122.2 | |
| 17 | 0 | 1000.91* | 27 | 16 | 1.14 | 2001.86 | 1995 | 14 | 1.85E-03 | 43.1 | |
| 18 | 0 | 1093.84 | 11 | 14 | 1.51 | 2187.62 | 2183 | 9 | 7.81E-04 | 66.2 | |
| 19 | 0 | 1193.15 | 32 | 13 | 4.60 | 2386.10 | 2376 | 20 | 2.23E-03 | 34.2 | |
| 20 | 0 | 1222.52 | 17 | 33 | 5.14 | 2444.80 | 2433 | 19 | 1.16E-03 | 86.4 | |
| 21 | 0 | 1298.38 | 13 | 16 | 2.28 | 2596.42 | 2587 | 13 | 8.86E-04 | 70.9 | |
| 22 | 0 | 1340.46 | 12 | 5 | 0.72 | 2680.51 | 2676 | 7 | 8.07E-04 | 44.0 | |
| 23 | 0 | 1362.17 | 8 | 8 | 1.26 | 2723.89 | 2720 | 6 | 5.34E-04 | 73.3 | |
| 24 | 0 | 1368.36 | 5 | 7 | 1.35 | 2736.27 | 2731 | 9 | 3.36E-04 | 107.9 | |
| 25 | 0 | 1377.49 | 13 | 3 | 0.98 | 2754.51 | 2746 | 14 | 8.98E-04 | 41.1 | |
| 26 | 0 | 1459.97* | 3 | 15 | 2.64 | 2919.34 | 2913 | 12 | 2.11E-04 | 381.7 | |
| 27 | 0 | 1533.79 | 15 | 7 | 0.61 | 3066.84 | 3058 | 15 | 1.04E-03 | 47.3 | |
| 28 | 0 | 1551.47 | 8 | 9 | 0.69 | 3102.19 | 3097 | 11 | 5.88E-04 | 74.4 | |
| 29 | 0 | 1764.70 | 7 | 20 | 1.43 | 3528.23 | 3522 | 11 | 5.20E-04 | 119.5 | |
| 30 | 0 | 1795.03 | 5 | 9 | 4.41 | 3588.83 | 3578 | 13 | 3.27E-04 | 143.4 | |
| 31 | 0 | 1845.41 | 12 | 3 | 1.03 | 3689.48 | 3684 | 11 | 8.47E-04 | 38.9 | |
| 32 | 0 | 1866.87 | 7 | 11 | 0.78 | 3732.36 | 3722 | 12 | 4.55E-04 | 112.1 | |
| 33 | 0 | 1956.98 | 11 | 2 | 1.33 | 3912.39 | 3907 | 10 | 7.43E-04 | 41.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:46:29

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146021.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 14:53:00 | Acquisition date | : 12-FEB-2014 11:46:00 |
| Sample ID | : G341146021 | Sample quantity | : 57.245 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA14 | Detector geometry | : JAR |
| Elapsed live time | : 0 04:00:00.00 | Elapsed real time | : 0 04:00:00.99 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 3 | 10.66* | 9.354E-01 | 1.001E-01 | 1.001E-01 | 763.34 |
| PB-210 | 46.54 | 70 | 4.25* | 6.375E-01 | 8.493E+00 | 8.564E+00 | 67.81 |
| TH-234 | 63.29 | 7 | 3.70* | 2.285E+00 | 2.811E-01 | 2.811E-01 | 775.04 |
| | 92.59 | 34 | 4.23 | 4.528E+00 | 5.844E-01 | 5.844E-01 | 250.01 |
| U-238 | 63.29 | 7 | 3.70* | 2.285E+00 | 2.811E-01 | 2.811E-01 | 775.04 |
| | 92.59 | 34 | 4.23 | 4.528E+00 | 5.844E-01 | 5.844E-01 | 250.01 |
| AM-241 | 59.54 | 40 | 35.90* | 1.893E+00 | 1.942E-01 | 1.943E-01 | 40.97 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:46:30.42

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:46:00 Sensitivity     : 3.000          *
* Detector ID      : GAM14                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:00.99     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 14:53:00 Nuclide Library : SOLID          *
* Sample ID        : G341146021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 5.7245E+01 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 21-NOV-2013 12:25:13 Eff. Geometry   : JAR           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_JAR.CNF;4           *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.001E-01 | 7.485E-01 | 5.830E-01 |
| PB-210 | 8.564E+00 | 5.691E+00 | 7.477E+00 |
| TH-234 | 2.811E-01 | 2.135E+00 | 2.545E+00 |
| U-238 | 2.811E-01 | 2.135E+00 | 2.545E+00 |
| AM-241 | 1.943E-01 | 7.801E-02 | 2.979E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -3.696E-01 | 1.048E+00 | 1.828E+00 | NOT IDENT. |
| NA-22 | -1.911E-02 | 4.315E-02 | 7.681E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.165E-02 | 4.719E-02 | 9.271E-02 | NOT IDENT. |
| SC-46 | -4.360E-02 | 8.346E-02 | 1.446E-01 | NOT IDENT. |
| V-48 | -9.061E-02 | 2.449E+00 | 4.604E+00 | NOT IDENT. |
| CR-51 | -7.869E-01 | 3.572E+00 | 6.298E+00 | NOT IDENT. |
| MN-54 | 8.482E-03 | 4.865E-02 | 8.856E-02 | NOT IDENT. |
| CO-56 | -1.127E-02 | 8.932E-02 | 1.581E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.830E-03 | 3.521E-02 | 6.073E-02 | NOT IDENT. |
| CO-58 | 5.754E-02 | 8.955E-02 | 1.734E-01 | NOT IDENT. |
| FE-59 | -2.305E-01 | 3.864E-01 | 5.592E-01 | NOT IDENT. |
| CO-60 | 2.992E-02 | 4.040E-02 | 8.237E-02 | NOT IDENT. |
| ZN-65 | -2.020E-02 | 1.141E-01 | 2.088E-01 | NOT IDENT. |
| GE-68 | 3.441E-02 | 1.438E+00 | 2.738E+00 | NOT IDENT. |
| AS-73 | -1.702E+00 | 2.078E+00 | 3.461E+00 | NOT IDENT. |
| AS-74 | 3.003E+00 | 2.909E+00 | 5.567E+00 | NOT IDENT. |
| SE-75 | 5.276E-02 | 8.270E-02 | 1.535E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.000E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.467E+00 | 3.447E+00 | 5.898E+00 | NOT IDENT. |
| RB-83 | -7.609E-02 | 1.872E-01 | 2.757E-01 | NOT IDENT. |
| KR-85 | 0.000E+00 | 9.564E+00 | 2.036E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 1.197E-01 | 2.547E-01 | NOT IDENT. |
| RB-86 | -1.292E+00 | 1.483E+01 | 2.795E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | 7.105E-02 | 8.355E-02 | 1.808E-01 | NOT IDENT. |
| Y-91 | -1.934E+00 | 5.155E+01 | 9.633E+01 | NOT IDENT. |
| NB-94 | -2.822E-03 | 4.059E-02 | 7.163E-02 | NOT IDENT. |
| NB-95 | 8.746E-02 | 1.092E-01 | 2.103E-01 | NOT IDENT. |
| NB-95M | 5.054E-02 | 3.368E-01 | 6.066E-01 | NOT IDENT. |
| ZR-95 | 5.588E-02 | 2.043E-01 | 3.741E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.117E+41 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 7.238E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.854E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.274E-02 | 3.590E-02 | 6.379E-02 | NOT IDENT. |
| RH-102 | -3.162E-02 | 6.446E-02 | 1.102E-01 | NOT IDENT. |
| RU-103 | 6.902E-02 | 1.943E-01 | 3.506E-01 | NOT IDENT. |
| RH-106 | 2.373E-01 | 4.643E-01 | 8.599E-01 | NOT IDENT. |
| RU-106 | 2.373E-01 | 4.643E-01 | 8.599E-01 | NOT IDENT. |
| AG-108M | -4.372E-03 | 3.258E-02 | 5.800E-02 | NOT IDENT. |
| CD-109 | -1.069E+00 | 1.066E+00 | 1.489E+00 | NOT IDENT. |
| AG-110M | 1.783E-02 | 7.931E-02 | 1.322E-01 | FAIL ABUN |
| SN-113 | -3.556E-03 | 9.327E-02 | 1.519E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.475E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.466E+00 | 4.159E+00 | 7.311E+00 | NOT IDENT. |
| TE-123M | 7.848E-03 | 5.423E-02 | 9.311E-02 | NOT IDENT. |
| SB-124 | 7.726E-02 | 2.562E-01 | 5.186E-01 | NOT IDENT. |
| SB-125 | -3.147E-02 | 9.985E-02 | 1.756E-01 | NOT IDENT. |
| TE-125M | -2.693E+01 | 3.156E+01 | 5.177E+01 | NOT IDENT. |
| I-126 | -2.087E+01 | 2.365E+01 | 3.157E+01 | NOT IDENT. |
| SB-126 | 2.036E+01 | 1.895E+01 | 3.316E+01 | FAIL ABUN |
| SN-126 | -8.550E-02 | 9.300E-02 | 1.308E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 3.383E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.607E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 3.913E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 7.073E-03 | 4.981E-02 | 9.002E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.724E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.126E-02 | 4.328E-02 | 8.259E-02 | NOT IDENT. |
| CS-135 | -1.007E-02 | 1.826E-01 | 3.258E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.124E+00 | 8.539E+00 | 1.575E+01 | NOT IDENT. |
| BA-137M | -2.314E-02 | 3.897E-02 | 6.579E-02 | NOT IDENT. |
| CS-137 | -2.444E-02 | 4.117E-02 | 6.950E-02 | NOT IDENT. |
| CE-139 | 2.476E-02 | 5.661E-02 | 9.827E-02 | NOT IDENT. |
| BA-140 | -1.846E+00 | 8.423E+00 | 1.554E+01 | NOT IDENT. |
| LA-140 | -1.846E+00 | 8.423E+00 | 1.554E+01 | NOT IDENT. |
| CE-141 | 4.804E-01 | 4.147E-01 | 7.497E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.131E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.412E-01 | 2.814E-01 | 4.940E-01 | NOT IDENT. |
| PM-144 | -4.184E-03 | 5.322E-02 | 8.104E-02 | NOT IDENT. |
| PR-144 | -3.619E-01 | 4.155E+00 | 6.319E+00 | NOT IDENT. |
| PM-146 | -3.283E-02 | 5.306E-02 | 9.044E-02 | NOT IDENT. |
| ND-147 | -1.248E+01 | 1.109E+02 | 1.973E+02 | NOT IDENT. |
| PM-147 | -1.006E+02 | 8.884E+02 | 1.516E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.507E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | 6.122E-03 | 3.288E-02 | 5.939E-02 | FAIL ABUN |
| EU-152 | 3.368E-02 | 1.088E-01 | 1.994E-01 | NOT IDENT. |
| GD-153 | 1.097E-02 | 1.312E-01 | 1.991E-01 | NOT IDENT. |
| EU-154 | -4.660E-02 | 1.181E-01 | 2.116E-01 | NOT IDENT. |
| EU-155 | 4.691E-02 | 1.218E-01 | 2.140E-01 | NOT IDENT. |
| TB-160 | 4.714E-02 | 3.572E-01 | 5.901E-01 | FAIL ABUN |
| HO-166M | 1.439E-02 | 7.752E-02 | 1.229E-01 | FAIL ABUN |
| TM-171 | 4.120E+00 | 2.360E+01 | 4.017E+01 | NOT IDENT. |
| LU-176 | -3.904E-03 | 3.135E-02 | 5.574E-02 | NOT IDENT. |
| HF-181 | -7.675E-02 | 1.984E-01 | 3.443E-01 | NOT IDENT. |
| TA-182 | 3.341E-01 | 5.658E-01 | 6.344E-01 | FAIL ABUN |
| RE-183 | 5.308E-01 | 2.132E-01 | 9.378E-01 | FAIL ABUN |
| RE-184 | -5.685E-01 | 6.534E-01 | 1.114E+00 | NOT IDENT. |
| W-188 | 7.162E+00 | 2.015E+01 | 3.667E+01 | FAIL ABUN |
| IR-192 | 1.872E-02 | 9.198E-02 | 1.664E-01 | NOT IDENT. |
| HG-203 | 6.739E-02 | 1.513E-01 | 2.774E-01 | NOT IDENT. |
| BI-207 | 1.587E-03 | 5.442E-02 | 1.024E-01 | NOT IDENT. |
| TL-208 | -1.503E-02 | 5.042E-02 | 8.099E-02 | NOT IDENT. |
| BI-211 | -5.619E-02 | 2.409E-01 | 4.244E-01 | NOT IDENT. |
| PB-211 | -3.216E-01 | 7.949E-01 | 1.384E+00 | NOT IDENT. |
| BI-212 | -2.080E-01 | 5.043E-01 | 8.679E-01 | NOT IDENT. |
| PB-212 | -4.913E-03 | 8.317E-02 | 1.367E-01 | NOT IDENT. |
| BI-214 | -9.186E-02 | 1.018E-01 | 1.465E-01 | FAIL ABUN |
| PB-214 | -6.771E-03 | 8.734E-02 | 1.554E-01 | NOT IDENT. |
| RN-219 | 2.989E-01 | 4.303E-01 | 8.147E-01 | NOT IDENT. |
| RN-222 | -9.186E-02 | 1.018E-01 | 1.465E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | 2.103E-01 | 7.849E-01 | 1.424E+00 | NOT IDENT. |
| RA-224 | 7.674E-02 | 7.530E-01 | 1.350E+00 | NOT IDENT. |
| RA-226 | -9.186E-02 | 1.018E-01 | 1.465E-01 | FAIL ABUN |
| AC-227 | 2.579E-02 | 2.755E-01 | 4.982E-01 | NOT IDENT. |
| TH-227 | 2.579E-02 | 2.755E-01 | 4.982E-01 | NOT IDENT. |
| AC-228 | -1.765E-01 | 2.072E-01 | 3.094E-01 | NOT IDENT. |
| RA-228 | -1.765E-01 | 2.072E-01 | 3.094E-01 | NOT IDENT. |
| TH-228 | -4.913E-03 | 8.317E-02 | 1.367E-01 | NOT IDENT. |
| TH-229 | -3.760E-01 | 5.952E-01 | 1.037E+00 | NOT IDENT. |
| TH-230 | -9.185E-02 | 1.018E-01 | 1.465E-01 | FAIL ABUN |
| PA-231 | -6.932E-01 | 1.690E+00 | 2.956E+00 | NOT IDENT. |
| TH-231 | 2.103E-01 | 7.849E-01 | 1.424E+00 | NOT IDENT. |
| TH-232 | -1.765E-01 | 2.072E-01 | 3.094E-01 | NOT IDENT. |
| PA-233 | -4.511E-02 | 7.749E-02 | 1.338E-01 | NOT IDENT. |
| PA-234 | 1.084E-02 | 2.994E-01 | 5.673E-01 | FAIL ABUN |
| PA-234M | 7.973E+00 | 6.730E+00 | 1.053E+01 | FAIL ABUN |
| U-234 | -9.185E-02 | 1.018E-01 | 1.465E-01 | FAIL ABUN |
| U-235 | -5.383E-02 | 2.456E-01 | 4.137E-01 | FAIL ABUN |
| NP-237 | -4.511E-02 | 7.749E-02 | 1.338E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 7.981E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | 6.763E-02 | 4.643E-01 | 8.030E-01 | NOT IDENT. |
| PU-239 | -3.360E+02 | 3.819E+02 | 6.227E+02 | NOT IDENT. |
| AM-243 | -2.348E-02 | 5.825E-02 | 9.855E-02 | NOT IDENT. |
| CM-243 | -3.747E-02 | 1.216E-01 | 2.059E-01 | NOT IDENT. |
| CM-247 | 4.361E-02 | 3.919E-02 | 7.637E-02 | NOT IDENT. |
| CF-249 | -3.171E-02 | 4.426E-02 | 7.531E-02 | NOT IDENT. |
| CF-251 | -7.256E-02 | 1.511E-01 | 2.502E-01 | NOT IDENT. |
| ANH-511 | -2.092E-02 | 7.502E-02 | 1.333E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:46:26.51

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 35.63 | 92 | 22 | 1.78 | 71.89 | 65 | 33 | 6.37E-03 | 22.4 | 5.94E+00 |
| 2 | 3 | 46.24 | 109 | 121 | 1.81 | 93.10 | 65 | 33 | 7.59E-03 | 18.1 | |
| 3 | 1 | 59.33 | 40 | 34 | 1.41 | 119.28 | 118 | 13 | 2.80E-03 | 20.5 | 1.54E+00 |
| 4 | 1 | 63.05 | 66 | 153 | 1.52 | 126.72 | 118 | 13 | 4.58E-03 | 35.9 | |
| 5 | 0 | 92.91 | 238 | 262 | 1.46 | 186.44 | 179 | 15 | 1.65E-02 | 16.2 | |
| 6 | 0 | 185.84 | 115 | 176 | 1.11 | 372.28 | 367 | 10 | 7.99E-03 | 23.6 | |
| 7 | 0 | 238.34 | 38 | 185 | 1.22 | 477.27 | 472 | 10 | 2.67E-03 | 68.2 | |
| 8 | 4 | 506.55 | 35 | 72 | 2.48 | 1013.57 | 1005 | 33 | 2.43E-03 | 57.0 | 1.80E+00 |
| 9 | 4 | 510.88 | 307 | 63 | 2.48 | 1022.23 | 1005 | 33 | 2.13E-02 | 8.2 | |
| 10 | 0 | 640.77 | 34 | 25 | 3.64 | 1281.93 | 1277 | 11 | 2.33E-03 | 34.6 | |
| 11 | 0 | 671.97 | 18 | 26 | 1.12 | 1344.31 | 1339 | 9 | 1.25E-03 | 56.9 | |
| 12 | 0 | 677.51 | 9 | 24 | 0.69 | 1355.39 | 1350 | 7 | 6.50E-04 | 93.0 | |
| 13 | 0 | 693.66 | 17 | 27 | 0.77 | 1387.66 | 1383 | 8 | 1.21E-03 | 57.4 | |
| 14 | 0 | 714.59 | 17 | 21 | 1.35 | 1429.52 | 1427 | 8 | 1.19E-03 | 51.6 | |
| 15 | 0 | 719.05 | 24 | 24 | 2.19 | 1438.42 | 1434 | 8 | 1.67E-03 | 40.8 | |
| 16 | 4 | 738.44 | 18 | 12 | 2.60 | 1477.18 | 1475 | 12 | 1.25E-03 | 30.3 | 5.63E+00 |
| 17 | 4 | 742.09 | 11 | 12 | 1.26 | 1484.48 | 1475 | 12 | 7.68E-04 | 51.2 | |
| 18 | 0 | 882.73 | 8 | 25 | 0.58 | 1765.63 | 1758 | 10 | 5.56E-04 | 122.2 | |
| 19 | 0 | 1000.91 | 39 | 16 | 1.14 | 2001.86 | 1995 | 14 | 2.70E-03 | 27.8 | |
| 20 | 0 | 1093.84 | 11 | 14 | 1.51 | 2187.62 | 2183 | 9 | 7.81E-04 | 66.2 | |
| 21 | 0 | 1193.15 | 32 | 13 | 4.60 | 2386.10 | 2376 | 20 | 2.23E-03 | 34.2 | |
| 22 | 0 | 1222.52 | 17 | 33 | 5.14 | 2444.80 | 2433 | 19 | 1.16E-03 | 86.4 | |
| 23 | 0 | 1298.38 | 13 | 16 | 2.28 | 2596.42 | 2587 | 13 | 8.86E-04 | 70.9 | |
| 24 | 0 | 1340.46 | 12 | 5 | 0.72 | 2680.51 | 2676 | 7 | 8.07E-04 | 44.0 | |
| 25 | 0 | 1362.17 | 8 | 8 | 1.26 | 2723.89 | 2720 | 6 | 5.34E-04 | 73.3 | |
| 26 | 0 | 1368.36 | 5 | 7 | 1.35 | 2736.27 | 2731 | 9 | 3.36E-04 | 107.9 | |
| 27 | 0 | 1377.49 | 13 | 3 | 0.98 | 2754.51 | 2746 | 14 | 8.98E-04 | 41.1 | |
| 28 | 0 | 1459.97 | 23 | 15 | 2.64 | 2919.34 | 2913 | 12 | 1.59E-03 | 39.8 | |
| 29 | 0 | 1533.79 | 15 | 7 | 0.61 | 3066.84 | 3058 | 15 | 1.04E-03 | 47.3 | |
| 30 | 0 | 1551.47 | 8 | 9 | 0.69 | 3102.19 | 3097 | 11 | 5.88E-04 | 74.4 | |
| 31 | 0 | 1764.70 | 7 | 20 | 1.43 | 3528.23 | 3522 | 11 | 5.20E-04 | 119.5 | |
| 32 | 0 | 1795.03 | 5 | 9 | 4.41 | 3588.83 | 3578 | 13 | 3.27E-04 | 143.4 | |
| 33 | 0 | 1845.41 | 12 | 3 | 1.03 | 3689.48 | 3684 | 11 | 8.47E-04 | 38.9 | |
| 34 | 0 | 1866.87 | 7 | 11 | 0.78 | 3732.36 | 3722 | 12 | 4.55E-04 | 112.1 | |
| 35 | 0 | 1956.98 | 11 | 2 | 1.33 | 3912.39 | 3907 | 10 | 7.43E-04 | 41.0 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:46:28.58

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 3 | 10.66* | 9.354E-01 | 1.001E-01 | 1.001E-01 | 763.34 |
| PB-210 | 46.54 | 70 | 4.25* | 6.375E-01 | 8.493E+00 | 8.564E+00 | 67.81 |
| TH-234 | 63.29 | 7 | 3.70* | 2.285E+00 | 2.811E-01 | 2.811E-01 | 775.04 |
| | 92.59 | 34 | 4.23 | 4.528E+00 | 5.844E-01 | 5.844E-01 | 250.01 |
| U-238 | 63.29 | 7 | 3.70* | 2.285E+00 | 2.811E-01 | 2.811E-01 | 775.04 |
| | 92.59 | 34 | 4.23 | 4.528E+00 | 5.844E-01 | 5.844E-01 | 250.01 |
| AM-241 | 59.54 | 40 | 35.90* | 1.893E+00 | 1.942E-01 | 1.943E-01 | 40.97 |

Flag: "*" = Keyline

Sample ID : G341146021 Acquisition date : 12-FEB-2014 11:46:00

| | | |
|---|---|---|
| Total number of lines in spectrum | 33 | |
| Number of unidentified lines | 16 | |
| Number of lines tentatively identified by NID | 17 | 51.52% |

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.001E-01 | 1.001E-01 | 7.638E-01 | 763.34 | |
| PB-210 | 22.20Y | 1.01 | 8.493E+00 | 8.564E+00 | 5.807E+00 | 67.81 | |
| TH-234 | 4.47E+09Y | 1.00 | 2.811E-01 | 2.811E-01 | 21.79E-01 | 775.04 | |
| U-238 | 4.47E+09Y | 1.00 | 2.811E-01 | 2.811E-01 | 21.79E-01 | 775.04 | |
| AM-241 | 432.60Y | 1.00 | 1.942E-01 | 1.943E-01 | 0.796E-01 | 40.97 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 9.349E+00 | 9.420E+00 | | | |
| | Grand Total Activity : | | 9.349E+00 | 9.420E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146021 Acquisition date : 12-FEB-2014 11:46:00

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 35.63 | 92 | 22 | 1.78 | 71.89 | 65 | 33 | 6.37E-03 | 44.8 | 1.01E-01 | |
| 0 | 185.84 | 8 | 176 | 1.11 | 372.28 | 367 | 10 | 5.72E-04 | **** | 4.52E+00 | T |
| 4 | 506.55 | 35 | 72 | 2.48 | 1013.57 | 1005 | 33 | 2.43E-03 | **** | 2.26E+00 | T |
| 0 | 640.77 | 34 | 25 | 3.64 | 1281.93 | 1277 | 11 | 2.33E-03 | 69.2 | 1.88E+00 | |
| 0 | 671.97 | 18 | 26 | 1.12 | 1344.31 | 1339 | 9 | 1.25E-03 | **** | 1.81E+00 | |
| 0 | 677.51 | 9 | 24 | 0.69 | 1355.39 | 1350 | 7 | 6.50E-04 | **** | 1.80E+00 | T |
| 0 | 693.66 | 17 | 27 | 0.77 | 1387.66 | 1383 | 8 | 1.21E-03 | **** | 1.77E+00 | T |
| 0 | 714.59 | 17 | 21 | 1.35 | 1429.52 | 1427 | 8 | 1.19E-03 | **** | 1.73E+00 | |
| 0 | 719.05 | 24 | 24 | 2.19 | 1438.42 | 1434 | 8 | 1.67E-03 | 81.6 | 1.72E+00 | |
| 4 | 738.44 | 18 | 12 | 2.60 | 1477.18 | 1475 | 12 | 1.25E-03 | 60.7 | 1.68E+00 | T |
| 4 | 742.09 | 11 | 12 | 1.26 | 1484.48 | 1475 | 12 | 7.68E-04 | **** | 1.67E+00 | |
| 0 | 882.73 | 8 | 25 | 0.58 | 1765.63 | 1758 | 10 | 5.56E-04 | **** | 1.45E+00 | T |
| 0 | 1000.91 | 27 | 16 | 1.14 | 2001.86 | 1995 | 14 | 1.85E-03 | 86.1 | 1.30E+00 | T |
| 0 | 1093.84 | 11 | 14 | 1.51 | 2187.62 | 2183 | 9 | 7.81E-04 | **** | 1.20E+00 | |
| 0 | 1193.15 | 32 | 13 | 4.60 | 2386.10 | 2376 | 20 | 2.23E-03 | 68.3 | 1.11E+00 | |
| 0 | 1222.52 | 17 | 33 | 5.14 | 2444.80 | 2433 | 19 | 1.16E-03 | **** | 1.09E+00 | T |
| 0 | 1298.38 | 13 | 16 | 2.28 | 2596.42 | 2587 | 13 | 8.86E-04 | **** | 1.04E+00 | T |
| 0 | 1340.46 | 12 | 5 | 0.72 | 2680.51 | 2676 | 7 | 8.07E-04 | 88.1 | 1.01E+00 | |
| 0 | 1362.17 | 8 | 8 | 1.26 | 2723.89 | 2720 | 6 | 5.34E-04 | **** | 9.93E-01 | T |
| 0 | 1368.36 | 5 | 7 | 1.35 | 2736.27 | 2731 | 9 | 3.36E-04 | **** | 9.89E-01 | T |
| 0 | 1377.49 | 13 | 3 | 0.98 | 2754.51 | 2746 | 14 | 8.98E-04 | 82.2 | 9.83E-01 | |
| 0 | 1533.79 | 15 | 7 | 0.61 | 3066.84 | 3058 | 15 | 1.04E-03 | 94.7 | 8.97E-01 | |
| 0 | 1551.47 | 8 | 9 | 0.69 | 3102.19 | 3097 | 11 | 5.88E-04 | **** | 8.89E-01 | |
| 0 | 1764.70 | 7 | 20 | 1.43 | 3528.23 | 3522 | 11 | 5.20E-04 | **** | 8.03E-01 | T |
| 0 | 1795.03 | 5 | 9 | 4.41 | 3588.83 | 3578 | 13 | 3.27E-04 | **** | 7.92E-01 | |
| 0 | 1845.41 | 12 | 3 | 1.03 | 3689.48 | 3684 | 11 | 8.47E-04 | 77.9 | 7.77E-01 | |
| 0 | 1866.87 | 7 | 11 | 0.78 | 3732.36 | 3722 | 12 | 4.55E-04 | **** | 7.70E-01 | |
| 0 | 1956.98 | 11 | 2 | 1.33 | 3912.39 | 3907 | 10 | 7.43E-04 | 82.1 | 7.46E-01 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:46:40.49

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:46:00 Sensitivity     : 3.000          *
* Detector ID      : GAM14                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:00.99     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 14:53:00 Nuclide Library : SOLID          *
* Sample ID        : G341146021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 5.7245E+01 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 21-NOV-2013 12:25:13 Eff. Geometry   : JAR          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_JAR.CNF;4          *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 2.471E-01 |
| PB-210 | 3.581E+00 |
| TH-234 | 1.221E+00 |
| U-238 | 1.221E+00 |
| AM-241 | 1.426E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 8.507E-01 | NOT IDENT. |
| NA-22 | 3.389E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.073E-02 | NOT IDENT. |
| SC-46 | 6.547E-02 | NOT IDENT. |
| V-48 | 2.077E+00 | NOT IDENT. |
| CR-51 | 2.991E+00 | NOT IDENT. |
| MN-54 | 4.068E-02 | NOT IDENT. |
| CO-56 | 7.203E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.907E-02 | NOT IDENT. |
| CO-58 | 7.932E-02 | NOT IDENT. |
| FE-59 | 2.500E-01 | NOT IDENT. |
| CO-60 | 3.666E-02 | NOT IDENT. |
| ZN-65 | 9.468E-02 | NOT IDENT. |
| GE-68 | 1.225E+00 | NOT IDENT. |
| AS-73 | 1.654E+00 | NOT IDENT. |
| AS-74 | 2.619E+00 | NOT IDENT. |
| SE-75 | 7.315E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.692E+00 | NOT IDENT. |
| RB-83 | 1.282E-01 | NOT IDENT. |
| KR-85 | 9.719E+00 | NOT IDENT. |
| SR-85 | 1.216E-01 | NOT IDENT. |
| RB-86 | 1.243E+01 | NOT IDENT. |
| Y-88 | 7.966E-02 | NOT IDENT. |

| | | |
|---|---|---|
| Y-91 | 4.331E+01 | NOT IDENT. |
| NB-94 | 3.329E-02 | NOT IDENT. |
| NB-95 | 9.740E-02 | NOT IDENT. |
| NB-95M | 2.904E-01 | NOT IDENT. |
| ZR-95 | 1.730E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.055E-02 | NOT IDENT. |
| RH-102 | 5.074E-02 | NOT IDENT. |
| RU-103 | 1.636E-01 | NOT IDENT. |
| RH-106 | 4.024E-01 | NOT IDENT. |
| RU-106 | 4.024E-01 | NOT IDENT. |
| AG-108M | 2.708E-02 | NOT IDENT. |
| CD-109 | 7.128E-01 | NOT IDENT. |
| AG-110M | 6.060E-02 | FAIL ABUN |
| SN-113 | 7.151E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.509E+00 | NOT IDENT. |
| TE-123M | 4.466E-02 | NOT IDENT. |
| SB-124 | 2.251E-01 | NOT IDENT. |
| SB-125 | 8.164E-02 | NOT IDENT. |
| TE-125M | 2.483E+01 | NOT IDENT. |
| I-126 | 1.446E+01 | NOT IDENT. |
| SB-126 | 1.548E+01 | FAIL ABUN |
| SN-126 | 6.263E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 4.255E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.773E-02 | NOT IDENT. |
| CS-135 | 1.553E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.145E+00 | NOT IDENT. |
| BA-137M | 3.020E-02 | NOT IDENT. |
| CS-137 | 3.191E-02 | NOT IDENT. |
| CE-139 | 4.727E-02 | NOT IDENT. |
| BA-140 | 6.730E+00 | NOT IDENT. |
| LA-140 | 6.730E+00 | NOT IDENT. |
| CE-141 | 3.605E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.372E-01 | NOT IDENT. |
| PM-144 | 3.750E-02 | NOT IDENT. |
| PR-144 | 2.923E+00 | NOT IDENT. |
| PM-146 | 4.237E-02 | NOT IDENT. |
| ND-147 | 9.163E+01 | NOT IDENT. |
| PM-147 | 7.256E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.820E-02 | FAIL ABUN |
| EU-152 | 9.414E-02 | NOT IDENT. |
| GD-153 | 9.527E-02 | NOT IDENT. |
| EU-154 | 9.353E-02 | NOT IDENT. |
| EU-155 | 1.026E-01 | NOT IDENT. |
| TB-160 | 2.695E-01 | FAIL ABUN |
| HO-166M | 5.674E-02 | FAIL ABUN |
| TM-171 | 1.921E+01 | NOT IDENT. |
| LU-176 | 2.644E-02 | NOT IDENT. |
| HF-181 | 1.608E-01 | NOT IDENT. |
| TA-182 | 2.903E-01 | FAIL ABUN |
| RE-183 | 4.498E-01 | FAIL ABUN |
| RE-184 | 5.024E-01 | NOT IDENT. |
| W-188 | 1.749E+01 | FAIL ABUN |
| IR-192 | 7.906E-02 | NOT IDENT. |
| HG-203 | 1.322E-01 | NOT IDENT. |
| BI-207 | 4.638E-02 | NOT IDENT. |
| TL-208 | 3.794E-02 | NOT IDENT. |
| BI-211 | 2.007E-01 | NOT IDENT. |
| PB-211 | 6.486E-01 | NOT IDENT. |
| BI-212 | 3.951E-01 | NOT IDENT. |
| PB-212 | 6.578E-02 | NOT IDENT. |
| BI-214 | 6.830E-02 | FAIL ABUN |
| PB-214 | 7.354E-02 | NOT IDENT. |
| RN-219 | 3.825E-01 | NOT IDENT. |
| RN-222 | 6.830E-02 | FAIL ABUN |
| RA-223 | 6.768E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-224 | 6.473E-01 | NOT IDENT. |
| RA-226 | 6.830E-02 | FAIL ABUN |
| AC-227 | 2.366E-01 | NOT IDENT. |
| TH-227 | 2.366E-01 | NOT IDENT. |
| AC-228 | 1.426E-01 | NOT IDENT. |
| RA-228 | 1.426E-01 | NOT IDENT. |
| TH-228 | 6.578E-02 | NOT IDENT. |
| TH-229 | 4.958E-01 | NOT IDENT. |
| TH-230 | 6.829E-02 | FAIL ABUN |
| PA-231 | 1.403E+00 | NOT IDENT. |
| TH-231 | 6.768E-01 | NOT IDENT. |
| TH-232 | 1.426E-01 | NOT IDENT. |
| PA-233 | 6.339E-02 | NOT IDENT. |
| PA-234 | 2.567E-01 | FAIL ABUN |
| PA-234M | 4.861E+00 | FAIL ABUN |
| U-234 | 6.829E-02 | FAIL ABUN |
| U-235 | 1.989E-01 | FAIL ABUN |
| NP-237 | 6.339E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 3.850E-01 | NOT IDENT. |
| PU-239 | 2.977E+02 | NOT IDENT. |
| AM-243 | 4.736E-02 | NOT IDENT. |
| CM-243 | 9.860E-02 | NOT IDENT. |
| CM-247 | 3.591E-02 | NOT IDENT. |
| CF-249 | 3.523E-02 | NOT IDENT. |
| CF-251 | 1.196E-01 | NOT IDENT. |
| ANH-511 | 6.471E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:46:45.12

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:46:00 Sensitivity     : 3.000          *
* Detector ID      : GAM14                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:00.99     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 14:53:00 Nuclide Library : SOLID          *
* Sample ID        : G341146021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 5.7245E+01 GRAM*
*                                         Quantity Err(%) : 1.7469E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 21-NOV-2013 12:25:13 Eff. Geometry   : JAR          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_JAR.CNF;4          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.001E-01 | 7.486E-01 | 7.486E-01 |
| PB-210 | 8.564E+00 | 5.744E+00 | 5.744E+00 |
| TH-234 | 2.811E-01 | 2.136E+00 | 2.136E+00 |
| U-238 | 2.811E-01 | 2.136E+00 | 2.136E+00 |
| AM-241 | 1.943E-01 | 7.993E-02 | 7.993E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -3.696E-01 | 1.048E+00 | 1.061E+00 | NOT IDENT. |
| NA-22 | -1.911E-02 | 4.318E-02 | 4.403E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 2.121E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.165E-02 | 4.720E-02 | 4.749E-02 | NOT IDENT. |
| SC-46 | -4.360E-02 | 8.368E-02 | 8.595E-02 | NOT IDENT. |
| V-48 | -9.061E-02 | 2.449E+00 | 2.449E+00 | NOT IDENT. |
| CR-51 | -7.869E-01 | 3.574E+00 | 3.591E+00 | NOT IDENT. |
| MN-54 | 8.482E-03 | 4.866E-02 | 4.881E-02 | NOT IDENT. |
| CO-56 | -1.127E-02 | 8.933E-02 | 8.948E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 8.752E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.830E-03 | 3.521E-02 | 3.523E-02 | NOT IDENT. |
| CO-58 | 5.754E-02 | 8.980E-02 | 9.348E-02 | NOT IDENT. |
| FE-59 | -2.305E-01 | 3.888E-01 | 4.025E-01 | NOT IDENT. |
| CO-60 | 2.992E-02 | 4.047E-02 | 4.266E-02 | NOT IDENT. |
| ZN-65 | -2.020E-02 | 1.142E-01 | 1.145E-01 | NOT IDENT. |
| GE-68 | 3.441E-02 | 1.438E+00 | 1.438E+00 | NOT IDENT. |
| AS-73 | -1.702E+00 | 2.108E+00 | 2.243E+00 | NOT IDENT. |
| AS-74 | 3.003E+00 | 2.927E+00 | 3.225E+00 | NOT IDENT. |
| SE-75 | 5.276E-02 | 8.312E-02 | 8.645E-02 | NOT IDENT. |
| BR-77 | 5.389E+09 | 3.004E+11 | 3.004E+11 | SHORT HLIF |
| SR-82 | -1.467E+00 | 3.450E+00 | 3.513E+00 | NOT IDENT. |
| RB-83 | -7.609E-02 | 1.875E-01 | 1.907E-01 | NOT IDENT. |
| KR-85 | 3.257E+01 | 9.930E+00 | 1.773E+01 | NOT IDENT. |
| SR-85 | 4.067E-01 | 1.243E-01 | 2.215E-01 | NOT IDENT. |
| RB-86 | -1.292E+00 | 1.483E+01 | 1.485E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | 7.105E-02 | 8.374E-02 | 8.965E-02 | NOT IDENT. |
| Y-91 | -1.934E+00 | 5.155E+01 | 5.156E+01 | NOT IDENT. |
| NB-94 | -2.822E-03 | 4.059E-02 | 4.061E-02 | NOT IDENT. |
| NB-95 | 8.746E-02 | 1.096E-01 | 1.165E-01 | NOT IDENT. |
| NB-95M | 5.054E-02 | 3.368E-01 | 3.376E-01 | NOT IDENT. |
| ZR-95 | 5.588E-02 | 2.044E-01 | 2.059E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 4.205E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 1.120E+41 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.217E+10 | 7.351E+09 | 9.173E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.858E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.274E-02 | 3.617E-02 | 3.759E-02 | NOT IDENT. |
| RH-102 | -3.162E-02 | 6.455E-02 | 6.610E-02 | NOT IDENT. |
| RU-103 | 6.902E-02 | 1.944E-01 | 1.969E-01 | NOT IDENT. |
| RH-106 | 2.373E-01 | 4.649E-01 | 4.770E-01 | NOT IDENT. |
| RU-106 | 2.373E-01 | 4.649E-01 | 4.770E-01 | NOT IDENT. |
| AG-108M | -4.372E-03 | 3.258E-02 | 3.264E-02 | NOT IDENT. |
| CD-109 | -1.069E+00 | 1.073E+00 | 1.176E+00 | NOT IDENT. |
| AG-110M | 1.783E-02 | 7.934E-02 | 7.975E-02 | FAIL ABUN |
| SN-113 | -3.556E-03 | 9.327E-02 | 9.328E-02 | NOT IDENT. |
| CD-115 | -1.710E+11 | 1.475E+12 | 1.477E+12 | SHORT HLIF |
| SN-117M | 2.466E+00 | 4.164E+00 | 4.310E+00 | NOT IDENT. |
| TE-123M | 7.848E-03 | 5.423E-02 | 5.435E-02 | NOT IDENT. |
| SB-124 | 7.726E-02 | 2.563E-01 | 2.586E-01 | NOT IDENT. |
| SB-125 | -3.147E-02 | 9.988E-02 | 1.009E-01 | NOT IDENT. |
| TE-125M | -2.693E+01 | 3.165E+01 | 3.390E+01 | NOT IDENT. |
| I-126 | -2.087E+01 | 2.374E+01 | 2.554E+01 | NOT IDENT. |
| SB-126 | 2.036E+01 | 1.916E+01 | 2.124E+01 | FAIL ABUN |
| SN-126 | -8.550E-02 | 9.334E-02 | 1.010E-01 | FAIL ABUN |
| SB-127 | -9.609E+05 | 3.411E+06 | 3.438E+06 | SHORT HLIF |
| I-131 | -2.068E+01 | 1.607E+02 | 1.610E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.809E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.204E+07 | 3.995E+07 | 4.422E+07 | SHORT HLIF |
| BA-133 | 7.073E-03 | 4.982E-02 | 4.992E-02 | NOT IDENT. |
| I-133 | -3.236E+31 | 1.735E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.126E-02 | 4.335E-02 | 4.440E-02 | NOT IDENT. |
| CS-135 | -1.007E-02 | 1.826E-01 | 1.827E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 4.150E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.124E+00 | 8.541E+00 | 8.556E+00 | NOT IDENT. |
| BA-137M | -2.314E-02 | 3.902E-02 | 4.039E-02 | NOT IDENT. |
| CS-137 | -2.444E-02 | 4.122E-02 | 4.267E-02 | NOT IDENT. |
| CE-139 | 2.476E-02 | 5.685E-02 | 5.794E-02 | NOT IDENT. |
| BA-140 | -1.846E+00 | 8.425E+00 | 8.466E+00 | NOT IDENT. |
| LA-140 | -1.846E+00 | 8.425E+00 | 8.466E+00 | NOT IDENT. |
| CE-141 | 4.804E-01 | 4.166E-01 | 4.695E-01 | NOT IDENT. |
| CE-143 | 6.988E+19 | 1.137E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.412E-01 | 2.817E-01 | 2.888E-01 | NOT IDENT. |
| PM-144 | -4.184E-03 | 5.322E-02 | 5.326E-02 | NOT IDENT. |
| PR-144 | -3.619E-01 | 4.155E+00 | 4.158E+00 | NOT IDENT. |
| PM-146 | -3.283E-02 | 5.316E-02 | 5.518E-02 | NOT IDENT. |
| ND-147 | -1.248E+01 | 1.109E+02 | 1.111E+02 | NOT IDENT. |
| PM-147 | -1.006E+02 | 8.884E+02 | 8.896E+02 | NOT IDENT. |
| PM-149 | -1.070E+12 | 1.507E+13 | 1.508E+13 | SHORT HLIF |
| EU-150 | 6.122E-03 | 3.289E-02 | 3.301E-02 | FAIL ABUN |
| EU-152 | 3.368E-02 | 1.089E-01 | 1.099E-01 | NOT IDENT. |
| GD-153 | 1.097E-02 | 1.312E-01 | 1.313E-01 | NOT IDENT. |
| EU-154 | -4.660E-02 | 1.181E-01 | 1.200E-01 | NOT IDENT. |
| EU-155 | 4.691E-02 | 1.219E-01 | 1.237E-01 | NOT IDENT. |
| TB-160 | 4.714E-02 | 3.573E-01 | 3.579E-01 | FAIL ABUN |
| HO-166M | 1.439E-02 | 7.753E-02 | 7.780E-02 | FAIL ABUN |
| TM-171 | 4.120E+00 | 2.360E+01 | 2.367E+01 | NOT IDENT. |
| LU-176 | -3.904E-03 | 3.136E-02 | 3.141E-02 | NOT IDENT. |
| HF-181 | -7.675E-02 | 1.985E-01 | 2.015E-01 | NOT IDENT. |
| TA-182 | 3.341E-01 | 5.666E-01 | 5.862E-01 | FAIL ABUN |
| RE-183 | 5.308E-01 | 2.225E-01 | 3.268E-01 | FAIL ABUN |
| RE-184 | -5.685E-01 | 6.605E-01 | 7.085E-01 | NOT IDENT. |
| W-188 | 7.162E+00 | 2.020E+01 | 2.045E+01 | FAIL ABUN |
| IR-192 | 1.872E-02 | 9.202E-02 | 9.241E-02 | NOT IDENT. |
| HG-203 | 6.739E-02 | 1.517E-01 | 1.547E-01 | NOT IDENT. |
| BI-207 | 1.587E-03 | 5.442E-02 | 5.443E-02 | NOT IDENT. |
| TL-208 | -1.503E-02 | 5.044E-02 | 5.089E-02 | NOT IDENT. |
| BI-211 | -5.619E-02 | 2.410E-01 | 2.423E-01 | NOT IDENT. |
| PB-211 | -3.216E-01 | 7.954E-01 | 8.085E-01 | NOT IDENT. |
| BI-212 | -2.080E-01 | 5.047E-01 | 5.133E-01 | NOT IDENT. |
| PB-212 | -4.913E-03 | 8.317E-02 | 8.320E-02 | NOT IDENT. |
| BI-214 | -9.186E-02 | 1.021E-01 | 1.102E-01 | FAIL ABUN |
| PB-214 | -6.771E-03 | 8.734E-02 | 8.740E-02 | NOT IDENT. |
| RN-219 | 2.989E-01 | 4.324E-01 | 4.529E-01 | NOT IDENT. |
| RN-222 | -9.186E-02 | 1.021E-01 | 1.102E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | 2.103E-01 | 7.855E-01 | 7.912E-01 | NOT IDENT. |
| RA-224 | 7.674E-02 | 7.531E-01 | 7.539E-01 | NOT IDENT. |
| RA-226 | -9.186E-02 | 1.021E-01 | 1.102E-01 | FAIL ABUN |
| AC-227 | 2.579E-02 | 2.755E-01 | 2.758E-01 | NOT IDENT. |
| TH-227 | 2.579E-02 | 2.755E-01 | 2.758E-01 | NOT IDENT. |
| AC-228 | -1.765E-01 | 2.088E-01 | 2.234E-01 | NOT IDENT. |
| RA-228 | -1.765E-01 | 2.088E-01 | 2.234E-01 | NOT IDENT. |
| TH-228 | -4.913E-03 | 8.317E-02 | 8.320E-02 | NOT IDENT. |
| TH-229 | -3.760E-01 | 5.964E-01 | 6.200E-01 | NOT IDENT. |
| TH-230 | -9.185E-02 | 1.021E-01 | 1.101E-01 | FAIL ABUN |
| PA-231 | -6.932E-01 | 1.694E+00 | 1.722E+00 | NOT IDENT. |
| TH-231 | 2.103E-01 | 7.855E-01 | 7.912E-01 | NOT IDENT. |
| TH-232 | -1.765E-01 | 2.088E-01 | 2.234E-01 | NOT IDENT. |
| PA-233 | -4.511E-02 | 7.779E-02 | 8.040E-02 | NOT IDENT. |
| PA-234 | 1.084E-02 | 2.997E-01 | 2.997E-01 | FAIL ABUN |
| PA-234M | 7.973E+00 | 6.851E+00 | 7.737E+00 | FAIL ABUN |
| U-234 | -9.185E-02 | 1.021E-01 | 1.101E-01 | FAIL ABUN |
| U-235 | -5.383E-02 | 2.456E-01 | 2.468E-01 | FAIL ABUN |
| NP-237 | -4.511E-02 | 7.779E-02 | 8.040E-02 | NOT IDENT. |
| NP-238 | -7.100E+11 | 7.981E+12 | 7.988E+12 | SHORT HLIF |
| NP-239 | 6.763E-02 | 4.644E-01 | 4.654E-01 | NOT IDENT. |
| PU-239 | -3.360E+02 | 3.830E+02 | 4.119E+02 | NOT IDENT. |
| AM-243 | -2.348E-02 | 5.829E-02 | 5.924E-02 | NOT IDENT. |
| CM-243 | -3.747E-02 | 1.217E-01 | 1.229E-01 | NOT IDENT. |
| CM-247 | 4.361E-02 | 3.997E-02 | 4.455E-02 | NOT IDENT. |
| CF-249 | -3.171E-02 | 4.439E-02 | 4.663E-02 | NOT IDENT. |
| CF-251 | -7.256E-02 | 1.514E-01 | 1.549E-01 | NOT IDENT. |
| ANH-511 | -2.092E-02 | 7.504E-02 | 7.563E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 88.2054 | 94.67 | 151.5113 | 193.51 | 182.7531 |
| 45.60 | 88.4213 | 94.87 | 149.8320 | 197.03 | 171.2962 |
| 46.54 | 170.9307 | 97.43 | 162.0677 | 198.01 | 169.5669 |
| 49.72 | 0.0000 | 98.43 | 148.5324 | 201.83 | 187.1515 |
| 51.35 | 144.0310 | 98.44 | 148.5335 | 205.31 | 177.4626 |
| 52.39 | 154.4933 | 99.53 | 140.1122 | 210.85 | 171.5546 |
| 53.44 | 183.5214 | 100.11 | 162.3958 | 215.65 | 150.9140 |
| 57.36 | 0.0000 | 103.18 | 185.2538 | 222.11 | 142.2010 |
| 57.53 | 140.0331 | 103.37 | 182.0666 | 227.09 | 132.4151 |
| 57.98 | 140.0972 | 105.21 | 161.9357 | 227.38 | 129.6737 |
| 59.32 | 141.9381 | 105.31 | 165.1647 | 228.16 | 0.0000 |
| 59.54 | 165.0809 | 106.12 | 170.6279 | 228.18 | 119.6017 |
| 63.29 | 187.2337 | 109.28 | 218.3398 | 117.23 | 119.6017 |
| 63.58 | 178.9994 | 111.00 | 170.1467 | 235.69 | 162.4777 |
| 64.28 | 172.4863 | 111.76 | 0.0000 | 235.96 | 160.6516 |
| 66.73 | 152.9404 | 116.30 | 0.0000 | 238.63 | 160.8443 |
| 67.24 | 158.0036 | 117.23 | 175.2106 | 238.98 | 0.0000 |
| 67.75 | 178.0468 | 121.12 | 169.1658 | 240.99 | 176.7449 |
| 69.67 | 192.7424 | 121.22 | 169.1771 | 242.00 | 210.1530 |
| 70.83 | 183.5605 | 121.78 | 164.9013 | 244.70 | 149.2296 |
| 72.81 | 181.7998 | 122.06 | 164.9320 | 252.40 | 0.0000 |
| 72.87 | 181.8094 | 123.07 | 165.0428 | 252.80 | 118.1331 |
| 74.66 | 216.6360 | 127.23 | 149.1633 | 254.15 | 0.0000 |
| 74.82 | 216.6668 | 129.30 | 189.7028 | 256.23 | 116.4444 |
| 74.97 | 209.3674 | 131.20 | 193.2102 | 260.90 | 0.0000 |
| 77.11 | 170.9546 | 133.02 | 167.2060 | 264.66 | 116.8625 |
| 79.69 | 200.7663 | 133.52 | 171.6313 | 268.22 | 138.5712 |
| 80.12 | 215.5611 | 136.00 | 210.2212 | 269.46 | 139.5802 |
| 80.19 | 0.0000 | 136.47 | 227.8063 | 271.23 | 131.2466 |
| 80.57 | 223.0066 | 140.51 | 0.0000 | 273.65 | 146.3909 |
| 81.00 | 223.0879 | 143.76 | 213.4293 | 276.40 | 138.1014 |
| 81.07 | 228.3631 | 144.24 | 198.0849 | 277.37 | 121.2398 |
| 83.79 | 155.0497 | 145.44 | 162.9883 | 277.60 | 121.2509 |
| 85.43 | 170.3981 | 152.43 | 162.5611 | 278.00 | 125.0317 |
| 86.55 | 189.4423 | 153.25 | 167.0640 | 279.20 | 122.2717 |
| 86.79 | 203.0127 | 323.87 | 179.3344 | 279.54 | 131.6943 |
| 86.94 | 192.8861 | 156.02 | 187.2807 | 280.46 | 134.5670 |
| 87.09 | 209.8312 | 158.56 | 167.5778 | 283.69 | 129.0897 |
| 87.57 | 209.9130 | 159.00 | 178.7212 | 284.31 | 0.0000 |
| 88.03 | 209.9909 | 162.33 | 180.1717 | 285.41 | 128.2355 |
| 88.34 | 213.4310 | 163.33 | 201.4169 | 285.90 | 0.0000 |
| 88.47 | 213.4533 | 165.86 | 192.7877 | 287.50 | 125.5123 |
| 89.96 | 149.2563 | 176.31 | 165.8745 | 290.67 | 131.3407 |
| 91.11 | 157.0321 | 176.60 | 165.8993 | 293.27 | 0.0000 |
| 92.59 | 157.2150 | 177.52 | 174.9537 | 351.93 | 127.7902 |
| 93.35 | 157.3082 | 181.07 | 0.0000 | 295.96 | 143.9250 |
| 94.56 | 151.4983 | 184.41 | 172.5912 | 879.38 | 124.1686 |
| 94.65 | 151.5086 | 143.76 | 151.6839 | 299.98 | 130.8743 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 130.8793 | 487.02 | 52.4767 | 702.65 | 59.6955 |
| 300.13 | 127.0890 | 492.35 | 0.0000 | 706.68 | 51.2145 |
| 301.36 | 110.0697 | 497.08 | 57.3501 | 711.68 | 44.5068 |
| 302.85 | 111.0829 | 505.52 | 52.7528 | 720.70 | 41.0296 |
| 256.23 | 127.3033 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 116.0057 | 511.00 | 52.8341 | 722.78 | 44.6177 |
| 308.46 | 115.1287 | 514.00 | 52.8776 | 722.91 | 44.6187 |
| 311.90 | 123.8539 | 514.00 | 52.8782 | 723.31 | 41.0530 |
| 316.51 | 115.4817 | 520.40 | 69.6096 | 724.19 | 44.6320 |
| 319.41 | 126.1170 | 520.69 | 0.0000 | 727.33 | 41.8041 |
| 320.08 | 125.1936 | 522.65 | 0.0000 | 733.00 | 36.7969 |
| 321.04 | 122.3703 | 527.90 | 0.0000 | 735.93 | 35.7983 |
| 323.87 | 115.7993 | 529.59 | 59.2319 | 333.97 | 32.2288 |
| 325.23 | 119.6884 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 117.9266 | 531.02 | 59.2560 | 747.24 | 39.9884 |
| 333.37 | 127.7300 | 546.56 | 0.0000 | 748.06 | 38.2856 |
| 333.97 | 112.3897 | 552.55 | 49.3230 | 752.31 | 37.7224 |
| 334.37 | 102.7981 | 563.25 | 57.7062 | 753.82 | 37.7344 |
| 338.28 | 114.4896 | 569.33 | 72.2473 | 756.73 | 45.3100 |
| 338.32 | 114.4910 | 946.00 | 74.3150 | 756.80 | 45.3110 |
| 311.90 | 108.8025 | 569.70 | 65.0287 | 884.68 | 43.2197 |
| 340.48 | 108.8025 | 583.19 | 61.1124 | 765.81 | 37.8326 |
| 340.55 | 108.8053 | 584.27 | 61.1290 | 766.42 | 44.3232 |
| 344.28 | 86.7755 | 595.83 | 60.2699 | 766.84 | 44.3272 |
| 345.93 | 107.0868 | 427.87 | 67.6248 | 772.60 | 0.0000 |
| 351.06 | 108.2484 | 602.52 | 0.0000 | 776.52 | 44.4193 |
| 351.93 | 105.3809 | 602.73 | 78.0707 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 64.5702 | 778.90 | 30.3502 |
| 356.01 | 95.8507 | 609.32 | 68.8150 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 74.0473 | 785.37 | 48.8441 |
| 366.42 | 0.0000 | 614.28 | 69.9443 | 792.07 | 36.9559 |
| 375.05 | 84.7868 | 618.01 | 66.8734 | 794.95 | 39.1535 |
| 356.01 | 79.1737 | 620.36 | 55.4119 | 795.86 | 29.3711 |
| 388.16 | 88.0972 | 621.93 | 59.6162 | 810.29 | 36.0051 |
| 388.63 | 95.9436 | 630.19 | 0.0000 | 344.28 | 28.3689 |
| 391.69 | 77.4204 | 631.29 | 55.5594 | 810.76 | 28.3702 |
| 264.66 | 71.7507 | 633.25 | 55.9362 | 815.77 | 37.1377 |
| 401.81 | 62.9281 | 634.78 | 41.9678 | 1048.07 | 37.1593 |
| 402.40 | 57.0399 | 635.95 | 48.9761 | 832.01 | 41.6451 |
| 404.85 | 83.6594 | 636.99 | 0.0000 | 834.85 | 39.4761 |
| 410.95 | 70.0172 | 645.85 | 35.0667 | 835.71 | 43.8691 |
| 413.71 | 79.9499 | 657.76 | 51.6940 | 836.80 | 0.0000 |
| 414.70 | 76.0253 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 70.3760 | 661.66 | 53.8538 | 846.77 | 37.3718 |
| 427.87 | 65.4352 | 664.57 | 0.0000 | 856.80 | 42.2200 |
| 433.94 | 69.5326 | 666.33 | 49.3315 | 860.56 | 32.1474 |
| 439.40 | 81.5896 | 666.50 | 45.8100 | 871.09 | 39.5776 |
| 453.88 | 88.9446 | 667.71 | 0.0000 | 873.19 | 43.1937 |
| 463.37 | 62.1377 | 677.62 | 36.3390 | 875.33 | 0.0000 |
| 468.07 | 78.2818 | 685.70 | 0.0000 | 879.38 | 34.7686 |
| 473.00 | 0.0000 | 695.00 | 44.3390 | 880.51 | 41.4944 |
| 475.06 | 80.4541 | 696.49 | 53.2251 | 883.24 | 33.2139 |
| 476.78 | 84.5188 | 696.51 | 53.2251 | 884.68 | 36.3867 |
| 477.60 | 68.4366 | 697.00 | 58.5543 | 889.28 | 39.2986 |
| 482.18 | 75.5814 | 697.49 | 56.7865 | 894.76 | 32.3632 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 32.3838 | 1298.22 | 0.0000 | | |
| 903.28 | 42.6037 | 1312.11 | 21.8237 | | |
| 911.20 | 42.6683 | 1332.49 | 13.1339 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 29.7689 | 1365.19 | 0.0000 | | |
| 937.49 | 29.8301 | 1368.63 | 0.0000 | | |
| 944.13 | 29.8672 | 1384.29 | 18.0447 | | |
| 946.00 | 29.8776 | 1408.01 | 24.1406 | | |
| 949.00 | 24.2888 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 10.4226 | | |
| 962.31 | 27.1580 | 1489.16 | 16.2760 | | |
| 964.08 | 38.4083 | 1505.03 | 14.2717 | | |
| 966.17 | 24.3660 | 1596.21 | 16.5085 | | |
| 968.97 | 30.9415 | 1620.50 | 17.5949 | | |
| 983.53 | 29.1439 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 11.4870 | | |
| 1274.44 | 32.3068 | 1750.46 | 0.0000 | | |
| 1001.03 | 32.0645 | 1764.49 | 11.5904 | | |
| 1004.73 | 24.2667 | 1063.66 | 9.0377 | | |
| 507.63 | 0.0000 | 1771.35 | 12.6548 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 14.8294 | | |
| 1037.84 | 28.4766 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 9.5643 | | |
| 631.29 | 27.5698 | | | | |
| 1048.07 | 34.2334 | | | | |
| 1049.04 | 31.3860 | | | | |
| 1050.41 | 31.3927 | | | | |
| 1063.66 | 30.5117 | | | | |
| 1077.00 | 22.9355 | | | | |
| 1077.34 | 23.8932 | | | | |
| 1085.87 | 24.0148 | | | | |
| 1099.45 | 34.5337 | | | | |
| 1112.07 | 30.7617 | | | | |
| 1112.84 | 30.7656 | | | | |
| 1115.54 | 34.6274 | | | | |
| 1120.29 | 30.8034 | | | | |
| 1120.55 | 26.9541 | | | | |
| 1221.41 | 28.8831 | | | | |
| 1129.67 | 32.7798 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 23.3027 | | | | |
| 1177.95 | 30.1221 | | | | |
| 1189.05 | 21.6936 | | | | |
| 1204.77 | 27.3232 | | | | |
| 1221.41 | 22.5031 | | | | |
| 1231.02 | 27.0441 | | | | |
| 1235.36 | 25.4932 | | | | |
| 1238.28 | 24.5239 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 15.7760 | | | | |
| 1274.44 | 24.6602 | | | | |
| 1274.54 | 24.6602 | | | | |
| 1291.59 | 16.9538 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:52:41.25

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146022.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM22.CNF;340
                                        Background date  : 9-FEB-2014 11:22:09.
Sample date      : 7-NOV-2013 14:58:00. Acquisition date : 12-FEB-2014 11:52:15
Sample ID        : G341146022           Sample quantity  : 4.66460E+01 GRAM
Detector name    : GAM22                Detector geometry: JAR
Elapsed live time: 0 04:00:00.00        Elapsed real time: 0 04:00:04.34  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.98* | 20 | 226 | 2.15 | 93.83 | 90 | 8 | 1.40E-03 | 145.0 | |
| 2 | 0 | 63.50* | 46 | 266 | 1.07 | 126.84 | 122 | 10 | 3.20E-03 | 79.7 | |
| 3 | 0 | 185.81* | 19 | 257 | 1.26 | 371.28 | 366 | 11 | 1.29E-03 | 209.4 | |
| 4 | 0 | 197.98* | 53 | 248 | 1.64 | 395.60 | 391 | 12 | 3.67E-03 | 67.0 | |
| 5 | 0 | 239.23* | 21 | 211 | 1.09 | 478.04 | 474 | 10 | 1.46E-03 | 153.9 | |
| 6 | 0 | 282.41 | 72 | 159 | 4.05 | 564.34 | 558 | 12 | 5.01E-03 | 36.9 | |
| 7 | 0 | 318.98 | 14 | 104 | 0.82 | 637.43 | 635 | 7 | 1.01E-03 | 119.4 | |
| 8 | 0 | 352.86* | 13 | 182 | 0.84 | 705.16 | 700 | 12 | 9.16E-04 | 229.6 | |
| 9 | 0 | 511.39* | 4 | 189 | 2.69 | 1022.07 | 1012 | 23 | 2.70E-04 | ***** | |
| 10 | 0 | 521.02 | 16 | 63 | 0.91 | 1041.32 | 1038 | 9 | 1.10E-03 | 93.1 | |
| 11 | 0 | 584.17* | 32 | 90 | 1.56 | 1167.57 | 1160 | 17 | 2.22E-03 | 80.9 | |
| 12 | 0 | 641.18 | 12 | 183 | 9.11 | 1281.56 | 1260 | 25 | 8.46E-04 | 299.2 | |
| 13 | 0 | 777.01 | 14 | 44 | 1.01 | 1553.14 | 1546 | 11 | 1.01E-03 | 94.3 | |
| 14 | 0 | 911.21* | 18 | 39 | 2.56 | 1821.52 | 1815 | 14 | 1.22E-03 | 98.6 | |
| 15 | 0 | 964.43 | 12 | 68 | 2.01 | 1927.96 | 1918 | 15 | 7.99E-04 | 158.5 | |
| 16 | 0 | 976.31 | 82 | 74 | 13.40 | 1951.71 | 1933 | 33 | 5.67E-03 | 35.4 | |
| 17 | 0 | 1007.51 | 18 | 93 | 10.59 | 2014.12 | 1994 | 28 | 1.24E-03 | 158.2 | |
| 18 | 0 | 1078.78 | 33 | 34 | 5.36 | 2156.66 | 2147 | 19 | 2.32E-03 | 44.8 | |
| 19 | 0 | 1195.55 | 43 | 78 | 6.37 | 2390.23 | 2369 | 39 | 2.97E-03 | 69.4 | |
| 20 | 0 | 1461.14 | 44 | 28 | 2.05 | 2921.55 | 2912 | 16 | 3.04E-03 | 30.9 | |
| 21 | 0 | 1619.63 | 16 | 13 | 6.42 | 3238.68 | 3231 | 17 | 1.09E-03 | 58.0 | |
| 22 | 0 | 1765.39* | 10 | 11 | 1.50 | 3530.38 | 3525 | 12 | 6.72E-04 | 108.2 | |
| 23 | 0 | 1771.16 | 8 | 4 | 1.04 | 3541.93 | 3536 | 9 | 5.32E-04 | 61.4 | |
| 24 | 0 | 1843.40 | 14 | 13 | 3.29 | 3686.52 | 3678 | 16 | 9.38E-04 | 63.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:52:42

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146022.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 14:58:00 | Acquisition date | : 12-FEB-2014 11:52:15 |
| Sample ID | : G341146022 | Sample quantity | : 46.646 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA22 | Detector geometry | : JAR |
| Elapsed live time | : 0 04:00:00.00 | Elapsed real time | : 0 04:00:04.34 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 44 | 10.66* | 1.538E+00 | 1.076E+00 | 1.076E+00 | 61.89 |
| CR-51 | 320.08 | 14 | 9.91* | 4.386E+00 | 1.340E-01 | 1.516E+00 | 238.80 |
| GE-68 | 1077.34 | 33 | 3.22* | 1.930E+00 | 2.168E+00 | 2.778E+00 | 89.62 |
| SR-82 | 776.52 | 14 | 15.08* | 2.501E+00 | 1.545E-01 | 2.189E+00 | 188.62 |
| TL-208 | 277.37 | ------ | 6.60 | 4.721E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 32 | 85.00* | 3.066E+00 | 4.938E-02 | 4.938E-02 | 161.84 |
| | 860.56 | ------ | 12.50 | 2.311E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 20 | 4.25* | 7.876E-01 | 2.418E+00 | 2.438E+00 | 289.99 |
| ANH-511 | 511.00 | 4 | 100.00* | 3.342E+00 | 4.682E-03 | 4.682E-03 | 2309.95 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:52:43.55

```
*****************************************************************************
*                          GEL Laboratories LLC                             *
*                            2040 Savage Road                               *
*                          Charleston, SC 29407                             *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146022.CNF;1   *
* Acquisition date : 12-FEB-2014 11:52:15 Sensitivity     : 3.000           *
* Detector ID      : GAM22                Energy tolerance: 1.500           *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 04:00:04.34     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 14:58:00 Nuclide Library : SOLID           *
* Sample ID        : G341146022           Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 4.6646E+01 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-OCT-2013 12:04:15 Eff. Geometry   : JAR             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM22_JAR.CNF;16            *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.076E+00 | 6.526E-01 | 6.925E-01 |
| CR-51 | 1.516E+00 | 3.548E+00 | 6.474E+00 |
| GE-68 | 2.778E+00 | 2.440E+00 | 2.746E+00 |
| SR-82 | 2.189E+00 | 4.047E+00 | 6.098E+00 |
| TL-208 | 4.938E-02 | 7.832E-02 | 6.758E-02 |
| PB-210 | 2.438E+00 | 6.929E+00 | 8.772E+00 |
| ANH-511 | 4.682E-03 | 1.060E-01 | 6.129E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -9.856E-01 | 1.137E+00 | 1.863E+00 | NOT IDENT. |
| NA-22 | -1.244E-02 | 4.485E-02 | 7.929E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.315E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.673E-02 | 3.940E-02 | 8.218E-02 | NOT IDENT. |
| SC-46 | 5.991E-02 | 8.973E-02 | 1.676E-01 | NOT IDENT. |
| V-48 | -1.220E+00 | 3.062E+00 | 4.567E+00 | NOT IDENT. |
| MN-54 | -3.821E-03 | 4.922E-02 | 8.679E-02 | NOT IDENT. |
| CO-56 | -9.269E-02 | 1.041E-01 | 1.708E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.129E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -2.244E-02 | 4.016E-02 | 6.866E-02 | NOT IDENT. |
| CO-58 | 8.009E-04 | 1.114E-01 | 1.785E-01 | NOT IDENT. |
| FE-59 | 1.398E-01 | 2.824E-01 | 5.482E-01 | NOT IDENT. |
| CO-60 | -1.250E-02 | 4.521E-02 | 7.959E-02 | NOT IDENT. |
| ZN-65 | 6.649E-02 | 1.112E-01 | 2.127E-01 | NOT IDENT. |
| AS-73 | -5.853E-01 | 2.224E+00 | 3.715E+00 | NOT IDENT. |
| AS-74 | 1.395E-01 | 3.070E+00 | 5.501E+00 | NOT IDENT. |
| SE-75 | -1.072E-02 | 9.044E-02 | 1.606E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.143E+11 | 0.000E+00 | SHORT HLIF |
| RB-83 | 9.311E-02 | 1.699E-01 | 2.788E-01 | FAIL ABUN |
| KR-85 | 0.000E+00 | 1.259E+01 | 2.602E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 1.576E-01 | 3.257E-01 | NOT IDENT. |
| RB-86 | 9.656E+00 | 1.876E+01 | 3.157E+01 | NOT IDENT. |
| Y-88 | -3.166E-02 | 8.094E-02 | 1.184E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 2.449E+01 | 5.950E+01 | 9.772E+01 | NOT IDENT. |
| NB-94 | 7.230E-04 | 4.314E-02 | 7.662E-02 | NOT IDENT. |
| NB-95 | 3.591E-03 | 1.112E-01 | 1.985E-01 | NOT IDENT. |
| NB-95M | 6.505E-02 | 4.187E-01 | 6.258E-01 | NOT IDENT. |
| ZR-95 | -1.965E-02 | 2.103E-01 | 3.712E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 4.551E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.282E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 7.600E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.261E-03 | 4.085E-02 | 7.144E-02 | FAIL ABUN |
| RH-102 | 6.643E-02 | 7.439E-02 | 1.257E-01 | NOT IDENT. |
| RU-103 | -8.770E-02 | 2.174E-01 | 3.671E-01 | NOT IDENT. |
| RH-106 | 9.566E-02 | 4.441E-01 | 8.086E-01 | NOT IDENT. |
| RU-106 | 9.566E-02 | 4.441E-01 | 8.086E-01 | NOT IDENT. |
| AG-108M | 1.693E-02 | 3.605E-02 | 6.498E-02 | NOT IDENT. |
| CD-109 | -1.232E+00 | 1.128E+00 | 1.914E+00 | NOT IDENT. |
| AG-110M | -3.505E-03 | 7.423E-02 | 1.307E-01 | NOT IDENT. |
| SN-113 | -3.577E-02 | 9.123E-02 | 1.565E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.630E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.743E+00 | 4.432E+00 | 7.817E+00 | NOT IDENT. |
| TE-123M | -7.254E-04 | 5.854E-02 | 1.012E-01 | NOT IDENT. |
| SB-124 | 1.261E-01 | 2.271E-01 | 4.625E-01 | NOT IDENT. |
| SB-125 | 7.828E-03 | 1.154E-01 | 2.031E-01 | NOT IDENT. |
| TE-125M | -1.653E+01 | 3.367E+01 | 5.803E+01 | NOT IDENT. |
| I-126 | 3.704E+00 | 2.071E+01 | 3.751E+01 | NOT IDENT. |
| SB-126 | 1.030E+01 | 1.717E+01 | 3.179E+01 | NOT IDENT. |
| SN-126 | 1.289E-02 | 9.385E-02 | 1.673E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 3.619E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.608E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 4.652E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 6.919E-02 | 5.958E-02 | 9.935E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.785E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 6.309E-03 | 4.699E-02 | 8.482E-02 | NOT IDENT. |
| CS-135 | 4.442E-02 | 1.976E-01 | 3.558E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.086E+00 | 8.202E+00 | 1.401E+01 | NOT IDENT. |
| BA-137M | -2.366E-04 | 4.133E-02 | 7.404E-02 | NOT IDENT. |
| CS-137 | -2.499E-04 | 4.366E-02 | 7.822E-02 | NOT IDENT. |
| CE-139 | -3.894E-02 | 5.846E-02 | 9.780E-02 | NOT IDENT. |
| BA-140 | -5.400E+00 | 8.481E+00 | 1.469E+01 | NOT IDENT. |
| LA-140 | -5.400E+00 | 8.481E+00 | 1.469E+01 | NOT IDENT. |
| CE-141 | 9.981E-03 | 5.261E-01 | 8.316E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.186E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 6.110E-02 | 2.970E-01 | 5.241E-01 | NOT IDENT. |
| PM-144 | 5.463E-02 | 5.263E-02 | 9.912E-02 | NOT IDENT. |
| PR-144 | 4.223E+00 | 4.108E+00 | 7.733E+00 | NOT IDENT. |
| PM-146 | 1.633E-03 | 5.297E-02 | 9.269E-02 | NOT IDENT. |
| ND-147 | 1.404E+01 | 1.124E+02 | 2.058E+02 | FAIL ABUN |
| PM-147 | -3.085E+02 | 9.933E+02 | 1.719E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.755E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.154E-02 | 3.372E-02 | 5.854E-02 | FAIL ABUN |
| EU-152 | 1.948E-02 | 1.255E-01 | 2.231E-01 | FAIL ABUN |
| GD-153 | -1.254E-01 | 1.534E-01 | 2.356E-01 | NOT IDENT. |
| EU-154 | -3.657E-02 | 1.216E-01 | 2.144E-01 | NOT IDENT. |
| EU-155 | 3.190E-02 | 1.297E-01 | 2.319E-01 | NOT IDENT. |
| TB-160 | 1.685E-01 | 3.357E-01 | 6.194E-01 | FAIL ABUN |
| HO-166M | 2.913E-03 | 7.495E-02 | 1.337E-01 | FAIL ABUN |
| TM-171 | -2.547E+01 | 2.588E+01 | 4.142E+01 | NOT IDENT. |
| LU-176 | 1.911E-02 | 3.275E-02 | 5.991E-02 | NOT IDENT. |
| HF-181 | 1.163E-01 | 1.911E-01 | 3.483E-01 | NOT IDENT. |
| TA-182 | -1.946E-01 | 2.994E-01 | 5.087E-01 | NOT IDENT. |
| RE-183 | -2.188E-01 | 6.152E-01 | 9.644E-01 | NOT IDENT. |
| RE-184 | 4.808E-02 | 7.779E-01 | 1.237E+00 | NOT IDENT. |
| W-188 | 4.053E-02 | 2.017E+01 | 3.590E+01 | FAIL ABUN |
| IR-192 | 4.027E-02 | 1.039E-01 | 1.650E-01 | NOT IDENT. |
| HG-203 | 3.301E-02 | 1.930E-01 | 2.687E-01 | NOT IDENT. |
| BI-207 | -7.872E-02 | 7.354E-02 | 9.704E-02 | FAIL ABUN |
| BI-211 | -2.430E-02 | 3.577E-01 | 4.915E-01 | NOT IDENT. |
| PB-211 | 1.857E-01 | 8.309E-01 | 1.481E+00 | NOT IDENT. |
| BI-212 | 8.729E-01 | 5.916E-01 | 1.158E+00 | FAIL ABUN |
| PB-212 | 3.817E-02 | 1.151E-01 | 1.536E-01 | FAIL ABUN |
| BI-214 | 1.821E-02 | 1.118E-01 | 1.759E-01 | FAIL ABUN |
| PB-214 | 3.591E-02 | 1.616E-01 | 1.815E-01 | FAIL ABUN |
| RN-219 | -4.422E-02 | 4.944E-01 | 8.632E-01 | NOT IDENT. |
| RN-222 | 1.821E-02 | 1.118E-01 | 1.759E-01 | FAIL ABUN |
| RA-223 | 6.399E-01 | 8.718E-01 | 1.418E+00 | NOT IDENT. |
| RA-224 | 0.000E+00 | 9.027E-01 | 1.545E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 1.821E-02 | 1.118E-01 | 1.759E-01 | FAIL ABUN |
| AC-227 | 1.733E-01 | 3.057E-01 | 5.622E-01 | NOT IDENT. |
| TH-227 | 1.733E-01 | 3.057E-01 | 5.622E-01 | NOT IDENT. |
| AC-228 | 1.244E-01 | 2.406E-01 | 3.386E-01 | FAIL ABUN |
| RA-228 | 1.244E-01 | 2.406E-01 | 3.386E-01 | FAIL ABUN |
| TH-228 | 3.817E-02 | 1.151E-01 | 1.536E-01 | FAIL ABUN |
| TH-229 | 2.008E-01 | 7.664E-01 | 1.168E+00 | NOT IDENT. |
| TH-230 | 1.820E-02 | 1.118E-01 | 1.759E-01 | FAIL ABUN |
| PA-231 | 0.000E+00 | 2.639E+00 | 3.337E+00 | FAIL ABUN |
| TH-231 | 6.399E-01 | 8.718E-01 | 1.418E+00 | NOT IDENT. |
| TH-232 | 1.244E-01 | 2.406E-01 | 3.386E-01 | FAIL ABUN |
| PA-233 | -4.117E-02 | 8.156E-02 | 1.409E-01 | NOT IDENT. |
| PA-234 | -2.819E-02 | 2.910E-01 | 5.343E-01 | NOT IDENT. |
| PA-234M | -8.699E-01 | 6.229E+00 | 9.609E+00 | NOT IDENT. |
| TH-234 | 1.809E+00 | 2.825E+00 | 3.528E+00 | FAIL ABUN |
| U-234 | 1.820E-02 | 1.118E-01 | 1.759E-01 | FAIL ABUN |
| U-235 | -1.487E-01 | 2.959E-01 | 4.575E-01 | FAIL ABUN |
| NP-237 | -4.117E-02 | 8.156E-02 | 1.409E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 9.871E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.809E+00 | 2.825E+00 | 3.528E+00 | FAIL ABUN |
| NP-239 | 1.184E-01 | 5.038E-01 | 8.947E-01 | NOT IDENT. |
| PU-239 | -4.032E+02 | 4.141E+02 | 6.918E+02 | NOT IDENT. |
| AM-241 | 1.275E-01 | 2.120E-01 | 3.317E-01 | NOT IDENT. |
| AM-243 | -1.329E-02 | 6.531E-02 | 1.156E-01 | NOT IDENT. |
| CM-243 | -3.196E-02 | 1.247E-01 | 2.184E-01 | NOT IDENT. |
| CM-247 | -1.391E-02 | 4.531E-02 | 7.807E-02 | NOT IDENT. |
| CF-249 | 2.852E-02 | 4.845E-02 | 8.814E-02 | NOT IDENT. |
| CF-251 | -2.112E-01 | 1.696E-01 | 2.744E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:52:39.74

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.98 | 37 | 226 | 2.15 | 93.83 | 90 | 8 | 2.54E-03 | 73.4 | |
| 2 | 0 | 63.50 | 163 | 266 | 1.07 | 126.84 | 122 | 10 | 1.13E-02 | 20.3 | |
| 3 | 0 | 92.79 | 338 | 313 | 1.22 | 185.38 | 180 | 11 | 2.35E-02 | 11.5 | |
| 4 | 0 | 143.87 | 46 | 201 | 1.27 | 287.45 | 284 | 8 | 3.20E-03 | 55.2 | |
| 5 | 0 | 185.81 | 220 | 257 | 1.26 | 371.28 | 366 | 11 | 1.53E-02 | 15.6 | |
| 6 | 0 | 197.98 | 84 | 248 | 1.64 | 395.60 | 391 | 12 | 5.85E-03 | 39.0 | |
| 7 | 0 | 239.23 | 122 | 211 | 1.09 | 478.04 | 474 | 10 | 8.44E-03 | 24.2 | |
| 8 | 0 | 282.41 | 72 | 159 | 4.05 | 564.34 | 558 | 12 | 5.01E-03 | 36.9 | |
| 9 | 0 | 318.98 | 14 | 104 | 0.82 | 637.43 | 635 | 7 | 1.01E-03 | 119.4 | |
| 10 | 0 | 352.86 | 39 | 182 | 0.84 | 705.16 | 700 | 12 | 2.71E-03 | 71.2 | |
| 11 | 0 | 511.39 | 558 | 189 | 2.69 | 1022.07 | 1012 | 23 | 3.87E-02 | 7.2 | |
| 12 | 0 | 521.02 | 16 | 63 | 0.91 | 1041.32 | 1038 | 9 | 1.10E-03 | 93.1 | |
| 13 | 0 | 584.17 | 94 | 90 | 1.56 | 1167.57 | 1160 | 17 | 6.56E-03 | 25.1 | |
| 14 | 0 | 641.18 | 12 | 183 | 9.11 | 1281.56 | 1260 | 25 | 8.46E-04 | 299.2 | |
| 15 | 0 | 777.01 | 14 | 44 | 1.01 | 1553.14 | 1546 | 11 | 1.01E-03 | 94.3 | |
| 16 | 0 | 911.21 | 59 | 39 | 2.56 | 1821.52 | 1815 | 14 | 4.12E-03 | 25.7 | |
| 17 | 0 | 964.43 | 12 | 68 | 2.01 | 1927.96 | 1918 | 15 | 7.99E-04 | 158.5 | |
| 18 | 0 | 976.31 | 82 | 74 | 13.40 | 1951.71 | 1933 | 33 | 5.67E-03 | 35.4 | |
| 19 | 0 | 1007.51 | 18 | 93 | 10.59 | 2014.12 | 1994 | 28 | 1.24E-03 | 158.2 | |
| 20 | 0 | 1064.53 | 12 | 32 | 0.67 | 2128.16 | 2121 | 12 | 8.07E-04 | 106.2 | |
| 21 | 0 | 1078.78 | 33 | 34 | 5.36 | 2156.66 | 2147 | 19 | 2.32E-03 | 44.8 | |
| 22 | 0 | 1195.55 | 43 | 78 | 6.37 | 2390.23 | 2369 | 39 | 2.97E-03 | 69.4 | |
| 23 | 0 | 1461.14 | 44 | 28 | 2.05 | 2921.55 | 2912 | 16 | 3.04E-03 | 30.9 | |
| 24 | 0 | 1619.63 | 16 | 13 | 6.42 | 3238.68 | 3231 | 17 | 1.09E-03 | 58.0 | |
| 25 | 0 | 1765.39 | 30 | 11 | 1.50 | 3530.38 | 3525 | 12 | 2.09E-03 | 29.2 | |
| 26 | 0 | 1771.16 | 8 | 4 | 1.04 | 3541.93 | 3536 | 9 | 5.32E-04 | 61.4 | |
| 27 | 0 | 1843.40 | 14 | 13 | 3.29 | 3686.52 | 3678 | 16 | 9.38E-04 | 63.7 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:52:41.76

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 44 | 10.66* | 1.538E+00 | 1.076E+00 | 1.076E+00 | 61.89 |
| CR-51 | 320.08 | 14 | 9.91* | 4.386E+00 | 1.340E-01 | 1.516E+00 | 238.80 |
| GE-68 | 1077.34 | 33 | 3.22* | 1.930E+00 | 2.168E+00 | 2.778E+00 | 89.62 |
| SR-82 | 776.52 | 14 | 15.08* | 2.501E+00 | 1.545E-01 | 2.189E+00 | 188.62 |
| TL-208 | 277.37 | ------ | 6.60 | 4.721E+00 | ------ Line Not Found | | ------ |
| | 583.19 | 32 | 85.00* | 3.066E+00 | 4.938E-02 | 4.938E-02 | 161.84 |
| | 860.56 | ------ | 12.50 | 2.311E+00 | ------ Line Not Found | | ------ |
| PB-210 | 46.54 | 20 | 4.25* | 7.876E-01 | 2.418E+00 | 2.438E+00 | 289.99 |
| ANH-511 | 511.00 | 4 | 100.00* | 3.342E+00 | 4.682E-03 | 4.682E-03 | 2309.95 |

Flag: "*" = Keyline

Sample ID : G341146022 Acquisition date : 12-FEB-2014 11:52:15

Total number of lines in spectrum 24
Number of unidentified lines 5
Number of lines tentatively identified by NID 19 79.17%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.076E+00 | 1.076E+00 | 0.666E+00 | 61.89 | |
| CR-51 | 27.70D | 11.3 | 1.340E-01 | 1.516E+00 | 3.620E+00 | 238.80 | |
| GE-68 | 270.95D | 1.28 | 2.168E+00 | 2.778E+00 | 2.489E+00 | 89.62 | |
| SR-82 | 25.35D | 14.2 | 1.545E-01 | 2.189E+00 | 4.130E+00 | 188.62 | |
| TL-208 | 1.41E+10Y | 1.00 | 4.938E-02 | 4.938E-02 | 7.991E-02 | 161.84 | |
| PB-210 | 22.20Y | 1.01 | 2.418E+00 | 2.438E+00 | 7.070E+00 | 289.99 | |
| ANH-511 | 1.00E+09Y | 1.00 | 4.682E-03 | 4.682E-03 | 108.2E-03 | 2309.95 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 6.004E+00 | 1.005E+01 | | | |

Grand Total Activity : 6.004E+00 1.005E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146022 Acquisition date : 12-FEB-2014 11:52:15

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.50 | 46 | 266 | 1.07 | 126.84 | 122 | 10 | 3.20E-03 | **** | 2.77E+00 | T |
| 0 | 185.81 | 19 | 257 | 1.26 | 371.28 | 366 | 11 | 1.29E-03 | **** | 5.69E+00 | T |
| 0 | 197.98 | 53 | 248 | 1.64 | 395.60 | 391 | 12 | 3.67E-03 | **** | 5.55E+00 | T |
| 0 | 239.23 | 21 | 211 | 1.09 | 478.04 | 474 | 10 | 1.46E-03 | **** | 5.09E+00 | T |
| 0 | 282.41 | 72 | 159 | 4.05 | 564.34 | 558 | 12 | 5.01E-03 | 73.8 | 4.68E+00 | T |
| 0 | 352.86 | 13 | 182 | 0.84 | 705.16 | 700 | 12 | 9.16E-04 | **** | 4.15E+00 | T |
| 0 | 521.02 | 16 | 63 | 0.91 | 1041.32 | 1038 | 9 | 1.10E-03 | **** | 3.30E+00 | T |
| 0 | 641.18 | 12 | 183 | 9.11 | 1281.56 | 1260 | 25 | 8.46E-04 | **** | 2.88E+00 | |
| 0 | 911.21 | 18 | 39 | 2.56 | 1821.52 | 1815 | 14 | 1.22E-03 | **** | 2.21E+00 | T |
| 0 | 964.43 | 12 | 68 | 2.01 | 1927.96 | 1918 | 15 | 7.99E-04 | **** | 2.11E+00 | T |
| 0 | 976.31 | 82 | 74 | 13.40 | 1951.71 | 1933 | 33 | 5.67E-03 | 70.9 | 2.09E+00 | |
| 0 | 1007.51 | 18 | 93 | 10.59 | 2014.12 | 1994 | 28 | 1.24E-03 | **** | 2.04E+00 | |
| 0 | 1195.55 | 43 | 78 | 6.37 | 2390.23 | 2369 | 39 | 2.97E-03 | **** | 1.78E+00 | |
| 0 | 1619.63 | 16 | 13 | 6.42 | 3238.68 | 3231 | 17 | 1.09E-03 | **** | 1.45E+00 | T |
| 0 | 1765.39 | 10 | 11 | 1.50 | 3530.38 | 3525 | 12 | 6.72E-04 | **** | 1.39E+00 | T |
| 0 | 1771.16 | 8 | 4 | 1.04 | 3541.93 | 3536 | 9 | 5.32E-04 | **** | 1.39E+00 | T |
| 0 | 1843.40 | 14 | 13 | 3.29 | 3686.52 | 3678 | 16 | 9.38E-04 | **** | 1.37E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:52:54.31

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146022.CNF;1    *
* Acquisition date : 12-FEB-2014 11:52:15 Sensitivity     : 3.000            *
* Detector ID      : GAM22                Energy tolerance: 1.500            *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 04:00:04.34     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 14:58:00 Nuclide Library : SOLID            *
* Sample ID        : G341146022           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 4.6646E+01 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-OCT-2013 12:04:15 Eff. Geometry   : JAR              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM22_JAR.CNF;16             *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 3.132E-01 |
| CR-51 | 3.097E+00 |
| GE-68 | 1.261E+00 |
| SR-82 | 2.846E+00 |
| TL-208 | 3.172E-02 |
| PB-210 | 4.215E+00 |
| ANH-511 | 2.903E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 8.788E-01 | NOT IDENT. |
| NA-22 | 3.621E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.715E-02 | NOT IDENT. |
| SC-46 | 7.845E-02 | NOT IDENT. |
| V-48 | 2.108E+00 | NOT IDENT. |
| MN-54 | 4.056E-02 | NOT IDENT. |
| CO-56 | 7.990E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 3.303E-02 | NOT IDENT. |
| CO-58 | 8.347E-02 | NOT IDENT. |
| FE-59 | 2.513E-01 | NOT IDENT. |
| CO-60 | 3.637E-02 | NOT IDENT. |
| ZN-65 | 9.887E-02 | NOT IDENT. |
| AS-73 | 1.777E+00 | NOT IDENT. |
| AS-74 | 2.618E+00 | NOT IDENT. |
| SE-75 | 7.702E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| RB-83 | 1.315E-01 | FAIL ABUN |
| KR-85 | 1.263E+01 | NOT IDENT. |
| SR-85 | 1.581E-01 | NOT IDENT. |
| RB-86 | 1.459E+01 | NOT IDENT. |
| Y-88 | 5.171E-02 | NOT IDENT. |
| Y-91 | 4.515E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 3.630E-02 | NOT IDENT. |
| NB-95 | 9.314E-02 | NOT IDENT. |
| NB-95M | 3.008E-01 | NOT IDENT. |
| ZR-95 | 1.745E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.437E-02 | FAIL ABUN |
| RH-102 | 5.934E-02 | NOT IDENT. |
| RU-103 | 1.739E-01 | NOT IDENT. |
| RH-106 | 3.821E-01 | NOT IDENT. |
| RU-106 | 3.821E-01 | NOT IDENT. |
| AG-108M | 3.087E-02 | NOT IDENT. |
| CD-109 | 9.246E-01 | NOT IDENT. |
| AG-110M | 6.104E-02 | NOT IDENT. |
| SN-113 | 7.446E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.763E+00 | NOT IDENT. |
| TE-123M | 4.875E-02 | NOT IDENT. |
| SB-124 | 2.067E-01 | NOT IDENT. |
| SB-125 | 9.635E-02 | NOT IDENT. |
| TE-125M | 2.795E+01 | NOT IDENT. |
| I-126 | 1.770E+01 | NOT IDENT. |
| SB-126 | 1.502E+01 | NOT IDENT. |
| SN-126 | 8.081E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 4.754E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.959E-02 | NOT IDENT. |
| CS-135 | 1.709E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 6.440E+00 | NOT IDENT. |
| BA-137M | 3.487E-02 | NOT IDENT. |
| CS-137 | 3.684E-02 | NOT IDENT. |
| CE-139 | 4.705E-02 | NOT IDENT. |
| BA-140 | 6.586E+00 | NOT IDENT. |
| LA-140 | 6.586E+00 | NOT IDENT. |
| CE-141 | 4.014E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.521E-01 | NOT IDENT. |
| PM-144 | 4.715E-02 | NOT IDENT. |
| PR-144 | 3.679E+00 | NOT IDENT. |
| PM-146 | 4.396E-02 | NOT IDENT. |
| ND-147 | 9.714E+01 | FAIL ABUN |
| PM-147 | 8.265E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.795E-02 | FAIL ABUN |
| EU-152 | 1.067E-01 | FAIL ABUN |
| GD-153 | 1.135E-01 | NOT IDENT. |
| EU-154 | 9.788E-02 | NOT IDENT. |
| EU-155 | 1.115E-01 | NOT IDENT. |
| TB-160 | 2.897E-01 | FAIL ABUN |
| HO-166M | 6.312E-02 | FAIL ABUN |
| TM-171 | 1.979E+01 | NOT IDENT. |
| LU-176 | 2.867E-02 | NOT IDENT. |
| HF-181 | 1.647E-01 | NOT IDENT. |
| TA-182 | 2.337E-01 | NOT IDENT. |
| RE-183 | 4.623E-01 | NOT IDENT. |
| RE-184 | 5.760E-01 | NOT IDENT. |
| W-188 | 1.719E+01 | FAIL ABUN |
| IR-192 | 7.883E-02 | NOT IDENT. |
| HG-203 | 1.284E-01 | NOT IDENT. |
| BI-207 | 4.478E-02 | FAIL ABUN |
| BI-211 | 2.358E-01 | NOT IDENT. |
| PB-211 | 7.034E-01 | NOT IDENT. |
| BI-212 | 5.481E-01 | FAIL ABUN |
| PB-212 | 7.438E-02 | FAIL ABUN |
| BI-214 | 8.400E-02 | FAIL ABUN |
| PB-214 | 8.713E-02 | FAIL ABUN |
| RN-219 | 4.104E-01 | NOT IDENT. |
| RN-222 | 8.400E-02 | FAIL ABUN |
| RA-223 | 6.780E-01 | NOT IDENT. |
| RA-224 | 7.469E-01 | NOT IDENT. |
| RA-226 | 8.400E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 2.696E-01 | NOT IDENT. |
| TH-227 | 2.696E-01 | NOT IDENT. |
| AC-228 | 1.598E-01 | FAIL ABUN |
| RA-228 | 1.598E-01 | FAIL ABUN |
| TH-228 | 7.438E-02 | FAIL ABUN |
| TH-229 | 5.620E-01 | NOT IDENT. |
| TH-230 | 8.399E-02 | FAIL ABUN |
| PA-231 | 1.601E+00 | FAIL ABUN |
| TH-231 | 6.780E-01 | NOT IDENT. |
| TH-232 | 1.598E-01 | FAIL ABUN |
| PA-233 | 6.731E-02 | NOT IDENT. |
| PA-234 | 2.461E-01 | NOT IDENT. |
| PA-234M | 4.490E+00 | NOT IDENT. |
| TH-234 | 1.711E+00 | FAIL ABUN |
| U-234 | 8.399E-02 | FAIL ABUN |
| U-235 | 2.208E-01 | FAIL ABUN |
| NP-237 | 6.731E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.711E+00 | FAIL ABUN |
| NP-239 | 4.307E-01 | NOT IDENT. |
| PU-239 | 3.321E+02 | NOT IDENT. |
| AM-241 | 1.592E-01 | NOT IDENT. |
| AM-243 | 5.583E-02 | NOT IDENT. |
| CM-243 | 1.048E-01 | NOT IDENT. |
| CM-247 | 3.709E-02 | NOT IDENT. |
| CF-249 | 4.200E-02 | NOT IDENT. |
| CF-251 | 1.319E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:52:58.88

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146022.CNF;1 | | |
| Acquisition date | : 12-FEB-2014 11:52:15 | Sensitivity | : 3.000 |
| Detector ID | : GAM22 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 04:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 04:00:04.34 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 14:58:00 | Nuclide Library | : SOLID |
| Sample ID | : G341146022 | Analyst initials | : RXF2 |
| Batch Number | : 1361908 | Sample Quantity | : 4.6646E+01 GRAM |
| | | Quantity Err(%) | : 1.0719E-03 % |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 7-OCT-2013 12:04:15 | Eff. Geometry | : JAR |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM22_JAR.CNF;16 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.076E+00 | 6.610E-01 | 6.610E-01 |
| CR-51 | 1.516E+00 | 3.550E+00 | 3.550E+00 |
| GE-68 | 2.778E+00 | 2.454E+00 | 2.454E+00 |
| SR-82 | 2.189E+00 | 4.053E+00 | 4.053E+00 |
| TL-208 | 4.938E-02 | 7.843E-02 | 7.843E-02 |
| PB-210 | 2.438E+00 | 6.932E+00 | 6.932E+00 |
| ANH-511 | 4.682E-03 | 1.060E-01 | 1.060E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -9.856E-01 | 1.140E+00 | 1.223E+00 | NOT IDENT. |
| NA-22 | -1.244E-02 | 4.486E-02 | 4.521E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.326E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.673E-02 | 3.951E-02 | 4.284E-02 | NOT IDENT. |
| SC-46 | 5.991E-02 | 8.998E-02 | 9.394E-02 | NOT IDENT. |
| V-48 | -1.220E+00 | 3.065E+00 | 3.114E+00 | NOT IDENT. |
| MN-54 | -3.821E-03 | 4.922E-02 | 4.925E-02 | NOT IDENT. |
| CO-56 | -9.269E-02 | 1.046E-01 | 1.126E-01 | FAIL ABUN |
| MN-56 | -1.000E+41 | 1.134E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -2.244E-02 | 4.021E-02 | 4.146E-02 | NOT IDENT. |
| CO-58 | 8.009E-04 | 1.114E-01 | 1.114E-01 | NOT IDENT. |
| FE-59 | 1.398E-01 | 2.828E-01 | 2.897E-01 | NOT IDENT. |
| CO-60 | -1.250E-02 | 4.523E-02 | 4.558E-02 | NOT IDENT. |
| ZN-65 | 6.649E-02 | 1.113E-01 | 1.153E-01 | NOT IDENT. |
| AS-73 | -5.853E-01 | 2.227E+00 | 2.242E+00 | NOT IDENT. |
| AS-74 | 1.395E-01 | 3.070E+00 | 3.070E+00 | NOT IDENT. |
| SE-75 | -1.072E-02 | 9.045E-02 | 9.058E-02 | NOT IDENT. |
| BR-77 | 1.373E+11 | 5.653E+11 | 5.686E+11 | SHORT HLIF |
| RB-83 | 9.311E-02 | 1.705E-01 | 1.756E-01 | FAIL ABUN |
| KR-85 | 7.362E+01 | 1.398E+01 | 3.601E+01 | NOT IDENT. |
| SR-85 | 9.205E-01 | 1.750E-01 | 4.503E-01 | NOT IDENT. |
| RB-86 | 9.656E+00 | 1.879E+01 | 1.928E+01 | NOT IDENT. |
| Y-88 | -3.166E-02 | 8.098E-02 | 8.223E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 2.449E+01 | 5.954E+01 | 6.055E+01 | NOT IDENT. |
| NB-94 | 7.230E-04 | 4.314E-02 | 4.314E-02 | NOT IDENT. |
| NB-95 | 3.591E-03 | 1.112E-01 | 1.112E-01 | NOT IDENT. |
| NB-95M | 6.505E-02 | 4.188E-01 | 4.198E-01 | NOT IDENT. |
| ZR-95 | -1.965E-02 | 2.103E-01 | 2.105E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 4.703E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 4.625E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 4.729E+09 | 1.283E+10 | 1.300E+10 | SHORT HLIF |
| TC-99M | -1.000E+41 | 7.691E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.261E-03 | 4.086E-02 | 4.086E-02 | FAIL ABUN |
| RH-102 | 6.643E-02 | 7.475E-02 | 8.053E-02 | NOT IDENT. |
| RU-103 | -8.770E-02 | 2.176E-01 | 2.211E-01 | NOT IDENT. |
| RH-106 | 9.566E-02 | 4.442E-01 | 4.463E-01 | NOT IDENT. |
| RU-106 | 9.566E-02 | 4.442E-01 | 4.463E-01 | NOT IDENT. |
| AG-108M | 1.693E-02 | 3.608E-02 | 3.688E-02 | NOT IDENT. |
| CD-109 | -1.232E+00 | 1.136E+00 | 1.264E+00 | NOT IDENT. |
| AG-110M | -3.505E-03 | 7.423E-02 | 7.425E-02 | NOT IDENT. |
| SN-113 | -3.577E-02 | 9.127E-02 | 9.268E-02 | NOT IDENT. |
| CD-115 | 4.215E+11 | 1.631E+12 | 1.642E+12 | SHORT HLIF |
| SN-117M | 1.743E+00 | 4.435E+00 | 4.504E+00 | NOT IDENT. |
| TE-123M | -7.254E-04 | 5.854E-02 | 5.854E-02 | NOT IDENT. |
| SB-124 | 1.261E-01 | 2.273E-01 | 2.343E-01 | NOT IDENT. |
| SB-125 | 7.828E-03 | 1.154E-01 | 1.154E-01 | NOT IDENT. |
| TE-125M | -1.653E+01 | 3.370E+01 | 3.452E+01 | NOT IDENT. |
| I-126 | 3.704E+00 | 2.071E+01 | 2.078E+01 | NOT IDENT. |
| SB-126 | 1.030E+01 | 1.722E+01 | 1.784E+01 | NOT IDENT. |
| SN-126 | 1.289E-02 | 9.386E-02 | 9.404E-02 | FAIL ABUN |
| SB-127 | 7.221E+05 | 3.634E+06 | 3.648E+06 | SHORT HLIF |
| I-131 | 1.080E+02 | 1.611E+02 | 1.683E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.749E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -4.780E+06 | 4.653E+07 | 4.658E+07 | SHORT HLIF |
| BA-133 | 6.919E-02 | 5.987E-02 | 6.750E-02 | NOT IDENT. |
| I-133 | -9.760E+31 | 1.876E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 6.309E-03 | 4.700E-02 | 4.708E-02 | NOT IDENT. |
| CS-135 | 4.442E-02 | 1.977E-01 | 1.987E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 5.051E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.086E+00 | 8.238E+00 | 8.682E+00 | NOT IDENT. |
| BA-137M | -2.366E-04 | 4.133E-02 | 4.133E-02 | NOT IDENT. |
| CS-137 | -2.499E-04 | 4.366E-02 | 4.366E-02 | NOT IDENT. |
| CE-139 | -3.894E-02 | 5.903E-02 | 6.159E-02 | NOT IDENT. |
| BA-140 | -5.400E+00 | 8.495E+00 | 8.837E+00 | NOT IDENT. |
| LA-140 | -5.400E+00 | 8.495E+00 | 8.837E+00 | NOT IDENT. |
| CE-141 | 9.981E-03 | 5.261E-01 | 5.261E-01 | NOT IDENT. |
| CE-143 | -3.610E+19 | 1.187E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 6.110E-02 | 2.971E-01 | 2.983E-01 | NOT IDENT. |
| PM-144 | 5.463E-02 | 5.286E-02 | 5.832E-02 | NOT IDENT. |
| PR-144 | 4.223E+00 | 4.125E+00 | 4.543E+00 | NOT IDENT. |
| PM-146 | 1.633E-03 | 5.297E-02 | 5.298E-02 | NOT IDENT. |
| ND-147 | 1.404E+01 | 1.124E+02 | 1.126E+02 | FAIL ABUN |
| PM-147 | -3.085E+02 | 9.936E+02 | 1.003E+03 | NOT IDENT. |
| PM-149 | -1.952E+12 | 1.755E+13 | 1.757E+13 | SHORT HLIF |
| EU-150 | -1.154E-02 | 3.374E-02 | 3.414E-02 | FAIL ABUN |
| EU-152 | 1.948E-02 | 1.255E-01 | 1.258E-01 | FAIL ABUN |
| GD-153 | -1.254E-01 | 1.538E-01 | 1.638E-01 | NOT IDENT. |
| EU-154 | -3.657E-02 | 1.216E-01 | 1.227E-01 | NOT IDENT. |
| EU-155 | 3.190E-02 | 1.297E-01 | 1.305E-01 | NOT IDENT. |
| TB-160 | 1.685E-01 | 3.362E-01 | 3.447E-01 | FAIL ABUN |
| HO-166M | 2.913E-03 | 7.495E-02 | 7.497E-02 | FAIL ABUN |
| TM-171 | -2.547E+01 | 2.597E+01 | 2.840E+01 | NOT IDENT. |
| LU-176 | 1.911E-02 | 3.280E-02 | 3.391E-02 | NOT IDENT. |
| HF-181 | 1.163E-01 | 1.914E-01 | 1.984E-01 | NOT IDENT. |
| TA-182 | -1.946E-01 | 2.998E-01 | 3.124E-01 | NOT IDENT. |
| RE-183 | -2.188E-01 | 6.157E-01 | 6.236E-01 | NOT IDENT. |
| RE-184 | 4.808E-02 | 7.779E-01 | 7.782E-01 | NOT IDENT. |
| W-188 | 4.053E-02 | 2.017E+01 | 2.017E+01 | FAIL ABUN |
| IR-192 | 4.027E-02 | 1.040E-01 | 1.055E-01 | NOT IDENT. |
| HG-203 | 3.301E-02 | 1.930E-01 | 1.936E-01 | NOT IDENT. |
| BI-207 | -7.872E-02 | 7.394E-02 | 8.201E-02 | FAIL ABUN |
| BI-211 | -2.430E-02 | 3.577E-01 | 3.578E-01 | NOT IDENT. |
| PB-211 | 1.857E-01 | 8.310E-01 | 8.352E-01 | NOT IDENT. |
| BI-212 | 8.729E-01 | 5.976E-01 | 7.155E-01 | FAIL ABUN |
| PB-212 | 3.817E-02 | 1.152E-01 | 1.165E-01 | FAIL ABUN |
| BI-214 | 1.821E-02 | 1.118E-01 | 1.121E-01 | FAIL ABUN |
| PB-214 | 3.591E-02 | 1.616E-01 | 1.624E-01 | FAIL ABUN |
| RN-219 | -4.422E-02 | 4.944E-01 | 4.948E-01 | NOT IDENT. |
| RN-222 | 1.821E-02 | 1.118E-01 | 1.121E-01 | FAIL ABUN |
| RA-223 | 6.399E-01 | 8.741E-01 | 9.205E-01 | NOT IDENT. |
| RA-224 | 1.573E+00 | 9.141E-01 | 1.157E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 1.821E-02 | 1.118E-01 | 1.121E-01 | FAIL ABUN |
| AC-227 | 1.733E-01 | 3.069E-01 | 3.167E-01 | NOT IDENT. |
| TH-227 | 1.733E-01 | 3.069E-01 | 3.167E-01 | NOT IDENT. |
| AC-228 | 1.244E-01 | 2.410E-01 | 2.475E-01 | FAIL ABUN |
| RA-228 | 1.244E-01 | 2.410E-01 | 2.475E-01 | FAIL ABUN |
| TH-228 | 3.817E-02 | 1.152E-01 | 1.165E-01 | FAIL ABUN |
| TH-229 | 2.008E-01 | 7.666E-01 | 7.719E-01 | NOT IDENT. |
| TH-230 | 1.820E-02 | 1.118E-01 | 1.121E-01 | FAIL ABUN |
| PA-231 | 3.650E+00 | 2.661E+00 | 3.129E+00 | FAIL ABUN |
| TH-231 | 6.399E-01 | 8.741E-01 | 9.205E-01 | NOT IDENT. |
| TH-232 | 1.244E-01 | 2.410E-01 | 2.475E-01 | FAIL ABUN |
| PA-233 | -4.117E-02 | 8.165E-02 | 8.373E-02 | NOT IDENT. |
| PA-234 | -2.819E-02 | 2.928E-01 | 2.931E-01 | NOT IDENT. |
| PA-234M | -8.699E-01 | 6.229E+00 | 6.242E+00 | NOT IDENT. |
| TH-234 | 1.809E+00 | 2.854E+00 | 2.969E+00 | FAIL ABUN |
| U-234 | 1.820E-02 | 1.118E-01 | 1.121E-01 | FAIL ABUN |
| U-235 | -1.487E-01 | 2.962E-01 | 3.036E-01 | FAIL ABUN |
| NP-237 | -4.117E-02 | 8.165E-02 | 8.373E-02 | NOT IDENT. |
| NP-238 | -2.778E+12 | 9.875E+12 | 9.955E+12 | SHORT HLIF |
| U-238 | 1.809E+00 | 2.854E+00 | 2.969E+00 | FAIL ABUN |
| NP-239 | 1.184E-01 | 5.040E-01 | 5.068E-01 | NOT IDENT. |
| PU-239 | -4.032E+02 | 4.153E+02 | 4.534E+02 | NOT IDENT. |
| AM-241 | 1.275E-01 | 2.123E-01 | 2.199E-01 | NOT IDENT. |
| AM-243 | -1.329E-02 | 6.532E-02 | 6.559E-02 | NOT IDENT. |
| CM-243 | -3.196E-02 | 1.248E-01 | 1.256E-01 | NOT IDENT. |
| CM-247 | -1.391E-02 | 4.538E-02 | 4.582E-02 | NOT IDENT. |
| CF-249 | 2.852E-02 | 4.854E-02 | 5.021E-02 | NOT IDENT. |
| CF-251 | -2.112E-01 | 1.718E-01 | 1.964E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 212.3179 | 94.67 | 280.0358 | 193.51 | 207.6150 |
| 45.60 | 203.6230 | 94.87 | 391.2597 | 197.03 | 227.3729 |
| 46.54 | 200.8369 | 97.43 | 227.9664 | 198.01 | 206.9253 |
| 49.72 | 0.0000 | 98.43 | 195.4808 | 201.83 | 188.7395 |
| 51.35 | 178.1320 | 98.44 | 195.4840 | 205.31 | 213.5318 |
| 52.39 | 189.4107 | 99.53 | 204.3373 | 210.85 | 194.4933 |
| 53.44 | 169.4719 | 100.11 | 211.1450 | 215.65 | 205.3488 |
| 57.36 | 0.0000 | 103.18 | 209.4351 | 222.11 | 197.8625 |
| 57.53 | 188.5289 | 103.37 | 194.3365 | 227.09 | 197.7404 |
| 57.98 | 193.3468 | 105.21 | 177.8328 | 227.38 | 203.3521 |
| 59.32 | 164.5518 | 105.31 | 194.0321 | 228.16 | 0.0000 |
| 59.54 | 164.6420 | 106.12 | 205.7287 | 228.18 | 203.5141 |
| 63.29 | 232.0311 | 109.28 | 245.1221 | 117.23 | 203.5141 |
| 63.58 | 223.1488 | 111.00 | 199.7282 | 235.69 | 197.1715 |
| 64.28 | 249.6411 | 111.76 | 0.0000 | 235.96 | 197.2225 |
| 66.73 | 232.7362 | 116.30 | 0.0000 | 238.63 | 204.9203 |
| 67.24 | 234.4223 | 117.23 | 209.5030 | 238.98 | 0.0000 |
| 67.75 | 216.3161 | 121.12 | 220.5402 | 240.99 | 193.6719 |
| 69.67 | 249.3866 | 121.22 | 220.5747 | 242.00 | 181.8348 |
| 70.83 | 237.5748 | 121.78 | 231.5104 | 244.70 | 197.3649 |
| 72.81 | 246.6548 | 122.06 | 233.5653 | 252.40 | 0.0000 |
| 72.87 | 246.6864 | 123.07 | 206.5215 | 252.80 | 197.6417 |
| 74.66 | 272.7655 | 127.23 | 213.7336 | 254.15 | 0.0000 |
| 74.82 | 272.8594 | 129.30 | 230.2002 | 256.23 | 160.8020 |
| 74.97 | 272.9464 | 131.20 | 210.0413 | 260.90 | 0.0000 |
| 77.11 | 239.9128 | 133.02 | 196.6903 | 264.66 | 183.1981 |
| 79.69 | 234.8531 | 133.52 | 203.7926 | 268.22 | 188.3912 |
| 80.12 | 242.3212 | 136.00 | 209.5081 | 269.46 | 171.9569 |
| 80.19 | 0.0000 | 136.47 | 209.6491 | 271.23 | 158.3336 |
| 80.57 | 259.8039 | 140.51 | 0.0000 | 273.65 | 193.9245 |
| 81.00 | 271.8504 | 143.76 | 227.9346 | 276.40 | 165.8639 |
| 81.07 | 283.7105 | 144.24 | 217.9924 | 277.37 | 147.3861 |
| 83.79 | 248.6914 | 145.44 | 208.2412 | 277.60 | 147.4151 |
| 85.43 | 241.2412 | 152.43 | 190.8150 | 278.00 | 158.3312 |
| 86.55 | 220.6256 | 153.25 | 203.2784 | 279.20 | 142.9545 |
| 86.79 | 234.5237 | 323.87 | 226.0364 | 279.54 | 153.8758 |
| 86.94 | 234.5927 | 156.02 | 223.4936 | 280.46 | 150.8856 |
| 87.09 | 238.3418 | 158.56 | 205.7144 | 283.69 | 149.7383 |
| 87.57 | 261.5904 | 159.00 | 223.3260 | 284.31 | 0.0000 |
| 88.03 | 315.2917 | 162.33 | 230.4741 | 285.41 | 160.8893 |
| 88.34 | 307.1775 | 163.33 | 221.4500 | 285.90 | 0.0000 |
| 88.47 | 307.2537 | 165.86 | 241.8758 | 287.50 | 165.8665 |
| 89.96 | 530.2016 | 176.31 | 217.6333 | 290.67 | 168.5008 |
| 91.11 | 282.8310 | 176.60 | 230.3300 | 293.27 | 0.0000 |
| 92.59 | 222.2418 | 177.52 | 251.6382 | 351.93 | 171.0220 |
| 93.35 | 226.2793 | 181.07 | 0.0000 | 295.96 | 161.6714 |
| 94.56 | 279.9797 | 184.41 | 239.4504 | 879.38 | 153.4907 |
| 94.65 | 280.0255 | 143.76 | 217.9126 | 299.98 | 159.3560 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 159.3703 | 487.02 | 115.0028 | 702.65 | 108.3458 |
| 300.13 | 167.9123 | 492.35 | 0.0000 | 706.68 | 98.5730 |
| 301.36 | 180.4258 | 497.08 | 119.9713 | 711.68 | 93.7896 |
| 302.85 | 162.5773 | 505.52 | 119.4410 | 720.70 | 82.1235 |
| 256.23 | 161.8403 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 144.9678 | 511.00 | 107.5443 | 722.78 | 111.2620 |
| 308.46 | 140.3857 | 514.00 | 107.7185 | 722.91 | 111.2665 |
| 311.90 | 168.5385 | 514.00 | 107.7185 | 723.31 | 115.2948 |
| 316.51 | 137.7519 | 520.40 | 83.9159 | 724.19 | 109.3193 |
| 319.41 | 165.6739 | 520.69 | 0.0000 | 727.33 | 67.2835 |
| 320.08 | 160.9414 | 522.65 | 0.0000 | 733.00 | 99.6486 |
| 321.04 | 157.5254 | 527.90 | 0.0000 | 735.93 | 75.5814 |
| 323.87 | 130.4813 | 529.59 | 95.6915 | 333.97 | 62.5184 |
| 325.23 | 149.9670 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 159.1012 | 531.02 | 91.7257 | 747.24 | 77.9509 |
| 333.37 | 154.7863 | 546.56 | 0.0000 | 748.06 | 76.9633 |
| 333.97 | 160.6998 | 552.55 | 109.4462 | 752.31 | 75.0659 |
| 334.37 | 164.6430 | 563.25 | 106.3091 | 753.82 | 73.0811 |
| 338.28 | 154.3760 | 569.33 | 105.6961 | 756.73 | 84.3425 |
| 338.32 | 154.3798 | 946.00 | 103.8344 | 756.80 | 82.3134 |
| 311.90 | 138.9683 | 569.70 | 103.8434 | 884.68 | 80.5076 |
| 340.48 | 138.9683 | 583.19 | 78.1654 | 765.81 | 76.4877 |
| 340.55 | 138.9752 | 584.27 | 78.2076 | 766.42 | 79.5663 |
| 344.28 | 153.0940 | 595.83 | 127.9166 | 766.84 | 76.5182 |
| 345.93 | 162.1218 | 427.87 | 127.2580 | 772.60 | 0.0000 |
| 351.06 | 161.0803 | 602.52 | 0.0000 | 776.52 | 65.5430 |
| 351.93 | 143.0901 | 602.73 | 167.3132 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 170.3253 | 778.90 | 59.7455 |
| 356.01 | 120.4147 | 609.32 | 115.3872 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 127.8442 | 785.37 | 54.4632 |
| 366.42 | 0.0000 | 614.28 | 123.3022 | 792.07 | 74.1782 |
| 375.05 | 142.4195 | 618.01 | 113.9424 | 794.95 | 64.9764 |
| 356.01 | 134.1900 | 620.36 | 111.1903 | 795.86 | 62.9360 |
| 388.16 | 117.3764 | 621.93 | 93.0471 | 810.29 | 76.7657 |
| 388.63 | 116.4010 | 630.19 | 0.0000 | 344.28 | 66.3958 |
| 391.69 | 139.9659 | 631.29 | 71.0148 | 810.76 | 63.2910 |
| 264.66 | 131.6109 | 633.25 | 81.9616 | 815.77 | 65.4891 |
| 401.81 | 127.6245 | 634.78 | 82.0186 | 1048.07 | 69.7181 |
| 402.40 | 130.7375 | 635.95 | 82.0619 | 832.01 | 74.2501 |
| 404.85 | 112.5311 | 636.99 | 0.0000 | 834.85 | 70.1406 |
| 410.95 | 108.8648 | 645.85 | 84.7854 | 835.71 | 71.2096 |
| 413.71 | 139.9213 | 657.76 | 86.7692 | 836.80 | 0.0000 |
| 414.70 | 122.5081 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 111.0138 | 661.66 | 87.8961 | 846.77 | 92.5243 |
| 427.87 | 112.1054 | 664.57 | 0.0000 | 856.80 | 97.0799 |
| 433.94 | 107.3151 | 666.33 | 88.0756 | 860.56 | 62.3418 |
| 439.40 | 129.6263 | 666.50 | 88.0829 | 871.09 | 71.0607 |
| 453.88 | 111.7749 | 667.71 | 0.0000 | 873.19 | 66.8683 |
| 463.37 | 103.9156 | 677.62 | 76.7083 | 875.33 | 0.0000 |
| 468.07 | 118.0215 | 685.70 | 0.0000 | 879.38 | 58.5046 |
| 473.00 | 0.0000 | 695.00 | 99.0804 | 880.51 | 62.7847 |
| 475.06 | 98.2138 | 696.49 | 97.1586 | 883.24 | 78.8222 |
| 476.78 | 118.6136 | 696.51 | 97.1606 | 884.68 | 68.2044 |
| 477.60 | 118.6692 | 697.00 | 107.0969 | 889.28 | 56.5724 |
| 482.18 | 84.6772 | 697.49 | 107.1189 | 894.76 | 69.5134 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 62.0982 | 1298.22 | 0.0000 | | |
| 903.28 | 59.5288 | 1312.11 | 47.6782 | | |
| 911.20 | 54.8505 | 1332.49 | 42.7145 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 56.2170 | 1365.19 | 40.9601 | | |
| 937.49 | 58.5945 | 1368.63 | 0.0000 | | |
| 944.13 | 49.4024 | 1384.29 | 23.2139 | | |
| 946.00 | 47.5679 | 1408.01 | 22.2847 | | |
| 949.00 | 55.0841 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 30.0840 | | |
| 962.31 | 60.7167 | 1489.16 | 25.5490 | | |
| 964.08 | 65.6775 | 1505.03 | 29.4400 | | |
| 966.17 | 59.1504 | 1596.21 | 34.8805 | | |
| 968.97 | 59.2042 | 1620.50 | 32.8975 | | |
| 983.53 | 57.8310 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 16.8013 | | |
| 1274.44 | 64.7021 | 1750.46 | 0.0000 | | |
| 1001.03 | 49.3712 | 1764.49 | 32.0967 | | |
| 1004.73 | 49.4292 | 1063.66 | 23.2070 | | |
| 507.63 | 0.0000 | 1771.35 | 28.5686 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 17.1987 | | |
| 1037.84 | 62.4247 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 21.6966 | | |
| 631.29 | 52.9628 | | | | |
| 1048.07 | 57.8048 | | | | |
| 1049.04 | 61.6763 | | | | |
| 1050.41 | 59.7727 | | | | |
| 1063.66 | 51.3012 | | | | |
| 1077.00 | 39.1157 | | | | |
| 1077.34 | 42.7646 | | | | |
| 1085.87 | 37.5144 | | | | |
| 1099.45 | 32.2830 | | | | |
| 1112.07 | 47.1311 | | | | |
| 1112.84 | 47.1412 | | | | |
| 1115.54 | 46.1951 | | | | |
| 1120.29 | 56.1014 | | | | |
| 1120.55 | 56.1054 | | | | |
| 1221.41 | 47.2567 | | | | |
| 1129.67 | 60.2001 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 43.9586 | | | | |
| 1177.95 | 36.6294 | | | | |
| 1189.05 | 47.1623 | | | | |
| 1204.77 | 40.5616 | | | | |
| 1221.41 | 55.6752 | | | | |
| 1231.02 | 39.5808 | | | | |
| 1235.36 | 55.8843 | | | | |
| 1238.28 | 45.7581 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 33.8540 | | | | |
| 1274.44 | 42.0882 | | | | |
| 1274.54 | 42.0896 | | | | |
| 1291.59 | 37.1194 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:53:25.87

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146023.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM18.CNF;371
                                      Background date  : 9-FEB-2014 11:21:47.
Sample date      : 7-NOV-2013 15:02:00. Acquisition date : 12-FEB-2014 11:52:51
Sample ID        : G341146023           Sample quantity  : 7.23930E+01 GRAM
Detector name    : GAM18                Detector geometry: JAR
Elapsed live time: 0 04:00:00.00        Elapsed real time: 0 04:00:01.69  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 77.05 | 33 | 267 | 0.90 | 154.18 | 152 | 7 | 2.30E-03 | 84.0 | |
| 2 | 0 | 92.87* | 8 | 308 | 1.58 | 185.79 | 181 | 10 | 5.35E-04 | 98.6 | |
| 3 | 0 | 158.62 | 24 | 149 | 1.03 | 317.19 | 315 | 6 | 1.69E-03 | 82.3 | |
| 4 | 0 | 185.82* | 32 | 182 | 1.23 | 371.55 | 367 | 8 | 2.20E-03 | 90.5 | |
| 5 | 0 | 238.19* | 82 | 320 | 1.14 | 476.21 | 469 | 14 | 5.73E-03 | 51.3 | |
| 6 | 0 | 271.26 | 36 | 109 | 2.01 | 542.31 | 539 | 8 | 2.49E-03 | 54.1 | |
| 7 | 0 | 295.24* | 51 | 143 | 1.34 | 590.24 | 586 | 9 | 3.53E-03 | 50.5 | |
| 8 | 0 | 337.91* | 33 | 145 | 0.96 | 675.52 | 671 | 10 | 2.30E-03 | 79.9 | |
| 9 | 0 | 351.13* | 55 | 120 | 1.19 | 701.92 | 696 | 12 | 3.79E-03 | 50.9 | |
| 10 | 0 | 459.81 | 44 | 77 | 1.46 | 919.15 | 913 | 11 | 3.04E-03 | 41.7 | |
| 11 | 0 | 510.87* | 137 | 156 | 2.54 | 1021.19 | 1011 | 24 | 9.53E-03 | 33.9 | |
| 12 | 0 | 521.33 | 18 | 67 | 1.75 | 1042.11 | 1038 | 10 | 1.25E-03 | 87.1 | |
| 13 | 0 | 558.33 | 20 | 60 | 1.08 | 1116.06 | 1112 | 9 | 1.41E-03 | 72.5 | |
| 14 | 1 | 782.13 | 40 | 23 | 2.23 | 1563.41 | 1560 | 19 | 2.76E-03 | 23.6 | 2.31E+00 |
| 15 | 1 | 784.93 | 34 | 48 | 2.03 | 1569.00 | 1560 | 19 | 2.37E-03 | 45.3 | |
| 16 | 0 | 884.12 | 32 | 34 | 4.62 | 1767.30 | 1761 | 13 | 2.24E-03 | 40.5 | |
| 17 | 5 | 907.37 | 27 | 13 | 2.75 | 1813.77 | 1811 | 15 | 1.85E-03 | 28.2 | 3.15E+00 |
| 18 | 5 | 910.93* | 34 | 30 | 1.99 | 1820.89 | 1811 | 15 | 2.38E-03 | 45.2 | |
| 19 | 0 | 969.18* | 20 | 76 | 2.22 | 1937.34 | 1927 | 14 | 1.36E-03 | 107.9 | |
| 20 | 3 | 987.80 | 21 | 5 | 2.46 | 1974.55 | 1973 | 43 | 1.45E-03 | 20.0 | 3.16E+00 |
| 21 | 3 | 990.92 | 30 | 24 | 2.97 | 1980.79 | 1973 | 43 | 2.06E-03 | 41.2 | |
| 22 | 3 | 1000.53* | 41 | 20 | 2.24 | 2000.00 | 1973 | 43 | 2.88E-03 | 34.2 | |
| 23 | 3 | 1003.10 | 19 | 15 | 1.64 | 2005.14 | 1973 | 43 | 1.32E-03 | 51.3 | |
| 24 | 3 | 1005.86 | 18 | 15 | 1.66 | 2010.67 | 1973 | 43 | 1.22E-03 | 50.3 | |
| 25 | 0 | 1121.07 | 19 | 59 | 0.54 | 2240.98 | 2231 | 15 | 1.29E-03 | 93.9 | |
| 26 | 3 | 1186.34 | 32 | 5 | 2.65 | 2371.48 | 2368 | 19 | 2.22E-03 | 19.0 | 4.02E+00 |
| 27 | 3 | 1191.30 | 28 | 14 | 3.21 | 2381.40 | 2368 | 19 | 1.94E-03 | 32.1 | |
| 28 | 0 | 1310.69 | 36 | 13 | 7.57 | 2620.10 | 2611 | 18 | 2.47E-03 | 29.5 | |
| 29 | 0 | 1317.73* | 10 | 16 | 1.41 | 2634.18 | 2630 | 10 | 7.24E-04 | 98.1 | |
| 30 | 0 | 1331.32 | 19 | 52 | 6.80 | 2661.35 | 2643 | 21 | 1.29E-03 | 100.4 | |
| 31 | 0 | 1420.88 | 14 | 27 | 6.82 | 2840.43 | 2829 | 18 | 9.72E-04 | 91.1 | |
| 32 | 0 | 1459.97* | 169 | 21 | 2.44 | 2918.58 | 2911 | 21 | 1.17E-02 | 11.9 | |
| 33 | 0 | 1605.09 | 8 | 10 | 0.94 | 3208.75 | 3202 | 10 | 5.56E-04 | 82.0 | |
| 34 | 1 | 1626.71 | 27 | 21 | 2.75 | 3252.00 | 3244 | 20 | 1.90E-03 | 39.5 | 5.07E+00 |

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 1 | 1630.21 | 25 | 8 | 2.75 | 3259.00 | 3244 | 20 | 1.73E-03 | 28.2 | |
| 36 | 0 | 1763.74* | 10 | 24 | 3.46 | 3526.01 | 3517 | 19 | 6.63E-04 | 144.5 | |
| 37 | 0 | 1840.81 | 9 | 17 | 3.93 | 3680.15 | 3673 | 14 | 6.50E-04 | 99.7 | |
| 38 | 0 | 1924.26 | 20 | 2 | 1.63 | 3847.03 | 3842 | 11 | 1.36E-03 | 27.7 | |
| 39 | 0 | 1973.18 | 12 | 11 | 2.47 | 3944.86 | 3934 | 15 | 8.64E-04 | 64.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:53:27

```
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146023.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title     : RXF2
Sample date      : 7-NOV-2013 15:02:00  Acquisition date : 12-FEB-2014 11:52:51
Sample ID        : G341146023           Sample quantity  : 72.393 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA18              Detector geometry: JAR
Elapsed live time: 0 04:00:00.00        Elapsed real time: 0 04:00:01.69   0.0%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00
```

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| PB-214 | 351.93 | BI-211 | 351.06 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10.66* | 1.492E+00 | 2.752E+00 | 2.752E+00 | 23.85 | OK |
| SN-117M | 156.02 | 2.11 | 5.698E+00 | ----- Line Not Found | ----- | | Absent |
| | 158.56 | 86.40* | 5.677E+00 | 1.285E-02 | 1.798E+00 | 164.60 | OK |
| TE-123M | 159.00 | 84.00* | 5.677E+00 | 1.322E-02 | 2.323E-02 | 164.60 | OK |
| PB-212 | 74.82 | 10.28 | 3.441E+00 | ----- Line Not Found | ----- | | Absent |
| | 77.11 | 17.10 | 3.661E+00 | 1.370E-01 | 1.370E-01 | 167.91 | OK |
| | 238.63 | 43.60* | 4.828E+00 | 1.016E-01 | 1.016E-01 | 102.69 | OK |
| | 300.09 | 3.30 | 4.290E+00 | ----- Line Not Found | ----- | | Absent |
| PB-214 | 74.82 | 5.80 | 3.441E+00 | ----- Line Not Found | ----- | | Absent |
| | 77.11 | 9.70 | 3.661E+00 | 2.415E-01 | 2.416E-01 | 167.91 | OK |
| | 87.09 | 3.41 | 4.504E+00 | ----- Line Not Found | ----- | | Absent |
| | 242.00 | 7.25 | 4.790E+00 | ----- Line Not Found | ----- | | Absent |
| | 295.22 | 18.42 | 4.327E+00 | 1.654E-01 | 1.654E-01 | 101.03 | OK |
| | 351.93 | 35.60* | 3.947E+00 | 1.006E-01 | 1.007E-01 | 101.79 | OK |
| AC-228 | 105.21 | 1.10 | 5.414E+00 | ----- Line Not Found | ----- | | Absent |
| | 338.32 | 11.27 | 4.029E+00 | 1.889E-01 | 1.889E-01 | 159.71 | OK |
| | 794.95 | 4.25 | 2.400E+00 | ----- Line Not Found | ----- | | Absent |
| | 835.71 | 1.61 | 2.313E+00 | ----- Line Not Found | ----- | | Absent |
| | 911.20 | 25.80* | 2.167E+00 | 1.590E-01 | 1.590E-01 | 90.44 | OK |
| | 968.97 | 15.80 | 2.065E+00 | 1.555E-01 | 1.555E-01 | 215.74 | OK |
| RA-228 | 105.21 | 1.10 | 5.414E+00 | ----- Line Not Found | ----- | | Absent |
| | 338.32 | 11.27 | 4.029E+00 | 1.889E-01 | 1.889E-01 | 159.71 | OK |
| | 794.95 | 4.25 | 2.400E+00 | ----- Line Not Found | ----- | | Absent |
| | 835.71 | 1.61 | 2.313E+00 | ----- Line Not Found | ----- | | Absent |
| | 911.20 | 25.80* | 2.167E+00 | 1.590E-01 | 1.590E-01 | 90.44 | OK |
| | 968.97 | 15.80 | 2.065E+00 | 1.555E-01 | 1.555E-01 | 215.74 | OK |
| TH-228 | 74.82 | 10.28 | 3.441E+00 | ----- Line Not Found | ----- | | Absent |
| | 77.11 | 17.10 | 3.661E+00 | 1.370E-01 | 1.370E-01 | 167.91 | OK |
| | 238.63 | 43.60* | 4.828E+00 | 1.016E-01 | 1.016E-01 | 102.69 | OK |
| | 300.09 | 3.30 | 4.290E+00 | ----- Line Not Found | ----- | | Absent |
| TH-232 | 338.32 | 11.27 | 4.029E+00 | 1.889E-01 | 1.889E-01 | 159.71 | OK |
| | 911.20 | 25.80* | 2.167E+00 | 1.590E-01 | 1.590E-01 | 90.44 | OK |
| | 968.97 | 15.80 | 2.065E+00 | 1.555E-01 | 1.555E-01 | 215.74 | OK |
| ANH-511 | 511.00 | 100.00* | 3.202E+00 | 1.111E-01 | 1.111E-01 | 67.75 | OK |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:53:28.31

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146023.CNF;1    *
* Acquisition date : 12-FEB-2014 11:52:51 Sensitivity     : 3.000          *
* Detector ID      : GAM18                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:01.69     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:02:00 Nuclide Library : SOLID          *
* Sample ID        : G341146023           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 7.2393E+01 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-MAR-2013 09:07:11 Eff. Geometry   : JAR           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM18_JAR.CNF;6           *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 2.752E+00 | 6.434E-01 | 5.376E-01 |
| SN-117M | 1.798E+00 | 2.901E+00 | 4.492E+00 |
| TE-123M | 2.323E-02 | 3.747E-02 | 6.274E-02 |
| PB-212 | 1.016E-01 | 1.022E-01 | 8.324E-02 |
| PB-214 | 1.007E-01 | 1.004E-01 | 9.338E-02 |
| AC-228 | 1.590E-01 | 1.409E-01 | 1.885E-01 |
| RA-228 | 1.590E-01 | 1.409E-01 | 1.885E-01 |
| TH-228 | 1.016E-01 | 1.022E-01 | 8.324E-02 |
| TH-232 | 1.590E-01 | 1.409E-01 | 1.885E-01 |
| ANH-511 | 1.111E-01 | 7.376E-02 | 3.360E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.140E-01 | 7.655E-01 | 1.378E+00 | NOT IDENT. |
| NA-22 | 7.980E-04 | 3.239E-02 | 5.820E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.537E-02 | 2.542E-02 | 4.174E-02 | NOT IDENT. |
| SC-46 | 3.382E-02 | 6.241E-02 | 1.019E-01 | FAIL ABUN |
| V-48 | 8.068E-01 | 2.094E+00 | 3.421E+00 | FAIL ABUN |
| CR-51 | 3.886E-01 | 2.436E+00 | 4.237E+00 | NOT IDENT. |
| MN-54 | 6.183E-03 | 3.597E-02 | 6.429E-02 | NOT IDENT. |
| CO-56 | -3.385E-02 | 6.264E-02 | 1.062E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.850E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.646E-02 | 2.566E-02 | 4.292E-02 | NOT IDENT. |
| CO-58 | -4.421E-02 | 6.425E-02 | 1.081E-01 | NOT IDENT. |
| FE-59 | 1.936E-02 | 2.261E-01 | 4.126E-01 | NOT IDENT. |
| CO-60 | 3.108E-02 | 6.118E-02 | 6.120E-02 | FAIL ABUN |
| ZN-65 | 4.013E-02 | 9.370E-02 | 1.511E-01 | NOT IDENT. |
| GE-68 | 3.893E-01 | 1.054E+00 | 1.982E+00 | NOT IDENT. |
| AS-73 | -3.023E-01 | 2.262E+00 | 3.703E+00 | NOT IDENT. |
| AS-74 | 1.462E+00 | 2.035E+00 | 3.676E+00 | NOT IDENT. |
| SE-75 | -1.159E-02 | 5.916E-02 | 1.024E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.676E+11 | 0.000E+00 | SHORT HLIF |

| | | | | |
|---|---|---|---|---|
| SR-82 | 1.089E+00 | 2.383E+00 | 3.901E+00 | NOT IDENT. |
| RB-83 | 7.175E-02 | 1.224E-01 | 1.797E-01 | FAIL ABUN |
| KR-85 | 0.000E+00 | 6.924E+00 | 1.463E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 8.665E-02 | 1.830E-01 | NOT IDENT. |
| RB-86 | 1.647E+00 | 1.136E+01 | 2.095E+01 | NOT IDENT. |
| Y-88 | -6.049E-03 | 6.032E-02 | 9.501E-02 | NOT IDENT. |
| Y-91 | -2.209E+01 | 3.625E+01 | 6.138E+01 | NOT IDENT. |
| NB-94 | 4.757E-03 | 2.700E-02 | 4.885E-02 | NOT IDENT. |
| NB-95 | -2.690E-02 | 8.732E-02 | 1.307E-01 | NOT IDENT. |
| NB-95M | -4.296E-02 | 2.547E-01 | 3.901E-01 | NOT IDENT. |
| ZR-95 | -6.488E-02 | 1.368E-01 | 2.358E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.034E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 9.219E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.747E-02 | 2.713E-02 | 4.519E-02 | NOT IDENT. |
| RH-102 | 1.777E-02 | 4.475E-02 | 8.314E-02 | NOT IDENT. |
| RU-103 | -5.314E-02 | 1.396E-01 | 2.400E-01 | NOT IDENT. |
| RH-106 | 2.312E-03 | 3.110E-01 | 5.617E-01 | NOT IDENT. |
| RU-106 | 2.312E-03 | 3.110E-01 | 5.617E-01 | NOT IDENT. |
| AG-108M | -5.861E-03 | 2.317E-02 | 4.072E-02 | NOT IDENT. |
| CD-109 | 1.679E-01 | 7.582E-01 | 1.220E+00 | NOT IDENT. |
| AG-110M | 6.802E-02 | 5.405E-02 | 8.530E-02 | FAIL ABUN |
| SN-113 | -1.935E-02 | 5.804E-02 | 1.023E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.152E+12 | 0.000E+00 | SHORT HLIF |
| SB-124 | -3.993E-02 | 1.755E-01 | 3.149E-01 | NOT IDENT. |
| SB-125 | -5.311E-02 | 7.984E-02 | 1.367E-01 | NOT IDENT. |
| TE-125M | 1.273E+00 | 1.931E+01 | 3.394E+01 | NOT IDENT. |
| I-126 | 7.873E-01 | 1.300E+01 | 2.359E+01 | NOT IDENT. |
| SB-126 | -1.654E+01 | 1.117E+01 | 1.784E+01 | NOT IDENT. |
| SN-126 | -1.905E-02 | 6.366E-02 | 1.058E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 2.348E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.044E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 2.843E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.540E-02 | 3.759E-02 | 5.738E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.272E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.068E-02 | 3.288E-02 | 5.712E-02 | NOT IDENT. |
| CS-135 | 4.363E-03 | 1.402E-01 | 2.154E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.460E+00 | 6.139E+00 | 1.144E+01 | NOT IDENT. |
| BA-137M | 4.583E-03 | 2.668E-02 | 4.878E-02 | NOT IDENT. |
| CS-137 | 4.842E-03 | 2.818E-02 | 5.153E-02 | NOT IDENT. |
| CE-139 | 6.821E-03 | 3.732E-02 | 6.352E-02 | NOT IDENT. |
| BA-140 | -1.032E+00 | 6.407E+00 | 1.010E+01 | NOT IDENT. |
| LA-140 | -1.032E+00 | 6.407E+00 | 1.010E+01 | NOT IDENT. |
| CE-141 | 2.421E-02 | 2.844E-01 | 4.871E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 8.805E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -2.540E-03 | 1.970E-01 | 3.381E-01 | NOT IDENT. |
| PM-144 | -4.673E-04 | 3.284E-02 | 5.870E-02 | NOT IDENT. |
| PR-144 | -5.135E-02 | 2.564E+00 | 4.582E+00 | NOT IDENT. |
| PM-146 | -9.953E-03 | 3.869E-02 | 5.829E-02 | NOT IDENT. |
| ND-147 | -3.341E+01 | 8.191E+01 | 1.397E+02 | NOT IDENT. |
| PM-147 | -5.186E+00 | 6.367E+02 | 1.102E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.270E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.751E-03 | 2.625E-02 | 3.910E-02 | NOT IDENT. |
| EU-152 | 3.938E-02 | 8.915E-02 | 1.388E-01 | NOT IDENT. |
| GD-153 | -6.165E-03 | 9.461E-02 | 1.485E-01 | NOT IDENT. |
| EU-154 | 4.911E-03 | 8.830E-02 | 1.591E-01 | FAIL ABUN |
| EU-155 | -1.699E-02 | 8.230E-02 | 1.429E-01 | NOT IDENT. |
| TB-160 | 9.768E-02 | 2.501E-01 | 3.981E-01 | NOT IDENT. |
| HO-166M | -2.289E-02 | 4.709E-02 | 8.156E-02 | FAIL ABUN |
| TM-171 | -4.406E+00 | 2.624E+01 | 4.293E+01 | NOT IDENT. |
| LU-176 | 1.440E-02 | 2.116E-02 | 3.817E-02 | NOT IDENT. |
| HF-181 | 6.813E-02 | 1.376E-01 | 2.507E-01 | NOT IDENT. |
| TA-182 | 1.071E-01 | 1.954E-01 | 3.695E-01 | FAIL ABUN |
| RE-183 | 1.413E-01 | 4.533E-01 | 8.371E-01 | NOT IDENT. |
| RE-184 | -3.125E-01 | 5.538E-01 | 7.747E-01 | NOT IDENT. |
| W-188 | -2.651E+00 | 1.476E+01 | 2.214E+01 | NOT IDENT. |
| IR-192 | -2.544E-02 | 5.976E-02 | 1.007E-01 | FAIL ABUN |
| HG-203 | 3.146E-02 | 1.021E-01 | 1.811E-01 | NOT IDENT. |
| BI-207 | -7.064E-02 | 5.129E-02 | 6.789E-02 | NOT IDENT. |
| TL-208 | -3.428E-03 | 3.853E-02 | 6.313E-02 | NOT IDENT. |
| PB-210 | -2.770E+00 | 5.293E+00 | 8.561E+00 | NOT IDENT. |
| BI-211 | 2.773E-01 | 2.766E-01 | 3.529E-01 | FAIL ABUN |
| PB-211 | -4.351E-01 | 5.603E-01 | 9.582E-01 | NOT IDENT. |
| BI-212 | 5.647E-01 | 4.186E-01 | 7.508E-01 | FAIL ABUN |
| BI-214 | -6.382E-02 | 8.028E-02 | 1.289E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | 3.501E-01 | 3.041E-01 | 5.835E-01 | FAIL ABUN |
| RN-222 | -6.382E-02 | 8.028E-02 | 1.289E-01 | FAIL ABUN |
| RA-223 | 4.227E-01 | 5.680E-01 | 1.015E+00 | FAIL ABUN |
| RA-224 | 6.454E-01 | 6.303E-01 | 9.935E-01 | NOT IDENT. |
| RA-226 | -6.382E-02 | 8.028E-02 | 1.289E-01 | FAIL ABUN |
| AC-227 | 1.686E-01 | 2.103E-01 | 3.835E-01 | NOT IDENT. |
| TH-227 | 1.686E-01 | 2.103E-01 | 3.835E-01 | NOT IDENT. |
| TH-229 | -3.636E-01 | 4.125E-01 | 7.084E-01 | NOT IDENT. |
| TH-230 | -6.381E-02 | 8.027E-02 | 1.289E-01 | FAIL ABUN |
| PA-231 | -2.756E-01 | 1.152E+00 | 1.981E+00 | NOT IDENT. |
| TH-231 | 4.227E-01 | 5.680E-01 | 1.015E+00 | FAIL ABUN |
| PA-233 | 3.583E-02 | 5.194E-02 | 9.361E-02 | NOT IDENT. |
| PA-234 | -5.832E-02 | 2.065E-01 | 3.707E-01 | FAIL ABUN |
| PA-234M | 6.356E+00 | 4.264E+00 | 6.976E+00 | FAIL ABUN |
| TH-234 | -4.791E-01 | 1.500E+00 | 2.388E+00 | FAIL ABUN |
| U-234 | -6.381E-02 | 8.027E-02 | 1.289E-01 | FAIL ABUN |
| U-235 | -5.571E-02 | 1.949E-01 | 2.818E-01 | FAIL ABUN |
| NP-237 | 3.583E-02 | 5.194E-02 | 9.361E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 7.137E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -4.791E-01 | 1.500E+00 | 2.388E+00 | FAIL ABUN |
| NP-239 | -3.482E-02 | 3.212E-01 | 5.548E-01 | NOT IDENT. |
| PU-239 | 2.220E+02 | 2.683E+02 | 4.816E+02 | NOT IDENT. |
| AM-241 | -4.989E-02 | 1.462E-01 | 2.621E-01 | NOT IDENT. |
| AM-243 | 3.847E-02 | 5.448E-02 | 8.282E-02 | NOT IDENT. |
| CM-243 | 7.668E-03 | 8.341E-02 | 1.471E-01 | NOT IDENT. |
| CM-247 | 1.444E-02 | 2.853E-02 | 5.274E-02 | NOT IDENT. |
| CF-249 | 5.277E-03 | 3.191E-02 | 5.789E-02 | NOT IDENT. |
| CF-251 | -2.823E-02 | 9.391E-02 | 1.673E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:53:24.45

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.34 | 40 | 256 | 0.71 | 126.78 | 125 | 7 | 2.75E-03 | 68.5 | |
| 2 | 0 | 77.05 | 33 | 267 | 0.90 | 154.18 | 152 | 7 | 2.30E-03 | 84.0 | |
| 3 | 0 | 92.87 | 207 | 308 | 1.58 | 185.79 | 181 | 10 | 1.44E-02 | 17.4 | |
| 4 | 0 | 140.72 | 6 | 279 | 1.00 | 281.42 | 276 | 9 | 3.86E-04 | 544.1 | |
| 5 | 0 | 158.62 | 24 | 149 | 1.03 | 317.19 | 315 | 6 | 1.69E-03 | 82.3 | |
| 6 | 0 | 185.82 | 160 | 182 | 1.23 | 371.55 | 367 | 8 | 1.11E-02 | 16.6 | |
| 7 | 0 | 238.19 | 160 | 320 | 1.14 | 476.21 | 469 | 14 | 1.11E-02 | 25.0 | |
| 8 | 0 | 271.26 | 36 | 109 | 2.01 | 542.31 | 539 | 8 | 2.49E-03 | 54.1 | |
| 9 | 0 | 295.24 | 79 | 143 | 1.34 | 590.24 | 586 | 9 | 5.48E-03 | 29.6 | |
| 10 | 0 | 337.91 | 59 | 145 | 0.96 | 675.52 | 671 | 10 | 4.10E-03 | 40.3 | |
| 11 | 0 | 351.13 | 125 | 120 | 1.19 | 701.92 | 696 | 12 | 8.68E-03 | 19.7 | |
| 12 | 0 | 459.81 | 44 | 77 | 1.46 | 919.15 | 913 | 11 | 3.04E-03 | 41.7 | |
| 13 | 0 | 510.87 | 652 | 156 | 2.54 | 1021.19 | 1011 | 24 | 4.53E-02 | 6.4 | |
| 14 | 0 | 521.33 | 18 | 67 | 1.75 | 1042.11 | 1038 | 10 | 1.25E-03 | 87.1 | |
| 15 | 0 | 558.33 | 20 | 60 | 1.08 | 1116.06 | 1112 | 9 | 1.41E-03 | 72.5 | |
| 16 | 0 | 584.33 | 45 | 152 | 1.68 | 1168.04 | 1160 | 15 | 3.09E-03 | 62.4 | |
| 17 | 0 | 609.28 | 45 | 127 | 1.11 | 1217.90 | 1212 | 10 | 3.14E-03 | 49.0 | |
| 18 | 1 | 782.13 | 40 | 23 | 2.23 | 1563.41 | 1560 | 19 | 2.76E-03 | 23.6 | 2.31E+00 |
| 19 | 1 | 784.93 | 34 | 48 | 2.03 | 1569.00 | 1560 | 19 | 2.37E-03 | 45.3 | |
| 20 | 0 | 884.12 | 32 | 34 | 4.62 | 1767.30 | 1761 | 13 | 2.24E-03 | 40.5 | |
| 21 | 5 | 907.37 | 27 | 13 | 2.75 | 1813.77 | 1811 | 15 | 1.85E-03 | 28.2 | 3.15E+00 |
| 22 | 5 | 910.93 | 70 | 30 | 1.99 | 1820.89 | 1811 | 15 | 4.88E-03 | 18.3 | |
| 23 | 0 | 969.18 | 31 | 76 | 2.22 | 1937.34 | 1927 | 14 | 2.13E-03 | 63.1 | |
| 24 | 3 | 987.80 | 21 | 5 | 2.46 | 1974.55 | 1973 | 43 | 1.45E-03 | 20.0 | 3.16E+00 |
| 25 | 3 | 990.92 | 30 | 24 | 2.97 | 1980.79 | 1973 | 43 | 2.06E-03 | 41.2 | |
| 26 | 3 | 1000.53 | 63 | 20 | 2.24 | 2000.00 | 1973 | 43 | 4.40E-03 | 19.1 | |
| 27 | 3 | 1003.10 | 19 | 15 | 1.64 | 2005.14 | 1973 | 43 | 1.32E-03 | 51.3 | |
| 28 | 3 | 1005.86 | 18 | 15 | 1.66 | 2010.67 | 1973 | 43 | 1.22E-03 | 50.3 | |
| 29 | 0 | 1121.07 | 19 | 59 | 0.54 | 2240.98 | 2231 | 15 | 1.29E-03 | 93.9 | |
| 30 | 3 | 1186.34 | 32 | 5 | 2.65 | 2371.48 | 2368 | 19 | 2.22E-03 | 19.0 | 4.02E+00 |
| 31 | 3 | 1191.30 | 28 | 14 | 3.21 | 2381.40 | 2368 | 19 | 1.94E-03 | 32.1 | |
| 32 | 0 | 1310.69 | 36 | 13 | 7.57 | 2620.10 | 2611 | 18 | 2.47E-03 | 29.5 | |
| 33 | 0 | 1317.73 | 14 | 16 | 1.41 | 2634.18 | 2630 | 10 | 9.95E-04 | 57.3 | |
| 34 | 0 | 1331.32 | 19 | 52 | 6.80 | 2661.35 | 2643 | 21 | 1.29E-03 | 100.4 | |
| 35 | 0 | 1420.88 | 14 | 27 | 6.82 | 2840.43 | 2829 | 18 | 9.72E-04 | 91.1 | |
| 36 | 0 | 1459.97 | 189 | 21 | 2.44 | 2918.58 | 2911 | 21 | 1.31E-02 | 9.5 | |
| 37 | 0 | 1605.09 | 8 | 10 | 0.94 | 3208.75 | 3202 | 10 | 5.56E-04 | 82.0 | |
| 38 | 1 | 1626.71 | 27 | 21 | 2.75 | 3252.00 | 3244 | 20 | 1.90E-03 | 39.5 | 5.07E+00 |
| 39 | 1 | 1630.21 | 25 | 8 | 2.75 | 3259.00 | 3244 | 20 | 1.73E-03 | 28.2 | |
| 40 | 0 | 1763.74 | 27 | 24 | 3.46 | 3526.01 | 3517 | 19 | 1.86E-03 | 47.7 | |
| 41 | 0 | 1840.81 | 9 | 17 | 3.93 | 3680.15 | 3673 | 14 | 6.50E-04 | 99.7 | |
| 42 | 0 | 1924.26 | 20 | 2 | 1.63 | 3847.03 | 3842 | 11 | 1.36E-03 | 27.7 | |
| 43 | 0 | 1973.18 | 12 | 11 | 2.47 | 3944.86 | 3934 | 15 | 8.64E-04 | 64.9 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:53:26.45

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 169 | 10.66* | 1.492E+00 | 2.752E+00 | 2.752E+00 | 23.85 |
| SN-117M | 156.02 | ------ | 2.11 | 5.698E+00 | ------ | Line Not Found | ------ |
| | 158.56 | 24 | 86.40* | 5.677E+00 | 1.285E-02 | 1.798E+00 | 164.60 |
| TE-123M | 159.00 | 24 | 84.00* | 5.677E+00 | 1.322E-02 | 2.323E-02 | 164.60 |
| BI-211 | 72.87 | ------ | 1.23 | 3.238E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 55 | 12.92* | 3.947E+00 | 2.773E-01 | 2.773E-01 | 101.79 |
| PB-212 | 74.82 | ------ | 10.28 | 3.441E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 33 | 17.10 | 3.661E+00 | 1.370E-01 | 1.370E-01 | 167.91 |
| | 238.63 | 82 | 43.60* | 4.828E+00 | 1.016E-01 | 1.016E-01 | 102.69 |
| | 300.09 | ------ | 3.30 | 4.290E+00 | ------ | Line Not Found | ------ |
| PB-214 | 74.82 | ------ | 5.80 | 3.441E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 33 | 9.70 | 3.661E+00 | 2.415E-01 | 2.416E-01 | 167.91 |
| | 87.09 | ------ | 3.41 | 4.504E+00 | ------ | Line Not Found | ------ |
| | 242.00 | ------ | 7.25 | 4.790E+00 | ------ | Line Not Found | ------ |
| | 295.22 | 51 | 18.42 | 4.327E+00 | 1.654E-01 | 1.654E-01 | 101.03 |
| | 351.93 | 55 | 35.60* | 3.947E+00 | 1.006E-01 | 1.007E-01 | 101.79 |
| AC-228 | 105.21 | ------ | 1.10 | 5.414E+00 | ------ | Line Not Found | ------ |
| | 338.32 | 33 | 11.27 | 4.029E+00 | 1.889E-01 | 1.889E-01 | 159.71 |
| | 794.95 | ------ | 4.25 | 2.400E+00 | ------ | Line Not Found | ------ |
| | 835.71 | ------ | 1.61 | 2.313E+00 | ------ | Line Not Found | ------ |
| | 911.20 | 34 | 25.80* | 2.167E+00 | 1.590E-01 | 1.590E-01 | 90.44 |
| | 968.97 | 20 | 15.80 | 2.065E+00 | 1.555E-01 | 1.555E-01 | 215.74 |
| RA-228 | 105.21 | ------ | 1.10 | 5.414E+00 | ------ | Line Not Found | ------ |
| | 338.32 | 33 | 11.27 | 4.029E+00 | 1.889E-01 | 1.889E-01 | 159.71 |
| | 794.95 | ------ | 4.25 | 2.400E+00 | ------ | Line Not Found | ------ |
| | 835.71 | ------ | 1.61 | 2.313E+00 | ------ | Line Not Found | ------ |
| | 911.20 | 34 | 25.80* | 2.167E+00 | 1.590E-01 | 1.590E-01 | 90.44 |
| | 968.97 | 20 | 15.80 | 2.065E+00 | 1.555E-01 | 1.555E-01 | 215.74 |
| TH-228 | 74.82 | ------ | 10.28 | 3.441E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 33 | 17.10 | 3.661E+00 | 1.370E-01 | 1.370E-01 | 167.91 |
| | 238.63 | 82 | 43.60* | 4.828E+00 | 1.016E-01 | 1.016E-01 | 102.69 |
| | 300.09 | ------ | 3.30 | 4.290E+00 | ------ | Line Not Found | ------ |
| TH-232 | 338.32 | 33 | 11.27 | 4.029E+00 | 1.889E-01 | 1.889E-01 | 159.71 |
| | 911.20 | 34 | 25.80* | 2.167E+00 | 1.590E-01 | 1.590E-01 | 90.44 |
| | 968.97 | 20 | 15.80 | 2.065E+00 | 1.555E-01 | 1.555E-01 | 215.74 |
| ANH-511 | 511.00 | 137 | 100.00* | 3.202E+00 | 1.111E-01 | 1.111E-01 | 67.75 |

Flag: "*" = Keyline

Sample ID : G341146023 Acquisition date : 12-FEB-2014 11:52:51

Total number of lines in spectrum 39
Number of unidentified lines 17
Number of lines tentatively identified by NID 22 56.41%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 2.752E+00 | 2.752E+00 | 0.657E+00 | 23.85 | |
| SN-117M | 13.60D | 140. | 1.285E-02 | 1.798E+00 | 2.960E+00 | 164.60 | |
| TE-123M | 119.20D | 1.76 | 1.322E-02 | 2.323E-02 | 3.823E-02 | 164.60 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.773E-01 | 2.773E-01 | 2.823E-01 | 101.79 | |
| PB-212 | 1.41E+10Y | 1.00 | 1.016E-01 | 1.016E-01 | 1.043E-01 | 102.69 | |
| PB-214 | 1600.00Y | 1.00 | 1.006E-01 | 1.007E-01 | 1.025E-01 | 101.79 | |
| AC-228 | 1.41E+10Y | 1.00 | 1.590E-01 | 1.590E-01 | 1.438E-01 | 90.44 | |
| RA-228 | 1.41E+10Y | 1.00 | 1.590E-01 | 1.590E-01 | 1.438E-01 | 90.44 | |
| TH-228 | 1.41E+10Y | 1.00 | 1.016E-01 | 1.016E-01 | 1.043E-01 | 102.69 | |
| TH-232 | 1.41E+10Y | 1.00 | 1.590E-01 | 1.590E-01 | 1.438E-01 | 90.44 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.111E-01 | 1.111E-01 | 0.753E-01 | 67.75 | |
| Total Activity : | | | 3.948E+00 | 5.743E+00 | | | |

Grand Total Activity : 3.948E+00 5.743E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146023 Acquisition date : 12-FEB-2014 11:52:51

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.87 | 8 | 308 | 1.58 | 185.79 | 181 | 10 | 5.35E-04 | **** | 4.87E+00 | T |
| 0 | 185.82 | 32 | 182 | 1.23 | 371.55 | 367 | 8 | 2.20E-03 | **** | 5.40E+00 | T |
| 0 | 271.26 | 36 | 109 | 2.01 | 542.31 | 539 | 8 | 2.49E-03 | **** | 4.52E+00 | T |
| 0 | 459.81 | 44 | 77 | 1.46 | 919.15 | 913 | 11 | 3.04E-03 | 83.5 | 3.40E+00 | |
| 0 | 521.33 | 18 | 67 | 1.75 | 1042.11 | 1038 | 10 | 1.25E-03 | **** | 3.16E+00 | T |
| 0 | 558.33 | 20 | 60 | 1.08 | 1116.06 | 1112 | 9 | 1.41E-03 | **** | 3.04E+00 | |
| 1 | 782.13 | 40 | 23 | 2.23 | 1563.41 | 1560 | 19 | 2.76E-03 | 47.2 | 2.43E+00 | |
| 1 | 784.93 | 34 | 48 | 2.03 | 1569.00 | 1560 | 19 | 2.37E-03 | 90.5 | 2.42E+00 | T |
| 0 | 884.12 | 32 | 34 | 4.62 | 1767.30 | 1761 | 13 | 2.24E-03 | 81.1 | 2.22E+00 | T |
| 5 | 907.37 | 27 | 13 | 2.75 | 1813.77 | 1811 | 15 | 1.85E-03 | 56.4 | 2.17E+00 | |
| 3 | 987.80 | 21 | 5 | 2.46 | 1974.55 | 1973 | 43 | 1.45E-03 | 40.0 | 2.03E+00 | |
| 3 | 990.92 | 30 | 24 | 2.97 | 1980.79 | 1973 | 43 | 2.06E-03 | 82.4 | 2.03E+00 | |
| 3 | 1000.53 | 41 | 20 | 2.24 | 2000.00 | 1973 | 43 | 2.88E-03 | 68.5 | 2.01E+00 | T |
| 3 | 1003.10 | 19 | 15 | 1.64 | 2005.14 | 1973 | 43 | 1.32E-03 | **** | 2.01E+00 | |
| 3 | 1005.86 | 18 | 15 | 1.66 | 2010.67 | 1973 | 43 | 1.22E-03 | **** | 2.01E+00 | T |
| 0 | 1121.07 | 19 | 59 | 0.54 | 2240.98 | 2231 | 15 | 1.29E-03 | **** | 1.84E+00 | T |
| 3 | 1186.34 | 32 | 5 | 2.65 | 2371.48 | 2368 | 19 | 2.22E-03 | 38.1 | 1.76E+00 | |
| 3 | 1191.30 | 28 | 14 | 3.21 | 2381.40 | 2368 | 19 | 1.94E-03 | 64.3 | 1.75E+00 | |
| 0 | 1310.69 | 36 | 13 | 7.57 | 2620.10 | 2611 | 18 | 2.47E-03 | 58.9 | 1.62E+00 | T |
| 0 | 1317.73 | 10 | 16 | 1.41 | 2634.18 | 2630 | 10 | 7.24E-04 | **** | 1.61E+00 | |
| 0 | 1331.32 | 19 | 52 | 6.80 | 2661.35 | 2643 | 21 | 1.29E-03 | **** | 1.60E+00 | T |
| 0 | 1420.88 | 14 | 27 | 6.82 | 2840.43 | 2829 | 18 | 9.72E-04 | **** | 1.52E+00 | |
| 0 | 1605.09 | 8 | 10 | 0.94 | 3208.75 | 3202 | 10 | 5.56E-04 | **** | 1.39E+00 | |
| 1 | 1626.71 | 27 | 21 | 2.75 | 3252.00 | 3244 | 20 | 1.90E-03 | 79.0 | 1.38E+00 | |
| 1 | 1630.21 | 25 | 8 | 2.75 | 3259.00 | 3244 | 20 | 1.73E-03 | 56.4 | 1.38E+00 | |
| 0 | 1763.74 | 10 | 24 | 3.46 | 3526.01 | 3517 | 19 | 6.63E-04 | **** | 1.31E+00 | T |
| 0 | 1840.81 | 9 | 17 | 3.93 | 3680.15 | 3673 | 14 | 6.50E-04 | **** | 1.28E+00 | |
| 0 | 1924.26 | 20 | 2 | 1.63 | 3847.03 | 3842 | 11 | 1.36E-03 | 55.4 | 1.26E+00 | |
| 0 | 1973.18 | 12 | 11 | 2.47 | 3944.86 | 3934 | 15 | 8.64E-04 | **** | 1.24E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:53:39.18

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146023.CNF;1    *
* Acquisition date : 12-FEB-2014 11:52:51 Sensitivity     : 3.000            *
* Detector ID      : GAM18                Energy tolerance: 1.500            *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 04:00:01.69     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 15:02:00 Nuclide Library : SOLID            *
* Sample ID        : G341146023           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 7.2393E+01 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-MAR-2013 09:07:11 Eff. Geometry   : JAR              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM18_JAR.CNF;6              *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 2.468E-01 |
| SN-117M | 2.147E+00 |
| TE-123M | 3.009E-02 |
| PB-212 | 3.998E-02 |
| PB-214 | 4.421E-02 |
| AC-228 | 8.804E-02 |
| RA-228 | 8.804E-02 |
| TH-228 | 3.998E-02 |
| TH-232 | 8.804E-02 |
| ANH-511 | 1.571E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 6.536E-01 | NOT IDENT. |
| NA-22 | 2.684E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.816E-02 | NOT IDENT. |
| SC-46 | 4.741E-02 | FAIL ABUN |
| V-48 | 1.596E+00 | FAIL ABUN |
| CR-51 | 2.023E+00 | NOT IDENT. |
| MN-54 | 3.028E-02 | NOT IDENT. |
| CO-56 | 4.946E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.056E-02 | NOT IDENT. |
| CO-58 | 5.020E-02 | NOT IDENT. |
| FE-59 | 1.913E-01 | NOT IDENT. |
| CO-60 | 2.834E-02 | FAIL ABUN |
| ZN-65 | 7.064E-02 | NOT IDENT. |
| GE-68 | 9.180E-01 | NOT IDENT. |
| AS-73 | 1.778E+00 | NOT IDENT. |
| AS-74 | 1.749E+00 | NOT IDENT. |
| SE-75 | 4.896E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.816E+00 | NOT IDENT. |

| | | |
|---|---|---|
| RB-83 | 8.451E-02 | FAIL ABUN |
| KR-85 | 7.061E+00 | NOT IDENT. |
| SR-85 | 8.834E-02 | NOT IDENT. |
| RB-86 | 9.692E+00 | NOT IDENT. |
| Y-88 | 4.236E-02 | NOT IDENT. |
| Y-91 | 2.825E+01 | NOT IDENT. |
| NB-94 | 2.309E-02 | NOT IDENT. |
| NB-95 | 6.130E-02 | NOT IDENT. |
| NB-95M | 1.868E-01 | NOT IDENT. |
| ZR-95 | 1.106E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.167E-02 | NOT IDENT. |
| RH-102 | 3.925E-02 | NOT IDENT. |
| RU-103 | 1.135E-01 | NOT IDENT. |
| RH-106 | 2.661E-01 | NOT IDENT. |
| RU-106 | 2.661E-01 | NOT IDENT. |
| AG-108M | 1.927E-02 | NOT IDENT. |
| CD-109 | 5.861E-01 | NOT IDENT. |
| AG-110M | 3.982E-02 | FAIL ABUN |
| SN-113 | 4.856E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SB-124 | 1.408E-01 | NOT IDENT. |
| SB-125 | 6.483E-02 | NOT IDENT. |
| TE-125M | 1.622E+01 | NOT IDENT. |
| I-126 | 1.109E+01 | NOT IDENT. |
| SB-126 | 8.341E+00 | NOT IDENT. |
| SN-126 | 5.085E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.724E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.670E-02 | NOT IDENT. |
| CS-135 | 1.029E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.352E+00 | NOT IDENT. |
| BA-137M | 2.296E-02 | NOT IDENT. |
| CS-137 | 2.425E-02 | NOT IDENT. |
| CE-139 | 3.050E-02 | NOT IDENT. |
| BA-140 | 4.543E+00 | NOT IDENT. |
| LA-140 | 4.543E+00 | NOT IDENT. |
| CE-141 | 2.337E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.622E-01 | NOT IDENT. |
| PM-144 | 2.775E-02 | NOT IDENT. |
| PR-144 | 2.166E+00 | NOT IDENT. |
| PM-146 | 2.753E-02 | NOT IDENT. |
| ND-147 | 6.598E+01 | NOT IDENT. |
| PM-147 | 5.283E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.865E-02 | NOT IDENT. |
| EU-152 | 6.609E-02 | NOT IDENT. |
| GD-153 | 7.117E-02 | NOT IDENT. |
| EU-154 | 7.341E-02 | FAIL ABUN |
| EU-155 | 6.827E-02 | NOT IDENT. |
| TB-160 | 1.859E-01 | NOT IDENT. |
| HO-166M | 3.830E-02 | FAIL ABUN |
| TM-171 | 2.062E+01 | NOT IDENT. |
| LU-176 | 1.821E-02 | NOT IDENT. |
| HF-181 | 1.190E-01 | NOT IDENT. |
| TA-182 | 1.712E-01 | FAIL ABUN |
| RE-183 | 4.015E-01 | NOT IDENT. |
| RE-184 | 3.593E-01 | NOT IDENT. |
| W-188 | 1.055E+01 | NOT IDENT. |
| IR-192 | 4.782E-02 | FAIL ABUN |
| HG-203 | 8.652E-02 | NOT IDENT. |
| BI-207 | 3.150E-02 | NOT IDENT. |
| TL-208 | 3.019E-02 | NOT IDENT. |
| PB-210 | 4.109E+00 | NOT IDENT. |
| BI-211 | 1.697E-01 | FAIL ABUN |
| PB-211 | 4.539E-01 | NOT IDENT. |
| BI-212 | 3.550E-01 | FAIL ABUN |
| BI-214 | 6.178E-02 | FAIL ABUN |
| RN-219 | 2.774E-01 | FAIL ABUN |

| | | |
|---|---|---|
| RN-222 | 6.178E-02 | FAIL ABUN |
| RA-223 | 4.864E-01 | FAIL ABUN |
| RA-224 | 4.792E-01 | NOT IDENT. |
| RA-226 | 6.178E-02 | FAIL ABUN |
| AC-227 | 1.839E-01 | NOT IDENT. |
| TH-227 | 1.839E-01 | NOT IDENT. |
| TH-229 | 3.394E-01 | NOT IDENT. |
| TH-230 | 6.178E-02 | FAIL ABUN |
| PA-231 | 9.443E-01 | NOT IDENT. |
| TH-231 | 4.864E-01 | FAIL ABUN |
| PA-233 | 4.466E-02 | NOT IDENT. |
| PA-234 | 1.715E-01 | FAIL ABUN |
| PA-234M | 3.282E+00 | FAIL ABUN |
| TH-234 | 1.151E+00 | FAIL ABUN |
| U-234 | 6.178E-02 | FAIL ABUN |
| U-235 | 1.354E-01 | FAIL ABUN |
| NP-237 | 4.466E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.151E+00 | FAIL ABUN |
| NP-239 | 2.658E-01 | NOT IDENT. |
| PU-239 | 2.313E+02 | NOT IDENT. |
| AM-241 | 1.254E-01 | NOT IDENT. |
| AM-243 | 3.991E-02 | NOT IDENT. |
| CM-243 | 7.043E-02 | NOT IDENT. |
| CM-247 | 2.505E-02 | NOT IDENT. |
| CF-249 | 2.754E-02 | NOT IDENT. |
| CF-251 | 7.999E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:53:43.82

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146023.CNF;1    *
* Acquisition date : 12-FEB-2014 11:52:51 Sensitivity     : 3.000          *
* Detector ID      : GAM18                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:01.69     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:02:00 Nuclide Library : SOLID          *
* Sample ID        : G341146023           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 7.2393E+01 GRAM*
*                                         Quantity Err(%) : 1.3813E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-MAR-2013 09:07:11 Eff. Geometry   : JAR          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM18_JAR.CNF;6          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 2.752E+00 | 6.950E-01 | 6.950E-01 |
| SN-117M | 1.798E+00 | 2.905E+00 | 2.905E+00 |
| TE-123M | 2.323E-02 | 3.751E-02 | 3.751E-02 |
| PB-212 | 1.016E-01 | 1.026E-01 | 1.026E-01 |
| PB-214 | 1.007E-01 | 1.008E-01 | 1.008E-01 |
| AC-228 | 1.590E-01 | 1.430E-01 | 1.430E-01 |
| RA-228 | 1.590E-01 | 1.430E-01 | 1.430E-01 |
| TH-228 | 1.016E-01 | 1.026E-01 | 1.026E-01 |
| TH-232 | 1.590E-01 | 1.430E-01 | 1.430E-01 |
| ANH-511 | 1.111E-01 | 7.431E-02 | 7.431E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.140E-01 | 7.657E-01 | 7.717E-01 | NOT IDENT. |
| NA-22 | 7.980E-04 | 3.239E-02 | 3.239E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.544E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.537E-02 | 2.550E-02 | 2.794E-02 | NOT IDENT. |
| SC-46 | 3.382E-02 | 6.259E-02 | 6.442E-02 | FAIL ABUN |
| V-48 | 8.068E-01 | 2.098E+00 | 2.130E+00 | FAIL ABUN |
| CR-51 | 3.886E-01 | 2.436E+00 | 2.443E+00 | NOT IDENT. |
| MN-54 | 6.183E-03 | 3.598E-02 | 3.609E-02 | NOT IDENT. |
| CO-56 | -3.385E-02 | 6.279E-02 | 6.462E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.855E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.646E-02 | 2.570E-02 | 2.675E-02 | NOT IDENT. |
| CO-58 | -4.421E-02 | 6.446E-02 | 6.747E-02 | NOT IDENT. |
| FE-59 | 1.936E-02 | 2.261E-01 | 2.263E-01 | NOT IDENT. |
| CO-60 | 3.108E-02 | 6.124E-02 | 6.283E-02 | FAIL ABUN |
| ZN-65 | 4.013E-02 | 9.407E-02 | 9.580E-02 | NOT IDENT. |
| GE-68 | 3.893E-01 | 1.056E+00 | 1.071E+00 | NOT IDENT. |
| AS-73 | -3.023E-01 | 2.263E+00 | 2.267E+00 | NOT IDENT. |
| AS-74 | 1.462E+00 | 2.041E+00 | 2.145E+00 | NOT IDENT. |
| SE-75 | -1.159E-02 | 5.917E-02 | 5.940E-02 | NOT IDENT. |
| BR-77 | 3.653E+11 | 1.087E+12 | 1.099E+12 | SHORT HLIF |

| | | | | |
|---|---|---|---|---|
| SR-82 | 1.089E+00 | 2.386E+00 | 2.436E+00 | NOT IDENT. |
| RB-83 | 7.175E-02 | 1.229E-01 | 1.271E-01 | FAIL ABUN |
| KR-85 | 3.507E+01 | 7.488E+00 | 1.749E+01 | NOT IDENT. |
| SR-85 | 4.380E-01 | 9.368E-02 | 2.185E-01 | NOT IDENT. |
| RB-86 | 1.647E+00 | 1.137E+01 | 1.139E+01 | NOT IDENT. |
| Y-88 | -6.049E-03 | 6.032E-02 | 6.038E-02 | NOT IDENT. |
| Y-91 | -2.209E+01 | 3.630E+01 | 3.765E+01 | NOT IDENT. |
| NB-94 | 4.757E-03 | 2.700E-02 | 2.709E-02 | NOT IDENT. |
| NB-95 | -2.690E-02 | 8.736E-02 | 8.820E-02 | NOT IDENT. |
| NB-95M | -4.296E-02 | 2.548E-01 | 2.555E-01 | NOT IDENT. |
| ZR-95 | -6.488E-02 | 1.370E-01 | 1.401E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 5.016E+42 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 2.190E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 9.109E+09 | 9.272E+09 | 1.014E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.034E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.747E-02 | 2.734E-02 | 2.845E-02 | NOT IDENT. |
| RH-102 | 1.777E-02 | 4.479E-02 | 4.550E-02 | NOT IDENT. |
| RU-103 | -5.314E-02 | 1.396E-01 | 1.417E-01 | NOT IDENT. |
| RH-106 | 2.312E-03 | 3.110E-01 | 3.110E-01 | NOT IDENT. |
| RU-106 | 2.312E-03 | 3.110E-01 | 3.110E-01 | NOT IDENT. |
| AG-108M | -5.861E-03 | 2.317E-02 | 2.332E-02 | NOT IDENT. |
| CD-109 | 1.679E-01 | 7.584E-01 | 7.621E-01 | NOT IDENT. |
| AG-110M | 6.802E-02 | 5.492E-02 | 6.290E-02 | FAIL ABUN |
| SN-113 | -1.935E-02 | 5.806E-02 | 5.871E-02 | NOT IDENT. |
| CD-115 | -7.783E+11 | 1.155E+12 | 1.207E+12 | SHORT HLIF |
| SB-124 | -3.993E-02 | 1.755E-01 | 1.764E-01 | NOT IDENT. |
| SB-125 | -5.311E-02 | 7.995E-02 | 8.345E-02 | NOT IDENT. |
| TE-125M | 1.273E+00 | 1.931E+01 | 1.932E+01 | NOT IDENT. |
| I-126 | 7.873E-01 | 1.300E+01 | 1.300E+01 | NOT IDENT. |
| SB-126 | -1.654E+01 | 1.141E+01 | 1.363E+01 | NOT IDENT. |
| SN-126 | -1.905E-02 | 6.368E-02 | 6.426E-02 | NOT IDENT. |
| SB-127 | 1.288E+06 | 2.419E+06 | 2.488E+06 | SHORT HLIF |
| I-131 | 2.706E+01 | 1.045E+02 | 1.052E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.106E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.778E+06 | 2.844E+07 | 2.849E+07 | SHORT HLIF |
| BA-133 | -1.540E-02 | 3.761E-02 | 3.825E-02 | NOT IDENT. |
| I-133 | -1.519E+32 | 1.558E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.068E-02 | 3.290E-02 | 3.325E-02 | NOT IDENT. |
| CS-135 | 4.363E-03 | 1.402E-01 | 1.402E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 8.198E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.460E+00 | 6.159E+00 | 6.258E+00 | NOT IDENT. |
| BA-137M | 4.583E-03 | 2.668E-02 | 2.676E-02 | NOT IDENT. |
| CS-137 | 4.842E-03 | 2.818E-02 | 2.827E-02 | NOT IDENT. |
| CE-139 | 6.821E-03 | 3.735E-02 | 3.748E-02 | NOT IDENT. |
| BA-140 | -1.032E+00 | 6.407E+00 | 6.424E+00 | NOT IDENT. |
| LA-140 | -1.032E+00 | 6.407E+00 | 6.424E+00 | NOT IDENT. |
| CE-141 | 2.421E-02 | 2.844E-01 | 2.846E-01 | NOT IDENT. |
| CE-143 | 1.370E+20 | 8.910E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | -2.540E-03 | 1.970E-01 | 1.970E-01 | NOT IDENT. |
| PM-144 | -4.673E-04 | 3.284E-02 | 3.284E-02 | NOT IDENT. |
| PR-144 | -5.135E-02 | 2.564E+00 | 2.564E+00 | NOT IDENT. |
| PM-146 | -9.953E-03 | 3.871E-02 | 3.897E-02 | NOT IDENT. |
| ND-147 | -3.341E+01 | 8.195E+01 | 8.333E+01 | NOT IDENT. |
| PM-147 | -5.186E+00 | 6.367E+02 | 6.367E+02 | NOT IDENT. |
| PM-149 | 5.175E+12 | 1.272E+13 | 1.294E+13 | SHORT HLIF |
| EU-150 | -1.751E-03 | 2.626E-02 | 2.627E-02 | NOT IDENT. |
| EU-152 | 3.938E-02 | 8.923E-02 | 9.098E-02 | NOT IDENT. |
| GD-153 | -6.165E-03 | 9.461E-02 | 9.465E-02 | NOT IDENT. |
| EU-154 | 4.911E-03 | 8.830E-02 | 8.833E-02 | FAIL ABUN |
| EU-155 | -1.699E-02 | 8.232E-02 | 8.267E-02 | NOT IDENT. |
| TB-160 | 9.768E-02 | 2.505E-01 | 2.543E-01 | NOT IDENT. |
| HO-166M | -2.289E-02 | 4.715E-02 | 4.826E-02 | FAIL ABUN |
| TM-171 | -4.406E+00 | 2.625E+01 | 2.632E+01 | NOT IDENT. |
| LU-176 | 1.440E-02 | 2.121E-02 | 2.218E-02 | NOT IDENT. |
| HF-181 | 6.813E-02 | 1.377E-01 | 1.411E-01 | NOT IDENT. |
| TA-182 | 1.071E-01 | 1.957E-01 | 2.015E-01 | FAIL ABUN |
| RE-183 | 1.413E-01 | 4.536E-01 | 4.580E-01 | NOT IDENT. |
| RE-184 | -3.125E-01 | 5.565E-01 | 5.740E-01 | NOT IDENT. |
| W-188 | -2.651E+00 | 1.476E+01 | 1.481E+01 | NOT IDENT. |
| IR-192 | -2.544E-02 | 5.980E-02 | 6.089E-02 | FAIL ABUN |
| HG-203 | 3.146E-02 | 1.021E-01 | 1.031E-01 | NOT IDENT. |
| BI-207 | -7.064E-02 | 5.304E-02 | 6.187E-02 | NOT IDENT. |
| TL-208 | -3.428E-03 | 3.853E-02 | 3.856E-02 | NOT IDENT. |
| PB-210 | -2.770E+00 | 5.300E+00 | 5.445E+00 | NOT IDENT. |
| BI-211 | 2.773E-01 | 2.777E-01 | 3.045E-01 | FAIL ABUN |
| PB-211 | -4.351E-01 | 5.615E-01 | 5.948E-01 | NOT IDENT. |
| BI-212 | 5.647E-01 | 4.225E-01 | 4.933E-01 | FAIL ABUN |
| BI-214 | -6.382E-02 | 8.046E-02 | 8.545E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | 3.501E-01 | 3.081E-01 | 3.462E-01 | FAIL ABUN |
| RN-222 | -6.382E-02 | 8.046E-02 | 8.545E-02 | FAIL ABUN |
| RA-223 | 4.227E-01 | 5.696E-01 | 6.006E-01 | FAIL ABUN |
| RA-224 | 6.454E-01 | 6.331E-01 | 6.968E-01 | NOT IDENT. |
| RA-226 | -6.382E-02 | 8.046E-02 | 8.545E-02 | FAIL ABUN |
| AC-227 | 1.686E-01 | 2.119E-01 | 2.252E-01 | NOT IDENT. |
| TH-227 | 1.686E-01 | 2.119E-01 | 2.252E-01 | NOT IDENT. |
| TH-229 | -3.636E-01 | 4.136E-01 | 4.449E-01 | NOT IDENT. |
| TH-230 | -6.381E-02 | 8.045E-02 | 8.544E-02 | FAIL ABUN |
| PA-231 | -2.756E-01 | 1.152E+00 | 1.159E+00 | NOT IDENT. |
| TH-231 | 4.227E-01 | 5.696E-01 | 6.006E-01 | FAIL ABUN |
| PA-233 | 3.583E-02 | 5.205E-02 | 5.450E-02 | NOT IDENT. |
| PA-234 | -5.832E-02 | 2.172E-01 | 2.188E-01 | FAIL ABUN |
| PA-234M | 6.356E+00 | 4.405E+00 | 5.255E+00 | FAIL ABUN |
| TH-234 | -4.791E-01 | 1.504E+00 | 1.519E+00 | FAIL ABUN |
| U-234 | -6.381E-02 | 8.045E-02 | 8.544E-02 | FAIL ABUN |
| U-235 | -5.571E-02 | 1.950E-01 | 1.966E-01 | FAIL ABUN |
| NP-237 | 3.583E-02 | 5.205E-02 | 5.450E-02 | NOT IDENT. |
| NP-238 | 1.585E+12 | 7.142E+12 | 7.178E+12 | SHORT HLIF |
| U-238 | -4.791E-01 | 1.504E+00 | 1.519E+00 | FAIL ABUN |
| NP-239 | -3.482E-02 | 3.212E-01 | 3.216E-01 | NOT IDENT. |
| PU-239 | 2.220E+02 | 2.690E+02 | 2.870E+02 | NOT IDENT. |
| AM-241 | -4.989E-02 | 1.463E-01 | 1.480E-01 | NOT IDENT. |
| AM-243 | 3.847E-02 | 5.458E-02 | 5.727E-02 | NOT IDENT. |
| CM-243 | 7.668E-03 | 8.341E-02 | 8.348E-02 | NOT IDENT. |
| CM-247 | 1.444E-02 | 2.865E-02 | 2.938E-02 | NOT IDENT. |
| CF-249 | 5.277E-03 | 3.192E-02 | 3.201E-02 | NOT IDENT. |
| CF-251 | -2.823E-02 | 9.398E-02 | 9.483E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 184.3365 | 94.67 | 180.3625 | 193.51 | 206.4340 |
| 45.60 | 194.8098 | 94.87 | 163.0081 | 197.03 | 158.2767 |
| 46.54 | 210.2071 | 97.43 | 177.4834 | 198.01 | 161.2886 |
| 49.72 | 0.0000 | 98.43 | 181.4488 | 201.83 | 215.8169 |
| 51.35 | 198.2142 | 98.44 | 181.4545 | 205.31 | 184.5933 |
| 52.39 | 204.1767 | 99.53 | 177.1225 | 210.85 | 157.2437 |
| 53.44 | 201.4834 | 100.11 | 169.5408 | 215.65 | 149.9577 |
| 57.36 | 0.0000 | 103.18 | 178.0231 | 222.11 | 162.9022 |
| 57.53 | 169.0211 | 103.37 | 165.1844 | 227.09 | 180.4583 |
| 57.98 | 171.9044 | 105.21 | 160.0513 | 227.38 | 181.4975 |
| 59.32 | 201.0486 | 105.31 | 162.0981 | 228.16 | 0.0000 |
| 59.54 | 177.3678 | 106.12 | 163.4717 | 228.18 | 174.9850 |
| 63.29 | 187.1914 | 109.28 | 152.7718 | 117.23 | 174.9850 |
| 63.58 | 222.9949 | 111.00 | 159.5897 | 235.69 | 177.3290 |
| 64.28 | 212.3356 | 111.76 | 0.0000 | 235.96 | 189.8476 |
| 66.73 | 197.7791 | 116.30 | 0.0000 | 238.63 | 194.2950 |
| 67.24 | 204.3523 | 117.23 | 177.7503 | 238.98 | 0.0000 |
| 67.75 | 202.1221 | 121.12 | 172.2241 | 240.99 | 175.5578 |
| 69.67 | 184.9887 | 121.22 | 178.5320 | 242.00 | 183.6594 |
| 70.83 | 167.0614 | 121.78 | 187.1485 | 244.70 | 189.0938 |
| 72.81 | 226.8420 | 122.06 | 195.6505 | 252.40 | 0.0000 |
| 72.87 | 226.8933 | 123.07 | 178.3146 | 252.80 | 162.3558 |
| 74.66 | 183.5506 | 127.23 | 203.4624 | 254.15 | 0.0000 |
| 74.82 | 183.6588 | 129.30 | 165.0758 | 256.23 | 153.1121 |
| 74.97 | 183.7608 | 131.20 | 185.0849 | 260.90 | 0.0000 |
| 77.11 | 230.4771 | 133.02 | 197.6993 | 264.66 | 162.9506 |
| 79.69 | 182.7649 | 133.52 | 187.1725 | 268.22 | 152.9359 |
| 80.12 | 201.0676 | 136.00 | 187.1703 | 269.46 | 167.8503 |
| 80.19 | 0.0000 | 136.47 | 187.3727 | 271.23 | 141.8994 |
| 80.57 | 201.3851 | 140.51 | 0.0000 | 273.65 | 139.2705 |
| 81.00 | 184.9957 | 143.76 | 200.3770 | 276.40 | 126.6082 |
| 81.07 | 185.0404 | 144.24 | 188.4646 | 277.37 | 134.0550 |
| 83.79 | 179.7549 | 145.44 | 183.4352 | 277.60 | 142.0324 |
| 85.43 | 192.9872 | 152.43 | 176.1012 | 278.00 | 147.2549 |
| 86.55 | 204.1007 | 153.25 | 166.2907 | 279.20 | 141.2896 |
| 86.79 | 211.8263 | 323.87 | 178.3321 | 279.54 | 126.9057 |
| 86.94 | 214.7707 | 156.02 | 205.1051 | 280.46 | 147.7131 |
| 87.09 | 214.8769 | 158.56 | 155.6246 | 283.69 | 146.2367 |
| 87.57 | 212.7502 | 159.00 | 183.0494 | 284.31 | 0.0000 |
| 88.03 | 192.2755 | 162.33 | 180.2717 | 285.41 | 135.1178 |
| 88.34 | 192.4702 | 163.33 | 169.2767 | 285.90 | 0.0000 |
| 88.47 | 192.5515 | 165.86 | 186.7192 | 287.50 | 143.8033 |
| 89.96 | 204.9450 | 176.31 | 160.4955 | 290.67 | 143.9450 |
| 91.11 | 199.9440 | 176.60 | 159.7007 | 293.27 | 0.0000 |
| 92.59 | 195.5793 | 177.52 | 168.8110 | 351.93 | 148.3194 |
| 93.35 | 196.0445 | 181.07 | 0.0000 | 295.96 | 158.3473 |
| 94.56 | 180.3010 | 184.41 | 148.9249 | 879.38 | 136.8773 |
| 94.65 | 180.3512 | 143.76 | 172.2393 | 299.98 | 121.8727 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 118.5027 | 487.02 | 127.4904 | 702.65 | 95.2665 |
| 300.13 | 118.5078 | 492.35 | 0.0000 | 706.68 | 83.7902 |
| 301.36 | 140.4789 | 497.08 | 112.1699 | 711.68 | 91.8409 |
| 302.85 | 167.7207 | 505.52 | 102.6294 | 720.70 | 107.0308 |
| 256.23 | 151.0288 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 121.5721 | 511.00 | 69.5608 | 722.78 | 96.3392 |
| 308.46 | 132.4955 | 514.00 | 69.7165 | 722.91 | 96.3471 |
| 311.90 | 121.2229 | 514.00 | 69.7169 | 723.31 | 87.5170 |
| 316.51 | 134.8038 | 520.40 | 72.6421 | 724.19 | 73.7869 |
| 319.41 | 143.9020 | 520.69 | 0.0000 | 727.33 | 50.2612 |
| 320.08 | 142.9268 | 522.65 | 0.0000 | 733.00 | 98.8566 |
| 321.04 | 152.8375 | 527.90 | 0.0000 | 735.93 | 71.2896 |
| 323.87 | 148.9720 | 529.59 | 118.0541 | 333.97 | 70.3572 |
| 325.23 | 161.1772 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 144.3126 | 531.02 | 108.7658 | 747.24 | 86.6655 |
| 333.37 | 145.9207 | 546.56 | 0.0000 | 748.06 | 82.7180 |
| 333.97 | 146.0160 | 552.55 | 60.1765 | 752.31 | 74.9130 |
| 334.37 | 154.8787 | 563.25 | 76.6707 | 753.82 | 83.9709 |
| 338.28 | 134.3248 | 569.33 | 98.8349 | 756.73 | 87.1027 |
| 338.32 | 134.3304 | 946.00 | 94.5484 | 756.80 | 87.1062 |
| 311.90 | 132.8687 | 569.70 | 94.5613 | 884.68 | 78.3888 |
| 340.48 | 132.8687 | 583.19 | 109.5194 | 765.81 | 78.4650 |
| 340.55 | 132.8778 | 584.27 | 96.5767 | 766.42 | 75.4715 |
| 344.28 | 115.6178 | 595.83 | 107.1540 | 766.84 | 69.4492 |
| 345.93 | 114.0375 | 427.87 | 150.2652 | 772.60 | 0.0000 |
| 351.06 | 115.3218 | 602.52 | 0.0000 | 776.52 | 50.2888 |
| 351.93 | 105.7895 | 602.73 | 137.2925 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 196.8519 | 778.90 | 57.2954 |
| 356.01 | 130.5425 | 609.32 | 136.9562 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 125.0872 | 785.37 | 58.9369 |
| 366.42 | 0.0000 | 614.28 | 162.2858 | 792.07 | 71.6656 |
| 375.05 | 133.0594 | 618.01 | 115.5319 | 794.95 | 69.8445 |
| 356.01 | 119.3927 | 620.36 | 105.5205 | 795.86 | 76.6190 |
| 388.16 | 121.7443 | 621.93 | 107.4780 | 810.29 | 68.9411 |
| 388.63 | 106.9225 | 630.19 | 0.0000 | 344.28 | 68.9465 |
| 391.69 | 127.7468 | 631.29 | 84.8089 | 810.76 | 73.0743 |
| 264.66 | 111.8966 | 633.25 | 77.4478 | 815.77 | 59.8420 |
| 401.81 | 91.3069 | 634.78 | 84.0582 | 1048.07 | 55.7908 |
| 402.40 | 105.4840 | 635.95 | 91.5959 | 832.01 | 82.1583 |
| 404.85 | 131.2084 | 636.99 | 0.0000 | 834.85 | 83.3122 |
| 410.95 | 120.5508 | 645.85 | 86.5102 | 835.71 | 67.7202 |
| 413.71 | 124.6579 | 657.76 | 84.2922 | 836.80 | 0.0000 |
| 414.70 | 103.8148 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 136.7391 | 661.66 | 81.6416 | 846.77 | 74.3642 |
| 427.87 | 132.9783 | 664.57 | 0.0000 | 856.80 | 78.9276 |
| 433.94 | 110.4319 | 666.33 | 80.9153 | 860.56 | 68.5256 |
| 439.40 | 87.5929 | 666.50 | 81.8760 | 871.09 | 60.3874 |
| 453.88 | 105.0872 | 667.71 | 0.0000 | 873.19 | 62.5675 |
| 463.37 | 114.1858 | 677.62 | 66.1208 | 875.33 | 0.0000 |
| 468.07 | 91.6979 | 685.70 | 0.0000 | 879.38 | 56.5173 |
| 473.00 | 0.0000 | 695.00 | 98.7274 | 880.51 | 45.6020 |
| 475.06 | 107.2482 | 696.49 | 100.7479 | 883.24 | 58.4442 |
| 476.78 | 95.3514 | 696.51 | 100.7479 | 884.68 | 65.7924 |
| 477.60 | 105.4576 | 697.00 | 104.6536 | 889.28 | 47.6174 |
| 482.18 | 101.8076 | 697.49 | 119.2213 | 894.76 | 74.9703 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 58.9925 | 1298.22 | 0.0000 | | |
| 903.28 | 70.0360 | 1312.11 | 0.0000 | | |
| 911.20 | 66.5859 | 1332.49 | 57.2293 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 57.7271 | 1365.19 | 43.9996 | | |
| 937.49 | 53.3272 | 1368.63 | 0.0000 | | |
| 944.13 | 62.8639 | 1384.29 | 33.6745 | | |
| 946.00 | 57.2800 | 1408.01 | 39.8684 | | |
| 949.00 | 61.1155 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 42.3216 | | |
| 962.31 | 61.2271 | 1489.16 | 37.7054 | | |
| 964.08 | 54.6492 | 1505.03 | 43.8550 | | |
| 966.17 | 59.6700 | 1596.21 | 29.4319 | | |
| 968.97 | 51.4431 | 1620.50 | 25.5991 | | |
| 983.53 | 55.0974 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 27.2322 | | |
| 1274.44 | 43.1598 | 1750.46 | 0.0000 | | |
| 1001.03 | 43.2438 | 1764.49 | 39.2527 | | |
| 1004.73 | 43.3097 | 1063.66 | 25.6355 | | |
| 507.63 | 0.0000 | 1771.35 | 25.6428 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 27.7893 | | |
| 1037.84 | 47.7917 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 24.3045 | | |
| 631.29 | 45.0197 | | | | |
| 1048.07 | 60.7155 | | | | |
| 1049.04 | 59.7575 | | | | |
| 1050.41 | 61.7498 | | | | |
| 1063.66 | 85.7165 | | | | |
| 1077.00 | 48.5249 | | | | |
| 1077.34 | 45.5604 | | | | |
| 1085.87 | 52.6654 | | | | |
| 1099.45 | 52.9353 | | | | |
| 1112.07 | 52.6849 | | | | |
| 1112.84 | 63.2395 | | | | |
| 1115.54 | 58.0280 | | | | |
| 1120.29 | 54.6057 | | | | |
| 1120.55 | 54.6114 | | | | |
| 1221.41 | 54.6265 | | | | |
| 1129.67 | 54.2057 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 46.1708 | | | | |
| 1177.95 | 47.9622 | | | | |
| 1189.05 | 39.2074 | | | | |
| 1204.77 | 57.0583 | | | | |
| 1221.41 | 42.7775 | | | | |
| 1231.02 | 42.9176 | | | | |
| 1235.36 | 45.0771 | | | | |
| 1238.28 | 52.4676 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 36.0788 | | | | |
| 1274.44 | 46.7300 | | | | |
| 1274.54 | 46.7316 | | | | |
| 1291.59 | 36.3124 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:54:11.63

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146024.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;248
                                       Background date  : 9-FEB-2014 11:20:45.
Sample date      : 7-NOV-2013 15:06:00. Acquisition date : 12-FEB-2014 11:53:30
Sample ID        : G341146024           Sample quantity  : 5.63500E+01 GRAM
Detector name    : GAM04                Detector geometry: JAR
Elapsed live time: 0 04:00:00.00        Elapsed real time: 0 04:00:01.41  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.32* | 8 | 47 | 0.96 | 126.44 | 125 | 4 | 5.79E-04 | 165.3 | |
| 2 | 0 | 65.93 | 45 | 85 | 0.71 | 131.66 | 129 | 7 | 3.14E-03 | 37.0 | |
| 3 | 0 | 84.57* | 13 | 89 | 1.53 | 168.94 | 166 | 7 | 8.87E-04 | 142.4 | |
| 4 | 0 | 92.77* | 32 | 98 | 1.07 | 185.34 | 182 | 7 | 2.24E-03 | 68.2 | |
| 5 | 0 | 140.82* | 13 | 97 | 1.28 | 281.43 | 279 | 7 | 9.37E-04 | 141.2 | |
| 6 | 0 | 185.80* | 24 | 141 | 1.27 | 371.36 | 367 | 10 | 1.67E-03 | 107.7 | |
| 7 | 0 | 238.43* | 1 | 146 | 0.99 | 476.62 | 471 | 11 | 7.01E-05 | ***** | |
| 8 | 0 | 338.90* | 17 | 60 | 1.57 | 677.53 | 673 | 9 | 1.16E-03 | 96.8 | |
| 9 | 0 | 352.16* | 18 | 71 | 4.08 | 704.04 | 698 | 13 | 1.27E-03 | 112.4 | |
| 10 | 0 | 398.67 | 13 | 44 | 2.28 | 797.06 | 791 | 10 | 9.00E-04 | 100.4 | |
| 11 | 0 | 556.82 | 33 | 39 | 4.22 | 1113.36 | 1107 | 14 | 2.32E-03 | 43.0 | |
| 12 | 0 | 583.89* | 20 | 31 | 1.44 | 1167.50 | 1163 | 11 | 1.40E-03 | 65.7 | |
| 13 | 0 | 604.05 | 16 | 66 | 1.58 | 1207.82 | 1200 | 14 | 1.11E-03 | 111.3 | |
| 14 | 0 | 625.02 | 15 | 34 | 1.45 | 1249.75 | 1242 | 10 | 1.01E-03 | 80.3 | |
| 15 | 0 | 656.86 | 8 | 25 | 0.88 | 1313.44 | 1305 | 10 | 5.56E-04 | 122.2 | |
| 16 | 0 | 765.51 | 13 | 25 | 3.65 | 1530.75 | 1523 | 14 | 9.09E-04 | 85.0 | |
| 17 | 0 | 851.80 | 12 | 18 | 0.82 | 1703.37 | 1694 | 12 | 8.61E-04 | 73.9 | |
| 18 | 0 | 894.88 | 11 | 13 | 1.31 | 1789.53 | 1783 | 10 | 7.93E-04 | 65.1 | |
| 19 | 0 | 1155.06 | 10 | 6 | 1.82 | 2310.03 | 2305 | 8 | 7.20E-04 | 51.0 | |
| 20 | 0 | 1207.79 | 9 | 2 | 0.94 | 2415.52 | 2412 | 8 | 6.53E-04 | 41.2 | |
| 21 | 0 | 1211.40 | 13 | 7 | 1.36 | 2422.75 | 2419 | 9 | 8.96E-04 | 46.0 | |
| 22 | 0 | 1275.69 | 8 | 12 | 1.42 | 2551.36 | 2546 | 10 | 5.38E-04 | 92.4 | |
| 23 | 0 | 1296.81 | 15 | 8 | 2.85 | 2593.63 | 2584 | 15 | 1.07E-03 | 46.2 | |
| 24 | 0 | 1346.66 | 13 | 6 | 2.80 | 2693.37 | 2689 | 10 | 9.36E-04 | 41.7 | |
| 25 | 0 | 1371.52 | 7 | 3 | 1.36 | 2743.11 | 2740 | 6 | 5.14E-04 | 51.5 | |
| 26 | 0 | 1427.57 | 6 | 7 | 3.46 | 2855.26 | 2848 | 10 | 4.17E-04 | 93.9 | |
| 27 | 0 | 1438.20 | 5 | 11 | 0.52 | 2876.51 | 2869 | 12 | 3.39E-04 | 147.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:54:13

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146024.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 15:06:00 | Acquisition date | : 12-FEB-2014 11:53:30 |
| Sample ID | : G341146024 | Sample quantity | : 56.350 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA4 | Detector geometry | : JAR |
| Elapsed live time | : 0 04:00:00.00 | Elapsed real time | : 0 04:00:01.41 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NA-22 | 1274.54 | 8 | 99.94* | 8.379E-01 | 3.083E-02 | 3.308E-02 | 184.75 |
| NB-95 | 765.81 | 13 | 99.81* | 1.304E+00 | 3.350E-02 | 9.567E-02 | 169.94 |
| TL-208 | 277.37 | ------ | 6.60 | 2.730E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 20 | 85.00* | 1.608E+00 | 4.899E-02 | 4.899E-02 | 131.50 |
| | 860.56 | ------ | 12.50 | 1.184E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 1.810E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 18 | 12.92* | 2.307E+00 | 2.038E-01 | 2.038E-01 | 224.82 |
| TH-234 | 63.29 | 8 | 3.70* | 1.069E+00 | 7.025E-01 | 7.025E-01 | 330.59 |
| | 92.59 | 32 | 4.23 | 3.087E+00 | 8.220E-01 | 8.220E-01 | 136.38 |
| U-238 | 63.29 | 8 | 3.70* | 1.069E+00 | 7.025E-01 | 7.025E-01 | 330.59 |
| | 92.59 | 32 | 4.23 | 3.087E+00 | 8.220E-01 | 8.220E-01 | 136.38 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:54:13.87

```
**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146024.CNF;1    *
* Acquisition date : 12-FEB-2014 11:53:30 Sensitivity     : 3.000            *
* Detector ID      : GAM04                Energy tolerance: 1.500            *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 04:00:01.41     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 15:06:00 Nuclide Library : SOLID            *
* Sample ID        : G341146024           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 5.6350E+01 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 12-MAR-2013 11:51:00 Eff. Geometry   : JAR              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_JAR.CNF;6              *
**************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| NA-22 | 3.308E-02 | 5.990E-02 | 9.467E-02 |
| NB-95 | 9.567E-02 | 1.593E-01 | 1.888E-01 |
| TL-208 | 4.899E-02 | 6.313E-02 | 7.037E-02 |
| BI-211 | 2.038E-01 | 4.490E-01 | 4.479E-01 |
| TH-234 | 7.025E-01 | 2.276E+00 | 4.150E+00 |
| U-238 | 7.025E-01 | 2.276E+00 | 4.150E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 4.043E-01 | 1.154E+00 | 2.148E+00 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -9.219E-03 | 4.864E-02 | 8.282E-02 | NOT IDENT. |
| K-40 | 7.594E-01 | 4.873E-01 | 1.123E+00 | NOT IDENT. |
| SC-46 | 7.856E-03 | 9.659E-02 | 1.605E-01 | NOT IDENT. |
| V-48 | -3.771E-01 | 2.685E+00 | 4.955E+00 | NOT IDENT. |
| CR-51 | 9.200E-01 | 3.289E+00 | 6.140E+00 | NOT IDENT. |
| MN-54 | -3.308E-02 | 4.713E-02 | 8.084E-02 | NOT IDENT. |
| CO-56 | 2.985E-02 | 1.078E-01 | 1.839E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 7.781E-03 | 3.566E-02 | 6.369E-02 | NOT IDENT. |
| CO-58 | -1.005E-01 | 8.479E-02 | 1.335E-01 | NOT IDENT. |
| FE-59 | 3.097E-01 | 3.239E-01 | 6.944E-01 | NOT IDENT. |
| CO-60 | -7.165E-03 | 4.239E-02 | 8.159E-02 | NOT IDENT. |
| ZN-65 | 2.391E-03 | 1.103E-01 | 2.077E-01 | NOT IDENT. |
| GE-68 | 6.686E-01 | 1.629E+00 | 3.248E+00 | NOT IDENT. |
| AS-73 | 5.836E-01 | 5.042E+00 | 7.993E+00 | NOT IDENT. |
| AS-74 | -9.196E-01 | 2.795E+00 | 4.626E+00 | NOT IDENT. |
| SE-75 | 3.164E-02 | 8.466E-02 | 1.588E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.574E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.159E-01 | 3.661E+00 | 6.847E+00 | NOT IDENT. |
| RB-83 | 6.649E-02 | 1.527E-01 | 2.902E-01 | NOT IDENT. |
| KR-85 | -1.148E+01 | 1.518E+01 | 2.510E+01 | NOT IDENT. |
| SR-85 | -1.451E-01 | 1.900E-01 | 3.141E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 8.588E+00 | 1.814E+01 | 3.622E+01 | NOT IDENT. |
| Y-88 | 5.127E-02 | 9.659E-02 | 2.043E-01 | NOT IDENT. |
| Y-91 | 1.299E+01 | 6.277E+01 | 1.057E+02 | NOT IDENT. |
| NB-94 | -3.273E-02 | 5.116E-02 | 8.302E-02 | NOT IDENT. |
| NB-95M | 1.541E-01 | 3.636E-01 | 6.106E-01 | NOT IDENT. |
| ZR-95 | 4.179E-02 | 1.970E-01 | 3.714E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.350E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.053E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.060E-02 | 3.563E-02 | 6.136E-02 | NOT IDENT. |
| RH-102 | 6.273E-03 | 6.755E-02 | 1.285E-01 | FAIL ABUN |
| RU-103 | -7.314E-02 | 2.048E-01 | 3.555E-01 | NOT IDENT. |
| RH-106 | -1.947E-01 | 6.031E-01 | 8.845E-01 | NOT IDENT. |
| RU-106 | -1.947E-01 | 6.031E-01 | 8.845E-01 | NOT IDENT. |
| AG-108M | -1.174E-02 | 3.409E-02 | 5.978E-02 | NOT IDENT. |
| CD-109 | 4.602E-02 | 1.330E+00 | 1.852E+00 | NOT IDENT. |
| AG-110M | 4.839E-03 | 7.207E-02 | 1.363E-01 | FAIL ABUN |
| SN-113 | 3.251E-03 | 9.122E-02 | 1.602E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.392E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.311E+00 | 3.874E+00 | 7.031E+00 | NOT IDENT. |
| TE-123M | 6.192E-02 | 4.969E-02 | 9.409E-02 | NOT IDENT. |
| SB-124 | -1.682E-01 | 3.041E-01 | 5.341E-01 | FAIL ABUN |
| SB-125 | 2.933E-02 | 1.098E-01 | 2.047E-01 | NOT IDENT. |
| TE-125M | 5.621E+00 | 3.057E+01 | 5.462E+01 | NOT IDENT. |
| I-126 | -1.365E+01 | 1.867E+01 | 3.253E+01 | NOT IDENT. |
| SB-126 | -7.736E+00 | 1.715E+01 | 3.061E+01 | NOT IDENT. |
| SN-126 | -4.242E-02 | 1.094E-01 | 1.566E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 3.825E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.831E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 3.888E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -3.820E-03 | 5.791E-02 | 9.171E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.162E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.790E-02 | 4.835E-02 | 9.691E-02 | FAIL ABUN |
| CS-135 | -1.073E-02 | 1.778E-01 | 3.240E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.857E+00 | 8.349E+00 | 1.649E+01 | NOT IDENT. |
| BA-137M | -1.690E-02 | 4.075E-02 | 6.911E-02 | NOT IDENT. |
| CS-137 | -1.786E-02 | 4.305E-02 | 7.301E-02 | NOT IDENT. |
| CE-139 | -2.604E-02 | 5.343E-02 | 8.338E-02 | NOT IDENT. |
| BA-140 | -9.782E-01 | 9.150E+00 | 1.769E+01 | NOT IDENT. |
| LA-140 | -9.782E-01 | 9.150E+00 | 1.769E+01 | NOT IDENT. |
| CE-141 | -2.278E-03 | 4.163E-01 | 6.493E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.092E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.470E-01 | 2.874E-01 | 5.294E-01 | NOT IDENT. |
| PM-144 | 4.127E-02 | 5.358E-02 | 1.058E-01 | NOT IDENT. |
| PR-144 | 3.242E+00 | 4.187E+00 | 8.274E+00 | NOT IDENT. |
| PM-146 | 1.385E-02 | 4.893E-02 | 9.140E-02 | NOT IDENT. |
| ND-147 | -1.028E+02 | 1.405E+02 | 1.940E+02 | NOT IDENT. |
| PM-147 | 4.242E+02 | 8.899E+02 | 1.618E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.528E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | 6.490E-03 | 3.648E-02 | 5.946E-02 | FAIL ABUN |
| EU-152 | -6.963E-02 | 1.446E-01 | 2.151E-01 | NOT IDENT. |
| GD-153 | 9.390E-02 | 1.223E-01 | 2.287E-01 | NOT IDENT. |
| EU-154 | 8.993E-02 | 1.628E-01 | 2.785E-01 | FAIL ABUN |
| EU-155 | -5.046E-02 | 1.238E-01 | 2.132E-01 | NOT IDENT. |
| TB-160 | 9.179E-02 | 3.378E-01 | 6.540E-01 | NOT IDENT. |
| HO-166M | -6.131E-02 | 7.343E-02 | 1.255E-01 | FAIL ABUN |
| TM-171 | 4.637E+00 | 5.881E+01 | 9.253E+01 | FAIL ABUN |
| LU-176 | -1.123E-02 | 3.109E-02 | 5.518E-02 | NOT IDENT. |
| HF-181 | -3.956E-02 | 1.993E-01 | 3.526E-01 | NOT IDENT. |
| TA-182 | 4.353E-02 | 2.591E-01 | 5.084E-01 | NOT IDENT. |
| RE-183 | -3.239E-01 | 8.302E-01 | 1.474E+00 | FAIL ABUN |
| RE-184 | -1.607E-01 | 7.166E-01 | 1.304E+00 | FAIL ABUN |
| W-188 | -6.490E+00 | 1.884E+01 | 3.355E+01 | FAIL ABUN |
| IR-192 | 8.749E-04 | 8.825E-02 | 1.611E-01 | NOT IDENT. |
| HG-203 | -8.601E-02 | 1.446E-01 | 2.532E-01 | NOT IDENT. |
| BI-207 | -6.908E-03 | 5.598E-02 | 1.033E-01 | NOT IDENT. |
| PB-210 | -5.247E+00 | 1.573E+01 | 2.442E+01 | NOT IDENT. |
| PB-211 | -1.711E-01 | 8.356E-01 | 1.487E+00 | NOT IDENT. |
| BI-212 | 3.813E-01 | 5.880E-01 | 1.172E+00 | NOT IDENT. |
| PB-212 | 2.545E-03 | 1.273E-01 | 1.439E-01 | FAIL ABUN |
| BI-214 | 5.694E-03 | 1.444E-01 | 1.864E-01 | NOT IDENT. |
| PB-214 | 7.398E-02 | 1.630E-01 | 1.810E-01 | FAIL ABUN |
| RN-219 | -1.089E-02 | 5.072E-01 | 8.087E-01 | NOT IDENT. |
| RN-222 | 5.694E-03 | 1.444E-01 | 1.864E-01 | NOT IDENT. |
| RA-223 | -7.435E-01 | 7.296E-01 | 1.219E+00 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | -6.774E-02 | 8.544E-01 | 1.275E+00 | NOT IDENT. |
| RA-226 | 5.694E-03 | 1.444E-01 | 1.864E-01 | NOT IDENT. |
| AC-227 | -2.107E-01 | 3.134E-01 | 5.472E-01 | NOT IDENT. |
| TH-227 | -2.107E-01 | 3.134E-01 | 5.472E-01 | NOT IDENT. |
| AC-228 | 1.345E-01 | 1.820E-01 | 3.624E-01 | FAIL ABUN |
| RA-228 | 1.345E-01 | 1.820E-01 | 3.624E-01 | FAIL ABUN |
| TH-228 | 2.545E-03 | 1.273E-01 | 1.439E-01 | FAIL ABUN |
| TH-229 | -7.064E-02 | 5.767E-01 | 9.866E-01 | FAIL ABUN |
| TH-230 | 5.693E-03 | 1.444E-01 | 1.864E-01 | NOT IDENT. |
| PA-231 | 7.524E-01 | 1.711E+00 | 3.221E+00 | NOT IDENT. |
| TH-231 | -7.435E-01 | 7.296E-01 | 1.219E+00 | FAIL ABUN |
| TH-232 | 1.345E-01 | 1.820E-01 | 3.624E-01 | FAIL ABUN |
| PA-233 | 6.314E-02 | 7.745E-02 | 1.496E-01 | NOT IDENT. |
| PA-234 | -2.935E-03 | 3.174E-01 | 5.990E-01 | NOT IDENT. |
| PA-234M | -2.058E-01 | 5.194E+00 | 9.229E+00 | FAIL ABUN |
| U-234 | 5.693E-03 | 1.444E-01 | 1.864E-01 | NOT IDENT. |
| U-235 | 1.544E-01 | 2.350E-01 | 3.893E-01 | FAIL ABUN |
| NP-237 | 6.314E-02 | 7.745E-02 | 1.496E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.092E+13 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.165E-01 | 4.126E-01 | 7.162E-01 | NOT IDENT. |
| PU-239 | -3.492E+01 | 3.807E+02 | 6.634E+02 | NOT IDENT. |
| AM-241 | -1.879E-01 | 2.766E-01 | 4.540E-01 | NOT IDENT. |
| AM-243 | -7.820E-03 | 8.823E-02 | 1.356E-01 | NOT IDENT. |
| CM-243 | 6.608E-02 | 1.209E-01 | 2.227E-01 | NOT IDENT. |
| CM-247 | -5.834E-03 | 4.857E-02 | 7.620E-02 | NOT IDENT. |
| CF-249 | -3.850E-02 | 4.734E-02 | 7.955E-02 | NOT IDENT. |
| CF-251 | 1.234E-01 | 1.479E-01 | 2.708E-01 | NOT IDENT. |
| ANH-511 | -1.075E-01 | 8.628E-02 | 1.503E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:54:09.92

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.87 | 10 | 101 | 1.35 | 107.55 | 103 | 8 | 6.76E-04 | 182.4 | |
| 2 | 0 | 63.32 | 28 | 47 | 0.96 | 126.44 | 125 | 4 | 1.97E-03 | 38.6 | |
| 3 | 0 | 65.93 | 45 | 85 | 0.71 | 131.66 | 129 | 7 | 3.14E-03 | 37.0 | |
| 4 | 0 | 84.57 | 31 | 89 | 1.53 | 168.94 | 166 | 7 | 2.15E-03 | 53.6 | |
| 5 | 0 | 92.77 | 89 | 98 | 1.07 | 185.34 | 182 | 7 | 6.21E-03 | 21.2 | |
| 6 | 0 | 140.82 | 27 | 97 | 1.28 | 281.43 | 279 | 7 | 1.87E-03 | 63.6 | |
| 7 | 0 | 185.80 | 70 | 141 | 1.27 | 371.36 | 367 | 10 | 4.87E-03 | 33.8 | |
| 8 | 0 | 238.43 | 37 | 146 | 0.99 | 476.62 | 471 | 11 | 2.56E-03 | 65.6 | |
| 9 | 0 | 338.90 | 26 | 60 | 1.57 | 677.53 | 673 | 9 | 1.78E-03 | 58.3 | |
| 10 | 0 | 352.16 | 46 | 71 | 4.08 | 704.04 | 698 | 13 | 3.20E-03 | 40.5 | |
| 11 | 0 | 398.67 | 13 | 44 | 2.28 | 797.06 | 791 | 10 | 9.00E-04 | 100.4 | |
| 12 | 0 | 511.66 | 272 | 61 | 2.35 | 1023.03 | 1016 | 16 | 1.89E-02 | 8.9 | |
| 13 | 0 | 556.82 | 33 | 39 | 4.22 | 1113.36 | 1107 | 14 | 2.32E-03 | 43.0 | |
| 14 | 0 | 583.89 | 34 | 31 | 1.44 | 1167.50 | 1163 | 11 | 2.36E-03 | 35.8 | |
| 15 | 0 | 604.05 | 16 | 66 | 1.58 | 1207.82 | 1200 | 14 | 1.11E-03 | 111.3 | |
| 16 | 0 | 625.02 | 15 | 34 | 1.45 | 1249.75 | 1242 | 10 | 1.01E-03 | 80.3 | |
| 17 | 0 | 656.86 | 8 | 25 | 0.88 | 1313.44 | 1305 | 10 | 5.56E-04 | 122.2 | |
| 18 | 0 | 765.51 | 13 | 25 | 3.65 | 1530.75 | 1523 | 14 | 9.09E-04 | 85.0 | |
| 19 | 0 | 851.80 | 12 | 18 | 0.82 | 1703.37 | 1694 | 12 | 8.61E-04 | 73.9 | |
| 20 | 0 | 894.88 | 11 | 13 | 1.31 | 1789.53 | 1783 | 10 | 7.93E-04 | 65.1 | |
| 21 | 0 | 1155.06 | 10 | 6 | 1.82 | 2310.03 | 2305 | 8 | 7.20E-04 | 51.0 | |
| 22 | 0 | 1207.79 | 9 | 2 | 0.94 | 2415.52 | 2412 | 8 | 6.53E-04 | 41.2 | |
| 23 | 0 | 1211.40 | 13 | 7 | 1.36 | 2422.75 | 2419 | 9 | 8.96E-04 | 46.0 | |
| 24 | 0 | 1275.69 | 8 | 12 | 1.42 | 2551.36 | 2546 | 10 | 5.38E-04 | 92.4 | |
| 25 | 0 | 1296.81 | 15 | 8 | 2.85 | 2593.63 | 2584 | 15 | 1.07E-03 | 46.2 | |
| 26 | 0 | 1346.66 | 13 | 6 | 2.80 | 2693.37 | 2689 | 10 | 9.36E-04 | 41.7 | |
| 27 | 0 | 1371.52 | 7 | 3 | 1.36 | 2743.11 | 2740 | 6 | 5.14E-04 | 51.5 | |
| 28 | 0 | 1427.57 | 6 | 7 | 3.46 | 2855.26 | 2848 | 10 | 4.17E-04 | 93.9 | |
| 29 | 0 | 1438.20 | 5 | 11 | 0.52 | 2876.51 | 2869 | 12 | 3.39E-04 | 147.9 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:54:12.16

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NA-22 | 1274.54 | 8 | 99.94* | 8.379E-01 | 3.083E-02 | 3.308E-02 | 184.75 |
| NB-95 | 765.81 | 13 | 99.81* | 1.304E+00 | 3.350E-02 | 9.567E-02 | 169.94 |
| TL-208 | 277.37 | ------ | 6.60 | 2.730E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 20 | 85.00* | 1.608E+00 | 4.899E-02 | 4.899E-02 | 131.50 |
| | 860.56 | ------ | 12.50 | 1.184E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 1.810E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 18 | 12.92* | 2.307E+00 | 2.038E-01 | 2.038E-01 | 224.82 |
| TH-234 | 63.29 | 8 | 3.70* | 1.069E+00 | 7.025E-01 | 7.025E-01 | 330.59 |
| | 92.59 | 32 | 4.23 | 3.087E+00 | 8.220E-01 | 8.220E-01 | 136.38 |
| U-238 | 63.29 | 8 | 3.70* | 1.069E+00 | 7.025E-01 | 7.025E-01 | 330.59 |
| | 92.59 | 32 | 4.23 | 3.087E+00 | 8.220E-01 | 8.220E-01 | 136.38 |

Flag: "*" = Keyline

Sample ID : G341146024 Acquisition date : 12-FEB-2014 11:53:30

| | | |
|---|---|---|
| Total number of lines in spectrum | 27 | |
| Number of unidentified lines | 11 | |
| Number of lines tentatively identified by NID | 16 | 59.26% |

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| NA-22 | 2.60Y | 1.07 | 3.083E-02 | 3.308E-02 | 6.112E-02 | 184.75 | |
| NB-95 | 64.03D | 2.86 | 3.350E-02 | 9.567E-02 | 16.26E-02 | 169.94 | |
| TL-208 | 1.41E+10Y | 1.00 | 4.899E-02 | 4.899E-02 | 6.442E-02 | 131.50 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.038E-01 | 2.038E-01 | 4.582E-01 | 224.82 | |
| TH-234 | 4.47E+09Y | 1.00 | 7.025E-01 | 7.025E-01 | 23.22E-01 | 330.59 | |
| U-238 | 4.47E+09Y | 1.00 | 7.025E-01 | 7.025E-01 | 23.22E-01 | 330.59 | |
| | Total Activity : | | 1.722E+00 | 1.786E+00 | | | |
| | Grand Total Activity : | | 1.722E+00 | 1.786E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341146024 Acquisition date : 12-FEB-2014 11:53:30

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 65.93 | 45 | 85 | 0.71 | 131.66 | 129 | 7 | 3.14E-03 | 74.0 | 1.27E+00 | T |
| 0 | 84.57 | 13 | 89 | 1.53 | 168.94 | 166 | 7 | 8.87E-04 | **** | 2.64E+00 | T |
| 0 | 140.82 | 13 | 97 | 1.28 | 281.43 | 279 | 7 | 9.37E-04 | **** | 3.88E+00 | T |
| 0 | 185.80 | 24 | 141 | 1.27 | 371.36 | 367 | 10 | 1.67E-03 | **** | 3.53E+00 | T |
| 0 | 238.43 | 1 | 146 | 0.99 | 476.62 | 471 | 11 | 7.01E-05 | **** | 3.03E+00 | T |
| 0 | 338.90 | 17 | 60 | 1.57 | 677.53 | 673 | 9 | 1.16E-03 | **** | 2.37E+00 | T |
| 0 | 398.67 | 13 | 44 | 2.28 | 797.06 | 791 | 10 | 9.00E-04 | **** | 2.11E+00 | |
| 0 | 556.82 | 33 | 39 | 4.22 | 1113.36 | 1107 | 14 | 2.32E-03 | 86.0 | 1.67E+00 | |
| 0 | 604.05 | 16 | 66 | 1.58 | 1207.82 | 1200 | 14 | 1.11E-03 | **** | 1.57E+00 | T |
| 0 | 625.02 | 15 | 34 | 1.45 | 1249.75 | 1242 | 10 | 1.01E-03 | **** | 1.53E+00 | |
| 0 | 656.86 | 8 | 25 | 0.88 | 1313.44 | 1305 | 10 | 5.56E-04 | **** | 1.47E+00 | T |
| 0 | 851.80 | 12 | 18 | 0.82 | 1703.37 | 1694 | 12 | 8.61E-04 | **** | 1.19E+00 | |
| 0 | 894.88 | 11 | 13 | 1.31 | 1789.53 | 1783 | 10 | 7.93E-04 | **** | 1.15E+00 | T |
| 0 | 1155.06 | 10 | 6 | 1.82 | 2310.03 | 2305 | 8 | 7.20E-04 | **** | 9.15E-01 | |
| 0 | 1207.79 | 9 | 2 | 0.94 | 2415.52 | 2412 | 8 | 6.53E-04 | 82.3 | 8.80E-01 | |
| 0 | 1211.40 | 13 | 7 | 1.36 | 2422.75 | 2419 | 9 | 8.96E-04 | 92.0 | 8.77E-01 | |
| 0 | 1296.81 | 15 | 8 | 2.85 | 2593.63 | 2584 | 15 | 1.07E-03 | 92.4 | 8.26E-01 | T |
| 0 | 1346.66 | 13 | 6 | 2.80 | 2693.37 | 2689 | 10 | 9.36E-04 | 83.3 | 7.99E-01 | |
| 0 | 1371.52 | 7 | 3 | 1.36 | 2743.11 | 2740 | 6 | 5.14E-04 | **** | 7.86E-01 | |
| 0 | 1427.57 | 6 | 7 | 3.46 | 2855.26 | 2848 | 10 | 4.17E-04 | **** | 7.60E-01 | |
| 0 | 1438.20 | 5 | 11 | 0.52 | 2876.51 | 2869 | 12 | 3.39E-04 | **** | 7.55E-01 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:54:23.90

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146024.CNF;1    *
* Acquisition date : 12-FEB-2014 11:53:30 Sensitivity     : 3.000          *
* Detector ID      : GAM04                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:01.41     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:06:00 Nuclide Library : SOLID          *
* Sample ID        : G341146024           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 5.6350E+01 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-MAR-2013 11:51:00 Eff. Geometry   : JAR           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_JAR.CNF;6           *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| NA-22 | 4.158E-02 |
| NB-95 | 8.456E-02 |
| TL-208 | 3.190E-02 |
| BI-211 | 2.090E-01 |
| TH-234 | 1.962E+00 |
| U-238 | 1.962E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 9.925E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.432E-02 | NOT IDENT. |
| K-40 | 5.048E-01 | NOT IDENT. |
| SC-46 | 7.156E-02 | NOT IDENT. |
| V-48 | 2.191E+00 | NOT IDENT. |
| CR-51 | 2.863E+00 | NOT IDENT. |
| MN-54 | 3.583E-02 | NOT IDENT. |
| CO-56 | 8.301E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 3.011E-02 | NOT IDENT. |
| CO-58 | 5.739E-02 | NOT IDENT. |
| FE-59 | 3.096E-01 | NOT IDENT. |
| CO-60 | 3.502E-02 | NOT IDENT. |
| ZN-65 | 9.147E-02 | NOT IDENT. |
| GE-68 | 1.440E+00 | NOT IDENT. |
| AS-73 | 3.762E+00 | NOT IDENT. |
| AS-74 | 2.102E+00 | NOT IDENT. |
| SE-75 | 7.469E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 3.096E+00 | NOT IDENT. |
| RB-83 | 1.327E-01 | NOT IDENT. |
| KR-85 | 1.196E+01 | NOT IDENT. |
| SR-85 | 1.496E-01 | NOT IDENT. |
| RB-86 | 1.615E+01 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 8.863E-02 | NOT IDENT. |
| Y-91 | 4.669E+01 | NOT IDENT. |
| NB-94 | 3.829E-02 | NOT IDENT. |
| NB-95M | 2.884E-01 | NOT IDENT. |
| ZR-95 | 1.678E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.889E-02 | NOT IDENT. |
| RH-102 | 5.872E-02 | FAIL ABUN |
| RU-103 | 1.627E-01 | NOT IDENT. |
| RH-106 | 4.070E-01 | NOT IDENT. |
| RU-106 | 4.070E-01 | NOT IDENT. |
| AG-108M | 2.740E-02 | NOT IDENT. |
| CD-109 | 8.769E-01 | NOT IDENT. |
| AG-110M | 6.117E-02 | FAIL ABUN |
| SN-113 | 7.434E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.324E+00 | NOT IDENT. |
| TE-123M | 4.457E-02 | NOT IDENT. |
| SB-124 | 2.236E-01 | FAIL ABUN |
| SB-125 | 9.436E-02 | NOT IDENT. |
| TE-125M | 2.585E+01 | NOT IDENT. |
| I-126 | 1.457E+01 | NOT IDENT. |
| SB-126 | 1.390E+01 | NOT IDENT. |
| SN-126 | 7.403E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 4.265E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.391E-02 | FAIL ABUN |
| CS-135 | 1.520E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.314E+00 | NOT IDENT. |
| BA-137M | 3.112E-02 | NOT IDENT. |
| CS-137 | 3.288E-02 | NOT IDENT. |
| CE-139 | 3.924E-02 | NOT IDENT. |
| BA-140 | 7.522E+00 | NOT IDENT. |
| LA-140 | 7.522E+00 | NOT IDENT. |
| CE-141 | 3.057E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.516E-01 | NOT IDENT. |
| PM-144 | 4.907E-02 | NOT IDENT. |
| PR-144 | 3.836E+00 | NOT IDENT. |
| PM-146 | 4.200E-02 | NOT IDENT. |
| ND-147 | 8.794E+01 | NOT IDENT. |
| PM-147 | 7.652E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.778E-02 | FAIL ABUN |
| EU-152 | 1.003E-01 | NOT IDENT. |
| GD-153 | 1.081E-01 | NOT IDENT. |
| EU-154 | 1.236E-01 | FAIL ABUN |
| EU-155 | 1.004E-01 | NOT IDENT. |
| TB-160 | 2.945E-01 | NOT IDENT. |
| HO-166M | 5.675E-02 | FAIL ABUN |
| TM-171 | 4.347E+01 | FAIL ABUN |
| LU-176 | 2.571E-02 | NOT IDENT. |
| HF-181 | 1.616E-01 | NOT IDENT. |
| TA-182 | 2.198E-01 | NOT IDENT. |
| RE-183 | 6.877E-01 | FAIL ABUN |
| RE-184 | 5.829E-01 | FAIL ABUN |
| W-188 | 1.567E+01 | FAIL ABUN |
| IR-192 | 7.516E-02 | NOT IDENT. |
| HG-203 | 1.180E-01 | NOT IDENT. |
| BI-207 | 4.548E-02 | NOT IDENT. |
| PB-210 | 1.152E+01 | NOT IDENT. |
| PB-211 | 6.868E-01 | NOT IDENT. |
| BI-212 | 5.367E-01 | NOT IDENT. |
| PB-212 | 6.855E-02 | FAIL ABUN |
| BI-214 | 8.688E-02 | NOT IDENT. |
| PB-214 | 8.505E-02 | FAIL ABUN |
| RN-219 | 3.720E-01 | NOT IDENT. |
| RN-222 | 8.688E-02 | NOT IDENT. |
| RA-223 | 5.635E-01 | FAIL ABUN |
| RA-224 | 6.011E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 8.688E-02 | NOT IDENT. |
| AC-227 | 2.573E-01 | NOT IDENT. |
| TH-227 | 2.573E-01 | NOT IDENT. |
| AC-228 | 1.658E-01 | FAIL ABUN |
| RA-228 | 1.658E-01 | FAIL ABUN |
| TH-228 | 6.855E-02 | FAIL ABUN |
| TH-229 | 4.639E-01 | FAIL ABUN |
| TH-230 | 8.687E-02 | NOT IDENT. |
| PA-231 | 1.512E+00 | NOT IDENT. |
| TH-231 | 5.635E-01 | FAIL ABUN |
| TH-232 | 1.658E-01 | FAIL ABUN |
| PA-233 | 7.016E-02 | NOT IDENT. |
| PA-234 | 2.652E-01 | NOT IDENT. |
| PA-234M | 4.100E+00 | FAIL ABUN |
| U-234 | 8.687E-02 | NOT IDENT. |
| U-235 | 1.841E-01 | FAIL ABUN |
| NP-237 | 7.016E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 3.356E-01 | NOT IDENT. |
| PU-239 | 3.135E+02 | NOT IDENT. |
| AM-241 | 2.113E-01 | NOT IDENT. |
| AM-243 | 6.437E-02 | NOT IDENT. |
| CM-243 | 1.052E-01 | NOT IDENT. |
| CM-247 | 3.513E-02 | NOT IDENT. |
| CF-249 | 3.662E-02 | NOT IDENT. |
| CF-251 | 1.283E-01 | NOT IDENT. |
| ANH-511 | 7.264E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:54:28.50

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341146024.CNF;1    *
* Acquisition date : 12-FEB-2014 11:53:30 Sensitivity     : 3.000          *
* Detector ID      : GAM04                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:01.41     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:06:00 Nuclide Library : SOLID          *
* Sample ID        : G341146024           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 5.6350E+01 GRAM   *
*                                         Quantity Err(%) : 1.7746E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-MAR-2013 11:51:00 Eff. Geometry   : JAR           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_JAR.CNF;6           *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| NA-22 | 3.308E-02 | 5.996E-02 | 5.996E-02 |
| NB-95 | 9.567E-02 | 1.597E-01 | 1.597E-01 |
| TL-208 | 4.899E-02 | 6.328E-02 | 6.328E-02 |
| BI-211 | 2.038E-01 | 4.494E-01 | 4.494E-01 |
| TH-234 | 7.025E-01 | 2.282E+00 | 2.282E+00 |
| U-238 | 7.025E-01 | 2.282E+00 | 2.282E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 4.043E-01 | 1.155E+00 | 1.169E+00 | NOT IDENT. |
| NA-24 | 1.000E+41 | 2.338E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -9.219E-03 | 4.865E-02 | 4.883E-02 | NOT IDENT. |
| K-40 | 7.594E-01 | 4.918E-01 | 5.992E-01 | NOT IDENT. |
| SC-46 | 7.856E-03 | 9.660E-02 | 9.666E-02 | NOT IDENT. |
| V-48 | -3.771E-01 | 2.686E+00 | 2.691E+00 | NOT IDENT. |
| CR-51 | 9.200E-01 | 3.290E+00 | 3.316E+00 | NOT IDENT. |
| MN-54 | -3.308E-02 | 4.732E-02 | 4.961E-02 | NOT IDENT. |
| CO-56 | 2.985E-02 | 1.079E-01 | 1.088E-01 | NOT IDENT. |
| MN-56 | 1.000E+41 | 3.679E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 7.781E-03 | 3.567E-02 | 3.585E-02 | NOT IDENT. |
| CO-58 | -1.005E-01 | 8.565E-02 | 9.689E-02 | NOT IDENT. |
| FE-59 | 3.097E-01 | 3.290E-01 | 3.574E-01 | NOT IDENT. |
| CO-60 | -7.165E-03 | 4.239E-02 | 4.251E-02 | NOT IDENT. |
| ZN-65 | 2.391E-03 | 1.103E-01 | 1.103E-01 | NOT IDENT. |
| GE-68 | 6.686E-01 | 1.633E+00 | 1.661E+00 | NOT IDENT. |
| AS-73 | 5.836E-01 | 5.043E+00 | 5.050E+00 | NOT IDENT. |
| AS-74 | -9.196E-01 | 2.797E+00 | 2.827E+00 | NOT IDENT. |
| SE-75 | 3.164E-02 | 8.472E-02 | 8.591E-02 | NOT IDENT. |
| BR-77 | 9.147E+09 | 4.581E+11 | 4.581E+11 | SHORT HLIF |
| SR-82 | -1.159E-01 | 3.661E+00 | 3.662E+00 | NOT IDENT. |
| RB-83 | 6.649E-02 | 1.531E-01 | 1.560E-01 | NOT IDENT. |
| KR-85 | -1.148E+01 | 1.521E+01 | 1.607E+01 | NOT IDENT. |
| SR-85 | -1.451E-01 | 1.905E-01 | 2.014E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 8.588E+00 | 1.820E+01 | 1.861E+01 | NOT IDENT. |
| Y-88 | 5.127E-02 | 9.668E-02 | 9.940E-02 | NOT IDENT. |
| Y-91 | 1.299E+01 | 6.278E+01 | 6.306E+01 | NOT IDENT. |
| NB-94 | -3.273E-02 | 5.126E-02 | 5.334E-02 | NOT IDENT. |
| NB-95M | 1.541E-01 | 3.640E-01 | 3.705E-01 | NOT IDENT. |
| ZR-95 | 4.179E-02 | 1.970E-01 | 1.979E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.396E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.000E+41 | 2.503E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -8.550E+08 | 1.053E+10 | 1.054E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.770E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.060E-02 | 3.570E-02 | 3.601E-02 | NOT IDENT. |
| RH-102 | 6.273E-03 | 6.755E-02 | 6.761E-02 | FAIL ABUN |
| RU-103 | -7.314E-02 | 2.049E-01 | 2.076E-01 | NOT IDENT. |
| RH-106 | -1.947E-01 | 6.034E-01 | 6.097E-01 | NOT IDENT. |
| RU-106 | -1.947E-01 | 6.034E-01 | 6.097E-01 | NOT IDENT. |
| AG-108M | -1.174E-02 | 3.410E-02 | 3.451E-02 | NOT IDENT. |
| CD-109 | 4.602E-02 | 1.330E+00 | 1.330E+00 | NOT IDENT. |
| AG-110M | 4.839E-03 | 7.207E-02 | 7.210E-02 | FAIL ABUN |
| SN-113 | 3.251E-03 | 9.122E-02 | 9.123E-02 | NOT IDENT. |
| CD-115 | 1.873E+11 | 1.392E+12 | 1.394E+12 | SHORT HLIF |
| SN-117M | 2.311E+00 | 3.880E+00 | 4.017E+00 | NOT IDENT. |
| TE-123M | 6.192E-02 | 4.994E-02 | 5.721E-02 | NOT IDENT. |
| SB-124 | -1.682E-01 | 3.044E-01 | 3.137E-01 | FAIL ABUN |
| SB-125 | 2.933E-02 | 1.099E-01 | 1.107E-01 | NOT IDENT. |
| TE-125M | 5.621E+00 | 3.057E+01 | 3.068E+01 | NOT IDENT. |
| I-126 | -1.365E+01 | 1.873E+01 | 1.971E+01 | NOT IDENT. |
| SB-126 | -7.736E+00 | 1.719E+01 | 1.754E+01 | NOT IDENT. |
| SN-126 | -4.242E-02 | 1.095E-01 | 1.111E-01 | FAIL ABUN |
| SB-127 | -1.832E+06 | 3.914E+06 | 4.001E+06 | SHORT HLIF |
| I-131 | 5.705E+01 | 1.831E+02 | 1.849E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.573E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -2.979E+06 | 3.889E+07 | 3.891E+07 | SHORT HLIF |
| BA-133 | -3.820E-03 | 5.791E-02 | 5.794E-02 | NOT IDENT. |
| I-133 | -1.008E+32 | 2.243E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.790E-02 | 4.846E-02 | 5.006E-02 | FAIL ABUN |
| CS-135 | -1.073E-02 | 1.778E-01 | 1.779E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 3.765E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.857E+00 | 8.365E+00 | 8.464E+00 | NOT IDENT. |
| BA-137M | -1.690E-02 | 4.078E-02 | 4.148E-02 | NOT IDENT. |
| CS-137 | -1.786E-02 | 4.308E-02 | 4.382E-02 | NOT IDENT. |
| CE-139 | -2.604E-02 | 5.372E-02 | 5.498E-02 | NOT IDENT. |
| BA-140 | -9.782E-01 | 9.150E+00 | 9.161E+00 | NOT IDENT. |
| LA-140 | -9.782E-01 | 9.150E+00 | 9.161E+00 | NOT IDENT. |
| CE-141 | -2.278E-03 | 4.163E-01 | 4.163E-01 | NOT IDENT. |
| CE-143 | -3.648E+19 | 1.093E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.470E-01 | 2.885E-01 | 3.092E-01 | NOT IDENT. |
| PM-144 | 4.127E-02 | 5.373E-02 | 5.686E-02 | NOT IDENT. |
| PR-144 | 3.242E+00 | 4.199E+00 | 4.446E+00 | NOT IDENT. |
| PM-146 | 1.385E-02 | 4.895E-02 | 4.935E-02 | NOT IDENT. |
| ND-147 | -1.028E+02 | 1.408E+02 | 1.483E+02 | NOT IDENT. |
| PM-147 | 4.242E+02 | 8.910E+02 | 9.113E+02 | NOT IDENT. |
| PM-149 | 8.848E+12 | 1.536E+13 | 1.587E+13 | SHORT HLIF |
| EU-150 | 6.490E-03 | 3.649E-02 | 3.660E-02 | FAIL ABUN |
| EU-152 | -6.963E-02 | 1.448E-01 | 1.482E-01 | NOT IDENT. |
| GD-153 | 9.390E-02 | 1.225E-01 | 1.297E-01 | NOT IDENT. |
| EU-154 | 8.993E-02 | 1.630E-01 | 1.680E-01 | FAIL ABUN |
| EU-155 | -5.046E-02 | 1.239E-01 | 1.260E-01 | NOT IDENT. |
| TB-160 | 9.179E-02 | 3.380E-01 | 3.405E-01 | NOT IDENT. |
| HO-166M | -6.131E-02 | 7.371E-02 | 7.873E-02 | FAIL ABUN |
| TM-171 | 4.637E+00 | 5.881E+01 | 5.885E+01 | FAIL ABUN |
| LU-176 | -1.123E-02 | 3.111E-02 | 3.152E-02 | NOT IDENT. |
| HF-181 | -3.956E-02 | 1.993E-01 | 2.001E-01 | NOT IDENT. |
| TA-182 | 4.353E-02 | 2.591E-01 | 2.599E-01 | NOT IDENT. |
| RE-183 | -3.239E-01 | 8.312E-01 | 8.439E-01 | FAIL ABUN |
| RE-184 | -1.607E-01 | 7.171E-01 | 7.208E-01 | FAIL ABUN |
| W-188 | -6.490E+00 | 1.887E+01 | 1.909E+01 | FAIL ABUN |
| IR-192 | 8.749E-04 | 8.825E-02 | 8.825E-02 | NOT IDENT. |
| HG-203 | -8.601E-02 | 1.449E-01 | 1.500E-01 | NOT IDENT. |
| BI-207 | -6.908E-03 | 5.599E-02 | 5.608E-02 | NOT IDENT. |
| PB-210 | -5.247E+00 | 1.574E+01 | 1.592E+01 | NOT IDENT. |
| PB-211 | -1.711E-01 | 8.358E-01 | 8.393E-01 | NOT IDENT. |
| BI-212 | 3.813E-01 | 5.893E-01 | 6.139E-01 | NOT IDENT. |
| PB-212 | 2.545E-03 | 1.273E-01 | 1.273E-01 | FAIL ABUN |
| BI-214 | 5.694E-03 | 1.444E-01 | 1.444E-01 | NOT IDENT. |
| PB-214 | 7.398E-02 | 1.631E-01 | 1.665E-01 | FAIL ABUN |
| RN-219 | -1.089E-02 | 5.072E-01 | 5.072E-01 | NOT IDENT. |
| RN-222 | 5.694E-03 | 1.444E-01 | 1.444E-01 | NOT IDENT. |
| RA-223 | -7.435E-01 | 7.339E-01 | 8.068E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | -6.774E-02 | 8.544E-01 | 8.550E-01 | NOT IDENT. |
| RA-226 | 5.694E-03 | 1.444E-01 | 1.444E-01 | NOT IDENT. |
| AC-227 | -2.107E-01 | 3.152E-01 | 3.292E-01 | NOT IDENT. |
| TH-227 | -2.107E-01 | 3.152E-01 | 3.292E-01 | NOT IDENT. |
| AC-228 | 1.345E-01 | 1.830E-01 | 1.928E-01 | FAIL ABUN |
| RA-228 | 1.345E-01 | 1.830E-01 | 1.928E-01 | FAIL ABUN |
| TH-228 | 2.545E-03 | 1.273E-01 | 1.273E-01 | FAIL ABUN |
| TH-229 | -7.064E-02 | 5.768E-01 | 5.777E-01 | FAIL ABUN |
| TH-230 | 5.693E-03 | 1.444E-01 | 1.444E-01 | NOT IDENT. |
| PA-231 | 7.524E-01 | 1.713E+00 | 1.746E+00 | NOT IDENT. |
| TH-231 | -7.435E-01 | 7.339E-01 | 8.068E-01 | FAIL ABUN |
| TH-232 | 1.345E-01 | 1.830E-01 | 1.928E-01 | FAIL ABUN |
| PA-233 | 6.314E-02 | 7.772E-02 | 8.277E-02 | NOT IDENT. |
| PA-234 | -2.935E-03 | 3.174E-01 | 3.174E-01 | NOT IDENT. |
| PA-234M | -2.058E-01 | 5.194E+00 | 5.195E+00 | FAIL ABUN |
| U-234 | 5.693E-03 | 1.444E-01 | 1.444E-01 | NOT IDENT. |
| U-235 | 1.544E-01 | 2.354E-01 | 2.455E-01 | FAIL ABUN |
| NP-237 | 6.314E-02 | 7.772E-02 | 8.277E-02 | NOT IDENT. |
| NP-238 | 3.635E+11 | 1.092E+13 | 1.093E+13 | SHORT HLIF |
| NP-239 | -1.165E-01 | 4.129E-01 | 4.162E-01 | NOT IDENT. |
| PU-239 | -3.492E+01 | 3.807E+02 | 3.811E+02 | NOT IDENT. |
| AM-241 | -1.879E-01 | 2.772E-01 | 2.898E-01 | NOT IDENT. |
| AM-243 | -7.820E-03 | 8.823E-02 | 8.830E-02 | NOT IDENT. |
| CM-243 | 6.608E-02 | 1.212E-01 | 1.248E-01 | NOT IDENT. |
| CM-247 | -5.834E-03 | 4.858E-02 | 4.865E-02 | NOT IDENT. |
| CF-249 | -3.850E-02 | 4.752E-02 | 5.059E-02 | NOT IDENT. |
| CF-251 | 1.234E-01 | 1.487E-01 | 1.588E-01 | NOT IDENT. |
| ANH-511 | -1.075E-01 | 8.678E-02 | 9.939E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 88.4926 | 94.65 | 104.6342 | 711.68 | 102.7327 |
| 45.60 | 84.5012 | 94.67 | 104.6379 | 185.72 | 111.3105 |
| 46.54 | 86.5168 | 94.87 | 85.2339 | 193.51 | 86.1548 |
| 49.72 | 0.0000 | 97.43 | 81.0943 | 197.03 | 91.0197 |
| 51.35 | 93.9866 | 311.90 | 101.2851 | 127.23 | 70.6115 |
| 52.39 | 68.6144 | 946.00 | 101.2867 | 306.78 | 126.9086 |
| 53.44 | 72.4608 | 99.53 | 101.4680 | 205.31 | 91.7855 |
| 57.36 | 0.0000 | 1221.41 | 92.5138 | 210.85 | 88.8284 |
| 57.53 | 66.6887 | 103.18 | 90.9517 | 215.65 | 84.6068 |
| 57.98 | 74.1758 | 103.37 | 82.8925 | 222.11 | 94.4588 |
| 59.54 | 77.0482 | 117.23 | 82.8925 | 290.67 | 88.7495 |
| 63.29 | 99.9373 | 105.21 | 98.3424 | 177.52 | 94.9260 |
| 63.58 | 87.3248 | 105.31 | 98.3577 | 228.16 | 0.0000 |
| 64.28 | 73.3519 | 106.12 | 102.5442 | 228.18 | 82.6817 |
| 66.73 | 96.4281 | 109.28 | 98.9670 | 235.69 | 85.0232 |
| 67.24 | 92.2736 | 111.00 | 97.1821 | 256.23 | 85.0437 |
| 67.75 | 96.6356 | 228.16 | 0.0000 | 238.63 | 97.6801 |
| 69.67 | 88.4628 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 70.83 | 102.0219 | 117.23 | 81.5696 | 240.99 | 78.3092 |
| 72.81 | 111.0475 | 121.12 | 88.2615 | 242.00 | 94.0556 |
| 279.20 | 111.0611 | 121.22 | 88.2741 | 344.28 | 77.6742 |
| 72.87 | 111.0611 | 121.78 | 89.3843 | 252.40 | 0.0000 |
| 74.66 | 100.8883 | 122.06 | 93.5788 | 252.80 | 86.3152 |
| 74.82 | 109.5701 | 123.07 | 88.5071 | 254.15 | 0.0000 |
| 1063.66 | 100.9497 | 127.23 | 94.2618 | 256.23 | 100.0958 |
| 238.63 | 86.8904 | 129.30 | 100.8333 | 260.90 | 0.0000 |
| 351.93 | 86.8904 | 131.20 | 110.5734 | 264.66 | 74.4714 |
| 79.69 | 96.0523 | 482.18 | 102.4004 | 268.22 | 78.3338 |
| 80.12 | 88.5564 | 133.52 | 97.1875 | 269.46 | 66.5606 |
| 80.19 | 0.0000 | 264.66 | 105.9886 | 271.23 | 88.5723 |
| 80.57 | 84.5499 | 122.06 | 105.6305 | 273.65 | 87.8320 |
| 81.00 | 65.6519 | 140.51 | 0.0000 | 356.01 | 70.6060 |
| 81.07 | 65.6605 | 143.76 | 81.9046 | 277.37 | 77.0850 |
| 323.87 | 83.5900 | 144.24 | 81.9544 | 277.60 | 78.9348 |
| 85.43 | 98.5484 | 145.44 | 86.9079 | 278.00 | 74.3691 |
| 86.55 | 103.1693 | 152.43 | 93.0801 | 279.20 | 77.1978 |
| 879.38 | 103.2130 | 153.25 | 81.2561 | 279.54 | 76.3003 |
| 87.57 | 101.7665 | 154.21 | 82.4362 | 280.46 | 80.9558 |
| 87.09 | 101.7933 | 156.02 | 100.0101 | 283.69 | 69.1738 |
| 87.57 | 94.4980 | 158.56 | 83.9595 | 364.49 | 0.0000 |
| 88.03 | 86.6939 | 159.00 | 74.1848 | 285.41 | 66.4969 |
| 88.34 | 88.7132 | 162.33 | 89.8118 | 285.90 | 0.0000 |
| 193.51 | 82.8178 | 163.33 | 91.0134 | 402.40 | 81.4070 |
| 89.96 | 102.3113 | 165.86 | 84.6832 | 290.67 | 75.1181 |
| 91.11 | 101.0304 | 176.31 | 93.4814 | 293.27 | 0.0000 |
| 63.29 | 94.3375 | 1048.07 | 99.0784 | 295.22 | 54.9083 |
| 143.76 | 90.9802 | 177.52 | 83.5777 | 295.96 | 58.6645 |
| 94.56 | 104.6181 | 739.50 | 0.0000 | 298.58 | 68.1122 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 299.98 | 70.9868 | 482.18 | 44.0200 | 697.49 | 41.6722 |
| 300.09 | 67.2561 | 1596.21 | 39.9303 | 702.65 | 50.1095 |
| 300.13 | 67.2583 | 527.90 | 0.0000 | 706.68 | 41.8250 |
| 283.69 | 61.7108 | 497.08 | 45.4244 | 711.68 | 43.7710 |
| 302.85 | 56.1639 | 505.52 | 53.0502 | 720.70 | 40.1886 |
| 304.50 | 52.4855 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 70.4132 | 511.00 | 59.5842 | 722.78 | 33.6735 |
| 316.51 | 77.0815 | 514.00 | 160.9087 | 722.91 | 33.6753 |
| 311.90 | 58.4296 | 514.00 | 160.9087 | 1274.44 | 34.6161 |
| 316.51 | 64.3020 | 520.40 | 31.0037 | 724.19 | 37.4355 |
| 531.02 | 55.9094 | 238.98 | 0.0000 | 727.33 | 29.0481 |
| 320.08 | 57.8325 | 522.65 | 0.0000 | 733.00 | 30.9899 |
| 427.87 | 57.8726 | 527.90 | 0.0000 | 735.93 | 21.6237 |
| 323.87 | 72.2508 | 520.40 | 33.2942 | 737.46 | 14.1108 |
| 325.23 | 58.9991 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 64.8716 | 531.02 | 41.9160 | 747.24 | 24.5502 |
| 388.16 | 62.5310 | 546.56 | 0.0000 | 748.06 | 28.3359 |
| 333.97 | 62.8133 | 552.55 | 29.5433 | 752.31 | 22.7057 |
| 334.37 | 68.9612 | 563.25 | 43.6694 | 753.82 | 32.1846 |
| 338.28 | 59.9292 | 795.86 | 41.6042 | 756.73 | 26.3238 |
| 338.32 | 66.2699 | 569.50 | 41.6077 | 756.80 | 27.3774 |
| 911.20 | 66.2699 | 569.70 | 37.2321 | 763.94 | 24.7057 |
| 340.48 | 60.0215 | 583.19 | 31.7364 | 765.81 | 24.7229 |
| 340.55 | 60.0244 | 584.27 | 36.3828 | 766.42 | 30.1181 |
| 344.28 | 65.5793 | 595.83 | 39.2679 | 766.84 | 30.1228 |
| 345.93 | 66.9413 | 600.60 | 37.3211 | 772.60 | 0.0000 |
| 351.06 | 64.9144 | 602.52 | 0.0000 | 776.52 | 30.5500 |
| 351.93 | 64.9523 | 602.73 | 55.5908 | 777.92 | 0.0000 |
| 507.63 | 0.0000 | 604.72 | 58.7571 | 778.90 | 31.5321 |
| 356.01 | 60.6595 | 609.32 | 33.8994 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 497.08 | 44.6252 | 727.33 | 31.6070 |
| 366.42 | 0.0000 | 433.94 | 54.7616 | 792.07 | 32.6445 |
| 129.30 | 62.9990 | 696.49 | 35.8223 | 794.95 | 24.0289 |
| 383.85 | 40.5865 | 620.36 | 44.8242 | 795.86 | 23.0754 |
| 388.16 | 61.5412 | 621.93 | 52.0315 | 801.95 | 31.7979 |
| 388.63 | 54.6098 | 667.71 | 0.0000 | 810.29 | 23.1955 |
| 391.69 | 54.5717 | 631.29 | 36.0313 | 810.45 | 23.1967 |
| 400.66 | 41.6140 | 453.88 | 37.8646 | 810.76 | 27.0655 |
| 401.81 | 44.8472 | 595.83 | 32.4765 | 815.77 | 16.4621 |
| 402.40 | 49.6696 | 635.95 | 31.5906 | 818.51 | 29.0793 |
| 404.85 | 53.1545 | 636.99 | 0.0000 | 832.01 | 17.5307 |
| 410.95 | 53.3510 | 1690.97 | 20.8482 | 834.85 | 30.2220 |
| 413.71 | 43.3569 | 884.68 | 25.8127 | 835.71 | 35.1070 |
| 414.70 | 52.4626 | 657.90 | 0.0000 | 1260.41 | 0.0000 |
| 404.85 | 34.5546 | 661.66 | 34.2197 | 846.75 | 0.0000 |
| 427.87 | 41.6882 | 664.57 | 0.0000 | 846.77 | 24.4733 |
| 433.94 | 46.9370 | 666.33 | 35.6580 | 856.80 | 25.2598 |
| 333.97 | 51.1795 | 720.70 | 35.6599 | 860.56 | 33.4414 |
| 453.88 | 38.1845 | 667.71 | 0.0000 | 702.65 | 22.7035 |
| 463.37 | 37.3486 | 677.62 | 36.7432 | 873.19 | 20.7437 |
| 468.07 | 35.3644 | 685.70 | 0.0000 | 529.87 | 0.0000 |
| 685.70 | 0.0000 | 695.00 | 43.4807 | 879.38 | 23.7568 |
| 475.06 | 42.8080 | 696.49 | 39.8033 | 880.51 | 21.7852 |
| 476.78 | 41.8024 | 696.51 | 39.8044 | 883.24 | 24.7784 |
| 477.60 | 42.8668 | 697.00 | 40.7376 | 884.68 | 24.7900 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 889.28 | 21.5180 | 1274.54 | 17.5558 | | |
| 903.28 | 31.5066 | 1099.45 | 14.3161 | | |
| 898.04 | 24.9005 | 1298.22 | 0.0000 | | |
| 903.28 | 26.9387 | 1312.11 | 14.9206 | | |
| 911.20 | 27.0086 | 1332.49 | 14.0570 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 33.1740 | 1365.19 | 21.4077 | | |
| 937.49 | 27.2380 | 1368.63 | 0.0000 | | |
| 944.13 | 21.2302 | 1384.29 | 8.5378 | | |
| 946.00 | 20.2310 | 1408.01 | 10.4924 | | |
| 949.00 | 21.2625 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 8.6876 | | |
| 962.31 | 25.4187 | 696.51 | 13.5990 | | |
| 964.08 | 25.4327 | 1505.03 | 9.7469 | | |
| 966.17 | 32.5750 | 1596.21 | 11.9243 | | |
| 968.97 | 23.4335 | 1620.50 | 10.9852 | | |
| 983.53 | 21.4922 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 14.1800 | | |
| 996.26 | 14.3838 | 1750.46 | 0.0000 | | |
| 1001.03 | 17.4914 | 1764.49 | 6.1641 | | |
| 1004.73 | 19.5710 | 1770.23 | 9.2563 | | |
| 1021.30 | 0.0000 | 1771.35 | 11.3156 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 7.2515 | | |
| 846.77 | 27.0461 | 846.75 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 9.3706 | | |
| 1046.59 | 26.0730 | | | | |
| 1048.07 | 16.6938 | | | | |
| 1049.04 | 12.5238 | | | | |
| 621.93 | 12.5285 | | | | |
| 1063.66 | 19.9129 | | | | |
| 1077.00 | 16.8336 | | | | |
| 1077.34 | 15.7830 | | | | |
| 1085.87 | 10.5474 | | | | |
| 1099.45 | 11.6467 | | | | |
| 1112.07 | 14.8750 | | | | |
| 1112.84 | 15.9412 | | | | |
| 1115.54 | 18.0799 | | | | |
| 609.32 | 21.2988 | | | | |
| 889.28 | 22.3648 | | | | |
| 1121.30 | 19.1742 | | | | |
| 1129.67 | 21.3535 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 19.4458 | | | | |
| 1177.95 | 16.2246 | | | | |
| 1189.05 | 9.7633 | | | | |
| 1204.77 | 16.3396 | | | | |
| 1221.41 | 12.0339 | | | | |
| 1231.02 | 21.9336 | | | | |
| 1235.36 | 19.7622 | | | | |
| 1238.28 | 19.7771 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 14.2464 | | | | |
| 1274.44 | 22.1748 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:23.68

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM27.CNF;190
                                        Background date  : 9-FEB-2014 11:22:29.
Sample date      : 22-JAN-2014 00:00:00 Acquisition date : 12-FEB-2014 14:36:55
Sample ID        : G1203023699          Sample quantity  : 1.30479E+02 GRAM
Detector name    : GAM27                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.42  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.42* | 3 | 65 | 0.93 | 126.19 | 121 | 10 | 9.34E-04 | 502.4 | |
| 2 | 0 | 74.11* | 23 | 75 | 3.37 | 147.56 | 142 | 11 | 6.47E-03 | 76.2 | |
| 3 | 2 | 85.03* | 19 | 34 | 1.20 | 169.42 | 165 | 26 | 5.39E-03 | 60.9 | 6.45E-01 |
| 4 | 2 | 89.83 | 16 | 38 | 1.21 | 179.02 | 165 | 26 | 4.33E-03 | 72.5 | |
| 5 | 0 | 112.53* | 13 | 29 | 1.35 | 224.42 | 220 | 8 | 3.51E-03 | 83.5 | |
| 6 | 0 | 185.99* | 3 | 23 | 1.21 | 371.37 | 367 | 9 | 9.72E-04 | 328.6 | |
| 7 | 0 | 201.49 | 11 | 18 | 1.37 | 402.39 | 400 | 5 | 3.10E-03 | 64.9 | |
| 8 | 1 | 238.69* | 16 | 32 | 1.33 | 476.80 | 474 | 15 | 4.58E-03 | 60.2 | 5.50E+00 |
| 9 | 1 | 242.85 | 15 | 35 | 1.34 | 485.13 | 474 | 15 | 4.10E-03 | 72.3 | |
| 10 | 0 | 438.93 | 7 | 22 | 0.52 | 877.40 | 874 | 9 | 2.06E-03 | 116.2 | |
| 11 | 0 | 496.50 | 14 | 12 | 3.65 | 992.57 | 986 | 14 | 3.77E-03 | 63.8 | |
| 12 | 0 | 511.41* | 8 | 32 | 3.07 | 1022.40 | 1014 | 17 | 2.14E-03 | 226.8 | |
| 13 | 0 | 537.06 | 11 | 15 | 3.85 | 1073.72 | 1066 | 12 | 3.04E-03 | 76.9 | |
| 14 | 0 | 564.97 | 22 | 12 | 6.02 | 1129.57 | 1121 | 16 | 6.12E-03 | 41.1 | |
| 15 | 0 | 608.70* | 0 | 20 | 1.37 | 1217.05 | 1212 | 10 | 1.29E-05 | ***** | |
| 16 | 0 | 789.47 | 9 | 2 | 0.92 | 1578.74 | 1576 | 6 | 2.40E-03 | 45.6 | |
| 17 | 0 | 805.96 | 19 | 5 | 3.90 | 1611.74 | 1606 | 12 | 5.24E-03 | 34.3 | |
| 18 | 0 | 911.32* | 10 | 0 | 1.50 | 1822.54 | 1819 | 7 | 2.74E-03 | 41.0 | |
| 19 | 0 | 1460.31* | 10 | 0 | 2.16 | 2921.16 | 2917 | 9 | 2.87E-03 | 44.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:37:25

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 22-JAN-2014 00:00:00 | Acquisition date | : 12-FEB-2014 14:36:55 |
| Sample ID | : G1203023699 | Sample quantity | : 130.48 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA27 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.42 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.470E+00 | 3.794E-01 | 3.794E-01 | 89.84 |
| RU-103 | 497.08 | 14 | 91.00* | 3.458E+00 | 2.483E-02 | 3.637E-02 | 127.57 |
| | 610.33 | ------ | 5.76 | 2.980E+00 | ------ | Line Not Found | ------ |
| TH-229 | 85.43 | 19 | 14.70 | 6.630E+00 | 1.146E-01 | 1.146E-01 | 121.71 |
| | 88.47 | 16 | 24.00 | 6.884E+00 | 5.425E-02 | 5.425E-02 | 144.91 |
| | 193.51 | ------ | 4.41* | 6.334E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 6.045E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.434E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 23 | 67.20* | 5.777E+00 | 3.454E-02 | 3.454E-02 | 152.34 |
| ANH-511 | 511.00 | 8 | 100.00* | 3.386E+00 | 1.310E-02 | 1.310E-02 | 453.63 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:26.03

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1  *
* Acquisition date : 12-FEB-2014 14:36:55 Sensitivity     : 3.000           *
* Detector ID      : GAM27                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****           *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023699          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 3.794E-01 | 3.340E-01 | 4.835E-01 |
| RU-103 | 3.637E-02 | 4.547E-02 | 5.936E-02 |
| TH-229 | -2.548E-01 | 3.776E-01 | 6.136E-01 |
| AM-243 | 3.454E-02 | 5.157E-02 | 5.200E-02 |
| ANH-511 | 1.310E-02 | 5.822E-02 | 3.446E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -2.252E-01 | 2.498E-01 | 3.976E-01 | NOT IDENT. |
| NA-22 | 7.698E-03 | 2.373E-02 | 5.321E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 4.663E+08 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.673E-03 | 1.803E-02 | 5.034E-02 | NOT IDENT. |
| SC-46 | -1.173E-02 | 3.063E-02 | 5.526E-02 | NOT IDENT. |
| V-48 | -1.431E-02 | 5.554E-02 | 1.046E-01 | NOT IDENT. |
| CR-51 | -8.963E-02 | 3.430E-01 | 6.192E-01 | NOT IDENT. |
| MN-54 | -2.707E-03 | 2.837E-02 | 5.361E-02 | NOT IDENT. |
| CO-56 | -6.148E-03 | 2.679E-02 | 5.060E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 8.839E-04 | 1.783E-02 | 3.227E-02 | NOT IDENT. |
| CO-58 | -1.240E-02 | 3.285E-02 | 5.016E-02 | NOT IDENT. |
| FE-59 | -8.837E-03 | 6.074E-02 | 1.212E-01 | NOT IDENT. |
| CO-60 | 7.923E-03 | 2.840E-02 | 6.091E-02 | NOT IDENT. |
| ZN-65 | -1.064E-02 | 6.422E-02 | 1.242E-01 | NOT IDENT. |
| GE-68 | 2.590E-01 | 6.687E-01 | 1.490E+00 | NOT IDENT. |
| AS-73 | -2.642E-01 | 3.585E-01 | 6.219E-01 | NOT IDENT. |
| AS-74 | -2.893E-02 | 7.969E-02 | 1.483E-01 | NOT IDENT. |
| SE-75 | 1.544E-02 | 2.924E-02 | 5.889E-02 | NOT IDENT. |
| BR-77 | 4.012E+01 | 4.731E+01 | 8.734E+01 | FAIL ABUN |
| SR-82 | -8.283E-02 | 2.477E-01 | 4.607E-01 | NOT IDENT. |
| RB-83 | -2.511E-02 | 5.376E-02 | 9.252E-02 | NOT IDENT. |
| KR-85 | 1.184E+01 | 6.643E+00 | 1.349E+01 | NOT IDENT. |
| SR-85 | 6.708E-02 | 3.768E-02 | 7.653E-02 | NOT IDENT. |
| RB-86 | 2.042E-01 | 5.269E-01 | 1.174E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | -4.088E-03 | 2.739E-02 | 5.895E-02 | NOT IDENT. |
| Y-91 | 4.612E+00 | 1.357E+01 | 2.922E+01 | NOT IDENT. |
| NB-94 | 3.821E-04 | 2.394E-02 | 4.648E-02 | NOT IDENT. |
| NB-95 | -2.812E-03 | 2.973E-02 | 5.622E-02 | NOT IDENT. |
| NB-95M | 2.211E-03 | 8.578E-02 | 1.446E-01 | NOT IDENT. |
| ZR-95 | -5.954E-03 | 5.297E-02 | 1.016E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 8.782E+08 | 0.000E+00 | SHORT HLIF |
| MO-99 | -2.814E+01 | 3.449E+01 | 5.739E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | 1.472E+24 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.116E-02 | 2.043E-02 | 3.468E-02 | NOT IDENT. |
| RH-102 | -1.585E-02 | 4.051E-02 | 7.439E-02 | NOT IDENT. |
| RH-106 | -5.288E-02 | 2.056E-01 | 3.903E-01 | NOT IDENT. |
| RU-106 | -5.288E-02 | 2.056E-01 | 3.903E-01 | NOT IDENT. |
| AG-108M | -6.284E-03 | 2.433E-02 | 3.768E-02 | NOT IDENT. |
| CD-109 | 2.085E-01 | 3.997E-01 | 7.738E-01 | NOT IDENT. |
| AG-110M | 9.189E-03 | 3.397E-02 | 6.997E-02 | NOT IDENT. |
| SN-113 | 3.100E-02 | 3.282E-02 | 6.864E-02 | NOT IDENT. |
| CD-115 | -2.232E+01 | 5.312E+01 | 9.300E+01 | NOT IDENT. |
| SN-117M | 3.621E-02 | 5.003E-02 | 9.652E-02 | NOT IDENT. |
| TE-123M | 2.152E-02 | 1.785E-02 | 3.655E-02 | NOT IDENT. |
| SB-124 | 2.237E-02 | 5.846E-02 | 1.432E-01 | NOT IDENT. |
| SB-125 | 4.266E-02 | 6.544E-02 | 1.329E-01 | NOT IDENT. |
| TE-125M | 4.484E-01 | 6.257E+00 | 1.043E+01 | NOT IDENT. |
| I-126 | 8.612E-02 | 2.278E-01 | 4.640E-01 | NOT IDENT. |
| SB-126 | -1.190E-01 | 1.504E-01 | 2.546E-01 | NOT IDENT. |
| SN-126 | 1.591E-02 | 3.831E-02 | 7.356E-02 | FAIL ABUN |
| SB-127 | 1.320E+00 | 2.870E+00 | 6.017E+00 | NOT IDENT. |
| I-131 | 7.366E-02 | 1.439E-01 | 2.870E-01 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.757E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.031E-01 | 1.846E+00 | 3.530E+00 | FAIL ABUN |
| BA-133 | -1.719E-02 | 3.251E-02 | 5.657E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 6.544E+05 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.169E-02 | 2.653E-02 | 4.700E-02 | NOT IDENT. |
| CS-135 | 1.708E-03 | 9.434E-02 | 1.800E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 4.008E+22 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.560E-02 | 1.205E-01 | 2.063E-01 | NOT IDENT. |
| BA-137M | -3.083E-03 | 2.523E-02 | 4.823E-02 | NOT IDENT. |
| CS-137 | -3.257E-03 | 2.666E-02 | 5.095E-02 | NOT IDENT. |
| CE-139 | -7.678E-03 | 2.018E-02 | 3.445E-02 | NOT IDENT. |
| BA-140 | -5.876E-02 | 1.089E-01 | 1.918E-01 | NOT IDENT. |
| LA-140 | -5.876E-02 | 1.089E-01 | 1.918E-01 | NOT IDENT. |
| CE-141 | 4.855E-02 | 4.949E-02 | 9.682E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.066E+03 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.970E-02 | 1.312E-01 | 2.459E-01 | NOT IDENT. |
| PM-144 | -1.089E-02 | 2.712E-02 | 4.911E-02 | NOT IDENT. |
| PR-144 | -7.974E-01 | 2.040E+00 | 3.699E+00 | NOT IDENT. |
| PM-146 | -1.642E-02 | 2.979E-02 | 5.102E-02 | NOT IDENT. |
| ND-147 | 2.970E-01 | 5.639E-01 | 1.068E+00 | FAIL ABUN |
| PM-147 | 2.662E+02 | 5.080E+02 | 9.633E+02 | NOT IDENT. |
| PM-149 | -8.050E+01 | 4.946E+02 | 9.123E+02 | NOT IDENT. |
| EU-150 | -3.699E-04 | 1.892E-02 | 3.586E-02 | FAIL ABUN |
| EU-152 | 2.739E-02 | 7.221E-02 | 1.404E-01 | NOT IDENT. |
| GD-153 | -4.462E-02 | 5.451E-02 | 7.772E-02 | NOT IDENT. |
| EU-154 | 2.174E-02 | 6.700E-02 | 1.503E-01 | NOT IDENT. |
| EU-155 | 5.192E-03 | 6.158E-02 | 1.138E-01 | NOT IDENT. |
| TB-160 | 3.489E-02 | 9.179E-02 | 1.938E-01 | NOT IDENT. |
| HO-166M | 4.408E-03 | 3.987E-02 | 7.968E-02 | NOT IDENT. |
| TM-171 | 5.810E-01 | 7.082E+00 | 1.343E+01 | NOT IDENT. |
| LU-176 | 3.660E-03 | 1.603E-02 | 3.151E-02 | FAIL ABUN |
| HF-181 | 3.193E-02 | 3.690E-02 | 7.649E-02 | NOT IDENT. |
| TA-182 | -7.550E-02 | 1.083E-01 | 1.884E-01 | NOT IDENT. |
| RE-183 | -9.252E-02 | 1.013E-01 | 1.613E-01 | NOT IDENT. |
| RE-184 | -6.770E-02 | 8.938E-02 | 1.477E-01 | NOT IDENT. |
| W-188 | -4.234E+00 | 5.449E+00 | 9.316E+00 | FAIL ABUN |
| IR-192 | 7.331E-03 | 2.788E-02 | 5.350E-02 | NOT IDENT. |
| HG-203 | -1.312E-02 | 2.866E-02 | 5.112E-02 | FAIL ABUN |
| BI-207 | 9.431E-03 | 3.372E-02 | 6.992E-02 | FAIL ABUN |
| TL-208 | -1.733E-02 | 2.487E-02 | 4.475E-02 | NOT IDENT. |
| PB-210 | -6.880E-01 | 1.403E+00 | 2.714E+00 | NOT IDENT. |
| BI-211 | -8.583E-03 | 1.708E-01 | 3.148E-01 | FAIL ABUN |
| PB-211 | -1.053E-01 | 4.300E-01 | 7.873E-01 | NOT IDENT. |
| BI-212 | -1.981E-01 | 3.435E-01 | 6.323E-01 | NOT IDENT. |
| PB-212 | 3.871E-02 | 4.565E-02 | 8.519E-02 | FAIL ABUN |
| BI-214 | 1.961E-04 | 7.779E-02 | 1.199E-01 | FAIL ABUN |
| PB-214 | 1.107E-02 | 6.120E-02 | 1.157E-01 | FAIL ABUN |
| RN-219 | -5.018E-02 | 2.539E-01 | 4.672E-01 | NOT IDENT. |
| RN-222 | 1.961E-04 | 7.779E-02 | 1.199E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | -2.495E-01 | 5.211E-01 | 8.994E-01 | FAIL ABUN |
| RA-224 | -1.299E-01 | 4.004E-01 | 7.304E-01 | NOT IDENT. |
| RA-226 | 1.961E-04 | 7.779E-02 | 1.199E-01 | FAIL ABUN |
| AC-227 | -1.493E-02 | 1.795E-01 | 3.347E-01 | NOT IDENT. |
| TH-227 | -1.493E-02 | 1.795E-01 | 3.347E-01 | NOT IDENT. |
| AC-228 | 1.007E-01 | 8.091E-02 | 2.117E-01 | FAIL ABUN |
| RA-228 | 1.007E-01 | 8.091E-02 | 2.117E-01 | FAIL ABUN |
| TH-228 | 3.871E-02 | 4.565E-02 | 8.519E-02 | FAIL ABUN |
| TH-230 | 1.961E-04 | 7.778E-02 | 1.199E-01 | FAIL ABUN |
| PA-231 | 4.386E-02 | 9.829E-01 | 1.863E+00 | NOT IDENT. |
| TH-231 | -2.495E-01 | 5.211E-01 | 8.994E-01 | FAIL ABUN |
| TH-232 | 1.007E-01 | 8.091E-02 | 2.117E-01 | FAIL ABUN |
| PA-233 | -3.985E-02 | 3.938E-02 | 6.421E-02 | NOT IDENT. |
| PA-234 | 1.845E-01 | 2.038E-01 | 4.615E-01 | NOT IDENT. |
| PA-234M | 3.350E-01 | 3.190E+00 | 6.471E+00 | NOT IDENT. |
| TH-234 | 1.158E-01 | 1.140E+00 | 1.510E+00 | FAIL ABUN |
| U-234 | 1.961E-04 | 7.778E-02 | 1.199E-01 | FAIL ABUN |
| U-235 | -5.694E-02 | 1.513E-01 | 2.640E-01 | FAIL ABUN |
| NP-237 | -3.985E-02 | 3.938E-02 | 6.421E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.027E+02 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.158E-01 | 1.140E+00 | 1.510E+00 | FAIL ABUN |
| NP-239 | 4.569E-02 | 2.522E-01 | 4.671E-01 | NOT IDENT. |
| PU-239 | -1.869E+02 | 2.200E+02 | 3.592E+02 | NOT IDENT. |
| AM-241 | 2.113E-02 | 7.523E-02 | 1.307E-01 | NOT IDENT. |
| CM-243 | 1.305E-02 | 6.364E-02 | 1.189E-01 | NOT IDENT. |
| CM-247 | -8.060E-03 | 2.342E-02 | 4.206E-02 | NOT IDENT. |
| CF-249 | -1.721E-02 | 2.618E-02 | 4.459E-02 | NOT IDENT. |
| CF-251 | -2.202E-02 | 8.577E-02 | 1.482E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:21.94

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.85 | 29 | 49 | 1.17 | 93.05 | 89 | 9 | 8.11E-03 | 47.1 | |
| 2 | 0 | 63.42 | 40 | 65 | 0.93 | 126.19 | 121 | 10 | 1.10E-02 | 41.7 | |
| 3 | 0 | 74.11 | 28 | 75 | 3.37 | 147.56 | 142 | 11 | 7.67E-03 | 63.5 | |
| 4 | 2 | 85.03 | 25 | 34 | 1.20 | 169.42 | 165 | 26 | 6.96E-03 | 45.6 | 6.45E-01 |
| 5 | 2 | 89.83 | 16 | 38 | 1.21 | 179.02 | 165 | 26 | 4.33E-03 | 72.5 | |
| 6 | 2 | 92.53 | 55 | 42 | 1.21 | 184.42 | 165 | 26 | 1.53E-02 | 23.1 | |
| 7 | 0 | 112.53 | 16 | 29 | 1.35 | 224.42 | 220 | 8 | 4.36E-03 | 65.3 | |
| 8 | 0 | 185.99 | 41 | 23 | 1.21 | 371.37 | 367 | 9 | 1.14E-02 | 26.6 | |
| 9 | 0 | 201.49 | 11 | 18 | 1.37 | 402.39 | 400 | 5 | 3.10E-03 | 64.9 | |
| 10 | 1 | 238.69 | 33 | 32 | 1.33 | 476.80 | 474 | 15 | 9.09E-03 | 28.8 | 5.50E+00 |
| 11 | 1 | 242.85 | 15 | 35 | 1.34 | 485.13 | 474 | 15 | 4.10E-03 | 72.3 | |
| 12 | 0 | 438.93 | 7 | 22 | 0.52 | 877.40 | 874 | 9 | 2.06E-03 | 116.2 | |
| 13 | 0 | 496.50 | 14 | 12 | 3.65 | 992.57 | 986 | 14 | 3.77E-03 | 63.8 | |
| 14 | 0 | 511.41 | 107 | 32 | 3.07 | 1022.40 | 1014 | 17 | 2.96E-02 | 15.8 | |
| 15 | 0 | 537.06 | 11 | 15 | 3.85 | 1073.72 | 1066 | 12 | 3.04E-03 | 76.9 | |
| 16 | 0 | 564.97 | 22 | 12 | 6.02 | 1129.57 | 1121 | 16 | 6.12E-03 | 41.1 | |
| 17 | 0 | 608.70 | 12 | 20 | 1.37 | 1217.05 | 1212 | 10 | 3.28E-03 | 76.7 | |
| 18 | 0 | 789.47 | 9 | 2 | 0.92 | 1578.74 | 1576 | 6 | 2.40E-03 | 45.6 | |
| 19 | 0 | 805.96 | 19 | 5 | 3.90 | 1611.74 | 1606 | 12 | 5.24E-03 | 34.3 | |
| 20 | 0 | 911.32 | 13 | 0 | 1.50 | 1822.54 | 1819 | 7 | 3.61E-03 | 27.7 | |
| 21 | 0 | 1460.31 | 19 | 0 | 2.16 | 2921.16 | 2917 | 9 | 5.28E-03 | 22.9 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:24.26

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.470E+00 | 3.794E-01 | 3.794E-01 | 89.84 |
| RU-103 | 497.08 | 14 | 91.00* | 3.458E+00 | 2.483E-02 | 3.637E-02 | 127.57 |
| | 610.33 | ------ | 5.76 | 2.980E+00 | ------ | Line Not Found | ------ |
| TH-229 | 85.43 | 19 | 14.70 | 6.630E+00 | 1.146E-01 | 1.146E-01 | 121.71 |
| | 88.47 | 16 | 24.00 | 6.884E+00 | 5.425E-02 | 5.425E-02 | 144.91 |
| | 193.51 | ------ | 4.41* | 6.334E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 6.045E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.434E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 23 | 67.20* | 5.777E+00 | 3.454E-02 | 3.454E-02 | 152.34 |
| ANH-511 | 511.00 | 8 | 100.00* | 3.386E+00 | 1.310E-02 | 1.310E-02 | 453.63 |

Flag: "*" = Keyline

Sample ID : G1203023699 Acquisition date : 12-FEB-2014 14:36:55

Total number of lines in spectrum 19
Number of unidentified lines 4
Number of lines tentatively identified by NID 15 78.95%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 3.794E-01 | 3.794E-01 | 3.408E-01 | 89.84 | |
| RU-103 | 39.26D | 1.47 | 2.483E-02 | 3.637E-02 | 4.640E-02 | 127.57 | |
| TH-229 | 7340.00Y | 1.00 | 5.425E-02 | 5.425E-02 | 7.861E-02 | 144.91 | K |
| AM-243 | 7370.00Y | 1.00 | 3.454E-02 | 3.454E-02 | 5.262E-02 | 152.34 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.310E-02 | 1.310E-02 | 5.941E-02 | 453.63 | |
| | Total Activity : | | 5.061E-01 | 5.176E-01 | | | |
| | Grand Total Activity : | | 5.061E-01 | 5.176E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203023699 Acquisition date : 12-FEB-2014 14:36:55

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.42 | 3 | 65 | 0.93 | 126.19 | 121 | 10 | 9.34E-04 | **** | 4.52E+00 | T |
| 0 | 112.53 | 13 | 29 | 1.35 | 224.42 | 220 | 8 | 3.51E-03 | **** | 7.40E+00 | T |
| 0 | 185.99 | 3 | 23 | 1.21 | 371.37 | 367 | 9 | 9.72E-04 | **** | 6.46E+00 | T |
| 0 | 201.49 | 11 | 18 | 1.37 | 402.39 | 400 | 5 | 3.10E-03 | **** | 6.20E+00 | T |
| 1 | 238.69 | 16 | 32 | 1.33 | 476.80 | 474 | 15 | 4.58E-03 | **** | 5.62E+00 | T |
| 1 | 242.85 | 15 | 35 | 1.34 | 485.13 | 474 | 15 | 4.10E-03 | **** | 5.56E+00 | T |
| 0 | 438.93 | 7 | 22 | 0.52 | 877.40 | 874 | 9 | 2.06E-03 | **** | 3.77E+00 | T |
| 0 | 537.06 | 11 | 15 | 3.85 | 1073.72 | 1066 | 12 | 3.04E-03 | **** | 3.27E+00 | |
| 0 | 564.97 | 22 | 12 | 6.02 | 1129.57 | 1121 | 16 | 6.12E-03 | 82.3 | 3.15E+00 | |
| 0 | 789.47 | 9 | 2 | 0.92 | 1578.74 | 1576 | 6 | 2.40E-03 | 91.2 | 2.45E+00 | |
| 0 | 805.96 | 19 | 5 | 3.90 | 1611.74 | 1606 | 12 | 5.24E-03 | 68.7 | 2.41E+00 | |
| 0 | 911.32 | 10 | 0 | 1.50 | 1822.54 | 1819 | 7 | 2.74E-03 | 82.0 | 2.19E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:36.76

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1  *
* Acquisition date : 12-FEB-2014 14:36:55 Sensitivity     : 3.000           *
* Detector ID      : GAM27                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****           *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023699          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7         *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.921E-01 |
| RU-103 | 2.606E-02 |
| TH-229 | 2.790E-01 |
| AM-243 | 2.403E-02 |
| ANH-511 | 1.494E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 1.710E-01 | NOT IDENT. |
| NA-22 | 2.182E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.884E-02 | NOT IDENT. |
| SC-46 | 2.346E-02 | NOT IDENT. |
| V-48 | 4.262E-02 | NOT IDENT. |
| CR-51 | 2.808E-01 | NOT IDENT. |
| MN-54 | 2.333E-02 | NOT IDENT. |
| CO-56 | 2.123E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.484E-02 | NOT IDENT. |
| CO-58 | 2.106E-02 | NOT IDENT. |
| FE-59 | 5.032E-02 | NOT IDENT. |
| CO-60 | 2.552E-02 | NOT IDENT. |
| ZN-65 | 5.327E-02 | NOT IDENT. |
| GE-68 | 6.109E-01 | NOT IDENT. |
| AS-73 | 2.807E-01 | NOT IDENT. |
| AS-74 | 6.406E-02 | NOT IDENT. |
| SE-75 | 2.661E-02 | NOT IDENT. |
| BR-77 | 4.040E+01 | FAIL ABUN |
| SR-82 | 1.929E-01 | NOT IDENT. |
| RB-83 | 4.012E-02 | NOT IDENT. |
| KR-85 | 6.216E+00 | NOT IDENT. |
| SR-85 | 3.525E-02 | NOT IDENT. |
| RB-86 | 4.813E-01 | NOT IDENT. |
| Y-88 | 2.207E-02 | NOT IDENT. |

| | | |
|---|---|---|
| Y-91 | 1.238E+01 | NOT IDENT. |
| NB-94 | 2.034E-02 | NOT IDENT. |
| NB-95 | 2.419E-02 | NOT IDENT. |
| NB-95M | 6.533E-02 | NOT IDENT. |
| ZR-95 | 4.368E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.287E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.577E-02 | NOT IDENT. |
| RH-102 | 3.237E-02 | NOT IDENT. |
| RH-106 | 1.674E-01 | NOT IDENT. |
| RU-106 | 1.674E-01 | NOT IDENT. |
| AG-108M | 1.658E-02 | NOT IDENT. |
| CD-109 | 3.551E-01 | NOT IDENT. |
| AG-110M | 2.992E-02 | NOT IDENT. |
| SN-113 | 3.098E-02 | NOT IDENT. |
| CD-115 | 3.935E+01 | NOT IDENT. |
| SN-117M | 4.437E-02 | NOT IDENT. |
| TE-123M | 1.677E-02 | NOT IDENT. |
| SB-124 | 5.548E-02 | NOT IDENT. |
| SB-125 | 5.958E-02 | NOT IDENT. |
| TE-125M | 4.709E+00 | NOT IDENT. |
| I-126 | 2.051E-01 | NOT IDENT. |
| SB-126 | 1.088E-01 | NOT IDENT. |
| SN-126 | 3.369E-02 | FAIL ABUN |
| SB-127 | 2.629E+00 | NOT IDENT. |
| I-131 | 1.291E-01 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.600E+00 | FAIL ABUN |
| BA-133 | 2.540E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.969E-02 | NOT IDENT. |
| CS-135 | 8.072E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 8.754E-02 | NOT IDENT. |
| BA-137M | 2.103E-02 | NOT IDENT. |
| CS-137 | 2.222E-02 | NOT IDENT. |
| CE-139 | 1.564E-02 | NOT IDENT. |
| BA-140 | 7.653E-02 | NOT IDENT. |
| LA-140 | 7.653E-02 | NOT IDENT. |
| CE-141 | 4.486E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.129E-01 | NOT IDENT. |
| PM-144 | 2.154E-02 | NOT IDENT. |
| PR-144 | 1.623E+00 | NOT IDENT. |
| PM-146 | 2.224E-02 | NOT IDENT. |
| ND-147 | 4.636E-01 | FAIL ABUN |
| PM-147 | 4.444E+02 | NOT IDENT. |
| PM-149 | 4.124E+02 | NOT IDENT. |
| EU-150 | 1.615E-02 | FAIL ABUN |
| EU-152 | 6.363E-02 | NOT IDENT. |
| GD-153 | 3.489E-02 | NOT IDENT. |
| EU-154 | 6.161E-02 | NOT IDENT. |
| EU-155 | 5.185E-02 | NOT IDENT. |
| TB-160 | 8.276E-02 | NOT IDENT. |
| HO-166M | 3.444E-02 | NOT IDENT. |
| TM-171 | 6.121E+00 | NOT IDENT. |
| LU-176 | 1.403E-02 | FAIL ABUN |
| HF-181 | 3.436E-02 | NOT IDENT. |
| TA-182 | 7.501E-02 | NOT IDENT. |
| RE-183 | 7.310E-02 | NOT IDENT. |
| RE-184 | 5.971E-02 | NOT IDENT. |
| W-188 | 4.176E+00 | FAIL ABUN |
| IR-192 | 2.431E-02 | NOT IDENT. |
| HG-203 | 2.299E-02 | FAIL ABUN |
| BI-207 | 2.954E-02 | FAIL ABUN |
| TL-208 | 1.941E-02 | NOT IDENT. |
| PB-210 | 1.260E+00 | NOT IDENT. |
| BI-211 | 1.437E-01 | FAIL ABUN |
| PB-211 | 3.421E-01 | NOT IDENT. |
| BI-212 | 2.716E-01 | NOT IDENT. |
| PB-212 | 3.944E-02 | FAIL ABUN |
| BI-214 | 5.423E-02 | FAIL ABUN |
| PB-214 | 5.286E-02 | FAIL ABUN |
| RN-219 | 2.042E-01 | NOT IDENT. |
| RN-222 | 5.423E-02 | FAIL ABUN |
| RA-223 | 4.077E-01 | FAIL ABUN |

| | | |
|---|---|---|
| RA-224 | 3.314E-01 | NOT IDENT. |
| RA-226 | 5.423E-02 | FAIL ABUN |
| AC-227 | 1.522E-01 | NOT IDENT. |
| TH-227 | 1.522E-01 | NOT IDENT. |
| AC-228 | 9.207E-02 | FAIL ABUN |
| RA-228 | 9.207E-02 | FAIL ABUN |
| TH-228 | 3.944E-02 | FAIL ABUN |
| TH-230 | 5.423E-02 | FAIL ABUN |
| PA-231 | 8.409E-01 | NOT IDENT. |
| TH-231 | 4.077E-01 | FAIL ABUN |
| TH-232 | 9.207E-02 | FAIL ABUN |
| PA-233 | 2.785E-02 | NOT IDENT. |
| PA-234 | 2.002E-01 | NOT IDENT. |
| PA-234M | 2.778E+00 | NOT IDENT. |
| TH-234 | 7.086E-01 | FAIL ABUN |
| U-234 | 5.423E-02 | FAIL ABUN |
| U-235 | 1.222E-01 | FAIL ABUN |
| NP-237 | 2.785E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 7.086E-01 | FAIL ABUN |
| NP-239 | 2.137E-01 | NOT IDENT. |
| PU-239 | 1.629E+02 | NOT IDENT. |
| AM-241 | 5.987E-02 | NOT IDENT. |
| CM-243 | 5.435E-02 | NOT IDENT. |
| CM-247 | 1.834E-02 | NOT IDENT. |
| CF-249 | 1.943E-02 | NOT IDENT. |
| CF-251 | 6.733E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:41.86

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1 | | |
| Acquisition date | : 12-FEB-2014 14:36:55 | Sensitivity | : 3.000 |
| Detector ID | : GAM27 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.42 | Half life ratio | : ***** |
| Sample date | : 22-JAN-2014 00:00:00 | Nuclide Library | : SOLID |
| Sample ID | : G1203023699 | Analyst initials | : RXF2 |
| Batch Number | : 1361908 | Sample Quantity | : 1.3048E+02 GRAM |
| | | Quantity Err(%) | : 1.5328E-03 % |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 7-SEP-2013 09:46:07 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 3.794E-01 | 3.359E-01 | 3.359E-01 |
| RU-103 | 3.637E-02 | 4.560E-02 | 4.560E-02 |
| TH-229 | -2.548E-01 | 3.781E-01 | 3.781E-01 |
| AM-243 | 3.454E-02 | 5.165E-02 | 5.165E-02 |
| ANH-511 | 1.310E-02 | 5.823E-02 | 5.823E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -2.252E-01 | 2.506E-01 | 2.704E-01 | NOT IDENT. |
| NA-22 | 7.698E-03 | 2.374E-02 | 2.399E-02 | NOT IDENT. |
| NA-24 | -1.792E+08 | 4.666E+08 | 4.736E+08 | SHORT HLIF |
| AL-26 | 9.673E-03 | 1.804E-02 | 1.856E-02 | NOT IDENT. |
| SC-46 | -1.173E-02 | 3.066E-02 | 3.112E-02 | NOT IDENT. |
| V-48 | -1.431E-02 | 5.558E-02 | 5.595E-02 | NOT IDENT. |
| CR-51 | -8.963E-02 | 3.431E-01 | 3.454E-01 | NOT IDENT. |
| MN-54 | -2.707E-03 | 2.838E-02 | 2.840E-02 | NOT IDENT. |
| CO-56 | -6.148E-03 | 2.680E-02 | 2.695E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 4.271E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 8.839E-04 | 1.783E-02 | 1.784E-02 | NOT IDENT. |
| CO-58 | -1.240E-02 | 3.288E-02 | 3.335E-02 | NOT IDENT. |
| FE-59 | -8.837E-03 | 6.076E-02 | 6.089E-02 | NOT IDENT. |
| CO-60 | 7.923E-03 | 2.841E-02 | 2.863E-02 | NOT IDENT. |
| ZN-65 | -1.064E-02 | 6.425E-02 | 6.443E-02 | NOT IDENT. |
| GE-68 | 2.590E-01 | 6.700E-01 | 6.801E-01 | NOT IDENT. |
| AS-73 | -2.642E-01 | 3.625E-01 | 3.816E-01 | NOT IDENT. |
| AS-74 | -2.893E-02 | 7.975E-02 | 8.081E-02 | NOT IDENT. |
| SE-75 | 1.544E-02 | 2.927E-02 | 3.008E-02 | NOT IDENT. |
| BR-77 | 4.012E+01 | 5.363E+01 | 5.660E+01 | FAIL ABUN |
| SR-82 | -8.283E-02 | 2.478E-01 | 2.506E-01 | NOT IDENT. |
| RB-83 | -2.511E-02 | 5.391E-02 | 5.508E-02 | NOT IDENT. |
| KR-85 | 1.184E+01 | 6.730E+00 | 8.591E+00 | NOT IDENT. |
| SR-85 | 6.708E-02 | 3.818E-02 | 4.870E-02 | NOT IDENT. |
| RB-86 | 2.042E-01 | 5.279E-01 | 5.359E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | -4.088E-03 | 2.739E-02 | 2.745E-02 | NOT IDENT. |
| Y-91 | 4.612E+00 | 1.358E+01 | 1.373E+01 | NOT IDENT. |
| NB-94 | 3.821E-04 | 2.394E-02 | 2.395E-02 | NOT IDENT. |
| NB-95 | -2.812E-03 | 2.973E-02 | 2.976E-02 | NOT IDENT. |
| NB-95M | 2.211E-03 | 8.578E-02 | 8.579E-02 | NOT IDENT. |
| ZR-95 | -5.954E-03 | 5.297E-02 | 5.304E-02 | NOT IDENT. |
| NB-97 | 1.000E+41 | 6.077E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 8.431E+08 | 8.815E+08 | 9.600E+08 | SHORT HLIF |
| MO-99 | -2.814E+01 | 3.461E+01 | 3.686E+01 | NOT IDENT. |
| TC-99M | 1.562E+23 | 1.472E+24 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.116E-02 | 2.054E-02 | 2.115E-02 | NOT IDENT. |
| RH-102 | -1.585E-02 | 4.055E-02 | 4.118E-02 | NOT IDENT. |
| RH-106 | -5.288E-02 | 2.056E-01 | 2.070E-01 | NOT IDENT. |
| RU-106 | -5.288E-02 | 2.056E-01 | 2.070E-01 | NOT IDENT. |
| AG-108M | -6.284E-03 | 2.433E-02 | 2.450E-02 | NOT IDENT. |
| CD-109 | 2.085E-01 | 4.004E-01 | 4.113E-01 | NOT IDENT. |
| AG-110M | 9.189E-03 | 3.399E-02 | 3.424E-02 | NOT IDENT. |
| SN-113 | 3.100E-02 | 3.295E-02 | 3.579E-02 | NOT IDENT. |
| CD-115 | -2.232E+01 | 5.317E+01 | 5.411E+01 | NOT IDENT. |
| SN-117M | 3.621E-02 | 5.011E-02 | 5.270E-02 | NOT IDENT. |
| TE-123M | 2.152E-02 | 1.792E-02 | 2.038E-02 | NOT IDENT. |
| SB-124 | 2.237E-02 | 5.849E-02 | 5.935E-02 | NOT IDENT. |
| SB-125 | 4.266E-02 | 6.556E-02 | 6.832E-02 | NOT IDENT. |
| TE-125M | 4.484E-01 | 6.257E+00 | 6.260E+00 | NOT IDENT. |
| I-126 | 8.612E-02 | 2.279E-01 | 2.312E-01 | NOT IDENT. |
| SB-126 | -1.190E-01 | 1.512E-01 | 1.604E-01 | NOT IDENT. |
| SN-126 | 1.591E-02 | 3.834E-02 | 3.901E-02 | FAIL ABUN |
| SB-127 | 1.320E+00 | 2.875E+00 | 2.936E+00 | NOT IDENT. |
| I-131 | 7.366E-02 | 1.440E-01 | 1.478E-01 | NOT IDENT. |
| I-132 | 1.000E+41 | 2.207E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.031E-01 | 1.846E+00 | 1.846E+00 | FAIL ABUN |
| BA-133 | -1.719E-02 | 3.255E-02 | 3.346E-02 | NOT IDENT. |
| I-133 | 4.207E+05 | 6.582E+05 | 6.850E+05 | SHORT HLIF |
| CS-134 | -1.169E-02 | 2.656E-02 | 2.707E-02 | NOT IDENT. |
| CS-135 | 1.708E-03 | 9.434E-02 | 9.435E-02 | NOT IDENT. |
| I-135 | -1.788E+21 | 4.009E+22 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.560E-02 | 1.210E-01 | 1.246E-01 | NOT IDENT. |
| BA-137M | -3.083E-03 | 2.524E-02 | 2.527E-02 | NOT IDENT. |
| CS-137 | -3.257E-03 | 2.666E-02 | 2.670E-02 | NOT IDENT. |
| CE-139 | -7.678E-03 | 2.024E-02 | 2.054E-02 | NOT IDENT. |
| BA-140 | -5.876E-02 | 1.090E-01 | 1.122E-01 | NOT IDENT. |
| LA-140 | -5.876E-02 | 1.090E-01 | 1.122E-01 | NOT IDENT. |
| CE-141 | 4.855E-02 | 4.964E-02 | 5.425E-02 | NOT IDENT. |
| CE-143 | 2.608E+02 | 2.066E+03 | 2.070E+03 | SHORT HLIF |
| CE-144 | 4.970E-02 | 1.313E-01 | 1.332E-01 | NOT IDENT. |
| PM-144 | -1.089E-02 | 2.714E-02 | 2.758E-02 | NOT IDENT. |
| PR-144 | -7.974E-01 | 2.041E+00 | 2.072E+00 | NOT IDENT. |
| PM-146 | -1.642E-02 | 2.985E-02 | 3.075E-02 | NOT IDENT. |
| ND-147 | 2.970E-01 | 5.645E-01 | 5.802E-01 | FAIL ABUN |
| PM-147 | 2.662E+02 | 5.084E+02 | 5.224E+02 | NOT IDENT. |
| PM-149 | -8.050E+01 | 4.947E+02 | 4.961E+02 | NOT IDENT. |
| EU-150 | -3.699E-04 | 1.892E-02 | 1.892E-02 | FAIL ABUN |
| EU-152 | 2.739E-02 | 7.226E-02 | 7.331E-02 | NOT IDENT. |
| GD-153 | -4.462E-02 | 5.467E-02 | 5.825E-02 | NOT IDENT. |
| EU-154 | 2.174E-02 | 6.703E-02 | 6.775E-02 | NOT IDENT. |
| EU-155 | 5.192E-03 | 6.158E-02 | 6.162E-02 | NOT IDENT. |
| TB-160 | 3.489E-02 | 9.190E-02 | 9.324E-02 | NOT IDENT. |
| HO-166M | 4.408E-03 | 3.987E-02 | 3.992E-02 | NOT IDENT. |
| TM-171 | 5.810E-01 | 7.082E+00 | 7.087E+00 | NOT IDENT. |
| LU-176 | 3.660E-03 | 1.603E-02 | 1.612E-02 | FAIL ABUN |
| HF-181 | 3.193E-02 | 3.702E-02 | 3.972E-02 | NOT IDENT. |
| TA-182 | -7.550E-02 | 1.085E-01 | 1.137E-01 | NOT IDENT. |
| RE-183 | -9.252E-02 | 1.018E-01 | 1.100E-01 | NOT IDENT. |
| RE-184 | -6.770E-02 | 8.991E-02 | 9.495E-02 | NOT IDENT. |
| W-188 | -4.234E+00 | 5.478E+00 | 5.801E+00 | FAIL ABUN |
| IR-192 | 7.331E-03 | 2.788E-02 | 2.808E-02 | NOT IDENT. |
| HG-203 | -1.312E-02 | 2.868E-02 | 2.929E-02 | FAIL ABUN |
| BI-207 | 9.431E-03 | 3.375E-02 | 3.402E-02 | FAIL ABUN |
| TL-208 | -1.733E-02 | 2.492E-02 | 2.612E-02 | NOT IDENT. |
| PB-210 | -6.880E-01 | 1.405E+00 | 1.438E+00 | NOT IDENT. |
| BI-211 | -8.583E-03 | 1.708E-01 | 1.708E-01 | FAIL ABUN |
| PB-211 | -1.053E-01 | 4.301E-01 | 4.327E-01 | NOT IDENT. |
| BI-212 | -1.981E-01 | 3.440E-01 | 3.554E-01 | NOT IDENT. |
| PB-212 | 3.871E-02 | 4.577E-02 | 4.898E-02 | FAIL ABUN |
| BI-214 | 1.961E-04 | 7.779E-02 | 7.779E-02 | FAIL ABUN |
| PB-214 | 1.107E-02 | 6.121E-02 | 6.141E-02 | FAIL ABUN |
| RN-219 | -5.018E-02 | 2.540E-01 | 2.550E-01 | NOT IDENT. |
| RN-222 | 1.961E-04 | 7.779E-02 | 7.779E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | -2.495E-01 | 5.217E-01 | 5.337E-01 | FAIL ABUN |
| RA-224 | -1.299E-01 | 4.006E-01 | 4.048E-01 | NOT IDENT. |
| RA-226 | 1.961E-04 | 7.779E-02 | 7.779E-02 | FAIL ABUN |
| AC-227 | -1.493E-02 | 1.795E-01 | 1.796E-01 | NOT IDENT. |
| TH-227 | -1.493E-02 | 1.795E-01 | 1.796E-01 | NOT IDENT. |
| AC-228 | 1.007E-01 | 8.201E-02 | 9.374E-02 | FAIL ABUN |
| RA-228 | 1.007E-01 | 8.201E-02 | 9.374E-02 | FAIL ABUN |
| TH-228 | 3.871E-02 | 4.577E-02 | 4.898E-02 | FAIL ABUN |
| TH-230 | 1.961E-04 | 7.778E-02 | 7.778E-02 | FAIL ABUN |
| PA-231 | 4.386E-02 | 9.829E-01 | 9.831E-01 | NOT IDENT. |
| TH-231 | -2.495E-01 | 5.217E-01 | 5.337E-01 | FAIL ABUN |
| TH-232 | 1.007E-01 | 8.201E-02 | 9.374E-02 | FAIL ABUN |
| PA-233 | -3.985E-02 | 3.954E-02 | 4.343E-02 | NOT IDENT. |
| PA-234 | 1.845E-01 | 2.944E-01 | 3.059E-01 | NOT IDENT. |
| PA-234M | 3.350E-01 | 3.190E+00 | 3.194E+00 | NOT IDENT. |
| TH-234 | 1.158E-01 | 1.141E+00 | 1.142E+00 | FAIL ABUN |
| U-234 | 1.961E-04 | 7.778E-02 | 7.778E-02 | FAIL ABUN |
| U-235 | -5.694E-02 | 1.514E-01 | 1.536E-01 | FAIL ABUN |
| NP-237 | -3.985E-02 | 3.954E-02 | 4.343E-02 | NOT IDENT. |
| NP-238 | -5.100E+01 | 1.030E+02 | 1.055E+02 | SHORT HLIF |
| U-238 | 1.158E-01 | 1.141E+00 | 1.142E+00 | FAIL ABUN |
| NP-239 | 4.569E-02 | 2.523E-01 | 2.531E-01 | NOT IDENT. |
| PU-239 | -1.869E+02 | 2.205E+02 | 2.361E+02 | NOT IDENT. |
| AM-241 | 2.113E-02 | 7.524E-02 | 7.584E-02 | NOT IDENT. |
| CM-243 | 1.305E-02 | 6.366E-02 | 6.393E-02 | NOT IDENT. |
| CM-247 | -8.060E-03 | 2.347E-02 | 2.375E-02 | NOT IDENT. |
| CF-249 | -1.721E-02 | 2.626E-02 | 2.738E-02 | NOT IDENT. |
| CF-251 | -2.202E-02 | 8.582E-02 | 8.639E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 44.8607 | 94.67 | 28.7425 | 193.51 | 46.2830 |
| 45.60 | 35.2062 | 94.87 | 28.7530 | 197.03 | 30.6649 |
| 46.54 | 31.6815 | 97.43 | 38.0068 | 198.01 | 40.1163 |
| 49.72 | 47.4930 | 98.43 | 32.8960 | 201.83 | 41.1576 |
| 51.35 | 27.5220 | 98.44 | 32.8965 | 205.31 | 39.8455 |
| 52.39 | 34.0388 | 99.53 | 29.5009 | 210.85 | 40.6666 |
| 53.44 | 40.5915 | 100.11 | 28.5126 | 215.65 | 39.9799 |
| 57.36 | 0.0000 | 103.18 | 34.8062 | 222.11 | 37.5588 |
| 57.53 | 43.8178 | 103.37 | 34.8176 | 227.09 | 33.2515 |
| 57.98 | 48.1604 | 105.21 | 33.8992 | 227.38 | 29.6651 |
| 59.32 | 40.7356 | 105.31 | 33.9049 | 228.16 | 30.5875 |
| 59.54 | 35.1359 | 106.12 | 33.9510 | 228.18 | 30.5881 |
| 63.29 | 35.9275 | 109.28 | 27.9242 | 117.23 | 30.5881 |
| 63.58 | 35.9521 | 111.00 | 31.1143 | 235.69 | 28.9990 |
| 64.28 | 32.6944 | 111.76 | 28.0374 | 235.96 | 29.0066 |
| 66.73 | 44.3165 | 116.30 | 32.9482 | 238.63 | 34.8967 |
| 67.24 | 38.6430 | 117.23 | 35.6152 | 238.98 | 37.2717 |
| 67.75 | 42.9863 | 121.12 | 42.1535 | 240.99 | 37.3427 |
| 69.67 | 46.0498 | 121.22 | 37.9440 | 242.00 | 37.3780 |
| 70.83 | 50.4959 | 121.78 | 41.1411 | 244.70 | 33.6341 |
| 72.81 | 49.2649 | 122.06 | 43.2695 | 252.40 | 27.6144 |
| 72.87 | 49.2711 | 123.07 | 41.2219 | 252.80 | 29.4661 |
| 74.66 | 49.4599 | 127.23 | 43.6066 | 254.15 | 0.0000 |
| 74.82 | 49.4768 | 129.30 | 46.9401 | 256.23 | 35.0997 |
| 74.97 | 49.4926 | 131.20 | 34.2331 | 260.90 | 31.5367 |
| 77.11 | 39.4795 | 133.02 | 38.6136 | 264.66 | 22.3352 |
| 79.69 | 41.1592 | 133.52 | 35.4210 | 268.22 | 25.2058 |
| 80.12 | 36.7813 | 136.00 | 37.7006 | 269.46 | 26.1675 |
| 80.19 | 36.7865 | 136.47 | 43.1152 | 271.23 | 27.1437 |
| 80.57 | 33.8695 | 140.51 | 40.1070 | 273.65 | 27.2003 |
| 81.00 | 38.3204 | 143.76 | 46.8195 | 276.40 | 31.9653 |
| 81.07 | 33.9036 | 144.24 | 43.5811 | 277.37 | 33.8730 |
| 83.79 | 42.9796 | 145.44 | 34.9219 | 277.60 | 33.8802 |
| 85.43 | 32.7098 | 152.43 | 27.5370 | 278.00 | 28.2426 |
| 86.55 | 32.7806 | 153.25 | 35.2852 | 279.20 | 26.3867 |
| 86.79 | 32.7956 | 323.87 | 35.3291 | 279.54 | 29.2224 |
| 86.94 | 32.8051 | 156.02 | 42.0515 | 280.46 | 26.4149 |
| 87.09 | 32.8145 | 158.56 | 31.0861 | 283.69 | 28.3786 |
| 87.57 | 32.8446 | 159.00 | 22.2168 | 284.31 | 29.3397 |
| 88.03 | 32.8734 | 162.33 | 40.1580 | 285.41 | 29.3667 |
| 88.34 | 32.8927 | 163.33 | 22.3378 | 285.90 | 32.2216 |
| 88.47 | 32.9010 | 165.86 | 39.2141 | 287.50 | 30.3667 |
| 89.96 | 32.9935 | 176.31 | 37.4416 | 290.67 | 37.1064 |
| 91.11 | 33.0643 | 176.60 | 37.4543 | 293.27 | 0.0000 |
| 92.59 | 33.1548 | 177.52 | 37.4949 | 351.93 | 24.8297 |
| 93.35 | 33.2011 | 181.07 | 23.9593 | 295.96 | 28.6665 |
| 94.56 | 28.7369 | 184.41 | 25.7696 | 879.38 | 30.6426 |
| 94.65 | 28.7415 | 143.76 | 26.3815 | 299.98 | 26.8426 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 26.8447 | 487.02 | 19.5340 | 702.65 | 16.3679 |
| 300.13 | 24.9280 | 492.35 | 6.9659 | 706.68 | 11.5731 |
| 301.36 | 23.9929 | 497.08 | 17.4602 | 711.68 | 12.5636 |
| 302.85 | 23.0607 | 505.52 | 12.2784 | 720.70 | 20.3704 |
| 256.23 | 27.9017 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 19.2773 | 511.00 | 14.2938 | 722.78 | 9.7085 |
| 308.46 | 16.4073 | 514.00 | 15.8585 | 722.91 | 10.6799 |
| 311.90 | 27.0968 | 514.00 | 15.8585 | 723.31 | 10.6818 |
| 316.51 | 29.1362 | 520.40 | 19.8907 | 724.19 | 11.6569 |
| 319.41 | 31.1479 | 520.69 | 19.8935 | 727.33 | 13.6172 |
| 320.08 | 36.0334 | 522.65 | 0.0000 | 733.00 | 10.7237 |
| 321.04 | 30.2124 | 527.90 | 14.4223 | 735.93 | 6.8323 |
| 323.87 | 37.1140 | 529.59 | 8.8831 | 333.97 | 9.7664 |
| 325.23 | 33.2415 | 529.87 | 0.0000 | 739.50 | 11.7293 |
| 328.76 | 28.4287 | 531.02 | 8.8896 | 747.24 | 10.7852 |
| 333.37 | 25.5755 | 546.56 | 0.0000 | 748.06 | 7.8463 |
| 333.97 | 22.6347 | 552.55 | 15.7295 | 752.31 | 7.8596 |
| 334.37 | 24.6101 | 563.25 | 19.8806 | 753.82 | 11.7964 |
| 338.28 | 26.6556 | 569.33 | 7.5531 | 756.73 | 13.7782 |
| 338.32 | 26.6564 | 946.00 | 7.5537 | 756.80 | 13.7785 |
| 311.90 | 26.6984 | 569.70 | 7.5545 | 884.68 | 14.8041 |
| 340.48 | 26.6984 | 583.19 | 15.5129 | 765.81 | 11.8521 |
| 340.55 | 25.7112 | 584.27 | 13.6952 | 766.42 | 12.8426 |
| 344.28 | 25.7810 | 595.83 | 17.4437 | 766.84 | 12.8448 |
| 345.93 | 25.8116 | 427.87 | 19.3235 | 772.60 | 0.0000 |
| 351.06 | 31.8853 | 602.52 | 0.0000 | 776.52 | 11.9013 |
| 351.93 | 28.9142 | 602.73 | 21.4922 | 739.50 | 11.9077 |
| 355.39 | 0.0000 | 604.72 | 21.5121 | 778.90 | 13.8975 |
| 356.01 | 33.9974 | 609.32 | 13.8593 | 783.70 | 17.4039 |
| 364.49 | 20.1175 | 610.33 | 23.1097 | 785.37 | 13.2686 |
| 366.42 | 20.1443 | 614.28 | 15.8756 | 792.07 | 3.3257 |
| 375.05 | 23.3036 | 618.01 | 19.4814 | 794.95 | 9.9878 |
| 356.01 | 24.4611 | 620.36 | 11.1442 | 795.86 | 9.9912 |
| 388.16 | 23.5092 | 621.93 | 14.8699 | 810.29 | 13.3942 |
| 388.63 | 20.4492 | 630.19 | 0.0000 | 344.28 | 13.3949 |
| 391.69 | 16.3923 | 631.29 | 19.6003 | 810.76 | 13.3965 |
| 264.66 | 15.4580 | 633.25 | 18.6836 | 815.77 | 10.0662 |
| 401.81 | 18.5633 | 634.78 | 17.7615 | 1048.07 | 14.1066 |
| 402.40 | 19.6019 | 635.95 | 14.0299 | 832.01 | 19.2403 |
| 404.85 | 17.5663 | 636.99 | 13.1007 | 834.85 | 16.2191 |
| 410.95 | 21.7841 | 645.85 | 9.3948 | 835.71 | 15.2102 |
| 413.71 | 29.0959 | 657.76 | 15.1113 | 836.80 | 0.0000 |
| 414.70 | 20.7959 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 20.9567 | 661.66 | 17.0292 | 846.77 | 11.1987 |
| 427.87 | 16.7734 | 664.57 | 0.0000 | 856.80 | 13.2825 |
| 433.94 | 21.8867 | 666.33 | 15.1684 | 860.56 | 9.2079 |
| 439.40 | 17.9473 | 666.50 | 15.1691 | 871.09 | 11.2959 |
| 453.88 | 22.3618 | 667.71 | 0.0000 | 873.19 | 8.2215 |
| 463.37 | 29.9811 | 677.62 | 13.3373 | 875.33 | 0.0000 |
| 468.07 | 15.0312 | 685.70 | 11.4715 | 879.38 | 8.2393 |
| 473.00 | 18.3037 | 695.00 | 18.2346 | 880.51 | 12.3636 |
| 475.06 | 7.5456 | 696.49 | 22.0875 | 883.24 | 12.3756 |
| 476.78 | 20.5009 | 696.51 | 22.0875 | 884.68 | 9.2863 |
| 477.60 | 23.7490 | 697.00 | 21.1320 | 889.28 | 14.4683 |
| 482.18 | 15.1521 | 697.49 | 21.1363 | 894.76 | 11.3894 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 9.3292 | 1298.22 | 0.0000 | | |
| 903.28 | 12.4611 | 1312.11 | 3.8999 | | |
| 911.20 | 9.3711 | 1332.49 | 6.8596 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.2798 | 1365.19 | 2.9635 | | |
| 937.49 | 8.4037 | 1368.63 | 0.0000 | | |
| 944.13 | 10.5276 | 1384.29 | 5.9546 | | |
| 946.00 | 6.3205 | 1408.01 | 4.9902 | | |
| 949.00 | 10.5444 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 5.0523 | | |
| 962.31 | 8.4723 | 1489.16 | 6.1021 | | |
| 964.08 | 14.8350 | 1505.03 | 7.1444 | | |
| 966.17 | 13.7849 | 1596.21 | 9.3710 | | |
| 968.97 | 10.6133 | 1620.50 | 3.1398 | | |
| 983.53 | 8.5303 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.1239 | | |
| 1274.44 | 9.6354 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.5055 | 1764.49 | 7.5440 | | |
| 1004.73 | 8.5877 | 1063.66 | 4.3156 | | |
| 507.63 | 0.0000 | 1771.35 | 3.2374 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.9317 | | |
| 1037.84 | 8.6762 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.7464 | | |
| 631.29 | 11.9614 | | | | |
| 1048.07 | 16.3184 | | | | |
| 1049.04 | 15.2346 | | | | |
| 1050.41 | 13.0641 | | | | |
| 1063.66 | 7.6511 | | | | |
| 1077.00 | 4.3895 | | | | |
| 1077.34 | 4.3898 | | | | |
| 1085.87 | 9.1687 | | | | |
| 1099.45 | 9.2049 | | | | |
| 1112.07 | 10.1626 | | | | |
| 1112.84 | 9.2407 | | | | |
| 1115.54 | 13.8721 | | | | |
| 1120.29 | 12.0389 | | | | |
| 1120.55 | 13.8916 | | | | |
| 1221.41 | 12.0420 | | | | |
| 1129.67 | 10.2140 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 9.3994 | | | | |
| 1177.95 | 9.4116 | | | | |
| 1189.05 | 5.6643 | | | | |
| 1204.77 | 7.5846 | | | | |
| 1221.41 | 10.4754 | | | | |
| 1231.02 | 4.7738 | | | | |
| 1235.36 | 4.7793 | | | | |
| 1238.28 | 5.7395 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 6.7550 | | | | |
| 1274.44 | 4.8283 | | | | |
| 1274.54 | 4.8283 | | | | |
| 1291.59 | 6.7892 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:49.70

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM28.CNF;115
                                        Background date  : 9-FEB-2014 11:22:34.
Sample date      : 6-NOV-2013 14:35:00. Acquisition date : 12-FEB-2014 14:38:29
Sample ID        : G1203023700          Sample quantity  : 1.02375E+02 GRAM
Detector name    : GAM28                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.18  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 47.02* | 15 | 25 | 1.61 | 94.69 | 91 | 10 | 4.16E-03 | 76.6 | |
| 2 | 0 | 77.33 | 19 | 28 | 1.50 | 155.30 | 152 | 7 | 5.17E-03 | 53.5 | |
| 3 | 0 | 92.39* | 15 | 62 | 1.25 | 185.42 | 179 | 12 | 4.26E-03 | 121.2 | |
| 4 | 0 | 112.62* | 24 | 42 | 1.01 | 225.88 | 221 | 11 | 6.66E-03 | 58.1 | |
| 5 | 0 | 189.34 | 16 | 23 | 1.18 | 379.31 | 376 | 7 | 4.31E-03 | 56.9 | |
| 6 | 0 | 238.11* | 21 | 26 | 2.88 | 476.83 | 472 | 11 | 5.76E-03 | 57.7 | |
| 7 | 0 | 317.90 | 10 | 57 | 4.37 | 636.40 | 620 | 19 | 2.78E-03 | 183.8 | |
| 8 | 0 | 342.62 | 12 | 9 | 1.72 | 685.84 | 683 | 6 | 3.23E-03 | 50.6 | |
| 9 | 0 | 351.36* | 13 | 17 | 1.15 | 703.31 | 697 | 11 | 3.56E-03 | 71.1 | |
| 10 | 0 | 366.01 | 25 | 18 | 3.71 | 732.61 | 726 | 14 | 7.03E-03 | 40.3 | |
| 11 | 0 | 479.59 | 11 | 3 | 0.71 | 959.75 | 956 | 7 | 3.00E-03 | 41.6 | |
| 12 | 0 | 510.46* | 4 | 20 | 2.87 | 1021.49 | 1015 | 17 | 1.05E-03 | 382.2 | |
| 13 | 0 | 603.62 | 6 | 10 | 0.89 | 1207.79 | 1203 | 8 | 1.60E-03 | 104.3 | |
| 14 | 0 | 637.59 | 8 | 7 | 0.63 | 1275.72 | 1270 | 9 | 2.31E-03 | 66.2 | |
| 15 | 0 | 649.98 | 6 | 6 | 0.89 | 1300.50 | 1297 | 6 | 1.67E-03 | 76.4 | |
| 16 | 0 | 739.82 | 5 | 8 | 0.63 | 1480.16 | 1471 | 11 | 1.37E-03 | 121.3 | |
| 17 | 0 | 1000.75* | 0 | 2 | 1.42 | 2002.00 | 1998 | 8 | 3.81E-05 | ***** | |
| 18 | 0 | 1103.84 | 6 | 3 | 1.31 | 2208.17 | 2204 | 7 | 1.64E-03 | 66.0 | |
| 19 | 0 | 1487.35 | 6 | 0 | 1.37 | 2975.17 | 2968 | 11 | 1.67E-03 | 40.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:38:51

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 6-NOV-2013 14:35:00 | Acquisition date | : 12-FEB-2014 14:38:29 |
| Sample ID | : G1203023700 | Sample quantity | : 102.38 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA28 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.18 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PB-210 | 46.54 | 15 | 4.25* | 5.075E-01 | 5.097E+00 | 5.140E+00 | 153.18 |
| BI-211 | 72.87 | ------ | 1.23 | 3.415E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 13 | 12.92* | 3.913E+00 | 1.859E-01 | 1.859E-01 | 142.28 |
| PB-212 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 4 | 100.00* | 3.059E+00 | 9.042E-03 | 9.042E-03 | 764.30 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:52.08

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1  *
* Acquisition date : 12-FEB-2014 14:38:29 Sensitivity     : 3.000           *
* Detector ID      : GAM28                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****           *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023700          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| PB-210 | 5.140E+00 | 7.717E+00 | 1.040E+01 |
| BI-211 | 1.859E-01 | 2.592E-01 | 3.887E-01 |
| PB-212 | 6.990E-02 | 7.899E-02 | 9.870E-02 |
| TH-228 | 6.990E-02 | 7.899E-02 | 9.870E-02 |
| ANH-511 | 9.042E-03 | 6.772E-02 | 5.369E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.463E-03 | 9.665E-01 | 1.652E+00 | NOT IDENT. |
| NA-22 | 3.496E-02 | 4.520E-02 | 1.069E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.028E-02 | 4.211E-02 | 9.816E-02 | NOT IDENT. |
| K-40 | 5.037E-02 | 3.655E-01 | 8.461E-01 | NOT IDENT. |
| SC-46 | -4.723E-03 | 5.806E-02 | 1.150E-01 | NOT IDENT. |
| V-48 | -6.230E-01 | 1.912E+00 | 3.719E+00 | NOT IDENT. |
| CR-51 | 4.217E-01 | 3.163E+00 | 5.269E+00 | NOT IDENT. |
| MN-54 | 1.689E-02 | 3.262E-02 | 7.241E-02 | NOT IDENT. |
| CO-56 | 4.136E-02 | 8.256E-02 | 1.723E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.104E-02 | 2.851E-02 | 5.533E-02 | NOT IDENT. |
| CO-58 | -6.819E-02 | 6.018E-02 | 8.004E-02 | NOT IDENT. |
| FE-59 | 2.005E-01 | 2.643E-01 | 5.890E-01 | NOT IDENT. |
| CO-60 | 3.177E-02 | 4.221E-02 | 9.679E-02 | NOT IDENT. |
| ZN-65 | 8.079E-02 | 9.182E-02 | 2.152E-01 | NOT IDENT. |
| GE-68 | -1.211E-01 | 1.182E+00 | 2.406E+00 | NOT IDENT. |
| AS-73 | 2.017E+00 | 2.233E+00 | 4.568E+00 | NOT IDENT. |
| AS-74 | 1.480E+00 | 2.013E+00 | 4.409E+00 | NOT IDENT. |
| SE-75 | -5.870E-02 | 6.387E-02 | 1.046E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.883E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -4.626E+00 | 2.897E+00 | 3.471E+00 | NOT IDENT. |
| RB-83 | 1.981E-02 | 9.938E-02 | 2.084E-01 | NOT IDENT. |
| KR-85 | 9.981E+00 | 7.829E+00 | 1.598E+01 | NOT IDENT. |
| SR-85 | 1.260E-01 | 9.910E-02 | 2.022E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -5.451E+00 | 1.394E+01 | 2.627E+01 | NOT IDENT. |
| Y-88 | -2.356E-02 | 7.688E-02 | 1.508E-01 | NOT IDENT. |
| Y-91 | 2.586E+01 | 4.858E+01 | 1.065E+02 | NOT IDENT. |
| NB-94 | -8.341E-03 | 3.580E-02 | 6.552E-02 | NOT IDENT. |
| NB-95 | 2.520E-02 | 7.212E-02 | 1.552E-01 | NOT IDENT. |
| NB-95M | 4.876E-02 | 3.201E-01 | 5.308E-01 | NOT IDENT. |
| ZR-95 | -2.664E-02 | 1.478E-01 | 2.807E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 5.933E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.661E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.064E-03 | 2.985E-02 | 5.827E-02 | NOT IDENT. |
| RH-102 | -3.803E-02 | 6.210E-02 | 8.822E-02 | NOT IDENT. |
| RU-103 | 7.252E-02 | 1.427E-01 | 3.048E-01 | NOT IDENT. |
| RH-106 | -1.342E-01 | 2.891E-01 | 5.241E-01 | NOT IDENT. |
| RU-106 | -1.342E-01 | 2.891E-01 | 5.241E-01 | NOT IDENT. |
| AG-108M | 1.224E-02 | 2.733E-02 | 5.651E-02 | NOT IDENT. |
| CD-109 | -2.926E-02 | 9.989E-01 | 1.576E+00 | NOT IDENT. |
| AG-110M | -4.457E-02 | 4.739E-02 | 7.018E-02 | NOT IDENT. |
| SN-113 | -5.328E-02 | 7.246E-02 | 1.185E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.307E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | -9.872E-01 | 3.223E+00 | 5.898E+00 | NOT IDENT. |
| TE-123M | -1.746E-02 | 3.961E-02 | 7.140E-02 | NOT IDENT. |
| SB-124 | 7.579E-03 | 2.189E-01 | 4.854E-01 | FAIL ABUN |
| SB-125 | -2.895E-02 | 8.727E-02 | 1.631E-01 | NOT IDENT. |
| TE-125M | -9.608E+00 | 2.919E+01 | 4.372E+01 | NOT IDENT. |
| I-126 | -1.965E+01 | 1.837E+01 | 2.877E+01 | NOT IDENT. |
| SB-126 | 9.216E+00 | 1.439E+01 | 3.053E+01 | NOT IDENT. |
| SN-126 | -5.674E-02 | 9.146E-02 | 1.321E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 3.452E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.636E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.244E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 4.386E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.171E-02 | 4.203E-02 | 7.907E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.876E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -5.134E-04 | 4.251E-02 | 8.159E-02 | FAIL ABUN |
| CS-135 | 1.305E-01 | 1.447E-01 | 2.962E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.838E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.552E-01 | 4.934E+00 | 1.092E+01 | NOT IDENT. |
| BA-137M | 1.674E-02 | 3.995E-02 | 8.586E-02 | NOT IDENT. |
| CS-137 | 1.769E-02 | 4.220E-02 | 9.071E-02 | NOT IDENT. |
| CE-139 | 9.717E-03 | 4.349E-02 | 8.298E-02 | NOT IDENT. |
| BA-140 | 1.536E+00 | 6.491E+00 | 1.545E+01 | NOT IDENT. |
| LA-140 | 1.536E+00 | 6.491E+00 | 1.545E+01 | NOT IDENT. |
| CE-141 | 1.228E-01 | 2.854E-01 | 5.700E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.638E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.043E-01 | 2.409E-01 | 4.851E-01 | NOT IDENT. |
| PM-144 | -1.541E-04 | 3.954E-02 | 7.576E-02 | NOT IDENT. |
| PR-144 | -4.609E-02 | 3.085E+00 | 5.901E+00 | NOT IDENT. |
| PM-146 | -1.903E-02 | 4.469E-02 | 8.153E-02 | NOT IDENT. |
| ND-147 | -4.219E+01 | 8.646E+01 | 1.571E+02 | FAIL ABUN |
| PM-147 | -2.803E+01 | 7.429E+02 | 1.315E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.921E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.297E-03 | 2.846E-02 | 5.187E-02 | NOT IDENT. |
| EU-152 | 1.949E-02 | 1.210E-01 | 1.872E-01 | NOT IDENT. |
| GD-153 | 5.079E-02 | 1.213E-01 | 2.040E-01 | NOT IDENT. |
| EU-154 | 1.000E-01 | 1.239E-01 | 2.934E-01 | NOT IDENT. |
| EU-155 | 2.283E-02 | 1.060E-01 | 1.936E-01 | NOT IDENT. |
| TB-160 | 1.139E-01 | 1.947E-01 | 4.587E-01 | FAIL ABUN |
| HO-166M | -2.206E-02 | 5.763E-02 | 1.039E-01 | NOT IDENT. |
| TM-171 | 2.036E+01 | 2.737E+01 | 5.098E+01 | NOT IDENT. |
| LU-176 | 3.353E-03 | 2.779E-02 | 4.636E-02 | NOT IDENT. |
| HF-181 | 1.981E-02 | 1.865E-01 | 3.225E-01 | NOT IDENT. |
| TA-182 | 1.978E-01 | 2.519E-01 | 5.829E-01 | NOT IDENT. |
| RE-183 | -1.520E-01 | 5.269E-01 | 9.371E-01 | NOT IDENT. |
| RE-184 | -1.181E-01 | 5.260E-01 | 9.866E-01 | NOT IDENT. |
| W-188 | -1.219E+01 | 1.851E+01 | 3.132E+01 | NOT IDENT. |
| IR-192 | 5.334E-02 | 1.921E-01 | 1.408E-01 | FAIL ABUN |
| HG-203 | -5.385E-02 | 1.270E-01 | 2.229E-01 | NOT IDENT. |
| BI-207 | -8.475E-03 | 4.307E-02 | 8.575E-02 | NOT IDENT. |
| TL-208 | 1.724E-03 | 3.491E-02 | 7.043E-02 | NOT IDENT. |
| PB-211 | -1.735E-01 | 6.040E-01 | 1.081E+00 | NOT IDENT. |
| BI-212 | -3.329E-01 | 5.805E-01 | 1.011E+00 | NOT IDENT. |
| BI-214 | -4.980E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| PB-214 | 6.748E-02 | 9.409E-02 | 1.462E-01 | FAIL ABUN |
| RN-219 | -1.797E-01 | 3.864E-01 | 6.579E-01 | NOT IDENT. |
| RN-222 | -4.980E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| RA-223 | -2.668E-01 | 6.333E-01 | 1.104E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 8.574E-02 | 5.997E-01 | 1.006E+00 | NOT IDENT. |
| RA-226 | -4.980E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| AC-227 | 1.574E-01 | 2.282E-01 | 4.608E-01 | NOT IDENT. |
| TH-227 | 1.574E-01 | 2.282E-01 | 4.608E-01 | NOT IDENT. |
| AC-228 | 6.265E-02 | 1.276E-01 | 2.795E-01 | NOT IDENT. |
| RA-228 | 6.265E-02 | 1.276E-01 | 2.795E-01 | NOT IDENT. |
| TH-229 | -4.086E-01 | 5.500E-01 | 8.009E-01 | NOT IDENT. |
| TH-230 | -4.979E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| PA-231 | -5.275E-01 | 1.568E+00 | 2.767E+00 | NOT IDENT. |
| TH-231 | -2.668E-01 | 6.333E-01 | 1.104E+00 | NOT IDENT. |
| TH-232 | 6.265E-02 | 1.276E-01 | 2.795E-01 | NOT IDENT. |
| PA-233 | 7.610E-03 | 7.175E-02 | 1.328E-01 | NOT IDENT. |
| PA-234 | 1.706E-01 | 2.890E-01 | 6.341E-01 | NOT IDENT. |
| PA-234M | 6.541E-02 | 3.978E+00 | 8.843E+00 | FAIL ABUN |
| TH-234 | -1.547E+00 | 1.676E+00 | 2.851E+00 | FAIL ABUN |
| U-234 | -4.979E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| U-235 | -4.869E-02 | 1.859E-01 | 3.359E-01 | FAIL ABUN |
| NP-237 | 7.610E-03 | 7.175E-02 | 1.328E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 8.580E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -1.547E+00 | 1.676E+00 | 2.851E+00 | FAIL ABUN |
| NP-239 | 6.692E-02 | 3.949E-01 | 6.468E-01 | NOT IDENT. |
| PU-239 | -2.159E+02 | 3.150E+02 | 5.569E+02 | NOT IDENT. |
| AM-241 | -1.862E-02 | 1.955E-01 | 3.521E-01 | NOT IDENT. |
| AM-243 | -1.533E-02 | 6.163E-02 | 9.515E-02 | NOT IDENT. |
| CM-243 | -3.793E-02 | 1.061E-01 | 1.812E-01 | NOT IDENT. |
| CM-247 | 3.886E-03 | 3.232E-02 | 6.122E-02 | NOT IDENT. |
| CF-249 | 1.395E-02 | 3.829E-02 | 7.462E-02 | NOT IDENT. |
| CF-251 | 2.854E-02 | 1.152E-01 | 2.218E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:48.10

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 47.02 | 31 | 25 | 1.61 | 94.69 | 91 | 10 | 8.47E-03 | 36.6 | |
| 2 | 0 | 77.33 | 19 | 28 | 1.50 | 155.30 | 152 | 7 | 5.17E-03 | 53.5 | |
| 3 | 0 | 92.39 | 75 | 62 | 1.25 | 185.42 | 179 | 12 | 2.07E-02 | 24.2 | |
| 4 | 0 | 112.62 | 32 | 42 | 1.01 | 225.88 | 221 | 11 | 8.92E-03 | 42.6 | |
| 5 | 0 | 185.60 | 34 | 38 | 1.38 | 371.83 | 367 | 9 | 9.54E-03 | 36.6 | |
| 6 | 0 | 189.34 | 16 | 23 | 1.18 | 379.31 | 376 | 7 | 4.31E-03 | 56.9 | |
| 7 | 0 | 238.11 | 35 | 26 | 2.88 | 476.83 | 472 | 11 | 9.62E-03 | 33.8 | |
| 8 | 0 | 317.90 | 10 | 57 | 4.37 | 636.40 | 620 | 19 | 2.78E-03 | 183.8 | |
| 9 | 0 | 342.62 | 12 | 9 | 1.72 | 685.84 | 683 | 6 | 3.23E-03 | 50.6 | |
| 10 | 0 | 351.36 | 18 | 17 | 1.15 | 703.31 | 697 | 11 | 4.86E-03 | 50.9 | |
| 11 | 0 | 366.01 | 25 | 18 | 3.71 | 732.61 | 726 | 14 | 7.03E-03 | 40.3 | |
| 12 | 0 | 479.59 | 11 | 3 | 0.71 | 959.75 | 956 | 7 | 3.00E-03 | 41.6 | |
| 13 | 0 | 510.46 | 98 | 20 | 2.87 | 1021.49 | 1015 | 17 | 2.72E-02 | 14.1 | |
| 14 | 0 | 603.62 | 6 | 10 | 0.89 | 1207.79 | 1203 | 8 | 1.60E-03 | 104.3 | |
| 15 | 0 | 637.59 | 8 | 7 | 0.63 | 1275.72 | 1270 | 9 | 2.31E-03 | 66.2 | |
| 16 | 0 | 649.98 | 6 | 6 | 0.89 | 1300.50 | 1297 | 6 | 1.67E-03 | 76.4 | |
| 17 | 0 | 739.82 | 5 | 8 | 0.63 | 1480.16 | 1471 | 11 | 1.37E-03 | 121.3 | |
| 18 | 0 | 1000.75 | 9 | 2 | 1.42 | 2002.00 | 1998 | 8 | 2.56E-03 | 42.0 | |
| 19 | 0 | 1103.84 | 6 | 3 | 1.31 | 2208.17 | 2204 | 7 | 1.64E-03 | 66.0 | |
| 20 | 0 | 1487.35 | 6 | 0 | 1.37 | 2975.17 | 2968 | 11 | 1.67E-03 | 40.8 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:50.31

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PB-210 | 46.54 | 15 | 4.25* | 5.075E-01 | 5.097E+00 | 5.140E+00 | 153.18 |
| BI-211 | 72.87 | ------ | 1.23 | 3.415E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 13 | 12.92* | 3.913E+00 | 1.859E-01 | 1.859E-01 | 142.28 |
| PB-212 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 4 | 100.00* | 3.059E+00 | 9.042E-03 | 9.042E-03 | 764.30 |

Flag: "*" = Keyline

Sample ID : G1203023700 Acquisition date : 12-FEB-2014 14:38:29

Total number of lines in spectrum 19
Number of unidentified lines 6
Number of lines tentatively identified by NID 13 68.42%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| PB-210 | 22.20Y | 1.01 | 5.097E+00 | 5.140E+00 | 7.874E+00 | 153.18 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.859E-01 | 1.859E-01 | 2.645E-01 | 142.28 | |
| PB-212 | 1.41E+10Y | 1.00 | 6.990E-02 | 6.990E-02 | 8.060E-02 | 115.30 | |
| TH-228 | 1.41E+10Y | 1.00 | 6.990E-02 | 6.990E-02 | 8.060E-02 | 115.30 | |
| ANH-511 | 1.00E+09Y | 1.00 | 9.042E-03 | 9.042E-03 | 69.11E-03 | 764.30 | |
| | Total Activity : | | 5.432E+00 | 5.475E+00 | | | |
| | Grand Total Activity : | | 5.432E+00 | 5.475E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203023700 Acquisition date : 12-FEB-2014 14:38:29

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.39 | 15 | 62 | 1.25 | 185.42 | 179 | 12 | 4.26E-03 | **** | 5.20E+00 | T |
| 0 | 112.62 | 24 | 42 | 1.01 | 225.88 | 221 | 11 | 6.66E-03 | **** | 6.04E+00 | T |
| 0 | 189.34 | 16 | 23 | 1.18 | 379.31 | 376 | 7 | 4.31E-03 | **** | 5.65E+00 | |
| 0 | 317.90 | 10 | 57 | 4.37 | 636.40 | 620 | 19 | 2.78E-03 | **** | 4.17E+00 | T |
| 0 | 342.62 | 12 | 9 | 1.72 | 685.84 | 683 | 6 | 3.23E-03 | **** | 3.98E+00 | |
| 0 | 366.01 | 25 | 18 | 3.71 | 732.61 | 726 | 14 | 7.03E-03 | 80.7 | 3.81E+00 | T |
| 0 | 479.59 | 11 | 3 | 0.71 | 959.75 | 956 | 7 | 3.00E-03 | 83.2 | 3.19E+00 | |
| 0 | 603.62 | 6 | 10 | 0.89 | 1207.79 | 1203 | 8 | 1.60E-03 | **** | 2.72E+00 | T |
| 0 | 637.59 | 8 | 7 | 0.63 | 1275.72 | 1270 | 9 | 2.31E-03 | **** | 2.62E+00 | T |
| 0 | 649.98 | 6 | 6 | 0.89 | 1300.50 | 1297 | 6 | 1.67E-03 | **** | 2.58E+00 | |
| 0 | 739.82 | 5 | 8 | 0.63 | 1480.16 | 1471 | 11 | 1.37E-03 | **** | 2.34E+00 | T |
| 0 | 1103.84 | 6 | 3 | 1.31 | 2208.17 | 2204 | 7 | 1.64E-03 | **** | 1.68E+00 | |
| 0 | 1487.35 | 6 | 0 | 1.37 | 2975.17 | 2968 | 11 | 1.67E-03 | 81.6 | 1.30E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:39:02.85

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1  *
* Acquisition date : 12-FEB-2014 14:38:29 Sensitivity     : 3.000        *
* Detector ID      : GAM28                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****        *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID        *
* Sample ID        : G1203023700          Analyst initials: RXF2         *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB      *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4      *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| PB-210 | 4.705E+00 |
| BI-211 | 1.748E-01 |
| PB-212 | 4.480E-02 |
| TH-228 | 4.480E-02 |
| ANH-511 | 2.361E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.199E-01 | NOT IDENT. |
| NA-22 | 4.628E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.024E-02 | NOT IDENT. |
| K-40 | 3.528E-01 | NOT IDENT. |
| SC-46 | 4.646E-02 | NOT IDENT. |
| V-48 | 1.484E+00 | NOT IDENT. |
| CR-51 | 2.356E+00 | NOT IDENT. |
| MN-54 | 3.042E-02 | NOT IDENT. |
| CO-56 | 7.479E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.527E-02 | NOT IDENT. |
| CO-58 | 2.808E-02 | NOT IDENT. |
| FE-59 | 2.467E-01 | NOT IDENT. |
| CO-60 | 4.123E-02 | NOT IDENT. |
| ZN-65 | 9.214E-02 | NOT IDENT. |
| GE-68 | 9.732E-01 | NOT IDENT. |
| AS-73 | 2.077E+00 | NOT IDENT. |
| AS-74 | 1.925E+00 | NOT IDENT. |
| SE-75 | 4.596E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.310E+00 | NOT IDENT. |
| RB-83 | 8.814E-02 | NOT IDENT. |
| KR-85 | 7.227E+00 | NOT IDENT. |
| SR-85 | 9.144E-02 | NOT IDENT. |
| RB-86 | 1.058E+01 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 5.844E-02 | NOT IDENT. |
| Y-91 | 4.547E+01 | NOT IDENT. |
| NB-94 | 2.869E-02 | NOT IDENT. |
| NB-95 | 6.501E-02 | NOT IDENT. |
| NB-95M | 2.425E-01 | NOT IDENT. |
| ZR-95 | 1.175E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.667E-02 | NOT IDENT. |
| RH-102 | 3.706E-02 | NOT IDENT. |
| RU-103 | 1.327E-01 | NOT IDENT. |
| RH-106 | 2.171E-01 | NOT IDENT. |
| RU-106 | 2.171E-01 | NOT IDENT. |
| AG-108M | 2.505E-02 | NOT IDENT. |
| CD-109 | 7.248E-01 | NOT IDENT. |
| AG-110M | 2.627E-02 | NOT IDENT. |
| SN-113 | 5.171E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.670E+00 | NOT IDENT. |
| TE-123M | 3.227E-02 | NOT IDENT. |
| SB-124 | 1.881E-01 | FAIL ABUN |
| SB-125 | 7.125E-02 | NOT IDENT. |
| TE-125M | 1.986E+01 | NOT IDENT. |
| I-126 | 1.211E+01 | NOT IDENT. |
| SB-126 | 1.338E+01 | NOT IDENT. |
| SN-126 | 6.053E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.536E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.506E-02 | FAIL ABUN |
| CS-135 | 1.348E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.230E+00 | NOT IDENT. |
| BA-137M | 3.859E-02 | NOT IDENT. |
| CS-137 | 4.076E-02 | NOT IDENT. |
| CE-139 | 3.810E-02 | NOT IDENT. |
| BA-140 | 5.987E+00 | NOT IDENT. |
| LA-140 | 5.987E+00 | NOT IDENT. |
| CE-141 | 2.583E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.245E-01 | NOT IDENT. |
| PM-144 | 3.299E-02 | NOT IDENT. |
| PR-144 | 2.568E+00 | NOT IDENT. |
| PM-146 | 3.601E-02 | NOT IDENT. |
| ND-147 | 6.618E+01 | FAIL ABUN |
| PM-147 | 5.971E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.338E-02 | NOT IDENT. |
| EU-152 | 8.411E-02 | NOT IDENT. |
| GD-153 | 9.379E-02 | NOT IDENT. |
| EU-154 | 1.273E-01 | NOT IDENT. |
| EU-155 | 8.846E-02 | NOT IDENT. |
| TB-160 | 1.881E-01 | FAIL ABUN |
| HO-166M | 4.435E-02 | NOT IDENT. |
| TM-171 | 2.310E+01 | NOT IDENT. |
| LU-176 | 2.070E-02 | NOT IDENT. |
| HF-181 | 1.421E-01 | NOT IDENT. |
| TA-182 | 2.484E-01 | NOT IDENT. |
| RE-183 | 4.206E-01 | NOT IDENT. |
| RE-184 | 4.045E-01 | NOT IDENT. |
| W-188 | 1.418E+01 | NOT IDENT. |
| IR-192 | 6.323E-02 | FAIL ABUN |
| HG-203 | 9.993E-02 | NOT IDENT. |
| BI-207 | 3.519E-02 | NOT IDENT. |
| TL-208 | 3.104E-02 | NOT IDENT. |
| PB-211 | 4.673E-01 | NOT IDENT. |
| BI-212 | 4.428E-01 | NOT IDENT. |
| BI-214 | 5.417E-02 | NOT IDENT. |
| PB-214 | 6.598E-02 | FAIL ABUN |
| RN-219 | 2.871E-01 | NOT IDENT. |
| RN-222 | 5.417E-02 | NOT IDENT. |
| RA-223 | 4.919E-01 | NOT IDENT. |
| RA-224 | 4.544E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 5.417E-02 | NOT IDENT. |
| AC-227 | 2.086E-01 | NOT IDENT. |
| TH-227 | 2.086E-01 | NOT IDENT. |
| AC-228 | 1.204E-01 | NOT IDENT. |
| RA-228 | 1.204E-01 | NOT IDENT. |
| TH-229 | 3.604E-01 | NOT IDENT. |
| TH-230 | 5.416E-02 | NOT IDENT. |
| PA-231 | 1.254E+00 | NOT IDENT. |
| TH-231 | 4.919E-01 | NOT IDENT. |
| TH-232 | 1.204E-01 | NOT IDENT. |
| PA-233 | 6.034E-02 | NOT IDENT. |
| PA-234 | 2.741E-01 | NOT IDENT. |
| PA-234M | 3.778E+00 | FAIL ABUN |
| TH-234 | 1.306E+00 | FAIL ABUN |
| U-234 | 5.416E-02 | NOT IDENT. |
| U-235 | 1.534E-01 | FAIL ABUN |
| NP-237 | 6.034E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.306E+00 | FAIL ABUN |
| NP-239 | 2.928E-01 | NOT IDENT. |
| PU-239 | 2.534E+02 | NOT IDENT. |
| AM-241 | 1.605E-01 | NOT IDENT. |
| AM-243 | 4.351E-02 | NOT IDENT. |
| CM-243 | 8.232E-02 | NOT IDENT. |
| CM-247 | 2.677E-02 | NOT IDENT. |
| CF-249 | 3.322E-02 | NOT IDENT. |
| CF-251 | 1.011E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:39:07.65

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1  *
* Acquisition date : 12-FEB-2014 14:38:29 Sensitivity     : 3.000       *
* Detector ID      : GAM28                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****       *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID        *
* Sample ID        : G1203023700          Analyst initials: RXF2        *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM  *
*                                         Quantity Err(%) : 1.9536E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB      *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| PB-210 | 5.140E+00 | 7.730E+00 | 7.730E+00 |
| BI-211 | 1.859E-01 | 2.597E-01 | 2.597E-01 |
| PB-212 | 6.990E-02 | 7.922E-02 | 7.922E-02 |
| TH-228 | 6.990E-02 | 7.922E-02 | 7.922E-02 |
| ANH-511 | 9.042E-03 | 6.773E-02 | 6.773E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.463E-03 | 9.665E-01 | 9.665E-01 | NOT IDENT. |
| NA-22 | 3.496E-02 | 4.530E-02 | 4.796E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 5.030E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.028E-02 | 4.214E-02 | 4.312E-02 | NOT IDENT. |
| K-40 | 5.037E-02 | 3.656E-01 | 3.663E-01 | NOT IDENT. |
| SC-46 | -4.723E-03 | 5.807E-02 | 5.811E-02 | NOT IDENT. |
| V-48 | -6.230E-01 | 1.915E+00 | 1.935E+00 | NOT IDENT. |
| CR-51 | 4.217E-01 | 3.163E+00 | 3.169E+00 | NOT IDENT. |
| MN-54 | 1.689E-02 | 3.268E-02 | 3.356E-02 | NOT IDENT. |
| CO-56 | 4.136E-02 | 8.271E-02 | 8.478E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.985E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.104E-02 | 2.858E-02 | 3.011E-02 | NOT IDENT. |
| CO-58 | -6.819E-02 | 6.066E-02 | 6.801E-02 | NOT IDENT. |
| FE-59 | 2.005E-01 | 2.667E-01 | 2.816E-01 | NOT IDENT. |
| CO-60 | 3.177E-02 | 4.229E-02 | 4.464E-02 | NOT IDENT. |
| ZN-65 | 8.079E-02 | 9.283E-02 | 9.972E-02 | NOT IDENT. |
| GE-68 | -1.211E-01 | 1.182E+00 | 1.184E+00 | NOT IDENT. |
| AS-73 | 2.017E+00 | 2.272E+00 | 2.447E+00 | NOT IDENT. |
| AS-74 | 1.480E+00 | 2.020E+00 | 2.127E+00 | NOT IDENT. |
| SE-75 | -5.870E-02 | 6.404E-02 | 6.929E-02 | NOT IDENT. |
| BR-77 | 3.436E+11 | 1.047E+12 | 1.059E+12 | SHORT HLIF |
| SR-82 | -4.626E+00 | 2.936E+00 | 3.602E+00 | NOT IDENT. |
| RB-83 | 1.981E-02 | 9.943E-02 | 9.983E-02 | NOT IDENT. |
| KR-85 | 9.981E+00 | 7.876E+00 | 9.071E+00 | NOT IDENT. |
| SR-85 | 1.260E-01 | 9.970E-02 | 1.147E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -5.451E+00 | 1.397E+01 | 1.419E+01 | NOT IDENT. |
| Y-88 | -2.356E-02 | 7.690E-02 | 7.763E-02 | NOT IDENT. |
| Y-91 | 2.586E+01 | 4.864E+01 | 5.002E+01 | NOT IDENT. |
| NB-94 | -8.341E-03 | 3.581E-02 | 3.601E-02 | NOT IDENT. |
| NB-95 | 2.520E-02 | 7.216E-02 | 7.305E-02 | NOT IDENT. |
| NB-95M | 4.876E-02 | 3.202E-01 | 3.209E-01 | NOT IDENT. |
| ZR-95 | -2.664E-02 | 1.478E-01 | 1.483E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 4.949E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 5.996E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 6.986E+09 | 1.663E+10 | 1.693E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.057E+42 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.064E-03 | 2.991E-02 | 3.019E-02 | NOT IDENT. |
| RH-102 | -3.803E-02 | 6.223E-02 | 6.455E-02 | NOT IDENT. |
| RU-103 | 7.252E-02 | 1.429E-01 | 1.466E-01 | NOT IDENT. |
| RH-106 | -1.342E-01 | 2.894E-01 | 2.957E-01 | NOT IDENT. |
| RU-106 | -1.342E-01 | 2.894E-01 | 2.957E-01 | NOT IDENT. |
| AG-108M | 1.224E-02 | 2.735E-02 | 2.790E-02 | NOT IDENT. |
| CD-109 | -2.926E-02 | 9.989E-01 | 9.990E-01 | NOT IDENT. |
| AG-110M | -4.457E-02 | 4.777E-02 | 5.182E-02 | NOT IDENT. |
| SN-113 | -5.328E-02 | 7.261E-02 | 7.648E-02 | NOT IDENT. |
| CD-115 | 7.800E+11 | 1.310E+12 | 1.356E+12 | SHORT HLIF |
| SN-117M | -9.872E-01 | 3.225E+00 | 3.255E+00 | NOT IDENT. |
| TE-123M | -1.746E-02 | 3.964E-02 | 4.041E-02 | NOT IDENT. |
| SB-124 | 7.579E-03 | 2.189E-01 | 2.189E-01 | FAIL ABUN |
| SB-125 | -2.895E-02 | 8.730E-02 | 8.827E-02 | NOT IDENT. |
| TE-125M | -9.608E+00 | 2.921E+01 | 2.953E+01 | NOT IDENT. |
| I-126 | -1.965E+01 | 1.847E+01 | 2.049E+01 | NOT IDENT. |
| SB-126 | 9.216E+00 | 1.444E+01 | 1.503E+01 | NOT IDENT. |
| SN-126 | -5.674E-02 | 9.162E-02 | 9.512E-02 | NOT IDENT. |
| SB-127 | -3.066E+06 | 3.726E+06 | 3.974E+06 | SHORT HLIF |
| I-131 | 9.747E+01 | 1.638E+02 | 1.696E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.169E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.173E+07 | 4.391E+07 | 4.422E+07 | SHORT HLIF |
| BA-133 | 3.171E-02 | 4.211E-02 | 4.447E-02 | NOT IDENT. |
| I-133 | 1.562E+32 | 3.024E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -5.134E-04 | 4.251E-02 | 4.251E-02 | FAIL ABUN |
| CS-135 | 1.305E-01 | 1.452E-01 | 1.567E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.880E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.552E-01 | 4.934E+00 | 4.934E+00 | NOT IDENT. |
| BA-137M | 1.674E-02 | 3.997E-02 | 4.068E-02 | NOT IDENT. |
| CS-137 | 1.769E-02 | 4.222E-02 | 4.297E-02 | NOT IDENT. |
| CE-139 | 9.717E-03 | 4.354E-02 | 4.376E-02 | NOT IDENT. |
| BA-140 | 1.536E+00 | 6.492E+00 | 6.529E+00 | NOT IDENT. |
| LA-140 | 1.536E+00 | 6.492E+00 | 6.529E+00 | NOT IDENT. |
| CE-141 | 1.228E-01 | 2.856E-01 | 2.909E-01 | NOT IDENT. |
| CE-143 | 1.027E+20 | 1.640E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.043E-01 | 2.417E-01 | 2.587E-01 | NOT IDENT. |
| PM-144 | -1.541E-04 | 3.954E-02 | 3.954E-02 | NOT IDENT. |
| PR-144 | -4.609E-02 | 3.085E+00 | 3.085E+00 | NOT IDENT. |
| PM-146 | -1.903E-02 | 4.473E-02 | 4.555E-02 | NOT IDENT. |
| ND-147 | -4.219E+01 | 8.654E+01 | 8.860E+01 | FAIL ABUN |
| PM-147 | -2.803E+01 | 7.429E+02 | 7.431E+02 | NOT IDENT. |
| PM-149 | 9.849E+12 | 1.928E+13 | 1.978E+13 | SHORT HLIF |
| EU-150 | -1.297E-03 | 2.846E-02 | 2.847E-02 | NOT IDENT. |
| EU-152 | 1.949E-02 | 1.210E-01 | 1.213E-01 | NOT IDENT. |
| GD-153 | 5.079E-02 | 1.214E-01 | 1.236E-01 | NOT IDENT. |
| EU-154 | 1.000E-01 | 1.242E-01 | 1.322E-01 | NOT IDENT. |
| EU-155 | 2.283E-02 | 1.060E-01 | 1.065E-01 | NOT IDENT. |
| TB-160 | 1.139E-01 | 1.953E-01 | 2.020E-01 | FAIL ABUN |
| HO-166M | -2.206E-02 | 5.767E-02 | 5.852E-02 | NOT IDENT. |
| TM-171 | 2.036E+01 | 2.744E+01 | 2.894E+01 | NOT IDENT. |
| LU-176 | 3.353E-03 | 2.779E-02 | 2.783E-02 | NOT IDENT. |
| HF-181 | 1.981E-02 | 1.866E-01 | 1.868E-01 | NOT IDENT. |
| TA-182 | 1.978E-01 | 2.525E-01 | 2.678E-01 | NOT IDENT. |
| RE-183 | -1.520E-01 | 5.272E-01 | 5.316E-01 | NOT IDENT. |
| RE-184 | -1.181E-01 | 5.263E-01 | 5.290E-01 | NOT IDENT. |
| W-188 | -1.219E+01 | 1.857E+01 | 1.937E+01 | NOT IDENT. |
| IR-192 | 5.334E-02 | 1.922E-01 | 1.937E-01 | FAIL ABUN |
| HG-203 | -5.385E-02 | 1.270E-01 | 1.293E-01 | NOT IDENT. |
| BI-207 | -8.475E-03 | 4.309E-02 | 4.326E-02 | NOT IDENT. |
| TL-208 | 1.724E-03 | 3.491E-02 | 3.492E-02 | NOT IDENT. |
| PB-211 | -1.735E-01 | 6.042E-01 | 6.092E-01 | NOT IDENT. |
| BI-212 | -3.329E-01 | 5.814E-01 | 6.005E-01 | NOT IDENT. |
| BI-214 | -4.980E-02 | 7.532E-02 | 7.859E-02 | NOT IDENT. |
| PB-214 | 6.748E-02 | 9.425E-02 | 9.904E-02 | FAIL ABUN |
| RN-219 | -1.797E-01 | 3.873E-01 | 3.957E-01 | NOT IDENT. |
| RN-222 | -4.980E-02 | 7.532E-02 | 7.859E-02 | NOT IDENT. |
| RA-223 | -2.668E-01 | 6.338E-01 | 6.451E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 8.574E-02 | 5.997E-01 | 6.010E-01 | NOT IDENT. |
| RA-226 | -4.980E-02 | 7.532E-02 | 7.859E-02 | NOT IDENT. |
| AC-227 | 1.574E-01 | 2.293E-01 | 2.401E-01 | NOT IDENT. |
| TH-227 | 1.574E-01 | 2.293E-01 | 2.401E-01 | NOT IDENT. |
| AC-228 | 6.265E-02 | 1.279E-01 | 1.310E-01 | NOT IDENT. |
| RA-228 | 6.265E-02 | 1.279E-01 | 1.310E-01 | NOT IDENT. |
| TH-229 | -4.086E-01 | 5.511E-01 | 5.811E-01 | NOT IDENT. |
| TH-230 | -4.979E-02 | 7.531E-02 | 7.858E-02 | NOT IDENT. |
| PA-231 | -5.275E-01 | 1.569E+00 | 1.586E+00 | NOT IDENT. |
| TH-231 | -2.668E-01 | 6.338E-01 | 6.451E-01 | NOT IDENT. |
| TH-232 | 6.265E-02 | 1.279E-01 | 1.310E-01 | NOT IDENT. |
| PA-233 | 7.610E-03 | 7.176E-02 | 7.184E-02 | NOT IDENT. |
| PA-234 | 1.706E-01 | 3.495E-01 | 3.578E-01 | NOT IDENT. |
| PA-234M | 6.541E-02 | 3.978E+00 | 3.979E+00 | FAIL ABUN |
| TH-234 | -1.547E+00 | 1.713E+00 | 1.849E+00 | FAIL ABUN |
| U-234 | -4.979E-02 | 7.531E-02 | 7.858E-02 | NOT IDENT. |
| U-235 | -4.869E-02 | 1.860E-01 | 1.873E-01 | FAIL ABUN |
| NP-237 | 7.610E-03 | 7.176E-02 | 7.184E-02 | NOT IDENT. |
| NP-238 | -4.213E+12 | 8.603E+12 | 8.810E+12 | SHORT HLIF |
| U-238 | -1.547E+00 | 1.713E+00 | 1.849E+00 | FAIL ABUN |
| NP-239 | 6.692E-02 | 3.950E-01 | 3.961E-01 | NOT IDENT. |
| PU-239 | -2.159E+02 | 3.156E+02 | 3.302E+02 | NOT IDENT. |
| AM-241 | -1.862E-02 | 1.955E-01 | 1.957E-01 | NOT IDENT. |
| AM-243 | -1.533E-02 | 6.165E-02 | 6.203E-02 | NOT IDENT. |
| CM-243 | -3.793E-02 | 1.062E-01 | 1.075E-01 | NOT IDENT. |
| CM-247 | 3.886E-03 | 3.233E-02 | 3.238E-02 | NOT IDENT. |
| CF-249 | 1.395E-02 | 3.833E-02 | 3.884E-02 | NOT IDENT. |
| CF-251 | 2.854E-02 | 1.152E-01 | 1.159E-01 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 37.6222 | 94.67 | 46.7879 | 193.51 | 40.8833 |
| 45.60 | 34.8016 | 94.87 | 48.4749 | 197.03 | 30.3906 |
| 46.54 | 30.3356 | 97.43 | 35.2478 | 198.01 | 28.5191 |
| 49.72 | 0.0000 | 98.43 | 36.9854 | 201.83 | 34.3518 |
| 51.35 | 32.2354 | 98.44 | 36.9859 | 205.31 | 36.3831 |
| 52.39 | 20.0050 | 99.53 | 42.6634 | 210.85 | 29.8387 |
| 53.44 | 20.5690 | 100.11 | 40.4550 | 215.65 | 31.9078 |
| 57.36 | 0.0000 | 103.18 | 35.0030 | 222.11 | 31.1262 |
| 57.53 | 34.2594 | 103.37 | 39.5311 | 227.09 | 29.3129 |
| 57.98 | 30.1370 | 105.21 | 39.6426 | 227.38 | 29.3207 |
| 59.32 | 31.2690 | 105.31 | 33.9845 | 228.16 | 0.0000 |
| 59.54 | 37.5409 | 106.12 | 30.6237 | 228.18 | 32.2759 |
| 63.29 | 40.9993 | 109.28 | 39.3159 | 235.69 | 34.6578 |
| 63.58 | 38.9206 | 111.00 | 32.5610 | 235.96 | 29.9387 |
| 64.28 | 33.7106 | 111.76 | 0.0000 | 238.63 | 32.5750 |
| 66.73 | 35.9995 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 30.7374 | 117.23 | 27.6672 | 240.99 | 26.9047 |
| 67.75 | 29.7081 | 121.12 | 37.0913 | 242.00 | 28.5122 |
| 69.67 | 35.1486 | 121.22 | 33.6186 | 244.70 | 41.9602 |
| 70.83 | 38.4318 | 121.78 | 25.5236 | 252.40 | 0.0000 |
| 72.81 | 33.4364 | 122.06 | 25.5334 | 252.80 | 35.9681 |
| 72.87 | 30.5464 | 123.07 | 24.4066 | 254.15 | 0.0000 |
| 74.66 | 43.5574 | 127.23 | 34.1872 | 256.23 | 21.0413 |
| 74.82 | 43.5705 | 129.30 | 45.7088 | 260.90 | 0.0000 |
| 74.97 | 43.5829 | 131.20 | 42.2988 | 264.66 | 30.2669 |
| 77.11 | 36.7356 | 133.02 | 38.8666 | 268.22 | 21.2474 |
| 79.69 | 42.3389 | 133.52 | 36.2400 | 269.46 | 22.2813 |
| 80.12 | 34.2235 | 136.00 | 35.4694 | 271.23 | 29.4120 |
| 80.19 | 0.0000 | 136.47 | 39.0398 | 273.65 | 28.4525 |
| 80.57 | 22.8344 | 140.51 | 0.0000 | 276.40 | 23.4222 |
| 81.00 | 32.6459 | 143.76 | 34.0264 | 277.37 | 23.4397 |
| 81.07 | 40.8125 | 144.24 | 34.0467 | 277.60 | 23.4440 |
| 83.79 | 41.5579 | 145.44 | 25.1240 | 278.00 | 27.5298 |
| 85.43 | 36.1938 | 152.43 | 30.7661 | 279.20 | 31.6381 |
| 86.55 | 41.2094 | 153.25 | 31.7017 | 279.54 | 30.6253 |
| 86.79 | 46.1736 | 154.21 | 33.5510 | 280.46 | 26.5610 |
| 86.94 | 46.1855 | 156.02 | 37.2573 | 283.69 | 36.8685 |
| 87.09 | 54.4470 | 158.56 | 35.5446 | 284.31 | 0.0000 |
| 87.57 | 54.4921 | 159.00 | 36.4746 | 285.41 | 30.7645 |
| 88.03 | 44.6195 | 162.33 | 41.1905 | 285.90 | 0.0000 |
| 88.34 | 38.0294 | 163.33 | 37.5720 | 287.50 | 27.7321 |
| 88.47 | 38.0378 | 165.86 | 38.5979 | 290.67 | 42.2131 |
| 89.96 | 43.1079 | 176.31 | 32.5359 | 293.27 | 0.0000 |
| 91.11 | 40.9765 | 176.60 | 34.4058 | 295.22 | 33.0596 |
| 92.59 | 41.0774 | 177.52 | 31.6472 | 295.96 | 28.9434 |
| 93.35 | 40.0173 | 181.07 | 0.0000 | 298.58 | 23.8212 |
| 94.56 | 46.7796 | 184.41 | 32.5032 | 299.98 | 20.7355 |
| 94.65 | 46.7864 | 185.72 | 31.5459 | 300.09 | 20.7373 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 20.7379 | 497.08 | 10.2847 | 711.68 | 15.4189 |
| 301.36 | 21.7944 | 505.52 | 4.6948 | 720.70 | 10.3149 |
| 302.85 | 22.8574 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 22.8849 | 511.00 | 17.8894 | 722.78 | 14.4525 |
| 306.78 | 21.6725 | 514.00 | 12.5726 | 722.91 | 13.4208 |
| 308.46 | 28.3754 | 514.00 | 12.5727 | 723.31 | 15.4882 |
| 311.90 | 31.3742 | 520.40 | 8.5135 | 724.19 | 17.5591 |
| 316.51 | 31.4777 | 520.69 | 0.0000 | 727.33 | 19.6485 |
| 319.41 | 20.1873 | 522.65 | 0.0000 | 733.00 | 15.5453 |
| 320.08 | 21.8797 | 527.90 | 0.0000 | 735.93 | 24.2083 |
| 321.04 | 21.8947 | 529.59 | 7.6016 | 737.46 | 17.6475 |
| 323.87 | 28.4774 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 19.0028 | 531.02 | 14.2628 | 747.24 | 12.5027 |
| 328.76 | 27.5159 | 546.56 | 0.0000 | 748.06 | 13.5488 |
| 333.37 | 24.4182 | 552.55 | 14.4100 | 752.31 | 6.2632 |
| 333.97 | 28.6768 | 563.25 | 9.6545 | 753.82 | 6.2666 |
| 334.37 | 29.7470 | 569.33 | 14.5225 | 756.73 | 10.4556 |
| 338.28 | 27.2695 | 569.50 | 14.5239 | 756.80 | 10.4561 |
| 338.32 | 27.2703 | 569.70 | 13.5567 | 763.94 | 7.3384 |
| 340.48 | 22.1895 | 583.19 | 11.6915 | 765.81 | 6.2943 |
| 340.55 | 22.1905 | 584.27 | 11.6974 | 766.42 | 9.4436 |
| 344.28 | 23.5294 | 595.83 | 8.8185 | 766.84 | 10.4946 |
| 345.93 | 21.4139 | 600.60 | 14.7283 | 772.60 | 0.0000 |
| 351.06 | 26.8585 | 602.52 | 0.0000 | 776.52 | 17.9035 |
| 351.93 | 25.7988 | 602.73 | 11.7938 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 19.6733 | 778.90 | 7.3784 |
| 356.01 | 13.7963 | 609.32 | 18.4808 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 15.7773 | 785.37 | 14.7913 |
| 366.42 | 0.0000 | 614.28 | 12.8410 | 792.07 | 10.5903 |
| 375.05 | 28.3669 | 618.01 | 9.8938 | 794.95 | 11.6615 |
| 383.85 | 23.0376 | 620.36 | 9.9038 | 795.86 | 12.7257 |
| 388.16 | 17.5989 | 621.93 | 11.8925 | 801.95 | 11.6902 |
| 388.63 | 18.7043 | 630.19 | 0.0000 | 810.29 | 10.6587 |
| 391.69 | 25.3531 | 631.29 | 16.5837 | 810.45 | 9.5933 |
| 400.66 | 17.7324 | 633.25 | 14.9374 | 810.76 | 9.5944 |
| 401.81 | 18.8537 | 634.78 | 9.9648 | 815.77 | 4.2716 |
| 402.40 | 12.2038 | 635.95 | 9.9697 | 818.51 | 9.6203 |
| 404.85 | 14.4437 | 636.99 | 0.0000 | 832.01 | 11.8129 |
| 410.95 | 12.2656 | 645.85 | 6.6742 | 834.85 | 5.3748 |
| 413.71 | 15.6359 | 657.76 | 19.1155 | 835.71 | 5.3763 |
| 414.70 | 20.1151 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.3068 | 661.66 | 10.0769 | 846.75 | 0.0000 |
| 427.87 | 19.8177 | 664.57 | 0.0000 | 846.77 | 9.7139 |
| 433.94 | 15.3664 | 666.33 | 21.2015 | 856.80 | 6.4978 |
| 439.40 | 13.6002 | 666.50 | 21.2030 | 860.56 | 7.5903 |
| 453.88 | 24.6767 | 667.71 | 0.0000 | 871.09 | 9.7930 |
| 463.37 | 19.2917 | 677.62 | 14.1993 | 873.19 | 4.3555 |
| 468.07 | 11.0515 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 11.2339 | 879.38 | 3.2733 |
| 475.06 | 12.3250 | 696.49 | 15.3278 | 880.51 | 3.2744 |
| 476.78 | 15.4201 | 696.51 | 15.3281 | 883.24 | 8.7396 |
| 477.60 | 15.4268 | 697.00 | 14.3090 | 884.68 | 9.8367 |
| 482.18 | 17.0100 | 697.49 | 16.3563 | 889.28 | 6.5678 |
| 487.02 | 20.4636 | 702.65 | 19.4620 | 894.76 | 4.3862 |
| 492.35 | 0.0000 | 706.68 | 18.4667 | 898.04 | 10.9773 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.7967 | 1312.11 | 5.1267 | | |
| 911.20 | 5.5118 | 1332.49 | 5.1516 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 3.6924 | 1365.19 | 1.0382 | | |
| 937.49 | 10.1892 | 1368.63 | 0.0000 | | |
| 944.13 | 12.0666 | 1384.29 | 7.2991 | | |
| 946.00 | 8.3586 | 1408.01 | 2.0967 | | |
| 949.00 | 12.0846 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.1213 | | |
| 962.31 | 4.6671 | 1489.16 | 0.0000 | | |
| 964.08 | 7.4712 | 1505.03 | 5.3542 | | |
| 966.17 | 13.0831 | 1596.21 | 2.8062 | | |
| 968.97 | 4.6765 | 1620.50 | 1.8800 | | |
| 983.53 | 7.5153 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.8125 | | |
| 996.26 | 9.6994 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.5545 | 1764.49 | 4.8326 | | |
| 1004.73 | 3.2412 | 1770.23 | 8.7078 | | |
| 1021.30 | 0.0000 | 1771.35 | 6.7742 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.8977 | | |
| 1037.84 | 9.5451 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.8757 | | |
| 1046.59 | 7.6553 | | | | |
| 1048.07 | 3.8293 | | | | |
| 1049.04 | 3.8304 | | | | |
| 1050.41 | 9.5797 | | | | |
| 1063.66 | 6.7308 | | | | |
| 1077.00 | 8.6865 | | | | |
| 1077.34 | 6.7568 | | | | |
| 1085.87 | 8.7078 | | | | |
| 1099.45 | 3.3298 | | | | |
| 1112.07 | 9.7453 | | | | |
| 1112.84 | 8.7726 | | | | |
| 1115.54 | 4.8773 | | | | |
| 1120.29 | 10.7440 | | | | |
| 1120.55 | 10.7444 | | | | |
| 1121.30 | 10.7467 | | | | |
| 1129.67 | 7.8333 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.9242 | | | | |
| 1177.95 | 2.9752 | | | | |
| 1189.05 | 2.9838 | | | | |
| 1204.77 | 6.9903 | | | | |
| 1221.41 | 5.0142 | | | | |
| 1231.02 | 5.0262 | | | | |
| 1235.36 | 6.0381 | | | | |
| 1238.28 | 6.0425 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 8.1237 | | | | |
| 1274.44 | 3.0483 | | | | |
| 1274.54 | 3.0483 | | | | |
| 1291.59 | 6.1221 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:26.42

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;376
                                     Background date  : 9-FEB-2014 11:21:17.
Sample date      : 22-JAN-2014 00:00:00 Acquisition date : 12-FEB-2014 16:15:51
Sample ID        : G1203023701          Sample quantity  : 1.30479E+02 GRAM
Detector name    : GAM11                Detector geometry: 500MLMB
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:10.25  1.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.29* | 9214 | 6889 | 0.93 | 92.59 | 87 | 10 | 1.02E+01 | 2.0 | |
| 2 | 0 | 59.32* | 17971 | 6142 | 0.92 | 118.68 | 113 | 12 | 2.00E+01 | 1.2 | |
| 3 | 2 | 86.16 | 156 | 1610 | 0.82 | 172.38 | 171 | 12 | 1.73E-01 | 32.9 | 2.01E+01 |
| 4 | 2 | 87.86 | 19592 | 2019 | 0.91 | 175.79 | 171 | 12 | 2.18E+01 | 0.8 | |
| 5 | 0 | 121.89 | 6010 | 2291 | 0.88 | 243.89 | 239 | 10 | 6.68E+00 | 2.0 | |
| 6 | 0 | 136.35 | 787 | 1743 | 0.96 | 272.82 | 268 | 10 | 8.74E-01 | 10.6 | |
| 7 | 0 | 165.67 | 1485 | 1669 | 1.08 | 331.49 | 327 | 10 | 1.65E+00 | 5.8 | |
| 8 | 0 | 391.21 | 623 | 1244 | 1.16 | 782.78 | 776 | 12 | 6.92E-01 | 12.0 | |
| 9 | 0 | 491.85 | 89 | 655 | 0.80 | 984.14 | 981 | 8 | 9.84E-02 | 51.2 | |
| 10 | 0 | 501.63 | 103 | 568 | 2.57 | 1003.72 | 1000 | 8 | 1.14E-01 | 41.5 | |
| 11 | 0 | 511.06* | 539 | 1321 | 2.78 | 1022.59 | 1015 | 19 | 5.98E-01 | 16.8 | |
| 12 | 0 | 623.57 | 118 | 616 | 1.67 | 1247.67 | 1243 | 11 | 1.31E-01 | 41.6 | |
| 13 | 0 | 661.60* | 16143 | 1045 | 1.38 | 1323.76 | 1316 | 16 | 1.79E+01 | 0.9 | |
| 14 | 0 | 679.86 | 20 | 325 | 1.20 | 1360.29 | 1357 | 6 | 2.20E-02 | 145.9 | |
| 15 | 0 | 752.36 | 27 | 529 | 1.35 | 1505.34 | 1500 | 9 | 3.05E-02 | 152.8 | |
| 16 | 0 | 849.25 | 36 | 422 | 1.19 | 1699.16 | 1696 | 6 | 3.99E-02 | 91.8 | |
| 17 | 0 | 866.87 | 78 | 461 | 1.82 | 1734.40 | 1732 | 7 | 8.67E-02 | 47.1 | |
| 18 | 0 | 897.93 | 519 | 1090 | 1.32 | 1796.54 | 1790 | 13 | 5.76E-01 | 13.8 | |
| 19 | 0 | 1115.53 | 2970 | 645 | 1.66 | 2231.78 | 2225 | 14 | 3.30E+00 | 2.6 | |
| 20 | 0 | 1173.27 | 14826 | 615 | 1.76 | 2347.28 | 2337 | 20 | 1.65E+01 | 0.9 | |
| 21 | 0 | 1300.02 | 80 | 120 | 6.63 | 2600.77 | 2591 | 21 | 8.85E-02 | 36.2 | |
| 22 | 0 | 1332.59* | 13352 | 219 | 1.76 | 2665.91 | 2657 | 19 | 1.48E+01 | 0.9 | |
| 23 | 0 | 1522.34 | 37 | 33 | 2.71 | 3045.38 | 3037 | 15 | 4.09E-02 | 38.1 | |
| 24 | 0 | 1715.93 | 17 | 52 | 3.58 | 3432.50 | 3421 | 16 | 1.87E-02 | 99.1 | |
| 25 | 0 | 1836.20 | 323 | 34 | 2.03 | 3672.96 | 3665 | 19 | 3.59E-01 | 7.0 | |
| 26 | 0 | 1909.69 | 36 | 9 | 6.98 | 3819.92 | 3811 | 18 | 4.00E-02 | 25.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 16:31:27

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 22-JAN-2014 00:00:00 | Acquisition date | : 12-FEB-2014 16:15:51 |
| Sample ID | : G1203023701 | Sample quantity | : 130.48 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA11 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 00:15:00.00 | Elapsed real time | : 0 00:15:10.25 1.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 6010 | 85.60* | 6.335E+00 | 2.551E+01 | 2.696E+01 | 3.95 |
| | 136.47 | 787 | 10.68 | 6.312E+00 | 2.686E+01 | 2.839E+01 | 21.15 |
| CO-60 | 1173.23 | 14826 | 99.85 | 1.498E+00 | 2.282E+02 | 2.300E+02 | 1.84 |
| | 1332.49 | 13352 | 99.98* | 1.344E+00 | 2.287E+02 | 2.305E+02 | 1.81 |
| ZN-65 | 1115.54 | 2970 | 50.60* | 1.563E+00 | 8.643E+01 | 9.192E+01 | 5.16 |
| Y-88 | 898.04 | 519 | 93.70 | 1.872E+00 | 6.806E+00 | 7.836E+00 | 27.66 |
| | 1836.06 | 323 | 99.20* | 1.036E+00 | 7.236E+00 | 8.331E+00 | 14.05 |
| CD-109 | 88.03 | 19592 | 3.70* | 5.342E+00 | 2.282E+03 | 2.357E+03 | 1.58 |
| SN-113 | 391.69 | 623 | 64.94* | 3.500E+00 | 6.305E+00 | 7.184E+00 | 24.04 |
| SN-126 | 64.28 | ------ | 9.60 | 3.047E+00 | ------ Line Not Found | | ------ |
| | 86.94 | 156 | 8.90 | 5.228E+00 | 7.708E+00 | 7.708E+00 | 65.71 |
| | 87.57 | 19592 | 37.00* | 5.342E+00 | 2.282E+02 | 2.282E+02 | 1.58 |
| BA-137M | 661.66 | 16143 | 89.90* | 2.382E+00 | 1.735E+02 | 1.738E+02 | 1.81 |
| CS-137 | 661.66 | 16143 | 85.10* | 2.382E+00 | 1.833E+02 | 1.836E+02 | 1.81 |
| CE-139 | 165.86 | 1485 | 80.00* | 5.980E+00 | 7.143E+00 | 7.967E+00 | 11.54 |
| PM-147 | 121.22 | 6010 | 0.00* | 6.335E+00 | 7.662E+05 | 7.783E+05 | 3.95 |
| PB-210 | 46.54 | 9214 | 4.25* | 8.491E-01 | 5.876E+03 | 5.887E+03 | 3.96 |
| TH-229 | 85.43 | 156 | 14.70 | 5.228E+00 | 4.667E+00 | 4.667E+00 | 65.71 |
| | 88.47 | 19592 | 24.00 | 5.342E+00 | 3.517E+02 | 3.517E+02 | 1.58 |
| | 193.51 | ------ | 4.41* | 5.558E+00 | ------ Line Not Found | | ------ |
| | 210.85 | ------ | 2.80 | 5.298E+00 | ------ Line Not Found | | ------ |
| AM-241 | 59.54 | 17971 | 35.90* | 2.409E+00 | 4.783E+02 | 4.783E+02 | 2.32 |
| ANH-511 | 511.00 | 539 | 100.00* | 2.887E+00 | 4.293E+00 | 4.293E+00 | 33.53 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:28.76

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1  *
* Acquisition date : 12-FEB-2014 16:15:51 Sensitivity     : 3.000           *
* Detector ID      : GAM11                Energy tolerance: 1.500           *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 00:15:10.25     Half life ratio : *****           *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023701          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9         *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CO-57 | 2.696E+01 | 1.043E+00 | 7.995E-01 |
| CO-60 | 2.305E+02 | 4.092E+00 | 9.481E-01 |
| ZN-65 | 9.192E+01 | 4.647E+00 | 3.597E+00 |
| Y-88 | 8.331E+00 | 1.147E+00 | 6.671E-01 |
| CD-109 | 2.357E+03 | 3.640E+01 | 2.805E+01 |
| SN-113 | 7.184E+00 | 1.693E+00 | 1.661E+00 |
| SN-126 | 2.282E+02 | 3.524E+00 | 2.729E+00 |
| BA-137M | 1.738E+02 | 3.085E+00 | 1.221E+00 |
| CS-137 | 1.836E+02 | 3.259E+00 | 1.289E+00 |
| CE-139 | 7.967E+00 | 9.007E-01 | 8.742E-01 |
| PM-147 | 7.783E+05 | 3.011E+04 | 2.308E+04 |
| PB-210 | 5.887E+03 | 2.287E+02 | 1.817E+02 |
| TH-229 | 2.437E+00 | 8.834E+00 | 1.563E+01 |
| AM-241 | 4.783E+02 | 1.086E+01 | 6.863E+00 |
| ANH-511 | 4.293E+00 | 1.411E+00 | 9.772E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 6.188E+00 | 8.104E+00 | 1.384E+01 | NOT IDENT. |
| NA-22 | -2.478E-01 | 4.694E-01 | 8.135E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.057E+10 | 0.000E+00 | SHORT HLIF |
| AL-26 | -4.145E-02 | 3.651E-01 | 6.526E-01 | NOT IDENT. |
| K-40 | -5.161E-01 | 3.432E+00 | 6.161E+00 | NOT IDENT. |
| SC-46 | -5.341E-02 | 1.154E+00 | 1.961E+00 | NOT IDENT. |
| V-48 | -4.356E-01 | 2.457E+00 | 4.134E+00 | NOT IDENT. |
| CR-51 | 1.300E+00 | 8.441E+00 | 1.456E+01 | NOT IDENT. |
| MN-54 | -3.799E-01 | 8.894E-01 | 1.505E+00 | NOT IDENT. |
| CO-56 | 2.000E-01 | 1.230E+00 | 1.830E+00 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | 3.755E-01 | 1.008E+00 | 1.746E+00 | NOT IDENT. |
| FE-59 | -6.801E-01 | 2.631E+00 | 4.378E+00 | NOT IDENT. |
| GE-68 | -5.474E+00 | 3.329E+01 | 5.565E+01 | NOT IDENT. |
| AS-73 | 2.170E+01 | 2.884E+01 | 4.776E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-74 | -2.061E-01 | 2.301E+00 | 4.029E+00 | NOT IDENT. |
| SE-75 | 2.324E-02 | 8.810E-01 | 1.529E+00 | FAIL ABUN |
| BR-77 | 2.494E+02 | 1.051E+03 | 1.842E+03 | NOT IDENT. |
| SR-82 | 2.718E+00 | 8.989E+00 | 1.561E+01 | NOT IDENT. |
| RB-83 | -1.229E+00 | 1.621E+00 | 2.552E+00 | NOT IDENT. |
| KR-85 | 2.054E+02 | 1.410E+02 | 2.450E+02 | NOT IDENT. |
| SR-85 | 1.164E+00 | 8.004E-01 | 1.391E+00 | NOT IDENT. |
| RB-86 | -1.355E+01 | 2.651E+01 | 4.386E+01 | NOT IDENT. |
| Y-91 | 1.733E+02 | 2.983E+02 | 5.432E+02 | NOT IDENT. |
| NB-94 | 1.119E-01 | 6.781E-01 | 1.182E+00 | NOT IDENT. |
| NB-95 | -5.936E-02 | 9.218E-01 | 1.587E+00 | NOT IDENT. |
| NB-95M | -1.632E-01 | 2.247E+00 | 3.914E+00 | NOT IDENT. |
| ZR-95 | 2.748E-01 | 1.883E+00 | 2.838E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | 2.818E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.495E+10 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.009E+02 | 1.360E+03 | 2.338E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | 4.681E+25 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.898E-01 | 5.663E-01 | 9.091E-01 | NOT IDENT. |
| RH-102 | -7.002E-01 | 1.153E+00 | 1.929E+00 | NOT IDENT. |
| RU-103 | 3.760E-01 | 1.511E+00 | 1.609E+00 | NOT IDENT. |
| RH-106 | 4.764E+00 | 7.251E+00 | 1.132E+01 | NOT IDENT. |
| RU-106 | 4.764E+00 | 7.251E+00 | 1.132E+01 | NOT IDENT. |
| AG-108M | -1.812E-01 | 6.611E-01 | 1.109E+00 | NOT IDENT. |
| AG-110M | -3.704E-01 | 1.409E+00 | 2.382E+00 | NOT IDENT. |
| CD-115 | -5.479E+02 | 1.864E+03 | 3.088E+03 | FAIL ABUN |
| SN-117M | 1.327E-01 | 1.290E+00 | 2.141E+00 | NOT IDENT. |
| TE-123M | -3.392E-02 | 5.036E-01 | 8.328E-01 | NOT IDENT. |
| SB-124 | -5.478E-01 | 1.003E+00 | 1.709E+00 | NOT IDENT. |
| SB-125 | -1.644E-01 | 2.063E+00 | 3.478E+00 | NOT IDENT. |
| TE-125M | 1.398E+02 | 1.920E+02 | 3.275E+02 | NOT IDENT. |
| I-126 | -4.198E+00 | 7.090E+00 | 1.049E+01 | FAIL ABUN |
| SB-126 | 2.578E+00 | 4.264E+00 | 7.512E+00 | NOT IDENT. |
| SB-127 | 6.306E+01 | 8.858E+01 | 1.533E+02 | NOT IDENT. |
| I-131 | -4.422E+00 | 4.197E+00 | 6.989E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.384E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.266E+01 | 5.556E+01 | 9.601E+01 | NOT IDENT. |
| BA-133 | -2.368E-02 | 8.236E-01 | 1.407E+00 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.356E+07 | 0.000E+00 | SHORT HLIF |
| CS-134 | -3.882E-01 | 9.341E-01 | 1.588E+00 | NOT IDENT. |
| CS-135 | 5.833E-01 | 2.874E+00 | 5.003E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.050E+24 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.341E+00 | 3.775E+00 | 6.474E+00 | NOT IDENT. |
| BA-140 | 8.682E-01 | 1.262E+00 | 2.434E+00 | NOT IDENT. |
| LA-140 | 8.682E-01 | 1.262E+00 | 2.434E+00 | NOT IDENT. |
| CE-141 | -1.666E-01 | 1.208E+00 | 2.004E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.191E+04 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.655E+00 | 3.927E+00 | 5.772E+00 | NOT IDENT. |
| PM-144 | -4.458E-01 | 6.854E-01 | 1.170E+00 | NOT IDENT. |
| PR-144 | -3.332E+01 | 5.148E+01 | 8.785E+01 | NOT IDENT. |
| PM-146 | 1.307E-01 | 1.014E+00 | 1.710E+00 | NOT IDENT. |
| ND-147 | -5.019E+00 | 1.823E+01 | 3.020E+01 | NOT IDENT. |
| PM-149 | 6.366E+03 | 1.313E+04 | 2.294E+04 | NOT IDENT. |
| EU-150 | -1.466E-02 | 5.104E-01 | 8.750E-01 | NOT IDENT. |
| EU-152 | 1.817E-01 | 1.853E+00 | 3.181E+00 | FAIL ABUN |
| GD-153 | -1.018E+00 | 1.554E+00 | 2.596E+00 | NOT IDENT. |
| EU-154 | -2.907E-01 | 1.311E+00 | 2.319E+00 | FAIL ABUN |
| EU-155 | 3.728E-01 | 1.943E+00 | 3.286E+00 | FAIL ABUN |
| TB-160 | 2.804E+00 | 3.880E+00 | 6.722E+00 | FAIL ABUN |
| HO-166M | 2.937E-01 | 1.232E+00 | 2.152E+00 | FAIL ABUN |
| TM-171 | -2.430E+02 | 5.515E+02 | 9.441E+02 | NOT IDENT. |
| LU-176 | -1.671E-01 | 5.011E-01 | 8.572E-01 | FAIL ABUN |
| HF-181 | -8.905E-01 | 1.113E+00 | 1.829E+00 | NOT IDENT. |
| TA-182 | 3.221E-01 | 2.301E+00 | 4.127E+00 | NOT IDENT. |
| RE-183 | 0.000E+00 | 1.409E+01 | 2.008E+01 | FAIL ABUN |
| RE-184 | -7.326E-01 | 4.805E+00 | 7.010E+00 | NOT IDENT. |
| W-188 | -6.003E+01 | 1.474E+02 | 2.524E+02 | NOT IDENT. |
| IR-192 | 2.878E-01 | 7.223E-01 | 1.253E+00 | NOT IDENT. |
| HG-203 | 5.171E-01 | 7.692E-01 | 1.350E+00 | NOT IDENT. |
| BI-207 | 2.465E-01 | 1.327E+00 | 2.244E+00 | NOT IDENT. |
| TL-208 | -3.742E-01 | 6.731E-01 | 1.167E+00 | NOT IDENT. |
| BI-211 | -7.998E-01 | 3.939E+00 | 6.709E+00 | NOT IDENT. |
| PB-211 | -2.598E+00 | 1.486E+01 | 2.510E+01 | NOT IDENT. |
| BI-212 | -7.655E+00 | 1.003E+01 | 1.700E+01 | NOT IDENT. |
| PB-212 | 1.927E-01 | 1.003E+00 | 1.757E+00 | NOT IDENT. |
| BI-214 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| PB-214 | -3.766E-01 | 1.439E+00 | 2.446E+00 | FAIL ABUN |
| RN-219 | -6.418E+00 | 8.511E+00 | 1.418E+01 | NOT IDENT. |
| RN-222 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-223 | 3.233E+00 | 1.220E+01 | 2.109E+01 | NOT IDENT. |
| RA-224 | -2.346E+00 | 1.068E+01 | 1.853E+01 | NOT IDENT. |
| RA-226 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| AC-227 | 5.217E+00 | 4.736E+00 | 8.401E+00 | NOT IDENT. |
| TH-227 | 5.217E+00 | 4.736E+00 | 8.401E+00 | NOT IDENT. |
| AC-228 | -4.205E+00 | 3.963E+00 | 6.553E+00 | NOT IDENT. |
| RA-228 | -4.205E+00 | 3.963E+00 | 6.553E+00 | NOT IDENT. |
| TH-228 | 1.927E-01 | 1.003E+00 | 1.757E+00 | NOT IDENT. |
| TH-230 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| PA-231 | -1.274E+01 | 2.694E+01 | 4.615E+01 | NOT IDENT. |
| TH-231 | 3.233E+00 | 1.220E+01 | 2.109E+01 | NOT IDENT. |
| TH-232 | -4.205E+00 | 3.963E+00 | 6.553E+00 | NOT IDENT. |
| PA-233 | 3.450E-01 | 1.265E+00 | 2.189E+00 | NOT IDENT. |
| PA-234 | -2.143E+00 | 9.068E+00 | 1.524E+01 | NOT IDENT. |
| PA-234M | -4.447E+01 | 1.181E+02 | 1.973E+02 | NOT IDENT. |
| TH-234 | -5.259E+01 | 3.042E+01 | 4.521E+01 | NOT IDENT. |
| U-234 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| U-235 | 8.707E-01 | 3.297E+00 | 5.518E+00 | NOT IDENT. |
| NP-237 | 3.450E-01 | 1.265E+00 | 2.189E+00 | NOT IDENT. |
| NP-238 | 0.000E+00 | 4.625E+03 | 0.000E+00 | SHORT HLIF |
| U-238 | -5.259E+01 | 3.042E+01 | 4.521E+01 | NOT IDENT. |
| NP-239 | 1.071E+00 | 8.646E+00 | 1.297E+01 | NOT IDENT. |
| PU-239 | 5.957E+02 | 5.764E+03 | 9.657E+03 | NOT IDENT. |
| AM-243 | -5.745E-01 | 1.167E+00 | 1.974E+00 | NOT IDENT. |
| CM-243 | 6.752E-01 | 1.973E+00 | 3.349E+00 | NOT IDENT. |
| CM-247 | -7.048E-01 | 7.790E-01 | 1.293E+00 | NOT IDENT. |
| CF-249 | 9.817E-01 | 9.234E-01 | 1.423E+00 | NOT IDENT. |
| CF-251 | -1.442E-02 | 2.176E+00 | 3.585E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:24.82

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.29 | 9218 | 6889 | 0.93 | 92.59 | 87 | 10 | 1.02E+01 | 2.0 | |
| 2 | 0 | 59.32 | 17972 | 6142 | 0.92 | 118.68 | 113 | 12 | 2.00E+01 | 1.2 | |
| 3 | 2 | 86.16 | 156 | 1610 | 0.82 | 172.38 | 171 | 12 | 1.73E-01 | 32.9 | 2.01E+01 |
| 4 | 2 | 87.86 | 19592 | 2019 | 0.91 | 175.79 | 171 | 12 | 2.18E+01 | 0.8 | |
| 5 | 0 | 121.89 | 6010 | 2291 | 0.88 | 243.89 | 239 | 10 | 6.68E+00 | 2.0 | |
| 6 | 0 | 136.35 | 787 | 1743 | 0.96 | 272.82 | 268 | 10 | 8.74E-01 | 10.6 | |
| 7 | 0 | 165.67 | 1485 | 1669 | 1.08 | 331.49 | 327 | 10 | 1.65E+00 | 5.8 | |
| 8 | 0 | 391.21 | 623 | 1244 | 1.16 | 782.78 | 776 | 12 | 6.92E-01 | 12.0 | |
| 9 | 0 | 491.85 | 89 | 655 | 0.80 | 984.14 | 981 | 8 | 9.84E-02 | 51.2 | |
| 10 | 0 | 501.63 | 103 | 568 | 2.57 | 1003.72 | 1000 | 8 | 1.14E-01 | 41.5 | |
| 11 | 0 | 511.06 | 559 | 1321 | 2.78 | 1022.59 | 1015 | 19 | 6.21E-01 | 16.2 | |
| 12 | 0 | 623.57 | 118 | 616 | 1.67 | 1247.67 | 1243 | 11 | 1.31E-01 | 41.6 | |
| 13 | 0 | 661.60 | 16146 | 1045 | 1.38 | 1323.76 | 1316 | 16 | 1.79E+01 | 0.9 | |
| 14 | 0 | 679.86 | 20 | 325 | 1.20 | 1360.29 | 1357 | 6 | 2.20E-02 | 145.9 | |
| 15 | 0 | 752.36 | 27 | 529 | 1.35 | 1505.34 | 1500 | 9 | 3.05E-02 | 152.8 | |
| 16 | 0 | 849.25 | 36 | 422 | 1.19 | 1699.16 | 1696 | 6 | 3.99E-02 | 91.8 | |
| 17 | 0 | 866.87 | 78 | 461 | 1.82 | 1734.40 | 1732 | 7 | 8.67E-02 | 47.1 | |
| 18 | 0 | 897.93 | 519 | 1090 | 1.32 | 1796.54 | 1790 | 13 | 5.76E-01 | 13.8 | |
| 19 | 0 | 1115.53 | 2970 | 645 | 1.66 | 2231.78 | 2225 | 14 | 3.30E+00 | 2.6 | |
| 20 | 0 | 1173.27 | 14826 | 615 | 1.76 | 2347.28 | 2337 | 20 | 1.65E+01 | 0.9 | |
| 21 | 0 | 1300.02 | 80 | 120 | 6.63 | 2600.77 | 2591 | 21 | 8.85E-02 | 36.2 | |
| 22 | 0 | 1332.59 | 13353 | 219 | 1.76 | 2665.91 | 2657 | 19 | 1.48E+01 | 0.9 | |
| 23 | 0 | 1522.34 | 37 | 33 | 2.71 | 3045.38 | 3037 | 15 | 4.09E-02 | 38.1 | |
| 24 | 0 | 1715.93 | 17 | 52 | 3.58 | 3432.50 | 3421 | 16 | 1.87E-02 | 99.1 | |
| 25 | 0 | 1836.20 | 323 | 34 | 2.03 | 3672.96 | 3665 | 19 | 3.59E-01 | 7.0 | |
| 26 | 0 | 1909.69 | 36 | 9 | 6.98 | 3819.92 | 3811 | 18 | 4.00E-02 | 25.7 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:27.02

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 6010 | 85.60* | 6.335E+00 | 2.551E+01 | 2.696E+01 | 3.95 |
| | 136.47 | 787 | 10.68 | 6.312E+00 | 2.686E+01 | 2.839E+01 | 21.15 |
| CO-60 | 1173.23 | 14826 | 99.85 | 1.498E+00 | 2.282E+02 | 2.300E+02 | 1.84 |
| | 1332.49 | 13352 | 99.98* | 1.344E+00 | 2.287E+02 | 2.305E+02 | 1.81 |
| ZN-65 | 1115.54 | 2970 | 50.60* | 1.563E+00 | 8.643E+01 | 9.192E+01 | 5.16 |
| Y-88 | 898.04 | 519 | 93.70 | 1.872E+00 | 6.806E+00 | 7.836E+00 | 27.66 |
| | 1836.06 | 323 | 99.20* | 1.036E+00 | 7.236E+00 | 8.331E+00 | 14.05 |
| CD-109 | 88.03 | 19592 | 3.70* | 5.342E+00 | 2.282E+03 | 2.357E+03 | 1.58 |
| SN-113 | 391.69 | 623 | 64.94* | 3.500E+00 | 6.305E+00 | 7.184E+00 | 24.04 |
| SN-126 | 64.28 | ------ | 9.60 | 3.047E+00 | ------ | Line Not Found | ------ |
| | 86.94 | 156 | 8.90 | 5.228E+00 | 7.708E+00 | 7.708E+00 | 65.71 |
| | 87.57 | 19592 | 37.00* | 5.342E+00 | 2.282E+02 | 2.282E+02 | 1.58 |
| BA-137M | 661.66 | 16143 | 89.90* | 2.382E+00 | 1.735E+02 | 1.738E+02 | 1.81 |
| CS-137 | 661.66 | 16143 | 85.10* | 2.382E+00 | 1.833E+02 | 1.836E+02 | 1.81 |
| CE-139 | 165.86 | 1485 | 80.00* | 5.980E+00 | 7.143E+00 | 7.967E+00 | 11.54 |
| PM-147 | 121.22 | 6010 | 0.00* | 6.335E+00 | 7.662E+05 | 7.783E+05 | 3.95 |
| PB-210 | 46.54 | 9214 | 4.25* | 8.491E-01 | 5.876E+03 | 5.887E+03 | 3.96 |
| TH-229 | 85.43 | 156 | 14.70 | 5.228E+00 | 4.667E+00 | 4.667E+00 | 65.71 |
| | 88.47 | 19592 | 24.00 | 5.342E+00 | 3.517E+02 | 3.517E+02 | 1.58 |
| | 193.51 | ------ | 4.41* | 5.558E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 5.298E+00 | ------ | Line Not Found | ------ |
| AM-241 | 59.54 | 17971 | 35.90* | 2.409E+00 | 4.783E+02 | 4.783E+02 | 2.32 |
| ANH-511 | 511.00 | 539 | 100.00* | 2.887E+00 | 4.293E+00 | 4.293E+00 | 33.53 |

Flag: "*" = Keyline

Sample ID : G1203023701 Acquisition date : 12-FEB-2014 16:15:51

Total number of lines in spectrum 26
Number of unidentified lines 9
Number of lines tentatively identified by NID 17 65.38%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CO-57 | 271.74D | 1.06 | 2.551E+01 | 2.696E+01 | 0.106E+01 | 3.95 | |
| CO-60 | 5.27Y | 1.01 | 2.287E+02 | 2.305E+02 | 0.042E+02 | 1.81 | |
| ZN-65 | 244.06D | 1.06 | 8.643E+01 | 9.192E+01 | 0.474E+01 | 5.16 | |
| Y-88 | 106.63D | 1.15 | 7.236E+00 | 8.331E+00 | 1.170E+00 | 14.05 | |
| CD-109 | 461.40D | 1.03 | 2.282E+03 | 2.357E+03 | 0.037E+03 | 1.58 | |
| SN-113 | 115.09D | 1.14 | 6.305E+00 | 7.184E+00 | 1.727E+00 | 24.04 | |
| SN-126 | 2.30E+05Y | 1.00 | 2.282E+02 | 2.282E+02 | 0.036E+02 | 1.58 | |
| BA-137M | 30.08Y | 1.00 | 1.735E+02 | 1.738E+02 | 0.031E+02 | 1.81 | |
| CS-137 | 30.08Y | 1.00 | 1.833E+02 | 1.836E+02 | 0.033E+02 | 1.81 | |
| CE-139 | 137.64D | 1.12 | 7.143E+00 | 7.967E+00 | 0.919E+00 | 11.54 | |
| PM-147 | 2.62Y | 1.02 | 7.662E+05 | 7.783E+05 | 0.307E+05 | 3.95 | |
| PB-210 | 22.20Y | 1.00 | 5.876E+03 | 5.887E+03 | 0.233E+03 | 3.96 | |
| TH-229 | 7340.00Y | 1.00 | 3.517E+02 | 3.517E+02 | 0.055E+02 | 1.58 | K |
| AM-241 | 432.60Y | 1.00 | 4.783E+02 | 4.783E+02 | 0.111E+02 | 2.32 | |
| ANH-511 | 1.00E+09Y | 1.00 | 4.293E+00 | 4.293E+00 | 1.440E+00 | 33.53 | |
| Total Activity : | | | 7.761E+05 | 7.883E+05 | | | |

Grand Total Activity : 7.761E+05 7.883E+05

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203023701 Acquisition date : 12-FEB-2014 16:15:51

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 491.85 | 89 | 655 | 0.80 | 984.14 | 981 | 8 | 9.84E-02 | **** | 2.97E+00 | T |
| 0 | 501.63 | 103 | 568 | 2.57 | 1003.72 | 1000 | 8 | 1.14E-01 | 83.0 | 2.93E+00 | |
| 0 | 623.57 | 118 | 616 | 1.67 | 1247.67 | 1243 | 11 | 1.31E-01 | 83.3 | 2.49E+00 | |
| 0 | 679.86 | 20 | 325 | 1.20 | 1360.29 | 1357 | 6 | 2.20E-02 | **** | 2.33E+00 | |
| 0 | 752.36 | 27 | 529 | 1.35 | 1505.34 | 1500 | 9 | 3.05E-02 | **** | 2.16E+00 | T |
| 0 | 849.25 | 36 | 422 | 1.19 | 1699.16 | 1696 | 6 | 3.99E-02 | **** | 1.96E+00 | |
| 0 | 866.87 | 78 | 461 | 1.82 | 1734.40 | 1732 | 7 | 8.67E-02 | 94.2 | 1.93E+00 | |
| 0 | 1300.02 | 80 | 120 | 6.63 | 2600.77 | 2591 | 21 | 8.85E-02 | 72.5 | 1.37E+00 | |
| 0 | 1522.34 | 37 | 33 | 2.71 | 3045.38 | 3037 | 15 | 4.09E-02 | 76.2 | 1.20E+00 | |
| 0 | 1715.93 | 17 | 52 | 3.58 | 3432.50 | 3421 | 16 | 1.87E-02 | **** | 1.09E+00 | |
| 0 | 1909.69 | 36 | 9 | 6.98 | 3819.92 | 3811 | 18 | 4.00E-02 | 51.4 | 1.01E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:39.11

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1  *
* Acquisition date : 12-FEB-2014 16:15:51 Sensitivity     : 3.000           *
* Detector ID      : GAM11                Energy tolerance: 1.500           *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 00:15:10.25     Half life ratio : *****           *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023701          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9         *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| CO-57 | 3.939E-01 |
| CO-60 | 4.509E-01 |
| ZN-65 | 1.758E+00 |
| Y-88 | 2.988E-01 |
| CD-109 | 1.387E+01 |
| SN-113 | 8.155E-01 |
| SN-126 | 1.349E+00 |
| BA-137M | 5.961E-01 |
| CS-137 | 6.297E-01 |
| CE-139 | 4.301E-01 |
| PM-147 | 1.137E+04 |
| PB-210 | 9.007E+01 |
| TH-229 | 7.694E+00 |
| AM-241 | 3.398E+00 |
| ANH-511 | 4.781E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 6.795E+00 | NOT IDENT. |
| NA-22 | 3.843E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.967E-01 | NOT IDENT. |
| K-40 | 2.847E+00 | NOT IDENT. |
| SC-46 | 9.613E-01 | NOT IDENT. |
| V-48 | 2.022E+00 | NOT IDENT. |
| CR-51 | 7.149E+00 | NOT IDENT. |
| MN-54 | 7.365E-01 | NOT IDENT. |
| CO-56 | 8.963E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-58 | 8.546E-01 | NOT IDENT. |
| FE-59 | 2.141E+00 | NOT IDENT. |
| GE-68 | 2.721E+01 | NOT IDENT. |
| AS-73 | 2.367E+01 | NOT IDENT. |
| AS-74 | 1.968E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SE-75 | 7.519E-01 | FAIL ABUN |
| BR-77 | 9.063E+02 | NOT IDENT. |
| SR-82 | 7.632E+00 | NOT IDENT. |
| RB-83 | 1.248E+00 | NOT IDENT. |
| KR-85 | 1.200E+02 | NOT IDENT. |
| SR-85 | 6.815E-01 | NOT IDENT. |
| RB-86 | 2.144E+01 | NOT IDENT. |
| Y-91 | 2.612E+02 | NOT IDENT. |
| NB-94 | 5.777E-01 | NOT IDENT. |
| NB-95 | 7.756E-01 | NOT IDENT. |
| NB-95M | 1.926E+00 | NOT IDENT. |
| ZR-95 | 1.386E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.142E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.475E-01 | NOT IDENT. |
| RH-102 | 9.423E-01 | NOT IDENT. |
| RU-103 | 7.877E-01 | NOT IDENT. |
| RH-106 | 5.534E+00 | NOT IDENT. |
| RU-106 | 5.534E+00 | NOT IDENT. |
| AG-108M | 5.440E-01 | NOT IDENT. |
| AG-110M | 1.168E+00 | NOT IDENT. |
| CD-115 | 1.511E+03 | FAIL ABUN |
| SN-117M | 1.053E+00 | NOT IDENT. |
| TE-123M | 4.097E-01 | NOT IDENT. |
| SB-124 | 7.786E-01 | NOT IDENT. |
| SB-125 | 1.707E+00 | NOT IDENT. |
| TE-125M | 1.614E+02 | NOT IDENT. |
| I-126 | 5.118E+00 | FAIL ABUN |
| SB-126 | 3.671E+00 | NOT IDENT. |
| SB-127 | 7.487E+01 | NOT IDENT. |
| I-131 | 3.429E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.727E+01 | NOT IDENT. |
| BA-133 | 6.903E-01 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.762E-01 | NOT IDENT. |
| CS-135 | 2.460E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.165E+00 | NOT IDENT. |
| BA-140 | 1.126E+00 | NOT IDENT. |
| LA-140 | 1.126E+00 | NOT IDENT. |
| CE-141 | 9.860E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.841E+00 | NOT IDENT. |
| PM-144 | 5.709E-01 | NOT IDENT. |
| PR-144 | 4.288E+01 | NOT IDENT. |
| PM-146 | 8.402E-01 | NOT IDENT. |
| ND-147 | 1.478E+01 | NOT IDENT. |
| PM-149 | 1.127E+04 | NOT IDENT. |
| EU-150 | 4.295E-01 | NOT IDENT. |
| EU-152 | 1.561E+00 | FAIL ABUN |
| GD-153 | 1.279E+00 | NOT IDENT. |
| EU-154 | 1.096E+00 | FAIL ABUN |
| EU-155 | 1.619E+00 | FAIL ABUN |
| TB-160 | 3.296E+00 | FAIL ABUN |
| HO-166M | 1.051E+00 | FAIL ABUN |
| TM-171 | 4.679E+02 | NOT IDENT. |
| LU-176 | 4.208E-01 | FAIL ABUN |
| HF-181 | 8.968E-01 | NOT IDENT. |
| TA-182 | 1.973E+00 | NOT IDENT. |
| RE-183 | 9.994E+00 | FAIL ABUN |
| RE-184 | 3.440E+00 | NOT IDENT. |
| W-188 | 1.240E+02 | NOT IDENT. |
| IR-192 | 6.153E-01 | NOT IDENT. |
| HG-203 | 6.634E-01 | NOT IDENT. |
| BI-207 | 1.097E+00 | NOT IDENT. |
| TL-208 | 5.697E-01 | NOT IDENT. |
| BI-211 | 3.293E+00 | NOT IDENT. |
| PB-211 | 1.231E+01 | NOT IDENT. |
| BI-212 | 8.292E+00 | NOT IDENT. |
| PB-212 | 8.643E-01 | NOT IDENT. |
| BI-214 | 1.135E+00 | NOT IDENT. |
| PB-214 | 1.201E+00 | FAIL ABUN |
| RN-219 | 6.958E+00 | NOT IDENT. |
| RN-222 | 1.135E+00 | NOT IDENT. |
| RA-223 | 1.035E+01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-224 | 9.115E+00 | NOT IDENT. |
| RA-226 | 1.135E+00 | NOT IDENT. |
| AC-227 | 4.133E+00 | NOT IDENT. |
| TH-227 | 4.133E+00 | NOT IDENT. |
| AC-228 | 3.213E+00 | NOT IDENT. |
| RA-228 | 3.213E+00 | NOT IDENT. |
| TH-228 | 8.643E-01 | NOT IDENT. |
| TH-230 | 1.135E+00 | NOT IDENT. |
| PA-231 | 2.267E+01 | NOT IDENT. |
| TH-231 | 1.035E+01 | NOT IDENT. |
| TH-232 | 3.213E+00 | NOT IDENT. |
| PA-233 | 1.075E+00 | NOT IDENT. |
| PA-234 | 7.482E+00 | NOT IDENT. |
| PA-234M | 9.656E+01 | NOT IDENT. |
| TH-234 | 2.233E+01 | NOT IDENT. |
| U-234 | 1.135E+00 | NOT IDENT. |
| U-235 | 2.715E+00 | NOT IDENT. |
| NP-237 | 1.075E+00 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.233E+01 | NOT IDENT. |
| NP-239 | 6.393E+00 | NOT IDENT. |
| PU-239 | 4.753E+03 | NOT IDENT. |
| AM-243 | 9.765E-01 | NOT IDENT. |
| CM-243 | 1.651E+00 | NOT IDENT. |
| CM-247 | 6.344E-01 | NOT IDENT. |
| CF-249 | 6.986E-01 | NOT IDENT. |
| CF-251 | 1.763E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:43.72

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1  *
* Acquisition date : 12-FEB-2014 16:15:51 Sensitivity     : 3.000       *
* Detector ID      : GAM11                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:15:10.25     Half life ratio : *****       *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203023701          Analyst initials: RXF2        *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM  *
*                                         Quantity Err(%) : 1.5328E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9     *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CO-57 | 2.696E+01 | 2.518E+00 | 2.518E+00 |
| CO-60 | 2.305E+02 | 1.931E+01 | 1.931E+01 |
| ZN-65 | 9.192E+01 | 1.641E+01 | 1.641E+01 |
| Y-88 | 8.331E+00 | 1.323E+00 | 1.323E+00 |
| CD-109 | 2.357E+03 | 2.541E+02 | 2.541E+02 |
| SN-113 | 7.184E+00 | 1.789E+00 | 1.789E+00 |
| SN-126 | 2.282E+02 | 2.143E+01 | 2.143E+01 |
| BA-137M | 1.738E+02 | 1.424E+01 | 1.424E+01 |
| CS-137 | 1.836E+02 | 1.503E+01 | 1.503E+01 |
| CE-139 | 7.967E+00 | 1.908E+00 | 1.908E+00 |
| PM-147 | 7.783E+05 | 7.264E+04 | 7.264E+04 |
| PB-210 | 5.887E+03 | 5.675E+02 | 5.675E+02 |
| TH-229 | 2.437E+00 | 8.836E+00 | 8.836E+00 |
| AM-241 | 4.783E+02 | 3.737E+01 | 3.737E+01 |
| ANH-511 | 4.293E+00 | 1.456E+00 | 1.456E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 6.188E+00 | 8.120E+00 | 8.586E+00 | NOT IDENT. |
| NA-22 | -2.478E-01 | 4.699E-01 | 4.830E-01 | NOT IDENT. |
| NA-24 | 7.024E+09 | 1.058E+10 | 1.105E+10 | SHORT HLIF |
| AL-26 | -4.145E-02 | 3.651E-01 | 3.656E-01 | NOT IDENT. |
| K-40 | -5.161E-01 | 3.432E+00 | 3.440E+00 | NOT IDENT. |
| SC-46 | -5.341E-02 | 1.154E+00 | 1.155E+00 | NOT IDENT. |
| V-48 | -4.356E-01 | 2.458E+00 | 2.466E+00 | NOT IDENT. |
| CR-51 | 1.300E+00 | 8.442E+00 | 8.462E+00 | NOT IDENT. |
| MN-54 | -3.799E-01 | 8.904E-01 | 9.068E-01 | NOT IDENT. |
| CO-56 | 2.000E-01 | 1.231E+00 | 1.234E+00 | NOT IDENT. |
| MN-56 | 1.000E+41 | 6.446E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | 3.755E-01 | 1.009E+00 | 1.023E+00 | NOT IDENT. |
| FE-59 | -6.801E-01 | 2.634E+00 | 2.652E+00 | NOT IDENT. |
| GE-68 | -5.474E+00 | 3.330E+01 | 3.339E+01 | NOT IDENT. |
| AS-73 | 2.170E+01 | 2.918E+01 | 3.078E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-74 | -2.061E-01 | 2.301E+00 | 2.303E+00 | NOT IDENT. |
| SE-75 | 2.324E-02 | 8.810E-01 | 8.810E-01 | FAIL ABUN |
| BR-77 | 2.494E+02 | 1.063E+03 | 1.069E+03 | NOT IDENT. |
| SR-82 | 2.718E+00 | 8.993E+00 | 9.076E+00 | NOT IDENT. |
| RB-83 | -1.229E+00 | 1.632E+00 | 1.723E+00 | NOT IDENT. |
| KR-85 | 2.054E+02 | 1.420E+02 | 1.695E+02 | NOT IDENT. |
| SR-85 | 1.164E+00 | 8.063E-01 | 9.621E-01 | NOT IDENT. |
| RB-86 | -1.355E+01 | 2.660E+01 | 2.729E+01 | NOT IDENT. |
| Y-91 | 1.733E+02 | 2.989E+02 | 3.089E+02 | NOT IDENT. |
| NB-94 | 1.119E-01 | 6.782E-01 | 6.801E-01 | NOT IDENT. |
| NB-95 | -5.936E-02 | 9.219E-01 | 9.223E-01 | NOT IDENT. |
| NB-95M | -1.632E-01 | 2.247E+00 | 2.248E+00 | NOT IDENT. |
| ZR-95 | 2.748E-01 | 1.883E+00 | 1.887E+00 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.930E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 4.620E+10 | 2.525E+10 | 3.273E+10 | SHORT HLIF |
| MO-99 | -3.009E+02 | 1.360E+03 | 1.367E+03 | NOT IDENT. |
| TC-99M | 6.454E+24 | 4.682E+25 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.898E-01 | 5.675E-01 | 5.739E-01 | NOT IDENT. |
| RH-102 | -7.002E-01 | 1.155E+00 | 1.197E+00 | NOT IDENT. |
| RU-103 | 3.760E-01 | 1.511E+00 | 1.521E+00 | NOT IDENT. |
| RH-106 | 4.764E+00 | 7.265E+00 | 7.576E+00 | NOT IDENT. |
| RU-106 | 4.764E+00 | 7.265E+00 | 7.576E+00 | NOT IDENT. |
| AG-108M | -1.812E-01 | 6.613E-01 | 6.663E-01 | NOT IDENT. |
| AG-110M | -3.704E-01 | 1.410E+00 | 1.420E+00 | NOT IDENT. |
| CD-115 | -5.479E+02 | 1.865E+03 | 1.881E+03 | FAIL ABUN |
| SN-117M | 1.327E-01 | 1.290E+00 | 1.291E+00 | NOT IDENT. |
| TE-123M | -3.392E-02 | 5.036E-01 | 5.039E-01 | NOT IDENT. |
| SB-124 | -5.478E-01 | 1.004E+00 | 1.034E+00 | NOT IDENT. |
| SB-125 | -1.644E-01 | 2.063E+00 | 2.065E+00 | NOT IDENT. |
| TE-125M | 1.398E+02 | 1.924E+02 | 2.025E+02 | NOT IDENT. |
| I-126 | -4.198E+00 | 7.100E+00 | 7.348E+00 | FAIL ABUN |
| SB-126 | 2.578E+00 | 4.276E+00 | 4.431E+00 | NOT IDENT. |
| SB-127 | 6.306E+01 | 8.896E+01 | 9.339E+01 | NOT IDENT. |
| I-131 | -4.422E+00 | 4.213E+00 | 4.660E+00 | NOT IDENT. |
| I-132 | -1.000E+41 | 1.926E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.266E+01 | 5.567E+01 | 5.758E+01 | NOT IDENT. |
| BA-133 | -2.368E-02 | 8.236E-01 | 8.236E-01 | NOT IDENT. |
| I-133 | -1.368E+07 | 2.366E+07 | 2.445E+07 | SHORT HLIF |
| CS-134 | -3.882E-01 | 9.350E-01 | 9.512E-01 | NOT IDENT. |
| CS-135 | 5.833E-01 | 2.875E+00 | 2.887E+00 | NOT IDENT. |
| I-135 | -1.007E+23 | 1.051E+24 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.341E+00 | 3.797E+00 | 3.941E+00 | NOT IDENT. |
| BA-140 | 8.682E-01 | 1.264E+00 | 1.323E+00 | NOT IDENT. |
| LA-140 | 8.682E-01 | 1.264E+00 | 1.323E+00 | NOT IDENT. |
| CE-141 | -1.666E-01 | 1.208E+00 | 1.211E+00 | NOT IDENT. |
| CE-143 | 2.908E+04 | 6.195E+04 | 6.332E+04 | SHORT HLIF |
| CE-144 | -1.655E+00 | 3.930E+00 | 4.000E+00 | NOT IDENT. |
| PM-144 | -4.458E-01 | 6.865E-01 | 7.153E-01 | NOT IDENT. |
| PR-144 | -3.332E+01 | 5.156E+01 | 5.370E+01 | NOT IDENT. |
| PM-146 | 1.307E-01 | 1.014E+00 | 1.016E+00 | NOT IDENT. |
| ND-147 | -5.019E+00 | 1.823E+01 | 1.837E+01 | NOT IDENT. |
| PM-149 | 6.366E+03 | 1.317E+04 | 1.348E+04 | NOT IDENT. |
| EU-150 | -1.466E-02 | 5.104E-01 | 5.104E-01 | NOT IDENT. |
| EU-152 | 1.817E-01 | 1.853E+00 | 1.855E+00 | FAIL ABUN |
| GD-153 | -1.018E+00 | 1.556E+00 | 1.623E+00 | NOT IDENT. |
| EU-154 | -2.907E-01 | 1.311E+00 | 1.318E+00 | FAIL ABUN |
| EU-155 | 3.728E-01 | 1.943E+00 | 1.950E+00 | FAIL ABUN |
| TB-160 | 2.804E+00 | 3.897E+00 | 4.097E+00 | FAIL ABUN |
| HO-166M | 2.937E-01 | 1.232E+00 | 1.240E+00 | FAIL ABUN |
| TM-171 | -2.430E+02 | 5.519E+02 | 5.627E+02 | NOT IDENT. |
| LU-176 | -1.671E-01 | 5.012E-01 | 5.069E-01 | FAIL ABUN |
| HF-181 | -8.905E-01 | 1.115E+00 | 1.185E+00 | NOT IDENT. |
| TA-182 | 3.221E-01 | 2.301E+00 | 2.306E+00 | NOT IDENT. |
| RE-183 | 6.205E+02 | 6.571E+01 | 2.873E+02 | FAIL ABUN |
| RE-184 | -7.326E-01 | 4.806E+00 | 4.817E+00 | NOT IDENT. |
| W-188 | -6.003E+01 | 1.476E+02 | 1.501E+02 | NOT IDENT. |
| IR-192 | 2.878E-01 | 7.227E-01 | 7.342E-01 | NOT IDENT. |
| HG-203 | 5.171E-01 | 7.702E-01 | 8.047E-01 | NOT IDENT. |
| BI-207 | 2.465E-01 | 1.328E+00 | 1.332E+00 | NOT IDENT. |
| TL-208 | -3.742E-01 | 6.738E-01 | 6.946E-01 | NOT IDENT. |
| BI-211 | -7.998E-01 | 3.939E+00 | 3.956E+00 | NOT IDENT. |
| PB-211 | -2.598E+00 | 1.486E+01 | 1.491E+01 | NOT IDENT. |
| BI-212 | -7.655E+00 | 1.005E+01 | 1.063E+01 | NOT IDENT. |
| PB-212 | 1.927E-01 | 1.003E+00 | 1.007E+00 | NOT IDENT. |
| BI-214 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| PB-214 | -3.766E-01 | 1.439E+00 | 1.449E+00 | FAIL ABUN |
| RN-219 | -6.418E+00 | 8.561E+00 | 9.037E+00 | NOT IDENT. |
| RN-222 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-223 | 3.233E+00 | 1.221E+01 | 1.229E+01 | NOT IDENT. |
| RA-224 | -2.346E+00 | 1.068E+01 | 1.073E+01 | NOT IDENT. |
| RA-226 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| AC-227 | 5.217E+00 | 4.796E+00 | 5.342E+00 | NOT IDENT. |
| TH-227 | 5.217E+00 | 4.796E+00 | 5.342E+00 | NOT IDENT. |
| AC-228 | -4.205E+00 | 4.001E+00 | 4.428E+00 | NOT IDENT. |
| RA-228 | -4.205E+00 | 4.001E+00 | 4.428E+00 | NOT IDENT. |
| TH-228 | 1.927E-01 | 1.003E+00 | 1.007E+00 | NOT IDENT. |
| TH-230 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| PA-231 | -1.274E+01 | 2.696E+01 | 2.756E+01 | NOT IDENT. |
| TH-231 | 3.233E+00 | 1.221E+01 | 1.229E+01 | NOT IDENT. |
| TH-232 | -4.205E+00 | 4.001E+00 | 4.428E+00 | NOT IDENT. |
| PA-233 | 3.450E-01 | 1.265E+00 | 1.274E+00 | NOT IDENT. |
| PA-234 | -2.143E+00 | 9.398E+00 | 9.447E+00 | NOT IDENT. |
| PA-234M | -4.447E+01 | 1.183E+02 | 1.200E+02 | NOT IDENT. |
| TH-234 | -5.259E+01 | 3.263E+01 | 4.034E+01 | NOT IDENT. |
| U-234 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| U-235 | 8.707E-01 | 3.297E+00 | 3.321E+00 | NOT IDENT. |
| NP-237 | 3.450E-01 | 1.265E+00 | 1.274E+00 | NOT IDENT. |
| NP-238 | -3.432E+03 | 4.651E+03 | 4.902E+03 | SHORT HLIF |
| U-238 | -5.259E+01 | 3.263E+01 | 4.034E+01 | NOT IDENT. |
| NP-239 | 1.071E+00 | 8.647E+00 | 8.660E+00 | NOT IDENT. |
| PU-239 | 5.957E+02 | 5.764E+03 | 5.770E+03 | NOT IDENT. |
| AM-243 | -5.745E-01 | 1.168E+00 | 1.196E+00 | NOT IDENT. |
| CM-243 | 6.752E-01 | 1.975E+00 | 1.998E+00 | NOT IDENT. |
| CM-247 | -7.048E-01 | 7.895E-01 | 8.511E-01 | NOT IDENT. |
| CF-249 | 9.817E-01 | 9.294E-01 | 1.029E+00 | NOT IDENT. |
| CF-251 | -1.442E-02 | 2.176E+00 | 2.176E+00 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 4206.4053 | 94.67 | 1506.2098 | 193.51 | 1214.8918 |
| 45.60 | 3879.0022 | 94.87 | 1507.7502 | 197.03 | 1216.7462 |
| 46.54 | 3888.9736 | 97.43 | 1515.3601 | 198.01 | 1247.0031 |
| 49.72 | 3543.4861 | 98.43 | 1472.5660 | 201.83 | 1213.0787 |
| 51.35 | 3650.1563 | 98.44 | 1472.5879 | 205.31 | 1240.4130 |
| 52.39 | 3833.4343 | 99.53 | 1492.8203 | 210.85 | 1266.9136 |
| 53.44 | 3769.7456 | 100.11 | 1502.5214 | 215.65 | 1313.1951 |
| 57.36 | 0.0000 | 103.18 | 1481.0214 | 222.11 | 1359.2535 |
| 57.53 | 4066.3281 | 103.37 | 1478.3616 | 227.09 | 1308.6724 |
| 57.98 | 3070.5886 | 105.21 | 1478.5797 | 227.38 | 1322.6045 |
| 59.32 | 3080.2480 | 105.31 | 1470.4807 | 228.16 | 1339.8811 |
| 59.54 | 3081.8318 | 106.12 | 1496.3831 | 228.18 | 1339.9149 |
| 63.29 | 2271.2366 | 109.28 | 1427.3027 | 235.69 | 1226.1108 |
| 63.58 | 2272.7058 | 111.00 | 1498.4142 | 235.96 | 1218.2058 |
| 64.28 | 2376.1492 | 111.76 | 1521.2231 | 238.63 | 1172.6937 |
| 66.73 | 2486.4331 | 116.30 | 1565.8734 | 238.98 | 1157.5148 |
| 67.24 | 2536.7766 | 117.23 | 1552.4482 | 240.99 | 1180.7028 |
| 67.75 | 2580.3894 | 121.12 | 1423.1129 | 242.00 | 1182.6913 |
| 69.67 | 2677.8459 | 121.22 | 1423.3163 | 244.70 | 1154.2817 |
| 70.83 | 2746.0061 | 121.78 | 1424.4756 | 252.40 | 1153.8181 |
| 72.81 | 2726.7480 | 122.06 | 1425.0519 | 252.80 | 1169.9747 |
| 72.87 | 2727.0867 | 123.07 | 1238.1693 | 254.15 | 0.0000 |
| 74.66 | 2774.4700 | 127.23 | 1232.9274 | 256.23 | 1081.4769 |
| 74.82 | 2675.6731 | 129.30 | 1251.8459 | 260.90 | 1124.9940 |
| 74.97 | 2676.4866 | 131.20 | 1307.6705 | 264.66 | 1119.2244 |
| 77.11 | 2753.2991 | 133.02 | 1271.8660 | 268.22 | 1100.0555 |
| 79.69 | 2852.8503 | 133.52 | 1295.5507 | 269.46 | 1103.0613 |
| 80.12 | 2847.2312 | 136.00 | 1206.7048 | 271.23 | 1077.4034 |
| 80.19 | 2847.6086 | 136.47 | 1207.4706 | 273.65 | 1047.4958 |
| 80.57 | 2878.6311 | 140.51 | 1144.8805 | 276.40 | 1052.7042 |
| 81.00 | 2987.8813 | 143.76 | 1180.5916 | 277.37 | 1055.4286 |
| 81.07 | 2988.2769 | 144.24 | 1224.2993 | 277.60 | 1039.5356 |
| 83.79 | 3017.1685 | 145.44 | 1233.9238 | 278.00 | 996.3460 |
| 85.43 | 3201.6023 | 152.43 | 1146.8998 | 279.20 | 991.6433 |
| 86.55 | 3350.4819 | 153.25 | 1192.6477 | 279.54 | 983.3884 |
| 86.79 | 2459.8015 | 154.21 | 1191.8417 | 280.46 | 1029.6254 |
| 86.94 | 2460.4829 | 156.02 | 1174.3607 | 283.69 | 1035.1615 |
| 87.09 | 2461.1521 | 158.56 | 1161.1743 | 284.31 | 1020.4601 |
| 87.57 | 2463.2954 | 159.00 | 1190.9807 | 285.41 | 1005.1787 |
| 88.03 | 2465.3398 | 162.33 | 1228.9978 | 285.90 | 970.3326 |
| 88.34 | 2466.7151 | 163.33 | 1218.6145 | 287.50 | 1034.5049 |
| 88.47 | 2467.2976 | 165.86 | 1186.0361 | 290.67 | 1082.9679 |
| 89.96 | 1533.9863 | 176.31 | 1088.1261 | 293.27 | 0.0000 |
| 91.11 | 1567.6339 | 176.60 | 1072.4333 | 295.22 | 1030.2443 |
| 92.59 | 1534.9790 | 177.52 | 1093.0455 | 295.96 | 1035.6332 |
| 93.35 | 1481.8402 | 181.07 | 1143.4288 | 298.58 | 1011.7731 |
| 94.56 | 1505.9255 | 184.41 | 1197.3165 | 299.98 | 977.2411 |
| 94.65 | 1506.1575 | 185.72 | 1197.8663 | 300.09 | 973.4824 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 973.4979 | 497.08 | 693.5773 | 711.68 | 556.2827 |
| 301.36 | 965.7491 | 505.52 | 578.3540 | 720.70 | 553.4430 |
| 302.85 | 983.2535 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 965.1746 | 511.00 | 664.5806 | 722.78 | 543.2712 |
| 306.78 | 961.0445 | 514.00 | 665.6145 | 722.91 | 545.2321 |
| 308.46 | 992.2969 | 514.00 | 665.6145 | 723.31 | 550.1491 |
| 311.90 | 983.2009 | 520.40 | 687.5037 | 724.19 | 560.9829 |
| 316.51 | 958.3110 | 520.69 | 687.6177 | 727.33 | 572.3292 |
| 319.41 | 978.9285 | 522.65 | 0.0000 | 733.00 | 530.8945 |
| 320.08 | 948.1241 | 527.90 | 681.4211 | 735.93 | 563.5742 |
| 321.04 | 941.9579 | 529.59 | 696.4192 | 737.46 | 570.7056 |
| 323.87 | 929.1951 | 529.87 | 0.0000 | 739.50 | 580.8944 |
| 325.23 | 942.8757 | 531.02 | 686.9298 | 747.24 | 601.8221 |
| 328.76 | 937.4114 | 546.56 | 0.0000 | 748.06 | 585.7471 |
| 333.37 | 919.7840 | 552.55 | 586.6034 | 752.31 | 603.3224 |
| 333.97 | 908.3344 | 563.25 | 620.5438 | 753.82 | 559.3150 |
| 334.37 | 891.7979 | 569.33 | 568.0671 | 756.73 | 559.9431 |
| 338.28 | 876.4520 | 569.50 | 568.1131 | 756.80 | 559.9570 |
| 338.32 | 876.4655 | 569.70 | 568.1744 | 763.94 | 576.5383 |
| 340.48 | 905.5746 | 583.19 | 595.4658 | 765.81 | 595.6140 |
| 340.55 | 905.6165 | 584.27 | 582.1047 | 766.42 | 611.4916 |
| 344.28 | 868.2045 | 595.83 | 581.5614 | 766.84 | 610.5994 |
| 345.93 | 898.0637 | 600.60 | 565.3936 | 772.60 | 0.0000 |
| 351.06 | 916.2444 | 602.52 | 0.0000 | 776.52 | 603.9466 |
| 351.93 | 926.7878 | 602.73 | 588.9188 | 777.92 | 625.9821 |
| 355.39 | 0.0000 | 604.72 | 607.8424 | 778.90 | 578.7894 |
| 356.01 | 891.2654 | 609.32 | 606.3367 | 783.70 | 643.1604 |
| 364.49 | 961.9044 | 610.33 | 612.1412 | 785.37 | 606.9239 |
| 366.42 | 858.1451 | 614.28 | 574.4389 | 792.07 | 620.3308 |
| 375.05 | 923.9550 | 618.01 | 615.1899 | 794.95 | 632.9099 |
| 383.85 | 913.7685 | 620.36 | 524.7616 | 795.86 | 656.9817 |
| 388.16 | 819.1528 | 621.93 | 556.0254 | 801.95 | 629.5467 |
| 388.63 | 837.4362 | 630.19 | 0.0000 | 810.29 | 638.4540 |
| 391.69 | 921.1576 | 631.29 | 620.3613 | 810.45 | 654.4723 |
| 400.66 | 894.7684 | 633.25 | 597.9252 | 810.76 | 654.5522 |
| 401.81 | 930.5173 | 634.78 | 561.9854 | 815.77 | 665.7468 |
| 402.40 | 931.8942 | 635.95 | 605.1577 | 818.51 | 689.4446 |
| 404.85 | 896.0621 | 636.99 | 606.3599 | 832.01 | 695.7911 |
| 410.95 | 897.3413 | 645.85 | 597.4708 | 834.85 | 708.5781 |
| 413.71 | 923.8121 | 657.76 | 611.8188 | 835.71 | 694.6856 |
| 414.70 | 952.4734 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 962.7122 | 661.66 | 566.6362 | 846.75 | 0.0000 |
| 427.87 | 951.6193 | 664.57 | 0.0000 | 846.77 | 716.9454 |
| 433.94 | 916.0648 | 666.33 | 587.2747 | 856.80 | 721.1458 |
| 439.40 | 952.7733 | 666.50 | 587.3202 | 860.56 | 757.0942 |
| 453.88 | 1003.3185 | 667.71 | 0.0000 | 871.09 | 731.4864 |
| 463.37 | 988.3350 | 677.62 | 578.9788 | 873.19 | 746.9069 |
| 468.07 | 1012.3840 | 685.70 | 531.1826 | 875.33 | 0.0000 |
| 473.00 | 930.0894 | 695.00 | 565.9266 | 879.38 | 764.5989 |
| 475.06 | 953.7760 | 696.49 | 585.4043 | 880.51 | 768.9866 |
| 476.78 | 895.3377 | 696.51 | 585.4043 | 883.24 | 795.3242 |
| 477.60 | 853.6418 | 697.00 | 579.7834 | 884.68 | 821.3379 |
| 482.18 | 877.4036 | 697.49 | 575.1171 | 889.28 | 805.1504 |
| 487.02 | 813.9601 | 702.65 | 588.7864 | 894.76 | 826.5155 |
| 492.35 | 741.8790 | 706.68 | 570.5358 | 898.04 | 839.4341 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 904.5333 | 1312.11 | 112.9486 | | |
| 911.20 | 906.1981 | 1332.49 | 126.1226 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 884.7408 | 1365.19 | 57.6892 | | |
| 937.49 | 912.9395 | 1368.63 | 0.0000 | | |
| 944.13 | 924.2936 | 1384.29 | 82.5063 | | |
| 946.00 | 924.8548 | 1408.01 | 59.2578 | | |
| 949.00 | 910.0314 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 51.9767 | | |
| 962.31 | 788.7268 | 1489.16 | 57.3363 | | |
| 964.08 | 789.1663 | 1505.03 | 38.3572 | | |
| 966.17 | 818.1074 | 1596.21 | 38.0810 | | |
| 968.97 | 722.9294 | 1620.50 | 48.6160 | | |
| 983.53 | 667.9880 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 45.1171 | | |
| 996.26 | 659.9792 | 1750.46 | 0.0000 | | |
| 1001.03 | 699.2495 | 1764.49 | 37.2516 | | |
| 1004.73 | 692.5928 | 1770.23 | 29.8343 | | |
| 1021.30 | 0.0000 | 1771.35 | 29.8411 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 35.4183 | | |
| 1037.84 | 609.1133 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 24.8118 | | |
| 1046.59 | 586.9516 | | | | |
| 1048.07 | 575.3173 | | | | |
| 1049.04 | 621.9281 | | | | |
| 1050.41 | 618.9127 | | | | |
| 1063.66 | 603.9697 | | | | |
| 1077.00 | 655.2923 | | | | |
| 1077.34 | 632.4900 | | | | |
| 1085.87 | 628.5938 | | | | |
| 1099.45 | 669.3553 | | | | |
| 1112.07 | 613.8395 | | | | |
| 1112.84 | 650.6311 | | | | |
| 1115.54 | 596.0978 | | | | |
| 1120.29 | 480.1367 | | | | |
| 1120.55 | 480.1580 | | | | |
| 1121.30 | 458.2195 | | | | |
| 1129.67 | 423.5010 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 341.9121 | | | | |
| 1177.95 | 305.4321 | | | | |
| 1189.05 | 265.7068 | | | | |
| 1204.77 | 184.1408 | | | | |
| 1221.41 | 154.7443 | | | | |
| 1231.02 | 142.8344 | | | | |
| 1235.36 | 144.8881 | | | | |
| 1238.28 | 131.7265 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 95.5811 | | | | |
| 1274.44 | 105.2063 | | | | |
| 1274.54 | 111.9060 | | | | |
| 1291.59 | 97.1508 | | | | |
| 1298.22 | 0.0000 | | | | |

# Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
10-FEB-2014 11:03:41.68

| Run Date | Detector | Parameter | | Flag |
|---|---|---|---|---|
| 10-FEB-2014 | GAM01 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 5-FEB-2014 | GAM02 | Cal Check may not have run since 10-FEB-2014 | | |
| 2-FEB-2014 | GAM02 | Bkg Check may not have run since 10-FEB-2014 | | locked out |
| 2-FEB-2014 | GAM03 | Bkg Check may not have run since 10-FEB-2014 | | |
| 10-FEB-2014 | GAM04 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 10-FEB-2014 | GAM05 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 10-FEB-2014 | GAM06 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 10-FEB-2014 | GAM07 | Cal Check | PSFWHM-662 | Investigate OK |
| 10-FEB-2014 | GAM08 | Cal Check | NLACTVTY-662 | Investigate OK |
| 10-FEB-2014 | GAM09 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 10-FEB-2014 | GAM10 | All Parameters Passed | | |
| 10-FEB-2014 | GAM11 | Cal Check | PSFWHM-1332 | Investigate OK |
| 10-FEB-2014 | GAM12 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 10-FEB-2014 | GAM13 | Cal Check | NLACTVTY-662 | Investigate OK |
| 10-FEB-2014 | GAM14 | Cal Check | PSFWHM-662 | Investigate OK |
| 10-FEB-2014 | GAM15 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |
| | No daily Bkg Check necessary. | | | |
| 31-JAN-2014 | GAM16 | Cal Check may not have run since 10-FEB-2014 | | |
| 28-JAN-2014 | GAM16 | Bkg Check may not have run since 10-FEB-2014 | | locked out |
| 10-FEB-2014 | GAM17 | All Parameters Passed | | |
| | Weekly Background check completed on 10-FEB-2014. | | | |

No daily Bkg Check necessary.

10-FEB-2014 GAM18 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM19 Cal Check PSFWHM-662 Investigate OK

10-FEB-2014 GAM20 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM21 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM22 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM23 Cal Check PSFWHM-662 Investigate OK

10-FEB-2014 GAM24 Cal Check PSFWHM-1332 Action Below LOC

10-FEB-2014 GAM25 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM26 Cal Check PSFWHM-1332 Investigate OK
10-FEB-2014 GAM26 Cal Check NLACTVTY-662 Investigate OK

10-FEB-2014 GAM27 Cal Check PSFWHM-1332 Investigate OK

10-FEB-2014 GAM28 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM29 Cal Check NLACTVTY-1332 Investigate OK

10-FEB-2014 GAM30 Cal Check NLACTVTY-1332 Investigate OK

10-FEB-2014 GAM31 Cal Check PSFWHM-59 Investigate OK

10-FEB-2014 GAM32 Cal Check PSFWHM-1332 Investigate OK

10-FEB-2014 GAM33 Cal Check NLACTVTY-1332 Investigate OK

10-FEB-2014 GAM36 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 GAM40 Cal Check PSFWHM-1332 Investigate OK
10-FEB-2014 GAM40 Cal Check NLACTVTY-59 Investigate OK
10-FEB-2014 GAM40 Cal Check NLACTVTY-1332 Investigate OK

---------- GAM43 Cal Check may not have run since 10-FEB-2014 Locked out

10-FEB-2014 WELL All Parameters Passed

10-FEB-2014 XRAY1 All Parameters Passed

Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 XRAY2 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 XRAY3 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 XRAY5 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

10-FEB-2014 XRAY6 All Parameters Passed
Weekly Background check completed on 10-FEB-2014.
No daily Bkg Check necessary.

APPROVAL DATE: 2/10/14 APPROVAL TIME: 11:27

APPROVED BY: RF PROCEDURE # GL-RAD-I-001

Report completed at 10-FEB-2014 11:08:30.32

* = OUT OF SERVICE

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
12-FEB-2014 11:21:45.44

| Run Date | Detector | Parameter | | Flag |
|---|---|---|---|---|
| 12-FEB-2014 | GAM01 | All Parameters Passed | | |
| 11-FEB-2014 | GAM02 | Cal Check may not have run since 12-FEB-2014 | | * |
| 12-FEB-2014 | GAM03 | All Parameters Passed | | |
| 12-FEB-2014 | GAM04 | Cal Check | NLACTVTY-662 | Investigate |
| 12-FEB-2014 | GAM04 | Cal Check | NLACTVTY-1332 | Investigate OK |
| 12-FEB-2014 | GAM05 | All Parameters Passed | | |
| 12-FEB-2014 | GAM06 | Cal Check | NLACTVTY-59 | Investigate |
| 12-FEB-2014 | GAM06 | Cal Check | PSFWHM-59 | Investigate OK |
| 12-FEB-2014 | GAM07 | All Parameters Passed | | |
| 12-FEB-2014 | GAM08 | All Parameters Passed | | |
| 12-FEB-2014 | GAM09 | All Parameters Passed | | |
| 12-FEB-2014 | GAM10 | All Parameters Passed | | |
| 12-FEB-2014 | GAM11 | All Parameters Passed | | |
| 12-FEB-2014 | GAM12 | All Parameters Passed | | |
| 12-FEB-2014 | GAM13 | Cal Check | PSFWHM-1332 | Investigate OK |
| 12-FEB-2014 | GAM14 | Cal Check | PSFWHM-662 | Investigate OK |
| 12-FEB-2014 | GAM15 | All Parameters Passed | | |
| 31-JAN-2014 | GAM16 | Cal Check may not have run since 12-FEB-2014 | | * |
| 12-FEB-2014 | GAM16 | Bkg Check | BACKRATE | Action |
| 12-FEB-2014 | GAM17 | All Parameters Passed | | |
| 12-FEB-2014 | GAM18 | All Parameters Passed | | |
| 12-FEB-2014 | GAM19 | Cal Check | NLACTVTY-1332 | Investigate OK |
| 12-FEB-2014 | GAM20 | All Parameters Passed | | |
| 12-FEB-2014 | GAM21 | All Parameters Passed | | |
| 12-FEB-2014 | GAM22 | All Parameters Passed | | |
| 12-FEB-2014 | GAM23 | All Parameters Passed | | |
| 12-FEB-2014 | GAM24 | All Parameters Passed | | |

| | | | | | |
|---|---|---|---|---|---|
| 12-FEB-2014 | GAM25 | Cal Check | NLACTVTY-662 | Investigate | OK |
| 12-FEB-2014 | GAM26 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM27 | Cal Check | NLACTVTY-59 | Investigate | OK |
| 12-FEB-2014 | GAM28 | Cal Check | PSFWHM-59 | Investigate | OK |
| 12-FEB-2014 | GAM29 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM30 | Cal Check | NLACTVTY-1332 | Investigate | OK |
| 12-FEB-2014 | GAM31 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM32 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM33 | Cal Check | NLACTVTY-59 | Investigate | OK |
| 12-FEB-2014 | GAM36 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM40 | Cal Check | NLACTVTY-59 | Investigate | OK |
| ---------- | GAM43 | Cal Check may not have run since 12-FEB-2014 | | | |
| 9-FEB-2014 | GAM43 | Bkg Check may not have run since 12-FEB-2014 | | | |
| 12-FEB-2014 | WELL | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY1 | Bkg Check | BACKRATE | Investigate | OK |
| 12-FEB-2014 | XRAY2 | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY3 | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY5 | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY6 | All Parameters Passed | | | |

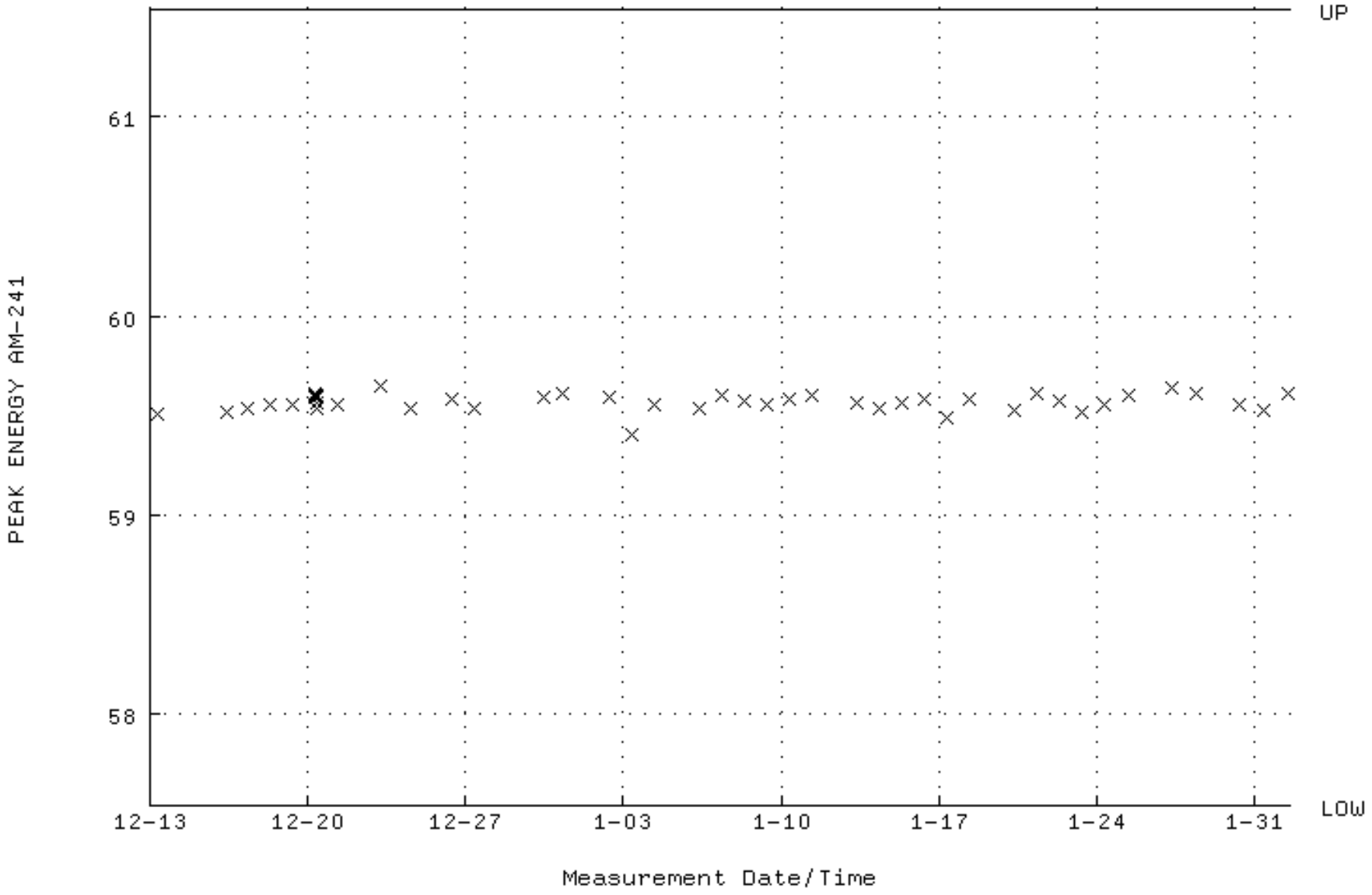
APPROVAL DATE: 2/12/14 APPROVAL TIME: 14:35

APPROVED BY: [signature] PROCEDURE # GL-RAD-I-001

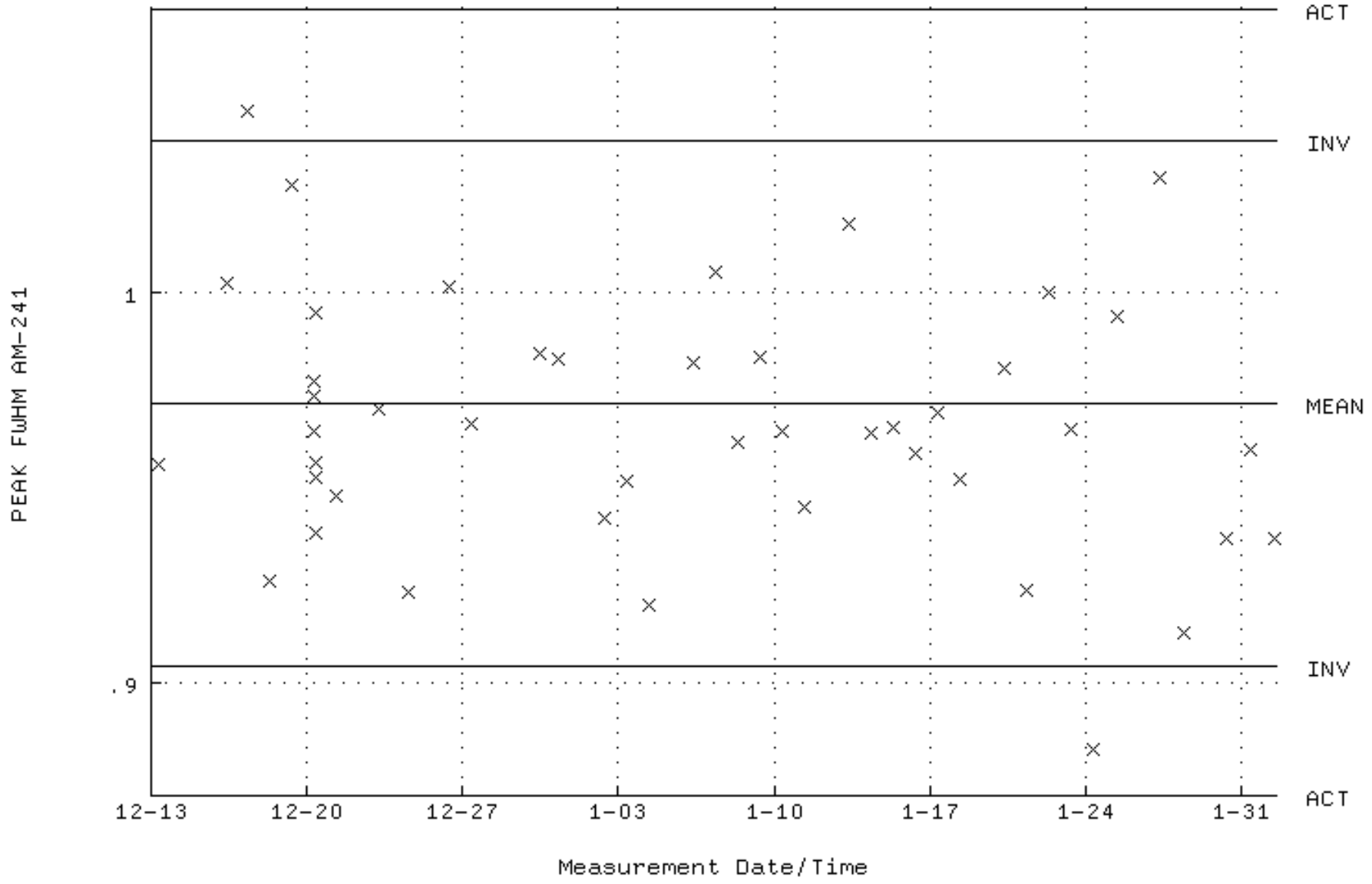
Report completed at 12-FEB-2014 11:25:58.59

# Background and Efficiency Data

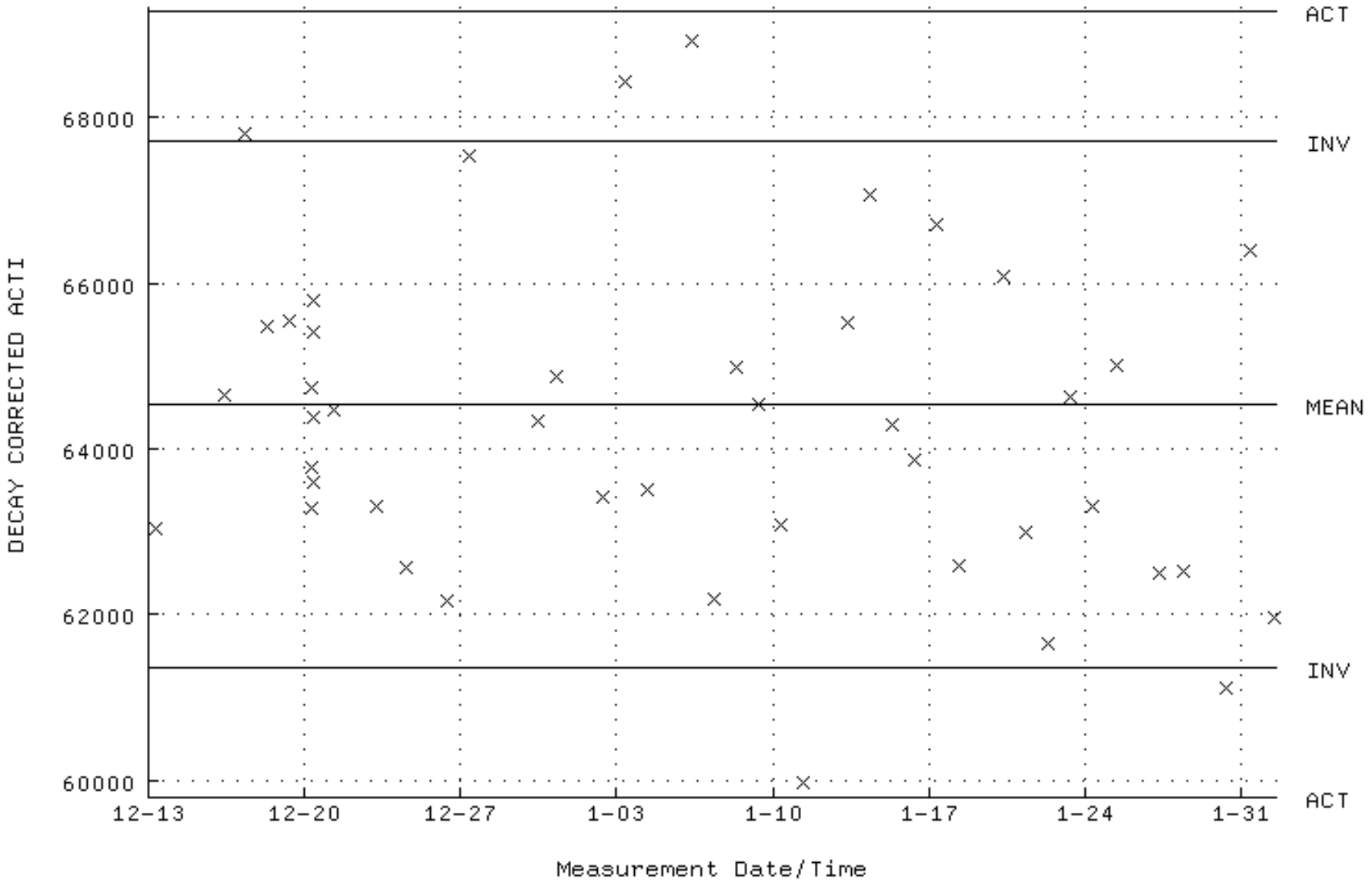
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 13-DEC-2013 07:59:51 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



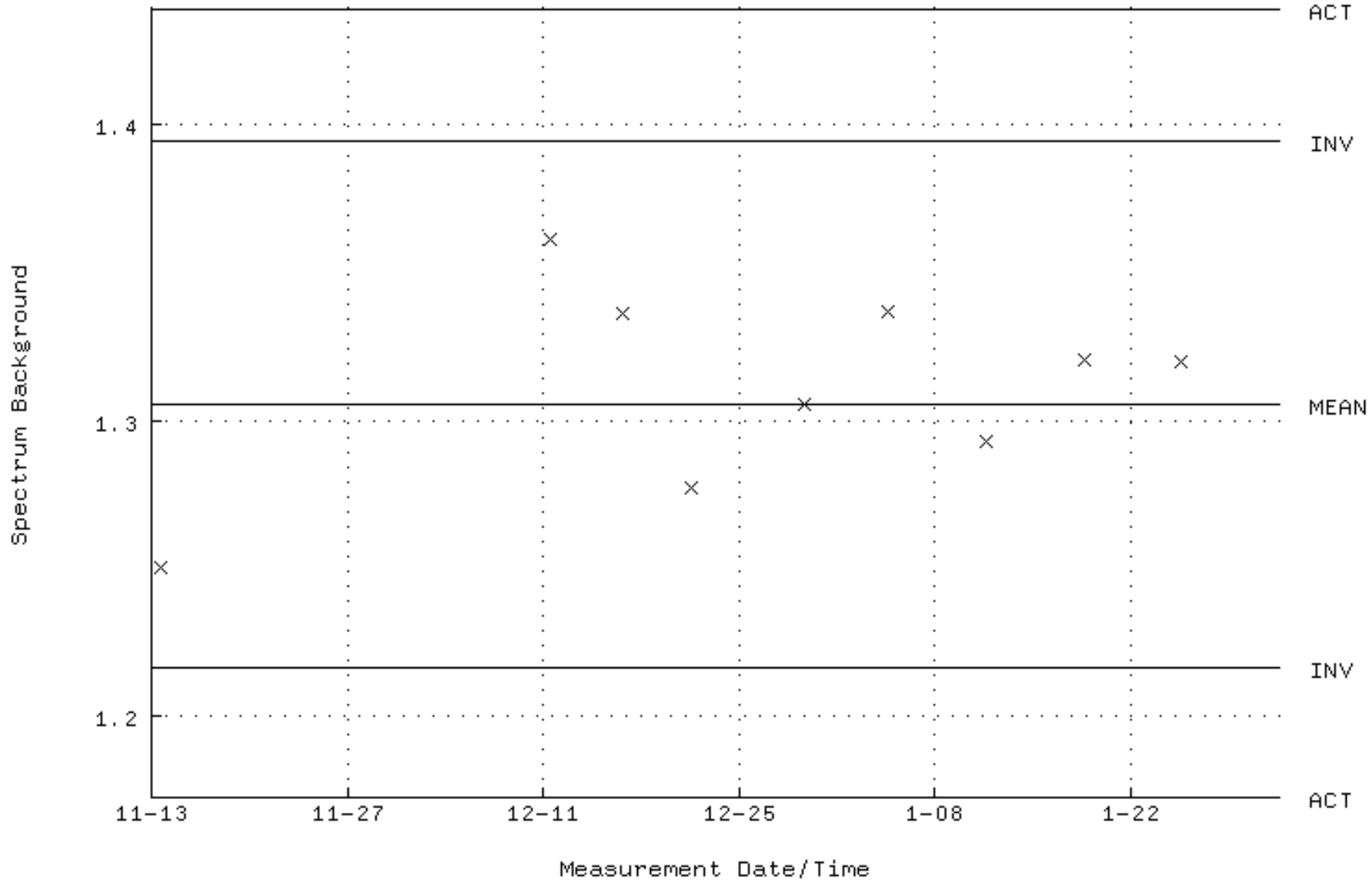
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 13-DEC-2013 07:59:51 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.971946 +- 3.361765E-02 (3.46 %)



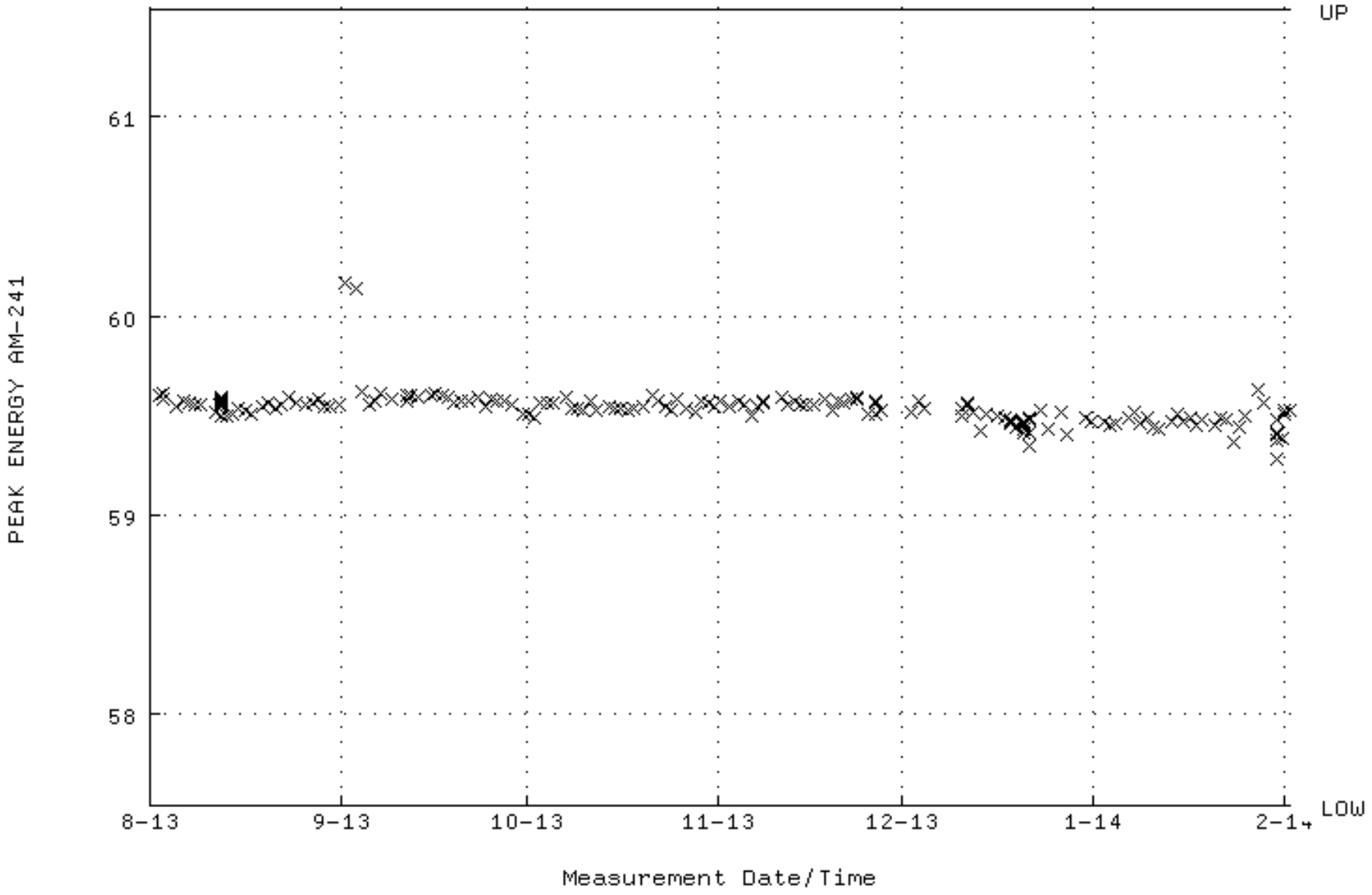
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 13-DEC-2013 07:59:51 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 64549.2 +- 1584.95 (2.46 %)



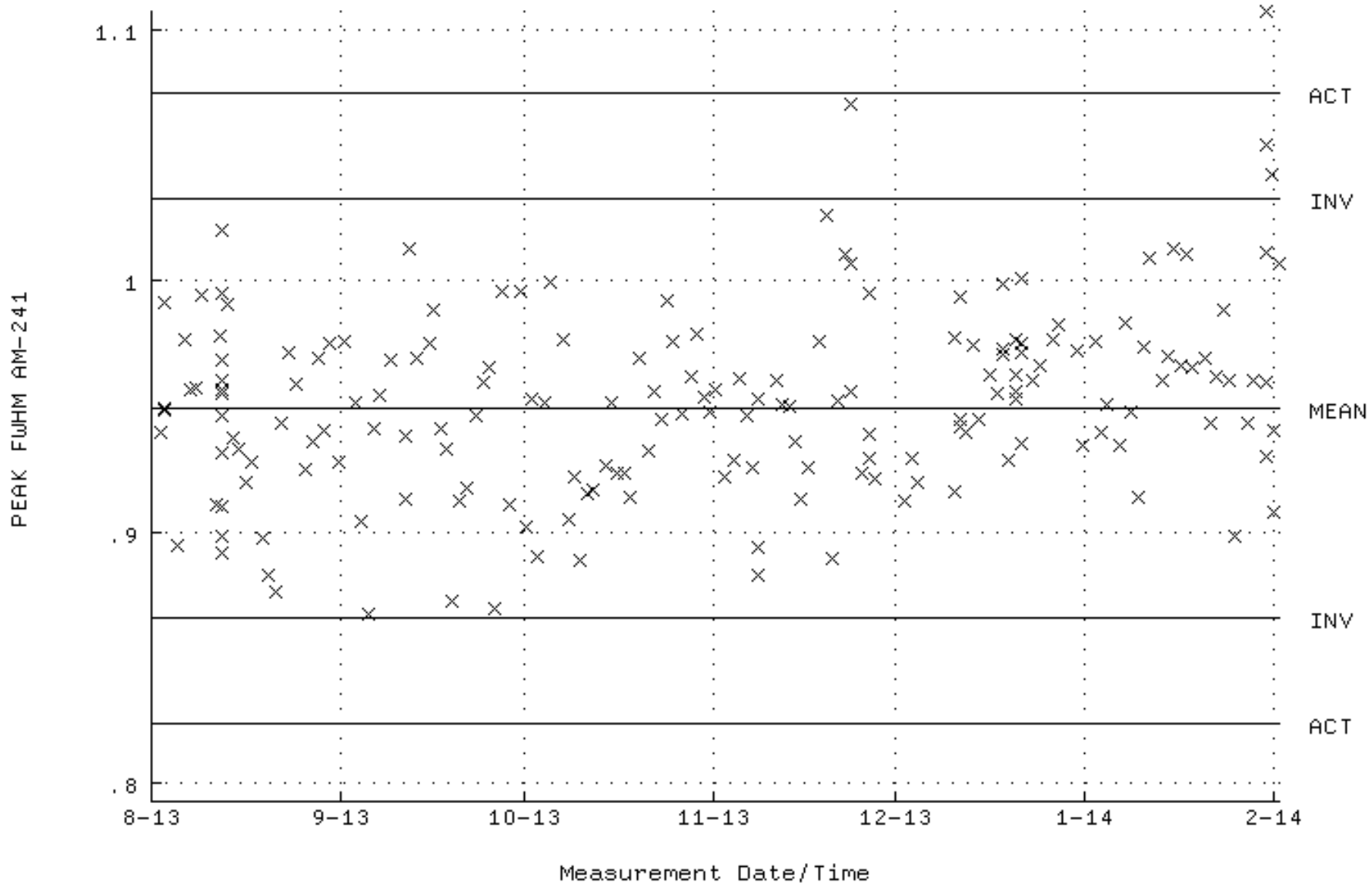
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM01.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 13-NOV-2013 15:06:05 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.30573 +- 4.439831E-02 (3.40 %)



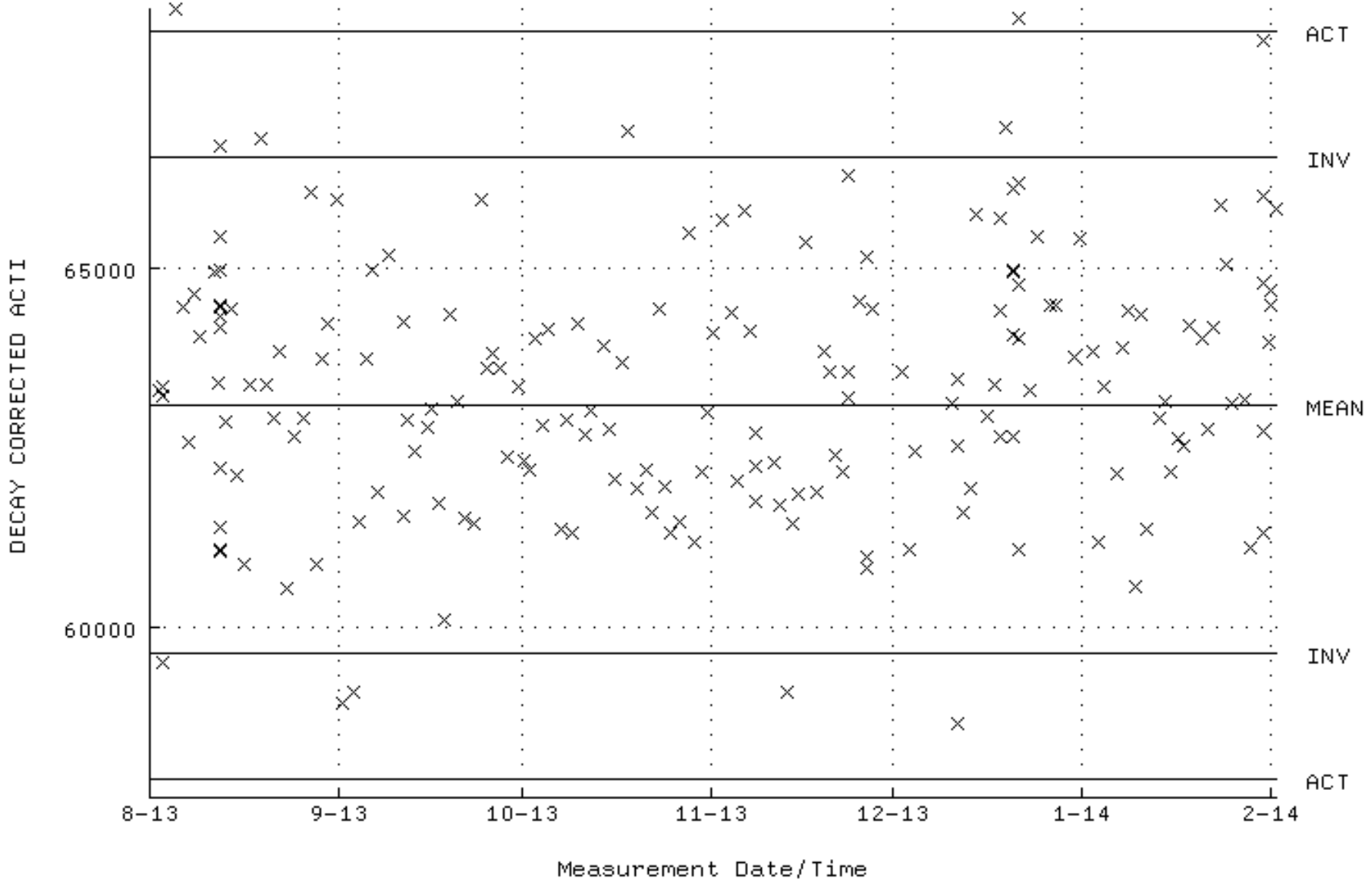
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:30 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



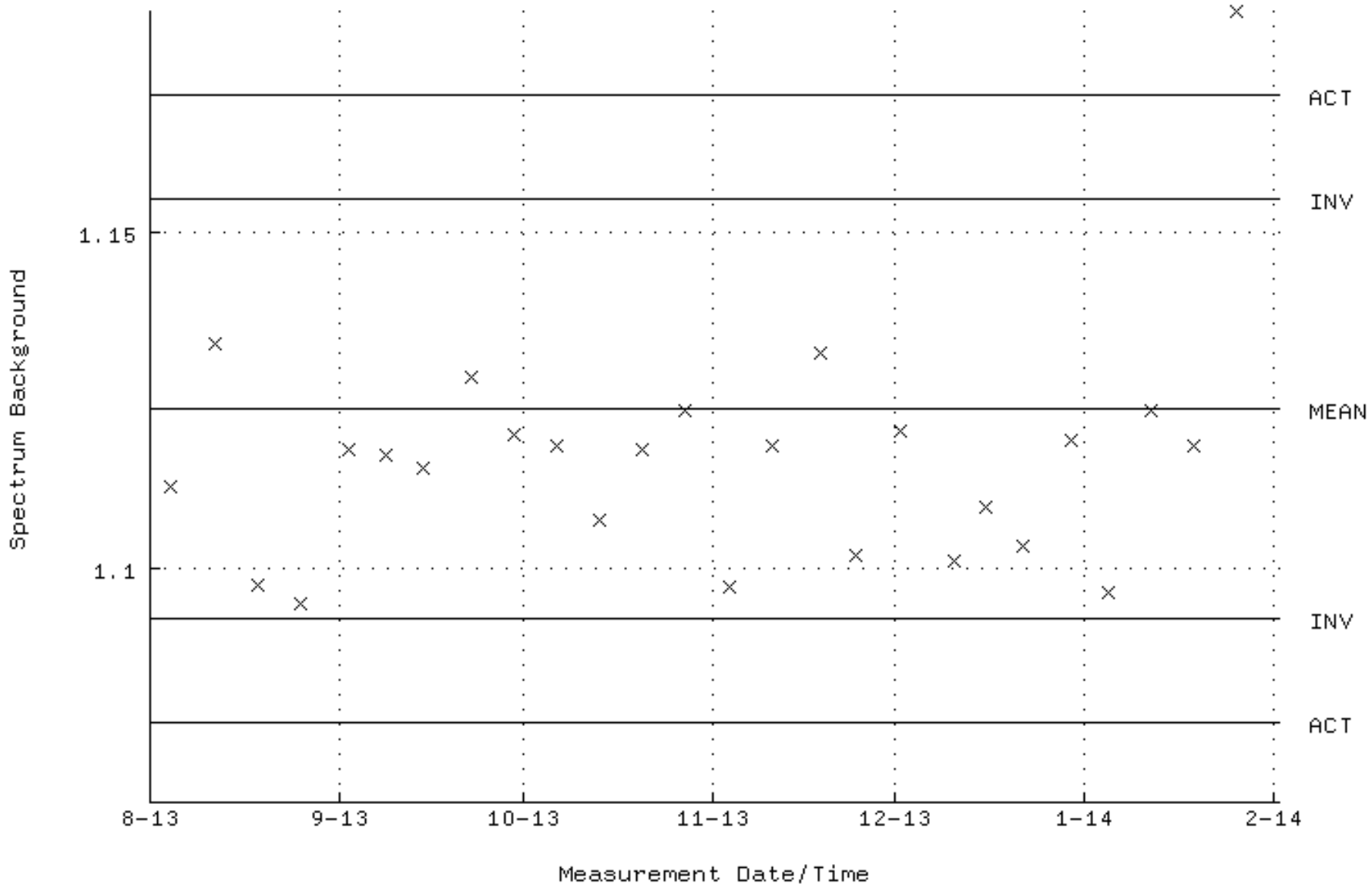
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:30 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.949746 +- 4.190384E-02 (4.41 %)



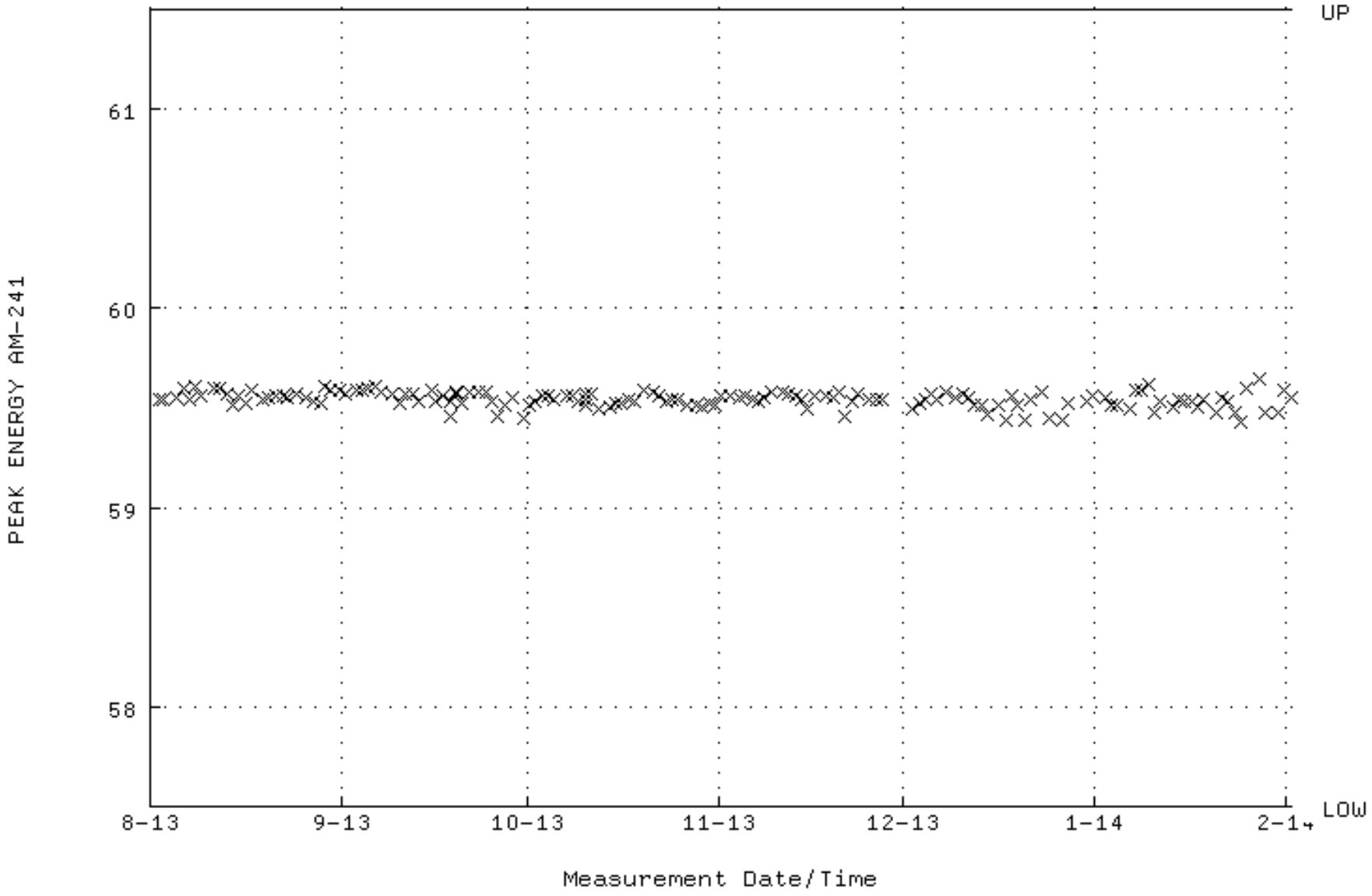
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:30 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63115.5 +- 1732.27 (2.74 %)



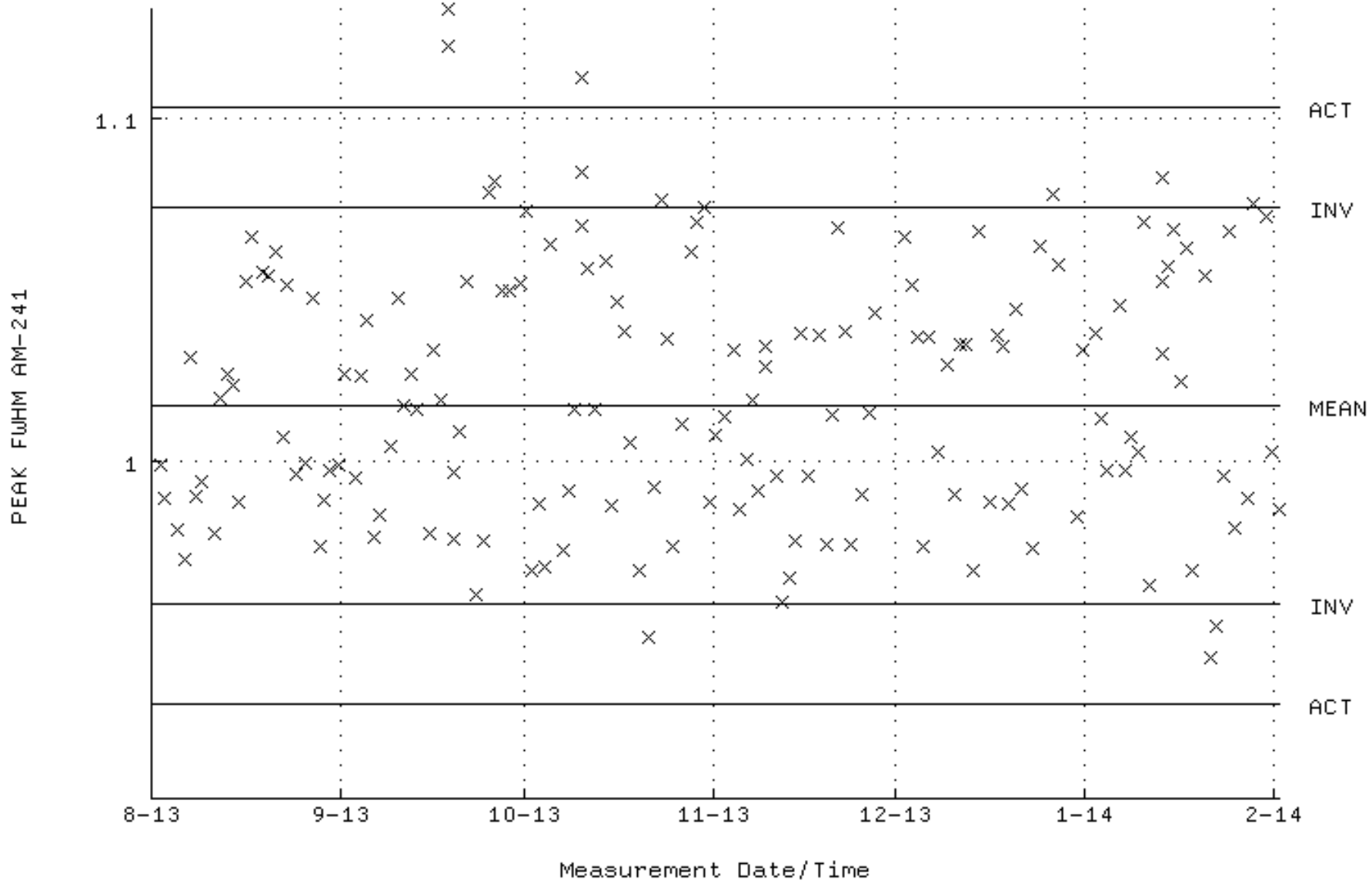
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM04.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:05:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.12388 +- 1.550973E-02 (1.38 %)



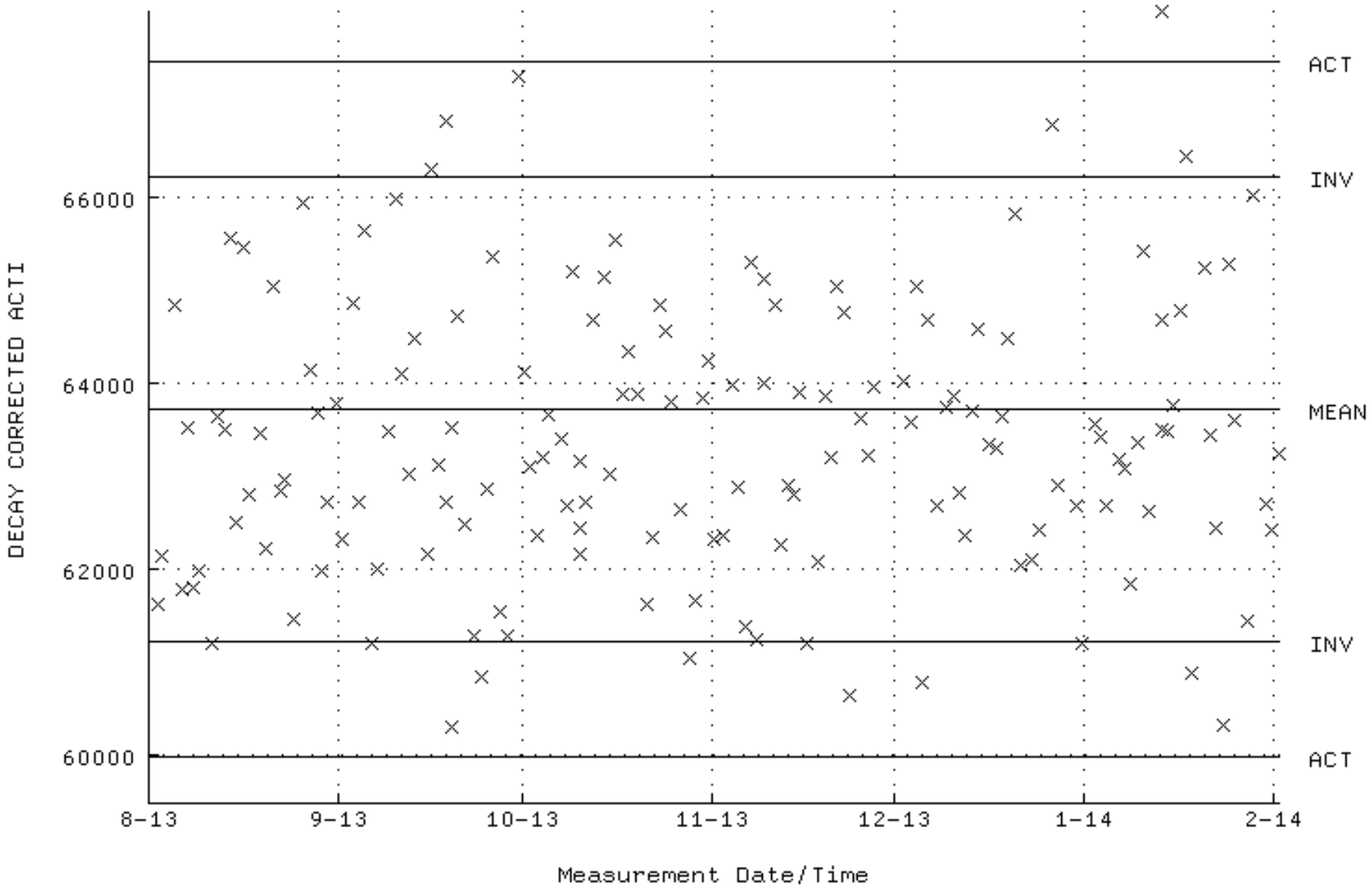
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:35:56 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



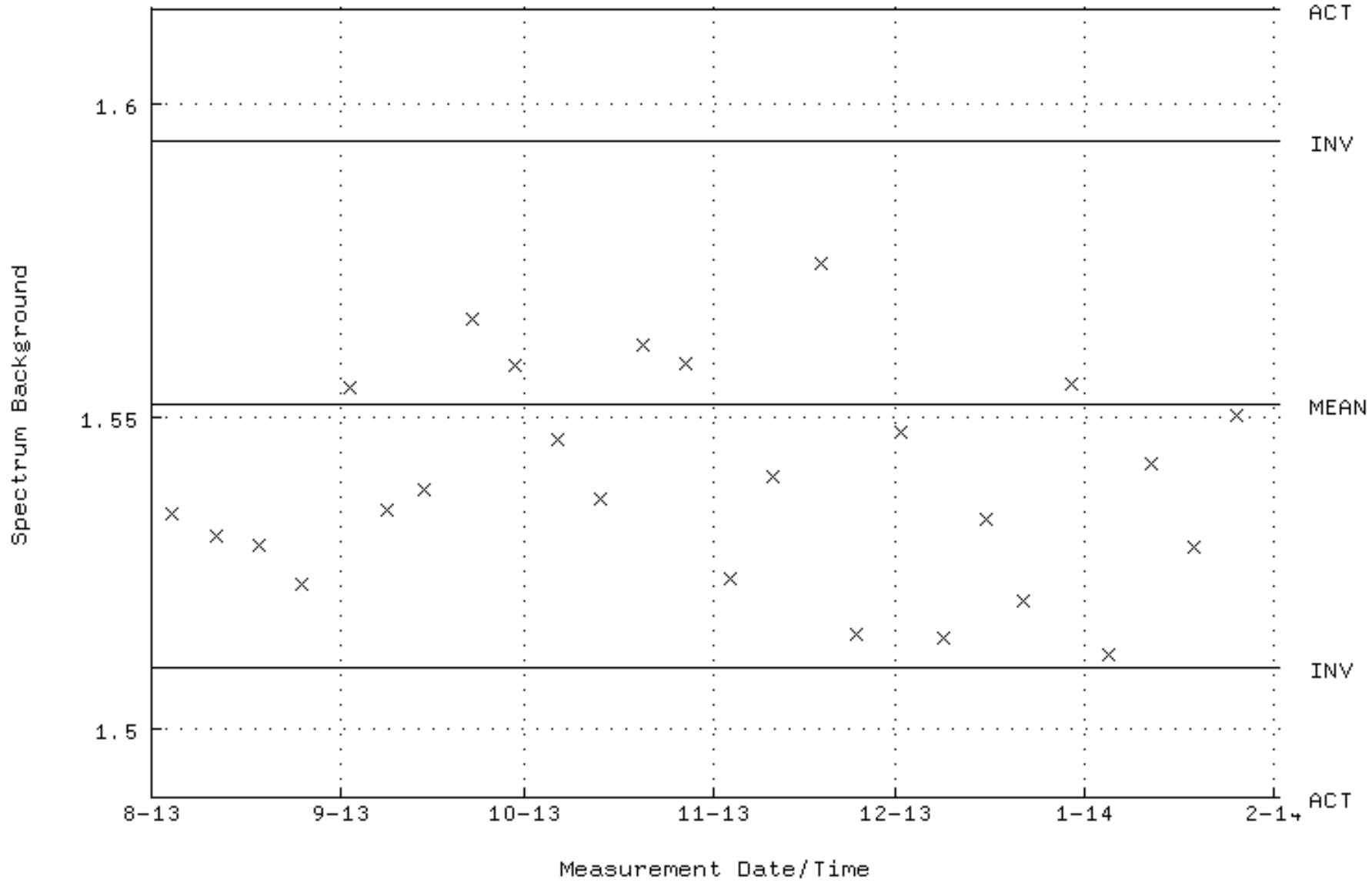
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:35:56 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.01657 +- 2.892673E-02 (2.85 %)



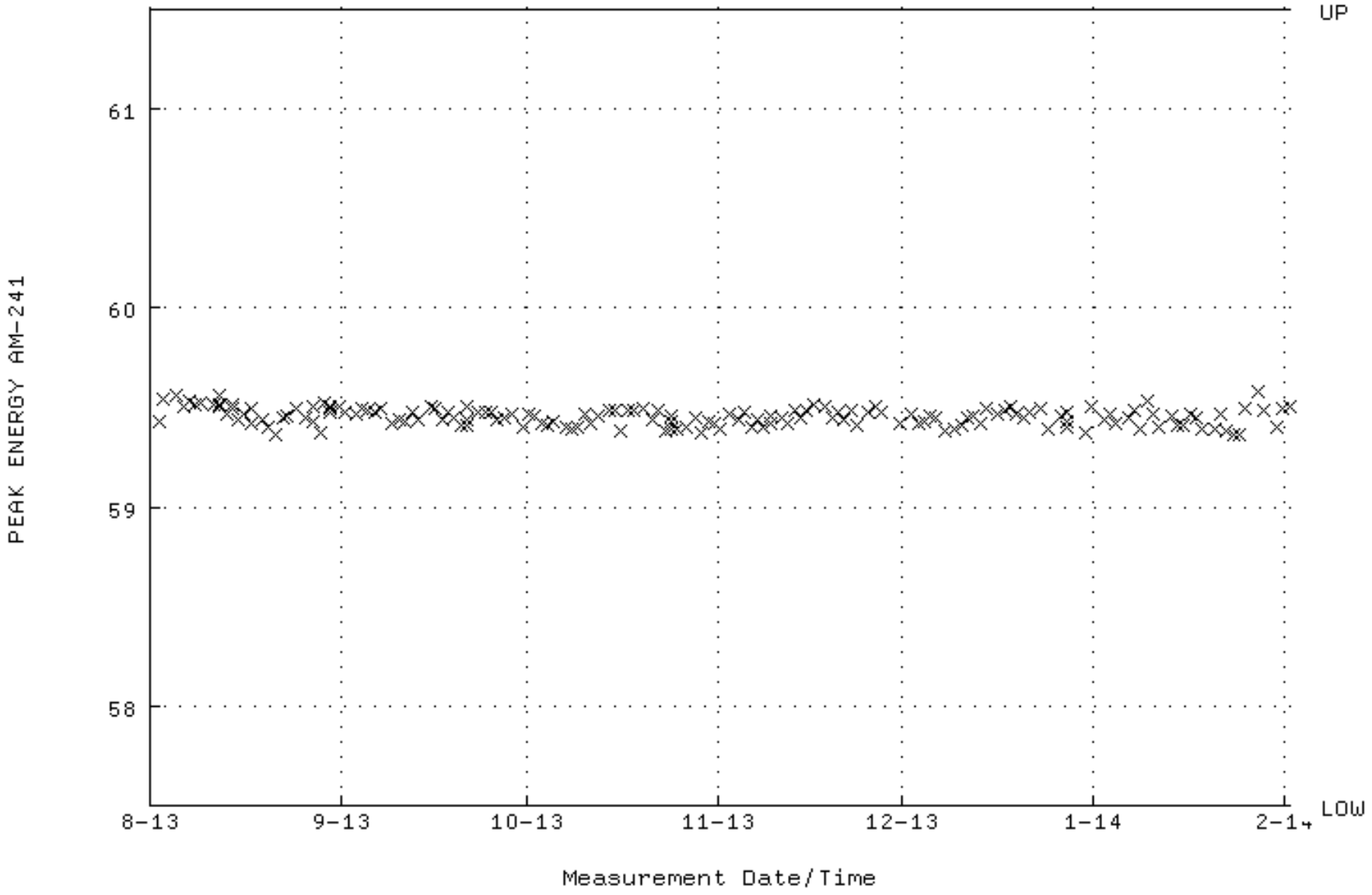
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:35:56 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63732.0 +- 1251.92 (1.96 %)



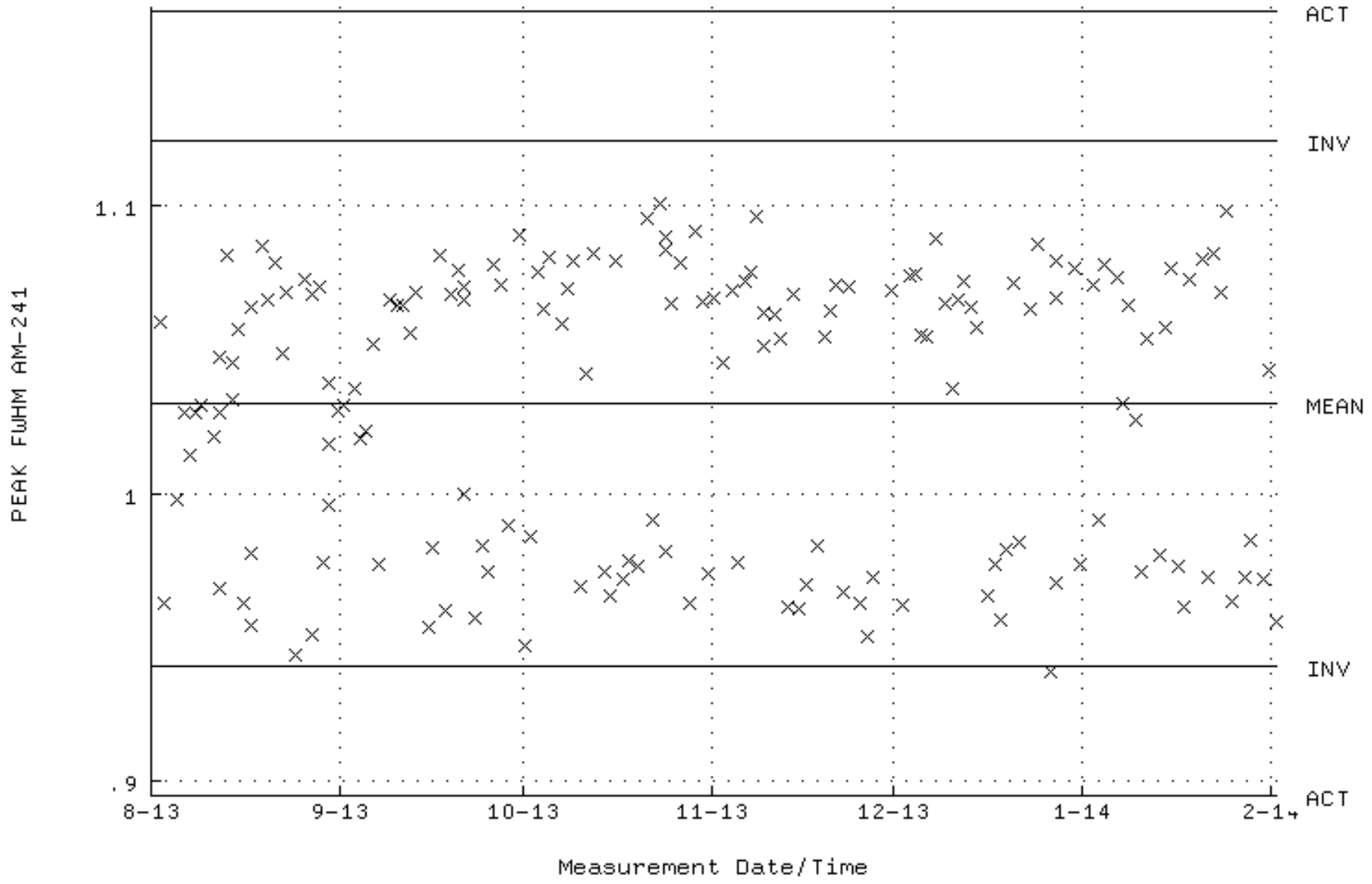
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM06.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:06:12 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.55214 +- 2.098598E-02 (1.35 %)



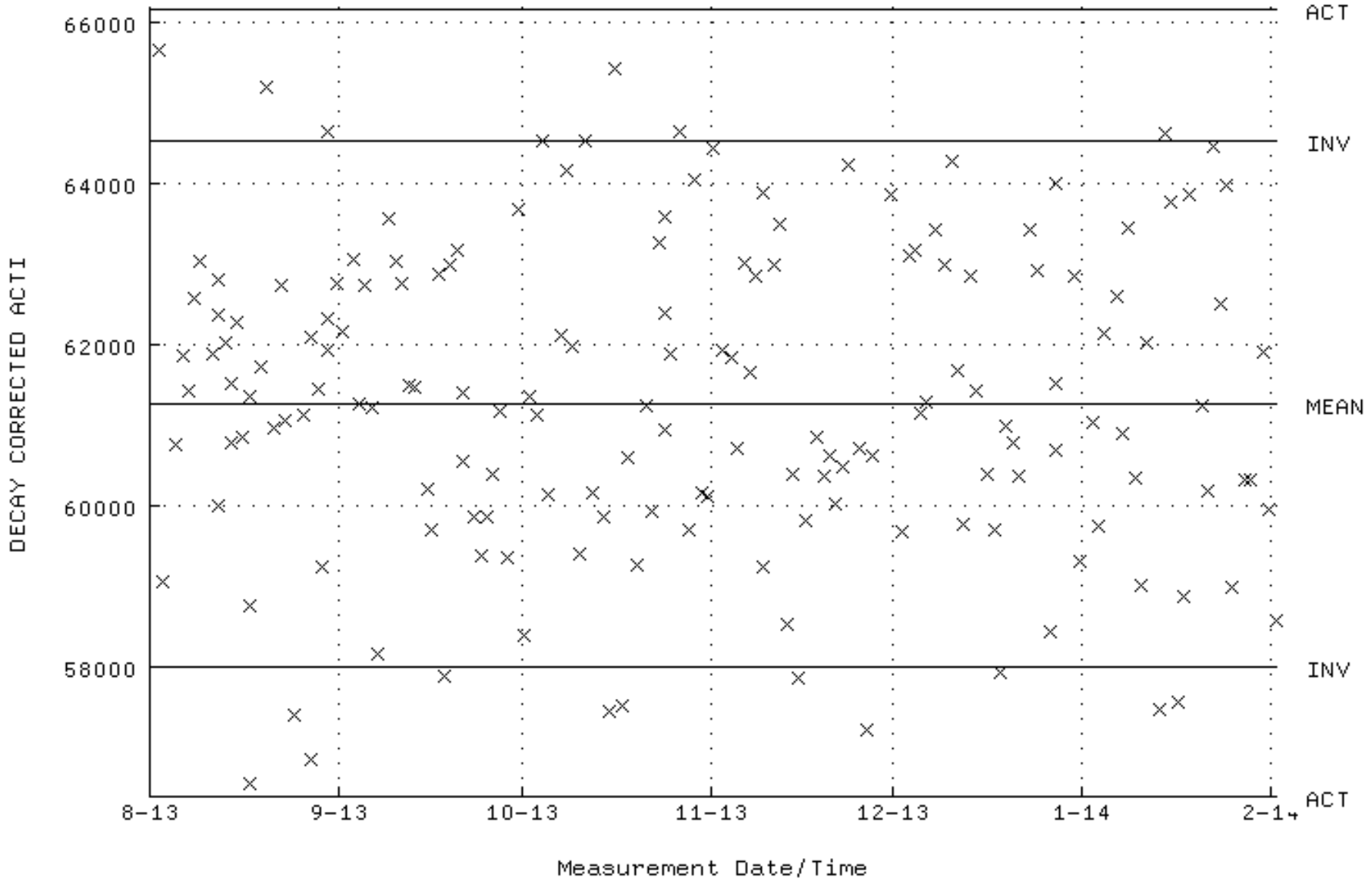
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:36 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



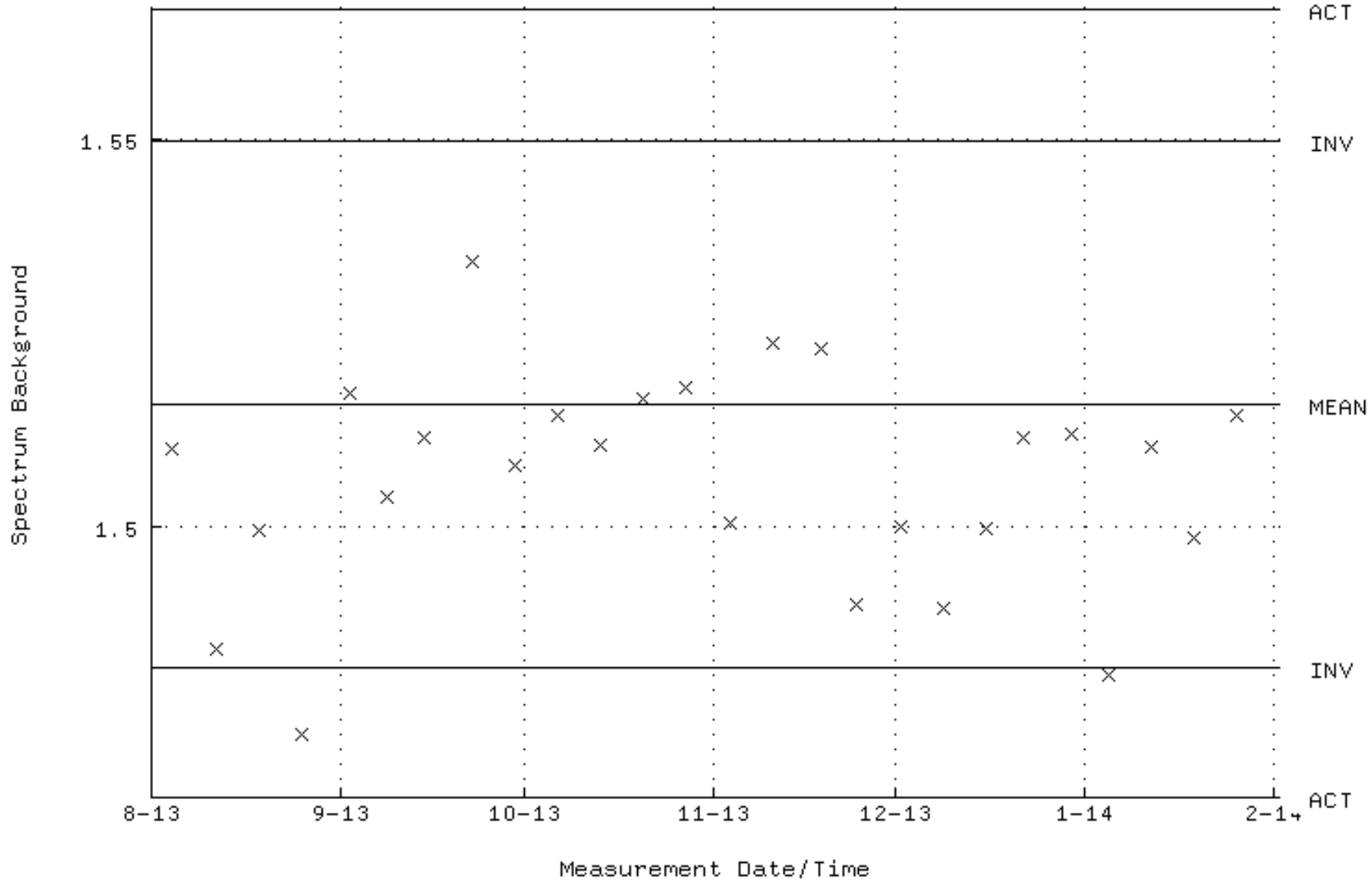
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:36 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.03160 +- 4.561273E-02 (4.42 %)



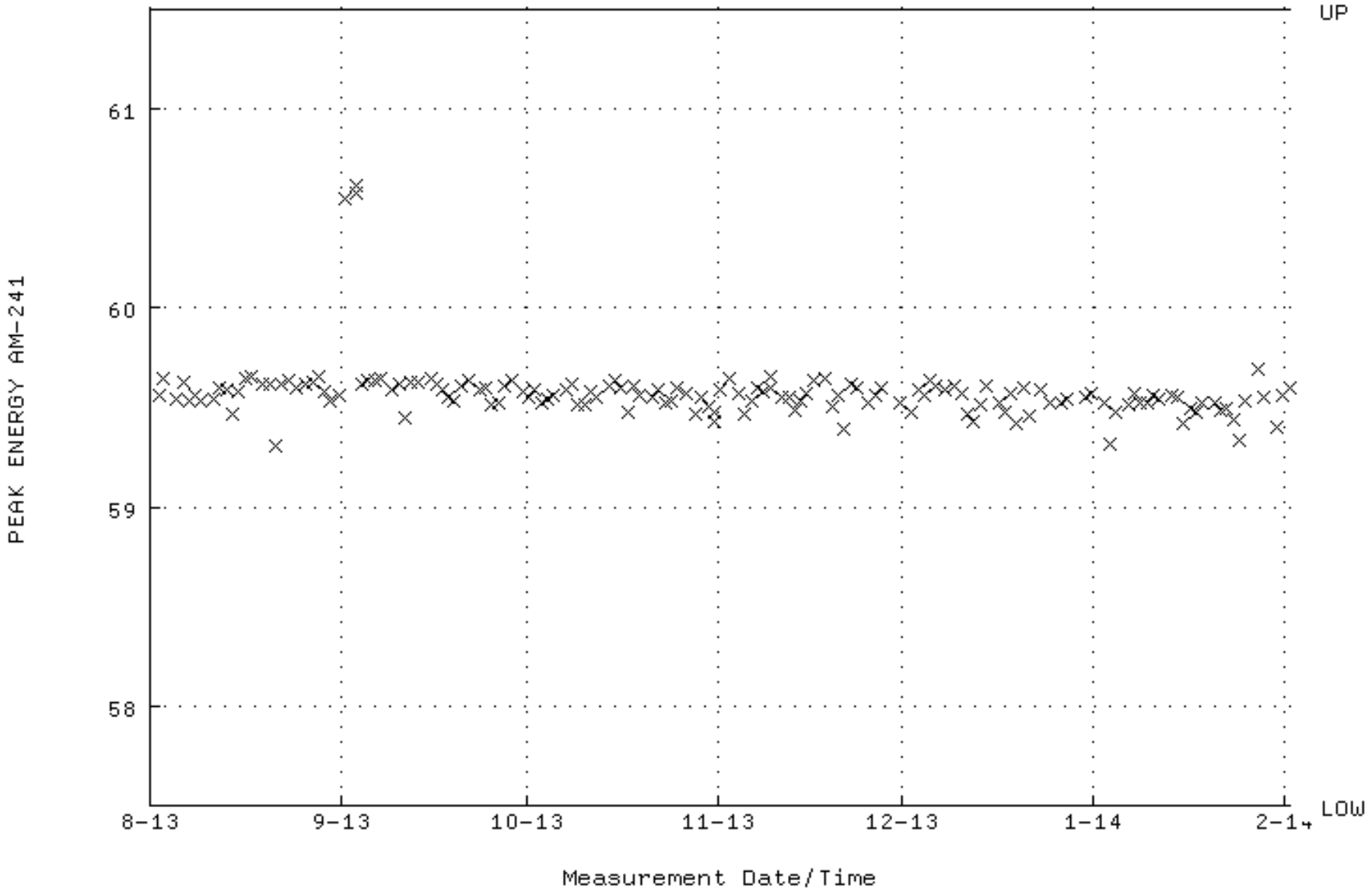
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:36 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 61278.6 +- 1628.45 (2.66 %)



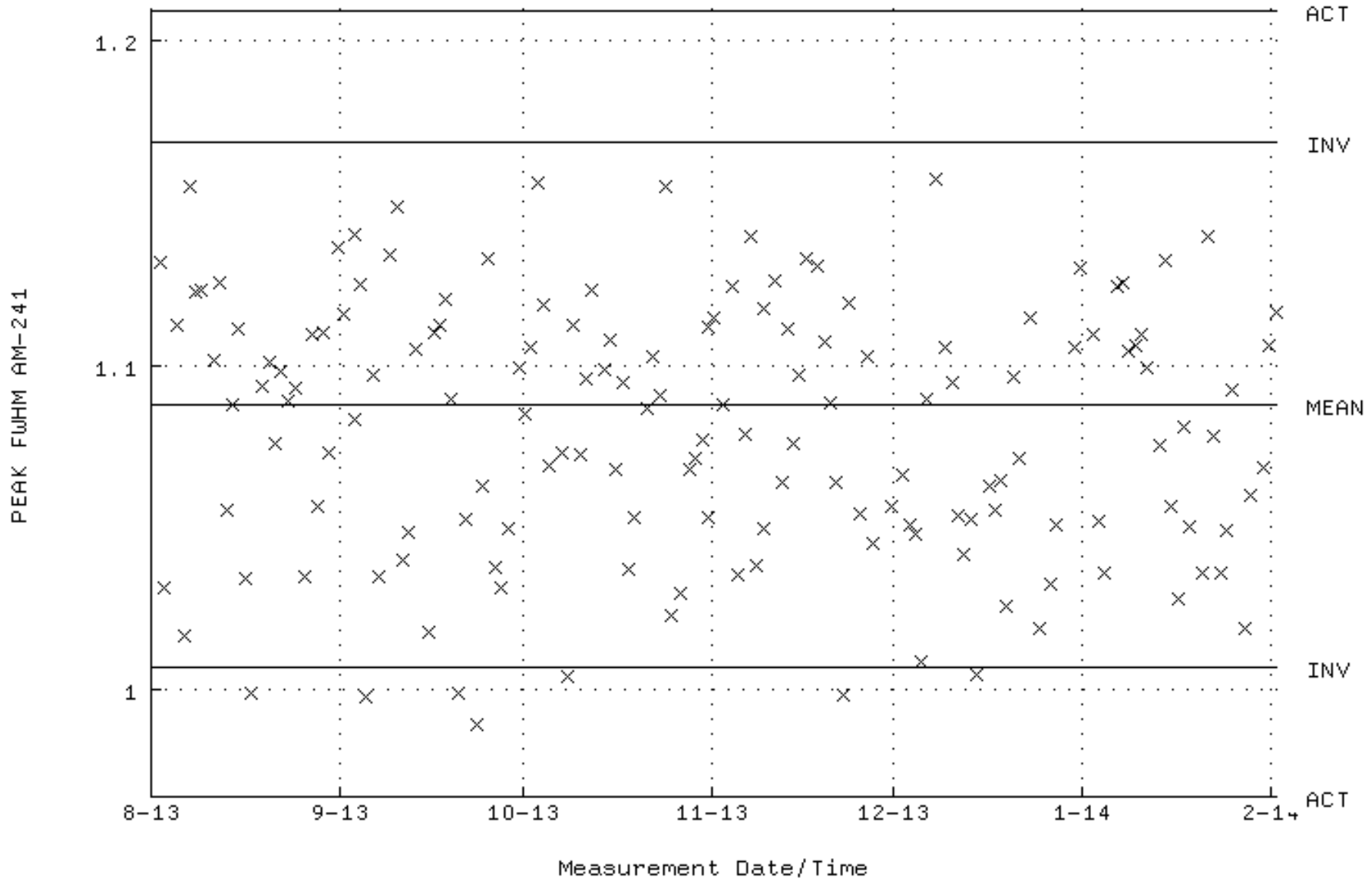
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM07.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:06:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.51582 +- 1.694994E-02 (1.12 %)



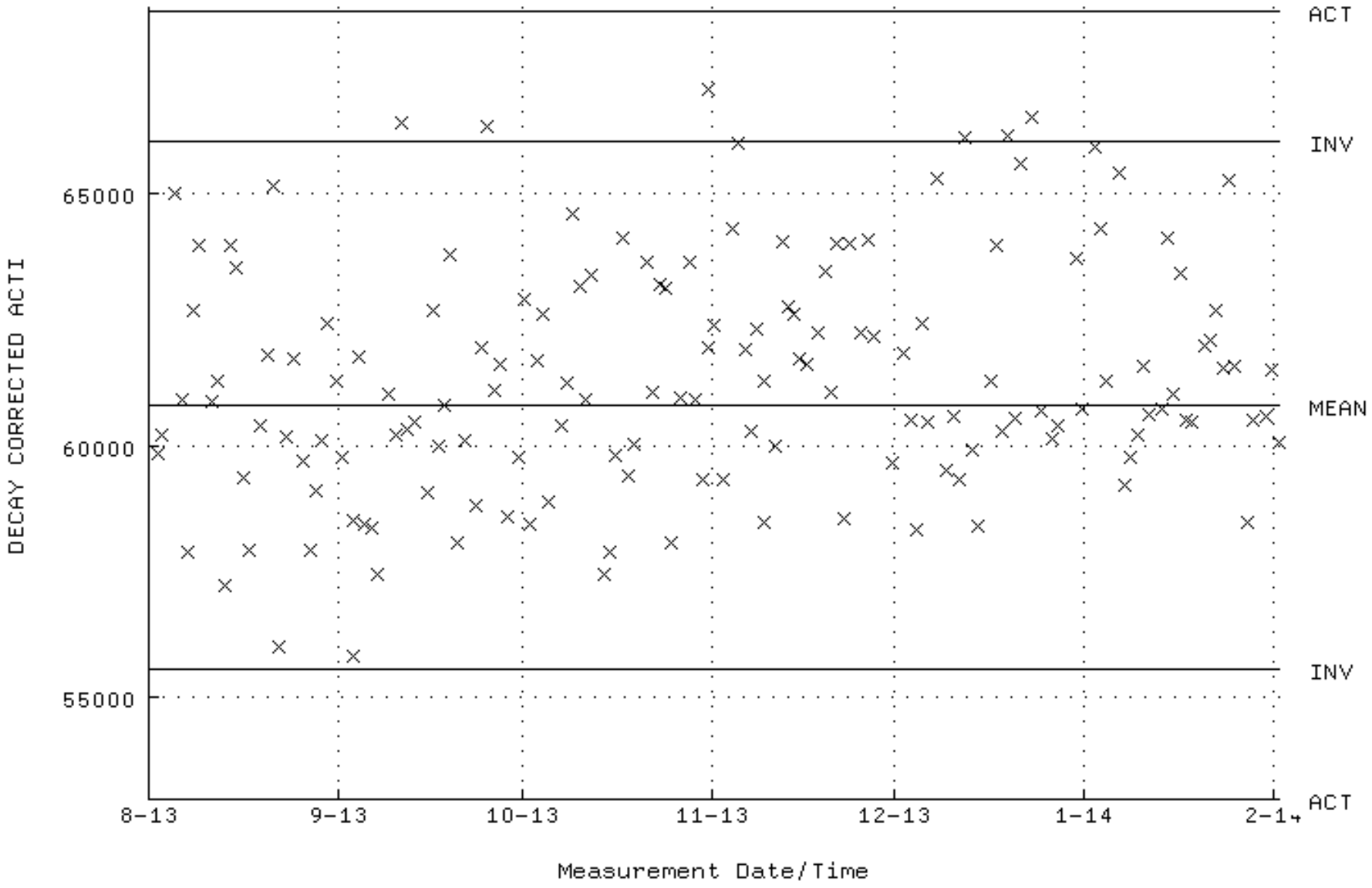
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:51:40 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



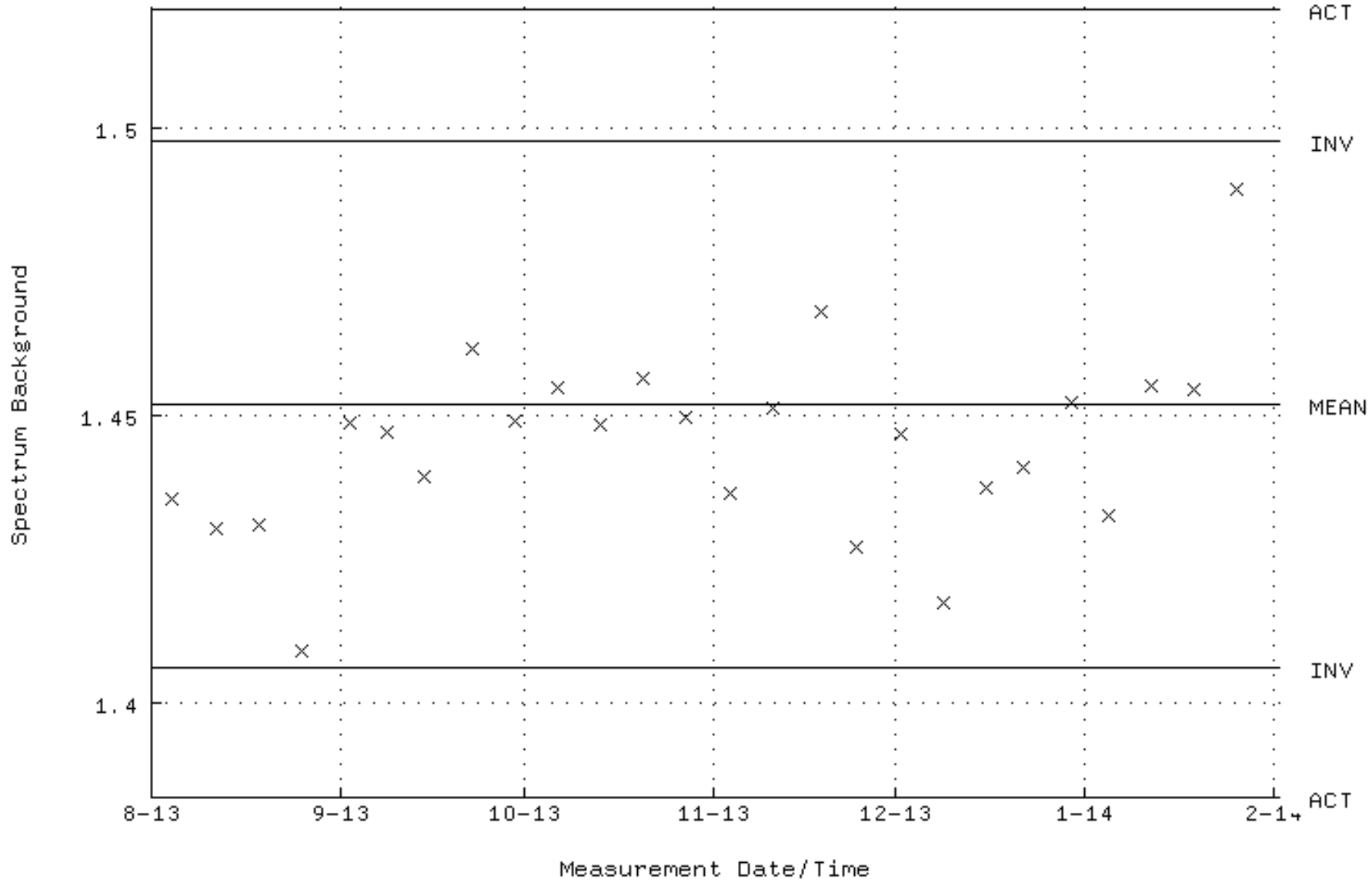
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:51:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.08808 +- 4.041690E-02 (3.71 %)



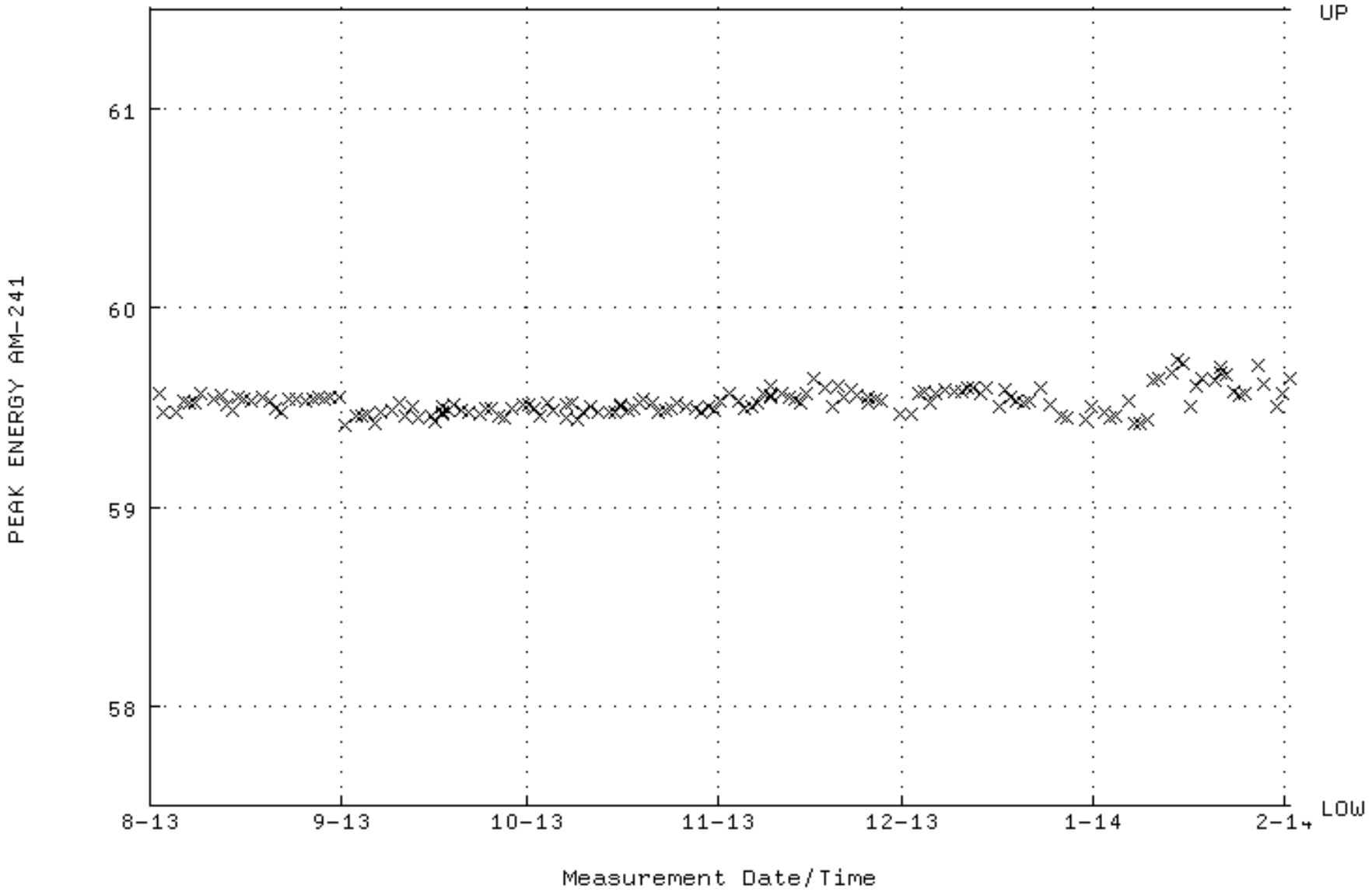
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:51:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60815.3 +- 2613.83 (4.30 %)



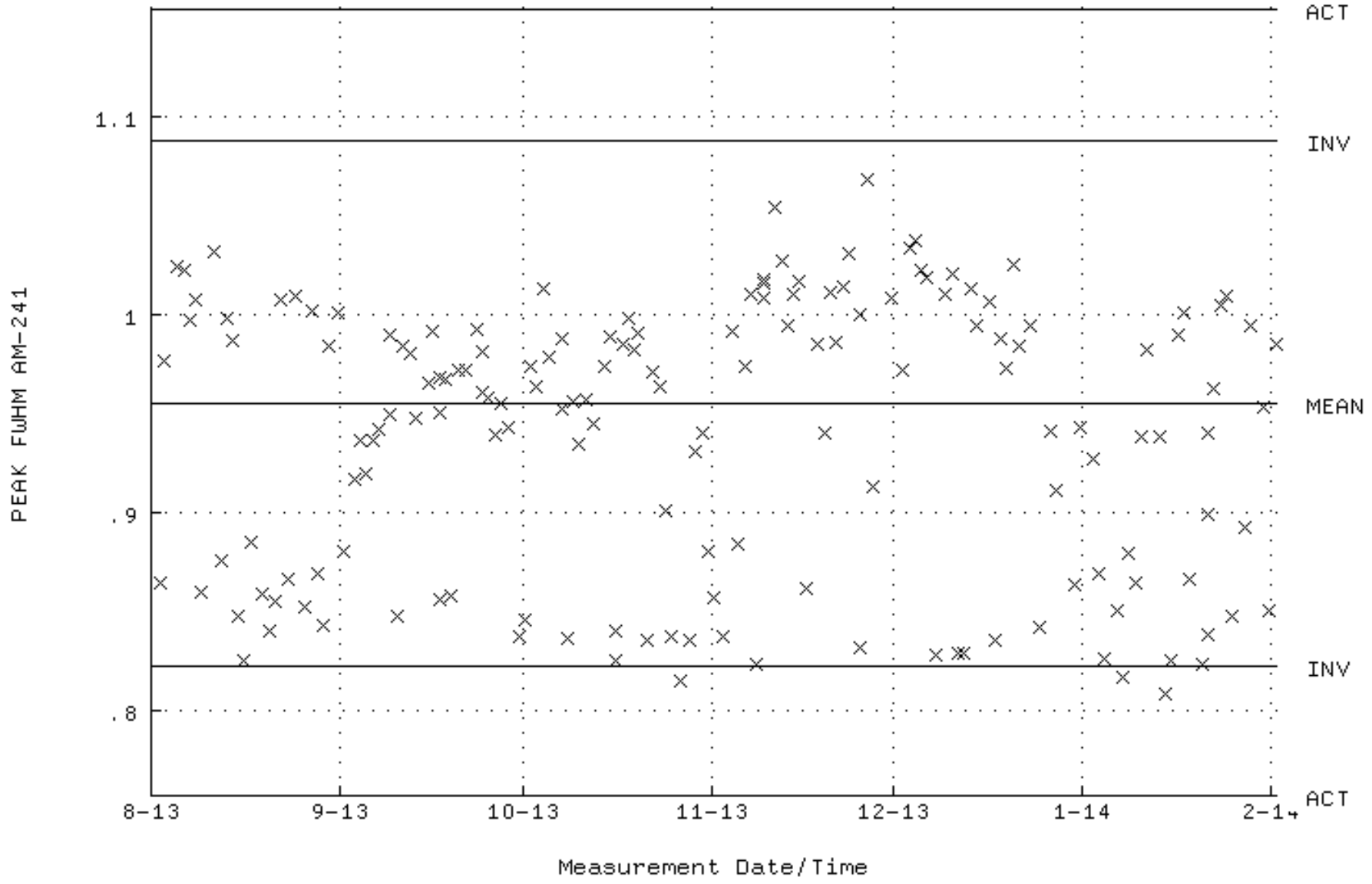
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM08.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:06:51 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.45204 +- 2.285979E-02 (1.57 %)



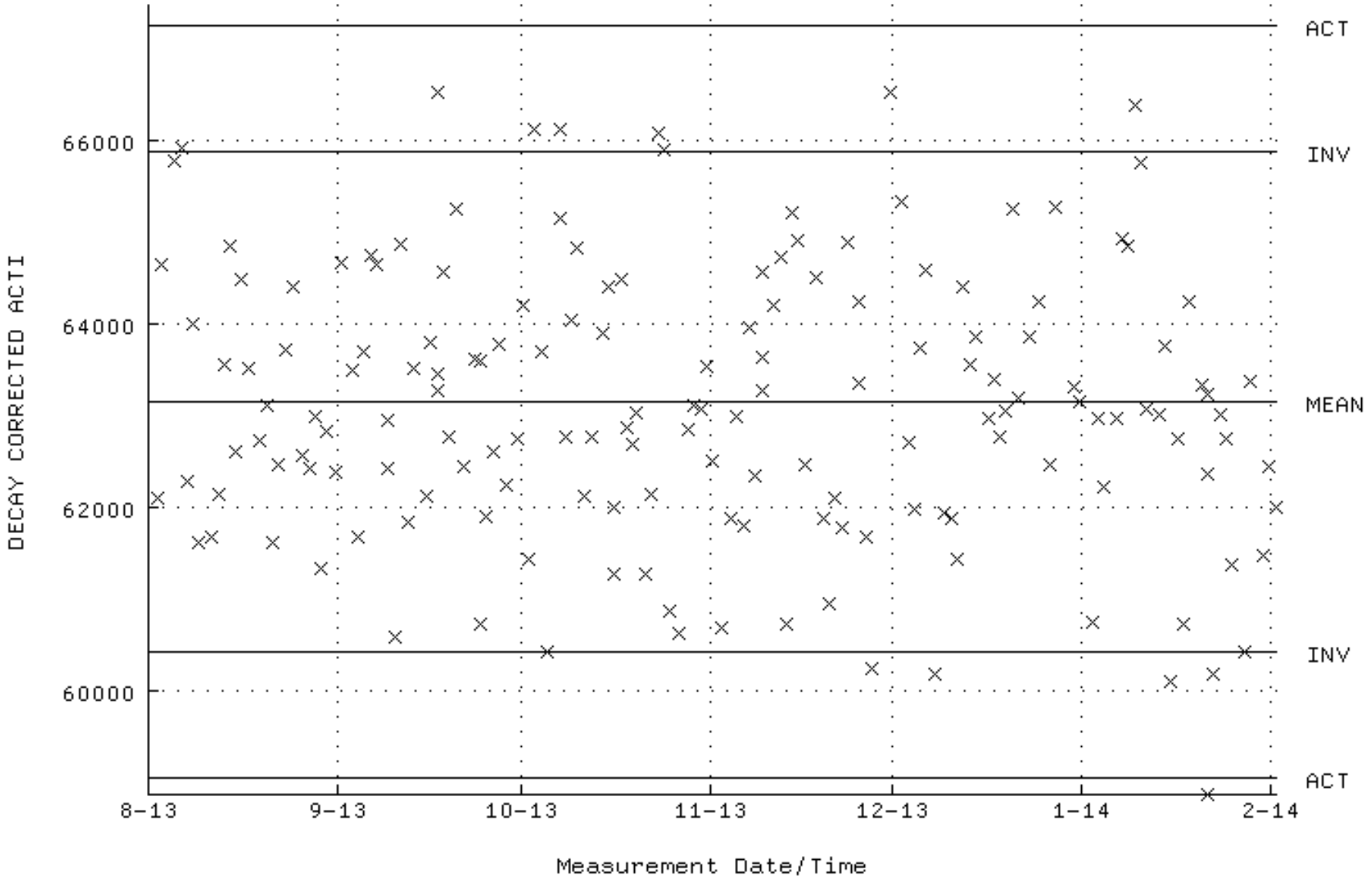
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:41 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



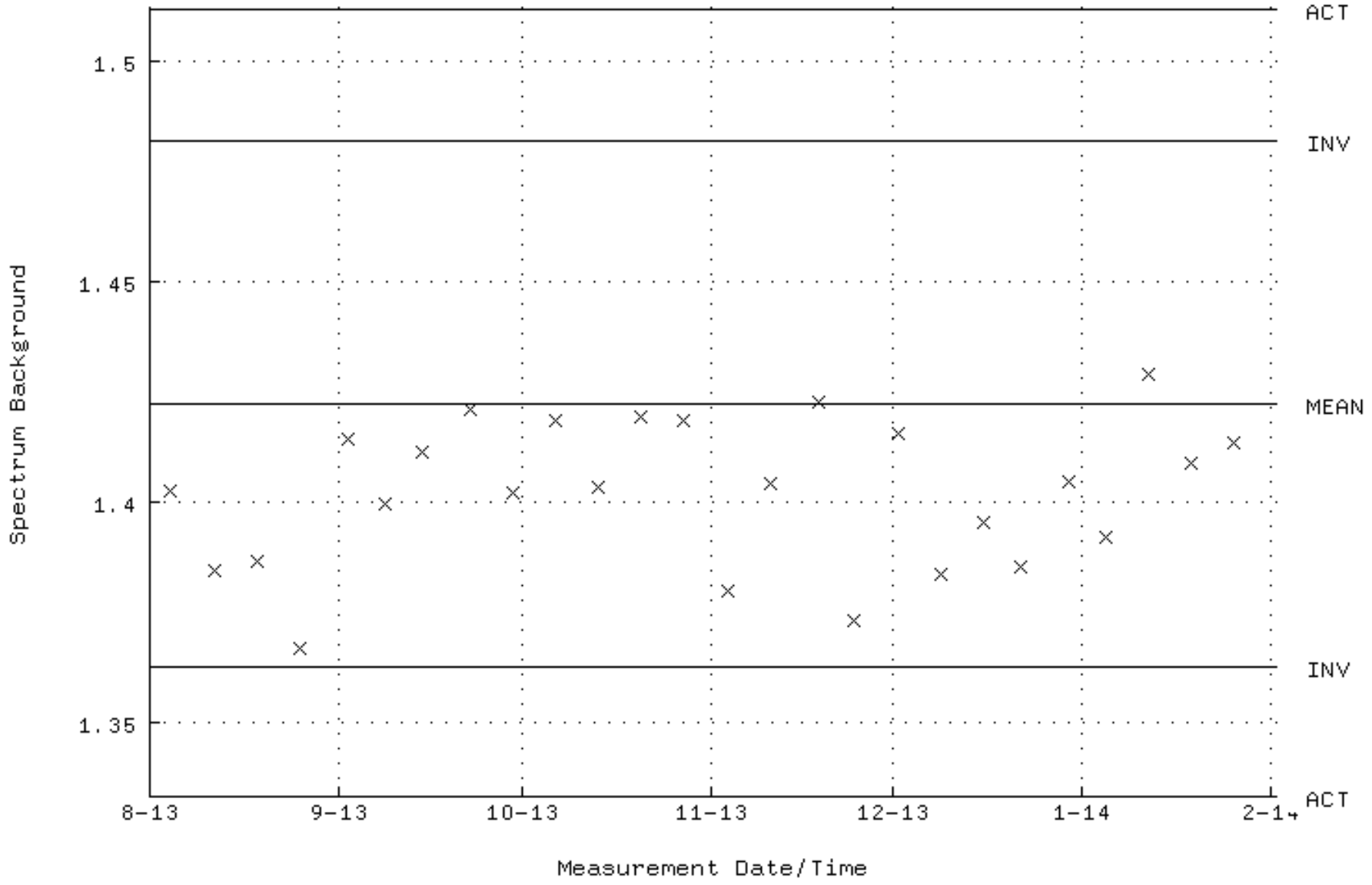
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:41 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.955734 +- 6.625439E-02 (6.93 %)



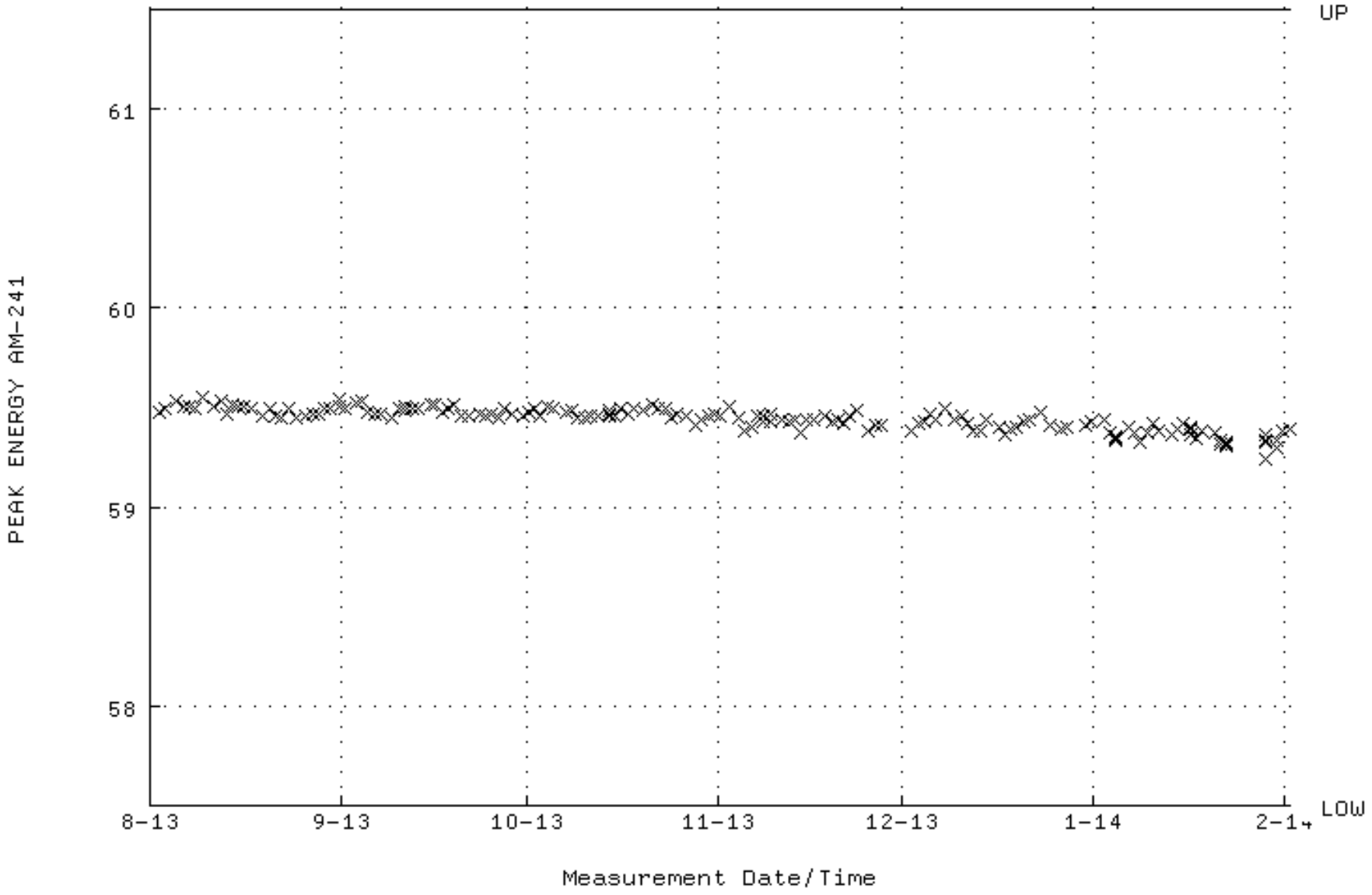
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:41 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63155.8 +- 1368.16 (2.17 %)



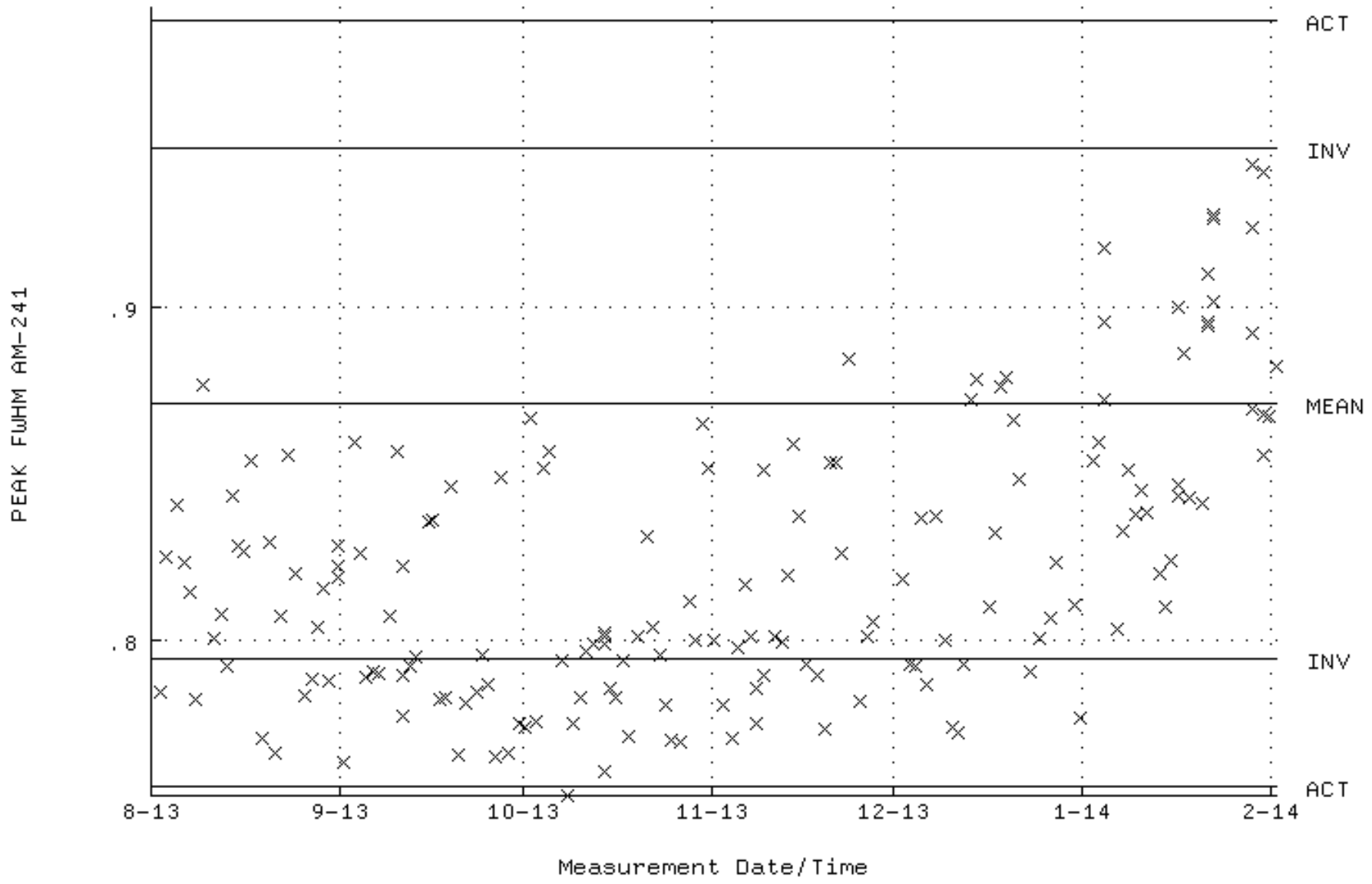
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM09.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:07:07 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.42250 +- 2.975852E-02 (2.09 %)



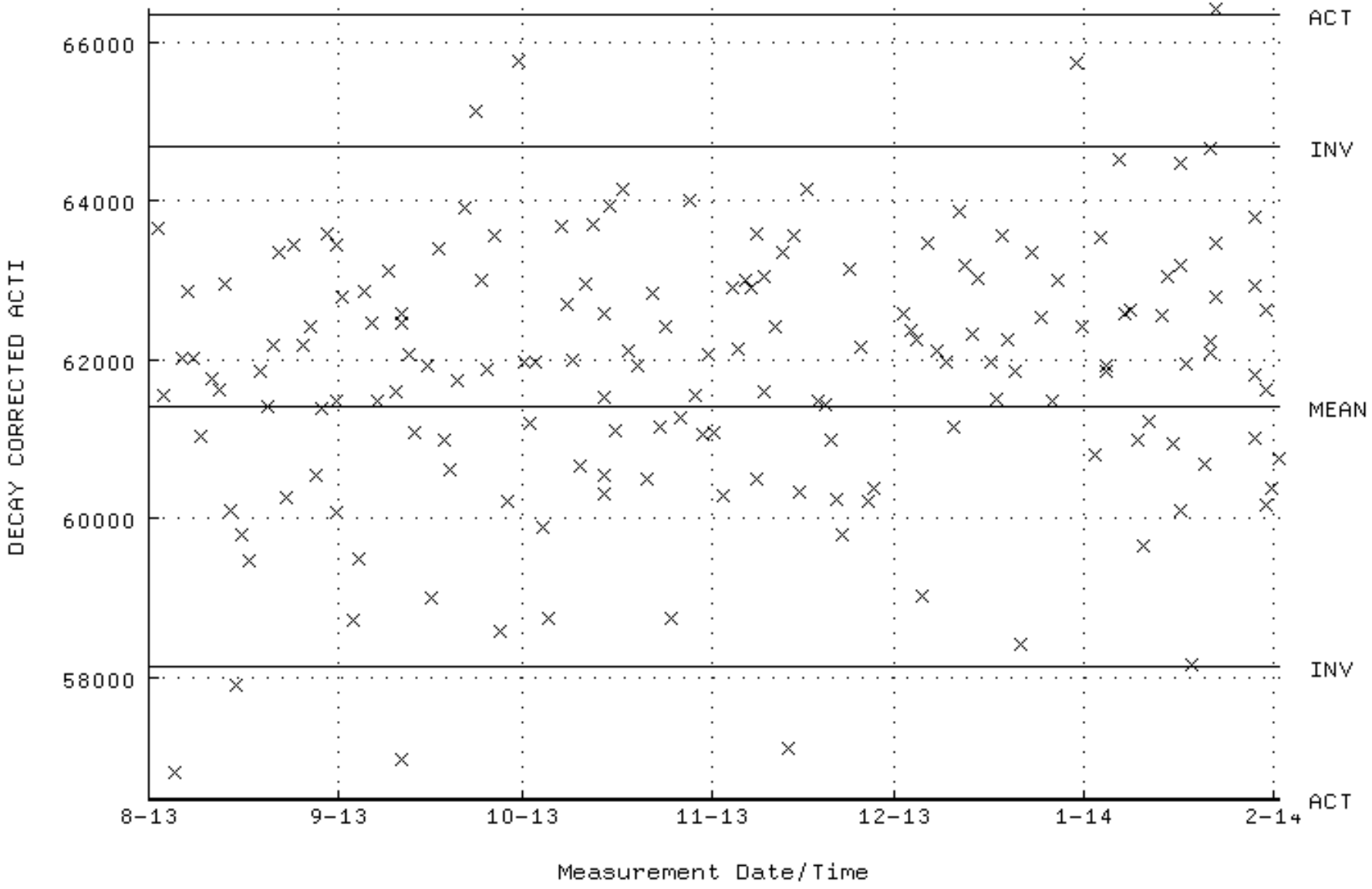
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:00 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



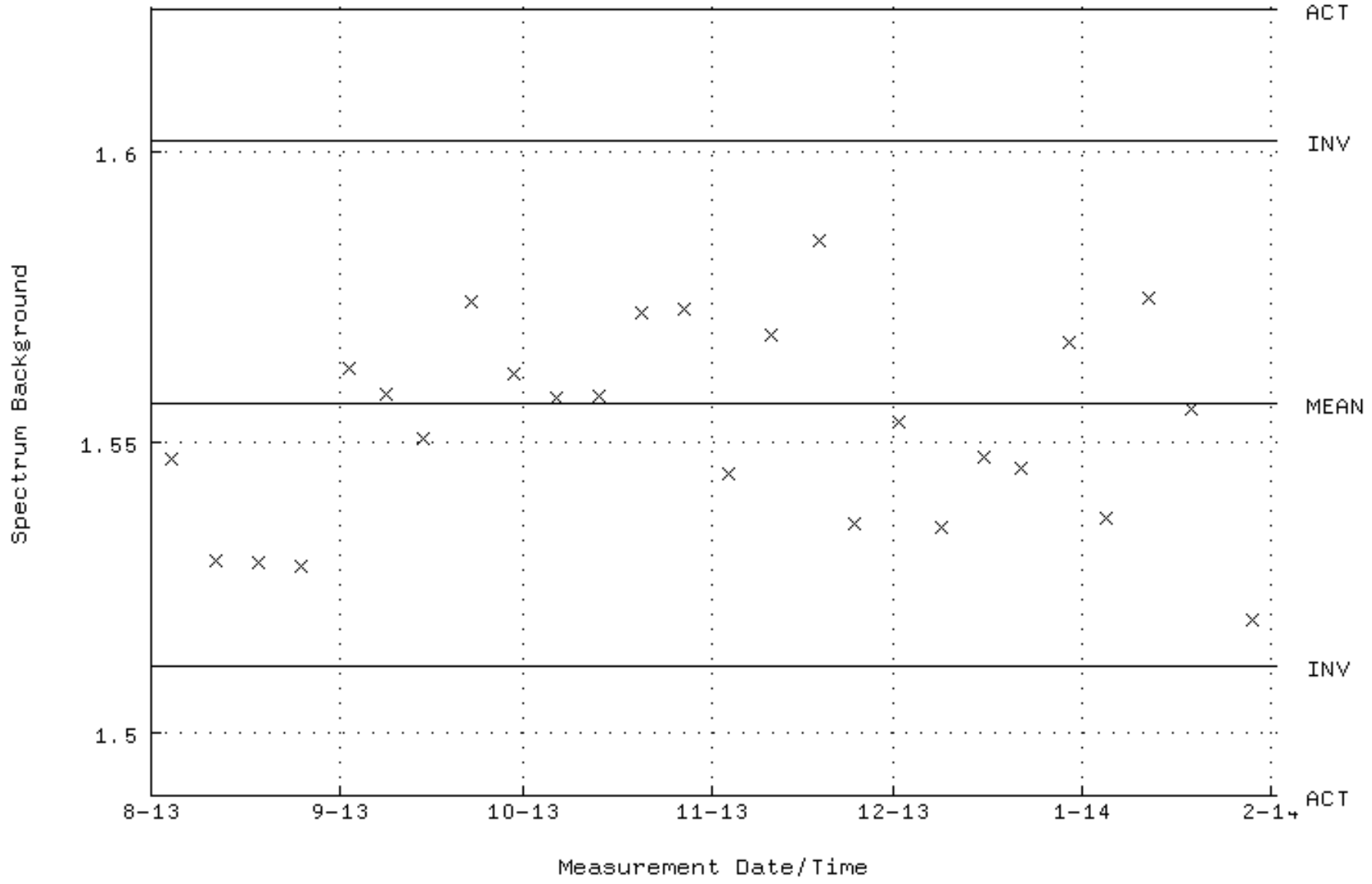
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:00 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.871600 +- 3.830351E-02 (4.39 %)



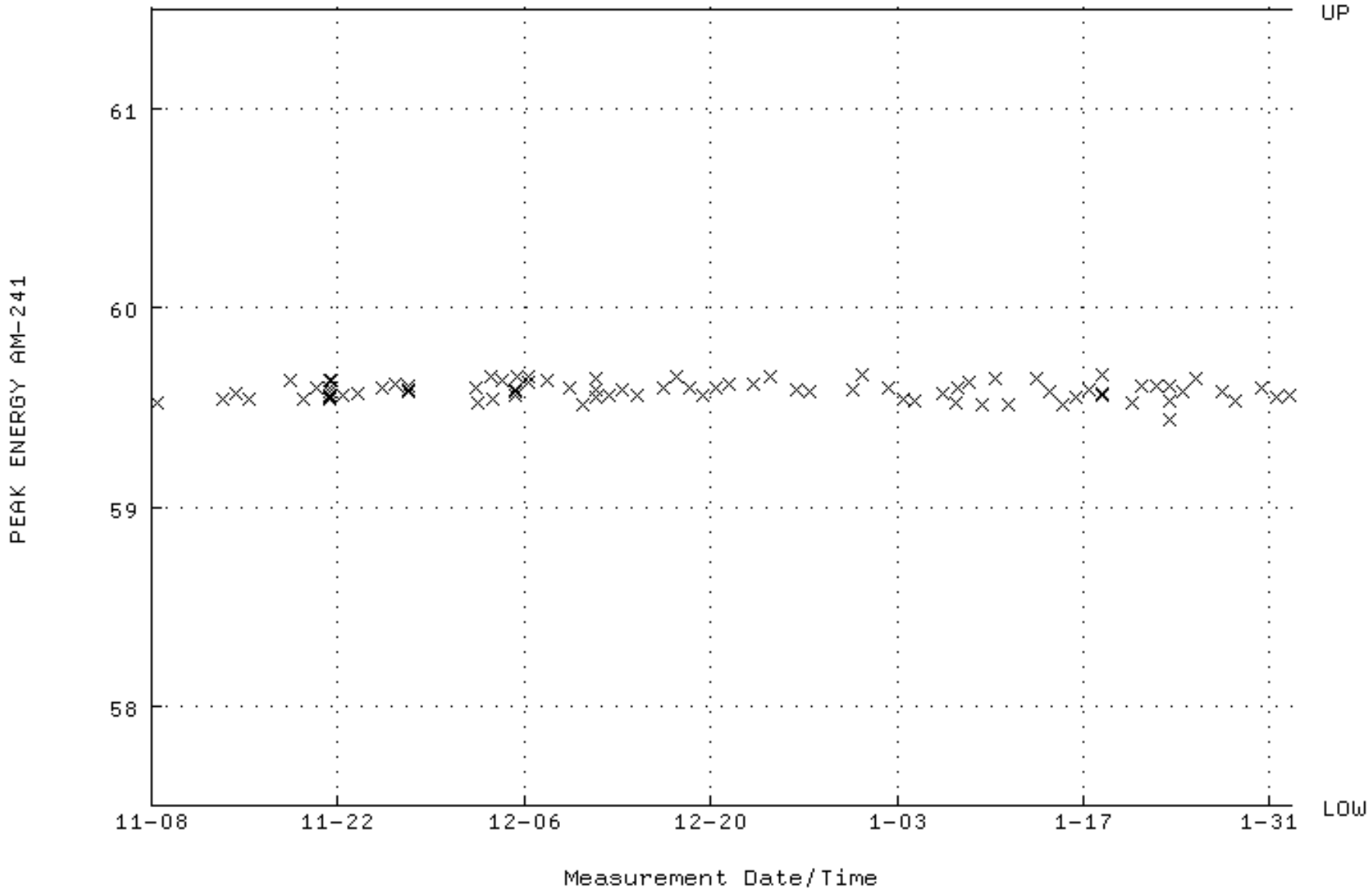
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:00 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 61421.1 +- 1640.81 (2.67 %)



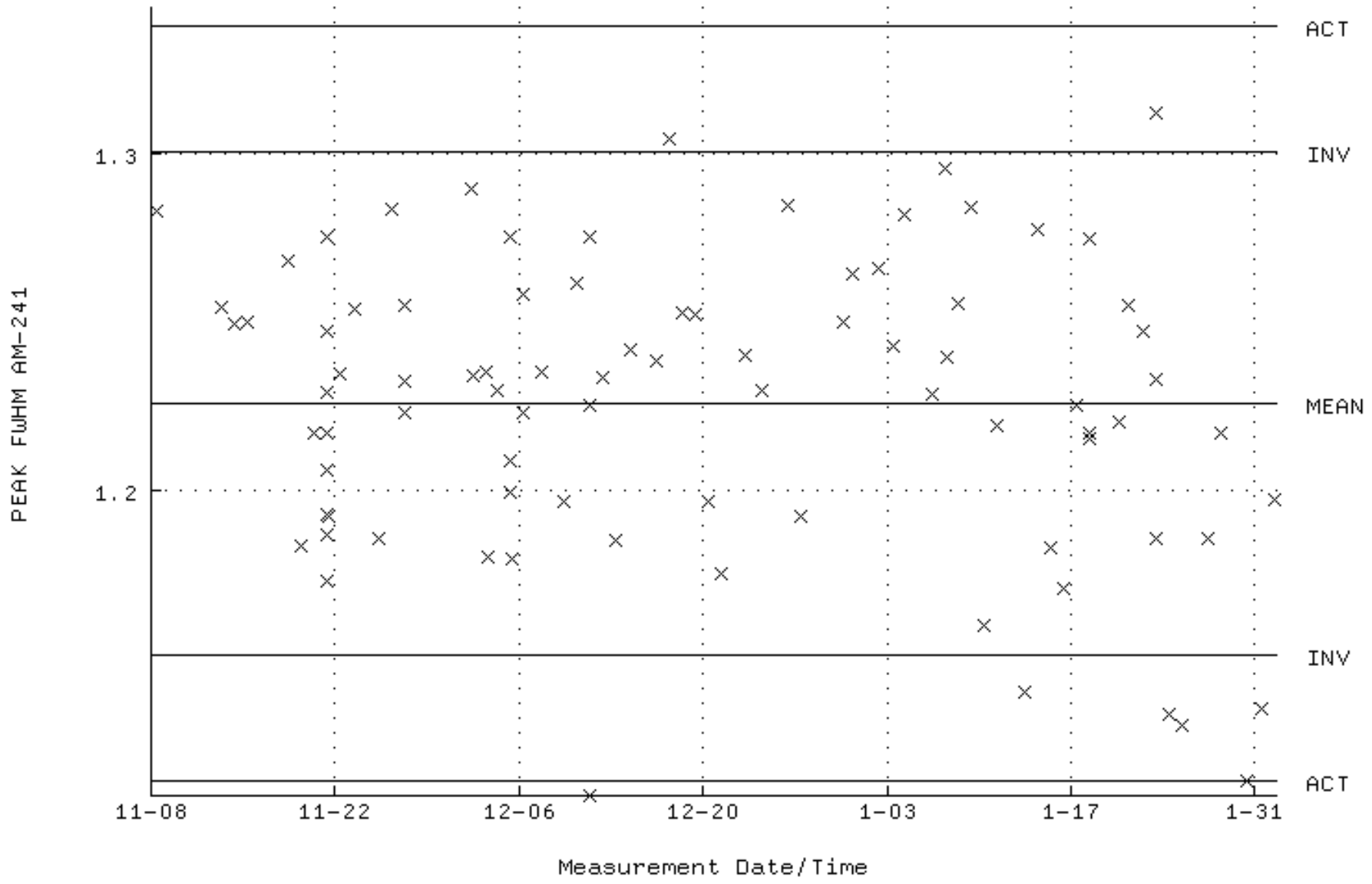
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM11.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:07:23 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.55675 +- 2.257414E-02 (1.45 %)



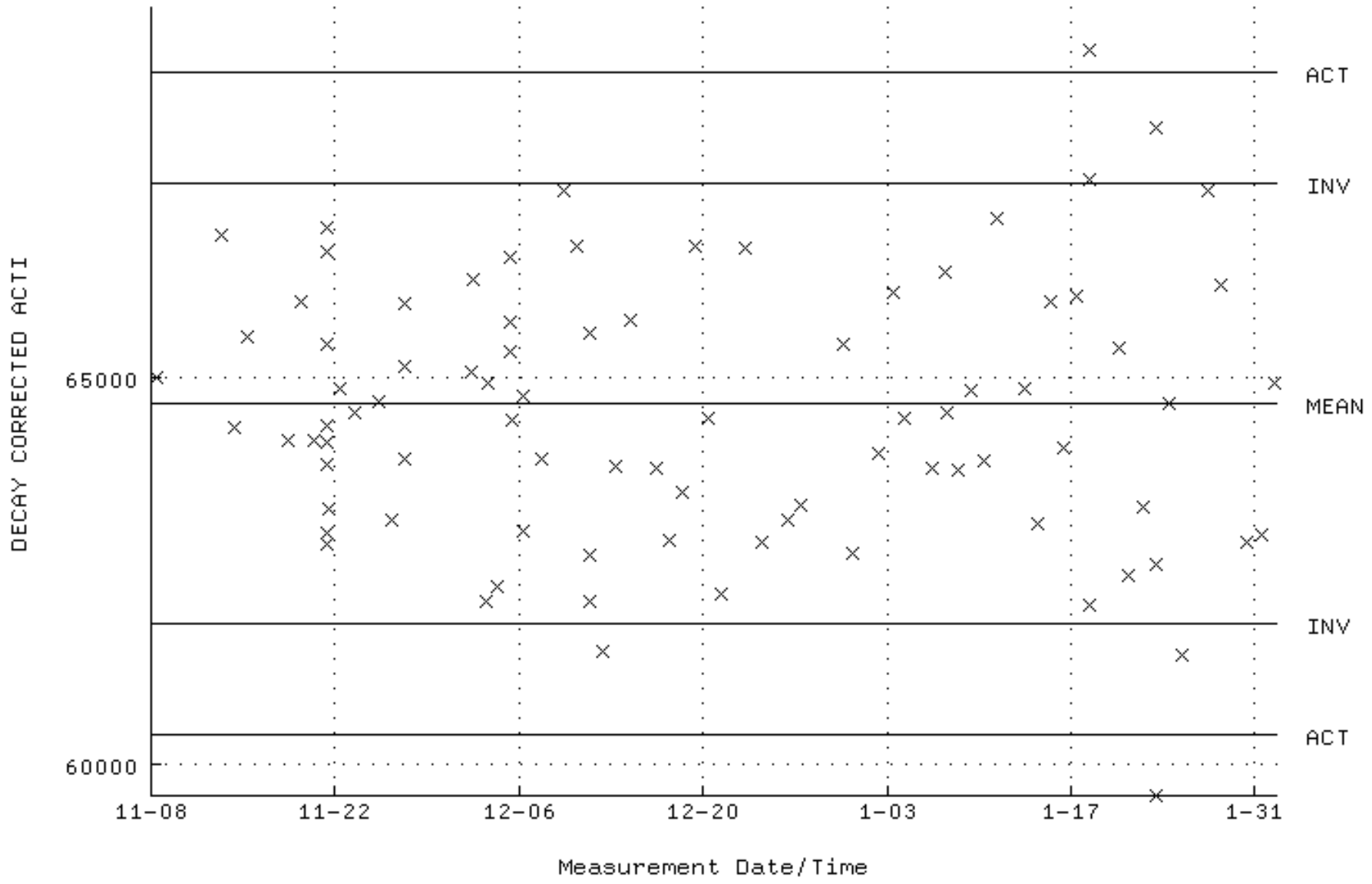
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM12_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 8-NOV-2013 08:39:38 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



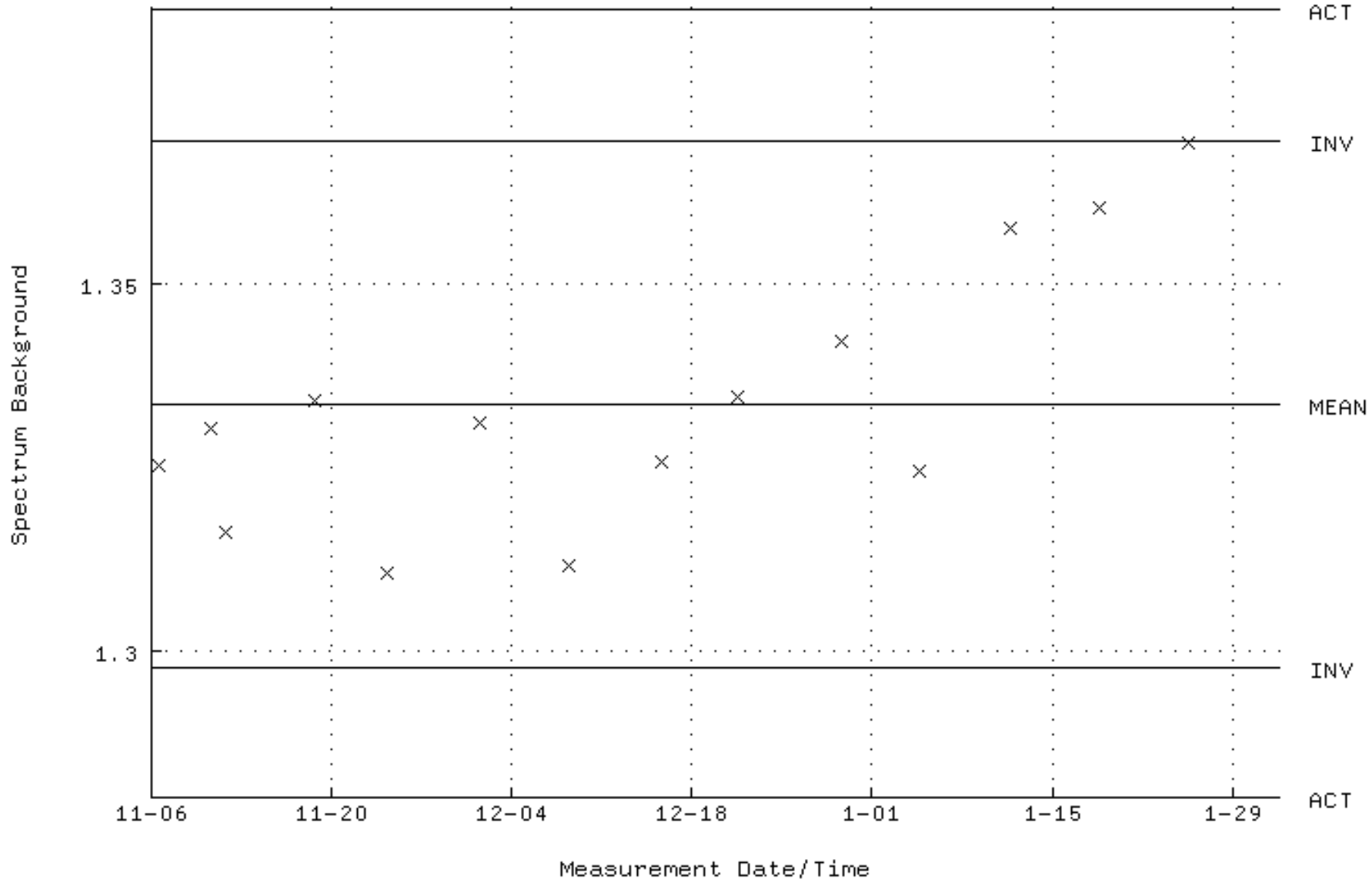
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM12_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 8-NOV-2013 08:39:38 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.22624 +- 3.731357E-02 (3.04 %)



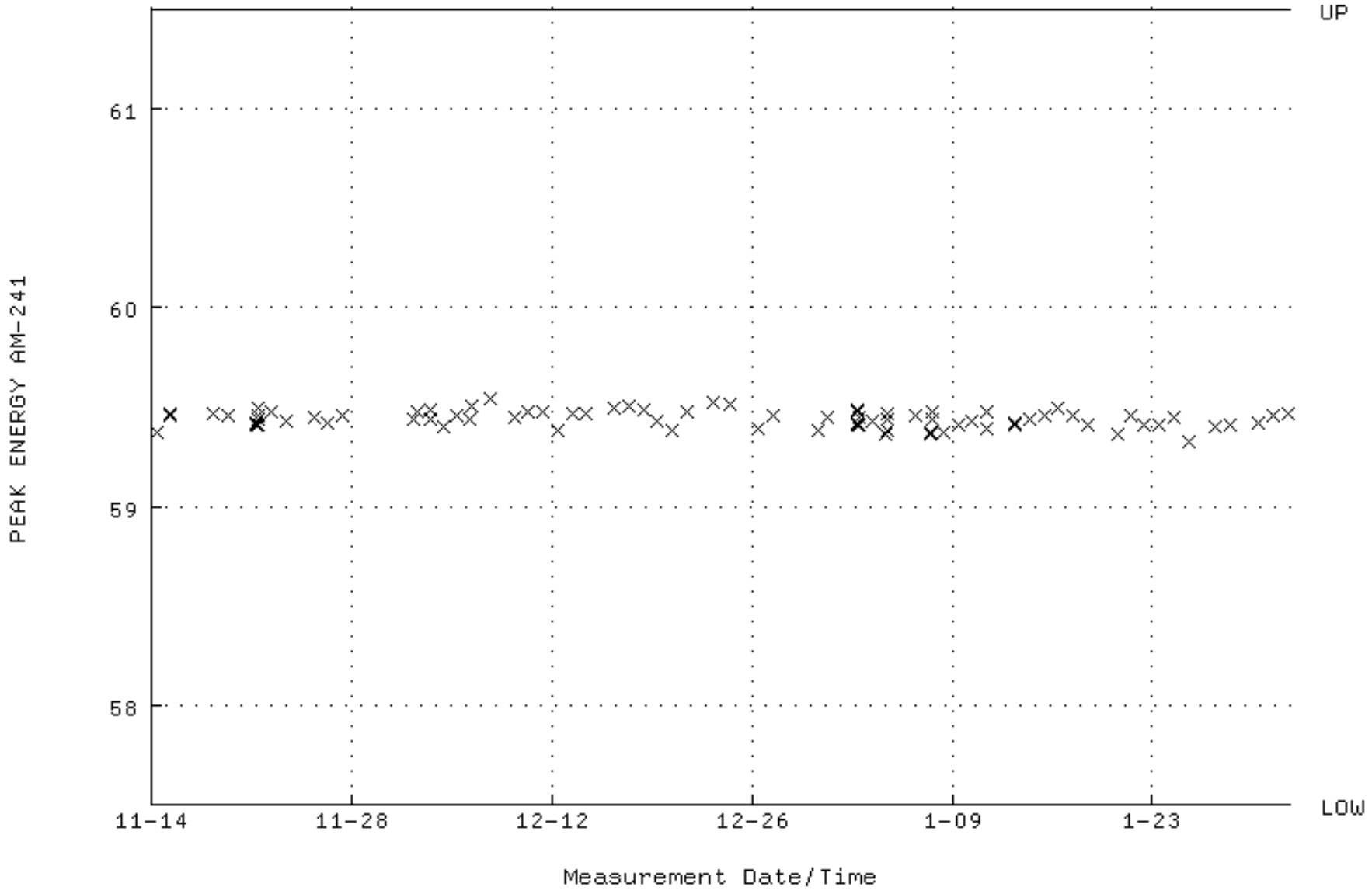
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM12_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 8-NOV-2013 08:39:38 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 64670.8 +- 1424.58 (2.20 %)



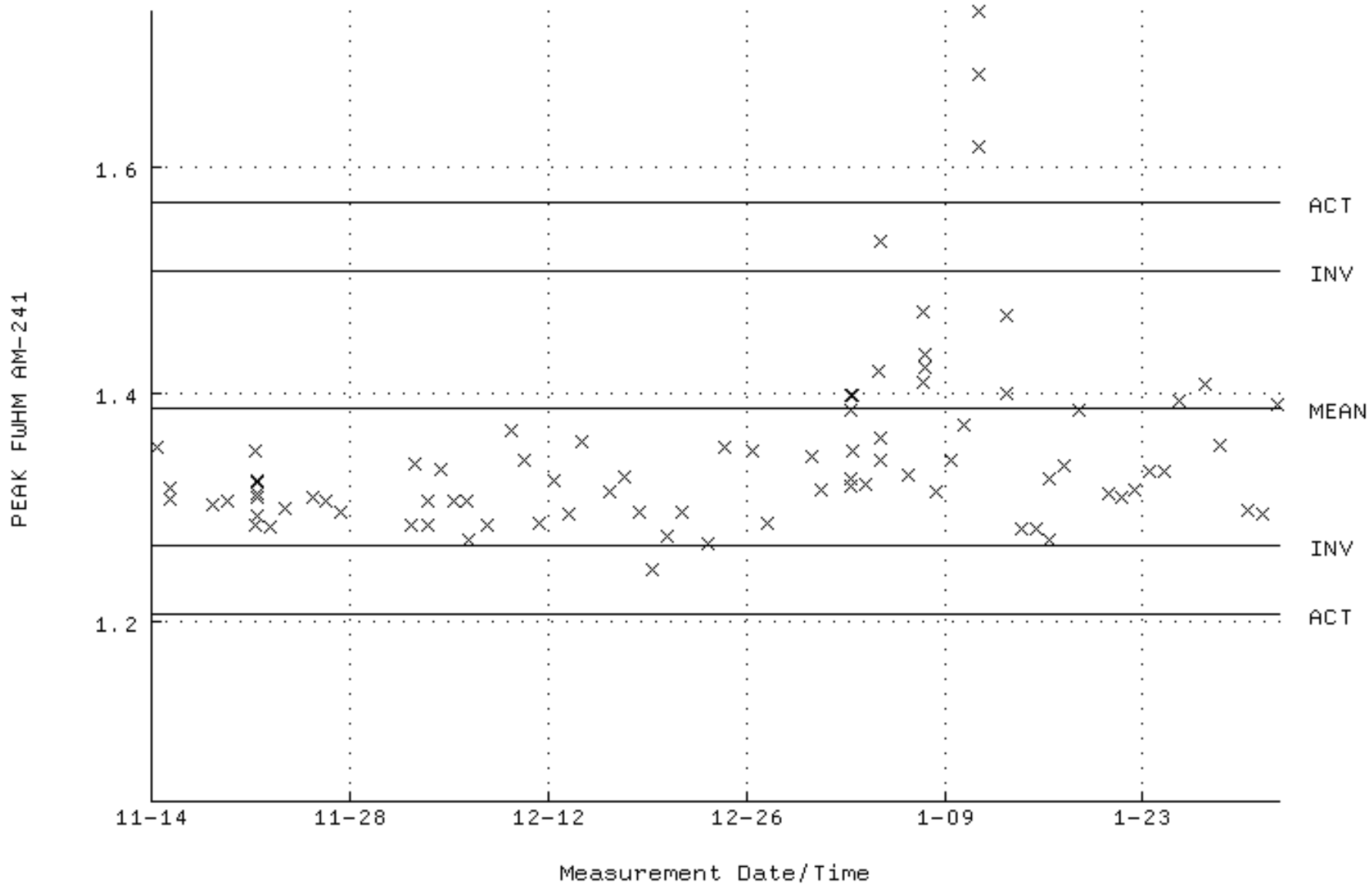
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM12.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-NOV-2013 13:11:34 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.33366 +- 1.783853E-02 (1.34 %)



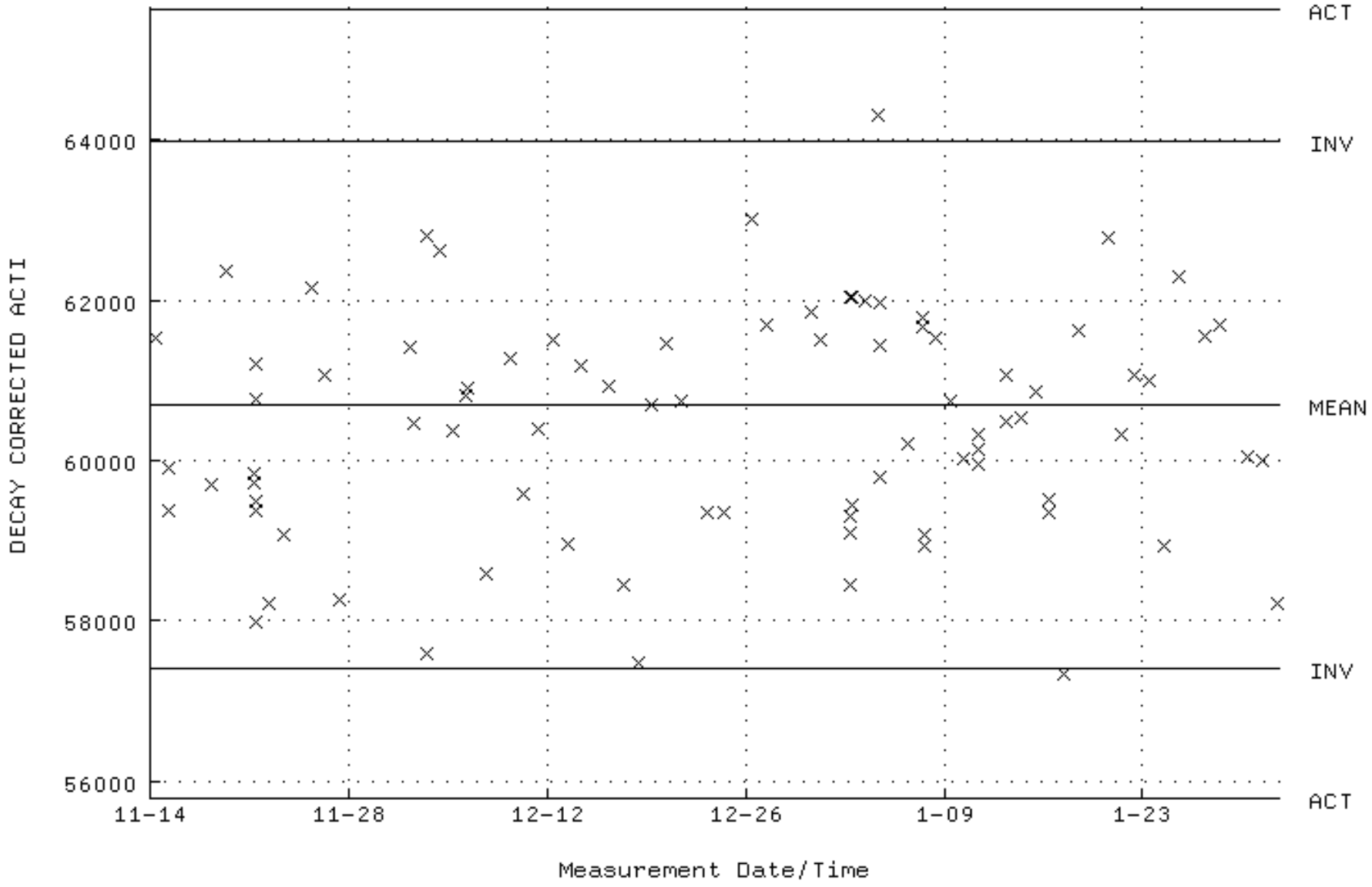
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM14_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 14-NOV-2013 08:09:11 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



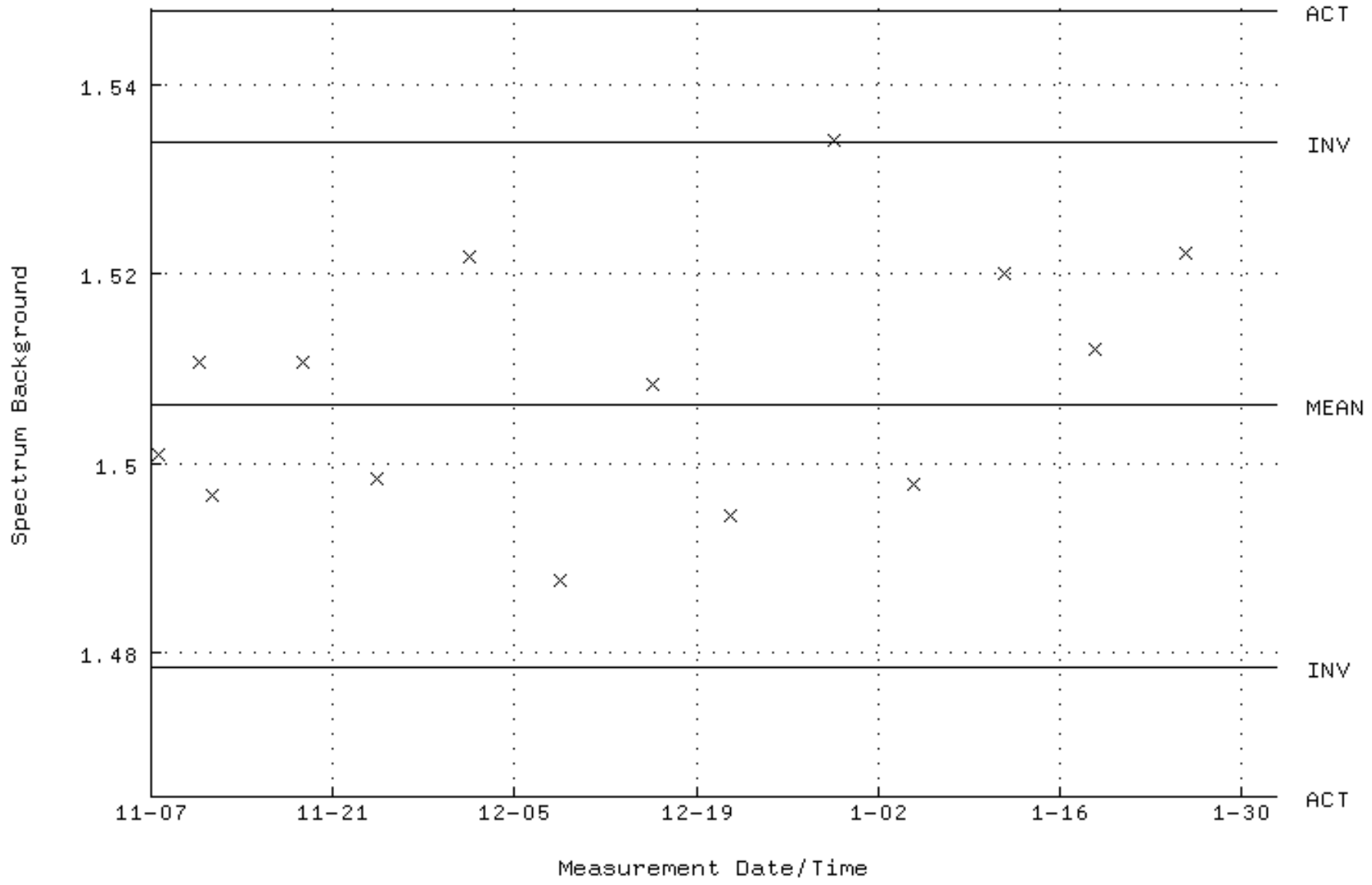
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM14_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 14-NOV-2013 08:09:11 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.38807 +- 6.018067E-02 (4.34 %)



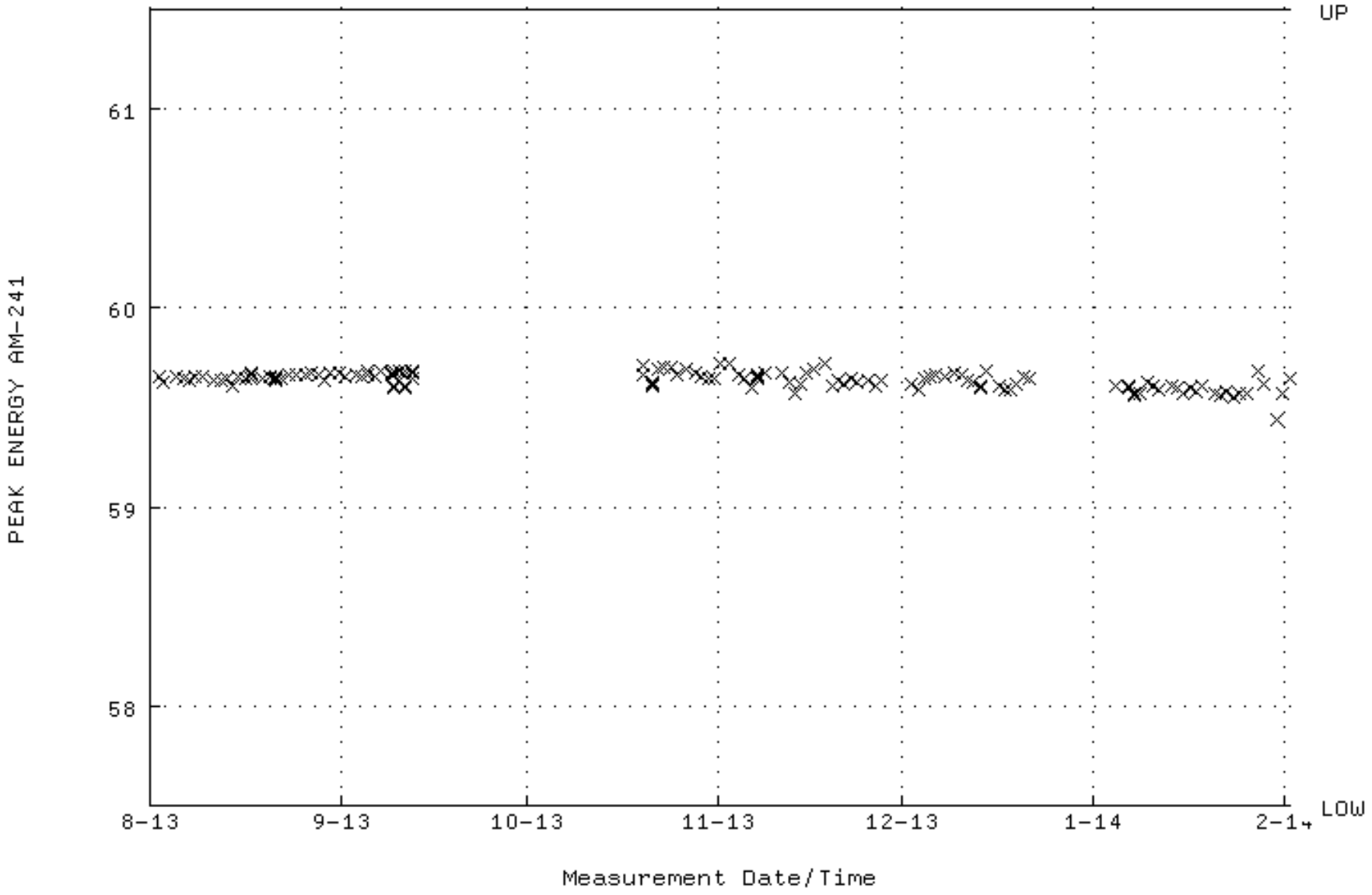
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM14_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 14-NOV-2013 08:09:11 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60704.0 +- 1639.60 (2.70 %)



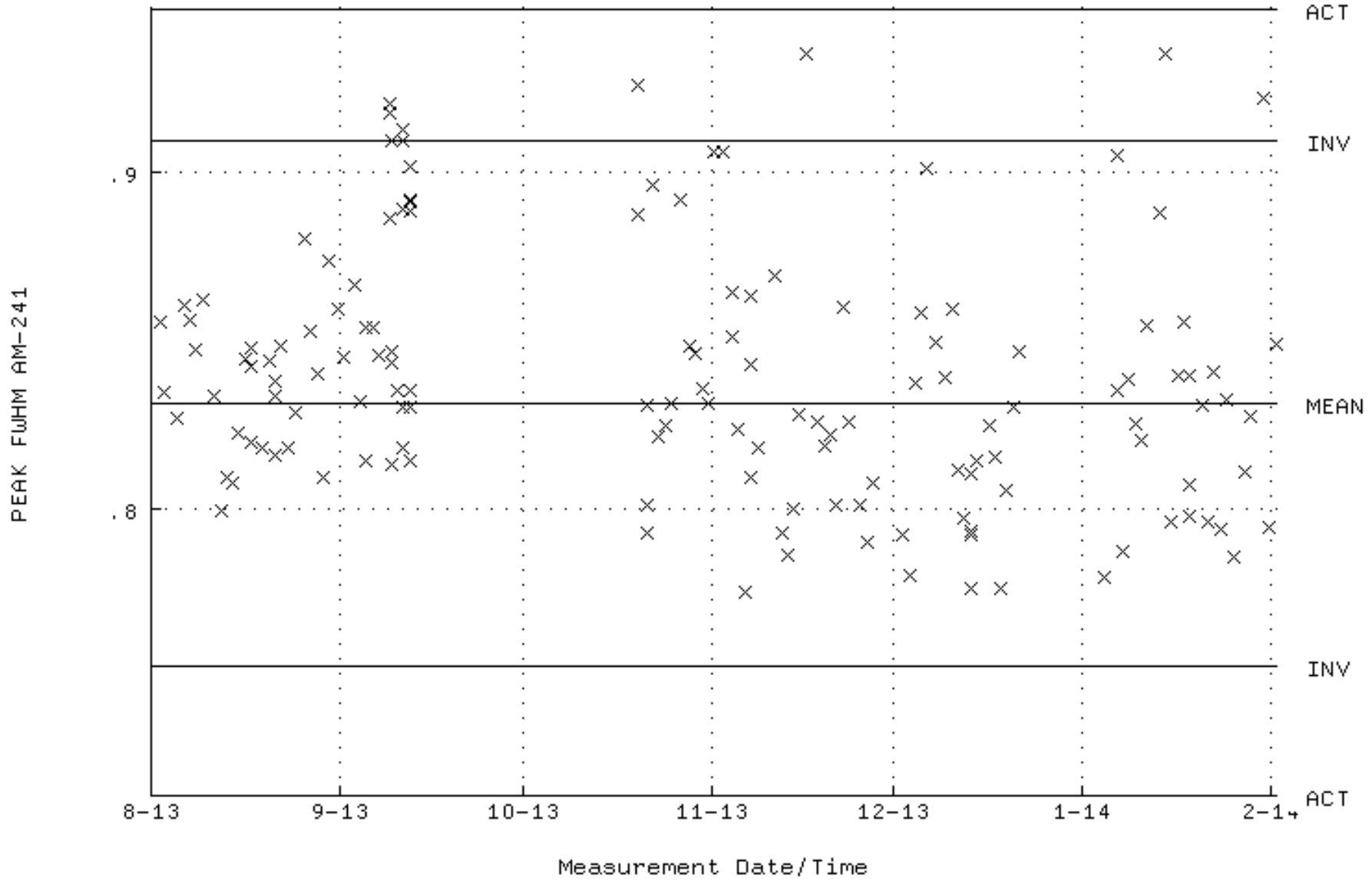
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM14.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 7-NOV-2013 15:11:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.50626 +- 1.383443E-02 (0.92 %)



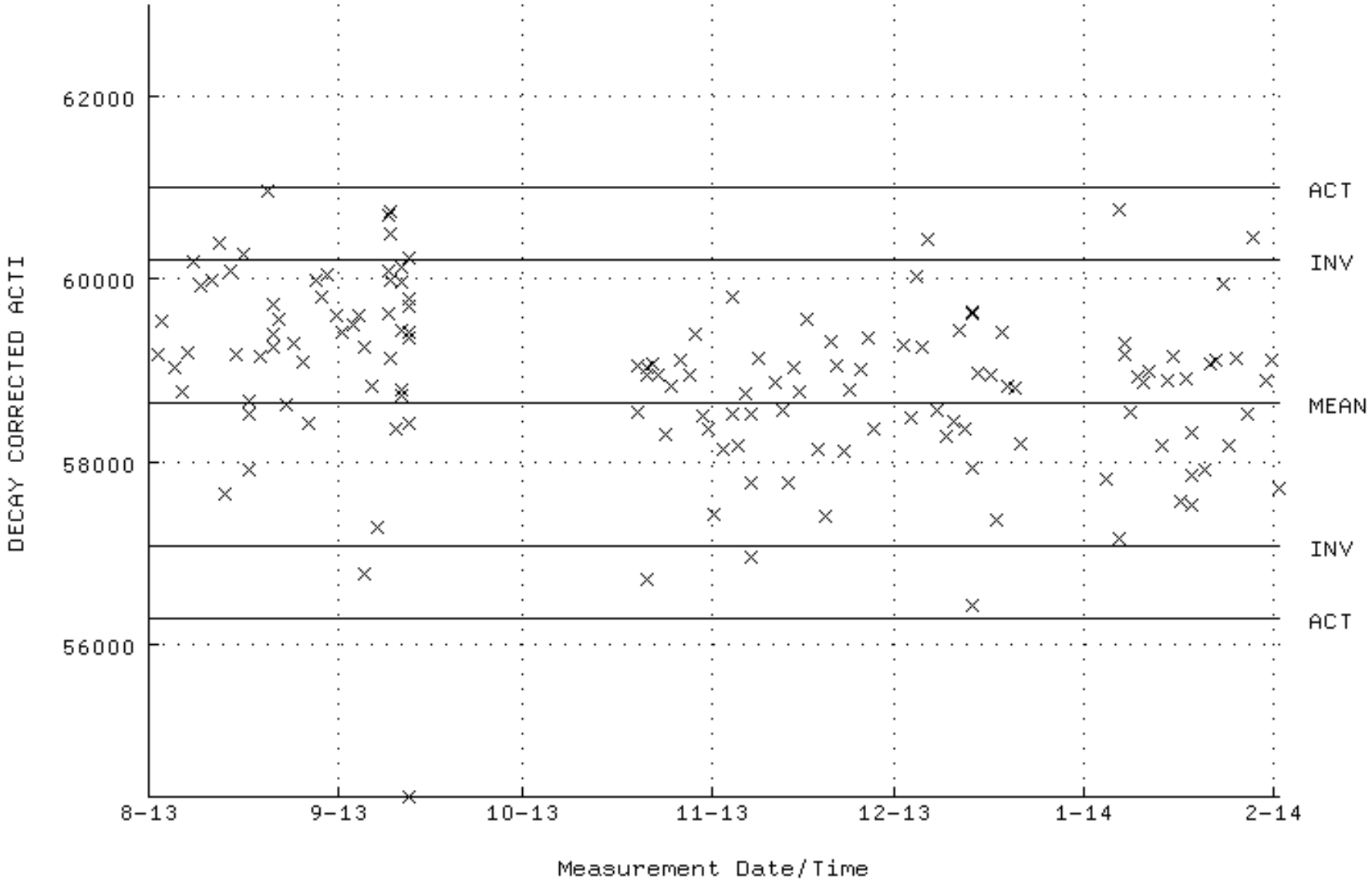
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM17_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:10 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



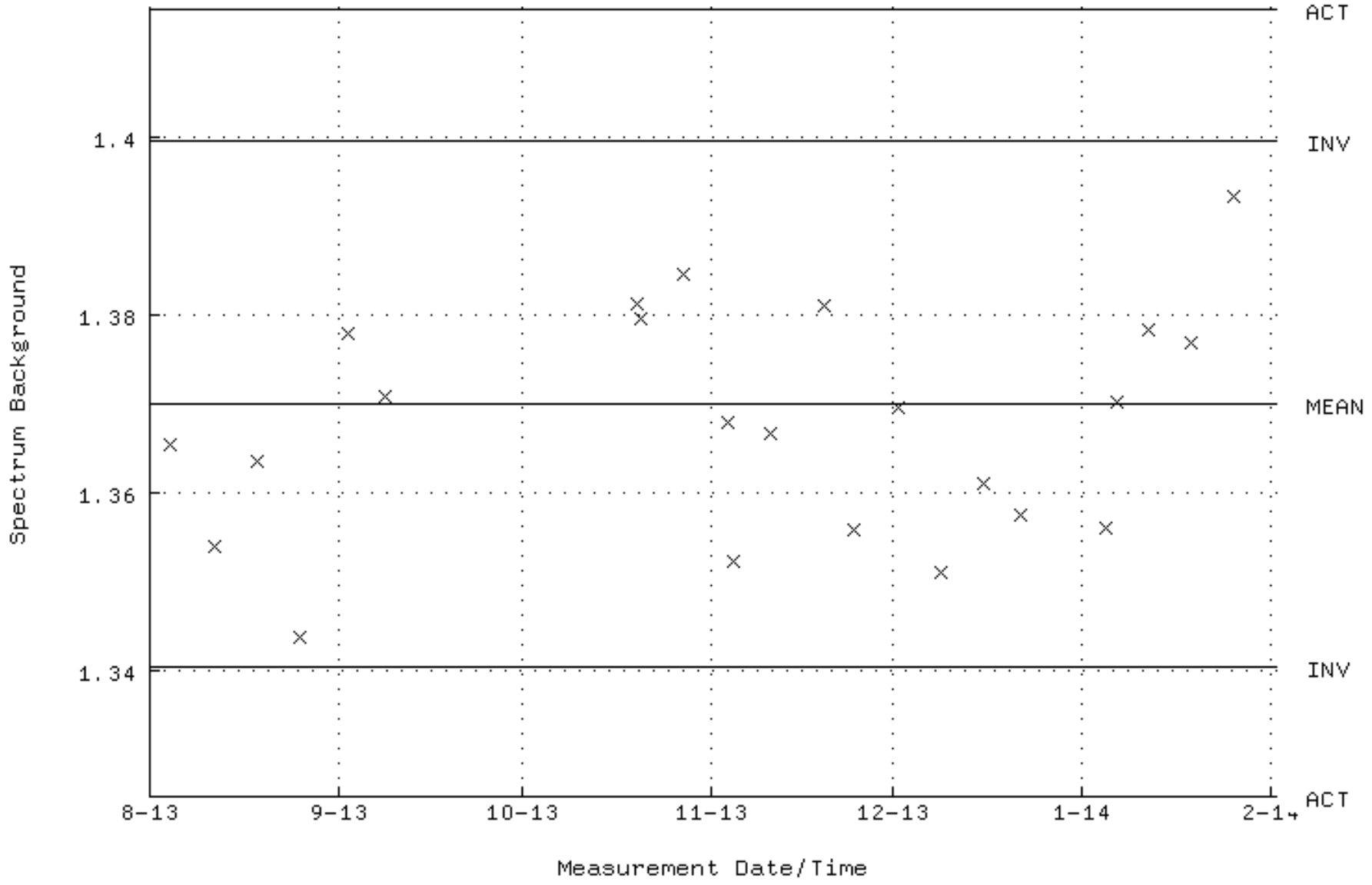
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM17_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:10 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.831575 +- 3.892219E-02 (4.68 %)



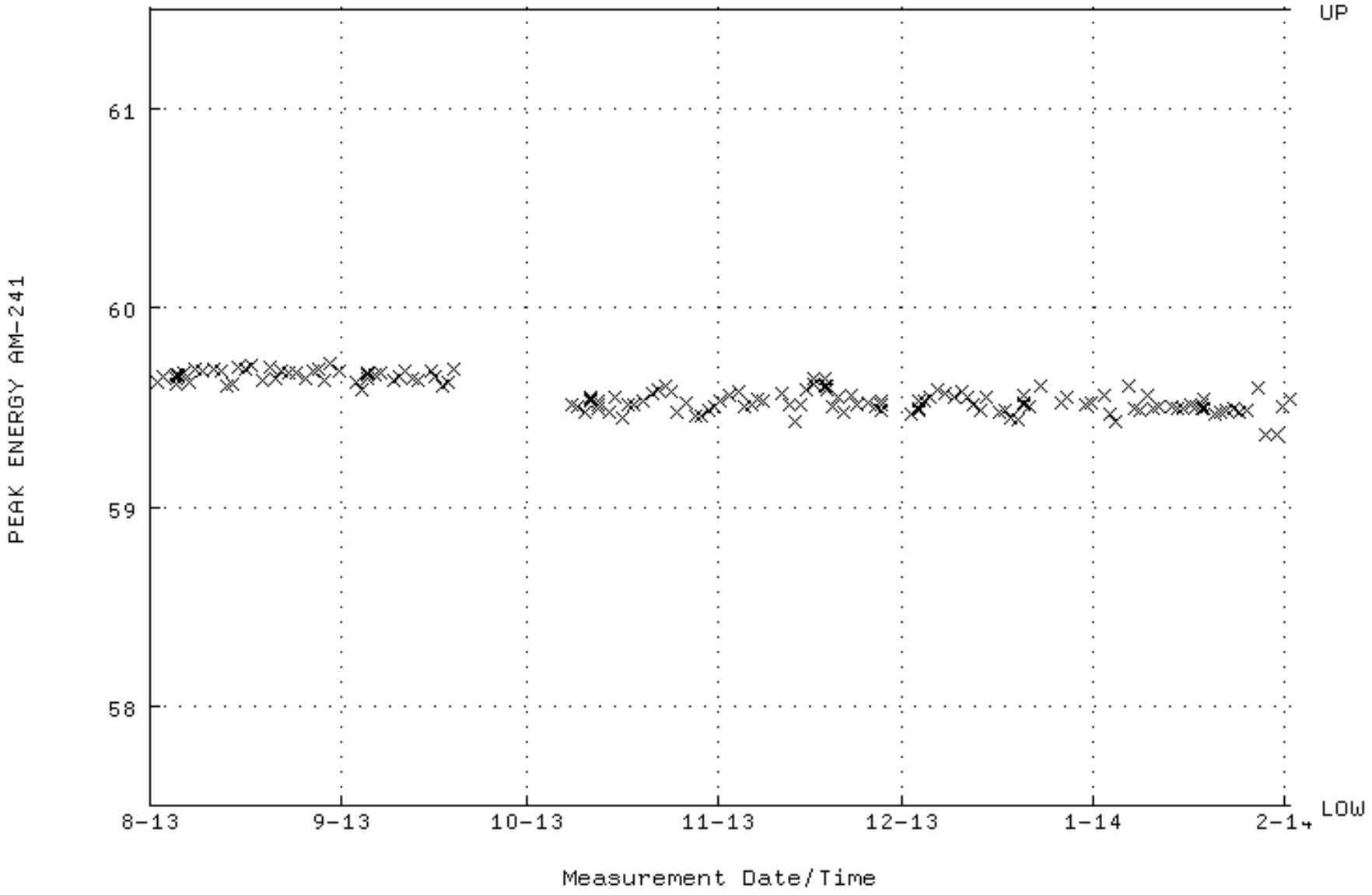
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM17_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:10 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 58655.2 +- 782.187 (1.33 %)



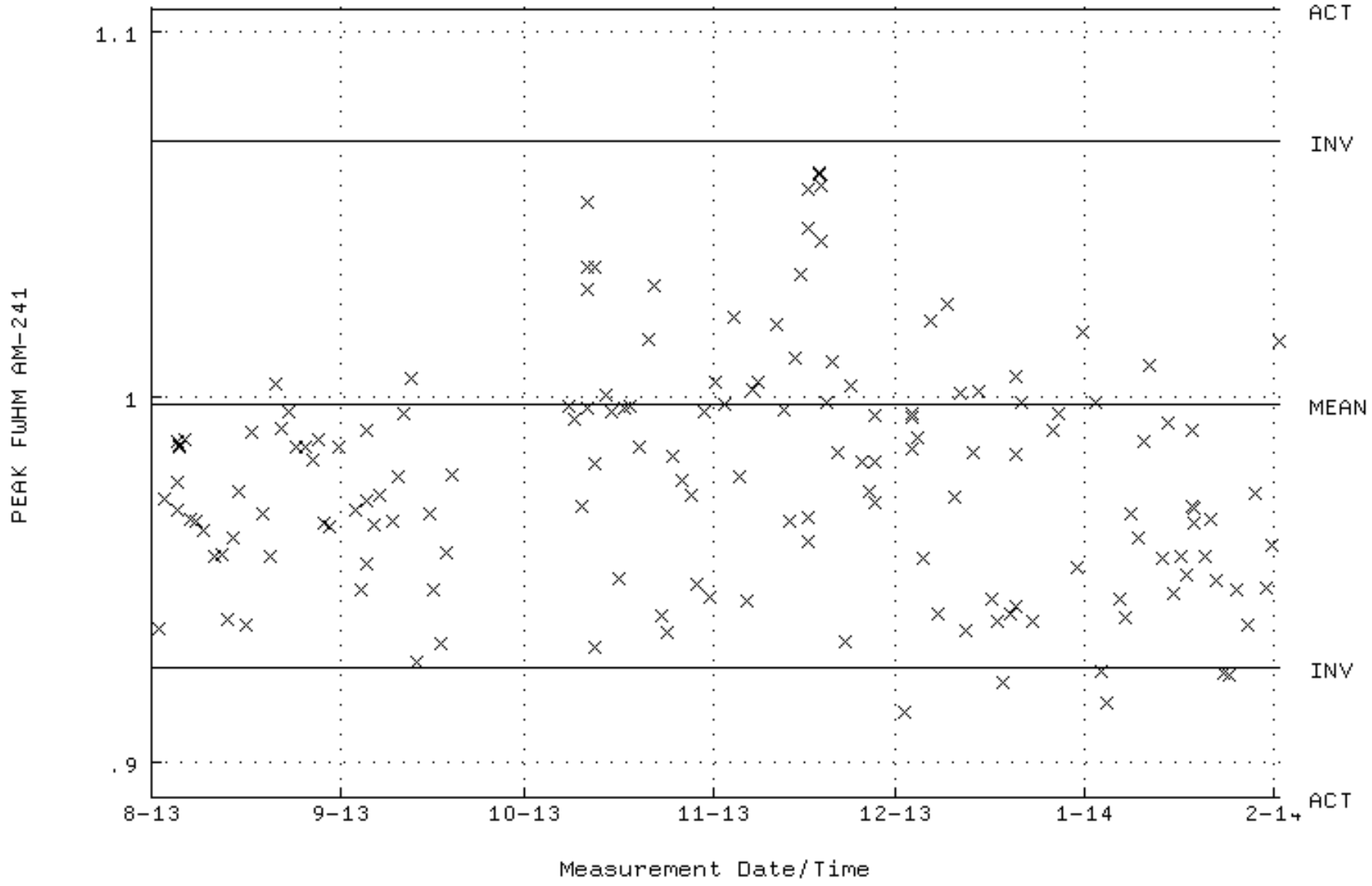
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM17.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:08:48 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.37021 +- 1.475731E-02 (1.08 %)



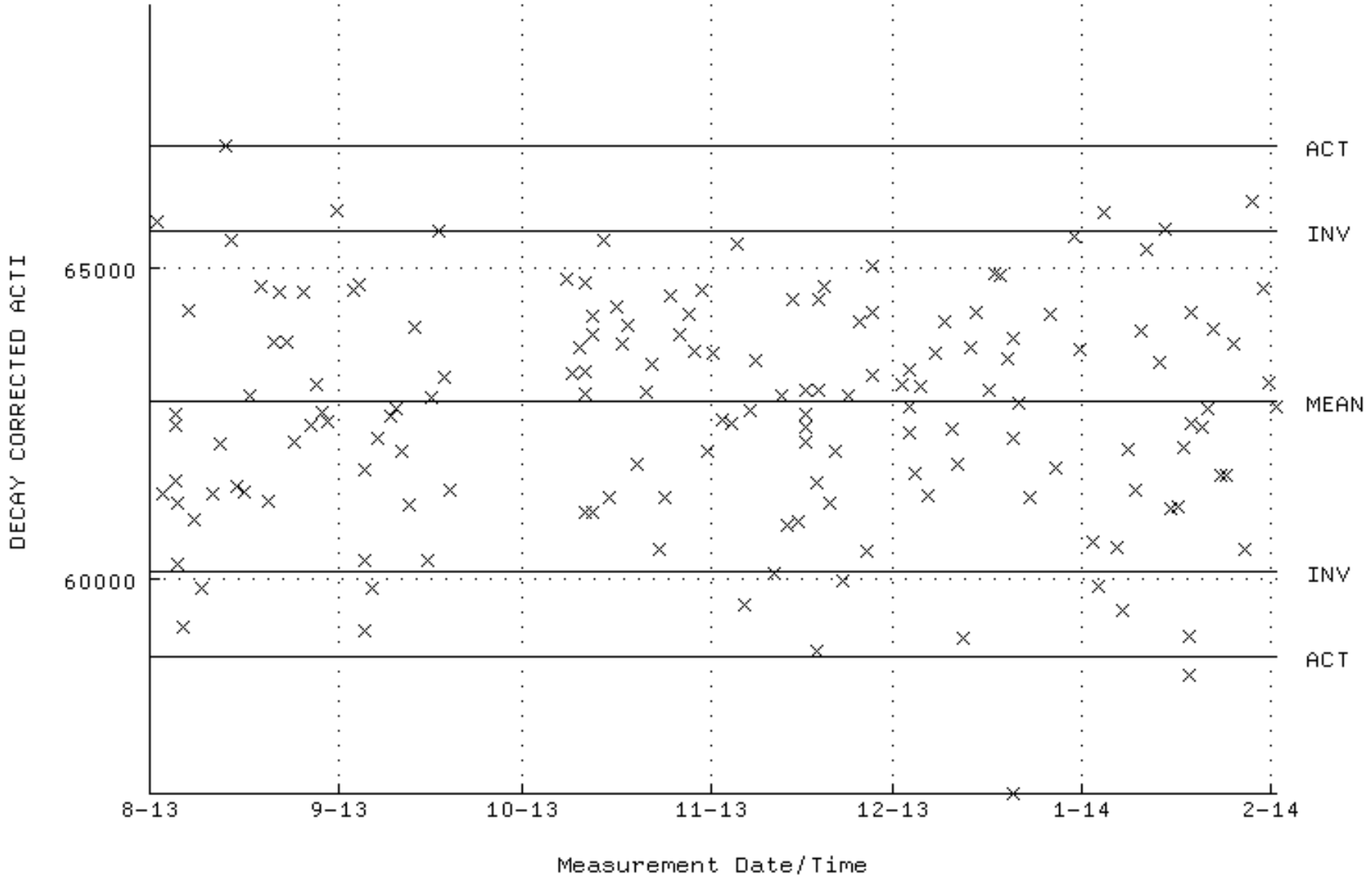
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM18_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 08:36:45 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



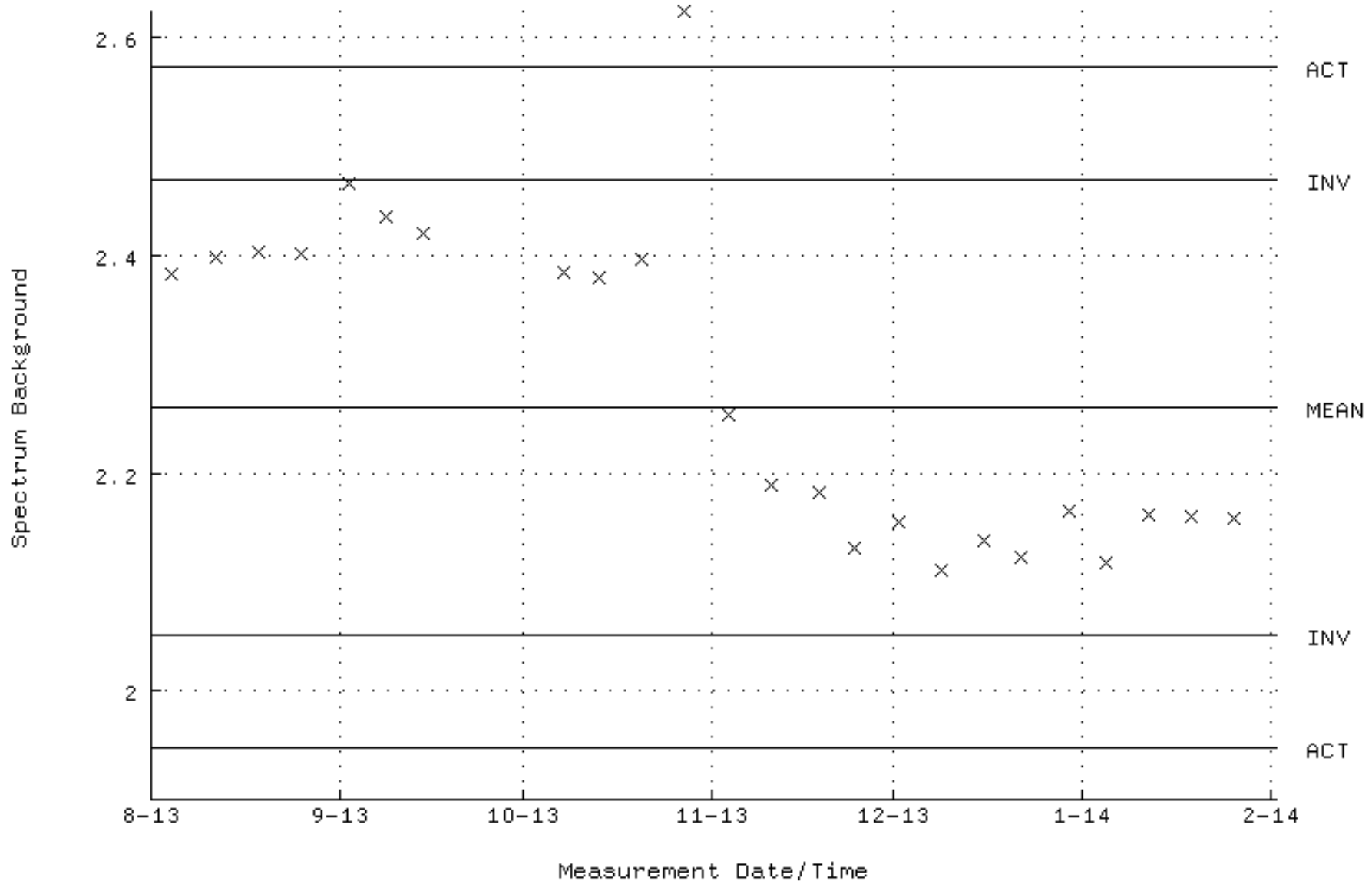
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM18_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 08:36:45 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.998275 +- 3.600832E-02 (3.61 %)



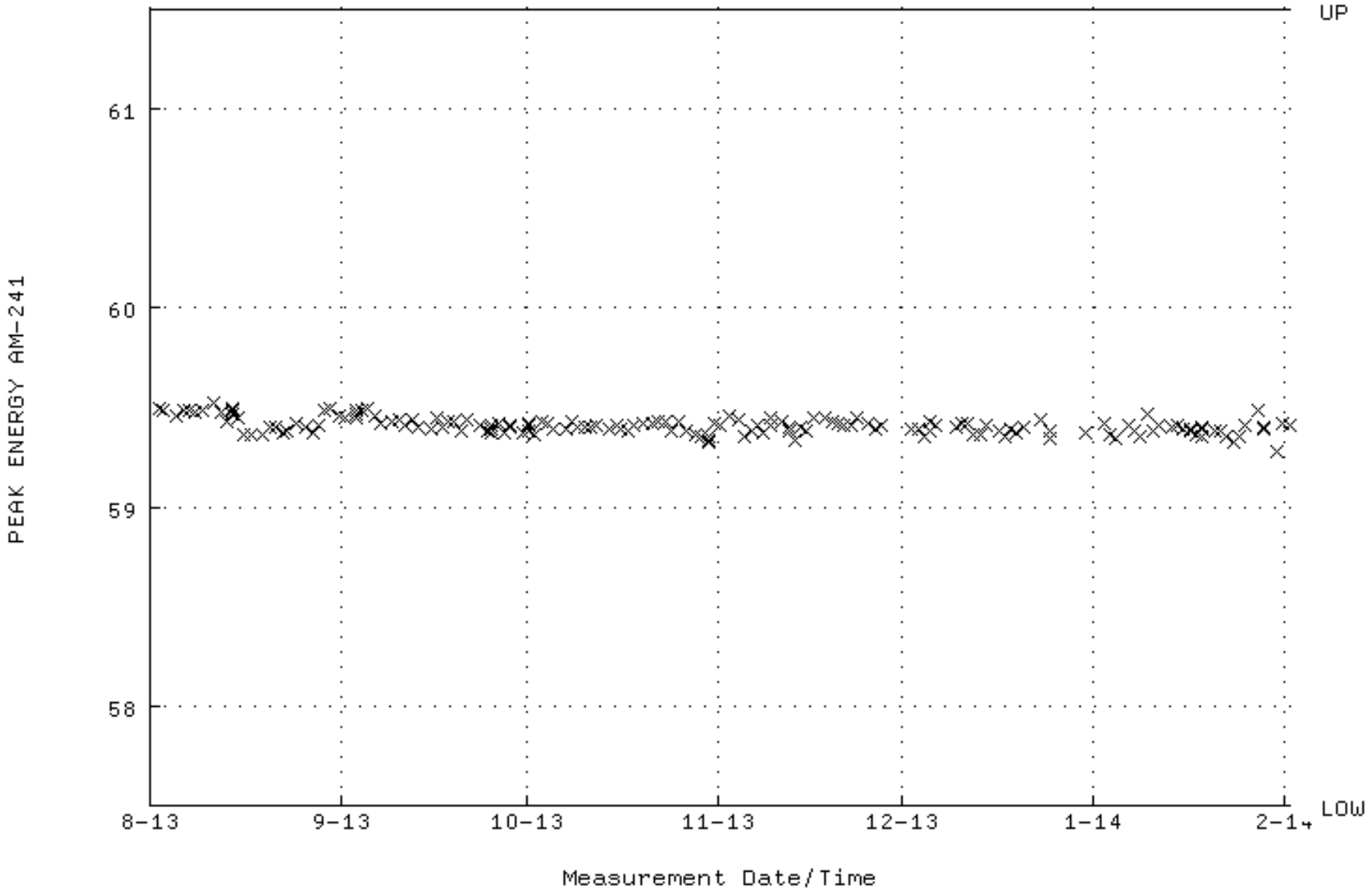
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM18_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 08:36:45 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 62878.1 +- 1373.56 (2.18 %)



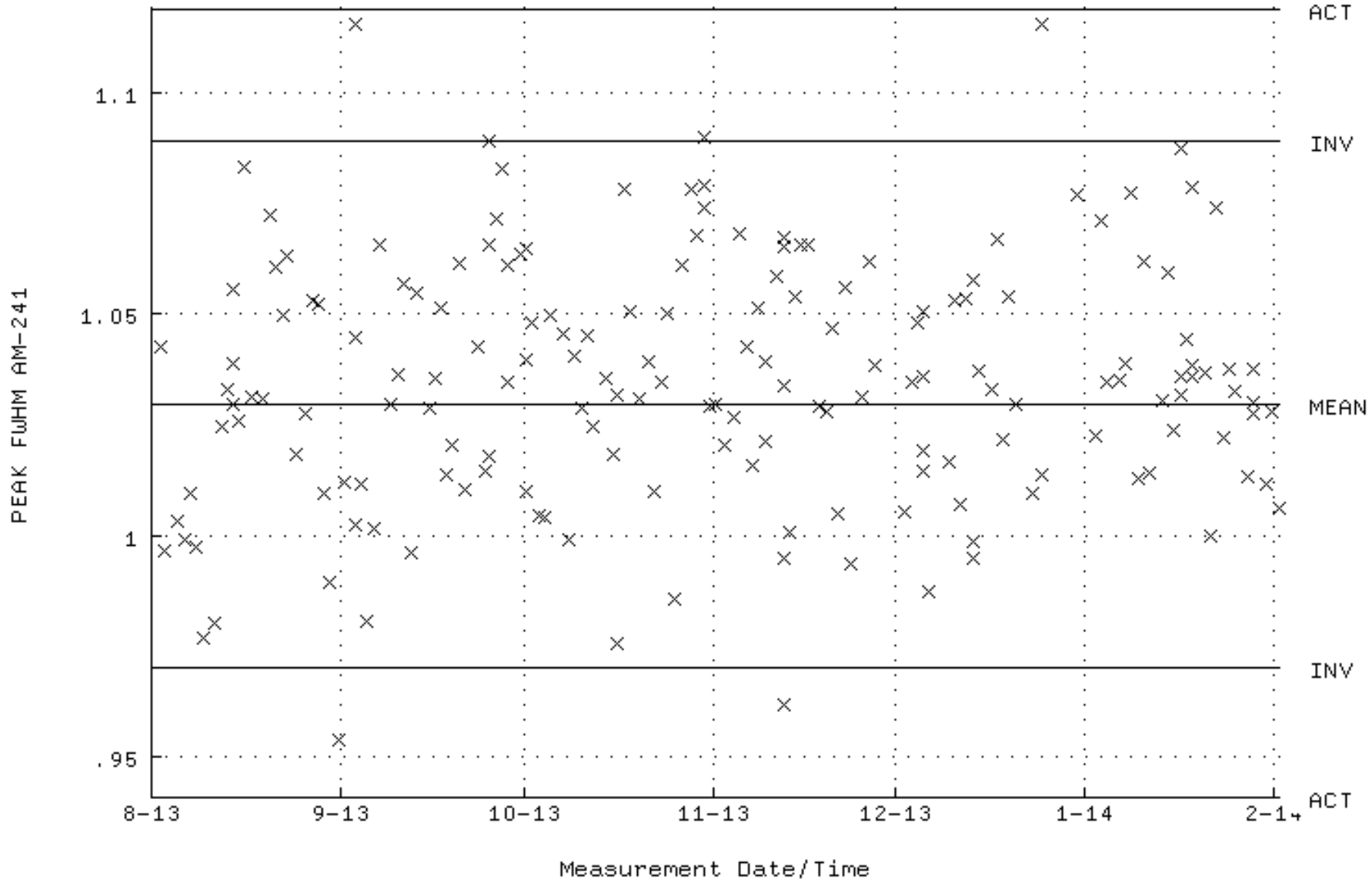
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM18.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:09:04 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 2.26149 +- 0.104462 (4.62 %)



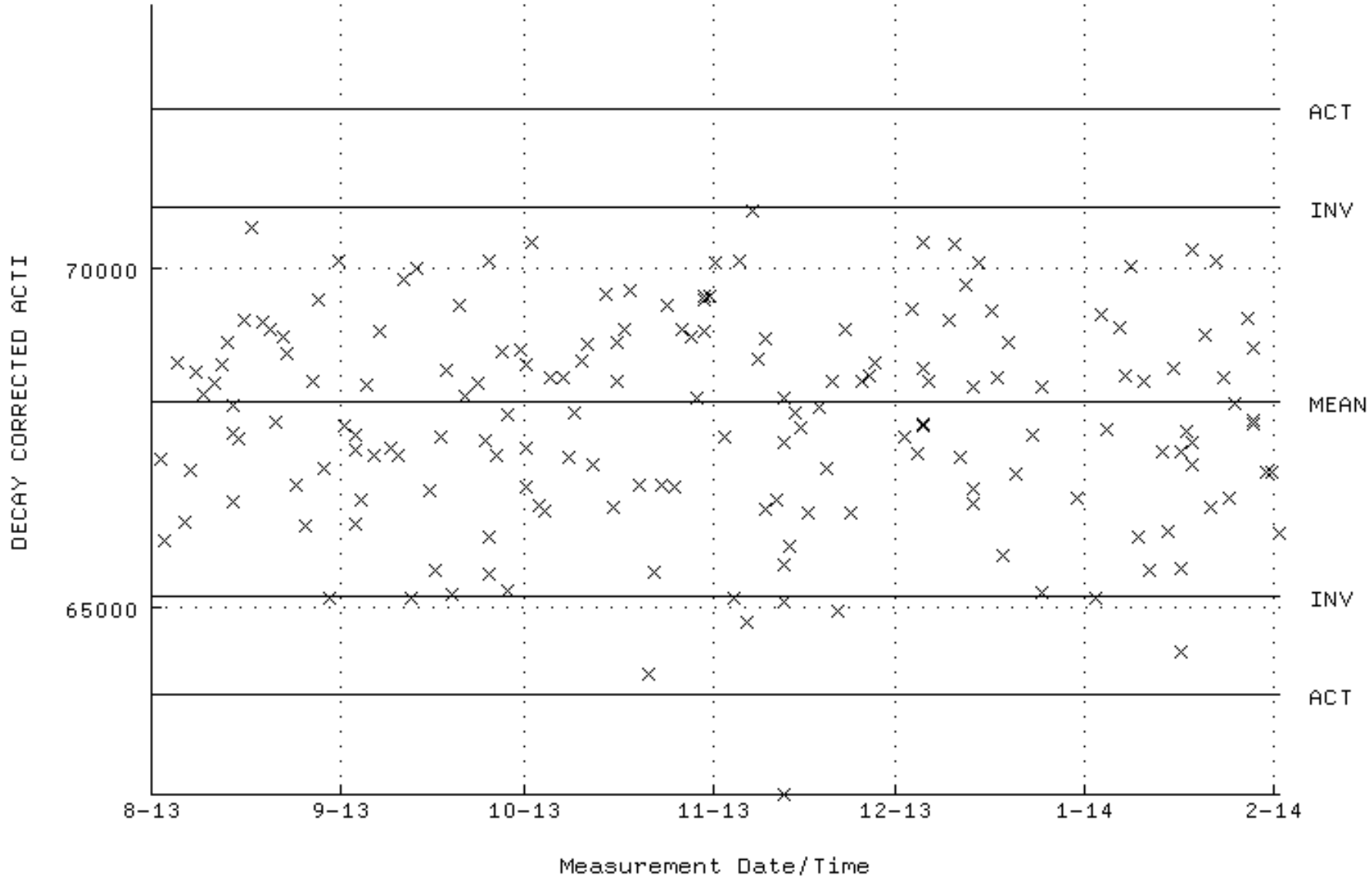
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 11:00:21 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



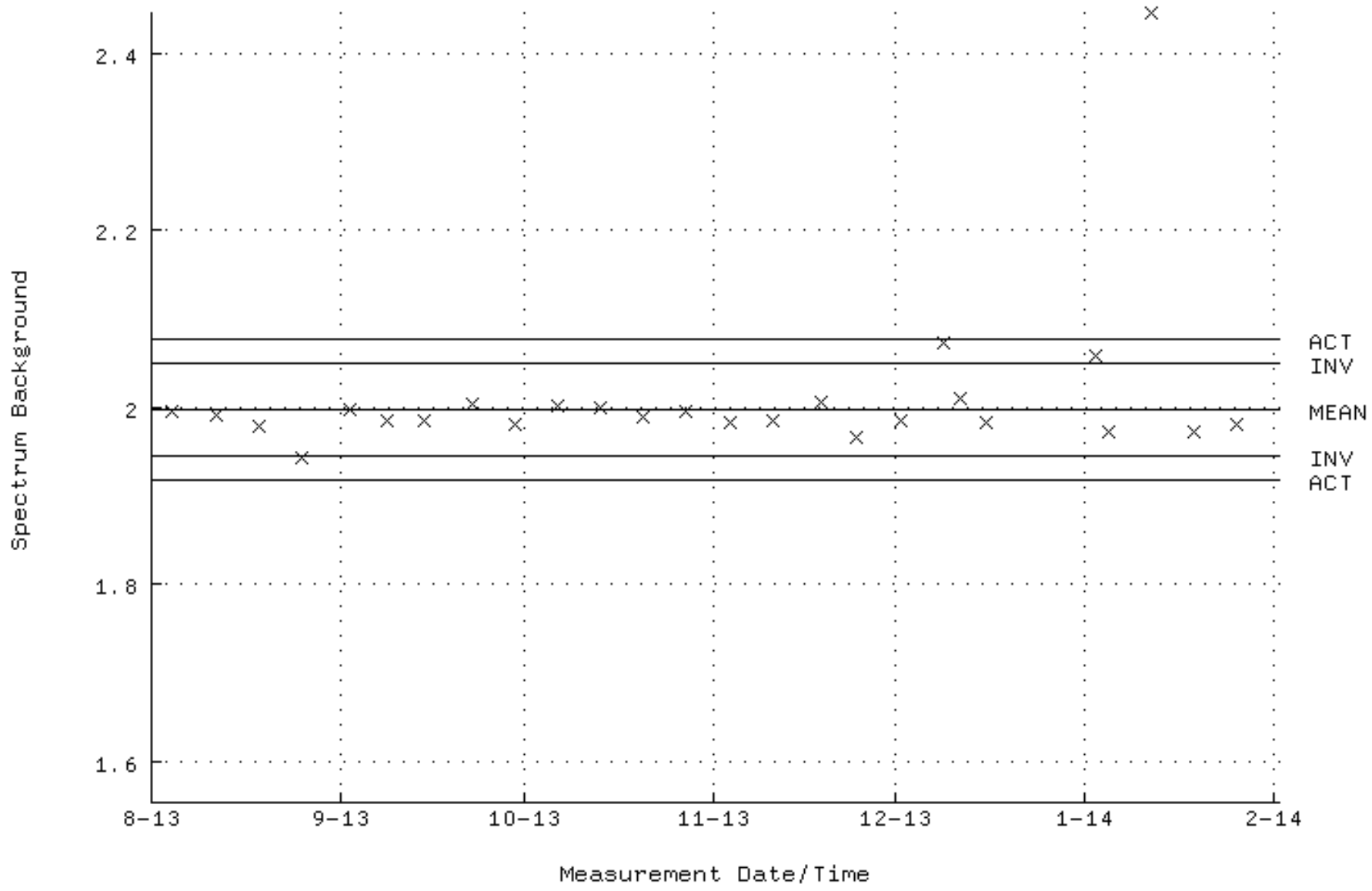
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 11:00:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.02979 +- 2.966322E-02 (2.88 %)



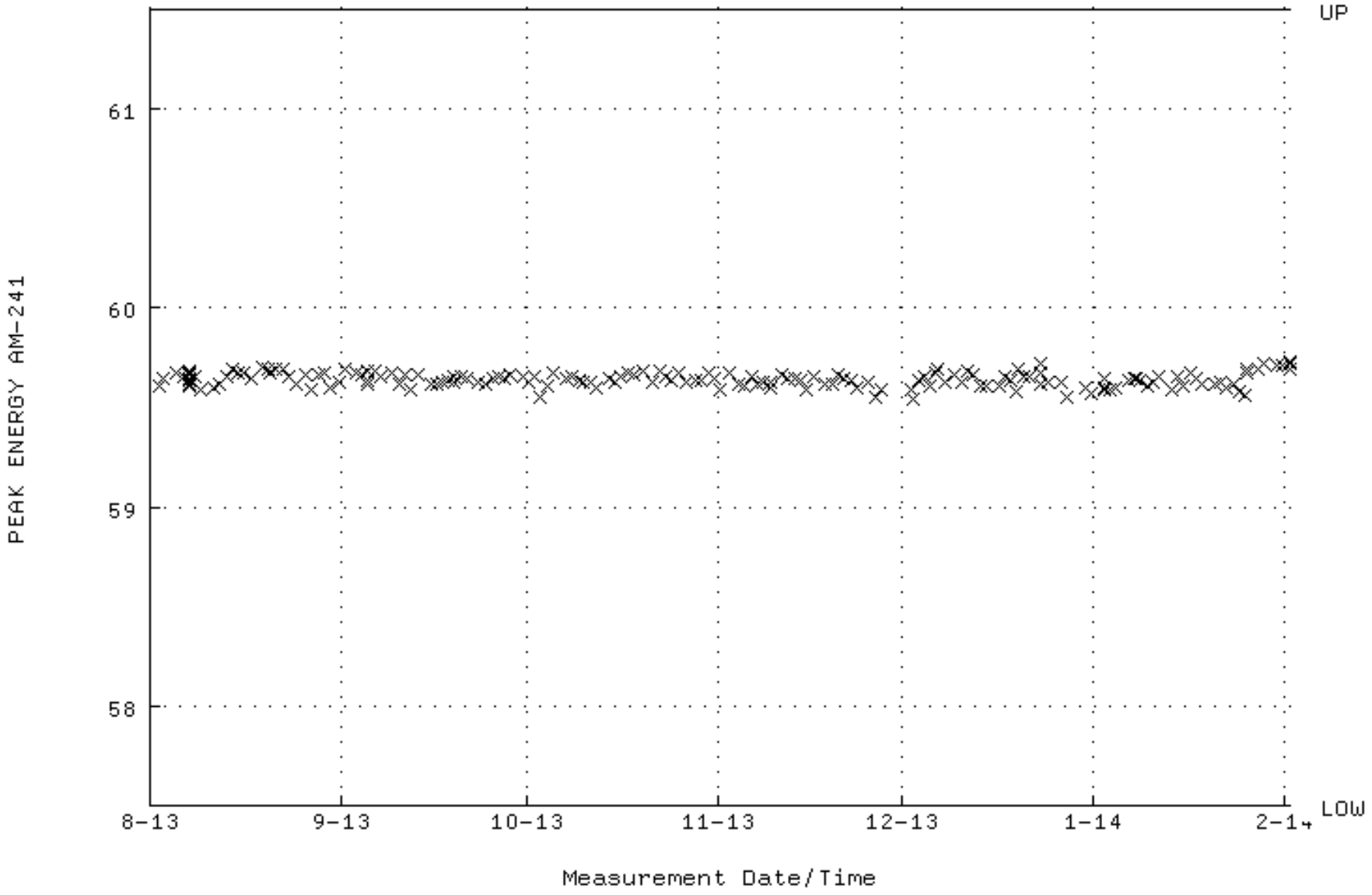
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 11:00:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 68053.7 +- 1438.48 (2.11 %)



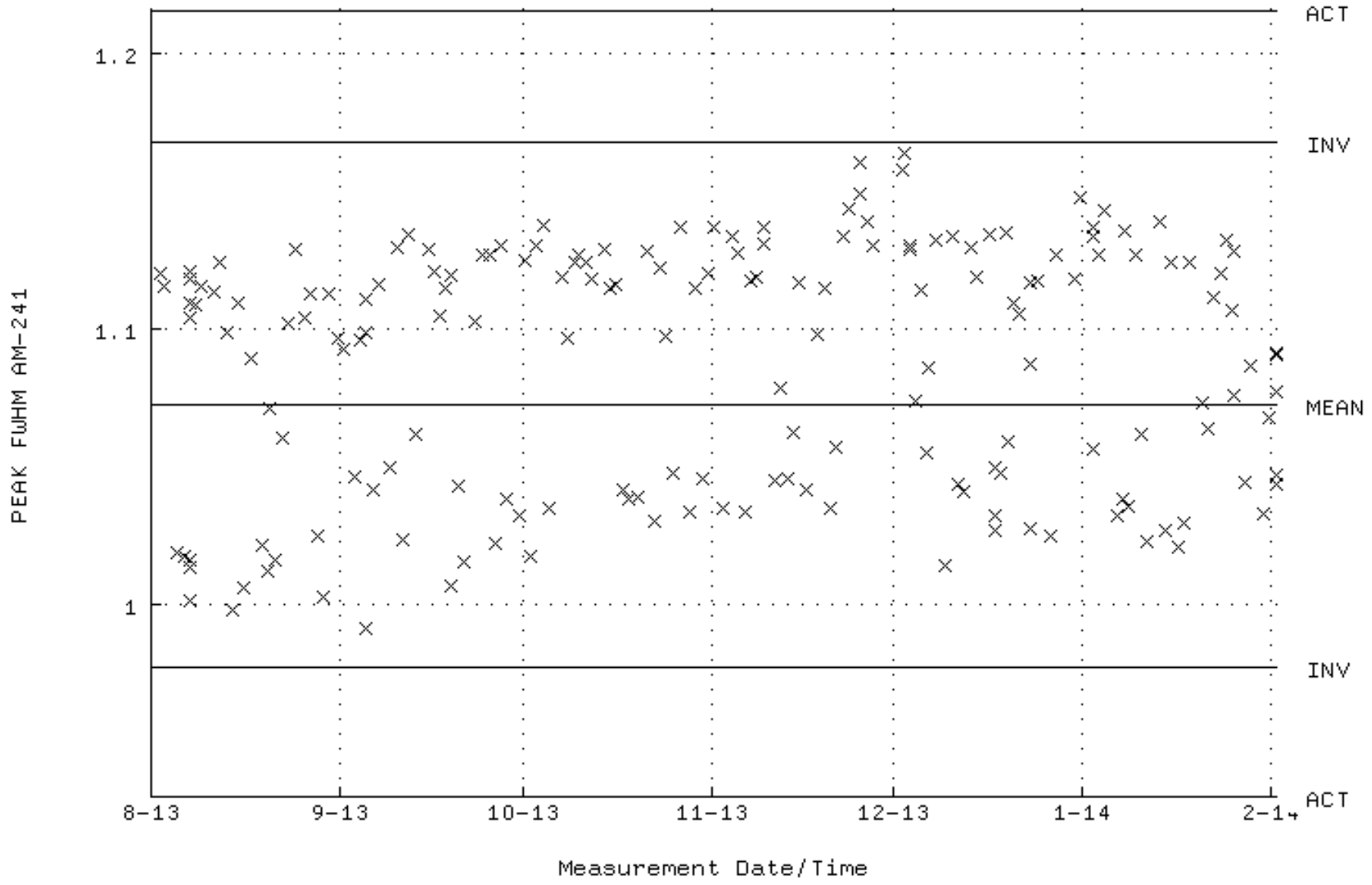
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM19.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:09:20 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.99831 +- 2.653599E-02 (1.33 %)



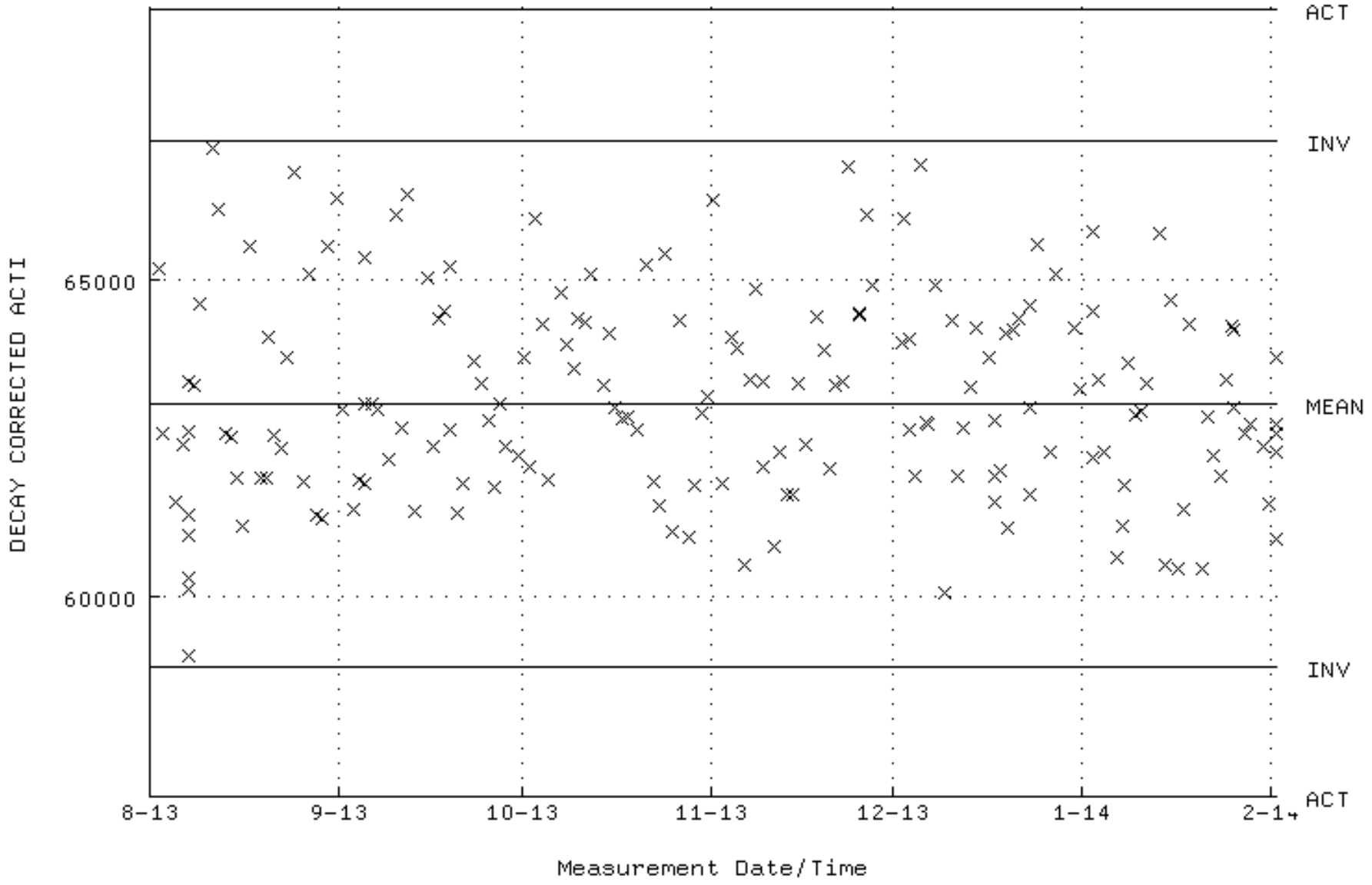
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM20_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 11:00:27 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



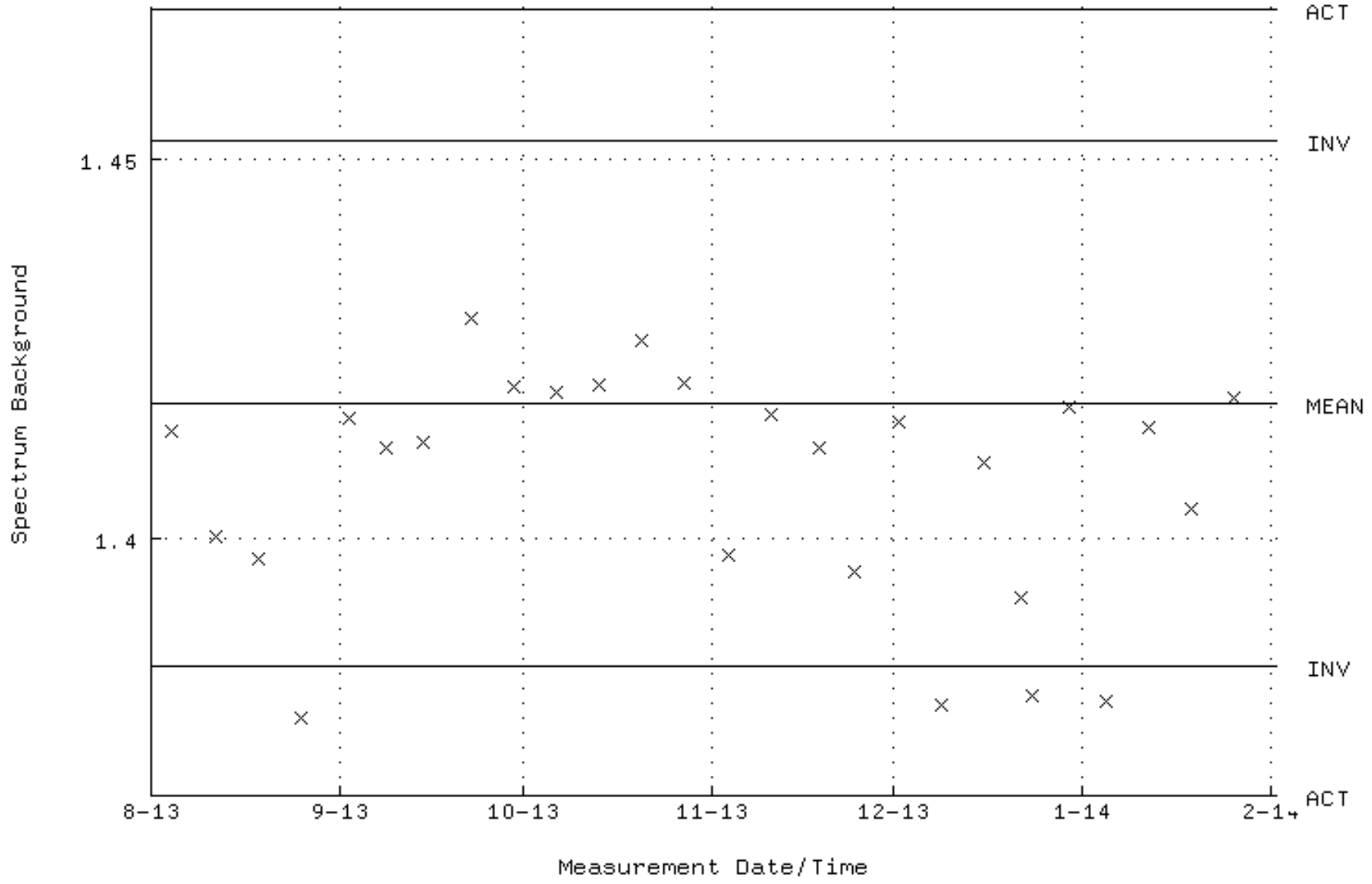
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM20_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 11:00:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.07278 +- 4.754534E-02 (4.43 %)



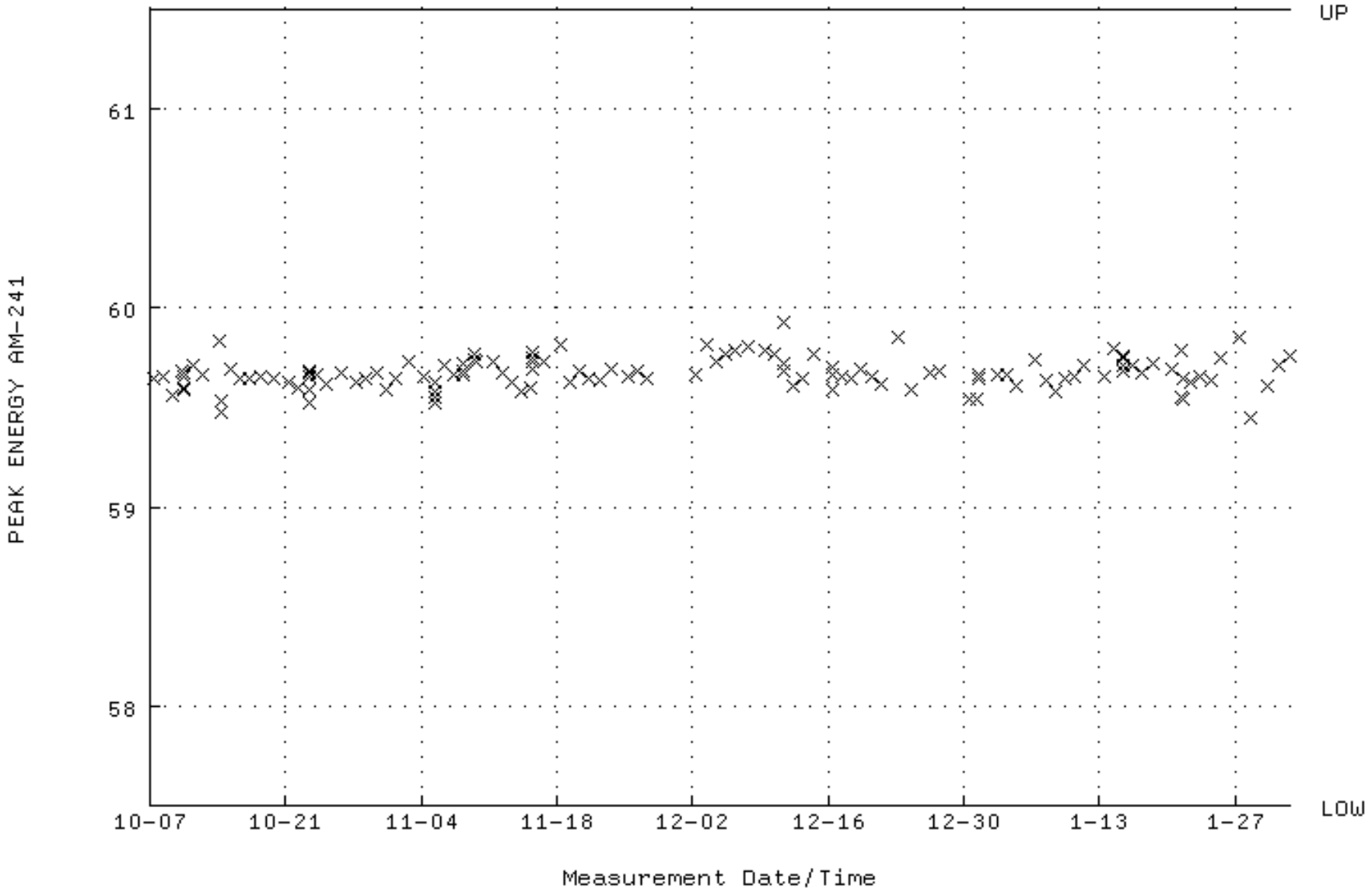
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM20_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 11:00:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63059.3 +- 2072.63 (3.29 %)



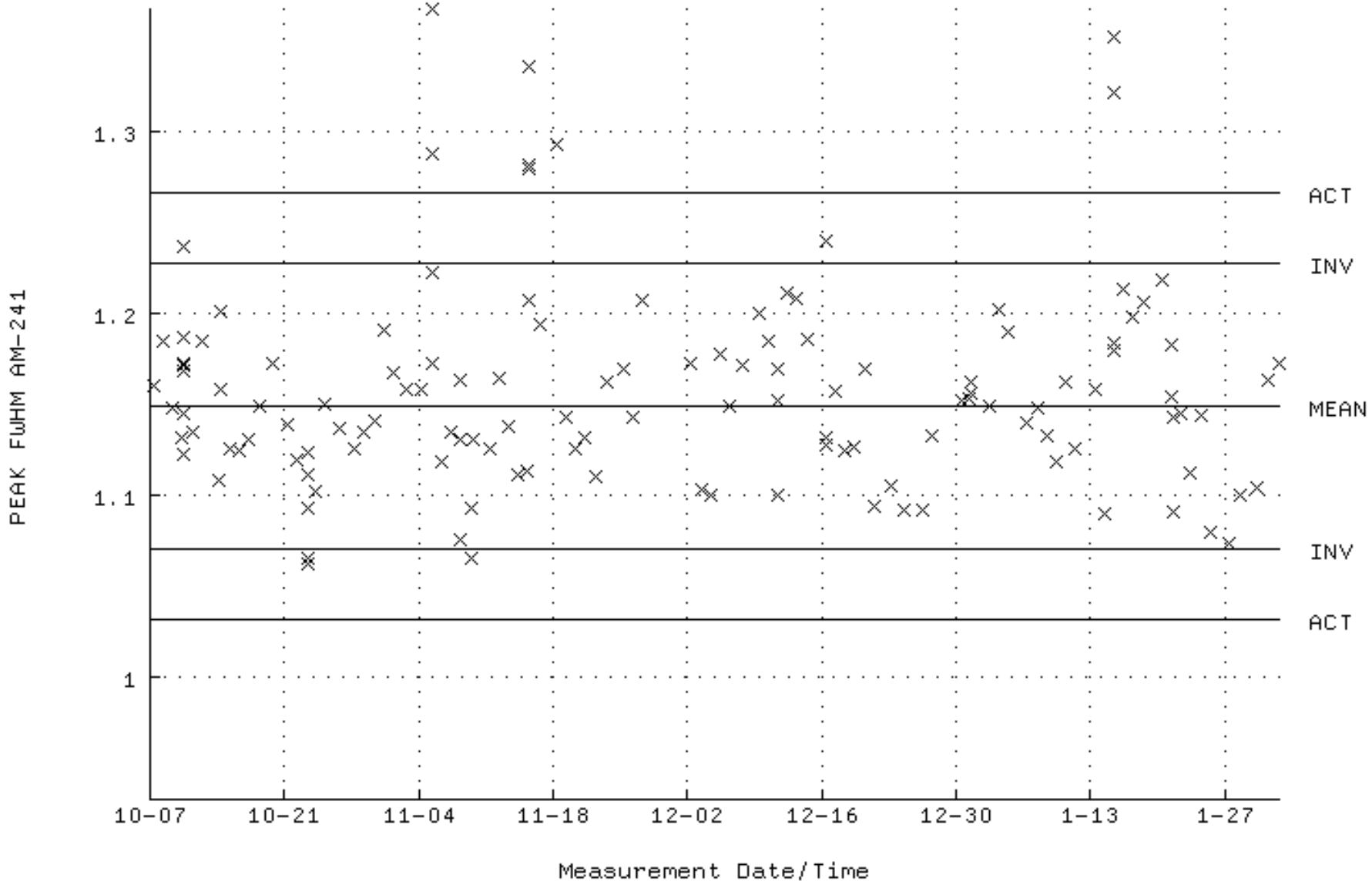
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM20.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:09:36 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.41799 +- 1.730532E-02 (1.22 %)



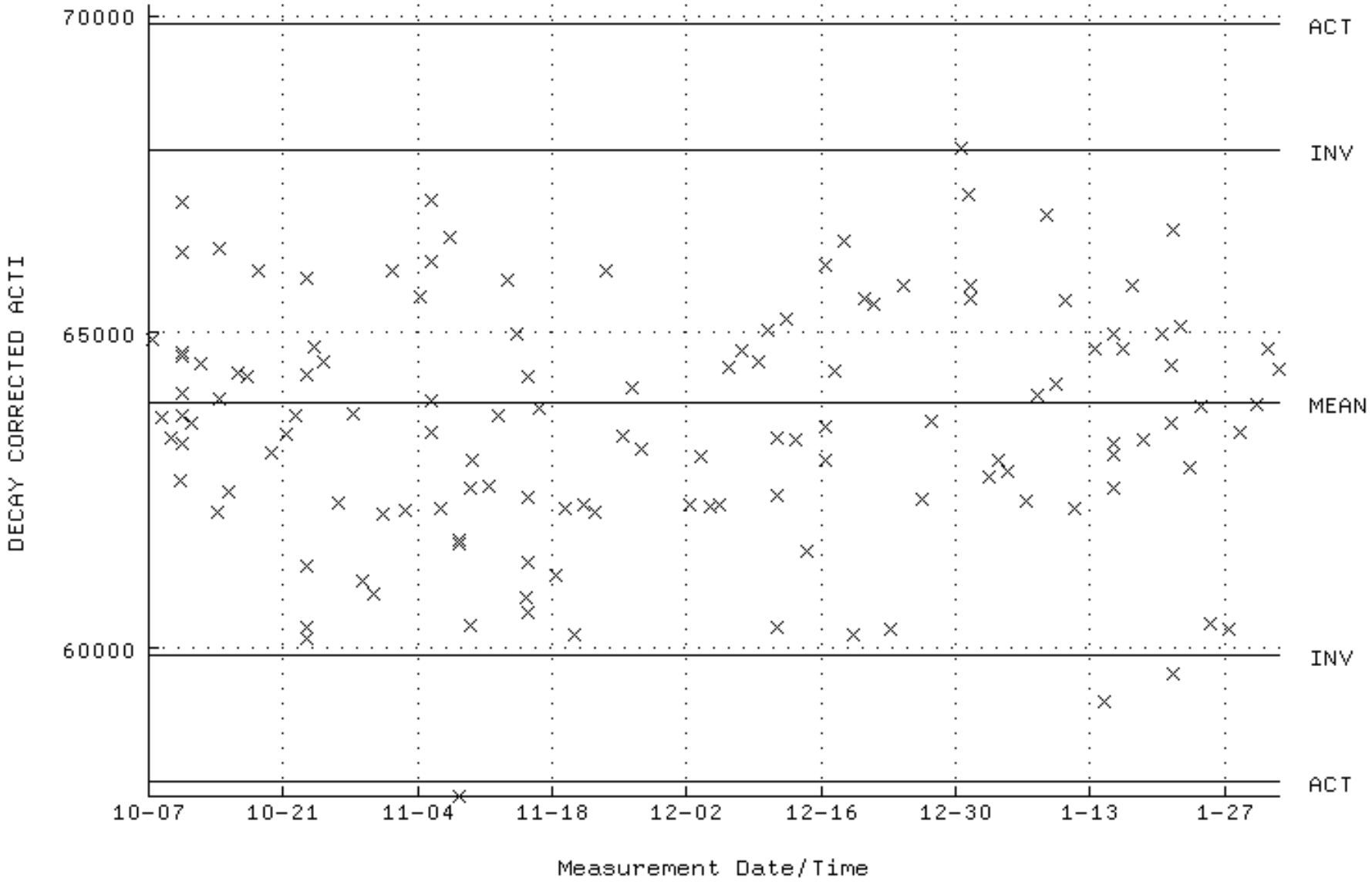
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM22_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 7-OCT-2013 07:37:42 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



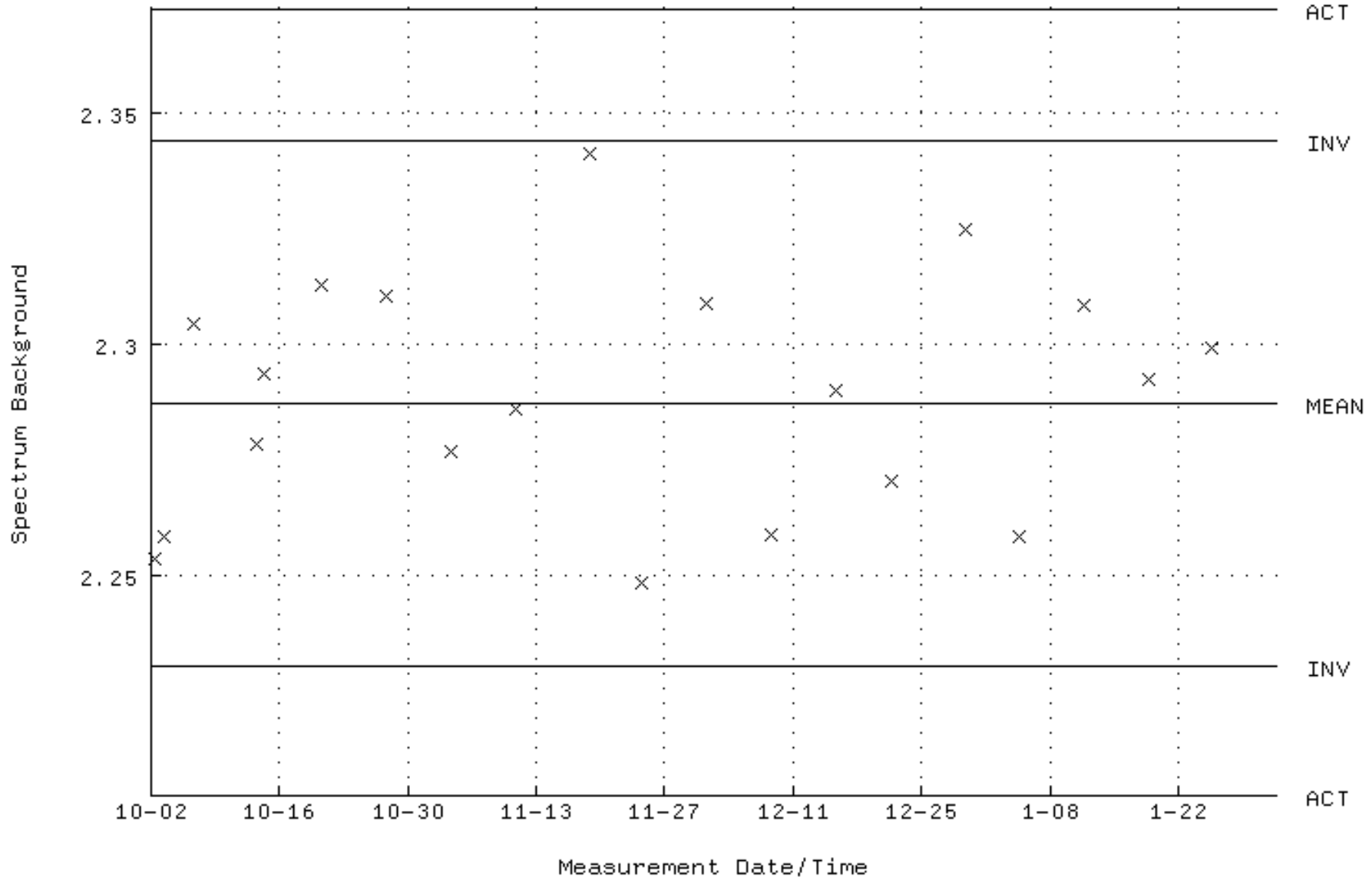
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM22_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 7-OCT-2013 07:37:42 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.14941 +- 3.906751E-02 (3.40 %)



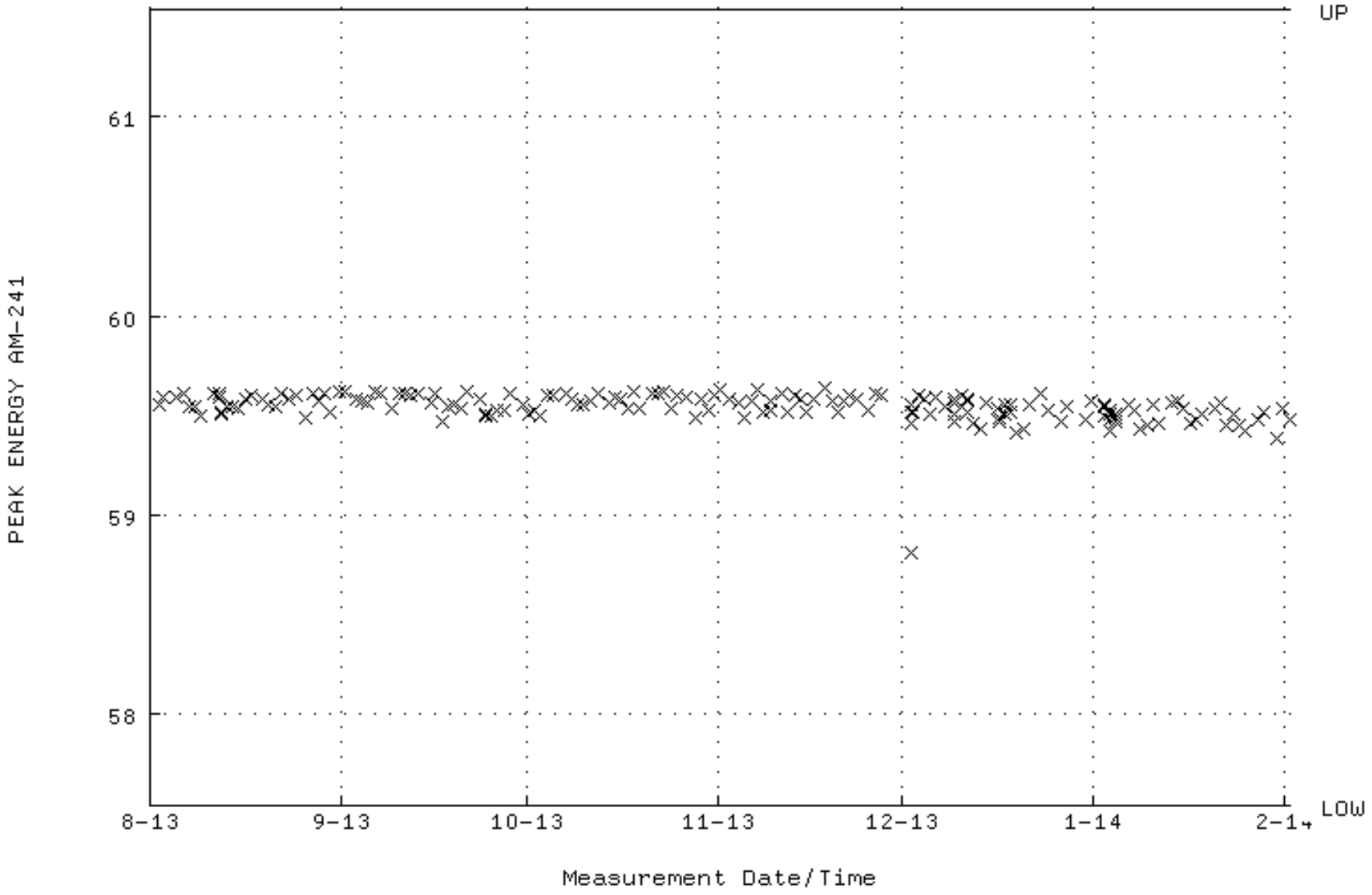
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM22_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 7-OCT-2013 07:37:42 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63891.2 +- 2004.11 (3.14 %)



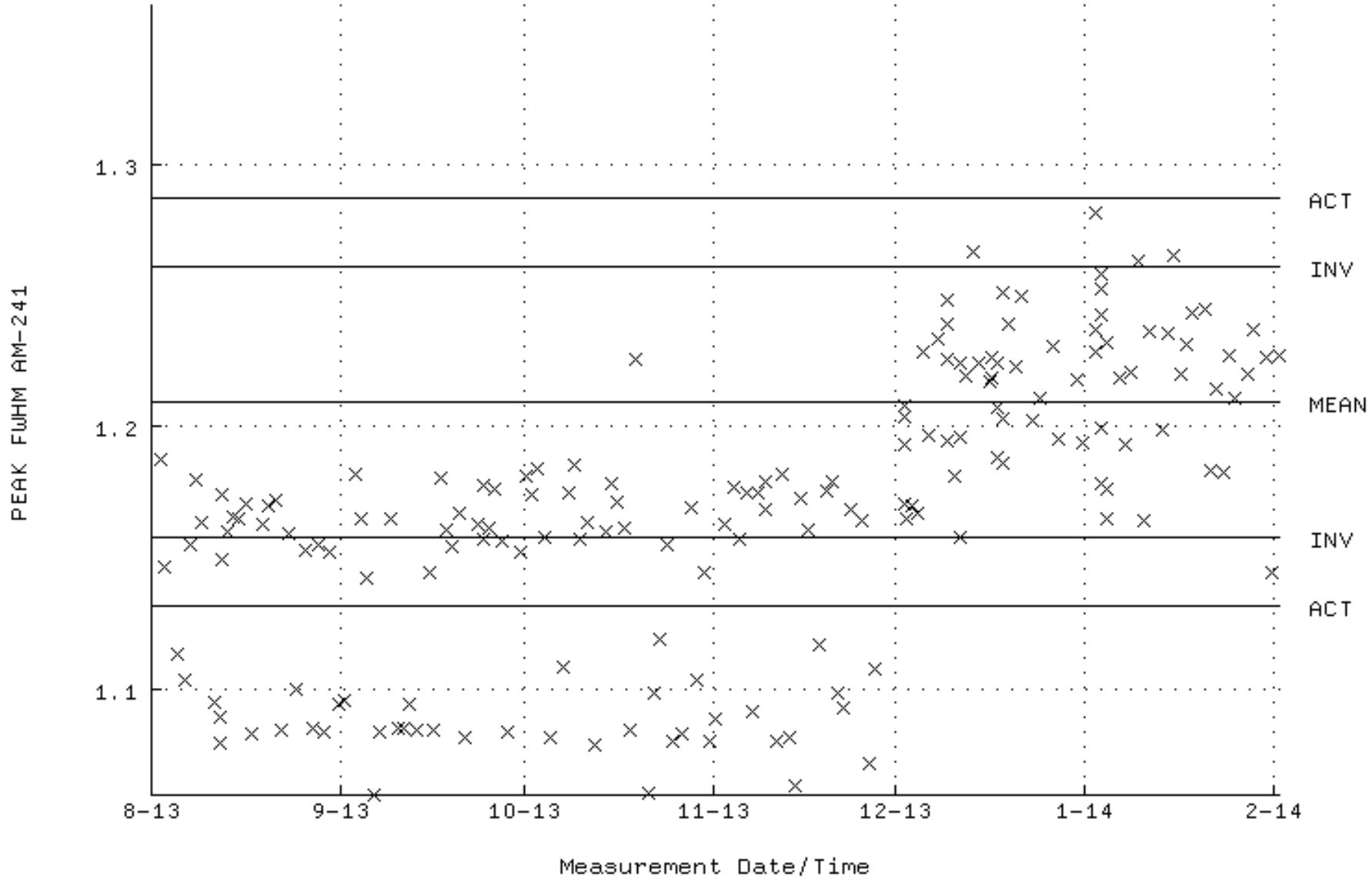
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM22.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-OCT-2013 10:42:11 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 2.28730 +- 2.830357E-02 (1.24 %)



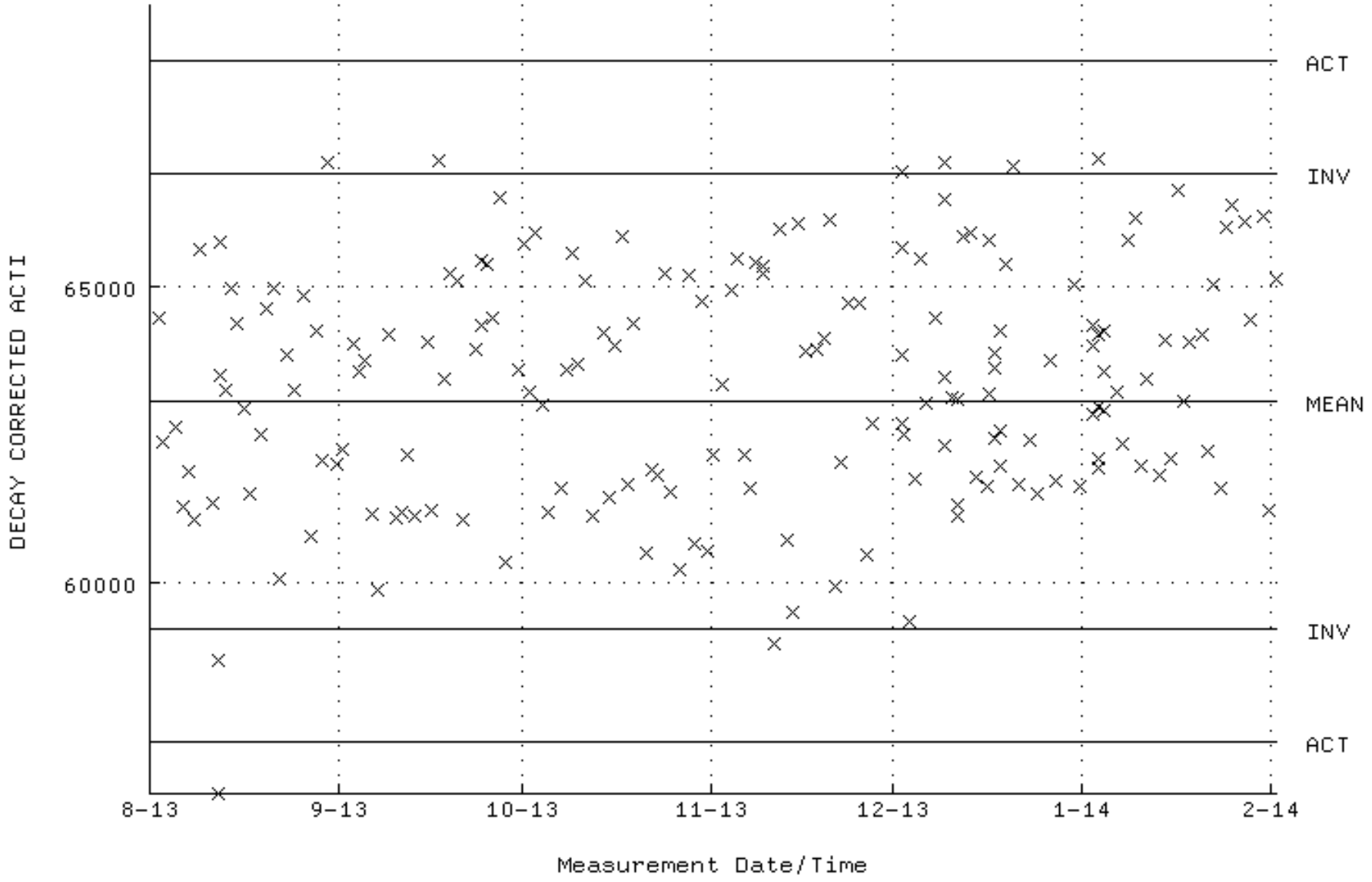
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:16 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



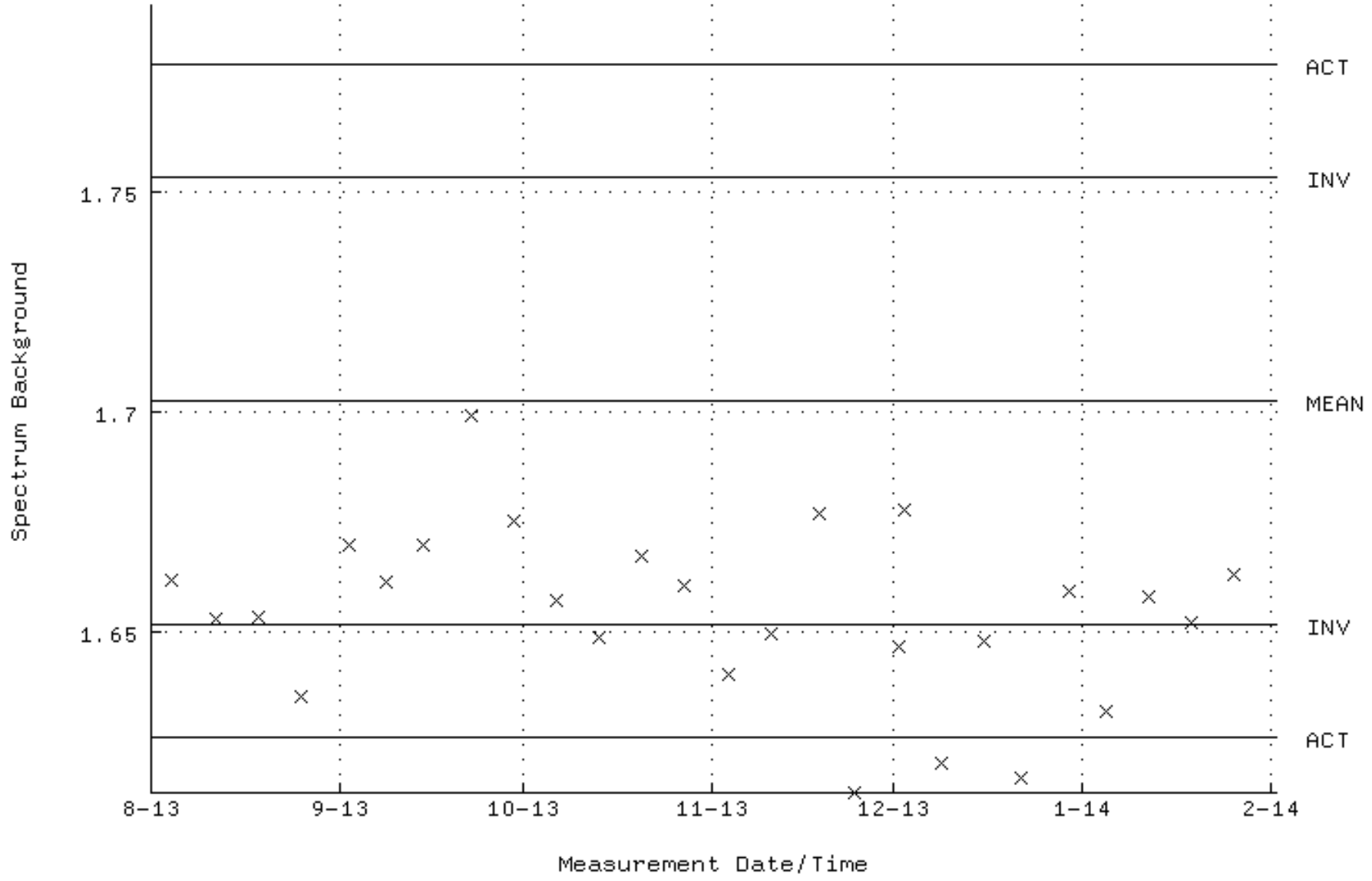
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:16 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.20983 +- 2.585393E-02 (2.14 %)



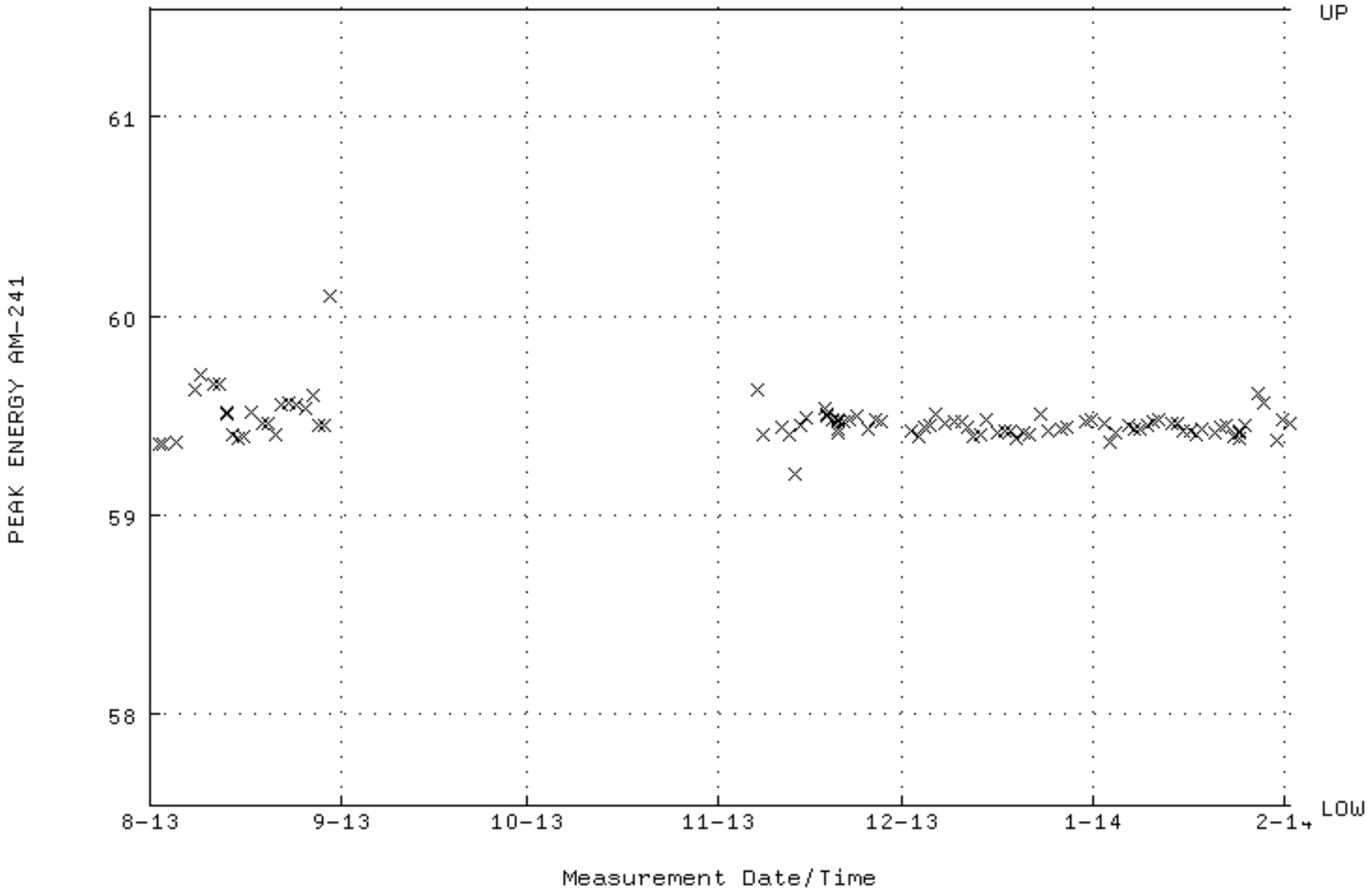
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:16 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63078.0 +- 1908.92 (3.03 %)



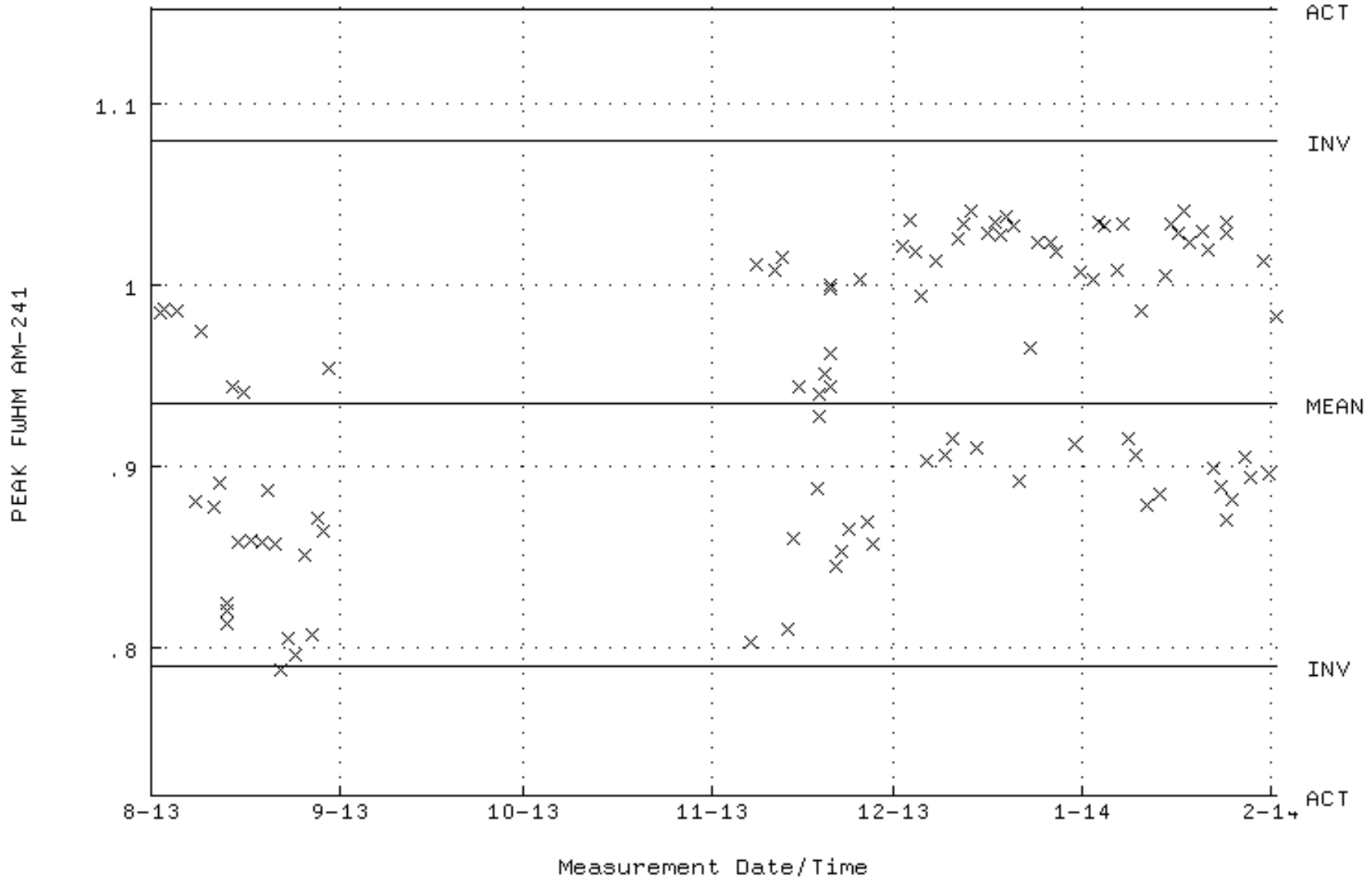
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM24.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:10:50 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.70273 +- 2.559708E-02 (1.50 %)



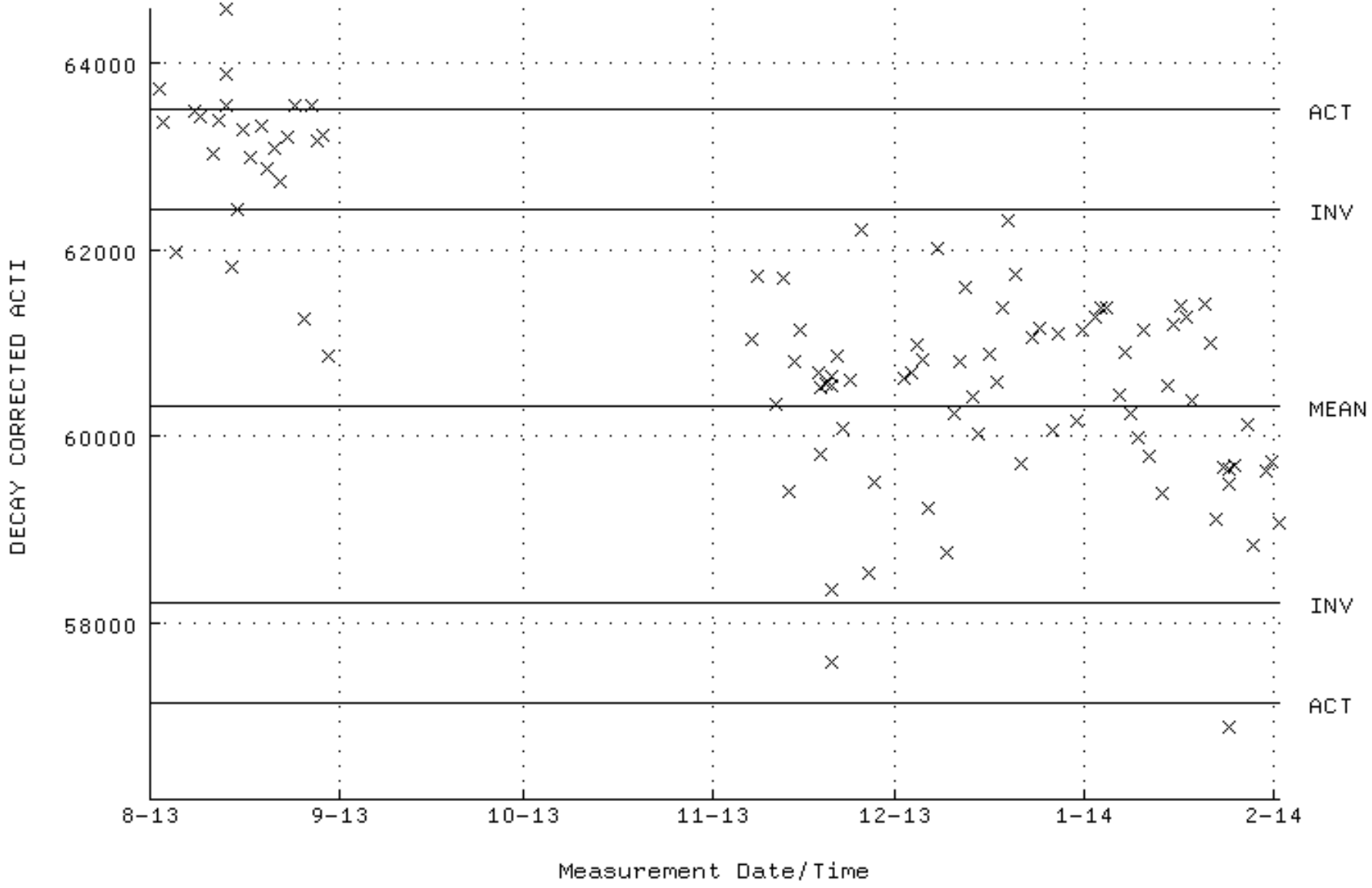
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:11:53 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



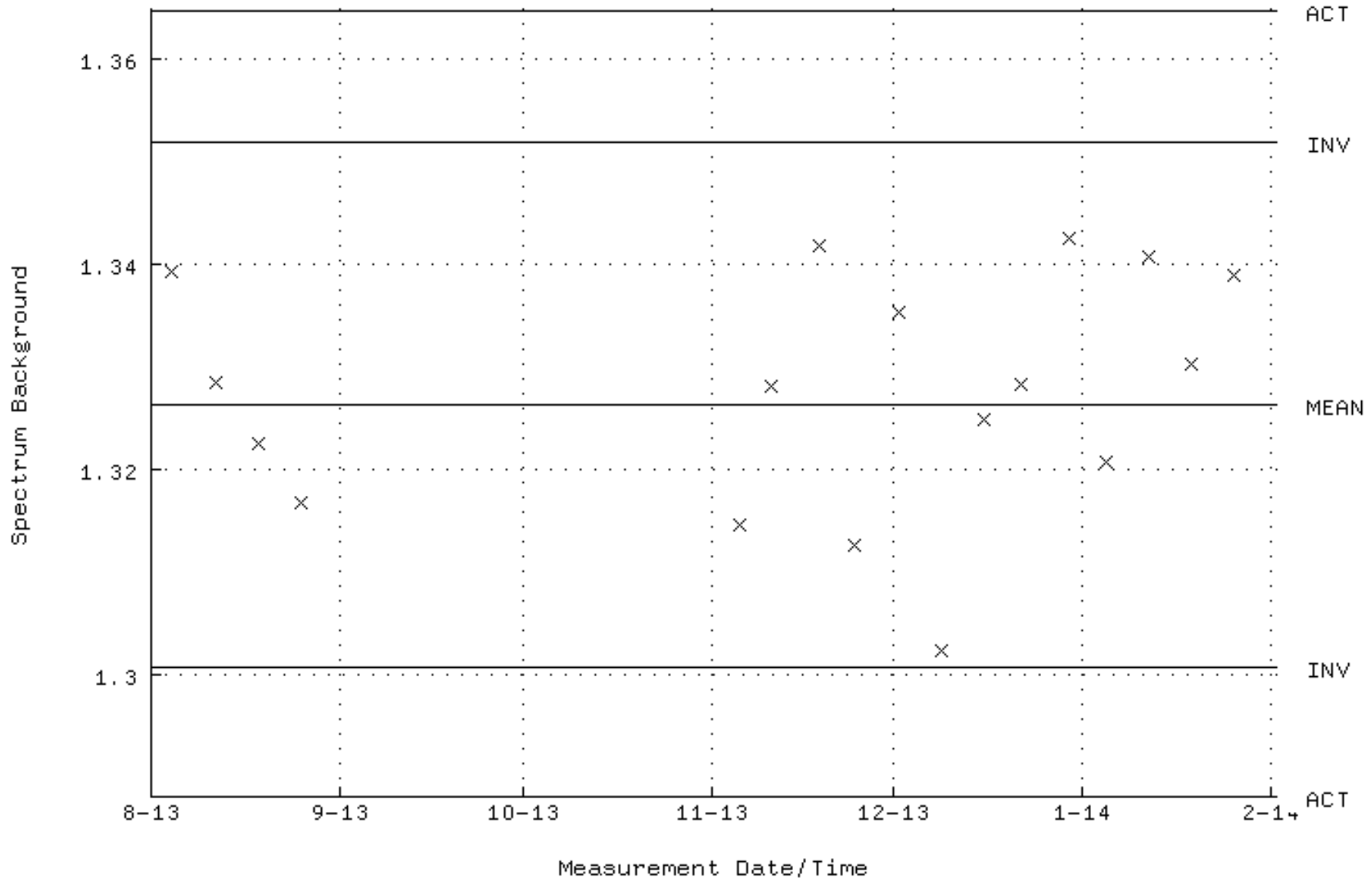
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:11:53 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.935052 +- 7.244962E-02 (7.75 %)



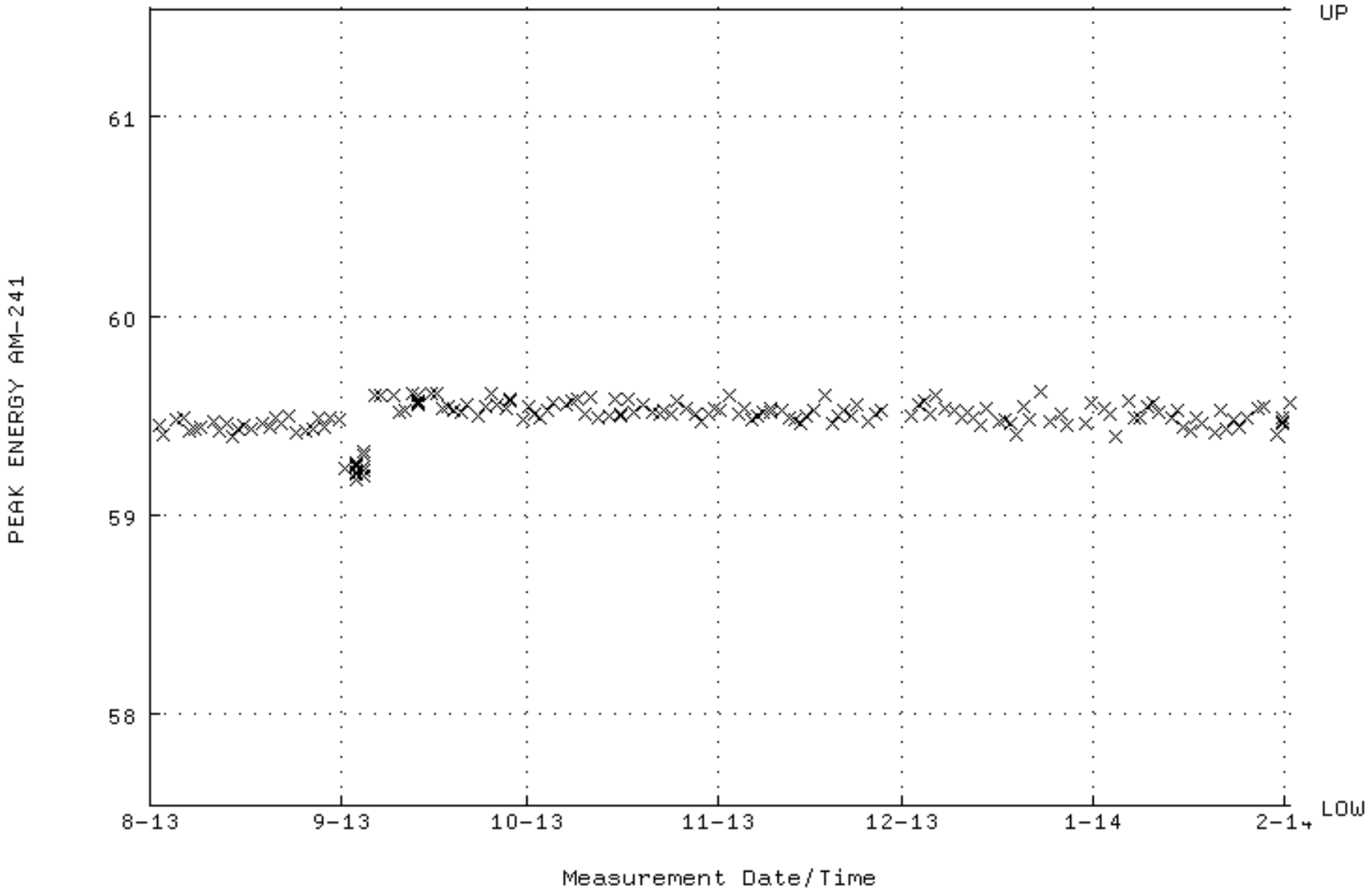
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:11:53 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60336.3 +- 1059.04 (1.76 %)



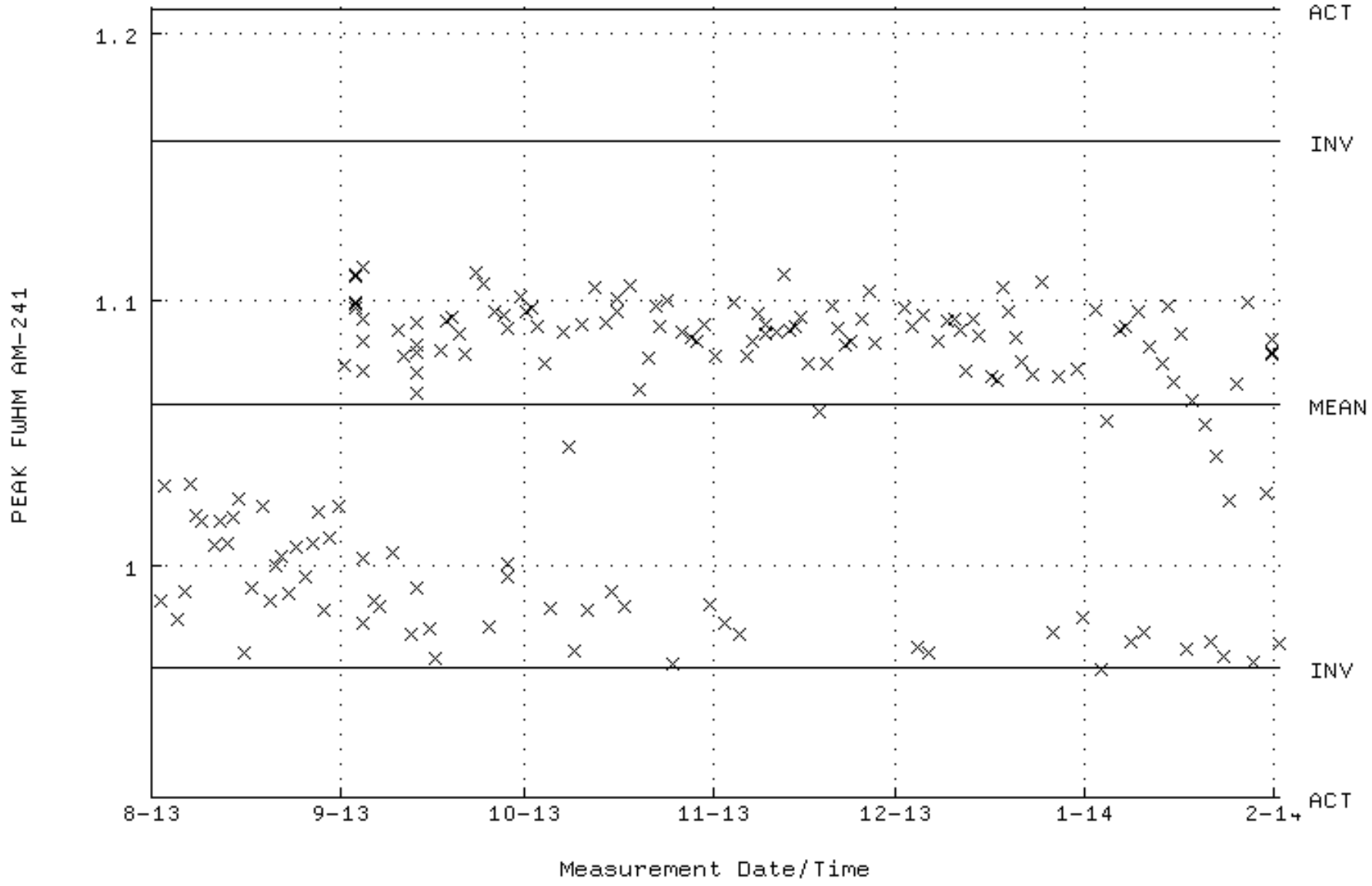
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM25.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:06 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.32636 +- 1.278824E-02 (0.96 %)



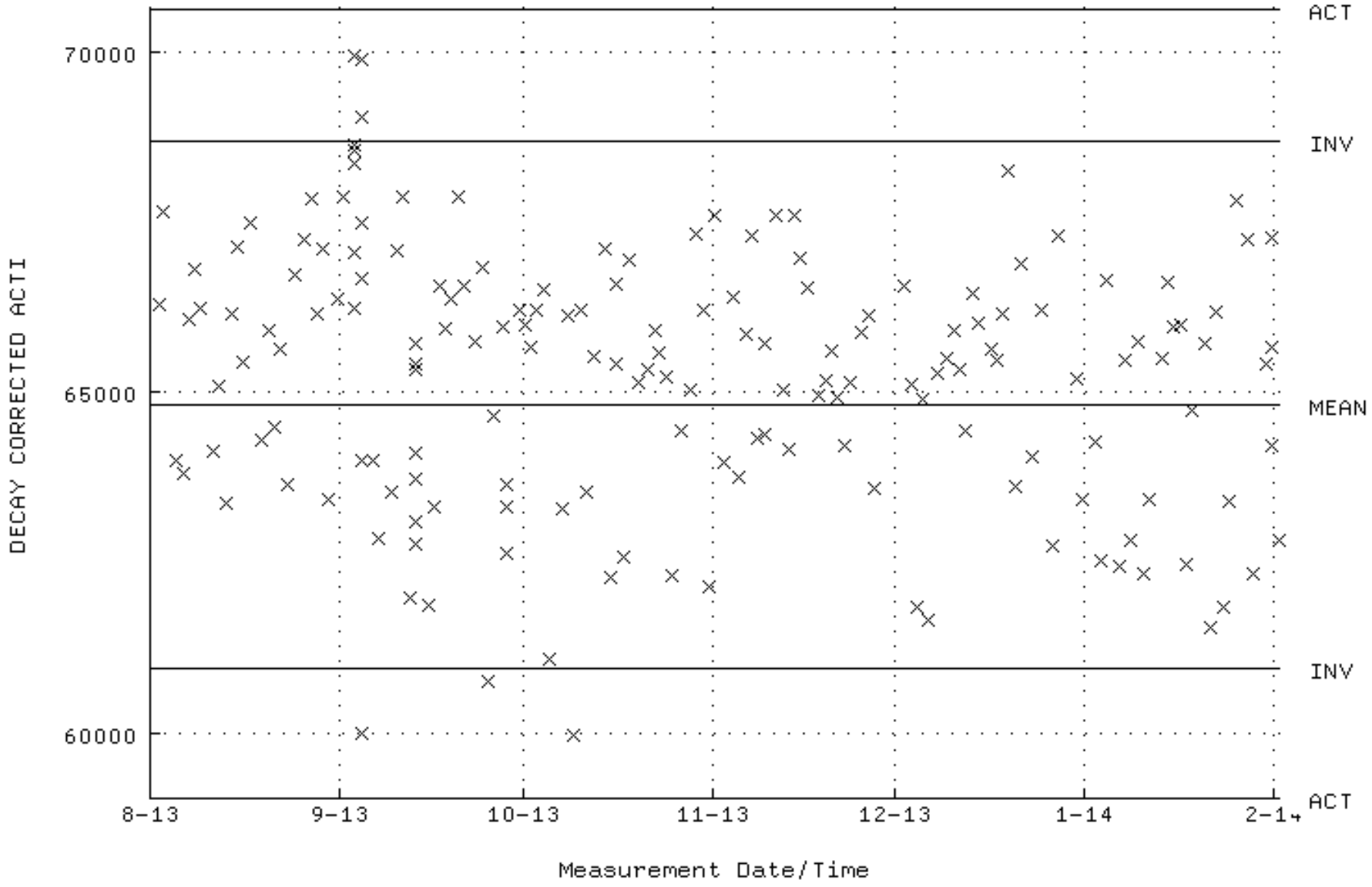
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:47:19 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



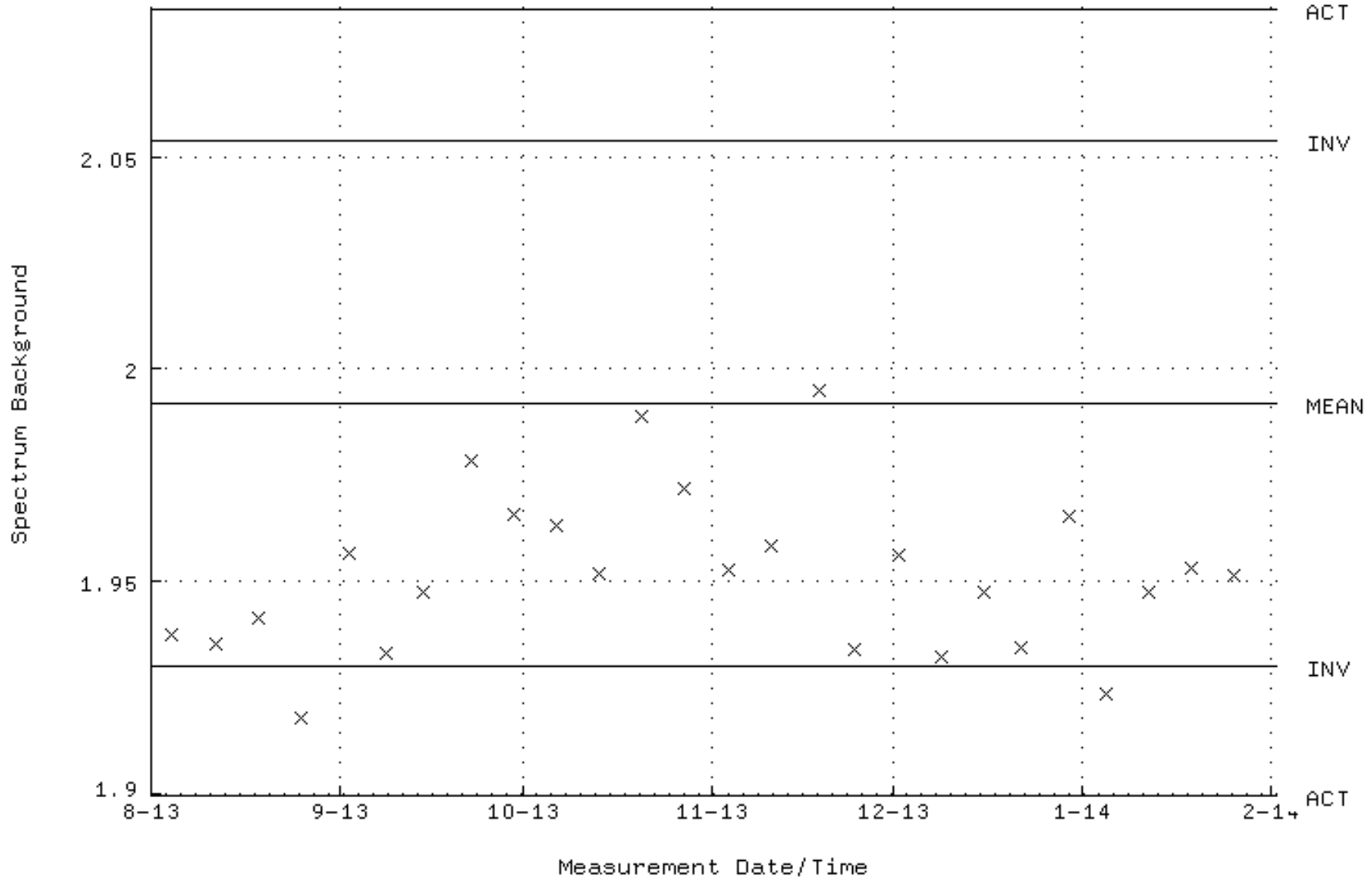
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:47:19 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.06116 +- 4.927532E-02 (4.64 %)



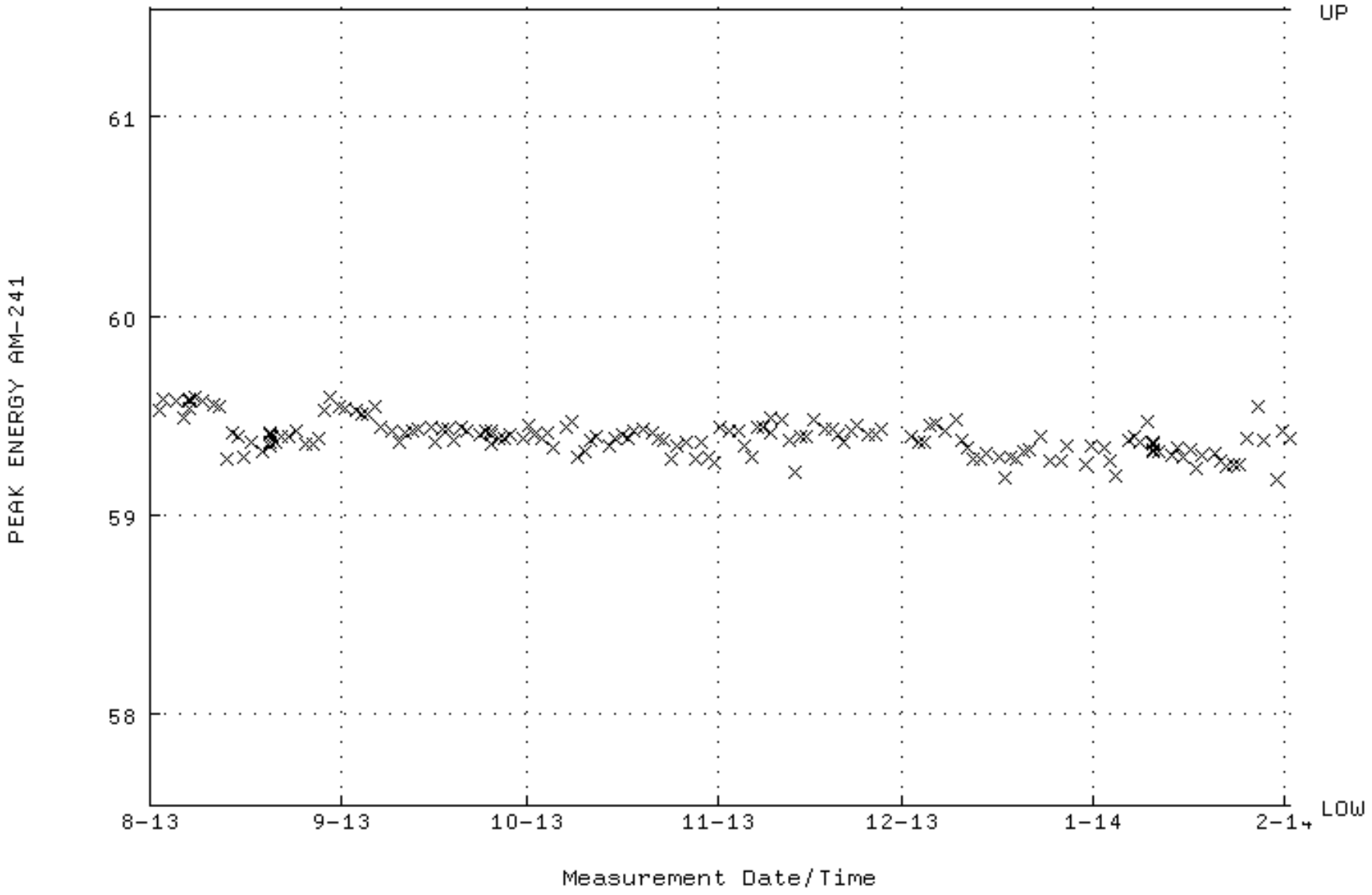
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:47:19 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 64826.7 +- 1930.90 (2.98 %)



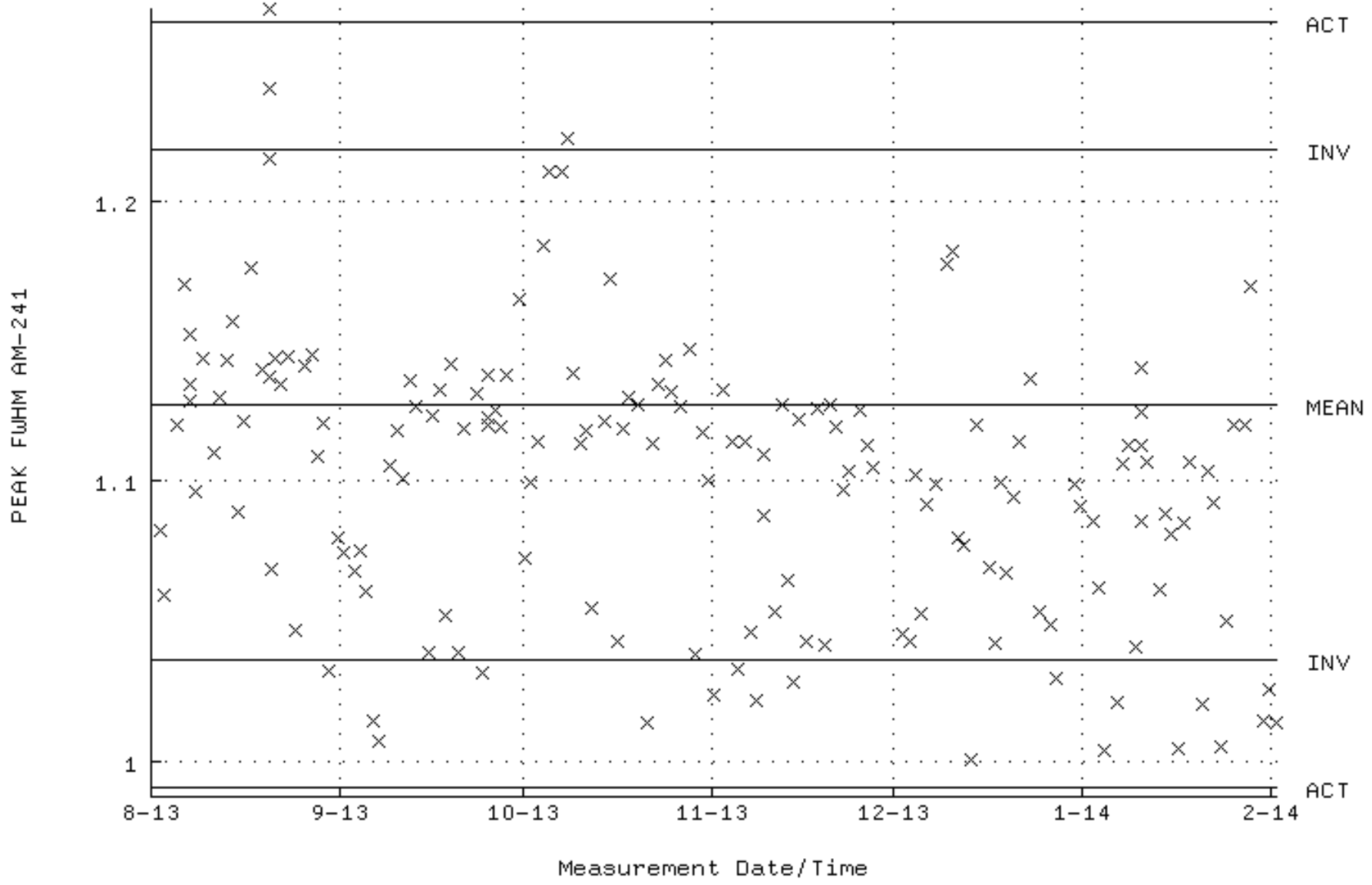
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM27.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:22 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.99202 +- 3.088858E-02 (1.55 %)



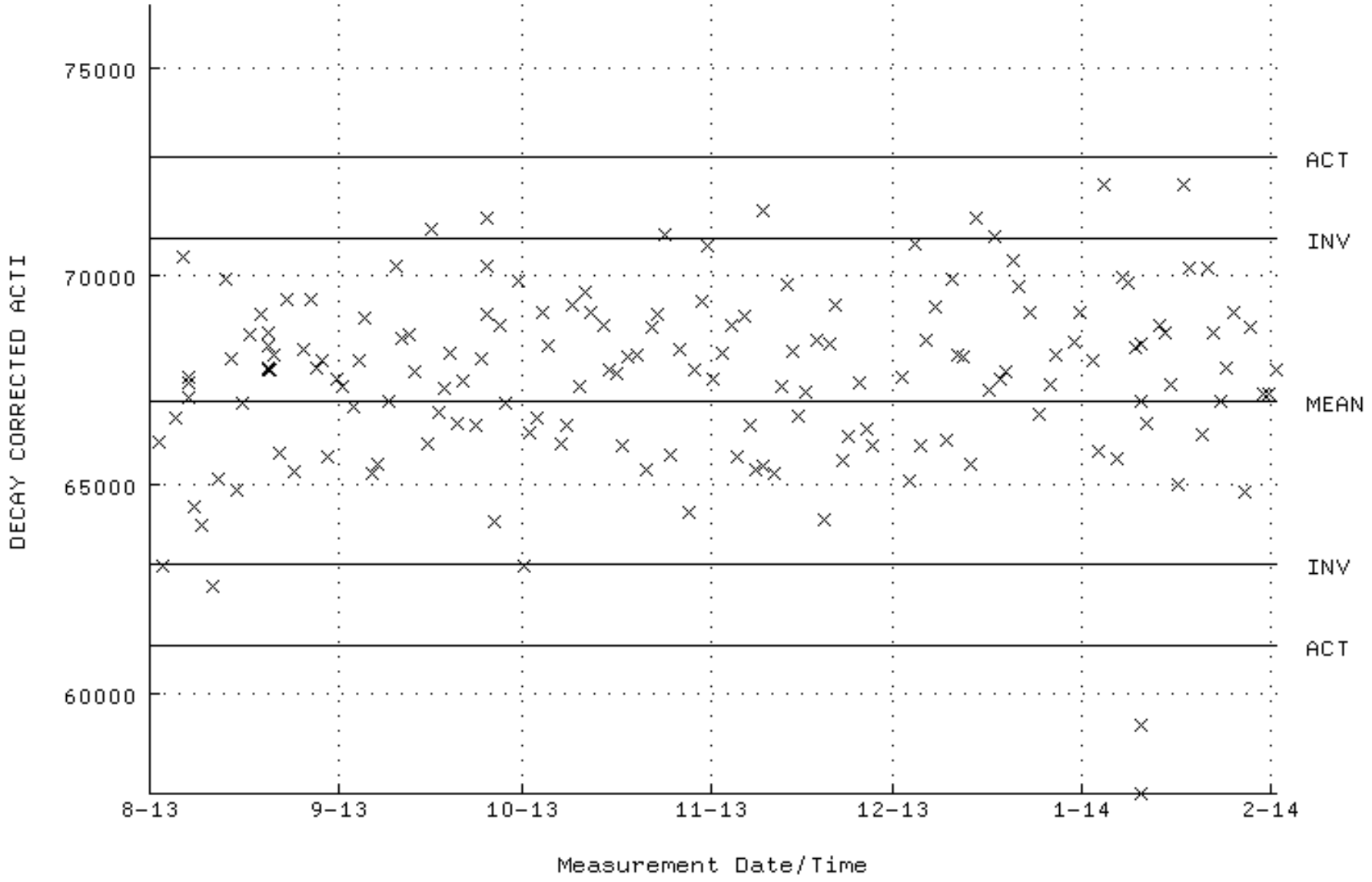
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 08:56:40 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



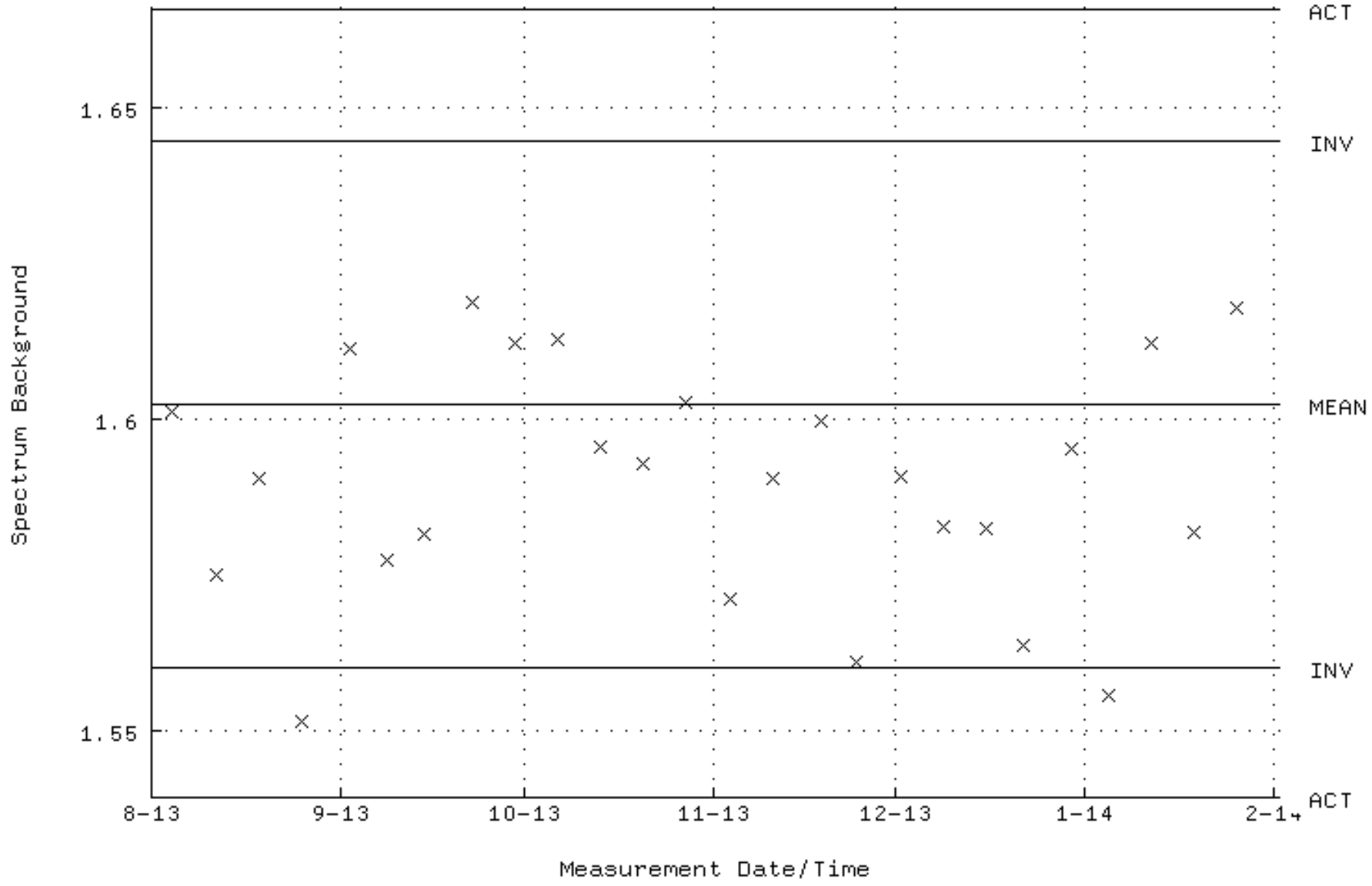
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 08:56:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.12745 +- 4.561869E-02 (4.05 %)



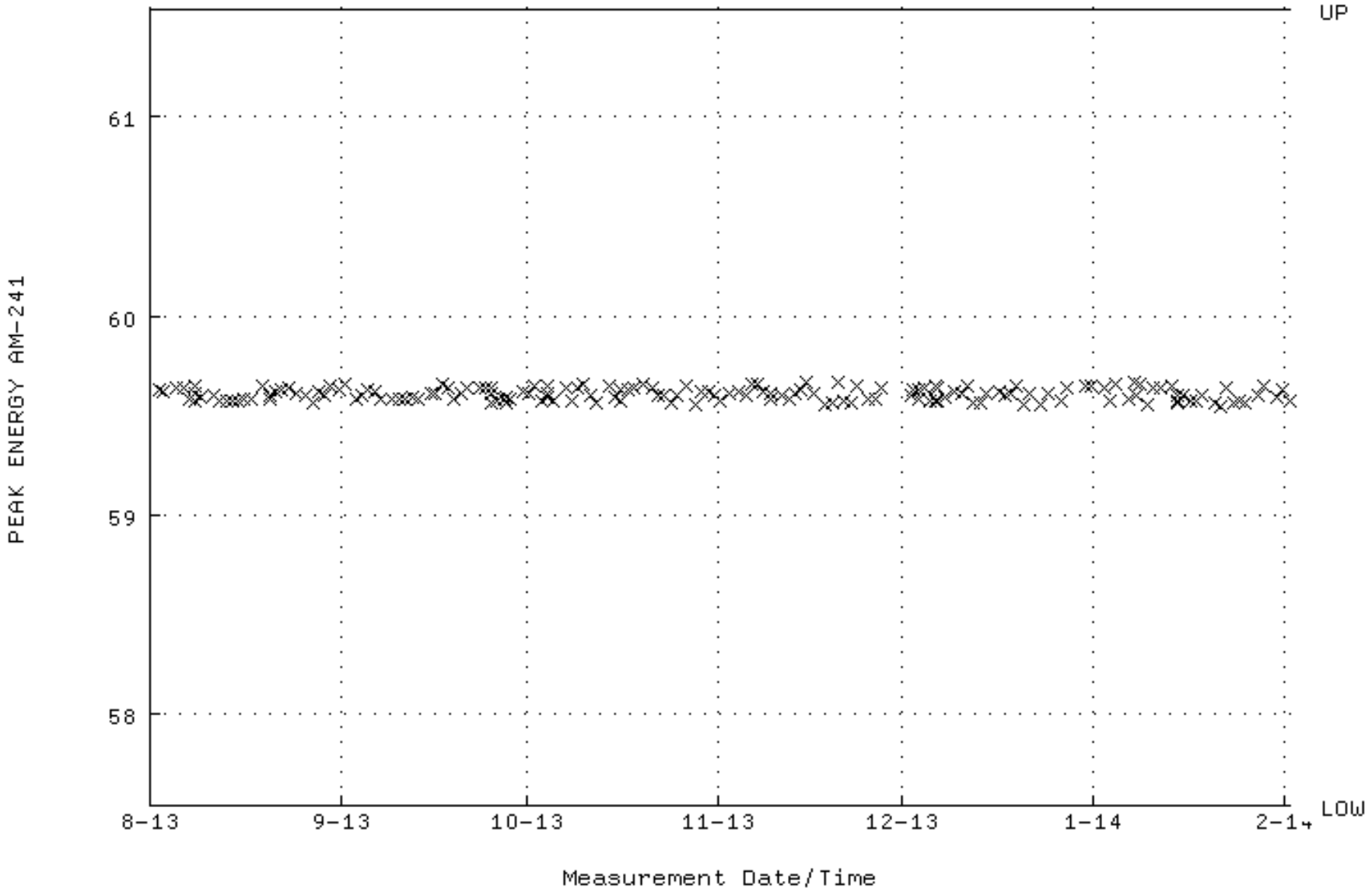
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 08:56:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 67020.3 +- 1955.01 (2.92 %)



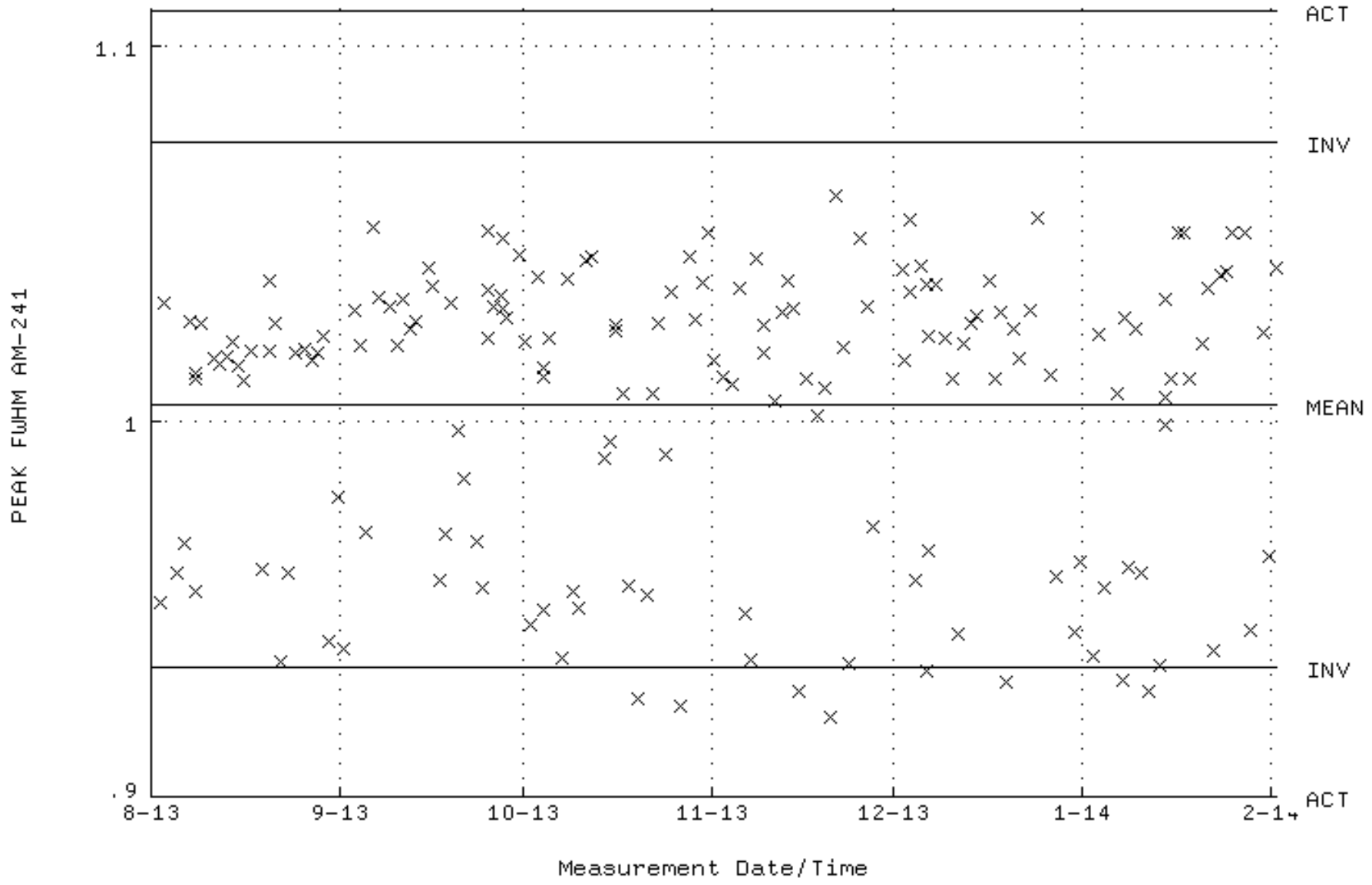
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM28.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:38 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.60249 +- 2.107004E-02 (1.31 %)



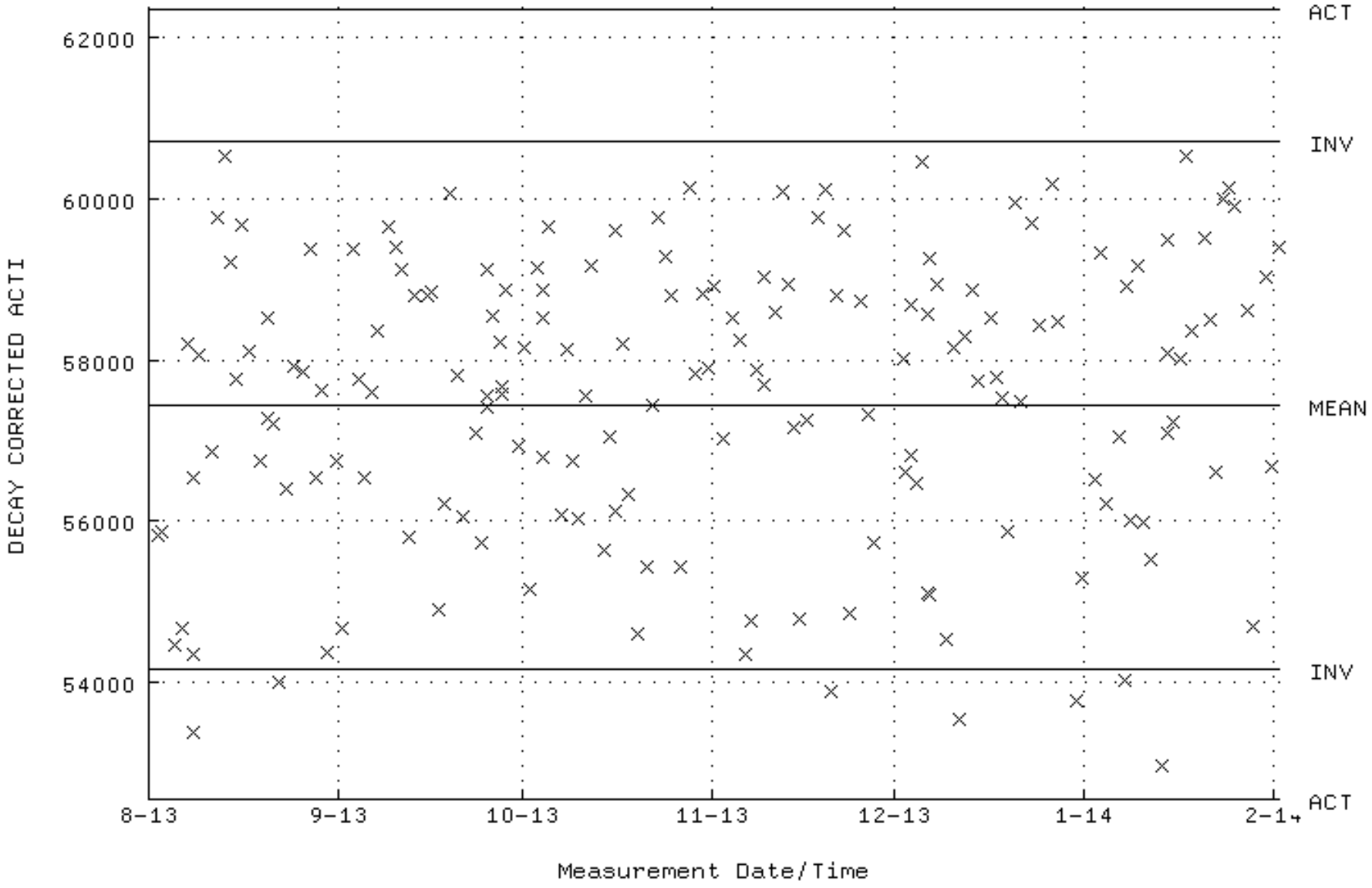
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:21 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



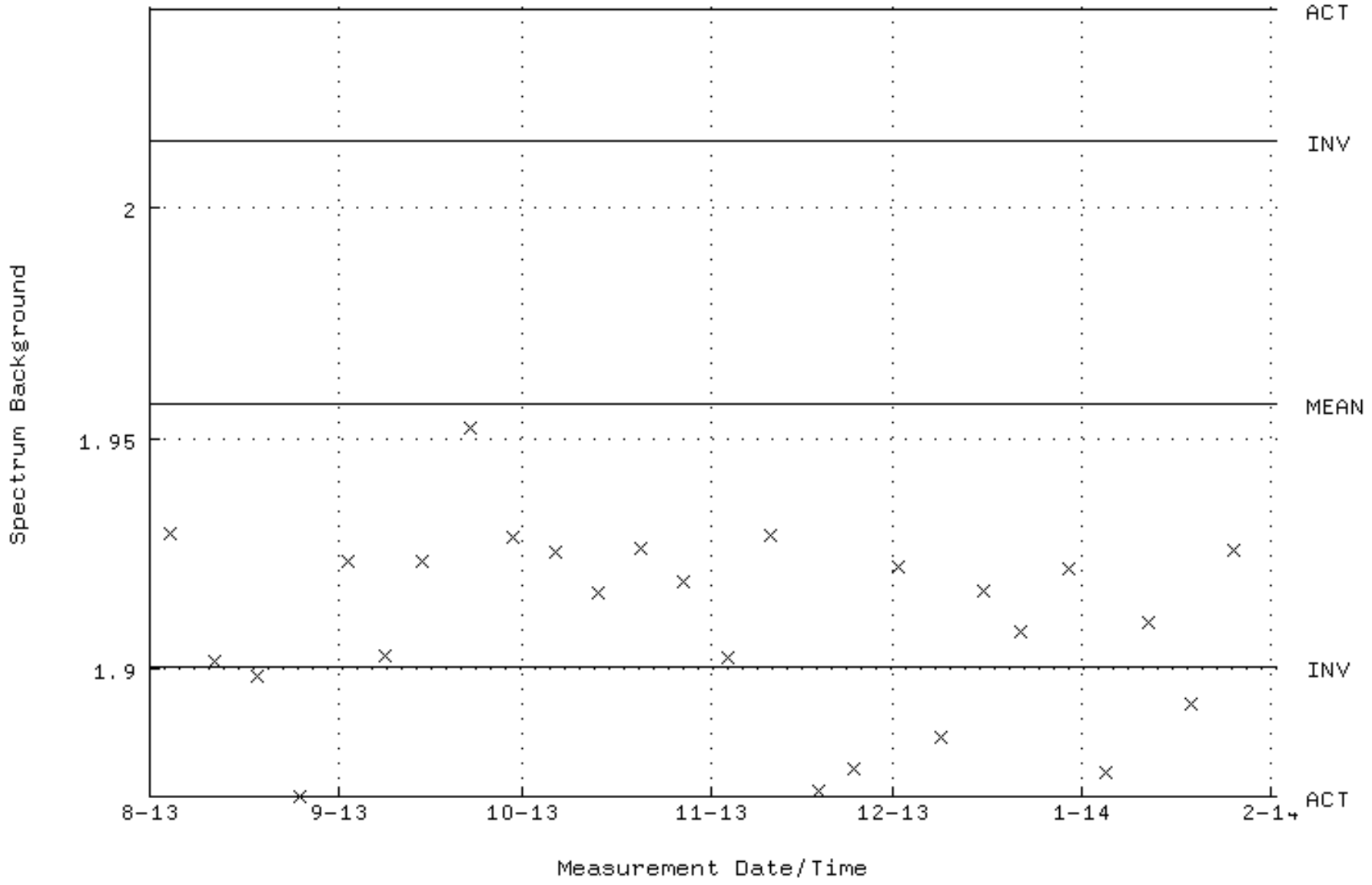
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.00467 +- 3.489131E-02 (3.47 %)



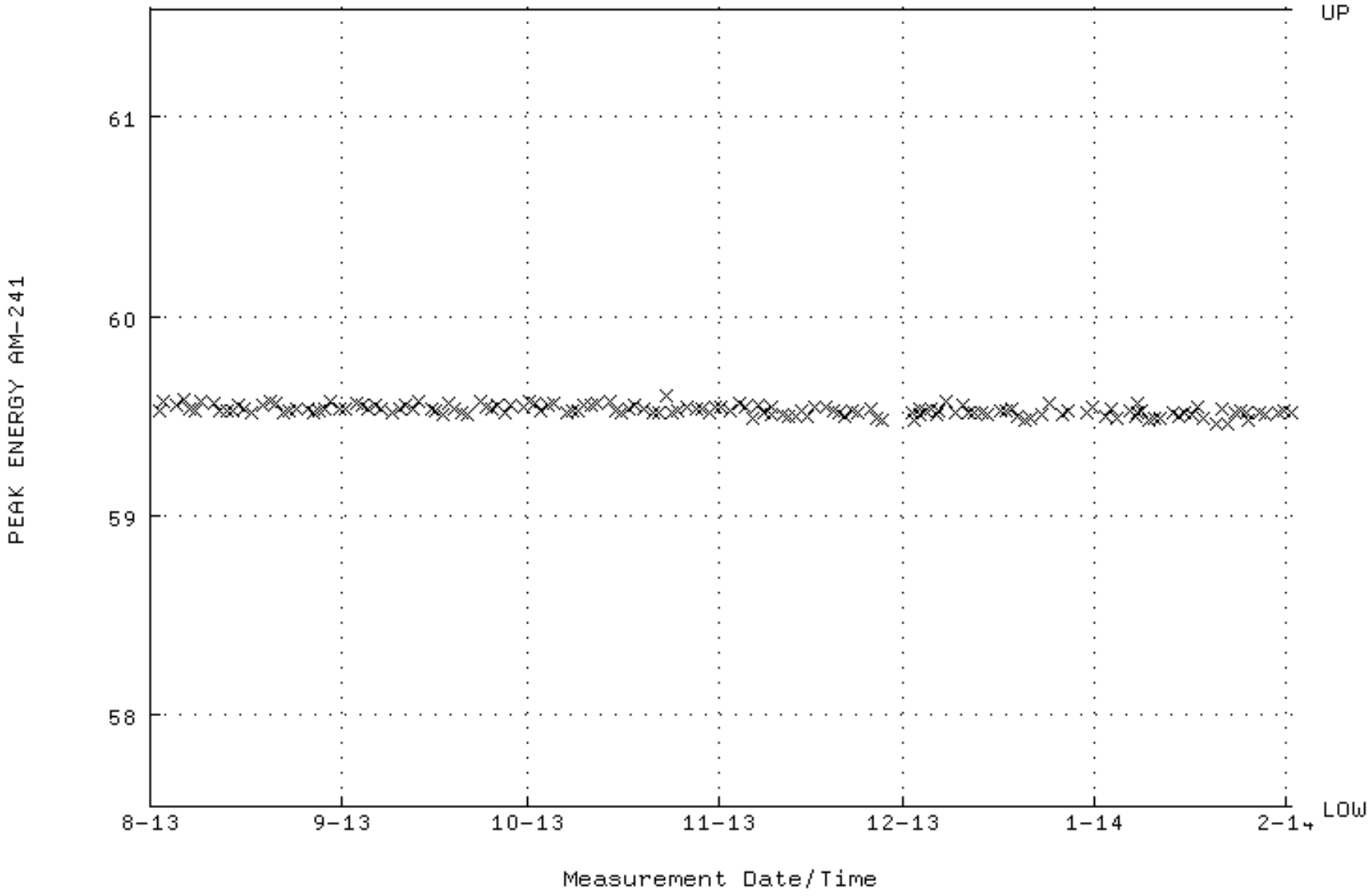
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 57448.1 +- 1629.14 (2.84 %)



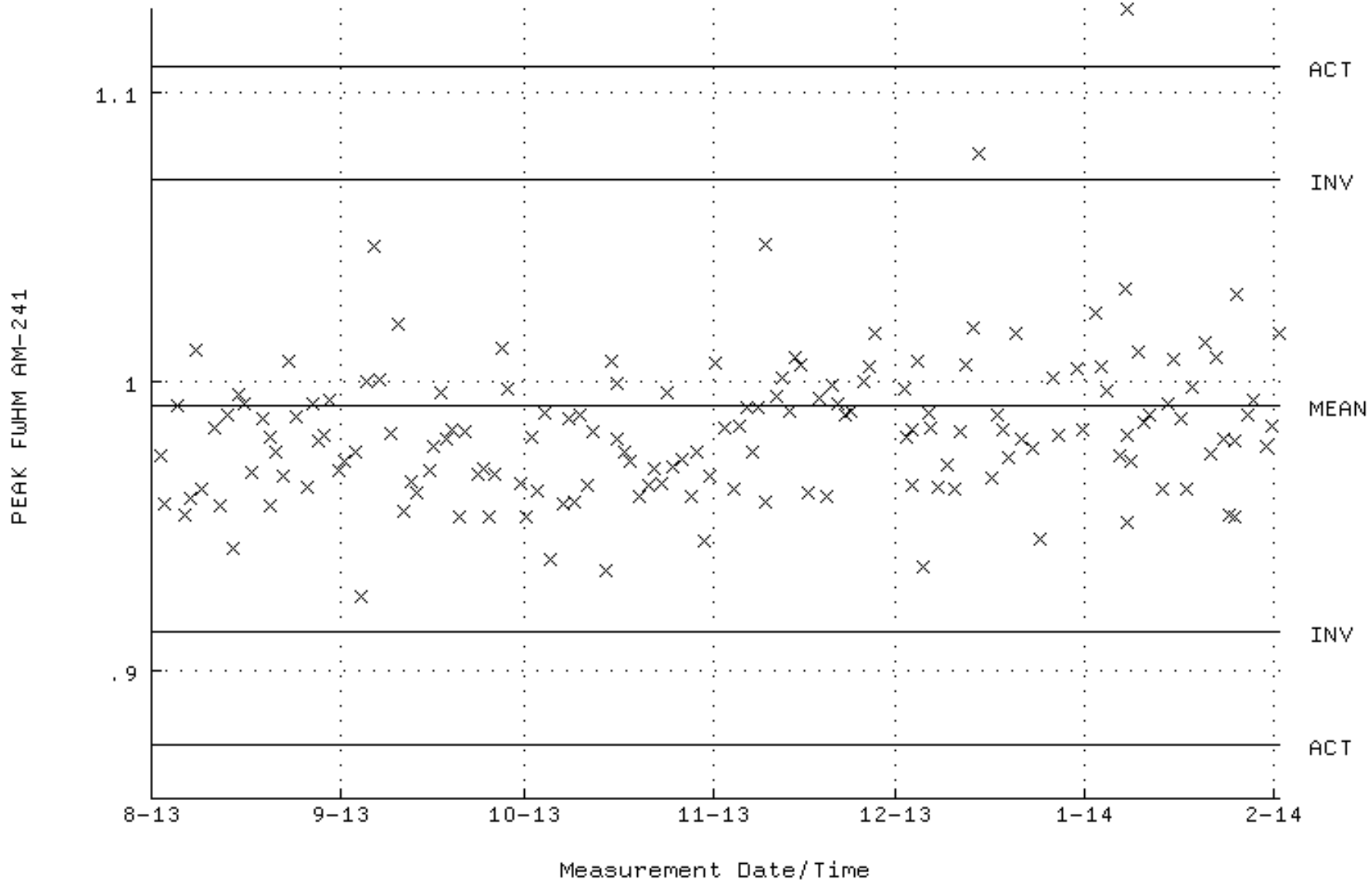
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM29.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:53 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.95762 +- 2.839290E-02 (1.45 %)



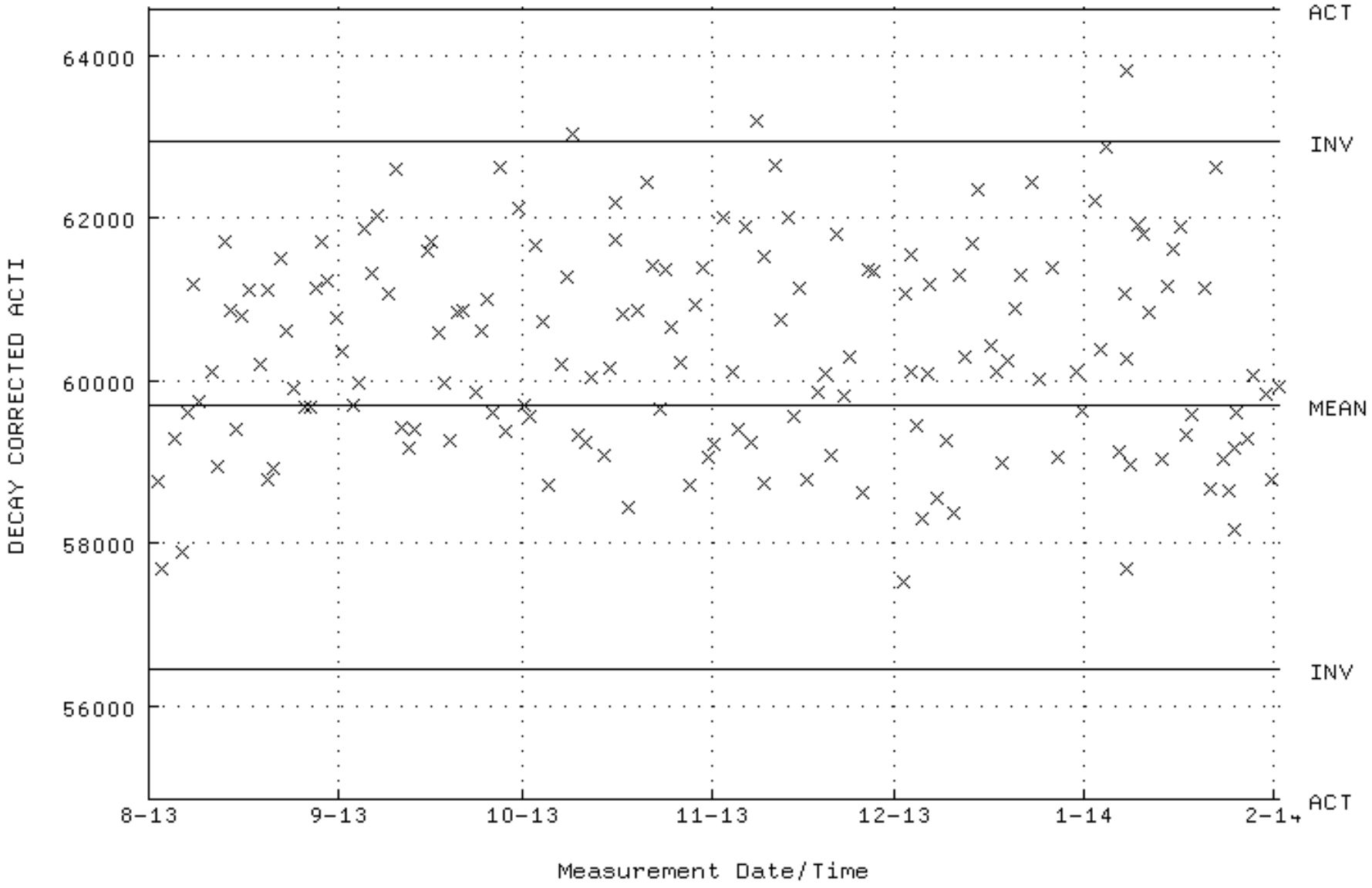
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:27 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



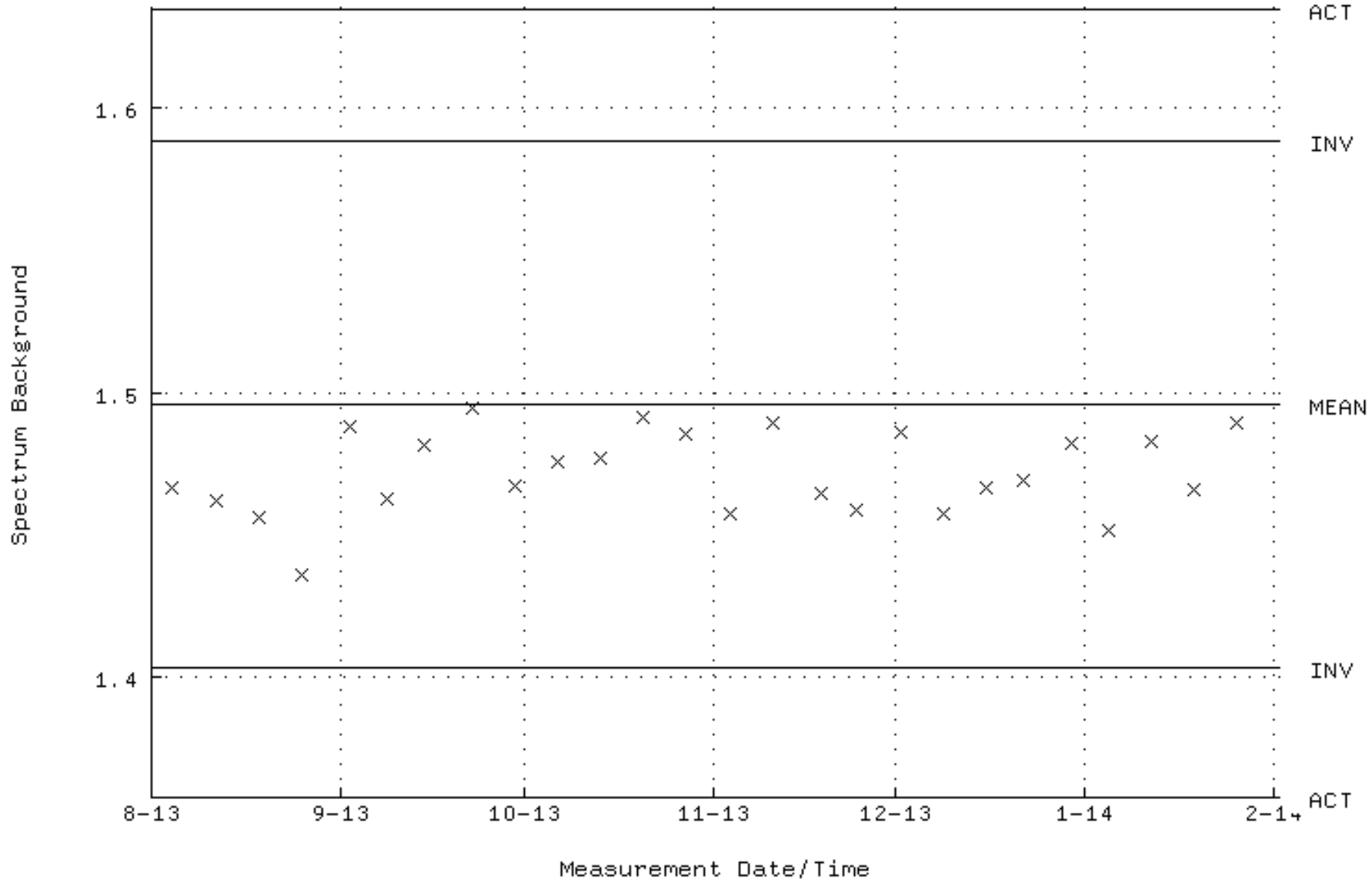
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.991793 +- 3.914304E-02 (3.95 %)



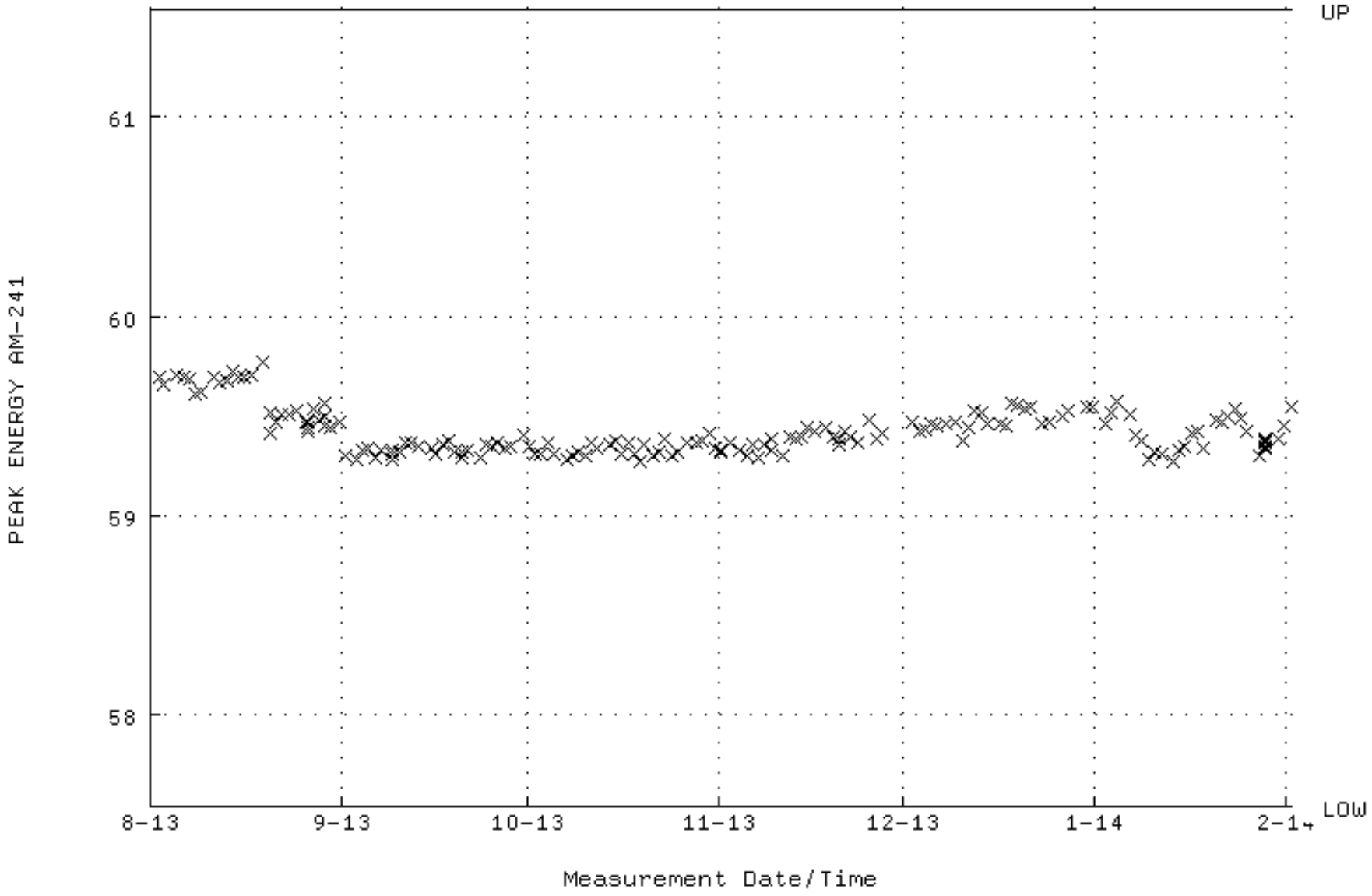
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 59710.0 +- 1618.68 (2.71 %)



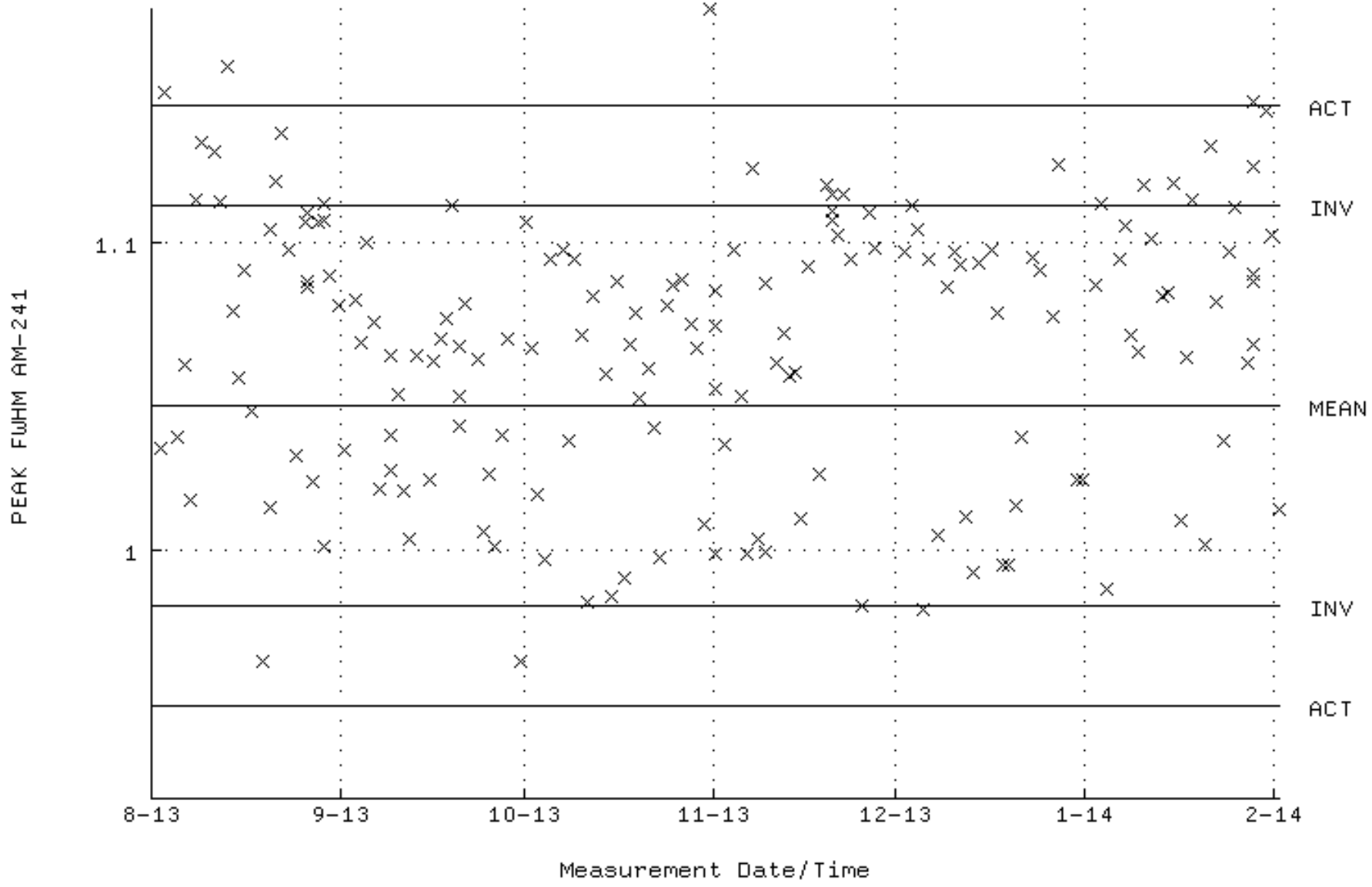
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM30.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:12:10 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.49629 +- 4.613569E-02 (3.08 %)



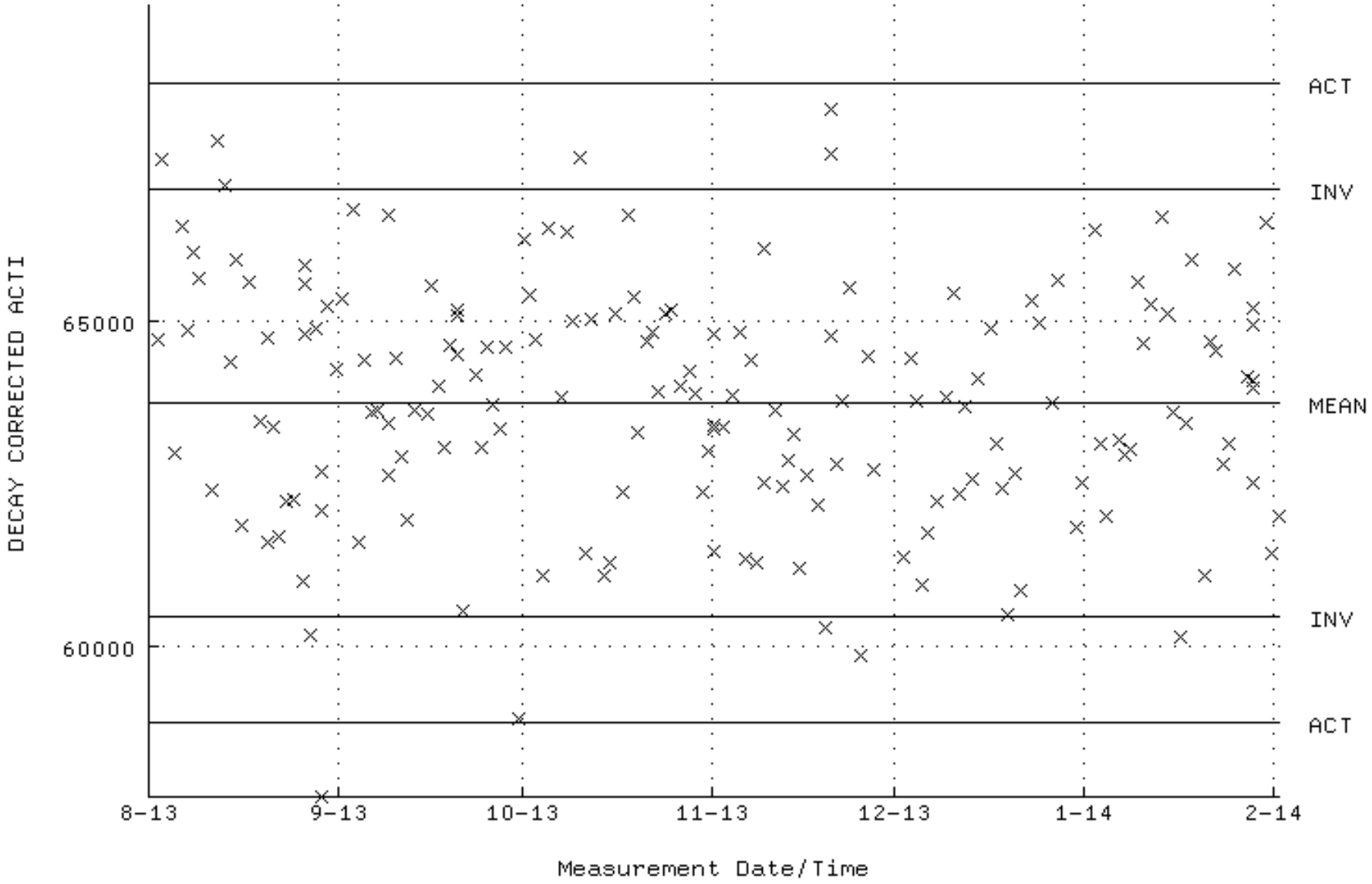
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:32 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



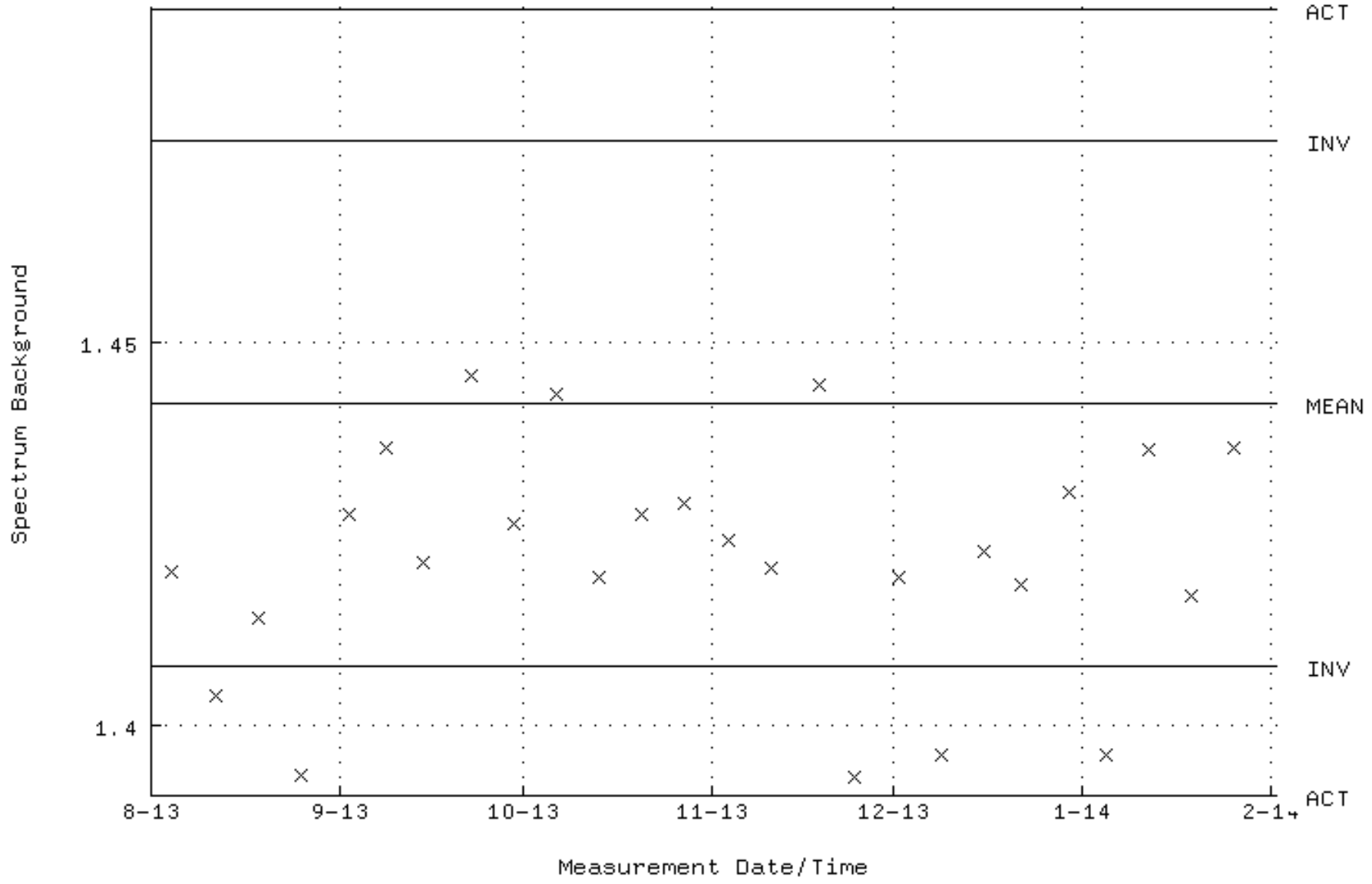
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.04735 +- 3.258776E-02 (3.11 %)



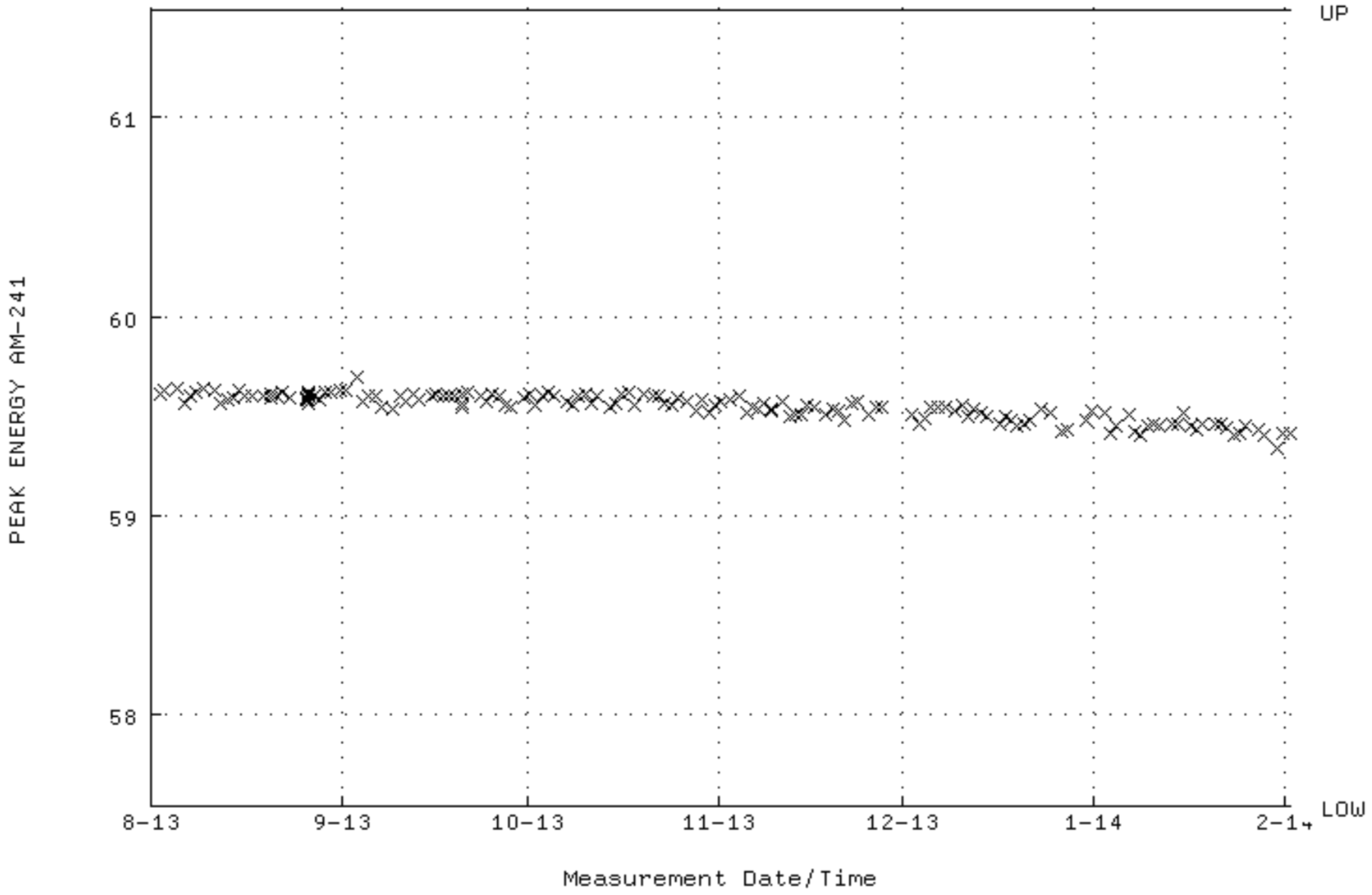
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63751.2 +- 1640.77 (2.57 %)



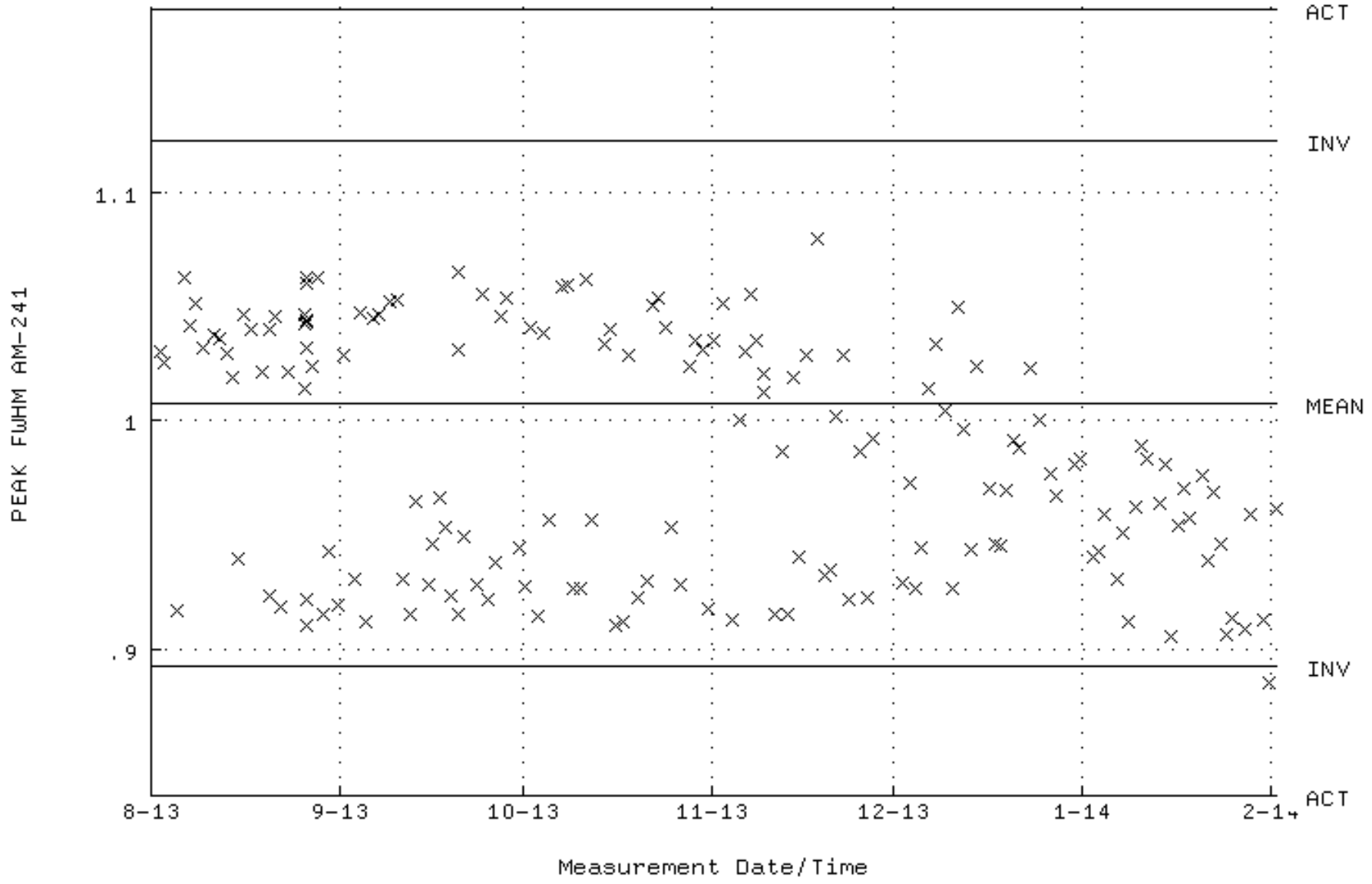
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM32.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:12:43 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.44220 +- 1.717079E-02 (1.19 %)



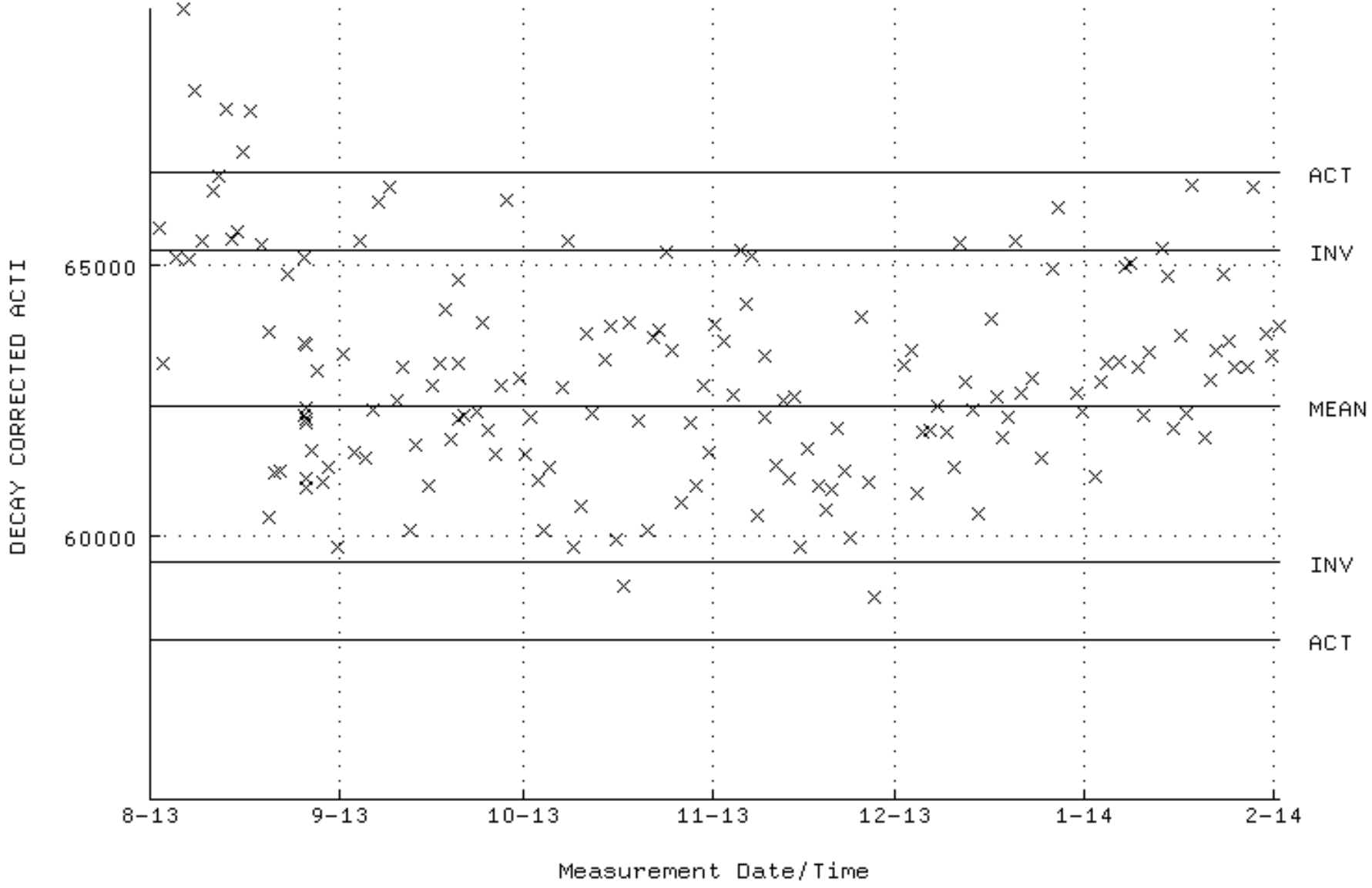
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:47:25 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



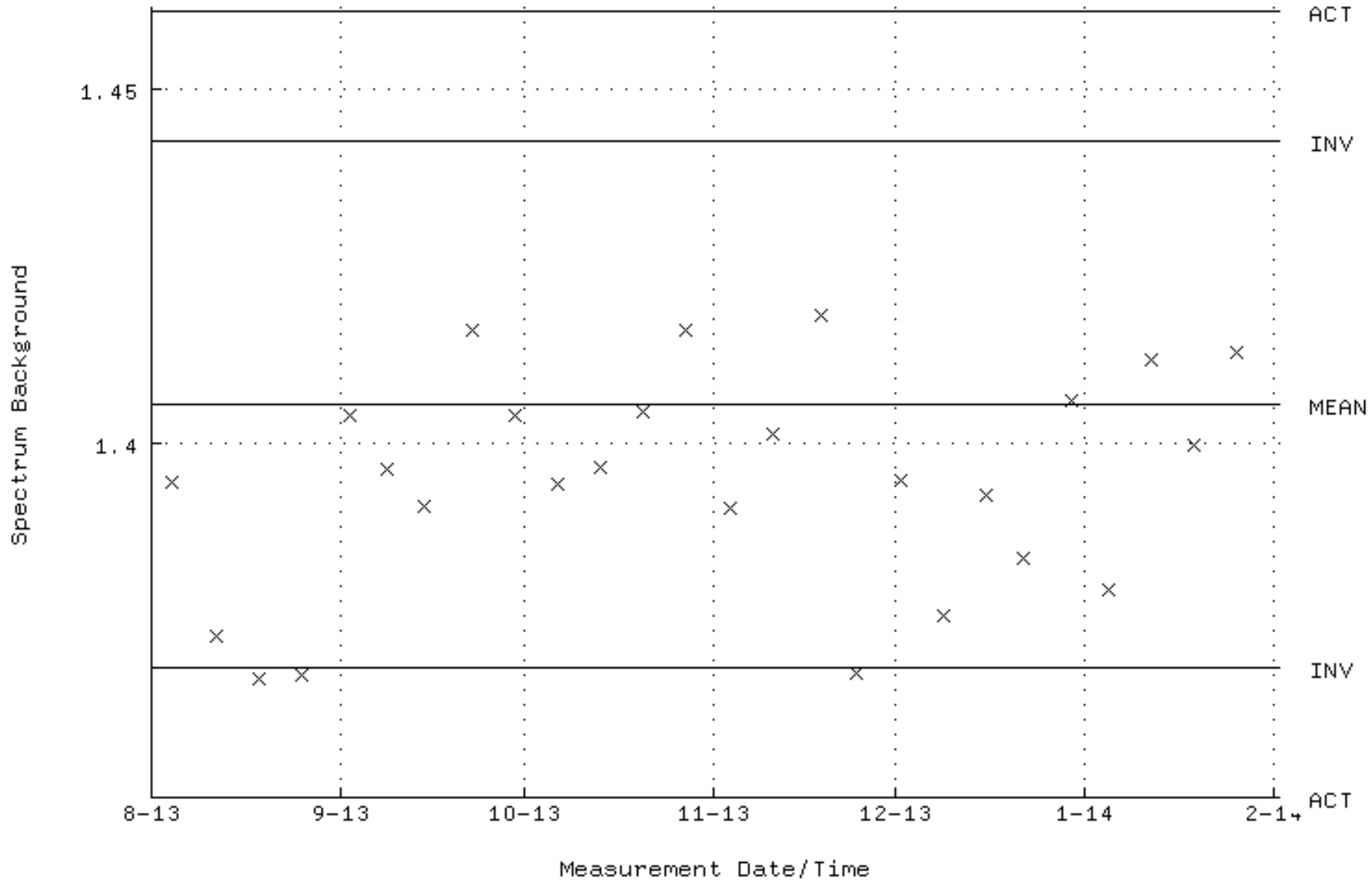
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:47:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.00788 +- 5.730930E-02 (5.69 %)



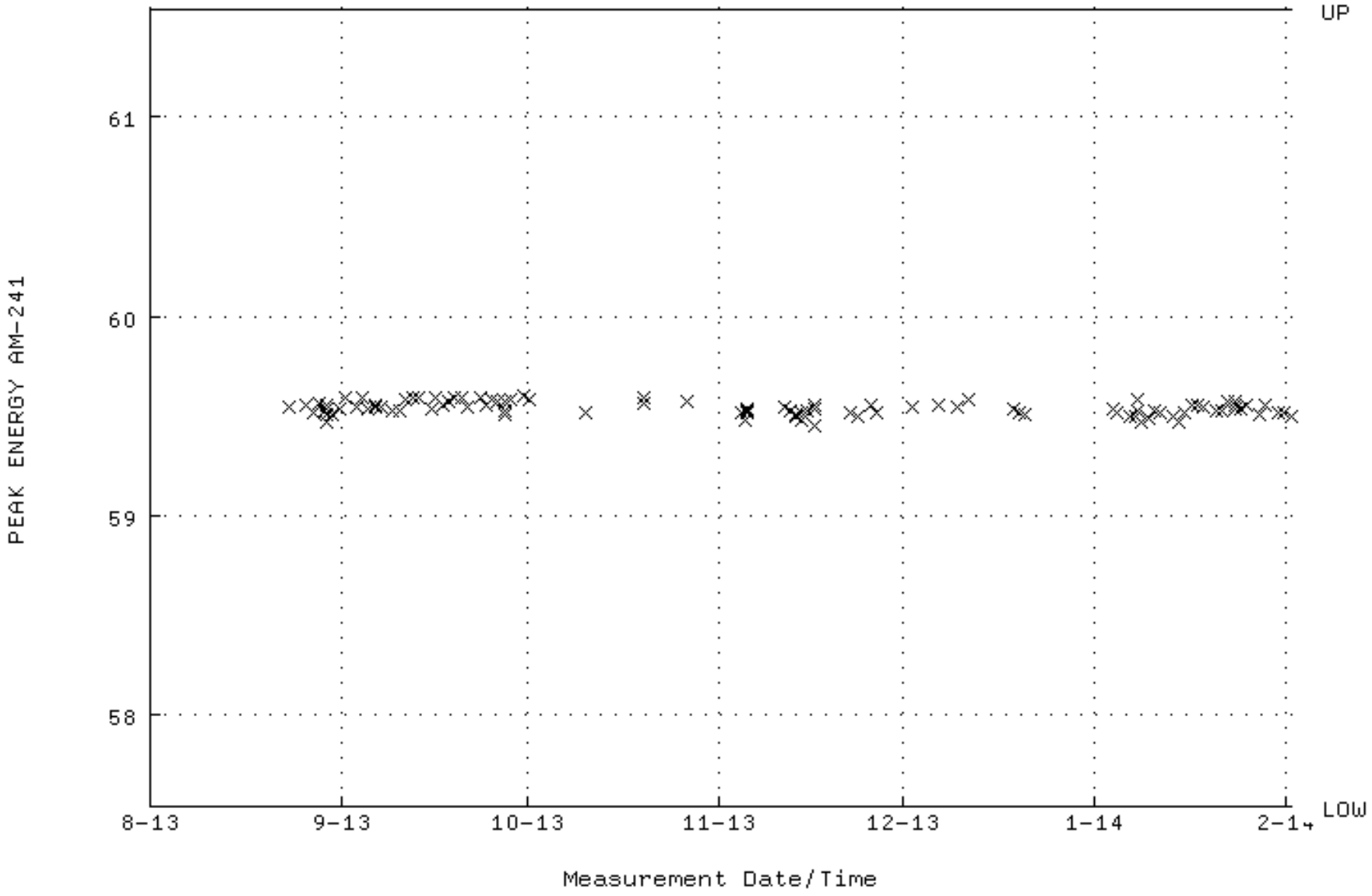
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:47:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 62415.9 +- 1434.02 (2.30 %)



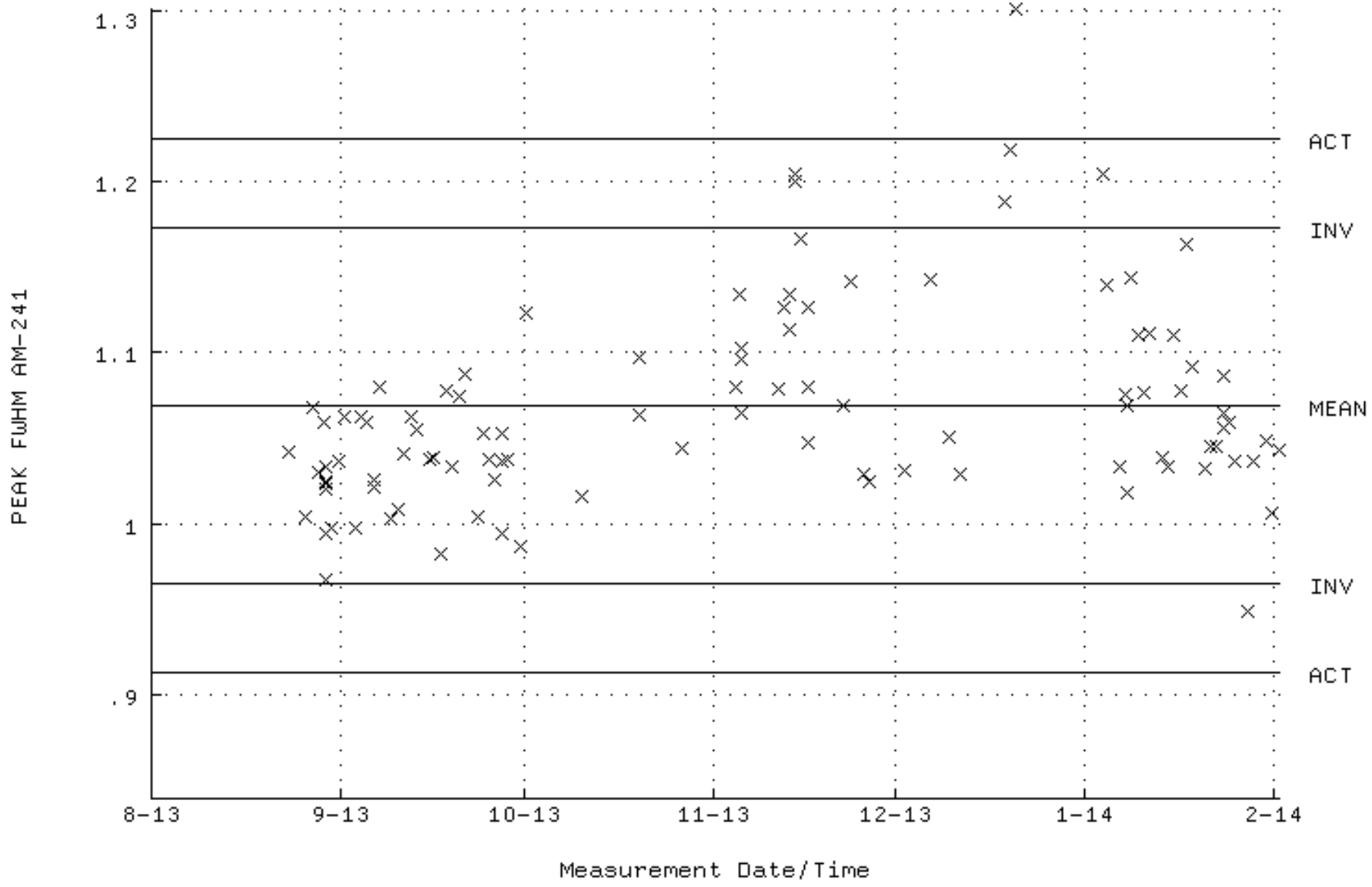
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM33.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:14:02 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.40566 +- 1.848232E-02 (1.31 %)



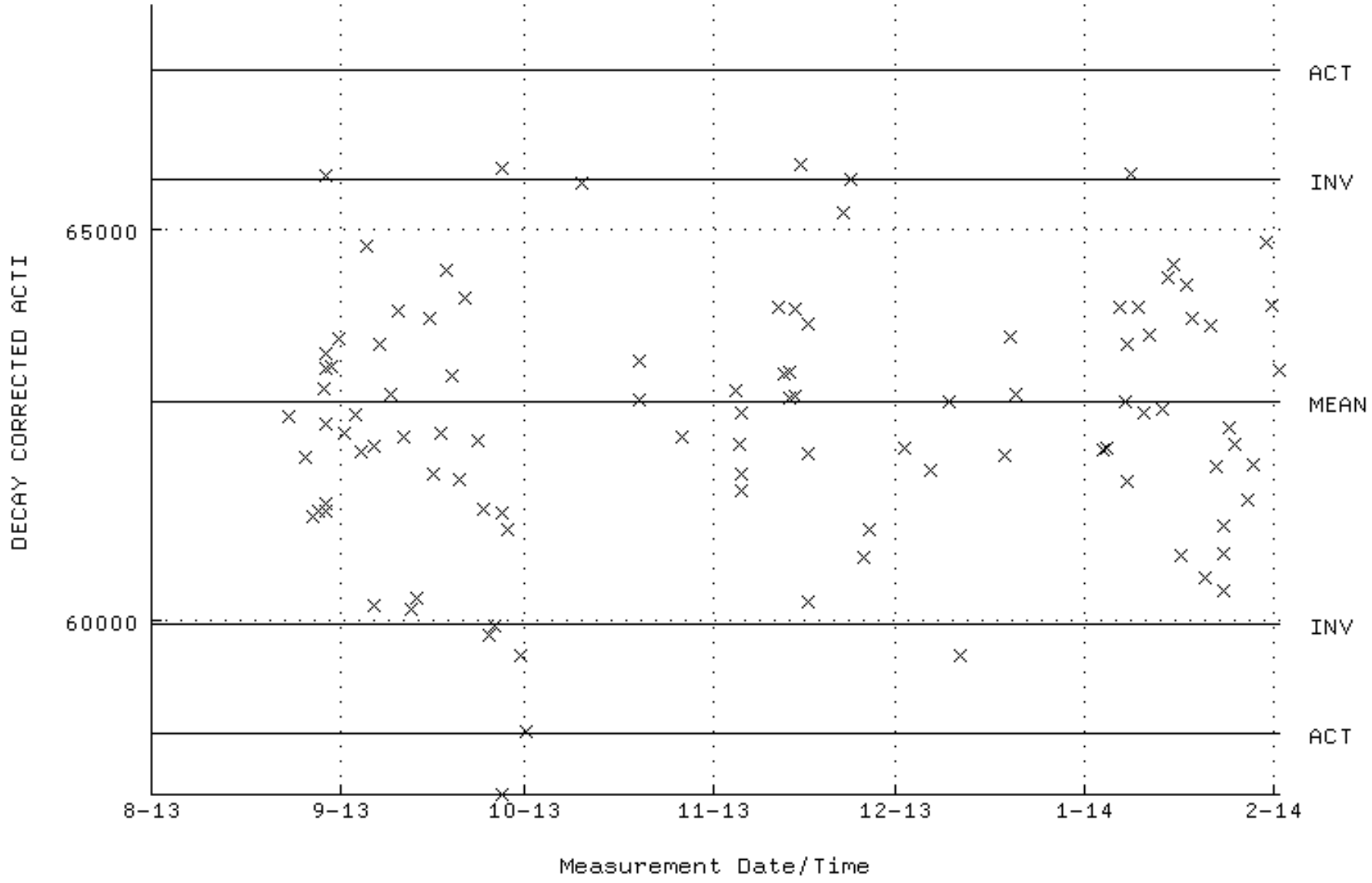
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM40_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 23-AUG-2013 10:52:57 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



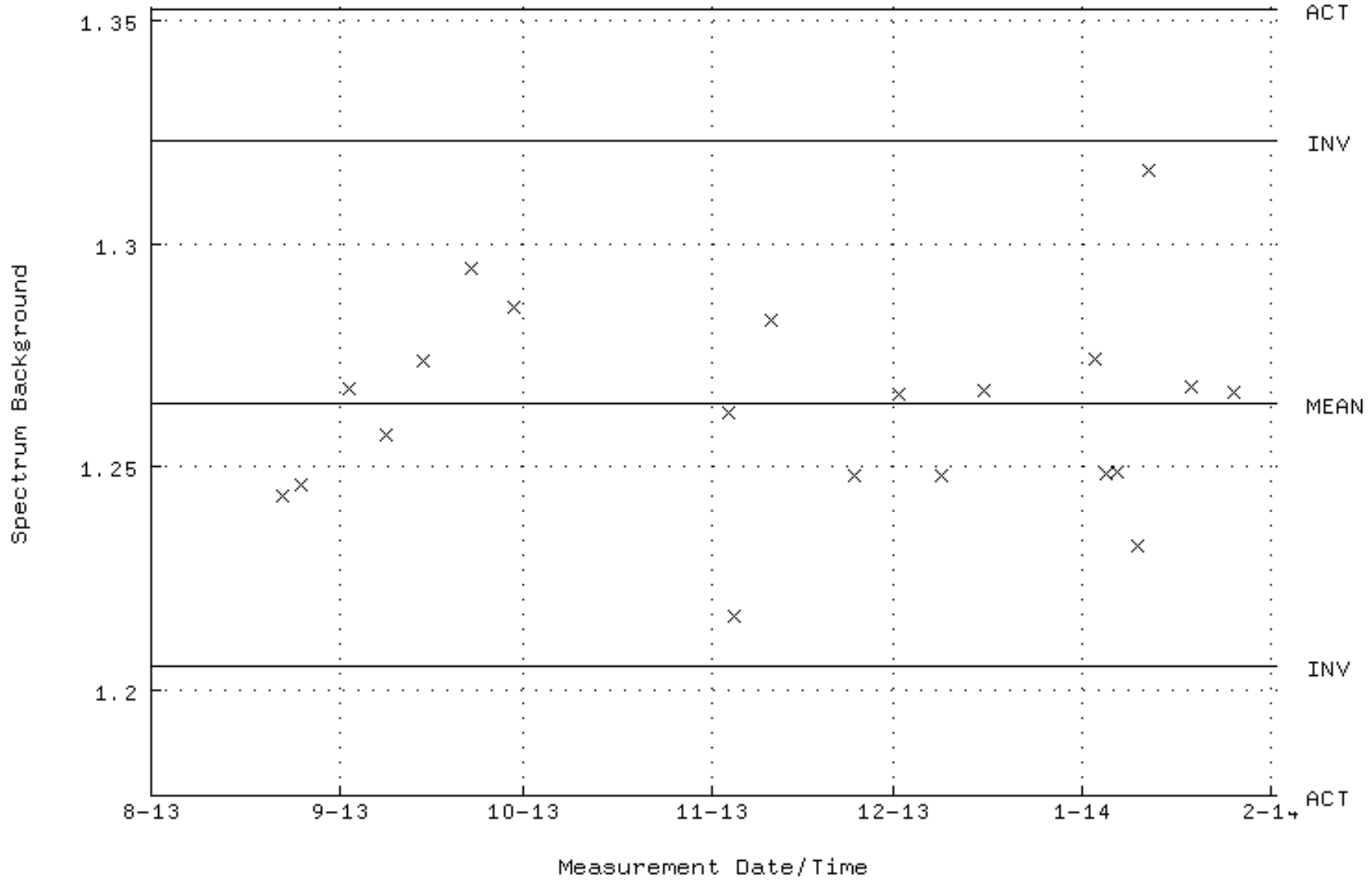
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM40_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 23-AUG-2013 10:52:57 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.06953 +- 5.224210E-02 (4.88 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM40_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 23-AUG-2013 10:52:57 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 62814.7 +- 1417.38 (2.26 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM40.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 22-AUG-2013 11:47:13 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.26434 +- 2.937377E-02 (2.32 %)



# RAD Standards Traceability

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

1605

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

## 90617

### 500 mL Solid in 500 mL Marinelli Beaker

**Customer:** GEL Laboratories, LLC
**P.O. No.:** 188182RD, Item 2
**Reference Date:** 01-Apr-2012 12:00 PM EST **Grams of Master Source:** 0.0066953

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.
Density of solid matrix 1.15 g/cc.

| Nuclide | Gamma-Ray Energy (keV) | Half-Life, Days | Master Source* γps/gram | This Source γps | Uncertainty* , % Type $u_A$ | $u_B$ | U | Calibration Method* |
|---|---|---|---|---|---|---|---|---|
| Pb-210 | 46.5 | 8.109E+03 | ——— | 1.177E+03 | 0.1 | 2.1 | 4.1 | 4π LS |
| Am-241 | 59.5 | 1.580E+05 | ——— | 7.363E+02 | 0.1 | 1.7 | 3.5 | 4π LS |
| Cd-109 | 88.0 | 4.626E+02 | 1.664E+05 | 1.114E+03 | 0.5 | 2.3 | 4.7 | HPGe |
| Co-57 | 122.1 | 2.718E+02 | 8.863E+04 | 5.934E+02 | 0.4 | 2.0 | 4.1 | HPGe |
| Ce-139 | 165.9 | 1.376E+02 | 1.239E+05 | 8.293E+02 | 0.4 | 1.9 | 3.9 | HPGe |
| Hg-203 | 279.2 | 4.661E+01 | 2.641E+05 | 1.768E+03 | 0.3 | 1.9 | 3.8 | HPGe |
| Sn-113 | 391.7 | 1.151E+02 | 1.742E+05 | 1.166E+03 | 0.4 | 1.9 | 3.9 | HPGe |
| Cs-137 | 661.7 | 1.098E+04 | 1.114E+05 | 7.459E+02 | 0.7 | 1.9 | 4.0 | HPGe |
| Y-88 | 898.0 | 1.066E+02 | 4.157E+05 | 2.783E+03 | 0.5 | 1.9 | 3.9 | HPGe |
| Zn-65 | 1115.6 | 2.441E+02 | ——— | 1.357E+03 | 0.1 | 1.7 | 3.5 | IC |
| Co-60 | 1173.2 | 1.925E+03 | 2.084E+05 | 1.395E+03 | 0.6 | 1.9 | 4.0 | HPGe |
| Co-60 | 1332.5 | 1.925E+03 | 2.084E+05 | 1.396E+03 | 0.7 | 1.9 | 4.0 | HPGe |
| Y-88 | 1836.1 | 1.066E+02 | 4.401E+05 | 2.946E+03 | 0.7 | 1.9 | 4.0 | HPGe |

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



**Corporate Office**
24937 Avenue Tibbitts Valencia, California 91355

**Laboratory**
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Source Prepared by: _____
K. Eardley, Radiochemist

QA Approved: _____ Date: 26 APR 12
J.D. McCorvey, Counting Room Manager

# Standard Logbook

**Serial ID:** 1605 **Open/Reference Date:** 01-APR-12
**Name:** Mixed Gamma- 500MLMB L **Received:** 01-APR-12
**Type:** Source Material **Expires:** 10-SEP-39
**Employee:** Maggie Stamps **Verified:** 10-SEP-13
**Supplier:** Eckert & Zeigler Analytics
**Description:** 500MLMB Calibration Standard 90617
**Comments:** None

| Analyte | Concentration | Analyte | Concentration |
|---|---|---|---|
| Americium-241 | 123058.5 dpm/mL | Cesium-137 | 52589.89 dpm/mL |
| Cobalt-60 | 83776.76 dpm/mL | | |

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1
Maggie Stamps
9/10/2013

| Isotope | Result |
|---|---|
| **Am-241** | **pCi/L** |
| Mixed Gamma N1 | 58470 |
| Mixed Gamma N2 | 60540 |
| Mixed Gamma N3 | 62880 |

Isotopic Abundance: 0.359
Certificate Value (dps): 736.3

| | | | | | |
|---|---|---|---|---|---|
| **Mean Value (Counting) =** | 60630.00 | pCi/L | **109.3777** | **Fail** | *Exception taken due to the high uncertainty of the certified value |
| **Stdev =** | 2206.377 | pCi/L | | **Rule B (Pass/Fail)** | |
| **Certificate Value =** | 55431.8 | pCi/L | | | |
| **Two sigma =** | 4412.754242 | | | | |
| **10 % of Mean =** | 6063 | | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | | |

M Stamps 9/11/13
RF. wtd 9/4/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1
Maggie Stamps
9/10/2013

| | Isotope | Result | | | |
|---|---|---|---|---|---|
| | **Cs-137** | **pCi/L** | | | |
| | Mixed Gamma N1 | 23670 | | Isotopic Abundance: | 0.851 |
| | Mixed Gamma N2 | 23850 | | Certificate Value (dps): | 745.9 |
| | Mixed Gamma N3 | 23680 | | | |
| **Mean Value (Counting) =** | 23733.33 | pCi/L | **100.1865** | **Pass** | |
| **Stdev =** | 101.160 | pCi/L | | **Rule B (Pass/Fail)** | |
| **Certificate Value =** | 23689.1 | pCi/L | | | |
| **Two sigma =** | 202.3198787 | | | | |
| **10 % of Mean =** | 2373.333333 | | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | | |

M Stamps 9/11/13
R. Feitl 9/11/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1

Maggie Stamps
9/10/2013

| Isotope | Result | | | |
|---|---|---|---|---|
| **Co-60 (1173)** | **pCi/L** | | | |
| Mixed Gamma N1 | 37100 | | Isotopic Abundance: | 0.9985 |
| Mixed Gamma N2 | 36890 | | Certificate Value (dps): | 1395 |
| Mixed Gamma N3 | 37230 | | | |
| **Mean Value (Counting) =** | 37073.33 | pCi/L | **98.18321** | **Pass** |
| **Stdev =** | 171.561 | pCi/L | | **Rule B (Pass/Fail)** |
| **Certificate Value =** | 37759.3 | pCi/L | | |
| **Two sigma =** | 343.1229129 | | | |
| **10 % of Mean =** | 3707.333333 | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | |

MStamps 9/4/13

R. Fuller 9/11/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1

Maggie Stamps
9/10/2013

| | Isotope | Result | | | |
|---|---|---|---|---|---|
| | **Co-60 (1332.50)** | **pCi/L** | | | |
| | Mixed Gamma N1 | 37690 | | Isotopic Abundance: | 0.9998 |
| | Mixed Gamma N2 | 37460 | | Certificate Value (dps): | 1396 |
| | Mixed Gamma N3 | 38010 | | | |
| **Mean Value (Counting) =** | 37720.00 | pCi/L | **99.95422** | **Pass** | |
| **Stdev =** | 276.225 | pCi/L | | **Rule B (Pass/Fail)** | |
| **Certificate Value =** | 37737.3 | pCi/L | | | |
| **Two sigma =** | 552.4490927 | | | | |
| **10 % of Mean =** | 3772 | | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | | |

M. Stamps 9/11/13

R. Futch 9/11/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Runlogs

# Instrument Run Log

**Instrument Type: GAMMA SPECTROMETER** **Batch ID: 1359492**

| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 1203017836 | LCS | RXF2 | GAM29 | FEB-10-14 11:15:33 | DONE | 500MLMB | 11-JUN-13 00:00 |
| 341146001 | SAMPLE | RXF2 | GAM08 | FEB-10-14 12:07:20 | DONE | 500MLMB | 08-JUL-13 00:00 |
| 341146002 | SAMPLE | RXF2 | GAM28 | FEB-10-14 12:07:56 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 1203017834 | MB | RXF2 | GAM33 | FEB-10-14 13:21:18 | DONE | 500MLMB | 23-AUG-13 00:00 |
| 1203017835 | DUP | RXF2 | GAM40 | FEB-10-14 13:21:47 | DONE | 500MLMB | 27-AUG-13 00:00 |
| 341146003 | SAMPLE | RXF2 | GAM01 | FEB-10-14 13:22:10 | DONE | 500MLMB | 12-DEC-13 00:00 |
| 341146004 | SAMPLE | RXF2 | GAM04 | FEB-10-14 13:22:34 | DONE | 500MLMB | 09-AUG-13 00:00 |
| 341146005 | SAMPLE | RXF2 | GAM12 | FEB-10-14 13:23:27 | DONE | 500MLMB | 14-NOV-13 00:00 |
| 341146006 | SAMPLE | RXF2 | GAM06 | FEB-10-14 13:23:49 | DONE | 500MLMB | 28-MAY-13 00:00 |
| 341146007 | SAMPLE | RXF2 | GAM07 | FEB-10-14 13:24:16 | DONE | 500MLMB | 26-JUL-13 00:00 |
| 341146008 | SAMPLE | RXF2 | GAM09 | FEB-10-14 13:24:42 | DONE | 500MLMB | 05-JUN-13 00:00 |
| 341146009 | SAMPLE | RXF2 | GAM11 | FEB-10-14 13:25:03 | DONE | 500MLMB | 11-JUL-13 00:00 |
| 341146010 | SAMPLE | RXF2 | GAM14 | FEB-10-14 13:25:23 | DONE | 500MLMB | 14-NOV-13 00:00 |
| 341146011 | SAMPLE | RXF2 | GAM17 | FEB-10-14 13:25:46 | DONE | 500MLMB | 18-JUL-13 00:00 |
| 341146012 | SAMPLE | RXF2 | GAM19 | FEB-10-14 13:26:14 | DONE | 500MLMB | 12-JUN-13 00:00 |
| 341146013 | SAMPLE | RXF2 | GAM20 | FEB-10-14 13:26:39 | DONE | 500MLMB | 11-JUN-13 00:00 |
| 341146014 | SAMPLE | RXF2 | GAM24 | FEB-10-14 13:27:00 | DONE | 500MLMB | 06-JUN-13 00:00 |
| 341146015 | SAMPLE | RXF2 | GAM25 | FEB-10-14 13:27:28 | DONE | 500MLMB | 08-NOV-13 00:00 |
| 341146016 | SAMPLE | RXF2 | GAM27 | FEB-10-14 13:27:51 | DONE | 500MLMB | 07-SEP-13 00:00 |
| 341146017 | SAMPLE | RXF2 | GAM28 | FEB-10-14 13:28:12 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 341146018 | SAMPLE | RXF2 | GAM29 | FEB-10-14 13:28:32 | DONE | 500MLMB | 11-JUN-13 00:00 |
| 341146019 | SAMPLE | RXF2 | GAM30 | FEB-10-14 13:28:54 | DONE | 500MLMB | 06-JUN-13 00:00 |
| 341146020 | SAMPLE | RXF2 | GAM32 | FEB-10-14 13:29:16 | DONE | 500MLMB | 23-AUG-13 00:00 |

# Instrument Run Log

**Instrument Type: GAMMA SPECTROMETER** **Batch ID: 1361908**

| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 341140023 | SAMPLE | RXF2 | GAM24 | FEB-12-14 11:43:07 | DONE | 500MLMB | 06-JUN-13 00:00 |
| 341140024 | SAMPLE | RXF2 | GAM28 | FEB-12-14 11:44:02 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 341140025 | SAMPLE | RXF2 | GAM32 | FEB-12-14 11:44:43 | DONE | 500MLMB | 23-AUG-13 00:00 |
| 341140026 | SAMPLE | RXF2 | GAM07 | FEB-12-14 11:45:24 | DONE | 500MLMB | 26-JUL-13 00:00 |
| 341146021 | SAMPLE | RXF2 | GAM14 | FEB-12-14 11:46:00 | DONE | JAR | 21-NOV-13 00:00 |
| 341140021 | SAMPLE | RXF2 | GAM17 | FEB-12-14 11:48:57 | DONE | 500MLMB | 18-JUL-13 00:00 |
| 341140022 | SAMPLE | RXF2 | GAM19 | FEB-12-14 11:49:54 | DONE | 500MLMB | 12-JUN-13 00:00 |
| 341146022 | SAMPLE | RXF2 | GAM22 | FEB-12-14 11:52:15 | DONE | JAR | 07-OCT-13 00:00 |
| 341146023 | SAMPLE | RXF2 | GAM18 | FEB-12-14 11:52:51 | DONE | JAR | 07-MAR-13 00:00 |
| 341146024 | SAMPLE | RXF2 | GAM04 | FEB-12-14 11:53:30 | DONE | JAR | 12-MAR-13 00:00 |
| 341147021 | SAMPLE | RXF2 | GAM01 | FEB-12-14 14:29:36 | DONE | 500MLMB | 12-DEC-13 00:00 |
| 341147022 | SAMPLE | RXF2 | GAM03 | FEB-12-14 14:30:08 | DONE | 500MLMB | 08-AUG-13 00:00 |
| 341147023 | SAMPLE | RXF2 | GAM05 | FEB-12-14 14:30:33 | DONE | JAR | 18-SEP-13 00:00 |
| 341147024 | SAMPLE | RXF2 | GAM06 | FEB-12-14 14:31:00 | DONE | JAR | 18-MAR-13 00:00 |
| 341148019 | SAMPLE | RXF2 | GAM07 | FEB-12-14 14:31:25 | DONE | JAR | 21-MAR-13 00:00 |
| 341148020 | SAMPLE | RXF2 | GAM09 | FEB-12-14 14:31:50 | DONE | 500MLMB | 05-JUN-13 00:00 |
| 341148021 | SAMPLE | RXF2 | GAM11 | FEB-12-14 14:32:19 | DONE | JAR | 25-MAR-13 00:00 |
| 341148022 | SAMPLE | RXF2 | GAM12 | FEB-12-14 14:32:52 | DONE | 500MLMB | 14-NOV-13 00:00 |
| 1203023699 | MB | RXF2 | GAM27 | FEB-12-14 14:36:55 | DONE | 500MLMB | 07-SEP-13 00:00 |
| 1203023700 | DUP | RXF2 | GAM28 | FEB-12-14 14:38:29 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 1203023701 | LCS | RXF2 | GAM11 | FEB-12-14 16:15:51 | DONE | 500MLMB | 11-JUL-13 00:00 |

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GEL Laboratories LLC
a member of The GEL Group INC

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www.gel.com

# Packing Slip:

**ITSI Gilbane Company**
**Hunter's Point Rad Analysis - Total Sr**
**SDG: 345763**
**Attn:Kriston Carlyon**

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# DODQSM Cover Sheet

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# DOD-QSM Cover Sheet

## Hunter's Point Rad Analysis - Total Sr

April 14, 2014

**GEL Laboratories, LLC**
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Project Manager:** Heather Shaffer
**Phone Extension:** 4505
**Email:** Heather.Shaffer@gel.com

**Contract Purchase Order:** 9259-07204.0004 9259-07204.0004

**Work Order:** 345763 **SDG:** 345763

**Client Contact:**
Kriston Carlyon
ITSI Gilbane Company
2730 Shadelands Drive
Walnut Creek, California 94598

**Project Identification:** Hunter's Point Rad Analysis - Total Sr

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 11, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,

Heather Shaffer

Heather Shaffer
Project Manager


problem solved

# Case Narrative

**DODQSM Case Narrative**
**for**
**ITSI Gilbane Company**
**SDG: 345763**

**April 14, 2014**

**Laboratory Identification:**

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on December 11, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. All samples under this SDG were relogged per client request.

**Sample Identification** The laboratory received the following samples:

| Laboratory ID | Client ID |
|---|---|
| 345763001 | 04-PDV-RT1300-08-0007 |
| 345763002 | 04-PDV-RT1300-08-0008 |
| 345763003 | 04-PDV-RT1300-08-0020 |

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

Heather Shaffer

Heather Shaffer
Project Manager

# Chain of Custody and Supporting Documentation

Relog 345763

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

COC # HPSD1-0034

Gilbane

~~339224~~ Relog 341146

| | |
|---|---|
| Project Name: HPSD1 | Laboratory: Curtis & Tompkins, Berkeley, CA |
| Project Number: 07204.0004 | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| WBS Code: 0058000 | Ship to: 2323 5th St., Berkley, CA 94710 |

Comments:

Equipment:

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250639 11/8/13 BIN 10

Analytical Test Method: E901.1 - Solid Ra-226 and CS-137; GS186 - Ra-226 and CS-137 Screening

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 | GS186 | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-08-0001 | SN | 11/7/2013 | 0930 | JL | X | | RT1300-08-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-08-0002 | SN | 11/7/2013 | 0936 | JL | X | | RT1300-08-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-08-0003 | SN | 11/7/2013 | 0939 | JL | X | | RT1300-08-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-08-0004 | SN | 11/7/2013 | 0949 | JL | X | | RT1300-08-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-08-0005 | SN | 11/7/2013 | 0953 | JL | X | | RT1300-08-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-08-0006 | SN | 11/7/2013 | 0958 | JL | X | | RT1300-08-0006 | N1 | 0.00 | 0.00 |
| * 7 | 04-PDV-RT1300-08-0007 | SN | 11/7/2013 | 1004 | JL | X | | RT1300-08-0007 | N1 | 0.00 | 0.00 |
| * 8 | 04-PDV-RT1300-08-0008 | SN | 11/7/2013 | 1009 | JL | X | | RT1300-08-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-08-0009 | SN | 11/7/2013 | 1012 | JL | X | | RT1300-08-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-08-0010 | SN | 11/7/2013 | 1018 | JL | X | | RT1300-08-0010 | N1 | 0.00 | 0.00 |

Cooler # 4 — Turnaround Time: 0 Days

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| [signature] | 12/10/13 | 0953 | [signature] | 12-10-13 | 0953 |
| | | | [signature] | 121113 | ~~1020~~ 1030 |
| | | | | | |

Shipping Date / Carrier / Airbill Number

Shipping Date: 11/8/2013

Recevied by Laboratory: (Signature, Date, Time) & condition

[signature] 11/08/13 1055 OK

Page 1 of 3

DCN: ITSI-0808-0004-0076, 8 May 2019

M-8902

DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag, |

250639 11/8/13 @ BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-08-0011 | SN | 11/7/2013 | 1022 | JL | X | | RT1300-08-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-08-0012 | SN | 11/7/2013 | 1026 | JL | X | | RT1300-08-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-08-0013 | SN | 11/7/2013 | 1029 | JL | X | | RT1300-08-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-08-0014 | SN | 11/7/2013 | 1033 | JL | X | | RT1300-08-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-08-0015 | SN | 11/7/2013 | 1037 | JL | X | | RT1300-08-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-08-0016 | SN | 11/7/2013 | 1042 | JL | X | | RT1300-08-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-08-0017 | SN | 11/7/2013 | 1100 | JL | X | | RT1300-08-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-08-0018 | SN | 11/7/2013 | 1110 | JL | X | | RT1300-08-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-08-0019 | SN | 11/7/2013 | 1115 | JL | X | | RT1300-08-0019 | N1 | 0.00 | 0.00 |
| * 20 | 04-PDV-RT1300-08-0020 | SN | 11/7/2013 | 1120 | JL | X | | RT1300-08-0020 | N1 | 0.00 | 0.00 |
| Cooler # 4 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| R. Stritz | 12/10/13 | 0953 | [signature] | 12-10-13 | 0953 |
| | | | [signature] | 12/11/13 | 1030 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11/08/13 1055 OK

**Subject:** Total Stronium Request for Wood Chip Samples - SDGs 341140 through 341148
**From:** "Carlyon, Peyton Kristen" <KCarlyon@GilbaneCo.com>
**Date:** 4/2/2014 4:55 PM
**To:** Heather Shaffer <Heather.Shaffer@gel.com>
**CC:** "Palser, Ed" <EPalser@GilbaneCo.com>, "Hess, Jeffrey (ITSI)" <J.Hess@gilbaneco.com>, "Hess, Rachel" <RHess@GilbaneCo.com>

Hi Heather,

We would like to request Total Strontium/Sr-90 if necessary for the following samples:

| FLDSAMPID | SDG | LABCODE |
|---|---|---|
| 04-PDV-RT1300-01-0002 | 341141 | GELC |
| 04-PDV-RT1300-01-0015 | 341141 | GELC |
| 04-PDV-RT1300-01-0016 | 341141 | GELC |
| 04-PDV-RT1300-02-0004 | 341142 | GELC |
| 04-PDV-RT1300-02-0015 | 341142 | GELC |
| 04-PDV-RT1300-02-0017 | 341142 | GELC |
| 04-PDV-RT1300-03-0002 | 341143 | GELC |
| 04-PDV-RT1300-03-0006 | 341143 | GELC |
| 04-PDV-RT1300-03-0022 | 341143 | GELC |
| 04-PDV-RT1300-04-0014 | 341144 | GELC |
| 04-PDV-RT1300-04-0019 | 341144 | GELC |
| 04-PDV-RT1300-04-0024 | 341144 | GELC |
| 04-PDV-RT1300-05-0009 | 341145 | GELC |
| 04-PDV-RT1300-05-0020 | 341145 | GELC |
| 04-PDV-RT1300-05-0021 | 341145 | GELC |
| 04-PDV-RT1300-06-0008 | 341140 | GELC |
| 04-PDV-RT1300-06-0018 | 341140 | GELC |
| 04-PDV-RT1300-06-0021 | 341140 | GELC |
| 04-PDV-RT1300-07-0010 | 341148 | GELC |

| | | |
|---|---|---|
| 04-PDV-RT1300-07-0013 | 341148 | GELC |
| 04-PDV-RT1300-07-0023 | 341148 | GELC |
| 04-PDV-RT1300-08-0007 | 341146 | GELC |
| 04-PDV-RT1300-08-0008 | 341146 | GELC |
| 04-PDV-RT1300-08-0020 | 341146 | GELC |
| 04-PDV-RT1300-09-0006 | 341147 | GELC |
| 04-PDV-RT1300-09-0015 | 341147 | GELC |
| 04-PDV-RT1300-09-0023 | 341147 | GELC |

Please bill to our PO with you (9259-07204.0004). Please let me know if you need additional information.

Thanks,
Kristen

**Please note my new email address: kcarlyon@gilbaneco.com**

Kristen Carlyon | Senior Chemist | **Gilbane**
2730 Shadelands Drive | Walnut Creek, CA, 94598
ph: 925.946.3180 | cell: 925.525.9050 | www.gilbaneco.com

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# Laboratory Certifications

**List of current GEL Certifications as of 14 April 2014**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−14−9 |
| Utah NELAP | SC000122013−11 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780−12 |
| Wisconsin | 999887790 |

# Radiological Analysis

**Radiochemistry Case Narrative**
**ITSI Gilbane Company (ITSI)**
**SDG 345763**

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **GFPC, Total Sr, Solid** |
| Analytical Method: | EPA 905.0 Modified |
| Analytical Batch Number: | 1377649 |

| Sample ID | Client ID |
|---|---|
| 345763001 | 04-PDV-RT1300-08-0007 |
| 345763002 | 04-PDV-RT1300-08-0008 |
| 345763003 | 04-PDV-RT1300-08-0020 |
| 1203062517 | Method Blank (MB) |
| 1203062518 | 345763001(04-PDV-RT1300-08-0007) Sample Duplicate (DUP) |
| 1203062519 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 345763001 (04-PDV-RT1300-08-0007).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Chemical Recoveries**
All chemical recoveries meet the required acceptance limits for this sample set.

**Recounts**
Sample 1203062519 (LCS) was recounted due to a detector lock out condition. The recount is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Qualifier Definition Report
for

ITSI003 ITSI Gilbane Company

Client SDG: 345763 GEL Work Order: 345763

**The Qualifiers in this report are defined as follows:**

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:** **Name: Kate Gellatly**

**Date: 15 APR 2014** **Title: Analyst I**

# Sample Data Summary

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive
Walnut Creek, California 94598
Report Date: April 15, 2014
Contact: Ms. Kristen Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-08-0007
Sample ID: 345763001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.131 | +/-0.102 | 0.165 | +/-0.107 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1253 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 72.0 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 15, 2014

Contact: Ms. Kristen Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-08-0008
Sample ID: 345763002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.0297 | +/-0.0791 | 0.139 | +/-0.0794 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1304 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 69.5 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 15, 2014

Contact: Ms. Kristen Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-08-0020
Sample ID: 345763003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | -0.0482 | +/-0.0653 | 0.129 | +/-0.0653 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1304 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 61.0 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# Quality Control Data

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## QC Summary

**Client :** **ITSI Gilbane Company**
**2730 Shadelands Drive**
**Walnut Creek, California**
**Contact:** **Ms. Kristen Carlyon**
**Workorder:** **345763**

**Report Date: April 15, 2014**


| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow** | | | | | | | | | | |
| Batch 1377649 | | | | | | | | | | |
| QC1203062518 345763001 DUP | | | | | | | | | | |
| Total Strontium | U | 0.131 | U | 0.00903 | pCi/g | 0 | | N/A | KSD1 | 04/12/1413:05 |
| | Uncert: | +/-0.102 | | +/-0.0698 | | | | | | |
| | TPU: | +/-0.107 | | +/-0.0698 | | | | | | |
| QC1203062519 LCS | | | | | | | | | | |
| Total Strontium | 3.88 | | | 4.03 | pCi/g | | 104 | (75%-125%) | KSD1 | 04/14/1410:58 |
| | Uncert: | | | +/-0.202 | | | | | | |
| | TPU: | | | +/-1.05 | | | | | | |
| QC1203062517 MB | | | | | | | | | | |
| Total Strontium | | | U | 0.0386 | pCi/g | | | | KSD1 | 04/12/1413:05 |
| | Uncert: | | | +/-0.0554 | | | | | | |
| | TPU: | | | +/-0.0563 | | | | | | |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

| | |
|---|---|
| ** | Analyte is a Tracer compound |
| < | Result is less than value reported |
| > | Result is greater than value reported |
| BD | Results are either below the MDC or tracer recovery is low |
| FA | Failed analysis. |
| H | Analytical holding time was exceeded |
| J | Value is estimated |
| K | Analyte present. Reported value may be biased high. Actual value is expected to be lower. |
| L | Analyte present. Reported value may be biased low. Actual value is expected to be higher. |
| M | M if above MDC and less than LLD |
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |

# QC Summary

**Workorder:** **345763**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|

Y Other specific qualifiers were required to properly define the results. Consult case narrative.

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Gas Flow Raw Data

Batch# 1377649 Product: ~~Sr 90~~ Total Sr TM 4/14/2014 Date: 4/14/14

| Criteria: | Yes | No | Comments |
|---|---|---|---|
| Sample Solids are less than or equal to 100 mg for GAB. | | | NB |
| Samples have been blank corrected (if required). Blank correction reported included (if required). | | | NB |
| If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay. | / | | |
| Instrument source check is within limits. Instrument bkg check is within limits. | / | | |
| Method RDL/ LLD has been met. | / | | |
| If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria. | / | | |
| Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria). | / | | |
| Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity) | / | | |
| Sample was run within hold time. | / | | |
| Sample was correctly preserved if required. | / | | |
| Smears Taken for Radioactive batches. | / | | |
| Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria). | / | | |
| No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent. | / | | |
| Aux data is correct. | | | NA |
| Client Special requirements page has been checked. | / | | |
| Raw Data and/ or spectrum are included and properly statused. | / | | |
| MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified | / | | |
| Hit notification complete (if necessary) | | | NA |
| Batch entered into Case Narrative. | / | | |
| Batch Data Exception Reports (DER) completed, if applicable. | | | NA |
| Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed. | | | NA |
| Aliquot Correction completed if required. | | | NA |
| Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.) | / | | |

Primary Review Performed By: [signature] 4/14/14 HSI

Secondary Review Performed By: [signature] 4/14/14

Tot Sr

# Strontium 90 Queue Sheet

04/09/14

Batch #: 1377649 Analyst: KSD1 First Client Due Date: 04/14/2014 Internal Due Date: 04/04/2014 Comments

Sr-90 Spike Code: ~~12431~~ Expiration Date: ~~12/4/14~~ Vol: ~~0.1~~ Sr Sep. Date/time: 4-12-14 / 1050

Sr-90 LCS Code: 12431 Expiration Date: 12/4/14 Vol: 0.1

Sr Carrier Code: 10410414 Exp Date: 12/5/14 Vol: 0.0 Sdt Wt: 8.2

Prep Date: 4/9/14 Initials: KSD Pipet ID: 17954/19 Balance #: ~~5110 S10410272~~ BF 4-12-14 50410272 Analytical Scale #: F305410 Witness: 4/9/14

DCN: ITSI-0808-0004-0076, 8 May 2019

| Sample ID | Client Description | Type | RDL | Collection Date | Matrix | Client | Rad | Pos. # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr wt (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 345760001-1 | 04-PDV-RT1300-05-0009 | SAMPLE | .166 pCi/g | NOV-05-13 02:20 PM | SOLID | ITSI003 | | 1 | 5.110 | 10D | 0.0240 | 0.0299 | 5.9 |
| 345760002-1 | 04-PDV-RT1300-05-0020 | SAMPLE | .166 pCi/g | NOV-05-13 03:25 PM | SOLID | ITSI003 | | 2 | 5.462 | 4C | 0.0232 | 0.0288 | 5.6 |
| 345760003-1 | 04-PDV-RT1300-05-0021 | SAMPLE | .166 pCi/g | NOV-06-13 02:52 PM | SOLID | ITSI003 | | 3 | 5.016 | 10B | 0.0238 | 0.0292 | 5.4 |
| 345761001-1 | 04-PDV-RT1300-06-0008 | SAMPLE | .166 pCi/g | NOV-06-13 08:52 AM | SOLID | ITSI003 | | 4 | 5.356 | 14A | 0.0238 | 0.0293 | 5.5 |
| 345761002-1 | 04-PDV-RT1300-06-0018 | SAMPLE | .166 pCi/g | NOV-06-13 10:20 AM | SOLID | ITSI003 | | 5 | 4.936 | 10C | 0.0230 | 0.0285 | 5.5 |
| 345761003-1 | 04-PDV-RT1300-06-0021 | SAMPLE | .166 pCi/g | NOV-06-13 02:35 PM | SOLID | ITSI003 | | 6 | 5.078 | 14C | 0.0240 | 0.0296 | 5.6 |
| 345762001-1 | 04-PDV-RT1300-07-0010 | SAMPLE | .166 pCi/g | NOV-06-13 12:00 PM | SOLID | ITSI003 | | 7 | 5.588 | 4B | 0.0232 | 0.0289 | 5.7 |
| 345762002-1 | 04-PDV-RT1300-07-0013 | SAMPLE | .166 pCi/g | NOV-06-13 01:27 PM | SOLID | ITSI003 | | 8 | 5.102 | 11D | 0.0248 | 0.0301 | 5.3 |
| ~~345762003-1~~ | ~~04-PDV-RT1300-07-0023~~ | ~~SAMPLE~~ | ~~.166 pCi/g~~ | ~~NOV-07-13 02:45 PM~~ | ~~SOLID~~ | ~~ITSI003~~ | | 9 | | | | | |
| 345763001-1 | 04-PDV-RT1300-08-0007 | SAMPLE | .166 pCi/g | NOV-07-13 10:04 AM | SOLID | ITSI003 | | 10 | 5.105 | 4D | 0.0240 | 0.0299 | 5.9 |
| 345763002-1 | 04-PDV-RT1300-08-0008 | SAMPLE | .166 pCi/g | NOV-07-13 10:09 AM | SOLID | ITSI003 | | 11 | 5.033 | A1 | 0.0232 | 0.0289 | 5.7 |
| 345763003-1 | 04-PDV-RT1300-08-0020 | SAMPLE | .166 pCi/g | NOV-07-13 11:20 AM | SOLID | ITSI003 | | 12 | 5.858 | A2 | 0.0240 | 0.0290 | 5.0 |
| 345764001-1 | 04-PDV-RT1300-09-0006 | SAMPLE | .166 pCi/g | NOV-07-13 11:55 AM | SOLID | ITSI003 | | 13 | 5.185 | F1 | 0.0240 | 0.0296 | 5.6 |
| 345764002-1 | 04-PDV-RT1300-09-0015 | SAMPLE | .166 pCi/g | NOV-07-13 01:42 PM | SOLID | ITSI003 | | 14 | 5.440 | F2 | 0.0232 | 0.0284 | 5.2 |
| ~~345764003-1~~ | ~~04-PDV-RT1300-09-0023~~ | ~~SAMPLE~~ | ~~.166 pCi/g~~ | ~~NOV-07-13 03:45 PM~~ | ~~SOLID~~ | ~~ITSI003~~ | | 15 | | | | | |
| 1203062517-1 | MB for batch 1377649 | MB | .166 pCi/g | | SOLID | QC ACCOUNT | | 16 | 5.858 | F3 | 0.0232 | 0.0295 | 6.3 |
| 1203062518-1 | 04-PDV-RT1300-08-0007(345763001DUP) | DUP | .166 pCi/g | NOV-07-13 10:04 AM | SOLID | QC ACCOUNT | | 17 | 5.003 | F4 | 0.0248 | 0.0302 | 5.4 |
| 1203062519-1 | LCS for batch 1377649 | LCS | .166 pCi/g | | SOLID | QC ACCOUNT | | 18 | 5.358 | G3 | 0.0246 | 0.0314 | 6.8 |

38 A ML 4/14/14 WTO

M-8921

Solid Sample Dissolution by: LEACH or DIGESTION (Circle One) Data Reviewed By:

# Total Strontium Solid

Filename : SR90.XLS
File type : Excel
Version # : 1.3.10

**Carrier S/N :** 2046474
**Carrier Exp Date :** 12/5/2014
**Carrier Volume Added:** 0.50
**Carrier Weight (mg/ml):** 16.40
**Carrier Weight StDev.:** 0.16

**Batch :** 1377649
**Analyst :** KSD1
**Prep Date :** 4/9/2014
**Method Uncertainty :** 0.1281

**Geometry:** Tuffryn Filter

| | | |
|---|---|---|
| **Procedure Code :** | GFCTOSRS | |
| **Parmname :** | Total Strontium | |
| **Required MDA :** | 0.166 | pCi/G |
| **Sr-90 Abundance :** | 1.00 | |
| **Halflife of Sr-90 :** | 28.90 | years |
| **Halflife of Y-90 :** | 64.053 | hours |

| Sample Characteristics | | | | | Carrier Calculations | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pos. | Sample ID | Sample Aliquot G | Sample Aliquot StDev. G | Sample Date/Time | Carrier Weight (mg) (Standard) | Net Weight (mg) (Sample) | Net Weight StDev. (mg) | Carrier Aliquot (mL) | Carrier Aliquot StDev. (mL) |
| 1 | 345760001.1 | 5.1100 | 3.7467E-03 | 11/5/2013 14:20 | 16.40 | 5.90 | 0.032688 | 0.5 | 0.001000 |
| 2 | 345760002.1 | 5.4620 | 3.7826E-03 | 11/5/2013 15:25 | 16.40 | 5.60 | 0.031399 | 0.5 | 0.001000 |
| 3 | 345760003.1 | 5.0160 | 3.7371E-03 | 11/6/2013 14:52 | 16.40 | 5.40 | 0.030539 | 0.5 | 0.001000 |
| 4 | 345761001.1 | 5.3560 | 3.7718E-03 | 11/6/2013 8:52 | 16.40 | 5.50 | 0.030969 | 0.5 | 0.001000 |
| 5 | 345761002.1 | 4.9360 | 3.7290E-03 | 11/6/2013 10:20 | 16.40 | 5.50 | 0.030969 | 0.5 | 0.001000 |
| 6 | 345761003.1 | 5.0780 | 3.7434E-03 | 11/6/2013 14:35 | 16.40 | 5.60 | 0.031399 | 0.5 | 0.001000 |
| 7 | 345762001.1 | 5.5880 | 3.7954E-03 | 11/6/2013 12:00 | 16.40 | 5.70 | 0.031829 | 0.5 | 0.001000 |
| 8 | 345762002.1 | 5.2020 | 3.7561E-03 | 11/6/2013 13:27 | 16.40 | 5.30 | 0.030109 | 0.5 | 0.001000 |
| 9 | 345763001.1 | 5.2650 | 3.7625E-03 | 11/7/2013 10:04 | 16.40 | 5.90 | 0.032688 | 0.5 | 0.001000 |
| 10 | 345763002.1 | 5.0330 | 3.7388E-03 | 11/7/2013 10:09 | 16.40 | 5.70 | 0.031829 | 0.5 | 0.001000 |
| 11 | 345763003.1 | 5.8580 | 3.8228E-03 | 11/7/2013 11:20 | 16.40 | 5.00 | 0.028820 | 0.5 | 0.001000 |
| 12 | 345764001.1 | 5.2850 | 3.7645E-03 | 11/7/2013 11:55 | 16.40 | 5.60 | 0.031399 | 0.5 | 0.001000 |
| 13 | 345764002.1 | 5.4400 | 3.7803E-03 | 11/7/2013 13:42 | 16.40 | 5.20 | 0.029680 | 0.5 | 0.001000 |
| 14 | 1203062517.1 | 5.8580 | 3.8228E-03 | 4/9/2014 0:00 | 16.40 | 6.30 | 0.034407 | 0.5 | 0.001000 |
| 15 | 1203062518.1 | 5.0030 | 3.7358E-03 | 11/7/2013 10:04 | 16.40 | 5.40 | 0.030539 | 0.5 | 0.001000 |
| 16 | 1203062519.1 | 5.8580 | 3.8228E-03 | 4/9/2014 0:00 | 16.40 | 6.80 | 0.036556 | 0.5 | 0.001000 |

DCN: ITSI-0808-0004-0076, 8 May 2019

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DCN: ITSI-0808-0004-0076, 8 May 2019

| | | |
|---|---|---|
| **Pipet, 0.1 ml Stdev : +/-** | 0.000200 | ml |
| **Pipet, 0.5 ml Stdev : +/-** | 0.001000 | ml |
| **Pipet, 1 ml Stdev : +/-** | 0.002000 | ml |

**Analytical SOP:** GL-RAD-A-004
**Instrument SOP:** GL-RAD-I-016, GL-RAD-I-006

**Count Raw Data**

| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Strontium Separation Date/Time | Yttrium Ingrowth | Sr-90 Decay | Calculated Sample Recovery % | Sample Recovery Error % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10D | 60 | 13 | 129 | 2.131 | 4/12/2014 12:54 | 4/12/2014 10:50 | 0.028 | 0.990 | 72.0% | 1.27% |
| 2 | 4C | 60 | 6 | 30 | 0.494 | 4/12/2014 12:53 | 4/12/2014 10:50 | 0.027 | 0.990 | 68.3% | 1.27% |
| 3 | 10B | 60 | 5 | 37 | 0.611 | 4/12/2014 12:54 | 4/12/2014 10:50 | 0.028 | 0.990 | 65.9% | 1.28% |
| 4 | 14A | 60 | 5 | 43 | 0.693 | 4/12/2014 12:55 | 4/12/2014 10:50 | 0.028 | 0.990 | 67.1% | 1.28% |
| 5 | 10C | 60 | 2 | 29 | 0.481 | 4/12/2014 12:55 | 4/12/2014 10:50 | 0.028 | 0.990 | 67.1% | 1.28% |
| 6 | 14C | 60 | 4 | 29 | 0.458 | 4/12/2014 12:56 | 4/12/2014 10:50 | 0.028 | 0.990 | 68.3% | 1.27% |
| 7 | 4B | 80 | 18 | 144 | 1.756 | 4/12/2014 12:53 | 4/12/2014 10:50 | 0.029 | 0.990 | 69.5% | 1.27% |
| 8 | 11D | 60 | 4 | 23 | 0.377 | 4/12/2014 12:56 | 4/12/2014 10:50 | 0.028 | 0.990 | 64.6% | 1.28% |
| 9 | 4D | 70 | 6 | 142 | 2.026 | 4/12/2014 12:53 | 4/12/2014 10:50 | 0.028 | 0.990 | 72.0% | 1.27% |
| 10 | A1 | 80 | 10 | 111 | 1.382 | 4/12/2014 13:04 | 4/12/2014 10:50 | 0.031 | 0.990 | 69.5% | 1.27% |
| 11 | A2 | 80 | 3 | 76 | 0.949 | 4/12/2014 13:04 | 4/12/2014 10:50 | 0.031 | 0.990 | 61.0% | 1.29% |
| 12 | F1 | 80 | 9 | 142 | 1.773 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 0.990 | 68.3% | 1.27% |
| 13 | F2 | 80 | 4 | 139 | 1.736 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 0.990 | 63.4% | 1.28% |
| 14 | F3 | 80 | 15 | 103 | 1.282 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 1.000 | 76.8% | 1.26% |
| 15 | F4 | 80 | 7 | 86 | 1.071 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 0.990 | 65.9% | 1.28% |
| 16 | 3B | 60 | 25 | 1594 | 26.553 | 4/14/2014 10:58 | 4/12/2014 10:50 | 0.409 | 1.000 | 82.9% | 1.25% |

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DCN: ITSI-0808-0004-0076, 8 May 2019

**Calibration Data**

| Pos. | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency (cpm/dpm) Sr-90 | Y-90 | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PIC | 3/1/2013 | 2/28/2015 | 0.4008 | 0.5333 | 0.00557 | 0.08818 | 0.891 | 4/5/2014 14:33 | 1000 |
| 2 | PIC | 3/1/2013 | 2/28/2015 | 0.3970 | 0.5373 | 0.00889 | 0.05801 | 1.246 | 4/5/2014 15:35 | 1000 |
| 3 | PIC | 3/1/2013 | 2/28/2015 | 0.4016 | 0.5268 | 0.00652 | 0.06640 | 0.489 | 4/5/2014 14:33 | 1000 |
| 4 | PIC | 3/1/2013 | 2/28/2015 | 0.4045 | 0.4988 | 0.02119 | 0.28791 | 0.824 | 4/5/2014 14:25 | 1000 |
| 5 | PIC | 3/1/2013 | 2/28/2015 | 0.4017 | 0.5291 | 0.00638 | 0.07158 | 0.572 | 4/5/2014 14:33 | 1000 |
| 6 | PIC | 3/1/2013 | 2/28/2015 | 0.3962 | 0.5271 | 0.01828 | 0.38146 | 0.477 | 4/5/2014 14:25 | 1000 |
| 7 | PIC | 3/1/2013 | 2/28/2015 | 0.3974 | 0.5348 | 0.01519 | 0.19699 | 1.912 | 4/5/2014 15:35 | 1000 |
| 8 | PIC | 3/1/2013 | 2/28/2015 | 0.4127 | 0.5341 | 0.01068 | 0.09722 | 0.582 | 4/5/2014 14:29 | 1000 |
| 9 | PIC | 3/1/2013 | 2/28/2015 | 0.3900 | 0.5316 | 0.00773 | 0.03235 | 1.583 | 4/5/2014 15:35 | 1000 |
| 10 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4211 | 0.5888 | 0.02044 | 0.04021 | 1.282 | 4/5/2014 15:37 | 1000 |
| 11 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4175 | 0.5959 | 0.02268 | 0.02360 | 1.114 | 4/5/2014 15:37 | 1000 |
| 12 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4430 | 0.6110 | 0.00772 | 0.01472 | 1.487 | 4/5/2014 15:33 | 1000 |
| 13 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4299 | 0.6058 | 0.01365 | 0.03537 | 1.390 | 4/5/2014 15:33 | 1000 |
| 14 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4442 | 0.6155 | 0.00981 | 0.03038 | 1.103 | 4/5/2014 15:33 | 1000 |
| 15 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4469 | 0.6121 | 0.00850 | 0.04040 | 1.041 | 4/5/2014 15:33 | 1000 |
| 16 | PIC | 3/1/2013 | 2/28/2015 | 0.3815 | 0.5306 | 0.01614 | 0.03189 | 0.538 | 4/12/2014 16:00 | 500 |

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DCN: ITSI-0808-0004-0076, 8 May 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

* - RPD changed to 0% due to sample & dup activity below MDA

**Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 504.36
**LCS Volume Added:** 0.10

**Results**

| Pos. | Decision Level pCi/G | Critical Level pCi/G | Required MDA pCi/G | MDA pCi/G | Sample Act. Conc. pCi/G | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/G | 2 SIGMA Total Prop. Uncertainty pCi/G | Sample QC | Sample Type | RPD | RER | Nominal pCi/G | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0871 | 0.0615 | 0.166 | 0.1379 | **0.3694** | 15.45% | 1.2399 | 0.1908 | 0.1114 | 0.1454 | | SAMPLE | | | | |
| 2 | 0.1025 | 0.0723 | 0.166 | 0.1595 | **-0.2228** | 13.05% | -0.7518 | 0.0974 | 0.0566 | 0.0566 | | SAMPLE | | | | |
| 3 | 0.0717 | 0.0506 | 0.166 | 0.1178 | **0.0404** | 84.61% | 0.1221 | 0.1033 | 0.0670 | 0.0678 | | SAMPLE | | | | |
| 4 | 0.0851 | 0.0601 | 0.166 | 0.1354 | **-0.0398** | 84.72% | -0.1313 | 0.1112 | 0.0660 | 0.0660 | | SAMPLE | | | | |
| 5 | 0.0773 | 0.0546 | 0.166 | 0.1257 | **-0.0301** | 101.79% | -0.0911 | 0.0927 | 0.0600 | 0.0600 | | SAMPLE | | | | |
| 6 | 0.0683 | 0.0482 | 0.166 | 0.1125 | **-6.101E-03** | 471.53% | -0.0191 | 0.0900 | 0.0564 | 0.0564 | | SAMPLE | | | | |
| 7 | 0.1062 | 0.0750 | 0.166 | 0.1606 | **-0.0444** | 98.83% | -0.1563 | 0.1545 | 0.0859 | 0.0859 | | SAMPLE | | | | |
| 8 | 0.0748 | 0.0528 | 0.166 | 0.1215 | **-0.0650** | 40.42% | -0.2051 | 0.0828 | 0.0514 | 0.0514 | | SAMPLE | | | | |
| 9 | 0.1075 | 0.0759 | 0.166 | 0.1645 | **0.1313** | 39.48% | 0.4428 | 0.1747 | 0.1016 | 0.1069 | | SAMPLE | | | | |
| 10 | 0.0907 | 0.0641 | 0.166 | 0.1392 | **0.0297** | 135.62% | 0.1005 | 0.1362 | 0.0791 | 0.0794 | | SAMPLE | | | | |
| 11 | 0.0835 | 0.0590 | 0.166 | 0.1289 | **-0.0482** | 69.14% | -0.1649 | 0.1139 | 0.0653 | 0.0653 | | SAMPLE | | | | |
| 12 | 0.0901 | 0.0636 | 0.166 | 0.1375 | **0.0781** | 53.73% | 0.2863 | 0.1538 | 0.0823 | 0.0846 | | SAMPLE | | | | |
| 13 | 0.0938 | 0.0662 | 0.166 | 0.1435 | **0.1016** | 43.99% | 0.3457 | 0.1519 | 0.0876 | 0.0913 | | SAMPLE | | | | |
| 14 | 0.0614 | 0.0434 | 0.166 | 0.0949 | **0.0386** | 73.21% | 0.1788 | 0.1309 | 0.0554 | 0.0563 | | MB | | | | |
| 15 | 0.0819 | 0.0578 | 0.166 | 0.1267 | **9.031E-03** | 394.37% | 0.0305 | 0.1201 | 0.0698 | 0.0698 | 345763001.1 | DUP | * 0.0% | | | |
| 16 | 0.0362 | 0.0255 | 0.166 | 0.0588 | **4.0310** | 3.28% | 26.0154 | 0.6661 | 0.2023 | 1.0524 | | LCS | | | 3.8783 | 103.9% |

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DCN: ITSI-0808-0004-0076, 8 May 2019

| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 345760001 | 10D | 60 | 13 | 129 | 4/12/2014 12:54 | 4/12/2014 13:54 | PIC | 1377649 |
| 345760002 | 4C | 60 | 6 | 30 | 4/12/2014 12:53 | 4/12/2014 13:53 | PIC | 1377649 |
| 345760003 | 10B | 60 | 5 | 37 | 4/12/2014 12:54 | 4/12/2014 13:54 | PIC | 1377649 |
| 345761001 | 14A | 60 | 5 | 43 | 4/12/2014 12:55 | 4/12/2014 13:55 | PIC | 1377649 |
| 345761002 | 10C | 60 | 2 | 29 | 4/12/2014 12:55 | 4/12/2014 13:55 | PIC | 1377649 |
| 345761003 | 14C | 60 | 4 | 29 | 4/12/2014 12:56 | 4/12/2014 13:56 | PIC | 1377649 |
| 345762001 | 4B | 80 | 18 | 144 | 4/12/2014 12:53 | 4/12/2014 14:13 | PIC | 1377649 |
| 345762002 | 11D | 60 | 4 | 23 | 4/12/2014 12:56 | 4/12/2014 13:56 | PIC | 1377649 |
| 345763001 | 4D | 70 | 6 | 142 | 4/12/2014 12:53 | 4/12/2014 14:03 | PIC | 1377649 |
| 345763002 | A1 | 80 | 10 | 111 | 4/12/2014 13:04 | 4/12/2014 14:24 | LB4100 | 1377649 |
| 345763003 | A2 | 80 | 3 | 76 | 4/12/2014 13:04 | 4/12/2014 14:24 | LB4100 | 1377649 |
| 345764001 | F1 | 80 | 9 | 142 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 345764002 | F2 | 80 | 4 | 139 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 1203062517 | F3 | 80 | 15 | 103 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 1203062518 | F4 | 80 | 7 | 86 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 1203062519 | 3B | 60 | 25 | 1594 | 4/14/2014 10:58 | 4/14/2014 11:58 | PIC | 1377649 |

M-8926

# Method Calibration Data

# Gas Flow Proportional Counter Calibration Package

Method: Strontium 89/90

Instrument (circle one): (LB4100) / Protean

| | Included/ Acceptable | Comments |
|---|---|---|
| **Part 1: Efficiency determination** | | |
| 1 Efficiency spreadsheet (eff pts, graphs, trendline equation) | ✓ | |
| 2 Applicable portion of GFPC_Machines.XLS | ✓ | |
| 3 Raw Data for Calibration standards | ✓ | |
| 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%) | ✓ | |
| 5 Plateau graph and raw data | ✓ | |
| 6 Standardization of Carrier (if applicable) | ✓ | |
| **Part 2. Documentation for Calibration Source** | | |
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |
| **Part 3. Documentation for Verification Source** | | |
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |
| **Part 4. Enter into LIMS** | | |
| 1 Alpha LIMS instrument calibration updated | ✓ | |

Primary Review of Package: Wallace Toney, III

Secondary Review of Package: Amanda L. Lehr

Effective Date: 3/1/13

exp date ~~2/28/14~~ *2/28/14 2/28/15

*Calibration verified 2/14 and exp. date extended 2/28/14

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

# Sr-89 Calibration - LB4100 - Feb 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-89 |
| | Standard ID number | 1633-A |
| | Half Life (days) | 50.53 |
| | Std. Act. (dpm/mL) | 123593.8614 |
| | Reference Date | 12/13/2012 |
| | Volume of spike (mL) | 1.0 |
| | Std. Nominal (dpm) | 52080.78 |
| | Decay Date | 2/14/2013 |

| Carrier Data | | Std ID<br>Std weight | 1858443<br>17.73 | mg/mL |
|---|---|---|---|---|
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 1.9 | 0.1 | 1.77 | 100.0% |
| 2 | 3.5 | 0.2 | 3.55 | 98.7% |
| 3 | 6.9 | 0.4 | 7.09 | 97.3% |
| 4 | 8.3 | 0.5 | 8.87 | 93.6% |
| 5 | 13.5 | 0.8 | 14.18 | 95.2% |
| 6 | 17.6 | 1 | 17.73 | 99.3% |
| 7 | 26.6 | 1.5 | 26.60 | 100.0% |
| 8 | 36.1 | 2.1 | 37.23 | 97.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

The following detectors were not calibrated:

A4

*Background is considered neglible.
**Decay corrected to mid-point of count

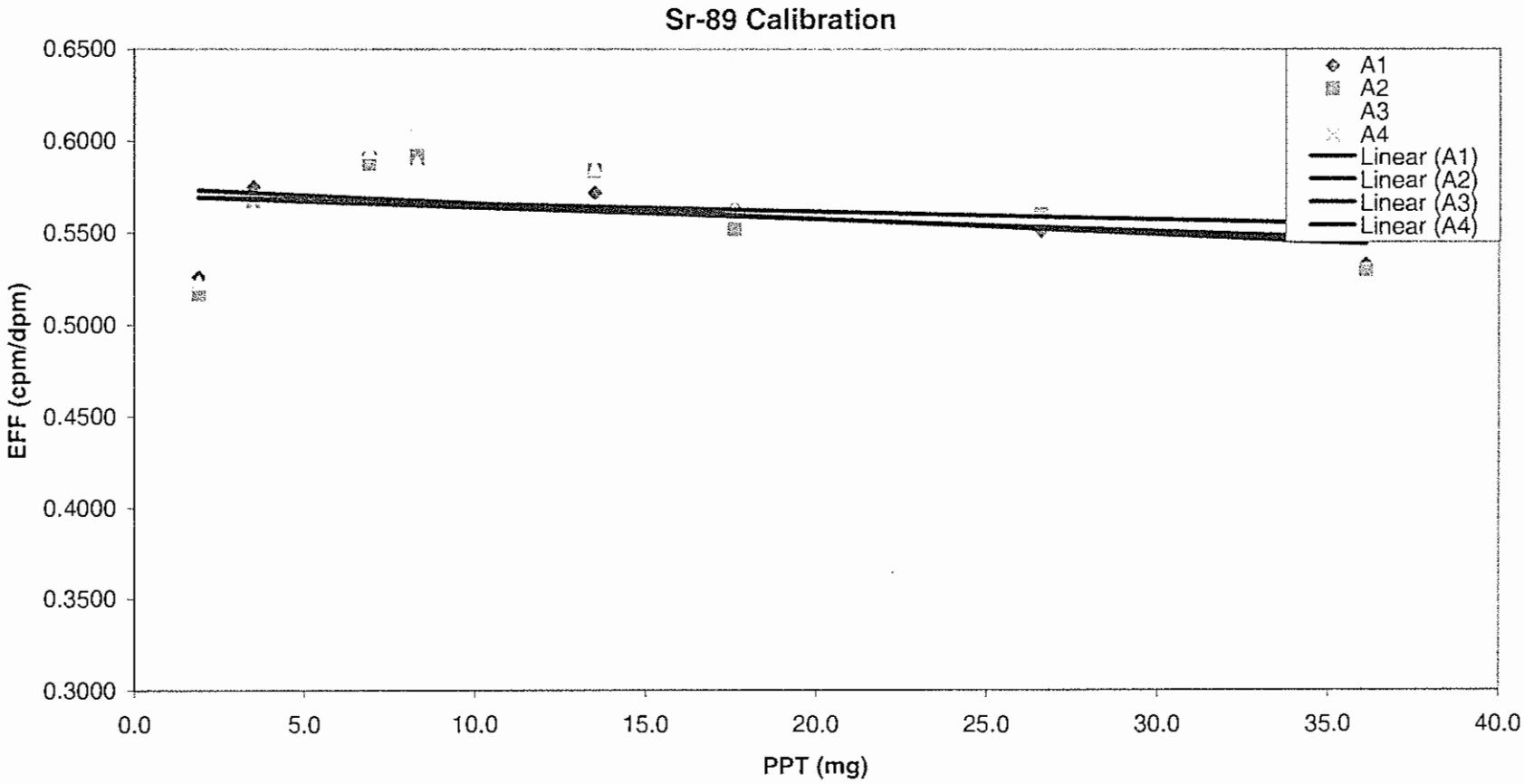
| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 2/14/2013 15:31 | 1 | 27150 | 27150.00 | 100.0% | 27150.00 | 51620.42 | 0.5260 | 0.5731 |
| A1 | 2 | 2/14/2013 15:44 | 1 | 29285 | 29285.00 | 98.7% | 29669.89 | 51613.92 | 0.5748 | 0.5717 |
| A1 | 3 | 2/14/2013 15:41 | 1 | 29776 | 29776.00 | 97.3% | 30604.55 | 51615.42 | 0.5929 | 0.5688 |
| A1 | 4 | 2/14/2013 15:38 | 1 | 28412 | 28412.00 | 93.6% | 30346.07 | 51616.82 | 0.5879 | 0.5677 |
| A1 | 5 | 2/14/2013 15:48 | 1 | 28092 | 28092.00 | 95.2% | 29515.33 | 51611.88 | 0.5719 | 0.5632 |
| A1 | 6 | 2/14/2013 15:57 | 1 | 28844 | 28844.00 | 99.3% | 29057.05 | 51607.85 | 0.5630 | 0.5598 |
| A1 | 7 | 2/14/2013 15:54 | 1 | 28434 | 28434.00 | 100.0% | 28434.00 | 51609.12 | 0.5509 | 0.5521 |
| A1 | 8 | 2/14/2013 15:51 | 1 | 26672 | 26672.00 | 97.0% | 27509.10 | 51610.64 | 0.5330 | 0.5441 |
| A2 | 1 | 2/14/2013 15:38 | 1 | 26680 | 26680.00 | 100.0% | 26680.00 | 51616.82 | 0.5169 | 0.5691 |
| A2 | 2 | 2/14/2013 15:31 | 1 | 28905 | 28905.00 | 98.7% | 29284.69 | 51620.41 | 0.5673 | 0.5681 |
| A2 | 3 | 2/14/2013 15:44 | 1 | 29511 | 29511.00 | 97.3% | 30332.16 | 51613.92 | 0.5877 | 0.5659 |
| A2 | 4 | 2/14/2013 15:41 | 1 | 28600 | 28600.00 | 93.6% | 30546.87 | 51615.41 | 0.5918 | 0.5650 |
| A2 | 5 | 2/14/2013 15:51 | 1 | 28678 | 28678.00 | 95.2% | 30131.02 | 51610.63 | 0.5838 | 0.5617 |
| A2 | 6 | 2/14/2013 15:48 | 1 | 28277 | 28277.00 | 99.3% | 28485.86 | 51611.88 | 0.5519 | 0.5591 |
| A2 | 7 | 2/14/2013 15:57 | 1 | 28907 | 28907.00 | 100.0% | 28907.00 | 51607.84 | 0.5601 | 0.5533 |
| A2 | 8 | 2/14/2013 15:54 | 1 | 26516 | 26516.00 | 97.0% | 27348.21 | 51609.11 | 0.5299 | 0.5472 |
| A3 | 1 | 2/14/2013 15:41 | 1 | 26987 | 26987.00 | 100.0% | 26987.00 | 51615.41 | 0.5228 | 0.5693 |
| A3 | 2 | 2/14/2013 15:36 | 1 | 28583 | 28583.00 | 98.7% | 28958.66 | 51617.77 | 0.5610 | 0.5686 |
| A3 | 3 | 2/14/2013 15:31 | 1 | 29853 | 29853.00 | 97.3% | 30683.69 | 51620.41 | 0.5944 | 0.5672 |
| A3 | 4 | 2/14/2013 15:44 | 1 | 28419 | 28419.00 | 93.6% | 30353.55 | 51613.92 | 0.5881 | 0.5666 |
| A3 | 5 | 2/14/2013 15:54 | 1 | 28725 | 28725.00 | 95.2% | 30180.40 | 51609.11 | 0.5848 | 0.5644 |
| A3 | 6 | 2/14/2013 15:51 | 1 | 28858 | 28858.00 | 99.3% | 29071.16 | 51610.63 | 0.5633 | 0.5627 |
| A3 | 7 | 2/14/2013 15:48 | 1 | 28676 | 28676.00 | 100.0% | 28676.00 | 51611.88 | 0.5556 | 0.5589 |
| A3 | 8 | 2/14/2013 15:57 | 1 | 27141 | 27141.00 | 97.0% | 27992.82 | 51607.84 | 0.5424 | 0.5549 |
| B1 | 1 | 2/14/2013 15:48 | 1 | 26722 | 26722.00 | 100.0% | 26722.00 | 51611.87 | 0.5177 | 0.5674 |
| B1 | 2 | 2/14/2013 15:57 | 1 | 28623 | 28623.00 | 98.7% | 28999.19 | 51607.84 | 0.5619 | 0.5662 |
| B1 | 3 | 2/14/2013 15:54 | 1 | 29424 | 29424.00 | 97.3% | 30242.75 | 51609.11 | 0.5860 | 0.5636 |
| B1 | 4 | 2/14/2013 15:51 | 1 | 28057 | 28057.00 | 93.6% | 29966.90 | 51610.62 | 0.5806 | 0.5626 |
| B1 | 5 | 2/14/2013 15:31 | 1 | 28929 | 28929.00 | 95.2% | 30394.74 | 51620.42 | 0.5888 | 0.5587 |
| B1 | 6 | 2/14/2013 15:44 | 1 | 28525 | 28525.00 | 99.3% | 28735.70 | 51613.92 | 0.5567 | 0.5556 |
| B1 | 7 | 2/14/2013 15:41 | 1 | 28211 | 28211.00 | 100.0% | 28211.00 | 51615.40 | 0.5466 | 0.5489 |
| B1 | 8 | 2/14/2013 15:36 | 1 | 26338 | 26338.00 | 97.0% | 27164.62 | 51617.77 | 0.5263 | 0.5418 |
| B2 | 1 | 2/14/2013 15:51 | 1 | 27329 | 27329.00 | 100.0% | 27329.00 | 51610.62 | 0.5295 | 0.5744 |
| B2 | 2 | 2/14/2013 15:48 | 1 | 29027 | 29027.00 | 98.7% | 29408.50 | 51611.87 | 0.5698 | 0.5732 |
| B2 | 3 | 2/14/2013 15:57 | 1 | 29390 | 29390.00 | 97.3% | 30207.81 | 51607.84 | 0.5853 | 0.5706 |
| B2 | 4 | 2/14/2013 15:54 | 1 | 28846 | 28846.00 | 93.6% | 30809.61 | 51609.11 | 0.5970 | 0.5695 |
| B2 | 5 | 2/14/2013 15:36 | 1 | 28795 | 28795.00 | 95.2% | 30253.95 | 51617.77 | 0.5861 | 0.5656 |
| B2 | 6 | 2/14/2013 15:31 | 1 | 28750 | 28750.00 | 99.3% | 28962.36 | 51620.41 | 0.5611 | 0.5624 |
| B2 | 7 | 2/14/2013 15:44 | 1 | 28726 | 28726.00 | 100.0% | 28726.00 | 51613.91 | 0.5566 | 0.5556 |
| B2 | 8 | 2/14/2013 15:41 | 1 | 26736 | 26736.00 | 97.0% | 27575.11 | 51615.40 | 0.5342 | 0.5484 |
| B3 | 1 | 2/14/2013 15:54 | 1 | 27326 | 27326.00 | 100.0% | 27326.00 | 51609.11 | 0.5295 | 0.5802 |
| B3 | 2 | 2/14/2013 15:51 | 1 | 29353 | 29353.00 | 98.7% | 29738.78 | 51610.61 | 0.5762 | 0.5789 |
| B3 | 3 | 2/14/2013 15:48 | 1 | 30111 | 30111.00 | 97.3% | 30948.87 | 51611.87 | 0.5996 | 0.5762 |
| B3 | 4 | 2/14/2013 15:57 | 1 | 29154 | 29154.00 | 93.6% | 31138.58 | 51607.83 | 0.6034 | 0.5751 |
| B3 | 5 | 2/14/2013 15:41 | 1 | 29120 | 29120.00 | 95.2% | 30595.41 | 51615.39 | 0.5928 | 0.5711 |
| B3 | 6 | 2/14/2013 15:36 | 1 | 28788 | 28788.00 | 99.3% | 29000.64 | 51617.76 | 0.5618 | 0.5679 |
| B3 | 7 | 2/14/2013 15:31 | 1 | 28809 | 28809.00 | 100.0% | 28809.00 | 51620.41 | 0.5581 | 0.5608 |
| B3 | 8 | 2/14/2013 15:44 | 1 | 27134 | 27134.00 | 97.0% | 27985.60 | 51613.90 | 0.5422 | 0.5534 |
| B4 | 1 | 2/14/2013 15:57 | 1 | 25575 | 25575.00 | 100.0% | 25575.00 | 51607.83 | 0.4956 | 0.5365 |
| B4 | 2 | 2/14/2013 15:54 | 1 | 26919 | 26919.00 | 98.7% | 27272.79 | 51609.10 | 0.5284 | 0.5361 |
| B4 | 3 | 2/14/2013 15:51 | 1 | 27774 | 27774.00 | 97.3% | 28546.84 | 51610.61 | 0.5531 | 0.5352 |
| B4 | 4 | 2/14/2013 15:48 | 1 | 27053 | 27053.00 | 93.6% | 28894.56 | 51611.86 | 0.5598 | 0.5348 |
| B4 | 5 | 2/14/2013 15:44 | 1 | 27278 | 27278.00 | 95.2% | 28660.09 | 51613.89 | 0.5553 | 0.5335 |
| B4 | 6 | 2/14/2013 15:41 | 1 | 27192 | 27192.00 | 99.3% | 27392.85 | 51615.39 | 0.5307 | 0.5324 |
| B4 | 7 | 2/14/2013 15:38 | 1 | 27195 | 27195.00 | 100.0% | 27195.00 | 51616.79 | 0.5269 | 0.5301 |
| B4 | 8 | 2/14/2013 15:31 | 1 | 25849 | 25849.00 | 97.0% | 26660.27 | 51620.41 | 0.5165 | 0.5277 |
| C1 | 1 | 2/14/2013 16:05 | 1 | 26526 | 26526.00 | 100.0% | 26526.00 | 51603.79 | 0.5140 | 0.5697 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 2 | 2/14/2013 16:16 | 1 | 28930 | 28930.00 | 98.7% | 29310.22 | 51598.21 | 0.5680 | 0.5682 |
| C1 | 3 | 2/14/2013 16:12 | 1 | 29354 | 29354.00 | 97.3% | 30170.81 | 51600.27 | 0.5847 | 0.5649 |
| C1 | 4 | 2/14/2013 16:09 | 1 | 28788 | 28788.00 | 93.6% | 30747.67 | 51601.76 | 0.5959 | 0.5635 |
| C1 | 5 | 2/14/2013 16:20 | 1 | 28560 | 28560.00 | 95.2% | 30007.04 | 51596.58 | 0.5816 | 0.5585 |
| C1 | 6 | 2/14/2013 16:31 | 1 | 28200 | 28200.00 | 99.3% | 28408.30 | 51590.92 | 0.5506 | 0.5545 |
| C1 | 7 | 2/14/2013 16:26 | 1 | 28046 | 28046.00 | 100.0% | 28046.00 | 51593.19 | 0.5436 | 0.5457 |
| C1 | 8 | 2/14/2013 16:23 | 1 | 26165 | 26165.00 | 97.0% | 26986.19 | 51594.87 | 0.5230 | 0.5365 |
| C2 | 1 | 2/14/2013 16:09 | 1 | 27178 | 27178.00 | 100.0% | 27178.00 | 51601.76 | 0.5267 | 0.5747 |
| C2 | 2 | 2/14/2013 16:05 | 1 | 28752 | 28752.00 | 98.7% | 29129.88 | 51603.79 | 0.5645 | 0.5735 |
| C2 | 3 | 2/14/2013 16:16 | 1 | 29850 | 29850.00 | 97.3% | 30680.61 | 51598.20 | 0.5946 | 0.5708 |
| C2 | 4 | 2/14/2013 16:12 | 1 | 28897 | 28897.00 | 93.6% | 30864.08 | 51600.26 | 0.5981 | 0.5698 |
| C2 | 5 | 2/14/2013 16:23 | 1 | 28700 | 28700.00 | 95.2% | 30154.13 | 51594.87 | 0.5844 | 0.5657 |
| C2 | 6 | 2/14/2013 16:20 | 1 | 28689 | 28689.00 | 99.3% | 28900.91 | 51596.58 | 0.5601 | 0.5626 |
| C2 | 7 | 2/14/2013 16:31 | 1 | 29075 | 29075.00 | 100.0% | 29075.00 | 51590.92 | 0.5636 | 0.5556 |
| C2 | 8 | 2/14/2013 16:26 | 1 | 26461 | 26461.00 | 97.0% | 27291.48 | 51593.19 | 0.5290 | 0.5483 |
| C3 | 1 | 2/14/2013 16:12 | 1 | 26597 | 26597.00 | 100.0% | 26597.00 | 51600.26 | 0.5154 | 0.5694 |
| C3 | 2 | 2/14/2013 16:09 | 1 | 28827 | 28827.00 | 98.7% | 29205.87 | 51601.76 | 0.5660 | 0.5683 |
| C3 | 3 | 2/14/2013 16:05 | 1 | 29624 | 29624.00 | 97.3% | 30448.32 | 51603.79 | 0.5900 | 0.5658 |
| C3 | 4 | 2/14/2013 16:16 | 1 | 28440 | 28440.00 | 93.6% | 30375.98 | 51598.20 | 0.5887 | 0.5647 |
| C3 | 5 | 2/14/2013 16:26 | 1 | 28677 | 28677.00 | 95.2% | 30129.97 | 51593.19 | 0.5840 | 0.5609 |
| C3 | 6 | 2/14/2013 16:23 | 1 | 28469 | 28469.00 | 99.3% | 28679.28 | 51594.87 | 0.5559 | 0.5579 |
| C3 | 7 | 2/14/2013 16:20 | 1 | 28776 | 28776.00 | 100.0% | 28776.00 | 51596.57 | 0.5577 | 0.5513 |
| C3 | 8 | 2/14/2013 16:31 | 1 | 26251 | 26251.00 | 97.0% | 27074.89 | 51590.92 | 0.5248 | 0.5443 |
| C4 | 1 | 2/14/2013 16:16 | 1 | 26622 | 26622.00 | 100.0% | 26622.00 | 51598.20 | 0.5159 | 0.5675 |
| C4 | 2 | 2/14/2013 16:12 | 1 | 28697 | 28697.00 | 98.7% | 29074.16 | 51600.26 | 0.5634 | 0.5664 |
| C4 | 3 | 2/14/2013 16:09 | 1 | 29635 | 29635.00 | 97.3% | 30459.63 | 51601.76 | 0.5903 | 0.5641 |
| C4 | 4 | 2/14/2013 16:05 | 1 | 28385 | 28385.00 | 93.6% | 30317.23 | 51603.77 | 0.5875 | 0.5631 |
| C4 | 5 | 2/14/2013 16:31 | 1 | 28434 | 28434.00 | 95.2% | 29874.66 | 51590.92 | 0.5791 | 0.5596 |
| C4 | 6 | 2/14/2013 16:26 | 1 | 28394 | 28394.00 | 99.3% | 28603.73 | 51593.18 | 0.5544 | 0.5569 |
| C4 | 7 | 2/14/2013 16:23 | 1 | 28540 | 28540.00 | 100.0% | 28540.00 | 51594.87 | 0.5532 | 0.5508 |
| C4 | 8 | 2/14/2013 16:20 | 1 | 26464 | 26464.00 | 97.0% | 27294.57 | 51596.57 | 0.5290 | 0.5444 |
| D1 | 1 | 2/14/2013 16:20 | 1 | 17106 | 17106.00 | 100.0% | 17106.00 | 51596.21 | 0.3315 | 0.4238 |
| D1 | 2 | 2/14/2013 16:32 | 1 | 21853 | 21853.00 | 98.7% | 22140.21 | 51590.62 | 0.4292 | 0.4260 |
| D1 | 3 | 2/14/2013 16:27 | 1 | 25612 | 25612.00 | 97.3% | 26324.68 | 51592.93 | 0.5102 | 0.4305 |
| D1 | 4 | 2/14/2013 16:24 | 1 | 16614 | 16614.00 | 93.6% | 17744.95 | 51594.46 | 0.3439 | 0.4324 |
| D1 | 5 | 2/14/2013 16:05 | 1 | 32889 | 32889.00 | 95.2% | 34555.38 | 51603.61 | 0.6696 | 0.4393 |
| D1 | 6 | 2/14/2013 16:17 | 1 | 17872 | 17872.00 | 99.3% | 18004.01 | 51597.85 | 0.3489 | 0.4448 |
| D1 | 7 | 2/14/2013 16:13 | 1 | 22231 | 22231.00 | 100.0% | 22231.00 | 51599.97 | 0.4308 | 0.4569 |
| D1 | 8 | 2/14/2013 16:09 | 1 | 22966 | 22966.00 | 97.0% | 23686.79 | 51601.54 | 0.4590 | 0.4696 |
| D2 | 1 | 2/14/2013 16:24 | 1 | 34220 | 34220.00 | 100.0% | 34220.00 | 51594.45 | 0.6632 | 0.6975 |
| D2 | 2 | 2/14/2013 16:20 | 1 | 36102 | 36102.00 | 98.7% | 36576.48 | 51596.21 | 0.7089 | 0.6952 |
| D2 | 3 | 2/14/2013 16:32 | 1 | 35700 | 35700.00 | 97.3% | 36693.39 | 51590.62 | 0.7112 | 0.6902 |
| D2 | 4 | 2/14/2013 16:27 | 1 | 33884 | 33884.00 | 93.6% | 36190.56 | 51592.93 | 0.7015 | 0.6881 |
| D2 | 5 | 2/14/2013 16:09 | 1 | 33596 | 33596.00 | 95.2% | 35298.20 | 51601.54 | 0.6841 | 0.6805 |
| D2 | 6 | 2/14/2013 16:05 | 1 | 33062 | 33062.00 | 99.3% | 33306.21 | 51603.61 | 0.6454 | 0.6745 |
| D2 | 7 | 2/14/2013 16:17 | 1 | 35188 | 35188.00 | 100.0% | 35188.00 | 51597.84 | 0.6820 | 0.6612 |
| D2 | 8 | 2/14/2013 16:13 | 1 | 31930 | 31930.00 | 97.0% | 32932.12 | 51599.97 | 0.6382 | 0.6473 |
| D3 | 1 | 2/14/2013 16:27 | 1 | 31213 | 31213.00 | 100.0% | 31213.00 | 51592.93 | 0.6050 | 0.6849 |
| D3 | 2 | 2/14/2013 16:24 | 1 | 36223 | 36223.00 | 98.7% | 36699.07 | 51594.45 | 0.7113 | 0.6826 |
| D3 | 3 | 2/14/2013 16:20 | 1 | 35945 | 35945.00 | 97.3% | 36945.21 | 51596.20 | 0.7160 | 0.6778 |
| D3 | 4 | 2/14/2013 16:32 | 1 | 33900 | 33900.00 | 93.6% | 36207.65 | 51590.62 | 0.7018 | 0.6757 |
| D3 | 5 | 2/14/2013 16:13 | 1 | 33729 | 33729.00 | 95.2% | 35437.94 | 51599.97 | 0.6868 | 0.6683 |
| D3 | 6 | 2/14/2013 16:09 | 1 | 33220 | 33220.00 | 99.3% | 33465.38 | 51601.54 | 0.6485 | 0.6624 |
| D3 | 7 | 2/14/2013 16:05 | 1 | 32405 | 32405.00 | 100.0% | 32405.00 | 51603.60 | 0.6280 | 0.6495 |
| D3 | 8 | 2/14/2013 16:17 | 1 | 32001 | 32001.00 | 97.0% | 33005.35 | 51597.84 | 0.6397 | 0.6358 |
| D4 | 1 | 2/14/2013 16:32 | 1 | 31768 | 31768.00 | 100.0% | 31768.00 | 51590.62 | 0.6158 | 0.6935 |
| D4 | 2 | 2/14/2013 16:27 | 1 | 33755 | 33755.00 | 98.7% | 34198.64 | 51592.93 | 0.6629 | 0.6903 |
| D4 | 3 | 2/14/2013 16:24 | 1 | 37049 | 37049.00 | 97.3% | 38079.93 | 51594.45 | 0.7381 | 0.6836 |
| D4 | 4 | 2/14/2013 16:20 | 1 | 35096 | 35096.00 | 93.6% | 37485.07 | 51596.20 | 0.7265 | 0.6808 |
| D4 | 5 | 2/14/2013 16:17 | 1 | 34910 | 34910.00 | 95.2% | 36678.77 | 51597.84 | 0.7109 | 0.6706 |
| D4 | 6 | 2/14/2013 16:13 | 1 | 33506 | 33506.00 | 99.3% | 33753.49 | 51599.97 | 0.6541 | 0.6625 |
| D4 | 7 | 2/14/2013 16:09 | 1 | 32930 | 32930.00 | 100.0% | 32930.00 | 51601.54 | 0.6382 | 0.6448 |
| D4 | 8 | 2/14/2013 16:05 | 1 | 30311 | 30311.00 | 97.0% | 31262.31 | 51603.60 | 0.6058 | 0.6261 |
| E1 | 1 | 2/14/2013 16:35 | 1 | 26763 | 26763.00 | 100.0% | 26763.00 | 51589.09 | 0.5188 | 0.5640 |
| E1 | 2 | 2/14/2013 16:44 | 1 | 28437 | 28437.00 | 98.7% | 28810.74 | 51584.59 | 0.5585 | 0.5627 |
| E1 | 3 | 2/14/2013 16:41 | 1 | 29015 | 29015.00 | 97.3% | 29822.37 | 51585.97 | 0.5781 | 0.5600 |
| E1 | 4 | 2/14/2013 16:39 | 1 | 28005 | 28005.00 | 93.6% | 29911.36 | 51587.07 | 0.5798 | 0.5589 |
| E1 | 5 | 2/14/2013 16:49 | 1 | 28319 | 28319.00 | 95.2% | 29753.83 | 51582.22 | 0.5768 | 0.5548 |
| E1 | 6 | 2/14/2013 16:56 | 1 | 28284 | 28284.00 | 99.3% | 28492.92 | 51578.54 | 0.5524 | 0.5516 |
| E1 | 7 | 2/14/2013 16:54 | 1 | 28411 | 28411.00 | 100.0% | 28411.00 | 51579.74 | 0.5508 | 0.5444 |
| E1 | 8 | 2/14/2013 16:51 | 1 | 25909 | 25909.00 | 97.0% | 26722.16 | 51580.94 | 0.5181 | 0.5369 |
| E2 | 1 | 2/14/2013 16:39 | 1 | 26781 | 26781.00 | 100.0% | 26781.00 | 51587.06 | 0.5191 | 0.5702 |
| E2 | 2 | 2/14/2013 16:35 | 1 | 28571 | 28571.00 | 98.7% | 28946.50 | 51589.08 | 0.5611 | 0.5691 |
| E2 | 3 | 2/14/2013 16:44 | 1 | 29563 | 29563.00 | 97.3% | 30385.62 | 51584.58 | 0.5890 | 0.5666 |
| E2 | 4 | 2/14/2013 16:41 | 1 | 28723 | 28723.00 | 93.6% | 30678.24 | 51585.96 | 0.5947 | 0.5655 |
| E2 | 5 | 2/14/2013 16:51 | 1 | 28719 | 28719.00 | 95.2% | 30174.10 | 51580.94 | 0.5850 | 0.5617 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| E2 | 6 | 2/14/2013 16:49 | 1 | 28554 | 28554.00 | 99.3% | 28764.91 | 51582.22 | 0.5577 | 0.5587 |
| E2 | 7 | 2/14/2013 16:56 | 1 | 28671 | 28671.00 | 100.0% | 28671.00 | 51578.53 | 0.5559 | 0.5521 |
| E2 | 8 | 2/14/2013 16:54 | 1 | 26339 | 26339.00 | 97.0% | 27165.65 | 51579.74 | 0.5267 | 0.5451 |
| E3 | 1 | 2/14/2013 16:41 | 1 | 26618 | 26618.00 | 100.0% | 26618.00 | 51585.96 | 0.5160 | 0.5690 |
| E3 | 2 | 2/14/2013 16:39 | 1 | 28693 | 28693.00 | 98.7% | 29070.11 | 51587.06 | 0.5635 | 0.5677 |
| E3 | 3 | 2/14/2013 16:35 | 1 | 29309 | 29309.00 | 97.3% | 30124.55 | 51589.08 | 0.5839 | 0.5648 |
| E3 | 4 | 2/14/2013 16:44 | 1 | 28454 | 28454.00 | 93.6% | 30390.93 | 51584.58 | 0.5891 | 0.5637 |
| E3 | 5 | 2/14/2013 16:54 | 1 | 28823 | 28823.00 | 95.2% | 30283.37 | 51579.74 | 0.5871 | 0.5594 |
| E3 | 6 | 2/14/2013 16:51 | 1 | 28468 | 28468.00 | 99.3% | 28678.28 | 51580.94 | 0.5560 | 0.5560 |
| E3 | 7 | 2/14/2013 16:49 | 1 | 28602 | 28602.00 | 100.0% | 28602.00 | 51582.22 | 0.5545 | 0.5486 |
| E3 | 8 | 2/14/2013 16:56 | 1 | 25989 | 25989.00 | 97.0% | 26804.67 | 51578.53 | 0.5197 | 0.5407 |
| E4 | 1 | 2/14/2013 16:44 | 1 | 26594 | 26594.00 | 100.0% | 26594.00 | 51584.57 | 0.5155 | 0.5688 |
| E4 | 2 | 2/14/2013 16:41 | 1 | 28704 | 28704.00 | 98.7% | 29081.25 | 51585.96 | 0.5637 | 0.5676 |
| E4 | 3 | 2/14/2013 16:39 | 1 | 29180 | 29180.00 | 97.3% | 29991.97 | 51587.05 | 0.5814 | 0.5652 |
| E4 | 4 | 2/14/2013 16:35 | 1 | 28925 | 28925.00 | 93.6% | 30893.99 | 51589.08 | 0.5988 | 0.5642 |
| E4 | 5 | 2/14/2013 16:56 | 1 | 28587 | 28587.00 | 95.2% | 30035.41 | 51578.52 | 0.5823 | 0.5604 |
| E4 | 6 | 2/14/2013 16:54 | 1 | 28404 | 28404.00 | 99.3% | 28613.80 | 51579.73 | 0.5547 | 0.5575 |
| E4 | 7 | 2/14/2013 16:51 | 1 | 28787 | 28787.00 | 100.0% | 28787.00 | 51580.93 | 0.5581 | 0.5510 |
| E4 | 8 | 2/14/2013 16:49 | 1 | 26216 | 26216.00 | 97.0% | 27038.79 | 51582.21 | 0.5242 | 0.5442 |
| F1 | 1 | 2/14/2013 16:49 | 1 | 27295 | 27295.00 | 100.0% | 27295.00 | 51582.20 | 0.5292 | 0.5830 |
| F1 | 2 | 2/14/2013 16:56 | 1 | 29644 | 29644.00 | 98.7% | 30033.61 | 51578.51 | 0.5823 | 0.5814 |
| F1 | 3 | 2/14/2013 16:54 | 1 | 30147 | 30147.00 | 97.3% | 30985.87 | 51579.73 | 0.6007 | 0.5781 |
| F1 | 4 | 2/14/2013 16:51 | 1 | 29146 | 29146.00 | 93.6% | 31130.03 | 51580.93 | 0.6035 | 0.5767 |
| F1 | 5 | 2/14/2013 16:35 | 1 | 29025 | 29025.00 | 95.2% | 30495.60 | 51589.08 | 0.5911 | 0.5716 |
| F1 | 6 | 2/14/2013 16:44 | 1 | 28823 | 28823.00 | 99.3% | 29035.90 | 51584.57 | 0.5629 | 0.5675 |
| F1 | 7 | 2/14/2013 16:41 | 1 | 29091 | 29091.00 | 100.0% | 29091.00 | 51585.96 | 0.5639 | 0.5586 |
| F1 | 8 | 2/14/2013 16:39 | 1 | 26635 | 26635.00 | 97.0% | 27470.94 | 51587.05 | 0.5325 | 0.5492 |
| F2 | 1 | 2/14/2013 16:51 | 1 | 27234 | 27234.00 | 100.0% | 27234.00 | 51580.92 | 0.5280 | 0.5784 |
| F2 | 2 | 2/14/2013 16:49 | 1 | 28779 | 28779.00 | 98.7% | 29157.24 | 51582.20 | 0.5653 | 0.5769 |
| F2 | 3 | 2/14/2013 16:56 | 1 | 30073 | 30073.00 | 97.3% | 30909.81 | 51578.51 | 0.5993 | 0.5736 |
| F2 | 4 | 2/14/2013 16:54 | 1 | 29103 | 29103.00 | 93.6% | 31084.11 | 51579.73 | 0.6026 | 0.5723 |
| F2 | 5 | 2/14/2013 16:39 | 1 | 28817 | 28817.00 | 95.2% | 30277.06 | 51587.05 | 0.5869 | 0.5673 |
| F2 | 6 | 2/14/2013 16:35 | 1 | 28793 | 28793.00 | 99.3% | 29005.68 | 51589.08 | 0.5622 | 0.5633 |
| F2 | 7 | 2/14/2013 16:44 | 1 | 29080 | 29080.00 | 100.0% | 29080.00 | 51584.56 | 0.5637 | 0.5547 |
| F2 | 8 | 2/14/2013 16:41 | 1 | 26207 | 26207.00 | 97.0% | 27029.51 | 51585.96 | 0.5240 | 0.5456 |
| F3 | 1 | 2/14/2013 16:54 | 1 | 27590 | 27590.00 | 100.0% | 27590.00 | 51579.72 | 0.5349 | 0.5865 |
| F3 | 2 | 2/14/2013 16:51 | 1 | 29748 | 29748.00 | 98.7% | 30138.97 | 51580.92 | 0.5843 | 0.5850 |
| F3 | 3 | 2/14/2013 16:49 | 1 | 30146 | 30146.00 | 97.3% | 30984.85 | 51582.20 | 0.6007 | 0.5818 |
| F3 | 4 | 2/14/2013 16:56 | 1 | 29369 | 29369.00 | 93.6% | 31368.22 | 51578.51 | 0.6082 | 0.5805 |
| F3 | 5 | 2/14/2013 16:41 | 1 | 29488 | 29488.00 | 95.2% | 30982.06 | 51585.95 | 0.6006 | 0.5757 |
| F3 | 6 | 2/14/2013 16:39 | 1 | 29095 | 29095.00 | 99.3% | 29309.91 | 51587.04 | 0.5682 | 0.5719 |
| F3 | 7 | 2/14/2013 16:35 | 1 | 28902 | 28902.00 | 100.0% | 28902.00 | 51589.07 | 0.5602 | 0.5635 |
| F3 | 8 | 2/14/2013 16:44 | 1 | 27124 | 27124.00 | 97.0% | 27975.29 | 51584.56 | 0.5423 | 0.5546 |
| F4 | 1 | 2/14/2013 16:56 | 1 | 27501 | 27501.00 | 100.0% | 27501.00 | 51578.50 | 0.5332 | 0.5848 |
| F4 | 2 | 2/14/2013 16:54 | 1 | 29663 | 29663.00 | 98.7% | 30052.86 | 51579.71 | 0.5826 | 0.5833 |
| F4 | 3 | 2/14/2013 16:51 | 1 | 30403 | 30403.00 | 97.3% | 31249.00 | 51580.92 | 0.6058 | 0.5800 |
| F4 | 4 | 2/14/2013 16:49 | 1 | 29060 | 29060.00 | 93.6% | 31038.18 | 51582.20 | 0.6017 | 0.5787 |
| F4 | 5 | 2/14/2013 16:44 | 1 | 29143 | 29143.00 | 95.2% | 30619.58 | 51584.55 | 0.5936 | 0.5737 |
| F4 | 6 | 2/14/2013 16:41 | 1 | 28837 | 28837.00 | 99.3% | 29050.00 | 51585.95 | 0.5631 | 0.5697 |
| F4 | 7 | 2/14/2013 16:39 | 1 | 29295 | 29295.00 | 100.0% | 29295.00 | 51587.04 | 0.5679 | 0.5611 |
| F4 | 8 | 2/14/2013 16:35 | 1 | 26770 | 26770.00 | 97.0% | 27610.18 | 51589.07 | 0.5352 | 0.5519 |
| G1 | 1 | 2/14/2013 17:00 | 1 | 26990 | 26990.00 | 100.0% | 26990.00 | 51576.86 | 0.5233 | 0.5806 |
| G1 | 2 | 2/14/2013 17:07 | 1 | 29405 | 29405.00 | 98.7% | 29791.47 | 51573.34 | 0.5777 | 0.5788 |
| G1 | 3 | 2/14/2013 17:05 | 1 | 29898 | 29898.00 | 97.3% | 30729.94 | 51574.47 | 0.5958 | 0.5750 |
| G1 | 4 | 2/14/2013 17:02 | 1 | 29244 | 29244.00 | 93.6% | 31234.71 | 51575.56 | 0.6056 | 0.5734 |
| G1 | 5 | 2/14/2013 17:11 | 1 | 29252 | 29252.00 | 95.2% | 30734.10 | 51571.20 | 0.5960 | 0.5676 |
| G1 | 6 | 2/14/2013 17:20 | 1 | 28210 | 28210.00 | 99.3% | 28418.37 | 51566.94 | 0.5511 | 0.5630 |
| G1 | 7 | 2/14/2013 17:17 | 1 | 28902 | 28902.00 | 100.0% | 28902.00 | 51568.21 | 0.5605 | 0.5530 |
| G1 | 8 | 2/14/2013 17:14 | 1 | 26193 | 26193.00 | 97.0% | 27015.07 | 51569.88 | 0.5239 | 0.5424 |
| G2 | 1 | 2/14/2013 17:02 | 1 | 27461 | 27461.00 | 100.0% | 27461.00 | 51575.56 | 0.5324 | 0.5756 |
| G2 | 2 | 2/14/2013 17:00 | 1 | 28555 | 28555.00 | 98.7% | 28930.29 | 51576.85 | 0.5609 | 0.5739 |
| G2 | 3 | 2/14/2013 17:07 | 1 | 29657 | 29657.00 | 97.3% | 30482.24 | 51573.34 | 0.5910 | 0.5704 |
| G2 | 4 | 2/14/2013 17:05 | 1 | 28546 | 28546.00 | 93.6% | 30489.19 | 51574.47 | 0.5912 | 0.5690 |
| G2 | 5 | 2/14/2013 17:14 | 1 | 28851 | 28851.00 | 95.2% | 30312.78 | 51569.87 | 0.5878 | 0.5636 |
| G2 | 6 | 2/14/2013 17:11 | 1 | 28993 | 28993.00 | 99.3% | 29207.15 | 51571.20 | 0.5663 | 0.5594 |
| G2 | 7 | 2/14/2013 17:20 | 1 | 28387 | 28387.00 | 100.0% | 28387.00 | 51566.93 | 0.5505 | 0.5501 |
| G2 | 8 | 2/14/2013 17:17 | 1 | 26098 | 26098.00 | 97.0% | 26917.09 | 51568.21 | 0.5220 | 0.5403 |
| G3 | 1 | 2/14/2013 17:05 | 1 | 27672 | 27672.00 | 100.0% | 27672.00 | 51574.47 | 0.5365 | 0.5688 |
| G3 | 2 | 2/14/2013 17:02 | 1 | 30013 | 30013.00 | 98.7% | 30407.46 | 51575.56 | 0.5896 | 0.5873 |
| G3 | 3 | 2/14/2013 17:00 | 1 | 30377 | 30377.00 | 97.3% | 31222.27 | 51576.85 | 0.6054 | 0.5840 |
| G3 | 4 | 2/14/2013 17:07 | 1 | 29285 | 29285.00 | 93.6% | 31278.50 | 51573.34 | 0.6065 | 0.5826 |
| G3 | 5 | 2/14/2013 17:17 | 1 | 29463 | 29463.00 | 95.2% | 30955.79 | 51568.20 | 0.6003 | 0.5776 |
| G3 | 6 | 2/14/2013 17:14 | 1 | 28921 | 28921.00 | 99.3% | 29134.62 | 51569.87 | 0.5650 | 0.5736 |
| G3 | 7 | 2/14/2013 17:11 | 1 | 29531 | 29531.00 | 100.0% | 29531.00 | 51571.19 | 0.5726 | 0.5649 |
| G3 | 8 | 2/14/2013 17:20 | 1 | 26930 | 26930.00 | 97.0% | 27775.20 | 51566.93 | 0.5386 | 0.5557 |
| G4 | 1 | 2/14/2013 17:07 | 1 | 27001 | 27001.00 | 100.0% | 27001.00 | 51573.34 | 0.5235 | 0.5767 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| G4 | 2 | 2/14/2013 17:05 | 1 | 28869 | 28869.00 | 98.7% | 29248.42 | 51574.47 | 0.5671 | 0.5754 |
| G4 | 3 | 2/14/2013 17:02 | 1 | 30051 | 30051.00 | 97.3% | 30887.20 | 51575.55 | 0.5989 | 0.5725 |
| G4 | 4 | 2/14/2013 17:00 | 1 | 28981 | 28981.00 | 93.6% | 30953.80 | 51576.85 | 0.6001 | 0.5713 |
| G4 | 5 | 2/14/2013 17:20 | 1 | 29338 | 29338.00 | 95.2% | 30824.46 | 51566.92 | 0.5978 | 0.5669 |
| G4 | 6 | 2/14/2013 17:17 | 1 | 28171 | 28171.00 | 99.3% | 28379.08 | 51568.20 | 0.5503 | 0.5635 |
| G4 | 7 | 2/14/2013 17:14 | 1 | 29023 | 29023.00 | 100.0% | 29023.00 | 51569.87 | 0.5628 | 0.5559 |
| G4 | 8 | 2/14/2013 17:11 | 1 | 26478 | 26478.00 | 97.0% | 27309.01 | 51571.19 | 0.5295 | 0.5478 |
| H1 | 1 | 2/14/2013 17:11 | 1 | 26604 | 26604.00 | 100.0% | 26604.00 | 51571.18 | 0.5159 | 0.5730 |
| H1 | 2 | 2/14/2013 17:20 | 1 | 28846 | 28846.00 | 98.7% | 29225.12 | 51566.92 | 0.5667 | 0.5718 |
| H1 | 3 | 2/14/2013 17:17 | 1 | 29666 | 29666.00 | 97.3% | 30491.49 | 51568.20 | 0.5913 | 0.5692 |
| H1 | 4 | 2/14/2013 17:14 | 1 | 28838 | 28838.00 | 93.6% | 30801.07 | 51569.86 | 0.5973 | 0.5682 |
| H1 | 5 | 2/14/2013 17:00 | 1 | 29238 | 29238.00 | 95.2% | 30719.39 | 51576.88 | 0.5956 | 0.5642 |
| H1 | 6 | 2/14/2013 17:07 | 1 | 28485 | 28485.00 | 99.3% | 28695.40 | 51573.33 | 0.5564 | 0.5611 |
| H1 | 7 | 2/14/2013 17:05 | 1 | 28838 | 28838.00 | 100.0% | 28838.00 | 51574.47 | 0.5592 | 0.5543 |
| H1 | 8 | 2/14/2013 17:02 | 1 | 26334 | 26334.00 | 97.0% | 27160.49 | 51575.55 | 0.5266 | 0.5471 |
| H2 | 1 | 2/14/2013 17:14 | 1 | 26712 | 26712.00 | 100.0% | 26712.00 | 51569.86 | 0.5180 | 0.5734 |
| H2 | 2 | 2/14/2013 17:11 | 1 | 29065 | 29065.00 | 98.7% | 29447.00 | 51571.18 | 0.5710 | 0.5726 |
| H2 | 3 | 2/14/2013 17:20 | 1 | 30048 | 30048.00 | 97.3% | 30884.12 | 51566.92 | 0.5989 | 0.5709 |
| H2 | 4 | 2/14/2013 17:17 | 1 | 28932 | 28932.00 | 93.6% | 30901.47 | 51568.19 | 0.5992 | 0.5702 |
| H2 | 5 | 2/14/2013 17:02 | 1 | 28551 | 28551.00 | 95.2% | 29997.58 | 51575.55 | 0.5816 | 0.5676 |
| H2 | 6 | 2/14/2013 17:00 | 1 | 28987 | 28987.00 | 99.3% | 29201.11 | 51576.88 | 0.5662 | 0.5655 |
| H2 | 7 | 2/14/2013 17:07 | 1 | 28907 | 28907.00 | 100.0% | 28907.00 | 51573.32 | 0.5605 | 0.5610 |
| H2 | 8 | 2/14/2013 17:05 | 1 | 27105 | 27105.00 | 97.0% | 27955.69 | 51574.46 | 0.5420 | 0.5562 |
| H3 | 1 | 2/14/2013 17:17 | 1 | 27270 | 27270.00 | 100.0% | 27270.00 | 51568.19 | 0.5288 | 0.5874 |
| H3 | 2 | 2/14/2013 17:14 | 1 | 29602 | 29602.00 | 98.7% | 29991.05 | 51569.86 | 0.5816 | 0.5859 |
| H3 | 3 | 2/14/2013 17:11 | 1 | 30365 | 30365.00 | 97.3% | 31209.94 | 51571.18 | 0.6052 | 0.5827 |
| H3 | 4 | 2/14/2013 17:20 | 1 | 29562 | 29562.00 | 93.6% | 31574.35 | 51566.92 | 0.6123 | 0.5814 |
| H3 | 5 | 2/14/2013 17:05 | 1 | 29489 | 29489.00 | 95.2% | 30983.11 | 51574.46 | 0.6007 | 0.5764 |
| H3 | 6 | 2/14/2013 17:02 | 1 | 29210 | 29210.00 | 99.3% | 29425.76 | 51575.55 | 0.5705 | 0.5725 |
| H3 | 7 | 2/14/2013 17:00 | 1 | 29736 | 29736.00 | 100.0% | 29736.00 | 51576.88 | 0.5765 | 0.5640 |
| H3 | 8 | 2/14/2013 17:07 | 1 | 26490 | 26490.00 | 97.0% | 27321.39 | 51573.32 | 0.5298 | 0.5550 |
| H4 | 1 | 2/14/2013 17:20 | 1 | 26626 | 26626.00 | 100.0% | 26626.00 | 51566.92 | 0.5163 | 0.5761 |
| H4 | 2 | 2/14/2013 17:17 | 1 | 28745 | 28745.00 | 98.7% | 29122.79 | 51568.19 | 0.5647 | 0.5747 |
| H4 | 3 | 2/14/2013 17:14 | 1 | 30627 | 30627.00 | 97.3% | 31479.23 | 51569.86 | 0.6104 | 0.5719 |
| H4 | 4 | 2/14/2013 17:11 | 1 | 28888 | 28888.00 | 93.6% | 30854.47 | 51571.17 | 0.5983 | 0.5707 |
| H4 | 5 | 2/14/2013 17:07 | 1 | 28747 | 28747.00 | 95.2% | 30203.51 | 51573.32 | 0.5856 | 0.5663 |
| H4 | 6 | 2/14/2013 17:05 | 1 | 28706 | 28706.00 | 99.3% | 28918.03 | 51574.46 | 0.5607 | 0.5629 |
| H4 | 7 | 2/14/2013 17:02 | 1 | 29087 | 29087.00 | 100.0% | 29087.00 | 51575.55 | 0.5640 | 0.5553 |
| H4 | 8 | 2/14/2013 17:00 | 1 | 26268 | 26268.00 | 97.0% | 27092.42 | 51576.87 | 0.5253 | 0.5474 |
| I1 | 1 | 2/14/2013 17:54 | 1 | 25458 | 25458.00 | 100.0% | 25458.00 | 51550.40 | 0.4938 | 0.5456 |
| I1 | 2 | 2/14/2013 18:14 | 1 | 27331 | 27331.00 | 98.7% | 27690.21 | 51540.57 | 0.5373 | 0.5439 |
| I1 | 3 | 2/14/2013 18:04 | 1 | 28374 | 28374.00 | 97.3% | 29163.54 | 51545.05 | 0.5658 | 0.5405 |
| I1 | 4 | 2/14/2013 17:56 | 1 | 27781 | 27781.00 | 93.6% | 29672.12 | 51549.16 | 0.5756 | 0.5391 |
| I1 | 5 | 2/14/2013 18:16 | 1 | 27505 | 27505.00 | 95.2% | 28898.59 | 51539.19 | 0.5607 | 0.5338 |
| I1 | 6 | 2/14/2013 18:25 | 1 | 25547 | 25547.00 | 99.3% | 25735.70 | 51535.12 | 0.4994 | 0.5297 |
| I1 | 7 | 2/14/2013 18:22 | 1 | 27827 | 27827.00 | 100.0% | 27827.00 | 51536.36 | 0.5399 | 0.5205 |
| I1 | 8 | 2/14/2013 18:19 | 1 | 24558 | 24558.00 | 97.0% | 25328.75 | 51537.81 | 0.4915 | 0.5109 |
| I2 | 1 | 2/14/2013 17:56 | 1 | 26014 | 26014.00 | 100.0% | 26014.00 | 51549.16 | 0.5046 | 0.5525 |
| I2 | 2 | 2/14/2013 17:54 | 1 | 27924 | 27924.00 | 98.7% | 28291.00 | 51550.40 | 0.5488 | 0.5508 |
| I2 | 3 | 2/14/2013 18:14 | 1 | 28671 | 28671.00 | 97.3% | 29468.80 | 51540.56 | 0.5718 | 0.5470 |
| I2 | 4 | 2/14/2013 18:04 | 1 | 27748 | 27748.00 | 93.6% | 29636.87 | 51545.05 | 0.5750 | 0.5455 |
| I2 | 5 | 2/14/2013 18:19 | 1 | 27973 | 27973.00 | 95.2% | 29390.30 | 51537.80 | 0.5703 | 0.5398 |
| I2 | 6 | 2/14/2013 18:16 | 1 | 25466 | 25466.00 | 99.3% | 25654.10 | 51539.18 | 0.4978 | 0.5353 |
| I2 | 7 | 2/14/2013 18:25 | 1 | 27985 | 27985.00 | 100.0% | 27985.00 | 51535.12 | 0.5430 | 0.5255 |
| I2 | 8 | 2/14/2013 18:22 | 1 | 24995 | 24995.00 | 97.0% | 25779.47 | 51536.36 | 0.5002 | 0.5150 |
| I3 | 1 | 2/14/2013 18:04 | 1 | 25605 | 25605.00 | 100.0% | 25605.00 | 51545.05 | 0.4967 | 0.5511 |
| I3 | 2 | 2/14/2013 17:56 | 1 | 27849 | 27849.00 | 98.7% | 28215.02 | 51549.16 | 0.5473 | 0.5494 |
| I3 | 3 | 2/14/2013 17:54 | 1 | 28684 | 28684.00 | 97.3% | 29482.16 | 51550.39 | 0.5719 | 0.5456 |
| I3 | 4 | 2/14/2013 18:14 | 1 | 27958 | 27958.00 | 93.6% | 29861.17 | 51540.56 | 0.5794 | 0.5441 |
| I3 | 5 | 2/14/2013 18:22 | 1 | 27726 | 27726.00 | 95.2% | 29130.78 | 51536.35 | 0.5652 | 0.5384 |
| I3 | 6 | 2/14/2013 18:19 | 1 | 25767 | 25767.00 | 99.3% | 25957.32 | 51537.80 | 0.5037 | 0.5339 |
| I3 | 7 | 2/14/2013 18:16 | 1 | 27712 | 27712.00 | 100.0% | 27712.00 | 51539.18 | 0.5377 | 0.5239 |
| I3 | 8 | 2/14/2013 18:25 | 1 | 24882 | 24882.00 | 97.0% | 25662.92 | 51535.12 | 0.4980 | 0.5135 |
| I4 | 1 | 2/14/2013 18:14 | 1 | 25975 | 25975.00 | 100.0% | 25975.00 | 51540.55 | 0.5040 | 0.5534 |
| I4 | 2 | 2/14/2013 18:04 | 1 | 28187 | 28187.00 | 98.7% | 28557.46 | 51545.05 | 0.5540 | 0.5520 |
| I4 | 3 | 2/14/2013 17:56 | 1 | 28724 | 28724.00 | 97.3% | 29523.28 | 51549.15 | 0.5727 | 0.5489 |
| I4 | 4 | 2/14/2013 17:54 | 1 | 27771 | 27771.00 | 93.6% | 29661.44 | 51550.39 | 0.5754 | 0.5476 |
| I4 | 5 | 2/14/2013 18:25 | 1 | 27999 | 27999.00 | 95.2% | 29417.62 | 51535.11 | 0.5708 | 0.5430 |
| I4 | 6 | 2/14/2013 18:22 | 1 | 26038 | 26038.00 | 99.3% | 26230.33 | 51536.35 | 0.5090 | 0.5393 |
| I4 | 7 | 2/14/2013 18:19 | 1 | 27846 | 27846.00 | 100.0% | 27846.00 | 51537.80 | 0.5403 | 0.5312 |
| I4 | 8 | 2/14/2013 18:16 | 1 | 25574 | 25574.00 | 97.0% | 26376.64 | 51539.17 | 0.5118 | 0.5227 |
| J1 | 1 | 2/14/2013 18:16 | 1 | 25319 | 25319.00 | 100.0% | 25319.00 | 51539.17 | 0.4913 | 0.5469 |
| J1 | 2 | 2/14/2013 18:25 | 1 | 27719 | 27719.00 | 98.7% | 28083.31 | 51535.11 | 0.5449 | 0.5457 |
| J1 | 3 | 2/14/2013 18:22 | 1 | 28831 | 28831.00 | 97.3% | 29633.25 | 51536.35 | 0.5750 | 0.5432 |
| J1 | 4 | 2/14/2013 18:19 | 1 | 27812 | 27812.00 | 93.6% | 29705.23 | 51537.80 | 0.5764 | 0.5421 |
| J1 | 5 | 2/14/2013 17:54 | 1 | 27562 | 27562.00 | 95.2% | 28958.47 | 51550.39 | 0.5618 | 0.5382 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| J1 | 6 | 2/14/2013 18:14 | 1 | 25600 | 25600.00 | 99.3% | 25789.09 | 51540.55 | 0.5004 | 0.5352 |
| J1 | 7 | 2/14/2013 18:04 | 1 | 28107 | 28107.00 | 100.0% | 28107.00 | 51545.05 | 0.5453 | 0.5285 |
| J1 | 8 | 2/14/2013 17:56 | 1 | 25299 | 25299.00 | 97.0% | 26093.01 | 51549.15 | 0.5062 | 0.5214 |
| J2 | 1 | 2/14/2013 18:19 | 1 | 25566 | 25566.00 | 100.0% | 25566.00 | 51537.80 | 0.4961 | 0.5447 |
| J2 | 2 | 2/14/2013 18:16 | 1 | 27613 | 27613.00 | 98.7% | 27975.91 | 51539.17 | 0.5428 | 0.5435 |
| J2 | 3 | 2/14/2013 18:25 | 1 | 28413 | 28413.00 | 97.3% | 29203.62 | 51535.10 | 0.5667 | 0.5409 |
| J2 | 4 | 2/14/2013 18:22 | 1 | 27447 | 27447.00 | 93.6% | 29315.38 | 51536.35 | 0.5688 | 0.5398 |
| J2 | 5 | 2/14/2013 17:56 | 1 | 27753 | 27753.00 | 95.2% | 29159.15 | 51549.15 | 0.5657 | 0.5359 |
| J2 | 6 | 2/14/2013 17:54 | 1 | 25406 | 25406.00 | 99.3% | 25593.66 | 51550.38 | 0.4965 | 0.5328 |
| J2 | 7 | 2/14/2013 18:14 | 1 | 27790 | 27790.00 | 100.0% | 27790.00 | 51540.55 | 0.5392 | 0.5259 |
| J2 | 8 | 2/14/2013 18:04 | 1 | 25316 | 25316.00 | 97.0% | 26110.54 | 51545.04 | 0.5066 | 0.5187 |
| J3 | 1 | 2/14/2013 18:22 | 1 | 25361 | 25361.00 | 100.0% | 25361.00 | 51536.34 | 0.4921 | 0.5490 |
| J3 | 2 | 2/14/2013 18:19 | 1 | 27836 | 27836.00 | 98.7% | 28201.84 | 51537.79 | 0.5472 | 0.5474 |
| J3 | 3 | 2/14/2013 18:16 | 1 | 28331 | 28331.00 | 97.3% | 29119.34 | 51539.16 | 0.5650 | 0.5441 |
| J3 | 4 | 2/14/2013 18:25 | 1 | 27891 | 27891.00 | 93.6% | 29789.60 | 51535.10 | 0.5780 | 0.5427 |
| J3 | 5 | 2/14/2013 18:04 | 1 | 28372 | 28372.00 | 95.2% | 29809.51 | 51545.03 | 0.5783 | 0.5376 |
| J3 | 6 | 2/14/2013 17:56 | 1 | 25570 | 25570.00 | 99.3% | 25758.87 | 51549.15 | 0.4997 | 0.5335 |
| J3 | 7 | 2/14/2013 17:54 | 1 | 27403 | 27403.00 | 100.0% | 27403.00 | 51550.37 | 0.5316 | 0.5246 |
| J3 | 8 | 2/14/2013 18:14 | 1 | 25098 | 25098.00 | 97.0% | 25885.70 | 51540.54 | 0.5022 | 0.5152 |
| J4 | 1 | 2/14/2013 18:25 | 1 | 26133 | 26133.00 | 100.0% | 26133.00 | 51535.09 | 0.5071 | 0.5534 |
| J4 | 2 | 2/14/2013 18:22 | 1 | 27899 | 27899.00 | 98.7% | 28265.67 | 51536.34 | 0.5485 | 0.5520 |
| J4 | 3 | 2/14/2013 18:19 | 1 | 28651 | 28651.00 | 97.3% | 29448.25 | 51537.79 | 0.5714 | 0.5491 |
| J4 | 4 | 2/14/2013 18:16 | 1 | 28007 | 28007.00 | 93.6% | 29913.50 | 51539.15 | 0.5804 | 0.5479 |
| J4 | 5 | 2/14/2013 18:14 | 1 | 27986 | 27986.00 | 95.2% | 29403.96 | 51540.54 | 0.5705 | 0.5435 |
| J4 | 6 | 2/14/2013 18:04 | 1 | 25877 | 25877.00 | 99.3% | 26068.14 | 51545.03 | 0.5057 | 0.5400 |
| J4 | 7 | 2/14/2013 17:56 | 1 | 28348 | 28348.00 | 100.0% | 28348.00 | 51549.14 | 0.5499 | 0.5323 |
| J4 | 8 | 2/14/2013 17:54 | 1 | 25430 | 25430.00 | 97.0% | 26228.12 | 51550.37 | 0.5088 | 0.5242 |

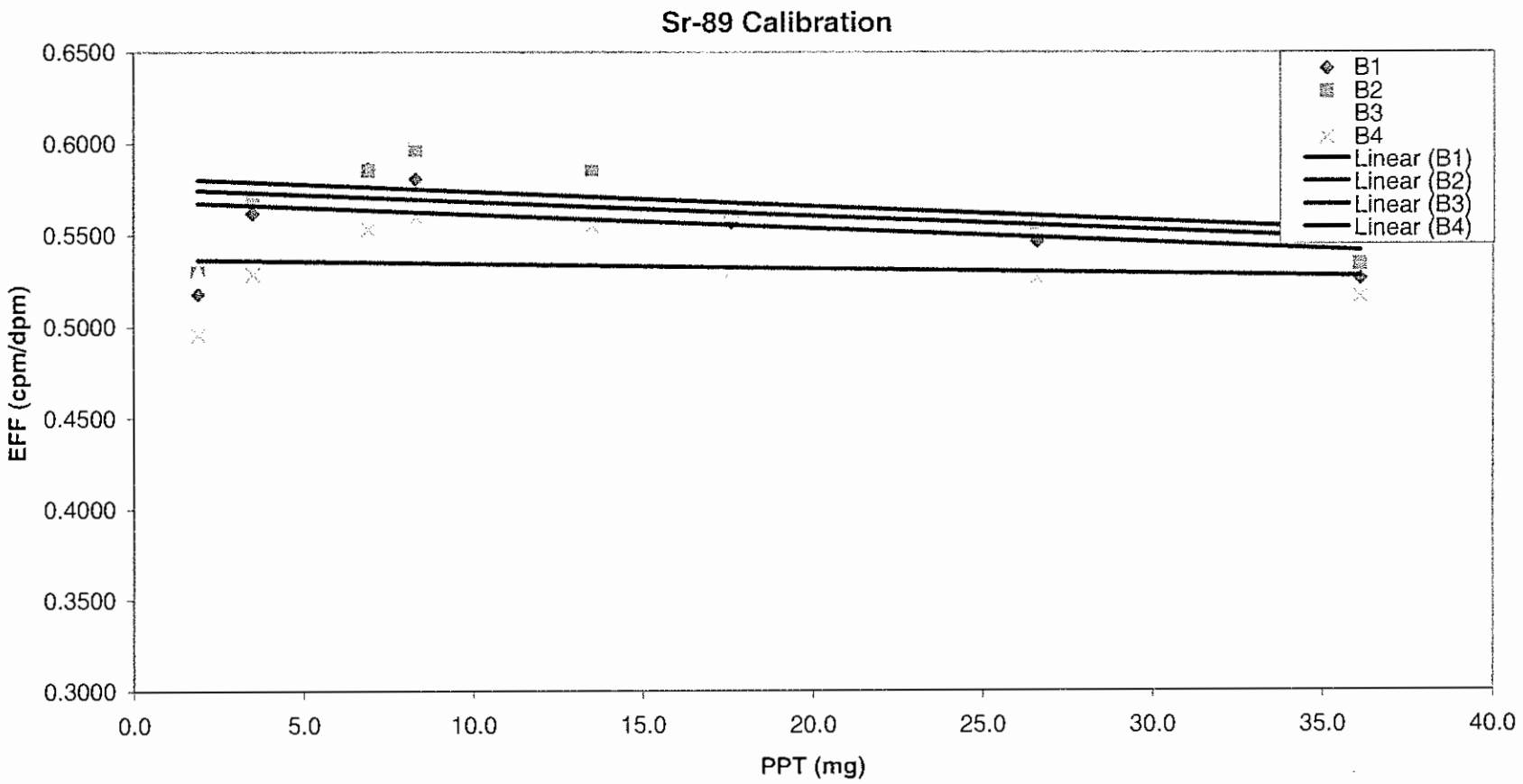



A1 y = -8.491165E-04x + 5.747061E-01

A2 y = -6.406264E-04x + 5.703443E-01

A3 y = -4.202331E-04x + 5.700664E-01

A4

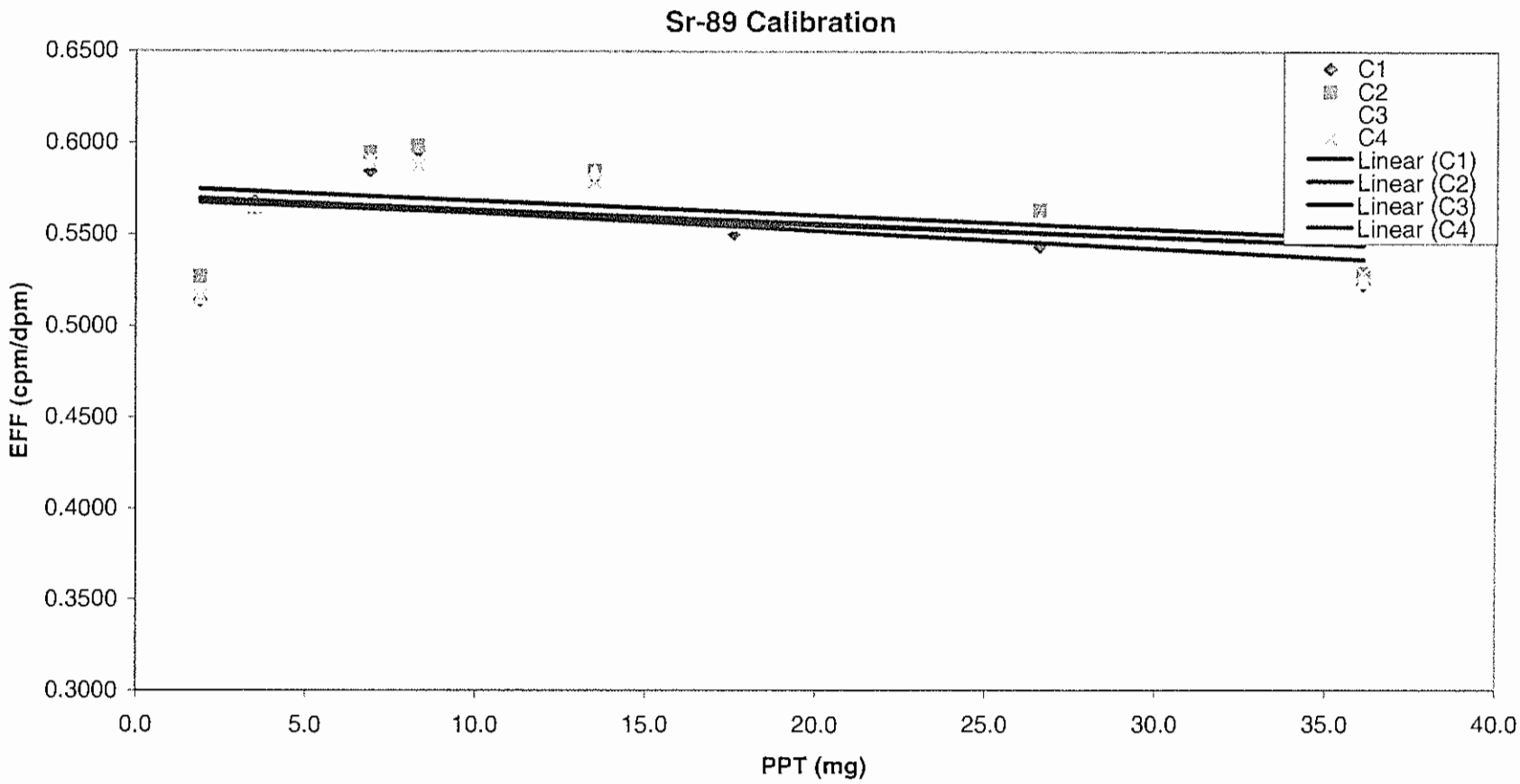



B1 y = -7.480430E-04x + 5.687816E-01

B2 y = -7.591522E-04x + 5.758076E-01

B3 y = -7.822953E-04x + 5.816376E-01

B4 y = -2.580587E-04x + 5.369774E-01

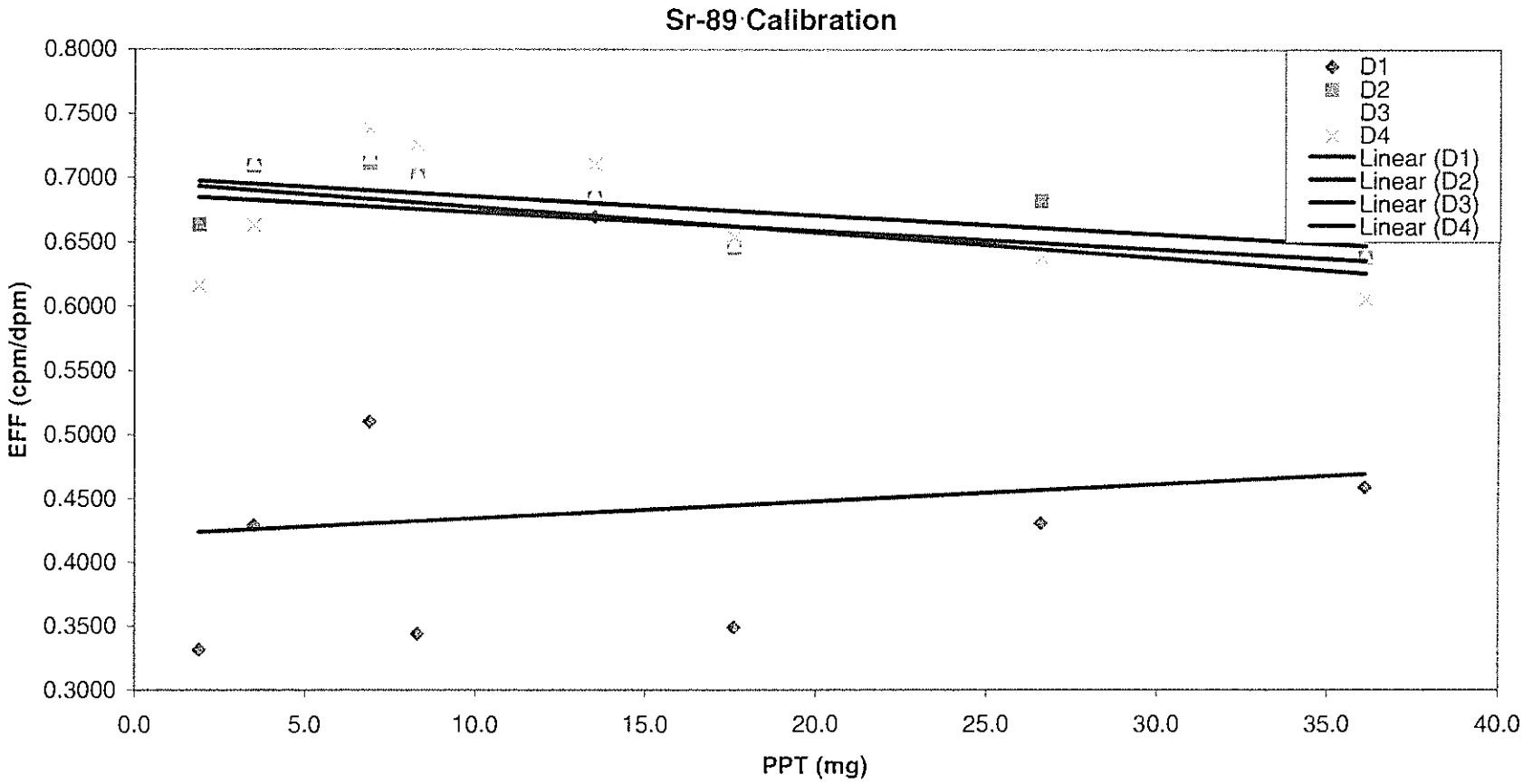



C1 y = -9.712360E-04x + 5.715763E-01

C2 y = -7.725299E-04x + 5.761770E-01

C3 y = -7.356185E-04x + 5.708355E-01

C4 y = -6.743296E-04x + 5.687446E-01

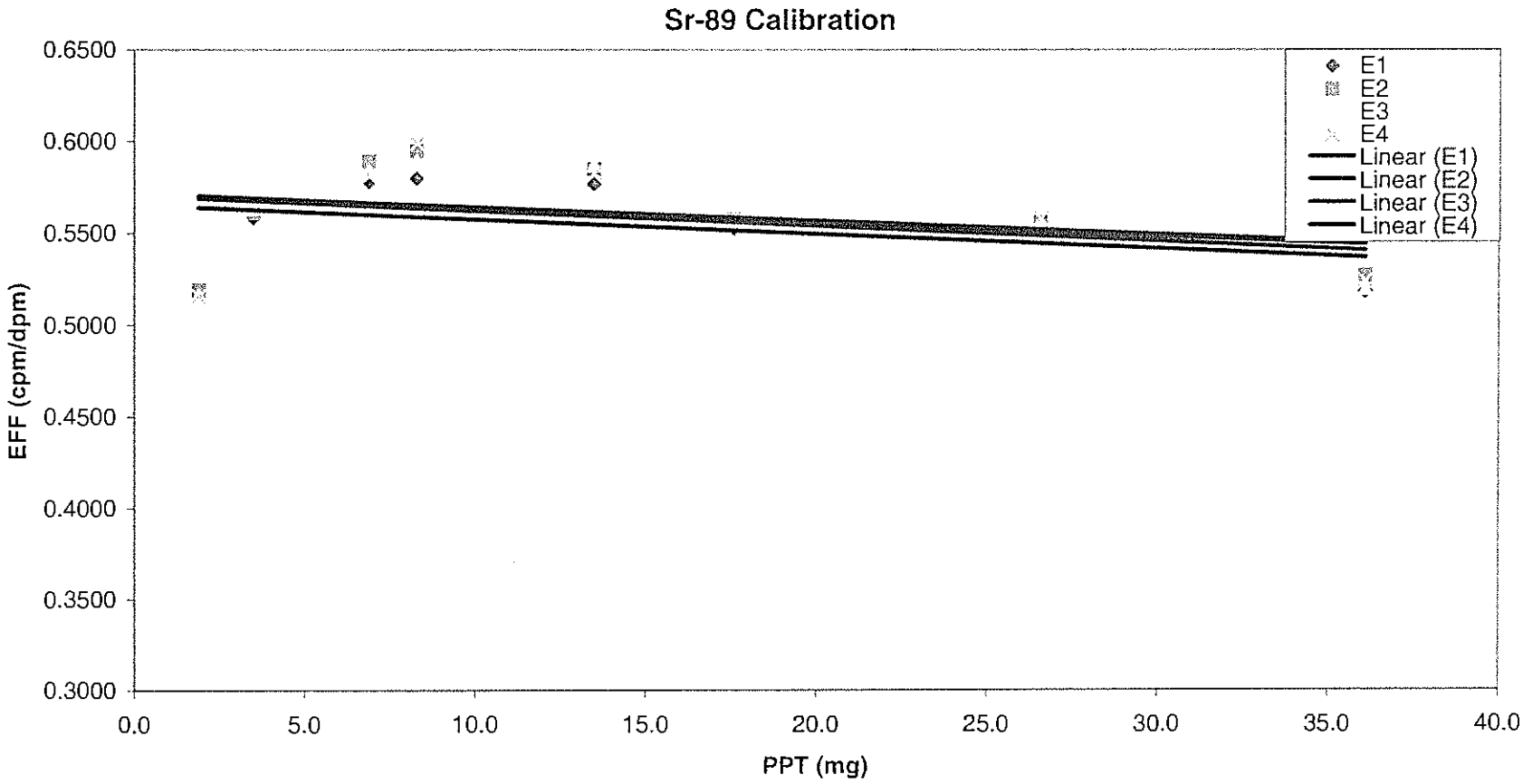



D1 y = 1.337734E-03x + 4.212809E-01

D2 y = -1.469478E-03x + 7.003281E-01

D3 y = -1.435312E-03x + 6.876622E-01

D4 y = -1.970516E-03x + 6.971995E-01

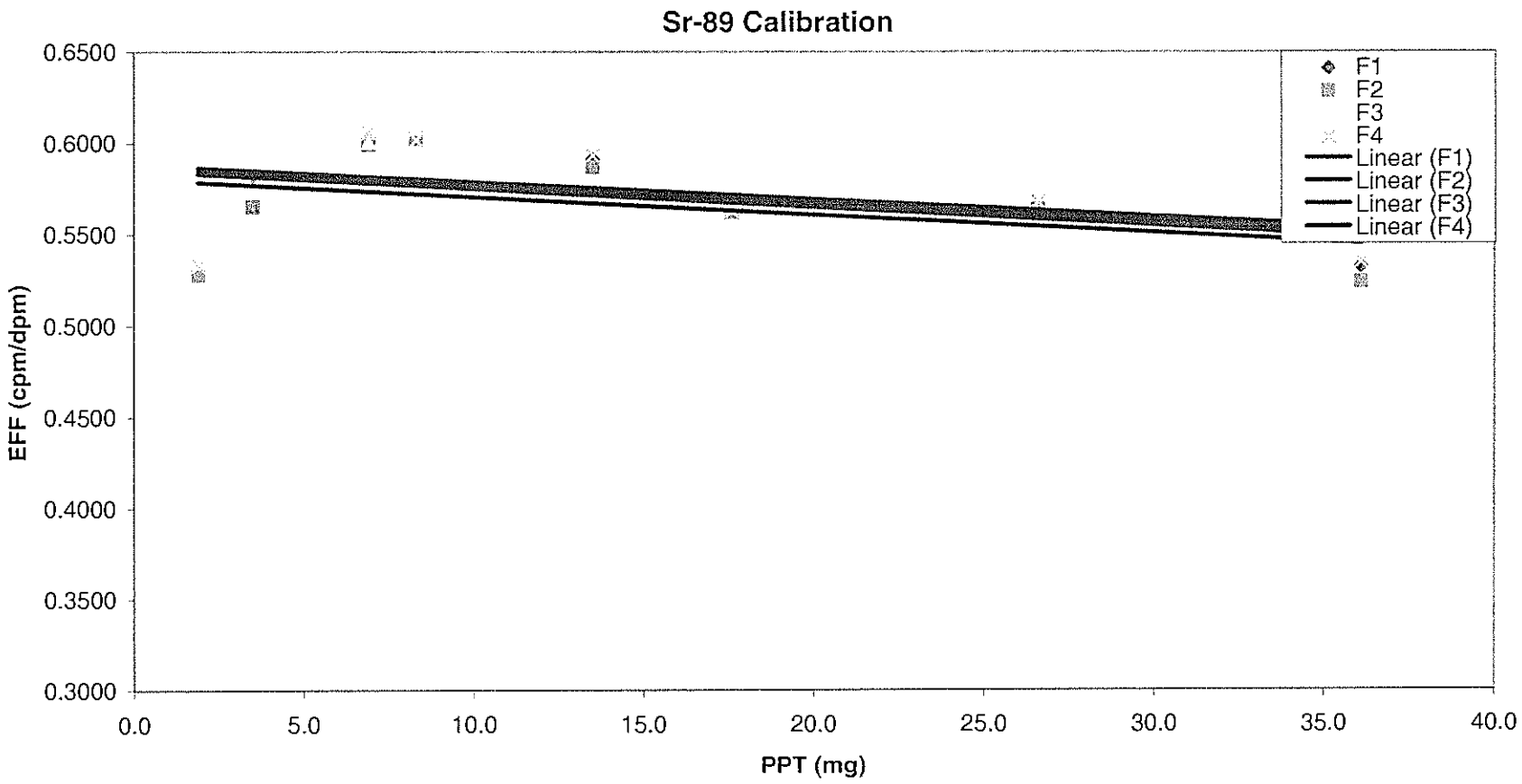



E1 y = -7.919716E-04x + 5.654928E-01

E2 y = -7.339795E-04x + 5.716417E-01

E3 y = -8.264190E-04x + 5.705518E-01

E4 y = -7.203757E-04x + 5.701605E-01

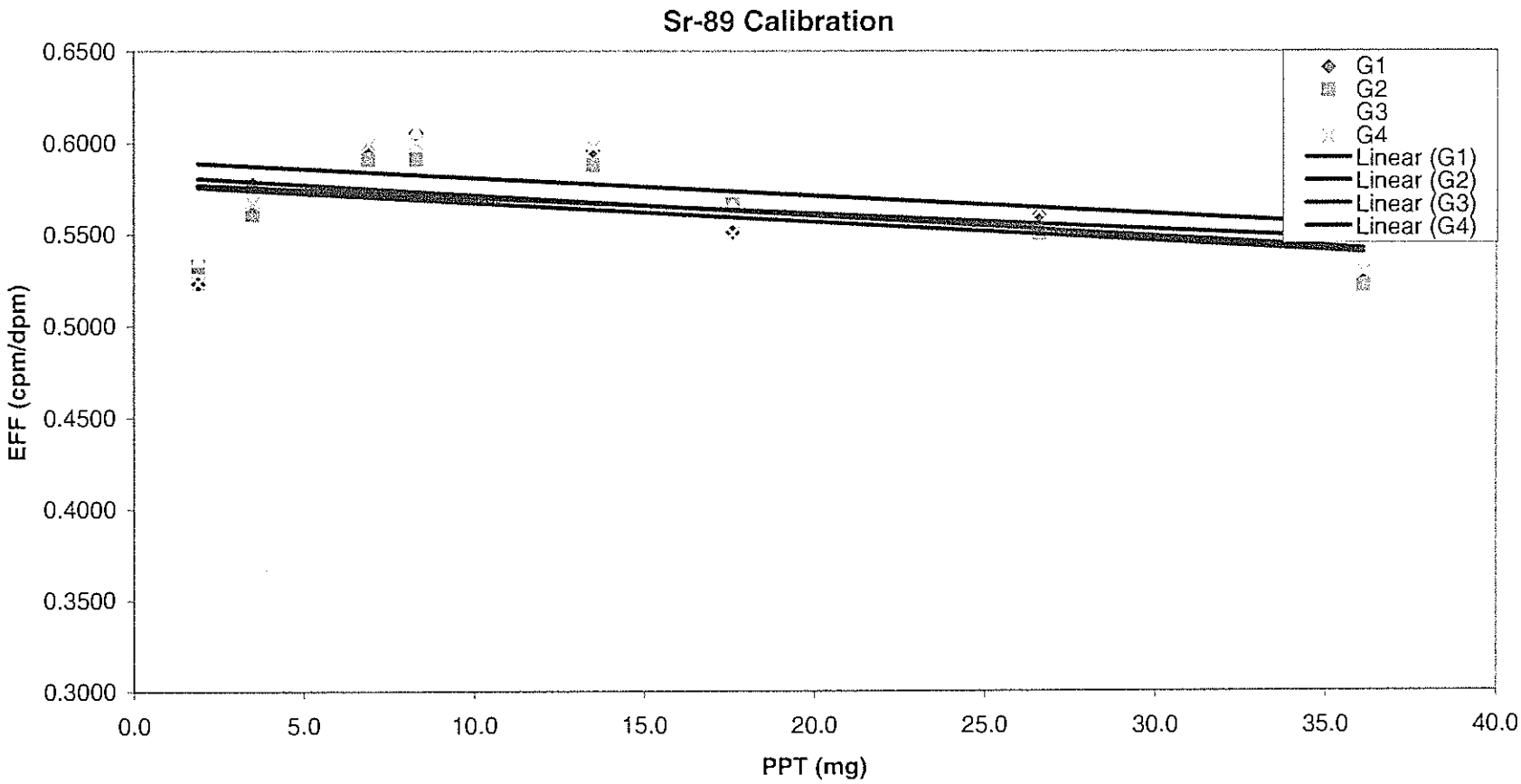



F1 y = -9.877608E-04x + 5.848942E-01

F2 y = -9.606949E-04x + 5.802409E-01

F3 y = -9.301478E-04x + 5.882220E-01

F4 y = -9.627272E-04x + 5.866634E-01

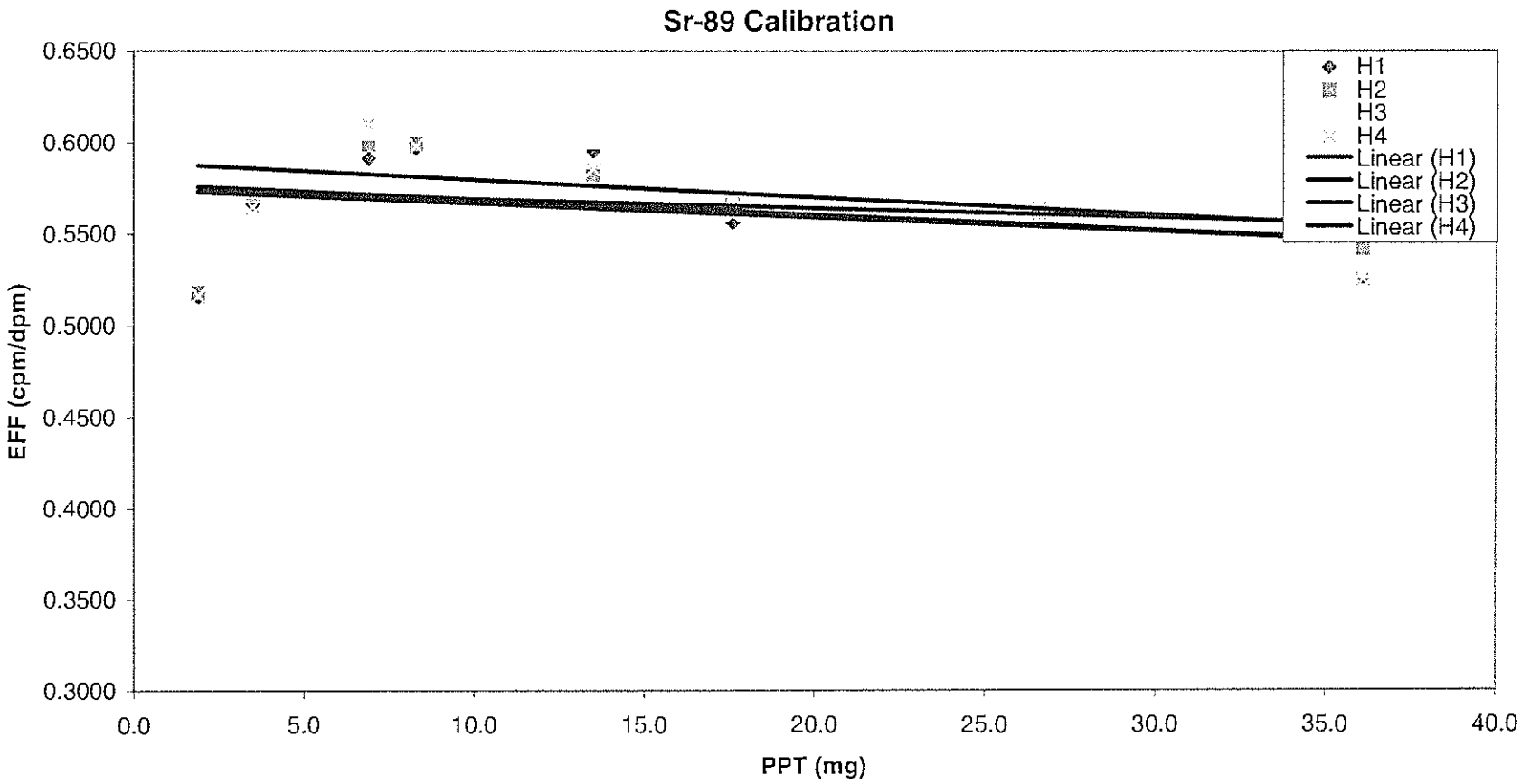



G1 y = -1.115706E-03x + 5.826749E-01

G2 y = -1.033069E-03x + 5.775452E-01

G3 y = -9.703879E-04x + 5.906826E-01

G4 y = -8.458304E-04x + 5.783561E-01

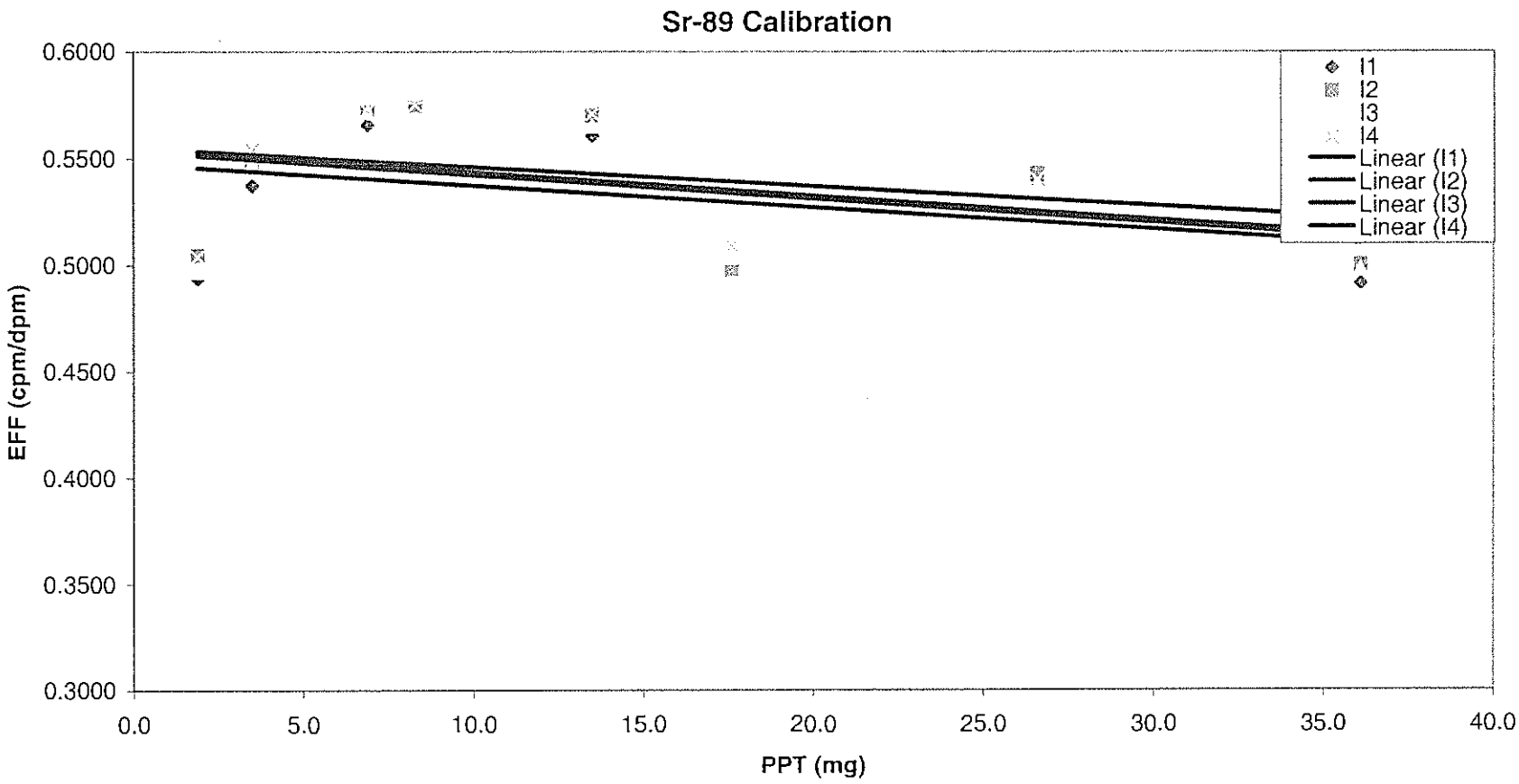



H1 y = -7.598651E-04x + 5.744832E-01

H2 y = -5.036199E-04x + 5.743844E-01

H3 y = -9.487267E-04x + 5.892461E-01

H4 y = -8.395378E-04x + 5.776789E-01

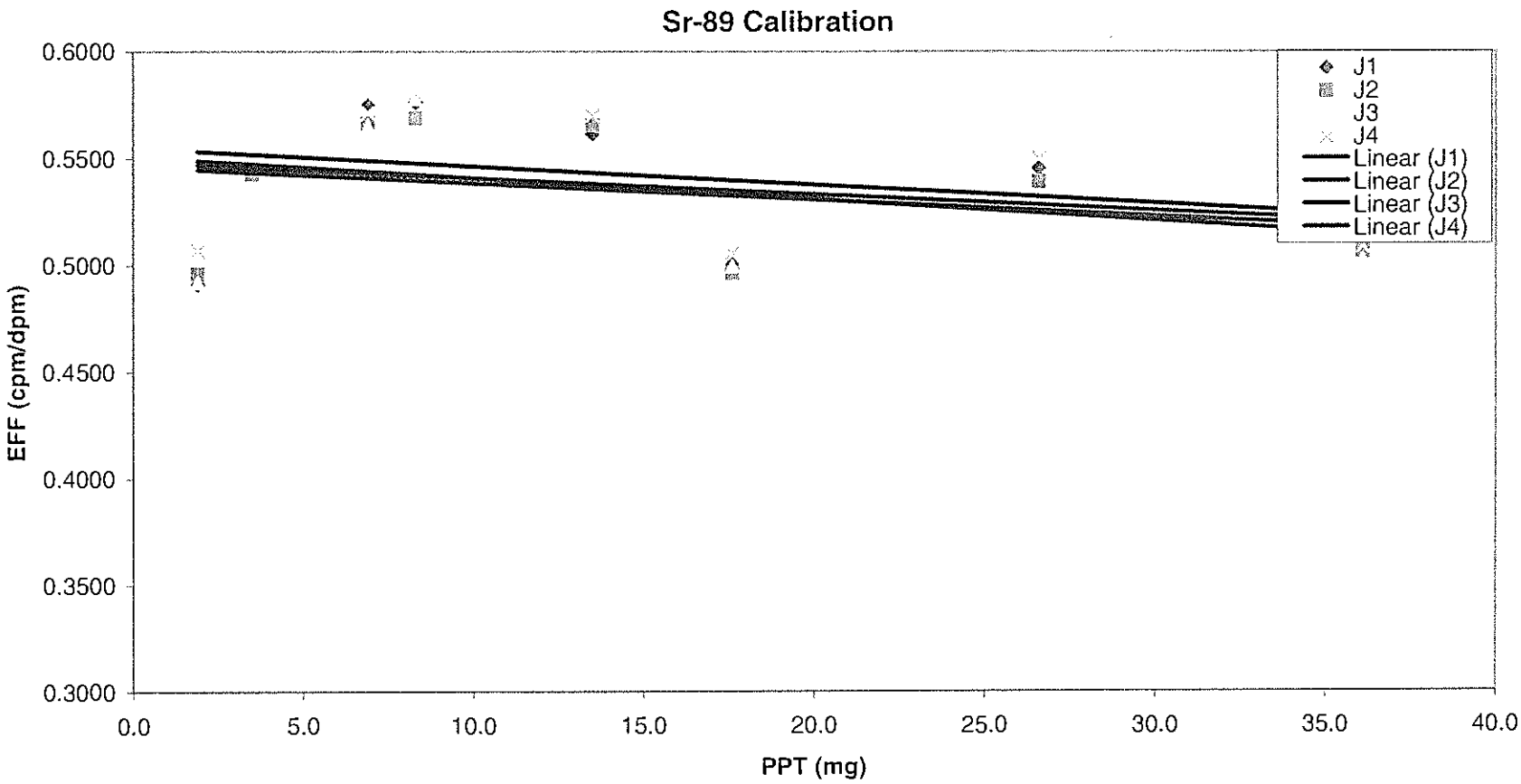



I1 y = -1.012691E-03x + 5.474808E-01

I2 y = -1.095949E-03x + 5.546033E-01

I3 y = -1.101048E-03x + 5.532368E-01

I4 y = -8.985042E-04x + 5.550967E-01




J1 y = -7.471830E-04x + 5.483286E-01

J2 y = -7.596602E-04x + 5.461452E-01

J3 y = -9.883080E-04x + 5.509050E-01

J4 y = -8.545895E-04x + 5.550071E-01

Current Calibration - LB4100

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-89 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **LB4100** | A0 | A1 | A2 | A3 | A4 |
| **A1** | 5.747061E-01 | -8.491165E-04 | | | |
| **A2** | 5.703443E-01 | -6.406264E-04 | | | |
| **A3** | 5.700664E-01 | -4.202331E-04 | | | |
| **A4** | #N/A | #N/A | | | |
| **B1** | 5.687816E-01 | -7.480430E-04 | | | |
| **B2** | 5.758076E-01 | -7.591522E-04 | | | |
| **B3** | 5.816376E-01 | -7.822953E-04 | | | |
| **B4** | 5.369774E-01 | -2.580587E-04 | | | |
| **C1** | 5.715763E-01 | -9.712360E-04 | | | |
| **C2** | 5.761770E-01 | -7.725299E-04 | | | |
| **C3** | 5.708355E-01 | -7.356185E-04 | | | |
| **C4** | 5.687446E-01 | -6.743296E-04 | | | |
| **D1** | 4.212809E-01 | 1.337734E-03 | | | |
| **D2** | 7.003281E-01 | -1.469478E-03 | | | |
| **D3** | 6.876622E-01 | -1.435312E-03 | | | |
| **D4** | 6.971995E-01 | -1.970516E-03 | | | |
| **E1** | 5.654928E-01 | -7.919716E-04 | | | |
| **E2** | 5.716417E-01 | -7.339795E-04 | | | |
| **E3** | 5.705518E-01 | -8.264190E-04 | | | |
| **E4** | 5.701605E-01 | -7.203757E-04 | | | |
| **F1** | 5.848942E-01 | -9.877608E-04 | | | |
| **F2** | 5.802409E-01 | -9.606949E-04 | | | |
| **F3** | 5.882220E-01 | -9.301478E-04 | | | |
| **F4** | 5.866634E-01 | -9.627272E-04 | | | |
| **G1** | 5.826749E-01 | -1.115706E-03 | | | |
| **G2** | 5.775452E-01 | -1.033069E-03 | | | |
| **G3** | 5.906826E-01 | -9.703879E-04 | | | |
| **G4** | 5.783561E-01 | -8.458304E-04 | | | |
| **H1** | 5.744832E-01 | -7.598651E-04 | | | |
| **H2** | 5.743844E-01 | -5.036199E-04 | | | |
| **H3** | 5.892461E-01 | -9.487267E-04 | | | |
| **H4** | 5.776789E-01 | -8.395378E-04 | | | |
| **I1** | 5.474808E-01 | -1.012691E-03 | | | |
| **I2** | 5.546033E-01 | -1.095949E-03 | | | |
| **I3** | 5.532368E-01 | -1.101048E-03 | | | |
| **I4** | 5.550967E-01 | -8.985042E-04 | | | |
| **J1** | 5.483286E-01 | -7.471830E-04 | | | |
| **J2** | 5.461452E-01 | -7.596602E-04 | | | |
| **J3** | 5.509050E-01 | -9.883080E-04 | | | |
| **J4** | 5.550071E-01 | -8.545895E-04 | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| C1 | A1 | 1 | 0 | 27150 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C2 | A1 | 1 | 0 | 29285 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C3 | A1 | 1 | 1 | 29776 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C4 | A1 | 1 | 0 | 28412 | 2/14/2013 15:38 | 2/14/2013 15:39 | LB4100 | SR89C13 |
| C5 | A1 | 1 | 0 | 28092 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C6 | A1 | 1 | 0 | 28844 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C7 | A1 | 1 | 1 | 28434 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C8 | A1 | 1 | 0 | 26672 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C1 | A2 | 1 | 0 | 26680 | 2/14/2013 15:38 | 2/14/2013 15:39 | LB4100 | SR89C13 |
| C2 | A2 | 1 | 0 | 28905 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C3 | A2 | 1 | 0 | 29511 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C4 | A2 | 1 | 0 | 28600 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C5 | A2 | 1 | 0 | 28678 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C6 | A2 | 1 | 0 | 28277 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C7 | A2 | 1 | 0 | 28907 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C8 | A2 | 1 | 0 | 26516 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C1 | A3 | 1 | 0 | 26987 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C2 | A3 | 1 | 0 | 28583 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C3 | A3 | 1 | 0 | 29853 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C4 | A3 | 1 | 0 | 28419 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C5 | A3 | 1 | 0 | 28725 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C6 | A3 | 1 | 0 | 28858 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C7 | A3 | 1 | 0 | 28676 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C8 | A3 | 1 | 0 | 27141 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C1 | B1 | 1 | 0 | 26722 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C2 | B1 | 1 | 0 | 28623 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C3 | B1 | 1 | 1 | 29424 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C4 | B1 | 1 | 0 | 28057 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C5 | B1 | 1 | 0 | 28929 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C6 | B1 | 1 | 1 | 28525 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C7 | B1 | 1 | 0 | 28211 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C8 | B1 | 1 | 0 | 26338 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C1 | B2 | 1 | 0 | 27329 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C2 | B2 | 1 | 0 | 29027 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C3 | B2 | 1 | 0 | 29390 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C4 | B2 | 1 | 0 | 28846 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C5 | B2 | 1 | 0 | 28795 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C6 | B2 | 1 | 0 | 28750 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C7 | B2 | 1 | 0 | 28726 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C8 | B2 | 1 | 0 | 26736 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C1 | B3 | 1 | 0 | 27326 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C2 | B3 | 1 | 0 | 29353 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C3 | B3 | 1 | 1 | 30111 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C4 | B3 | 1 | 0 | 29154 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C5 | B3 | 1 | 0 | 29120 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C6 | B3 | 1 | 0 | 28788 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C7 | B3 | 1 | 0 | 28809 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C8 | B3 | 1 | 0 | 27134 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C1 | B4 | 1 | 0 | 25575 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C2 | B4 | 1 | 0 | 26919 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C3 | B4 | 1 | 2 | 27774 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C4 | B4 | 1 | 0 | 27053 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C5 | B4 | 1 | 0 | 27278 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C6 | B4 | 1 | 0 | 27192 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C7 | B4 | 1 | 0 | 27195 | 2/14/2013 15:38 | 2/14/2013 15:39 | LB4100 | SR89C13 |
| C8 | B4 | 1 | 0 | 25849 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C1 | C1 | 1 | 0 | 26526 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C2 | C1 | 1 | 0 | 28930 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C3 | C1 | 1 | 0 | 29354 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |
| C4 | C1 | 1 | 0 | 28788 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C5 | C1 | 1 | 0 | 28560 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C6 | C1 | 1 | 0 | 28200 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C7 | C1 | 1 | 0 | 28046 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C8 | C1 | 1 | 0 | 26165 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C1 | C2 | 1 | 0 | 27178 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C2 | C2 | 1 | 0 | 28752 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C3 | C2 | 1 | 1 | 29850 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C4 | C2 | 1 | 0 | 28897 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |
| C5 | C2 | 1 | 0 | 28700 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C6 | C2 | 1 | 0 | 28689 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C7 | C2 | 1 | 0 | 29075 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C8 | C2 | 1 | 0 | 26461 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C1 | C3 | 1 | 0 | 26597 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C2 | C3 | 1 | 0 | 28827 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C3 | C3 | 1 | 0 | 29624 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C4 | C3 | 1 | 0 | 28440 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C5 | C3 | 1 | 0 | 28677 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C6 | C3 | 1 | 0 | 28469 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C7 | C3 | 1 | 0 | 28776 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C8 | C3 | 1 | 0 | 26251 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C1 | C4 | 1 | 0 | 26622 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C2 | C4 | 1 | 0 | 28697 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |
| C3 | C4 | 1 | 0 | 29635 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C4 | C4 | 1 | 0 | 28385 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C5 | C4 | 1 | 0 | 28434 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C6 | C4 | 1 | 0 | 28394 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C7 | C4 | 1 | 0 | 28540 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C8 | C4 | 1 | 0 | 26464 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C1 | D1 | 1 | 0 | 17106 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C2 | D1 | 1 | 0 | 21853 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C3 | D1 | 1 | 0 | 25612 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C4 | D1 | 1 | 0 | 16614 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C5 | D1 | 1 | 0 | 32889 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C6 | D1 | 1 | 0 | 17872 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C7 | D1 | 1 | 0 | 22231 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C8 | D1 | 1 | 0 | 22966 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C1 | D2 | 1 | 0 | 34220 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C2 | D2 | 1 | 0 | 36102 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C3 | D2 | 1 | 0 | 35700 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C4 | D2 | 1 | 0 | 33884 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C5 | D2 | 1 | 0 | 33596 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C6 | D2 | 1 | 1 | 33062 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C7 | D2 | 1 | 0 | 35188 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C8 | D2 | 1 | 0 | 31930 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C1 | D3 | 1 | 0 | 31213 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C2 | D3 | 1 | 0 | 36223 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C3 | D3 | 1 | 3 | 35945 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C4 | D3 | 1 | 0 | 33900 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C5 | D3 | 1 | 0 | 33729 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C6 | D3 | 1 | 0 | 33220 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C7 | D3 | 1 | 0 | 32405 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C8 | D3 | 1 | 0 | 32001 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C1 | D4 | 1 | 0 | 31768 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C2 | D4 | 1 | 1 | 33755 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C3 | D4 | 1 | 0 | 37049 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C4 | D4 | 1 | 0 | 35096 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C5 | D4 | 1 | 0 | 34910 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C6 | D4 | 1 | 0 | 33506 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C7 | D4 | 1 | 0 | 32930 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C8 | D4 | 1 | 0 | 30311 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C1 | E1 | 1 | 0 | 26763 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C2 | E1 | 1 | 0 | 28437 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C3 | E1 | 1 | 2 | 29015 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C4 | E1 | 1 | 0 | 28005 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C5 | E1 | 1 | 0 | 28319 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C6 | E1 | 1 | 0 | 28284 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C7 | E1 | 1 | 0 | 28411 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C8 | E1 | 1 | 0 | 25909 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C1 | E2 | 1 | 0 | 26781 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C2 | E2 | 1 | 0 | 28571 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C3 | E2 | 1 | 0 | 29563 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C4 | E2 | 1 | 0 | 28723 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C5 | E2 | 1 | 0 | 28719 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C6 | E2 | 1 | 0 | 28554 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C7 | E2 | 1 | 0 | 28671 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C8 | E2 | 1 | 0 | 26339 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C1 | E3 | 1 | 0 | 26618 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C2 | E3 | 1 | 0 | 28693 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C3 | E3 | 1 | 0 | 29309 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C4 | E3 | 1 | 0 | 28454 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C5 | E3 | 1 | 0 | 28823 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C6 | E3 | 1 | 0 | 28468 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C7 | E3 | 1 | 0 | 28602 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C8 | E3 | 1 | 0 | 25989 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C1 | E4 | 1 | 0 | 26594 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C2 | E4 | 1 | 0 | 28704 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C3 | E4 | 1 | 0 | 29180 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C4 | E4 | 1 | 0 | 28925 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C5 | E4 | 1 | 0 | 28587 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C6 | E4 | 1 | 0 | 28404 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C7 | E4 | 1 | 0 | 28787 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C8 | E4 | 1 | 0 | 26216 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C1 | F1 | 1 | 1 | 27295 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C2 | F1 | 1 | 0 | 29644 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C3 | F1 | 1 | 1 | 30147 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C4 | F1 | 1 | 0 | 29146 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C5 | F1 | 1 | 0 | 29025 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C6 | F1 | 1 | 0 | 28823 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C7 | F1 | 1 | 0 | 29091 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C8 | F1 | 1 | 0 | 26635 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C1 | F2 | 1 | 0 | 27234 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C2 | F2 | 1 | 0 | 28779 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C3 | F2 | 1 | 0 | 30073 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C4 | F2 | 1 | 0 | 29103 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C5 | F2 | 1 | 0 | 28817 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C6 | F2 | 1 | 0 | 28793 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C7 | F2 | 1 | 0 | 29080 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C8 | F2 | 1 | 0 | 26207 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C1 | F3 | 1 | 0 | 27590 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C2 | F3 | 1 | 0 | 29748 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C3 | F3 | 1 | 1 | 30146 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C4 | F3 | 1 | 1 | 29369 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C5 | F3 | 1 | 0 | 29488 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C6 | F3 | 1 | 0 | 29095 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C7 | F3 | 1 | 0 | 28902 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C8 | F3 | 1 | 0 | 27124 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C1 | F4 | 1 | 0 | 27501 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C2 | F4 | 1 | 0 | 29663 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C3 | F4 | 1 | 0 | 30403 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C4 | F4 | 1 | 0 | 29060 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C5 | F4 | 1 | 0 | 29143 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C6 | F4 | 1 | 0 | 28837 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C7 | F4 | 1 | 0 | 29295 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C8 | F4 | 1 | 0 | 26770 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C1 | G1 | 1 | 0 | 26990 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C2 | G1 | 1 | 0 | 29405 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C3 | G1 | 1 | 2 | 29898 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C4 | G1 | 1 | 0 | 29244 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C5 | G1 | 1 | 0 | 29252 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C6 | G1 | 1 | 0 | 28210 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C7 | G1 | 1 | 0 | 28902 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C8 | G1 | 1 | 0 | 26193 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C1 | G2 | 1 | 0 | 27461 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C2 | G2 | 1 | 0 | 28555 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C3 | G2 | 1 | 2 | 29657 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C4 | G2 | 1 | 0 | 28546 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C5 | G2 | 1 | 0 | 28851 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C6 | G2 | 1 | 0 | 28993 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C7 | G2 | 1 | 0 | 28387 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C8 | G2 | 1 | 0 | 26098 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C1 | G3 | 1 | 0 | 27672 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C2 | G3 | 1 | 0 | 30013 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C3 | G3 | 1 | 0 | 30377 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C4 | G3 | 1 | 1 | 29285 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C5 | G3 | 1 | 0 | 29463 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C6 | G3 | 1 | 0 | 28921 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C7 | G3 | 1 | 0 | 29531 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C8 | G3 | 1 | 0 | 26930 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C1 | G4 | 1 | 0 | 27001 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C2 | G4 | 1 | 0 | 28869 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C3 | G4 | 1 | 0 | 30051 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C4 | G4 | 1 | 0 | 28981 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C5 | G4 | 1 | 0 | 29338 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C6 | G4 | 1 | 0 | 28171 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C7 | G4 | 1 | 0 | 29023 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C8 | G4 | 1 | 0 | 26478 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C1 | H1 | 1 | 0 | 26604 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C2 | H1 | 1 | 0 | 28846 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C3 | H1 | 1 | 0 | 29666 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C4 | H1 | 1 | 0 | 28838 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C5 | H1 | 1 | 0 | 29238 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C6 | H1 | 1 | 0 | 28485 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C7 | H1 | 1 | 0 | 28838 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C8 | H1 | 1 | 0 | 26334 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C1 | H2 | 1 | 1 | 26712 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C2 | H2 | 1 | 0 | 29065 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C3 | H2 | 1 | 0 | 30048 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C4 | H2 | 1 | 0 | 28932 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C5 | H2 | 1 | 0 | 28551 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C6 | H2 | 1 | 0 | 28987 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C7 | H2 | 1 | 0 | 28907 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C8 | H2 | 1 | 0 | 27105 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C1 | H3 | 1 | 0 | 27270 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C2 | H3 | 1 | 0 | 29602 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C3 | H3 | 1 | 1 | 30365 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C4 | H3 | 1 | 0 | 29562 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C5 | H3 | 1 | 0 | 29489 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C6 | H3 | 1 | 0 | 29210 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C7 | H3 | 1 | 0 | 29736 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C8 | H3 | 1 | 0 | 26490 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C1 | H4 | 1 | 0 | 26626 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C2 | H4 | 1 | 0 | 28745 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C3 | H4 | 1 | 0 | 30627 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C4 | H4 | 1 | 0 | 28888 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C5 | H4 | 1 | 0 | 28747 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C6 | H4 | 1 | 1 | 28706 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C7 | H4 | 1 | 0 | 29087 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C8 | H4 | 1 | 0 | 26268 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C1 | I1 | 1 | 0 | 25458 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C2 | I1 | 1 | 0 | 27331 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C3 | I1 | 1 | 1 | 28374 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C4 | I1 | 1 | 0 | 27781 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C5 | I1 | 1 | 0 | 27505 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C6 | I1 | 1 | 0 | 25547 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C7 | I1 | 1 | 1 | 27827 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C8 | I1 | 1 | 0 | 24558 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C1 | I2 | 1 | 0 | 26014 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C2 | I2 | 1 | 0 | 27924 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |

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| C3 | I2 | 1 | 1 | 28671 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C4 | I2 | 1 | 0 | 27748 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C5 | I2 | 1 | 0 | 27973 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C6 | I2 | 1 | 0 | 25466 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C7 | I2 | 1 | 0 | 27985 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C8 | I2 | 1 | 0 | 24995 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C1 | I3 | 1 | 0 | 25605 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C2 | I3 | 1 | 0 | 27849 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C3 | I3 | 1 | 0 | 28684 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C4 | I3 | 1 | 0 | 27958 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C5 | I3 | 1 | 0 | 27726 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C6 | I3 | 1 | 0 | 25767 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C7 | I3 | 1 | 0 | 27712 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C8 | I3 | 1 | 0 | 24882 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C1 | I4 | 1 | 0 | 25975 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C2 | I4 | 1 | 0 | 28187 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C3 | I4 | 1 | 2 | 28724 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C4 | I4 | 1 | 0 | 27771 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C5 | I4 | 1 | 0 | 27999 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C6 | I4 | 1 | 0 | 26038 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C7 | I4 | 1 | 1 | 27846 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C8 | I4 | 1 | 0 | 25574 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C1 | J1 | 1 | 0 | 25319 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C2 | J1 | 1 | 0 | 27719 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C3 | J1 | 1 | 0 | 28831 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C4 | J1 | 1 | 0 | 27812 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C5 | J1 | 1 | 0 | 27562 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C6 | J1 | 1 | 0 | 25600 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C7 | J1 | 1 | 0 | 28107 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C8 | J1 | 1 | 0 | 25299 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C1 | J2 | 1 | 1 | 25566 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C2 | J2 | 1 | 0 | 27613 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C3 | J2 | 1 | 0 | 28413 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C4 | J2 | 1 | 0 | 27447 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C5 | J2 | 1 | 0 | 27753 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C6 | J2 | 1 | 0 | 25406 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C7 | J2 | 1 | 0 | 27790 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C8 | J2 | 1 | 0 | 25316 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C1 | J3 | 1 | 0 | 25361 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C2 | J3 | 1 | 0 | 27836 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C3 | J3 | 1 | 0 | 28331 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C4 | J3 | 1 | 0 | 27891 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C5 | J3 | 1 | 1 | 28372 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C6 | J3 | 1 | 0 | 25570 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C7 | J3 | 1 | 0 | 27403 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C8 | J3 | 1 | 0 | 25098 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C1 | J4 | 1 | 0 | 26133 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C2 | J4 | 1 | 0 | 27899 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C3 | J4 | 1 | 0 | 28651 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C4 | J4 | 1 | 0 | 28007 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C5 | J4 | 1 | 0 | 27986 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C6 | J4 | 1 | 0 | 25877 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C7 | J4 | 1 | 0 | 28348 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C8 | J4 | 1 | 0 | 25430 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |

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## Sr-90 Calibration - LB4100 - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

Separation Date/Time 3/29/2013 14:10
Y-90 Half Life (days) 2.668875
The following detectors were not calibrated:
A4

| Carrier Data | | Std ID | 1858443 | |
|---|---|---|---|---|
| | | Std weight | 17.1 | mg/mL |
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 3.3 | 0.2 | 3.42 | 96.5% |
| 2 | 7.3 | 0.4 | 6.84 | 100.0% |
| 3 | 8.5 | 0.5 | 8.55 | 99.4% |
| 4 | 12.2 | 0.7 | 11.97 | 100.0% |
| 5 | 17.2 | 1 | 17.10 | 100.0% |
| 6 | 26.6 | 1.5 | 25.65 | 100.0% |
| 7 | 31.0 | 1.8 | 30.78 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

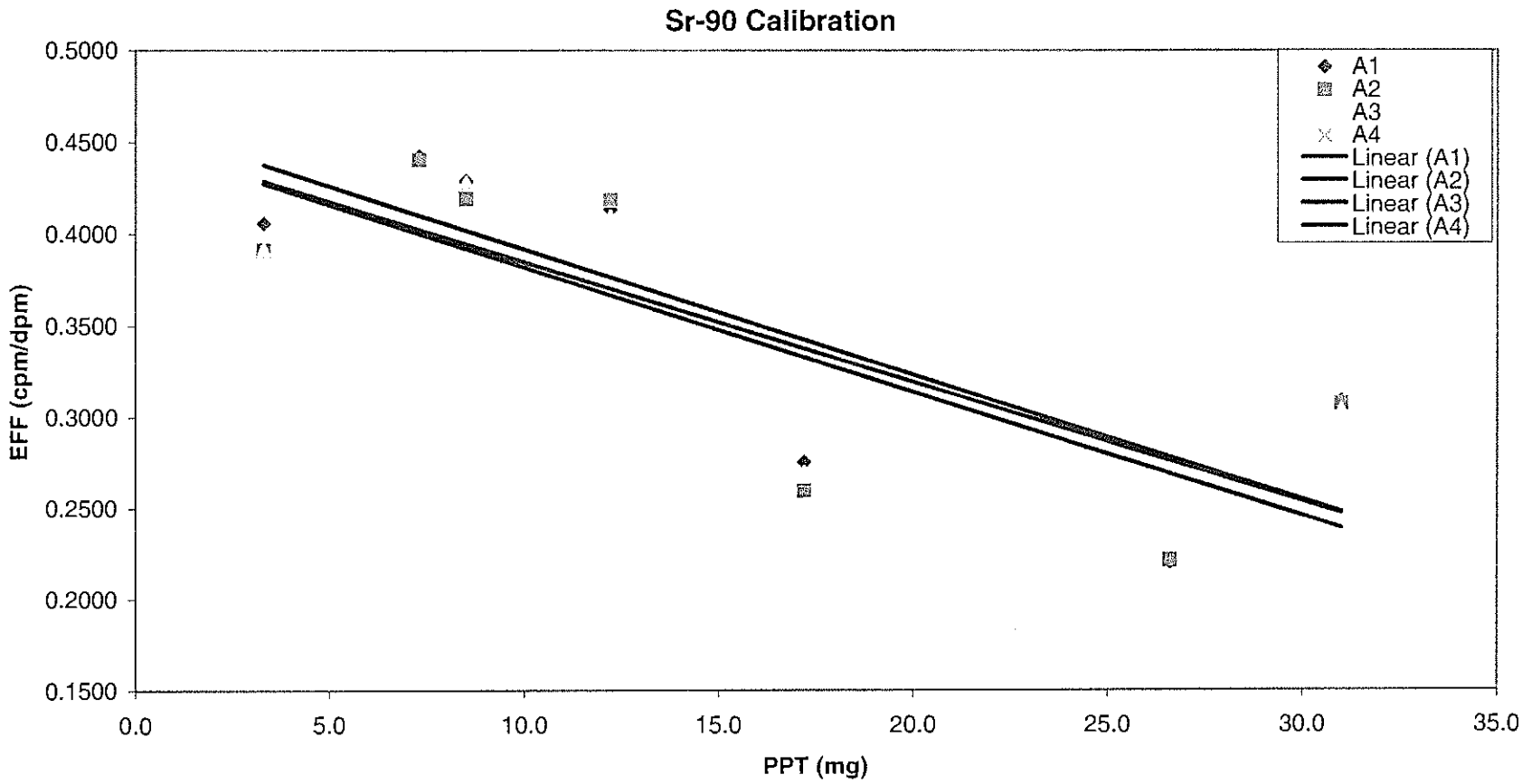
*Background is considered neglible.
**Decay corrected to mid-point of cou

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 3/30/2013 17:34 | 3 | 16161 | 5387.00 | 96.5% | 0.58883 | 0.25692 | 3885.49 | 9576.84 | 0.4057 | 0.4375 |
| A1 | 2 | 3/30/2013 18:04 | 3 | 17126 | 5708.67 | 100.0% | 0.58883 | 0.26093 | 4237.27 | 9576.83 | 0.4424 | 0.4102 |
| A1 | 3 | 3/30/2013 18:00 | 3 | 16749 | 5583.00 | 99.4% | 0.58883 | 0.26035 | 4106.22 | 9576.83 | 0.4288 | 0.4020 |
| A1 | 4 | 3/30/2013 17:56 | 3 | 16276 | 5425.33 | 100.0% | 0.58883 | 0.25978 | 3960.40 | 9576.83 | 0.4135 | 0.3767 |
| A1 | 5 | 3/30/2013 17:52 | 3 | 12301 | 4100.33 | 100.0% | 0.58883 | 0.25922 | 2638.53 | 9576.83 | 0.2755 | 0.3425 |
| A1 | 6 | 3/30/2013 17:47 | 3 | 10705 | 3568.33 | 100.0% | 0.58883 | 0.25857 | 2110.25 | 9576.84 | 0.2203 | 0.2782 |
| A1 | 7 | 3/30/2013 17:43 | 3 | 13238 | 4412.67 | 100.0% | 0.58883 | 0.25801 | 2957.70 | 9576.84 | 0.3088 | 0.2481 |
| A2 | 1 | 3/30/2013 17:39 | 3 | 15811 | 5270.33 | 96.5% | 0.59585 | 0.25748 | 3747.52 | 9576.84 | 0.3913 | 0.4286 |
| A2 | 2 | 3/30/2013 17:35 | 3 | 17048 | 5682.67 | 100.0% | 0.59585 | 0.25693 | 4216.56 | 9576.84 | 0.4403 | 0.4024 |
| A2 | 3 | 3/30/2013 18:04 | 3 | 16536 | 5512.00 | 99.4% | 0.59585 | 0.26093 | 4014.30 | 9576.83 | 0.4192 | 0.3946 |
| A2 | 4 | 3/30/2013 18:00 | 3 | 16478 | 5492.67 | 100.0% | 0.59585 | 0.26035 | 4007.03 | 9576.83 | 0.4184 | 0.3704 |
| A2 | 5 | 3/30/2013 17:56 | 3 | 11902 | 3967.33 | 100.0% | 0.59585 | 0.25978 | 2484.94 | 9576.83 | 0.2595 | 0.3377 |
| A2 | 6 | 3/30/2013 17:52 | 3 | 10797 | 3599.00 | 100.0% | 0.59585 | 0.25923 | 2119.76 | 9576.83 | 0.2213 | 0.2762 |
| A2 | 7 | 3/30/2013 17:47 | 3 | 13258 | 4419.33 | 100.0% | 0.59585 | 0.25857 | 2943.87 | 9576.84 | 0.3074 | 0.2475 |
| A3 | 1 | 3/30/2013 17:43 | 3 | 15854 | 5284.67 | 96.5% | 0.59919 | 0.25802 | 3750.23 | 9576.84 | 0.3916 | 0.4273 |
| A3 | 2 | 3/30/2013 17:39 | 3 | 16572 | 5524.00 | 100.0% | 0.59919 | 0.25748 | 4046.49 | 9576.84 | 0.4225 | 0.4001 |
| A3 | 3 | 3/30/2013 17:35 | 3 | 16758 | 5586.00 | 99.4% | 0.59919 | 0.25693 | 4103.01 | 9576.84 | 0.4284 | 0.3920 |
| A3 | 4 | 3/30/2013 18:04 | 3 | 16259 | 5419.67 | 100.0% | 0.59919 | 0.26093 | 3922.39 | 9576.83 | 0.4096 | 0.3668 |
| A3 | 5 | 3/30/2013 18:00 | 3 | 12236 | 4078.67 | 100.0% | 0.59919 | 0.26035 | 2584.71 | 9576.83 | 0.2699 | 0.3329 |
| A3 | 6 | 3/30/2013 17:56 | 3 | 10256 | 3418.67 | 100.0% | 0.59919 | 0.25978 | 1927.98 | 9576.83 | 0.2013 | 0.2691 |
| A3 | 7 | 3/30/2013 17:52 | 3 | 13195 | 4398.33 | 100.0% | 0.59919 | 0.25923 | 2910.81 | 9576.83 | 0.3039 | 0.2392 |
| B1 | 1 | 3/30/2013 17:52 | 3 | 15694 | 5231.33 | 96.5% | 0.60441 | 0.25921 | 3676.38 | 9576.83 | 0.3839 | 0.4311 |
| B1 | 2 | 3/30/2013 17:47 | 3 | 16458 | 5486.00 | 100.0% | 0.60441 | 0.25855 | 3989.43 | 9576.84 | 0.4166 | 0.4060 |
| B1 | 3 | 3/30/2013 17:43 | 3 | 16119 | 5373.00 | 99.4% | 0.60441 | 0.25801 | 3870.78 | 9576.84 | 0.4042 | 0.3985 |
| B1 | 4 | 3/30/2013 17:39 | 3 | 16296 | 5432.00 | 100.0% | 0.60441 | 0.25747 | 3941.68 | 9576.84 | 0.4116 | 0.3753 |
| B1 | 5 | 3/30/2013 17:34 | 3 | 15592 | 5197.33 | 100.0% | 0.60441 | 0.25690 | 3710.33 | 9576.84 | 0.3874 | 0.3440 |
| B1 | 6 | 3/30/2013 18:04 | 3 | 10430 | 3476.67 | 100.0% | 0.60441 | 0.26091 | 1966.43 | 9576.83 | 0.2053 | 0.2851 |
| B1 | 7 | 3/30/2013 18:00 | 3 | 12809 | 4269.67 | 100.0% | 0.60441 | 0.26034 | 2762.77 | 9576.83 | 0.2885 | 0.2575 |
| B2 | 1 | 3/30/2013 17:56 | 3 | 15924 | 5308.00 | 96.5% | 0.60565 | 0.25977 | 3746.51 | 9576.83 | 0.3912 | 0.4442 |
| B2 | 2 | 3/30/2013 17:52 | 3 | 16897 | 5632.33 | 100.0% | 0.60565 | 0.25921 | 4128.83 | 9576.83 | 0.4311 | 0.4158 |
| B2 | 3 | 3/30/2013 17:47 | 3 | 16417 | 5472.33 | 99.4% | 0.60565 | 0.25855 | 3963.85 | 9576.84 | 0.4139 | 0.4073 |
| B2 | 4 | 3/30/2013 17:43 | 3 | 16651 | 5550.33 | 100.0% | 0.60565 | 0.25801 | 4053.81 | 9576.84 | 0.4233 | 0.3810 |
| B2 | 5 | 3/30/2013 17:39 | 3 | 15592 | 5197.33 | 100.0% | 0.60565 | 0.25747 | 3703.93 | 9576.84 | 0.3868 | 0.3455 |
| B2 | 6 | 3/30/2013 17:34 | 3 | 9824 | 3274.67 | 100.0% | 0.60565 | 0.25690 | 1784.60 | 9576.84 | 0.1863 | 0.2788 |
| B2 | 7 | 3/30/2013 18:04 | 3 | 12806 | 4268.67 | 100.0% | 0.60565 | 0.26091 | 2755.31 | 9576.83 | 0.2877 | 0.2476 |
| B3 | 1 | 3/30/2013 18:00 | 3 | 16050 | 5350.00 | 96.5% | 0.61133 | 0.26034 | 3770.42 | 9576.83 | 0.3937 | 0.4340 |
| B3 | 2 | 3/30/2013 17:56 | 3 | 17122 | 5707.33 | 100.0% | 0.61133 | 0.25977 | 4186.50 | 9576.83 | 0.4371 | 0.4090 |
| B3 | 3 | 3/30/2013 17:52 | 3 | 16567 | 5522.33 | 99.4% | 0.61133 | 0.25921 | 3995.82 | 9576.83 | 0.4172 | 0.4015 |
| B3 | 4 | 4/1/2013 11:09 | 3 | 19703 | 6567.67 | 100.0% | 0.61133 | 0.52619 | 3487.42 | 9575.75 | 0.3642 | 0.3783 |
| B3 | 5 | 3/30/2013 17:43 | 3 | 15955 | 5318.33 | 100.0% | 0.61133 | 0.25801 | 3807.79 | 9576.84 | 0.3976 | 0.3470 |
| B3 | 6 | 3/30/2013 17:39 | 3 | 10587 | 3529.00 | 100.0% | 0.61133 | 0.25747 | 2021.50 | 9576.84 | 0.2111 | 0.2882 |
| B3 | 7 | 3/30/2013 17:34 | 3 | 13066 | 4355.33 | 100.0% | 0.61133 | 0.25690 | 2851.30 | 9576.84 | 0.2977 | 0.2607 |
| B4 | 1 | 3/30/2013 18:04 | 3 | 14738 | 4912.67 | 96.5% | 0.57015 | 0.26092 | 3436.20 | 9576.83 | 0.3588 | 0.4071 |
| B4 | 2 | 3/30/2013 18:00 | 3 | 15486 | 5162.00 | 100.0% | 0.57015 | 0.26034 | 3740.49 | 9576.83 | 0.3906 | 0.3829 |
| B4 | 3 | 3/30/2013 17:56 | 3 | 15349 | 5116.33 | 99.4% | 0.57015 | 0.25977 | 3689.58 | 9576.83 | 0.3853 | 0.3756 |
| B4 | 4 | 3/30/2013 17:52 | 3 | 15422 | 5140.67 | 100.0% | 0.57015 | 0.25921 | 3725.30 | 9576.83 | 0.3890 | 0.3531 |
| B4 | 5 | 3/30/2013 17:47 | 3 | 14782 | 4927.33 | 100.0% | 0.57015 | 0.25855 | 3515.58 | 9576.84 | 0.3671 | 0.3228 |
| B4 | 6 | 3/30/2013 17:43 | 3 | 9596 | 3198.67 | 100.0% | 0.57015 | 0.25801 | 1789.87 | 9576.84 | 0.1869 | 0.2658 |
| B4 | 7 | 3/30/2013 17:39 | 3 | 11943 | 3981.00 | 100.0% | 0.57015 | 0.25747 | 2575.12 | 9576.84 | 0.2689 | 0.2392 |
| C1 | 1 | 3/30/2013 18:09 | 3 | 15726 | 5242.67 | 96.5% | 0.58269 | 0.26155 | 3730.05 | 9576.83 | 0.3895 | 0.4300 |
| C1 | 2 | 3/30/2013 18:44 | 3 | 16973 | 5657.67 | 100.0% | 0.58269 | 0.26613 | 4172.59 | 9576.81 | 0.4357 | 0.4054 |
| C1 | 3 | 3/30/2013 18:39 | 3 | 16728 | 5576.00 | 99.4% | 0.58269 | 0.26549 | 4085.76 | 9576.81 | 0.4266 | 0.3980 |
| C1 | 4 | 3/30/2013 18:34 | 3 | 16665 | 5555.00 | 100.0% | 0.58269 | 0.26487 | 4076.96 | 9576.82 | 0.4257 | 0.3753 |
| C1 | 5 | 3/30/2013 18:29 | 3 | 12265 | 4088.33 | 100.0% | 0.58269 | 0.26422 | 2613.90 | 9576.82 | 0.2729 | 0.3445 |
| C1 | 6 | 3/30/2013 18:24 | 3 | 11355 | 3785.00 | 100.0% | 0.58269 | 0.26356 | 2314.26 | 9576.82 | 0.2417 | 0.2857 |
| C1 | 7 | 3/30/2013 18:19 | 3 | 13236 | 4412.00 | 100.0% | 0.58269 | 0.25291 | 2944.89 | 9576.82 | 0.3075 | 0.2596 |
| C2 | 1 | 3/30/2013 18:14 | 3 | 16885 | 5628.33 | 96.5% | 0.59154 | 0.26224 | 4088.68 | 9576.82 | 0.4269 | 0.4603 |
| C2 | 2 | 3/30/2013 18:09 | 3 | 17728 | 5909.33 | 100.0% | 0.59154 | 0.26155 | 4427.62 | 9576.83 | 0.4623 | 0.4330 |
| C2 | 3 | 3/30/2013 18:44 | 3 | 17608 | 5869.33 | 99.4% | 0.59154 | 0.26613 | 4352.83 | 9576.81 | 0.4545 | 0.4249 |
| C2 | 4 | 3/30/2013 18:39 | 3 | 17198 | 5732.67 | 100.0% | 0.59154 | 0.26549 | 4226.65 | 9576.81 | 0.4416 | 0.3997 |
| C2 | 5 | 3/30/2013 18:34 | 3 | 12850 | 4283.33 | 100.0% | 0.59154 | 0.26487 | 2782.84 | 9576.82 | 0.2906 | 0.3657 |
| C2 | 6 | 3/30/2013 18:29 | 3 | 11926 | 3975.33 | 100.0% | 0.59154 | 0.26422 | 2478.51 | 9576.82 | 0.2588 | 0.3017 |
| C2 | 7 | 3/30/2013 18:24 | 3 | 13738 | 4579.33 | 100.0% | 0.59154 | 0.26356 | 3066.26 | 9576.82 | 0.3203 | 0.2718 |
| C3 | 1 | 3/30/2013 18:19 | 3 | 17291 | 5763.67 | 96.5% | 0.58516 | 0.26291 | 4236.77 | 9576.82 | 0.4424 | 0.4741 |
| C3 | 2 | 3/30/2013 18:14 | 3 | 18199 | 6066.33 | 100.0% | 0.58516 | 0.26224 | 4596.71 | 9576.82 | 0.4800 | 0.4467 |
| C3 | 3 | 3/30/2013 18:09 | 3 | 17785 | 5928.33 | 99.4% | 0.58516 | 0.26155 | 4453.95 | 9576.83 | 0.4651 | 0.4385 |
| C3 | 4 | 3/30/2013 18:44 | 3 | 17652 | 5884.00 | 100.0% | 0.58516 | 0.26613 | 4392.62 | 9576.81 | 0.4587 | 0.4131 |
| C3 | 5 | 3/30/2013 18:39 | 3 | 12971 | 4323.67 | 100.0% | 0.58516 | 0.26549 | 2835.87 | 9576.81 | 0.2961 | 0.3788 |
| C3 | 6 | 3/30/2013 18:34 | 3 | 12022 | 4007.33 | 100.0% | 0.58516 | 0.26487 | 2523.01 | 9576.82 | 0.2634 | 0.3144 |
| C3 | 7 | 3/30/2013 18:29 | 3 | 14327 | 4775.67 | 100.0% | 0.58516 | 0.26422 | 3294.99 | 9576.82 | 0.3441 | 0.2842 |
| C4 | 1 | 3/30/2013 18:24 | 3 | 17245 | 5748.33 | 96.5% | 0.58553 | 0.26356 | 4216.68 | 9576.82 | 0.4403 | 0.4719 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C4 | 2 | 3/30/2013 18:19 | 3 | 17812 | 5937.33 | 100.0% | 0.58553 | 0.26291 | 4463.06 | 9576.82 | 0.4660 | 0.4444 |
| C4 | 3 | 3/30/2013 18:14 | 3 | 17917 | 5972.33 | 99.4% | 0.58553 | 0.26224 | 4493.14 | 9576.82 | 0.4692 | 0.4361 |
| C4 | 4 | 3/30/2013 18:09 | 3 | 17597 | 5865.67 | 100.0% | 0.58553 | 0.26155 | 4398.99 | 9576.83 | 0.4593 | 0.4107 |
| C4 | 5 | 3/30/2013 18:44 | 3 | 13064 | 4354.67 | 100.0% | 0.58553 | 0.26613 | 2862.36 | 9576.81 | 0.2989 | 0.3763 |
| C4 | 6 | 3/30/2013 18:39 | 3 | 11923 | 3974.33 | 100.0% | 0.58553 | 0.26549 | 2485.59 | 9576.81 | 0.2595 | 0.3116 |
| C4 | 7 | 3/30/2013 18:34 | 3 | 14197 | 4732.33 | 100.0% | 0.58553 | 0.26487 | 3247.07 | 9576.82 | 0.3391 | 0.2814 |
| D1 | 1 | 3/30/2013 18:30 | 3 | 17998 | 5999.33 | 96.5% | 0.67247 | 0.26428 | 4235.47 | 9576.82 | 0.4423 | 0.4737 |
| D1 | 2 | 3/30/2013 18:25 | 3 | 18672 | 6224.00 | 100.0% | 0.67247 | 0.26362 | 4526.29 | 9576.82 | 0.4726 | 0.4452 |
| D1 | 3 | 3/30/2013 18:20 | 3 | 18274 | 6091.33 | 99.4% | 0.67247 | 0.26297 | 4387.83 | 9576.82 | 0.4582 | 0.4367 |
| D1 | 4 | 3/30/2013 18:15 | 3 | 18243 | 6081.00 | 100.0% | 0.67247 | 0.26231 | 4391.70 | 9576.82 | 0.4586 | 0.4104 |
| D1 | 5 | 3/30/2013 18:10 | 3 | 13824 | 4608.00 | 100.0% | 0.67247 | 0.26161 | 2923.17 | 9576.83 | 0.3052 | 0.3748 |
| D1 | 6 | 3/30/2013 18:44 | 3 | 12622 | 4207.33 | 100.0% | 0.67247 | 0.26619 | 2493.06 | 9576.81 | 0.2603 | 0.3080 |
| D1 | 7 | 3/30/2013 18:39 | 3 | 14560 | 4853.33 | 100.0% | 0.67247 | 0.26555 | 3143.19 | 9576.81 | 0.3282 | 0.2767 |
| D2 | 1 | 3/30/2013 18:35 | 3 | 18378 | 6126.00 | 96.5% | 0.67504 | 0.26493 | 4351.03 | 9576.82 | 0.4543 | 0.4903 |
| D2 | 2 | 3/30/2013 18:30 | 3 | 19314 | 6438.00 | 100.0% | 0.67504 | 0.26428 | 4729.52 | 9576.82 | 0.4939 | 0.4585 |
| D2 | 3 | 3/30/2013 18:25 | 3 | 18625 | 6208.33 | 99.4% | 0.67504 | 0.26362 | 4494.11 | 9576.82 | 0.4693 | 0.4489 |
| D2 | 4 | 3/30/2013 18:20 | 3 | 18750 | 6250.00 | 100.0% | 0.67504 | 0.26297 | 4549.98 | 9576.82 | 0.4751 | 0.4194 |
| D2 | 5 | 3/30/2013 18:15 | 3 | 13854 | 4618.00 | 100.0% | 0.67504 | 0.26231 | 2922.25 | 9576.82 | 0.3051 | 0.3796 |
| D2 | 6 | 3/30/2013 18:10 | 3 | 11743 | 3914.33 | 100.0% | 0.67504 | 0.26161 | 2223.07 | 9576.83 | 0.2321 | 0.3047 |
| D2 | 7 | 3/30/2013 18:44 | 3 | 14966 | 4988.67 | 100.0% | 0.67504 | 0.26619 | 3267.83 | 9576.81 | 0.3412 | 0.2696 |
| D3 | 1 | 3/30/2013 18:39 | 3 | 18779 | 6259.67 | 96.5% | 0.67813 | 0.26555 | 4472.39 | 9576.81 | 0.4670 | 0.5006 |
| D3 | 2 | 3/30/2013 18:35 | 3 | 19428 | 6476.00 | 100.0% | 0.67813 | 0.26493 | 4755.45 | 9576.82 | 0.4966 | 0.4666 |
| D3 | 3 | 3/30/2013 18:30 | 3 | 19167 | 6389.00 | 99.4% | 0.67813 | 0.26428 | 4662.59 | 9576.82 | 0.4869 | 0.4564 |
| D3 | 4 | 3/30/2013 18:25 | 3 | 18722 | 6240.67 | 100.0% | 0.67813 | 0.26362 | 4528.64 | 9576.82 | 0.4729 | 0.4251 |
| D3 | 5 | 3/30/2013 18:20 | 3 | 13946 | 4648.67 | 100.0% | 0.67813 | 0.26297 | 2940.85 | 9576.82 | 0.3071 | 0.3826 |
| D3 | 6 | 3/30/2013 18:15 | 3 | 11717 | 3905.67 | 100.0% | 0.67813 | 0.26231 | 2202.13 | 9576.82 | 0.2299 | 0.3029 |
| D3 | 7 | 3/30/2013 18:10 | 3 | 14849 | 4949.67 | 100.0% | 0.67813 | 0.26162 | 3250.64 | 9576.83 | 0.3394 | 0.2656 |
| D4 | 1 | 3/30/2013 18:44 | 3 | 18298 | 6099.33 | 96.5% | 0.67635 | 0.26619 | 4312.45 | 9576.81 | 0.4503 | 0.4901 |
| D4 | 2 | 3/30/2013 18:39 | 3 | 19342 | 6447.33 | 100.0% | 0.67635 | 0.26555 | 4727.31 | 9576.81 | 0.4936 | 0.4597 |
| D4 | 3 | 3/30/2013 18:35 | 3 | 18911 | 6303.67 | 99.4% | 0.67635 | 0.26493 | 4577.54 | 9576.82 | 0.4780 | 0.4505 |
| D4 | 4 | 3/30/2013 18:30 | 3 | 18797 | 6265.67 | 100.0% | 0.67635 | 0.26428 | 4553.86 | 9576.82 | 0.4755 | 0.4224 |
| D4 | 5 | 3/30/2013 18:25 | 3 | 13889 | 4629.67 | 100.0% | 0.67635 | 0.26362 | 2922.14 | 9576.82 | 0.3051 | 0.3844 |
| D4 | 6 | 3/30/2013 18:20 | 3 | 12639 | 4213.00 | 100.0% | 0.67635 | 0.26297 | 2509.66 | 9576.82 | 0.2621 | 0.3130 |
| D4 | 7 | 3/30/2013 18:15 | 3 | 14727 | 4909.00 | 100.0% | 0.67635 | 0.26231 | 3209.94 | 9576.82 | 0.3352 | 0.2795 |
| E1 | 1 | 3/30/2013 18:27 | 3 | 15390 | 5130.00 | 96.5% | 0.58862 | 0.24789 | 3681.81 | 9576.87 | 0.3844 | 0.4315 |
| E1 | 2 | 3/30/2013 16:57 | 3 | 16259 | 5419.67 | 100.0% | 0.58862 | 0.25187 | 3999.65 | 9576.86 | 0.4177 | 0.4075 |
| E1 | 3 | 3/30/2013 16:53 | 3 | 15987 | 5329.00 | 99.4% | 0.58862 | 0.25132 | 3903.93 | 9576.86 | 0.4076 | 0.4003 |
| E1 | 4 | 3/30/2013 16:49 | 3 | 16116 | 5372.00 | 100.0% | 0.58862 | 0.25077 | 3958.39 | 9576.86 | 0.4133 | 0.3781 |
| E1 | 5 | 3/30/2013 16:45 | 3 | 15325 | 5108.33 | 100.0% | 0.58862 | 0.25022 | 3697.78 | 9576.86 | 0.3861 | 0.3481 |
| E1 | 6 | 3/30/2013 16:41 | 3 | 10706 | 3568.67 | 100.0% | 0.58862 | 0.24967 | 2161.26 | 9576.86 | 0.2257 | 0.2917 |
| E1 | 7 | 3/30/2013 16:36 | 3 | 12474 | 4158.00 | 100.0% | 0.58862 | 0.24910 | 2753.77 | 9576.87 | 0.2875 | 0.2653 |
| E2 | 1 | 3/30/2013 16:32 | 3 | 15809 | 5269.67 | 96.5% | 0.60087 | 0.24850 | 3787.70 | 9576.87 | 0.3955 | 0.4454 |
| E2 | 2 | 3/30/2013 16:27 | 3 | 16432 | 5477.33 | 100.0% | 0.60087 | 0.24789 | 4050.86 | 9576.87 | 0.4230 | 0.4203 |
| E2 | 3 | 3/30/2013 16:57 | 3 | 16516 | 5505.33 | 99.4% | 0.60087 | 0.25187 | 4047.45 | 9576.86 | 0.4226 | 0.4128 |
| E2 | 4 | 3/30/2013 16:53 | 3 | 16816 | 5605.33 | 100.0% | 0.60087 | 0.25132 | 4159.12 | 9576.86 | 0.4343 | 0.3896 |
| E2 | 5 | 3/30/2013 16:49 | 3 | 15824 | 5274.67 | 100.0% | 0.60087 | 0.25077 | 3831.63 | 9576.86 | 0.4001 | 0.3582 |
| E2 | 6 | 3/30/2013 16:45 | 3 | 10813 | 3604.33 | 100.0% | 0.60087 | 0.25023 | 2164.42 | 9576.86 | 0.2260 | 0.2991 |
| E2 | 7 | 3/30/2013 16:41 | 3 | 12797 | 4265.67 | 100.0% | 0.60087 | 0.24967 | 2828.97 | 9576.86 | 0.2954 | 0.2715 |
| E3 | 1 | 3/30/2013 16:36 | 3 | 15240 | 5080.00 | 96.5% | 0.59431 | 0.24910 | 3610.63 | 9576.87 | 0.3770 | 0.4219 |
| E3 | 2 | 3/30/2013 16:32 | 3 | 15970 | 5323.33 | 100.0% | 0.59431 | 0.24850 | 3908.98 | 9576.87 | 0.4082 | 0.4005 |
| E3 | 3 | 3/30/2013 16:27 | 3 | 15685 | 5228.33 | 99.4% | 0.59431 | 0.24789 | 3809.14 | 9576.87 | 0.3977 | 0.3941 |
| E3 | 4 | 3/30/2013 16:57 | 3 | 16121 | 5373.67 | 100.0% | 0.59431 | 0.25187 | 3940.12 | 9576.86 | 0.4114 | 0.3743 |
| E3 | 5 | 3/30/2013 16:53 | 3 | 15491 | 5163.67 | 100.0% | 0.59431 | 0.25132 | 3733.25 | 9576.86 | 0.3898 | 0.3476 |
| E3 | 6 | 3/30/2013 16:49 | 3 | 10842 | 3614.00 | 100.0% | 0.59431 | 0.25077 | 2186.71 | 9576.86 | 0.2283 | 0.2973 |
| E3 | 7 | 3/30/2013 16:45 | 3 | 12801 | 4267.00 | 100.0% | 0.59431 | 0.25023 | 2842.81 | 9576.86 | 0.2968 | 0.2738 |
| E4 | 1 | 3/30/2013 16:41 | 3 | 15712 | 5237.33 | 96.5% | 0.59053 | 0.24967 | 3773.98 | 9576.86 | 0.3941 | 0.4441 |
| E4 | 2 | 3/30/2013 16:38 | 3 | 16576 | 5525.33 | 100.0% | 0.59053 | 0.24910 | 4116.53 | 9576.87 | 0.4298 | 0.4193 |
| E4 | 3 | 3/30/2013 16:32 | 3 | 16377 | 5459.00 | 99.4% | 0.59053 | 0.24850 | 4045.36 | 9576.87 | 0.4224 | 0.4119 |
| E4 | 4 | 3/30/2013 16:27 | 3 | 16478 | 5492.67 | 100.0% | 0.59053 | 0.24789 | 4090.73 | 9576.87 | 0.4271 | 0.3890 |
| E4 | 5 | 3/30/2013 16:57 | 3 | 15702 | 5234.00 | 100.0% | 0.59053 | 0.25187 | 3809.56 | 9576.86 | 0.3978 | 0.3580 |
| E4 | 6 | 3/30/2013 16:53 | 3 | 10478 | 3492.67 | 100.0% | 0.59053 | 0.25132 | 2071.32 | 9576.86 | 0.2163 | 0.2997 |
| E4 | 7 | 3/30/2013 16:49 | 3 | 13072 | 4357.33 | 100.0% | 0.59053 | 0.25077 | 2939.11 | 9576.86 | 0.3069 | 0.2725 |
| F1 | 1 | 3/30/2013 16:45 | 3 | 16331 | 5443.67 | 96.5% | 0.61096 | 0.25023 | 3926.32 | 9576.86 | 0.4100 | 0.4580 |
| F1 | 2 | 3/30/2013 16:41 | 3 | 17177 | 5725.67 | 100.0% | 0.61096 | 0.24967 | 4264.81 | 9576.86 | 0.4453 | 0.4320 |
| F1 | 3 | 3/30/2013 16:36 | 3 | 16803 | 5601.00 | 99.4% | 0.61096 | 0.24911 | 4134.87 | 9576.87 | 0.4318 | 0.4242 |
| F1 | 4 | 3/30/2013 16:32 | 3 | 16746 | 5582.00 | 100.0% | 0.61096 | 0.24850 | 4128.02 | 9576.87 | 0.4310 | 0.4001 |
| F1 | 5 | 3/30/2013 16:28 | 3 | 16084 | 5354.67 | 100.0% | 0.61096 | 0.24789 | 3904.23 | 9576.87 | 0.4077 | 0.3677 |
| F1 | 6 | 3/30/2013 16:57 | 3 | 11329 | 3776.33 | 100.0% | 0.61096 | 0.25187 | 2302.61 | 9576.86 | 0.2404 | 0.3066 |
| F1 | 7 | 3/30/2013 16:53 | 3 | 13040 | 4346.67 | 100.0% | 0.61096 | 0.25132 | 2876.15 | 9576.86 | 0.3003 | 0.2780 |
| F2 | 1 | 3/30/2013 16:49 | 3 | 15935 | 5311.67 | 96.5% | 0.60585 | 0.25077 | 3803.75 | 9576.86 | 0.3972 | 0.4412 |
| F2 | 2 | 3/30/2013 16:45 | 3 | 16617 | 5539.00 | 100.0% | 0.60585 | 0.25023 | 4087.14 | 9576.86 | 0.4268 | 0.4173 |
| F2 | 3 | 3/30/2013 16:41 | 3 | 16268 | 5422.67 | 99.4% | 0.60585 | 0.24967 | 3965.52 | 9576.86 | 0.4141 | 0.4102 |
| F2 | 4 | 3/30/2013 16:36 | 3 | 16500 | 5500.00 | 100.0% | 0.60585 | 0.24911 | 4054.63 | 9576.87 | 0.4234 | 0.3880 |
| F2 | 5 | 3/30/2013 16:32 | 3 | 15688 | 5229.33 | 100.0% | 0.60585 | 0.24850 | 3787.49 | 9576.87 | 0.3955 | 0.3581 |
| F2 | 6 | 3/30/2013 16:28 | 3 | 11219 | 3739.67 | 100.0% | 0.60585 | 0.24789 | 2301.36 | 9576.87 | 0.2403 | 0.3019 |
| F2 | 7 | 3/30/2013 16:57 | 3 | 12868 | 4289.33 | 100.0% | 0.60585 | 0.25187 | 2827.94 | 9576.86 | 0.2953 | 0.2755 |
| F3 | 1 | 3/30/2013 16:53 | 3 | 16431 | 5477.00 | 96.5% | 0.61555 | 0.25132 | 3941.56 | 9576.86 | 0.4116 | 0.4648 |
| F3 | 2 | 3/30/2013 16:49 | 3 | 17530 | 5843.33 | 100.0% | 0.61555 | 0.25077 | 4365.02 | 9576.86 | 0.4558 | 0.4373 |
| F3 | 3 | 3/30/2013 16:45 | 3 | 17043 | 5681.00 | 99.4% | 0.61555 | 0.25023 | 4197.21 | 9576.86 | 0.4383 | 0.4290 |
| F3 | 4 | 3/30/2013 16:41 | 3 | 16858 | 5619.33 | 100.0% | 0.61555 | 0.24967 | 4147.52 | 9576.86 | 0.4331 | 0.4035 |
| F3 | 5 | 3/30/2013 16:36 | 3 | 16156 | 5385.33 | 100.0% | 0.61555 | 0.24911 | 3916.83 | 9576.87 | 0.4090 | 0.3691 |
| F3 | 6 | 3/30/2013 16:32 | 3 | 11315 | 3771.67 | 100.0% | 0.61555 | 0.24850 | 2306.74 | 9576.87 | 0.2409 | 0.3043 |
| F3 | 7 | 4/1/2013 10:07 | 3 | 17640 | 5880.00 | 100.0% | 0.61555 | 0.52084 | 2810.01 | 9575.78 | 0.2934 | 0.2740 |
| F4 | 1 | 3/30/2013 16:57 | 3 | 16446 | 5482.67 | 96.5% | 0.61212 | 0.25187 | 3952.45 | 9576.86 | 0.4127 | 0.4607 |
| F4 | 2 | 3/30/2013 16:53 | 3 | 17260 | 5753.33 | 100.0% | 0.61212 | 0.25133 | 4280.01 | 9576.86 | 0.4469 | 0.4345 |
| F4 | 3 | 3/30/2013 16:49 | 3 | 16859 | 5619.67 | 99.4% | 0.61212 | 0.25078 | 4140.93 | 9576.86 | 0.4324 | 0.4267 |
| F4 | 4 | 3/30/2013 16:45 | 3 | 17073 | 5691.00 | 100.0% | 0.61212 | 0.25023 | 4224.10 | 9576.86 | 0.4411 | 0.4025 |
| F4 | 5 | 3/30/2013 16:41 | 3 | 16002 | 5334.00 | 100.0% | 0.61212 | 0.24967 | 3870.37 | 9576.86 | 0.4041 | 0.3700 |
| F4 | 6 | 3/30/2013 16:36 | 3 | 11367 | 3789.00 | 100.0% | 0.61212 | 0.24911 | 2328.67 | 9576.87 | 0.2432 | 0.3086 |

| Raw Count Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| F4 | 7 | 3/30/2013 16:32 | 3 | 13064 | 4354.67 | 100.0% | 0.61212 | 0.24850 | 2897.90 | 9576.87 | 0.3026 | 0.2799 |
| G1 | 1 | 3/30/2013 17:02 | 3 | 15385 | 5128.33 | 96.5% | 0.53730 | 0.25250 | 3781.80 | 9576.86 | 0.3949 | 0.4455 |
| G1 | 2 | 3/30/2013 17:30 | 3 | 16518 | 5506.00 | 100.0% | 0.53730 | 0.25632 | 4187.05 | 9576.84 | 0.4372 | 0.4210 |
| G1 | 3 | 3/30/2013 17:26 | 3 | 15987 | 5329.00 | 99.4% | 0.53730 | 0.25579 | 4005.07 | 9576.84 | 0.4182 | 0.4136 |
| G1 | 4 | 3/30/2013 17:22 | 3 | 16141 | 5380.33 | 100.0% | 0.53730 | 0.25524 | 4066.96 | 9576.85 | 0.4247 | 0.3908 |
| G1 | 5 | 3/30/2013 17:18 | 3 | 15413 | 5137.67 | 100.0% | 0.53730 | 0.25470 | 3827.05 | 9576.85 | 0.3996 | 0.3600 |
| G1 | 6 | 3/30/2013 17:14 | 3 | 10864 | 3621.33 | 100.0% | 0.53730 | 0.25417 | 2313.46 | 9576.85 | 0.2416 | 0.3021 |
| G1 | 7 | 3/30/2013 17:10 | 3 | 12302 | 4100.67 | 100.0% | 0.53730 | 0.25364 | 2795.52 | 9576.85 | 0.2919 | 0.2750 |
| G2 | 1 | 3/30/2013 17:06 | 3 | 16229 | 5409.67 | 96.5% | 0.59756 | 0.25306 | 3908.83 | 9576.85 | 0.4082 | 0.4596 |
| G2 | 2 | 3/30/2013 17:02 | 3 | 17029 | 5676.33 | 100.0% | 0.59756 | 0.25250 | 4231.33 | 9576.86 | 0.4418 | 0.4328 |
| G2 | 3 | 3/30/2013 17:30 | 3 | 16908 | 5636.00 | 99.4% | 0.59756 | 0.25633 | 4160.49 | 9576.84 | 0.4344 | 0.4247 |
| G2 | 4 | 3/30/2013 17:26 | 3 | 17104 | 5701.33 | 100.0% | 0.59756 | 0.25579 | 4237.52 | 9576.84 | 0.4425 | 0.4000 |
| G2 | 5 | 3/30/2013 17:22 | 3 | 16047 | 5349.00 | 100.0% | 0.59756 | 0.25524 | 3888.33 | 9576.85 | 0.4060 | 0.3655 |
| G2 | 6 | 3/30/2013 17:18 | 3 | 10784 | 3594.67 | 100.0% | 0.59756 | 0.25471 | 2137.06 | 9576.85 | 0.2231 | 0.3035 |
| G2 | 7 | 3/30/2013 17:14 | 3 | 13124 | 4374.67 | 100.0% | 0.59756 | 0.25417 | 2920.12 | 9576.85 | 0.3049 | 0.2740 |
| G3 | 1 | 3/30/2013 17:10 | 3 | 16936 | 5645.33 | 96.5% | 0.60776 | 0.25364 | 4115.34 | 9576.85 | 0.4297 | 0.4802 |
| G3 | 2 | 3/30/2013 17:06 | 3 | 17728 | 5909.33 | 100.0% | 0.60776 | 0.25306 | 4436.40 | 9576.85 | 0.4632 | 0.4533 |
| G3 | 3 | 3/30/2013 17:02 | 3 | 17443 | 5814.33 | 99.4% | 0.60776 | 0.25250 | 4336.00 | 9576.86 | 0.4528 | 0.4452 |
| G3 | 4 | 3/30/2013 17:30 | 3 | 17689 | 5896.33 | 100.0% | 0.60776 | 0.25633 | 4404.39 | 9576.84 | 0.4599 | 0.4203 |
| G3 | 5 | 3/30/2013 17:26 | 3 | 16907 | 5635.67 | 100.0% | 0.60776 | 0.25579 | 4146.85 | 9576.84 | 0.4330 | 0.3867 |
| G3 | 6 | 3/30/2013 17:22 | 3 | 11209 | 3736.33 | 100.0% | 0.60776 | 0.25524 | 2250.71 | 9576.85 | 0.2350 | 0.3234 |
| G3 | 7 | 3/30/2013 17:18 | 3 | 13910 | 4636.67 | 100.0% | 0.60776 | 0.25471 | 3154.16 | 9576.85 | 0.3294 | 0.2938 |
| G4 | 1 | 3/30/2013 17:14 | 3 | 16355 | 5451.67 | 96.5% | 0.60389 | 0.25417 | 3928.24 | 9576.85 | 0.4102 | 0.4700 |
| G4 | 2 | 3/30/2013 17:10 | 3 | 17548 | 5849.33 | 100.0% | 0.60389 | 0.25364 | 4382.43 | 9576.85 | 0.4576 | 0.4427 |
| G4 | 3 | 3/30/2013 17:06 | 3 | 17016 | 5672.67 | 99.4% | 0.60389 | 0.25306 | 4200.52 | 9576.85 | 0.4386 | 0.4345 |
| G4 | 4 | 3/30/2013 17:02 | 3 | 17695 | 5898.33 | 100.0% | 0.60389 | 0.25250 | 4438.02 | 9576.86 | 0.4634 | 0.4092 |
| G4 | 5 | 3/30/2013 17:30 | 3 | 16498 | 5499.33 | 100.0% | 0.60389 | 0.25633 | 4016.91 | 9576.84 | 0.4194 | 0.3750 |
| G4 | 6 | 3/30/2013 17:26 | 3 | 10596 | 3532.00 | 100.0% | 0.60389 | 0.25579 | 2052.68 | 9576.84 | 0.2143 | 0.3108 |
| G4 | 7 | 3/30/2013 17:22 | 3 | 13598 | 4532.67 | 100.0% | 0.60389 | 0.25524 | 3056.51 | 9576.85 | 0.3192 | 0.2807 |
| H1 | 1 | 3/30/2013 17:18 | 3 | 15975 | 5325.00 | 96.5% | 0.59583 | 0.25468 | 3818.93 | 9576.85 | 0.3988 | 0.4497 |
| H1 | 2 | 3/30/2013 17:14 | 3 | 16806 | 5602.00 | 100.0% | 0.59583 | 0.25414 | 4151.80 | 9576.85 | 0.4335 | 0.4231 |
| H1 | 3 | 3/30/2013 17:10 | 3 | 16419 | 5473.00 | 99.4% | 0.59583 | 0.25361 | 4017.33 | 9576.85 | 0.4195 | 0.4151 |
| H1 | 4 | 3/30/2013 17:06 | 3 | 16775 | 5591.67 | 100.0% | 0.59583 | 0.25303 | 4147.83 | 9576.85 | 0.4331 | 0.3905 |
| H1 | 5 | 3/30/2013 17:01 | 3 | 15992 | 5330.67 | 100.0% | 0.59583 | 0.25248 | 3889.98 | 9576.86 | 0.4062 | 0.3573 |
| H1 | 6 | 3/30/2013 17:30 | 3 | 10179 | 3393.00 | 100.0% | 0.59583 | 0.25630 | 1930.49 | 9576.84 | 0.2016 | 0.2948 |
| H1 | 7 | 3/30/2013 17:26 | 3 | 13094 | 4364.67 | 100.0% | 0.59583 | 0.25576 | 2905.25 | 9576.85 | 0.3034 | 0.2655 |
| H2 | 1 | 3/30/2013 17:22 | 3 | 16521 | 5507.00 | 96.5% | 0.59812 | 0.25521 | 3991.97 | 9576.85 | 0.4168 | 0.4638 |
| H2 | 2 | 3/30/2013 17:18 | 3 | 17287 | 5762.33 | 100.0% | 0.59812 | 0.25468 | 4303.52 | 9576.85 | 0.4494 | 0.4373 |
| H2 | 3 | 3/30/2013 17:14 | 3 | 17107 | 5702.33 | 99.4% | 0.59812 | 0.25414 | 4238.00 | 9576.85 | 0.4425 | 0.4294 |
| H2 | 4 | 3/30/2013 17:10 | 3 | 16752 | 5584.00 | 100.0% | 0.59812 | 0.25361 | 4131.29 | 9576.85 | 0.4314 | 0.4049 |
| H2 | 5 | 3/30/2013 17:06 | 3 | 16119 | 5373.00 | 100.0% | 0.59812 | 0.25303 | 3923.62 | 9576.85 | 0.4097 | 0.3718 |
| H2 | 6 | 3/30/2013 17:01 | 3 | 11258 | 3752.67 | 100.0% | 0.59812 | 0.25248 | 2306.45 | 9576.86 | 0.2408 | 0.3097 |
| H2 | 7 | 3/30/2013 17:30 | 3 | 13217 | 4405.67 | 100.0% | 0.59812 | 0.25630 | 2937.54 | 9576.84 | 0.3067 | 0.2806 |
| H3 | 1 | 3/30/2013 17:26 | 3 | 16866 | 5622.00 | 96.5% | 0.61253 | 0.25576 | 4067.13 | 9576.85 | 0.4247 | 0.4786 |
| H3 | 2 | 3/30/2013 17:22 | 3 | 17699 | 5899.67 | 100.0% | 0.61253 | 0.25521 | 4402.55 | 9576.85 | 0.4597 | 0.4505 |
| H3 | 3 | 3/30/2013 17:18 | 3 | 17697 | 5899.00 | 99.4% | 0.61253 | 0.25468 | 4396.25 | 9576.85 | 0.4591 | 0.4420 |
| H3 | 4 | 3/30/2013 17:14 | 3 | 17437 | 5812.33 | 100.0% | 0.61253 | 0.25414 | 4321.49 | 9576.85 | 0.4512 | 0.4160 |
| H3 | 5 | 3/30/2013 17:10 | 3 | 16538 | 5512.67 | 100.0% | 0.61253 | 0.25361 | 4024.94 | 9576.85 | 0.4203 | 0.3808 |
| H3 | 6 | 3/30/2013 17:06 | 3 | 11441 | 3813.67 | 100.0% | 0.61253 | 0.25303 | 2329.36 | 9576.85 | 0.2432 | 0.3147 |
| H3 | 7 | 3/30/2013 17:01 | 3 | 13301 | 4433.67 | 100.0% | 0.61253 | 0.25248 | 2952.60 | 9576.86 | 0.3083 | 0.2838 |
| H4 | 1 | 3/30/2013 17:30 | 3 | 16173 | 5391.00 | 96.5% | 0.59765 | 0.25630 | 3870.66 | 9576.84 | 0.4042 | 0.4566 |
| H4 | 2 | 3/30/2013 17:26 | 3 | 17139 | 5713.00 | 100.0% | 0.59765 | 0.25576 | 4249.10 | 9576.85 | 0.4437 | 0.4310 |
| H4 | 3 | 3/30/2013 17:22 | 3 | 16875 | 5625.00 | 99.4% | 0.59765 | 0.25521 | 4155.66 | 9576.85 | 0.4339 | 0.4234 |
| H4 | 4 | 3/30/2013 17:18 | 3 | 16818 | 5606.00 | 100.0% | 0.59765 | 0.25468 | 4148.32 | 9576.85 | 0.4332 | 0.3998 |
| H4 | 5 | 3/30/2013 17:14 | 3 | 16239 | 5413.00 | 100.0% | 0.59765 | 0.25414 | 3958.37 | 9576.85 | 0.4133 | 0.3679 |
| H4 | 6 | 3/30/2013 17:10 | 3 | 10966 | 3655.33 | 100.0% | 0.59765 | 0.25361 | 2203.75 | 9576.85 | 0.2301 | 0.3079 |
| H4 | 7 | 3/30/2013 17:06 | 3 | 13189 | 4396.33 | 100.0% | 0.59765 | 0.25303 | 2948.09 | 9576.85 | 0.3078 | 0.2798 |
| I1 | 1 | 3/30/2013 11:17 | 3 | 14017 | 4672.33 | 96.5% | 0.58071 | 0.20463 | 3492.93 | 9577.01 | 0.3647 | 0.3968 |
| I1 | 2 | 3/30/2013 11:31 | 3 | 14980 | 4993.33 | 100.0% | 0.58071 | 0.20662 | 3844.24 | 9577.00 | 0.4014 | 0.3852 |
| I1 | 3 | 3/30/2013 11:27 | 3 | 14513 | 4837.67 | 99.4% | 0.58071 | 0.20595 | 3685.56 | 9577.00 | 0.3848 | 0.3812 |
| I1 | 4 | 3/30/2013 11:22 | 3 | 14695 | 4898.33 | 100.0% | 0.58071 | 0.20528 | 3756.67 | 9577.00 | 0.3923 | 0.3686 |
| I1 | 5 | 3/30/2013 11:36 | 3 | 14034 | 4678.00 | 100.0% | 0.58071 | 0.20728 | 3525.24 | 9577.00 | 0.3681 | 0.3517 |
| I1 | 6 | 3/30/2013 12:02 | 3 | 11459 | 3819.67 | 100.0% | 0.58071 | 0.21096 | 2646.41 | 9576.99 | 0.2763 | 0.3198 |
| I1 | 7 | 3/30/2013 11:57 | 3 | 12779 | 4259.67 | 100.0% | 0.58071 | 0.21033 | 3089.92 | 9576.99 | 0.3226 | 0.3049 |
| I2 | 1 | 3/30/2013 11:22 | 3 | 14220 | 4740.00 | 96.5% | 0.59727 | 0.20528 | 3523.07 | 9577.00 | 0.3679 | 0.4068 |
| I2 | 2 | 3/30/2013 11:17 | 3 | 15645 | 5215.00 | 100.0% | 0.59727 | 0.20463 | 4044.53 | 9577.01 | 0.4223 | 0.3938 |
| I2 | 3 | 3/30/2013 11:31 | 3 | 14831 | 4943.67 | 99.4% | 0.59727 | 0.20662 | 3754.84 | 9577.00 | 0.3921 | 0.3893 |
| I2 | 4 | 3/30/2013 11:27 | 3 | 14874 | 4958.00 | 100.0% | 0.59727 | 0.20595 | 3779.97 | 9577.00 | 0.3947 | 0.3754 |
| I2 | 5 | 3/30/2013 11:52 | 3 | 14319 | 4773.00 | 100.0% | 0.59727 | 0.20954 | 3574.40 | 9576.99 | 0.3732 | 0.3566 |
| I2 | 6 | 3/30/2013 11:36 | 3 | 11488 | 3829.33 | 100.0% | 0.59727 | 0.20728 | 2643.70 | 9577.00 | 0.2760 | 0.3213 |
| I2 | 7 | 3/30/2013 12:02 | 3 | 12916 | 4305.33 | 100.0% | 0.59727 | 0.21097 | 3098.60 | 9576.99 | 0.3235 | 0.3047 |
| I3 | 1 | 3/30/2013 11:27 | 3 | 14044 | 4681.33 | 96.5% | 0.59590 | 0.20595 | 3463.24 | 9577.00 | 0.3615 | 0.4001 |
| I3 | 2 | 3/30/2013 11:22 | 3 | 15263 | 5087.67 | 100.0% | 0.59590 | 0.20528 | 3916.12 | 9577.00 | 0.4089 | 0.3863 |
| I3 | 3 | 3/30/2013 11:17 | 3 | 14712 | 4904.00 | 99.4% | 0.59590 | 0.20463 | 3729.33 | 9577.01 | 0.3894 | 0.3822 |
| I3 | 4 | 3/30/2013 11:31 | 3 | 14694 | 4898.00 | 100.0% | 0.59590 | 0.20662 | 3718.82 | 9577.00 | 0.3883 | 0.3694 |
| I3 | 5 | 3/30/2013 11:57 | 3 | 14163 | 4721.00 | 100.0% | 0.59590 | 0.21033 | 3520.63 | 9576.99 | 0.3676 | 0.3522 |
| I3 | 6 | 3/30/2013 11:52 | 3 | 11478 | 3826.00 | 100.0% | 0.59590 | 0.20954 | 2630.14 | 9576.99 | 0.2746 | 0.3198 |
| I3 | 7 | 3/30/2013 11:36 | 3 | 12865 | 4288.33 | 100.0% | 0.59590 | 0.20728 | 3105.40 | 9577.00 | 0.3243 | 0.3047 |
| I4 | 1 | 3/30/2013 11:31 | 3 | 14702 | 4900.67 | 96.5% | 0.60011 | 0.20662 | 3669.98 | 9577.00 | 0.3832 | 0.4152 |
| I4 | 2 | 3/30/2013 11:27 | 3 | 15485 | 5161.67 | 100.0% | 0.60011 | 0.20595 | 3978.03 | 9577.00 | 0.4154 | 0.4011 |
| I4 | 3 | 3/30/2013 11:22 | 3 | 15018 | 5006.00 | 99.4% | 0.60011 | 0.20528 | 3819.25 | 9577.00 | 0.3988 | 0.3966 |
| I4 | 4 | 3/30/2013 11:17 | 3 | 15237 | 5079.00 | 100.0% | 0.60011 | 0.20463 | 3902.95 | 9577.01 | 0.4075 | 0.3827 |
| I4 | 5 | 3/30/2013 12:02 | 3 | 14705 | 4901.67 | 100.0% | 0.60011 | 0.21097 | 3689.19 | 9576.99 | 0.3852 | 0.3640 |
| I4 | 6 | 3/30/2013 11:57 | 3 | 11552 | 3850.67 | 100.0% | 0.60011 | 0.21033 | 2641.83 | 9576.99 | 0.2759 | 0.3286 |
| I4 | 7 | 3/30/2013 11:52 | 3 | 13250 | 4416.67 | 100.0% | 0.60011 | 0.20955 | 3212.36 | 9576.99 | 0.3354 | 0.3121 |
| J1 | 1 | 3/30/2013 11:36 | 3 | 14098 | 4699.33 | 96.5% | 0.59388 | 0.20728 | 3477.53 | 9577.00 | 0.3631 | 0.4013 |
| J1 | 2 | 3/30/2013 12:02 | 3 | 15235 | 5078.33 | 100.0% | 0.59388 | 0.21097 | 3878.43 | 9576.99 | 0.4050 | 0.3881 |
| J1 | 3 | 3/30/2013 11:57 | 3 | 14926 | 4975.33 | 99.4% | 0.59388 | 0.21034 | 3771.98 | 9576.99 | 0.3939 | 0.3842 |
| J1 | 4 | 3/30/2013 11:52 | 3 | 14903 | 4967.67 | 100.0% | 0.59388 | 0.20955 | 3775.85 | 9576.99 | 0.3943 | 0.3720 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1 | 5 | 3/30/2013 11:17 | 3 | 14201 | 4733.67 | 100.0% | 0.59388 | 0.20463 | 3569.82 | 9577.01 | 0.3727 | 0.3555 |
| J1 | 6 | 3/30/2013 11:31 | 3 | 11434 | 3811.33 | 100.0% | 0.59388 | 0.20662 | 2636.14 | 9577.00 | 0.2753 | 0.3246 |
| J1 | 7 | 3/30/2013 11:27 | 3 | 13043 | 4347.67 | 100.0% | 0.59388 | 0.20595 | 3176.29 | 9577.00 | 0.3317 | 0.3102 |
| J2 | 1 | 3/30/2013 11:52 | 3 | 13996 | 4665.33 | 96.5% | 0.59026 | 0.20955 | 3437.72 | 9576.99 | 0.3590 | 0.3985 |
| J2 | 2 | 3/30/2013 11:36 | 3 | 15032 | 5010.67 | 100.0% | 0.59026 | 0.20728 | 3838.93 | 9577.00 | 0.4008 | 0.3853 |
| J2 | 3 | 3/30/2013 12:02 | 3 | 14838 | 4946.00 | 99.4% | 0.59026 | 0.21097 | 3746.41 | 9576.99 | 0.3912 | 0.3813 |
| J2 | 4 | 3/30/2013 11:57 | 3 | 14873 | 4957.67 | 100.0% | 0.59026 | 0.21034 | 3768.66 | 9576.99 | 0.3935 | 0.3691 |
| J2 | 5 | 3/30/2013 11:22 | 3 | 14122 | 4707.33 | 100.0% | 0.59026 | 0.20529 | 3546.86 | 9577.00 | 0.3704 | 0.3526 |
| J2 | 6 | 3/30/2013 11:17 | 3 | 11387 | 3795.67 | 100.0% | 0.59026 | 0.20463 | 2638.91 | 9577.01 | 0.2755 | 0.3215 |
| J2 | 7 | 3/30/2013 11:31 | 3 | 12835 | 4278.33 | 100.0% | 0.59026 | 0.20662 | 3110.32 | 9577.00 | 0.3248 | 0.3070 |
| J3 | 1 | 3/30/2013 11:57 | 3 | 14169 | 4723.00 | 96.5% | 0.59264 | 0.21034 | 3485.77 | 9576.99 | 0.3640 | 0.4024 |
| J3 | 2 | 3/30/2013 11:52 | 3 | 15436 | 5145.33 | 100.0% | 0.59264 | 0.20955 | 3955.99 | 9576.99 | 0.4131 | 0.3869 |
| J3 | 3 | 3/30/2013 11:36 | 3 | 14681 | 4893.67 | 99.4% | 0.59264 | 0.20728 | 3710.28 | 9577.00 | 0.3874 | 0.3849 |
| J3 | 4 | 3/30/2013 12:02 | 3 | 14942 | 4980.67 | 100.0% | 0.59264 | 0.21097 | 3783.27 | 9576.99 | 0.3950 | 0.3725 |
| J3 | 5 | 3/30/2013 11:27 | 3 | 14153 | 4717.67 | 100.0% | 0.59264 | 0.20595 | 3548.72 | 9577.00 | 0.3705 | 0.3556 |
| J3 | 6 | 3/30/2013 11:22 | 3 | 11535 | 3845.00 | 100.0% | 0.59264 | 0.20529 | 2679.84 | 9577.00 | 0.2798 | 0.3240 |
| J3 | 7 | 3/30/2013 11:17 | 3 | 12898 | 4299.33 | 100.0% | 0.59264 | 0.20463 | 3137.90 | 9577.01 | 0.3276 | 0.3092 |
| J4 | 1 | 3/30/2013 12:02 | 3 | 14607 | 4869.00 | 96.5% | 0.59452 | 0.21097 | 3624.10 | 9576.99 | 0.3784 | 0.4107 |
| J4 | 2 | 3/30/2013 11:57 | 3 | 15304 | 5101.33 | 100.0% | 0.59452 | 0.21034 | 3903.72 | 9576.99 | 0.4076 | 0.3971 |
| J4 | 3 | 3/30/2013 11:52 | 3 | 15038 | 5012.67 | 99.4% | 0.59452 | 0.20955 | 3812.53 | 9576.99 | 0.3981 | 0.3930 |
| J4 | 4 | 3/30/2013 11:36 | 3 | 15278 | 5092.67 | 100.0% | 0.59452 | 0.20728 | 3912.46 | 9577.00 | 0.4085 | 0.3804 |
| J4 | 5 | 3/30/2013 11:31 | 3 | 14435 | 4811.67 | 100.0% | 0.59452 | 0.20663 | 3635.19 | 9577.00 | 0.3796 | 0.3633 |
| J4 | 6 | 3/30/2013 11:27 | 3 | 11579 | 3859.67 | 100.0% | 0.59452 | 0.20595 | 2687.02 | 9577.00 | 0.2806 | 0.3312 |
| J4 | 7 | 3/30/2013 11:22 | 3 | 13248 | 4416.00 | 100.0% | 0.59452 | 0.20529 | 3247.13 | 9577.00 | 0.3391 | 0.3162 |

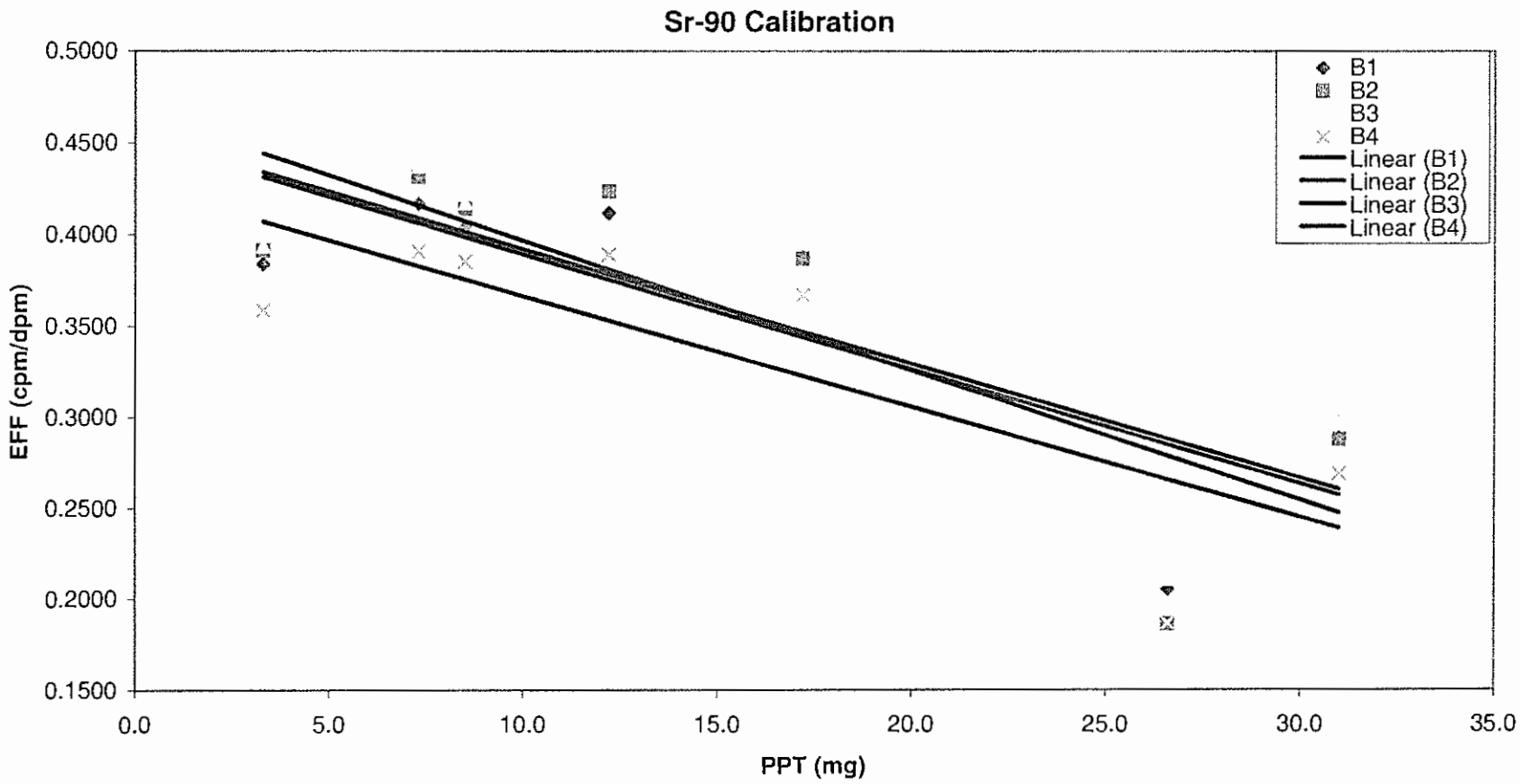



A1 y = -6.838931E-03x + 4.601118E-01

A2 y = -6.538213E-03x + 4.501572E-01

A3 y = -6.790414E-03x + 4.496771E-01

A4

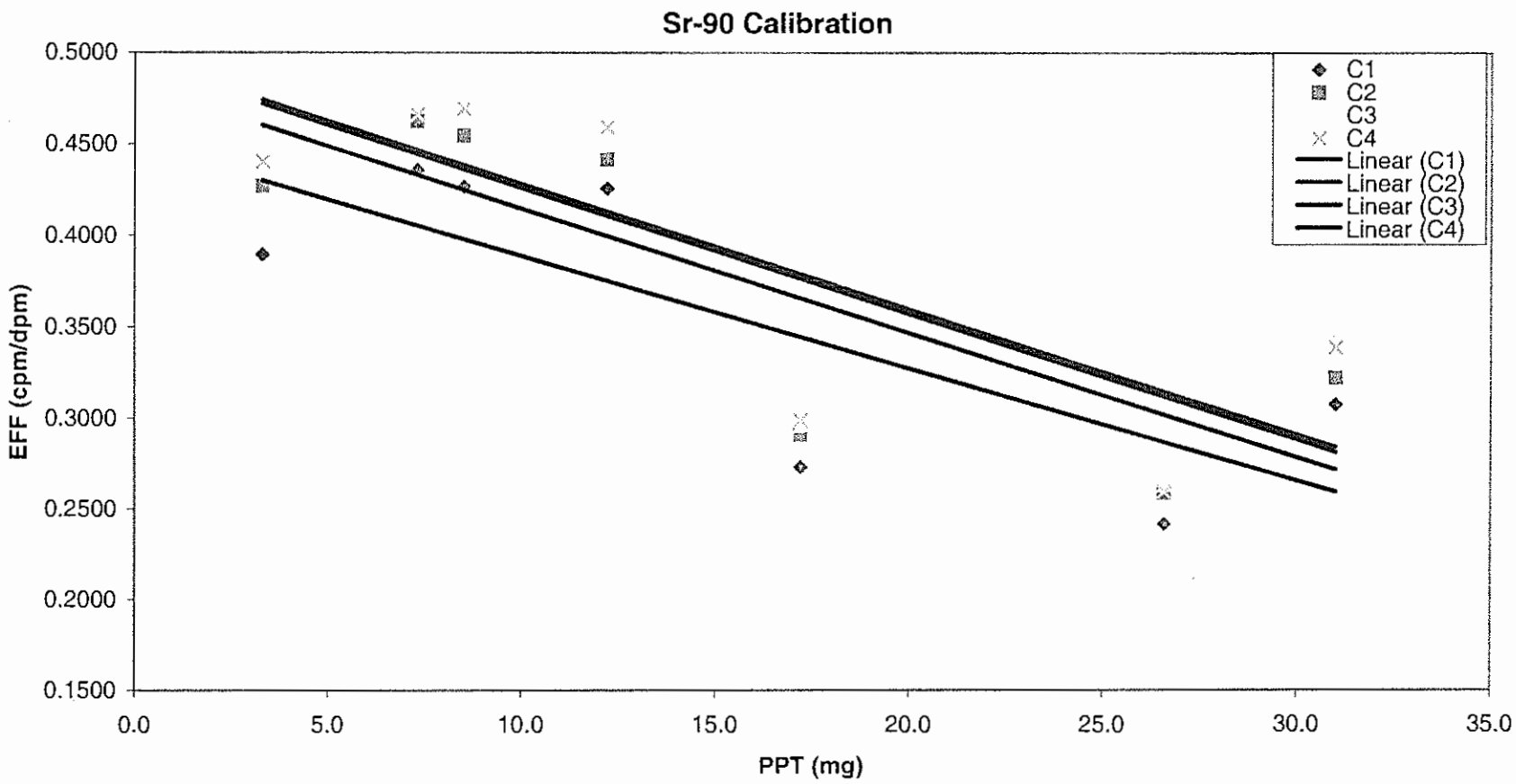



B1 y = -6.268380E-03x + 4.517913E-01

B2 y = -7.096876E-03x + 4.676161E-01

B3 y = -6.255501E-03x + 4.546309E-01

B4 y = -6.063498E-03x + 4.271211E-01

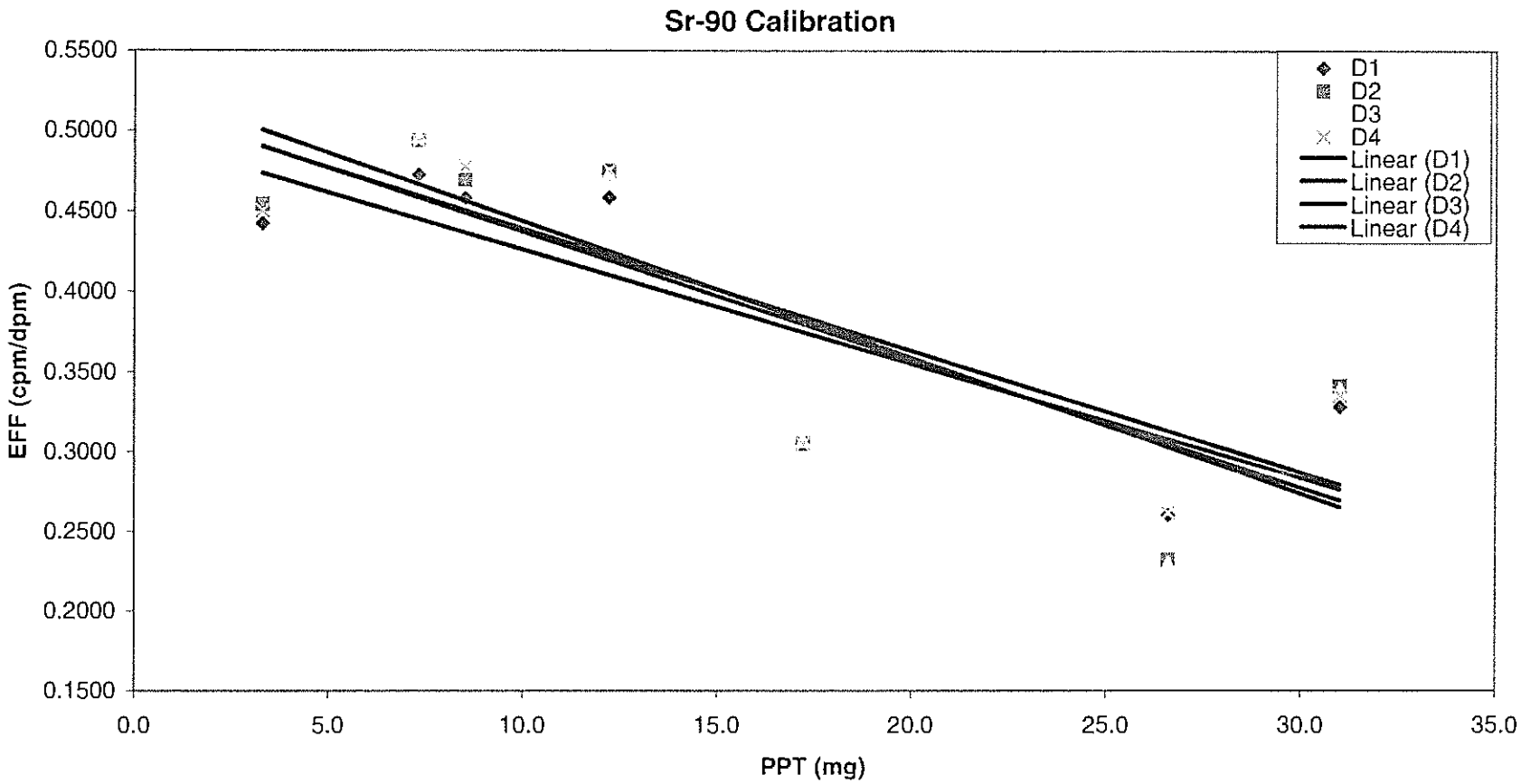



C1 y = -6.151357E-03x + 4.503257E-01

C2 y = -6.805446E-03x + 4.827195E-01

C3 y = -6.857230E-03x + 4.967583E-01

C4 y = -6.877521E-03x + 4.945746E-01

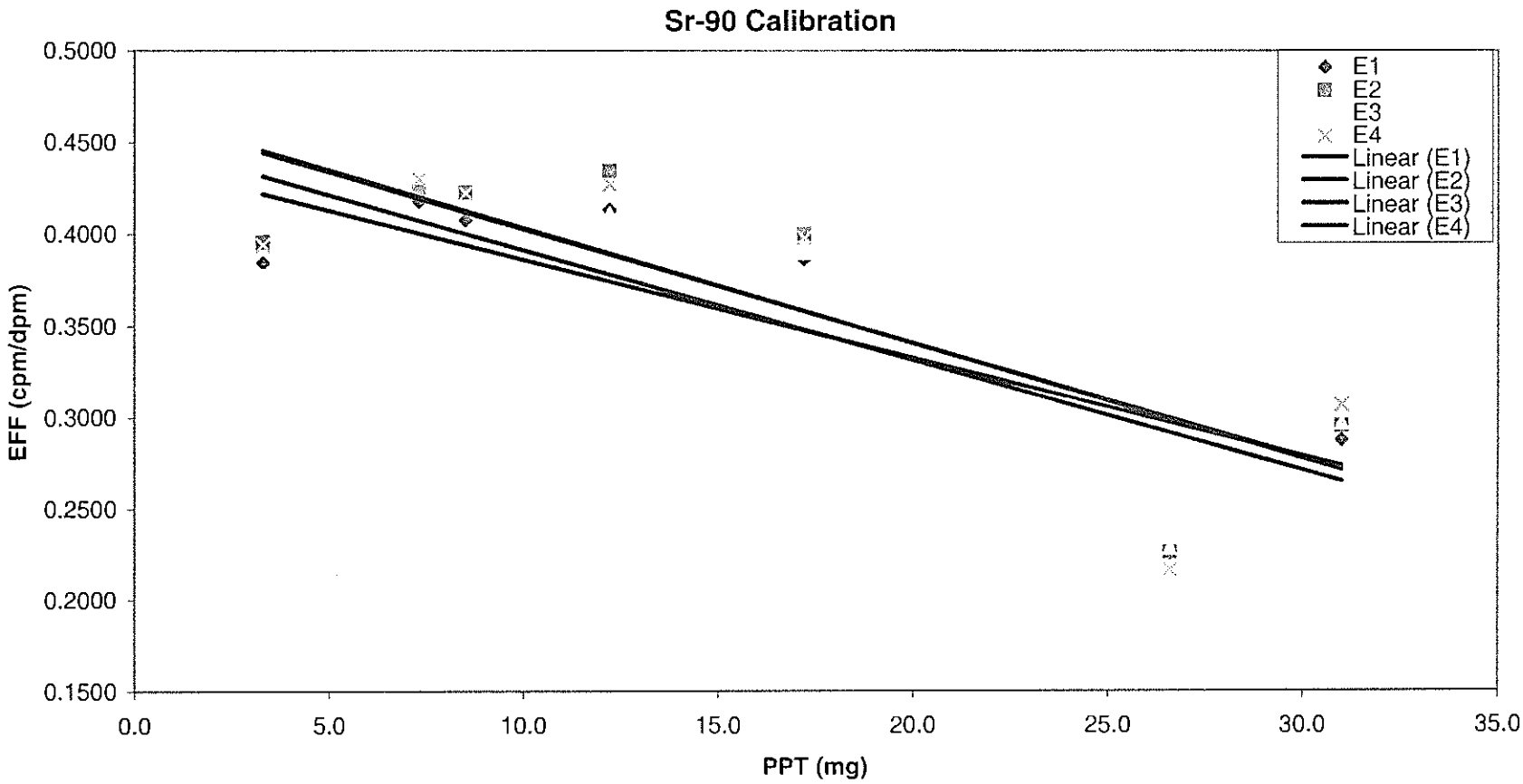



D1 y = -7.110776E-03x + 4.971226E-01

D2 y = -7.966863E-03x + 5.166183E-01

D3 y = -8.483742E-03x + 5.285535E-01

D4 y = -7.597376E-03x + 5.151222E-01

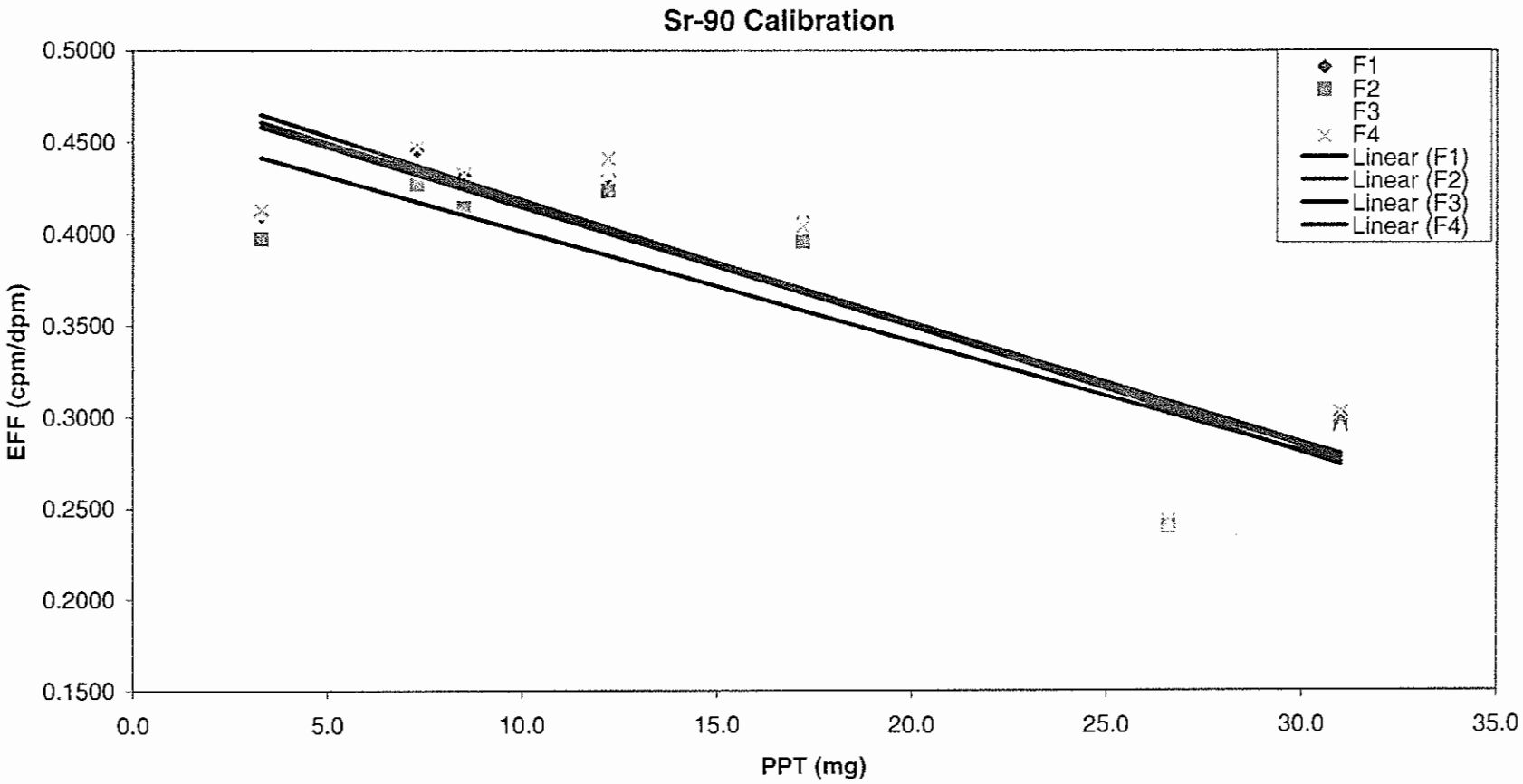



E1 y = -6.000645E-03x + 4.512971E-01

E2 y = -6.278061E-03x + 4.661429E-01

E3 y = -5.346722E-03x + 4.395187E-01

E4 y = -6.197105E-03x + 4.645646E-01

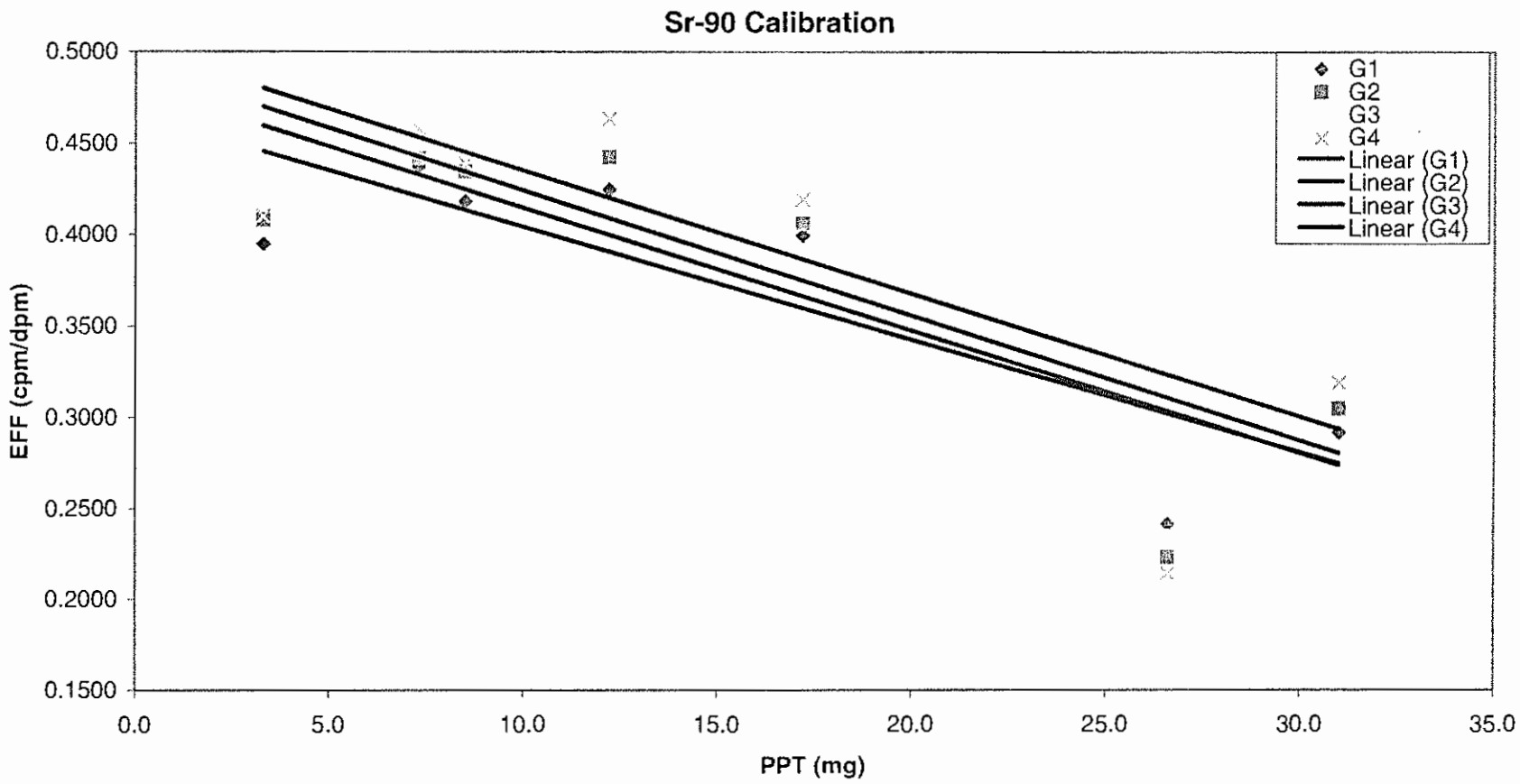



F1 y = -6.495779E-03x + 4.793904E-01

F2 y = -5.978627E-03x + 4.609735E-01

F3 y = -6.888160E-03x + 4.875487E-01

F4 y = -6.525092E-03x + 4.821831E-01

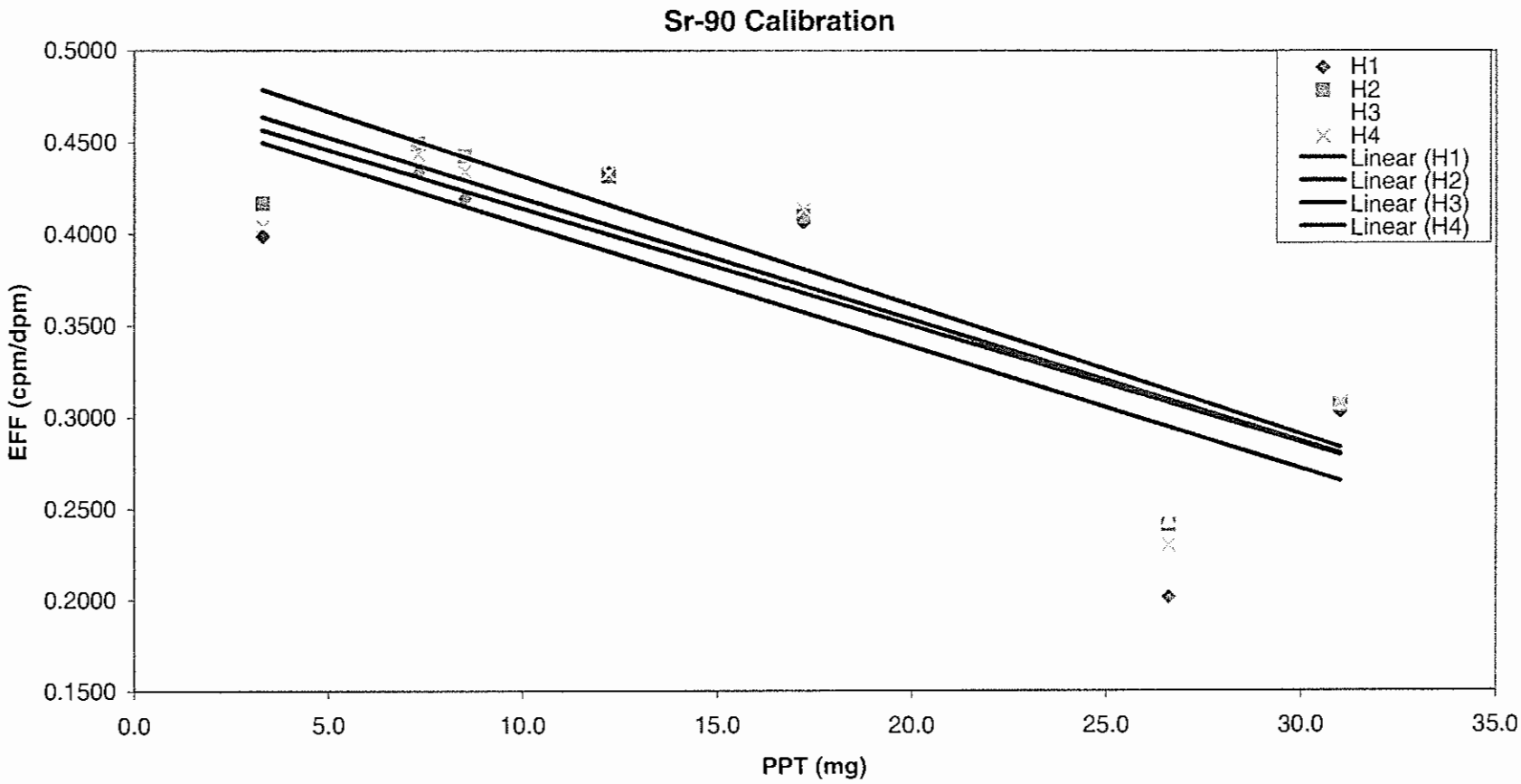



G1y = -6.160750E-03x + 4.659581E-01

G2y = -6.699940E-03x + 4.816901E-01

G3y = -6.730103E-03x + 5.024367E-01

G4y = -6.833214E-03x + 4.925353E-01

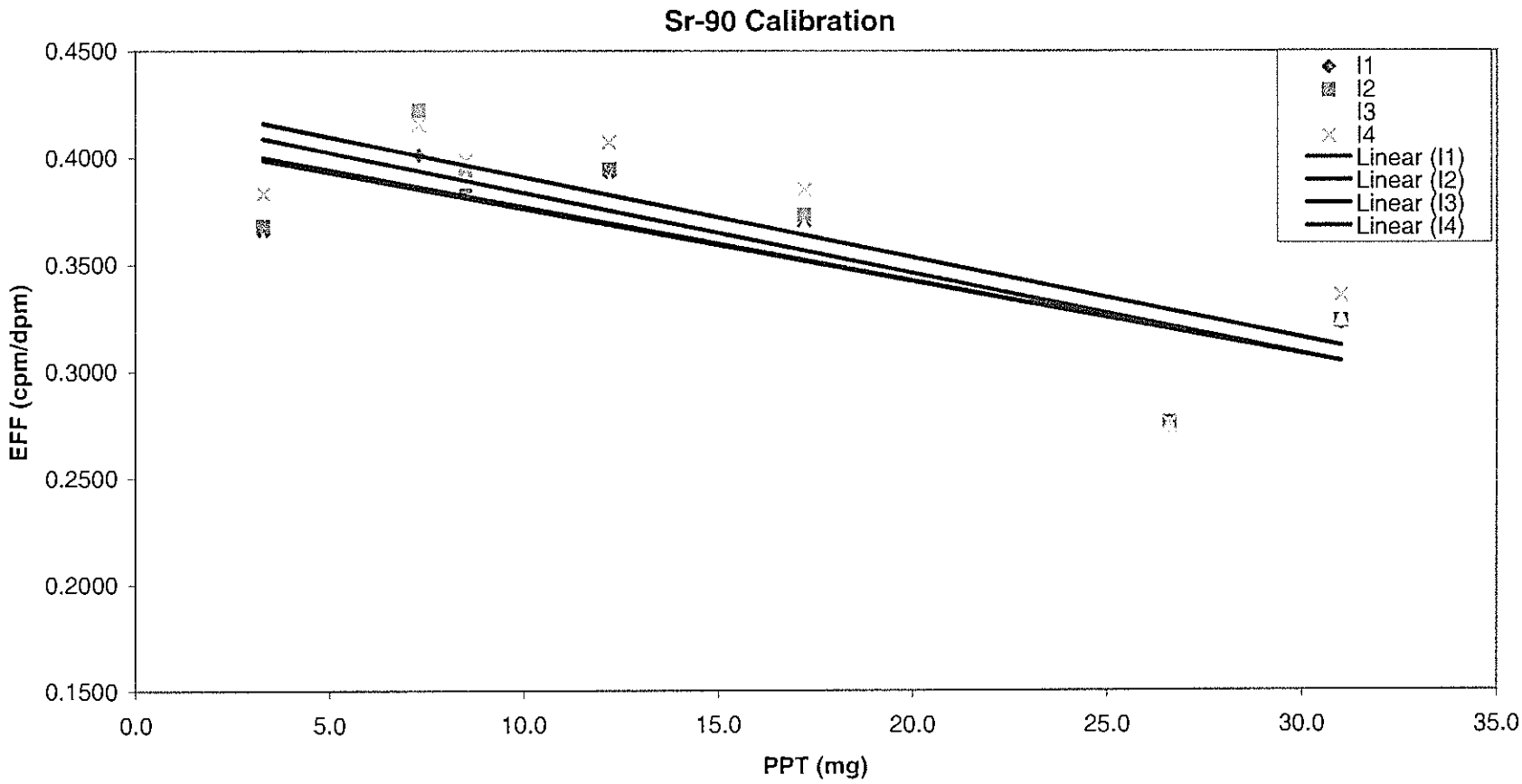



H1 y = -6.648954E-03x + 4.716380E-01

H2 y = -6.613426E-03x + 4.855805E-01

H3 y = -7.032967E-03x + 5.018137E-01

H4 y = -6.381233E-03x + 4.776094E-01

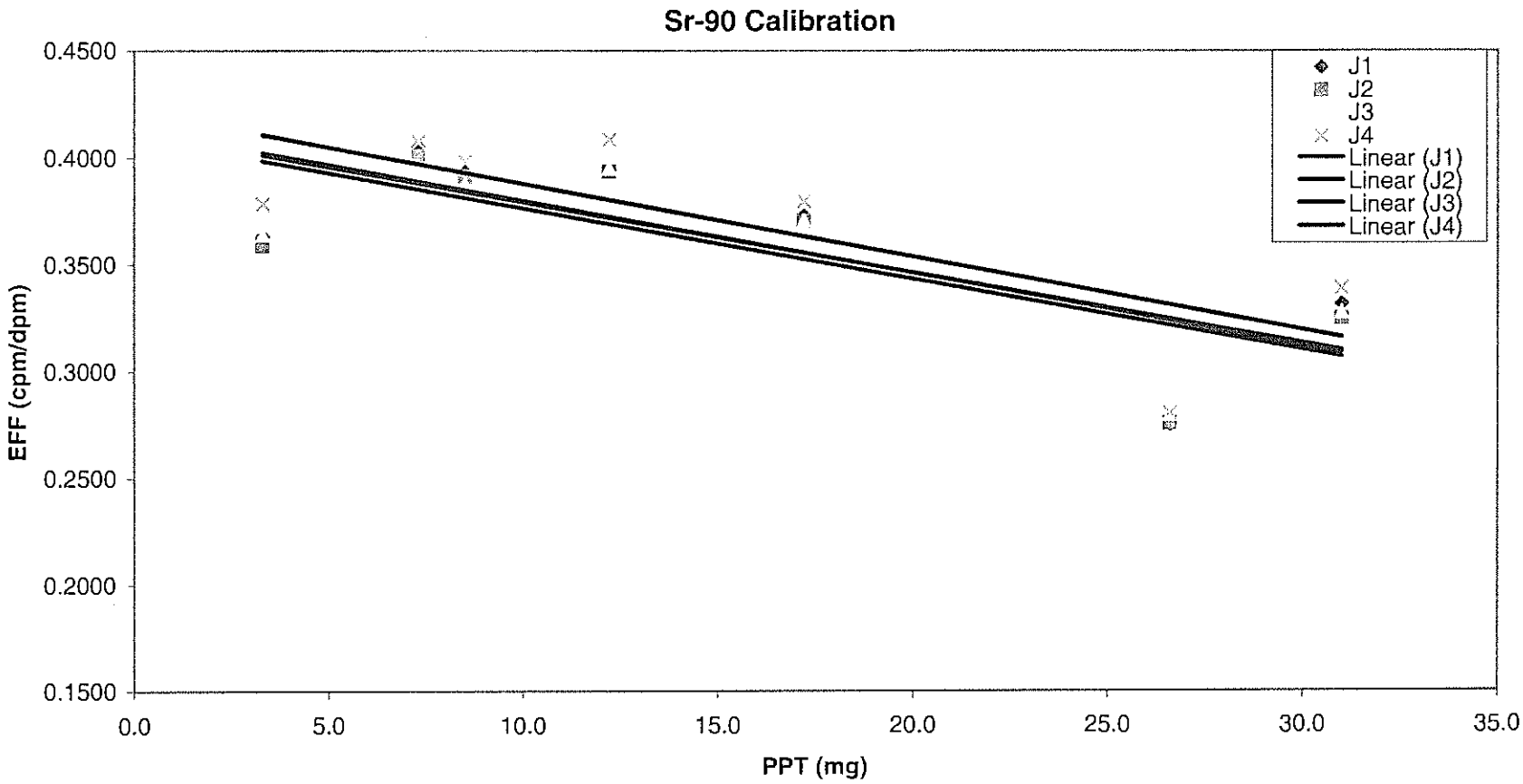



I1 y = -3.390175E-03x + 4.099971E-01

I2 y = -3.757063E-03x + 4.211986E-01

I3 y = -3.445925E-03x + 4.114795E-01

I4 y = -3.756514E-03x + 4.285664E-01




J1 y = -3.288666E-03x + 4.121145E-01

J2 y = -3.302749E-03x + 4.093705E-01

J3 y = -3.365113E-03x + 4.135077E-01

J4 y = -3.414406E-03x + 4.220172E-01

Current Calibration - LB4100

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **LB4100** | A0 | A1 | A2 | A3 | A4 |
| **A1** | 4.601118E-01 | -6.838931E-03 | | | |
| **A2** | 4.501572E-01 | -6.538213E-03 | | | |
| **A3** | 4.496771E-01 | -6.790414E-03 | | | |
| **A4** | #N/A | #N/A | | | |
| **B1** | 4.517913E-01 | -6.268380E-03 | | | |
| **B2** | 4.676161E-01 | -7.096876E-03 | | | |
| **B3** | 4.546309E-01 | -6.255501E-03 | | | |
| **B4** | 4.271211E-01 | -6.063498E-03 | | | |
| **C1** | 4.503257E-01 | -6.151357E-03 | | | |
| **C2** | 4.827195E-01 | -6.805446E-03 | | | |
| **C3** | 4.967583E-01 | -6.857230E-03 | | | |
| **C4** | 4.945746E-01 | -6.877521E-03 | | | |
| **D1** | 4.971226E-01 | -7.110776E-03 | | | |
| **D2** | 5.166183E-01 | -7.966863E-03 | | | |
| **D3** | 5.285535E-01 | -8.483742E-03 | | | |
| **D4** | 5.151222E-01 | -7.597376E-03 | | | |
| **E1** | 4.512971E-01 | -6.000645E-03 | | | |
| **E2** | 4.661429E-01 | -6.278061E-03 | | | |
| **E3** | 4.395187E-01 | -5.346722E-03 | | | |
| **E4** | 4.645646E-01 | -6.197105E-03 | | | |
| **F1** | 4.793904E-01 | -6.495779E-03 | | | |
| **F2** | 4.609735E-01 | -5.978627E-03 | | | |
| **F3** | 4.875487E-01 | -6.888160E-03 | | | |
| **F4** | 4.821831E-01 | -6.525092E-03 | | | |
| **G1** | 4.659581E-01 | -6.160750E-03 | | | |
| **G2** | 4.816901E-01 | -6.699940E-03 | | | |
| **G3** | 5.024367E-01 | -6.730103E-03 | | | |
| **G4** | 4.925353E-01 | -6.833214E-03 | | | |
| **H1** | 4.716380E-01 | -6.648954E-03 | | | |
| **H2** | 4.855805E-01 | -6.613426E-03 | | | |
| **H3** | 5.018137E-01 | -7.032967E-03 | | | |
| **H4** | 4.776094E-01 | -6.381233E-03 | | | |
| **I1** | 4.099971E-01 | -3.390175E-03 | | | |
| **I2** | 4.211986E-01 | -3.757063E-03 | | | |
| **I3** | 4.114795E-01 | -3.445925E-03 | | | |
| **I4** | 4.285664E-01 | -3.756514E-03 | | | |
| **J1** | 4.121145E-01 | -3.288666E-03 | | | |
| **J2** | 4.093705E-01 | -3.302749E-03 | | | |
| **J3** | 4.135077E-01 | -3.365113E-03 | | | |
| **J4** | 4.220172E-01 | -3.414406E-03 | | | |

DCN: ITSI-0808-0004-0076, 8 May 2019

| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| S1 | A1 | 3 | 0 | 16161 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S2 | A1 | 3 | 0 | 17126 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S3 | A1 | 3 | 0 | 16749 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S4 | A1 | 3 | 0 | 16276 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S5 | A1 | 3 | 0 | 12301 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S6 | A1 | 3 | 0 | 10705 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S7 | A1 | 3 | 2 | 13238 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S1 | A2 | 3 | 0 | 15811 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S2 | A2 | 3 | 0 | 17048 | 3/30/2013 17:35 | 3/30/2013 17:38 | LB4100 | Sr90S13 |
| S3 | A2 | 3 | 0 | 16536 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S4 | A2 | 3 | 0 | 16478 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S5 | A2 | 3 | 0 | 11902 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S6 | A2 | 3 | 0 | 10797 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S7 | A2 | 3 | 0 | 13258 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S1 | A3 | 3 | 1 | 15854 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S2 | A3 | 3 | 0 | 16572 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S3 | A3 | 3 | 0 | 16758 | 3/30/2013 17:35 | 3/30/2013 17:38 | LB4100 | Sr90S13 |
| S4 | A3 | 3 | 0 | 16259 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S5 | A3 | 3 | 1 | 12236 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S6 | A3 | 3 | 0 | 10256 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S7 | A3 | 3 | 0 | 13195 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S1 | B1 | 3 | 0 | 15694 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S2 | B1 | 3 | 1 | 16458 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S3 | B1 | 3 | 0 | 16119 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S4 | B1 | 3 | 0 | 16296 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S5 | B1 | 3 | 0 | 15592 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S6 | B1 | 3 | 0 | 10430 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S7 | B1 | 3 | 0 | 12809 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S1 | B2 | 3 | 1 | 15924 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S2 | B2 | 3 | 0 | 16897 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S3 | B2 | 3 | 0 | 16417 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S4 | B2 | 3 | 0 | 16651 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S5 | B2 | 3 | 0 | 15592 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S6 | B2 | 3 | 1 | 9824 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S7 | B2 | 3 | 0 | 12806 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S1 | B3 | 3 | 1 | 16050 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S2 | B3 | 3 | 0 | 17122 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S3 | B3 | 3 | 1 | 16567 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S4 | B3 | 3 | 0 | 19703 | 4/1/2013 11:09 | 4/1/2013 11:12 | LB4100 | SR90S13 |
| S5 | B3 | 3 | 0 | 15955 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S6 | B3 | 3 | 0 | 10587 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S7 | B3 | 3 | 0 | 13066 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S1 | B4 | 3 | 0 | 14738 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S2 | B4 | 3 | 0 | 15486 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S3 | B4 | 3 | 0 | 15349 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S4 | B4 | 3 | 0 | 15422 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S5 | B4 | 3 | 0 | 14782 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S6 | B4 | 3 | 0 | 9596 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S7 | B4 | 3 | 0 | 11943 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S1 | C1 | 3 | 1 | 15728 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S2 | C1 | 3 | 0 | 16973 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S3 | C1 | 3 | 0 | 16728 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S4 | C1 | 3 | 1 | 16665 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S5 | C1 | 3 | 0 | 12265 | 3/30/2013 18:29 | 3/30/2013 18:32 | LB4100 | Sr90S13 |
| S6 | C1 | 3 | 0 | 11355 | 3/30/2013 18:24 | 3/30/2013 18:27 | LB4100 | Sr90S13 |
| S7 | C1 | 3 | 0 | 13236 | 3/30/2013 18:19 | 3/30/2013 18:22 | LB4100 | Sr90S13 |
| S1 | C2 | 3 | 0 | 16885 | 3/30/2013 18:14 | 3/30/2013 18:17 | LB4100 | Sr90S13 |
| S2 | C2 | 3 | 0 | 17728 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S3 | C2 | 3 | 0 | 17608 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S4 | C2 | 3 | 0 | 17198 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S5 | C2 | 3 | 0 | 12850 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S6 | C2 | 3 | 0 | 11926 | 3/30/2013 18:29 | 3/30/2013 18:32 | LB4100 | Sr90S13 |
| S7 | C2 | 3 | 0 | 13738 | 3/30/2013 18:24 | 3/30/2013 18:27 | LB4100 | Sr90S13 |
| S1 | C3 | 3 | 0 | 17291 | 3/30/2013 18:19 | 3/30/2013 18:22 | LB4100 | Sr90S13 |
| S2 | C3 | 3 | 0 | 18199 | 3/30/2013 18:14 | 3/30/2013 18:17 | LB4100 | Sr90S13 |
| S3 | C3 | 3 | 0 | 17785 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S4 | C3 | 3 | 0 | 17652 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S5 | C3 | 3 | 0 | 12971 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S6 | C3 | 3 | 1 | 12022 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S7 | C3 | 3 | 0 | 14327 | 3/30/2013 18:29 | 3/30/2013 18:32 | LB4100 | Sr90S13 |
| S1 | C4 | 3 | 0 | 17245 | 3/30/2013 18:24 | 3/30/2013 18:27 | LB4100 | Sr90S13 |
| S2 | C4 | 3 | 0 | 17812 | 3/30/2013 18:19 | 3/30/2013 18:22 | LB4100 | Sr90S13 |
| S3 | C4 | 3 | 0 | 17917 | 3/30/2013 18:14 | 3/30/2013 18:17 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S4 | C4 | 3 | 0 | 17597 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S5 | C4 | 3 | 0 | 13064 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S6 | C4 | 3 | 0 | 11923 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S7 | C4 | 3 | 0 | 14197 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S1 | D1 | 3 | 0 | 17998 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S2 | D1 | 3 | 0 | 18672 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S3 | D1 | 3 | 0 | 18274 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S4 | D1 | 3 | 0 | 18243 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S5 | D1 | 3 | 0 | 13824 | 3/30/2013 18:10 | 3/30/2013 18:13 | LB4100 | Sr90S13 |
| S6 | D1 | 3 | 0 | 12622 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S7 | D1 | 3 | 0 | 14560 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S1 | D2 | 3 | 0 | 18378 | 3/30/2013 18:35 | 3/30/2013 18:38 | LB4100 | Sr90S13 |
| S2 | D2 | 3 | 1 | 19314 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S3 | D2 | 3 | 0 | 18625 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S4 | D2 | 3 | 0 | 18750 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S5 | D2 | 3 | 0 | 13854 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S6 | D2 | 3 | 0 | 11743 | 3/30/2013 18:10 | 3/30/2013 18:13 | LB4100 | Sr90S13 |
| S7 | D2 | 3 | 0 | 14966 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S1 | D3 | 3 | 0 | 18779 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S2 | D3 | 3 | 0 | 19428 | 3/30/2013 18:35 | 3/30/2013 18:38 | LB4100 | Sr90S13 |
| S3 | D3 | 3 | 0 | 19167 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S4 | D3 | 3 | 0 | 18722 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S5 | D3 | 3 | 0 | 13946 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S6 | D3 | 3 | 0 | 11717 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S7 | D3 | 3 | 0 | 14849 | 3/30/2013 18:10 | 3/30/2013 18:13 | LB4100 | Sr90S13 |
| S1 | D4 | 3 | 0 | 18298 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S2 | D4 | 3 | 0 | 19342 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S3 | D4 | 3 | 1 | 18911 | 3/30/2013 18:35 | 3/30/2013 18:38 | LB4100 | Sr90S13 |
| S4 | D4 | 3 | 0 | 18797 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S5 | D4 | 3 | 0 | 13889 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S6 | D4 | 3 | 0 | 12639 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S7 | D4 | 3 | 0 | 14727 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S1 | E1 | 3 | 1 | 15390 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S2 | E1 | 3 | 1 | 16259 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S3 | E1 | 3 | 0 | 15987 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S4 | E1 | 3 | 0 | 16116 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S5 | E1 | 3 | 0 | 15325 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S6 | E1 | 3 | 0 | 10706 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S7 | E1 | 3 | 0 | 12474 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S1 | E2 | 3 | 0 | 15809 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S2 | E2 | 3 | 0 | 16432 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S3 | E2 | 3 | 2 | 16516 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S4 | E2 | 3 | 0 | 16816 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S5 | E2 | 3 | 0 | 15824 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S6 | E2 | 3 | 0 | 10813 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S7 | E2 | 3 | 0 | 12797 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S1 | E3 | 3 | 1 | 15240 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S2 | E3 | 3 | 0 | 15970 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S3 | E3 | 3 | 0 | 15685 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S4 | E3 | 3 | 0 | 16121 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S5 | E3 | 3 | 0 | 15491 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S6 | E3 | 3 | 0 | 10842 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S7 | E3 | 3 | 0 | 12801 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S1 | E4 | 3 | 1 | 15712 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S2 | E4 | 3 | 0 | 16576 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S3 | E4 | 3 | 1 | 16377 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S4 | E4 | 3 | 0 | 16478 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S5 | E4 | 3 | 1 | 15702 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S6 | E4 | 3 | 0 | 10478 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S7 | E4 | 3 | 0 | 13072 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S1 | F1 | 3 | 1 | 16331 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S2 | F1 | 3 | 0 | 17177 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S3 | F1 | 3 | 0 | 16803 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S4 | F1 | 3 | 0 | 16746 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S5 | F1 | 3 | 0 | 16064 | 3/30/2013 16:28 | 3/30/2013 16:31 | LB4100 | Sr90S13 |
| S6 | F1 | 3 | 0 | 11329 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S7 | F1 | 3 | 0 | 13040 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S1 | F2 | 3 | 0 | 15935 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S2 | F2 | 3 | 0 | 16617 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S3 | F2 | 3 | 1 | 16268 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S4 | F2 | 3 | 0 | 16500 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S5 | F2 | 3 | 0 | 15688 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S6 | F2 | 3 | 0 | 11219 | 3/30/2013 16:28 | 3/30/2013 16:31 | LB4100 | Sr90S13 |
| S7 | F2 | 3 | 0 | 12868 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S1 | F3 | 3 | 1 | 16431 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S2 | F3 | 3 | 0 | 17530 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S3 | F3 | 3 | 0 | 17043 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S4 | F3 | 3 | 0 | 16858 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S5 | F3 | 3 | 0 | 16156 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S6 | F3 | 3 | 1 | 11315 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S7 | F3 | 3 | 0 | 17640 | 4/1/2013 10:07 | 4/1/2013 10:10 | LB4100 | SR90S13 |
| S1 | F4 | 3 | 0 | 16448 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S2 | F4 | 3 | 0 | 17260 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S3 | F4 | 3 | 0 | 16859 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S4 | F4 | 3 | 0 | 17073 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S5 | F4 | 3 | 0 | 16002 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S6 | F4 | 3 | 0 | 11367 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S7 | F4 | 3 | 0 | 13064 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S1 | G1 | 3 | 0 | 15385 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S2 | G1 | 3 | 0 | 16518 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S3 | G1 | 3 | 0 | 15987 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S4 | G1 | 3 | 0 | 16141 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S5 | G1 | 3 | 0 | 15413 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S6 | G1 | 3 | 0 | 10864 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S7 | G1 | 3 | 0 | 12302 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S1 | G2 | 3 | 0 | 16229 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S2 | G2 | 3 | 0 | 17029 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S3 | G2 | 3 | 0 | 16908 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S4 | G2 | 3 | 0 | 17104 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S5 | G2 | 3 | 0 | 16047 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S6 | G2 | 3 | 0 | 10784 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S7 | G2 | 3 | 0 | 13124 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S1 | G3 | 3 | 0 | 16936 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S2 | G3 | 3 | 0 | 17728 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S3 | G3 | 3 | 0 | 17443 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S4 | G3 | 3 | 0 | 17689 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S5 | G3 | 3 | 0 | 16907 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S6 | G3 | 3 | 1 | 11209 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S7 | G3 | 3 | 0 | 13910 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S1 | G4 | 3 | 0 | 16355 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S2 | G4 | 3 | 0 | 17548 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S3 | G4 | 3 | 0 | 17018 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S4 | G4 | 3 | 1 | 17695 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S5 | G4 | 3 | 0 | 16498 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S6 | G4 | 3 | 0 | 10596 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S7 | G4 | 3 | 0 | 13598 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S1 | H1 | 3 | 1 | 15975 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S2 | H1 | 3 | 0 | 16806 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S3 | H1 | 3 | 1 | 16419 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S4 | H1 | 3 | 1 | 16775 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S5 | H1 | 3 | 0 | 15992 | 3/30/2013 17:01 | 3/30/2013 17:04 | LB4100 | Sr90S13 |
| S6 | H1 | 3 | 0 | 10179 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S7 | H1 | 3 | 0 | 13094 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S1 | H2 | 3 | 0 | 16521 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S2 | H2 | 3 | 0 | 17287 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S3 | H2 | 3 | 0 | 17107 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S4 | H2 | 3 | 0 | 16752 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S5 | H2 | 3 | 0 | 16119 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S6 | H2 | 3 | 1 | 11258 | 3/30/2013 17:01 | 3/30/2013 17:04 | LB4100 | Sr90S13 |
| S7 | H2 | 3 | 0 | 13217 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S1 | H3 | 3 | 0 | 16866 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S2 | H3 | 3 | 0 | 17699 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S3 | H3 | 3 | 0 | 17697 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S4 | H3 | 3 | 0 | 17437 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S5 | H3 | 3 | 0 | 16538 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S6 | H3 | 3 | 0 | 11441 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S7 | H3 | 3 | 0 | 13301 | 3/30/2013 17:01 | 3/30/2013 17:04 | LB4100 | Sr90S13 |
| S1 | H4 | 3 | 1 | 16173 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S2 | H4 | 3 | 0 | 17139 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S3 | H4 | 3 | 0 | 16875 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S4 | H4 | 3 | 0 | 16818 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S5 | H4 | 3 | 0 | 16239 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S6 | H4 | 3 | 0 | 10966 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S7 | H4 | 3 | 1 | 13189 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S1 | I1 | 3 | 3 | 14017 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S2 | I1 | 3 | 2 | 14980 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S3 | I1 | 3 | 4 | 14513 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S4 | I1 | 3 | 0 | 14695 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S5 | I1 | 3 | 0 | 14034 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S6 | I1 | 3 | 1 | 11459 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S7 | I1 | 3 | 0 | 12779 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S1 | I2 | 3 | 1 | 14220 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S2 | I2 | 3 | 0 | 15645 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S3 | I2 | 3 | 1 | 14831 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S4 | I2 | 3 | 0 | 14874 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S5 | I2 | 3 | 1 | 14319 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S6 | I2 | 3 | 0 | 11488 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S7 | I2 | 3 | 0 | 12916 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S1 | I3 | 3 | 0 | 14044 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S2 | I3 | 3 | 0 | 15263 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S3 | I3 | 3 | 0 | 14712 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S4 | I3 | 3 | 1 | 14694 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S5 | I3 | 3 | 0 | 14163 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S6 | I3 | 3 | 1 | 11478 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S7 | I3 | 3 | 0 | 12865 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S1 | I4 | 3 | 2 | 14702 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S2 | I4 | 3 | 1 | 15485 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S3 | I4 | 3 | 2 | 15018 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S4 | I4 | 3 | 1 | 15237 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S5 | I4 | 3 | 1 | 14705 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S6 | I4 | 3 | 0 | 11552 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S7 | I4 | 3 | 1 | 13250 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S1 | J1 | 3 | 0 | 14098 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S2 | J1 | 3 | 0 | 15235 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S3 | J1 | 3 | 1 | 14926 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S4 | J1 | 3 | 0 | 14903 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S5 | J1 | 3 | 0 | 14201 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S6 | J1 | 3 | 0 | 11434 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S7 | J1 | 3 | 0 | 13043 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S1 | J2 | 3 | 0 | 13996 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S2 | J2 | 3 | 0 | 15032 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S3 | J2 | 3 | 0 | 14838 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S4 | J2 | 3 | 0 | 14873 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S5 | J2 | 3 | 0 | 14122 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S6 | J2 | 3 | 0 | 11387 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S7 | J2 | 3 | 0 | 12835 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S1 | J3 | 3 | 0 | 14169 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S2 | J3 | 3 | 0 | 15436 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S3 | J3 | 3 | 0 | 14681 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S4 | J3 | 3 | 1 | 14942 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S5 | J3 | 3 | 0 | 14153 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S6 | J3 | 3 | 0 | 11535 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S7 | J3 | 3 | 1 | 12898 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S1 | J4 | 3 | 1 | 14607 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S2 | J4 | 3 | 0 | 15304 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S3 | J4 | 3 | 0 | 15038 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S4 | J4 | 3 | 1 | 15278 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S5 | J4 | 3 | 1 | 14435 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S6 | J4 | 3 | 0 | 11579 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S7 | J4 | 3 | 0 | 13248 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |

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## Y-90 Calibration - LB4100 - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

Separation Date/Time 3/29/2013 13:05
Y-90 Half Life (days) 2.668875
The following detectors were not calibrated:
A4

| Carrier Data | | Std ID<br>Std weight | 1892786<br>31.85 | mg/mL |
|---|---|---|---|---|
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 15.9 | 0.5 | 15.93 | 99.8% |
| 2 | 16.1 | 0.5 | 15.93 | 100.0% |
| 3 | 16.0 | 0.5 | 15.93 | 100.0% |
| 4 | 16.1 | 0.5 | 15.93 | 100.0% |
| 5 | 16.0 | 0.5 | 15.93 | 100.0% |
| 6 | 16.2 | 0.5 | 15.93 | 100.0% |
| 7 | 15.9 | 0.5 | 15.93 | 99.8% |
| 8 | 16.4 | 0.5 | 15.93 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered negligible.
**Decay corrected to mid-point of cour

| Detector (#) | Source ID (#) | Raw Count Data<br>Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 3/30/2013 11:12 | 3 | 13609 | 4536.33 | 99.8% | 0.78692 | 5773.75 | 9577.01 | 0.6029 | |
| A1 | 2 | 3/30/2013 11:29 | 3 | 13067 | 4355.67 | 100.0% | 0.78451 | 5552.10 | 9577.00 | 0.5797 | |
| A1 | 3 | 3/30/2013 11:24 | 3 | 13370 | 4456.67 | 100.0% | 0.78516 | 5676.10 | 9577.00 | 0.5927 | |
| A1 | 4 | 3/30/2013 11:16 | 3 | 12879 | 4293.00 | 100.0% | 0.78627 | 5459.94 | 9577.01 | 0.5701 | |
| A1 | 5 | 3/30/2013 11:35 | 3 | 13230 | 4410.00 | 100.0% | 0.78366 | 5627.44 | 9577.00 | 0.5876 | |
| A1 | 6 | 3/30/2013 12:03 | 3 | 12870 | 4290.00 | 100.0% | 0.77964 | 5502.54 | 9576.99 | 0.5746 | |
| A1 | 7 | 3/30/2013 11:56 | 3 | 13380 | 4460.00 | 99.8% | 0.78058 | 5722.65 | 9576.99 | 0.5975 | |
| A1 | 8 | 3/30/2013 11:51 | 3 | 13594 | 4531.33 | 100.0% | 0.78135 | 5799.38 | 9576.99 | 0.6056 | 0.5888 |
| A2 | 1 | 3/30/2013 11:16 | 3 | 13095 | 4365.00 | 99.8% | 0.78627 | 5560.25 | 9577.01 | 0.5806 | |
| A2 | 2 | 3/30/2013 11:12 | 3 | 13922 | 4640.67 | 100.0% | 0.78691 | 5897.29 | 9577.01 | 0.6158 | |
| A2 | 3 | 3/30/2013 11:29 | 3 | 13018 | 4339.33 | 100.0% | 0.78451 | 5531.28 | 9577.00 | 0.5776 | |
| A2 | 4 | 3/30/2013 11:24 | 3 | 13740 | 4580.00 | 100.0% | 0.78516 | 5833.19 | 9577.00 | 0.6091 | |
| A2 | 5 | 3/30/2013 11:51 | 3 | 13262 | 4420.67 | 100.0% | 0.78135 | 5657.75 | 9576.99 | 0.5908 | |
| A2 | 6 | 3/30/2013 11:35 | 3 | 13159 | 4386.33 | 100.0% | 0.78366 | 5597.24 | 9577.00 | 0.5844 | |
| A2 | 7 | 3/30/2013 12:03 | 3 | 13590 | 4530.00 | 99.8% | 0.77964 | 5819.53 | 9576.99 | 0.6077 | |
| A2 | 8 | 3/30/2013 11:56 | 3 | 13477 | 4492.33 | 100.0% | 0.78058 | 5755.11 | 9576.99 | 0.6009 | 0.5959 |
| A3 | 1 | 3/30/2013 11:24 | 3 | 13615 | 4538.33 | 99.8% | 0.78516 | 5789.21 | 9577.00 | 0.6045 | |
| A3 | 2 | 3/30/2013 11:16 | 3 | 13338 | 4446.00 | 100.0% | 0.78627 | 5654.55 | 9577.01 | 0.5904 | |
| A3 | 3 | 3/30/2013 11:12 | 3 | 13773 | 4591.00 | 100.0% | 0.78691 | 5834.18 | 9577.01 | 0.6092 | |
| A3 | 4 | 3/30/2013 11:29 | 3 | 13485 | 4495.00 | 100.0% | 0.78451 | 5729.70 | 9577.00 | 0.5983 | |
| A3 | 5 | 3/30/2013 11:56 | 3 | 13089 | 4363.00 | 100.0% | 0.78058 | 5589.42 | 9576.99 | 0.5836 | |
| A3 | 6 | 3/30/2013 11:51 | 3 | 13309 | 4436.33 | 100.0% | 0.78135 | 5677.82 | 9576.99 | 0.5929 | |
| A3 | 7 | 3/30/2013 11:35 | 3 | 13758 | 4586.00 | 99.8% | 0.78366 | 5861.23 | 9577.00 | 0.6120 | |
| A3 | 8 | 3/30/2013 12:03 | 3 | 13498 | 4499.33 | 100.0% | 0.77963 | 5771.08 | 9576.99 | 0.6026 | 0.5992 |
| B1 | 1 | 3/30/2013 11:35 | 3 | 13650 | 4550.00 | 99.8% | 0.78367 | 5815.17 | 9577.00 | 0.6072 | |
| B1 | 2 | 3/30/2013 12:03 | 3 | 13728 | 4576.00 | 100.0% | 0.77966 | 5869.26 | 9576.99 | 0.6129 | |
| B1 | 3 | 3/30/2013 11:56 | 3 | 13629 | 4543.00 | 100.0% | 0.78059 | 5819.96 | 9576.99 | 0.6077 | |
| B1 | 4 | 3/30/2013 11:51 | 3 | 13494 | 4498.00 | 100.0% | 0.78135 | 5756.69 | 9576.99 | 0.6011 | |
| B1 | 5 | 3/30/2013 11:11 | 3 | 13423 | 4474.33 | 100.0% | 0.78695 | 5685.68 | 9577.01 | 0.5937 | |
| B1 | 6 | 3/30/2013 11:29 | 3 | 13398 | 4466.00 | 100.0% | 0.78452 | 5692.64 | 9577.00 | 0.5944 | |
| B1 | 7 | 3/30/2013 11:24 | 3 | 13865 | 4621.67 | 99.8% | 0.78518 | 5895.39 | 9577.00 | 0.6156 | |
| B1 | 8 | 3/30/2013 11:20 | 3 | 13608 | 4536.00 | 100.0% | 0.78579 | 5772.54 | 9577.00 | 0.6027 | 0.6044 |
| B2 | 1 | 3/30/2013 11:51 | 3 | 13621 | 4540.33 | 99.8% | 0.78135 | 5820.00 | 9576.99 | 0.6077 | |
| B2 | 2 | 3/30/2013 11:35 | 3 | 13593 | 4531.00 | 100.0% | 0.78367 | 5781.79 | 9577.00 | 0.6037 | |
| B2 | 3 | 3/30/2013 12:03 | 3 | 13435 | 4478.33 | 100.0% | 0.77965 | 5744.00 | 9576.99 | 0.5998 | |
| B2 | 4 | 3/30/2013 11:56 | 3 | 13710 | 4570.00 | 100.0% | 0.78059 | 5854.57 | 9576.99 | 0.6113 | |
| B2 | 5 | 3/30/2013 11:20 | 3 | 13771 | 4590.33 | 100.0% | 0.78579 | 5841.68 | 9577.00 | 0.6100 | |
| B2 | 6 | 3/30/2013 11:11 | 3 | 13752 | 4584.00 | 100.0% | 0.78695 | 5825.05 | 9577.01 | 0.6082 | |
| B2 | 7 | 3/30/2013 11:29 | 3 | 13556 | 4518.67 | 99.8% | 0.78452 | 5768.82 | 9577.00 | 0.6024 | |
| B2 | 8 | 3/30/2013 11:24 | 3 | 13584 | 4528.00 | 100.0% | 0.78518 | 5766.84 | 9577.00 | 0.6022 | 0.6057 |
| B3 | 1 | 3/30/2013 11:56 | 3 | 13691 | 4563.67 | 99.8% | 0.78059 | 5855.65 | 9576.99 | 0.6114 | |
| B3 | 2 | 3/30/2013 11:51 | 3 | 13798 | 4599.33 | 100.0% | 0.78135 | 5886.39 | 9576.99 | 0.6146 | |
| B3 | 3 | 3/30/2013 11:35 | 3 | 13908 | 4636.00 | 100.0% | 0.78366 | 5915.80 | 9577.00 | 0.6177 | |
| B3 | 4 | 3/30/2013 12:03 | 3 | 13648 | 4549.33 | 100.0% | 0.77965 | 5835.07 | 9576.99 | 0.6093 | |
| B3 | 5 | 3/30/2013 11:24 | 3 | 13507 | 4502.33 | 100.0% | 0.78518 | 5734.17 | 9577.00 | 0.5987 | |
| B3 | 6 | 3/30/2013 11:20 | 3 | 14073 | 4691.00 | 100.0% | 0.78579 | 5969.81 | 9577.00 | 0.6233 | |
| B3 | 7 | 3/30/2013 11:11 | 3 | 13982 | 4660.67 | 99.8% | 0.78695 | 5931.79 | 9577.01 | 0.6194 | |
| B3 | 8 | 3/30/2013 11:29 | 3 | 13436 | 4478.67 | 100.0% | 0.78452 | 5708.78 | 9577.00 | 0.5961 | 0.6113 |
| B4 | 1 | 3/30/2013 12:03 | 3 | 12732 | 4244.00 | 99.8% | 0.77965 | 5452.02 | 9576.99 | 0.5693 | |
| B4 | 2 | 3/30/2013 11:56 | 3 | 12808 | 4269.33 | 100.0% | 0.78058 | 5469.41 | 9576.99 | 0.5711 | |
| B4 | 3 | 3/30/2013 11:51 | 3 | 12570 | 4190.00 | 100.0% | 0.78135 | 5362.52 | 9576.99 | 0.5599 | |
| B4 | 5 | 3/30/2013 11:29 | 3 | 12723 | 4241.00 | 100.0% | 0.78452 | 5405.85 | 9577.00 | 0.5645 | |
| B4 | 6 | 3/30/2013 11:24 | 3 | 12765 | 4255.00 | 100.0% | 0.78518 | 5419.17 | 9577.00 | 0.5659 | |
| B4 | 7 | 3/30/2013 11:20 | 3 | 13418 | 4472.00 | 99.8% | 0.78579 | 5700.06 | 9577.00 | 0.5952 | |
| B4 | 8 | 3/30/2013 11:11 | 3 | 12780 | 4260.00 | 100.0% | 0.78694 | 5413.35 | 9577.01 | 0.5652 | 0.5702 |
| C1 | 1 | 3/30/2013 13:58 | 3 | 12969 | 4323.00 | 99.8% | 0.76365 | 5669.86 | 9576.94 | 0.5920 | |
| C1 | 2 | 3/30/2013 14:15 | 3 | 13130 | 4376.67 | 100.0% | 0.76135 | 5748.54 | 9576.93 | 0.6002 | |
| C1 | 3 | 3/30/2013 14:09 | 3 | 12220 | 4073.33 | 100.0% | 0.76212 | 5344.74 | 9576.93 | 0.5581 | |
| C1 | 4 | 3/30/2013 14:03 | 3 | 12937 | 4312.33 | 100.0% | 0.76296 | 5652.12 | 9576.93 | 0.5902 | |
| C1 | 5 | 3/30/2013 14:20 | 3 | 12776 | 4258.67 | 100.0% | 0.76062 | 5598.94 | 9576.93 | 0.5846 | |
| C1 | 6 | 3/30/2013 14:36 | 3 | 12163 | 4054.33 | 100.0% | 0.75839 | 5345.97 | 9576.92 | 0.5582 | |
| C1 | 7 | 3/30/2013 14:31 | 3 | 13000 | 4333.33 | 99.8% | 0.75909 | 5717.58 | 9576.92 | 0.5970 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 8 | 3/30/2013 14:26 | 3 | 12686 | 4228.67 | 100.0% | 0.75979 | 5565.58 | 9576.92 | 0.5811 | 0.5827 |
| C2 | 1 | 3/30/2013 14:03 | 3 | 13036 | 4345.33 | 99.8% | 0.76296 | 5704.33 | 9576.93 | 0.5956 | |
| C2 | 2 | 3/30/2013 13:58 | 3 | 13061 | 4353.67 | 100.0% | 0.76365 | 5701.13 | 9576.94 | 0.5953 | |
| C2 | 3 | 3/30/2013 14:15 | 3 | 12586 | 4195.33 | 100.0% | 0.76135 | 5510.39 | 9576.93 | 0.5754 | |
| C2 | 4 | 3/30/2013 14:09 | 3 | 13408 | 4469.33 | 100.0% | 0.76212 | 5864.36 | 9576.93 | 0.6123 | |
| C2 | 5 | 3/30/2013 14:26 | 3 | 12797 | 4265.67 | 100.0% | 0.75979 | 5614.28 | 9576.92 | 0.5862 | |
| C2 | 6 | 3/30/2013 14:20 | 3 | 12374 | 4124.67 | 100.0% | 0.76062 | 5422.78 | 9576.93 | 0.5662 | |
| C2 | 7 | 3/30/2013 14:36 | 3 | 13059 | 4353.00 | 99.8% | 0.75839 | 5748.83 | 9576.92 | 0.6003 | |
| C2 | 8 | 3/30/2013 14:31 | 3 | 13106 | 4368.67 | 100.0% | 0.75909 | 5755.17 | 9576.92 | 0.6009 | 0.5915 |
| C3 | 1 | 3/30/2013 14:09 | 3 | 13495 | 4498.33 | 99.8% | 0.76212 | 5911.70 | 9576.93 | 0.6173 | |
| C3 | 2 | 3/30/2013 14:03 | 3 | 12737 | 4245.67 | 100.0% | 0.76296 | 5564.76 | 9576.93 | 0.5811 | |
| C3 | 3 | 3/30/2013 13:58 | 3 | 12131 | 4043.67 | 100.0% | 0.76365 | 5295.19 | 9576.94 | 0.5529 | |
| C3 | 4 | 3/30/2013 14:15 | 3 | 13403 | 4467.67 | 100.0% | 0.76135 | 5868.08 | 9576.93 | 0.6127 | |
| C3 | 5 | 3/30/2013 14:31 | 3 | 12610 | 4203.33 | 100.0% | 0.75909 | 5537.36 | 9576.92 | 0.5782 | |
| C3 | 6 | 3/30/2013 14:26 | 3 | 12167 | 4055.67 | 100.0% | 0.75979 | 5337.89 | 9576.92 | 0.5574 | |
| C3 | 7 | 3/30/2013 14:20 | 3 | 12849 | 4283.00 | 99.8% | 0.76062 | 5639.80 | 9576.93 | 0.5889 | |
| C3 | 8 | 3/30/2013 14:36 | 3 | 12918 | 4306.00 | 100.0% | 0.75839 | 5677.83 | 9576.92 | 0.5929 | 0.5852 |
| C4 | 1 | 3/30/2013 14:15 | 3 | 13286 | 4428.67 | 99.8% | 0.76135 | 5826.02 | 9576.93 | 0.6083 | |
| C4 | 2 | 3/30/2013 14:09 | 3 | 13301 | 4433.67 | 100.0% | 0.76212 | 5817.58 | 9576.93 | 0.6075 | |
| C4 | 3 | 3/30/2013 14:03 | 3 | 12516 | 4172.00 | 100.0% | 0.76296 | 5468.20 | 9576.93 | 0.5710 | |
| C4 | 4 | 3/30/2013 13:58 | 3 | 12966 | 4322.00 | 100.0% | 0.76365 | 5659.68 | 9576.94 | 0.5910 | |
| C4 | 5 | 3/30/2013 14:36 | 3 | 12481 | 4160.33 | 100.0% | 0.75839 | 5485.78 | 9576.92 | 0.5728 | |
| C4 | 6 | 3/30/2013 14:31 | 3 | 12394 | 4131.33 | 100.0% | 0.75908 | 5442.53 | 9576.92 | 0.5683 | |
| C4 | 7 | 3/30/2013 14:26 | 3 | 12824 | 4274.67 | 99.8% | 0.75979 | 5634.99 | 9576.92 | 0.5884 | |
| C4 | 8 | 3/30/2013 14:20 | 3 | 12609 | 4203.00 | 100.0% | 0.76062 | 5525.78 | 9576.93 | 0.5770 | 0.5855 |
| D1 | 1 | 3/30/2013 14:21 | 3 | 14821 | 4940.33 | 99.8% | 0.76048 | 6506.52 | 9576.93 | 0.6794 | |
| D1 | 2 | 3/30/2013 14:37 | 3 | 15003 | 5001.00 | 100.0% | 0.75825 | 6595.42 | 9576.92 | 0.6887 | |
| D1 | 3 | 3/30/2013 14:32 | 3 | 13959 | 4653.00 | 100.0% | 0.75895 | 6130.83 | 9576.92 | 0.6402 | |
| D1 | 4 | 3/30/2013 14:27 | 3 | 14807 | 4935.67 | 100.0% | 0.75965 | 6497.26 | 9576.92 | 0.6784 | |
| D1 | 5 | 3/30/2013 13:59 | 3 | 14684 | 4894.67 | 100.0% | 0.76351 | 6410.71 | 9576.94 | 0.6694 | |
| D1 | 6 | 3/30/2013 14:16 | 3 | 14280 | 4760.00 | 100.0% | 0.76122 | 6253.16 | 9576.93 | 0.6529 | |
| D1 | 7 | 3/30/2013 14:10 | 3 | 15223 | 5074.33 | 99.8% | 0.76198 | 6669.86 | 9576.93 | 0.6965 | |
| D1 | 8 | 3/30/2013 14:04 | 3 | 14778 | 4926.00 | 100.0% | 0.76282 | 6457.61 | 9576.93 | 0.6743 | 0.6725 |
| D2 | 1 | 3/30/2013 14:27 | 3 | 15028 | 5009.33 | 99.8% | 0.75965 | 6604.62 | 9576.92 | 0.6896 | |
| D2 | 2 | 3/30/2013 14:21 | 3 | 14728 | 4909.33 | 100.0% | 0.76048 | 6455.56 | 9576.93 | 0.6741 | |
| D2 | 3 | 3/30/2013 14:37 | 3 | 13806 | 4602.00 | 100.0% | 0.75825 | 6069.23 | 9576.92 | 0.6337 | |
| D2 | 4 | 3/30/2013 14:32 | 3 | 14923 | 4974.33 | 100.0% | 0.75895 | 6554.24 | 9576.92 | 0.6844 | |
| D2 | 5 | 3/30/2013 14:04 | 3 | 14988 | 4996.00 | 100.0% | 0.76282 | 6549.37 | 9576.93 | 0.6839 | |
| D2 | 6 | 3/30/2013 13:59 | 3 | 14328 | 4776.00 | 100.0% | 0.76351 | 6255.31 | 9576.94 | 0.6532 | |
| D2 | 7 | 3/30/2013 14:16 | 3 | 15369 | 5123.00 | 99.8% | 0.76121 | 6740.63 | 9576.93 | 0.7038 | |
| D2 | 8 | 3/30/2013 14:10 | 3 | 14834 | 4944.67 | 100.0% | 0.76198 | 6489.24 | 9576.93 | 0.6776 | 0.6750 |
| D3 | 1 | 3/30/2013 14:32 | 3 | 15108 | 5036.00 | 99.8% | 0.75895 | 6645.93 | 9576.92 | 0.6940 | |
| D3 | 2 | 3/30/2013 14:27 | 3 | 14957 | 4985.67 | 100.0% | 0.75965 | 6563.10 | 9576.92 | 0.6853 | |
| D3 | 3 | 3/30/2013 14:21 | 3 | 13886 | 4628.67 | 100.0% | 0.76048 | 6086.50 | 9576.93 | 0.6355 | |
| D3 | 4 | 3/30/2013 14:37 | 3 | 15018 | 5006.00 | 100.0% | 0.75825 | 6602.04 | 9576.92 | 0.6894 | |
| D3 | 5 | 3/30/2013 14:10 | 3 | 14800 | 4933.33 | 100.0% | 0.76198 | 6474.36 | 9576.93 | 0.6760 | |
| D3 | 6 | 3/30/2013 14:04 | 3 | 14387 | 4795.67 | 100.0% | 0.76282 | 6286.75 | 9576.93 | 0.6564 | |
| D3 | 7 | 3/30/2013 13:59 | 3 | 15410 | 5136.67 | 99.8% | 0.76351 | 6738.27 | 9576.94 | 0.7036 | |
| D3 | 8 | 3/30/2013 14:16 | 3 | 14977 | 4992.33 | 100.0% | 0.76121 | 6558.39 | 9576.93 | 0.6848 | 0.6781 |
| D4 | 1 | 3/30/2013 14:37 | 3 | 14839 | 4946.33 | 99.8% | 0.75825 | 6533.62 | 9576.92 | 0.6822 | |
| D4 | 2 | 3/30/2013 14:32 | 3 | 15095 | 5031.67 | 100.0% | 0.75895 | 6629.80 | 9576.92 | 0.6923 | |
| D4 | 3 | 3/30/2013 14:27 | 3 | 13854 | 4618.00 | 100.0% | 0.75965 | 6079.12 | 9576.92 | 0.6348 | |
| D4 | 4 | 3/30/2013 14:21 | 3 | 14995 | 4998.33 | 100.0% | 0.76048 | 6572.61 | 9576.93 | 0.6863 | |
| D4 | 5 | 3/30/2013 14:16 | 3 | 14568 | 4856.00 | 100.0% | 0.76121 | 6379.31 | 9576.93 | 0.6661 | |
| D4 | 6 | 3/30/2013 14:10 | 3 | 14132 | 4710.67 | 100.0% | 0.76198 | 6182.16 | 9576.93 | 0.6455 | |
| D4 | 7 | 3/30/2013 14:04 | 3 | 15398 | 5132.67 | 99.8% | 0.76282 | 6739.13 | 9576.93 | 0.7037 | |
| D4 | 8 | 3/30/2013 13:59 | 3 | 15353 | 5117.67 | 100.0% | 0.76351 | 6702.82 | 9576.94 | 0.6999 | 0.6763 |
| E1 | 1 | 3/30/2013 12:38 | 3 | 13060 | 4353.33 | 99.8% | 0.77475 | 5627.85 | 9576.97 | 0.5876 | |
| E1 | 2 | 3/30/2013 12:51 | 3 | 12973 | 4324.33 | 100.0% | 0.77291 | 5594.84 | 9576.96 | 0.5842 | |
| E1 | 3 | 3/30/2013 12:47 | 3 | 13204 | 4401.33 | 100.0% | 0.77357 | 5689.67 | 9576.97 | 0.5941 | |
| E1 | 4 | 3/30/2013 12:42 | 3 | 13122 | 4374.00 | 100.0% | 0.77418 | 5649.82 | 9576.97 | 0.5899 | |
| E1 | 5 | 3/30/2013 12:16 | 3 | 13033 | 4344.33 | 100.0% | 0.77778 | 5585.58 | 9576.98 | 0.5832 | |
| E1 | 6 | 3/30/2013 12:34 | 3 | 12814 | 4271.33 | 100.0% | 0.77537 | 5508.74 | 9576.97 | 0.5752 | |
| E1 | 7 | 3/30/2013 12:29 | 3 | 13375 | 4458.33 | 99.8% | 0.77596 | 5754.59 | 9576.97 | 0.6009 | |
| E1 | 8 | 3/30/2013 12:25 | 3 | 13248 | 4416.00 | 100.0% | 0.77655 | 5686.69 | 9576.98 | 0.5938 | 0.5886 |
| E2 | 1 | 3/30/2013 12:42 | 3 | 13343 | 4447.67 | 99.8% | 0.77418 | 5754.02 | 9576.97 | 0.6008 | |
| E2 | 2 | 3/30/2013 12:38 | 3 | 13427 | 4475.67 | 100.0% | 0.77475 | 5776.92 | 9576.97 | 0.6032 | |
| E2 | 3 | 3/30/2013 12:51 | 3 | 13274 | 4424.67 | 100.0% | 0.77291 | 5724.67 | 9576.96 | 0.5978 | |
| E2 | 4 | 3/30/2013 12:47 | 3 | 13559 | 4519.67 | 100.0% | 0.77356 | 5842.66 | 9576.97 | 0.6101 | |
| E2 | 5 | 3/30/2013 12:25 | 3 | 13236 | 4412.00 | 100.0% | 0.77655 | 5681.54 | 9576.98 | 0.5933 | |
| E2 | 6 | 3/30/2013 12:16 | 3 | 13436 | 4478.67 | 100.0% | 0.77777 | 5758.31 | 9576.98 | 0.6013 | |
| E2 | 7 | 3/30/2013 12:34 | 3 | 13438 | 4479.33 | 99.8% | 0.77537 | 5786.08 | 9576.97 | 0.6042 | |
| E2 | 8 | 3/30/2013 12:29 | 3 | 13297 | 4432.33 | 100.0% | 0.77596 | 5712.05 | 9576.97 | 0.5964 | 0.6009 |
| E3 | 1 | 3/30/2013 12:47 | 3 | 13197 | 4399.00 | 99.8% | 0.77356 | 5695.61 | 9576.97 | 0.5947 | |
| E3 | 2 | 3/30/2013 12:42 | 3 | 13473 | 4491.00 | 100.0% | 0.77418 | 5800.96 | 9576.97 | 0.6057 | |
| E3 | 3 | 3/30/2013 12:38 | 3 | 13229 | 4409.67 | 100.0% | 0.77475 | 5691.73 | 9576.97 | 0.5943 | |
| E3 | 4 | 3/30/2013 12:51 | 3 | 13246 | 4415.33 | 100.0% | 0.77291 | 5712.59 | 9576.96 | 0.5965 | |
| E3 | 5 | 3/30/2013 12:29 | 3 | 13113 | 4371.00 | 100.0% | 0.77596 | 5633.01 | 9576.97 | 0.5882 | |
| E3 | 6 | 3/30/2013 12:25 | 3 | 12790 | 4263.33 | 100.0% | 0.77655 | 5490.10 | 9576.98 | 0.5733 | |
| E3 | 7 | 3/30/2013 12:16 | 3 | 13567 | 4522.33 | 99.8% | 0.77777 | 5823.60 | 9576.98 | 0.6081 | |
| E3 | 8 | 3/30/2013 12:34 | 3 | 13226 | 4408.67 | 100.0% | 0.77537 | 5685.86 | 9576.97 | 0.5937 | 0.5943 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E4 | 1 | 3/30/2013 12:51 | 3 | 12939 | 4313.00 | 99.8% | 0.77291 | 5588.99 | 9576.96 | 0.5836 | |
| E4 | 2 | 3/30/2013 12:47 | 3 | 13227 | 4409.00 | 100.0% | 0.77356 | 5699.62 | 9576.97 | 0.5951 | |
| E4 | 3 | 3/30/2013 12:42 | 3 | 13211 | 4403.67 | 100.0% | 0.77418 | 5688.17 | 9576.97 | 0.5939 | |
| E4 | 4 | 3/30/2013 12:38 | 3 | 13251 | 4417.00 | 100.0% | 0.77475 | 5701.21 | 9576.97 | 0.5953 | |
| E4 | 5 | 3/30/2013 12:34 | 3 | 12899 | 4299.67 | 100.0% | 0.77537 | 5545.30 | 9576.97 | 0.5790 | |
| E4 | 6 | 3/30/2013 12:29 | 3 | 12717 | 4239.00 | 100.0% | 0.77596 | 5462.91 | 9576.97 | 0.5704 | |
| E4 | 7 | 3/30/2013 12:25 | 3 | 13546 | 4515.33 | 99.8% | 0.77655 | 5823.75 | 9576.98 | 0.6081 | |
| E4 | 8 | 3/30/2013 12:16 | 3 | 13380 | 4460.00 | 100.0% | 0.77777 | 5734.31 | 9576.98 | 0.5988 | 0.5905 |
| F1 | 1 | 3/30/2013 12:16 | 3 | 13838 | 4612.67 | 99.8% | 0.77777 | 5939.94 | 9576.98 | 0.6202 | |
| F1 | 2 | 3/30/2013 12:34 | 3 | 13557 | 4519.00 | 100.0% | 0.77537 | 5828.17 | 9576.97 | 0.6086 | |
| F1 | 3 | 3/30/2013 12:29 | 3 | 13644 | 4548.00 | 100.0% | 0.77596 | 5861.13 | 9576.97 | 0.6120 | |
| F1 | 4 | 3/30/2013 12:25 | 3 | 13677 | 4559.00 | 100.0% | 0.77655 | 5870.86 | 9576.98 | 0.6130 | |
| F1 | 5 | 3/30/2013 12:38 | 3 | 13447 | 4482.33 | 100.0% | 0.77475 | 5785.54 | 9576.97 | 0.6041 | |
| F1 | 6 | 3/30/2013 12:51 | 3 | 13011 | 4337.00 | 100.0% | 0.77291 | 5611.26 | 9576.96 | 0.5859 | |
| F1 | 7 | 3/30/2013 12:47 | 3 | 13955 | 4651.67 | 99.8% | 0.77356 | 6022.77 | 9576.97 | 0.6289 | |
| F1 | 8 | 3/30/2013 12:42 | 3 | 13679 | 4559.67 | 100.0% | 0.77418 | 5889.68 | 9576.97 | 0.6150 | 0.6110 |
| F2 | 1 | 3/30/2013 12:25 | 3 | 13510 | 4503.33 | 99.8% | 0.77655 | 5808.31 | 9576.98 | 0.6065 | |
| F2 | 2 | 3/30/2013 12:16 | 3 | 13530 | 4510.00 | 100.0% | 0.77777 | 5798.62 | 9576.98 | 0.6055 | |
| F2 | 3 | 3/30/2013 12:34 | 3 | 13607 | 4535.67 | 100.0% | 0.77537 | 5849.68 | 9576.97 | 0.6108 | |
| F2 | 4 | 3/30/2013 12:29 | 3 | 13634 | 4544.67 | 100.0% | 0.77596 | 5856.85 | 9576.97 | 0.6116 | |
| F2 | 5 | 3/30/2013 12:42 | 3 | 13375 | 4458.33 | 100.0% | 0.77418 | 5758.80 | 9576.97 | 0.6013 | |
| F2 | 6 | 3/30/2013 12:38 | 3 | 13083 | 4361.00 | 100.0% | 0.77475 | 5628.95 | 9576.97 | 0.5878 | |
| F2 | 7 | 3/30/2013 12:51 | 3 | 13627 | 4542.33 | 99.8% | 0.77291 | 5886.17 | 9576.96 | 0.6146 | |
| F2 | 8 | 3/30/2013 12:47 | 3 | 13530 | 4510.00 | 100.0% | 0.77356 | 5830.20 | 9576.97 | 0.6088 | 0.6058 |
| F3 | 1 | 3/30/2013 12:29 | 3 | 13685 | 4561.67 | 99.8% | 0.77596 | 5888.01 | 9576.97 | 0.6148 | |
| F3 | 2 | 3/30/2013 12:25 | 3 | 13708 | 4569.33 | 100.0% | 0.77655 | 5884.18 | 9576.98 | 0.6144 | |
| F3 | 3 | 3/30/2013 12:16 | 3 | 13870 | 4623.33 | 100.0% | 0.77777 | 5944.35 | 9576.98 | 0.6207 | |
| F3 | 4 | 3/30/2013 12:34 | 3 | 13788 | 4596.00 | 100.0% | 0.77537 | 5927.50 | 9576.97 | 0.6189 | |
| F3 | 5 | 3/30/2013 12:47 | 3 | 13568 | 4522.67 | 100.0% | 0.77356 | 5846.58 | 9576.97 | 0.6105 | |
| F3 | 6 | 3/30/2013 12:42 | 3 | 13292 | 4430.67 | 100.0% | 0.77418 | 5723.07 | 9576.97 | 0.5976 | |
| F3 | 7 | 3/30/2013 12:38 | 3 | 14041 | 4680.33 | 99.8% | 0.77475 | 6050.63 | 9576.97 | 0.6318 | |
| F3 | 8 | 3/30/2013 12:51 | 3 | 13672 | 4557.33 | 100.0% | 0.77291 | 5896.35 | 9576.96 | 0.6157 | 0.6155 |
| F4 | 1 | 3/30/2013 12:34 | 3 | 13645 | 4548.33 | 99.8% | 0.77537 | 5875.26 | 9576.97 | 0.6135 | |
| F4 | 2 | 3/30/2013 12:29 | 3 | 13606 | 4535.33 | 100.0% | 0.77596 | 5844.84 | 9576.97 | 0.6103 | |
| F4 | 3 | 3/30/2013 12:25 | 3 | 13873 | 4624.33 | 100.0% | 0.77655 | 5955.01 | 9576.98 | 0.6218 | |
| F4 | 4 | 3/30/2013 12:16 | 3 | 13654 | 4551.33 | 100.0% | 0.77777 | 5851.78 | 9576.98 | 0.6110 | |
| F4 | 5 | 3/30/2013 12:51 | 3 | 13624 | 4541.33 | 100.0% | 0.77291 | 5875.67 | 9576.96 | 0.6135 | |
| F4 | 6 | 3/30/2013 12:47 | 3 | 13165 | 4388.33 | 100.0% | 0.77356 | 5672.92 | 9576.97 | 0.5924 | |
| F4 | 7 | 3/30/2013 12:42 | 3 | 13984 | 4661.33 | 99.8% | 0.77417 | 6030.50 | 9576.97 | 0.6297 | |
| F4 | 8 | 3/30/2013 12:38 | 3 | 13462 | 4487.33 | 100.0% | 0.77474 | 5792.03 | 9576.97 | 0.6048 | 0.6121 |
| G1 | 1 | 3/30/2013 12:57 | 3 | 12509 | 4169.67 | 99.8% | 0.77213 | 5408.71 | 9576.96 | 0.5648 | |
| G1 | 2 | 3/30/2013 13:26 | 3 | 13307 | 4435.67 | 100.0% | 0.76812 | 5774.72 | 9576.95 | 0.6030 | |
| G1 | 3 | 3/30/2013 13:20 | 3 | 3249 | 1083.00 | 100.0% | 0.76887 | 1408.57 | 9576.95 | 0.1471 | |
| G1 | 4 | 3/30/2013 13:03 | 3 | 12930 | 4310.00 | 100.0% | 0.77131 | 5587.92 | 9576.96 | 0.5835 | |
| G1 | 5 | 3/30/2013 13:40 | 3 | 12839 | 4279.67 | 100.0% | 0.75618 | 5585.70 | 9576.94 | 0.5832 | |
| G1 | 6 | 3/30/2013 13:52 | 3 | 13224 | 4408.00 | 100.0% | 0.76442 | 5766.47 | 9576.94 | 0.6021 | |
| G1 | 7 | 3/30/2013 13:48 | 3 | 13339 | 4446.33 | 99.8% | 0.76506 | 5820.85 | 9576.94 | 0.6078 | |
| G1 | 8 | 3/30/2013 13:44 | 3 | 13351 | 4450.33 | 100.0% | 0.76564 | 5812.57 | 9576.94 | 0.6069 | 0.5373 |
| G2 | 1 | 3/30/2013 13:03 | 3 | 13555 | 4518.33 | 99.8% | 0.77130 | 5867.26 | 9576.96 | 0.6126 | |
| G2 | 2 | 3/30/2013 12:57 | 3 | 13099 | 4366.33 | 100.0% | 0.77213 | 5654.92 | 9576.96 | 0.5905 | |
| G2 | 3 | 3/30/2013 13:26 | 3 | 12682 | 4227.33 | 100.0% | 0.76812 | 5503.51 | 9576.95 | 0.5747 | |
| G2 | 4 | 3/30/2013 13:20 | 3 | 13719 | 4573.00 | 100.0% | 0.76886 | 5947.74 | 9576.95 | 0.6210 | |
| G2 | 5 | 3/30/2013 13:44 | 3 | 12786 | 4262.67 | 100.0% | 0.76564 | 5567.46 | 9576.94 | 0.5813 | |
| G2 | 6 | 3/30/2013 13:40 | 3 | 13035 | 4345.00 | 100.0% | 0.76618 | 5670.99 | 9576.94 | 0.5921 | |
| G2 | 7 | 3/30/2013 13:53 | 3 | 13594 | 4531.33 | 99.8% | 0.76442 | 5937.16 | 9576.94 | 0.6199 | |
| G2 | 8 | 3/30/2013 13:48 | 3 | 12929 | 4309.67 | 100.0% | 0.76506 | 5633.09 | 9576.94 | 0.5882 | 0.5976 |
| G3 | 1 | 3/30/2013 13:20 | 3 | 13760 | 4586.67 | 99.8% | 0.76886 | 5974.89 | 9576.95 | 0.6239 | |
| G3 | 2 | 3/30/2013 13:03 | 3 | 13754 | 4584.67 | 100.0% | 0.77130 | 5944.05 | 9576.96 | 0.6207 | |
| G3 | 3 | 3/30/2013 12:57 | 3 | 12839 | 4279.67 | 100.0% | 0.77213 | 5542.70 | 9576.96 | 0.5788 | |
| G3 | 4 | 3/30/2013 13:26 | 3 | 13651 | 4550.33 | 100.0% | 0.76812 | 5924.02 | 9576.95 | 0.6186 | |
| G3 | 5 | 3/30/2013 13:48 | 3 | 12746 | 4248.67 | 100.0% | 0.76506 | 5553.36 | 9576.94 | 0.5799 | |
| G3 | 6 | 3/30/2013 13:44 | 3 | 12953 | 4317.67 | 100.0% | 0.76564 | 5639.31 | 9576.94 | 0.5888 | |
| G3 | 7 | 3/30/2013 13:40 | 3 | 14028 | 4676.00 | 99.8% | 0.76618 | 6112.59 | 9576.94 | 0.6383 | |
| G3 | 8 | 3/30/2013 13:53 | 3 | 13469 | 4489.67 | 100.0% | 0.76442 | 5873.33 | 9576.94 | 0.6133 | 0.6078 |
| G4 | 1 | 3/30/2013 13:26 | 3 | 13594 | 4531.33 | 99.8% | 0.76811 | 5908.58 | 9576.95 | 0.6170 | |
| G4 | 2 | 3/30/2013 13:20 | 3 | 13680 | 4560.00 | 100.0% | 0.76886 | 5930.83 | 9576.95 | 0.6193 | |
| G4 | 3 | 3/30/2013 13:03 | 3 | 13515 | 4505.00 | 100.0% | 0.77130 | 5840.78 | 9576.96 | 0.6099 | |
| G4 | 4 | 3/30/2013 12:57 | 3 | 13312 | 4437.33 | 100.0% | 0.77213 | 5746.89 | 9576.96 | 0.6001 | |
| G4 | 5 | 3/30/2013 13:53 | 3 | 12950 | 4316.67 | 100.0% | 0.76441 | 5647.03 | 9576.94 | 0.5896 | |
| G4 | 6 | 3/30/2013 13:48 | 3 | 12437 | 4145.67 | 100.0% | 0.76506 | 5418.75 | 9576.94 | 0.5658 | |
| G4 | 7 | 3/30/2013 13:44 | 3 | 13621 | 4540.33 | 99.8% | 0.76564 | 5939.46 | 9576.94 | 0.6202 | |
| G4 | 8 | 3/30/2013 13:40 | 3 | 13412 | 4470.67 | 100.0% | 0.76618 | 5835.02 | 9576.94 | 0.6093 | 0.6039 |
| H1 | 1 | 3/30/2013 13:40 | 3 | 13205 | 4401.67 | 99.8% | 0.76621 | 5753.77 | 9576.94 | 0.6008 | |
| H1 | 2 | 3/30/2013 13:53 | 3 | 13099 | 4366.33 | 100.0% | 0.76441 | 5712.00 | 9576.94 | 0.5964 | |
| H1 | 3 | 3/30/2013 13:48 | 3 | 12500 | 4166.67 | 100.0% | 0.76506 | 5446.20 | 9576.94 | 0.5687 | |
| H1 | 4 | 3/30/2013 13:44 | 3 | 13397 | 4465.67 | 100.0% | 0.76564 | 5832.63 | 9576.94 | 0.6090 | |
| H1 | 5 | 3/30/2013 12:57 | 3 | 13157 | 4385.67 | 100.0% | 0.77214 | 5679.91 | 9576.96 | 0.5931 | |
| H1 | 6 | 3/30/2013 13:26 | 3 | 12929 | 4309.67 | 100.0% | 0.76814 | 5610.50 | 9576.95 | 0.5858 | |
| H1 | 7 | 3/30/2013 13:20 | 3 | 13568 | 4522.67 | 99.8% | 0.76889 | 5891.29 | 9576.95 | 0.6152 | |
| H1 | 8 | 3/30/2013 13:03 | 3 | 13245 | 4415.00 | 100.0% | 0.77133 | 5723.85 | 9576.96 | 0.5977 | 0.5958 |
| H2 | 1 | 3/30/2013 13:44 | 3 | 13183 | 4394.33 | 99.8% | 0.76564 | 5748.49 | 9576.94 | 0.6002 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| H2 | 2 | 3/30/2013 13:40 | 3 | 13306 | 4435.33 | 100.0% | 0.76621 | 5788.68 | 9576.94 | 0.6044 | |
| H2 | 3 | 3/30/2013 13:53 | 3 | 12430 | 4143.33 | 100.0% | 0.76441 | 5420.27 | 9576.94 | 0.5660 | |
| H2 | 4 | 3/30/2013 13:48 | 3 | 13206 | 4402.00 | 100.0% | 0.76506 | 5753.80 | 9576.94 | 0.6008 | |
| H2 | 5 | 3/30/2013 13:03 | 3 | 13357 | 4452.33 | 100.0% | 0.77133 | 5772.27 | 9576.96 | 0.6027 | |
| H2 | 6 | 3/30/2013 12:57 | 3 | 12989 | 4329.67 | 100.0% | 0.77214 | 5607.38 | 9576.96 | 0.5855 | |
| H2 | 7 | 3/30/2013 13:26 | 3 | 13679 | 4559.67 | 99.8% | 0.76814 | 5945.29 | 9576.95 | 0.6208 | |
| H2 | 8 | 3/30/2013 13:20 | 3 | 13354 | 4451.33 | 100.0% | 0.76889 | 5789.27 | 9576.95 | 0.6045 | 0.5981 |
| H3 | 1 | 3/30/2013 13:48 | 3 | 13509 | 4503.00 | 99.8% | 0.76506 | 5895.07 | 9576.94 | 0.6155 | |
| H3 | 2 | 3/30/2013 13:44 | 3 | 13463 | 4487.67 | 100.0% | 0.76564 | 5861.37 | 9576.94 | 0.6120 | |
| H3 | 3 | 3/30/2013 13:40 | 3 | 13106 | 4368.67 | 100.0% | 0.76621 | 5701.69 | 9576.94 | 0.5954 | |
| H3 | 4 | 3/30/2013 13:53 | 3 | 13554 | 4518.00 | 100.0% | 0.76441 | 5910.43 | 9576.94 | 0.6172 | |
| H3 | 5 | 3/30/2013 13:20 | 3 | 13483 | 4494.33 | 100.0% | 0.76889 | 5845.21 | 9576.95 | 0.6103 | |
| H3 | 6 | 3/30/2013 13:03 | 3 | 13220 | 4406.67 | 100.0% | 0.77133 | 5713.06 | 9576.96 | 0.5965 | |
| H3 | 7 | 3/30/2013 12:57 | 3 | 13980 | 4660.00 | 99.8% | 0.77214 | 6044.69 | 9576.96 | 0.6312 | |
| H3 | 8 | 3/30/2013 13:26 | 3 | 13730 | 4576.67 | 100.0% | 0.76814 | 5958.09 | 9576.95 | 0.6221 | 0.6125 |
| H4 | 1 | 3/30/2013 13:53 | 3 | 13083 | 4361.00 | 99.8% | 0.76441 | 5714.03 | 9576.94 | 0.5966 | |
| H4 | 2 | 3/30/2013 13:48 | 3 | 13343 | 4447.67 | 100.0% | 0.76506 | 5813.51 | 9576.94 | 0.6070 | |
| H4 | 3 | 3/30/2013 13:44 | 3 | 12783 | 4261.00 | 100.0% | 0.76563 | 5565.33 | 9576.94 | 0.5811 | |
| H4 | 4 | 3/30/2013 13:40 | 3 | 13324 | 4441.33 | 100.0% | 0.76621 | 5796.53 | 9576.94 | 0.6053 | |
| H4 | 5 | 3/30/2013 13:26 | 3 | 12966 | 4322.00 | 100.0% | 0.76814 | 5626.57 | 9576.95 | 0.5875 | |
| H4 | 6 | 3/30/2013 13:20 | 3 | 12785 | 4261.67 | 100.0% | 0.76889 | 5542.61 | 9576.95 | 0.5787 | |
| H4 | 7 | 3/30/2013 13:03 | 3 | 13672 | 4557.33 | 99.8% | 0.77133 | 5917.71 | 9576.96 | 0.6179 | |
| H4 | 8 | 3/30/2013 12:57 | 3 | 13466 | 4488.67 | 100.0% | 0.77214 | 5813.31 | 9576.96 | 0.6070 | 0.5977 |
| I1 | 1 | 3/30/2013 10:30 | 3 | 13127 | 4375.67 | 99.8% | 0.79279 | 5528.03 | 9577.03 | 0.5772 | |
| I1 | 2 | 3/30/2013 10:45 | 3 | 13322 | 4440.67 | 100.0% | 0.79064 | 5616.55 | 9577.02 | 0.5865 | |
| I1 | 3 | 3/30/2013 10:40 | 3 | 13122 | 4374.00 | 100.0% | 0.79138 | 5527.03 | 9577.02 | 0.5771 | |
| I1 | 4 | 3/30/2013 10:36 | 3 | 13138 | 4379.33 | 100.0% | 0.79199 | 5529.54 | 9577.02 | 0.5774 | |
| I1 | 5 | 3/30/2013 10:50 | 3 | 12951 | 4317.00 | 100.0% | 0.78994 | 5464.96 | 9577.02 | 0.5706 | |
| I1 | 6 | 3/30/2013 11:05 | 3 | 13362 | 4454.00 | 100.0% | 0.78779 | 5653.77 | 9577.01 | 0.5903 | |
| I1 | 7 | 3/30/2013 11:01 | 3 | 13283 | 4427.67 | 99.8% | 0.78837 | 5625.09 | 9577.01 | 0.5874 | |
| I1 | 8 | 3/30/2013 10:57 | 3 | 13130 | 4376.67 | 100.0% | 0.78904 | 5546.81 | 9577.01 | 0.5792 | 0.5807 |
| I2 | 1 | 3/30/2013 10:36 | 3 | 13691 | 4563.67 | 99.8% | 0.79199 | 5771.37 | 9577.02 | 0.6026 | |
| I2 | 2 | 3/30/2013 10:30 | 3 | 13662 | 4554.00 | 100.0% | 0.79278 | 5744.31 | 9577.03 | 0.5998 | |
| I2 | 3 | 3/30/2013 10:45 | 3 | 13627 | 4542.33 | 100.0% | 0.79064 | 5745.14 | 9577.02 | 0.5999 | |
| I2 | 4 | 3/30/2013 10:40 | 3 | 13607 | 4535.67 | 100.0% | 0.79138 | 5731.33 | 9577.02 | 0.5984 | |
| I2 | 5 | 3/30/2013 10:57 | 3 | 13214 | 4404.67 | 100.0% | 0.78904 | 5582.31 | 9577.01 | 0.5829 | |
| I2 | 6 | 3/30/2013 10:50 | 3 | 13489 | 4496.33 | 100.0% | 0.78994 | 5691.98 | 9577.02 | 0.5943 | |
| I2 | 7 | 3/30/2013 11:06 | 3 | 13773 | 4591.00 | 99.8% | 0.78779 | 5836.85 | 9577.01 | 0.6095 | |
| I2 | 8 | 3/30/2013 11:01 | 3 | 13380 | 4460.00 | 100.0% | 0.78837 | 5657.27 | 9577.01 | 0.5907 | 0.5973 |
| I3 | 1 | 3/30/2013 10:40 | 3 | 13450 | 4483.33 | 99.8% | 0.79138 | 5674.11 | 9577.02 | 0.5925 | |
| I3 | 2 | 3/30/2013 10:36 | 3 | 13623 | 4541.00 | 100.0% | 0.79199 | 5733.69 | 9577.02 | 0.5987 | |
| I3 | 3 | 3/30/2013 10:30 | 3 | 13604 | 4534.67 | 100.0% | 0.79278 | 5719.93 | 9577.03 | 0.5973 | |
| I3 | 4 | 3/30/2013 10:45 | 3 | 13476 | 4492.00 | 100.0% | 0.79064 | 5681.48 | 9577.02 | 0.5932 | |
| I3 | 5 | 3/30/2013 11:01 | 3 | 13338 | 4446.00 | 100.0% | 0.78836 | 5639.53 | 9577.01 | 0.5889 | |
| I3 | 6 | 3/30/2013 10:57 | 3 | 13548 | 4516.00 | 100.0% | 0.78904 | 5723.41 | 9577.01 | 0.5976 | |
| I3 | 7 | 3/30/2013 10:50 | 3 | 13574 | 4524.67 | 99.8% | 0.78994 | 5736.88 | 9577.02 | 0.5990 | |
| I3 | 8 | 3/30/2013 11:06 | 3 | 13582 | 4527.33 | 100.0% | 0.78779 | 5746.87 | 9577.01 | 0.6001 | 0.5959 |
| I4 | 1 | 3/30/2013 10:46 | 3 | 13602 | 4534.00 | 99.8% | 0.79064 | 5743.63 | 9577.02 | 0.5997 | |
| I4 | 2 | 3/30/2013 10:40 | 3 | 13677 | 4559.00 | 100.0% | 0.79138 | 5760.83 | 9577.02 | 0.6015 | |
| I4 | 3 | 3/30/2013 10:36 | 3 | 13582 | 4527.33 | 100.0% | 0.79198 | 5716.45 | 9577.02 | 0.5969 | |
| I4 | 4 | 3/30/2013 10:30 | 3 | 13706 | 4568.67 | 100.0% | 0.79278 | 5762.83 | 9577.03 | 0.6017 | |
| I4 | 5 | 3/30/2013 11:06 | 3 | 13163 | 4387.67 | 100.0% | 0.78779 | 5569.60 | 9577.01 | 0.5816 | |
| I4 | 6 | 3/30/2013 11:01 | 3 | 13636 | 4545.33 | 100.0% | 0.78836 | 5765.53 | 9577.01 | 0.6020 | |
| I4 | 7 | 3/30/2013 10:57 | 3 | 13908 | 4636.00 | 99.8% | 0.78904 | 5884.75 | 9577.01 | 0.6145 | |
| I4 | 8 | 3/30/2013 10:50 | 3 | 13684 | 4561.33 | 100.0% | 0.78994 | 5774.29 | 9577.02 | 0.6029 | 0.6001 |
| J1 | 1 | 3/30/2013 10:50 | 3 | 13603 | 4534.33 | 99.8% | 0.78994 | 5749.15 | 9577.02 | 0.6003 | |
| J1 | 2 | 3/30/2013 11:06 | 3 | 13578 | 4526.00 | 100.0% | 0.78779 | 5745.20 | 9577.01 | 0.5999 | |
| J1 | 3 | 3/30/2013 11:01 | 3 | 13458 | 4486.00 | 100.0% | 0.78836 | 5690.28 | 9577.01 | 0.5942 | |
| J1 | 4 | 3/30/2013 10:57 | 3 | 13240 | 4413.33 | 100.0% | 0.78904 | 5593.32 | 9577.01 | 0.5840 | |
| J1 | 5 | 3/30/2013 10:30 | 3 | 13403 | 4467.67 | 100.0% | 0.79278 | 5635.43 | 9577.03 | 0.5884 | |
| J1 | 6 | 3/30/2013 10:46 | 3 | 13474 | 4491.33 | 100.0% | 0.79064 | 5680.65 | 9577.02 | 0.5932 | |
| J1 | 7 | 3/30/2013 10:40 | 3 | 13434 | 4478.00 | 99.8% | 0.79138 | 5667.39 | 9577.02 | 0.5918 | |
| J1 | 8 | 3/30/2013 10:36 | 3 | 13637 | 4545.67 | 100.0% | 0.79198 | 5739.60 | 9577.02 | 0.5993 | 0.5939 |
| J2 | 1 | 3/30/2013 10:57 | 3 | 13277 | 4425.67 | 99.8% | 0.78903 | 5617.78 | 9577.01 | 0.5866 | |
| J2 | 2 | 3/30/2013 10:50 | 3 | 13438 | 4479.33 | 100.0% | 0.78994 | 5670.50 | 9577.02 | 0.5921 | |
| J2 | 3 | 3/30/2013 11:06 | 3 | 13471 | 4490.33 | 100.0% | 0.78779 | 5699.93 | 9577.01 | 0.5952 | |
| J2 | 4 | 3/30/2013 11:01 | 3 | 13476 | 4492.00 | 100.0% | 0.78836 | 5697.89 | 9577.01 | 0.5950 | |
| J2 | 5 | 3/30/2013 10:36 | 3 | 13351 | 4450.33 | 100.0% | 0.79198 | 5619.22 | 9577.02 | 0.5867 | |
| J2 | 6 | 3/30/2013 10:30 | 3 | 13390 | 4463.33 | 100.0% | 0.79278 | 5629.97 | 9577.03 | 0.5879 | |
| J2 | 7 | 3/30/2013 10:46 | 3 | 13243 | 4414.33 | 99.8% | 0.79063 | 5592.06 | 9577.02 | 0.5839 | |
| J2 | 8 | 3/30/2013 10:40 | 3 | 13523 | 4507.67 | 100.0% | 0.79138 | 5695.98 | 9577.02 | 0.5948 | 0.5903 |
| J3 | 1 | 3/30/2013 11:01 | 3 | 13385 | 4461.67 | 99.8% | 0.78836 | 5668.32 | 9577.01 | 0.5919 | |
| J3 | 2 | 3/30/2013 10:57 | 3 | 13420 | 4473.33 | 100.0% | 0.78903 | 5669.37 | 9577.01 | 0.5920 | |
| J3 | 3 | 3/30/2013 10:50 | 3 | 13609 | 4536.33 | 100.0% | 0.78994 | 5742.66 | 9577.02 | 0.5996 | |
| J3 | 4 | 3/30/2013 11:06 | 3 | 13446 | 4482.00 | 100.0% | 0.78779 | 5689.36 | 9577.01 | 0.5941 | |
| J3 | 5 | 3/30/2013 10:40 | 3 | 13204 | 4401.33 | 100.0% | 0.79138 | 5561.62 | 9577.02 | 0.5807 | |
| J3 | 6 | 3/30/2013 10:36 | 3 | 13560 | 4520.00 | 100.0% | 0.79198 | 5707.21 | 9577.02 | 0.5959 | |
| J3 | 7 | 3/30/2013 10:31 | 3 | 13568 | 4522.67 | 99.8% | 0.79278 | 5713.80 | 9577.03 | 0.5966 | |
| J3 | 8 | 3/30/2013 10:46 | 3 | 13410 | 4470.00 | 100.0% | 0.79063 | 5653.68 | 9577.02 | 0.5903 | 0.5926 |
| J4 | 1 | 3/30/2013 11:06 | 3 | 13329 | 4443.00 | 99.8% | 0.78778 | 5648.74 | 9577.01 | 0.5898 | |
| J4 | 2 | 3/30/2013 11:02 | 3 | 13456 | 4485.33 | 100.0% | 0.78836 | 5689.47 | 9577.01 | 0.5941 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| J4 | 3 | 3/30/2013 10:57 | 3 | 13293 | 4431.00 | 100.0% | 0.78903 | 5615.72 | 9577.01 | 0.5864 | |
| J4 | 4 | 3/30/2013 10:50 | 3 | 13473 | 4491.00 | 100.0% | 0.78993 | 5685.28 | 9577.02 | 0.5936 | |
| J4 | 5 | 3/30/2013 10:46 | 3 | 13349 | 4449.67 | 100.0% | 0.79063 | 5627.98 | 9577.02 | 0.5877 | |
| J4 | 6 | 3/30/2013 10:40 | 3 | 13537 | 4512.33 | 100.0% | 0.79137 | 5701.89 | 9577.02 | 0.5954 | |
| J4 | 7 | 3/30/2013 10:36 | 3 | 13896 | 4632.00 | 99.8% | 0.79198 | 5857.84 | 9577.02 | 0.6117 | |
| J4 | 8 | 3/30/2013 10:31 | 3 | 13611 | 4537.00 | 100.0% | 0.79278 | 5722.91 | 9577.03 | 0.5976 | 0.5945 |

Current Calibration - LB4100

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Y-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **LB4100** | A0 | A1 | A2 | A3 | A4 |
| **A1** | 5.888316E-01 | | | | |
| **A2** | 5.958501E-01 | | | | |
| **A3** | 5.991856E-01 | | | | |
| **A4** | #N/A | | | | |
| **B1** | 6.044081E-01 | | | | |
| **B2** | 6.056540E-01 | | | | |
| **B3** | 6.113276E-01 | | | | |
| **B4** | 5.701514E-01 | | | | |
| **C1** | 5.826939E-01 | | | | |
| **C2** | 5.915425E-01 | | | | |
| **C3** | 5.851644E-01 | | | | |
| **C4** | 5.855293E-01 | | | | |
| **D1** | 6.724674E-01 | | | | |
| **D2** | 6.750365E-01 | | | | |
| **D3** | 6.781316E-01 | | | | |
| **D4** | 6.763468E-01 | | | | |
| **E1** | 5.886228E-01 | | | | |
| **E2** | 6.008718E-01 | | | | |
| **E3** | 5.943093E-01 | | | | |
| **E4** | 5.905346E-01 | | | | |
| **F1** | 6.109624E-01 | | | | |
| **F2** | 6.058489E-01 | | | | |
| **F3** | 6.155476E-01 | | | | |
| **F4** | 6.121195E-01 | | | | |
| **G1** | 5.372994E-01 | | | | |
| **G2** | 5.975562E-01 | | | | |
| **G3** | 6.077647E-01 | | | | |
| **G4** | 6.038893E-01 | | | | |
| **H1** | 5.958337E-01 | | | | |
| **H2** | 5.981218E-01 | | | | |
| **H3** | 6.125334E-01 | | | | |
| **H4** | 5.976537E-01 | | | | |
| **I1** | 5.807102E-01 | | | | |
| **I2** | 5.972705E-01 | | | | |
| **I3** | 5.959043E-01 | | | | |
| **I4** | 6.001073E-01 | | | | |
| **J1** | 5.938828E-01 | | | | |
| **J2** | 5.902584E-01 | | | | |
| **J3** | 5.926428E-01 | | | | |
| **J4** | 5.945201E-01 | | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| Y1 | A1 | 3 | 0 | 13609 | 3/30/2013 11:12 | 3/30/2013 11:15 | LB4100 | SR90Y13 |
| Y2 | A1 | 3 | 0 | 13067 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y3 | A1 | 3 | 0 | 13370 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y4 | A1 | 3 | 0 | 12879 | 3/30/2013 11:16 | 3/30/2013 11:19 | LB4100 | SR90Y13 |
| Y5 | A1 | 3 | 0 | 13230 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y6 | A1 | 3 | 0 | 12870 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y7 | A1 | 3 | 0 | 13380 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y8 | A1 | 3 | 0 | 13594 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y1 | A2 | 3 | 0 | 13095 | 3/30/2013 11:16 | 3/30/2013 11:19 | LB4100 | SR90Y13 |
| Y2 | A2 | 3 | 0 | 13922 | 3/30/2013 11:12 | 3/30/2013 11:15 | LB4100 | SR90Y13 |
| Y3 | A2 | 3 | 0 | 13018 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y4 | A2 | 3 | 0 | 13740 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y5 | A2 | 3 | 0 | 13262 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y6 | A2 | 3 | 0 | 13159 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y7 | A2 | 3 | 0 | 13590 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y8 | A2 | 3 | 0 | 13477 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y1 | A3 | 3 | 0 | 13615 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y2 | A3 | 3 | 0 | 13338 | 3/30/2013 11:16 | 3/30/2013 11:19 | LB4100 | SR90Y13 |
| Y3 | A3 | 3 | 0 | 13773 | 3/30/2013 11:12 | 3/30/2013 11:15 | LB4100 | SR90Y13 |
| Y4 | A3 | 3 | 0 | 13485 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y5 | A3 | 3 | 0 | 13089 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y6 | A3 | 3 | 0 | 13309 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y7 | A3 | 3 | 0 | 13758 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y8 | A3 | 3 | 0 | 13498 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y1 | B1 | 3 | 0 | 13650 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y2 | B1 | 3 | 0 | 13728 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y3 | B1 | 3 | 0 | 13629 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y4 | B1 | 3 | 0 | 13494 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y5 | B1 | 3 | 1 | 13423 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y6 | B1 | 3 | 0 | 13398 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y7 | B1 | 3 | 0 | 13865 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y8 | B1 | 3 | 1 | 13608 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y1 | B2 | 3 | 1 | 13621 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y2 | B2 | 3 | 0 | 13593 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y3 | B2 | 3 | 0 | 13435 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y4 | B2 | 3 | 0 | 13710 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y5 | B2 | 3 | 0 | 13771 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y6 | B2 | 3 | 1 | 13752 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y7 | B2 | 3 | 1 | 13556 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y8 | B2 | 3 | 0 | 13584 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y1 | B3 | 3 | 0 | 13691 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y2 | B3 | 3 | 0 | 13798 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y3 | B3 | 3 | 0 | 13908 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y4 | B3 | 3 | 1 | 13648 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y5 | B3 | 3 | 0 | 13507 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y6 | B3 | 3 | 0 | 14073 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y7 | B3 | 3 | 0 | 13982 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y8 | B3 | 3 | 0 | 13436 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y1 | B4 | 3 | 0 | 12732 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y2 | B4 | 3 | 0 | 12808 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y3 | B4 | 3 | 0 | 12570 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y4. | B4 | 3 | 1 | 12846 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y5 | B4 | 3 | 0 | 12723 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y6 | B4 | 3 | 0 | 12765 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y7 | B4 | 3 | 0 | 13416 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y8 | B4 | 3 | 0 | 12780 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y1 | C1 | 3 | 0 | 12969 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y2 | C1 | 3 | 0 | 13130 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y3 | C1 | 3 | 0 | 12220 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |
| Y4 | C1 | 3 | 0 | 12937 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y5 | C1 | 3 | 0 | 12776 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y6 | C1 | 3 | 0 | 12163 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y7 | C1 | 3 | 0 | 13000 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y8 | C1 | 3 | 1 | 12686 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y1 | C2 | 3 | 0 | 13036 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y2 | C2 | 3 | 0 | 13061 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y3 | C2 | 3 | 0 | 12586 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y4 | C2 | 3 | 0 | 13408 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |
| Y5 | C2 | 3 | 0 | 12797 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y6 | C2 | 3 | 0 | 12374 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y7 | C2 | 3 | 0 | 13059 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y8 | C2 | 3 | 0 | 13106 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y1 | C3 | 3 | 0 | 13495 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y2 | C3 | 3 | 0 | 12737 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y3 | C3 | 3 | 0 | 12131 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y4 | C3 | 3 | 0 | 13403 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y5 | C3 | 3 | 0 | 12610 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y6 | C3 | 3 | 0 | 12167 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y7 | C3 | 3 | 0 | 12849 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y8 | C3 | 3 | 0 | 12918 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y1 | C4 | 3 | 0 | 13286 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y2 | C4 | 3 | 0 | 13301 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |
| Y3 | C4 | 3 | 0 | 12516 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y4 | C4 | 3 | 0 | 12966 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y5 | C4 | 3 | 0 | 12481 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y6 | C4 | 3 | 0 | 12394 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y7 | C4 | 3 | 0 | 12824 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y8 | C4 | 3 | 0 | 12609 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y1 | D1 | 3 | 0 | 14821 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y2 | D1 | 3 | 0 | 15003 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y3 | D1 | 3 | 0 | 13959 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y4 | D1 | 3 | 0 | 14807 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y5 | D1 | 3 | 0 | 14684 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y6 | D1 | 3 | 0 | 14280 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y7 | D1 | 3 | 0 | 15223 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y8 | D1 | 3 | 0 | 14778 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |
| Y1 | D2 | 3 | 0 | 15028 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y2 | D2 | 3 | 0 | 14728 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y3 | D2 | 3 | 0 | 13806 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y4 | D2 | 3 | 0 | 14923 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y5 | D2 | 3 | 0 | 14988 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |
| Y6 | D2 | 3 | 0 | 14328 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y7 | D2 | 3 | 0 | 15369 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y8 | D2 | 3 | 0 | 14834 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y1 | D3 | 3 | 0 | 15108 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y2 | D3 | 3 | 0 | 14957 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y3 | D3 | 3 | 0 | 13886 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y4 | D3 | 3 | 0 | 15018 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y5 | D3 | 3 | 0 | 14800 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y6 | D3 | 3 | 0 | 14387 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y7 | D3 | 3 | 1 | 15410 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y8 | D3 | 3 | 0 | 14977 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y1 | D4 | 3 | 0 | 14839 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y2 | D4 | 3 | 0 | 15095 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y3 | D4 | 3 | 0 | 13854 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y4 | D4 | 3 | 0 | 14995 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y5 | D4 | 3 | 0 | 14568 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y6 | D4 | 3 | 0 | 14132 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y7 | D4 | 3 | 0 | 15398 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |
| Y8 | D4 | 3 | 0 | 15353 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y1 | E1 | 3 | 0 | 13060 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y2 | E1 | 3 | 0 | 12973 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y3 | E1 | 3 | 0 | 13204 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y4 | E1 | 3 | 0 | 13122 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y5 | E1 | 3 | 0 | 13033 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y6 | E1 | 3 | 0 | 12814 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y7 | E1 | 3 | 0 | 13375 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y8 | E1 | 3 | 0 | 13248 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y1 | E2 | 3 | 0 | 13343 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y2 | E2 | 3 | 0 | 13427 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y3 | E2 | 3 | 0 | 13274 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y4 | E2 | 3 | 0 | 13559 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y5 | E2 | 3 | 0 | 13236 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y6 | E2 | 3 | 0 | 13436 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y7 | E2 | 3 | 0 | 13438 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y8 | E2 | 3 | 0 | 13297 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y1 | E3 | 3 | 0 | 13197 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y2 | E3 | 3 | 0 | 13473 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y3 | E3 | 3 | 0 | 13229 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y4 | E3 | 3 | 0 | 13246 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y5 | E3 | 3 | 1 | 13113 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y6 | E3 | 3 | 0 | 12790 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y7 | E3 | 3 | 0 | 13567 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y8 | E3 | 3 | 0 | 13226 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y1 | E4 | 3 | 0 | 12939 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y2 | E4 | 3 | 0 | 13227 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y3 | E4 | 3 | 0 | 13211 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y4 | E4 | 3 | 0 | 13251 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y5 | E4 | 3 | 0 | 12899 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y6 | E4 | 3 | 0 | 12717 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y7 | E4 | 3 | 0 | 13546 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y8 | E4 | 3 | 0 | 13380 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y1 | F1 | 3 | 0 | 13838 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y2 | F1 | 3 | 0 | 13557 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y3 | F1 | 3 | 0 | 13644 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y4 | F1 | 3 | 0 | 13677 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y5 | F1 | 3 | 0 | 13447 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y6 | F1 | 3 | 1 | 13011 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y7 | F1 | 3 | 0 | 13955 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y8 | F1 | 3 | 0 | 13679 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y1 | F2 | 3 | 0 | 13510 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y2 | F2 | 3 | 0 | 13530 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y3 | F2 | 3 | 0 | 13607 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y4 | F2 | 3 | 0 | 13634 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y5 | F2 | 3 | 0 | 13375 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y6 | F2 | 3 | 0 | 13083 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y7 | F2 | 3 | 0 | 13627 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y8 | F2 | 3 | 0 | 13530 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y1 | F3 | 3 | 0 | 13685 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y2 | F3 | 3 | 0 | 13708 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y3 | F3 | 3 | 1 | 13870 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y4 | F3 | 3 | 1 | 13788 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y5 | F3 | 3 | 1 | 13568 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y6 | F3 | 3 | 0 | 13292 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y7 | F3 | 3 | 0 | 14041 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y8 | F3 | 3 | 0 | 13672 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y1 | F4 | 3 | 0 | 13645 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y2 | F4 | 3 | 0 | 13606 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y3 | F4 | 3 | 0 | 13873 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y4 | F4 | 3 | 0 | 13654 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y5 | F4 | 3 | 0 | 13624 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y6 | F4 | 3 | 0 | 13165 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y7 | F4 | 3 | 0 | 13984 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y8 | F4 | 3 | 0 | 13462 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y1 | G1 | 3 | 0 | 12509 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y2 | G1 | 3 | 0 | 13307 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y3 | G1 | 3 | 0 | 3249 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y4 | G1 | 3 | 0 | 12930 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y5 | G1 | 3 | 0 | 12839 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y6 | G1 | 3 | 0 | 13224 | 3/30/2013 13:52 | 3/30/2013 13:55 | LB4100 | SR90Y13 |
| Y7 | G1 | 3 | 0 | 13339 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y8 | G1 | 3 | 0 | 13351 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y1 | G2 | 3 | 0 | 13555 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y2 | G2 | 3 | 0 | 13099 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y3 | G2 | 3 | 0 | 12682 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y4 | G2 | 3 | 0 | 13719 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y5 | G2 | 3 | 0 | 12788 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y6 | G2 | 3 | 0 | 13035 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y7 | G2 | 3 | 0 | 13594 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y8 | G2 | 3 | 0 | 12929 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y1 | G3 | 3 | 1 | 13760 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y2 | G3 | 3 | 0 | 13754 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y3 | G3 | 3 | 0 | 12839 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y4 | G3 | 3 | 0 | 13651 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y5 | G3 | 3 | 0 | 12746 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y6 | G3 | 3 | 0 | 12953 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y7 | G3 | 3 | 0 | 14028 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y8 | G3 | 3 | 0 | 13469 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y1 | G4 | 3 | 0 | 13594 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y2 | G4 | 3 | 0 | 13680 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y3 | G4 | 3 | 0 | 13515 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y4 | G4 | 3 | 0 | 13312 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y5 | G4 | 3 | 0 | 12950 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y6 | G4 | 3 | 1 | 12437 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y7 | G4 | 3 | 0 | 13621 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y8 | G4 | 3 | 0 | 13412 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y1 | H1 | 3 | 0 | 13205 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y2 | H1 | 3 | 0 | 13099 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y3 | H1 | 3 | 0 | 12500 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y4 | H1 | 3 | 0 | 13397 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y5 | H1 | 3 | 0 | 13157 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |

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| Y6 | H1 | 3 | 0 | 12929 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y7 | H1 | 3 | 1 | 13568 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y8 | H1 | 3 | 0 | 13245 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y1 | H2 | 3 | 0 | 13183 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y2 | H2 | 3 | 0 | 13306 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y3 | H2 | 3 | 0 | 12430 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y4 | H2 | 3 | 0 | 13206 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y5 | H2 | 3 | 0 | 13357 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y6 | H2 | 3 | 0 | 12989 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y7 | H2 | 3 | 1 | 13679 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y8 | H2 | 3 | 0 | 13354 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y1 | H3 | 3 | 0 | 13509 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y2 | H3 | 3 | 0 | 13463 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y3 | H3 | 3 | 0 | 13106 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y4 | H3 | 3 | 0 | 13554 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y5 | H3 | 3 | 0 | 13483 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y6 | H3 | 3 | 0 | 13220 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y7 | H3 | 3 | 0 | 13980 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y8 | H3 | 3 | 1 | 13730 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y1 | H4 | 3 | 0 | 13083 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y2 | H4 | 3 | 0 | 13343 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y3 | H4 | 3 | 0 | 12783 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y4 | H4 | 3 | 0 | 13324 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y5 | H4 | 3 | 0 | 12966 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y6 | H4 | 3 | 0 | 12785 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y7 | H4 | 3 | 0 | 13672 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y8 | H4 | 3 | 0 | 13466 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y1 | I1 | 3 | 0 | 13127 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y2 | I1 | 3 | 0 | 13322 | 3/30/2013 10:45 | 3/30/2013 10:48 | LB4100 | SR90Y13 |
| Y3 | I1 | 3 | 0 | 13122 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y4 | I1 | 3 | 0 | 13138 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y5 | I1 | 3 | 2 | 12951 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y6 | I1 | 3 | 1 | 13362 | 3/30/2013 11:05 | 3/30/2013 11:08 | LB4100 | SR90Y13 |
| Y7 | I1 | 3 | 1 | 13283 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y8 | I1 | 3 | 0 | 13130 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y1 | I2 | 3 | 0 | 13691 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y2 | I2 | 3 | 0 | 13662 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y3 | I2 | 3 | 0 | 13627 | 3/30/2013 10:45 | 3/30/2013 10:48 | LB4100 | SR90Y13 |
| Y4 | I2 | 3 | 0 | 13607 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y5 | I2 | 3 | 0 | 13214 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y6 | I2 | 3 | 0 | 13489 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y7 | I2 | 3 | 0 | 13773 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y8 | I2 | 3 | 0 | 13380 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y1 | I3 | 3 | 0 | 13450 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y2 | I3 | 3 | 0 | 13623 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y3 | I3 | 3 | 0 | 13604 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y4 | I3 | 3 | 0 | 13476 | 3/30/2013 10:45 | 3/30/2013 10:48 | LB4100 | SR90Y13 |
| Y5 | I3 | 3 | 0 | 13338 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y6 | I3 | 3 | 0 | 13548 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y7 | I3 | 3 | 0 | 13574 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y8 | I3 | 3 | 0 | 13582 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y1 | I4 | 3 | 0 | 13602 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y2 | I4 | 3 | 2 | 13677 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y3 | I4 | 3 | 2 | 13582 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y4 | I4 | 3 | 0 | 13706 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y5 | I4 | 3 | 4 | 13163 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y6 | I4 | 3 | 0 | 13636 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y7 | I4 | 3 | 4 | 13908 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y8 | I4 | 3 | 1 | 13684 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y1 | J1 | 3 | 0 | 13603 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y2 | J1 | 3 | 0 | 13578 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y3 | J1 | 3 | 1 | 13458 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y4 | J1 | 3 | 0 | 13240 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y5 | J1 | 3 | 0 | 13403 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y6 | J1 | 3 | 0 | 13474 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y7 | J1 | 3 | 0 | 13434 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y8 | J1 | 3 | 0 | 13637 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y1 | J2 | 3 | 0 | 13277 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y2 | J2 | 3 | 0 | 13438 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y3 | J2 | 3 | 0 | 13471 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y4 | J2 | 3 | 0 | 13476 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y5 | J2 | 3 | 0 | 13351 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y6 | J2 | 3 | 0 | 13390 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y7 | J2 | 3 | 0 | 13243 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y8 | J2 | 3 | 0 | 13523 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y1 | J3 | 3 | 1 | 13385 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y2 | J3 | 3 | 0 | 13420 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y3 | J3 | 3 | 0 | 13609 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y4 | J3 | 3 | 0 | 13446 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y5 | J3 | 3 | 0 | 13204 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y6 | J3 | 3 | 0 | 13560 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y7 | J3 | 3 | 0 | 13568 | 3/30/2013 10:31 | 3/30/2013 10:34 | LB4100 | SR90Y13 |
| Y8 | J3 | 3 | 0 | 13410 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y1 | J4 | 3 | 0 | 13329 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y2 | J4 | 3 | 0 | 13456 | 3/30/2013 11:02 | 3/30/2013 11:05 | LB4100 | SR90Y13 |
| Y3 | J4 | 3 | 0 | 13293 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y4 | J4 | 3 | 0 | 13473 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y5 | J4 | 3 | 0 | 13349 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y6 | J4 | 3 | 0 | 13537 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y7 | J4 | 3 | 0 | 13896 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y8 | J4 | 3 | 0 | 13611 | 3/30/2013 10:31 | 3/30/2013 10:34 | LB4100 | SR90Y13 |

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# Strontium-89 & 90 Liquid

Filename : SR8990.XLS
File type : Excel
Version # : 1.3.9

Batch : 1082959
Analyst : AF1
Prep Date : 2/14/2014
Sr-89 Method Uncertainty : 0.0829
Sr-90 Method Uncertainty : 0.0821

Geometry: Tuffryn Filter

Sr Carrier S/N : 2046474
Carrier Exp Date : 12/5/2014
Carrier Volume Added: 2.00
Carrier Weight (mg/ml): 16.40
Carrier Weight StDev.: 0.16

Y Carrier S/N : 2073992
Carrier Exp Date : 5/14/2014
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 33.18
Carrier Weight StDev.: 0.29

Procedure Code : GFCGANBL
Parmname1 : Strontium-89
Parmname2 : Strontium-90
Required MDA Sr-89 : 1 pCi/L
Required MDA Sr-90 : 1 pCi/L
Sr-89 Abundance : 1.00
Sr-90 Abundance : 1.00
Halflife of Sr-89 : 50.53 days
Halflife of Sr-90 : 28.9 years
Halflife of Y-90 : 64.053 hours

| Sample Characteristics | | | | | Carrier Calculations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Net Weight (mg) | | Net Weight StDev. (mg) | | Carrier Aliquot (mL) | | Carrier Aliquot StDev. (mL) | |
| Pos. | Sample ID | Sample Aliquot L | Sample Aliquot StDev. L | Sample Date/Time | Sr | Y | Sr | Y | Sr | Y | Sr | Y |
| 1 | 1202347886.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 2 | 1202347887.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 3 | 1202347888.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 4 | ~~1202347889.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~6.9~~ | ~~17.6~~ | ~~0.036986~~ | ~~0.082975~~ | ~~0.5~~ | ~~0.5~~ | ~~0.001000~~ | ~~0.001000~~ |
| 5 | 1202347890.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 6 | 1202347891.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 7 | 1202347892.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 8 | 1202347893.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 9 | 1202347894.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 10 | 1202347895.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 11 | 1202347896.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 12 | 1202347897.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 13 | ~~1202347898.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~8.6~~ | ~~17.0~~ | ~~0.044293~~ | ~~0.080396~~ | ~~0.8~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| 14 | 1202347899.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 15 | 1202347900.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 16 | 1202347901.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 17 | 1202347902.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 18 | 1202347903.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 19 | 1202347904.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 20 | 1202347905.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 21 | 1202347906.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 22 | 1202347907.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 23 | 1202347908.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 24 | 1202347909.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 25 | 1202347910.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 26 | 1202347911.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 27 | 1202347912.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 28 | 1202347913.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 29 | 1202347914.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 30 | 1202347915.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 31 | 1202347916.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 32 | 1202347917.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 33 | 1202347918.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 34 | 1202347919.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 35 | 1202347920.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 36 | 1202347921.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 37 | 1202347922.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 38 | 1202347923.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 39 | 1202347924.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 40 | 1202347925.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |



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**Pipet, 0.1 ml Stdev : +/-** 0.000200 ml
**Pipet, 0.5 ml Stdev : +/-** 0.001000 ml
**Pipet, 1 ml Stdev : +/-** 0.002000 ml
**Pipet, 5 ml Stdev : +/-** 0.010000 ml

**Analytical SOP:** GL-RAD-A-001
**Instrument SOP:** GL-RAD-I-006

| 1st Count Raw Data | | | | | | | 1st Count Calibration Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Counting | Gross Counts | | | Count | | | Calibration | Detector Efficiency (cpm/dpm) | | Detector Efficiency | | | Weekly Bkg Count | Weekly Bkg Count |
| Pos. | Detector ID | Time (min.) | Alpha | Beta | Gross Beta CPM | Start Date/Time | Counted on | Calibration Date | Due Date | Sr-89 | Sr-90 | Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Start Date/Time | Time (min.) |
| 1 | A1 | 15 | 2 | 5538 | 369.196 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5735 | 0.4505 | 0.02044 | 0.03298 | 1.222 | 2/8/2014 18:10 | 500 |
| 2 | A2 | 15 | 2 | 6110 | 407.330 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5680 | 0.4266 | 0.02268 | 0.02236 | 1.282 | 2/8/2014 18:10 | 500 |
| 3 | A3 | 15 | 2 | 6313 | 420.863 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5675 | 0.4076 | 0.01784 | 0.02575 | 1.080 | 2/8/2014 18:10 | 500 |
| 4 | A4 | 0.01 | 0 | 1489 | 148000.000 | 2/15/2014 13:38 | LB4100 | 3/1/2013 | 2/28/2014 | 0.0000 | 0.0000 | 0.00000 | 0.00000 | 0.000 | 12:00:00 AM | 0 |
| 5 | B1 | 15 | 4 | 4734 | 315.596 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5623 | 0.3979 | 0.01796 | 0.01463 | 1.076 | 2/8/2014 18:01 | 500 |
| 6 | B2 | 15 | 2 | 4242 | 282.797 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5687 | 0.4016 | 0.01415 | 0.02581 | 1.228 | 2/8/2014 18:01 | 500 |
| 7 | B3 | 15 | 0 | 2936 | 195.733 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5741 | 0.3946 | 0.01320 | 0.02600 | 4.120 | 2/8/2014 18:01 | 500 |
| 8 | B4 | 15 | 0 | 1995 | 133.000 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5343 | 0.3635 | 0.00972 | 0.02500 | 1.136 | 2/8/2014 18:01 | 500 |
| 9 | C1 | 15 | 6 | 5997 | 399.795 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5702 | 0.4417 | 0.01816 | 0.01335 | 1.554 | 2/8/2014 20:04 | 500 |
| 10 | C2 | 15 | 4 | 6775 | 451.659 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5734 | 0.4582 | 0.02351 | 0.02904 | 1.252 | 2/8/2014 20:04 | 500 |
| 11 | C3 | 15 | 3 | 6845 | 456.326 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5663 | 0.4542 | 0.02588 | 0.03694 | 1.342 | 2/8/2014 20:04 | 500 |
| 12 | C4 | 15 | 1 | 6520 | 434.664 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5641 | 0.4471 | 0.02683 | 0.03775 | 3.960 | 2/8/2014 20:04 | 500 |
| 13 | D1 | 15 | 2 | 4429 | 295.263 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.4328 | 0.4360 | 0.02033 | 0.02573 | 0.868 | 2/8/2014 20:28 | 500 |
| 14 | D2 | 15 | 3 | 4744 | 316.261 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6867 | 0.4425 | 0.01910 | 0.02995 | 1.134 | 2/8/2014 20:28 | 500 |
| 15 | D3 | 15 | 0 | 3235 | 215.667 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6739 | 0.4471 | 0.02505 | 0.02741 | 1.026 | 2/8/2014 20:28 | 500 |
| 16 | D4 | 15 | 1 | 2532 | 168.798 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6765 | 0.4353 | 0.02356 | 0.02624 | 1.120 | 2/8/2014 20:28 | 500 |
| 17 | E1 | 15 | 1 | 5941 | 396.066 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5644 | 0.4429 | 0.02254 | 0.01370 | 1.962 | 2/15/2014 16:12 | 500 |
| 18 | E2 | 15 | 3 | 6650 | 443.327 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5690 | 0.4435 | 0.01894 | 0.03375 | 1.616 | 2/15/2014 16:12 | 500 |
| 19 | E3 | 15 | 3 | 6666 | 444.397 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5654 | 0.4064 | 0.01897 | 0.01648 | 1.672 | 2/15/2014 16:12 | 500 |
| 20 | E4 | 15 | 3 | 6497 | 433.129 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5652 | 0.4218 | 0.02127 | 0.02085 | 2.678 | 2/15/2014 16:12 | 500 |
| 21 | F1 | 15 | 2 | 5046 | 336.398 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5764 | 0.4235 | 0.00772 | 0.01640 | 1.508 | 2/15/2014 16:12 | 500 |
| 22 | F2 | 15 | 1 | 4355 | 290.331 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5713 | 0.4054 | 0.01365 | 0.03915 | 1.270 | 2/15/2014 16:12 | 500 |
| 23 | F3 | 15 | 1 | 3070 | 204.664 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5793 | 0.4214 | 0.00961 | 0.03381 | 1.072 | 2/15/2014 16:12 | 500 |
| 24 | F4 | 15 | 1 | 2459 | 163.930 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5766 | 0.4137 | 0.00850 | 0.04642 | 1.036 | 2/15/2014 16:12 | 500 |
| 25 | G1 | 15 | 2 | 5748 | 383.198 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5811 | 0.4573 | 0.01543 | 0.01645 | 0.960 | 2/15/2014 16:18 | 500 |
| 26 | G2 | 15 | 5 | 6680 | 445.324 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5738 | 0.4576 | 0.01349 | 0.02788 | 0.954 | 2/15/2014 16:18 | 500 |
| 27 | G3 | 15 | 1 | 7001 | 466.730 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5847 | 0.4607 | 0.01089 | 0.04320 | 1.290 | 2/15/2014 16:18 | 500 |
| 28 | G4 | 15 | 2 | 6354 | 423.597 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5725 | 0.4454 | 0.00938 | 0.02199 | 0.924 | 2/15/2014 16:18 | 500 |
| 29 | H1 | 15 | 1 | 4874 | 324.932 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5679 | 0.4145 | 0.00965 | 0.02716 | 0.904 | 2/15/2014 16:12 | 500 |
| 30 | H2 | 15 | 0 | 4353 | 290.200 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5697 | 0.4241 | 0.00948 | 0.03714 | 0.944 | 2/15/2014 16:12 | 500 |
| 31 | H3 | 15 | 2 | 3025 | 201.664 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5801 | 0.4343 | 0.00824 | 0.02348 | 1.252 | 2/15/2014 16:12 | 500 |
| 32 | H4 | 15 | 1 | 2371 | 158.064 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5689 | 0.4106 | 0.00628 | 0.04001 | 1.000 | 2/15/2014 16:12 | 500 |
| 33 | I1 | 15 | 0 | 5533 | 368.867 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5461 | 0.4053 | 0.01079 | 0.00864 | 1.062 | 2/15/2014 16:12 | 500 |
| 34 | I2 | 15 | 4 | 6369 | 424.598 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5507 | 0.4077 | 0.00589 | 0.00805 | 0.944 | 2/15/2014 16:12 | 500 |
| 35 | I3 | 15 | 2 | 6318 | 421.199 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5464 | 0.3901 | 0.01067 | 0.01119 | 1.010 | 2/15/2014 16:12 | 500 |
| 36 | I4 | 15 | 1 | 6220 | 414.666 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5489 | 0.4026 | 0.01280 | 0.01109 | 0.870 | 2/15/2014 16:12 | 500 |
| 37 | J1 | 15 | 2 | 4739 | 315.932 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5419 | 0.3838 | 0.01589 | 0.01343 | 0.964 | 2/15/2014 16:12 | 500 |
| 38 | J2 | 15 | 1 | 4005 | 266.999 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5391 | 0.3787 | 0.01035 | 0.01166 | 0.886 | 2/15/2014 16:12 | 500 |
| 39 | J3 | 15 | 5 | 2909 | 193.930 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5414 | 0.3812 | 0.01579 | 0.01025 | 0.914 | 2/15/2014 16:12 | 500 |
| 40 | J4 | 15 | 3 | 2254 | 150.264 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5460 | 0.3862 | 0.01072 | 0.01526 | 0.978 | 2/15/2014 16:12 | 500 |

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| 2nd Count Raw Data | | | | | | | 2nd Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency Y-90 (cpm/dpm) | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | A1 | 15 | 0 | 1421 | 94.733 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5888 | 0.02044 | 0.03298 | 1.120 | 2/22/2014 18:34 | 500 |
| 2 | A2 | 15 | 1 | 1572 | 104.799 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5959 | 0.02268 | 0.02236 | 1.146 | 2/22/2014 18:34 | 500 |
| 3 | A3 | 15 | 3 | 1657 | 110.462 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5992 | 0.01784 | 0.02575 | 1.146 | 2/22/2014 18:34 | 500 |
| 4 | A4 | ~~0.01~~ | ~~0~~ | ~~176~~ | ~~17600.000~~ | ~~2/27/2014 7:22~~ | ~~LB4100~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.00000~~ | ~~0.00000~~ | ~~FAIL~~ | ~~12:00:00 AM~~ | ~~0~~ |
| 5 | B1 | 15 | 0 | 1227 | 81.800 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6044 | 0.01796 | 0.01463 | 0.940 | 2/22/2014 18:20 | 500 |
| 6 | B2 | 15 | 0 | 1005 | 67.000 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6057 | 0.01415 | 0.02581 | 1.274 | 2/22/2014 18:20 | 500 |
| 7 | B3 | 15 | 0 | 772 | 51.467 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6113 | 0.01320 | 0.02600 | 4.780 | 2/22/2014 18:20 | 500 |
| 8 | B4 | 15 | 1 | 527 | 35.132 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5702 | 0.00972 | 0.02500 | 1.278 | 2/22/2014 18:20 | 500 |
| 9 | C1 | 15 | 2 | 1511 | 100.732 | 2/27/2014 7:27 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5827 | 0.01816 | 0.01335 | 1.440 | 2/22/2014 19:32 | 500 |
| 10 | C2 | 15 | 0 | 1670 | 111.333 | 2/27/2014 7:27 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5915 | 0.02351 | 0.02904 | 1.584 | 2/22/2014 19:33 | 500 |
| 11 | C3 | 15 | 1 | 1686 | 112.398 | 2/27/2014 7:28 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5852 | 0.02588 | 0.03694 | 1.196 | 2/22/2014 19:33 | 500 |
| 12 | C4 | 15 | 0 | 1820 | 121.333 | 2/27/2014 7:28 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5855 | 0.02683 | 0.03775 | 4.416 | 2/22/2014 19:33 | 500 |
| ~~13~~ | ~~D1~~ | ~~15~~ | ~~0~~ | ~~1138~~ | ~~75.867~~ | ~~2/27/2014 7:29~~ | ~~LB4100~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.6725~~ | ~~0.02033~~ | ~~0.02673~~ | ~~1.068~~ | ~~2/22/2014 21:30~~ | ~~500~~ |
| 14 | D2 | 15 | 1 | 1097 | 73.131 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6750 | 0.01910 | 0.02995 | 1.200 | 2/22/2014 21:30 | 500 |
| 15 | D3 | 15 | 1 | 851 | 56.732 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6781 | 0.02505 | 0.02741 | 1.054 | 2/22/2014 21:30 | 500 |
| 16 | D4 | 15 | 0 | 665 | 44.333 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6763 | 0.02356 | 0.02624 | 1.114 | 2/22/2014 21:30 | 500 |
| 17 | E1 | 15 | 1 | 1381 | 92.066 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5886 | 0.02254 | 0.01370 | 1.188 | 2/22/2014 18:54 | 500 |
| 18 | E2 | 15 | 2 | 1531 | 102.062 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6009 | 0.01894 | 0.03375 | 1.232 | 2/22/2014 18:54 | 500 |
| 19 | E3 | 15 | 4 | 1589 | 105.929 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5943 | 0.01897 | 0.01648 | 1.040 | 2/22/2014 18:54 | 500 |
| 20 | E4 | 15 | 1 | 1588 | 105.865 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5905 | 0.02127 | 0.02085 | 1.174 | 2/22/2014 18:54 | 500 |
| 21 | F1 | 15 | 2 | 1252 | 83.464 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6110 | 0.00772 | 0.01640 | 1.558 | 2/22/2014 18:55 | 500 |
| 22 | F2 | 15 | 2 | 1024 | 68.261 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6058 | 0.01365 | 0.03915 | 1.264 | 2/22/2014 18:55 | 500 |
| 23 | F3 | 15 | 1 | 775 | 51.664 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6155 | 0.00981 | 0.03381 | 1.010 | 2/22/2014 18:55 | 500 |
| 24 | F4 | 15 | 0 | 596 | 39.733 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6121 | 0.00850 | 0.04642 | 1.108 | 2/22/2014 18:55 | 500 |
| 25 | G1 | 15 | 1 | 1374 | 91.599 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5373 | 0.01543 | 0.01645 | 1.316 | 2/22/2014 18:54 | 500 |
| 26 | G2 | 15 | 2 | 1510 | 100.663 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5976 | 0.01349 | 0.02788 | 1.166 | 2/22/2014 18:54 | 500 |
| 27 | G3 | 15 | 1 | 1614 | 107.597 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6078 | 0.01089 | 0.04320 | 1.378 | 2/22/2014 18:54 | 500 |
| 28 | G4 | 15 | 0 | 1574 | 104.933 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6039 | 0.00938 | 0.02199 | 1.064 | 2/22/2014 18:54 | 500 |
| 29 | H1 | 15 | 0 | 1222 | 81.467 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5958 | 0.00965 | 0.02716 | 0.890 | 2/22/2014 18:54 | 500 |
| 30 | H2 | 15 | 2 | 999 | 66.595 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5981 | 0.00946 | 0.03714 | 0.874 | 2/22/2014 18:54 | 500 |
| 31 | H3 | 15 | 3 | 734 | 48.929 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6125 | 0.00824 | 0.02348 | 1.314 | 2/22/2014 18:54 | 500 |
| 32 | H4 | 15 | 3 | 611 | 40.725 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5977 | 0.00628 | 0.04001 | 1.114 | 2/22/2014 18:54 | 500 |
| 33 | I1 | 15 | 0 | 1393 | 92.867 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5807 | 0.01079 | 0.00864 | 0.968 | 2/22/2014 19:02 | 500 |
| 34 | I2 | 15 | 3 | 1561 | 104.065 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5973 | 0.00589 | 0.00805 | 0.974 | 2/22/2014 19:02 | 500 |
| 35 | I3 | 15 | 2 | 1585 | 105.665 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5959 | 0.01067 | 0.01119 | 1.006 | 2/22/2014 19:02 | 500 |
| 36 | I4 | 15 | 1 | 1553 | 103.533 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6001 | 0.01280 | 0.01109 | 0.986 | 2/22/2014 19:02 | 500 |
| 37 | J1 | 15 | 3 | 1161 | 77.397 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5939 | 0.01589 | 0.01343 | 1.052 | 2/22/2014 19:03 | 500 |
| 38 | J2 | 15 | 1 | 989 | 65.933 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5903 | 0.01035 | 0.01166 | 0.728 | 2/22/2014 19:03 | 500 |
| 39 | J3 | 15 | 0 | 785 | 52.333 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5926 | 0.01579 | 0.01025 | 0.774 | 2/22/2014 19:03 | 500 |
| 40 | J4 | 15 | 3 | 551 | 36.730 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5945 | 0.01072 | 0.01528 | 0.914 | 2/22/2014 19:03 | 500 |

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**Correction Factors**

| Pos. | Separation Date/Time Strontium | Separation Date/Time Yttrium | Yttrium Ingrowth (Sr-89 calc) | Yttrium Ingrowth (Sr-90 calc) | Yttrium Decay | Decay from Sample Date Sr-89 | Decay from Sample Date Sr-90 | Net Count Rate Y-90 | Net Count Rate Sr-90 | Gross CPM Sr-89 | Calculated Sample Recovery % Sr | Calculated Sample Recovery % Y | Sample Recovery % Error Sr | Sample Recovery % Error Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0211 | 0.9424 | 0.8062 | 0.9788 | 0.9999 | 3.0440 | 97.1442 | 269.007397 | 85.4% | 97.0% | 1.68% | 1.12% |
| 2 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0211 | 0.9424 | 0.8062 | 0.9788 | 0.9999 | 2.6214 | 97.6205 | 307.088396 | 110% | 100% | 1.33% | 1.12% |
| 3 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0211 | 0.9424 | 0.8062 | 0.9788 | 0.9999 | 3.2110 | 104.0811 | 313.571104 | 94.5% | 94.0% | 1.25% | 1.12% |
| 4 | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.0230~~ | ~~0.9424~~ | ~~0.8054~~ | ~~0.9787~~ | ~~0.9999~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~84.1%~~ | ~~106%~~ | ~~1.26%~~ | ~~1.12%~~ |
| 5 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.4156 | 68.3669 | 243.8134 | 65.5% | 102% | 1.22% | 1.12% |
| 6 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.2094 | 58.3810 | 221.20608 | 56.7% | 98.3% | 1.23% | 1.12% |
| 7 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.3127 | 41.3801 | 151.040507 | 39.0% | 95.8% | 1.21% | 1.12% |
| 8 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.0752 | 29.4498 | 100.475035 | 30.5% | 96.4% | 1.20% | 1.12% |
| 9 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 3.6882 | 102.4773 | 293.429136 | 85.4% | 97.0% | 1.68% | 1.12% |
| 10 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 3.3427 | 112.2594 | 336.056856 | 110% | 100% | 1.33% | 1.12% |
| 11 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 3.9336 | 121.2940 | 331.098342 | 94.5% | 94.0% | 1.25% | 1.12% |
| 12 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 4.6453 | 111.1949 | 318.823905 | 84.1% | 106% | 1.25% | 1.12% |
| ~~13~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.0254~~ | ~~0.9424~~ | ~~0.8029~~ | ~~0.9786~~ | ~~0.9999~~ | ~~3.6376~~ | ~~62.6476~~ | ~~228.878124~~ | ~~65.5%~~ | ~~102%~~ | ~~1.22%~~ | ~~1.12%~~ |
| 14 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0254 | 0.9424 | 0.8029 | 0.9786 | 0.9999 | 4.2658 | 63.4341 | 248.56078 | 56.7% | 98.3% | 1.23% | 1.12% |
| 15 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0254 | 0.9424 | 0.8029 | 0.9786 | 0.9999 | 4.7980 | 50.6248 | 160.243871 | 39.0% | 95.8% | 1.21% | 1.12% |
| 16 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0254 | 0.9424 | 0.8029 | 0.9786 | 0.9999 | 4.7678 | 38.1249 | 125.90552 | 30.5% | 96.4% | 1.20% | 1.12% |
| 17 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 31.6163 | 93.4900 | 270.959426 | 85.4% | 97.0% | 1.68% | 1.12% |
| 18 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 27.2838 | 98.6973 | 317.34548 | 110% | 100% | 1.33% | 1.12% |
| 19 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 32.9598 | 101.2006 | 310.236231 | 94.5% | 94.0% | 1.25% | 1.12% |
| 20 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 36.9508 | 93.5266 | 302.651727 | 84.1% | 106% | 1.25% | 1.12% |
| 21 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 37.1110 | 73.5203 | 225.766545 | 65.5% | 102% | 1.22% | 1.12% |
| 22 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 35.0891 | 60.5385 | 194.703073 | 56.7% | 98.3% | 1.23% | 1.12% |
| 23 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 38.5510 | 46.0119 | 118.101482 | 39.0% | 95.8% | 1.21% | 1.12% |
| 24 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 37.6275 | 35.9122 | 90.3904956 | 30.5% | 96.4% | 1.20% | 1.12% |
| 25 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 31.8633 | 105.4188 | 245.915768 | 85.4% | 97.0% | 1.68% | 1.12% |
| 26 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 27.3121 | 101.3688 | 316.643134 | 110% | 100% | 1.33% | 1.12% |
| 27 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 33.8602 | 113.9971 | 318.873169 | 94.5% | 94.0% | 1.25% | 1.12% |
| 28 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 37.1905 | 96.1344 | 290.272135 | 84.1% | 106% | 1.25% | 1.12% |
| 29 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 37.0330 | 72.8181 | 215.080353 | 65.5% | 102% | 1.22% | 1.12% |
| 30 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 34.9150 | 63.1388 | 192.146214 | 56.7% | 98.3% | 1.23% | 1.12% |
| 31 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 36.7579 | 46.8950 | 118.010649 | 39.0% | 95.8% | 1.21% | 1.12% |
| 32 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 39.1422 | 37.5667 | 81.3551149 | 30.5% | 96.4% | 1.20% | 1.12% |
| 33 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 31.0017 | 88.3293 | 249.535694 | 85.4% | 97.0% | 1.68% | 1.12% |
| 34 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 27.0495 | 93.9966 | 303.551779 | 110% | 100% | 1.33% | 1.12% |
| 35 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 31.8901 | 97.3928 | 291.915619 | 94.5% | 94.0% | 1.25% | 1.12% |
| 36 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 35.0961 | 86.6888 | 292.881037 | 84.1% | 106% | 1.25% | 1.12% |
| 37 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 33.5487 | 64.3626 | 218.020257 | 65.5% | 102% | 1.22% | 1.12% |
| 38 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 33.1210 | 56.9053 | 176.972955 | 56.7% | 98.3% | 1.23% | 1.12% |
| 39 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 38.0571 | 46.2524 | 109.62048 | 39.0% | 95.8% | 1.21% | 1.12% |
| 40 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 33.8396 | 32.2426 | 84.1814562 | 30.5% | 96.4% | 1.20% | 1.12% |

M-8995

DCN: ITSI-0808 0004-0076, 8 Ma 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-89 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-89 LCS S/N :** 1680-A
**LCS Exp Date :** 3/24/2014
**LCS Activity (dpm/ml):** 2849.70
**LCS Volume Added:** 0.20
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-89 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.1721 | 2.2396 | 1 | 5.4191 | 1258.5608 | 3.08% | 267.7854 | 4.2351 | 39.0130 | 225.1004 | | LCS | | | 1283.6485 | 98.0% |
| 2 | 2.5514 | 1.8013 | 1 | 4.3408 | 1128.6481 | 3.02% | 305.8064 | 4.5249 | 32.7327 | 202.3998 | | LCS | | | 1283.6485 | 87.9% |
| 3 | 2.7223 | 1.9220 | 1 | 4.7020 | 1340.7009 | 2.62% | 312.4911 | 4.5724 | 38.4499 | 234.3604 | | LCS | | | 1283.6485 | 104.4% |
| 4 | #DIV/0! | #DIV/0! | 1 | #DIV/0! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | | LCS | | | 1283.6485 | #VALUE! |
| 5 | 3.9535 | 2.7912 | 1 | 6.8309 | 1515.2471 | 2.73% | 242.7374 | 4.0319 | 49.3304 | 266.2048 | | LCS | | | 1283.6485 | 118.0% |
| 6 | 4.8271 | 3.4080 | 1 | 8.2428 | 1569.4144 | 2.56% | 219.9781 | 3.8405 | 53.7036 | 272.0302 | | LCS | | | 1283.6485 | 122.3% |
| 7 | 12.7277 | 8.9859 | 1 | 20.0257 | 1508.8802 | 2.81% | 146.9205 | 3.1745 | 63.9009 | 264.4128 | | LCS | | | 1283.6485 | 117.5% |
| 8 | 9.1928 | 6.4902 | 1 | 15.8057 | 1403.3039 | 3.03% | 99.3390 | 2.5886 | 71.6712 | 247.8956 | | LCS | | | 1283.6485 | 109.3% |
| 9 | 3.5987 | 2.5407 | 1 | 6.0271 | 1380.0346 | 2.90% | 291.8751 | 4.4232 | 40.9911 | 243.7629 | | LCS | | | 1283.6485 | 107.5% |
| 10 | 2.4984 | 1.7639 | 1 | 4.2592 | 1224.4060 | 3.05% | 334.8049 | 4.7335 | 33.9293 | 220.2116 | | LCS | | | 1283.6485 | 95.4% |
| 11 | 3.0416 | 2.1474 | 1 | 5.1549 | 1418.0618 | 3.21% | 329.7563 | 4.6985 | 39.6020 | 258.3477 | | LCS | | | 1283.6485 | 110.5% |
| 12 | 5.8913 | 4.1593 | 1 | 9.2883 | 1526.7040 | 3.30% | 314.8639 | 4.6112 | 43.8227 | 280.1474 | | LCS | | | 1283.6485 | 118.9% |
| 13 | 4.6160 | 3.2582 | 1 | 8.1301 | 1849.8529 | 2.92% | 228.0101 | 3.9064 | 62.1184 | 329.0784 | | LCS | | | 1283.6485 | 144.1% |
| 14 | 3.8430 | 2.7132 | 1 | 6.6086 | 1462.4630 | 2.80% | 247.4268 | 4.0710 | 47.1623 | 258.0363 | | LCS | | | 1283.6485 | 113.9% |
| 15 | 5.4126 | 3.8213 | 1 | 9.3930 | 1393.4498 | 3.46% | 159.2179 | 3.2688 | 56.0715 | 256.8566 | | LCS | | | 1283.6485 | 108.6% |
| 16 | 7.2104 | 5.0906 | 1 | 12.4130 | 1392.4665 | 3.52% | 124.7855 | 2.8976 | 63.3740 | 256.8508 | | LCS | | | 1283.6485 | 108.5% |
| 17 | 4.1349 | 2.9192 | 1 | 6.8055 | 1300.5602 | 3.22% | 268.9974 | 4.2506 | 40.2802 | 235.0667 | | LCS | | | 1283.6485 | 101.3% |
| 18 | 2.8950 | 2.0439 | 1 | 4.8338 | 1177.6495 | 2.73% | 315.7295 | 4.6000 | 33.6287 | 207.0585 | | LCS | | | 1283.6485 | 91.7% |
| 19 | 3.4413 | 2.4296 | 1 | 5.7310 | 1344.9983 | 2.71% | 308.5642 | 4.5482 | 38.8569 | 236.3604 | | LCS | | | 1283.6485 | 104.8% |
| 20 | 4.8938 | 3.4551 | 1 | 7.8897 | 1469.2475 | 2.89% | 299.9737 | 4.4925 | 43.1272 | 261.3527 | | LCS | | | 1283.6485 | 114.5% |
| 21 | 4.6226 | 3.2636 | 1 | 7.7602 | 1382.6181 | 2.25% | 224.2585 | 3.8800 | 46.8853 | 235.4681 | | LCS | | | 1283.6485 | 107.7% |
| 22 | 4.9473 | 3.4928 | 1 | 8.4236 | 1390.7977 | 2.62% | 193.4331 | 3.6032 | 50.7776 | 241.7429 | | LCS | | | 1283.6485 | 108.3% |
| 23 | 6.5138 | 4.5988 | 1 | 11.2584 | 1205.8760 | 2.86% | 117.0295 | 2.8063 | 56.6767 | 211.9030 | | LCS | | | 1283.6485 | 93.9% |
| 24 | 8.2354 | 5.8142 | 1 | 14.2769 | 1184.1078 | 3.12% | 89.3545 | 2.4552 | 63.7707 | 210.7901 | | LCS | | | 1283.6485 | 92.2% |
| 25 | 2.8095 | 1.9835 | 1 | 4.9064 | 1150.4228 | 2.81% | 244.9558 | 4.0492 | 37.2734 | 201.7361 | | LCS | | | 1283.6485 | 89.6% |
| 26 | 2.2060 | 1.5575 | 1 | 3.8548 | 1167.7914 | 2.39% | 315.6891 | 4.5947 | 33.3135 | 200.7422 | | LCS | | | 1283.6485 | 91.0% |
| 27 | 2.9238 | 2.0642 | 1 | 4.9716 | 1338.9867 | 2.20% | 317.5832 | 4.6109 | 38.1035 | 227.9908 | | LCS | | | 1283.6485 | 104.3% |
| 28 | 2.8383 | 2.0038 | 1 | 4.9749 | 1399.2959 | 2.18% | 289.3481 | 4.3992 | 41.6987 | 237.8318 | | LCS | | | 1283.6485 | 109.0% |
| 29 | 3.6329 | 2.5649 | 1 | 6.3813 | 1340.3315 | 2.35% | 214.1764 | 3.7869 | 46.4493 | 229.5948 | | LCS | | | 1283.6485 | 104.4% |
| 30 | 4.2780 | 3.0203 | 1 | 7.4830 | 1378.8631 | 2.43% | 191.2022 | 3.5793 | 50.5926 | 236.7632 | | LCS | | | 1283.6485 | 107.4% |
| 31 | 7.0304 | 4.9635 | 1 | 11.9851 | 1201.5326 | 2.81% | 116.7586 | 2.8053 | 56.5831 | 210.2625 | | LCS | | | 1283.6485 | 93.6% |
| 32 | 8.2018 | 5.7905 | 1 | 14.2677 | 1079.4270 | 3.20% | 80.3551 | 2.3293 | 61.3285 | 193.4133 | | LCS | | | 1283.6485 | 84.1% |
| 33 | 3.1424 | 2.2186 | 1 | 5.4359 | 1240.9335 | 2.58% | 248.4737 | 4.0790 | 39.9275 | 214.2005 | | LCS | | | 1283.6485 | 96.7% |
| 34 | 2.2851 | 1.6133 | 1 | 3.9970 | 1165.6406 | 2.08% | 302.6078 | 4.4987 | 33.9650 | 196.7323 | | LCS | | | 1283.6485 | 90.8% |
| 35 | 2.7662 | 1.9529 | 1 | 4.8075 | 1311.4160 | 2.23% | 290.9056 | 4.4117 | 38.9807 | 223.6203 | | LCS | | | 1283.6485 | 102.2% |
| 36 | 2.8705 | 2.0266 | 1 | 5.0613 | 1471.8663 | 2.34% | 292.0110 | 4.4190 | 43.6561 | 252.6004 | | LCS | | | 1283.6485 | 114.7% |
| 37 | 3.9290 | 2.7739 | 1 | 6.8586 | 1422.5997 | 2.66% | 217.0563 | 3.8127 | 48.9777 | 248.5193 | | LCS | | | 1283.6485 | 110.8% |
| 38 | 4.3767 | 3.0900 | 1 | 7.7031 | 1341.0071 | 2.53% | 176.0870 | 3.4351 | 51.2744 | 231.5371 | | LCS | | | 1283.6485 | 104.5% |
| 39 | 6.4318 | 4.5409 | 1 | 11.2855 | 1197.7983 | 3.19% | 108.7065 | 2.7037 | 58.3900 | 215.5747 | | LCS | | | 1283.6485 | 93.3% |
| 40 | 8.4440 | 5.9615 | 1 | 14.7200 | 1163.5689 | 3.27% | 83.2035 | 2.3694 | 64.9449 | 209.1728 | | LCS | | | 1283.6485 | 90.6% |

M-8996

DCN: ITSI-0808 0004-0076, 8 Ma 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-90 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-90 LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 506.15
**LCS Volume Added:** 0.50
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-90 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.9266 | 2.7722 | 1 | 6.7598 | 568.8779 | 3.56% | 93.6133 | 2.5135 | 22.7481 | 99.7577 | | LCS | | | 569.9889 | 99.8% |
| 2 | 2.9609 | 2.0905 | 1 | 5.0869 | 469.5573 | 3.59% | 103.6525 | 2.6436 | 17.8358 | 82.4743 | | LCS | | | 569.9889 | 82.4% |
| 3 | 3.6386 | 2.5689 | 1 | 6.2511 | 608.5438 | 3.26% | 109.3155 | 2.7141 | 22.5018 | 105.3476 | | LCS | | | 569.9889 | 106.8% |
| 4 | #DIV/0! | #DIV/0! | 1 | #DIV/0! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | | LCS | | | 569.9889 | #VALUE! |
| 5 | 4.3222 | 3.0515 | 1 | 7.5633 | 590.3947 | 3.58% | 80.8600 | 2.3356 | 25.3996 | 103.6460 | | LCS | | | 569.9889 | 103.6% |
| 6 | 6.0536 | 4.2739 | 1 | 10.3047 | 577.3507 | 3.69% | 65.7260 | 2.1141 | 27.6585 | 101.8482 | | LCS | | | 569.9889 | 101.3% |
| 7 | 17.3057 | 12.2180 | 1 | 27.0288 | 605.2564 | 4.33% | 46.6867 | 1.8549 | 35.8161 | 110.1340 | | LCS | | | 569.9889 | 106.2% |
| 8 | 12.2043 | 8.6163 | 1 | 20.7689 | 598.5814 | 4.76% | 33.8537 | 1.5312 | 40.3244 | 111.3407 | | LCS | | | 569.9889 | 105.0% |
| 9 | 4.5167 | 3.1888 | 1 | 7.6105 | 612.0962 | 3.37% | 99.2916 | 2.5920 | 23.7052 | 106.4792 | | LCS | | | 569.9889 | 107.4% |
| 10 | 3.5200 | 2.4851 | 1 | 5.8664 | 502.7327 | 3.60% | 109.7493 | 2.7250 | 18.5183 | 88.3243 | | LCS | | | 569.9889 | 88.2% |
| 11 | 3.8209 | 2.6976 | 1 | 6.5396 | 636.3261 | 3.74% | 111.2015 | 2.7378 | 23.2421 | 112.5415 | | LCS | | | 569.9889 | 111.6% |
| 12 | 7.3048 | 5.1572 | 1 | 11.4531 | 665.6454 | 3.79% | 116.9173 | 2.8456 | 24.0353 | 117.9805 | | LCS | | | 569.9889 | 116.8% |
| 13 | 4.1584 | 2.9359 | 1 | 7.1898 | 492.9544 | 3.80% | 74.7087 | 2.2494 | 21.8863 | 87.4019 | | LCS | | | 569.9889 | 86.5% |
| 14 | 5.2937 | 3.7374 | 1 | 9.0578 | 569.3270 | 3.79% | 71.9313 | 2.2086 | 25.9253 | 100.8844 | | LCS | | | 569.9889 | 99.9% |
| 15 | 7.3570 | 5.1941 | 1 | 12.7355 | 653.4768 | 4.44% | 55.6775 | 1.9453 | 33.8614 | 119.5652 | | LCS | | | 569.9889 | 114.6% |
| 16 | 9.5462 | 6.8103 | 1 | 16.6143 | 646.9362 | 4.76% | 43.2193 | 1.7198 | 38.1797 | 120.3234 | | LCS | | | 569.9889 | 113.5% |
| 17 | 4.0783 | 2.8793 | 1 | 6.9842 | 556.9244 | 3.71% | 90.8778 | 2.4779 | 22.4352 | 98.3467 | | LCS | | | 569.9889 | 97.7% |
| 18 | 3.0690 | 2.1668 | 1 | 5.2393 | 456.6243 | 3.40% | 100.8302 | 2.6089 | 17.4557 | 79.5183 | | LCS | | | 569.9889 | 80.1% |
| 19 | 3.5230 | 2.4872 | 1 | 6.1061 | 593.4605 | 3.36% | 104.8889 | 2.6578 | 22.2172 | 103.1770 | | LCS | | | 569.9889 | 104.1% |
| 20 | 3.7502 | 2.6477 | 1 | 6.4292 | 593.4794 | 3.49% | 104.6913 | 2.6571 | 22.2536 | 103.7931 | | LCS | | | 569.9889 | 104.1% |
| 21 | 5.5497 | 3.9182 | 1 | 9.2928 | 596.4563 | 3.19% | 81.9065 | 2.3595 | 25.3856 | 102.9502 | | LCS | | | 569.9889 | 104.6% |
| 22 | 6.0771 | 4.2905 | 1 | 10.3517 | 593.1378 | 3.64% | 66.9974 | 2.1338 | 27.9101 | 104.4129 | | LCS | | | 569.9889 | 104.1% |
| 23 | 7.9650 | 5.6233 | 1 | 13.8428 | 657.5248 | 3.96% | 50.6544 | 1.8564 | 35.6018 | 117.4499 | | LCS | | | 569.9889 | 115.4% |
| 24 | 10.6710 | 7.5338 | 1 | 18.3884 | 641.3271 | 4.44% | 38.6253 | 1.6282 | 39.9412 | 117.3482 | | LCS | | | 569.9889 | 112.5% |
| 25 | 4.7181 | 3.3310 | 1 | 8.0093 | 608.1605 | 3.34% | 90.2829 | 2.4717 | 24.5164 | 105.6351 | | LCS | | | 569.9889 | 106.7% |
| 26 | 3.0123 | 2.1267 | 1 | 5.1673 | 454.6055 | 3.14% | 99.4969 | 2.5910 | 17.4317 | 78.3182 | | LCS | | | 569.9889 | 79.8% |
| 27 | 3.9787 | 2.8090 | 1 | 6.7283 | 589.6512 | 2.97% | 106.2191 | 2.6788 | 21.8968 | 100.8910 | | LCS | | | 569.9889 | 103.4% |
| 28 | 3.5030 | 2.4731 | 1 | 6.0587 | 577.7286 | 2.94% | 103.8693 | 2.6453 | 21.6652 | 98.7280 | | LCS | | | 569.9889 | 101.4% |
| 29 | 4.3155 | 3.0468 | 1 | 7.5919 | 603.6878 | 3.25% | 80.5767 | 2.3309 | 25.7138 | 104.4698 | | LCS | | | 569.9889 | 105.9% |
| 30 | 5.1358 | 3.6259 | 1 | 9.0514 | 591.3318 | 3.53% | 65.7210 | 2.1075 | 27.9212 | 103.5613 | | LCS | | | 569.9889 | 103.7% |
| 31 | 9.1602 | 6.4672 | 1 | 15.5521 | 623.1901 | 4.04% | 47.6146 | 1.8068 | 34.8207 | 111.7745 | | LCS | | | 569.9889 | 109.3% |
| 32 | 10.9956 | 7.7630 | 1 | 18.9386 | 675.8776 | 4.36% | 39.6113 | 1.6484 | 41.4151 | 123.1151 | | LCS | | | 569.9889 | 118.6% |
| 33 | 3.7590 | 2.6539 | 1 | 6.5593 | 575.0605 | 3.12% | 91.8987 | 2.4886 | 22.8387 | 99.0048 | | LCS | | | 569.9889 | 100.9% |
| 34 | 2.7655 | 1.9525 | 1 | 4.8229 | 473.1386 | 2.65% | 103.0911 | 2.6343 | 17.7316 | 80.5963 | | LCS | | | 569.9889 | 83.0% |
| 35 | 3.4811 | 2.4577 | 1 | 6.0522 | 594.9269 | 2.97% | 104.6592 | 2.6545 | 22.1300 | 101.8109 | | LCS | | | 569.9889 | 104.4% |
| 36 | 3.4070 | 2.4053 | 1 | 5.9346 | 576.2633 | 3.07% | 102.5466 | 2.6276 | 21.6554 | 99.0193 | | LCS | | | 569.9889 | 101.1% |
| 37 | 4.7261 | 3.3366 | 1 | 8.1826 | 576.1620 | 3.55% | 76.3453 | 2.2720 | 25.1466 | 101.0295 | | LCS | | | 569.9889 | 101.1% |
| 38 | 4.7687 | 3.3668 | 1 | 8.5643 | 596.8798 | 3.56% | 65.2046 | 2.0969 | 28.1511 | 104.6851 | | LCS | | | 569.9889 | 104.7% |
| 39 | 7.2954 | 5.1506 | 1 | 13.0176 | 700.2592 | 4.11% | 51.5593 | 1.8683 | 37.2136 | 126.0061 | | LCS | | | 569.9889 | 122.9% |
| 40 | 10.0524 | 7.0971 | 1 | 17.6384 | 616.8036 | 4.64% | 35.8163 | 1.5654 | 39.5370 | 113.9946 | | LCS | | | 569.9889 | 108.2% |

M-8997

DCN: ITSI-0808 0004-0076, 8 Ma 2019

| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 1st Count | | | | | | | | |
| V1 | A1 | 15 | 2 | 5538 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V2 | A2 | 15 | 2 | 6110 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V3 | A3 | 15 | 2 | 6313 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V4 | A4 | 0.01 | 0 | 1480 | 2/15/2014 13:38 | 2/15/2014 13:39 | LB4100 | SR89V14 |
| V5 | B1 | 15 | 4 | 4734 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V6 | B2 | 15 | 2 | 4242 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V7 | B3 | 15 | 0 | 2936 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V8 | B4 | 15 | 0 | 1995 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V1 | C1 | 15 | 6 | 5997 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V2 | C2 | 15 | 4 | 6775 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V3 | C3 | 15 | 3 | 6845 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V4 | C4 | 15 | 1 | 6520 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V5 | D1 | 15 | 2 | 4429 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V6 | D2 | 15 | 3 | 4744 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V7 | D3 | 15 | 0 | 3235 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V8 | D4 | 15 | 1 | 2532 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V1 | E1 | 15 | 1 | 5941 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V2 | E2 | 15 | 3 | 6650 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V3 | E3 | 15 | 3 | 6666 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V4 | E4 | 15 | 3 | 6497 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V5 | F1 | 15 | 2 | 5046 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V6 | F2 | 15 | 4 | 4355 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V7 | F3 | 15 | 1 | 3070 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V8 | F4 | 15 | 1 | 2459 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V1 | G1 | 15 | 2 | 5748 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V2 | G2 | 15 | 5 | 6680 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V3 | G3 | 15 | 1 | 7001 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V4 | G4 | 15 | 2 | 6354 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V5 | H1 | 15 | 1 | 4874 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V6 | H2 | 15 | 0 | 4353 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V7 | H3 | 15 | 2 | 3025 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V8 | H4 | 15 | 1 | 2371 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V1 | I1 | 15 | 0 | 5533 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V2 | I2 | 15 | 4 | 6369 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V3 | I3 | 15 | 2 | 6318 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V4 | I4 | 15 | 1 | 6220 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V5 | J1 | 15 | 2 | 4739 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V6 | J2 | 15 | 1 | 4005 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V7 | J3 | 15 | 5 | 2909 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V8 | J4 | 15 | 3 | 2254 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| 2nd Count | | | | | | | | |
| SV1 | A1 | 15 | 0 | 1421 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV2 | A2 | 15 | 1 | 1572 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV3 | A3 | 15 | 3 | 1657 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV4 | A4 | 0.01 | 0 | 176 | 2/27/2014 7:22 | 2/27/2014 7:22 | LB4100 | SR90V14 |
| SV5 | B1 | 15 | 0 | 1227 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV6 | B2 | 15 | 0 | 1005 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV7 | B3 | 15 | 0 | 772 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV8 | B4 | 15 | 1 | 527 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV1 | C1 | 15 | 2 | 1511 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV2 | C2 | 15 | 0 | 1670 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV3 | C3 | 15 | 1 | 1686 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV4 | C4 | 15 | 0 | 1820 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV5 | D1 | 15 | 0 | 1138 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV6 | D2 | 15 | 1 | 1097 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV7 | D3 | 15 | 1 | 851 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV8 | D4 | 15 | 0 | 665 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV1 | E1 | 15 | 1 | 1381 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV2 | E2 | 15 | 2 | 1531 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV3 | E3 | 15 | 4 | 1589 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV4 | E4 | 15 | 1 | 1588 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV5 | F1 | 15 | 2 | 1252 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV6 | F2 | 15 | 2 | 1024 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV7 | F3 | 15 | 1 | 775 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV8 | F4 | 15 | 0 | 596 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV1 | G1 | 15 | 1 | 1374 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV2 | G2 | 15 | 2 | 1510 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV3 | G3 | 15 | 1 | 1614 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV4 | G4 | 15 | 0 | 1574 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV5 | H1 | 15 | 0 | 1222 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV6 | H2 | 15 | 2 | 999 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV7 | H3 | 15 | 3 | 734 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV8 | H4 | 15 | 3 | 611 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV1 | I1 | 15 | 0 | 1393 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV2 | I2 | 15 | 3 | 1561 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV3 | I3 | 15 | 2 | 1585 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV4 | I4 | 15 | 1 | 1553 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV5 | J1 | 15 | 3 | 1161 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV6 | J2 | 15 | 1 | 989 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV7 | J3 | 15 | 0 | 785 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV8 | J4 | 15 | 3 | 551 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 1st Count | | | | | | | | |
| V1 | A1 | 15 | 2 | 5538 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V2 | A2 | 15 | 2 | 6110 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V3 | A3 | 15 | 2 | 6313 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V4 | A4 | 0.01 | 0 | 1480 | 2/15/2014 13:38 | 2/15/2014 13:39 | LB4100 | SR89V14 |
| V5 | B1 | 15 | 4 | 4734 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V6 | B2 | 15 | 2 | 4242 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V7 | B3 | 15 | 0 | 2936 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V8 | B4 | 15 | 0 | 1995 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V1 | C1 | 15 | 6 | 5997 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V2 | C2 | 15 | 4 | 6775 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V3 | C3 | 15 | 3 | 6845 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V4 | C4 | 15 | 1 | 6520 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V5 | D1 | 15 | 2 | 4429 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V6 | D2 | 15 | 3 | 4744 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V7 | D3 | 15 | 0 | 3235 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V8 | D4 | 15 | 1 | 2532 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V1 | E1 | 15 | 1 | 5941 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V2 | E2 | 15 | 3 | 6650 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V3 | E3 | 15 | 3 | 6666 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V4 | E4 | 15 | 3 | 6497 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V5 | F1 | 15 | 2 | 5046 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V6 | F2 | 15 | 1 | 4355 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V7 | F3 | 15 | 1 | 3070 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V8 | F4 | 15 | 1 | 2459 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V1 | G1 | 15 | 2 | 5748 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V2 | G2 | 15 | 5 | 6680 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V3 | G3 | 15 | 1 | 7001 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V4 | G4 | 15 | 2 | 6354 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V5 | H1 | 15 | 1 | 4874 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V6 | H2 | 15 | 0 | 4353 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V7 | H3 | 15 | 2 | 3025 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V8 | H4 | 15 | 1 | 2371 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V1 | I1 | 15 | 0 | 5533 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V2 | I2 | 15 | 4 | 6369 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |

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DCN: ITSI-0808 0004-0076, 8 Ma 2019

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V3 | I3 | 15 | 2 | 6318 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V4 | I4 | 15 | 1 | 6220 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V5 | J1 | 15 | 2 | 4739 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V6 | J2 | 15 | 1 | 4005 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V7 | J3 | 15 | 5 | 2909 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V8 | J4 | 15 | 3 | 2254 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| 2nd Count | | | | | | | | |
| SV1 | A1 | 15 | 0 | 1421 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV2 | A2 | 15 | 1 | 1572 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV3 | A3 | 15 | 3 | 1657 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV4 | A4 | 0.01 | 0 | 176 | 2/27/2014 7:22 | 2/27/2014 7:22 | LB4100 | SR90V14 |
| SV5 | B1 | 15 | 0 | 1227 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV6 | B2 | 15 | 0 | 1005 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV7 | B3 | 15 | 0 | 772 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV8 | B4 | 15 | 1 | 527 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV1 | C1 | 15 | 2 | 1511 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV2 | C2 | 15 | 0 | 1670 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV3 | C3 | 15 | 1 | 1686 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV4 | C4 | 15 | 0 | 1820 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV5 | D1 | 15 | 0 | 1138 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV6 | D2 | 15 | 1 | 1097 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV7 | D3 | 15 | 1 | 851 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV8 | D4 | 15 | 0 | 665 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV1 | E1 | 15 | 1 | 1381 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV2 | E2 | 15 | 2 | 1531 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV3 | E3 | 15 | 4 | 1589 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV4 | E4 | 15 | 1 | 1588 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV5 | F1 | 15 | 2 | 1252 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV6 | F2 | 15 | 2 | 1024 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV7 | F3 | 15 | 1 | 775 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV8 | F4 | 15 | 0 | 596 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV1 | G1 | 15 | 1 | 1374 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV2 | G2 | 15 | 2 | 1510 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV3 | G3 | 15 | 1 | 1614 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV4 | G4 | 15 | 0 | 1574 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV5 | H1 | 15 | 0 | 1222 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV6 | H2 | 15 | 2 | 999 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV7 | H3 | 15 | 3 | 734 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV8 | H4 | 15 | 3 | 611 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV1 | I1 | 15 | 0 | 1393 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV2 | I2 | 15 | 3 | 1561 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV3 | I3 | 15 | 2 | 1585 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV4 | I4 | 15 | 1 | 1553 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV5 | J1 | 15 | 3 | 1161 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV6 | J2 | 15 | 1 | 989 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV7 | J3 | 15 | 0 | 785 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV8 | J4 | 15 | 3 | 551 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |

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| Detector # | Sample I.D. | Pgm time (min) | Total (counts) | Voltage | %slope/100V | Date/Time |
|---|---|---|---|---|---|---|
| A1 | Sr-90' | 0.11 | 1 | 750 | 1.2 | 7/1/2009 15:09 |
| A1 | Sr-90' | 0.12 | 1 | 780 | 2.2 | 7/1/2009 15:09 |
| A1 | Sr-90' | 0.5 | 71 | 810 | 3.6 | 7/1/2009 15:10 |
| A1 | Sr-90' | 0.5 | 197 | 840 | 6.3 | 7/1/2009 15:11 |
| A1 | Sr-90' | 0.5 | 436 | 870 | 9.1 | 7/1/2009 15:11 |
| A1 | Sr-90' | 0.5 | 768 | 900 | 11.7 | 7/1/2009 15:12 |
| A1 | Sr-90' | 0.5 | 1146 | 930 | 14.3 | 7/1/2009 15:12 |
| A1 | Sr-90' | 0.5 | 1601 | 960 | 17.2 | 7/1/2009 15:13 |
| A1 | Sr-90' | 0.5 | 2167 | 990 | 20.3 | 7/1/2009 15:14 |
| A1 | Sr-90' | 0.5 | 2839 | 1020 | 23.6 | 7/1/2009 15:14 |
| A1 | Sr-90' | 0.5 | 3575 | 1050 | 27.3 | 7/1/2009 15:15 |
| A1 | Sr-90' | 0.5 | 4430 | 1080 | 33.0 | 7/1/2009 15:16 |
| A1 | Sr-90' | 0.5 | 5461 | 1110 | 38.9 | 7/1/2009 15:16 |
| A1 | Sr-90' | 0.5 | 6850 | 1140 | 44.3 | 7/1/2009 15:17 |
| A1 | Sr-90' | 0.5 | 8198 | 1170 | 46.9 | 7/1/2009 15:18 |
| A1 | Sr-90' | 0.5 | 9713 | 1200 | 44.5 | 7/1/2009 15:18 |
| A1 | Sr-90' | 0.5 | 11070 | 1230 | 40.2 | 7/1/2009 15:19 |
| A1 | Sr-90' | 0.5 | 12096 | 1260 | 32.3 | 7/1/2009 15:20 |
| A1 | Sr-90' | 0.5 | 13036 | 1290 | 23.4 | 7/1/2009 15:20 |
| A1 | Sr-90' | 0.5 | 13569 | 1320 | 14.3 | 7/1/2009 15:21 |
| A1 | Sr-90' | 0.5 | 13839 | 1350 | 7.0 | 7/1/2009 15:21 |
| A1 | Sr-90' | 0.5 | 13834 | 1380 | 5.3 | 7/1/2009 15:22 |
| A1 | Sr-90' | 0.5 | 13947 | 1410 | 3.7 | 7/1/2009 15:23 |
| A1 | Sr-90' | 0.5 | 14310 | 1440 | 4.9 | 7/1/2009 15:23 |
| A1 | Sr-90' | 0.5 | 14159 | 1470 | 1.6 | 7/1/2009 15:24 |
| A1 | Sr-90' | 0.5 | 14463 | 1500 | -0.7 | 7/1/2009 15:25 |
| A1 | Sr-90' | 0.5 | 14107 | 1530 | 0.8 | 7/1/2009 15:25 |
| A1 | Sr-90' | 0.5 | 14237 | 1560 | -1.5 | 7/1/2009 15:53 |
| A1 | Sr-90' | 0.5 | 14392 | 1590 | 0.1 | 7/1/2009 15:53 |
| A1 | Sr-90' | 0.5 | 14095 | 1620 | 16.5 | 7/1/2009 15:54 |
| A1 | Sr-90' | 0.5 | 14197 | 1650 | 16.6 | 7/1/2009 15:55 |
| A2 | Sr-90' | 0.11 | 5 | 750 | 16.4 | 7/1/2009 15:09 |
| A2 | Sr-90' | 0.5 | 52 | 780 | 16.3 | 7/1/2009 15:09 |
| A2 | Sr-90' | 0.5 | 164 | 810 | 5.3 | 7/1/2009 15:10 |
| A2 | Sr-90' | 0.5 | 362 | 840 | 8.4 | 7/1/2009 15:11 |
| A2 | Sr-90' | 0.5 | 643 | 870 | 11.5 | 7/1/2009 15:11 |
| A2 | Sr-90' | 0.5 | 1065 | 900 | 15.3 | 7/1/2009 15:12 |
| A2 | Sr-90' | 0.5 | 1537 | 930 | 19.4 | 7/1/2009 15:12 |
| A2 | Sr-90' | 0.5 | 2206 | 960 | 23.9 | 7/1/2009 15:13 |
| A2 | Sr-90' | 0.5 | 2982 | 990 | 29.1 | 7/1/2009 15:14 |
| A2 | Sr-90' | 0.5 | 3922 | 1020 | 32.4 | 7/1/2009 15:14 |
| A2 | Sr-90' | 0.5 | 5045 | 1050 | 38.2 | 7/1/2009 15:15 |
| A2 | Sr-90' | 0.5 | 6034 | 1080 | 44.5 | 7/1/2009 15:16 |
| A2 | Sr-90' | 0.5 | 7649 | 1110 | 49.6 | 7/1/2009 15:16 |
| A2 | Sr-90' | 0.5 | 9297 | 1140 | 57.5 | 7/1/2009 15:17 |
| A2 | Sr-90' | 0.5 | 10846 | 1170 | 55.5 | 7/1/2009 15:18 |
| A2 | Sr-90' | 0.5 | 13066 | 1200 | 52.9 | 7/1/2009 15:18 |
| A2 | Sr-90' | 0.5 | 14085 | 1230 | 46.3 | 7/1/2009 15:19 |
| A2 | Sr-90' | 0.5 | 15618 | 1260 | 35.4 | 7/1/2009 15:20 |
| A2 | Sr-90' | 0.5 | 16518 | 1290 | 29.3 | 7/1/2009 15:20 |
| A2 | Sr-90' | 0.5 | 17153 | 1320 | 18.3 | 7/1/2009 15:21 |
| A2 | Sr-90' | 0.5 | 17712 | 1350 | 9.3 | 7/1/2009 15:21 |
| A2 | Sr-90' | 0.5 | 17772 | 1380 | 1.8 | 7/1/2009 15:22 |
| A2 | Sr-90' | 0.5 | 17602 | 1410 | -1.3 | 7/1/2009 15:23 |
| A2 | Sr-90' | 0.5 | 17483 | 1440 | -1.1 | 7/1/2009 15:23 |
| A2 | Sr-90' | 0.5 | 17666 | 1470 | 1.0 | 7/1/2009 15:24 |
| A2 | Sr-90' | 0.5 | 17571 | 1500 | 2.6 | 7/1/2009 15:25 |
| A2 | Sr-90' | 0.5 | 17710 | 1530 | 2.0 | 7/1/2009 15:25 |
| A2 | Sr-90' | 0.5 | 17851 | 1560 | 1.0 | 7/1/2009 15:53 |
| A2 | Sr-90' | 0.5 | 17830 | 1590 | -1.5 | 7/1/2009 15:53 |
| A2 | Sr-90' | 0.5 | 17655 | 1620 | 20.6 | 7/1/2009 15:54 |
| A2 | Sr-90' | 0.5 | 17586 | 1650 | 20.6 | 7/1/2009 15:55 |
| A3 | Sr-90' | 0.12 | 2 | 750 | 20.5 | 7/1/2009 15:09 |
| A3 | Sr-90' | 0.11 | 10 | 780 | 20.3 | 7/1/2009 15:09 |
| A3 | Sr-90' | 0.5 | 158 | 810 | 6.3 | 7/1/2009 15:10 |
| A3 | Sr-90' | 0.5 | 412 | 840 | 9.8 | 7/1/2009 15:11 |
| A3 | Sr-90' | 0.5 | 752 | 870 | 13.1 | 7/1/2009 15:11 |
| A3 | Sr-90' | 0.5 | 1186 | 900 | 16.1 | 7/1/2009 15:12 |

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|---|---|---|---|---|---|---|
| A3 | Sr-90' | 0.5 | 1743 | 930 | 20.3 | 7/1/2009 15:12 |
| A3 | Sr-90' | 0.5 | 2332 | 960 | 24.4 | 7/1/2009 15:13 |
| A3 | Sr-90' | 0.5 | 3228 | 990 | 28.2 | 7/1/2009 15:14 |
| A3 | Sr-90' | 0.5 | 4102 | 1020 | 33.6 | 7/1/2009 15:14 |
| A3 | Sr-90' | 0.5 | 5082 | 1050 | 38.9 | 7/1/2009 15:15 |
| A3 | Sr-90' | 0.5 | 6439 | 1080 | 47.4 | 7/1/2009 15:16 |
| A3 | Sr-90' | 0.5 | 7892 | 1110 | 54.0 | 7/1/2009 15:16 |
| A3 | Sr-90' | 0.5 | 9804 | 1140 | 56.5 | 7/1/2009 15:17 |
| A3 | Sr-90' | 0.5 | 11495 | 1170 | 55.1 | 7/1/2009 15:18 |
| A3 | Sr-90' | 0.5 | 13109 | 1200 | 49.0 | 7/1/2009 15:18 |
| A3 | Sr-90' | 0.5 | 14504 | 1230 | 41.8 | 7/1/2009 15:19 |
| A3 | Sr-90' | 0.5 | 15649 | 1260 | 31.8 | 7/1/2009 15:20 |
| A3 | Sr-90' | 0.5 | 16497 | 1290 | 21.3 | 7/1/2009 15:20 |
| A3 | Sr-90' | 0.5 | 16882 | 1320 | 11.8 | 7/1/2009 15:21 |
| A3 | Sr-90' | 0.5 | 17082 | 1350 | 6.1 | 7/1/2009 15:21 |
| A3 | Sr-90' | 0.5 | 17120 | 1380 | 5.1 | 7/1/2009 15:22 |
| A3 | Sr-90' | 0.5 | 17292 | 1410 | 4.4 | 7/1/2009 15:23 |
| A3 | Sr-90' | 0.5 | 17541 | 1440 | 3.6 | 7/1/2009 15:23 |
| A3 | Sr-90' | 0.5 | 17524 | 1470 | 1.1 | 7/1/2009 15:24 |
| A3 | Sr-90' | 0.5 | 17542 | 1500 | -0.5 | 7/1/2009 15:25 |
| A3 | Sr-90' | 0.5 | 17462 | 1530 | -0.2 | 7/1/2009 15:25 |
| A3 | Sr-90' | 0.5 | 17501 | 1560 | -0.4 | 7/1/2009 15:53 |
| A3 | Sr-90' | 0.5 | 17517 | 1590 | 0.0 | 7/1/2009 15:53 |
| A3 | Sr-90' | 0.5 | 17449 | 1620 | -0.4 | 7/1/2009 15:54 |
| A3 | Sr-90' | 0.5 | 17488 | 1650 | -0.5 | 7/1/2009 15:55 |
| A4 | Sr-90' | 0.12 | 0 | | 1.3 | 7/1/2009 15:09 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:09 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:10 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:11 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:11 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:12 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:12 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:13 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:14 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:14 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:15 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:16 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:16 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:17 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:18 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:18 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:19 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:20 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:20 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:21 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:21 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:22 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:23 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:23 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:24 |
| A4 | Sr-90' | 0.13 | 0 | | #DIV/0! | 7/1/2009 15:25 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:25 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:26 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:53 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:54 |
| A4 | Sr-90' | 0.12 | 0 | | 0.1 | 7/1/2009 15:55 |
| B1 | Sr-90' | 0.11 | 2 | 750 | 1.2 | 7/1/2009 15:09 |
| B1 | Sr-90' | 0.12 | 5 | 780 | 2.8 | 7/1/2009 15:09 |
| B1 | Sr-90' | 0.5 | 74 | 810 | 4.9 | 7/1/2009 15:10 |
| B1 | Sr-90' | 0.5 | 259 | 840 | 8.8 | 7/1/2009 15:10 |
| B1 | Sr-90' | 0.5 | 604 | 870 | 12.3 | 7/1/2009 15:11 |
| B1 | Sr-90' | 0.5 | 1066 | 900 | 16.1 | 7/1/2009 15:12 |
| B1 | Sr-90' | 0.5 | 1521 | 930 | 20.5 | 7/1/2009 15:12 |
| B1 | Sr-90' | 0.5 | 2215 | 960 | 24.7 | 7/1/2009 15:13 |
| B1 | Sr-90' | 0.5 | 3106 | 990 | 29.4 | 7/1/2009 15:14 |
| B1 | Sr-90' | 0.5 | 3985 | 1020 | 34.3 | 7/1/2009 15:14 |
| B1 | Sr-90' | 0.5 | 5047 | 1050 | 39.2 | 7/1/2009 15:15 |
| B1 | Sr-90' | 0.5 | 6386 | 1080 | 46.0 | 7/1/2009 15:16 |
| B1 | Sr-90' | 0.5 | 7782 | 1110 | 53.3 | 7/1/2009 15:16 |
| B1 | Sr-90' | 0.5 | 9521 | 1140 | 58.8 | 7/1/2009 15:17 |

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|---|---|---|---|---|---|---|
| B1 | Sr-90' | 0.5 | 11467 | 1170 | 61.3 | 7/1/2009 15:18 |
| B1 | Sr-90' | 0.5 | 13368 | 1200 | 60.4 | 7/1/2009 15:18 |
| B1 | Sr-90' | 0.5 | 15059 | 1230 | 52.4 | 7/1/2009 15:19 |
| B1 | Sr-90' | 0.5 | 16782 | 1260 | 40.4 | 7/1/2009 15:20 |
| B1 | Sr-90' | 0.5 | 17615 | 1290 | 27.3 | 7/1/2009 15:20 |
| B1 | Sr-90' | 0.5 | 18143 | 1320 | 17.5 | 7/1/2009 15:21 |
| B1 | Sr-90' | 0.5 | 18471 | 1350 | 17.1 | 7/1/2009 15:22 |
| B1 | Sr-90' | 0.5 | 18973 | 1380 | 14.4 | 7/1/2009 15:22 |
| B1 | Sr-90' | 0.5 | 19758 | 1410 | 12.4 | 7/1/2009 15:23 |
| B1 | Sr-90' | 0.5 | 19657 | 1440 | 11.1 | 7/1/2009 15:24 |
| B1 | Sr-90' | 0.5 | 19984 | 1470 | 5.9 | 7/1/2009 15:25 |
| B1 | Sr-90' | 0.49 | 20518 | 1500 | 4.2 | 7/1/2009 15:26 |
| B1 | Sr-90' | 0.47 | 20211 | 1530 | 1.5 | 7/1/2009 15:54 |
| B1 | Sr-90' | 0.43 | 20172 | 1560 | 0.2 | 7/1/2009 15:55 |
| B1 | Sr-90' | 0.41 | 20383 | 1590 | 1.5 | 7/1/2009 15:57 |
| B1 | Sr-90' | 0.4 | 20465 | 1620 | | 7/1/2009 15:58 |
| B1 | Sr-90' | 0.39 | 20290 | 1650 | | 7/1/2009 16:00 |
| B2 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| B2 | Sr-90' | 0.11 | 9 | 780 | | 7/1/2009 15:09 |
| B2 | Sr-90' | 0.5 | 109 | 810 | 5.8 | 7/1/2009 15:10 |
| B2 | Sr-90' | 0.5 | 325 | 840 | 9.8 | 7/1/2009 15:10 |
| B2 | Sr-90' | 0.5 | 717 | 870 | 13.6 | 7/1/2009 15:11 |
| B2 | Sr-90' | 0.5 | 1181 | 900 | 17.1 | 7/1/2009 15:12 |
| B2 | Sr-90' | 0.5 | 1714 | 930 | 21.6 | 7/1/2009 15:12 |
| B2 | Sr-90' | 0.5 | 2393 | 960 | 26.7 | 7/1/2009 15:13 |
| B2 | Sr-90' | 0.5 | 3345 | 990 | 34.1 | 7/1/2009 15:14 |
| B2 | Sr-90' | 0.5 | 4370 | 1020 | 41.0 | 7/1/2009 15:14 |
| B2 | Sr-90' | 0.5 | 5845 | 1050 | 47.3 | 7/1/2009 15:15 |
| B2 | Sr-90' | 0.5 | 7288 | 1080 | 53.3 | 7/1/2009 15:16 |
| B2 | Sr-90' | 0.5 | 8981 | 1110 | 59.1 | 7/1/2009 15:16 |
| B2 | Sr-90' | 0.5 | 10794 | 1140 | 66.4 | 7/1/2009 15:17 |
| B2 | Sr-90' | 0.5 | 12959 | 1170 | 70.8 | 7/1/2009 15:18 |
| B2 | Sr-90' | 0.5 | 15256 | 1200 | 68.7 | 7/1/2009 15:18 |
| B2 | Sr-90' | 0.5 | 17372 | 1230 | 55.6 | 7/1/2009 15:19 |
| B2 | Sr-90' | 0.5 | 18895 | 1260 | 39.3 | 7/1/2009 15:20 |
| B2 | Sr-90' | 0.5 | 19482 | 1290 | 27.6 | 7/1/2009 15:20 |
| B2 | Sr-90' | 0.49 | 20099 | 1320 | 15.3 | 7/1/2009 15:21 |
| B2 | Sr-90' | 0.5 | 20913 | 1350 | 7.7 | 7/1/2009 15:22 |
| B2 | Sr-90' | 0.48 | 20468 | 1380 | 0.8 | 7/1/2009 15:22 |
| B2 | Sr-90' | 0.46 | 20449 | 1410 | -1.9 | 7/1/2009 15:23 |
| B2 | Sr-90' | 0.46 | 20458 | 1440 | 1.9 | 7/1/2009 15:24 |
| B2 | Sr-90' | 0.45 | 20631 | 1470 | -0.2 | 7/1/2009 15:25 |
| B2 | Sr-90' | 0.43 | 20659 | 1500 | -0.4 | 7/1/2009 15:26 |
| B2 | Sr-90' | 0.4 | 20326 | 1530 | -4.0 | 7/1/2009 15:54 |
| B2 | Sr-90' | 0.37 | 20546 | 1560 | -1.6 | 7/1/2009 15:55 |
| B2 | Sr-90' | 0.35 | 20090 | 1590 | 1.1 | 7/1/2009 15:57 |
| B2 | Sr-90' | 0.34 | 20530 | 1620 | | 7/1/2009 15:58 |
| B2 | Sr-90' | 0.33 | 20505 | 1650 | | 7/1/2009 16:00 |
| B3 | Sr-90' | 0.16 | 4 | 750 | | 7/1/2009 15:09 |
| B3 | Sr-90' | 0.11 | 7 | 780 | | 7/1/2009 15:09 |
| B3 | Sr-90' | 0.5 | 123 | 810 | 5.1 | 7/1/2009 15:10 |
| B3 | Sr-90' | 0.5 | 351 | 840 | 8.9 | 7/1/2009 15:10 |
| B3 | Sr-90' | 0.5 | 602 | 870 | 12.1 | 7/1/2009 15:11 |
| B3 | Sr-90' | 0.5 | 1104 | 900 | 16.3 | 7/1/2009 15:12 |
| B3 | Sr-90' | 0.5 | 1561 | 930 | 20.0 | 7/1/2009 15:12 |
| B3 | Sr-90' | 0.5 | 2320 | 960 | 23.4 | 7/1/2009 15:13 |
| B3 | Sr-90' | 0.5 | 3001 | 990 | 28.5 | 7/1/2009 15:14 |
| B3 | Sr-90' | 0.5 | 3889 | 1020 | 32.8 | 7/1/2009 15:14 |
| B3 | Sr-90' | 0.5 | 5051 | 1050 | 39.8 | 7/1/2009 15:15 |
| B3 | Sr-90' | 0.5 | 6217 | 1080 | 46.0 | 7/1/2009 15:16 |
| B3 | Sr-90' | 0.5 | 7803 | 1110 | 53.0 | 7/1/2009 15:16 |
| B3 | Sr-90' | 0.5 | 9410 | 1140 | 58.7 | 7/1/2009 15:17 |
| B3 | Sr-90' | 0.5 | 11403 | 1170 | 61.2 | 7/1/2009 15:18 |
| B3 | Sr-90' | 0.5 | 13228 | 1200 | 58.5 | 7/1/2009 15:18 |
| B3 | Sr-90' | 0.5 | 15074 | 1230 | 47.7 | 7/1/2009 15:19 |
| B3 | Sr-90' | 0.5 | 16346 | 1260 | 34.9 | 7/1/2009 15:20 |
| B3 | Sr-90' | 0.5 | 17002 | 1290 | 21.9 | 7/1/2009 15:20 |
| B3 | Sr-90' | 0.5 | 17498 | 1320 | 17.0 | 7/1/2009 15:21 |
| B3 | Sr-90' | 0.5 | 17784 | 1350 | 19.0 | 7/1/2009 15:22 |
| B3 | Sr-90' | 0.5 | 18505 | 1380 | 19.3 | 7/1/2009 15:22 |

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| B3 | Sr-90' | 0.5 | 19344 | 1410 | 19.5 | 7/1/2009 15:23 |
| B3 | Sr-90' | 0.5 | 19614 | 1440 | 14.7 | 7/1/2009 15:24 |
| B3 | Sr-90' | 0.5 | 20160 | 1470 | 8.1 | 7/1/2009 15:25 |
| B3 | Sr-90' | 0.49 | 20302 | 1500 | 4.3 | 7/1/2009 15:26 |
| B3 | Sr-90' | 0.46 | 20220 | 1530 | 0.7 | 7/1/2009 15:54 |
| B3 | Sr-90' | 0.42 | 20225 | 1560 | 1.2 | 7/1/2009 15:55 |
| B3 | Sr-90' | 0.4 | 20304 | 1590 | 1.4 | 7/1/2009 15:57 |
| B3 | Sr-90' | 0.39 | 20442 | 1620 | | 7/1/2009 15:58 |
| B3 | Sr-90' | 0.38 | 20327 | 1650 | | 7/1/2009 16:00 |
| B4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 15:09 |
| B4 | Sr-90' | 0.11 | 6 | 780 | | 7/1/2009 15:09 |
| B4 | Sr-90' | 0.5 | 96 | 810 | 5.1 | 7/1/2009 15:10 |
| B4 | Sr-90' | 0.5 | 302 | 840 | 8.3 | 7/1/2009 15:10 |
| B4 | Sr-90' | 0.5 | 616 | 870 | 11.7 | 7/1/2009 15:11 |
| B4 | Sr-90' | 0.5 | 992 | 900 | 15.1 | 7/1/2009 15:12 |
| B4 | Sr-90' | 0.5 | 1511 | 930 | 18.6 | 7/1/2009 15:12 |
| B4 | Sr-90' | 0.5 | 2118 | 960 | 22.1 | 7/1/2009 15:13 |
| B4 | Sr-90' | 0.5 | 2837 | 990 | 26.1 | 7/1/2009 15:14 |
| B4 | Sr-90' | 0.5 | 3650 | 1020 | 32.3 | 7/1/2009 15:14 |
| B4 | Sr-90' | 0.5 | 4667 | 1050 | 38.3 | 7/1/2009 15:15 |
| B4 | Sr-90' | 0.5 | 6052 | 1080 | 44.6 | 7/1/2009 15:16 |
| B4 | Sr-90' | 0.5 | 7378 | 1110 | 51.6 | 7/1/2009 15:16 |
| B4 | Sr-90' | 0.5 | 8977 | 1140 | 54.8 | 7/1/2009 15:17 |
| B4 | Sr-90' | 0.5 | 10948 | 1170 | 57.4 | 7/1/2009 15:18 |
| B4 | Sr-90' | 0.5 | 12490 | 1200 | 54.0 | 7/1/2009 15:18 |
| B4 | Sr-90' | 0.5 | 14225 | 1230 | 42.7 | 7/1/2009 15:19 |
| B4 | Sr-90' | 0.5 | 15436 | 1260 | 31.5 | 7/1/2009 15:20 |
| B4 | Sr-90' | 0.5 | 15887 | 1290 | 20.5 | 7/1/2009 15:20 |
| B4 | Sr-90' | 0.5 | 16380 | 1320 | 16.2 | 7/1/2009 15:21 |
| B4 | Sr-90' | 0.5 | 16833 | 1350 | 18.5 | 7/1/2009 15:22 |
| B4 | Sr-90' | 0.5 | 17391 | 1380 | 17.3 | 7/1/2009 15:22 |
| B4 | Sr-90' | 0.5 | 18163 | 1410 | 16.2 | 7/1/2009 15:23 |
| B4 | Sr-90' | 0.5 | 18306 | 1440 | 15.9 | 7/1/2009 15:24 |
| B4 | Sr-90' | 0.5 | 18799 | 1470 | 17.1 | 7/1/2009 15:25 |
| B4 | Sr-90' | 0.5 | 19464 | 1500 | 16.9 | 7/1/2009 15:53 |
| B4 | Sr-90' | 0.48 | 20148 | 1530 | 13.5 | 7/1/2009 15:54 |
| B4 | Sr-90' | 0.45 | 20170 | 1560 | 7.4 | 7/1/2009 15:55 |
| B4 | Sr-90' | 0.43 | 20474 | 1590 | 1.8 | 7/1/2009 15:57 |
| B4 | Sr-90' | 0.42 | 20404 | 1620 | 23.6 | 7/1/2009 15:58 |
| B4 | Sr-90' | 0.4 | 20306 | 1650 | 23.8 | 7/1/2009 16:00 |
| C1 | Sr-90' | 0.11 | 3 | 750 | 23.7 | 7/1/2009 15:09 |
| C1 | Sr-90' | 0.12 | 8 | 780 | 23.5 | 7/1/2009 15:09 |
| C1 | Sr-90' | 0.5 | 135 | 810 | 5.9 | 7/1/2009 15:10 |
| C1 | Sr-90' | 0.5 | 353 | 840 | 9.2 | 7/1/2009 15:10 |
| C1 | Sr-90' | 0.5 | 711 | 870 | 12.0 | 7/1/2009 15:11 |
| C1 | Sr-90' | 0.5 | 1103 | 900 | 14.8 | 7/1/2009 15:11 |
| C1 | Sr-90' | 0.5 | 1565 | 930 | 18.4 | 7/1/2009 15:12 |
| C1 | Sr-90' | 0.5 | 2153 | 960 | 22.0 | 7/1/2009 15:13 |
| C1 | Sr-90' | 0.5 | 2943 | 990 | 26.8 | 7/1/2009 15:13 |
| C1 | Sr-90' | 0.5 | 3707 | 1020 | 31.9 | 7/1/2009 15:14 |
| C1 | Sr-90' | 0.5 | 4809 | 1050 | 37.8 | 7/1/2009 15:15 |
| C1 | Sr-90' | 0.5 | 6002 | 1080 | 44.8 | 7/1/2009 15:15 |
| C1 | Sr-90' | 0.5 | 7464 | 1110 | 49.4 | 7/1/2009 15:16 |
| C1 | Sr-90' | 0.5 | 9096 | 1140 | 54.5 | 7/1/2009 15:16 |
| C1 | Sr-90' | 0.5 | 10669 | 1170 | 56.4 | 7/1/2009 15:17 |
| C1 | Sr-90' | 0.5 | 12567 | 1200 | 51.0 | 7/1/2009 15:18 |
| C1 | Sr-90' | 0.5 | 14181 | 1230 | 44.2 | 7/1/2009 15:18 |
| C1 | Sr-90' | 0.5 | 14993 | 1260 | 33.0 | 7/1/2009 15:19 |
| C1 | Sr-90' | 0.5 | 16093 | 1290 | 22.2 | 7/1/2009 15:20 |
| C1 | Sr-90' | 0.5 | 16566 | 1320 | 14.2 | 7/1/2009 15:20 |
| C1 | Sr-90' | 0.5 | 16722 | 1350 | 6.5 | 7/1/2009 15:21 |
| C1 | Sr-90' | 0.5 | 16806 | 1380 | 5.5 | 7/1/2009 15:22 |
| C1 | Sr-90' | 0.5 | 16948 | 1410 | 4.8 | 7/1/2009 15:22 |
| C1 | Sr-90' | 0.5 | 17275 | 1440 | 1.1 | 7/1/2009 15:23 |
| C1 | Sr-90' | 0.5 | 17203 | 1470 | -0.4 | 7/1/2009 15:23 |
| C1 | Sr-90' | 0.5 | 16846 | 1500 | -1.1 | 7/1/2009 15:24 |
| C1 | Sr-90' | 0.5 | 17103 | 1530 | -1.1 | 7/1/2009 15:25 |
| C1 | Sr-90' | 0.5 | 17160 | 1560 | 0.7 | 7/1/2009 15:25 |
| C1 | Sr-90' | 0.5 | 16887 | 1590 | -1.3 | 7/1/2009 15:26 |
| C1 | Sr-90' | | | | | |

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|---|---|---|---|---|---|---|
| C1 | Sr-90' | 0.5 | 16958 | 1650 | | 7/1/2009 15:27 |
| C2 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| C2 | Sr-90' | 0.12 | 1 | 780 | | 7/1/2009 15:09 |
| C2 | Sr-90' | 0.5 | 47 | 810 | 3.2 | 7/1/2009 15:10 |
| C2 | Sr-90' | 0.5 | 176 | 840 | 5.8 | 7/1/2009 15:10 |
| C2 | Sr-90' | 0.5 | 397 | 870 | 9.0 | 7/1/2009 15:11 |
| C2 | Sr-90' | 0.5 | 700 | 900 | 12.3 | 7/1/2009 15:11 |
| C2 | Sr-90' | 0.5 | 1129 | 930 | 15.6 | 7/1/2009 15:12 |
| C2 | Sr-90' | 0.5 | 1653 | 960 | 19.5 | 7/1/2009 15:13 |
| C2 | Sr-90' | 0.5 | 2258 | 990 | 24.3 | 7/1/2009 15:13 |
| C2 | Sr-90' | 0.5 | 3063 | 1020 | 28.9 | 7/1/2009 15:14 |
| C2 | Sr-90' | 0.5 | 4071 | 1050 | 33.8 | 7/1/2009 15:15 |
| C2 | Sr-90' | 0.5 | 5074 | 1080 | 39.0 | 7/1/2009 15:15 |
| C2 | Sr-90' | 0.5 | 6319 | 1110 | 46.0 | 7/1/2009 15:16 |
| C2 | Sr-90' | 0.5 | 7785 | 1140 | 53.8 | 7/1/2009 15:17 |
| C2 | Sr-90' | 0.5 | 9615 | 1170 | 56.3 | 7/1/2009 15:17 |
| C2 | Sr-90' | 0.5 | 11493 | 1200 | 55.4 | 7/1/2009 15:18 |
| C2 | Sr-90' | 0.5 | 12903 | 1230 | 51.4 | 7/1/2009 15:18 |
| C2 | Sr-90' | 0.5 | 14448 | 1260 | 43.4 | 7/1/2009 15:19 |
| C2 | Sr-90' | 0.5 | 15845 | 1290 | 36.3 | 7/1/2009 15:20 |
| C2 | Sr-90' | 0.5 | 16538 | 1320 | 26.0 | 7/1/2009 15:20 |
| C2 | Sr-90' | 0.5 | 17303 | 1350 | 16.2 | 7/1/2009 15:21 |
| C2 | Sr-90' | 0.5 | 17622 | 1380 | 8.3 | 7/1/2009 15:22 |
| C2 | Sr-90' | 0.5 | 17729 | 1410 | 1.2 | 7/1/2009 15:22 |
| C2 | Sr-90' | 0.5 | 17572 | 1440 | -0.5 | 7/1/2009 15:23 |
| C2 | Sr-90' | 0.5 | 17507 | 1470 | 0.5 | 7/1/2009 15:23 |
| C2 | Sr-90' | 0.5 | 17657 | 1500 | 2.7 | 7/1/2009 15:24 |
| C2 | Sr-90' | 0.5 | 17758 | 1530 | 1.4 | 7/1/2009 15:25 |
| C2 | Sr-90' | 0.5 | 17852 | 1560 | 1.7 | 7/1/2009 15:25 |
| C2 | Sr-90' | 0.5 | 17621 | 1590 | 0.7 | 7/1/2009 15:26 |
| C2 | Sr-90' | 0.5 | 17984 | 1620 | | 7/1/2009 15:27 |
| C2 | Sr-90' | 0.5 | 17797 | 1650 | | 7/1/2009 15:27 |
| C3 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| C3 | Sr-90' | 0.11 | 1 | 780 | | 7/1/2009 15:09 |
| C3 | Sr-90' | 0.11 | 5 | 810 | 3.3 | 7/1/2009 15:10 |
| C3 | Sr-90' | 0.5 | 146 | 840 | 6.5 | 7/1/2009 15:10 |
| C3 | Sr-90' | 0.5 | 419 | 870 | 10.9 | 7/1/2009 15:11 |
| C3 | Sr-90' | 0.5 | 776 | 900 | 14.3 | 7/1/2009 15:11 |
| C3 | Sr-90' | 0.5 | 1319 | 930 | 17.7 | 7/1/2009 15:12 |
| C3 | Sr-90' | 0.5 | 1837 | 960 | 21.7 | 7/1/2009 15:13 |
| C3 | Sr-90' | 0.5 | 2548 | 990 | 25.2 | 7/1/2009 15:13 |
| C3 | Sr-90' | 0.5 | 3420 | 1020 | 31.1 | 7/1/2009 15:14 |
| C3 | Sr-90' | 0.5 | 4313 | 1050 | 36.7 | 7/1/2009 15:15 |
| C3 | Sr-90' | 0.5 | 5621 | 1080 | 42.8 | 7/1/2009 15:15 |
| C3 | Sr-90' | 0.5 | 6946 | 1110 | 51.9 | 7/1/2009 15:16 |
| C3 | Sr-90' | 0.5 | 8517 | 1140 | 58.5 | 7/1/2009 15:17 |
| C3 | Sr-90' | 0.5 | 10649 | 1170 | 64.5 | 7/1/2009 15:17 |
| C3 | Sr-90' | 0.5 | 12537 | 1200 | 67.2 | 7/1/2009 15:18 |
| C3 | Sr-90' | 0.5 | 14612 | 1230 | 64.4 | 7/1/2009 15:18 |
| C3 | Sr-90' | 0.5 | 16617 | 1260 | 56.7 | 7/1/2009 15:19 |
| C3 | Sr-90' | 0.5 | 18266 | 1290 | 44.5 | 7/1/2009 15:20 |
| C3 | Sr-90' | 0.5 | 19218 | 1320 | 30.5 | 7/1/2009 15:20 |
| C3 | Sr-90' | 0.5 | 19990 | 1350 | 17.2 | 7/1/2009 15:21 |
| C3 | Sr-90' | 0.5 | 20330 | 1380 | 9.3 | 7/1/2009 15:22 |
| C3 | Sr-90' | 0.5 | 20293 | 1410 | 3.9 | 7/1/2009 15:22 |
| C3 | Sr-90' | 0.5 | 20457 | 1440 | 1.2 | 7/1/2009 15:23 |
| C3 | Sr-90' | 0.49 | 20504 | 1470 | 2.9 | 7/1/2009 15:23 |
| C3 | Sr-90' | 0.49 | 20402 | 1500 | -0.1 | 7/1/2009 15:24 |
| C3 | Sr-90' | 0.5 | 20751 | 1530 | -0.7 | 7/1/2009 15:25 |
| C3 | Sr-90' | 0.49 | 20326 | 1560 | 1.1 | 7/1/2009 15:25 |
| C3 | Sr-90' | 0.49 | 20435 | 1590 | 1.3 | 7/1/2009 15:26 |
| C3 | Sr-90' | 0.5 | 20730 | 1620 | | 7/1/2009 15:27 |
| C3 | Sr-90' | 0.5 | 20748 | 1650 | | 7/1/2009 15:27 |
| C4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 15:09 |
| C4 | Sr-90' | 0.11 | 0 | 780 | | 7/1/2009 15:09 |
| C4 | Sr-90' | 0.11 | 2 | 810 | 2.1 | 7/1/2009 15:10 |
| C4 | Sr-90' | 0.5 | 103 | 840 | 4.3 | 7/1/2009 15:10 |
| C4 | Sr-90' | 0.5 | 259 | 870 | 6.9 | 7/1/2009 15:11 |
| C4 | Sr-90' | 0.5 | 521 | 900 | 9.3 | 7/1/2009 15:11 |
| C4 | Sr-90' | 0.5 | 831 | 930 | 11.9 | 7/1/2009 15:12 |

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|---|---|---|---|---|---|---|
| C4 | Sr-90' | 0.5 | 1216 | 960 | 14.4 | 7/1/2009 15:13 |
| C4 | Sr-90' | 0.5 | 1699 | 990 | 17.6 | 7/1/2009 15:13 |
| C4 | Sr-90' | 0.5 | 2244 | 1020 | 21.6 | 7/1/2009 15:14 |
| C4 | Sr-90' | 0.5 | 2955 | 1050 | 25.8 | 7/1/2009 15:15 |
| C4 | Sr-90' | 0.5 | 3821 | 1080 | 31.0 | 7/1/2009 15:15 |
| C4 | Sr-90' | 0.5 | 4783 | 1110 | 35.5 | 7/1/2009 15:16 |
| C4 | Sr-90' | 0.5 | 5977 | 1140 | 38.8 | 7/1/2009 15:17 |
| C4 | Sr-90' | 0.5 | 7204 | 1170 | 43.3 | 7/1/2009 15:17 |
| C4 | Sr-90' | 0.5 | 8425 | 1200 | 44.9 | 7/1/2009 15:18 |
| C4 | Sr-90' | 0.5 | 10053 | 1230 | 42.6 | 7/1/2009 15:18 |
| C4 | Sr-90' | 0.5 | 11280 | 1260 | 36.6 | 7/1/2009 15:19 |
| C4 | Sr-90' | 0.5 | 12165 | 1290 | 28.3 | 7/1/2009 15:20 |
| C4 | Sr-90' | 0.5 | 12855 | 1320 | 20.1 | 7/1/2009 15:20 |
| C4 | Sr-90' | 0.5 | 13515 | 1350 | 13.9 | 7/1/2009 15:21 |
| C4 | Sr-90' | 0.5 | 13616 | 1380 | 8.4 | 7/1/2009 15:22 |
| C4 | Sr-90' | 0.5 | 13872 | 1410 | 4.0 | 7/1/2009 15:22 |
| C4 | Sr-90' | 0.5 | 13942 | 1440 | 3.0 | 7/1/2009 15:23 |
| C4 | Sr-90' | 0.5 | 13948 | 1470 | 1.3 | 7/1/2009 15:23 |
| C4 | Sr-90' | 0.5 | 14027 | 1500 | 3.1 | 7/1/2009 15:24 |
| C4 | Sr-90' | 0.5 | 14021 | 1530 | 2.0 | 7/1/2009 15:25 |
| C4 | Sr-90' | 0.5 | 14373 | 1560 | 0.9 | 7/1/2009 15:25 |
| C4 | Sr-90' | 0.5 | 14078 | 1590 | 0.1 | 7/1/2009 15:26 |
| C4 | Sr-90' | 0.5 | 14134 | 1620 | | 7/1/2009 15:27 |
| C4 | Sr-90' | 0.5 | 14161 | 1650 | | 7/1/2009 15:27 |
| D1 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| D1 | Sr-90' | 0.11 | 1 | 780 | | 7/1/2009 15:09 |
| D1 | Sr-90' | 0.5 | 72 | 810 | 5.0 | 7/1/2009 15:10 |
| D1 | Sr-90' | 0.5 | 270 | 840 | 8.8 | 7/1/2009 15:11 |
| D1 | Sr-90' | 0.5 | 615 | 870 | 13.4 | 7/1/2009 15:11 |
| D1 | Sr-90' | 0.5 | 1053 | 900 | 17.1 | 7/1/2009 15:12 |
| D1 | Sr-90' | 0.5 | 1693 | 930 | 20.6 | 7/1/2009 15:13 |
| D1 | Sr-90' | 0.5 | 2291 | 960 | 23.8 | 7/1/2009 15:14 |
| D1 | Sr-90' | 0.5 | 3080 | 990 | 28.2 | 7/1/2009 15:15 |
| D1 | Sr-90' | 0.5 | 3936 | 1020 | 34.8 | 7/1/2009 15:15 |
| D1 | Sr-90' | 0.5 | 5093 | 1050 | 40.1 | 7/1/2009 15:16 |
| D1 | Sr-90' | 0.5 | 6502 | 1080 | 48.6 | 7/1/2009 15:17 |
| D1 | Sr-90' | 0.5 | 7816 | 1110 | 56.3 | 7/1/2009 15:18 |
| D1 | Sr-90' | 0.5 | 9861 | 1140 | 62.6 | 7/1/2009 15:19 |
| D1 | Sr-90' | 0.5 | 11853 | 1170 | 66.5 | 7/1/2009 15:19 |
| D1 | Sr-90' | 0.5 | 13871 | 1200 | 63.1 | 7/1/2009 15:20 |
| D1 | Sr-90' | 0.5 | 15783 | 1230 | 56.3 | 7/1/2009 15:21 |
| D1 | Sr-90' | 0.5 | 17367 | 1260 | 45.6 | 7/1/2009 15:22 |
| D1 | Sr-90' | 0.5 | 18552 | 1290 | 32.7 | 7/1/2009 15:22 |
| D1 | Sr-90' | 0.5 | 19322 | 1320 | 19.4 | 7/1/2009 15:23 |
| D1 | Sr-90' | 0.5 | 19713 | 1350 | 10.4 | 7/1/2009 15:24 |
| D1 | Sr-90' | 0.5 | 19695 | 1380 | 5.3 | 7/1/2009 15:25 |
| D1 | Sr-90' | 0.5 | 19923 | 1410 | 2.4 | 7/1/2009 15:26 |
| D1 | Sr-90' | 0.5 | 20015 | 1440 | -0.9 | 7/1/2009 15:26 |
| D1 | Sr-90' | 0.5 | 19909 | 1470 | -2.8 | 7/1/2009 15:27 |
| D1 | Sr-90' | 0.5 | 19560 | 1500 | -3.0 | 7/1/2009 15:28 |
| D1 | Sr-90' | 0.5 | 19731 | 1530 | -0.4 | 7/1/2009 15:29 |
| D1 | Sr-90' | 0.5 | 19656 | 1560 | 1.3 | 7/1/2009 15:30 |
| D1 | Sr-90' | 0.5 | 19805 | 1590 | 0.8 | 7/1/2009 15:30 |
| D1 | Sr-90' | 0.5 | 19711 | 1620 | | 7/1/2009 15:31 |
| D1 | Sr-90' | 0.5 | 19827 | 1650 | | 7/1/2009 15:32 |
| D2 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 15:09 |
| D2 | Sr-90' | 0.11 | 0 | 780 | | 7/1/2009 15:09 |
| D2 | Sr-90' | 0.12 | 8 | 810 | 3.7 | 7/1/2009 15:10 |
| D2 | Sr-90' | 0.5 | 183 | 840 | 7.3 | 7/1/2009 15:11 |
| D2 | Sr-90' | 0.5 | 461 | 870 | 11.1 | 7/1/2009 15:11 |
| D2 | Sr-90' | 0.5 | 873 | 900 | 14.3 | 7/1/2009 15:12 |
| D2 | Sr-90' | 0.5 | 1331 | 930 | 17.1 | 7/1/2009 15:13 |
| D2 | Sr-90' | 0.5 | 1899 | 960 | 20.1 | 7/1/2009 15:14 |
| D2 | Sr-90' | 0.5 | 2520 | 990 | 24.9 | 7/1/2009 15:15 |
| D2 | Sr-90' | 0.5 | 3298 | 1020 | 30.4 | 7/1/2009 15:15 |
| D2 | Sr-90' | 0.5 | 4359 | 1050 | 36.7 | 7/1/2009 15:16 |
| D2 | Sr-90' | 0.5 | 5534 | 1080 | 42.9 | 7/1/2009 15:17 |
| D2 | Sr-90' | 0.5 | 6912 | 1110 | 48.8 | 7/1/2009 15:18 |
| D2 | Sr-90' | 0.5 | 8458 | 1140 | 55.7 | 7/1/2009 15:19 |
| D2 | Sr-90' | 0.5 | 10221 | 1170 | 60.7 | 7/1/2009 15:19 |

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|---|---|---|---|---|---|---|
| D2 | Sr-90' | 0.5 | 12229 | 1200 | 59.3 | 7/1/2009 15:20 |
| D2 | Sr-90' | 0.5 | 14132 | 1230 | 54.2 | 7/1/2009 15:21 |
| D2 | Sr-90' | 0.5 | 15397 | 1260 | 44.8 | 7/1/2009 15:22 |
| D2 | Sr-90' | 0.5 | 16761 | 1290 | 32.3 | 7/1/2009 15:22 |
| D2 | Sr-90' | 0.5 | 17632 | 1320 | 23.4 | 7/1/2009 15:23 |
| D2 | Sr-90' | 0.5 | 17862 | 1350 | 14.5 | 7/1/2009 15:24 |
| D2 | Sr-90' | 0.5 | 18357 | 1380 | 8.4 | 7/1/2009 15:25 |
| D2 | Sr-90' | 0.5 | 18569 | 1410 | 4.9 | 7/1/2009 15:26 |
| D2 | Sr-90' | 0.5 | 18543 | 1440 | -2.0 | 7/1/2009 15:26 |
| D2 | Sr-90' | 0.5 | 18507 | 1470 | -1.9 | 7/1/2009 15:27 |
| D2 | Sr-90' | 0.5 | 18087 | 1500 | -0.4 | 7/1/2009 15:28 |
| D2 | Sr-90' | 0.5 | 18508 | 1530 | 1.2 | 7/1/2009 15:29 |
| D2 | Sr-90' | 0.5 | 18487 | 1560 | 2.0 | 7/1/2009 15:30 |
| D2 | Sr-90' | 0.5 | 18483 | 1590 | | 7/1/2009 15:30 |
| D2 | Sr-90' | 0.5 | 18406 | 1620 | | 7/1/2009 15:31 |
| D2 | Sr-90' | 0.5 | 18558 | 1650 | | 7/1/2009 15:32 |
| D3 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| D3 | Sr-90' | 0.11 | 2 | 780 | | 7/1/2009 15:09 |
| D3 | Sr-90' | 0.11 | 13 | 810 | 3.5 | 7/1/2009 15:10 |
| D3 | Sr-90' | 0.5 | 180 | 840 | 7.3 | 7/1/2009 15:11 |
| D3 | Sr-90' | 0.5 | 443 | 870 | 11.9 | 7/1/2009 15:11 |
| D3 | Sr-90' | 0.5 | 889 | 900 | 16.7 | 7/1/2009 15:12 |
| D3 | Sr-90' | 0.5 | 1450 | 930 | 21.0 | 7/1/2009 15:13 |
| D3 | Sr-90' | 0.5 | 2177 | 960 | 24.5 | 7/1/2009 15:14 |
| D3 | Sr-90' | 0.5 | 2948 | 990 | 29.5 | 7/1/2009 15:15 |
| D3 | Sr-90' | 0.5 | 3811 | 1020 | 35.9 | 7/1/2009 15:15 |
| D3 | Sr-90' | 0.5 | 5065 | 1050 | 43.8 | 7/1/2009 15:16 |
| D3 | Sr-90' | 0.5 | 6499 | 1080 | 51.6 | 7/1/2009 15:17 |
| D3 | Sr-90' | 0.5 | 8172 | 1110 | 58.7 | 7/1/2009 15:18 |
| D3 | Sr-90' | 0.5 | 10000 | 1140 | 67.5 | 7/1/2009 15:19 |
| D3 | Sr-90' | 0.5 | 12119 | 1170 | 72.7 | 7/1/2009 15:19 |
| D3 | Sr-90' | 0.5 | 14648 | 1200 | 75.0 | 7/1/2009 15:20 |
| D3 | Sr-90' | 0.5 | 16756 | 1230 | 69.6 | 7/1/2009 15:21 |
| D3 | Sr-90' | 0.5 | 18932 | 1260 | 50.7 | 7/1/2009 15:22 |
| D3 | Sr-90' | 0.49 | 20419 | 1290 | 28.7 | 7/1/2009 15:22 |
| D3 | Sr-90' | 0.47 | 20417 | 1320 | 7.9 | 7/1/2009 15:23 |
| D3 | Sr-90' | 0.45 | 20316 | 1350 | 1.1 | 7/1/2009 15:24 |
| D3 | Sr-90' | 0.44 | 20172 | 1380 | -0.5 | 7/1/2009 15:25 |
| D3 | Sr-90' | 0.45 | 20699 | 1410 | 3.2 | 7/1/2009 15:26 |
| D3 | Sr-90' | 0.44 | 20157 | 1440 | 0.3 | 7/1/2009 15:26 |
| D3 | Sr-90' | 0.45 | 20796 | 1470 | -3.9 | 7/1/2009 15:27 |
| D3 | Sr-90' | 0.44 | 20171 | 1500 | -0.2 | 7/1/2009 15:28 |
| D3 | Sr-90' | 0.44 | 20106 | 1530 | 0.5 | 7/1/2009 15:29 |
| D3 | Sr-90' | 0.44 | 20476 | 1560 | 4.9 | 7/1/2009 15:30 |
| D3 | Sr-90' | 0.45 | 20713 | 1590 | 3.7 | 7/1/2009 15:30 |
| D3 | Sr-90' | 0.45 | 20599 | 1620 | | 7/1/2009 15:31 |
| D3 | Sr-90' | 0.45 | 20602 | 1650 | | 7/1/2009 15:32 |
| D4 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 15:09 |
| D4 | Sr-90' | 0.11 | 1 | 780 | | 7/1/2009 15:09 |
| D4 | Sr-90' | 0.11 | 7 | 810 | 3.2 | 7/1/2009 15:10 |
| D4 | Sr-90' | 0.5 | 147 | 840 | 7.0 | 7/1/2009 15:11 |
| D4 | Sr-90' | 0.5 | 404 | 870 | 11.2 | 7/1/2009 15:11 |
| D4 | Sr-90' | 0.5 | 853 | 900 | 15.0 | 7/1/2009 15:12 |
| D4 | Sr-90' | 0.5 | 1327 | 930 | 17.8 | 7/1/2009 15:13 |
| D4 | Sr-90' | 0.5 | 1936 | 960 | 20.5 | 7/1/2009 15:14 |
| D4 | Sr-90' | 0.5 | 2527 | 990 | 24.2 | 7/1/2009 15:15 |
| D4 | Sr-90' | 0.5 | 3323 | 1020 | 29.1 | 7/1/2009 15:15 |
| D4 | Sr-90' | 0.5 | 4264 | 1050 | 36.1 | 7/1/2009 15:16 |
| D4 | Sr-90' | 0.5 | 5435 | 1080 | 42.7 | 7/1/2009 15:17 |
| D4 | Sr-90' | 0.5 | 6888 | 1110 | 51.1 | 7/1/2009 15:18 |
| D4 | Sr-90' | 0.5 | 8412 | 1140 | 56.9 | 7/1/2009 15:19 |
| D4 | Sr-90' | 0.5 | 10433 | 1170 | 59.9 | 7/1/2009 15:19 |
| D4 | Sr-90' | 0.5 | 12204 | 1200 | 61.4 | 7/1/2009 15:20 |
| D4 | Sr-90' | 0.5 | 13978 | 1230 | 56.9 | 7/1/2009 15:21 |
| D4 | Sr-90' | 0.5 | 15844 | 1260 | 49.4 | 7/1/2009 15:22 |
| D4 | Sr-90' | 0.5 | 17152 | 1290 | 38.6 | 7/1/2009 15:22 |
| D4 | Sr-90' | 0.5 | 18022 | 1320 | 24.6 | 7/1/2009 15:23 |
| D4 | Sr-90' | 0.5 | 18681 | 1350 | 14.6 | 7/1/2009 15:24 |
| D4 | Sr-90' | 0.5 | 18775 | 1380 | 10.1 | 7/1/2009 15:25 |
| D4 | Sr-90' | 0.5 | 18959 | 1410 | 5.8 | 7/1/2009 15:26 |

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|---|---|---|---|---|---|---|
| D4 | Sr-90' | 0.5 | 19392 | 1440 | 2.8 | 7/1/2009 15:26 |
| D4 | Sr-90' | 0.5 | 19243 | 1470 | -2.5 | 7/1/2009 15:27 |
| D4 | Sr-90' | 0.5 | 19058 | 1500 | -4.4 | 7/1/2009 15:28 |
| D4 | Sr-90' | 0.5 | 18753 | 1530 | -2.5 | 7/1/2009 15:29 |
| D4 | Sr-90' | 0.5 | 18970 | 1560 | 2.3 | 7/1/2009 15:30 |
| D4 | Sr-90' | 0.5 | 18909 | 1590 | 2.7 | 7/1/2009 15:30 |
| D4 | Sr-90' | 0.5 | 19318 | 1620 | | 7/1/2009 15:31 |
| D4 | Sr-90' | 0.5 | 18979 | 1650 | | 7/1/2009 15:32 |
| E1 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 16:53 |
| E1 | Sr-90' | 0.11 | 5 | 780 | | 7/1/2009 16:54 |
| E1 | Sr-90' | 0.5 | 105 | 810 | 4.8 | 7/1/2009 16:54 |
| E1 | Sr-90' | 0.5 | 272 | 840 | 7.7 | 7/1/2009 16:55 |
| E1 | Sr-90' | 0.5 | 586 | 870 | 10.2 | 7/1/2009 16:55 |
| E1 | Sr-90' | 0.5 | 917 | 900 | 12.7 | 7/1/2009 16:56 |
| E1 | Sr-90' | 0.5 | 1310 | 930 | 15.1 | 7/1/2009 16:57 |
| E1 | Sr-90' | 0.5 | 1822 | 960 | 17.8 | 7/1/2009 16:57 |
| E1 | Sr-90' | 0.5 | 2394 | 990 | 21.9 | 7/1/2009 16:58 |
| E1 | Sr-90' | 0.5 | 3047 | 1020 | 26.4 | 7/1/2009 16:59 |
| E1 | Sr-90' | 0.5 | 3979 | 1050 | 30.7 | 7/1/2009 16:59 |
| E1 | Sr-90' | 0.5 | 4991 | 1080 | 36.2 | 7/1/2009 17:00 |
| E1 | Sr-90' | 0.5 | 6025 | 1110 | 40.8 | 7/1/2009 17:00 |
| E1 | Sr-90' | 0.5 | 7460 | 1140 | 44.7 | 7/1/2009 17:01 |
| E1 | Sr-90' | 0.5 | 8857 | 1170 | 46.7 | 7/1/2009 17:02 |
| E1 | Sr-90' | 0.5 | 10283 | 1200 | 42.6 | 7/1/2009 17:02 |
| E1 | Sr-90' | 0.5 | 11614 | 1230 | 36.4 | 7/1/2009 17:03 |
| E1 | Sr-90' | 0.5 | 12474 | 1260 | 28.4 | 7/1/2009 17:04 |
| E1 | Sr-90' | 0.5 | 13226 | 1290 | 20.6 | 7/1/2009 17:04 |
| E1 | Sr-90' | 0.5 | 13737 | 1320 | 14.1 | 7/1/2009 17:05 |
| E1 | Sr-90' | 0.5 | 14075 | 1350 | 7.7 | 7/1/2009 17:05 |
| E1 | Sr-90' | 0.5 | 14159 | 1380 | 3.5 | 7/1/2009 17:06 |
| E1 | Sr-90' | 0.5 | 14167 | 1410 | 2.0 | 7/1/2009 17:07 |
| E1 | Sr-90' | 0.5 | 14219 | 1440 | 3.8 | 7/1/2009 17:07 |
| E1 | Sr-90' | 0.5 | 14348 | 1470 | 3.2 | 7/1/2009 17:08 |
| E1 | Sr-90' | 0.5 | 14643 | 1500 | 0.4 | 7/1/2009 17:09 |
| E1 | Sr-90' | 0.5 | 14432 | 1530 | -0.1 | 7/1/2009 17:09 |
| E1 | Sr-90' | 0.5 | 14241 | 1560 | -0.1 | 7/1/2009 17:10 |
| E1 | Sr-90' | 0.5 | 14536 | 1590 | 2.5 | 7/1/2009 17:10 |
| E1 | Sr-90' | 0.5 | 14569 | 1620 | | 7/1/2009 17:11 |
| E1 | Sr-90' | 0.5 | 14650 | 1650 | | 7/1/2009 17:12 |
| E2 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 16:53 |
| E2 | Sr-90' | 0.11 | 3 | 780 | | 7/1/2009 16:54 |
| E2 | Sr-90' | 0.5 | 81 | 810 | 4.5 | 7/1/2009 16:54 |
| E2 | Sr-90' | 0.5 | 238 | 840 | 7.9 | 7/1/2009 16:55 |
| E2 | Sr-90' | 0.5 | 551 | 870 | 11.3 | 7/1/2009 16:55 |
| E2 | Sr-90' | 0.5 | 958 | 900 | 15.1 | 7/1/2009 16:56 |
| E2 | Sr-90' | 0.5 | 1416 | 930 | 18.1 | 7/1/2009 16:57 |
| E2 | Sr-90' | 0.5 | 2066 | 960 | 21.2 | 7/1/2009 16:57 |
| E2 | Sr-90' | 0.5 | 2713 | 990 | 25.8 | 7/1/2009 16:58 |
| E2 | Sr-90' | 0.5 | 3496 | 1020 | 30.6 | 7/1/2009 16:59 |
| E2 | Sr-90' | 0.5 | 4569 | 1050 | 37.2 | 7/1/2009 16:59 |
| E2 | Sr-90' | 0.5 | 5734 | 1080 | 44.5 | 7/1/2009 17:00 |
| E2 | Sr-90' | 0.5 | 7168 | 1110 | 50.7 | 7/1/2009 17:00 |
| E2 | Sr-90' | 0.5 | 8866 | 1140 | 56.4 | 7/1/2009 17:01 |
| E2 | Sr-90' | 0.5 | 10605 | 1170 | 58.5 | 7/1/2009 17:02 |
| E2 | Sr-90' | 0.5 | 12472 | 1200 | 55.9 | 7/1/2009 17:02 |
| E2 | Sr-90' | 0.5 | 14141 | 1230 | 48.8 | 7/1/2009 17:03 |
| E2 | Sr-90' | 0.5 | 15488 | 1260 | 37.9 | 7/1/2009 17:04 |
| E2 | Sr-90' | 0.5 | 16420 | 1290 | 27.4 | 7/1/2009 17:04 |
| E2 | Sr-90' | 0.5 | 17015 | 1320 | 19.0 | 7/1/2009 17:05 |
| E2 | Sr-90' | 0.5 | 17485 | 1350 | 12.1 | 7/1/2009 17:05 |
| E2 | Sr-90' | 0.5 | 17805 | 1380 | 6.0 | 7/1/2009 17:06 |
| E2 | Sr-90' | 0.5 | 17843 | 1410 | 2.5 | 7/1/2009 17:07 |
| E2 | Sr-90' | 0.5 | 17729 | 1440 | 0.6 | 7/1/2009 17:07 |
| E2 | Sr-90' | 0.5 | 17899 | 1470 | 0.2 | 7/1/2009 17:08 |
| E2 | Sr-90' | 0.5 | 17869 | 1500 | 1.8 | 7/1/2009 17:09 |
| E2 | Sr-90' | 0.5 | 17806 | 1530 | 0.0 | 7/1/2009 17:09 |
| E2 | Sr-90' | 0.5 | 18040 | 1560 | 2.2 | 7/1/2009 17:10 |
| E2 | Sr-90' | 0.5 | 17819 | 1590 | 1.9 | 7/1/2009 17:10 |
| E2 | Sr-90' | 0.5 | 18188 | 1620 | | 7/1/2009 17:11 |
| E2 | Sr-90' | 0.5 | 18023 | 1650 | | 7/1/2009 17:12 |

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|---|---|---|---|---|---|---|
| E3 | Sr-90' | 0.11 | 6 | 750 | | 7/1/2009 16:53 |
| E3 | Sr-90' | 0.5 | 100 | 780 | | 7/1/2009 16:54 |
| E3 | Sr-90' | 0.5 | 299 | 810 | 8.2 | 7/1/2009 16:54 |
| E3 | Sr-90' | 0.5 | 562 | 840 | 12.0 | 7/1/2009 16:55 |
| E3 | Sr-90' | 0.5 | 998 | 870 | 15.3 | 7/1/2009 16:55 |
| E3 | Sr-90' | 0.5 | 1557 | 900 | 18.2 | 7/1/2009 16:56 |
| E3 | Sr-90' | 0.5 | 2103 | 930 | 21.5 | 7/1/2009 16:57 |
| E3 | Sr-90' | 0.5 | 2734 | 960 | 25.7 | 7/1/2009 16:57 |
| E3 | Sr-90' | 0.5 | 3637 | 990 | 32.2 | 7/1/2009 16:58 |
| E3 | Sr-90' | 0.5 | 4648 | 1020 | 38.0 | 7/1/2009 16:59 |
| E3 | Sr-90' | 0.5 | 5981 | 1050 | 43.0 | 7/1/2009 16:59 |
| E3 | Sr-90' | 0.5 | 7264 | 1080 | 48.2 | 7/1/2009 17:00 |
| E3 | Sr-90' | 0.5 | 8773 | 1110 | 52.4 | 7/1/2009 17:00 |
| E3 | Sr-90' | 0.5 | 10478 | 1140 | 56.1 | 7/1/2009 17:01 |
| E3 | Sr-90' | 0.5 | 12239 | 1170 | 54.1 | 7/1/2009 17:02 |
| E3 | Sr-90' | 0.5 | 13953 | 1200 | 47.1 | 7/1/2009 17:02 |
| E3 | Sr-90' | 0.5 | 15145 | 1230 | 37.8 | 7/1/2009 17:03 |
| E3 | Sr-90' | 0.5 | 16088 | 1260 | 27.2 | 7/1/2009 17:04 |
| E3 | Sr-90' | 0.5 | 16835 | 1290 | 18.2 | 7/1/2009 17:04 |
| E3 | Sr-90' | 0.5 | 17187 | 1320 | 9.6 | 7/1/2009 17:05 |
| E3 | Sr-90' | 0.5 | 17323 | 1350 | 4.3 | 7/1/2009 17:05 |
| E3 | Sr-90' | 0.5 | 17281 | 1380 | 4.2 | 7/1/2009 17:06 |
| E3 | Sr-90' | 0.5 | 17438 | 1410 | 2.2 | 7/1/2009 17:07 |
| E3 | Sr-90' | 0.5 | 17763 | 1440 | 1.7 | 7/1/2009 17:07 |
| E3 | Sr-90' | 0.5 | 17411 | 1470 | -0.9 | 7/1/2009 17:08 |
| E3 | Sr-90' | 0.5 | 17545 | 1500 | -0.4 | 7/1/2009 17:09 |
| E3 | Sr-90' | 0.5 | 17408 | 1530 | 2.9 | 7/1/2009 17:09 |
| E3 | Sr-90' | 0.5 | 17704 | 1560 | 1.8 | 7/1/2009 17:10 |
| E3 | Sr-90' | 0.5 | 17768 | 1590 | 0.6 | 7/1/2009 17:10 |
| E3 | Sr-90' | 0.5 | 17641 | 1620 | | 7/1/2009 17:11 |
| E3 | Sr-90' | 0.5 | 17535 | 1650 | | 7/1/2009 17:12 |
| E4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 16:53 |
| E4 | Sr-90' | 0.12 | 1 | 780 | | 7/1/2009 16:54 |
| E4 | Sr-90' | 0.5 | 62 | 810 | 3.5 | 7/1/2009 16:54 |
| E4 | Sr-90' | 0.5 | 205 | 840 | 6.0 | 7/1/2009 16:55 |
| E4 | Sr-90' | 0.5 | 428 | 870 | 8.7 | 7/1/2009 16:55 |
| E4 | Sr-90' | 0.5 | 712 | 900 | 12.1 | 7/1/2009 16:56 |
| E4 | Sr-90' | 0.5 | 1114 | 930 | 15.5 | 7/1/2009 16:57 |
| E4 | Sr-90' | 0.5 | 1670 | 960 | 17.6 | 7/1/2009 16:57 |
| E4 | Sr-90' | 0.5 | 2269 | 990 | 21.0 | 7/1/2009 16:58 |
| E4 | Sr-90' | 0.5 | 2774 | 1020 | 25.3 | 7/1/2009 16:59 |
| E4 | Sr-90' | 0.5 | 3713 | 1050 | 30.9 | 7/1/2009 16:59 |
| E4 | Sr-90' | 0.5 | 4742 | 1080 | 38.0 | 7/1/2009 17:00 |
| E4 | Sr-90' | 0.5 | 5922 | 1110 | 41.9 | 7/1/2009 17:00 |
| E4 | Sr-90' | 0.5 | 7364 | 1140 | 46.6 | 7/1/2009 17:01 |
| E4 | Sr-90' | 0.5 | 8687 | 1170 | 48.0 | 7/1/2009 17:02 |
| E4 | Sr-90' | 0.5 | 10345 | 1200 | 46.5 | 7/1/2009 17:02 |
| E4 | Sr-90' | 0.5 | 11633 | 1230 | 42.6 | 7/1/2009 17:03 |
| E4 | Sr-90' | 0.5 | 12867 | 1260 | 35.1 | 7/1/2009 17:04 |
| E4 | Sr-90' | 0.5 | 13814 | 1290 | 27.5 | 7/1/2009 17:04 |
| E4 | Sr-90' | 0.5 | 14521 | 1320 | 17.8 | 7/1/2009 17:05 |
| E4 | Sr-90' | 0.5 | 14937 | 1350 | 11.4 | 7/1/2009 17:05 |
| E4 | Sr-90' | 0.5 | 14976 | 1380 | 6.8 | 7/1/2009 17:06 |
| E4 | Sr-90' | 0.5 | 15298 | 1410 | 4.0 | 7/1/2009 17:07 |
| E4 | Sr-90' | 0.5 | 15356 | 1440 | 3.4 | 7/1/2009 17:07 |
| E4 | Sr-90' | 0.5 | 15348 | 1470 | 2.5 | 7/1/2009 17:08 |
| E4 | Sr-90' | 0.5 | 15467 | 1500 | 1.5 | 7/1/2009 17:09 |
| E4 | Sr-90' | 0.5 | 15614 | 1530 | -0.3 | 7/1/2009 17:09 |
| E4 | Sr-90' | 0.5 | 15441 | 1560 | -2.2 | 7/1/2009 17:10 |
| E4 | Sr-90' | 0.5 | 15310 | 1590 | -0.7 | 7/1/2009 17:10 |
| E4 | Sr-90' | 0.5 | 15285 | 1620 | | 7/1/2009 17:11 |
| E4 | Sr-90' | 0.5 | 15594 | 1650 | | 7/1/2009 17:12 |
| F1 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 16:53 |
| F1 | Sr-90' | 0.5 | 41 | 780 | | 7/1/2009 16:54 |
| F1 | Sr-90' | 0.5 | 140 | 810 | 5.8 | 7/1/2009 16:54 |
| F1 | Sr-90' | 0.5 | 386 | 840 | 9.6 | 7/1/2009 16:55 |
| F1 | Sr-90' | 0.5 | 692 | 870 | 13.4 | 7/1/2009 16:55 |
| F1 | Sr-90' | 0.5 | 1203 | 900 | 17.5 | 7/1/2009 16:56 |
| F1 | Sr-90' | 0.5 | 1739 | 930 | 22.0 | 7/1/2009 16:57 |
| F1 | Sr-90' | 0.5 | 2486 | 960 | 24.4 | 7/1/2009 16:57 |

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|---|---|---|---|---|---|---|
| F1 | Sr-90' | 0.5 | 3345 | 990 | 28.5 | 7/1/2009 16:58 |
| F1 | Sr-90' | 0.5 | 4063 | 1020 | 33.4 | 7/1/2009 16:59 |
| F1 | Sr-90' | 0.5 | 5218 | 1050 | 39.9 | 7/1/2009 16:59 |
| F1 | Sr-90' | 0.5 | 6559 | 1080 | 49.9 | 7/1/2009 17:00 |
| F1 | Sr-90' | 0.5 | 8089 | 1110 | 56.9 | 7/1/2009 17:00 |
| F1 | Sr-90' | 0.5 | 10105 | 1140 | 63.2 | 7/1/2009 17:01 |
| F1 | Sr-90' | 0.5 | 11973 | 1170 | 63.6 | 7/1/2009 17:02 |
| F1 | Sr-90' | 0.5 | 14100 | 1200 | 60.5 | 7/1/2009 17:02 |
| F1 | Sr-90' | 0.5 | 15625 | 1230 | 51.4 | 7/1/2009 17:03 |
| F1 | Sr-90' | 0.5 | 17349 | 1260 | 40.8 | 7/1/2009 17:04 |
| F1 | Sr-90' | 0.5 | 18058 | 1290 | 29.0 | 7/1/2009 17:04 |
| F1 | Sr-90' | 0.5 | 19007 | 1320 | 16.9 | 7/1/2009 17:05 |
| F1 | Sr-90' | 0.5 | 19153 | 1350 | 11.1 | 7/1/2009 17:05 |
| F1 | Sr-90' | 0.5 | 19337 | 1380 | 4.5 | 7/1/2009 17:06 |
| F1 | Sr-90' | 0.5 | 19560 | 1410 | 4.6 | 7/1/2009 17:07 |
| F1 | Sr-90' | 0.5 | 19474 | 1440 | 2.9 | 7/1/2009 17:07 |
| F1 | Sr-90' | 0.5 | 19777 | 1470 | 2.2 | 7/1/2009 17:08 |
| F1 | Sr-90' | 0.5 | 19660 | 1500 | 2.0 | 7/1/2009 17:09 |
| F1 | Sr-90' | 0.5 | 19795 | 1530 | 1.4 | 7/1/2009 17:09 |
| F1 | Sr-90' | 0.5 | 19765 | 1560 | 1.5 | 7/1/2009 17:10 |
| F1 | Sr-90' | 0.5 | 19927 | 1590 | -0.9 | 7/1/2009 17:10 |
| F1 | Sr-90' | 0.5 | 19825 | 1620 | | 7/1/2009 17:11 |
| F1 | Sr-90' | 0.5 | 19634 | 1650 | | 7/1/2009 17:12 |
| F2 | Sr-90' | 0.11 | 3 | 750 | | 7/1/2009 16:53 |
| F2 | Sr-90' | 0.5 | 75 | 780 | | 7/1/2009 16:54 |
| F2 | Sr-90' | 0.5 | 255 | 810 | 8.6 | 7/1/2009 16:54 |
| F2 | Sr-90' | 0.5 | 549 | 840 | 12.8 | 7/1/2009 16:55 |
| F2 | Sr-90' | 0.5 | 1053 | 870 | 16.1 | 7/1/2009 16:56 |
| F2 | Sr-90' | 0.5 | 1600 | 900 | 20.7 | 7/1/2009 16:56 |
| F2 | Sr-90' | 0.5 | 2150 | 930 | 24.4 | 7/1/2009 16:57 |
| F2 | Sr-90' | 0.5 | 3108 | 960 | 30.2 | 7/1/2009 16:57 |
| F2 | Sr-90' | 0.5 | 3956 | 990 | 37.2 | 7/1/2009 16:58 |
| F2 | Sr-90' | 0.5 | 5225 | 1020 | 43.1 | 7/1/2009 16:59 |
| F2 | Sr-90' | 0.5 | 6673 | 1050 | 52.0 | 7/1/2009 16:59 |
| F2 | Sr-90' | 0.5 | 8221 | 1080 | 57.9 | 7/1/2009 17:00 |
| F2 | Sr-90' | 0.5 | 10263 | 1110 | 65.3 | 7/1/2009 17:00 |
| F2 | Sr-90' | 0.5 | 12122 | 1140 | 70.5 | 7/1/2009 17:01 |
| F2 | Sr-90' | 0.5 | 14514 | 1170 | 70.5 | 7/1/2009 17:02 |
| F2 | Sr-90' | 0.5 | 16669 | 1200 | 64.7 | 7/1/2009 17:02 |
| F2 | Sr-90' | 0.5 | 18558 | 1230 | 50.8 | 7/1/2009 17:03 |
| F2 | Sr-90' | 0.5 | 19798 | 1260 | 30.8 | 7/1/2009 17:04 |
| F2 | Sr-90' | 0.5 | 20571 | 1290 | 14.2 | 7/1/2009 17:04 |
| F2 | Sr-90' | 0.48 | 20276 | 1320 | 4.2 | 7/1/2009 17:05 |
| F2 | Sr-90' | 0.48 | 20444 | 1350 | -2.3 | 7/1/2009 17:05 |
| F2 | Sr-90' | 0.48 | 20498 | 1380 | -0.7 | 7/1/2009 17:06 |
| F2 | Sr-90' | 0.47 | 20110 | 1410 | 0.6 | 7/1/2009 17:07 |
| F2 | Sr-90' | 0.47 | 20341 | 1440 | 0.6 | 7/1/2009 17:07 |
| F2 | Sr-90' | 0.48 | 20608 | 1470 | 2.6 | 7/1/2009 17:08 |
| F2 | Sr-90' | 0.47 | 20343 | 1500 | 1.8 | 7/1/2009 17:09 |
| F2 | Sr-90' | 0.48 | 20506 | 1530 | -0.2 | 7/1/2009 17:09 |
| F2 | Sr-90' | 0.48 | 20655 | 1560 | 1.8 | 7/1/2009 17:10 |
| F2 | Sr-90' | 0.47 | 20420 | 1590 | -0.3 | 7/1/2009 17:10 |
| F2 | Sr-90' | 0.48 | 20663 | 1620 | | 7/1/2009 17:11 |
| F2 | Sr-90' | 0.47 | 20459 | 1650 | | 7/1/2009 17:12 |
| F3 | Sr-90' | 0.11 | 4 | 750 | | 7/1/2009 16:53 |
| F3 | Sr-90' | 0.5 | 50 | 780 | | 7/1/2009 16:54 |
| F3 | Sr-90' | 0.5 | 177 | 810 | 6.3 | 7/1/2009 16:54 |
| F3 | Sr-90' | 0.5 | 380 | 840 | 10.6 | 7/1/2009 16:55 |
| F3 | Sr-90' | 0.5 | 779 | 870 | 14.1 | 7/1/2009 16:56 |
| F3 | Sr-90' | 0.5 | 1332 | 900 | 17.5 | 7/1/2009 16:56 |
| F3 | Sr-90' | 0.5 | 1821 | 930 | 21.0 | 7/1/2009 16:57 |
| F3 | Sr-90' | 0.5 | 2490 | 960 | 24.7 | 7/1/2009 16:57 |
| F3 | Sr-90' | 0.5 | 3348 | 990 | 30.7 | 7/1/2009 16:58 |
| F3 | Sr-90' | 0.5 | 4268 | 1020 | 37.1 | 7/1/2009 16:59 |
| F3 | Sr-90' | 0.5 | 5535 | 1050 | 43.6 | 7/1/2009 16:59 |
| F3 | Sr-90' | 0.5 | 6954 | 1080 | 49.9 | 7/1/2009 17:00 |
| F3 | Sr-90' | 0.5 | 8548 | 1110 | 54.8 | 7/1/2009 17:00 |
| F3 | Sr-90' | 0.5 | 10239 | 1140 | 59.6 | 7/1/2009 17:01 |
| F3 | Sr-90' | 0.5 | 12114 | 1170 | 60.8 | 7/1/2009 17:02 |
| F3 | Sr-90' | 0.5 | 14106 | 1200 | 57.4 | 7/1/2009 17:02 |

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| F3 | Sr-90' | 0.5 | 15735 | 1230 | 48.0 | 7/1/2009 17:03 |
| F3 | Sr-90' | 0.5 | 17035 | 1260 | 35.4 | 7/1/2009 17:04 |
| F3 | Sr-90' | 0.5 | 17852 | 1290 | 25.4 | 7/1/2009 17:04 |
| F3 | Sr-90' | 0.5 | 18355 | 1320 | 15.1 | 7/1/2009 17:05 |
| F3 | Sr-90' | 0.5 | 18889 | 1350 | 7.9 | 7/1/2009 17:05 |
| F3 | Sr-90' | 0.5 | 18778 | 1380 | 4.9 | 7/1/2009 17:06 |
| F3 | Sr-90' | 0.5 | 18827 | 1410 | 2.1 | 7/1/2009 17:07 |
| F3 | Sr-90' | 0.5 | 19124 | 1440 | 2.7 | 7/1/2009 17:07 |
| F3 | Sr-90' | 0.5 | 19026 | 1470 | 1.2 | 7/1/2009 17:08 |
| F3 | Sr-90' | 0.5 | 19090 | 1500 | -0.3 | 7/1/2009 17:09 |
| F3 | Sr-90' | 0.5 | 19021 | 1530 | 0.7 | 7/1/2009 17:09 |
| F3 | Sr-90' | 0.5 | 19089 | 1560 | 1.2 | 7/1/2009 17:10 |
| F3 | Sr-90' | 0.5 | 19128 | 1590 | 2.1 | 7/1/2009 17:10 |
| F3 | Sr-90' | 0.5 | 19221 | 1620 | | 7/1/2009 17:11 |
| F3 | Sr-90' | 0.5 | 19274 | 1650 | | 7/1/2009 17:12 |
| F4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 16:53 |
| F4 | Sr-90' | 0.11 | 0 | 780 | | 7/1/2009 16:54 |
| F4 | Sr-90' | 0.5 | 125 | 810 | 5.6 | 7/1/2009 16:54 |
| F4 | Sr-90' | 0.5 | 346 | 840 | 9.4 | 7/1/2009 16:55 |
| F4 | Sr-90' | 0.5 | 671 | 870 | 13.3 | 7/1/2009 16:56 |
| F4 | Sr-90' | 0.5 | 1133 | 900 | 16.8 | 7/1/2009 16:56 |
| F4 | Sr-90' | 0.5 | 1726 | 930 | 20.4 | 7/1/2009 16:57 |
| F4 | Sr-90' | 0.5 | 2343 | 960 | 24.5 | 7/1/2009 16:57 |
| F4 | Sr-90' | 0.5 | 3123 | 990 | 28.7 | 7/1/2009 16:58 |
| F4 | Sr-90' | 0.5 | 4105 | 1020 | 34.6 | 7/1/2009 16:59 |
| F4 | Sr-90' | 0.5 | 5144 | 1050 | 40.7 | 7/1/2009 16:59 |
| F4 | Sr-90' | 0.5 | 6524 | 1080 | 46.8 | 7/1/2009 17:00 |
| F4 | Sr-90' | 0.5 | 8020 | 1110 | 53.6 | 7/1/2009 17:00 |
| F4 | Sr-90' | 0.5 | 9687 | 1140 | 59.4 | 7/1/2009 17:01 |
| F4 | Sr-90' | 0.5 | 11603 | 1170 | 59.9 | 7/1/2009 17:02 |
| F4 | Sr-90' | 0.5 | 13644 | 1200 | 58.2 | 7/1/2009 17:02 |
| F4 | Sr-90' | 0.5 | 15027 | 1230 | 50.3 | 7/1/2009 17:03 |
| F4 | Sr-90' | 0.5 | 16711 | 1260 | 38.9 | 7/1/2009 17:04 |
| F4 | Sr-90' | 0.5 | 17608 | 1290 | 27.3 | 7/1/2009 17:04 |
| F4 | Sr-90' | 0.5 | 18185 | 1320 | 15.4 | 7/1/2009 17:05 |
| F4 | Sr-90' | 0.5 | 18391 | 1350 | 9.8 | 7/1/2009 17:05 |
| F4 | Sr-90' | 0.5 | 18626 | 1380 | 5.6 | 7/1/2009 17:06 |
| F4 | Sr-90' | 0.5 | 18863 | 1410 | 3.4 | 7/1/2009 17:07 |
| F4 | Sr-90' | 0.5 | 18792 | 1440 | 2.1 | 7/1/2009 17:07 |
| F4 | Sr-90' | 0.5 | 18816 | 1470 | -0.5 | 7/1/2009 17:08 |
| F4 | Sr-90' | 0.5 | 18962 | 1500 | 1.5 | 7/1/2009 17:09 |
| F4 | Sr-90' | 0.5 | 18700 | 1530 | 1.6 | 7/1/2009 17:09 |
| F4 | Sr-90' | 0.5 | 19073 | 1560 | 0.5 | 7/1/2009 17:10 |
| F4 | Sr-90' | 0.5 | 18996 | 1590 | 1.6 | 7/1/2009 17:10 |
| F4 | Sr-90' | 0.5 | 18893 | 1620 | | 7/1/2009 17:11 |
| F4 | Sr-90' | 0.5 | 19035 | 1650 | | 7/1/2009 17:12 |
| G1 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 16:53 |
| G1 | Sr-90' | 0.11 | 8 | 780 | | 7/1/2009 16:54 |
| G1 | Sr-90' | 0.5 | 142 | 810 | 5.3 | 7/1/2009 16:54 |
| G1 | Sr-90' | 0.5 | 309 | 840 | 8.5 | 7/1/2009 16:54 |
| G1 | Sr-90' | 0.5 | 643 | 870 | 11.6 | 7/1/2009 16:55 |
| G1 | Sr-90' | 0.5 | 1029 | 900 | 14.5 | 7/1/2009 16:56 |
| G1 | Sr-90' | 0.5 | 1529 | 930 | 17.1 | 7/1/2009 16:56 |
| G1 | Sr-90' | 0.5 | 2045 | 960 | 20.8 | 7/1/2009 16:57 |
| G1 | Sr-90' | 0.5 | 2698 | 990 | 24.9 | 7/1/2009 16:58 |
| G1 | Sr-90' | 0.5 | 3567 | 1020 | 30.5 | 7/1/2009 16:58 |
| G1 | Sr-90' | 0.5 | 4501 | 1050 | 34.9 | 7/1/2009 16:59 |
| G1 | Sr-90' | 0.5 | 5717 | 1080 | 42.1 | 7/1/2009 16:59 |
| G1 | Sr-90' | 0.5 | 6865 | 1110 | 49.7 | 7/1/2009 17:00 |
| G1 | Sr-90' | 0.5 | 8707 | 1140 | 54.5 | 7/1/2009 17:01 |
| G1 | Sr-90' | 0.5 | 10467 | 1170 | 57.3 | 7/1/2009 17:01 |
| G1 | Sr-90' | 0.5 | 12095 | 1200 | 52.8 | 7/1/2009 17:02 |
| G1 | Sr-90' | 0.5 | 13759 | 1230 | 47.4 | 7/1/2009 17:03 |
| G1 | Sr-90' | 0.5 | 14976 | 1260 | 37.0 | 7/1/2009 17:03 |
| G1 | Sr-90' | 0.5 | 16137 | 1290 | 25.1 | 7/1/2009 17:04 |
| G1 | Sr-90' | 0.5 | 16455 | 1320 | 16.0 | 7/1/2009 17:04 |
| G1 | Sr-90' | 0.5 | 16791 | 1350 | 8.1 | 7/1/2009 17:05 |
| G1 | Sr-90' | 0.5 | 17045 | 1380 | 5.8 | 7/1/2009 17:06 |
| G1 | Sr-90' | 0.5 | 17060 | 1410 | 2.2 | 7/1/2009 17:06 |
| G1 | Sr-90' | 0.5 | 17183 | 1440 | 0.5 | 7/1/2009 17:07 |

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|---|---|---|---|---|---|---|
| G1 | Sr-90' | 0.5 | 17051 | 1470 | -0.1 | 7/1/2009 17:08 |
| G1 | Sr-90' | 0.5 | 17124 | 1500 | 0.2 | 7/1/2009 17:08 |
| G1 | Sr-90' | 0.5 | 17071 | 1530 | 1.3 | 7/1/2009 17:09 |
| G1 | Sr-90' | 0.5 | 17202 | 1560 | 0.7 | 7/1/2009 17:09 |
| G1 | Sr-90' | 0.5 | 17214 | 1590 | 1.5 | 7/1/2009 17:10 |
| G1 | Sr-90' | 0.5 | 17159 | 1620 | | 7/1/2009 17:11 |
| G1 | Sr-90' | 0.5 | 17321 | 1650 | | 7/1/2009 17:11 |
| G2 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 16:53 |
| G2 | Sr-90' | 0.11 | 8 | 780 | | 7/1/2009 16:54 |
| G2 | Sr-90' | 0.5 | 148 | 810 | 5.7 | 7/1/2009 16:54 |
| G2 | Sr-90' | 0.5 | 324 | 840 | 9.1 | 7/1/2009 16:54 |
| G2 | Sr-90' | 0.5 | 700 | 870 | 12.3 | 7/1/2009 16:55 |
| G2 | Sr-90' | 0.5 | 1101 | 900 | 15.5 | 7/1/2009 16:56 |
| G2 | Sr-90' | 0.5 | 1601 | 930 | 18.8 | 7/1/2009 16:56 |
| G2 | Sr-90' | 0.5 | 2197 | 960 | 23.0 | 7/1/2009 16:57 |
| G2 | Sr-90' | 0.5 | 2979 | 990 | 28.0 | 7/1/2009 16:58 |
| G2 | Sr-90' | 0.5 | 3866 | 1020 | 33.2 | 7/1/2009 16:58 |
| G2 | Sr-90' | 0.5 | 4971 | 1050 | 38.4 | 7/1/2009 16:59 |
| G2 | Sr-90' | 0.5 | 6177 | 1080 | 44.0 | 7/1/2009 16:59 |
| G2 | Sr-90' | 0.5 | 7579 | 1110 | 50.4 | 7/1/2009 17:00 |
| G2 | Sr-90' | 0.5 | 9156 | 1140 | 56.2 | 7/1/2009 17:01 |
| G2 | Sr-90' | 0.5 | 11042 | 1170 | 59.0 | 7/1/2009 17:01 |
| G2 | Sr-90' | 0.5 | 12872 | 1200 | 58.2 | 7/1/2009 17:02 |
| G2 | Sr-90' | 0.5 | 14577 | 1230 | 50.9 | 7/1/2009 17:03 |
| G2 | Sr-90' | 0.5 | 16124 | 1260 | 38.8 | 7/1/2009 17:03 |
| G2 | Sr-90' | 0.5 | 17054 | 1290 | 26.4 | 7/1/2009 17:04 |
| G2 | Sr-90' | 0.5 | 17456 | 1320 | 16.4 | 7/1/2009 17:04 |
| G2 | Sr-90' | 0.5 | 17867 | 1350 | 9.5 | 7/1/2009 17:05 |
| G2 | Sr-90' | 0.5 | 18172 | 1380 | 5.6 | 7/1/2009 17:06 |
| G2 | Sr-90' | 0.5 | 18119 | 1410 | 3.2 | 7/1/2009 17:06 |
| G2 | Sr-90' | 0.5 | 18174 | 1440 | 2.4 | 7/1/2009 17:07 |
| G2 | Sr-90' | 0.5 | 18347 | 1470 | 2.6 | 7/1/2009 17:08 |
| G2 | Sr-90' | 0.5 | 18411 | 1500 | 2.6 | 7/1/2009 17:08 |
| G2 | Sr-90' | 0.5 | 18383 | 1530 | 0.5 | 7/1/2009 17:09 |
| G2 | Sr-90' | 0.5 | 18551 | 1560 | 0.4 | 7/1/2009 17:09 |
| G2 | Sr-90' | 0.5 | 18352 | 1590 | -1.0 | 7/1/2009 17:10 |
| G2 | Sr-90' | 0.5 | 18482 | 1620 | | 7/1/2009 17:11 |
| G2 | Sr-90' | 0.5 | 18274 | 1650 | | 7/1/2009 17:11 |
| G3 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 16:53 |
| G3 | Sr-90' | 0.12 | 0 | 780 | | 7/1/2009 16:54 |
| G3 | Sr-90' | 0.5 | 43 | 810 | 2.8 | 7/1/2009 16:54 |
| G3 | Sr-90' | 0.5 | 140 | 840 | 6.1 | 7/1/2009 16:54 |
| G3 | Sr-90' | 0.5 | 346 | 870 | 10.0 | 7/1/2009 16:55 |
| G3 | Sr-90' | 0.5 | 770 | 900 | 13.8 | 7/1/2009 16:56 |
| G3 | Sr-90' | 0.5 | 1233 | 930 | 17.3 | 7/1/2009 16:56 |
| G3 | Sr-90' | 0.5 | 1759 | 960 | 21.4 | 7/1/2009 16:57 |
| G3 | Sr-90' | 0.5 | 2451 | 990 | 25.6 | 7/1/2009 16:58 |
| G3 | Sr-90' | 0.5 | 3366 | 1020 | 31.4 | 7/1/2009 16:58 |
| G3 | Sr-90' | 0.5 | 4276 | 1050 | 35.9 | 7/1/2009 16:59 |
| G3 | Sr-90' | 0.5 | 5558 | 1080 | 42.3 | 7/1/2009 16:59 |
| G3 | Sr-90' | 0.5 | 6744 | 1110 | 49.0 | 7/1/2009 17:00 |
| G3 | Sr-90' | 0.5 | 8480 | 1140 | 55.9 | 7/1/2009 17:01 |
| G3 | Sr-90' | 0.5 | 10165 | 1170 | 63.6 | 7/1/2009 17:01 |
| G3 | Sr-90' | 0.5 | 12235 | 1200 | 67.0 | 7/1/2009 17:02 |
| G3 | Sr-90' | 0.5 | 14404 | 1230 | 67.4 | 7/1/2009 17:03 |
| G3 | Sr-90' | 0.5 | 16407 | 1260 | 59.3 | 7/1/2009 17:03 |
| G3 | Sr-90' | 0.5 | 18185 | 1290 | 47.6 | 7/1/2009 17:04 |
| G3 | Sr-90' | 0.5 | 19233 | 1320 | 33.5 | 7/1/2009 17:04 |
| G3 | Sr-90' | 0.5 | 20131 | 1350 | 19.1 | 7/1/2009 17:05 |
| G3 | Sr-90' | 0.5 | 20459 | 1380 | 9.5 | 7/1/2009 17:06 |
| G3 | Sr-90' | 0.49 | 20432 | 1410 | 3.7 | 7/1/2009 17:06 |
| G3 | Sr-90' | 0.49 | 20500 | 1440 | 1.6 | 7/1/2009 17:07 |
| G3 | Sr-90' | 0.49 | 20665 | 1470 | -0.3 | 7/1/2009 17:08 |
| G3 | Sr-90' | 0.49 | 20578 | 1500 | -1.6 | 7/1/2009 17:08 |
| G3 | Sr-90' | 0.48 | 20348 | 1530 | -1.6 | 7/1/2009 17:09 |
| G3 | Sr-90' | 0.48 | 20420 | 1560 | 1.5 | 7/1/2009 17:09 |
| G3 | Sr-90' | 0.48 | 20503 | 1590 | 3.3 | 7/1/2009 17:10 |
| G3 | Sr-90' | 0.48 | 20725 | 1620 | | 7/1/2009 17:11 |
| G3 | Sr-90' | 0.48 | 20692 | 1650 | | 7/1/2009 17:11 |
| G4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 16:53 |

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|---|---|---|---|---|---|---|
| G4 | Sr-90' | 0.12 | 2 | 780 | | 7/1/2009 16:54 |
| G4 | Sr-90' | 0.12 | 10 | 810 | 2.1 | 7/1/2009 16:54 |
| G4 | Sr-90' | 0.5 | 96 | 840 | 4.3 | 7/1/2009 16:54 |
| G4 | Sr-90' | 0.5 | 266 | 870 | 7.1 | 7/1/2009 16:55 |
| G4 | Sr-90' | 0.5 | 522 | 900 | 9.6 | 7/1/2009 16:56 |
| G4 | Sr-90' | 0.5 | 858 | 930 | 11.1 | 7/1/2009 16:56 |
| G4 | Sr-90' | 0.5 | 1238 | 960 | 13.8 | 7/1/2009 16:57 |
| G4 | Sr-90' | 0.5 | 1580 | 990 | 16.0 | 7/1/2009 16:58 |
| G4 | Sr-90' | 0.5 | 2232 | 1020 | 19.4 | 7/1/2009 16:58 |
| G4 | Sr-90' | 0.5 | 2756 | 1050 | 24.6 | 7/1/2009 16:59 |
| G4 | Sr-90' | 0.5 | 3567 | 1080 | 28.0 | 7/1/2009 16:59 |
| G4 | Sr-90' | 0.5 | 4603 | 1110 | 33.4 | 7/1/2009 17:00 |
| G4 | Sr-90' | 0.5 | 5501 | 1140 | 38.6 | 7/1/2009 17:01 |
| G4 | Sr-90' | 0.5 | 6802 | 1170 | 41.7 | 7/1/2009 17:01 |
| G4 | Sr-90' | 0.5 | 8262 | 1200 | 44.3 | 7/1/2009 17:02 |
| G4 | Sr-90' | 0.5 | 9472 | 1230 | 42.5 | 7/1/2009 17:03 |
| G4 | Sr-90' | 0.5 | 10818 | 1260 | 38.5 | 7/1/2009 17:03 |
| G4 | Sr-90' | 0.5 | 11904 | 1290 | 32.4 | 7/1/2009 17:04 |
| G4 | Sr-90' | 0.5 | 12821 | 1320 | 23.7 | 7/1/2009 17:04 |
| G4 | Sr-90' | 0.5 | 13335 | 1350 | 16.3 | 7/1/2009 17:05 |
| G4 | Sr-90' | 0.5 | 13662 | 1380 | 8.9 | 7/1/2009 17:06 |
| G4 | Sr-90' | 0.5 | 13925 | 1410 | 5.9 | 7/1/2009 17:06 |
| G4 | Sr-90' | 0.5 | 13865 | 1440 | 2.8 | 7/1/2009 17:07 |
| G4 | Sr-90' | 0.5 | 14125 | 1470 | 0.9 | 7/1/2009 17:08 |
| G4 | Sr-90' | 0.5 | 13975 | 1500 | 2.0 | 7/1/2009 17:08 |
| G4 | Sr-90' | 0.5 | 14009 | 1530 | 2.4 | 7/1/2009 17:09 |
| G4 | Sr-90' | 0.5 | 14226 | 1560 | 3.7 | 7/1/2009 17:09 |
| G4 | Sr-90' | 0.5 | 14366 | 1590 | 2.1 | 7/1/2009 17:10 |
| G4 | Sr-90' | 0.5 | 14354 | 1620 | | 7/1/2009 17:11 |
| G4 | Sr-90' | 0.5 | 14254 | 1650 | | 7/1/2009 17:11 |
| H1 | Sr-90' | 0.11 | 3 | 750 | | 7/1/2009 16:53 |
| H1 | Sr-90' | 0.12 | 4 | 780 | | 7/1/2009 16:54 |
| H1 | Sr-90' | 0.5 | 120 | 810 | 5.0 | 7/1/2009 16:54 |
| H1 | Sr-90' | 0.5 | 277 | 840 | 8.3 | 7/1/2009 16:55 |
| H1 | Sr-90' | 0.5 | 613 | 870 | 11.3 | 7/1/2009 16:55 |
| H1 | Sr-90' | 0.5 | 1000 | 900 | 15.1 | 7/1/2009 16:56 |
| H1 | Sr-90' | 0.5 | 1459 | 930 | 18.3 | 7/1/2009 16:56 |
| H1 | Sr-90' | 0.5 | 2112 | 960 | 22.4 | 7/1/2009 16:57 |
| H1 | Sr-90' | 0.5 | 2797 | 990 | 26.1 | 7/1/2009 16:58 |
| H1 | Sr-90' | 0.5 | 3684 | 1020 | 31.3 | 7/1/2009 16:58 |
| H1 | Sr-90' | 0.5 | 4585 | 1050 | 36.5 | 7/1/2009 16:59 |
| H1 | Sr-90' | 0.5 | 5908 | 1080 | 43.0 | 7/1/2009 17:00 |
| H1 | Sr-90' | 0.5 | 7164 | 1110 | 49.9 | 7/1/2009 17:00 |
| H1 | Sr-90' | 0.5 | 8847 | 1140 | 54.0 | 7/1/2009 17:01 |
| H1 | Sr-90' | 0.5 | 10607 | 1170 | 56.0 | 7/1/2009 17:01 |
| H1 | Sr-90' | 0.5 | 12293 | 1200 | 52.8 | 7/1/2009 17:02 |
| H1 | Sr-90' | 0.5 | 13845 | 1230 | 45.0 | 7/1/2009 17:03 |
| H1 | Sr-90' | 0.5 | 15147 | 1260 | 35.9 | 7/1/2009 17:03 |
| H1 | Sr-90' | 0.5 | 15927 | 1290 | 24.6 | 7/1/2009 17:04 |
| H1 | Sr-90' | 0.5 | 16632 | 1320 | 15.7 | 7/1/2009 17:05 |
| H1 | Sr-90' | 0.5 | 16799 | 1350 | 10.3 | 7/1/2009 17:05 |
| H1 | Sr-90' | 0.5 | 17067 | 1380 | 6.6 | 7/1/2009 17:06 |
| H1 | Sr-90' | 0.5 | 17254 | 1410 | 5.4 | 7/1/2009 17:06 |
| H1 | Sr-90' | 0.5 | 17390 | 1440 | 2.6 | 7/1/2009 17:07 |
| H1 | Sr-90' | 0.5 | 17444 | 1470 | -1.0 | 7/1/2009 17:08 |
| H1 | Sr-90' | 0.5 | 17357 | 1500 | -0.5 | 7/1/2009 17:08 |
| H1 | Sr-90' | 0.5 | 17121 | 1530 | 1.8 | 7/1/2009 17:09 |
| H1 | Sr-90' | 0.5 | 17478 | 1560 | 3.5 | 7/1/2009 17:10 |
| H1 | Sr-90' | 0.5 | 17655 | 1590 | 2.8 | 7/1/2009 17:10 |
| H1 | Sr-90' | 0.5 | 17621 | 1620 | 20.4 | 7/1/2009 17:11 |
| H1 | Sr-90' | 0.5 | 17476 | 1650 | | 7/1/2009 17:11 |
| H2 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 16:53 |
| H2 | Sr-90' | 0.11 | 2 | 780 | | 7/1/2009 16:54 |
| H2 | Sr-90' | 0.11 | 9 | 810 | 3.0 | 7/1/2009 16:54 |
| H2 | Sr-90' | 0.5 | 130 | 840 | 5.7 | 7/1/2009 16:55 |
| H2 | Sr-90' | 0.5 | 386 | 870 | 8.8 | 7/1/2009 16:55 |
| H2 | Sr-90' | 0.5 | 671 | 900 | 11.9 | 7/1/2009 16:56 |
| H2 | Sr-90' | 0.5 | 1065 | 930 | 14.0 | 7/1/2009 16:56 |
| H2 | Sr-90' | 0.5 | 1570 | 960 | 18.0 | 7/1/2009 16:57 |
| H2 | Sr-90' | 0.5 | 2032 | 990 | 22.2 | 7/1/2009 16:58 |

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| H2 | Sr-90' | 0.5 | 2889 | 1020 | 26.1 | 7/1/2009 16:58 |
| H2 | Sr-90' | 0.5 | 3732 | 1050 | 31.4 | 7/1/2009 16:59 |
| H2 | Sr-90' | 0.5 | 4634 | 1080 | 34.9 | 7/1/2009 17:00 |
| H2 | Sr-90' | 0.5 | 5875 | 1110 | 40.7 | 7/1/2009 17:00 |
| H2 | Sr-90' | 0.5 | 7057 | 1140 | 46.8 | 7/1/2009 17:01 |
| H2 | Sr-90' | 0.5 | 8628 | 1170 | 52.3 | 7/1/2009 17:01 |
| H2 | Sr-90' | 0.5 | 10272 | 1200 | 54.8 | 7/1/2009 17:02 |
| H2 | Sr-90' | 0.5 | 12110 | 1230 | 50.3 | 7/1/2009 17:03 |
| H2 | Sr-90' | 0.5 | 13536 | 1260 | 42.6 | 7/1/2009 17:03 |
| H2 | Sr-90' | 0.5 | 14535 | 1290 | 31.4 | 7/1/2009 17:04 |
| H2 | Sr-90' | 0.5 | 15451 | 1320 | 21.6 | 7/1/2009 17:05 |
| H2 | Sr-90' | 0.5 | 15866 | 1350 | 13.4 | 7/1/2009 17:05 |
| H2 | Sr-90' | 0.5 | 16110 | 1380 | 7.8 | 7/1/2009 17:06 |
| H2 | Sr-90' | 0.5 | 16214 | 1410 | 5.3 | 7/1/2009 17:06 |
| H2 | Sr-90' | 0.5 | 16443 | 1440 | 2.9 | 7/1/2009 17:07 |
| H2 | Sr-90' | 0.5 | 16489 | 1470 | 1.2 | 7/1/2009 17:08 |
| H2 | Sr-90' | 0.5 | 16408 | 1500 | 0.0 | 7/1/2009 17:08 |
| H2 | Sr-90' | 0.5 | 16413 | 1530 | 1.6 | 7/1/2009 17:09 |
| H2 | Sr-90' | 0.5 | 16476 | 1560 | 0.9 | 7/1/2009 17:10 |
| H2 | Sr-90' | 0.5 | 16689 | 1590 | 0.2 | 7/1/2009 17:10 |
| H2 | Sr-90' | 0.5 | 16407 | 1620 | | 7/1/2009 17:11 |
| H2 | Sr-90' | 0.5 | 16470 | 1650 | | 7/1/2009 17:11 |
| H3 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 16:53 |
| H3 | Sr-90' | 0.11 | 2 | 780 | | 7/1/2009 16:54 |
| H3 | Sr-90' | 0.11 | 10 | 810 | 2.2 | 7/1/2009 16:54 |
| H3 | Sr-90' | 0.5 | 107 | 840 | 5.0 | 7/1/2009 16:55 |
| H3 | Sr-90' | 0.5 | 281 | 870 | 8.6 | 7/1/2009 16:55 |
| H3 | Sr-90' | 0.5 | 620 | 900 | 12.4 | 7/1/2009 16:56 |
| H3 | Sr-90' | 0.5 | 1041 | 930 | 16.8 | 7/1/2009 16:56 |
| H3 | Sr-90' | 0.5 | 1590 | 960 | 20.0 | 7/1/2009 16:57 |
| H3 | Sr-90' | 0.5 | 2316 | 990 | 24.3 | 7/1/2009 16:58 |
| H3 | Sr-90' | 0.5 | 2989 | 1020 | 29.6 | 7/1/2009 16:58 |
| H3 | Sr-90' | 0.5 | 3989 | 1050 | 35.8 | 7/1/2009 16:59 |
| H3 | Sr-90' | 0.5 | 5187 | 1080 | 42.4 | 7/1/2009 17:00 |
| H3 | Sr-90' | 0.5 | 6593 | 1110 | 48.1 | 7/1/2009 17:00 |
| H3 | Sr-90' | 0.5 | 8042 | 1140 | 56.1 | 7/1/2009 17:01 |
| H3 | Sr-90' | 0.5 | 9778 | 1170 | 62.8 | 7/1/2009 17:01 |
| H3 | Sr-90' | 0.5 | 12005 | 1200 | 68.0 | 7/1/2009 17:02 |
| H3 | Sr-90' | 0.5 | 14024 | 1230 | 67.5 | 7/1/2009 17:03 |
| H3 | Sr-90' | 0.5 | 16121 | 1260 | 59.0 | 7/1/2009 17:03 |
| H3 | Sr-90' | 0.5 | 17840 | 1290 | 49.1 | 7/1/2009 17:04 |
| H3 | Sr-90' | 0.5 | 18952 | 1320 | 33.9 | 7/1/2009 17:05 |
| H3 | Sr-90' | 0.5 | 19970 | 1350 | 20.2 | 7/1/2009 17:05 |
| H3 | Sr-90' | 0.5 | 20148 | 1380 | 11.3 | 7/1/2009 17:06 |
| H3 | Sr-90' | 0.5 | 20279 | 1410 | 3.1 | 7/1/2009 17:06 |
| H3 | Sr-90' | 0.5 | 20488 | 1440 | 1.9 | 7/1/2009 17:07 |
| H3 | Sr-90' | 0.49 | 20260 | 1470 | 1.2 | 7/1/2009 17:08 |
| H3 | Sr-90' | 0.5 | 20448 | 1500 | 0.3 | 7/1/2009 17:08 |
| H3 | Sr-90' | 0.49 | 20478 | 1530 | 0.5 | 7/1/2009 17:09 |
| H3 | Sr-90' | 0.49 | 20420 | 1560 | -1.7 | 7/1/2009 17:10 |
| H3 | Sr-90' | 0.49 | 20351 | 1590 | -1.3 | 7/1/2009 17:10 |
| H3 | Sr-90' | 0.49 | 20252 | 1620 | | 7/1/2009 17:11 |
| H3 | Sr-90' | 0.49 | 20370 | 1650 | | 7/1/2009 17:11 |
| H4 | Sr-90' | 0.12 | 1 | 750 | | 7/1/2009 16:53 |
| H4 | Sr-90' | 0.11 | 3 | 780 | | 7/1/2009 16:54 |
| H4 | Sr-90' | 0.11 | 6 | 810 | 2.6 | 7/1/2009 16:54 |
| H4 | Sr-90' | 0.5 | 150 | 840 | 5.2 | 7/1/2009 16:55 |
| H4 | Sr-90' | 0.5 | 313 | 870 | 8.6 | 7/1/2009 16:55 |
| H4 | Sr-90' | 0.5 | 632 | 900 | 11.7 | 7/1/2009 16:56 |
| H4 | Sr-90' | 0.5 | 1050 | 930 | 16.1 | 7/1/2009 16:56 |
| H4 | Sr-90' | 0.5 | 1541 | 960 | 19.0 | 7/1/2009 16:57 |
| H4 | Sr-90' | 0.5 | 2266 | 990 | 21.7 | 7/1/2009 16:58 |
| H4 | Sr-90' | 0.5 | 2881 | 1020 | 26.3 | 7/1/2009 16:58 |
| H4 | Sr-90' | 0.5 | 3633 | 1050 | 31.4 | 7/1/2009 16:59 |
| H4 | Sr-90' | 0.5 | 4798 | 1080 | 36.1 | 7/1/2009 17:00 |
| H4 | Sr-90' | 0.5 | 6014 | 1110 | 42.2 | 7/1/2009 17:00 |
| H4 | Sr-90' | 0.5 | 7109 | 1140 | 46.2 | 7/1/2009 17:01 |
| H4 | Sr-90' | 0.5 | 8810 | 1170 | 50.5 | 7/1/2009 17:01 |
| H4 | Sr-90' | 0.5 | 10328 | 1200 | 53.0 | 7/1/2009 17:02 |
| H4 | Sr-90' | 0.5 | 11973 | 1230 | 48.7 | 7/1/2009 17:03 |

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| H4 | Sr-90' | 0.5 | 13484 | 1260 | 43.5 | 7/1/2009 17:03 |
| H4 | Sr-90' | 0.5 | 14544 | 1290 | 33.5 | 7/1/2009 17:04 |
| H4 | Sr-90' | 0.5 | 15574 | 1320 | 21.0 | 7/1/2009 17:05 |
| H4 | Sr-90' | 0.5 | 15946 | 1350 | 13.2 | 7/1/2009 17:05 |
| H4 | Sr-90' | 0.5 | 15928 | 1380 | 8.1 | 7/1/2009 17:06 |
| H4 | Sr-90' | 0.5 | 16344 | 1410 | 7.2 | 7/1/2009 17:06 |
| H4 | Sr-90' | 0.5 | 16589 | 1440 | 5.8 | 7/1/2009 17:07 |
| H4 | Sr-90' | 0.5 | 16693 | 1470 | 1.0 | 7/1/2009 17:08 |
| H4 | Sr-90' | 0.5 | 16624 | 1500 | 0.0 | 7/1/2009 17:08 |
| H4 | Sr-90' | 0.5 | 16474 | 1530 | -1.0 | 7/1/2009 17:09 |
| H4 | Sr-90' | 0.5 | 16692 | 1560 | -0.1 | 7/1/2009 17:10 |
| H4 | Sr-90' | 0.5 | 16507 | 1590 | -0.7 | 7/1/2009 17:10 |
| H4 | Sr-90' | 0.5 | 16597 | 1620 | | 7/1/2009 17:11 |
| H4 | Sr-90' | 0.5 | 16414 | 1650 | | 7/1/2009 17:11 |
| I1 | Sr-90 | 0.5 | 123 | 750 | 18.9 | 1/27/2011 10:01 |
| I1 | Sr-90 | 0.5 | 268 | 780 | 18.6 | 1/27/2011 10:01 |
| I1 | Sr-90 | 0.5 | 584 | 810 | 9.6 | 1/27/2011 10:02 |
| I1 | Sr-90 | 0.5 | 867 | 840 | 12.4 | 1/27/2011 10:03 |
| I1 | Sr-90 | 0.5 | 1256 | 870 | 15.1 | 1/27/2011 10:03 |
| I1 | Sr-90 | 0.5 | 1797 | 900 | 17.5 | 1/27/2011 10:04 |
| I1 | Sr-90 | 0.5 | 2382 | 930 | 20.8 | 1/27/2011 10:05 |
| I1 | Sr-90 | 0.5 | 2927 | 960 | 24.5 | 1/27/2011 10:05 |
| I1 | Sr-90 | 0.5 | 3808 | 990 | 29.9 | 1/27/2011 10:06 |
| I1 | Sr-90 | 0.5 | 4757 | 1020 | 34.4 | 1/27/2011 10:07 |
| I1 | Sr-90 | 0.5 | 5949 | 1050 | 39.8 | 1/27/2011 10:07 |
| I1 | Sr-90 | 0.5 | 7017 | 1080 | 42.7 | 1/27/2011 10:08 |
| I1 | Sr-90 | 0.5 | 8641 | 1110 | 43.8 | 1/27/2011 10:08 |
| I1 | Sr-90 | 0.5 | 9823 | 1140 | 43.7 | 1/27/2011 10:09 |
| I1 | Sr-90 | 0.5 | 11116 | 1170 | 36.7 | 1/27/2011 10:10 |
| I1 | Sr-90 | 0.5 | 12334 | 1200 | 28.5 | 1/27/2011 10:10 |
| I1 | Sr-90 | 0.5 | 12896 | 1230 | 18.7 | 1/27/2011 10:11 |
| I1 | Sr-90 | 0.5 | 13215 | 1260 | 9.7 | 1/27/2011 10:12 |
| I1 | Sr-90 | 0.5 | 13483 | 1290 | 6.5 | 1/27/2011 10:12 |
| I1 | Sr-90 | 0.5 | 13490 | 1320 | 4.5 | 1/27/2011 10:13 |
| I1 | Sr-90 | 0.5 | 13739 | 1350 | 2.2 | 1/27/2011 10:13 |
| I1 | Sr-90 | 0.5 | 13768 | 1380 | 1.8 | 1/27/2011 10:14 |
| I1 | Sr-90 | 0.5 | 13669 | 1410 | 0.0 | 1/27/2011 10:15 |
| I1 | Sr-90 | 0.5 | 13797 | 1440 | 0.7 | 1/27/2011 10:15 |
| I1 | Sr-90 | 0.5 | 13731 | 1470 | 0.1 | 1/27/2011 10:16 |
| I1 | Sr-90 | 0.5 | 13846 | 1500 | -0.1 | 1/27/2011 10:17 |
| I1 | Sr-90 | 0.5 | 13654 | 1530 | 1.1 | 1/27/2011 10:17 |
| I1 | Sr-90 | 0.5 | 13826 | 1560 | 1.5 | 1/27/2011 10:18 |
| I1 | Sr-90 | 0.5 | 13901 | 1590 | 3.2 | 1/27/2011 10:18 |
| I1 | Sr-90 | 0.5 | 13942 | 1620 | 16.1 | 1/27/2011 10:19 |
| I1 | Sr-90 | 0.5 | 14075 | 1650 | 16.2 | 1/27/2011 10:20 |
| I2 | Sr-90 | 0.5 | 59 | 750 | 16.1 | 1/27/2011 10:01 |
| I2 | Sr-90 | 0.5 | 171 | 780 | 16.0 | 1/27/2011 10:01 |
| I2 | Sr-90 | 0.5 | 413 | 810 | 10.2 | 1/27/2011 10:02 |
| I2 | Sr-90 | 0.5 | 765 | 840 | 14.7 | 1/27/2011 10:03 |
| I2 | Sr-90 | 0.5 | 1299 | 870 | 18.6 | 1/27/2011 10:03 |
| I2 | Sr-90 | 0.5 | 1931 | 900 | 22.6 | 1/27/2011 10:04 |
| I2 | Sr-90 | 0.5 | 2626 | 930 | 26.9 | 1/27/2011 10:05 |
| I2 | Sr-90 | 0.5 | 3495 | 960 | 32.0 | 1/27/2011 10:05 |
| I2 | Sr-90 | 0.5 | 4556 | 990 | 36.2 | 1/27/2011 10:06 |
| I2 | Sr-90 | 0.5 | 5768 | 1020 | 42.1 | 1/27/2011 10:07 |
| I2 | Sr-90 | 0.5 | 6917 | 1050 | 50.6 | 1/27/2011 10:07 |
| I2 | Sr-90 | 0.5 | 8632 | 1080 | 59.4 | 1/27/2011 10:08 |
| I2 | Sr-90 | 0.5 | 10708 | 1110 | 64.5 | 1/27/2011 10:08 |
| I2 | Sr-90 | 0.5 | 12783 | 1140 | 63.6 | 1/27/2011 10:09 |
| I2 | Sr-90 | 0.5 | 14516 | 1170 | 56.5 | 1/27/2011 10:10 |
| I2 | Sr-90 | 0.5 | 16266 | 1200 | 43.1 | 1/27/2011 10:10 |
| I2 | Sr-90 | 0.5 | 17438 | 1230 | 28.9 | 1/27/2011 10:11 |
| I2 | Sr-90 | 0.5 | 17789 | 1260 | 16.6 | 1/27/2011 10:12 |
| I2 | Sr-90 | 0.5 | 18087 | 1290 | 10.0 | 1/27/2011 10:12 |
| I2 | Sr-90 | 0.5 | 18433 | 1320 | 5.9 | 1/27/2011 10:13 |
| I2 | Sr-90 | 0.5 | 18610 | 1350 | 2.4 | 1/27/2011 10:13 |
| I2 | Sr-90 | 0.5 | 18415 | 1380 | 0.5 | 1/27/2011 10:14 |
| I2 | Sr-90 | 0.5 | 18457 | 1410 | -1.2 | 1/27/2011 10:15 |
| I2 | Sr-90 | 0.5 | 18578 | 1440 | -2.3 | 1/27/2011 10:15 |
| I2 | Sr-90 | 0.5 | 18346 | 1470 | -1.8 | 1/27/2011 10:16 |

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|---|---|---|---|---|---|---|
| I2 | Sr-90 | 0.5 | 18133 | 1500 | -0.7 | 1/27/2011 10:17 |
| I2 | Sr-90 | 0.5 | 18411 | 1530 | 1.6 | 1/27/2011 10:17 |
| I2 | Sr-90 | 0.5 | 18435 | 1560 | 3.5 | 1/27/2011 10:18 |
| I2 | Sr-90 | 0.5 | 18432 | 1590 | -0.2 | 1/27/2011 10:18 |
| I2 | Sr-90 | 0.5 | 18646 | 1620 | 21.2 | 1/27/2011 10:19 |
| I2 | Sr-90 | 0.5 | 18270 | 1650 | 21.2 | 1/27/2011 10:20 |
| I3 | Sr-90 | 0.5 | 154 | 750 | 21.1 | 1/27/2011 10:01 |
| I3 | Sr-90 | 0.5 | 362 | 780 | 20.6 | 1/27/2011 10:01 |
| I3 | Sr-90 | 0.5 | 717 | 810 | 14.2 | 1/27/2011 10:02 |
| I3 | Sr-90 | 0.5 | 1227 | 840 | 18.8 | 1/27/2011 10:03 |
| I3 | Sr-90 | 0.5 | 1845 | 870 | 22.1 | 1/27/2011 10:03 |
| I3 | Sr-90 | 0.5 | 2619 | 900 | 26.4 | 1/27/2011 10:04 |
| I3 | Sr-90 | 0.5 | 3329 | 930 | 31.0 | 1/27/2011 10:05 |
| I3 | Sr-90 | 0.5 | 4448 | 960 | 38.6 | 1/27/2011 10:05 |
| I3 | Sr-90 | 0.5 | 5579 | 990 | 45.8 | 1/27/2011 10:06 |
| I3 | Sr-90 | 0.5 | 7283 | 1020 | 53.0 | 1/27/2011 10:07 |
| I3 | Sr-90 | 0.5 | 8786 | 1050 | 61.6 | 1/27/2011 10:07 |
| I3 | Sr-90 | 0.5 | 10788 | 1080 | 66.6 | 1/27/2011 10:08 |
| I3 | Sr-90 | 0.5 | 13064 | 1110 | 66.9 | 1/27/2011 10:08 |
| I3 | Sr-90 | 0.5 | 15140 | 1140 | 60.2 | 1/27/2011 10:09 |
| I3 | Sr-90 | 0.5 | 16644 | 1170 | 46.6 | 1/27/2011 10:10 |
| I3 | Sr-90 | 0.5 | 18029 | 1200 | 34.2 | 1/27/2011 10:10 |
| I3 | Sr-90 | 0.5 | 18614 | 1230 | 23.1 | 1/27/2011 10:11 |
| I3 | Sr-90 | 0.5 | 19281 | 1260 | 10.6 | 1/27/2011 10:12 |
| I3 | Sr-90 | 0.5 | 19484 | 1290 | 6.5 | 1/27/2011 10:12 |
| I3 | Sr-90 | 0.5 | 19183 | 1320 | 0.8 | 1/27/2011 10:13 |
| I3 | Sr-90 | 0.5 | 19645 | 1350 | 1.1 | 1/27/2011 10:13 |
| I3 | Sr-90 | 0.5 | 19325 | 1380 | 2.4 | 1/27/2011 10:14 |
| I3 | Sr-90 | 0.5 | 19574 | 1410 | -1.1 | 1/27/2011 10:15 |
| I3 | Sr-90 | 0.5 | 19575 | 1440 | -1.2 | 1/27/2011 10:15 |
| I3 | Sr-90 | 0.5 | 19349 | 1470 | -2.3 | 1/27/2011 10:16 |
| I3 | Sr-90 | 0.5 | 19263 | 1500 | -0.8 | 1/27/2011 10:17 |
| I3 | Sr-90 | 0.5 | 19381 | 1530 | 0.7 | 1/27/2011 10:17 |
| I3 | Sr-90 | 0.5 | 19438 | 1560 | 2.1 | 1/27/2011 10:18 |
| I3 | Sr-90 | 0.5 | 19369 | 1590 | 0.5 | 1/27/2011 10:18 |
| I3 | Sr-90 | 0.5 | 19577 | 1620 | 22.6 | 1/27/2011 10:19 |
| I3 | Sr-90 | 0.5 | 19380 | 1650 | 22.6 | 1/27/2011 10:20 |
| I4 | Sr-90 | 0.11 | 7 | 750 | 22.5 | 1/27/2011 10:00 |
| I4 | Sr-90 | 0.5 | 130 | 780 | 22.2 | 1/27/2011 10:01 |
| I4 | Sr-90 | 0.5 | 348 | 810 | 8.9 | 1/27/2011 10:02 |
| I4 | Sr-90 | 0.5 | 686 | 840 | 11.9 | 1/27/2011 10:03 |
| I4 | Sr-90 | 0.5 | 1062 | 870 | 15.7 | 1/27/2011 10:03 |
| I4 | Sr-90 | 0.5 | 1562 | 900 | 19.2 | 1/27/2011 10:04 |
| I4 | Sr-90 | 0.5 | 2268 | 930 | 23.3 | 1/27/2011 10:05 |
| I4 | Sr-90 | 0.5 | 2966 | 960 | 28.2 | 1/27/2011 10:05 |
| I4 | Sr-90 | 0.5 | 3857 | 990 | 32.2 | 1/27/2011 10:06 |
| I4 | Sr-90 | 0.5 | 4995 | 1020 | 38.9 | 1/27/2011 10:07 |
| I4 | Sr-90 | 0.5 | 6078 | 1050 | 45.5 | 1/27/2011 10:07 |
| I4 | Sr-90 | 0.5 | 7697 | 1080 | 52.2 | 1/27/2011 10:08 |
| I4 | Sr-90 | 0.5 | 9336 | 1110 | 56.5 | 1/27/2011 10:08 |
| I4 | Sr-90 | 0.5 | 11190 | 1140 | 54.7 | 1/27/2011 10:09 |
| I4 | Sr-90 | 0.5 | 12811 | 1170 | 48.6 | 1/27/2011 10:10 |
| I4 | Sr-90 | 0.5 | 14166 | 1200 | 37.6 | 1/27/2011 10:10 |
| I4 | Sr-90 | 0.5 | 15132 | 1230 | 24.1 | 1/27/2011 10:11 |
| I4 | Sr-90 | 0.5 | 15674 | 1260 | 13.8 | 1/27/2011 10:12 |
| I4 | Sr-90 | 0.5 | 15676 | 1290 | 6.6 | 1/27/2011 10:12 |
| I4 | Sr-90 | 0.5 | 15961 | 1320 | 3.5 | 1/27/2011 10:13 |
| I4 | Sr-90 | 0.5 | 15975 | 1350 | 4.1 | 1/27/2011 10:13 |
| I4 | Sr-90 | 0.5 | 16050 | 1380 | 1.2 | 1/27/2011 10:14 |
| I4 | Sr-90 | 0.5 | 16239 | 1410 | 2.5 | 1/27/2011 10:15 |
| I4 | Sr-90 | 0.5 | 16010 | 1440 | 1.1 | 1/27/2011 10:15 |
| I4 | Sr-90 | 0.5 | 16371 | 1470 | 0.1 | 1/27/2011 10:16 |
| I4 | Sr-90 | 0.5 | 16155 | 1500 | 0.4 | 1/27/2011 10:17 |
| I4 | Sr-90 | 0.5 | 16176 | 1530 | 0.2 | 1/27/2011 10:17 |
| I4 | Sr-90 | 0.5 | 16160 | 1560 | 0.4 | 1/27/2011 10:18 |
| I4 | Sr-90 | 0.5 | 16393 | 1590 | -0.8 | 1/27/2011 10:18 |
| I4 | Sr-90 | 0.5 | 16100 | 1620 | 18.8 | 1/27/2011 10:19 |
| I4 | Sr-90 | 0.5 | 16079 | 1650 | 18.8 | 1/27/2011 10:20 |
| J1 | Sr-90 | 0.11 | 10 | 750 | 18.6 | 1/27/2011 10:00 |
| J1 | Sr-90 | 0.5 | 119 | 780 | 18.4 | 1/27/2011 10:01 |

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|---|---|---|---|---|---|---|
| J1 | Sr-90 | 0.5 | 316 | 810 | 9.1 | 1/27/2011 10:01 |
| J1 | Sr-90 | 0.5 | 660 | 840 | 12.9 | 1/27/2011 10:02 |
| J1 | Sr-90 | 0.5 | 1111 | 870 | 15.9 | 1/27/2011 10:03 |
| J1 | Sr-90 | 0.5 | 1652 | 900 | 19.2 | 1/27/2011 10:03 |
| J1 | Sr-90 | 0.5 | 2205 | 930 | 22.2 | 1/27/2011 10:04 |
| J1 | Sr-90 | 0.5 | 2986 | 960 | 26.6 | 1/27/2011 10:05 |
| J1 | Sr-90 | 0.5 | 3780 | 990 | 32.8 | 1/27/2011 10:05 |
| J1 | Sr-90 | 0.5 | 4856 | 1020 | 39.1 | 1/27/2011 10:06 |
| J1 | Sr-90 | 0.5 | 6195 | 1050 | 47.2 | 1/27/2011 10:06 |
| J1 | Sr-90 | 0.5 | 7645 | 1080 | 54.9 | 1/27/2011 10:07 |
| J1 | Sr-90 | 0.5 | 9463 | 1110 | 58.6 | 1/27/2011 10:08 |
| J1 | Sr-90 | 0.5 | 11453 | 1140 | 61.1 | 1/27/2011 10:08 |
| J1 | Sr-90 | 0.5 | 13083 | 1170 | 58.1 | 1/27/2011 10:09 |
| J1 | Sr-90 | 0.5 | 15007 | 1200 | 48.1 | 1/27/2011 10:10 |
| J1 | Sr-90 | 0.5 | 16406 | 1230 | 38.0 | 1/27/2011 10:10 |
| J1 | Sr-90 | 0.5 | 17006 | 1260 | 27.4 | 1/27/2011 10:11 |
| J1 | Sr-90 | 0.5 | 17784 | 1290 | 17.1 | 1/27/2011 10:11 |
| J1 | Sr-90 | 0.5 | 18433 | 1320 | 10.7 | 1/27/2011 10:12 |
| J1 | Sr-90 | 0.5 | 18263 | 1350 | 4.1 | 1/27/2011 10:13 |
| J1 | Sr-90 | 0.5 | 18375 | 1380 | 1.6 | 1/27/2011 10:13 |
| J1 | Sr-90 | 0.5 | 18431 | 1410 | 2.0 | 1/27/2011 10:14 |
| J1 | Sr-90 | 0.5 | 18585 | 1440 | 2.8 | 1/27/2011 10:15 |
| J1 | Sr-90 | 0.5 | 18462 | 1470 | 3.2 | 1/27/2011 10:15 |
| J1 | Sr-90 | 0.5 | 18776 | 1500 | 1.2 | 1/27/2011 10:16 |
| J1 | Sr-90 | 0.5 | 18813 | 1530 | 0.4 | 1/27/2011 10:16 |
| J1 | Sr-90 | 0.5 | 18590 | 1560 | -1.2 | 1/27/2011 10:17 |
| J1 | Sr-90 | 0.5 | 18619 | 1590 | -0.3 | 1/27/2011 10:18 |
| J1 | Sr-90 | 0.5 | 18698 | 1620 | | 1/27/2011 10:18 |
| J1 | Sr-90 | 0.5 | 18719 | 1650 | | 1/27/2011 10:19 |
| J2 | Sr-90 | 0.11 | 7 | 750 | | 1/27/2011 10:00 |
| J2 | Sr-90 | 0.5 | 151 | 780 | | 1/27/2011 10:01 |
| J2 | Sr-90 | 0.5 | 376 | 810 | 10.4 | 1/27/2011 10:01 |
| J2 | Sr-90 | 0.5 | 774 | 840 | 14.1 | 1/27/2011 10:02 |
| J2 | Sr-90 | 0.5 | 1253 | 870 | 18.2 | 1/27/2011 10:03 |
| J2 | Sr-90 | 0.5 | 1832 | 900 | 21.4 | 1/27/2011 10:03 |
| J2 | Sr-90 | 0.5 | 2579 | 930 | 25.4 | 1/27/2011 10:04 |
| J2 | Sr-90 | 0.5 | 3318 | 960 | 31.3 | 1/27/2011 10:05 |
| J2 | Sr-90 | 0.5 | 4327 | 990 | 36.3 | 1/27/2011 10:05 |
| J2 | Sr-90 | 0.5 | 5659 | 1020 | 44.2 | 1/27/2011 10:06 |
| J2 | Sr-90 | 0.5 | 6856 | 1050 | 52.5 | 1/27/2011 10:06 |
| J2 | Sr-90 | 0.5 | 8683 | 1080 | 60.2 | 1/27/2011 10:07 |
| J2 | Sr-90 | 0.5 | 10687 | 1110 | 66.9 | 1/27/2011 10:08 |
| J2 | Sr-90 | 0.5 | 12771 | 1140 | 66.8 | 1/27/2011 10:08 |
| J2 | Sr-90 | 0.5 | 14852 | 1170 | 62.4 | 1/27/2011 10:09 |
| J2 | Sr-90 | 0.5 | 16623 | 1200 | 52.8 | 1/27/2011 10:10 |
| J2 | Sr-90 | 0.5 | 18114 | 1230 | 40.3 | 1/27/2011 10:10 |
| J2 | Sr-90 | 0.5 | 19058 | 1260 | 29.0 | 1/27/2011 10:11 |
| J2 | Sr-90 | 0.5 | 19679 | 1290 | 15.5 | 1/27/2011 10:11 |
| J2 | Sr-90 | 0.5 | 20190 | 1320 | 8.0 | 1/27/2011 10:12 |
| J2 | Sr-90 | 0.5 | 19875 | 1350 | 5.8 | 1/27/2011 10:13 |
| J2 | Sr-90 | 0.5 | 20157 | 1380 | 5.4 | 1/27/2011 10:13 |
| J2 | Sr-90 | 0.5 | 20567 | 1410 | 5.1 | 1/27/2011 10:14 |
| J2 | Sr-90 | 0.5 | 20653 | 1440 | 1.2 | 1/27/2011 10:15 |
| J2 | Sr-90 | 0.5 | 20388 | 1470 | -3.0 | 1/27/2011 10:15 |
| J2 | Sr-90 | 0.5 | 20423 | 1500 | -0.6 | 1/27/2011 10:16 |
| J2 | Sr-90 | 0.5 | 20233 | 1530 | 2.6 | 1/27/2011 10:16 |
| J2 | Sr-90 | 0.5 | 20634 | 1560 | 2.0 | 1/27/2011 10:17 |
| J2 | Sr-90 | 0.5 | 20666 | 1590 | -0.5 | 1/27/2011 10:18 |
| J2 | Sr-90 | 0.5 | 20509 | 1620 | | 1/27/2011 10:18 |
| J2 | Sr-90 | 0.49 | 20221 | 1650 | | 1/27/2011 10:19 |
| J3 | Sr-90 | 0.12 | 4 | 750 | | 1/27/2011 10:00 |
| J3 | Sr-90 | 0.5 | 71 | 780 | | 1/27/2011 10:01 |
| J3 | Sr-90 | 0.5 | 221 | 810 | 7.7 | 1/27/2011 10:01 |
| J3 | Sr-90 | 0.5 | 519 | 840 | 11.8 | 1/27/2011 10:02 |
| J3 | Sr-90 | 0.5 | 931 | 870 | 14.8 | 1/27/2011 10:03 |
| J3 | Sr-90 | 0.5 | 1493 | 900 | 18.2 | 1/27/2011 10:03 |
| J3 | Sr-90 | 0.5 | 1958 | 930 | 21.6 | 1/27/2011 10:04 |
| J3 | Sr-90 | 0.5 | 2731 | 960 | 26.1 | 1/27/2011 10:05 |
| J3 | Sr-90 | 0.5 | 3550 | 990 | 31.0 | 1/27/2011 10:05 |
| J3 | Sr-90 | 0.5 | 4617 | 1020 | 37.8 | 1/27/2011 10:06 |

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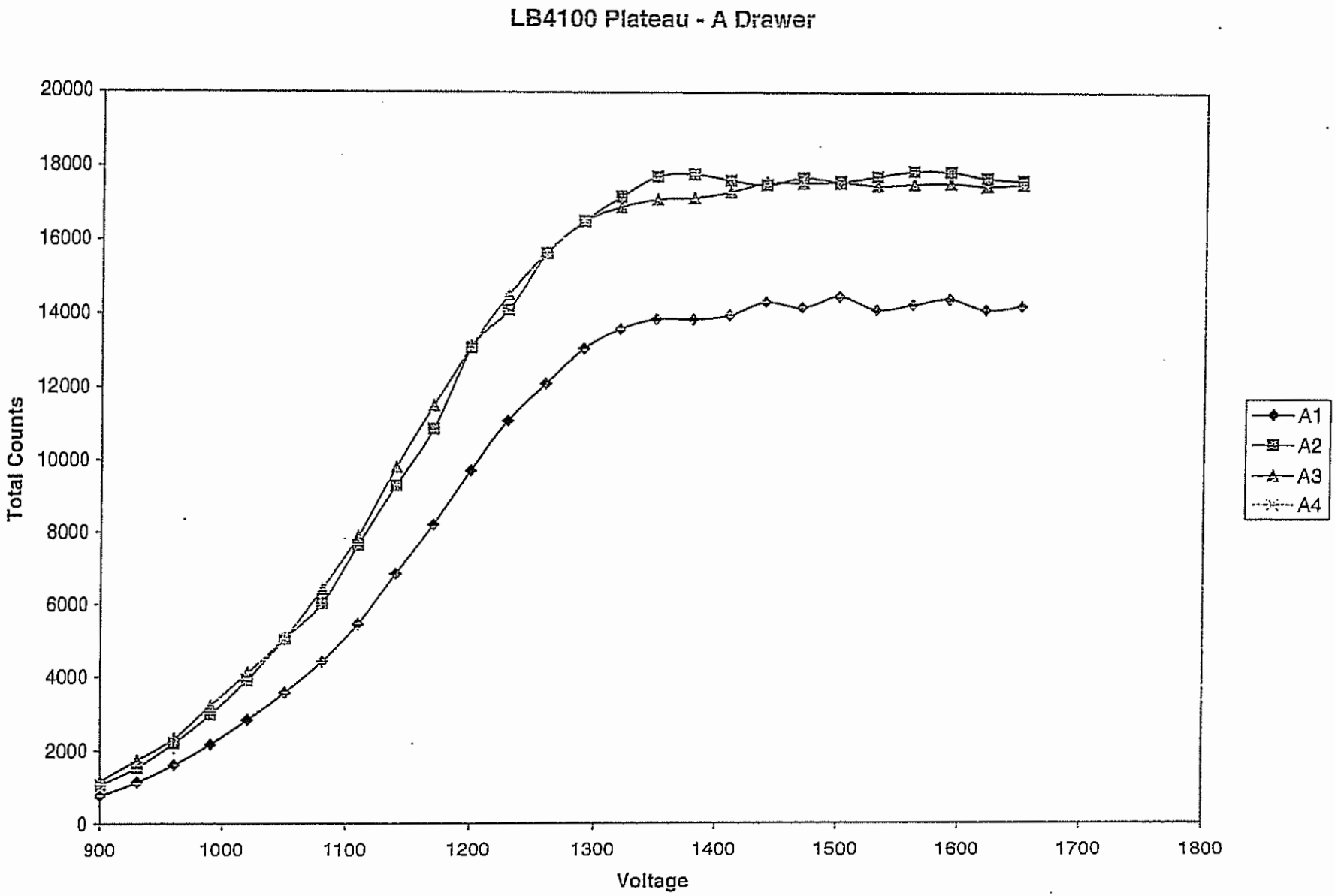
|---|---|---|---|---|---|---|
| J3 | Sr-90 | 0.5 | 5670 | 1050 | 46.7 | 1/27/2011 10:06 |
| J3 | Sr-90 | 0.5 | 7343 | 1080 | 51.9 | 1/27/2011 10:07 |
| J3 | Sr-90 | 0.5 | 9190 | 1110 | 57.7 | 1/27/2011 10:08 |
| J3 | Sr-90 | 0.5 | 10644 | 1140 | 60.1 | 1/27/2011 10:08 |
| J3 | Sr-90 | 0.5 | 12673 | 1170 | 58.4 | 1/27/2011 10:09 |
| J3 | Sr-90 | 0.5 | 14621 | 1200 | 51.6 | 1/27/2011 10:10 |
| J3 | Sr-90 | 0.5 | 15968 | 1230 | 39.6 | 1/27/2011 10:10 |
| J3 | Sr-90 | 0.5 | 16732 | 1260 | 27.0 | 1/27/2011 10:11 |
| J3 | Sr-90 | 0.5 | 17556 | 1290 | 18.2 | 1/27/2011 10:11 |
| J3 | Sr-90 | 0.5 | 17875 | 1320 | 12.6 | 1/27/2011 10:12 |
| J3 | Sr-90 | 0.5 | 18126 | 1350 | 6.3 | 1/27/2011 10:13 |
| J3 | Sr-90 | 0.5 | 18337 | 1380 | 4.4 | 1/27/2011 10:13 |
| J3 | Sr-90 | 0.5 | 18271 | 1410 | 1.5 | 1/27/2011 10:14 |
| J3 | Sr-90 | 0.5 | 18460 | 1440 | 0.5 | 1/27/2011 10:15 |
| J3 | Sr-90 | 0.5 | 18291 | 1470 | -0.4 | 1/27/2011 10:15 |
| J3 | Sr-90 | 0.5 | 18399 | 1500 | -0.1 | 1/27/2011 10:16 |
| J3 | Sr-90 | 0.5 | 18247 | 1530 | 0.5 | 1/27/2011 10:16 |
| J3 | Sr-90 | 0.5 | 18472 | 1560 | 1.1 | 1/27/2011 10:17 |
| J3 | Sr-90 | 0.5 | 18335 | 1590 | 1.3 | 1/27/2011 10:18 |
| J3 | Sr-90 | 0.5 | 18525 | 1620 | | 1/27/2011 10:18 |
| J3 | Sr-90 | 0.5 | 18422 | 1650 | | 1/27/2011 10:19 |
| J4 | Sr-90 | 0.11 | 1 | 750 | | 1/27/2011 10:00 |
| J4 | Sr-90 | 0.5 | 49 | 780 | | 1/27/2011 10:01 |
| J4 | Sr-90 | 0.5 | 166 | 810 | 6.8 | 1/27/2011 10:01 |
| J4 | Sr-90 | 0.5 | 433 | 840 | 10.9 | 1/27/2011 10:02 |
| J4 | Sr-90 | 0.5 | 836 | 870 | 14.1 | 1/27/2011 10:03 |
| J4 | Sr-90 | 0.5 | 1347 | 900 | 17.4 | 1/27/2011 10:03 |
| J4 | Sr-90 | 0.5 | 1829 | 930 | 20.3 | 1/27/2011 10:04 |
| J4 | Sr-90 | 0.5 | 2543 | 960 | 23.8 | 1/27/2011 10:05 |
| J4 | Sr-90 | 0.5 | 3284 | 990 | 29.9 | 1/27/2011 10:05 |
| J4 | Sr-90 | 0.5 | 4184 | 1020 | 36.4 | 1/27/2011 10:06 |
| J4 | Sr-90 | 0.5 | 5494 | 1050 | 42.5 | 1/27/2011 10:06 |
| J4 | Sr-90 | 0.5 | 6895 | 1080 | 48.2 | 1/27/2011 10:07 |
| J4 | Sr-90 | 0.5 | 8310 | 1110 | 54.0 | 1/27/2011 10:08 |
| J4 | Sr-90 | 0.5 | 10001 | 1140 | 58.7 | 1/27/2011 10:08 |
| J4 | Sr-90 | 0.5 | 12034 | 1170 | 59.7 | 1/27/2011 10:09 |
| J4 | Sr-90 | 0.5 | 13840 | 1200 | 53.3 | 1/27/2011 10:10 |
| J4 | Sr-90 | 0.5 | 15343 | 1230 | 44.8 | 1/27/2011 10:10 |
| J4 | Sr-90 | 0.5 | 16337 | 1260 | 31.9 | 1/27/2011 10:11 |
| J4 | Sr-90 | 0.5 | 17505 | 1290 | 20.0 | 1/27/2011 10:11 |
| J4 | Sr-90 | 0.5 | 17549 | 1320 | 9.7 | 1/27/2011 10:12 |
| J4 | Sr-90 | 0.5 | 17735 | 1350 | 1.4 | 1/27/2011 10:13 |
| J4 | Sr-90 | 0.5 | 17679 | 1380 | 2.4 | 1/27/2011 10:13 |
| J4 | Sr-90 | 0.5 | 17657 | 1410 | 1.5 | 1/27/2011 10:14 |
| J4 | Sr-90 | 0.5 | 17945 | 1440 | 2.6 | 1/27/2011 10:15 |
| J4 | Sr-90 | 0.5 | 17829 | 1470 | 2.9 | 1/27/2011 10:15 |
| J4 | Sr-90 | 0.5 | 17979 | 1500 | -0.3 | 1/27/2011 10:16 |
| J4 | Sr-90 | 0.5 | 18069 | 1530 | 1.1 | 1/27/2011 10:17 |
| J4 | Sr-90 | 0.5 | 17773 | 1560 | 2.5 | 1/27/2011 10:17 |
| J4 | Sr-90 | 0.5 | 18094 | 1590 | 2.2 | 1/27/2011 10:18 |
| J4 | Sr-90 | 0.5 | 18340 | 1620 | 4.2 | 1/27/2011 10:18 |
| J4 | Sr-90 | 0.5 | 18112 | 1650 | 0.3 | 1/27/2011 10:19 |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16000
14000
12000
10000
8000
6000
4000
2000
0
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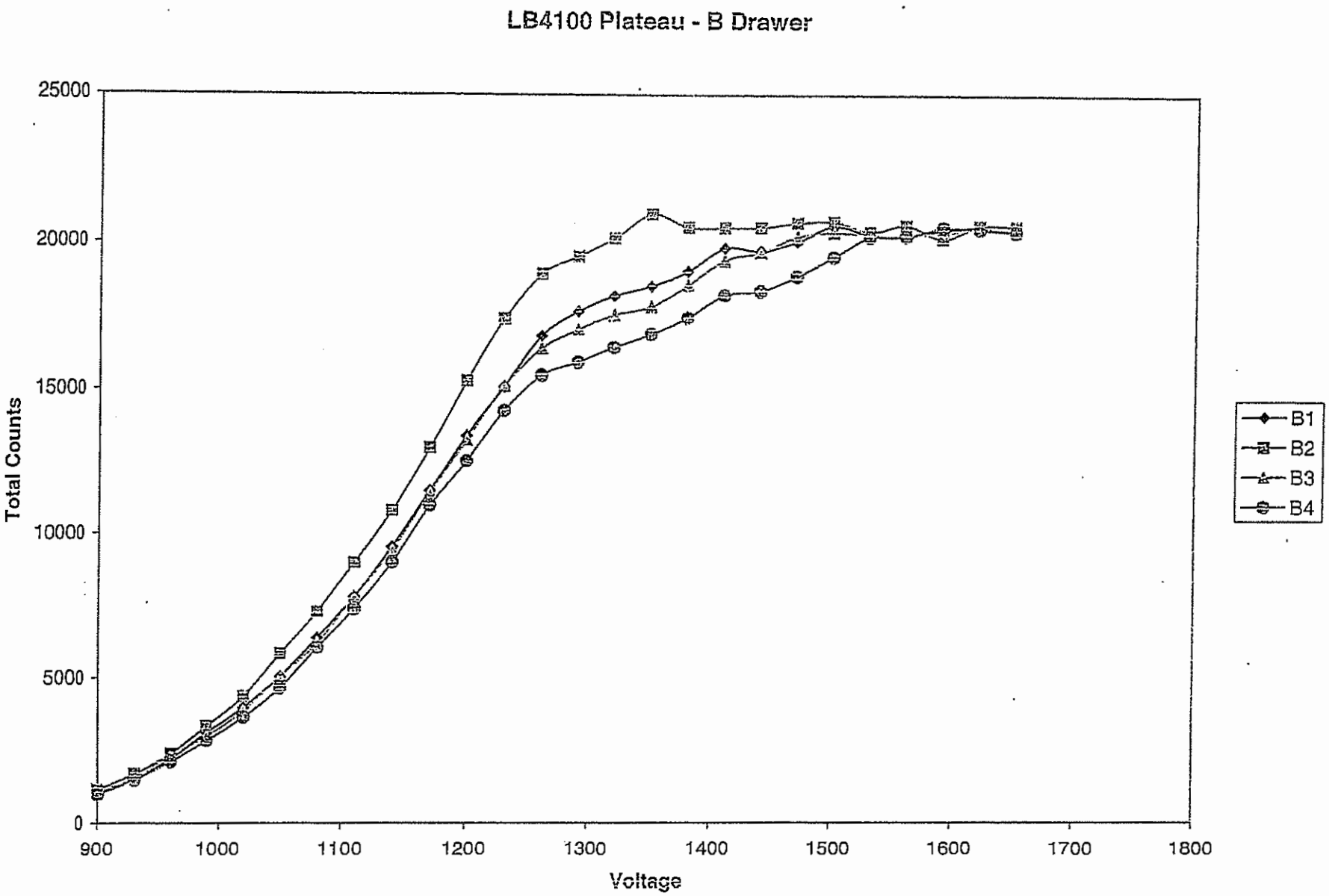
1100
1200
1300
1400
1500
1600
1700
1800
Voltage
A1
A2
A3
A4


LB4100 Plateau - B Drawer
Total Counts
25000
20000
15000
10000
5000
0
900
1000
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1200
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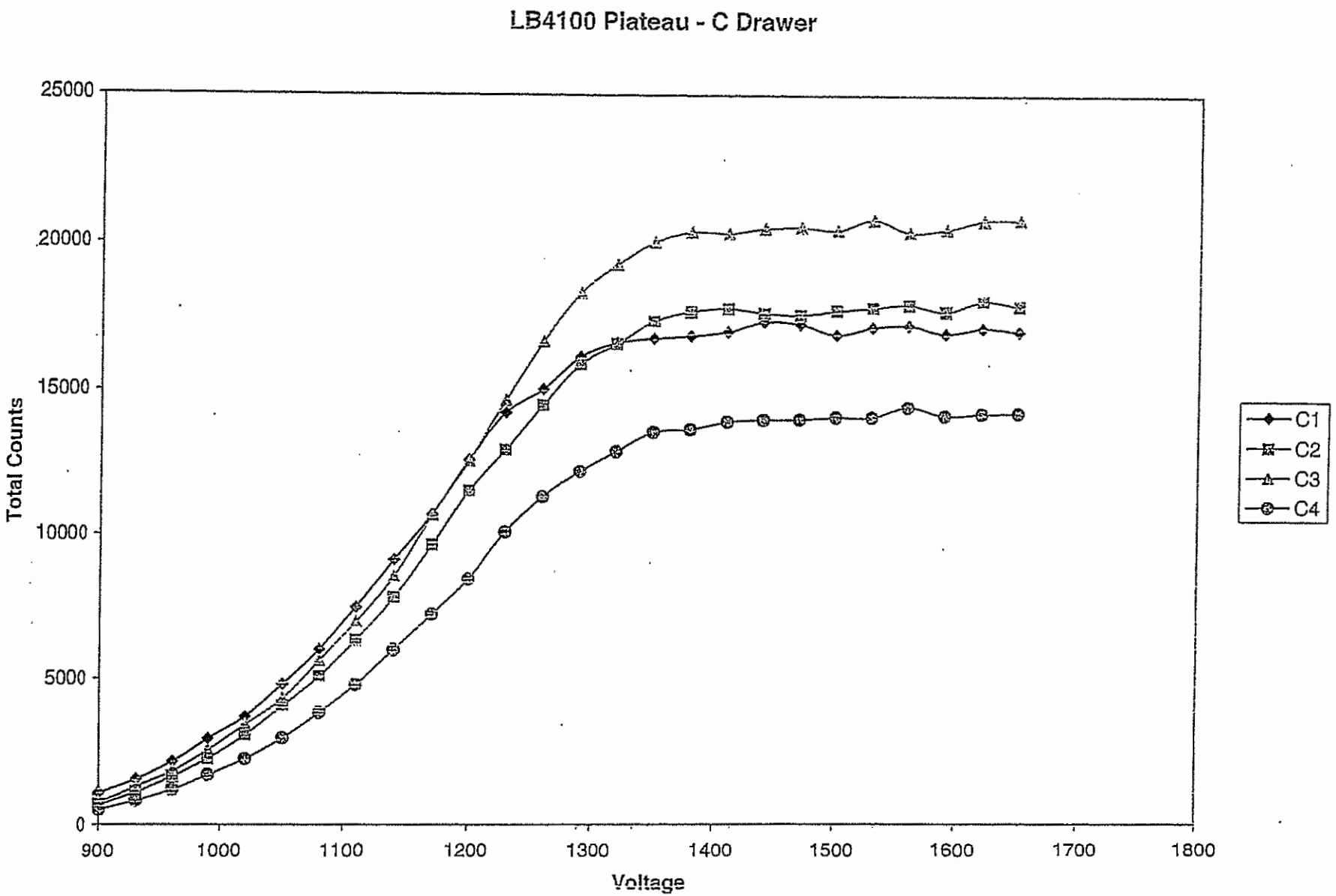
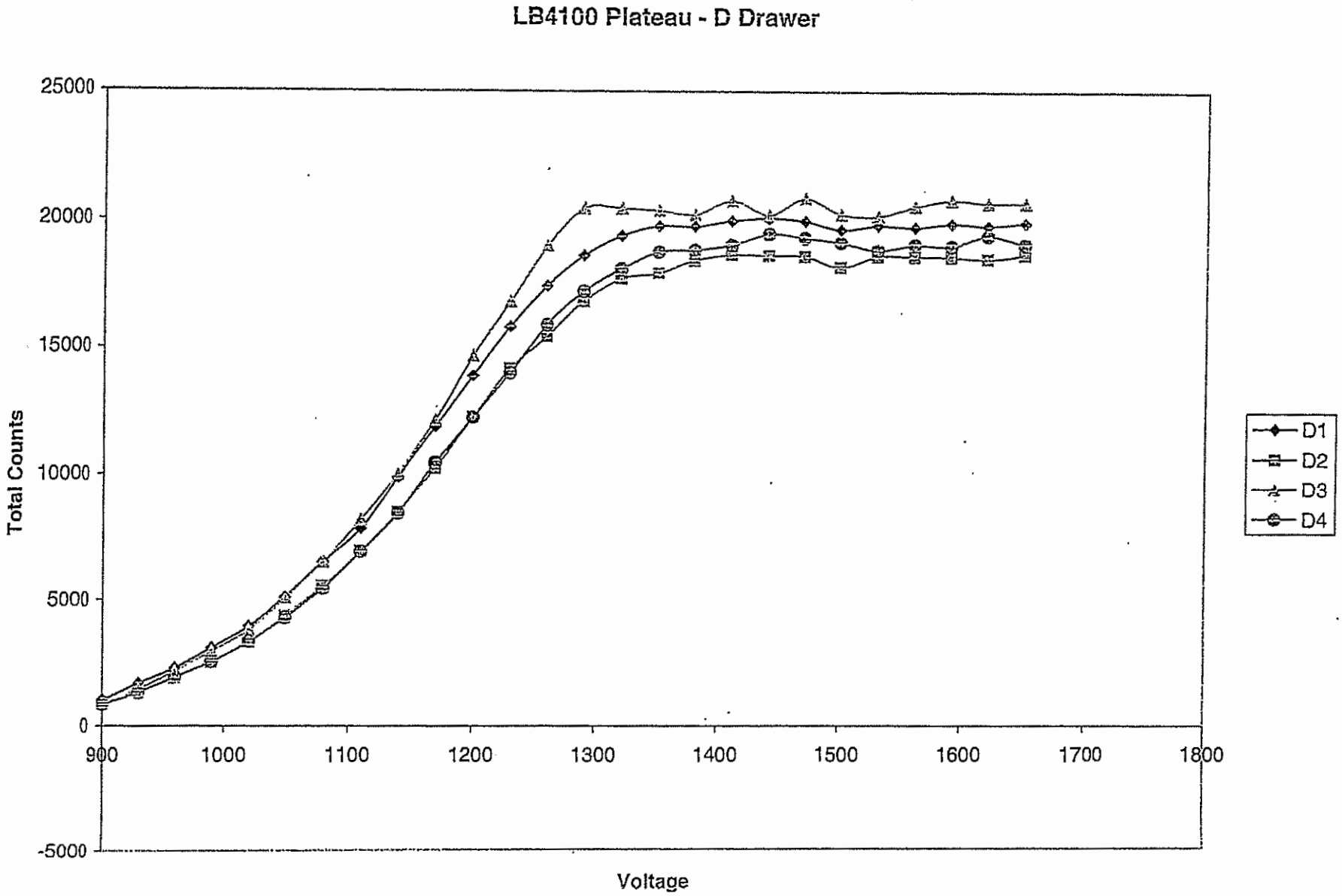
1400
1500
1600
1700
1800
Voltage
B1
B2
B3
B4

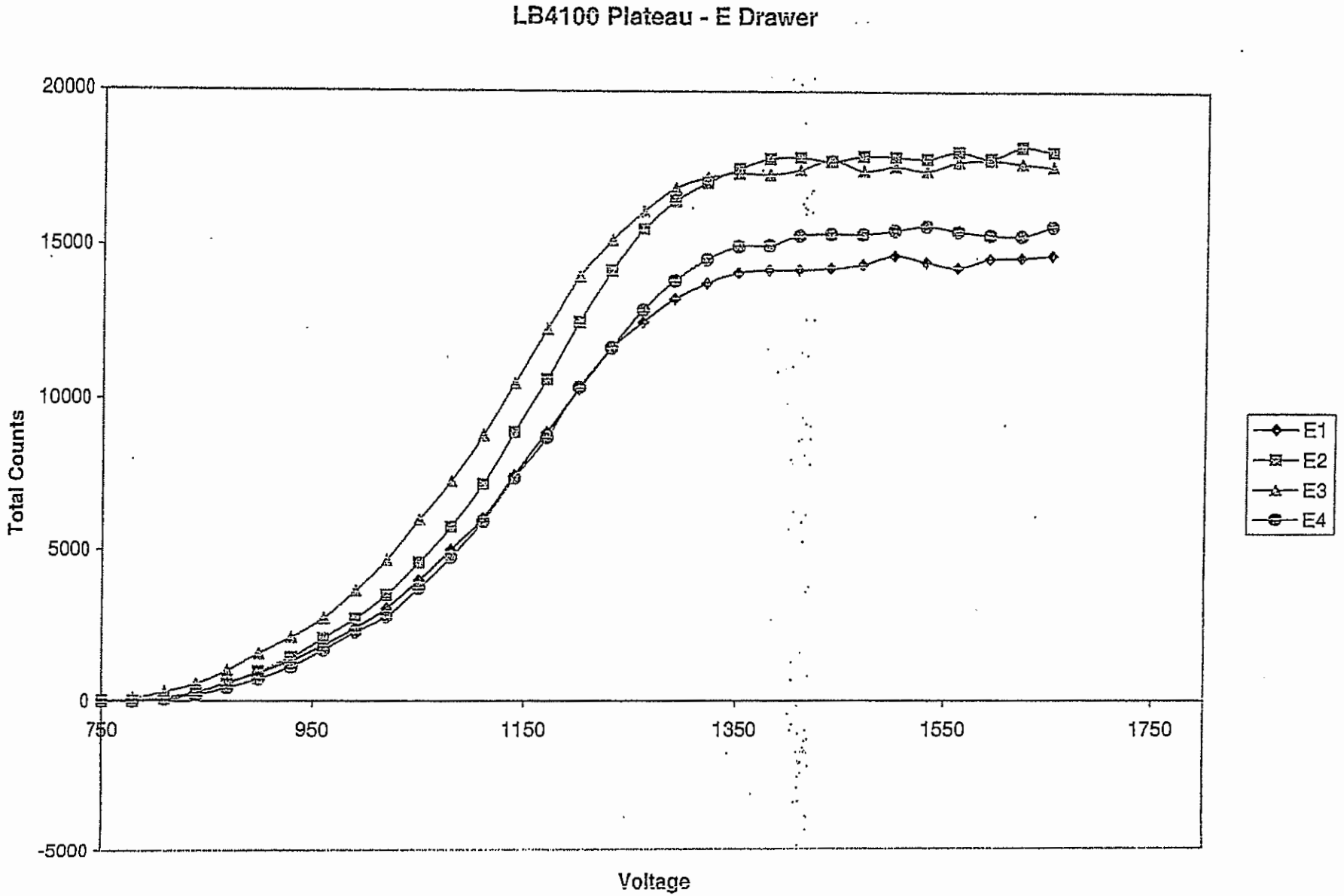

LB4100 Plateau - C Drawer
Total Counts
25000
20000
15000
10000
5000
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Voltage
C1
C2
C3
C4

DCN: ITSI-0808 0004-0076, 8 May 2019



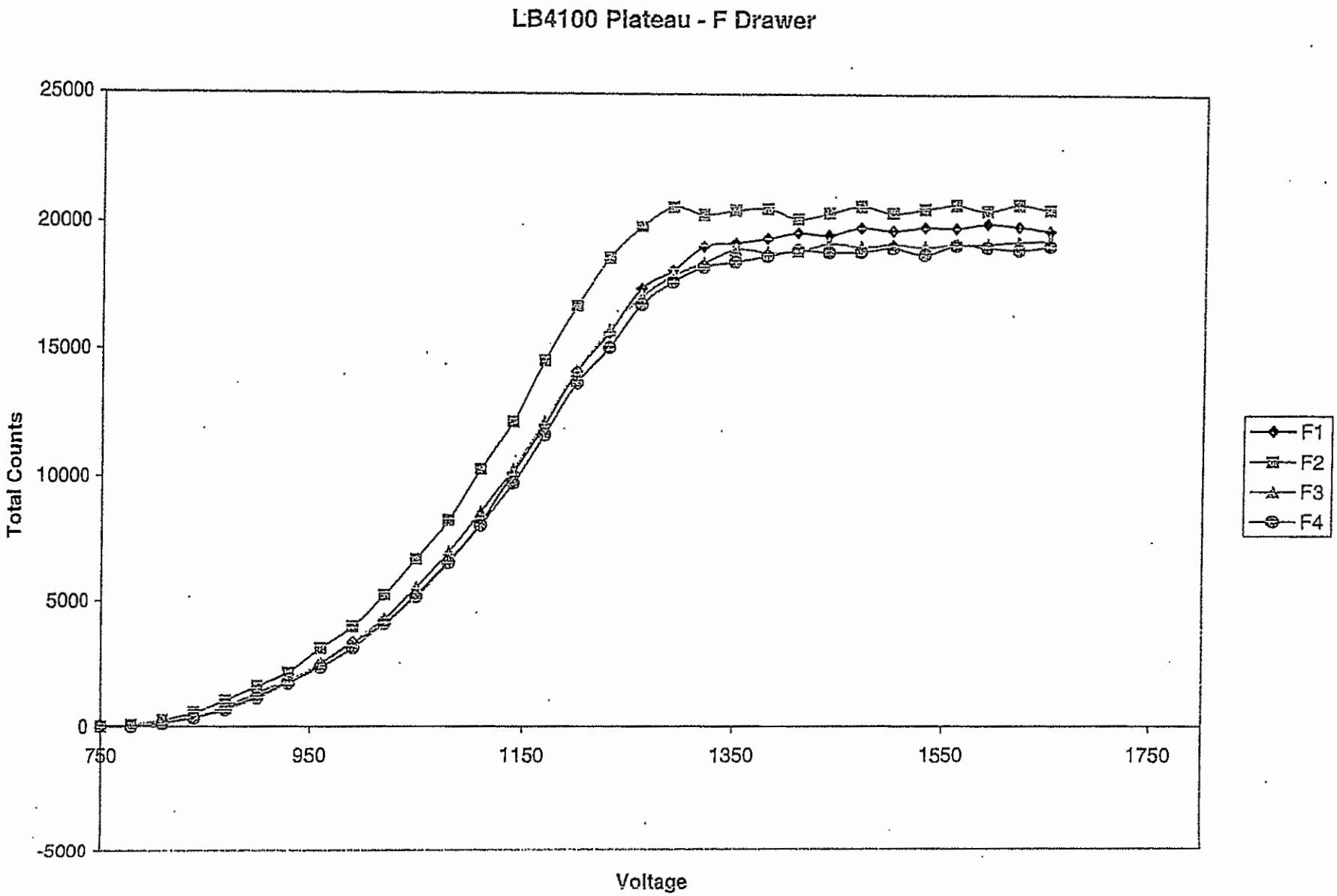

M-9025

DCN: ITSI-0808 0004-0076, 8 May 2019



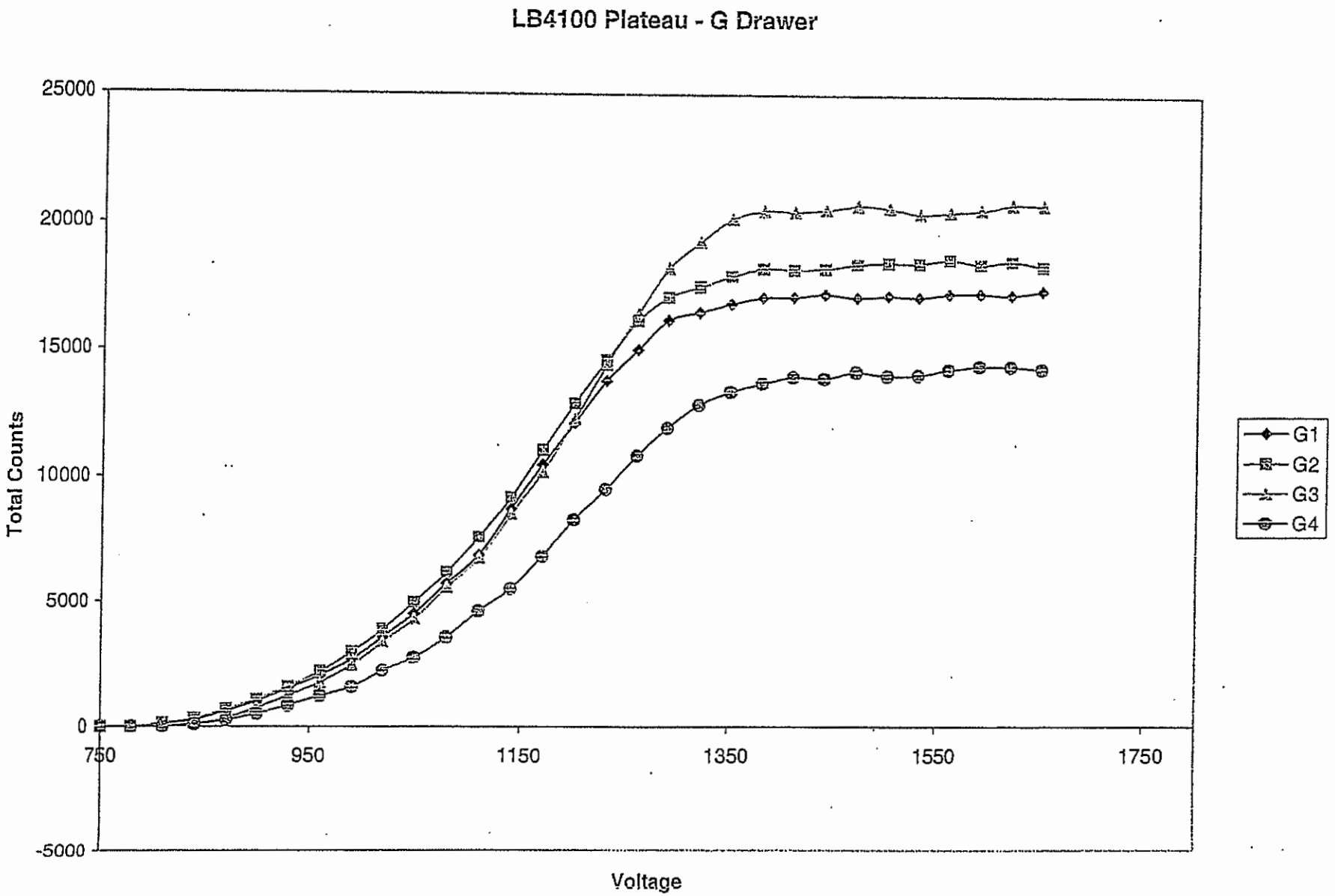

M-9026

DCN: ITSI-0808 0004-0076, 8 May 2019

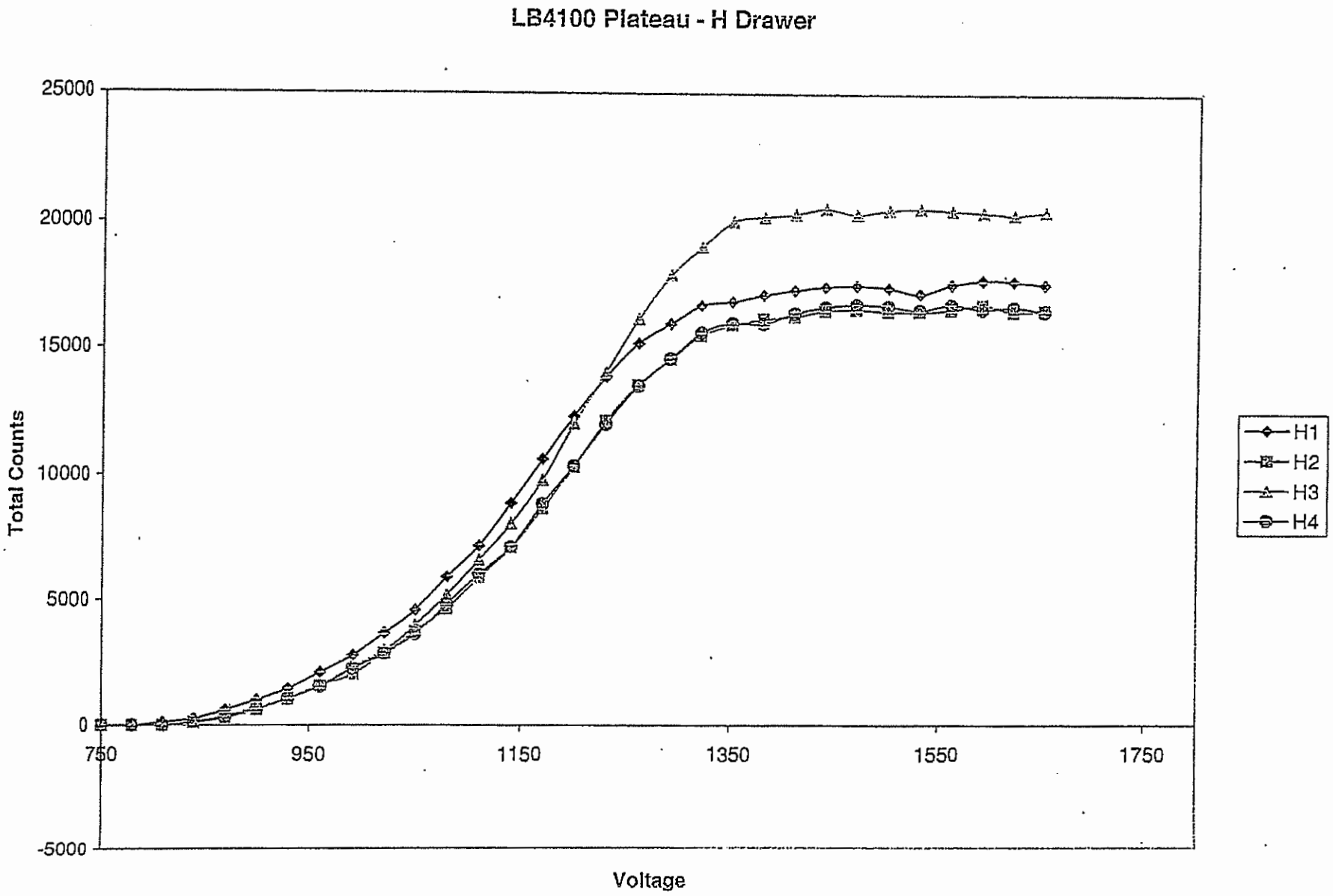


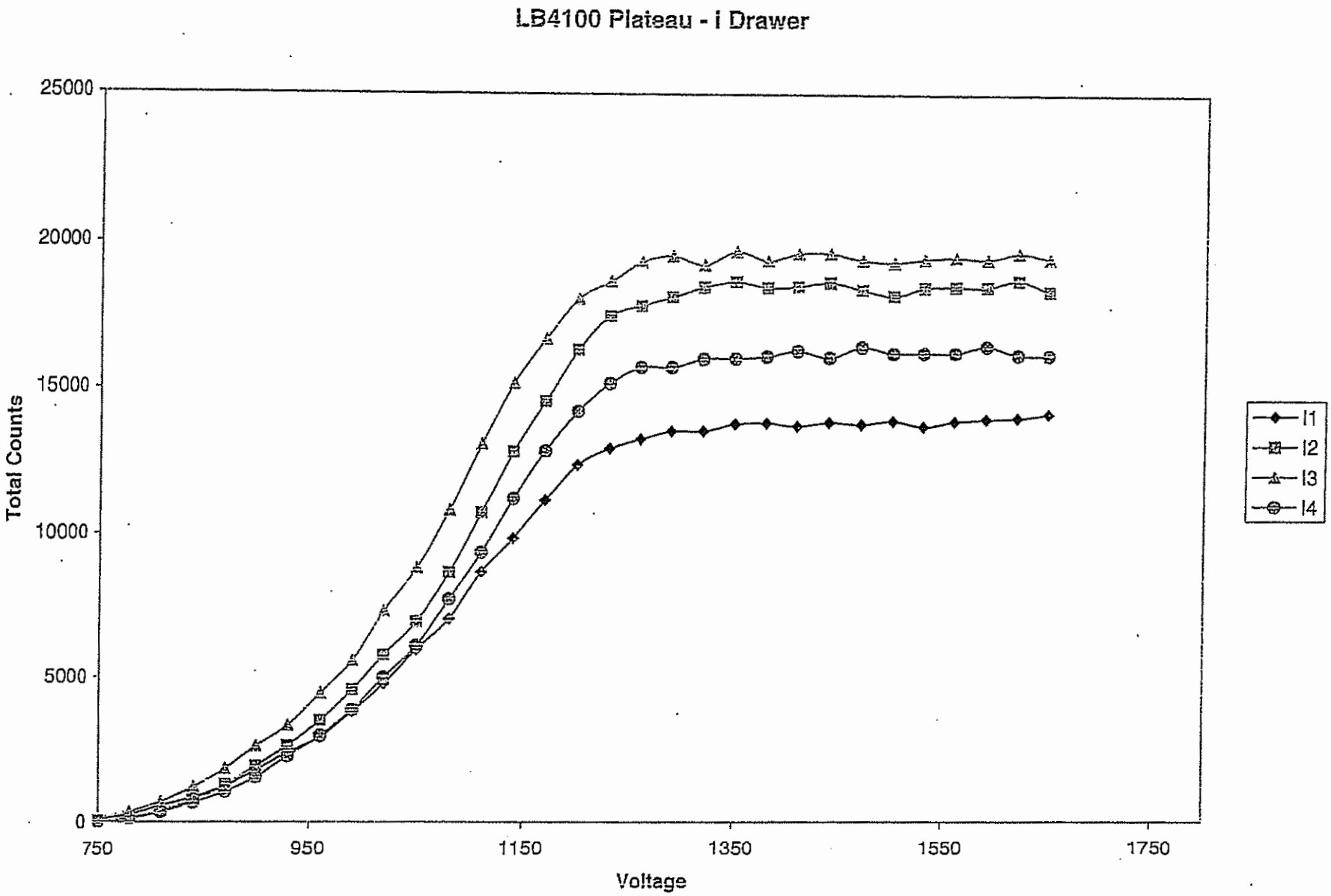

M-9027

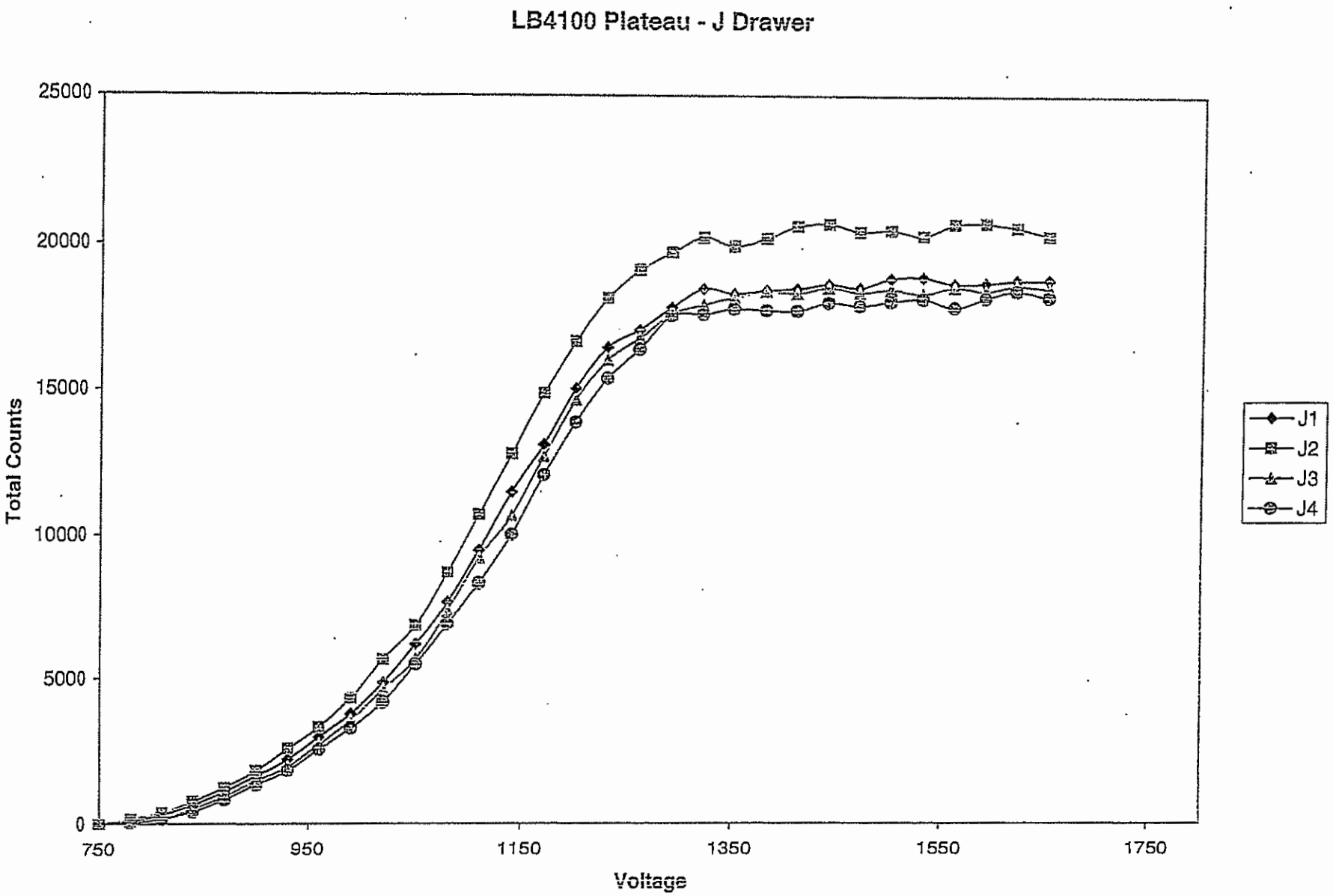
DCN: ITSI-0808 0004-0076, 8 May 2019




M-9028


LB4100 Plateau - H Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
H1
H2
H3
H4


LB4100 Plateau - i Drawer
Total Counts
25000
20000
15000
10000
5000
0
750
950
1150
1350
1550
1750
Voltage
I1
I2
I3
I4


LB4100 Plateau - J Drawer
Total Counts
25000
20000
15000
10000
5000
0
750
950
1150
1350
1550
1750
Voltage
J1
J2
J3
J4

DCN: ITSI-0808 0004-0076, 8 May 2019

showfile.cgi

# Standardization of Strontium Carrier 1858443

v1.2

| Analyst | VXC2 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Strontium |
| Serial Number | 1858443 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 12/11/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 1747929 |
| Parent Exp. Date | 3/5/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Strontium/mL | mg Strontium/g |
|---|---|---|---|---|---|---|
| 1 | 1.0326 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.24 |
| 2 | 1.0306 | 0.0248 | 0.0423 | 0.0175 | 17.50 | 16.98 |
| 3 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |
| 4 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |

| | |
|---|---|
| Mean Value (mg/mL) = | 17.73 |
| Stdev (mg/mL) = | ± 0.15 |
| 1.0% of Mean Value = | 0.177250 |
| | Pass |
| Expiration Date | 12/11/2013 |
| Mean Value (mg/1.0mL) = | 17.73 |

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

V. Chapp
12/11/12

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

M-9882
2/28/2013 10:32 AM

DCN: ITSI-0808 0004-0076, 8 May 2019

showfile.cgi

# Standardization of Yttrium Carrier 1840837

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1840837 |
| Amount of Std. (mL) | 0.5 |
| Standard Prepared | 10/25/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 17318701 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium/mL | mg Yttrium/g |
|---|---|---|---|---|---|---|
| 1 | 0.5000 | 0.0241 | 0.0399 | 0.0158 | 31.60 | 31.60 |
| 2 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |
| 3 | 0.5000 | 0.0244 | 0.0400 | 0.0156 | 31.20 | 31.20 |
| 4 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |

Mean Value (mg/mL) = 31.20
Stdev (mg/mL) = ± 0.28
1.0% of Mean Value = 0.312000
Pass
Expiration Date 10/25/2013

Mean Value (mg/0.5mL) = 15.60

Jennifer L. Robb

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

https://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

8/8/2013 10:33 AM

# Standardization of Yttrium Carrier 1892786

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1892786 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 3/15/2013 |

| Parent Information | |
|---|---|
| Parent Serial # | 1731870.1 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium /mL | mg Yttrium /g |
|---|---|---|---|---|---|---|
| 1 | 1.0100 | 0.0242 | 0.0560 | 0.0318 | 31.80 | 31.49 |
| 2 | 1.0200 | 0.0242 | 0.0562 | 0.0320 | 32.00 | 31.37 |
| 3 | 1.0100 | 0.0242 | 0.0559 | 0.0317 | 31.70 | 31.39 |
| 4 | 1.0100 | 0.0242 | 0.0561 | 0.0319 | 31.90 | 31.58 |

Mean Value (mg/mL) = 31.85
Stdev (mg/mL) = ± 0.13
1.0% of Mean Value = 0.318500
Pass
Expiration Date 1/26/2014

Mean Value (mg/1.0mL) = 31.85

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

Jennifer L. Robb

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

92552
Sr-89 5 mL Liquid in Flame Sealed Vial

1633

**Customer:** General Engineering Labs
**P.O. No.:** GEL1202747, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty* , % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 2.121E+05 | 0.1 | 0.9 | 1.8 | 12/13/2012 |

*Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.07181 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: K. Eardley, Radiochemist

QA Approved: J.D. McCorvey, Counting Room Manager Date: 11 DEC 12

RECEIVED 12/14/12 MW

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-062

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1633 |
| Prepared By: | Ashley Drochter |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 12/13/2012 |
| Ampoule Mass (g): | 5.07181 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-062 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Bethany Fiem |
| Prep Date: | 01/08/2013 |
| Verification Date: | 01/09/2013 |
| Expiration Date: | 08/22/2013 |
| Primary Code: | 1633-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.9257 g |
| Density(g/mL): | 0.9986 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / (5.07181 g * 100 mL ) = 123593.8614 dpm/mL |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / ( 0.9986 g/mL)/ (5.07181 g * 100 mL) = 123767.0118 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1633-A

v1.0.2

| | |
|---|---|
| Instrument | Silver |
| Analyst | BF1 |
| Verification Prep Date | 1/8/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1633-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 12/13/2012 |
| Ref. Act. (DPM/mL) | 123593.8614 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 1/8/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 1/9/2013 | 89.20 | 8539.17 | 44.60 |
| 2 | 1/9/2013 | 88.90 | 8565.00 | 44.60 |
| 3 | 1/9/2013 | 88.90 | 8571.67 | 44.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 8494.57 | 1.011371 | 83990.64 | 8399.06 |
| 2 | 8520.40 | 1.011371 | 84246.04 | 8424.60 |
| 3 | 8527.07 | 1.011371 | 84311.99 | 8431.20 |

| | dpm/mL |
|---|---|
| Mean Value = | 84182.89 |
| Stdev = | 169.7251269 |
| Certificate Value* = | 85338.6 |
| Two sigma = | 339.450 |
| 10 % of Mean = | 8418.289 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.65% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 8/22/2013 |

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-89 source 1633-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Sr-89 source 1618-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,

B = BKG cpm,

C = System efficiency (cpm/dpm), and

D = volume used for standard verification.

RAD-M-001

1-11-13

Amanda L [illegible]

1/11/13

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-004 | Isotope: Sr-89

Date Standards Prepared: 2-14-13

Standard ID: 1633-A | Matrix of Planchett/Filter: Sr Carbonate ppt on 25mm 0.45um filter

Amount Used (g or (ml)): 1.0

Standard Activity (DPM/g or mL): 123593.861 * | Residue/Carrier Agent: Sr Carrier 1858443 exp 12-11-

Reference Date: 12-13-12 | Pipette ID Used: 4043264

Expiration Date: 8-22-13 | Balance ID Used: 1113021018

*Not decay corrected

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | $C_1$ | 0.1 | 0.0246 | 0.0265 | 1.9 |
| | $C_2$ | 0.2 | 0.0241 | 0.0276 | 3.5 |
| | $C_3$ | 0.4 | 0.0246 | 0.0315 | 6.9 |
| | $C_4$ | 0.5 | 0.0242 | 0.0325 | 8.3 |
| | $C_5$ | 0.8 | 0.0236 | 0.0371 | 13.5 |
| | $C_6$ | 1.0 | 0.0236 | 0.0412 | 17.6 |
| | $C_7$ | 1.5 | 0.0236 | 0.0502 | 26.6 |
| | $C_8$ | 2.1 | 0.0238 | 0.0599 | 36.1 |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

wl ✓ WL 2/25/13

Prepared By: _____ Date: 2-14-13

Reviewed By: _____ Date: 2/25/13

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1244

78351-278

Sr-90 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 2

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.691 E4 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
5.01862 grams 0.1M HCl solution with 30 µg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED 10/7/08
RC-S-048-125

End of Certificate

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1244 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 5.01862 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-125 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 02/12/2013 |
| Verification Date: | 02/12/2013 |
| Expiration Date: | 02/12/2014 |
| Primary Code: | 1244-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.8346 g |
| Density(g/mL): | 0.9984 |
| Balance ID: | 38080204 |

## Calculations Converting parent activity to dpm/mL|dpm/g

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / (5.01862 g * 100 mL ) = 21333.9626 dpm/mL |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / ( 0.9984 g/mL)/ (5.01862 g * 100 mL) = 21367.7236 dpm/g |

## Secondary Standards

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

DCN: ITSI-0808 0004-0076, 8 May 2019

showfile.cgi

# Verification for Sr-90 Standard 1244-A

v1.0.2

| | |
|---|---|
| Instrument | GOLD |
| Analyst | BF |
| Verification Prep Date | 2/12/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1244-A |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 21333.9626 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 2/12/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 2/12/2013 | 57.70 | 3807.92 | 38.20 |
| 2 | 2/12/2013 | 55.70 | 3846.92 | 38.20 |
| 3 | 2/12/2013 | 56.20 | 3861.54 | 38.20 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 3769.72 | 2.046222 | 18422.83 | 1842.28 |
| 2 | 3808.72 | 2.046222 | 18613.42 | 1861.34 |
| 3 | 3823.34 | 2.046222 | 18684.87 | 1868.49 |

| | dpm/mL |
|---|---|
| Mean Value = | 18573.71 |
| Stdev = | 135.4612019 |
| Certificate Value* = | 19212.6 |
| Two sigma = | 270.922 |
| 10 % of Mean = | 1857.371 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 96.67% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 2/12/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1244-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

Amanda Lifeh 2/14/13

2-13-13

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap..

4/29/2013 10:39 AM

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet
Sr-90 (Sr portion)

Applicable SOP Number: GL-RAD-A-004

Isotope: Sr-90

Date Standards Prepared: 3/29/13

Standard ID: 1244-A

Matrix of Planchett/Filter: Sr carbonate ppt on 25mm 0.45 µm filter

Amount Used (g or ml): 0.5

Standard Activity (DPM/g or mL): ~~21333.9629~~ 21333.9626 (AP 3/29/13)

Residue/Carrier Agent: Sr carrier 1858443

Reference Date: 10/1/08

Pipette ID Used: 1795419 / 2154115 / 4043264 / 11518634

Expiration Date: 2/12/14

Balance ID Used: 1113021018

Std carrier wt. 17.1 mg/mL

Sep Date/Time: 3-29-13 / 1410

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) | |
|---|---|---|---|---|---|---|
| | S1 | 0.2 | 0.0239 | 0.0272 | 3.3 | |
| | S2 | 0.4 | 0.0241 | 0.0314 | 7.3 | |
| | S3 | 0.5 | * ~~0.0243~~ 3/29/13 | 0.0328 | 8.5 | 0.0243 |
| | S4 | 0.7 | 0.0243 | 0.0365 | 12.2 | |
| | S5 | 1.0 | 0.0245 | 0.0417 | 17.2 | |
| | S6 | 1.5 | 0.0246 | 0.0512 | 26.6 | |
| | S7 | 1.8 | 0.0246 | 0.0556 | 31.0 | |
| | ~~S8~~ | ~~2.1~~ | ~~0.0247~~ | ~~0.0608~~ | ~~36.1~~ | (AP) 3/29/13 |
| | | | | | | |
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| | | | | | | |

(AP) 3/29/13

*NL 4/1/13

Prepared By: [signature] Date: 3-29-13

Reviewed By: [signature] AP Date: 4/1/13

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet
Sr-90 Yttrium Portion

Applicable SOP Number GL-RAD-A-004

Isotope Sr-90 (Y-90)

Date Standards Prepared 3/29/13

Standard ID 1244-A

Matrix of Planchett/Filter Yttrium oxalate ppt on 25 mm 0.45 µm filter

Amount Used (g or ml) 0.5

Standard Activity (DPM/g or mL) 21333.9626

Residue/Carrier Agent Ytt carrier 1892786

Reference Date 10/1/08

Pipette ID Used 2154115

Expiration Date 2/12/14

Balance ID Used ~~38~~ 1113021018 3-29-13

Std carrier wt. 31.86 mg/mL

Sep date/time: 3/29/13 1305

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | Y1 | 0.5 | 0.0239 | 0.0398 | 15.9 |
| | Y2 | 0.5 | 0.0240 | 0.0401 | 16.1 |
| | Y3 | 0.5 | 0.0242 | 0.0402 | 16.0 |
| | Y4 | 0.5 | 0.0242 | 0.0403 | 16.1 |
| | Y5 | 0.5 | 0.0244 | 0.0404 | 16.0 |
| | Y6 | 0.5 | 0.0245 | 0.0407 | 16.2 |
| | Y7 | 0.5 | 0.0245 | 0.0404 | 15.9 |
| | Y8 | 0.5 | 0.0249 | 0.0413 | 16.4 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

wt ✓

AP 3/29/13

Prepared By: [signature] Date 3-29-13

Reviewed By: [signature] Date 4/1/13

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

1680

94136

Sr-89 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs, LLC
**P.O. No.:** GEL1304373, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty* , % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 1.878E+05 | 0.1 | 0.9 | 1.8 | 07/15/2013 |

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.02926 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: R. Ormsby
R. Ormsby, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 15 Jul 13

RECEIVED 7/17/13

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

ANA Form005 Rev —

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-109

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1680 |
| Prepared By: | Gregory Ramsay |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 07/15/2013 |
| Ampoule Mass (g): | 5.02926 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-109 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 11/07/2013 |
| Verification Date: | 11/07/2013 |
| Expiration Date: | 03/24/2014 |
| Primary Code: | 1680-A |
| Dilution(mL): | 200 mL |
| Mass of Parent(g): | 4.7905 g |
| Density(g/mL): | 0.9979 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / (5.02926 g * 200 mL ) = 53665.3046 dpm/mL |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / ( 0.9979 g/mL)/ (5.02926 g * 200 mL) = 53778.2389 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

DCN: ITSI-0808 0004-0076, 8 May 2019

# Verification for Sr-89 Standard 1680-A

v1.0.1

| | |
|---|---|
| Instrument | RED |
| Analyst | GXR1 |
| Verification Prep Date | 11/7/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1680-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 7/15/2013 |
| Ref. Act. (DPM/mL) | 53665.3046 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 11/7/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 11/8/2013 | 61.90 | 1139.80 | 39.60 |
| 2 | 11/8/2013 | 60.50 | 1139.20 | 39.60 |
| 3 | 11/8/2013 | 62.00 | 1128.40 | 39.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 1100.20 | 1.021162 | 10774.00 | 1077.40 |
| 2 | 1099.60 | 1.021162 | 10768.12 | 1076.81 |
| 3 | 1088.80 | 1.021162 | 10662.36 | 1066.24 |

| | dpm/mL |
|---|---|
| Mean Value = | 10734.83 |
| Stdev = | 62.82650264 |
| Certificate Value* = | 10930.2 |
| Two sigma = | 125.653 |
| 10 % of Mean = | 1073.483 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.21% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 3/24/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-89 source 1680-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRED for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 11/7/2013 using Sr-89 source 1657-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

11/25/13

11/14/13

11/25/13

M-9046

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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.856 E5 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED

DCN: ITSI-0808 0004-0076, 8 May 2019

# Verification for Sr-90 Standard 1243-L

v1.0.1

| | |
|---|---|
| Instrument | GREEN |
| Analyst | GXR1 |
| Verification Prep Date | 12/4/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1243-L |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 575.747476 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 12/4/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 12/5/2013 | 63.60 | 146.60 | 48.40 |
| 2 | 12/5/2013 | 63.10 | 147.60 | 48.40 |
| 3 | 12/5/2013 | 62.70 | 140.00 | 48.40 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 98.20 | 1.961352 | 500.67 | 50.07 |
| 2 | 99.20 | 1.961352 | 505.77 | 50.58 |
| 3 | 91.60 | 1.961352 | 467.02 | 46.70 |

| | dpm/mL |
|---|---|
| Mean Value = | 491.16 |
| Stdev = | 21.05469752 |
| **Certificate Value* =** | **508.5** |
| Two sigma = | 42.109 |
| 10 % of Mean = | 49.116 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 96.59% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 12/4/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-L by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/4/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12/13/13

Amanda L. Fehn 12/13/13

M-9048

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1243 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 10.41484 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-124 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Daniel Roy |
| Prep Date: | 12/19/2008 |
| Verification Date: | 12/04/2013 |
| Expiration Date: | 12/04/2014 |
| Primary Code: | 1243-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 10.2164 g |
| Density(g/mL): | 0.9991 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL) |
|---|
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g) |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL ) = 226951.7634 dpm/mL |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / ( 0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|
| 01/21/2010 | Bethany Fiem | 2.2467 | 1000 | 1243-B | 510.329369 dpm/mL | 01/21/2010 | 01/21/2011 |
| 08/03/2010 | Bethany Fiem | 2.5604 | 1000 | 1243-C | 581.5851 dpm/mL | 08/03/2010 | 08/03/2011 |
| 01/12/2011 | Bethany Fiem | 2.4946 | 1000 | 1243-D | 566.6389 dpm/mL | 01/12/2011 | 01/12/2012 |
| 08/12/2011 | Tim Chandler | 3.3115 | 100 | 1243-G | 18.7877 dpm/mL | 08/11/2011 | 08/11/2012 |
| 08/17/2011 | Tim Chandler | 2.5541 | 100 | 1243-H | 14.49064 dpm/mL | 08/18/2011 | 08/16/2012 |
| 06/21/2011 | Tim Chandler | .0235 | 100 | 1243-E | 53.37936 dpm/mL | 06/25/2012 | 06/20/2013 |
| 07/05/2011 | Bethany Fiem | 2.6072 | 1000 | 1243-F | 592.2156 dpm/mL | 07/05/2011 | 07/05/2012 |
| 01/31/2012 | Gregory Ramsay | 2.6792 | 1000 | 1243-I | 608.5701 dpm/ml | 01/31/2012 | 01/31/2013 |
| 08/29/2012 | Bethany Fiem | 2.6799 | 1000 | 1243-J | 608.729104 dpm/mL | 09/14/2012 | 09/11/2013 |
| 02/12/2013 | Gregory Ramsay | 2.6526 | 1000 | 1243-K | 602.528 dpm/ml | 01/15/2014 | 01/15/2015 |
| 12/04/2013 | Gregory Ramsay | 2.5347 | 1000 | 1243-L | 575.747476 dpm/ml | 12/04/2013 | 12/04/2014 |

GEL Laboratories LLC
Version 1.0 9/18/2000

# Strontium 89/90 Queue Sheet

02/27/14

DCN: ITSI-0808 0004-0076, 8 May 2019

**Batch #:** 1366732 **Analyst:** AF1 **First Client Due Date:** **Internal Due Date:** 03/13/2014 **Comments**

**Sr-89/90 Spike Code(s):** — / — **Expiration Date:** — / — **Vol(s):** — / — **Sr Sep. Date/time:** 2/15/14 11:30

**Sr-89/90 LCS Code(s):** 1680-A / 1243-L **Expiration Date:** 3/24/14 / 12/9/14 **Vol(s):** 0.2 / 0.5 **Y Sep. Date/time:** 2/26/14 11:20

**Sr Carrier Code:** 2696474 **Exp Date:** 12/5/14 **Vol:** * **Sdt Wt:** 8.2 **Y Carrier Code:** 2073992 **Exp Date:** 5/14/14 **Vol:** 0.5 **Sdt Wt:** 16.59

**Prep Date:** 2/14/14 **Initials:** AF1 **Pipet ID:** **Balance #:** — **Analytical Scale #:** 11182018 **Witness:** —

| Sample ID | Client Description | Type | RDL (Carrier Volume) | Date Collected | Matrix | Client | Rad | Pos # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr wt (mg) | Initial Y wt (g) | Final Y wt (g) | Net Y wt (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1203036037-1 | LCS for batch 1366732 | LCS | 0.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V1 | 200 | | 0.0270 | 0.0284 | 1.4 | 0.0259 | 0.0426 | 16.1 |
| 1203036038-1 | LCS for batch 1366732 | LCS | 0.2 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V2 | 200 | | 0.0240 | 0.0276 | 3.6 | 0.0278 | 0.0444 | 16.6 |
| 1203036039-1 | LCS for batch 1366732 | LCS | 0.4 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V3 | 200 | | 0.0280 | 0.0342 | 6.2 | 0.0271 | 0.0427 | 15.6 |
| 1203036040-1 | LCS for batch 1366732 | LCS | 0.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V4 | 200 | | 0.0243 | 0.0312 | 6.9 | 0.0281 | 0.0457 | 17.6 |
| 1203036041-1 | LCS for batch 1366732 | LCS | 0.8 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V5 | 200 | | 0.0231 | 0.0325 | 8.6 | 0.0271 | 0.0441 | 17.0 |
| 1203036042-1 | LCS for batch 1366732 | LCS | 1.0 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V6 | 200 | | 0.0261 | 0.0354 | 9.3 | 0.0282 | 0.0445 | 16.3 |
| 1203036043-1 | LCS for batch 1366732 | LCS | 1.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V7 | 200 | | 0.0280 | 0.0376 | 9.6 | 0.0275 | 0.0434 | 15.9 |
| 1203036044-1 | LCS for batch 1366732 | LCS | 2.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V8 | 200 | | 0.0262 | 0.0367 | 10.5 | 0.0266 | 0.0426 | 16.0 |

WH ✓ WH ✓

M-9050

Solid Sample Dissolution by: **LEACH or DIGESTION** (Circle One)

**Data Reviewed By:**

# Gas Flow Proportional Counter Calibration Package

Method: Strontium 89/90

Instrument (circle one): LB4100 / (Protean)

| | Included/ Acceptable | Comments |
|---|---|---|
| **Part 1: Efficiency determination** | | |
| 1 Efficiency spreadsheet (eff pts, graphs, trendline equation) | ✓ | |
| 2 Applicable portion of GFPC_Machines.XLS | ✓ | |
| 3 Raw Data for Calibration standards | ✓ | |
| 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%) | ✓ | |
| 5 Plateau graph and raw data | ✓ | |
| 6 Standardization of Carrier (if applicable) | ✓ | |
| **Part 2. Documentation for Calibration Source** | | |
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |
| **Part 3. Documentation for Verification Source** | | |
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |
| **Part 4. Enter into LIMS** | | |
| 1 Alpha LIMS instrument calibration updated | ✓ | |

Primary Review of Package [signature]

Secondary Review of Package Amanda L. Fehr

Effective Date: 3/1/13

exp date ~~2/28/14~~ ~~2/25/14~~ 2/28/15

*calibration verified 2/1 and exp date extended.

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

Rev 7 SSC 8/3/09

# Sr-89 Calibration - PIC - Feb 2013

| Standard Data | |
|---|---|
| Isotope | Sr-89 |
| Standard ID number | 1633-A |
| Half Life (days) | 50.53 |
| Std. Act. (dpm/mL) | 123593.8614 |
| Reference Date | 12/13/2012 |
| Volume of spike (mL) | 1.0 |
| Std. Nominal (dpm) | 51371.24 |
| Decay Date | 2/15/2013 |

| Carrier Data | | Std ID<br>Std weight | 1858443<br>17.73 | mg/mL |
|---|---|---|---|---|
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 1.9 | 0.1 | 1.77 | 100.0% |
| 2 | 3.5 | 0.2 | 3.55 | 98.7% |
| 3 | 6.9 | 0.4 | 7.09 | 97.3% |
| 4 | 8.3 | 0.5 | 8.87 | 93.6% |
| 5 | 13.5 | 0.8 | 14.18 | 95.2% |
| 6 | 17.6 | 1 | 17.73 | 99.3% |
| 7 | 26.6 | 1.5 | 26.60 | 100.0% |
| 8 | 36.1 | 2.1 | 37.23 | 97.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

The following detectors were not calibrated:

12A

*Background is considered neglible.
**Decay corrected to mid-point of count

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1A | 1 | 2/15/2013 16:21 | 1 | 22671 | 22671.00 | 100.0% | 22671.00 | 50892.77 | 0.4455 | 0.5143 |
| 1A | 2 | 2/15/2013 16:30 | 1 | 24304 | 24304.00 | 98.7% | 24623.42 | 50888.38 | 0.4839 | 0.5095 |
| 1A | 3 | 2/15/2013 16:28 | 1 | 25873 | 25873.00 | 97.3% | 26592.94 | 50889.58 | 0.5226 | 0.4993 |
| 1A | 4 | 2/15/2013 16:24 | 1 | 24881 | 24881.00 | 93.6% | 26574.71 | 50891.32 | 0.5222 | 0.4951 |
| 1A | 5 | 2/15/2013 16:33 | 1 | 25969 | 25969.00 | 95.2% | 27284.76 | 50887.10 | 0.5362 | 0.4794 |
| 1A | 6 | 2/15/2013 16:39 | 1 | 23419 | 23419.00 | 99.3% | 23591.96 | 50884.19 | 0.4636 | 0.4671 |
| 1A | 7 | 2/15/2013 16:37 | 1 | 25270 | 25270.00 | 100.0% | 25270.00 | 50885.14 | 0.4966 | 0.4401 |
| 1A | 8 | 2/15/2013 16:35 | 1 | 17057 | 17057.00 | 97.0% | 17592.33 | 50886.14 | 0.3457 | 0.4115 |
| 1B | 1 | 2/15/2013 16:24 | 1 | 22892 | 22892.00 | 100.0% | 22892.00 | 50891.24 | 0.4498 | 0.5191 |
| 1B | 2 | 2/15/2013 16:22 | 1 | 24815 | 24815.00 | 98.7% | 25141.14 | 50892.67 | 0.4940 | 0.5141 |
| 1B | 3 | 2/15/2013 16:30 | 1 | 25632 | 25632.00 | 97.3% | 26345.24 | 50888.35 | 0.5177 | 0.5037 |
| 1B | 4 | 2/15/2013 16:28 | 1 | 25351 | 25351.00 | 93.6% | 27076.70 | 50889.55 | 0.5321 | 0.4994 |
| 1B | 5 | 2/15/2013 16:35 | 1 | 26005 | 26005.00 | 95.2% | 27322.59 | 50886.07 | 0.5369 | 0.4833 |
| 1B | 6 | 2/15/2013 16:33 | 1 | 23585 | 23585.00 | 99.3% | 23759.21 | 50887.06 | 0.4669 | 0.4707 |
| 1B | 7 | 2/15/2013 16:39 | 1 | 25562 | 25562.00 | 100.0% | 25562.00 | 50884.16 | 0.5024 | 0.4430 |
| 1B | 8 | 2/15/2013 16:37 | 1 | 17129 | 17129.00 | 97.0% | 17666.59 | 50885.13 | 0.3472 | 0.4137 |
| 1C | 1 | 2/15/2013 16:28 | 1 | 23030 | 23030.00 | 100.0% | 23030.00 | 50889.54 | 0.4525 | 0.5246 |
| 1C | 2 | 2/15/2013 16:25 | 1 | 25093 | 25093.00 | 98.7% | 25422.79 | 50891.21 | 0.4996 | 0.5192 |
| 1C | 3 | 2/15/2013 16:22 | 1 | 26245 | 26245.00 | 97.3% | 26975.30 | 50892.57 | 0.5300 | 0.5077 |
| 1C | 4 | 2/15/2013 16:31 | 1 | 25504 | 25504.00 | 93.6% | 27240.12 | 50888.31 | 0.5353 | 0.5030 |
| 1C | 5 | 2/15/2013 16:37 | 1 | 25732 | 25732.00 | 95.2% | 27035.75 | 50885.07 | 0.5313 | 0.4855 |
| 1C | 6 | 2/15/2013 16:35 | 1 | 23516 | 23516.00 | 99.3% | 23689.70 | 50886.03 | 0.4655 | 0.4717 |
| 1C | 7 | 2/15/2013 16:33 | 1 | 25862 | 25862.00 | 100.0% | 25862.00 | 50887.03 | 0.5082 | 0.4414 |
| 1C | 8 | 2/15/2013 16:39 | 1 | 16780 | 16780.00 | 97.0% | 17306.64 | 50884.12 | 0.3401 | 0.4094 |
| 1D | 1 | 2/15/2013 16:31 | 1 | 23237 | 23237.00 | 100.0% | 23237.00 | 50888.28 | 0.4566 | 0.5225 |
| 1D | 2 | 2/15/2013 16:28 | 1 | 24810 | 24810.00 | 98.7% | 25136.07 | 50889.50 | 0.4939 | 0.5173 |
| 1D | 3 | 2/15/2013 16:25 | 1 | 26179 | 26179.00 | 97.3% | 26907.46 | 50891.17 | 0.5287 | 0.5062 |
| 1D | 4 | 2/15/2013 16:22 | 1 | 25241 | 25241.00 | 93.6% | 26959.21 | 50892.51 | 0.5297 | 0.5016 |
| 1D | 5 | 2/15/2013 16:39 | 1 | 26012 | 26012.00 | 95.2% | 27329.94 | 50884.08 | 0.5371 | 0.4846 |
| 1D | 6 | 2/15/2013 16:37 | 1 | 23271 | 23271.00 | 99.3% | 23442.89 | 50885.05 | 0.4607 | 0.4713 |
| 1D | 7 | 2/15/2013 16:35 | 1 | 25607 | 25607.00 | 100.0% | 25607.00 | 50886.00 | 0.5032 | 0.4419 |
| 1D | 8 | 2/15/2013 16:33 | 1 | 17078 | 17078.00 | 97.0% | 17613.99 | 50887.01 | 0.3461 | 0.4109 |
| 2A | 1 | 2/15/2013 16:33 | 1 | 22234 | 22234.00 | 100.0% | 22234.00 | 50886.97 | 0.4369 | 0.5053 |
| 2A | 2 | 2/15/2013 16:39 | 1 | 23993 | 23993.00 | 98.7% | 24308.34 | 50884.06 | 0.4777 | 0.5006 |
| 2A | 3 | 2/15/2013 16:37 | 1 | 25476 | 25476.00 | 97.3% | 26184.90 | 50885.01 | 0.5146 | 0.4907 |
| 2A | 4 | 2/15/2013 16:35 | 1 | 24595 | 24595.00 | 93.6% | 26269.24 | 50885.96 | 0.5162 | 0.4866 |
| 2A | 5 | 2/15/2013 16:22 | 1 | 25135 | 25135.00 | 95.2% | 26408.51 | 50892.44 | 0.5189 | 0.4713 |
| 2A | 6 | 2/15/2013 16:31 | 1 | 22948 | 22948.00 | 99.3% | 23117.50 | 50888.22 | 0.4543 | 0.4593 |
| 2A | 7 | 2/15/2013 16:28 | 1 | 25149 | 25149.00 | 100.0% | 25149.00 | 50889.46 | 0.4942 | 0.4330 |
| 2A | 8 | 2/15/2013 16:25 | 1 | 16736 | 16736.00 | 97.0% | 17261.26 | 50891.14 | 0.3392 | 0.4052 |
| 2B | 1 | 2/15/2013 16:35 | 1 | 21501 | 21501.00 | 100.0% | 21501.00 | 50885.93 | 0.4225 | 0.4850 |
| 2B | 2 | 2/15/2013 16:33 | 1 | 23103 | 23103.00 | 98.7% | 23406.64 | 50886.92 | 0.4600 | 0.4806 |
| 2B | 3 | 2/15/2013 16:39 | 1 | 24238 | 24238.00 | 97.3% | 24912.45 | 50884.02 | 0.4896 | 0.4714 |
| 2B | 4 | 2/15/2013 16:37 | 1 | 23758 | 23758.00 | 93.6% | 25375.26 | 50884.98 | 0.4987 | 0.4676 |
| 2B | 5 | 2/15/2013 16:25 | 1 | 23999 | 23999.00 | 95.2% | 25214.95 | 50891.10 | 0.4955 | 0.4534 |
| 2B | 6 | 2/15/2013 16:22 | 1 | 22186 | 22186.00 | 99.3% | 22349.87 | 50892.40 | 0.4392 | 0.4422 |
| 2B | 7 | 2/15/2013 16:31 | 1 | 24035 | 24035.00 | 100.0% | 24035.00 | 50888.20 | 0.4723 | 0.4177 |
| 2B | 8 | 2/15/2013 16:28 | 1 | 16377 | 16377.00 | 97.0% | 16890.99 | 50889.43 | 0.3319 | 0.3918 |
| 2C | 1 | 2/15/2013 16:37 | 1 | 22296 | 22296.00 | 100.0% | 22296.00 | 50884.96 | 0.4382 | 0.5061 |
| 2C | 2 | 2/15/2013 16:36 | 1 | 23951 | 23951.00 | 98.7% | 24265.78 | 50885.89 | 0.4769 | 0.5019 |
| 2C | 3 | 2/15/2013 16:33 | 1 | 25463 | 25463.00 | 97.3% | 26171.54 | 50886.87 | 0.5143 | 0.4931 |
| 2C | 4 | 2/15/2013 16:39 | 1 | 24962 | 24962.00 | 93.6% | 26661.22 | 50883.99 | 0.5240 | 0.4894 |
| 2C | 5 | 2/15/2013 16:28 | 1 | 25437 | 25437.00 | 95.2% | 26725.81 | 50889.38 | 0.5252 | 0.4758 |
| 2C | 6 | 2/15/2013 16:25 | 1 | 23144 | 23144.00 | 99.3% | 23314.95 | 50891.06 | 0.4581 | 0.4651 |
| 2C | 7 | 2/15/2013 16:22 | 1 | 25548 | 25548.00 | 100.0% | 25548.00 | 50892.31 | 0.5020 | 0.4416 |
| 2C | 8 | 2/15/2013 16:31 | 1 | 17333 | 17333.00 | 97.0% | 17877.00 | 50888.17 | 0.3513 | 0.4168 |
| 2D | 1 | 2/15/2013 16:39 | 1 | 22601 | 22601.00 | 100.0% | 22601.00 | 50883.96 | 0.4442 | 0.5098 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2D | 2 | 2/15/2013 16:38 | 1 | 24333 | 24333.00 | 98.7% | 24652.81 | 50884.92 | 0.4845 | 0.5053 |
| 2D | 3 | 2/15/2013 16:36 | 1 | 25432 | 25432.00 | 97.3% | 26139.67 | 50885.86 | 0.5137 | 0.4956 |
| 2D | 4 | 2/15/2013 16:34 | 1 | 24784 | 24784.00 | 93.6% | 26471.10 | 50886.85 | 0.5202 | 0.4916 |
| 2D | 5 | 2/15/2013 16:31 | 1 | 25497 | 25497.00 | 95.2% | 26788.85 | 50888.12 | 0.5264 | 0.4789 |
| 2D | 6 | 2/15/2013 16:28 | 1 | 23111 | 23111.00 | 99.3% | 23281.71 | 50889.36 | 0.4575 | 0.4652 |
| 2D | 7 | 2/15/2013 16:25 | 1 | 25715 | 25715.00 | 100.0% | 25715.00 | 50891.02 | 0.5053 | 0.4396 |
| 2D | 8 | 2/15/2013 16:22 | 1 | 17022 | 17022.00 | 97.0% | 17556.24 | 50892.25 | 0.3450 | 0.4127 |
| 3A | 1 | 2/15/2013 17:08 | 1 | 22713 | 22713.00 | 100.0% | 22713.00 | 50870.09 | 0.4465 | 0.5136 |
| 3A | 2 | 2/15/2013 17:16 | 1 | 24219 | 24219.00 | 98.7% | 24537.31 | 50866.48 | 0.4824 | 0.5082 |
| 3A | 3 | 2/15/2013 17:13 | 1 | 25568 | 25568.00 | 97.3% | 26279.46 | 50867.78 | 0.5166 | 0.4966 |
| 3A | 4 | 2/15/2013 17:11 | 1 | 24790 | 24790.00 | 93.6% | 26477.51 | 50868.84 | 0.5205 | 0.4919 |
| 3A | 5 | 2/15/2013 17:20 | 1 | 25636 | 25636.00 | 95.2% | 26934.89 | 50864.33 | 0.5295 | 0.4742 |
| 3A | 6 | 2/15/2013 17:28 | 1 | 22922 | 22922.00 | 99.3% | 23091.31 | 50860.34 | 0.4540 | 0.4603 |
| 3A | 7 | 2/15/2013 17:26 | 1 | 25188 | 25188.00 | 100.0% | 25188.00 | 50861.29 | 0.4952 | 0.4297 |
| 3A | 8 | 2/15/2013 17:23 | 1 | 16133 | 16133.00 | 97.0% | 16639.33 | 50862.81 | 0.3271 | 0.3974 |
| 3B | 1 | 2/15/2013 17:11 | 1 | 22710 | 22710.00 | 100.0% | 22710.00 | 50868.83 | 0.4464 | 0.5168 |
| 3B | 2 | 2/15/2013 17:08 | 1 | 24287 | 24287.00 | 98.7% | 24606.20 | 50870.03 | 0.4837 | 0.5111 |
| 3B | 3 | 2/15/2013 17:16 | 1 | 25785 | 25785.00 | 97.3% | 26502.50 | 50866.44 | 0.5210 | 0.4990 |
| 3B | 4 | 2/15/2013 17:13 | 1 | 25095 | 25095.00 | 93.6% | 26803.27 | 50867.74 | 0.5269 | 0.4941 |
| 3B | 5 | 2/15/2013 17:23 | 1 | 25479 | 25479.00 | 95.2% | 26769.94 | 50862.77 | 0.5263 | 0.4756 |
| 3B | 6 | 2/15/2013 17:20 | 1 | 23180 | 23180.00 | 99.3% | 23351.22 | 50864.25 | 0.4591 | 0.4611 |
| 3B | 7 | 2/15/2013 17:28 | 1 | 25229 | 25229.00 | 100.0% | 25229.00 | 50860.31 | 0.4960 | 0.4291 |
| 3B | 8 | 2/15/2013 17:26 | 1 | 15914 | 15914.00 | 97.0% | 16413.46 | 50861.27 | 0.3227 | 0.3954 |
| 3C | 1 | 2/15/2013 17:13 | 1 | 22789 | 22789.00 | 100.0% | 22789.00 | 50867.71 | 0.4480 | 0.5218 |
| 3C | 2 | 2/15/2013 17:11 | 1 | 24757 | 24757.00 | 98.7% | 25082.38 | 50868.78 | 0.4931 | 0.5163 |
| 3C | 3 | 2/15/2013 17:08 | 1 | 25765 | 25765.00 | 97.3% | 26481.94 | 50869.95 | 0.5206 | 0.5047 |
| 3C | 4 | 2/15/2013 17:16 | 1 | 25700 | 25700.00 | 93.6% | 27449.46 | 50866.42 | 0.5396 | 0.4999 |
| 3C | 5 | 2/15/2013 17:26 | 1 | 25884 | 25884.00 | 95.2% | 27195.46 | 50861.23 | 0.5347 | 0.4821 |
| 3C | 6 | 2/15/2013 17:23 | 1 | 23317 | 23317.00 | 99.3% | 23489.23 | 50862.74 | 0.4618 | 0.4680 |
| 3C | 7 | 2/15/2013 17:20 | 1 | 25638 | 25638.00 | 100.0% | 25638.00 | 50864.20 | 0.5040 | 0.4372 |
| 3C | 8 | 2/15/2013 17:28 | 1 | 16405 | 16405.00 | 97.0% | 16919.87 | 50860.27 | 0.3327 | 0.4047 |
| 3D | 1 | 2/15/2013 17:16 | 1 | 22440 | 22440.00 | 100.0% | 22440.00 | 50866.39 | 0.4412 | 0.5133 |
| 3D | 2 | 2/15/2013 17:13 | 1 | 24241 | 24241.00 | 98.7% | 24559.60 | 50867.67 | 0.4828 | 0.5079 |
| 3D | 3 | 2/15/2013 17:11 | 1 | 25787 | 25787.00 | 97.3% | 26504.55 | 50868.75 | 0.5210 | 0.4963 |
| 3D | 4 | 2/15/2013 17:09 | 1 | 24974 | 24974.00 | 93.6% | 26674.04 | 50869.88 | 0.5244 | 0.4915 |
| 3D | 5 | 2/15/2013 17:28 | 1 | 25471 | 25471.00 | 95.2% | 26761.53 | 50860.24 | 0.5262 | 0.4737 |
| 3D | 6 | 2/15/2013 17:26 | 1 | 22855 | 22855.00 | 99.3% | 23023.82 | 50861.19 | 0.4527 | 0.4597 |
| 3D | 7 | 2/15/2013 17:23 | 1 | 24979 | 24979.00 | 100.0% | 24979.00 | 50862.70 | 0.4911 | 0.4289 |
| 3D | 8 | 2/15/2013 17:20 | 1 | 16191 | 16191.00 | 97.0% | 16699.16 | 50864.17 | 0.3283 | 0.3964 |
| 4A | 1 | 2/15/2013 17:20 | 1 | 22414 | 22414.00 | 100.0% | 22414.00 | 50864.14 | 0.4407 | 0.5128 |
| 4A | 2 | 2/15/2013 17:28 | 1 | 24462 | 24462.00 | 98.7% | 24783.50 | 50860.22 | 0.4873 | 0.5079 |
| 4A | 3 | 2/15/2013 17:27 | 1 | 25519 | 25519.00 | 97.3% | 26229.09 | 50861.15 | 0.5157 | 0.4974 |
| 4A | 4 | 2/15/2013 17:23 | 1 | 25109 | 25109.00 | 93.6% | 26818.23 | 50862.66 | 0.5273 | 0.4931 |
| 4A | 5 | 2/15/2013 17:09 | 1 | 25709 | 25709.00 | 95.2% | 27011.59 | 50869.83 | 0.5310 | 0.4771 |
| 4A | 6 | 2/15/2013 17:15 | 1 | 23050 | 23050.00 | 99.3% | 23220.26 | 50866.35 | 0.4565 | 0.4645 |
| 4A | 7 | 2/15/2013 17:13 | 1 | 25348 | 25348.00 | 100.0% | 25348.00 | 50867.64 | 0.4983 | 0.4368 |
| 4A | 8 | 2/15/2013 17:11 | 1 | 16794 | 16794.00 | 97.0% | 17321.08 | 50868.71 | 0.3405 | 0.4076 |
| 4B | 1 | 2/15/2013 17:24 | 1 | 22758 | 22758.00 | 100.0% | 22758.00 | 50862.63 | 0.4474 | 0.5134 |
| 4B | 2 | 2/15/2013 17:20 | 1 | 24066 | 24066.00 | 98.7% | 24382.30 | 50864.09 | 0.4794 | 0.5086 |
| 4B | 3 | 2/15/2013 17:29 | 1 | 25905 | 25905.00 | 97.3% | 26625.83 | 50860.18 | 0.5235 | 0.4983 |
| 4B | 4 | 2/15/2013 17:27 | 1 | 25162 | 25162.00 | 93.6% | 26874.83 | 50861.12 | 0.5284 | 0.4940 |
| 4B | 5 | 2/15/2013 17:11 | 1 | 25354 | 25354.00 | 95.2% | 26638.60 | 50868.66 | 0.5237 | 0.4783 |
| 4B | 6 | 2/15/2013 17:09 | 1 | 23302 | 23302.00 | 99.3% | 23474.12 | 50869.77 | 0.4615 | 0.4658 |
| 4B | 7 | 2/15/2013 17:16 | 1 | 25359 | 25359.00 | 100.0% | 25359.00 | 50866.30 | 0.4985 | 0.4386 |
| 4B | 8 | 2/15/2013 17:13 | 1 | 16980 | 16980.00 | 97.0% | 17512.92 | 50867.60 | 0.3443 | 0.4098 |
| 4C | 1 | 2/15/2013 17:27 | 1 | 23173 | 23173.00 | 100.0% | 23173.00 | 50861.10 | 0.4556 | 0.5244 |
| 4C | 2 | 2/15/2013 17:24 | 1 | 25035 | 25035.00 | 98.7% | 25364.03 | 50862.60 | 0.4987 | 0.5189 |
| 4C | 3 | 2/15/2013 17:21 | 1 | 25859 | 25859.00 | 97.3% | 26578.55 | 50864.07 | 0.5225 | 0.5073 |
| 4C | 4 | 2/15/2013 17:29 | 1 | 25412 | 25412.00 | 93.6% | 27141.85 | 50860.14 | 0.5337 | 0.5025 |
| 4C | 5 | 2/15/2013 17:13 | 1 | 26023 | 26023.00 | 95.2% | 27341.50 | 50867.55 | 0.5375 | 0.4847 |
| 4C | 6 | 2/15/2013 17:11 | 1 | 23478 | 23478.00 | 99.3% | 23651.42 | 50868.63 | 0.4650 | 0.4707 |
| 4C | 7 | 2/15/2013 17:09 | 1 | 25643 | 25643.00 | 100.0% | 25643.00 | 50869.71 | 0.5041 | 0.4399 |
| 4C | 8 | 2/15/2013 17:16 | 1 | 16702 | 16702.00 | 97.0% | 17226.19 | 50866.26 | 0.3387 | 0.4074 |
| 4D | 1 | 2/15/2013 17:29 | 1 | 22653 | 22653.00 | 100.0% | 22653.00 | 50860.10 | 0.4454 | 0.5205 |
| 4D | 2 | 2/15/2013 17:27 | 1 | 24739 | 24739.00 | 98.7% | 25064.14 | 50861.06 | 0.4928 | 0.5149 |
| 4D | 3 | 2/15/2013 17:24 | 1 | 25941 | 25941.00 | 97.3% | 26662.84 | 50862.55 | 0.5242 | 0.5032 |
| 4D | 4 | 2/15/2013 17:21 | 1 | 25276 | 25276.00 | 93.6% | 26996.60 | 50864.03 | 0.5308 | 0.4984 |
| 4D | 5 | 2/15/2013 17:16 | 1 | 25947 | 25947.00 | 95.2% | 27261.65 | 50866.22 | 0.5359 | 0.4804 |
| 4D | 6 | 2/15/2013 17:13 | 1 | 23091 | 23091.00 | 99.3% | 23261.56 | 50867.51 | 0.4573 | 0.4663 |
| 4D | 7 | 2/15/2013 17:11 | 1 | 25813 | 25813.00 | 100.0% | 25813.00 | 50868.58 | 0.5074 | 0.4352 |
| 4D | 8 | 2/15/2013 17:09 | 1 | 16149 | 16149.00 | 97.0% | 16655.84 | 50869.66 | 0.3274 | 0.4024 |
| 5A | 1 | 2/15/2013 13:38 | 1 | 23403 | 23403.00 | 100.0% | 23403.00 | 50972.23 | 0.4591 | 0.5263 |
| 5A | 2 | 2/15/2013 14:12 | 1 | 25086 | 25086.00 | 98.7% | 25415.70 | 50955.57 | 0.4988 | 0.5219 |
| 5A | 3 | 2/15/2013 13:48 | 1 | 26469 | 26469.00 | 97.3% | 27205.53 | 50967.40 | 0.5338 | 0.5124 |
| 5A | 4 | 2/15/2013 13:45 | 1 | 25794 | 25794.00 | 93.6% | 27549.86 | 50968.82 | 0.5405 | 0.5085 |
| 5A | 5 | 2/15/2013 14:15 | 1 | 26347 | 26347.00 | 95.2% | 27681.91 | 50953.88 | 0.5433 | 0.4940 |

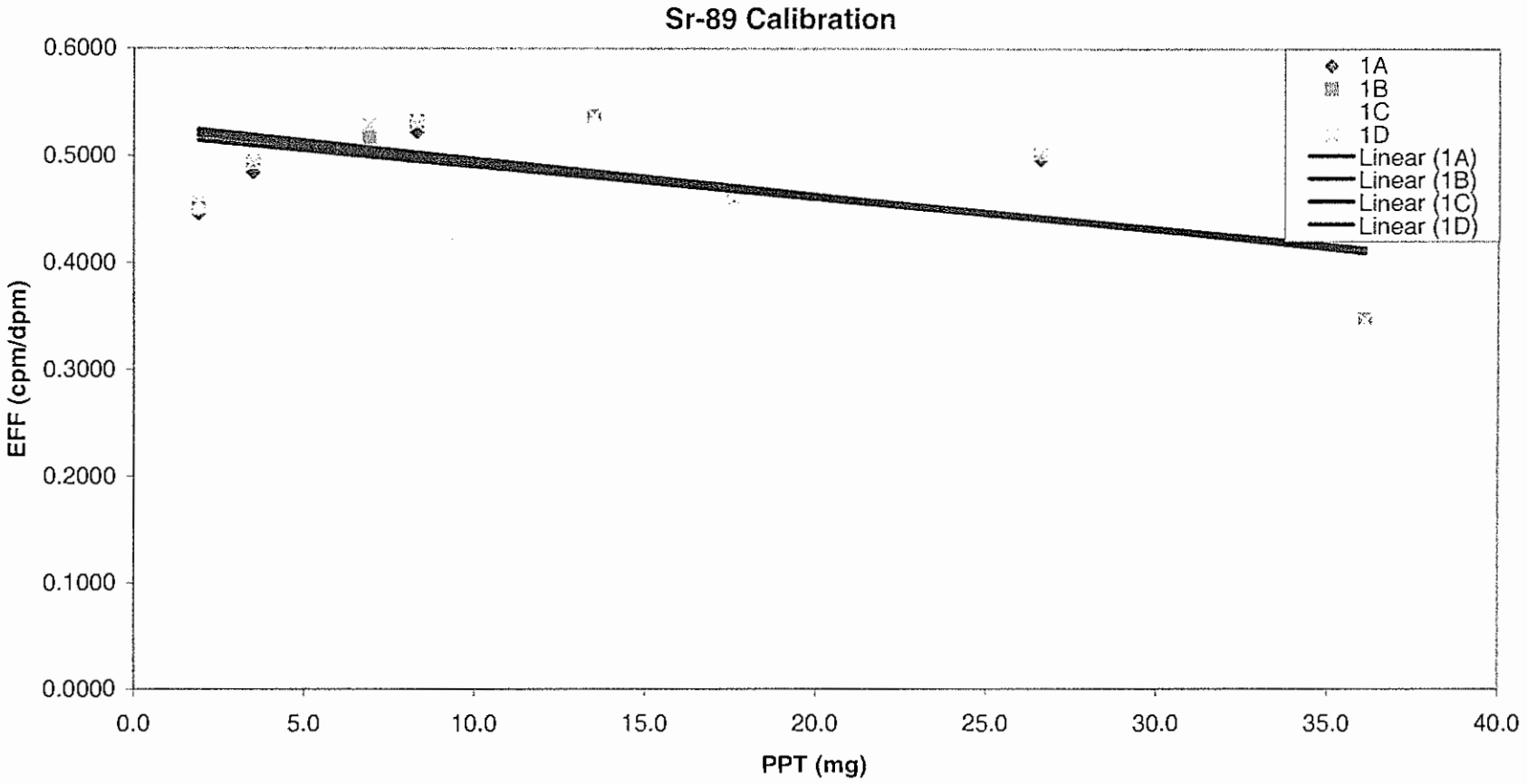
| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5A | 6 | 2/15/2013 14:30 | 1 | 24007 | 24007.00 | 99.3% | 24184.32 | 50946.54 | 0.4747 | 0.4826 |
| 5A | 7 | 2/15/2013 14:27 | 1 | 26340 | 26340.00 | 100.0% | 26340.00 | 50948.05 | 0.5170 | 0.4575 |
| 5A | 8 | 2/15/2013 14:25 | 1 | 18123 | 18123.00 | 97.0% | 18691.79 | 50949.39 | 0.3669 | 0.4310 |
| 5B | 1 | 2/15/2013 13:45 | 1 | 23574 | 23574.00 | 100.0% | 23574.00 | 50968.78 | 0.4625 | 0.5274 |
| 5B | 2 | 2/15/2013 13:38 | 1 | 25221 | 25221.00 | 98.7% | 25552.48 | 50972.23 | 0.5013 | 0.5227 |
| 5B | 3 | 2/15/2013 14:12 | 1 | 26417 | 26417.00 | 97.3% | 27152.08 | 50955.53 | 0.5329 | 0.5128 |
| 5B | 4 | 2/15/2013 13:48 | 1 | 25811 | 25811.00 | 93.6% | 27568.01 | 50967.35 | 0.5409 | 0.5088 |
| 5B | 5 | 2/15/2013 14:25 | 1 | 26405 | 26405.00 | 95.2% | 27742.85 | 50949.32 | 0.5445 | 0.4936 |
| 5B | 6 | 2/15/2013 14:15 | 1 | 23663 | 23663.00 | 99.3% | 23837.78 | 50953.83 | 0.4678 | 0.4817 |
| 5B | 7 | 2/15/2013 14:31 | 1 | 26124 | 26124.00 | 100.0% | 26124.00 | 50946.50 | 0.5128 | 0.4555 |
| 5B | 8 | 2/15/2013 14:27 | 1 | 18167 | 18167.00 | 97.0% | 18737.17 | 50947.99 | 0.3678 | 0.4279 |
| 5C | 1 | 2/15/2013 13:48 | 1 | 23369 | 23369.00 | 100.0% | 23369.00 | 50967.32 | 0.4585 | 0.5266 |
| 5C | 2 | 2/15/2013 13:45 | 1 | 25051 | 25051.00 | 98.7% | 25380.24 | 50968.73 | 0.4980 | 0.5217 |
| 5C | 3 | 2/15/2013 13:38 | 1 | 26297 | 26297.00 | 97.3% | 27028.74 | 50972.23 | 0.5303 | 0.5112 |
| 5C | 4 | 2/15/2013 14:12 | 1 | 26150 | 26150.00 | 93.6% | 27930.09 | 50955.49 | 0.5481 | 0.5069 |
| 5C | 5 | 2/15/2013 14:28 | 1 | 26199 | 26199.00 | 95.2% | 27526.42 | 50947.95 | 0.5403 | 0.4908 |
| 5C | 6 | 2/15/2013 14:25 | 1 | 23488 | 23488.00 | 99.3% | 23661.49 | 50949.26 | 0.4644 | 0.4782 |
| 5C | 7 | 2/15/2013 14:16 | 1 | 25842 | 25842.00 | 100.0% | 25842.00 | 50953.76 | 0.5072 | 0.4504 |
| 5C | 8 | 2/15/2013 14:31 | 1 | 17798 | 17798.00 | 97.0% | 18356.59 | 50946.45 | 0.3603 | 0.4211 |
| 5D | 1 | 2/15/2013 14:12 | 1 | 23109 | 23109.00 | 100.0% | 23109.00 | 50955.42 | 0.4535 | 0.5190 |
| 5D | 2 | 2/15/2013 13:48 | 1 | 24806 | 24806.00 | 98.7% | 25132.02 | 50967.28 | 0.4931 | 0.5147 |
| 5D | 3 | 2/15/2013 13:45 | 1 | 26008 | 26008.00 | 97.3% | 26731.70 | 50968.69 | 0.5245 | 0.5056 |
| 5D | 4 | 2/15/2013 13:38 | 1 | 25558 | 25558.00 | 93.6% | 27297.79 | 50972.23 | 0.5355 | 0.5018 |
| 5D | 5 | 2/15/2013 14:31 | 1 | 26045 | 26045.00 | 95.2% | 27364.61 | 50946.41 | 0.5371 | 0.4879 |
| 5D | 6 | 2/15/2013 14:28 | 1 | 23651 | 23651.00 | 99.3% | 23825.69 | 50947.63 | 0.4677 | 0.4768 |
| 5D | 7 | 2/15/2013 14:25 | 1 | 25829 | 25829.00 | 100.0% | 25829.00 | 50949.18 | 0.5070 | 0.4526 |
| 5D | 8 | 2/15/2013 14:16 | 1 | 18148 | 18148.00 | 97.0% | 18717.58 | 50953.71 | 0.3673 | 0.4271 |
| 6A | 1 | 2/15/2013 14:16 | 1 | 22130 | 22130.00 | 100.0% | 22130.00 | 50953.45 | 0.4343 | 0.4933 |
| 6A | 2 | 2/15/2013 14:31 | 1 | 24034 | 24034.00 | 98.7% | 24349.88 | 50946.16 | 0.4780 | 0.4901 |
| 6A | 3 | 2/15/2013 14:28 | 1 | 24798 | 24798.00 | 97.3% | 25488.03 | 50947.64 | 0.5003 | 0.4835 |
| 6A | 4 | 2/15/2013 14:26 | 1 | 24454 | 24454.00 | 93.6% | 26118.64 | 50948.80 | 0.5126 | 0.4807 |
| 6A | 5 | 2/15/2013 13:38 | 1 | 24903 | 24903.00 | 95.2% | 26164.75 | 50972.02 | 0.5133 | 0.4706 |
| 6A | 6 | 2/15/2013 14:13 | 1 | 22477 | 22477.00 | 99.3% | 22643.02 | 50954.98 | 0.4444 | 0.4625 |
| 6A | 7 | 2/15/2013 13:48 | 1 | 24857 | 24857.00 | 100.0% | 24857.00 | 50966.92 | 0.4877 | 0.4449 |
| 6A | 8 | 2/15/2013 13:45 | 1 | 18846 | 18846.00 | 97.0% | 19437.48 | 50968.41 | 0.3814 | 0.4263 |
| 6B | 1 | 2/15/2013 14:26 | 1 | 22530 | 22530.00 | 100.0% | 22530.00 | 50948.63 | 0.4422 | 0.5126 |
| 6B | 2 | 2/15/2013 14:16 | 1 | 25573 | 25573.00 | 98.7% | 25909.10 | 50953.38 | 0.5085 | 0.5090 |
| 6B | 3 | 2/15/2013 14:31 | 1 | 25565 | 25565.00 | 97.3% | 26276.37 | 50946.11 | 0.5158 | 0.5014 |
| 6B | 4 | 2/15/2013 14:28 | 1 | 25190 | 25190.00 | 93.6% | 26904.74 | 50947.58 | 0.5281 | 0.4982 |
| 6B | 5 | 2/15/2013 13:46 | 1 | 25651 | 25651.00 | 95.2% | 26950.65 | 50968.31 | 0.5288 | 0.4865 |
| 6B | 6 | 2/15/2013 13:41 | 1 | 23552 | 23552.00 | 99.3% | 23725.96 | 50970.56 | 0.4655 | 0.4773 |
| 6B | 7 | 2/15/2013 14:13 | 1 | 25638 | 25638.00 | 100.0% | 25638.00 | 50954.91 | 0.5032 | 0.4571 |
| 6B | 8 | 2/15/2013 13:49 | 1 | 19075 | 19075.00 | 97.0% | 19673.67 | 50966.85 | 0.3860 | 0.4358 |
| 6C | 1 | 2/15/2013 14:28 | 1 | 22479 | 22479.00 | 100.0% | 22479.00 | 50947.53 | 0.4412 | 0.5091 |
| 6C | 2 | 2/15/2013 14:26 | 1 | 24382 | 24382.00 | 98.7% | 24702.45 | 50948.63 | 0.4849 | 0.5050 |
| 6C | 3 | 2/15/2013 14:17 | 1 | 25764 | 25764.00 | 97.3% | 26480.91 | 50953.28 | 0.5197 | 0.4964 |
| 6C | 4 | 2/15/2013 14:31 | 1 | 25070 | 25070.00 | 93.6% | 26776.57 | 50946.05 | 0.5256 | 0.4928 |
| 6C | 5 | 2/15/2013 13:49 | 1 | 25538 | 25538.00 | 95.2% | 26831.93 | 50966.78 | 0.5265 | 0.4796 |
| 6C | 6 | 2/15/2013 13:46 | 1 | 23213 | 23213.00 | 99.3% | 23384.46 | 50968.22 | 0.4588 | 0.4692 |
| 6C | 7 | 2/15/2013 13:38 | 1 | 25525 | 25525.00 | 100.0% | 25525.00 | 50972.02 | 0.5008 | 0.4463 |
| 6C | 8 | 2/15/2013 14:13 | 1 | 17935 | 17935.00 | 97.0% | 18497.89 | 50954.86 | 0.3630 | 0.4221 |
| 6D | 1 | 2/15/2013 14:32 | 1 | 11648 | 11648.00 | 100.0% | 11648.00 | 50946.01 | 0.2286 | 0.3015 |
| 6D | 2 | 2/15/2013 14:29 | 1 | 13066 | 13066.00 | 98.7% | 13237.72 | 50947.40 | 0.2598 | 0.2955 |
| 6D | 3 | 2/15/2013 14:26 | 1 | 12930 | 12930.00 | 97.3% | 13289.79 | 50948.60 | 0.2608 | 0.2828 |
| 6D | 4 | 2/15/2013 14:17 | 1 | 15725 | 15725.00 | 93.6% | 16795.44 | 50953.26 | 0.3296 | 0.2776 |
| 6D | 5 | 2/15/2013 14:13 | 1 | 12091 | 12091.00 | 95.2% | 12703.61 | 50954.81 | 0.2493 | 0.2581 |
| 6D | 6 | 2/15/2013 13:50 | 1 | 17778 | 17778.00 | 99.3% | 17909.31 | 50966.02 | 0.3514 | 0.2428 |
| 6D | 7 | 2/15/2013 13:46 | 1 | 16245 | 16245.00 | 100.0% | 16245.00 | 50968.15 | 0.3187 | 0.2091 |
| 6D | 8 | 2/15/2013 13:38 | 1 | 2109 | 2109.00 | 97.0% | 2175.19 | 50972.03 | 0.0427 | 0.1736 |
| 7A | 1 | 2/15/2013 14:40 | 1 | 23154 | 23154.00 | 100.0% | 23154.00 | 50942.13 | 0.4545 | 0.5239 |
| 7A | 2 | 2/15/2013 14:57 | 1 | 24947 | 24947.00 | 98.7% | 25274.87 | 50933.78 | 0.4962 | 0.5194 |
| 7A | 3 | 2/15/2013 14:54 | 1 | 26400 | 26400.00 | 97.3% | 27134.61 | 50935.10 | 0.5327 | 0.5097 |
| 7A | 4 | 2/15/2013 14:51 | 1 | 25726 | 25726.00 | 93.6% | 27477.23 | 50936.44 | 0.5394 | 0.5058 |
| 7A | 5 | 2/15/2013 15:00 | 1 | 26121 | 26121.00 | 95.2% | 27444.46 | 50932.43 | 0.5388 | 0.4910 |
| 7A | 6 | 2/15/2013 15:13 | 1 | 23722 | 23722.00 | 99.3% | 23897.22 | 50925.78 | 0.4693 | 0.4794 |
| 7A | 7 | 2/15/2013 15:09 | 1 | 26485 | 26485.00 | 100.0% | 26485.00 | 50927.86 | 0.5200 | 0.4538 |
| 7A | 8 | 2/15/2013 15:05 | 1 | 17724 | 17724.00 | 97.0% | 18280.27 | 50929.64 | 0.3589 | 0.4269 |
| 7B | 1 | 2/15/2013 14:51 | 1 | 23235 | 23235.00 | 100.0% | 23235.00 | 50936.42 | 0.4562 | 0.5241 |
| 7B | 2 | 2/15/2013 14:40 | 1 | 25027 | 25027.00 | 98.7% | 25355.93 | 50941.89 | 0.4977 | 0.5193 |
| 7B | 3 | 2/15/2013 14:57 | 1 | 26374 | 26374.00 | 97.3% | 27107.89 | 50933.73 | 0.5322 | 0.5090 |
| 7B | 4 | 2/15/2013 14:54 | 1 | 25565 | 25565.00 | 93.6% | 27305.27 | 50935.08 | 0.5361 | 0.5048 |
| 7B | 5 | 2/15/2013 15:06 | 1 | 25913 | 25913.00 | 95.2% | 27225.93 | 50929.20 | 0.5346 | 0.4890 |
| 7B | 6 | 2/15/2013 15:00 | 1 | 23710 | 23710.00 | 99.3% | 23885.13 | 50932.39 | 0.4690 | 0.4766 |
| 7B | 7 | 2/15/2013 15:13 | 1 | 26047 | 26047.00 | 100.0% | 26047.00 | 50925.78 | 0.5115 | 0.4494 |
| 7B | 8 | 2/15/2013 15:09 | 1 | 17556 | 17556.00 | 97.0% | 18107.00 | 50927.83 | 0.3555 | 0.4206 |
| 7C | 1 | 2/15/2013 14:54 | 1 | 23070 | 23070.00 | 100.0% | 23070.00 | 50934.94 | 0.4529 | 0.5213 |

| Raw Count Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| 7C | 2 | 2/15/2013 14:52 | 1 | 24941 | 24941.00 | 98.7% | 25268.80 | 50936.26 | 0.4961 | 0.5165 |
| 7C | 3 | 2/15/2013 14:41 | 1 | 25992 | 25992.00 | 97.3% | 26715.26 | 50941.51 | 0.5244 | 0.5063 |
| 7C | 4 | 2/15/2013 14:57 | 1 | 25550 | 25550.00 | 93.6% | 27289.25 | 50933.71 | 0.5358 | 0.5020 |
| 7C | 5 | 2/15/2013 15:09 | 1 | 26073 | 26073.00 | 95.2% | 27394.03 | 50927.78 | 0.5379 | 0.4864 |
| 7C | 6 | 2/15/2013 15:06 | 1 | 23471 | 23471.00 | 99.3% | 23644.37 | 50929.17 | 0.4643 | 0.4741 |
| 7C | 7 | 2/15/2013 15:00 | 1 | 25731 | 25731.00 | 100.0% | 25731.00 | 50932.34 | 0.5052 | 0.4470 |
| 7C | 8 | 2/15/2013 15:13 | 1 | 17544 | 17544.00 | 97.0% | 18094.62 | 50925.73 | 0.3553 | 0.4184 |
| 7D | 1 | 2/15/2013 14:57 | 1 | 22969 | 22969.00 | 100.0% | 22969.00 | 50933.67 | 0.4510 | 0.5216 |
| 7D | 2 | 2/15/2013 14:54 | 1 | 25017 | 25017.00 | 98.7% | 25345.79 | 50934.88 | 0.4976 | 0.5168 |
| 7D | 3 | 2/15/2013 14:52 | 1 | 26248 | 26248.00 | 97.3% | 26978.38 | 50936.26 | 0.5296 | 0.5067 |
| 7D | 4 | 2/15/2013 14:41 | 1 | 25375 | 25375.00 | 93.6% | 27102.33 | 50941.33 | 0.5320 | 0.5025 |
| 7D | 5 | 2/15/2013 15:14 | 1 | 25995 | 25995.00 | 95.2% | 27312.08 | 50925.62 | 0.5363 | 0.4870 |
| 7D | 6 | 2/15/2013 15:09 | 1 | 23670 | 23670.00 | 99.3% | 23844.84 | 50927.74 | 0.4682 | 0.4748 |
| 7D | 7 | 2/15/2013 15:06 | 1 | 25810 | 25810.00 | 100.0% | 25810.00 | 50929.13 | 0.5068 | 0.4479 |
| 7D | 8 | 2/15/2013 15:00 | 1 | 17546 | 17546.00 | 97.0% | 18096.68 | 50932.31 | 0.3553 | 0.4195 |
| 8A | 1 | 2/15/2013 15:00 | 1 | 22652 | 22652.00 | 100.0% | 22652.00 | 50932.27 | 0.4447 | 0.5143 |
| 8A | 2 | 2/15/2013 15:14 | 1 | 24637 | 24637.00 | 98.7% | 24960.80 | 50925.54 | 0.4901 | 0.5098 |
| 8A | 3 | 2/15/2013 15:09 | 1 | 25565 | 25565.00 | 97.3% | 26276.37 | 50927.64 | 0.5160 | 0.5002 |
| 8A | 4 | 2/15/2013 15:07 | 1 | 25423 | 25423.00 | 93.6% | 27153.60 | 50929.02 | 0.5332 | 0.4962 |
| 8A | 5 | 2/15/2013 14:45 | 1 | 25896 | 25896.00 | 95.2% | 27208.06 | 50939.61 | 0.5341 | 0.4814 |
| 8A | 6 | 2/15/2013 14:57 | 1 | 23169 | 23169.00 | 99.3% | 23340.13 | 50933.62 | 0.4582 | 0.4698 |
| 8A | 7 | 2/15/2013 14:55 | 1 | 25611 | 25611.00 | 100.0% | 25611.00 | 50934.81 | 0.5028 | 0.4443 |
| 8A | 8 | 2/15/2013 14:52 | 1 | 17494 | 17494.00 | 97.0% | 18043.05 | 50936.23 | 0.3542 | 0.4174 |
| 8B | 1 | 2/15/2013 15:07 | 1 | 22319 | 22319.00 | 100.0% | 22319.00 | 50928.99 | 0.4382 | 0.5087 |
| 8B | 2 | 2/15/2013 15:00 | 1 | 24615 | 24615.00 | 98.7% | 24938.51 | 50932.22 | 0.4896 | 0.5037 |
| 8B | 3 | 2/15/2013 15:14 | 1 | 25451 | 25451.00 | 97.3% | 26159.20 | 50925.42 | 0.5137 | 0.4931 |
| 8B | 4 | 2/15/2013 15:09 | 1 | 24461 | 24461.00 | 93.6% | 26126.12 | 50927.61 | 0.5130 | 0.4888 |
| 8B | 5 | 2/15/2013 14:52 | 1 | 25258 | 25258.00 | 95.2% | 26537.74 | 50936.18 | 0.5210 | 0.4727 |
| 8B | 6 | 2/15/2013 14:45 | 1 | 22990 | 22990.00 | 99.3% | 23159.81 | 50939.55 | 0.4547 | 0.4600 |
| 8B | 7 | 2/15/2013 14:57 | 1 | 25222 | 25222.00 | 100.0% | 25222.00 | 50933.57 | 0.4952 | 0.4320 |
| 8B | 8 | 2/15/2013 14:55 | 1 | 16601 | 16601.00 | 97.0% | 17122.02 | 50934.75 | 0.3362 | 0.4026 |
| 8C | 1 | 2/15/2013 15:10 | 1 | 22927 | 22927.00 | 100.0% | 22927.00 | 50927.57 | 0.4502 | 0.5208 |
| 8C | 2 | 2/15/2013 15:07 | 1 | 25010 | 25010.00 | 98.7% | 25338.70 | 50928.95 | 0.4975 | 0.5164 |
| 8C | 3 | 2/15/2013 15:00 | 1 | 26237 | 26237.00 | 97.3% | 26967.07 | 50932.19 | 0.5295 | 0.5068 |
| 8C | 4 | 2/15/2013 15:14 | 1 | 25433 | 25433.00 | 93.6% | 27164.28 | 50925.42 | 0.5334 | 0.5029 |
| 8C | 5 | 2/15/2013 14:55 | 1 | 26120 | 26120.00 | 95.2% | 27443.41 | 50934.67 | 0.5388 | 0.4883 |
| 8C | 6 | 2/15/2013 14:52 | 1 | 23608 | 23608.00 | 99.3% | 23782.38 | 50936.11 | 0.4669 | 0.4768 |
| 8C | 7 | 2/15/2013 14:45 | 1 | 26024 | 26024.00 | 100.0% | 26024.00 | 50939.45 | 0.5109 | 0.4516 |
| 8C | 8 | 2/15/2013 14:57 | 1 | 17848 | 17848.00 | 97.0% | 18408.16 | 50933.53 | 0.3614 | 0.4249 |
| 8D | 1 | 2/15/2013 15:14 | 1 | 23697 | 23697.00 | 100.0% | 23697.00 | 50925.42 | 0.4653 | 0.5332 |
| 8D | 2 | 2/15/2013 15:10 | 1 | 25697 | 25697.00 | 98.7% | 26034.73 | 50927.53 | 0.5112 | 0.5284 |
| 8D | 3 | 2/15/2013 15:07 | 1 | 26831 | 26831.00 | 97.3% | 27577.60 | 50928.92 | 0.5415 | 0.5182 |
| 8D | 4 | 2/15/2013 15:00 | 1 | 26060 | 26060.00 | 93.6% | 27833.96 | 50932.14 | 0.5465 | 0.5139 |
| 8D | 5 | 2/15/2013 14:57 | 1 | 26234 | 26234.00 | 95.2% | 27563.19 | 50933.49 | 0.5412 | 0.4983 |
| 8D | 6 | 2/15/2013 14:55 | 1 | 23718 | 23718.00 | 99.3% | 23893.19 | 50934.64 | 0.4691 | 0.4859 |
| 8D | 7 | 2/15/2013 14:52 | 1 | 26787 | 26787.00 | 100.0% | 26787.00 | 50936.06 | 0.5259 | 0.4588 |
| 8D | 8 | 2/15/2013 14:45 | 1 | 18085 | 18085.00 | 97.0% | 18652.60 | 50939.40 | 0.3662 | 0.4302 |
| 9A | 1 | 2/15/2013 12:54 | 1 | 23046 | 23046.00 | 100.0% | 23046.00 | 50993.19 | 0.4519 | 0.5206 |
| 9A | 2 | 2/15/2013 13:04 | 1 | 25056 | 25056.00 | 98.7% | 25385.31 | 50988.47 | 0.4979 | 0.5173 |
| 9A | 3 | 2/15/2013 13:00 | 1 | 26656 | 26656.00 | 97.3% | 27397.73 | 50990.45 | 0.5373 | 0.5103 |
| 9A | 4 | 2/15/2013 12:57 | 1 | 25929 | 25929.00 | 93.6% | 27694.05 | 50991.87 | 0.5431 | 0.5074 |
| 9A | 5 | 2/15/2013 13:07 | 1 | 26267 | 26267.00 | 95.2% | 27597.86 | 50987.08 | 0.5413 | 0.4968 |
| 9A | 6 | 2/15/2013 13:17 | 1 | 23993 | 23993.00 | 99.3% | 24170.22 | 50982.11 | 0.4741 | 0.4883 |
| 9A | 7 | 2/15/2013 13:14 | 1 | 26420 | 26420.00 | 100.0% | 26420.00 | 50983.52 | 0.5182 | 0.4698 |
| 9A | 8 | 2/15/2013 13:10 | 1 | 19631 | 19631.00 | 97.0% | 20247.12 | 50985.51 | 0.3971 | 0.4503 |
| 9B | 1 | 2/15/2013 12:57 | 1 | 22752 | 22752.00 | 100.0% | 22752.00 | 50991.83 | 0.4462 | 0.5071 |
| 9B | 2 | 2/15/2013 12:54 | 1 | 24464 | 24464.00 | 98.7% | 24785.53 | 50993.19 | 0.4861 | 0.5039 |
| 9B | 3 | 2/15/2013 13:04 | 1 | 25548 | 25548.00 | 97.3% | 26258.90 | 50988.45 | 0.5150 | 0.4971 |
| 9B | 4 | 2/15/2013 13:00 | 1 | 25161 | 25161.00 | 93.6% | 26873.77 | 50990.41 | 0.5270 | 0.4943 |
| 9B | 5 | 2/15/2013 13:10 | 1 | 25785 | 25785.00 | 95.2% | 27091.44 | 50985.46 | 0.5314 | 0.4839 |
| 9B | 6 | 2/15/2013 13:07 | 1 | 23221 | 23221.00 | 99.3% | 23392.52 | 50987.03 | 0.4588 | 0.4757 |
| 9B | 7 | 2/15/2013 13:17 | 1 | 25852 | 25852.00 | 100.0% | 25852.00 | 50982.05 | 0.5071 | 0.4577 |
| 9B | 8 | 2/15/2013 13:14 | 1 | 19119 | 19119.00 | 97.0% | 19719.05 | 50983.48 | 0.3868 | 0.4387 |
| 9C | 1 | 2/15/2013 13:00 | 1 | 22898 | 22898.00 | 100.0% | 22898.00 | 50990.37 | 0.4491 | 0.5117 |
| 9C | 2 | 2/15/2013 12:57 | 1 | 24745 | 24745.00 | 98.7% | 25070.22 | 50991.71 | 0.4917 | 0.5084 |
| 9C | 3 | 2/15/2013 12:54 | 1 | 25810 | 25810.00 | 97.3% | 26528.19 | 50993.19 | 0.5202 | 0.5015 |
| 9C | 4 | 2/15/2013 13:04 | 1 | 25450 | 25450.00 | 93.6% | 27182.44 | 50988.39 | 0.5331 | 0.4986 |
| 9C | 5 | 2/15/2013 13:14 | 1 | 26012 | 26012.00 | 95.2% | 27329.94 | 50983.43 | 0.5361 | 0.4880 |
| 9C | 6 | 2/15/2013 13:10 | 1 | 23438 | 23438.00 | 99.3% | 23611.12 | 50985.41 | 0.4631 | 0.4797 |
| 9C | 7 | 2/15/2013 13:07 | 1 | 25678 | 25678.00 | 100.0% | 25678.00 | 50986.97 | 0.5036 | 0.4613 |
| 9C | 8 | 2/15/2013 13:17 | 1 | 19493 | 19493.00 | 97.0% | 20104.79 | 50982.00 | 0.3944 | 0.4420 |
| 9D | 1 | 2/15/2013 13:04 | 1 | 22005 | 22005.00 | 100.0% | 22005.00 | 50988.37 | 0.4316 | 0.4903 |
| 9D | 2 | 2/15/2013 13:00 | 1 | 23660 | 23660.00 | 98.7% | 23970.96 | 50990.33 | 0.4701 | 0.4874 |
| 9D | 3 | 2/15/2013 12:58 | 1 | 24728 | 24728.00 | 97.3% | 25416.08 | 50991.64 | 0.4984 | 0.4814 |
| 9D | 4 | 2/15/2013 12:54 | 1 | 24408 | 24408.00 | 93.6% | 26069.51 | 50993.19 | 0.5112 | 0.4789 |
| 9D | 5 | 2/15/2013 13:18 | 1 | 24915 | 24915.00 | 95.2% | 26177.36 | 50981.96 | 0.5135 | 0.4697 |

| Raw Count Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| 9D | 6 | 2/15/2013 13:15 | 1 | 22693 | 22693.00 | 99.3% | 22860.62 | 50983.38 | 0.4484 | 0.4624 |
| 9D | 7 | 2/15/2013 13:10 | 1 | 25159 | 25159.00 | 100.0% | 25159.00 | 50985.39 | 0.4935 | 0.4465 |
| 9D | 8 | 2/15/2013 13:07 | 1 | 18766 | 18766.00 | 97.0% | 19354.97 | 50986.91 | 0.3796 | 0.4297 |
| 10A | 1 | 2/15/2013 13:07 | 1 | 22993 | 22993.00 | 100.0% | 22993.00 | 50986.88 | 0.4510 | 0.5156 |
| 10A | 2 | 2/15/2013 13:18 | 1 | 24908 | 24908.00 | 98.7% | 25235.36 | 50981.83 | 0.4950 | 0.5124 |
| 10A | 3 | 2/15/2013 13:15 | 1 | 25972 | 25972.00 | 97.3% | 26694.70 | 50983.34 | 0.5236 | 0.5056 |
| 10A | 4 | 2/15/2013 13:11 | 1 | 25551 | 25551.00 | 93.6% | 27290.32 | 50985.34 | 0.5353 | 0.5028 |
| 10A | 5 | 2/15/2013 12:54 | 1 | 26172 | 26172.00 | 95.2% | 27498.05 | 50993.17 | 0.5392 | 0.4923 |
| 10A | 6 | 2/15/2013 13:04 | 1 | 24100 | 24100.00 | 99.3% | 24278.01 | 50988.32 | 0.4761 | 0.4841 |
| 10A | 7 | 2/15/2013 13:00 | 1 | 26093 | 26093.00 | 100.0% | 26093.00 | 50990.27 | 0.5117 | 0.4661 |
| 10A | 8 | 2/15/2013 12:58 | 1 | 19475 | 19475.00 | 97.0% | 20086.22 | 50991.60 | 0.3939 | 0.4470 |
| 10B | 1 | 2/15/2013 13:11 | 1 | 22828 | 22828.00 | 100.0% | 22828.00 | 50985.31 | 0.4477 | 0.5123 |
| 10B | 2 | 2/15/2013 13:07 | 1 | 24594 | 24594.00 | 98.7% | 24917.24 | 50986.84 | 0.4887 | 0.5090 |
| 10B | 3 | 2/15/2013 13:18 | 1 | 25749 | 25749.00 | 97.3% | 26465.49 | 50981.83 | 0.5191 | 0.5020 |
| 10B | 4 | 2/15/2013 13:15 | 1 | 25497 | 25497.00 | 93.6% | 27232.64 | 50983.30 | 0.5341 | 0.4991 |
| 10B | 5 | 2/15/2013 12:58 | 1 | 26074 | 26074.00 | 95.2% | 27395.08 | 50991.54 | 0.5372 | 0.4883 |
| 10B | 6 | 2/15/2013 12:54 | 1 | 23956 | 23956.00 | 99.3% | 24132.95 | 50993.17 | 0.4733 | 0.4798 |
| 10B | 7 | 2/15/2013 13:05 | 1 | 25717 | 25717.00 | 100.0% | 25717.00 | 50988.27 | 0.5044 | 0.4611 |
| 10B | 8 | 2/15/2013 13:00 | 1 | 19206 | 19206.00 | 97.0% | 19808.78 | 50990.23 | 0.3885 | 0.4414 |
| 10C | 1 | 2/15/2013 13:15 | 1 | 22920 | 22920.00 | 100.0% | 22920.00 | 50983.26 | 0.4496 | 0.5136 |
| 10C | 2 | 2/15/2013 13:11 | 1 | 24784 | 24784.00 | 98.7% | 25109.73 | 50985.27 | 0.4925 | 0.5104 |
| 10C | 3 | 2/15/2013 13:08 | 1 | 25610 | 25610.00 | 97.3% | 26322.63 | 50986.80 | 0.5163 | 0.5038 |
| 10C | 4 | 2/15/2013 13:18 | 1 | 25623 | 25623.00 | 93.6% | 27367.22 | 50981.83 | 0.5368 | 0.5010 |
| 10C | 5 | 2/15/2013 13:01 | 1 | 26296 | 26296.00 | 95.2% | 27628.33 | 50990.18 | 0.5418 | 0.4908 |
| 10C | 6 | 2/15/2013 12:58 | 1 | 23777 | 23777.00 | 99.3% | 23952.63 | 50991.49 | 0.4697 | 0.4827 |
| 10C | 7 | 2/15/2013 12:54 | 1 | 26396 | 26396.00 | 100.0% | 26396.00 | 50993.17 | 0.5176 | 0.4650 |
| 10C | 8 | 2/15/2013 13:05 | 1 | 19243 | 19243.00 | 97.0% | 19846.94 | 50988.24 | 0.3892 | 0.4463 |
| 10D | 1 | 2/15/2013 13:18 | 1 | 22791 | 22791.00 | 100.0% | 22791.00 | 50981.78 | 0.4470 | 0.5126 |
| 10D | 2 | 2/15/2013 13:15 | 1 | 24951 | 24951.00 | 98.7% | 25278.93 | 50983.22 | 0.4958 | 0.5097 |
| 10D | 3 | 2/15/2013 13:11 | 1 | 26000 | 26000.00 | 97.3% | 26723.48 | 50985.23 | 0.5241 | 0.5037 |
| 10D | 4 | 2/15/2013 13:08 | 1 | 25540 | 25540.00 | 93.6% | 27278.57 | 50986.75 | 0.5350 | 0.5012 |
| 10D | 5 | 2/15/2013 13:05 | 1 | 25889 | 25889.00 | 95.2% | 27200.71 | 50988.18 | 0.5335 | 0.4919 |
| 10D | 6 | 2/15/2013 13:01 | 1 | 23854 | 23854.00 | 99.3% | 24030.19 | 50990.14 | 0.4713 | 0.4846 |
| 10D | 7 | 2/15/2013 12:58 | 1 | 26394 | 26394.00 | 100.0% | 26394.00 | 50991.44 | 0.5176 | 0.4686 |
| 10D | 8 | 2/15/2013 12:54 | 1 | 19760 | 19760.00 | 97.0% | 20380.17 | 50993.17 | 0.3997 | 0.4517 |
| 11A | 1 | 2/15/2013 12:26 | 1 | 19465 | 19465.00 | 100.0% | 19465.00 | 51007.16 | 0.3816 | 0.4304 |
| 11A | 2 | 2/15/2013 12:37 | 1 | 20978 | 20978.00 | 98.7% | 21253.71 | 51001.72 | 0.4167 | 0.4286 |
| 11A | 3 | 2/15/2013 12:34 | 1 | 21798 | 21798.00 | 97.3% | 22404.55 | 51003.25 | 0.4393 | 0.4248 |
| 11A | 4 | 2/15/2013 12:30 | 1 | 21585 | 21585.00 | 93.6% | 23054.34 | 51004.95 | 0.4520 | 0.4233 |
| 11A | 5 | 2/15/2013 12:39 | 1 | 22052 | 22052.00 | 95.2% | 23169.30 | 51000.53 | 0.4543 | 0.4174 |
| 11A | 6 | 2/15/2013 12:48 | 1 | 20207 | 20207.00 | 99.3% | 20356.26 | 50996.49 | 0.3992 | 0.4128 |
| 11A | 7 | 2/15/2013 12:45 | 1 | 21925 | 21925.00 | 100.0% | 21925.00 | 50997.59 | 0.4299 | 0.4028 |
| 11A | 8 | 2/15/2013 12:43 | 1 | 17769 | 17769.00 | 97.0% | 18326.68 | 50998.96 | 0.3594 | 0.3921 |
| 11B | 1 | 2/15/2013 12:30 | 1 | 22955 | 22955.00 | 100.0% | 22955.00 | 51004.91 | 0.4501 | 0.5077 |
| 11B | 2 | 2/15/2013 12:26 | 1 | 24624 | 24624.00 | 98.7% | 24947.63 | 51007.09 | 0.4891 | 0.5053 |
| 11B | 3 | 2/15/2013 12:37 | 1 | 25818 | 25818.00 | 97.3% | 26536.41 | 51001.67 | 0.5203 | 0.5002 |
| 11B | 4 | 2/15/2013 12:34 | 1 | 25455 | 25455.00 | 93.6% | 27187.78 | 51003.21 | 0.5331 | 0.4981 |
| 11B | 5 | 2/15/2013 12:43 | 1 | 25722 | 25722.00 | 95.2% | 27025.25 | 50998.90 | 0.5299 | 0.4902 |
| 11B | 6 | 2/15/2013 12:39 | 1 | 23486 | 23486.00 | 99.3% | 23659.48 | 51000.49 | 0.4639 | 0.4841 |
| 11B | 7 | 2/15/2013 12:48 | 1 | 26243 | 26243.00 | 100.0% | 26243.00 | 50996.44 | 0.5146 | 0.4705 |
| 11B | 8 | 2/15/2013 12:45 | 1 | 20341 | 20341.00 | 97.0% | 20979.40 | 50997.52 | 0.4114 | 0.4562 |
| 11C | 1 | 2/15/2013 12:34 | 1 | 22849 | 22849.00 | 100.0% | 22849.00 | 51003.17 | 0.4480 | 0.5084 |
| 11C | 2 | 2/15/2013 12:30 | 1 | 24747 | 24747.00 | 98.7% | 25072.25 | 51004.83 | 0.4916 | 0.5055 |
| 11C | 3 | 2/15/2013 12:26 | 1 | 25794 | 25794.00 | 97.3% | 26511.75 | 51007.04 | 0.5198 | 0.4994 |
| 11C | 4 | 2/15/2013 12:37 | 1 | 25259 | 25259.00 | 93.6% | 26978.44 | 51001.63 | 0.5290 | 0.4969 |
| 11C | 5 | 2/15/2013 12:46 | 1 | 25754 | 25754.00 | 95.2% | 27058.87 | 50997.48 | 0.5306 | 0.4876 |
| 11C | 6 | 2/15/2013 12:43 | 1 | 23292 | 23292.00 | 99.3% | 23464.04 | 50998.79 | 0.4601 | 0.4803 |
| 11C | 7 | 2/15/2013 12:39 | 1 | 26032 | 26032.00 | 100.0% | 26032.00 | 51000.45 | 0.5104 | 0.4642 |
| 11C | 8 | 2/15/2013 12:48 | 1 | 19787 | 19787.00 | 97.0% | 20408.02 | 50996.40 | 0.4002 | 0.4472 |
| 11D | 1 | 2/15/2013 12:37 | 1 | 23032 | 23032.00 | 100.0% | 23032.00 | 51001.60 | 0.4516 | 0.5100 |
| 11D | 2 | 2/15/2013 12:34 | 1 | 24975 | 24975.00 | 98.7% | 25303.24 | 51003.13 | 0.4961 | 0.5079 |
| 11D | 3 | 2/15/2013 12:31 | 1 | 26164 | 26164.00 | 97.3% | 26892.04 | 51004.78 | 0.5272 | 0.5036 |
| 11D | 4 | 2/15/2013 12:26 | 1 | 25392 | 25392.00 | 93.6% | 27120.49 | 51006.98 | 0.5317 | 0.5018 |
| 11D | 5 | 2/15/2013 12:48 | 1 | 26139 | 26139.00 | 95.2% | 27463.38 | 50996.36 | 0.5385 | 0.4951 |
| 11D | 6 | 2/15/2013 12:46 | 1 | 23587 | 23587.00 | 99.3% | 23761.22 | 50997.43 | 0.4659 | 0.4899 |
| 11D | 7 | 2/15/2013 12:43 | 1 | 26126 | 26126.00 | 100.0% | 26126.00 | 50998.71 | 0.5123 | 0.4784 |
| 11D | 8 | 2/15/2013 12:40 | 1 | 21236 | 21236.00 | 97.0% | 21902.49 | 51000.41 | 0.4295 | 0.4662 |
| 12B | 1 | 2/15/2013 12:43 | 1 | 11423 | 11423.00 | 100.0% | 11423.00 | 50998.62 | 0.2240 | 0.2534 |
| 12B | 2 | 2/15/2013 12:40 | 1 | 12283 | 12283.00 | 98.7% | 12444.43 | 51000.35 | 0.2440 | 0.2527 |
| 12B | 3 | 2/15/2013 12:48 | 1 | 13000 | 13000.00 | 97.3% | 13361.74 | 50996.30 | 0.2620 | 0.2511 |
| 12B | 4 | 2/15/2013 12:46 | 1 | 12474 | 12474.00 | 93.6% | 13323.13 | 50997.35 | 0.2613 | 0.2505 |
| 12B | 5 | 2/15/2013 12:31 | 1 | 13323 | 13323.00 | 95.2% | 13998.03 | 51004.70 | 0.2744 | 0.2481 |
| 12B | 6 | 2/15/2013 12:26 | 1 | 12524 | 12524.00 | 99.3% | 12616.51 | 51006.87 | 0.2473 | 0.2462 |
| 12B | 7 | 2/15/2013 12:37 | 1 | 12656 | 12656.00 | 100.0% | 12656.00 | 51001.51 | 0.2481 | 0.2421 |
| 12B | 8 | 2/15/2013 12:35 | 1 | 10909 | 10909.00 | 97.0% | 11251.38 | 51002.78 | 0.2206 | 0.2377 |
| 12C | 1 | 2/15/2013 12:46 | 1 | 10621 | 10621.00 | 100.0% | 10621.00 | 50997.31 | 0.2083 | 0.2324 |

| Raw Count Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| 12C | 2 | 2/15/2013 12:43 | 1 | 10886 | 10886.00 | 98.7% | 11029.07 | 50998.58 | 0.2163 | 0.2293 |
| 12C | 3 | 2/15/2013 12:40 | 1 | 10093 | 10093.00 | 97.3% | 10373.85 | 51000.32 | 0.2034 | 0.2226 |
| 12C | 4 | 2/15/2013 12:48 | 1 | 12768 | 12768.00 | 93.6% | 13637.15 | 50996.26 | 0.2674 | 0.2199 |
| 12C | 5 | 2/15/2013 12:35 | 1 | 11356 | 11356.00 | 95.2% | 11931.37 | 51002.73 | 0.2339 | 0.2097 |
| 12C | 6 | 2/15/2013 12:31 | 1 | 10436 | 10436.00 | 99.3% | 10513.08 | 51004.66 | 0.2061 | 0.2017 |
| 12C | 7 | 2/15/2013 12:26 | 1 | 8655 | 8655.00 | 100.0% | 8655.00 | 51006.80 | 0.1697 | 0.1841 |
| 12C | 8 | 2/15/2013 12:37 | 1 | 7925 | 7925.00 | 97.0% | 8173.73 | 51001.47 | 0.1603 | 0.1655 |
| 12D | 1 | 2/15/2013 12:48 | 1 | 22275 | 22275.00 | 100.0% | 22275.00 | 50996.21 | 0.4368 | 0.4874 |
| 12D | 2 | 2/15/2013 12:46 | 1 | 23929 | 23929.00 | 98.7% | 24243.50 | 50997.26 | 0.4754 | 0.4857 |
| 12D | 3 | 2/15/2013 12:43 | 1 | 24816 | 24816.00 | 97.3% | 25506.53 | 50998.52 | 0.5001 | 0.4823 |
| 12D | 4 | 2/15/2013 12:40 | 1 | 24308 | 24308.00 | 93.6% | 25962.70 | 51000.28 | 0.5091 | 0.4809 |
| 12D | 5 | 2/15/2013 12:37 | 1 | 25022 | 25022.00 | 95.2% | 26289.78 | 51001.42 | 0.5155 | 0.4756 |
| 12D | 6 | 2/15/2013 12:35 | 1 | 22695 | 22695.00 | 99.3% | 22862.63 | 51002.67 | 0.4483 | 0.4715 |
| 12D | 7 | 2/15/2013 12:31 | 1 | 25156 | 25156.00 | 100.0% | 25156.00 | 51004.58 | 0.4932 | 0.4624 |
| 12D | 8 | 2/15/2013 12:27 | 1 | 20790 | 20790.00 | 97.0% | 21442.50 | 51006.74 | 0.4204 | 0.4528 |
| 13A | 1 | 2/15/2013 11:39 | 1 | 22743 | 22743.00 | 100.0% | 22743.00 | 51030.02 | 0.4457 | 0.5033 |
| 13A | 2 | 2/15/2013 11:49 | 1 | 24809 | 24809.00 | 98.7% | 25135.06 | 51024.88 | 0.4926 | 0.5019 |
| 13A | 3 | 2/15/2013 11:47 | 1 | 26030 | 26030.00 | 97.3% | 26754.31 | 51025.93 | 0.5243 | 0.4988 |
| 13A | 4 | 2/15/2013 11:45 | 1 | 25231 | 25231.00 | 93.6% | 26948.53 | 51027.01 | 0.5281 | 0.4976 |
| 13A | 5 | 2/15/2013 12:12 | 1 | 25679 | 25679.00 | 95.2% | 26980.07 | 51013.70 | 0.5289 | 0.4929 |
| 13A | 6 | 2/15/2013 12:22 | 1 | 23601 | 23601.00 | 99.3% | 23775.33 | 51009.16 | 0.4661 | 0.4892 |
| 13A | 7 | 2/15/2013 12:19 | 1 | 26108 | 26108.00 | 100.0% | 26108.00 | 51010.44 | 0.5118 | 0.4810 |
| 13A | 8 | 2/15/2013 12:16 | 1 | 21741 | 21741.00 | 97.0% | 22423.34 | 51011.99 | 0.4396 | 0.4725 |
| 13B | 1 | 2/15/2013 11:45 | 1 | 23326 | 23326.00 | 100.0% | 23326.00 | 51026.99 | 0.4571 | 0.5143 |
| 13B | 2 | 2/15/2013 11:39 | 1 | 25000 | 25000.00 | 98.7% | 25328.57 | 51029.95 | 0.4963 | 0.5129 |
| 13B | 3 | 2/15/2013 11:49 | 1 | 26432 | 26432.00 | 97.3% | 27167.50 | 51024.83 | 0.5324 | 0.5100 |
| 13B | 4 | 2/15/2013 11:47 | 1 | 25874 | 25874.00 | 93.6% | 27635.30 | 51025.87 | 0.5416 | 0.5087 |
| 13B | 5 | 2/15/2013 12:16 | 1 | 26690 | 26690.00 | 95.2% | 28042.29 | 51011.93 | 0.5497 | 0.5042 |
| 13B | 6 | 2/15/2013 12:12 | 1 | 24326 | 24326.00 | 99.3% | 24505.68 | 51013.66 | 0.4804 | 0.5006 |
| 13B | 7 | 2/15/2013 12:22 | 1 | 26586 | 26586.00 | 100.0% | 26586.00 | 51009.10 | 0.5212 | 0.4927 |
| 13B | 8 | 2/15/2013 12:19 | 1 | 22201 | 22201.00 | 97.0% | 22897.78 | 51010.30 | 0.4489 | 0.4843 |
| 13C | 1 | 2/15/2013 11:47 | 1 | 23080 | 23080.00 | 100.0% | 23080.00 | 51025.84 | 0.4523 | 0.5099 |
| 13C | 2 | 2/15/2013 11:45 | 1 | 24850 | 24850.00 | 98.7% | 25176.60 | 51026.95 | 0.4934 | 0.5081 |
| 13C | 3 | 2/15/2013 11:39 | 1 | 26077 | 26077.00 | 97.3% | 26802.62 | 51029.89 | 0.5252 | 0.5041 |
| 13C | 4 | 2/15/2013 11:49 | 1 | 25534 | 25534.00 | 93.6% | 27272.16 | 51024.79 | 0.5345 | 0.5025 |
| 13C | 5 | 2/15/2013 12:19 | 1 | 26440 | 26440.00 | 95.2% | 27779.63 | 51010.25 | 0.5446 | 0.4965 |
| 13C | 6 | 2/15/2013 12:16 | 1 | 23843 | 23843.00 | 99.3% | 24019.11 | 51011.90 | 0.4709 | 0.4917 |
| 13C | 7 | 2/15/2013 12:12 | 1 | 25844 | 25844.00 | 100.0% | 25844.00 | 51013.62 | 0.5066 | 0.4813 |
| 13C | 8 | 2/15/2013 12:22 | 1 | 21603 | 21603.00 | 97.0% | 22281.01 | 51009.05 | 0.4368 | 0.4702 |
| 13D | 1 | 2/15/2013 11:49 | 1 | 22759 | 22759.00 | 100.0% | 22759.00 | 51024.77 | 0.4460 | 0.4983 |
| 13D | 2 | 2/15/2013 11:47 | 1 | 24457 | 24457.00 | 98.7% | 24778.43 | 51025.80 | 0.4856 | 0.4970 |
| 13D | 3 | 2/15/2013 11:45 | 1 | 25628 | 25628.00 | 97.3% | 26341.13 | 51026.90 | 0.5162 | 0.4942 |
| 13D | 4 | 2/15/2013 11:39 | 1 | 25066 | 25066.00 | 93.6% | 26772.30 | 51029.83 | 0.5246 | 0.4930 |
| 13D | 5 | 2/15/2013 12:22 | 1 | 25723 | 25723.00 | 95.2% | 27026.30 | 51009.00 | 0.5298 | 0.4888 |
| 13D | 6 | 2/15/2013 12:19 | 1 | 23187 | 23187.00 | 99.3% | 23358.27 | 51010.21 | 0.4579 | 0.4854 |
| 13D | 7 | 2/15/2013 12:16 | 1 | 25552 | 25552.00 | 100.0% | 25552.00 | 51011.79 | 0.5009 | 0.4780 |
| 13D | 8 | 2/15/2013 12:12 | 1 | 21943 | 21943.00 | 97.0% | 22631.68 | 51013.58 | 0.4436 | 0.4701 |
| 14A | 1 | 2/15/2013 12:12 | 1 | 21875 | 21875.00 | 100.0% | 21875.00 | 51013.88 | 0.4288 | 0.4926 |
| 14A | 2 | 2/15/2013 12:22 | 1 | 24524 | 24524.00 | 98.7% | 24846.32 | 51008.96 | 0.4871 | 0.4919 |
| 14A | 3 | 2/15/2013 12:18 | 1 | 25512 | 25512.00 | 97.3% | 26221.90 | 51010.63 | 0.5140 | 0.4903 |
| 14A | 4 | 2/15/2013 12:16 | 1 | 24999 | 24999.00 | 93.6% | 26700.74 | 51011.71 | 0.5234 | 0.4896 |
| 14A | 5 | 2/15/2013 11:39 | 1 | 25660 | 25660.00 | 95.2% | 26960.11 | 51029.77 | 0.5283 | 0.4872 |
| 14A | 6 | 2/15/2013 11:50 | 1 | 23262 | 23262.00 | 99.3% | 23433.82 | 51024.72 | 0.4593 | 0.4853 |
| 14A | 7 | 2/15/2013 11:47 | 1 | 25922 | 25922.00 | 100.0% | 25922.00 | 51025.75 | 0.5080 | 0.4811 |
| 14A | 8 | 2/15/2013 11:45 | 1 | 22048 | 22048.00 | 97.0% | 22739.98 | 51026.84 | 0.4456 | 0.4767 |
| 14B | 1 | 2/15/2013 12:16 | 1 | 23056 | 23056.00 | 100.0% | 23056.00 | 51011.67 | 0.4520 | 0.5052 |
| 14B | 2 | 2/15/2013 12:12 | 1 | 24712 | 24712.00 | 98.7% | 25036.79 | 51013.83 | 0.4908 | 0.5041 |
| 14B | 3 | 2/15/2013 12:22 | 1 | 25936 | 25936.00 | 97.3% | 26657.70 | 51008.92 | 0.5226 | 0.5020 |
| 14B | 4 | 2/15/2013 12:19 | 1 | 25683 | 25683.00 | 93.6% | 27431.30 | 51010.58 | 0.5378 | 0.5011 |
| 14B | 5 | 2/15/2013 11:45 | 1 | 25954 | 25954.00 | 95.2% | 27269.00 | 51026.78 | 0.5344 | 0.4977 |
| 14B | 6 | 2/15/2013 11:39 | 1 | 23872 | 23872.00 | 99.3% | 24048.33 | 51029.70 | 0.4713 | 0.4951 |
| 14B | 7 | 2/15/2013 11:50 | 1 | 26271 | 26271.00 | 100.0% | 26271.00 | 51024.67 | 0.5149 | 0.4893 |
| 14B | 8 | 2/15/2013 11:48 | 1 | 22456 | 22456.00 | 97.0% | 23160.78 | 51025.67 | 0.4539 | 0.4832 |
| 14C | 1 | 2/15/2013 12:19 | 1 | 22999 | 22999.00 | 100.0% | 22999.00 | 51010.54 | 0.4509 | 0.5104 |
| 14C | 2 | 2/15/2013 12:16 | 1 | 25216 | 25216.00 | 98.7% | 25547.41 | 51011.62 | 0.5008 | 0.5091 |
| 14C | 3 | 2/15/2013 12:12 | 1 | 26170 | 26170.00 | 97.3% | 26898.21 | 51013.79 | 0.5273 | 0.5062 |
| 14C | 4 | 2/15/2013 12:22 | 1 | 25729 | 25729.00 | 93.6% | 27480.43 | 51008.89 | 0.5387 | 0.5050 |
| 14C | 5 | 2/15/2013 11:48 | 1 | 26457 | 26457.00 | 95.2% | 27797.49 | 51025.63 | 0.5448 | 0.5005 |
| 14C | 6 | 2/15/2013 11:45 | 1 | 23806 | 23806.00 | 99.3% | 23981.84 | 51026.73 | 0.4700 | 0.4971 |
| 14C | 7 | 2/15/2013 11:39 | 1 | 26330 | 26330.00 | 100.0% | 26330.00 | 51029.60 | 0.5160 | 0.4894 |
| 14C | 8 | 2/15/2013 11:50 | 1 | 22288 | 22288.00 | 97.0% | 22987.51 | 51024.61 | 0.4505 | 0.4813 |
| 14D | 1 | 2/15/2013 12:22 | 1 | 22297 | 22297.00 | 100.0% | 22297.00 | 51008.86 | 0.4371 | 0.4895 |
| 14D | 2 | 2/15/2013 12:19 | 1 | 24355 | 24355.00 | 98.7% | 24675.09 | 51010.51 | 0.4837 | 0.4890 |
| 14D | 3 | 2/15/2013 12:17 | 1 | 25319 | 25319.00 | 97.3% | 26023.53 | 51011.58 | 0.5101 | 0.4877 |
| 14D | 4 | 2/15/2013 12:12 | 1 | 24492 | 24492.00 | 93.6% | 26159.23 | 51013.75 | 0.5128 | 0.4872 |
| 14D | 5 | 2/15/2013 11:50 | 1 | 25239 | 25239.00 | 95.2% | 26517.78 | 51024.57 | 0.5197 | 0.4853 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 14D | 6 | 2/15/2013 11:48 | 1 | 23452 | 23452.00 | 99.3% | 23625.23 | 51025.59 | 0.4630 | 0.4839 |
| 14D | 7 | 2/15/2013 11:45 | 1 | 25637 | 25637.00 | 100.0% | 25637.00 | 51026.68 | 0.5024 | 0.4806 |
| 14D | 8 | 2/15/2013 11:40 | 1 | 22338 | 22338.00 | 97.0% | 23039.08 | 51029.54 | 0.4515 | 0.4772 |

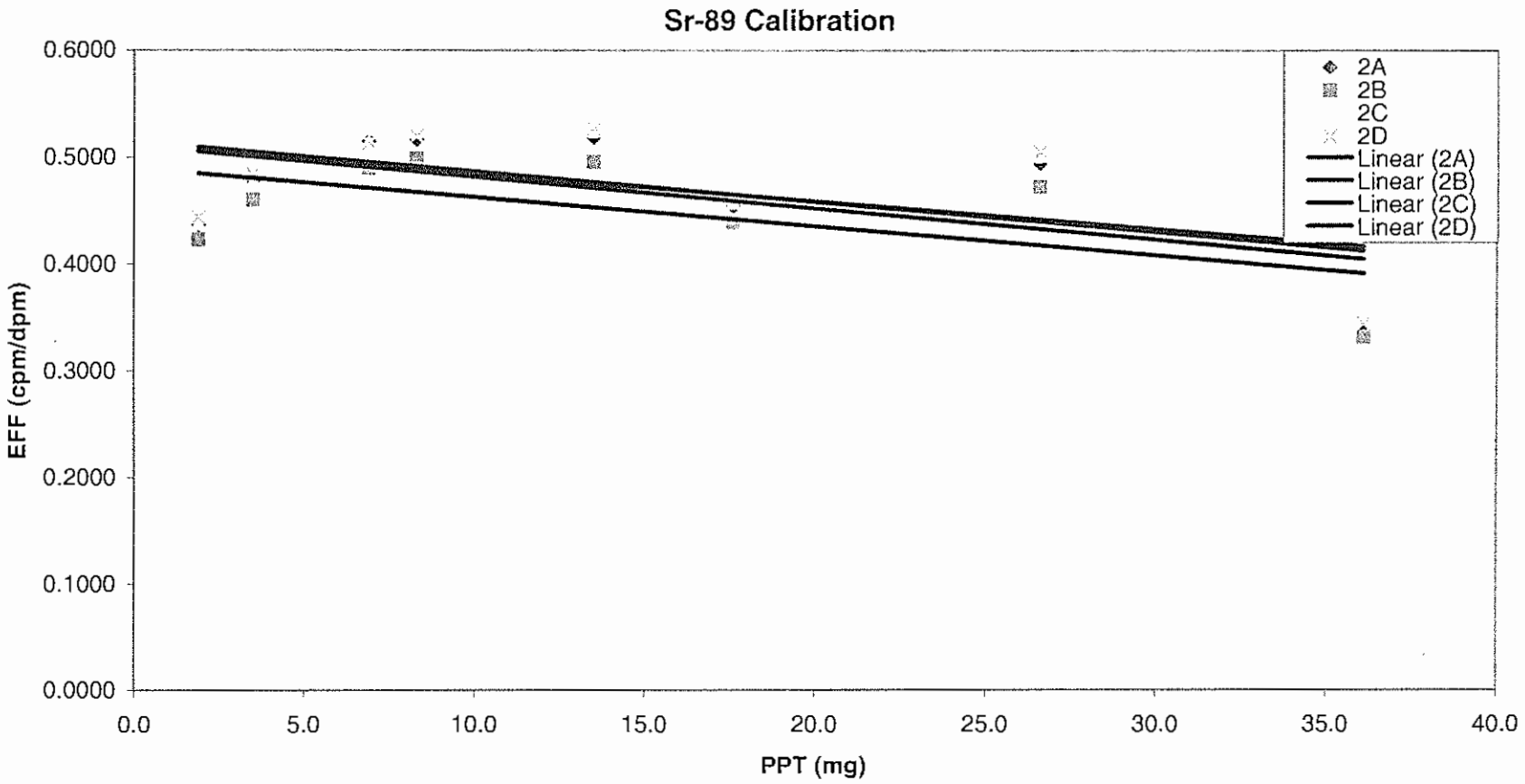



1A y = -3.005961E-03x + 5.200147E-01

1B y = -3.080004E-03x + 5.249165E-01

1C y = -3.366481E-03x + 5.309699E-01

1D y = -3.264044E-03x + 5.286987E-01

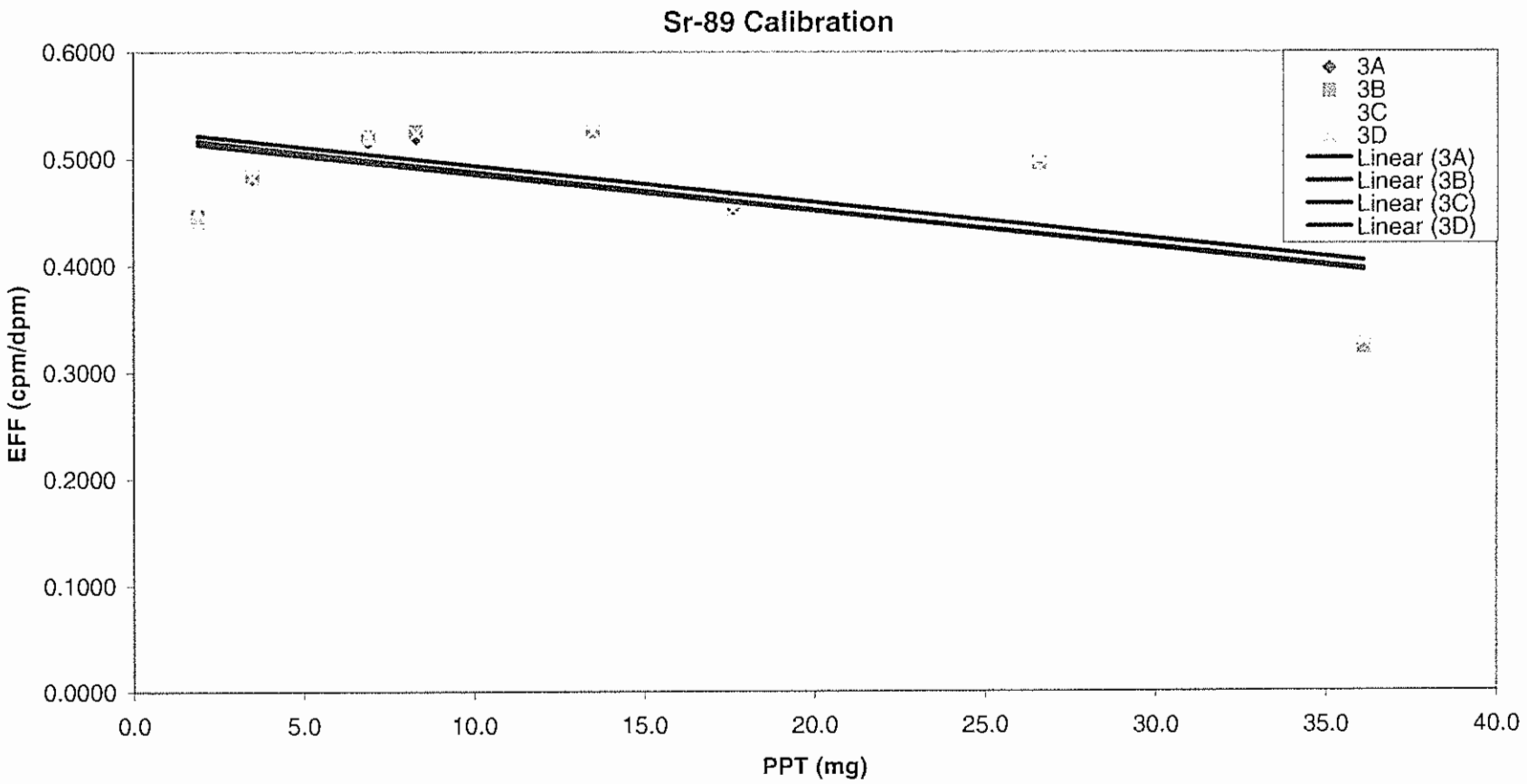



2A y = -2.928324E-03x + 5.108792E-01

2B y = -2.726292E-03x + 4.901900E-01

2C y = -2.610435E-03x + 5.110680E-01

2D y = -2.840738E-03x + 5.152130E-01

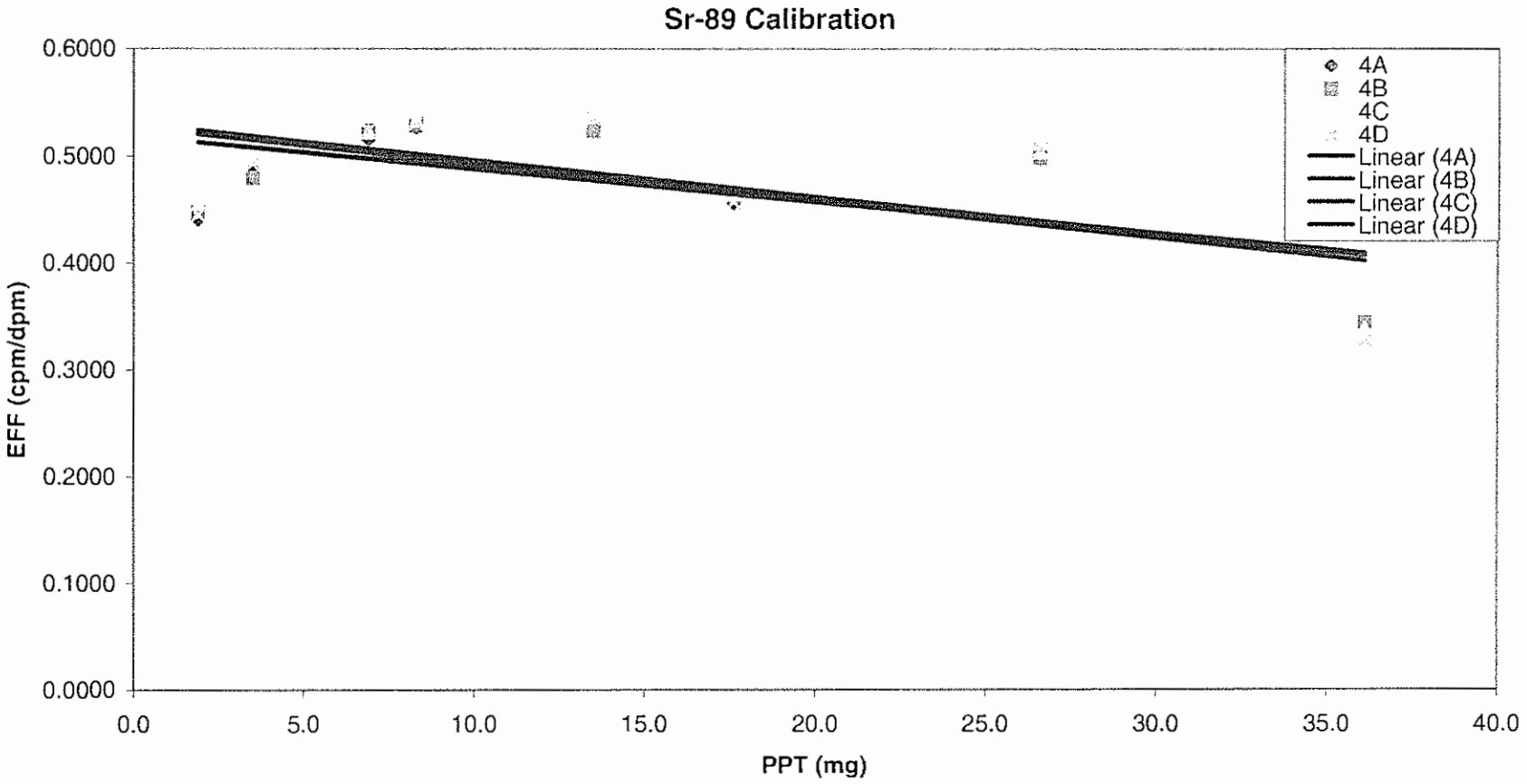



3A y = -3.397329E-03x + 5.200735E-01

3B y = -3.549394E-03x + 5.235380E-01

3C y = -3.425019E-03x + 5.282955E-01

3D y = -3.418573E-03x + 5.198403E-01

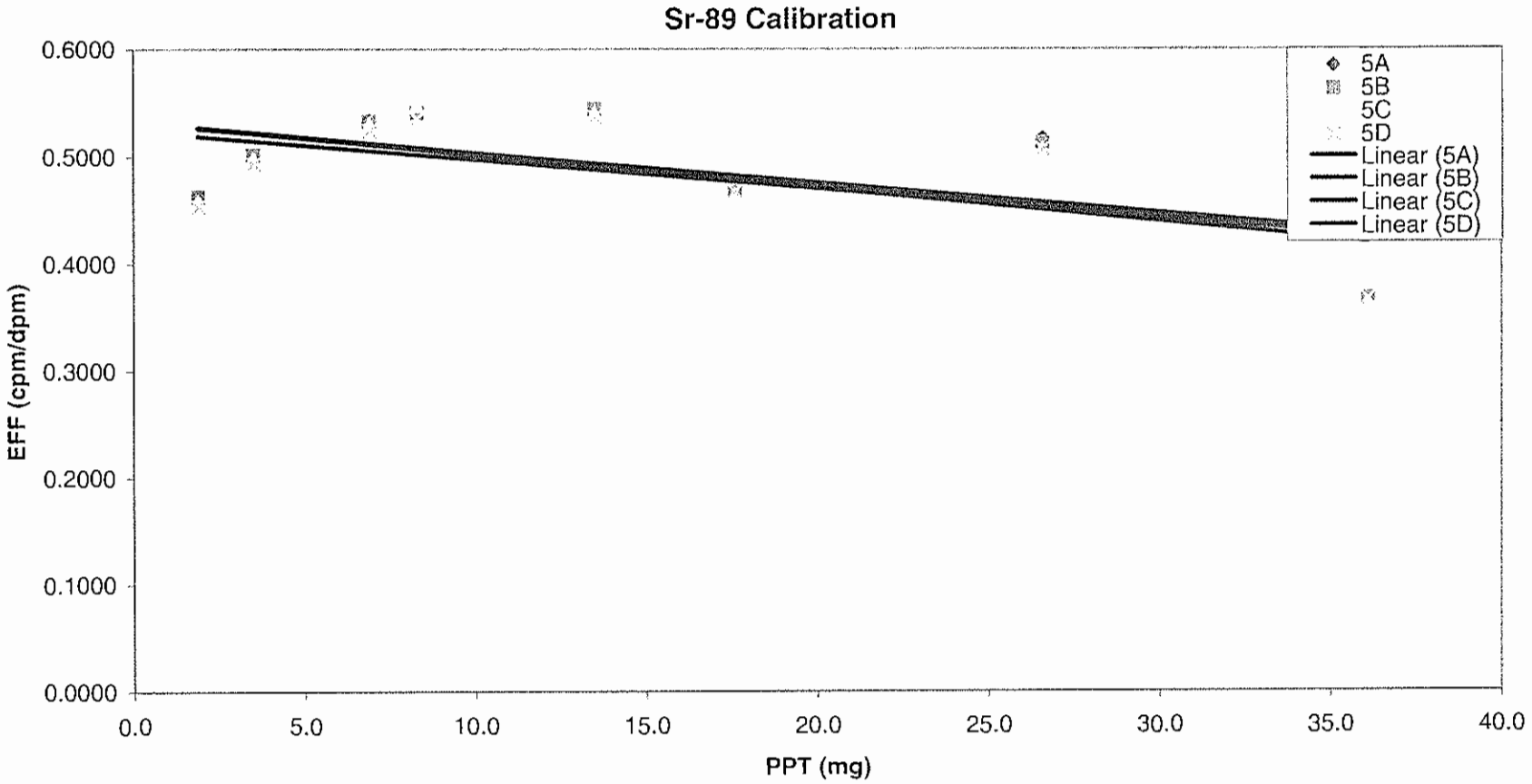



4A y = -3.075203E-03x + 5.186287E-01

4B y = -3.030756E-03x + 5.191729E-01

4C y = -3.419356E-03x + 5.308582E-01

4D y = -3.451883E-03x + 5.270219E-01

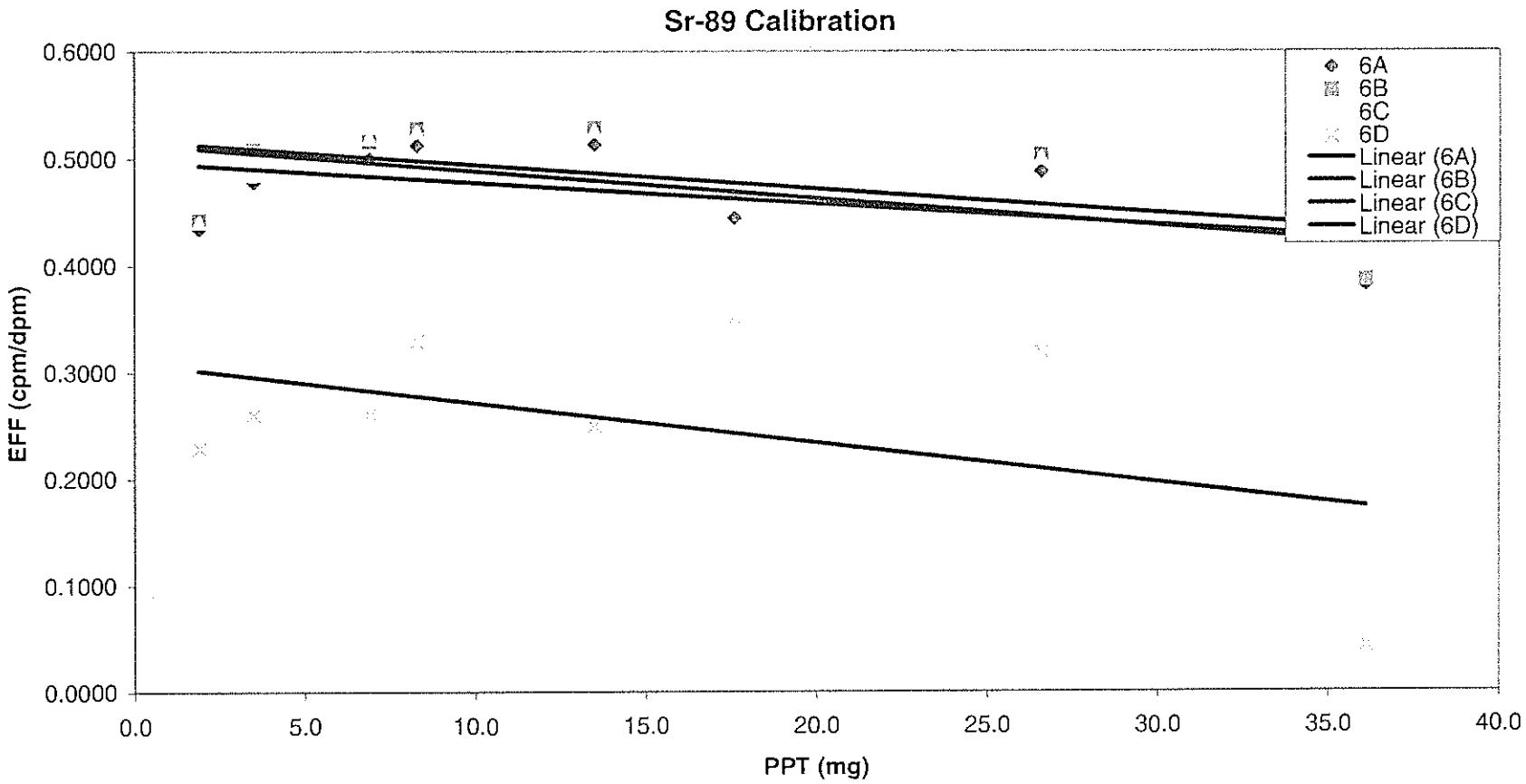



5A y = -2.786676E-03x + 5.316072E-01

5B y = -2.907347E-03x + 5.328835E-01

5C y = -3.085316E-03x + 5.324992E-01

5D y = -2.688295E-03x + 5.241561E-01

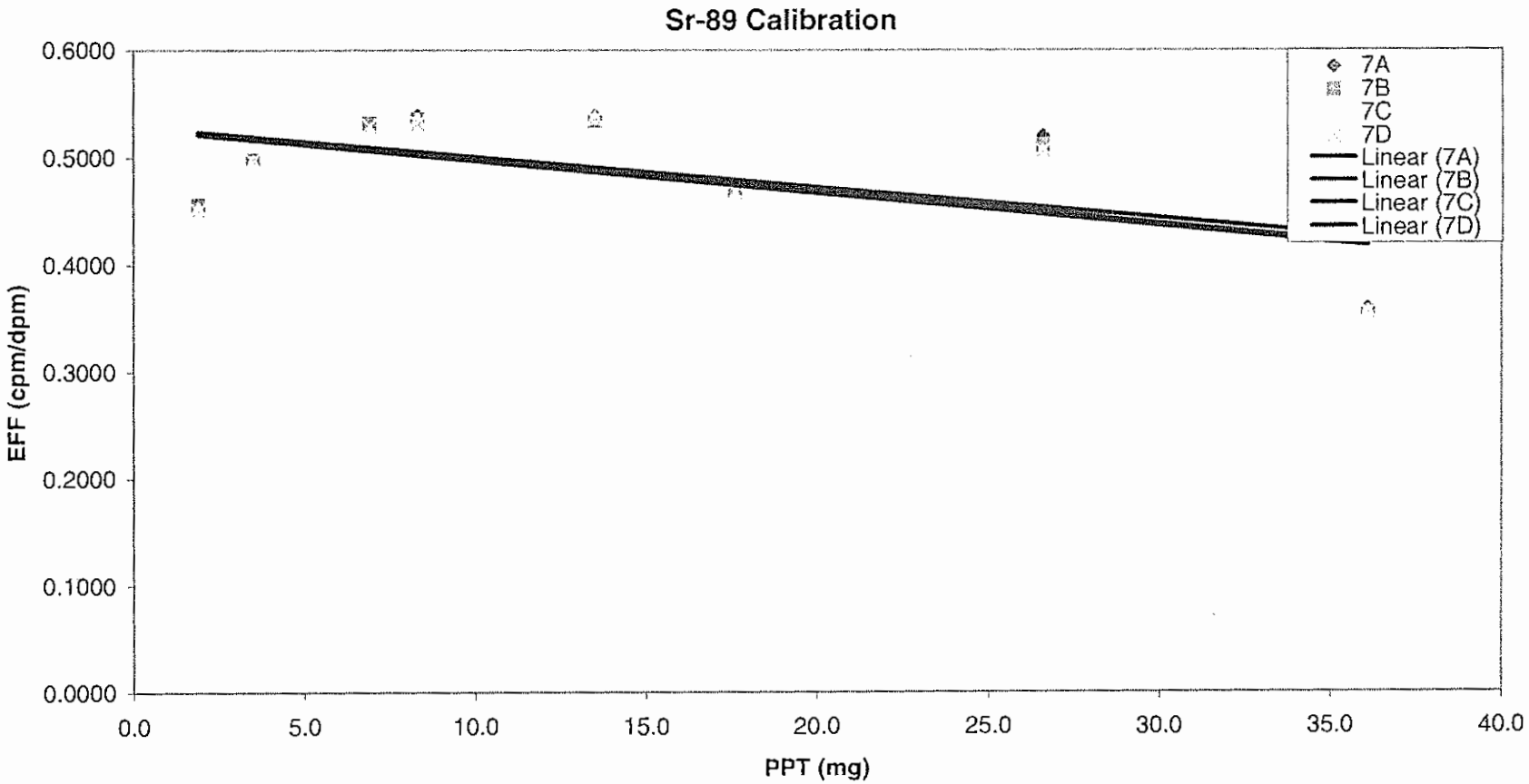



6A y = -1.958586E-03x + 4.970023E-01

6B y = -2.245183E-03x + 5.168520E-01

6C y = -2.542606E-03x + 5.139116E-01

6D y = -3.741354E-03x + 3.086324E-01

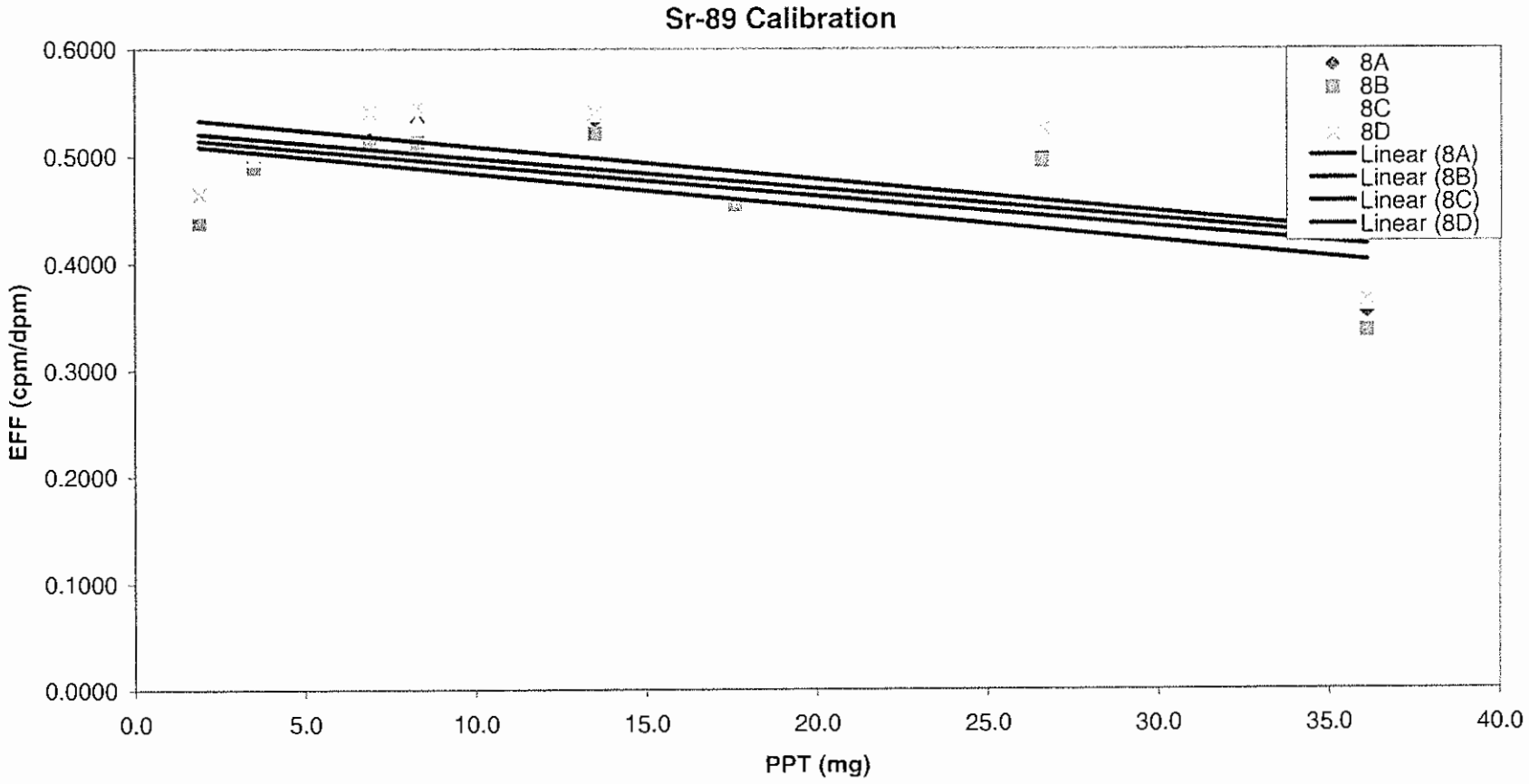



7A y = -2.837544E-03x + 5.293261E-01

7B y = -3.027427E-03x + 5.298861E-01

7C y = -3.010349E-03x + 5.270355E-01

7D y = -2.984826E-03x + 5.272911E-01

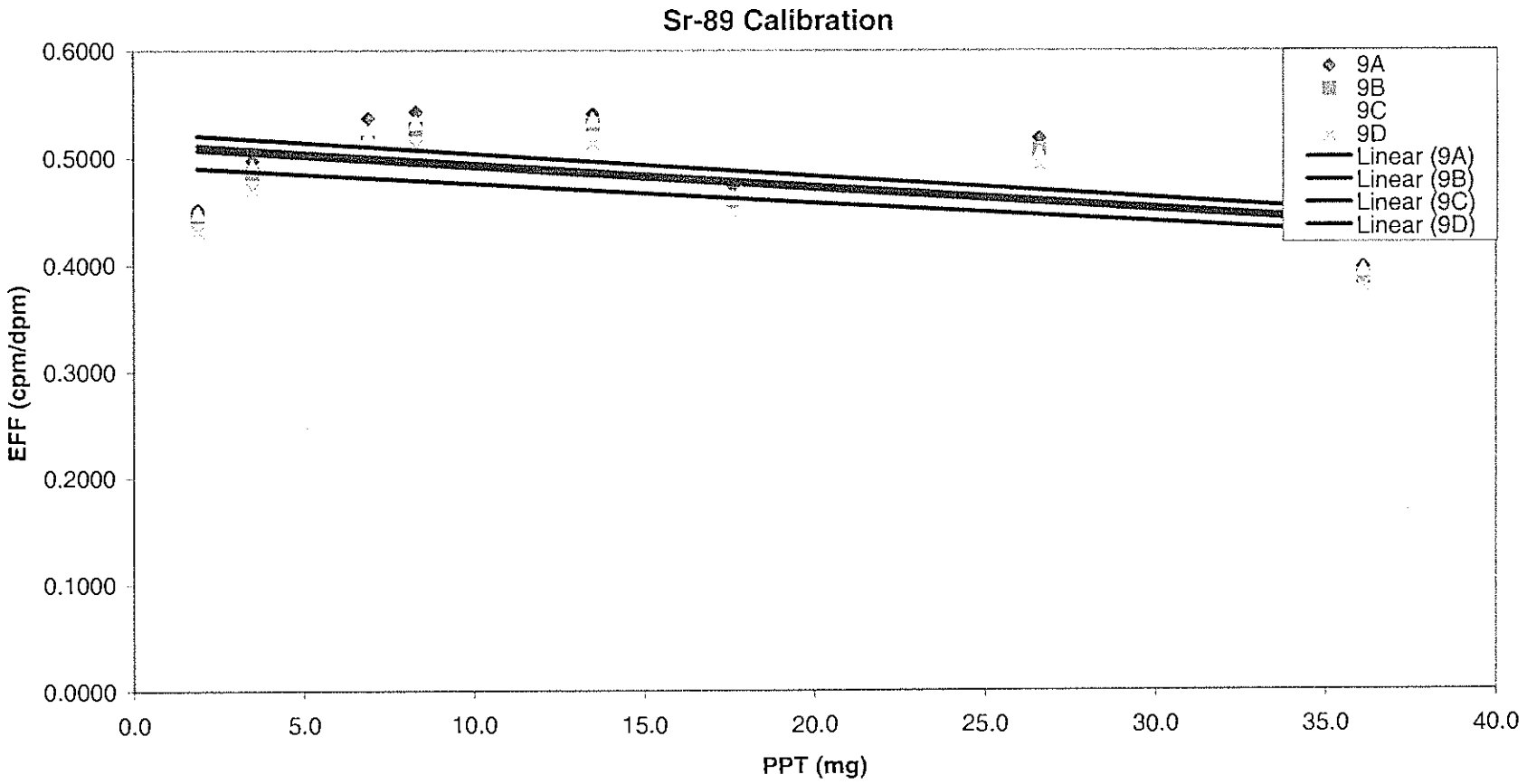



8A y = -2.835923E-03x + 5.197323E-01

8B y = -3.101285E-03x + 5.145438E-01

8C y = -2.803963E-03x + 5.261718E-01

8D y = -3.013335E-03x + 5.389462E-01

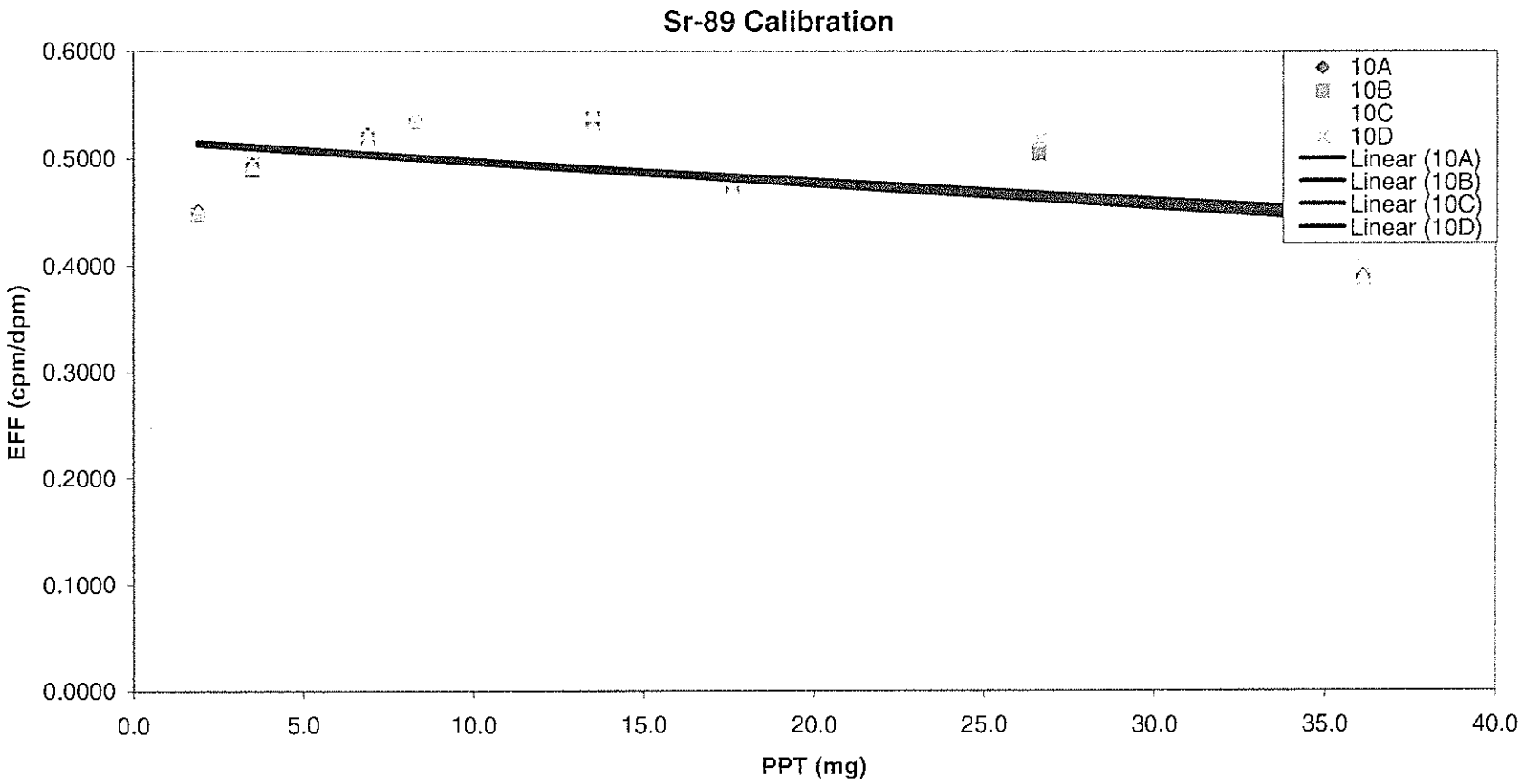



9A y = -2.054823E-03x + 5.244978E-01

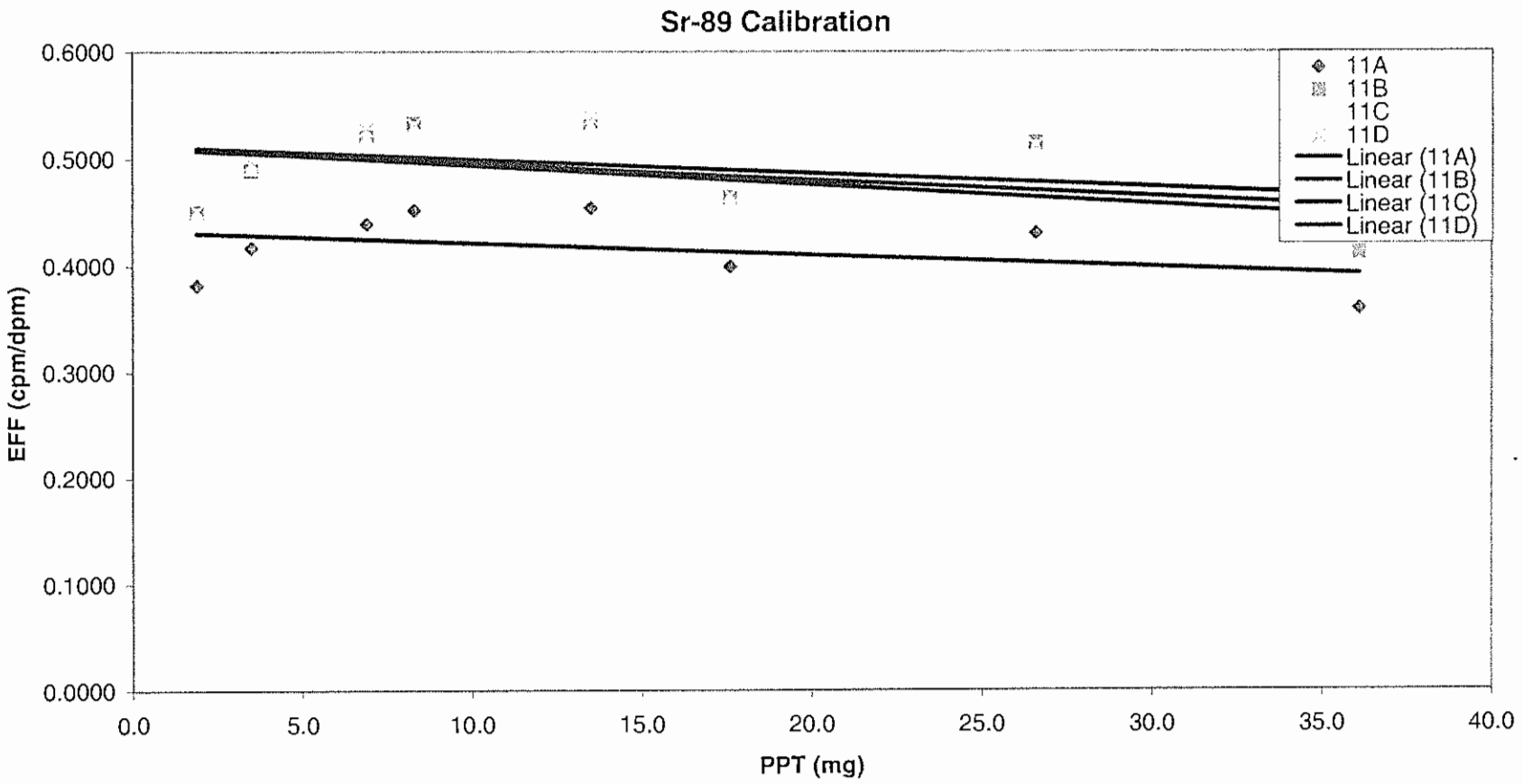
9B y = -1.999215E-03x + 5.108739E-01

9C y = -2.037484E-03x + 5.155334E-01

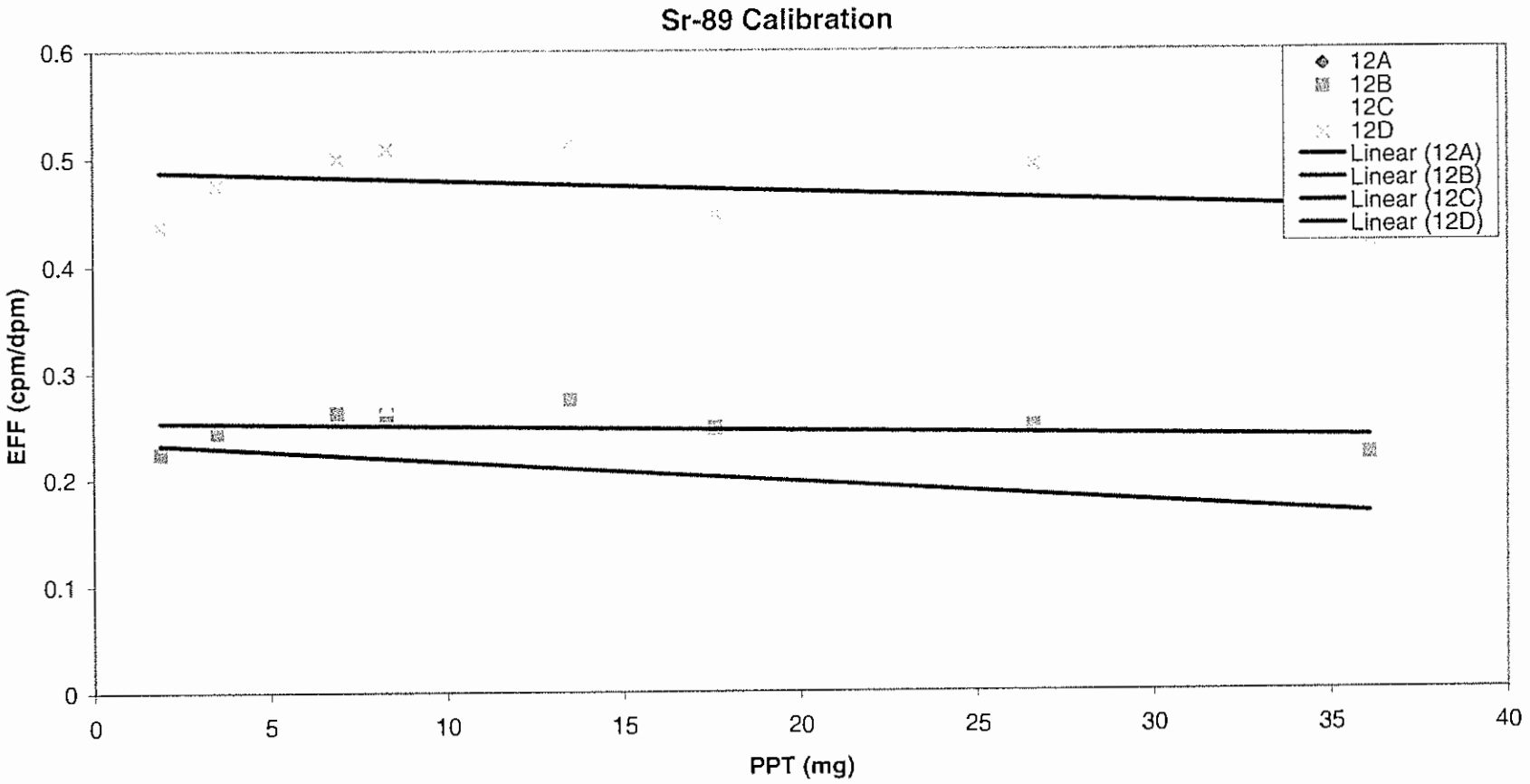
9D y = -1.771991E-03x + 4.936228E-01




| | |
|---|---|
| 10A | y = -2.004084E-03x + 5.193880E-01 |
| 10B | y = -2.073233E-03x + 5.162797E-01 |
| 10C | y = -1.966967E-03x + 5.173243E-01 |
| 10D | y = -1.780592E-03x + 5.159685E-01 |




| | |
|---|---|
| 11A | y = -1.120388E-03x + 4.325664E-01 |
| 11B | y = -1.508069E-03x + 5.106068E-01 |
| 11C | y = -1.789395E-03x + 5.117872E-01 |
| 11D | y = -1.280551E-03x + 5.124197E-01 |

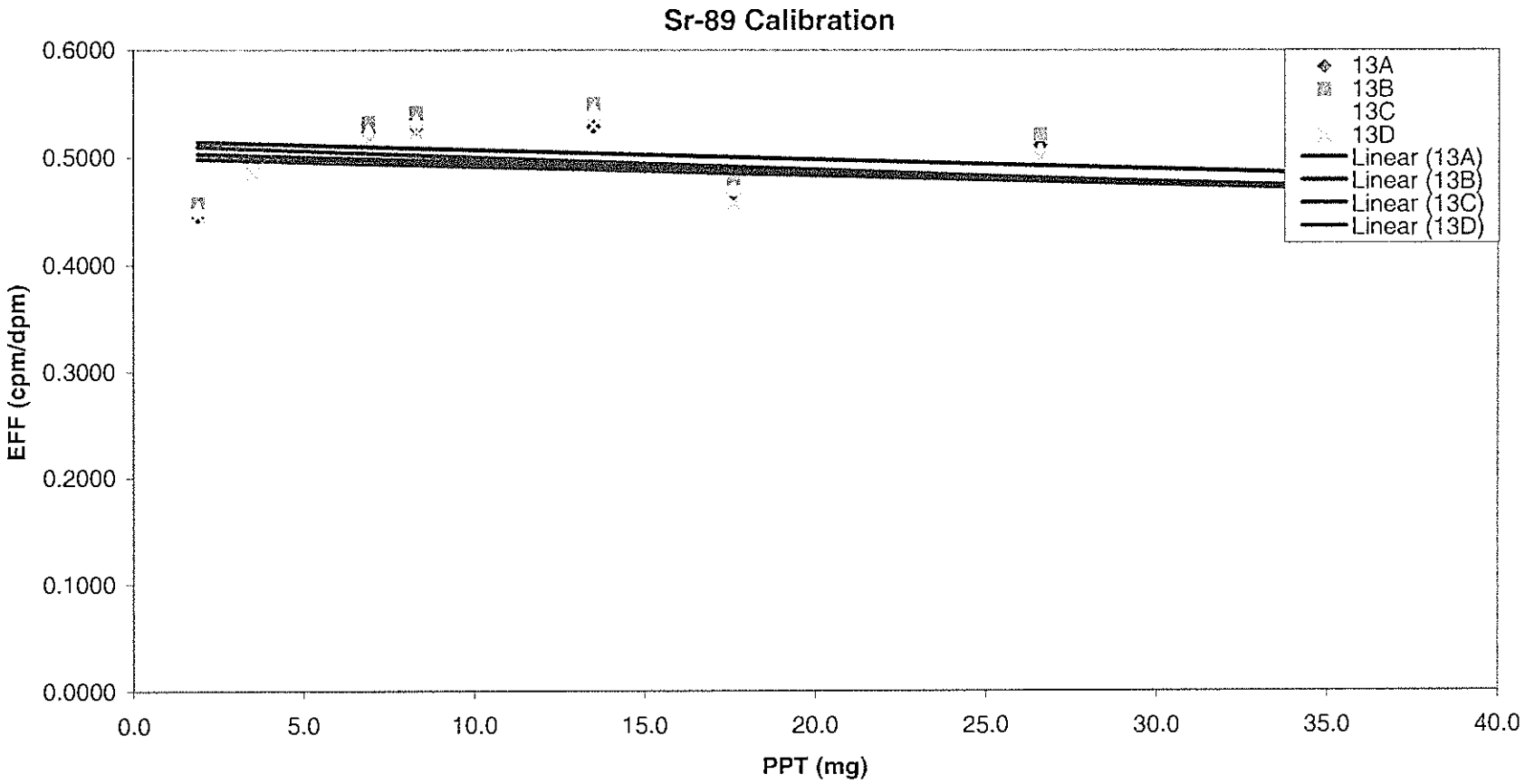



12A

12B y = -4.613917E-04x + 2.543237E-01

12C y = -1.955441E-03x + 2.361321E-01

12D y = -1.008951E-03x + 4.892691E-01

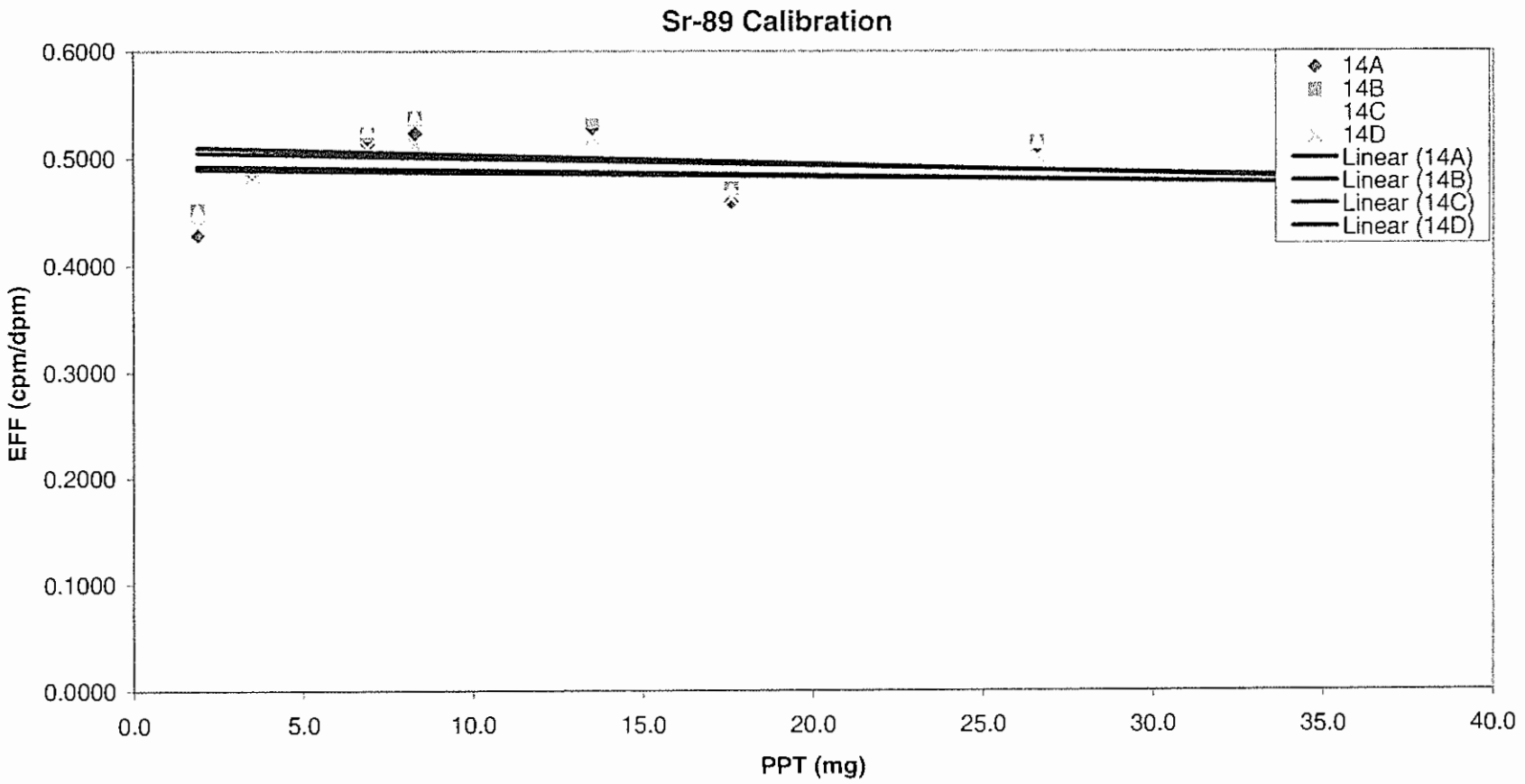



13A y = -9.030103E-04x + 5.050504E-01

13B y = -8.773138E-04x + 5.160069E-01

13C y = -1.160236E-03x + 5.121285E-01

13D y = -8.242116E-04x + 4.998858E-01




| | |
|---|---|
| 14A | y = -4.660381E-04x + 4.934923E-01 |
| 14B | y = -6.436680E-04x + 5.064001E-01 |
| 14C | y = -8.515606E-04x + 5.120459E-01 |
| 14D | y = -3.622979E-04x + 4.902315E-01 |

Current Calibration - PIC

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-89 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **Protean** | A0 | A1 | A2 | A3 | A4 |
| **1A** | 5.200147E-01 | -3.005961E-03 | | | |
| **1B** | 5.249165E-01 | -3.080004E-03 | | | |
| **1C** | 5.309699E-01 | -3.366481E-03 | | | |
| **1D** | 5.286987E-01 | -3.264044E-03 | | | |
| **2A** | 5.108792E-01 | -2.928324E-03 | | | |
| **2B** | 4.901900E-01 | -2.726292E-03 | | | |
| **2C** | 5.110680E-01 | -2.610435E-03 | | | |
| **2D** | 5.152130E-01 | -2.840738E-03 | | | |
| **3A** | 5.200735E-01 | -3.397329E-03 | | | |
| **3B** | 5.235380E-01 | -3.549394E-03 | | | |
| **3C** | 5.282955E-01 | -3.425019E-03 | | | |
| **3D** | 5.198403E-01 | -3.418573E-03 | | | |
| **4A** | 5.186287E-01 | -3.075203E-03 | | | |
| **4B** | 5.191729E-01 | -3.030756E-03 | | | |
| **4C** | 5.308582E-01 | -3.419356E-03 | | | |
| **4D** | 5.270219E-01 | -3.451883E-03 | | | |
| **5A** | 5.316072E-01 | -2.786676E-03 | | | |
| **5B** | 5.328835E-01 | -2.907347E-03 | | | |
| **5C** | 5.324992E-01 | -3.085316E-03 | | | |
| **5D** | 5.241561E-01 | -2.688295E-03 | | | |
| **6A** | 4.970023E-01 | -1.958586E-03 | | | |
| **6B** | 5.168520E-01 | -2.245183E-03 | | | |
| **6C** | 5.139116E-01 | -2.542606E-03 | | | |
| **6D** | 3.086324E-01 | -3.741354E-03 | | | |
| **7A** | 5.293261E-01 | -2.837544E-03 | | | |
| **7B** | 5.298861E-01 | -3.027427E-03 | | | |
| **7C** | 5.270355E-01 | -3.010349E-03 | | | |
| **7D** | 5.272911E-01 | -2.984826E-03 | | | |
| **8A** | 5.197323E-01 | -2.835923E-03 | | | |
| **8B** | 5.145438E-01 | -3.101285E-03 | | | |
| **8C** | 5.261718E-01 | -2.803963E-03 | | | |
| **8D** | 5.389462E-01 | -3.013335E-03 | | | |
| **9A** | 5.244978E-01 | -2.054823E-03 | | | |
| **9B** | 5.108739E-01 | -1.999215E-03 | | | |
| **9C** | 5.155334E-01 | -2.037484E-03 | | | |
| **9D** | 4.936228E-01 | -1.771991E-03 | | | |
| **10A** | 5.193880E-01 | -2.004084E-03 | | | |
| **10B** | 5.162797E-01 | -2.073233E-03 | | | |
| **10C** | 5.173243E-01 | -1.966967E-03 | | | |
| **10D** | 5.159685E-01 | -1.780592E-03 | | | |
| **11A** | 4.325664E-01 | -1.120388E-03 | | | |
| **11B** | 5.106068E-01 | -1.508069E-03 | | | |
| **11C** | 5.117872E-01 | -1.789395E-03 | | | |
| **11D** | 5.124197E-01 | -1.280551E-03 | | | |
| **12A** | #N/A | #N/A | | | |
| **12B** | 2.543237E-01 | -4.613917E-04 | | | |
| **12C** | 2.361321E-01 | -1.955441E-03 | | | |
| **12D** | 4.892691E-01 | -1.008951E-03 | | | |
| **13A** | 5.050504E-01 | -9.030103E-04 | | | |
| **13B** | 5.160069E-01 | -8.773138E-04 | | | |
| **13C** | 5.121285E-01 | -1.160236E-03 | | | |
| **13D** | 4.998858E-01 | -8.242116E-04 | | | |
| **14A** | 4.934923E-01 | -4.660381E-04 | | | |
| **14B** | 5.064001E-01 | -6.436680E-04 | | | |
| **14C** | 5.120459E-01 | -8.515606E-04 | | | |
| **14D** | 4.902315E-01 | -3.622979E-04 | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| C1 | 1A | 1 | 3 | 22671 | 2/15/2013 16:21 | 2/15/2013 16:22 | PIC | SR89C13 |
| C2 | 1A | 1 | 3 | 24304 | 2/15/2013 16:30 | 2/15/2013 16:31 | PIC | SR89C13 |
| C3 | 1A | 1 | 3 | 25873 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C4 | 1A | 1 | 5 | 24881 | 2/15/2013 16:24 | 2/15/2013 16:25 | PIC | SR89C13 |
| C5 | 1A | 1 | 5 | 25969 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C6 | 1A | 1 | 4 | 23419 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C7 | 1A | 1 | 6 | 25270 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C8 | 1A | 1 | 6 | 17057 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C1 | 1B | 1 | 14 | 22892 | 2/15/2013 16:24 | 2/15/2013 16:25 | PIC | SR89C13 |
| C2 | 1B | 1 | 22 | 24815 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C3 | 1B | 1 | 22 | 25632 | 2/15/2013 16:30 | 2/15/2013 16:31 | PIC | SR89C13 |
| C4 | 1B | 1 | 17 | 25351 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C5 | 1B | 1 | 31 | 26005 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C6 | 1B | 1 | 14 | 23585 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C7 | 1B | 1 | 23 | 25562 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C8 | 1B | 1 | 22 | 17129 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C1 | 1C | 1 | 252 | 23030 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C2 | 1C | 1 | 277 | 25093 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C3 | 1C | 1 | 288 | 26245 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C4 | 1C | 1 | 311 | 25504 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C5 | 1C | 1 | 309 | 25732 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C6 | 1C | 1 | 299 | 23516 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C7 | 1C | 1 | 318 | 25862 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C8 | 1C | 1 | 174 | 16780 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C1 | 1D | 1 | 216 | 23237 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C2 | 1D | 1 | 223 | 24810 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C3 | 1D | 1 | 247 | 26179 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C4 | 1D | 1 | 248 | 25241 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C5 | 1D | 1 | 218 | 26012 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C6 | 1D | 1 | 220 | 23271 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C7 | 1D | 1 | 261 | 25607 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C8 | 1D | 1 | 154 | 17078 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C1 | 2A | 1 | 8 | 22234 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C2 | 2A | 1 | 11 | 23993 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C3 | 2A | 1 | 8 | 25476 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C4 | 2A | 1 | 7 | 24595 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C5 | 2A | 1 | 2 | 25135 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C6 | 2A | 1 | 8 | 22948 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C7 | 2A | 1 | 11 | 25149 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C8 | 2A | 1 | 7 | 16736 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C1 | 2B | 1 | 0 | 21501 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C2 | 2B | 1 | 0 | 23103 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C3 | 2B | 1 | 0 | 24238 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C4 | 2B | 1 | 0 | 23758 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C5 | 2B | 1 | 1 | 23999 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C6 | 2B | 1 | 0 | 22186 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C7 | 2B | 1 | 0 | 24035 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C8 | 2B | 1 | 0 | 16377 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C1 | 2C | 1 | 67 | 22296 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C2 | 2C | 1 | 84 | 23951 | 2/15/2013 16:36 | 2/15/2013 16:37 | PIC | SR89C13 |
| C3 | 2C | 1 | 89 | 25463 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C4 | 2C | 1 | 87 | 24962 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C5 | 2C | 1 | 98 | 25437 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C6 | 2C | 1 | 108 | 23144 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C7 | 2C | 1 | 99 | 25548 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C8 | 2C | 1 | 61 | 17333 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C1 | 2D | 1 | 42 | 22601 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C2 | 2D | 1 | 41 | 24333 | 2/15/2013 16:38 | 2/15/2013 16:39 | PIC | SR89C13 |
| C3 | 2D | 1 | 43 | 25432 | 2/15/2013 16:36 | 2/15/2013 16:37 | PIC | SR89C13 |
| C4 | 2D | 1 | 56 | 24784 | 2/15/2013 16:34 | 2/15/2013 16:35 | PIC | SR89C13 |
| C5 | 2D | 1 | 32 | 25497 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C6 | 2D | 1 | 40 | 23111 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C7 | 2D | 1 | 58 | 25715 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C8 | 2D | 1 | 37 | 17022 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C1 | 3A | 1 | 389 | 22713 | 2/15/2013 17:08 | 2/15/2013 17:09 | PIC | SR89C13 |
| C2 | 3A | 1 | 405 | 24219 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C3 | 3A | 1 | 428 | 25568 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C4 | 3A | 1 | 397 | 24790 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C5 | 3A | 1 | 436 | 25636 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C6 | 3A | 1 | 429 | 22922 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C7 | 3A | 1 | 385 | 25188 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C8 | 3A | 1 | 237 | 16133 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C1 | 3B | 1 | 370 | 22710 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C2 | 3B | 1 | 373 | 24287 | 2/15/2013 17:08 | 2/15/2013 17:09 | PIC | SR89C13 |
| C3 | 3B | 1 | 412 | 25785 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C4 | 3B | 1 | 396 | 25095 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C5 | 3B | 1 | 375 | 25479 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C6 | 3B | 1 | 360 | 23180 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C7 | 3B | 1 | 384 | 25229 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C8 | 3B | 1 | 259 | 15914 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C1 | 3C | 1 | 157 | 22789 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C2 | 3C | 1 | 179 | 24757 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C3 | 3C | 1 | 159 | 25765 | 2/15/2013 17:08 | 2/15/2013 17:09 | PIC | SR89C13 |
| C4 | 3C | 1 | 176 | 25700 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C5 | 3C | 1 | 163 | 25884 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C6 | 3C | 1 | 162 | 23317 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C7 | 3C | 1 | 156 | 25638 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C8 | 3C | 1 | 115 | 16405 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C1 | 3D | 1 | 140 | 22440 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C2 | 3D | 1 | 176 | 24241 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C3 | 3D | 1 | 170 | 25787 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C4 | 3D | 1 | 163 | 24974 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C5 | 3D | 1 | 150 | 25471 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C6 | 3D | 1 | 163 | 22855 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C7 | 3D | 1 | 147 | 24979 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C8 | 3D | 1 | 104 | 16191 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C1 | 4A | 1 | 156 | 22414 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C2 | 4A | 1 | 140 | 24462 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C3 | 4A | 1 | 132 | 25519 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C4 | 4A | 1 | 149 | 25109 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C5 | 4A | 1 | 147 | 25709 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C6 | 4A | 1 | 134 | 23050 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C7 | 4A | 1 | 143 | 25348 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C8 | 4A | 1 | 111 | 16794 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C1 | 4B | 1 | 0 | 22758 | 2/15/2013 17:24 | 2/15/2013 17:25 | PIC | SR89C13 |
| C2 | 4B | 1 | 0 | 24066 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C3 | 4B | 1 | 0 | 25905 | 2/15/2013 17:29 | 2/15/2013 17:30 | PIC | SR89C13 |
| C4 | 4B | 1 | 0 | 25162 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C5 | 4B | 1 | 0 | 25354 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C6 | 4B | 1 | 0 | 23302 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C7 | 4B | 1 | 0 | 25359 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C8 | 4B | 1 | 0 | 16980 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C1 | 4C | 1 | 92 | 23173 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C2 | 4C | 1 | 95 | 25035 | 2/15/2013 17:24 | 2/15/2013 17:25 | PIC | SR89C13 |
| C3 | 4C | 1 | 112 | 25859 | 2/15/2013 17:21 | 2/15/2013 17:22 | PIC | SR89C13 |
| C4 | 4C | 1 | 107 | 25412 | 2/15/2013 17:29 | 2/15/2013 17:30 | PIC | SR89C13 |
| C5 | 4C | 1 | 105 | 26023 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C6 | 4C | 1 | 87 | 23478 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C7 | 4C | 1 | 97 | 25643 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C8 | 4C | 1 | 71 | 16702 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C1 | 4D | 1 | 286 | 22653 | 2/15/2013 17:29 | 2/15/2013 17:30 | PIC | SR89C13 |
| C2 | 4D | 1 | 296 | 24739 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C3 | 4D | 1 | 336 | 25941 | 2/15/2013 17:24 | 2/15/2013 17:25 | PIC | SR89C13 |
| C4 | 4D | 1 | 268 | 25276 | 2/15/2013 17:21 | 2/15/2013 17:22 | PIC | SR89C13 |
| C5 | 4D | 1 | 303 | 25947 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C6 | 4D | 1 | 262 | 23091 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C7 | 4D | 1 | 277 | 25813 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C8 | 4D | 1 | 173 | 16149 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C1 | 5A | 1 | 95 | 23403 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C2 | 5A | 1 | 79 | 25086 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C3 | 5A | 1 | 94 | 26469 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C4 | 5A | 1 | 67 | 25794 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C5 | 5A | 1 | 56 | 26347 | 2/15/2013 14:15 | 2/15/2013 14:16 | PIC | SR89C13 |
| C6 | 5A | 1 | 82 | 24007 | 2/15/2013 14:30 | 2/15/2013 14:31 | PIC | SR89C13 |
| C7 | 5A | 1 | 80 | 26340 | 2/15/2013 14:27 | 2/15/2013 14:28 | PIC | SR89C13 |
| C8 | 5A | 1 | 56 | 18123 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C1 | 5B | 1 | 82 | 23574 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C2 | 5B | 1 | 93 | 25221 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C3 | 5B | 1 | 106 | 26417 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C4 | 5B | 1 | 81 | 25811 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C5 | 5B | 1 | 86 | 26405 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C6 | 5B | 1 | 95 | 23663 | 2/15/2013 14:15 | 2/15/2013 14:16 | PIC | SR89C13 |
| C7 | 5B | 1 | 88 | 26124 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C8 | 5B | 1 | 66 | 18167 | 2/15/2013 14:27 | 2/15/2013 14:28 | PIC | SR89C13 |
| C1 | 5C | 1 | 76 | 23369 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C2 | 5C | 1 | 106 | 25051 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C3 | 5C | 1 | 83 | 26297 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C4 | 5C | 1 | 86 | 26150 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C5 | 5C | 1 | 93 | 26199 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C6 | 5C | 1 | 90 | 23488 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C7 | 5C | 1 | 85 | 25842 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C8 | 5C | 1 | 60 | 17798 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C1 | 5D | 1 | 82 | 23109 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C2 | 5D | 1 | 114 | 24806 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C3 | 5D | 1 | 99 | 26008 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C4 | 5D | 1 | 92 | 25558 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C5 | 5D | 1 | 94 | 26045 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C6 | 5D | 1 | 105 | 23651 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C7 | 5D | 1 | 106 | 25829 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C8 | 5D | 1 | 79 | 18148 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C1 | 6A | 1 | 1 | 22130 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C2 | 6A | 1 | 2 | 24034 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C3 | 6A | 1 | 1 | 24798 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C4 | 6A | 1 | 0 | 24454 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C5 | 6A | 1 | 1 | 24903 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C6 | 6A | 1 | 0 | 22477 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |
| C7 | 6A | 1 | 5 | 24857 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C8 | 6A | 1 | 3 | 18846 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C1 | 6B | 1 | 57 | 22530 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C2 | 6B | 1 | 68 | 25573 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C3 | 6B | 1 | 68 | 25565 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C4 | 6B | 1 | 69 | 25190 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C5 | 6B | 1 | 68 | 25651 | 2/15/2013 13:46 | 2/15/2013 13:47 | PIC | SR89C13 |
| C6 | 6B | 1 | 66 | 23552 | 2/15/2013 13:41 | 2/15/2013 13:42 | PIC | SR89C13 |
| C7 | 6B | 1 | 83 | 25638 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |
| C8 | 6B | 1 | 56 | 19075 | 2/15/2013 13:49 | 2/15/2013 13:50 | PIC | SR89C13 |
| C1 | 6C | 1 | 13 | 22479 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C2 | 6C | 1 | 10 | 24382 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C3 | 6C | 1 | 10 | 25764 | 2/15/2013 14:17 | 2/15/2013 14:18 | PIC | SR89C13 |
| C4 | 6C | 1 | 6 | 25070 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C5 | 6C | 1 | 18 | 25538 | 2/15/2013 13:49 | 2/15/2013 13:50 | PIC | SR89C13 |
| C6 | 6C | 1 | 16 | 23213 | 2/15/2013 13:46 | 2/15/2013 13:47 | PIC | SR89C13 |
| C7 | 6C | 1 | 7 | 25525 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C8 | 6C | 1 | 6 | 17935 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C1 | 6D | 1 | 0 | 11648 | 2/15/2013 14:32 | 2/15/2013 14:33 | PIC | SR89C13 |
| C2 | 6D | 1 | 0 | 13066 | 2/15/2013 14:29 | 2/15/2013 14:30 | PIC | SR89C13 |
| C3 | 6D | 1 | 0 | 12930 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C4 | 6D | 1 | 0 | 15725 | 2/15/2013 14:17 | 2/15/2013 14:18 | PIC | SR89C13 |
| C5 | 6D | 1 | 0 | 12091 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |
| C6 | 6D | 1 | 0 | 17778 | 2/15/2013 13:50 | 2/15/2013 13:51 | PIC | SR89C13 |
| C7 | 6D | 1 | 0 | 16245 | 2/15/2013 13:46 | 2/15/2013 13:47 | PIC | SR89C13 |
| C8 | 6D | 1 | 1 | 2109 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C1 | 7A | 1 | 131 | 23154 | 2/15/2013 14:40 | 2/15/2013 14:41 | PIC | SR89C13 |
| C2 | 7A | 1 | 141 | 24947 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C3 | 7A | 1 | 185 | 26400 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C4 | 7A | 1 | 154 | 25726 | 2/15/2013 14:51 | 2/15/2013 14:52 | PIC | SR89C13 |
| C5 | 7A | 1 | 172 | 26121 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C6 | 7A | 1 | 120 | 23722 | 2/15/2013 15:13 | 2/15/2013 15:14 | PIC | SR89C13 |
| C7 | 7A | 1 | 173 | 26485 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C8 | 7A | 1 | 121 | 17724 | 2/15/2013 15:05 | 2/15/2013 15:06 | PIC | SR89C13 |
| C1 | 7B | 1 | 167 | 23235 | 2/15/2013 14:51 | 2/15/2013 14:52 | PIC | SR89C13 |
| C2 | 7B | 1 | 184 | 25027 | 2/15/2013 14:40 | 2/15/2013 14:41 | PIC | SR89C13 |
| C3 | 7B | 1 | 191 | 26374 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C4 | 7B | 1 | 181 | 25565 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C5 | 7B | 1 | 200 | 25913 | 2/15/2013 15:06 | 2/15/2013 15:07 | PIC | SR89C13 |
| C6 | 7B | 1 | 161 | 23710 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C7 | 7B | 1 | 160 | 26047 | 2/15/2013 15:13 | 2/15/2013 15:14 | PIC | SR89C13 |
| C8 | 7B | 1 | 136 | 17556 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C1 | 7C | 1 | 59 | 23070 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C2 | 7C | 1 | 59 | 24941 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C3 | 7C | 1 | 79 | 25992 | 2/15/2013 14:41 | 2/15/2013 14:42 | PIC | SR89C13 |
| C4 | 7C | 1 | 83 | 25550 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C5 | 7C | 1 | 68 | 26073 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C6 | 7C | 1 | 60 | 23471 | 2/15/2013 15:06 | 2/15/2013 15:07 | PIC | SR89C13 |
| C7 | 7C | 1 | 67 | 25731 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C8 | 7C | 1 | 46 | 17544 | 2/15/2013 15:13 | 2/15/2013 15:14 | PIC | SR89C13 |
| C1 | 7D | 1 | 96 | 22969 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C2 | 7D | 1 | 94 | 25017 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C3 | 7D | 1 | 138 | 26248 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C4 | 7D | 1 | 90 | 25375 | 2/15/2013 14:41 | 2/15/2013 14:42 | PIC | SR89C13 |
| C5 | 7D | 1 | 127 | 25995 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C6 | 7D | 1 | 106 | 23670 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C7 | 7D | 1 | 120 | 25810 | 2/15/2013 15:06 | 2/15/2013 15:07 | PIC | SR89C13 |
| C8 | 7D | 1 | 55 | 17546 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C1 | 8A | 1 | 5 | 22652 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C2 | 8A | 1 | 13 | 24637 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C3 | 8A | 1 | 21 | 25565 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C4 | 8A | 1 | 21 | 25423 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C5 | 8A | 1 | 17 | 25896 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C6 | 8A | 1 | 11 | 23169 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C7 | 8A | 1 | 21 | 25611 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C8 | 8A | 1 | 18 | 17494 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C1 | 8B | 1 | 1 | 22319 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C2 | 8B | 1 | 0 | 24615 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C3 | 8B | 1 | 1 | 25451 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C4 | 8B | 1 | 0 | 24461 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C5 | 8B | 1 | 0 | 25258 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C6 | 8B | 1 | 0 | 22990 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C7 | 8B | 1 | 0 | 25222 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C8 | 8B | 1 | 0 | 16601 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C1 | 8C | 1 | 22 | 22927 | 2/15/2013 15:10 | 2/15/2013 15:11 | PIC | SR89C13 |
| C2 | 8C | 1 | 23 | 25010 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C3 | 8C | 1 | 17 | 26237 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C4 | 8C | 1 | 18 | 25433 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C5 | 8C | 1 | 21 | 26120 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C6 | 8C | 1 | 24 | 23608 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C7 | 8C | 1 | 14 | 26024 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C8 | 8C | 1 | 13 | 17848 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C1 | 8D | 1 | 31 | 23697 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C2 | 8D | 1 | 37 | 25697 | 2/15/2013 15:10 | 2/15/2013 15:11 | PIC | SR89C13 |
| C3 | 8D | 1 | 57 | 26831 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C4 | 8D | 1 | 37 | 26060 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C5 | 8D | 1 | 49 | 26234 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C6 | 8D | 1 | 34 | 23718 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C7 | 8D | 1 | 43 | 26787 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C8 | 8D | 1 | 21 | 18085 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C1 | 9A | 1 | 42 | 23046 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C2 | 9A | 1 | 33 | 25056 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C3 | 9A | 1 | 49 | 26656 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C4 | 9A | 1 | 37 | 25929 | 2/15/2013 12:57 | 2/15/2013 12:58 | PIC | SR89C13 |
| C5 | 9A | 1 | 48 | 26267 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C6 | 9A | 1 | 30 | 23993 | 2/15/2013 13:17 | 2/15/2013 13:18 | PIC | SR89C13 |
| C7 | 9A | 1 | 47 | 26420 | 2/15/2013 13:14 | 2/15/2013 13:15 | PIC | SR89C13 |
| C8 | 9A | 1 | 32 | 19631 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C1 | 9B | 1 | 22 | 22752 | 2/15/2013 12:57 | 2/15/2013 12:58 | PIC | SR89C13 |
| C2 | 9B | 1 | 29 | 24464 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C3 | 9B | 1 | 27 | 25548 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C4 | 9B | 1 | 17 | 25161 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C5 | 9B | 1 | 24 | 25785 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C6 | 9B | 1 | 16 | 23221 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C7 | 9B | 1 | 25 | 25852 | 2/15/2013 13:17 | 2/15/2013 13:18 | PIC | SR89C13 |
| C8 | 9B | 1 | 16 | 19119 | 2/15/2013 13:14 | 2/15/2013 13:15 | PIC | SR89C13 |
| C1 | 9C | 1 | 40 | 22898 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C2 | 9C | 1 | 43 | 24745 | 2/15/2013 12:57 | 2/15/2013 12:58 | PIC | SR89C13 |
| C3 | 9C | 1 | 47 | 25810 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C4 | 9C | 1 | 39 | 25450 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C5 | 9C | 1 | 33 | 26012 | 2/15/2013 13:14 | 2/15/2013 13:15 | PIC | SR89C13 |
| C6 | 9C | 1 | 45 | 23438 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C7 | 9C | 1 | 35 | 25678 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C8 | 9C | 1 | 36 | 19493 | 2/15/2013 13:17 | 2/15/2013 13:18 | PIC | SR89C13 |
| C1 | 9D | 1 | 0 | 22005 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C2 | 9D | 1 | 0 | 23660 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C3 | 9D | 1 | 0 | 24728 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C4 | 9D | 1 | 1 | 24408 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C5 | 9D | 1 | 1 | 24915 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C6 | 9D | 1 | 1 | 22693 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C7 | 9D | 1 | 2 | 25159 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C8 | 9D | 1 | 0 | 18766 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C1 | 10A | 1 | 10 | 22993 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C2 | 10A | 1 | 25 | 24908 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C3 | 10A | 1 | 16 | 25972 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C4 | 10A | 1 | 22 | 25551 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C5 | 10A | 1 | 17 | 26172 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C6 | 10A | 1 | 19 | 24100 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C7 | 10A | 1 | 14 | 26093 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |

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| C8 | 10A | 1 | 6 | 19475 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C1 | 10B | 1 | 41 | 22828 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C2 | 10B | 1 | 48 | 24594 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C3 | 10B | 1 | 42 | 25749 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C4 | 10B | 1 | 30 | 25497 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C5 | 10B | 1 | 51 | 26074 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C6 | 10B | 1 | 35 | 23956 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C7 | 10B | 1 | 37 | 25717 | 2/15/2013 13:05 | 2/15/2013 13:06 | PIC | SR89C13 |
| C8 | 10B | 1 | 24 | 19206 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C1 | 10C | 1 | 36 | 22920 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C2 | 10C | 1 | 50 | 24784 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C3 | 10C | 1 | 53 | 25610 | 2/15/2013 13:08 | 2/15/2013 13:09 | PIC | SR89C13 |
| C4 | 10C | 1 | 49 | 25623 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C5 | 10C | 1 | 55 | 26296 | 2/15/2013 13:01 | 2/15/2013 13:02 | PIC | SR89C13 |
| C6 | 10C | 1 | 42 | 23777 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C7 | 10C | 1 | 38 | 26396 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C8 | 10C | 1 | 29 | 19243 | 2/15/2013 13:05 | 2/15/2013 13:06 | PIC | SR89C13 |
| C1 | 10D | 1 | 25 | 22791 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C2 | 10D | 1 | 27 | 24951 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C3 | 10D | 1 | 25 | 26000 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C4 | 10D | 1 | 18 | 25540 | 2/15/2013 13:08 | 2/15/2013 13:09 | PIC | SR89C13 |
| C5 | 10D | 1 | 25 | 25889 | 2/15/2013 13:05 | 2/15/2013 13:06 | PIC | SR89C13 |
| C6 | 10D | 1 | 21 | 23854 | 2/15/2013 13:01 | 2/15/2013 13:02 | PIC | SR89C13 |
| C7 | 10D | 1 | 21 | 26394 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C8 | 10D | 1 | 19 | 19760 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C1 | 11A | 1 | 0 | 19465 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C2 | 11A | 1 | 0 | 20978 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C3 | 11A | 1 | 0 | 21798 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C4 | 11A | 1 | 0 | 21585 | 2/15/2013 12:30 | 2/15/2013 12:31 | PIC | SR89C13 |
| C5 | 11A | 1 | 1 | 22052 | 2/15/2013 12:39 | 2/15/2013 12:40 | PIC | SR89C13 |
| C6 | 11A | 1 | 0 | 20207 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C7 | 11A | 1 | 0 | 21925 | 2/15/2013 12:45 | 2/15/2013 12:46 | PIC | SR89C13 |
| C8 | 11A | 1 | 0 | 17769 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C1 | 11B | 1 | 0 | 22955 | 2/15/2013 12:30 | 2/15/2013 12:31 | PIC | SR89C13 |
| C2 | 11B | 1 | 0 | 24624 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C3 | 11B | 1 | 1 | 25818 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C4 | 11B | 1 | 1 | 25455 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C5 | 11B | 1 | 2 | 25722 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C6 | 11B | 1 | 1 | 23486 | 2/15/2013 12:39 | 2/15/2013 12:40 | PIC | SR89C13 |
| C7 | 11B | 1 | 0 | 26243 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C8 | 11B | 1 | 1 | 20341 | 2/15/2013 12:45 | 2/15/2013 12:46 | PIC | SR89C13 |
| C1 | 11C | 1 | 0 | 22849 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C2 | 11C | 1 | 0 | 24747 | 2/15/2013 12:30 | 2/15/2013 12:31 | PIC | SR89C13 |
| C3 | 11C | 1 | 0 | 25794 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C4 | 11C | 1 | 0 | 25259 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C5 | 11C | 1 | 0 | 25754 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C6 | 11C | 1 | 0 | 23292 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C7 | 11C | 1 | 0 | 26032 | 2/15/2013 12:39 | 2/15/2013 12:40 | PIC | SR89C13 |
| C8 | 11C | 1 | 1 | 19787 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C1 | 11D | 1 | 0 | 23032 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C2 | 11D | 1 | 0 | 24975 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C3 | 11D | 1 | 0 | 26164 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C4 | 11D | 1 | 0 | 25392 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C5 | 11D | 1 | 0 | 26139 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C6 | 11D | 1 | 0 | 23587 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C7 | 11D | 1 | 0 | 26126 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C8 | 11D | 1 | 0 | 21236 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C1 | 12A | 1 | 0 | 0 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C2 | 12A | 1 | 0 | 0 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C3 | 12A | 1 | 0 | 0 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C4 | 12A | 1 | 0 | 0 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C5 | 12A | 1 | 0 | 0 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C6 | 12A | 1 | 0 | 0 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C7 | 12A | 1 | 0 | 0 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C8 | 12A | 1 | 0 | 0 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C1 | 12B | 1 | 0 | 11423 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C2 | 12B | 1 | 0 | 12283 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C3 | 12B | 1 | 0 | 13000 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C4 | 12B | 1 | 0 | 12474 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C5 | 12B | 1 | 0 | 13323 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C6 | 12B | 1 | 0 | 12524 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C7 | 12B | 1 | 0 | 12656 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C8 | 12B | 1 | 0 | 10909 | 2/15/2013 12:35 | 2/15/2013 12:36 | PIC | SR89C13 |
| C1 | 12C | 1 | 0 | 10621 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C2 | 12C | 1 | 0 | 10886 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C3 | 12C | 1 | 0 | 10093 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C4 | 12C | 1 | 0 | 12768 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C5 | 12C | 1 | 0 | 11356 | 2/15/2013 12:35 | 2/15/2013 12:36 | PIC | SR89C13 |
| C6 | 12C | 1 | 0 | 10436 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C7 | 12C | 1 | 0 | 8655 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C8 | 12C | 1 | 0 | 7925 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C1 | 12D | 1 | 0 | 22275 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C2 | 12D | 1 | 0 | 23929 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C3 | 12D | 1 | 2 | 24816 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C4 | 12D | 1 | 0 | 24308 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C5 | 12D | 1 | 0 | 25022 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C6 | 12D | 1 | 0 | 22695 | 2/15/2013 12:35 | 2/15/2013 12:36 | PIC | SR89C13 |
| C7 | 12D | 1 | 0 | 25156 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C8 | 12D | 1 | 1 | 20790 | 2/15/2013 12:27 | 2/15/2013 12:28 | PIC | SR89C13 |
| C1 | 13A | 1 | 0 | 22743 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C2 | 13A | 1 | 0 | 24809 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C3 | 13A | 1 | 0 | 26030 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C4 | 13A | 1 | 0 | 25231 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C5 | 13A | 1 | 0 | 25679 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C6 | 13A | 1 | 0 | 23601 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C7 | 13A | 1 | 0 | 26108 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C8 | 13A | 1 | 3 | 21741 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C1 | 13B | 1 | 0 | 23326 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C2 | 13B | 1 | 0 | 25000 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C3 | 13B | 1 | 0 | 26432 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C4 | 13B | 1 | 0 | 25874 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C5 | 13B | 1 | 0 | 26690 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C6 | 13B | 1 | 0 | 24326 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C7 | 13B | 1 | 0 | 26586 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C8 | 13B | 1 | 1 | 22201 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C1 | 13C | 1 | 0 | 23080 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C2 | 13C | 1 | 0 | 24850 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C3 | 13C | 1 | 0 | 26077 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C4 | 13C | 1 | 0 | 25534 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C5 | 13C | 1 | 0 | 26440 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C6 | 13C | 1 | 0 | 23843 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C7 | 13C | 1 | 1 | 25844 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C8 | 13C | 1 | 0 | 21603 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C1 | 13D | 1 | 0 | 22759 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C2 | 13D | 1 | 0 | 24457 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C3 | 13D | 1 | 1 | 25628 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C4 | 13D | 1 | 0 | 25066 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C5 | 13D | 1 | 0 | 25723 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C6 | 13D | 1 | 0 | 23187 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C7 | 13D | 1 | 0 | 25552 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C8 | 13D | 1 | 0 | 21943 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C1 | 14A | 1 | 0 | 21875 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C2 | 14A | 1 | 0 | 24524 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C3 | 14A | 1 | 0 | 25512 | 2/15/2013 12:18 | 2/15/2013 12:19 | PIC | SR89C13 |
| C4 | 14A | 1 | 0 | 24999 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C5 | 14A | 1 | 0 | 25660 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C6 | 14A | 1 | 0 | 23262 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C7 | 14A | 1 | 0 | 25922 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C8 | 14A | 1 | 0 | 22048 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C1 | 14B | 1 | 1 | 23056 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C2 | 14B | 1 | 1 | 24712 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C3 | 14B | 1 | 0 | 25936 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C4 | 14B | 1 | 0 | 25683 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C5 | 14B | 1 | 1 | 25954 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C6 | 14B | 1 | 0 | 23872 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C7 | 14B | 1 | 0 | 26271 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C8 | 14B | 1 | 0 | 22456 | 2/15/2013 11:48 | 2/15/2013 11:49 | PIC | SR89C13 |
| C1 | 14C | 1 | 0 | 22999 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C2 | 14C | 1 | 0 | 25216 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C3 | 14C | 1 | 0 | 26170 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C4 | 14C | 1 | 0 | 25729 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C5 | 14C | 1 | 0 | 26457 | 2/15/2013 11:48 | 2/15/2013 11:49 | PIC | SR89C13 |
| C6 | 14C | 1 | 0 | 23806 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C7 | 14C | 1 | 0 | 26330 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C8 | 14C | 1 | 0 | 22288 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C1 | 14D | 1 | 0 | 22297 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C2 | 14D | 1 | 0 | 24355 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C3 | 14D | 1 | 0 | 25319 | 2/15/2013 12:17 | 2/15/2013 12:18 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C4 | 14D | 1 | 0 | 24492 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C5 | 14D | 1 | 0 | 25239 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C6 | 14D | 1 | 0 | 23452 | 2/15/2013 11:48 | 2/15/2013 11:49 | PIC | SR89C13 |
| C7 | 14D | 1 | 0 | 25637 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C8 | 14D | 1 | 0 | 22338 | 2/15/2013 11:40 | 2/15/2013 11:41 | PIC | SR89C13 |

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## Sr-90 Calibration - PIC - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

| | |
|---|---|
| Separation Date/Time | 3/29/2013 14:10 |
| Y-90 Half Life (days) | 2.668875 |

The following detectors were not calibrated:
12A, 12B, 12C, 12D

| Carrier Data | | Std ID | 1858443 | |
|---|---|---|---|---|
| | | Std weight | 17.1 | mg/mL |
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 3.3 | 0.2 | 3.42 | 96.5% |
| 2 | 7.3 | 0.4 | 6.84 | 100.0% |
| 3 | 8.5 | 0.5 | 8.55 | 99.4% |
| 4 | 12.2 | 0.7 | 11.97 | 100.0% |
| 5 | 17.2 | 1 | 17.10 | 100.0% |
| 6 | 26.6 | 1.5 | 25.65 | 100.0% |
| 7 | 31.0 | 1.8 | 30.78 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered negligible.
**Decay corrected to mid-point of cou

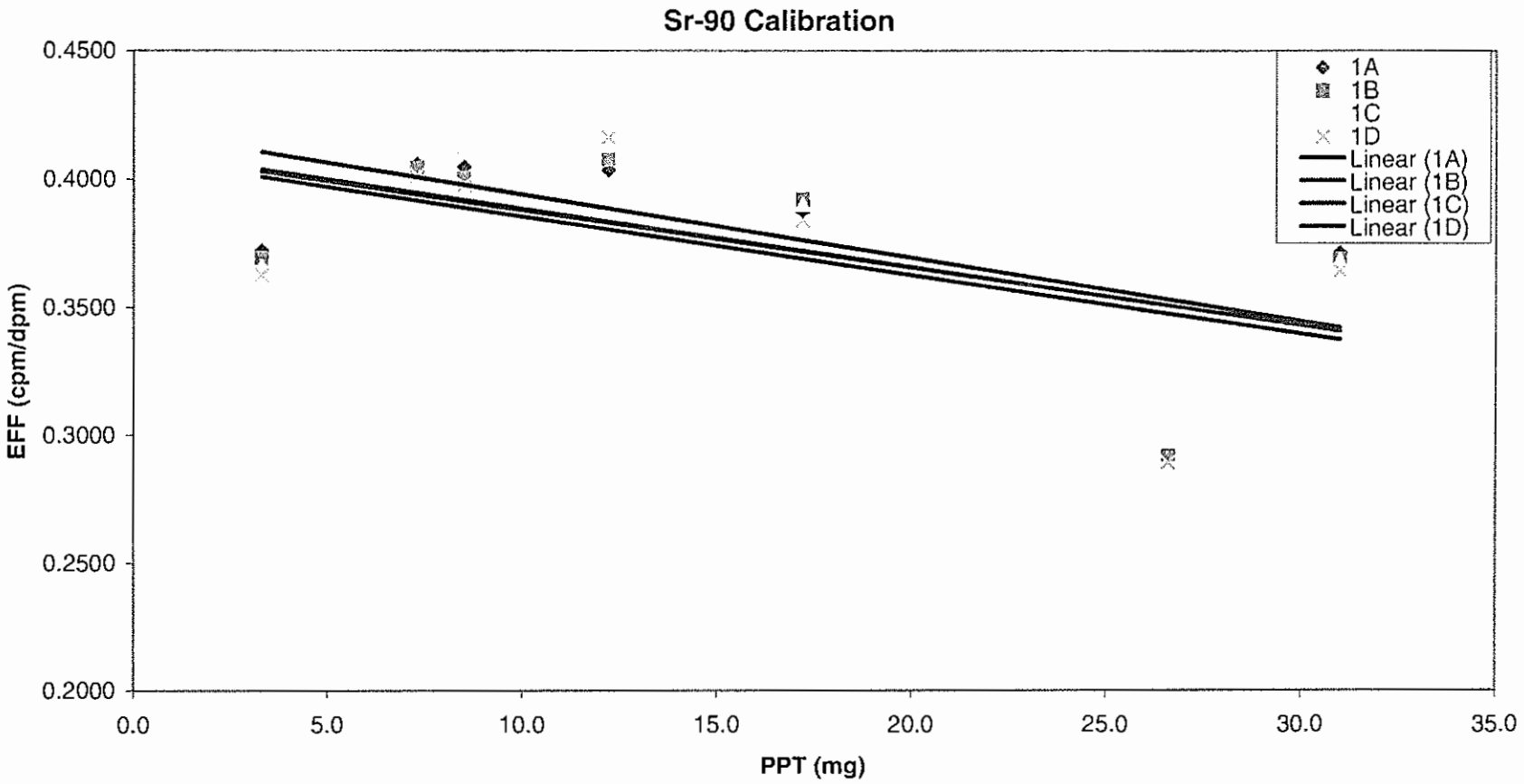
| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A | 1 | 3/30/2013 12:17 | 3 | 14094 | 4698.00 | 96.5% | 0.53530 | 0.21317 | 3565.42 | 9576.98 | 0.3723 | 0.4039 |
| 1A | 2 | 3/30/2013 13:18 | 3 | 15073 | 5024.33 | 100.0% | 0.53530 | 0.22169 | 3887.63 | 9576.95 | 0.4060 | 0.3948 |
| 1A | 3 | 3/30/2013 13:10 | 3 | 15044 | 5014.67 | 99.4% | 0.53530 | 0.22059 | 3877.15 | 9576.96 | 0.4048 | 0.3921 |
| 1A | 4 | 3/30/2013 13:02 | 3 | 14969 | 4989.67 | 100.0% | 0.53530 | 0.21950 | 3864.39 | 9576.96 | 0.4035 | 0.3836 |
| 1A | 5 | 3/30/2013 12:55 | 3 | 14480 | 4826.67 | 100.0% | 0.53530 | 0.21852 | 3706.40 | 9576.96 | 0.3870 | 0.3722 |
| 1A | 6 | 3/30/2013 12:41 | 3 | 11753 | 3917.67 | 100.0% | 0.53530 | 0.21653 | 2807.61 | 9576.97 | 0.2932 | 0.3508 |
| 1A | 7 | 3/30/2013 12:33 | 3 | 13985 | 4661.67 | 100.0% | 0.53530 | 0.21541 | 3557.36 | 9576.97 | 0.3714 | 0.3408 |
| 1B | 1 | 3/30/2013 12:25 | 3 | 14015 | 4671.67 | 96.5% | 0.53354 | 0.21423 | 3537.22 | 9576.98 | 0.3693 | 0.4030 |
| 1B | 2 | 3/30/2013 12:17 | 3 | 14889 | 4963.00 | 100.0% | 0.53354 | 0.21318 | 3873.70 | 9576.98 | 0.4045 | 0.3941 |
| 1B | 3 | 3/30/2013 13:18 | 3 | 14916 | 4972.00 | 99.4% | 0.53354 | 0.22169 | 3832.59 | 9576.95 | 0.4002 | 0.3914 |
| 1B | 4 | 3/30/2013 13:10 | 3 | 15096 | 5032.00 | 100.0% | 0.53354 | 0.22059 | 3904.87 | 9576.96 | 0.4077 | 0.3831 |
| 1B | 5 | 3/30/2013 13:02 | 3 | 14632 | 4877.33 | 100.0% | 0.53354 | 0.21946 | 3755.95 | 9576.96 | 0.3922 | 0.3719 |
| 1B | 6 | 3/30/2013 12:55 | 3 | 11749 | 3916.33 | 100.0% | 0.53354 | 0.21849 | 2799.92 | 9576.96 | 0.2924 | 0.3508 |
| 1B | 7 | 3/30/2013 12:41 | 3 | 13913 | 4637.67 | 100.0% | 0.53354 | 0.21649 | 3531.48 | 9576.97 | 0.3687 | 0.3409 |
| 1C | 1 | 3/30/2013 12:33 | 3 | 13961 | 4653.67 | 96.5% | 0.53619 | 0.21541 | 3507.31 | 9576.97 | 0.3662 | 0.4107 |
| 1C | 2 | 3/30/2013 12:25 | 3 | 15401 | 5133.67 | 100.0% | 0.53619 | 0.21423 | 4033.58 | 9576.98 | 0.4212 | 0.4008 |
| 1C | 3 | 3/30/2013 12:18 | 3 | 15175 | 5058.33 | 99.4% | 0.53619 | 0.21322 | 3956.99 | 9576.98 | 0.4132 | 0.3979 |
| 1C | 4 | 3/30/2013 13:18 | 3 | 15289 | 5096.33 | 100.0% | 0.53619 | 0.22169 | 3957.94 | 9576.95 | 0.4133 | 0.3887 |
| 1C | 5 | 3/30/2013 13:10 | 3 | 14609 | 4869.67 | 100.0% | 0.53619 | 0.22059 | 3736.93 | 9576.96 | 0.3902 | 0.3764 |
| 1C | 6 | 3/30/2013 13:02 | 3 | 11924 | 3974.67 | 100.0% | 0.53619 | 0.21946 | 2847.70 | 9576.96 | 0.2973 | 0.3531 |
| 1C | 7 | 3/30/2013 12:55 | 3 | 13954 | 4651.33 | 100.0% | 0.53619 | 0.21849 | 3529.37 | 9576.96 | 0.3685 | 0.3422 |
| 1D | 1 | 3/30/2013 12:41 | 3 | 13844 | 4614.67 | 96.5% | 0.53094 | 0.21649 | 3473.83 | 9576.97 | 0.3627 | 0.4009 |
| 1D | 2 | 3/30/2013 12:33 | 3 | 14825 | 4941.67 | 100.0% | 0.53094 | 0.21541 | 3846.37 | 9576.97 | 0.4016 | 0.3917 |
| 1D | 3 | 3/30/2013 12:25 | 3 | 14718 | 4906.00 | 99.4% | 0.53094 | 0.21423 | 3810.27 | 9576.98 | 0.3979 | 0.3890 |
| 1D | 4 | 3/30/2013 12:18 | 3 | 15215 | 5071.67 | 100.0% | 0.53094 | 0.21323 | 3987.43 | 9576.98 | 0.4164 | 0.3805 |
| 1D | 5 | 3/30/2013 13:18 | 3 | 14413 | 4804.33 | 100.0% | 0.53094 | 0.22169 | 3677.09 | 9576.95 | 0.3840 | 0.3691 |
| 1D | 6 | 3/30/2013 13:10 | 3 | 11672 | 3890.67 | 100.0% | 0.53094 | 0.22059 | 2769.01 | 9576.96 | 0.2891 | 0.3475 |
| 1D | 7 | 3/30/2013 13:02 | 3 | 13819 | 4606.33 | 100.0% | 0.53094 | 0.21946 | 3490.40 | 9576.96 | 0.3645 | 0.3374 |
| 2A | 1 | 3/30/2013 12:55 | 3 | 13666 | 4555.33 | 96.5% | 0.51176 | 0.21853 | 3445.37 | 9576.96 | 0.3598 | 0.3955 |
| 2A | 2 | 3/30/2013 12:41 | 3 | 14488 | 4829.33 | 100.0% | 0.51176 | 0.21654 | 3768.06 | 9576.97 | 0.3935 | 0.3867 |
| 2A | 3 | 3/30/2013 12:33 | 3 | 14873 | 4957.67 | 99.4% | 0.51176 | 0.21541 | 3895.69 | 9576.97 | 0.4068 | 0.3840 |
| 2A | 4 | 3/30/2013 12:25 | 3 | 14469 | 4823.00 | 100.0% | 0.51176 | 0.21423 | 3773.02 | 9576.98 | 0.3940 | 0.3758 |
| 2A | 5 | 3/30/2013 12:18 | 3 | 14051 | 4683.67 | 100.0% | 0.51176 | 0.21325 | 3638.49 | 9576.98 | 0.3799 | 0.3647 |
| 2A | 6 | 3/30/2013 13:18 | 3 | 11610 | 3870.00 | 100.0% | 0.51176 | 0.22168 | 2783.51 | 9576.95 | 0.2906 | 0.3439 |
| 2A | 7 | 3/30/2013 13:10 | 3 | 13591 | 4530.33 | 100.0% | 0.51176 | 0.22059 | 3449.18 | 9576.96 | 0.3602 | 0.3341 |
| 2B | 1 | 3/30/2013 13:02 | 3 | 13529 | 4509.67 | 96.5% | 0.51601 | 0.21951 | 3385.45 | 9576.96 | 0.3535 | 0.3921 |
| 2B | 2 | 3/30/2013 12:55 | 3 | 14792 | 4930.67 | 100.0% | 0.51601 | 0.21853 | 3850.76 | 9576.96 | 0.4021 | 0.3843 |
| 2B | 3 | 3/30/2013 12:41 | 3 | 14576 | 4858.67 | 99.4% | 0.51601 | 0.21654 | 3782.28 | 9576.97 | 0.3949 | 0.3820 |
| 2B | 4 | 3/30/2013 12:33 | 3 | 14582 | 4860.67 | 100.0% | 0.51601 | 0.21541 | 3796.13 | 9576.97 | 0.3964 | 0.3747 |
| 2B | 5 | 3/30/2013 12:25 | 3 | 14089 | 4696.33 | 100.0% | 0.51601 | 0.21428 | 3637.42 | 9576.98 | 0.3798 | 0.3649 |
| 2B | 6 | 3/30/2013 12:18 | 3 | 11449 | 3816.33 | 100.0% | 0.51601 | 0.21327 | 2762.41 | 9576.98 | 0.2884 | 0.3465 |
| 2B | 7 | 3/30/2013 13:18 | 3 | 13840 | 4613.33 | 100.0% | 0.51601 | 0.22168 | 3517.82 | 9576.95 | 0.3673 | 0.3379 |
| 2C | 1 | 3/30/2013 13:10 | 3 | 13679 | 4559.67 | 96.5% | 0.51812 | 0.22059 | 3425.28 | 9576.96 | 0.3577 | 0.3937 |
| 2C | 2 | 3/30/2013 13:02 | 3 | 14707 | 4902.33 | 100.0% | 0.51812 | 0.21951 | 3813.12 | 9576.96 | 0.3982 | 0.3872 |
| 2C | 3 | 3/30/2013 12:55 | 3 | 14753 | 4917.67 | 99.4% | 0.51812 | 0.21853 | 3826.96 | 9576.96 | 0.3996 | 0.3853 |
| 2C | 4 | 3/30/2013 12:41 | 3 | 14853 | 4951.00 | 100.0% | 0.51812 | 0.21653 | 3876.57 | 9576.97 | 0.4048 | 0.3793 |
| 2C | 5 | 3/30/2013 12:33 | 3 | 14390 | 4796.67 | 100.0% | 0.51812 | 0.21541 | 3727.79 | 9576.97 | 0.3892 | 0.3712 |
| 2C | 6 | 3/30/2013 12:25 | 3 | 11397 | 3799.00 | 100.0% | 0.51812 | 0.21428 | 2735.76 | 9576.98 | 0.2857 | 0.3560 |
| 2C | 7 | 3/30/2013 12:18 | 3 | 14284 | 4761.33 | 100.0% | 0.51812 | 0.21329 | 3703.01 | 9576.98 | 0.3867 | 0.3489 |
| 2D | 1 | 3/30/2013 13:18 | 3 | 13865 | 4621.67 | 96.5% | 0.51988 | 0.22168 | 3477.80 | 9576.95 | 0.3631 | 0.3954 |
| 2D | 2 | 3/30/2013 13:10 | 3 | 14898 | 4966.00 | 100.0% | 0.51988 | 0.22059 | 3867.69 | 9576.96 | 0.4039 | 0.3870 |
| 2D | 3 | 3/30/2013 13:02 | 3 | 14524 | 4841.33 | 99.4% | 0.51988 | 0.21951 | 3741.99 | 9576.96 | 0.3907 | 0.3845 |
| 2D | 4 | 3/30/2013 12:55 | 3 | 14804 | 4934.67 | 100.0% | 0.51988 | 0.21853 | 3846.65 | 9576.96 | 0.4017 | 0.3768 |
| 2D | 5 | 3/30/2013 12:41 | 3 | 14073 | 4691.00 | 100.0% | 0.51988 | 0.21653 | 3612.91 | 9576.97 | 0.3772 | 0.3664 |
| 2D | 6 | 3/30/2013 12:33 | 3 | 11483 | 3827.67 | 100.0% | 0.51988 | 0.21541 | 2755.15 | 9576.97 | 0.2877 | 0.3469 |
| 2D | 7 | 3/30/2013 12:25 | 3 | 13847 | 4615.67 | 100.0% | 0.51988 | 0.21428 | 3548.81 | 9576.98 | 0.3706 | 0.3377 |
| 3A | 1 | 3/30/2013 12:21 | 3 | 13645 | 4548.33 | 96.5% | 0.53079 | 0.21370 | 3422.53 | 9576.98 | 0.3574 | 0.3908 |
| 3A | 2 | 3/30/2013 13:21 | 3 | 14564 | 4854.67 | 100.0% | 0.53079 | 0.22223 | 3725.02 | 9576.95 | 0.3890 | 0.3817 |
| 3A | 3 | 3/30/2013 13:14 | 3 | 14572 | 4857.33 | 99.4% | 0.53079 | 0.22116 | 3726.48 | 9576.96 | 0.3891 | 0.3790 |
| 3A | 4 | 3/30/2013 13:06 | 3 | 14839 | 4946.33 | 100.0% | 0.53079 | 0.22010 | 3827.48 | 9576.96 | 0.3997 | 0.3706 |
| 3A | 5 | 3/30/2013 12:58 | 3 | 14177 | 4725.67 | 100.0% | 0.53079 | 0.21896 | 3612.62 | 9576.96 | 0.3772 | 0.3594 |
| 3A | 6 | 3/30/2013 12:51 | 3 | 11303 | 3767.67 | 100.0% | 0.53079 | 0.21793 | 2659.65 | 9576.97 | 0.2777 | 0.3381 |
| 3A | 7 | 3/30/2013 12:37 | 3 | 13572 | 4524.00 | 100.0% | 0.53079 | 0.21601 | 3425.94 | 9576.97 | 0.3577 | 0.3282 |
| 3B | 1 | 3/30/2013 12:29 | 3 | 13621 | 4540.33 | 96.5% | 0.53063 | 0.21488 | 3408.64 | 9576.97 | 0.3559 | 0.3883 |
| 3B | 2 | 3/30/2013 12:21 | 3 | 14585 | 4861.67 | 100.0% | 0.53063 | 0.21370 | 3775.68 | 9576.98 | 0.3942 | 0.3805 |
| 3B | 3 | 3/30/2013 13:21 | 3 | 14415 | 4805.00 | 99.4% | 0.53063 | 0.22223 | 3669.05 | 9576.95 | 0.3831 | 0.3782 |
| 3B | 4 | 3/30/2013 13:14 | 3 | 14709 | 4903.00 | 100.0% | 0.53063 | 0.22116 | 3779.10 | 9576.96 | 0.3946 | 0.3710 |
| 3B | 5 | 3/30/2013 13:06 | 3 | 14272 | 4757.33 | 100.0% | 0.53063 | 0.22010 | 3638.81 | 9576.96 | 0.3800 | 0.3613 |
| 3B | 6 | 3/30/2013 12:58 | 3 | 11627 | 3875.67 | 100.0% | 0.53063 | 0.21894 | 2763.04 | 9576.96 | 0.2885 | 0.3431 |
| 3B | 7 | 3/30/2013 12:51 | 3 | 13584 | 4561.33 | 100.0% | 0.53063 | 0.21793 | 3453.64 | 9576.97 | 0.3606 | 0.3346 |
| 3C | 1 | 3/30/2013 12:37 | 3 | 14011 | 4670.33 | 96.5% | 0.53195 | 0.21601 | 3529.65 | 9576.97 | 0.3686 | 0.4047 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3C | 2 | 3/30/2013 12:29 | 3 | 15274 | 5091.33 | 100.0% | 0.53195 | 0.21488 | 3996.63 | 9576.97 | 0.4173 | 0.3956 |
| 3C | 3 | 3/30/2013 12:21 | 3 | 14723 | 4907.67 | 99.4% | 0.53195 | 0.21370 | 3812.58 | 9576.98 | 0.3981 | 0.3929 |
| 3C | 4 | 3/30/2013 13:21 | 3 | 15163 | 5054.33 | 100.0% | 0.53195 | 0.22223 | 3922.22 | 9576.95 | 0.4095 | 0.3846 |
| 3C | 5 | 3/30/2013 13:14 | 3 | 14420 | 4806.67 | 100.0% | 0.53195 | 0.22116 | 3679.97 | 9576.96 | 0.3843 | 0.3733 |
| 3C | 6 | 3/30/2013 13:06 | 3 | 11833 | 3944.33 | 100.0% | 0.53195 | 0.22010 | 2823.06 | 9576.96 | 0.2948 | 0.3520 |
| 3C | 7 | 3/30/2013 12:58 | 3 | 14051 | 4683.67 | 100.0% | 0.53195 | 0.21895 | 3568.26 | 9576.96 | 0.3726 | 0.3421 |
| 3D | 1 | 3/30/2013 12:51 | 3 | 13662 | 4554.00 | 96.5% | 0.52104 | 0.21793 | 3426.97 | 9576.97 | 0.3578 | 0.3947 |
| 3D | 2 | 3/30/2013 12:37 | 3 | 14617 | 4872.33 | 100.0% | 0.52104 | 0.21601 | 3794.43 | 9576.97 | 0.3962 | 0.3857 |
| 3D | 3 | 3/30/2013 12:29 | 3 | 14360 | 4786.67 | 99.4% | 0.52104 | 0.21488 | 3708.10 | 9576.97 | 0.3872 | 0.3830 |
| 3D | 4 | 3/30/2013 12:21 | 3 | 14989 | 4996.33 | 100.0% | 0.52104 | 0.21370 | 3929.97 | 9576.98 | 0.4104 | 0.3748 |
| 3D | 5 | 3/30/2013 13:21 | 3 | 14309 | 4769.67 | 100.0% | 0.52104 | 0.22222 | 3660.77 | 9576.95 | 0.3822 | 0.3636 |
| 3D | 6 | 3/30/2013 13:14 | 3 | 11533 | 3844.33 | 100.0% | 0.52104 | 0.22116 | 2740.74 | 9576.96 | 0.2862 | 0.3426 |
| 3D | 7 | 3/30/2013 13:06 | 3 | 13555 | 4518.33 | 100.0% | 0.52104 | 0.22010 | 3420.03 | 9576.96 | 0.3571 | 0.3328 |
| 4A | 1 | 3/30/2013 12:58 | 3 | 14023 | 4674.33 | 96.5% | 0.53002 | 0.21898 | 3522.35 | 9576.96 | 0.3678 | 0.4038 |
| 4A | 2 | 3/30/2013 12:51 | 3 | 14894 | 4964.67 | 100.0% | 0.53002 | 0.21794 | 3858.41 | 9576.97 | 0.4029 | 0.3945 |
| 4A | 3 | 3/30/2013 12:37 | 3 | 14985 | 4995.00 | 99.4% | 0.53002 | 0.21599 | 3892.19 | 9576.97 | 0.4064 | 0.3917 |
| 4A | 4 | 3/30/2013 12:30 | 3 | 15019 | 5006.33 | 100.0% | 0.53002 | 0.21491 | 3915.47 | 9576.97 | 0.4088 | 0.3832 |
| 4A | 5 | 3/30/2013 12:21 | 3 | 14476 | 4825.33 | 100.0% | 0.53002 | 0.21372 | 3740.47 | 9576.98 | 0.3906 | 0.3716 |
| 4A | 6 | 3/30/2013 13:21 | 3 | 11639 | 3879.67 | 100.0% | 0.53002 | 0.22220 | 2751.79 | 9576.95 | 0.2873 | 0.3499 |
| 4A | 7 | 3/30/2013 13:14 | 3 | 14014 | 4671.33 | 100.0% | 0.53002 | 0.22119 | 3548.59 | 9576.95 | 0.3705 | 0.3397 |
| 4B | 1 | 3/30/2013 13:06 | 3 | 13871 | 4623.67 | 96.5% | 0.53481 | 0.22006 | 3455.57 | 9576.96 | 0.3608 | 0.4026 |
| 4B | 2 | 3/30/2013 12:58 | 3 | 15191 | 5063.67 | 100.0% | 0.53481 | 0.21898 | 3942.07 | 9576.96 | 0.4116 | 0.3939 |
| 4B | 3 | 3/30/2013 12:51 | 3 | 15008 | 5002.67 | 99.4% | 0.53481 | 0.21794 | 3879.86 | 9576.97 | 0.4051 | 0.3913 |
| 4B | 4 | 3/30/2013 12:37 | 3 | 15000 | 5000.00 | 100.0% | 0.53481 | 0.21599 | 3893.74 | 9576.97 | 0.4066 | 0.3832 |
| 4B | 5 | 3/30/2013 12:30 | 3 | 14550 | 4850.00 | 100.0% | 0.53481 | 0.21490 | 3749.30 | 9576.97 | 0.3915 | 0.3722 |
| 4B | 6 | 3/30/2013 12:21 | 3 | 11562 | 3854.00 | 100.0% | 0.53481 | 0.21372 | 2759.36 | 9576.98 | 0.2881 | 0.3517 |
| 4B | 7 | 3/30/2013 13:21 | 3 | 14136 | 4712.00 | 100.0% | 0.53481 | 0.22220 | 3573.94 | 9576.95 | 0.3732 | 0.3421 |
| 4C | 1 | 3/30/2013 13:14 | 3 | 14091 | 4697.00 | 96.5% | 0.53734 | 0.22119 | 3517.34 | 9576.95 | 0.3673 | 0.4019 |
| 4C | 2 | 3/30/2013 13:06 | 3 | 15137 | 5045.67 | 100.0% | 0.53734 | 0.22006 | 3913.20 | 9576.96 | 0.4086 | 0.3939 |
| 4C | 3 | 3/30/2013 12:58 | 3 | 15020 | 5006.67 | 99.4% | 0.53734 | 0.21898 | 3873.12 | 9576.96 | 0.4044 | 0.3917 |
| 4C | 4 | 3/30/2013 12:51 | 3 | 15005 | 5001.67 | 100.0% | 0.53734 | 0.21794 | 3880.13 | 9576.97 | 0.4052 | 0.3848 |
| 4C | 5 | 3/30/2013 12:37 | 3 | 14581 | 4860.33 | 100.0% | 0.53734 | 0.21599 | 3748.83 | 9576.97 | 0.3914 | 0.3756 |
| 4C | 6 | 3/30/2013 12:30 | 3 | 11676 | 3892.00 | 100.0% | 0.53734 | 0.21490 | 2786.08 | 9576.97 | 0.2909 | 0.3582 |
| 4C | 7 | 3/30/2013 12:21 | 3 | 14439 | 4813.00 | 100.0% | 0.53734 | 0.21375 | 3713.00 | 9576.98 | 0.3877 | 0.3501 |
| 4D | 1 | 3/30/2013 13:21 | 3 | 13872 | 4624.00 | 96.5% | 0.53162 | 0.22220 | 3451.58 | 9576.95 | 0.3604 | 0.3956 |
| 4D | 2 | 3/30/2013 13:14 | 3 | 15024 | 5008.00 | 100.0% | 0.53162 | 0.22119 | 3881.66 | 9576.95 | 0.4053 | 0.3870 |
| 4D | 3 | 3/30/2013 13:06 | 3 | 14688 | 4896.00 | 99.4% | 0.53162 | 0.22006 | 3769.01 | 9576.96 | 0.3935 | 0.3844 |
| 4D | 4 | 3/30/2013 12:58 | 3 | 14941 | 4980.33 | 100.0% | 0.53162 | 0.21899 | 3865.41 | 9576.96 | 0.4036 | 0.3765 |
| 4D | 5 | 3/30/2013 12:51 | 3 | 14023 | 4674.33 | 100.0% | 0.53162 | 0.21794 | 3564.75 | 9576.97 | 0.3722 | 0.3658 |
| 4D | 6 | 3/30/2013 12:37 | 3 | 11509 | 3836.33 | 100.0% | 0.53162 | 0.21599 | 2736.67 | 9576.97 | 0.2858 | 0.3457 |
| 4D | 7 | 3/30/2013 12:30 | 3 | 13924 | 4641.33 | 100.0% | 0.53162 | 0.21490 | 3547.19 | 9576.97 | 0.3704 | 0.3363 |
| 5A | 1 | 3/30/2013 13:25 | 3 | 14335 | 4778.33 | 96.5% | 0.53718 | 0.22270 | 3590.98 | 9576.95 | 0.3750 | 0.4129 |
| 5A | 2 | 3/30/2013 14:15 | 3 | 15370 | 5123.33 | 100.0% | 0.53718 | 0.22970 | 3941.61 | 9576.93 | 0.4116 | 0.4010 |
| 5A | 3 | 3/30/2013 14:07 | 3 | 15373 | 5124.33 | 99.4% | 0.53718 | 0.22864 | 3941.17 | 9576.93 | 0.4115 | 0.3974 |
| 5A | 4 | 3/30/2013 14:00 | 3 | 15258 | 5086.00 | 100.0% | 0.53718 | 0.22766 | 3914.80 | 9576.93 | 0.4088 | 0.3863 |
| 5A | 5 | 3/30/2013 13:53 | 3 | 14748 | 4916.00 | 100.0% | 0.53718 | 0.22668 | 3749.83 | 9576.94 | 0.3915 | 0.3714 |
| 5A | 6 | 3/30/2013 13:47 | 3 | 11926 | 3975.33 | 100.0% | 0.53718 | 0.22573 | 2814.04 | 9576.94 | 0.2938 | 0.3434 |
| 5A | 7 | 3/30/2013 13:40 | 3 | 13537 | 4512.33 | 100.0% | 0.53718 | 0.22477 | 3356.01 | 9576.94 | 0.3504 | 0.3302 |
| 5B | 1 | 3/30/2013 13:32 | 3 | 14174 | 4724.67 | 96.5% | 0.53788 | 0.22367 | 3530.60 | 9576.95 | 0.3687 | 0.4096 |
| 5B | 2 | 3/30/2013 13:25 | 3 | 15365 | 5121.67 | 100.0% | 0.53788 | 0.22270 | 3974.51 | 9576.95 | 0.4150 | 0.3982 |
| 5B | 3 | 3/30/2013 14:15 | 3 | 15151 | 5050.33 | 99.4% | 0.53788 | 0.22966 | 3860.34 | 9576.93 | 0.4031 | 0.3947 |
| 5B | 4 | 3/30/2013 14:07 | 3 | 15253 | 5084.33 | 100.0% | 0.53788 | 0.22864 | 3906.57 | 9576.93 | 0.4079 | 0.3841 |
| 5B | 5 | 3/30/2013 14:00 | 3 | 14820 | 4940.00 | 100.0% | 0.53788 | 0.22763 | 3767.44 | 9576.93 | 0.3934 | 0.3698 |
| 5B | 6 | 3/30/2013 13:53 | 3 | 11897 | 3965.67 | 100.0% | 0.53788 | 0.22668 | 2797.98 | 9576.94 | 0.2922 | 0.3429 |
| 5B | 7 | 3/30/2013 13:47 | 3 | 13533 | 4511.00 | 100.0% | 0.53788 | 0.22582 | 3347.73 | 9576.94 | 0.3496 | 0.3303 |
| 5C | 1 | 3/30/2013 13:39 | 3 | 14333 | 4777.67 | 96.5% | 0.53909 | 0.22471 | 3575.31 | 9576.94 | 0.3733 | 0.4156 |
| 5C | 2 | 3/30/2013 13:32 | 3 | 15507 | 5169.00 | 100.0% | 0.53909 | 0.22367 | 4014.22 | 9576.95 | 0.4192 | 0.4019 |
| 5C | 3 | 3/30/2013 13:25 | 3 | 15162 | 5054.00 | 99.4% | 0.53909 | 0.22270 | 3897.48 | 9576.95 | 0.4070 | 0.3978 |
| 5C | 4 | 3/30/2013 14:15 | 3 | 15436 | 5145.33 | 100.0% | 0.53909 | 0.22966 | 3959.63 | 9576.93 | 0.4135 | 0.3850 |
| 5C | 5 | 3/30/2013 14:07 | 3 | 14618 | 4872.67 | 100.0% | 0.53909 | 0.22854 | 3692.76 | 9576.93 | 0.3856 | 0.3677 |
| 5C | 6 | 3/30/2013 14:00 | 3 | 11698 | 3899.33 | 100.0% | 0.53909 | 0.22763 | 2724.11 | 9576.93 | 0.2844 | 0.3351 |
| 5C | 7 | 3/30/2013 13:54 | 3 | 13285 | 4428.33 | 100.0% | 0.53909 | 0.22673 | 3257.78 | 9576.94 | 0.3402 | 0.3199 |
| 5D | 1 | 3/30/2013 13:47 | 3 | 14052 | 4684.00 | 96.5% | 0.53831 | 0.22582 | 3477.46 | 9576.94 | 0.3631 | 0.4061 |
| 5D | 2 | 3/30/2013 13:39 | 3 | 15099 | 5033.00 | 100.0% | 0.53831 | 0.22471 | 3874.51 | 9576.94 | 0.4046 | 0.3938 |
| 5D | 3 | 3/30/2013 13:32 | 3 | 14907 | 4969.00 | 99.4% | 0.53831 | 0.22366 | 3809.14 | 9576.95 | 0.3977 | 0.3901 |
| 5D | 4 | 3/30/2013 13:25 | 3 | 15249 | 5083.00 | 100.0% | 0.53831 | 0.22270 | 3934.92 | 9576.95 | 0.4109 | 0.3788 |
| 5D | 5 | 3/30/2013 14:15 | 3 | 14837 | 4945.67 | 100.0% | 0.53831 | 0.22966 | 3761.66 | 9576.93 | 0.3928 | 0.3634 |
| 5D | 6 | 3/30/2013 14:07 | 3 | 11545 | 3848.33 | 100.0% | 0.53831 | 0.22854 | 2670.13 | 9576.93 | 0.2788 | 0.3346 |
| 5D | 7 | 3/30/2013 14:00 | 3 | 13288 | 4429.33 | 100.0% | 0.53831 | 0.22763 | 3255.82 | 9576.93 | 0.3400 | 0.3211 |
| 6A | 1 | 3/30/2013 13:54 | 3 | 13113 | 4371.00 | 96.5% | 0.47877 | 0.22672 | 3293.68 | 9576.94 | 0.3439 | 0.3692 |
| 6A | 2 | 3/30/2013 13:47 | 3 | 14330 | 4776.67 | 100.0% | 0.47877 | 0.22582 | 3741.28 | 9576.94 | 0.3907 | 0.3766 |
| 6A | 3 | 3/30/2013 13:39 | 3 | 14044 | 4681.33 | 99.4% | 0.47877 | 0.22473 | 3644.85 | 9576.94 | 0.3806 | 0.3728 |
| 6A | 4 | 3/30/2013 13:32 | 3 | 14336 | 4778.67 | 100.0% | 0.47877 | 0.22367 | 3753.12 | 9576.95 | 0.3919 | 0.3612 |
| 6A | 5 | 3/30/2013 13:25 | 3 | 13718 | 4572.67 | 100.0% | 0.47877 | 0.22273 | 3551.44 | 9576.95 | 0.3708 | 0.3455 |
| 6A | 6 | 3/30/2013 14:15 | 3 | 11049 | 3683.00 | 100.0% | 0.47877 | 0.22954 | 2630.07 | 9576.93 | 0.2746 | 0.3159 |
| 6A | 7 | 3/30/2013 14:07 | 3 | 12072 | 4024.00 | 100.0% | 0.47877 | 0.22860 | 2975.83 | 9576.93 | 0.3107 | 0.3021 |
| 6B | 1 | 3/30/2013 14:00 | 3 | 12617 | 4205.67 | 96.5% | 0.44887 | 0.22766 | 3191.42 | 9576.93 | 0.3332 | 0.3740 |
| 6B | 2 | 3/30/2013 13:54 | 3 | 13913 | 4637.67 | 100.0% | 0.44887 | 0.22673 | 3662.97 | 9576.94 | 0.3825 | 0.3632 |
| 6B | 3 | 3/30/2013 13:46 | 3 | 13094 | 4364.67 | 99.4% | 0.44887 | 0.22573 | 3388.60 | 9576.94 | 0.3538 | 0.3600 |
| 6B | 4 | 3/30/2013 13:39 | 3 | 13831 | 4610.33 | 100.0% | 0.44887 | 0.22473 | 3644.24 | 9576.94 | 0.3805 | 0.3500 |
| 6B | 5 | 3/30/2013 13:32 | 3 | 13414 | 4471.33 | 100.0% | 0.44887 | 0.22371 | 3509.65 | 9576.95 | 0.3665 | 0.3366 |
| 6B | 6 | 3/30/2013 13:25 | 3 | 10672 | 3557.33 | 100.0% | 0.44887 | 0.22272 | 2599.89 | 9576.95 | 0.2715 | 0.3112 |
| 6B | 7 | 3/30/2013 14:15 | 3 | 11765 | 3921.67 | 100.0% | 0.44887 | 0.22969 | 2934.25 | 9576.93 | 0.3064 | 0.2994 |
| 6C | 1 | 3/30/2013 14:07 | 3 | 14081 | 4693.67 | 96.5% | 0.51012 | 0.22860 | 3536.25 | 9576.93 | 0.3692 | 0.4020 |
| 6C | 2 | 3/30/2013 14:00 | 3 | 14961 | 4987.00 | 100.0% | 0.51012 | 0.22766 | 3874.82 | 9576.93 | 0.4046 | 0.3932 |
| 6C | 3 | 3/30/2013 13:53 | 3 | 15089 | 5029.67 | 99.4% | 0.51012 | 0.22668 | 3915.76 | 9576.94 | 0.4089 | 0.3905 |
| 6C | 4 | 3/30/2013 13:46 | 3 | 14784 | 4928.00 | 100.0% | 0.51012 | 0.22573 | 3825.24 | 9576.94 | 0.3994 | 0.3823 |
| 6C | 5 | 3/30/2013 13:39 | 3 | 14305 | 4768.33 | 100.0% | 0.51012 | 0.22473 | 3670.43 | 9576.94 | 0.3833 | 0.3713 |
| 6C | 6 | 3/30/2013 13:32 | 3 | 11626 | 3875.33 | 100.0% | 0.51012 | 0.22371 | 2782.44 | 9576.95 | 0.2905 | 0.3505 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6C | 7 | 3/30/2013 13:25 | 3 | 14025 | 4675.00 | 100.0% | 0.51012 | 0.22272 | 3586.91 | 9576.95 | 0.3745 | 0.3407 |
| 6D | 1 | 3/30/2013 14:15 | 3 | 12095 | 4031.67 | 96.5% | 0.45548 | 0.22969 | 2993.29 | 9576.93 | 0.3126 | 0.3433 |
| 6D | 2 | 3/30/2013 14:07 | 3 | 12930 | 4310.00 | 100.0% | 0.45548 | 0.22860 | 3312.81 | 9576.93 | 0.3459 | 0.3355 |
| 6D | 3 | 3/30/2013 14:00 | 3 | 12868 | 4289.33 | 99.4% | 0.45548 | 0.22765 | 3290.45 | 9576.93 | 0.3436 | 0.3332 |
| 6D | 4 | 3/30/2013 13:53 | 3 | 12981 | 4327.00 | 100.0% | 0.45548 | 0.22667 | 3338.24 | 9576.94 | 0.3486 | 0.3260 |
| 6D | 5 | 3/30/2013 13:46 | 3 | 12417 | 4139.00 | 100.0% | 0.45548 | 0.22573 | 3154.36 | 9576.94 | 0.3294 | 0.3164 |
| 6D | 6 | 3/30/2013 13:39 | 3 | 9991 | 3330.33 | 100.0% | 0.45548 | 0.22473 | 2350.04 | 9576.94 | 0.2454 | 0.2982 |
| 6D | 7 | 3/30/2013 13:32 | 3 | 12032 | 4010.67 | 100.0% | 0.45548 | 0.22371 | 3034.84 | 9576.95 | 0.3169 | 0.2897 |
| 7A | 1 | 3/30/2013 13:28 | 3 | 14545 | 4848.33 | 96.5% | 0.53735 | 0.22316 | 3658.13 | 9576.95 | 0.3820 | 0.4141 |
| 7A | 2 | 3/30/2013 14:18 | 3 | 15303 | 5101.00 | 100.0% | 0.53735 | 0.23017 | 3916.52 | 9576.93 | 0.4090 | 0.4013 |
| 7A | 3 | 3/30/2013 14:11 | 3 | 15303 | 5101.00 | 99.4% | 0.53735 | 0.22917 | 3914.70 | 9576.93 | 0.4088 | 0.3975 |
| 7A | 4 | 3/30/2013 14:04 | 3 | 15216 | 5072.00 | 100.0% | 0.53735 | 0.22812 | 3898.05 | 9576.93 | 0.4070 | 0.3857 |
| 7A | 5 | 3/30/2013 13:57 | 3 | 14738 | 4912.67 | 100.0% | 0.53735 | 0.22716 | 3743.65 | 9576.94 | 0.3909 | 0.3697 |
| 7A | 6 | 3/30/2013 13:50 | 3 | 11695 | 3898.33 | 100.0% | 0.53735 | 0.22622 | 2734.17 | 9576.94 | 0.2855 | 0.3396 |
| 7A | 7 | 3/30/2013 13:43 | 3 | 13540 | 4513.33 | 100.0% | 0.53735 | 0.22523 | 3354.28 | 9576.94 | 0.3502 | 0.3255 |
| 7B | 1 | 3/30/2013 13:36 | 3 | 14155 | 4718.33 | 96.5% | 0.53953 | 0.22424 | 3517.55 | 9576.95 | 0.3673 | 0.4106 |
| 7B | 2 | 3/30/2013 13:28 | 3 | 15340 | 5113.33 | 100.0% | 0.53953 | 0.22316 | 3960.24 | 9576.95 | 0.4135 | 0.3972 |
| 7B | 3 | 3/30/2013 14:18 | 3 | 15172 | 5057.33 | 99.4% | 0.53953 | 0.23010 | 3861.38 | 9576.93 | 0.4032 | 0.3932 |
| 7B | 4 | 3/30/2013 14:11 | 3 | 15304 | 5101.33 | 100.0% | 0.53953 | 0.22917 | 3917.19 | 9576.93 | 0.4090 | 0.3808 |
| 7B | 5 | 3/30/2013 14:03 | 3 | 14547 | 4849.00 | 100.0% | 0.53953 | 0.22808 | 3670.51 | 9576.93 | 0.3833 | 0.3641 |
| 7B | 6 | 3/30/2013 13:57 | 3 | 11731 | 3910.33 | 100.0% | 0.53953 | 0.22716 | 2736.58 | 9576.94 | 0.2857 | 0.3327 |
| 7B | 7 | 3/30/2013 13:50 | 3 | 13123 | 4374.33 | 100.0% | 0.53953 | 0.22626 | 3205.23 | 9576.94 | 0.3347 | 0.3180 |
| 7C | 1 | 3/30/2013 13:43 | 3 | 14289 | 4763.00 | 96.5% | 0.53213 | 0.22523 | 3573.45 | 9576.94 | 0.3731 | 0.4137 |
| 7C | 2 | 3/30/2013 13:36 | 3 | 15396 | 5132.00 | 100.0% | 0.53213 | 0.22424 | 3989.24 | 9576.95 | 0.4165 | 0.4006 |
| 7C | 3 | 3/30/2013 13:28 | 3 | 15144 | 5048.00 | 99.4% | 0.53213 | 0.22316 | 3904.02 | 9576.95 | 0.4076 | 0.3967 |
| 7C | 4 | 3/30/2013 14:18 | 3 | 15243 | 5081.00 | 100.0% | 0.53213 | 0.23010 | 3908.34 | 9576.93 | 0.4081 | 0.3846 |
| 7C | 5 | 3/30/2013 14:11 | 3 | 14647 | 4882.33 | 100.0% | 0.53213 | 0.22918 | 3714.40 | 9576.93 | 0.3878 | 0.3682 |
| 7C | 6 | 3/30/2013 14:03 | 3 | 11785 | 3928.33 | 100.0% | 0.53213 | 0.22808 | 2765.98 | 9576.93 | 0.2888 | 0.3375 |
| 7C | 7 | 3/30/2013 13:57 | 3 | 13310 | 4436.67 | 100.0% | 0.53213 | 0.22716 | 3279.00 | 9576.94 | 0.3424 | 0.3232 |
| 7D | 1 | 3/30/2013 13:50 | 3 | 14208 | 4736.00 | 96.5% | 0.53666 | 0.22626 | 3530.81 | 9576.94 | 0.3687 | 0.4092 |
| 7D | 2 | 3/30/2013 13:43 | 3 | 15261 | 5087.00 | 100.0% | 0.53666 | 0.22523 | 3929.42 | 9576.94 | 0.4103 | 0.3960 |
| 7D | 3 | 3/30/2013 13:36 | 3 | 14845 | 4948.33 | 99.4% | 0.53666 | 0.22424 | 3789.07 | 9576.95 | 0.3956 | 0.3920 |
| 7D | 4 | 3/30/2013 13:28 | 3 | 15230 | 5076.67 | 100.0% | 0.53666 | 0.22317 | 3929.68 | 9576.95 | 0.4103 | 0.3798 |
| 7D | 5 | 3/30/2013 14:18 | 3 | 14768 | 4922.67 | 100.0% | 0.53666 | 0.23011 | 3740.01 | 9576.93 | 0.3905 | 0.3632 |
| 7D | 6 | 3/30/2013 14:11 | 3 | 11438 | 3812.67 | 100.0% | 0.53666 | 0.22918 | 2634.79 | 9576.93 | 0.2751 | 0.3322 |
| 7D | 7 | 3/30/2013 14:03 | 3 | 13266 | 4422.00 | 100.0% | 0.53666 | 0.22808 | 3249.75 | 9576.93 | 0.3393 | 0.3176 |
| 8A | 1 | 3/30/2013 13:57 | 3 | 13895 | 4631.67 | 96.5% | 0.52553 | 0.22719 | 3446.66 | 9576.94 | 0.3599 | 0.4057 |
| 8A | 2 | 3/30/2013 13:50 | 3 | 14992 | 4997.33 | 100.0% | 0.52553 | 0.22628 | 3858.47 | 9576.94 | 0.4029 | 0.3905 |
| 8A | 3 | 3/30/2013 13:43 | 3 | 14765 | 4921.67 | 99.4% | 0.52553 | 0.22519 | 3781.62 | 9576.94 | 0.3949 | 0.3859 |
| 8A | 4 | 3/30/2013 13:36 | 3 | 15068 | 5022.67 | 100.0% | 0.52553 | 0.22427 | 3893.92 | 9576.95 | 0.4066 | 0.3718 |
| 8A | 5 | 3/30/2013 13:28 | 3 | 14209 | 4736.33 | 100.0% | 0.52553 | 0.22320 | 3612.98 | 9576.95 | 0.3773 | 0.3527 |
| 8A | 6 | 3/30/2013 14:18 | 3 | 11132 | 3710.67 | 100.0% | 0.52553 | 0.23013 | 2552.44 | 9576.93 | 0.2665 | 0.3168 |
| 8A | 7 | 3/30/2013 14:12 | 3 | 12521 | 4173.67 | 100.0% | 0.52553 | 0.22923 | 3019.94 | 9576.93 | 0.3153 | 0.3000 |
| 8B | 1 | 3/30/2013 14:04 | 3 | 13736 | 4578.67 | 96.5% | 0.51282 | 0.22811 | 3417.63 | 9576.93 | 0.3569 | 0.4011 |
| 8B | 2 | 3/30/2013 13:57 | 3 | 14887 | 4962.33 | 100.0% | 0.51282 | 0.22719 | 3846.56 | 9576.94 | 0.4016 | 0.3886 |
| 8B | 3 | 3/30/2013 13:50 | 3 | 14532 | 4844.00 | 99.4% | 0.51282 | 0.22621 | 3726.50 | 9576.94 | 0.3891 | 0.3848 |
| 8B | 4 | 3/30/2013 13:43 | 3 | 14897 | 4965.67 | 100.0% | 0.51282 | 0.22519 | 3859.69 | 9576.94 | 0.4030 | 0.3732 |
| 8B | 5 | 3/30/2013 13:36 | 3 | 14465 | 4821.67 | 100.0% | 0.51282 | 0.22427 | 3720.21 | 9576.95 | 0.3885 | 0.3576 |
| 8B | 6 | 3/30/2013 13:28 | 3 | 11620 | 3873.33 | 100.0% | 0.51282 | 0.22320 | 2777.15 | 9576.95 | 0.2900 | 0.3283 |
| 8B | 7 | 3/30/2013 14:18 | 3 | 12555 | 4185.00 | 100.0% | 0.51282 | 0.23015 | 3054.66 | 9576.93 | 0.3190 | 0.3145 |
| 8C | 1 | 3/30/2013 14:12 | 3 | 14553 | 4851.00 | 96.5% | 0.53584 | 0.22923 | 3631.87 | 9576.93 | 0.3792 | 0.4099 |
| 8C | 2 | 3/30/2013 14:04 | 3 | 15356 | 5118.67 | 100.0% | 0.53584 | 0.22811 | 3948.07 | 9576.93 | 0.4122 | 0.3991 |
| 8C | 3 | 3/30/2013 13:57 | 3 | 14984 | 4994.67 | 99.4% | 0.53584 | 0.22717 | 3822.04 | 9576.94 | 0.3991 | 0.3958 |
| 8C | 4 | 3/30/2013 13:50 | 3 | 15283 | 5094.33 | 100.0% | 0.53584 | 0.22621 | 3933.50 | 9576.94 | 0.4107 | 0.3858 |
| 8C | 5 | 3/30/2013 13:43 | 3 | 14518 | 4839.33 | 100.0% | 0.53584 | 0.22519 | 3683.72 | 9576.94 | 0.3846 | 0.3723 |
| 8C | 6 | 3/30/2013 13:36 | 3 | 12272 | 4090.67 | 100.0% | 0.53584 | 0.22427 | 2939.76 | 9576.95 | 0.3070 | 0.3468 |
| 8C | 7 | 3/30/2013 13:28 | 3 | 13541 | 4513.67 | 100.0% | 0.53584 | 0.22320 | 3368.29 | 9576.95 | 0.3517 | 0.3349 |
| 8D | 1 | 3/30/2013 14:18 | 3 | 14393 | 4797.67 | 96.5% | 0.54197 | 0.23015 | 3559.64 | 9576.93 | 0.3717 | 0.4137 |
| 8D | 2 | 3/30/2013 14:12 | 3 | 15368 | 5122.67 | 100.0% | 0.54197 | 0.22923 | 3932.84 | 9576.93 | 0.4107 | 0.4025 |
| 8D | 3 | 3/30/2013 14:04 | 3 | 15551 | 5183.67 | 99.4% | 0.54197 | 0.22810 | 3992.74 | 9576.93 | 0.4169 | 0.3992 |
| 8D | 4 | 3/30/2013 13:57 | 3 | 15442 | 5147.33 | 100.0% | 0.54197 | 0.22717 | 3968.22 | 9576.94 | 0.4144 | 0.3888 |
| 8D | 5 | 3/30/2013 13:50 | 3 | 14977 | 4992.33 | 100.0% | 0.54197 | 0.22620 | 3818.24 | 9576.94 | 0.3987 | 0.3749 |
| 8D | 6 | 3/30/2013 13:43 | 3 | 11985 | 3995.00 | 100.0% | 0.54197 | 0.22519 | 2826.18 | 9576.94 | 0.2951 | 0.3486 |
| 8D | 7 | 3/30/2013 13:36 | 3 | 13737 | 4579.00 | 100.0% | 0.54197 | 0.22427 | 3414.94 | 9576.95 | 0.3566 | 0.3363 |
| 9A | 1 | 3/30/2013 14:22 | 3 | 14571 | 4857.00 | 96.5% | 0.53774 | 0.23062 | 3626.15 | 9576.93 | 0.3786 | 0.4201 |
| 9A | 2 | 3/30/2013 15:14 | 3 | 15738 | 5246.00 | 100.0% | 0.53774 | 0.23789 | 4020.87 | 9576.90 | 0.4199 | 0.4045 |
| 9A | 3 | 3/30/2013 15:07 | 3 | 15197 | 5065.67 | 99.4% | 0.53774 | 0.23689 | 3838.56 | 9576.91 | 0.4008 | 0.3999 |
| 9A | 4 | 3/30/2013 14:57 | 3 | 15737 | 5245.67 | 100.0% | 0.53774 | 0.23556 | 4032.58 | 9576.91 | 0.4211 | 0.3855 |
| 9A | 5 | 3/30/2013 14:50 | 3 | 14772 | 4924.00 | 100.0% | 0.53774 | 0.23457 | 3715.98 | 9576.91 | 0.3880 | 0.3660 |
| 9A | 6 | 3/30/2013 14:42 | 3 | 11700 | 3900.00 | 100.0% | 0.53774 | 0.23349 | 2697.54 | 9576.92 | 0.2817 | 0.3294 |
| 9A | 7 | 3/30/2013 14:35 | 3 | 13004 | 4334.67 | 100.0% | 0.53774 | 0.23253 | 3137.16 | 9576.92 | 0.3276 | 0.3123 |
| 9B | 1 | 3/30/2013 14:28 | 3 | 14063 | 4687.67 | 96.5% | 0.52675 | 0.23155 | 3477.09 | 9576.92 | 0.3631 | 0.4037 |
| 9B | 2 | 3/30/2013 14:22 | 3 | 14946 | 4982.00 | 100.0% | 0.52675 | 0.23063 | 3818.55 | 9576.93 | 0.3987 | 0.3890 |
| 9B | 3 | 3/30/2013 15:15 | 3 | 14825 | 4941.67 | 99.4% | 0.52675 | 0.23795 | 3734.25 | 9576.90 | 0.3899 | 0.3846 |
| 9B | 4 | 3/30/2013 15:07 | 3 | 15236 | 5078.67 | 100.0% | 0.52675 | 0.23692 | 3883.52 | 9576.91 | 0.4055 | 0.3709 |
| 9B | 5 | 3/30/2013 14:57 | 3 | 14428 | 4809.33 | 100.0% | 0.52675 | 0.23552 | 3621.23 | 9576.91 | 0.3781 | 0.3525 |
| 9B | 6 | 3/30/2013 14:50 | 3 | 11183 | 3727.67 | 100.0% | 0.52675 | 0.23460 | 2544.19 | 9576.91 | 0.2657 | 0.3178 |
| 9B | 7 | 3/30/2013 14:43 | 3 | 12700 | 4233.33 | 100.0% | 0.52675 | 0.23354 | 3055.23 | 9576.92 | 0.3190 | 0.3016 |
| 9C | 1 | 3/30/2013 14:35 | 3 | 14218 | 4739.33 | 96.5% | 0.53222 | 0.23248 | 3511.30 | 9576.92 | 0.3666 | 0.4182 |
| 9C | 2 | 3/30/2013 14:28 | 3 | 15402 | 5134.00 | 100.0% | 0.53222 | 0.23156 | 3953.74 | 9576.92 | 0.4128 | 0.4000 |
| 9C | 3 | 3/30/2013 14:21 | 3 | 15296 | 5098.67 | 99.4% | 0.53222 | 0.23057 | 3916.53 | 9576.93 | 0.4090 | 0.3945 |
| 9C | 4 | 3/30/2013 15:15 | 3 | 15315 | 5105.00 | 100.0% | 0.53222 | 0.23795 | 3892.16 | 9576.90 | 0.4064 | 0.3776 |
| 9C | 5 | 3/30/2013 15:07 | 3 | 14853 | 4951.00 | 100.0% | 0.53222 | 0.23692 | 3743.42 | 9576.91 | 0.3909 | 0.3548 |
| 9C | 6 | 3/30/2013 14:57 | 3 | 10978 | 3659.33 | 100.0% | 0.53222 | 0.23552 | 2458.88 | 9576.91 | 0.2568 | 0.3119 |
| 9C | 7 | 3/30/2013 14:50 | 3 | 12385 | 4128.33 | 100.0% | 0.53222 | 0.23460 | 2932.54 | 9576.91 | 0.3062 | 0.2918 |
| 9D | 1 | 3/30/2013 14:43 | 3 | 13987 | 4662.33 | 96.5% | 0.51007 | 0.23353 | 3480.06 | 9576.92 | 0.3634 | 0.4105 |
| 9D | 2 | 3/30/2013 14:35 | 3 | 15196 | 5065.33 | 100.0% | 0.51007 | 0.23248 | 3929.71 | 9576.92 | 0.4103 | 0.3933 |
| 9D | 3 | 3/30/2013 14:28 | 3 | 14760 | 4920.00 | 99.4% | 0.51007 | 0.23156 | 3782.21 | 9576.92 | 0.3949 | 0.3882 |
| 9D | 4 | 3/30/2013 14:21 | 3 | 14958 | 4986.00 | 100.0% | 0.51007 | 0.23057 | 3859.69 | 9576.93 | 0.4030 | 0.3723 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9D | 5 | 3/30/2013 15:15 | 3 | 14493 | 4831.00 | 100.0% | 0.51007 | 0.23795 | 3668.64 | 9576.90 | 0.3831 | 0.3509 |
| 9D | 6 | 3/30/2013 15:07 | 3 | 10632 | 3544.00 | 100.0% | 0.51007 | 0.23691 | 2385.70 | 9576.91 | 0.2492 | 0.3105 |
| 9D | 7 | 3/30/2013 14:57 | 3 | 12459 | 4153.00 | 100.0% | 0.51007 | 0.23552 | 3002.50 | 9576.91 | 0.3135 | 0.2917 |
| 10A | 1 | 3/30/2013 14:50 | 3 | 14585 | 4861.67 | 96.5% | 0.53055 | 0.23461 | 3626.29 | 9576.91 | 0.3786 | 0.4169 |
| 10A | 2 | 3/30/2013 14:43 | 3 | 15225 | 5075.00 | 100.0% | 0.53055 | 0.23354 | 3888.38 | 9576.92 | 0.4060 | 0.3995 |
| 10A | 3 | 3/30/2013 14:35 | 3 | 15080 | 5026.67 | 99.4% | 0.53055 | 0.23248 | 3838.51 | 9576.92 | 0.4008 | 0.3943 |
| 10A | 4 | 3/30/2013 14:28 | 3 | 15107 | 5035.67 | 100.0% | 0.53055 | 0.23156 | 3859.11 | 9576.92 | 0.4030 | 0.3782 |
| 10A | 5 | 3/30/2013 14:21 | 3 | 14855 | 4951.67 | 100.0% | 0.53055 | 0.23058 | 3780.08 | 9576.93 | 0.3947 | 0.3565 |
| 10A | 6 | 3/30/2013 15:15 | 3 | 11188 | 3729.33 | 100.0% | 0.53055 | 0.23795 | 2520.29 | 9576.90 | 0.2632 | 0.3156 |
| 10A | 7 | 3/30/2013 15:07 | 3 | 12557 | 4185.67 | 100.0% | 0.53055 | 0.23692 | 2981.89 | 9576.91 | 0.3114 | 0.2965 |
| 10B | 1 | 3/30/2013 14:57 | 3 | 14134 | 4711.33 | 96.5% | 0.52680 | 0.23556 | 3479.69 | 9576.91 | 0.3633 | 0.4101 |
| 10B | 2 | 3/30/2013 14:50 | 3 | 15177 | 5059.00 | 100.0% | 0.52680 | 0.23457 | 3875.59 | 9576.91 | 0.4047 | 0.3940 |
| 10B | 3 | 3/30/2013 14:43 | 3 | 14709 | 4903.00 | 99.4% | 0.52680 | 0.23354 | 3717.83 | 9576.92 | 0.3882 | 0.3692 |
| 10B | 4 | 3/30/2013 14:35 | 3 | 15366 | 5122.00 | 100.0% | 0.52680 | 0.23254 | 3948.80 | 9576.92 | 0.4123 | 0.3743 |
| 10B | 5 | 3/30/2013 14:29 | 3 | 14785 | 4928.33 | 100.0% | 0.52680 | 0.23160 | 3759.89 | 9576.92 | 0.3926 | 0.3542 |
| 10B | 6 | 3/30/2013 14:22 | 3 | 11381 | 3793.67 | 100.0% | 0.52680 | 0.23060 | 2630.24 | 9576.93 | 0.2746 | 0.3163 |
| 10B | 7 | 3/30/2013 15:14 | 3 | 12244 | 4081.33 | 100.0% | 0.52680 | 0.23789 | 2881.16 | 9576.90 | 0.3008 | 0.2986 |
| 10C | 1 | 3/30/2013 15:07 | 3 | 14391 | 4797.00 | 96.5% | 0.52915 | 0.23686 | 3552.94 | 9576.91 | 0.3710 | 0.4094 |
| 10C | 2 | 3/30/2013 14:57 | 3 | 15140 | 5046.67 | 100.0% | 0.52915 | 0.23556 | 3852.93 | 9576.91 | 0.4023 | 0.3955 |
| 10C | 3 | 3/30/2013 14:50 | 3 | 14971 | 4990.33 | 99.4% | 0.52915 | 0.23457 | 3794.65 | 9576.91 | 0.3962 | 0.3913 |
| 10C | 4 | 3/30/2013 14:42 | 3 | 15541 | 5180.33 | 100.0% | 0.52915 | 0.23350 | 3997.05 | 9576.92 | 0.4174 | 0.3784 |
| 10C | 5 | 3/30/2013 14:36 | 3 | 14457 | 4819.00 | 100.0% | 0.52915 | 0.23254 | 3640.56 | 9576.92 | 0.3801 | 0.3610 |
| 10C | 6 | 3/30/2013 14:29 | 3 | 11591 | 3863.67 | 100.0% | 0.52915 | 0.23159 | 2690.04 | 9576.92 | 0.2809 | 0.3262 |
| 10C | 7 | 3/30/2013 14:22 | 3 | 12946 | 4315.33 | 100.0% | 0.52915 | 0.23060 | 3146.72 | 9576.93 | 0.3286 | 0.3129 |
| 10D | 1 | 3/30/2013 15:14 | 3 | 14192 | 4730.67 | 96.5% | 0.53332 | 0.23789 | 3471.45 | 9576.90 | 0.3625 | 0.4099 |
| 10D | 2 | 3/30/2013 15:07 | 3 | 15388 | 5129.33 | 100.0% | 0.53332 | 0.23688 | 3919.44 | 9576.91 | 0.4093 | 0.3959 |
| 10D | 3 | 3/30/2013 14:57 | 3 | 15273 | 5091.00 | 99.4% | 0.53332 | 0.23556 | 3880.76 | 9576.91 | 0.4052 | 0.3916 |
| 10D | 4 | 3/30/2013 14:50 | 3 | 15258 | 5086.00 | 100.0% | 0.53332 | 0.23457 | 3887.93 | 9576.91 | 0.4060 | 0.3786 |
| 10D | 5 | 3/30/2013 14:42 | 3 | 14721 | 4907.00 | 100.0% | 0.53332 | 0.23350 | 3714.36 | 9576.92 | 0.3878 | 0.3610 |
| 10D | 6 | 3/30/2013 14:36 | 3 | 11720 | 3906.67 | 100.0% | 0.53332 | 0.23254 | 2718.92 | 9576.92 | 0.2839 | 0.3279 |
| 10D | 7 | 3/30/2013 14:29 | 3 | 12821 | 4273.67 | 100.0% | 0.53332 | 0.23160 | 3090.77 | 9576.92 | 0.3227 | 0.3124 |
| 11A | 1 | 3/30/2013 15:28 | 3 | 13341 | 4447.00 | 96.5% | 0.46775 | 0.23976 | 3333.90 | 9576.90 | 0.3481 | 0.3959 |
| 11A | 2 | 3/30/2013 15:31 | 3 | 14364 | 4788.00 | 100.0% | 0.46775 | 0.24023 | 3711.65 | 9576.90 | 0.3876 | 0.3772 |
| 11A | 3 | 3/30/2013 15:35 | 3 | 14259 | 4753.00 | 99.4% | 0.46775 | 0.24072 | 3668.31 | 9576.89 | 0.3830 | 0.3716 |
| 11A | 4 | 3/30/2013 15:38 | 3 | 14370 | 4790.00 | 100.0% | 0.46775 | 0.24121 | 3709.47 | 9576.89 | 0.3873 | 0.3543 |
| 11A | 5 | 3/30/2013 15:43 | 3 | 13698 | 4566.00 | 100.0% | 0.46775 | 0.24183 | 3482.71 | 9576.89 | 0.3637 | 0.3309 |
| 11A | 6 | 3/30/2013 15:47 | 3 | 9866 | 3288.67 | 100.0% | 0.46775 | 0.24234 | 2203.07 | 9576.89 | 0.2300 | 0.2870 |
| 11A | 7 | 3/30/2013 15:51 | 3 | 11413 | 3804.33 | 100.0% | 0.46775 | 0.24292 | 2715.15 | 9576.89 | 0.2836 | 0.2664 |
| 11B | 1 | 3/30/2013 15:54 | 3 | 14495 | 4831.67 | 96.5% | 0.53231 | 0.24340 | 3545.73 | 9576.88 | 0.3702 | 0.4201 |
| 11B | 2 | 3/30/2013 15:28 | 3 | 15572 | 5190.67 | 100.0% | 0.53231 | 0.23976 | 3968.40 | 9576.90 | 0.4144 | 0.4011 |
| 11B | 3 | 3/30/2013 15:31 | 3 | 15188 | 5062.67 | 99.4% | 0.53231 | 0.24024 | 3830.78 | 9576.90 | 0.4000 | 0.3953 |
| 11B | 4 | 3/30/2013 15:35 | 3 | 15612 | 5204.00 | 100.0% | 0.53231 | 0.24073 | 3976.79 | 9576.89 | 0.4152 | 0.3777 |
| 11B | 5 | 3/30/2013 15:39 | 3 | 14881 | 4960.33 | 100.0% | 0.53231 | 0.24122 | 3730.64 | 9576.89 | 0.3895 | 0.3539 |
| 11B | 6 | 3/30/2013 15:43 | 3 | 11037 | 3679.00 | 100.0% | 0.53231 | 0.24183 | 2446.17 | 9576.89 | 0.2554 | 0.3091 |
| 11B | 7 | 3/30/2013 15:47 | 3 | 12343 | 4114.33 | 100.0% | 0.53231 | 0.24235 | 2878.87 | 9576.89 | 0.3006 | 0.2882 |
| 11C | 1 | 3/30/2013 15:51 | 3 | 14267 | 4755.67 | 96.5% | 0.52945 | 0.24294 | 3479.05 | 9576.89 | 0.3633 | 0.4152 |
| 11C | 2 | 3/30/2013 15:55 | 3 | 15354 | 5118.00 | 100.0% | 0.52945 | 0.24341 | 3883.80 | 9576.88 | 0.4055 | 0.3956 |
| 11C | 3 | 3/30/2013 15:28 | 3 | 15138 | 5046.00 | 99.4% | 0.52945 | 0.23976 | 3823.14 | 9576.90 | 0.3992 | 0.3897 |
| 11C | 4 | 3/30/2013 15:31 | 3 | 15373 | 5124.33 | 100.0% | 0.52945 | 0.24025 | 3906.14 | 9576.89 | 0.4079 | 0.3716 |
| 11C | 5 | 3/30/2013 15:35 | 3 | 14902 | 4967.33 | 100.0% | 0.52945 | 0.24074 | 3746.66 | 9576.89 | 0.3912 | 0.3470 |
| 11C | 6 | 3/30/2013 15:39 | 3 | 10342 | 3447.33 | 100.0% | 0.52945 | 0.24123 | 2224.18 | 9576.89 | 0.2322 | 0.3009 |
| 11C | 7 | 3/30/2013 15:43 | 3 | 12297 | 4099.00 | 100.0% | 0.52945 | 0.24184 | 2872.74 | 9576.89 | 0.3000 | 0.2793 |
| 11D | 1 | 3/30/2013 15:47 | 3 | 14538 | 4846.00 | 96.5% | 0.53406 | 0.24237 | 3561.31 | 9576.89 | 0.3719 | 0.4230 |
| 11D | 2 | 3/30/2013 15:51 | 3 | 15591 | 5197.00 | 100.0% | 0.53406 | 0.24295 | 3954.43 | 9576.89 | 0.4129 | 0.4023 |
| 11D | 3 | 3/30/2013 15:55 | 3 | 15511 | 5170.33 | 99.4% | 0.53406 | 0.24342 | 3918.04 | 9576.88 | 0.4091 | 0.3961 |
| 11D | 4 | 3/30/2013 15:28 | 3 | 15573 | 5191.00 | 100.0% | 0.53406 | 0.23976 | 3964.73 | 9576.90 | 0.4140 | 0.3770 |
| 11D | 5 | 3/30/2013 15:32 | 3 | 14769 | 4923.00 | 100.0% | 0.53406 | 0.24026 | 3694.18 | 9576.89 | 0.3857 | 0.3512 |
| 11D | 6 | 3/30/2013 15:35 | 3 | 10450 | 3483.33 | 100.0% | 0.53406 | 0.24075 | 2252.00 | 9576.89 | 0.2351 | 0.3027 |
| 11D | 7 | 3/30/2013 15:39 | 3 | 12426 | 4142.00 | 100.0% | 0.53406 | 0.24124 | 2908.14 | 9576.89 | 0.3037 | 0.2800 |
| 13A | 1 | 3/30/2013 14:31 | 3 | 14517 | 4839.00 | 96.5% | 0.53002 | 0.23188 | 3619.17 | 9576.92 | 0.3779 | 0.4202 |
| 13A | 2 | 3/30/2013 15:25 | 3 | 15416 | 5138.67 | 100.0% | 0.53002 | 0.23932 | 3923.88 | 9576.90 | 0.4097 | 0.4041 |
| 13A | 3 | 3/30/2013 15:16 | 3 | 15553 | 5184.33 | 99.4% | 0.53002 | 0.23816 | 3968.33 | 9576.90 | 0.4144 | 0.3993 |
| 13A | 4 | 3/30/2013 15:09 | 3 | 15547 | 5182.33 | 100.0% | 0.53002 | 0.23718 | 3978.39 | 9576.90 | 0.4154 | 0.3844 |
| 13A | 5 | 3/30/2013 14:59 | 3 | 14769 | 4923.00 | 100.0% | 0.53002 | 0.23585 | 3725.83 | 9576.91 | 0.3890 | 0.3643 |
| 13A | 6 | 3/30/2013 14:53 | 3 | 11476 | 3825.33 | 100.0% | 0.53002 | 0.23491 | 2632.92 | 9576.91 | 0.2749 | 0.3266 |
| 13A | 7 | 3/30/2013 14:44 | 3 | 12935 | 4311.67 | 100.0% | 0.53002 | 0.23378 | 3125.02 | 9576.92 | 0.3263 | 0.3089 |
| 13B | 1 | 3/30/2013 14:37 | 3 | 14929 | 4976.33 | 96.5% | 0.54385 | 0.23280 | 3719.73 | 9576.92 | 0.3884 | 0.4290 |
| 13B | 2 | 3/30/2013 14:31 | 3 | 15677 | 5225.67 | 100.0% | 0.54385 | 0.23188 | 4017.94 | 9576.92 | 0.4195 | 0.4105 |
| 13B | 3 | 3/30/2013 15:25 | 3 | 15456 | 5152.00 | 99.4% | 0.54385 | 0.23932 | 3898.20 | 9576.90 | 0.4070 | 0.4049 |
| 13B | 4 | 3/30/2013 15:16 | 3 | 15818 | 5272.67 | 100.0% | 0.54385 | 0.23816 | 4032.25 | 9576.90 | 0.4210 | 0.3878 |
| 13B | 5 | 3/30/2013 15:09 | 3 | 15205 | 5068.33 | 100.0% | 0.54385 | 0.23718 | 3833.01 | 9576.90 | 0.4002 | 0.3646 |
| 13B | 6 | 3/30/2013 14:59 | 3 | 11264 | 3754.67 | 100.0% | 0.54385 | 0.23585 | 2526.27 | 9576.91 | 0.2638 | 0.3211 |
| 13B | 7 | 3/30/2013 14:53 | 3 | 12827 | 4275.67 | 100.0% | 0.54385 | 0.23491 | 3052.16 | 9576.91 | 0.3187 | 0.3007 |
| 13C | 1 | 3/30/2013 14:44 | 3 | 13771 | 4590.33 | 96.5% | 0.49054 | 0.23378 | 3452.11 | 9576.92 | 0.3605 | 0.4084 |
| 13C | 2 | 3/30/2013 14:37 | 3 | 14798 | 4932.67 | 100.0% | 0.49054 | 0.23280 | 3838.98 | 9576.92 | 0.4009 | 0.3907 |
| 13C | 3 | 3/30/2013 14:31 | 3 | 14645 | 4881.67 | 99.4% | 0.49054 | 0.23188 | 3785.90 | 9576.92 | 0.3953 | 0.3854 |
| 13C | 4 | 3/30/2013 15:25 | 3 | 15000 | 5000.00 | 100.0% | 0.49054 | 0.23932 | 3875.71 | 9576.90 | 0.4047 | 0.3690 |
| 13C | 5 | 3/30/2013 15:16 | 3 | 14263 | 4754.33 | 100.0% | 0.49054 | 0.23816 | 3635.49 | 9576.90 | 0.3796 | 0.3469 |
| 13C | 6 | 3/30/2013 15:09 | 3 | 10434 | 3478.00 | 100.0% | 0.49054 | 0.23718 | 2363.75 | 9576.90 | 0.2468 | 0.3053 |
| 13C | 7 | 3/30/2013 14:59 | 3 | 12050 | 4016.67 | 100.0% | 0.49054 | 0.23585 | 2908.67 | 9576.91 | 0.3037 | 0.2858 |
| 13D | 1 | 3/30/2013 14:53 | 3 | 14215 | 4738.33 | 96.5% | 0.52636 | 0.23491 | 3511.08 | 9576.91 | 0.3666 | 0.4177 |
| 13D | 2 | 3/30/2013 14:44 | 3 | 15393 | 5131.00 | 100.0% | 0.52636 | 0.23378 | 3952.50 | 9576.92 | 0.4127 | 0.4009 |
| 13D | 3 | 3/30/2013 14:37 | 3 | 15231 | 5077.00 | 99.4% | 0.52636 | 0.23280 | 3896.55 | 9576.92 | 0.4069 | 0.3958 |
| 13D | 4 | 3/30/2013 14:31 | 3 | 15518 | 5172.67 | 100.0% | 0.52636 | 0.23188 | 4003.76 | 9576.92 | 0.4181 | 0.3802 |
| 13D | 5 | 3/30/2013 15:25 | 3 | 14852 | 4950.67 | 100.0% | 0.52636 | 0.23932 | 3744.28 | 9576.90 | 0.3910 | 0.3591 |
| 13D | 6 | 3/30/2013 15:16 | 3 | 11056 | 3685.33 | 100.0% | 0.52636 | 0.23816 | 2484.81 | 9576.90 | 0.2595 | 0.3195 |
| 13D | 7 | 3/30/2013 15:09 | 3 | 12768 | 4256.00 | 100.0% | 0.52636 | 0.23718 | 3060.37 | 9576.90 | 0.3196 | 0.3010 |
| 14A | 1 | 3/30/2013 14:59 | 3 | 13882 | 4627.33 | 96.5% | 0.49881 | 0.23585 | 3459.65 | 9576.91 | 0.3612 | 0.4155 |
| 14A | 2 | 3/30/2013 14:52 | 3 | 14985 | 4995.00 | 100.0% | 0.49881 | 0.23488 | 3872.95 | 9576.91 | 0.4044 | 0.3955 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14A | 3 | 3/30/2013 14:45 | 3 | 14874 | 4958.00 | 99.4% | 0.49881 | 0.23380 | 3834.57 | 9576.92 | 0.4004 | 0.3896 |
| 14A | 4 | 3/30/2013 14:38 | 3 | 15344 | 5114.67 | 100.0% | 0.49881 | 0.23285 | 4002.34 | 9576.92 | 0.4179 | 0.3711 |
| 14A | 5 | 3/30/2013 14:31 | 3 | 14151 | 4717.00 | 100.0% | 0.49881 | 0.23189 | 3609.23 | 9576.92 | 0.3769 | 0.3462 |
| 14A | 6 | 3/30/2013 15:24 | 3 | 10357 | 3452.33 | 100.0% | 0.49881 | 0.23929 | 2309.23 | 9576.90 | 0.2411 | 0.2993 |
| 14A | 7 | 3/30/2013 15:16 | 3 | 11816 | 3938.67 | 100.0% | 0.49881 | 0.23816 | 2800.94 | 9576.90 | 0.2925 | 0.2773 |
| 14B | 1 | 3/30/2013 15:09 | 3 | 14442 | 4814.00 | 96.5% | 0.52166 | 0.23715 | 3586.15 | 9576.90 | 0.3745 | 0.4137 |
| 14B | 2 | 3/30/2013 14:59 | 3 | 15221 | 5073.67 | 100.0% | 0.52166 | 0.23585 | 3895.37 | 9576.91 | 0.4067 | 0.3971 |
| 14B | 3 | 3/30/2013 14:52 | 3 | 14787 | 4929.00 | 99.4% | 0.52166 | 0.23488 | 3748.66 | 9576.91 | 0.3914 | 0.3922 |
| 14B | 4 | 3/30/2013 14:45 | 3 | 15252 | 5084.00 | 100.0% | 0.52166 | 0.23380 | 3915.99 | 9576.92 | 0.4089 | 0.3768 |
| 14B | 5 | 3/30/2013 14:38 | 3 | 14644 | 4881.33 | 100.0% | 0.52166 | 0.23285 | 3718.06 | 9576.92 | 0.3882 | 0.3561 |
| 14B | 6 | 3/30/2013 14:31 | 3 | 11477 | 3825.67 | 100.0% | 0.52166 | 0.23189 | 2667.19 | 9576.92 | 0.2785 | 0.3171 |
| 14B | 7 | 3/30/2013 15:24 | 3 | 12308 | 4102.67 | 100.0% | 0.52166 | 0.23929 | 2907.21 | 9576.90 | 0.3036 | 0.2988 |
| 14C | 1 | 3/30/2013 15:16 | 3 | 14188 | 4729.33 | 96.5% | 0.52711 | 0.23816 | 3483.34 | 9576.90 | 0.3637 | 0.4031 |
| 14C | 2 | 3/30/2013 15:09 | 3 | 15087 | 5029.00 | 100.0% | 0.52711 | 0.23715 | 3831.65 | 9576.90 | 0.4001 | 0.3911 |
| 14C | 3 | 3/30/2013 14:59 | 3 | 14907 | 4969.00 | 99.4% | 0.52711 | 0.23585 | 3771.38 | 9576.91 | 0.3938 | 0.3875 |
| 14C | 4 | 3/30/2013 14:52 | 3 | 15149 | 5049.67 | 100.0% | 0.52711 | 0.23488 | 3863.96 | 9576.91 | 0.4035 | 0.3765 |
| 14C | 5 | 3/30/2013 14:45 | 3 | 14790 | 4930.00 | 100.0% | 0.52711 | 0.23379 | 3749.76 | 9576.92 | 0.3915 | 0.3616 |
| 14C | 6 | 3/30/2013 14:38 | 3 | 11904 | 3968.00 | 100.0% | 0.52711 | 0.23284 | 2792.58 | 9576.92 | 0.2916 | 0.3335 |
| 14C | 7 | 3/30/2013 14:31 | 3 | 12979 | 4326.33 | 100.0% | 0.52711 | 0.23189 | 3155.73 | 9576.92 | 0.3295 | 0.3204 |
| 14D | 1 | 3/30/2013 15:24 | 3 | 13129 | 4376.33 | 96.5% | 0.47151 | 0.23929 | 3256.50 | 9576.90 | 0.3400 | 0.3650 |
| 14D | 2 | 3/30/2013 15:16 | 3 | 14162 | 4720.67 | 100.0% | 0.47151 | 0.23816 | 3645.22 | 9576.90 | 0.3806 | 0.3723 |
| 14D | 3 | 3/30/2013 15:09 | 3 | 14253 | 4751.00 | 99.4% | 0.47151 | 0.23715 | 3673.84 | 9576.90 | 0.3836 | 0.3685 |
| 14D | 4 | 3/30/2013 14:59 | 3 | 14346 | 4782.00 | 100.0% | 0.47151 | 0.23585 | 3716.98 | 9576.91 | 0.3881 | 0.3567 |
| 14D | 5 | 3/30/2013 14:52 | 3 | 13660 | 4553.33 | 100.0% | 0.47151 | 0.23488 | 3492.70 | 9576.91 | 0.3647 | 0.3409 |
| 14D | 6 | 3/30/2013 14:45 | 3 | 10732 | 3577.33 | 100.0% | 0.47151 | 0.23379 | 2521.62 | 9576.92 | 0.2633 | 0.3110 |
| 14D | 7 | 3/30/2013 14:38 | 3 | 12093 | 4031.00 | 100.0% | 0.47151 | 0.23284 | 2979.57 | 9576.92 | 0.3111 | 0.2971 |

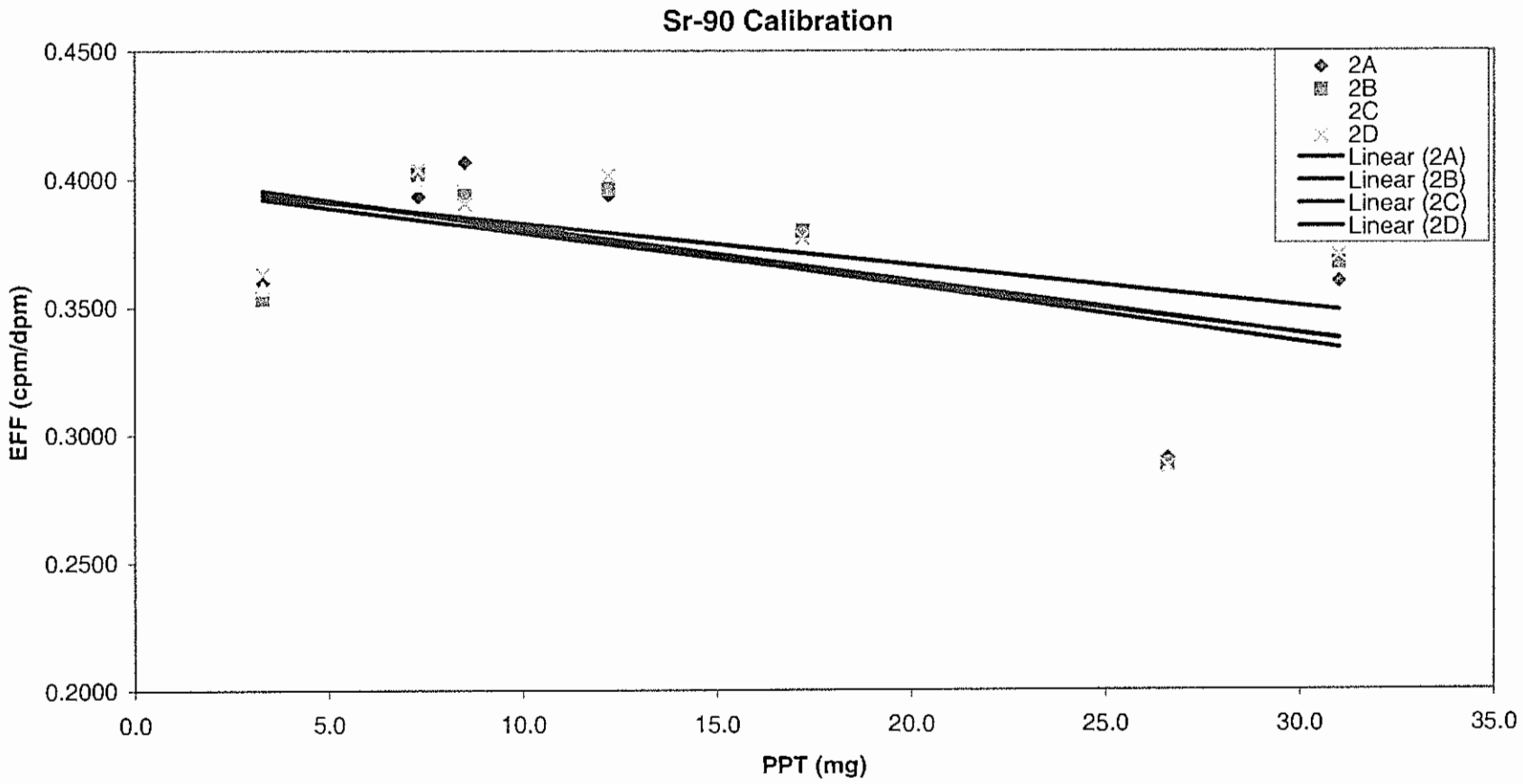



1A y = -2.279414E-03x + 4.114385E-01

1B y = -2.242680E-03x + 4.104277E-01

1C y = -2.472545E-03x + 4.188951E-01

1D y = -2.290631E-03x + 4.084494E-01

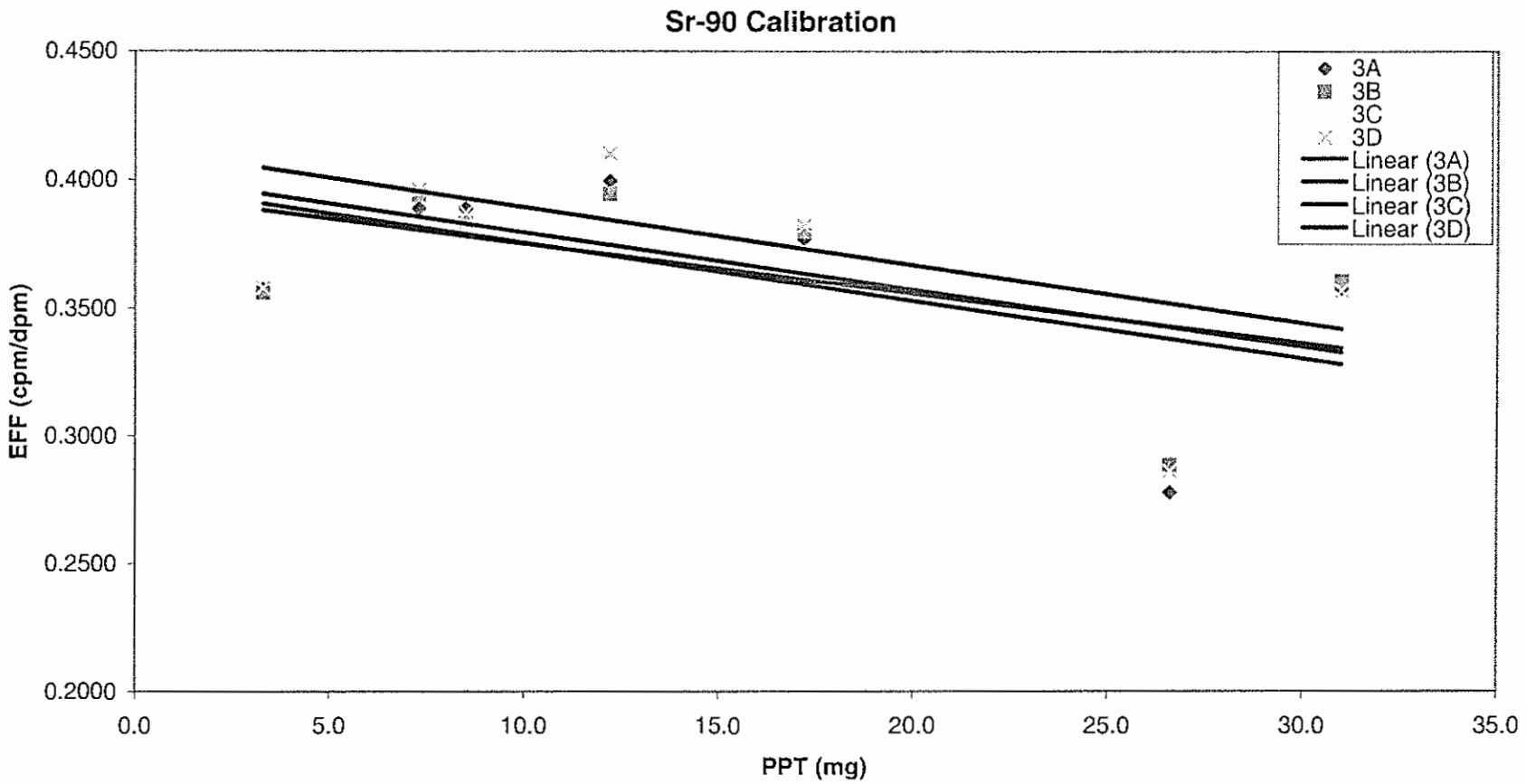



2A y = -2.217073E-03x + 4.028435E-01

2B y = -1.958094E-03x + 3.986039E-01

2C y = -1.615998E-03x + 3.990307E-01

2D y = -2.080413E-03x + 4.022292E-01

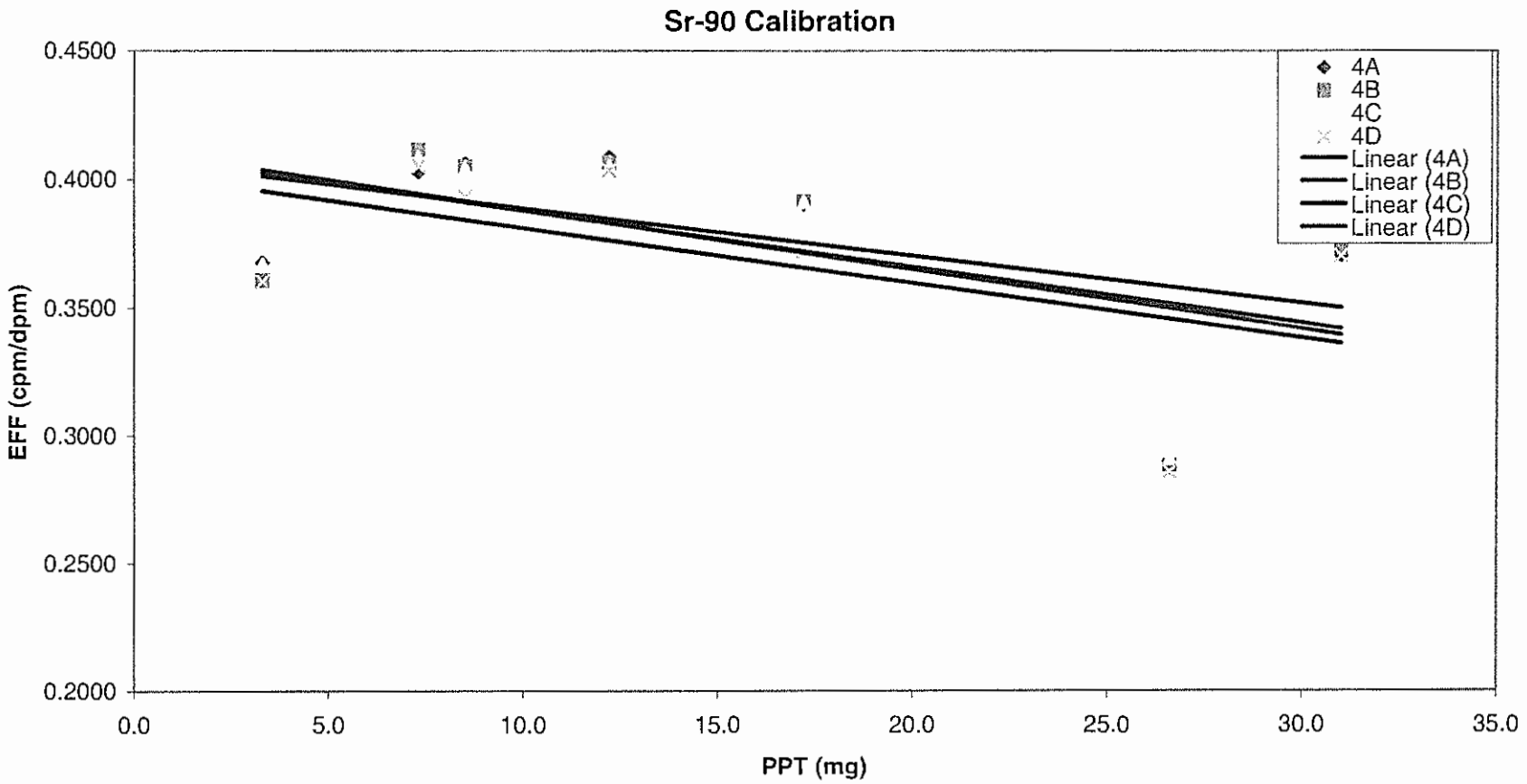



3A y = -2.259677E-03x + 3.982176E-01

3B y = -1.939291E-03x + 3.946777E-01

3C y = -2.259665E-03x + 4.121296E-01

3D y = -2.234962E-03x + 4.020361E-01

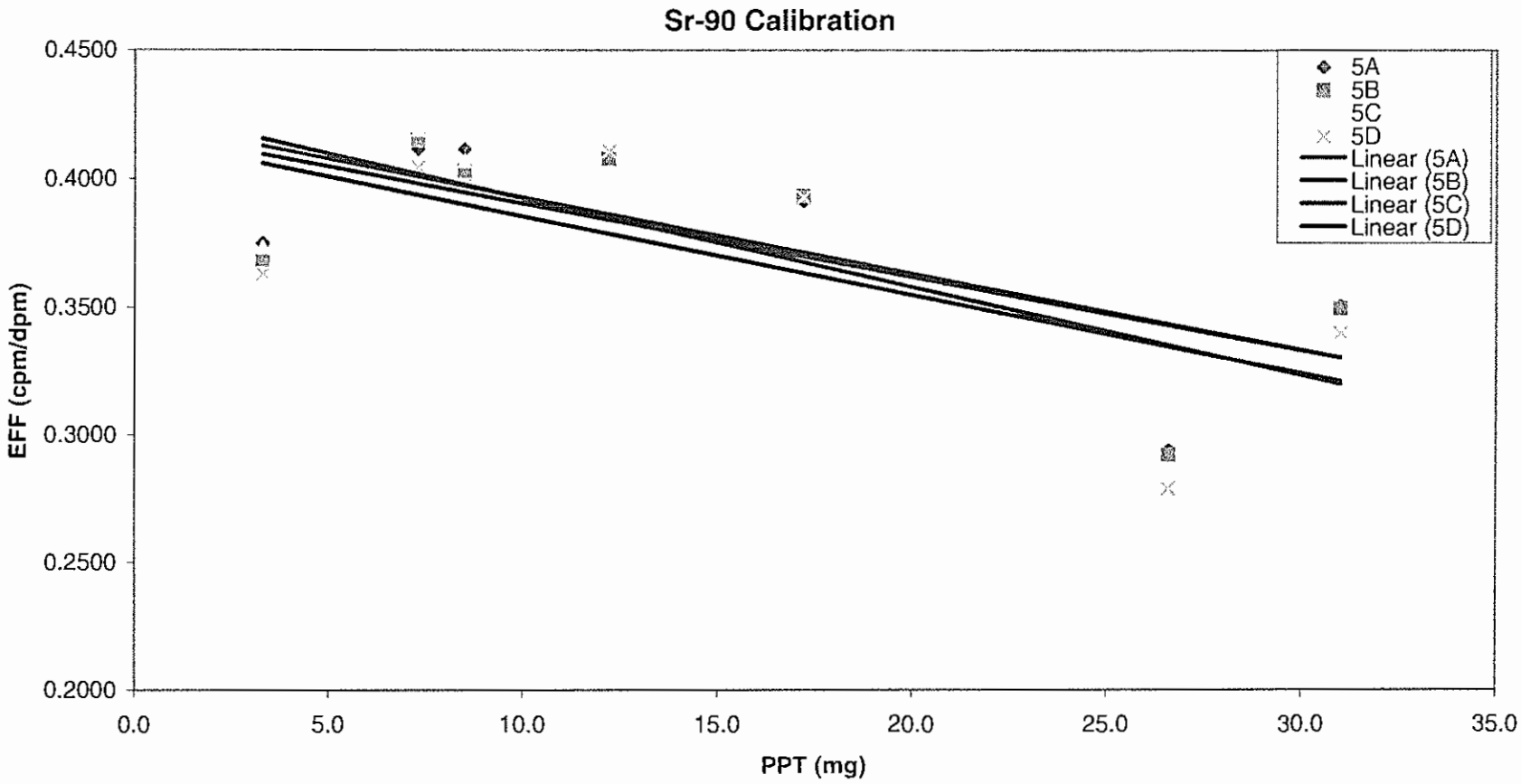



4A y = -2.314786E-03x + 4.114242E-01

4B y = -2.186682E-03x + 4.098489E-01

4C y = -1.846963E-03x + 4.073528E-01

4D y = -2.140852E-03x + 4.026301E-01

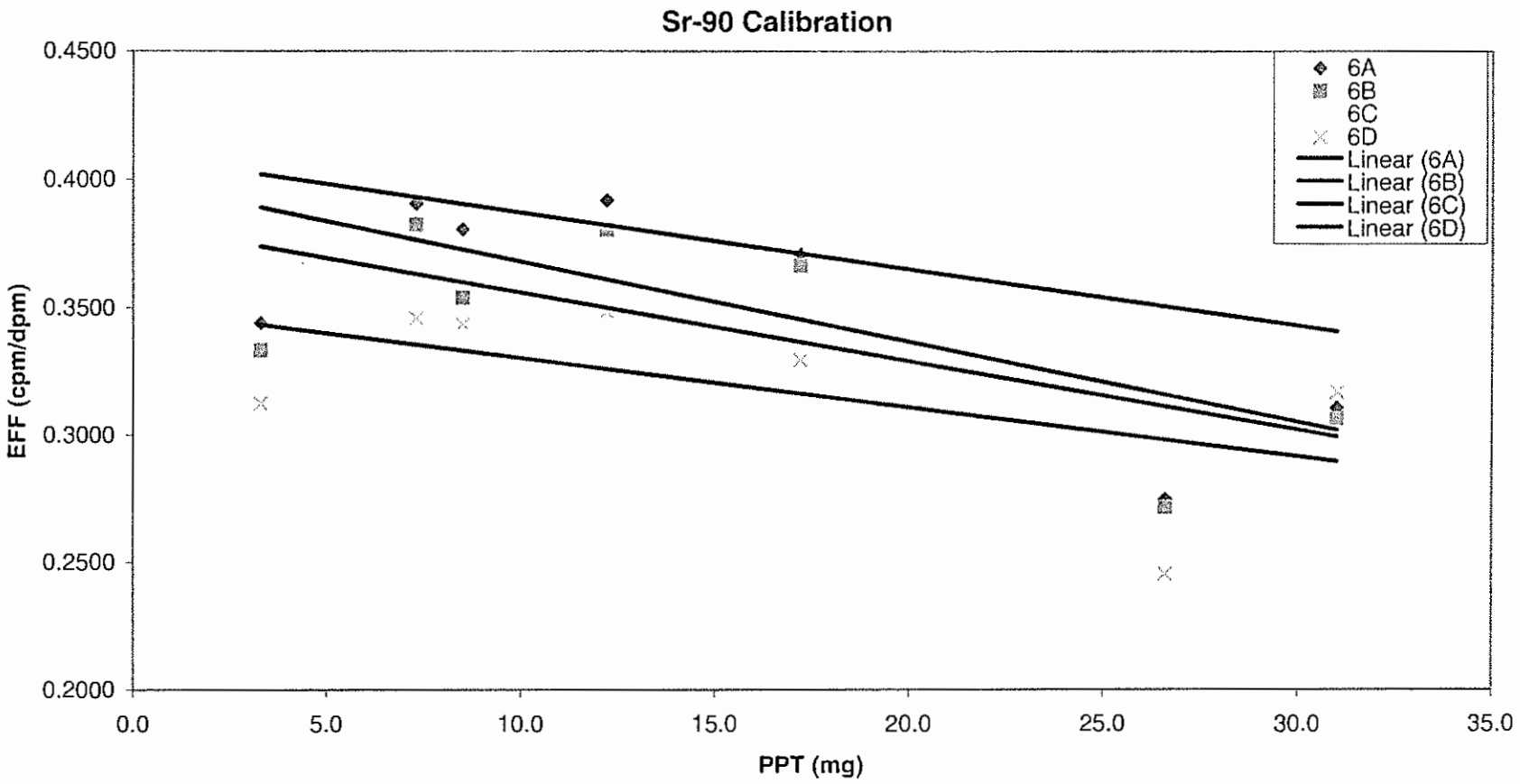



5A y = -2.984003E-03x + 4.227495E-01

5B y = -2.863352E-03x + 4.190820E-01

5C y = -3.460598E-03x + 4.271818E-01

5D y = -3.068168E-03x + 4.161972E-01

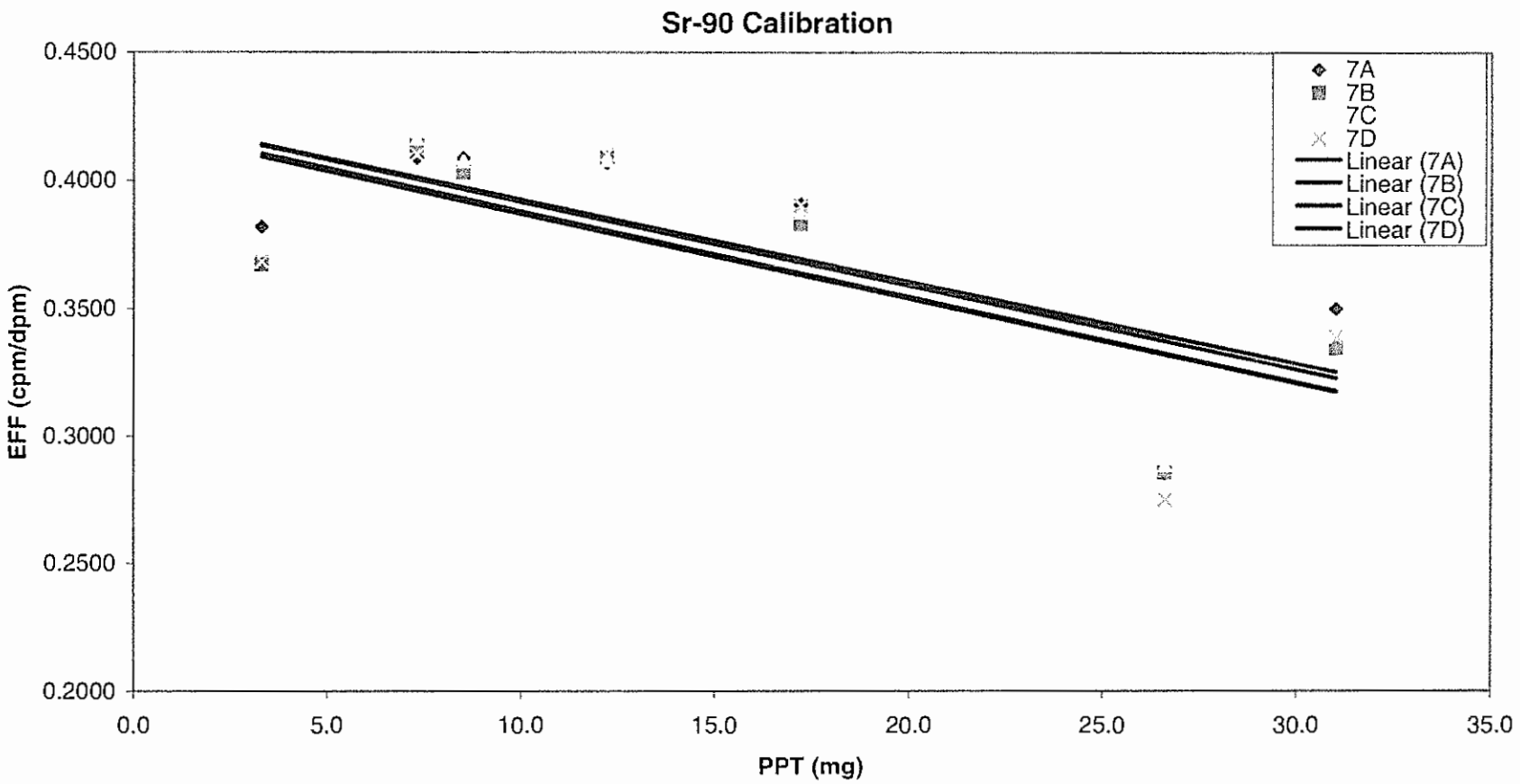



6A y = -3.144071E-03x + 3.995459E-01

6B y = -2.693844E-03x + 3.828880E-01

6C y = -2.212101E-03x + 4.093105E-01

6D y = -1.934101E-03x + 3.496389E-01

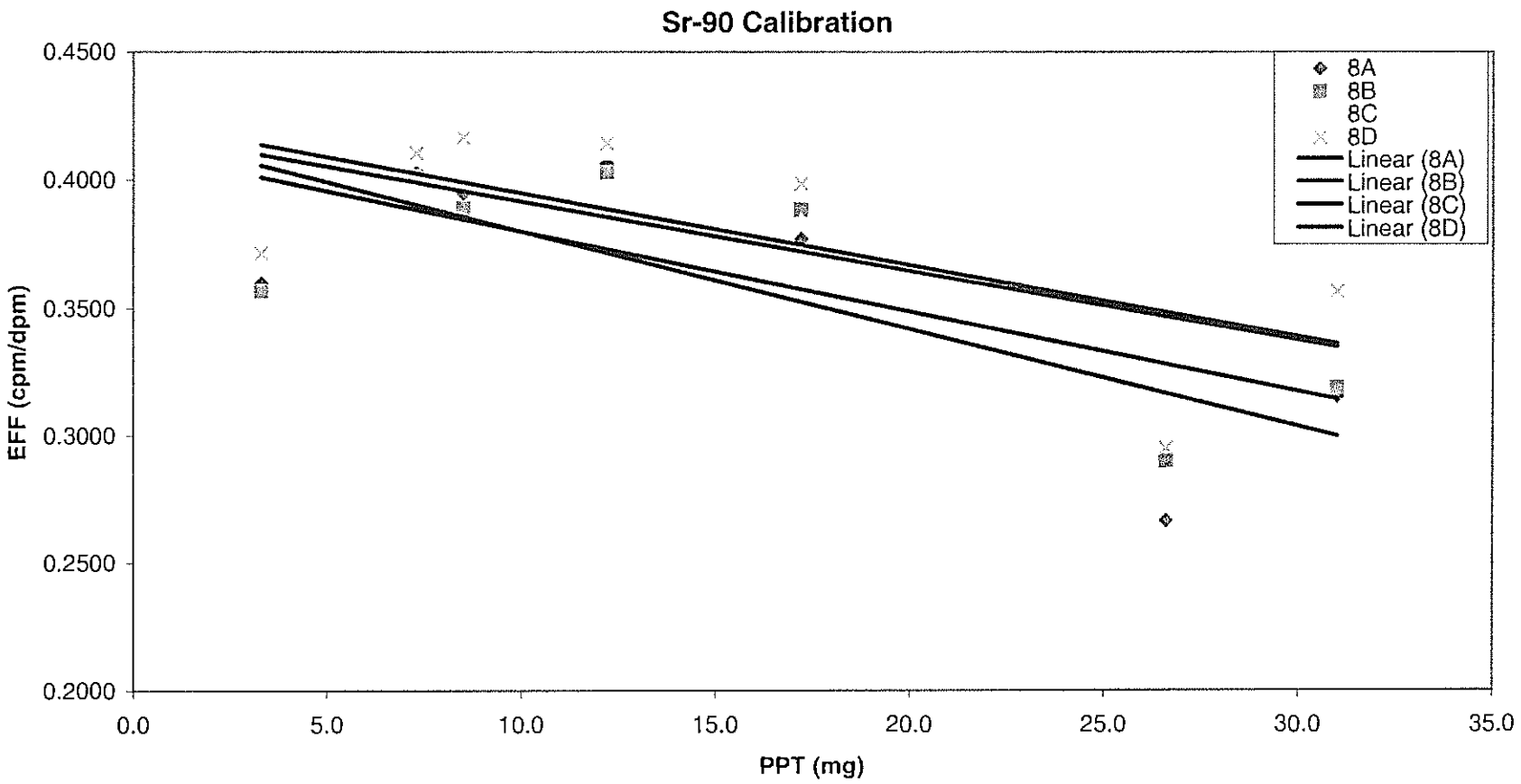



7A y = -3.200040E-03x + 4.246974E-01

7B y = -3.340259E-03x + 4.215895E-01

7C y = -3.267580E-03x + 4.244522E-01

7D y = -3.305734E-03x + 4.200945E-01

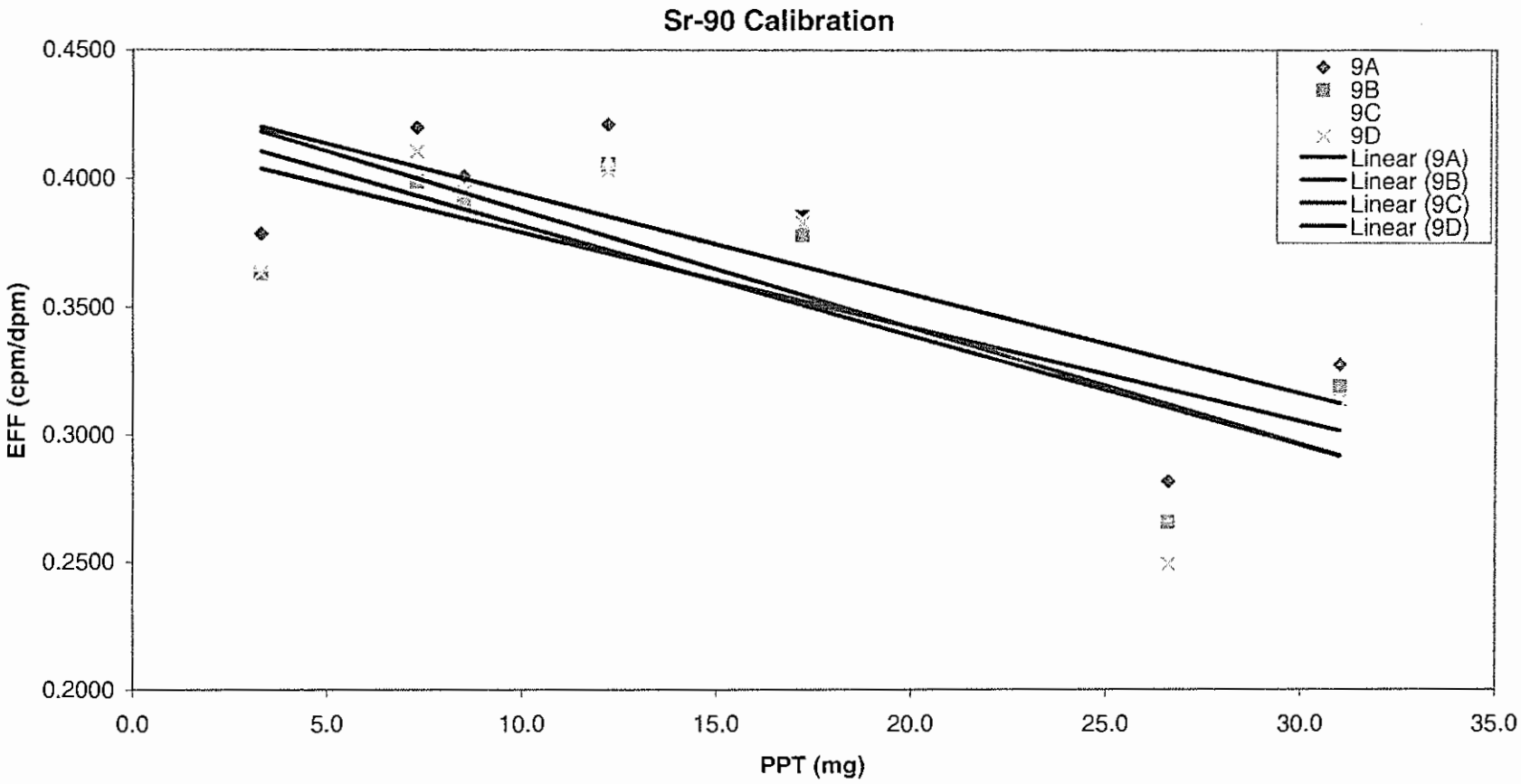



8A y = -3.815539E-03x + 4.183121E-01

8B y = -3.124360E-03x + 4.113619E-01

8C y = -2.707227E-03x + 4.188353E-01

8D y = -2.796572E-03x + 4.229571E-01

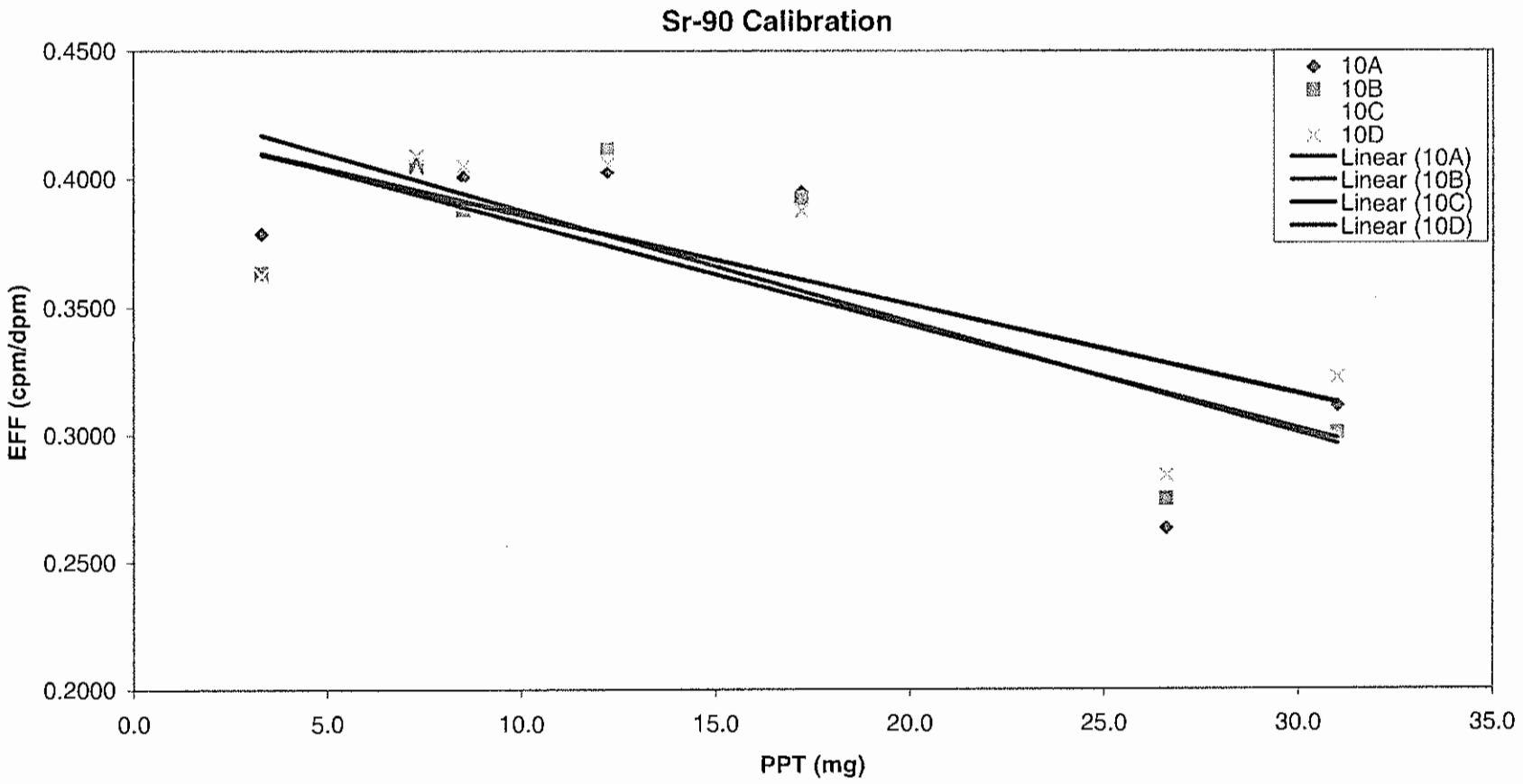



9A y = -3.891363E-03x + 4.329295E-01

9B y = -3.688512E-03x + 4.159108E-01

9C y = -4.563783E-03x + 4.332722E-01

9D y = -4.290468E-03x + 4.246685E-01

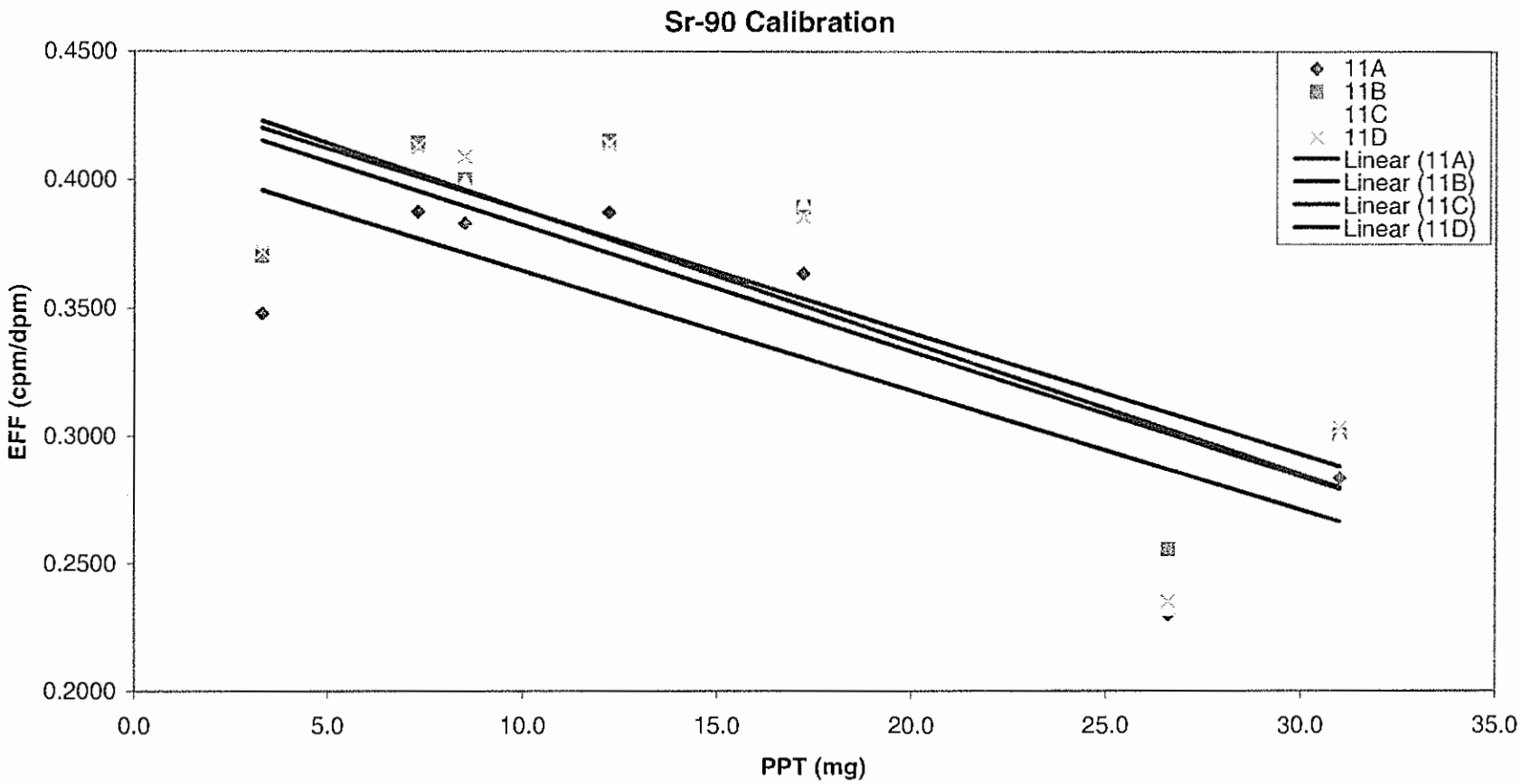



10A y = -4.347820E-03x + 4.312815E-01

10B y = -4.022619E-03x + 4.233487E-01

10C y = -3.484999E-03x + 4.208936E-01

10D y = -3.519529E-03x + 4.215478E-01

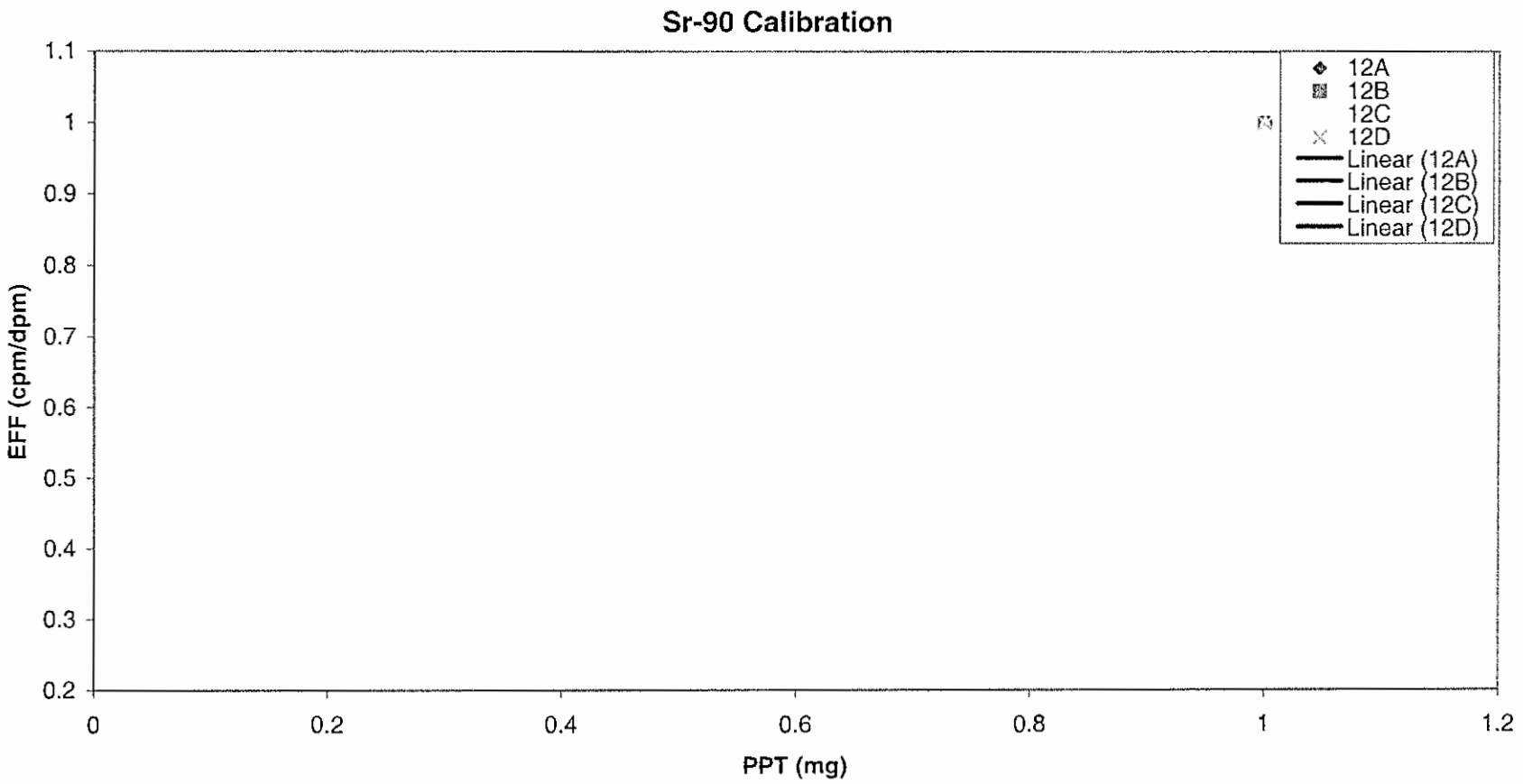



11A y = -4.676337E-03x + 4.113641E-01

11B y = -4.763146E-03x + 4.358297E-01

11C y = -4.907925E-03x + 4.314356E-01

11D y = -5.162403E-03x + 4.400233E-01



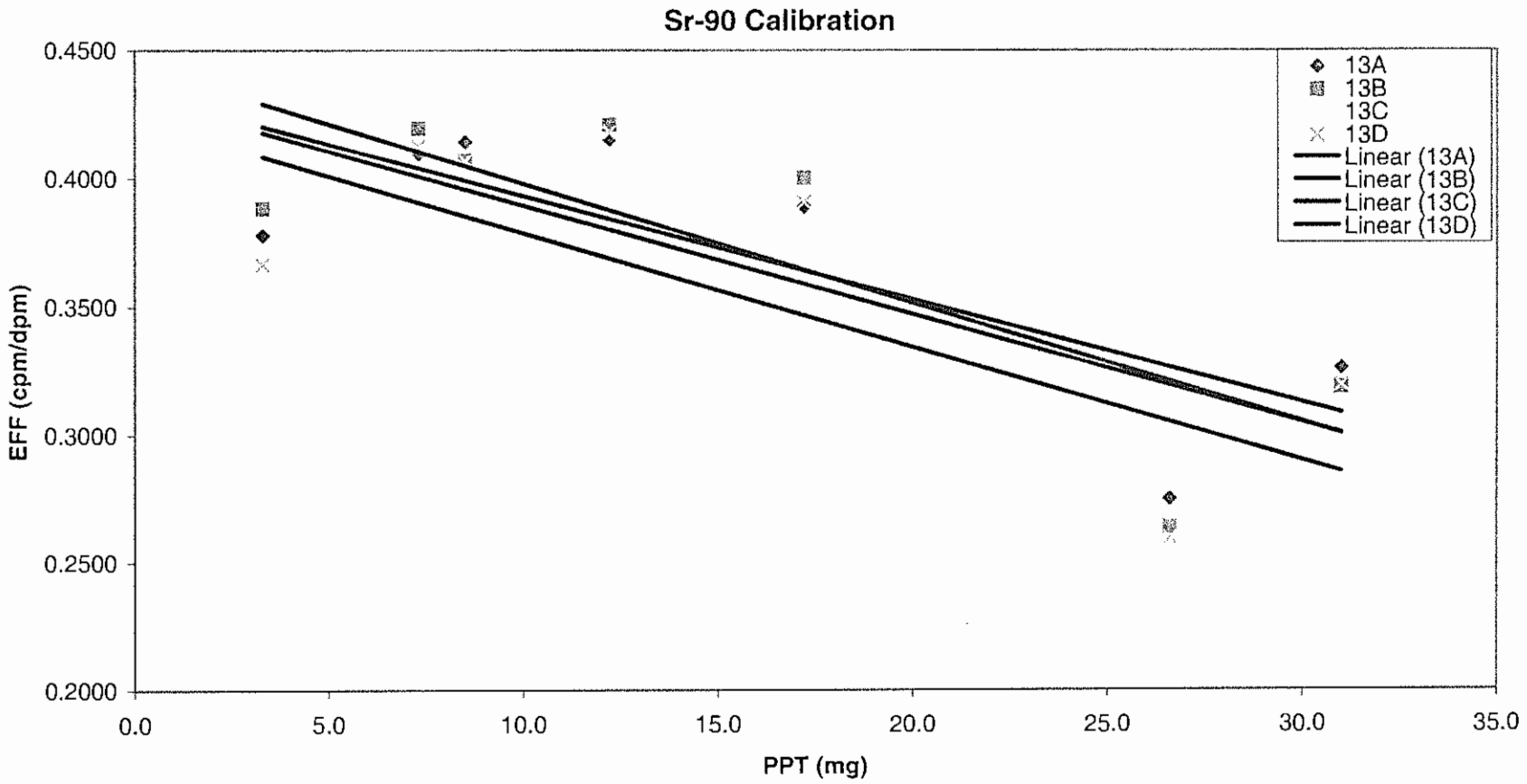

12A

12B

12C

12D

*Detectors not used in this calibration cycle. AP

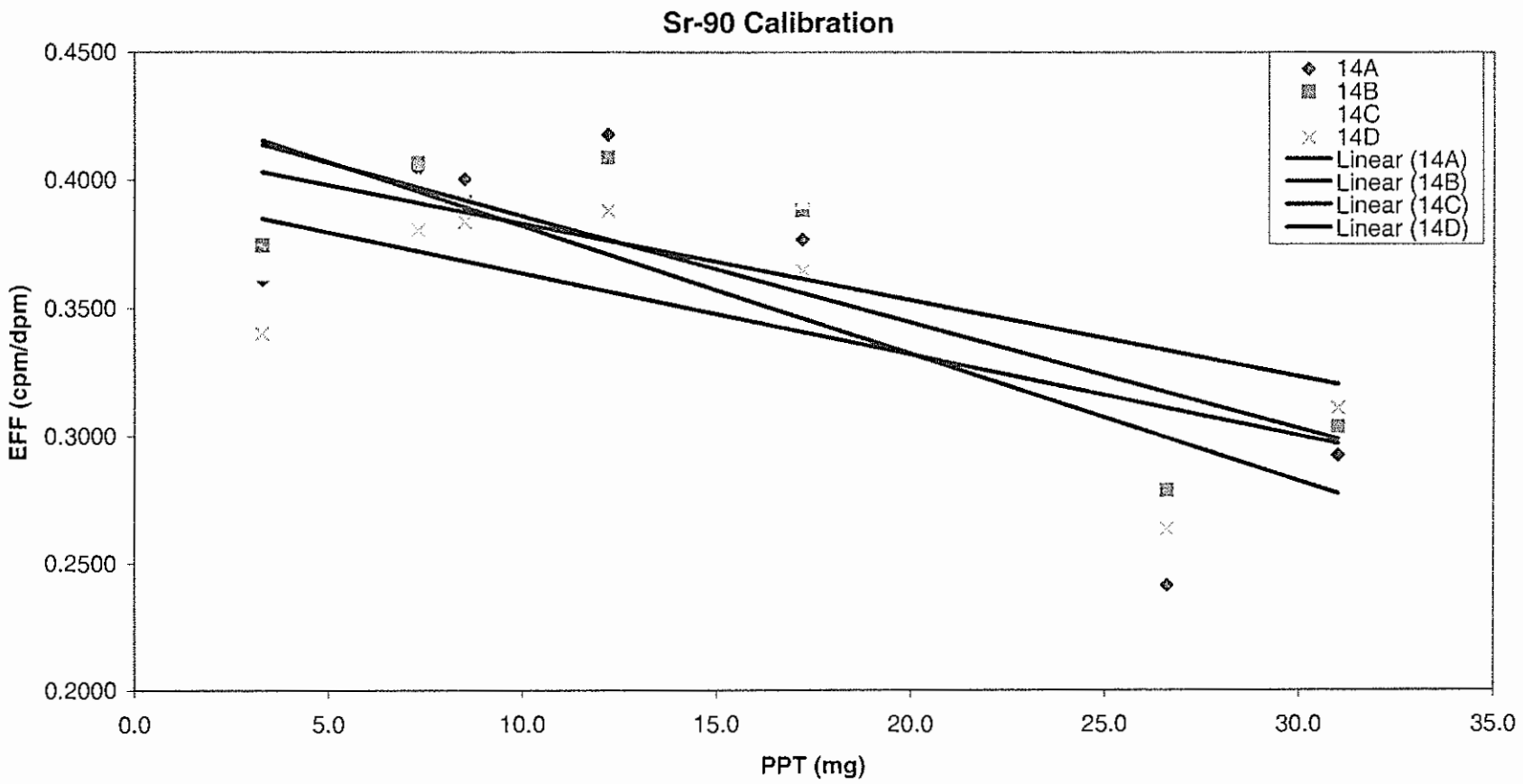



13A y = -4.016750E-03x + 4.334086E-01

13B y = -4.631961E-03x + 4.443149E-01

13C y = -4.427953E-03x + 4.230399E-01

13D y = -4.215610E-03x + 4.316464E-01




14A y = -4.987729E-03x + 4.319463E-01

14B y = -4.148939E-03x + 4.274329E-01

14C y = -2.983884E-03x + 4.129063E-01

14D y = -3.175399E-03x + 3.954898E-01

Current Calibration - PIC

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **Protean** | A0 | A1 | A2 | A3 | A4 |
| **1A** | 4.114385E-01 | -2.279414E-03 | | | |
| **1B** | 4.104277E-01 | -2.242680E-03 | | | |
| **1C** | 4.188951E-01 | -2.472545E-03 | | | |
| **1D** | 4.084494E-01 | -2.290631E-03 | | | |
| **2A** | 4.028435E-01 | -2.217073E-03 | | | |
| **2B** | 3.986039E-01 | -1.958094E-03 | | | |
| **2C** | 3.990307E-01 | -1.615998E-03 | | | |
| **2D** | 4.022292E-01 | -2.080413E-03 | | | |
| **3A** | 3.982176E-01 | -2.259677E-03 | | | |
| **3B** | 3.946777E-01 | -1.939291E-03 | | | |
| **3C** | 4.121296E-01 | -2.259665E-03 | | | |
| **3D** | 4.020361E-01 | -2.234962E-03 | | | |
| **4A** | 4.114242E-01 | -2.314786E-03 | | | |
| **4B** | 4.098489E-01 | -2.186682E-03 | | | |
| **4C** | 4.073528E-01 | -1.846963E-03 | | | |
| **4D** | 4.026301E-01 | -2.140852E-03 | | | |
| **5A** | 4.227495E-01 | -2.984003E-03 | | | |
| **5B** | 4.190820E-01 | -2.863352E-03 | | | |
| **5C** | 4.271818E-01 | -3.460598E-03 | | | |
| **5D** | 4.161972E-01 | -3.068168E-03 | | | |
| **6A** | 3.995459E-01 | -3.144071E-03 | | | |
| **6B** | 3.828880E-01 | -2.693844E-03 | | | |
| **6C** | 4.093105E-01 | -2.212101E-03 | | | |
| **6D** | 3.496389E-01 | -1.934101E-03 | | | |
| **7A** | 4.246974E-01 | -3.200040E-03 | | | |
| **7B** | 4.215895E-01 | -3.340259E-03 | | | |
| **7C** | 4.244522E-01 | -3.267580E-03 | | | |
| **7D** | 4.200945E-01 | -3.305734E-03 | | | |
| **8A** | 4.183121E-01 | -3.815539E-03 | | | |
| **8B** | 4.113619E-01 | -3.124360E-03 | | | |
| **8C** | 4.188353E-01 | -2.707227E-03 | | | |
| **8D** | 4.229571E-01 | -2.796572E-03 | | | |
| **9A** | 4.329295E-01 | -3.891363E-03 | | | |
| **9B** | 4.159108E-01 | -3.688512E-03 | | | |
| **9C** | 4.332722E-01 | -4.563783E-03 | | | |
| **9D** | 4.246685E-01 | -4.290468E-03 | | | |
| **10A** | 4.312815E-01 | -4.347820E-03 | | | |
| **10B** | 4.233487E-01 | -4.022619E-03 | | | |
| **10C** | 4.208936E-01 | -3.484999E-03 | | | |
| **10D** | 4.215478E-01 | -3.519529E-03 | | | |
| **11A** | 4.113641E-01 | -4.676337E-03 | | | |
| **11B** | 4.358297E-01 | -4.763146E-03 | | | |
| **11C** | 4.314356E-01 | -4.907925E-03 | | | |
| **11D** | 4.400233E-01 | -5.162403E-03 | | | |
| **12A** | #N/A | #N/A | | | |
| **12B** | #N/A | #N/A | | | |
| **12C** | #N/A | #N/A | | | |
| **12D** | #N/A | #N/A | | | |
| **13A** | 4.334086E-01 | -4.016750E-03 | | | |
| **13B** | 4.443149E-01 | -4.631961E-03 | | | |
| **13C** | 4.230399E-01 | -4.427953E-03 | | | |
| **13D** | 4.316464E-01 | -4.215610E-03 | | | |
| **14A** | 4.319463E-01 | -4.987729E-03 | | | |
| **14B** | 4.274329E-01 | -4.148939E-03 | | | |
| **14C** | 4.129063E-01 | -2.983884E-03 | | | |
| **14D** | 3.954898E-01 | -3.175399E-03 | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| S1 | 1A | 3 | 9 | 14094 | 3/30/2013 12:17 | 3/30/2013 12:20 | PIC | Sr90S13 |
| S2 | 1A | 3 | 13 | 15073 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S3 | 1A | 3 | 10 | 15044 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S4 | 1A | 3 | 9 | 14969 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S5 | 1A | 3 | 21 | 14480 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S6 | 1A | 3 | 18 | 11753 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S7 | 1A | 3 | 11 | 13985 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S1 | 1B | 3 | 21 | 14015 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S2 | 1B | 3 | 21 | 14889 | 3/30/2013 12:17 | 3/30/2013 12:20 | PIC | Sr90S13 |
| S3 | 1B | 3 | 28 | 14916 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S4 | 1B | 3 | 19 | 15096 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S5 | 1B | 3 | 32 | 14632 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S6 | 1B | 3 | 26 | 11749 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S7 | 1B | 3 | 27 | 13913 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S1 | 1C | 3 | 290 | 13961 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S2 | 1C | 3 | 258 | 15401 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S3 | 1C | 3 | 242 | 15175 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S4 | 1C | 3 | 290 | 15289 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S5 | 1C | 3 | 283 | 14609 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S6 | 1C | 3 | 199 | 11924 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S7 | 1C | 3 | 266 | 13954 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S1 | 1D | 3 | 206 | 13844 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S2 | 1D | 3 | 183 | 14825 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S3 | 1D | 3 | 193 | 14718 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S4 | 1D | 3 | 197 | 15215 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S5 | 1D | 3 | 185 | 14413 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S6 | 1D | 3 | 142 | 11672 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S7 | 1D | 3 | 191 | 13819 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S1 | 2A | 3 | 4 | 13666 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S2 | 2A | 3 | 2 | 14488 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S3 | 2A | 3 | 0 | 14873 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S4 | 2A | 3 | 2 | 14469 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S5 | 2A | 3 | 6 | 14051 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S6 | 2A | 3 | 1 | 11610 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S7 | 2A | 3 | 2 | 13591 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S1 | 2B | 3 | 0 | 13529 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S2 | 2B | 3 | 2 | 14792 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S3 | 2B | 3 | 0 | 14576 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S4 | 2B | 3 | 1 | 14582 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S5 | 2B | 3 | 0 | 14089 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S6 | 2B | 3 | 2 | 11449 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S7 | 2B | 3 | 1 | 13840 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S1 | 2C | 3 | 22 | 13679 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S2 | 2C | 3 | 38 | 14707 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S3 | 2C | 3 | 27 | 14753 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S4 | 2C | 3 | 31 | 14853 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S5 | 2C | 3 | 31 | 14390 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S6 | 2C | 3 | 30 | 11397 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S7 | 2C | 3 | 19 | 14284 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S1 | 2D | 3 | 7 | 13865 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S2 | 2D | 3 | 17 | 14898 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S3 | 2D | 3 | 17 | 14524 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S4 | 2D | 3 | 16 | 14804 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S5 | 2D | 3 | 15 | 14073 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S6 | 2D | 3 | 13 | 11483 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S7 | 2D | 3 | 15 | 13847 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S1 | 3A | 3 | 441 | 13645 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S2 | 3A | 3 | 405 | 14564 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S3 | 3A | 3 | 425 | 14572 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S4 | 3A | 3 | 446 | 14839 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S5 | 3A | 3 | 402 | 14177 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S6 | 3A | 3 | 305 | 11303 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S7 | 3A | 3 | 410 | 13572 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S1 | 3B | 3 | 359 | 13621 | 3/30/2013 12:29 | 3/30/2013 12:32 | PIC | Sr90S13 |
| S2 | 3B | 3 | 365 | 14585 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S3 | 3B | 3 | 376 | 14415 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S4 | 3B | 3 | 365 | 14709 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S5 | 3B | 3 | 338 | 14272 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S6 | 3B | 3 | 265 | 11627 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S7 | 3B | 3 | 337 | 13684 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S1 | 3C | 3 | 144 | 14011 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S2 | 3C | 3 | 155 | 15274 | 3/30/2013 12:29 | 3/30/2013 12:32 | PIC | Sr90S13 |
| S3 | 3C | 3 | 165 | 14723 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S4 | 3C | 3 | 170 | 15163 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S5 | 3C | 3 | 159 | 14420 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S6 | 3C | 3 | 143 | 11833 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S7 | 3C | 3 | 175 | 14051 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S1 | 3D | 3 | 135 | 13662 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S2 | 3D | 3 | 152 | 14617 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S3 | 3D | 3 | 150 | 14360 | 3/30/2013 12:29 | 3/30/2013 12:32 | PIC | Sr90S13 |
| S4 | 3D | 3 | 160 | 14989 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S5 | 3D | 3 | 152 | 14309 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S6 | 3D | 3 | 111 | 11533 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S7 | 3D | 3 | 135 | 13555 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S1 | 4A | 3 | 128 | 14023 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S2 | 4A | 3 | 128 | 14894 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S3 | 4A | 3 | 131 | 14985 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S4 | 4A | 3 | 113 | 15019 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S5 | 4A | 3 | 115 | 14476 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S6 | 4A | 3 | 88 | 11639 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S7 | 4A | 3 | 114 | 14014 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S1 | 4B | 3 | 2 | 13871 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S2 | 4B | 3 | 0 | 15191 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S3 | 4B | 3 | 0 | 15008 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S4 | 4B | 3 | 0 | 15000 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S5 | 4B | 3 | 1 | 14550 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S6 | 4B | 3 | 0 | 11562 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S7 | 4B | 3 | 0 | 14136 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S1 | 4C | 3 | 108 | 14091 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S2 | 4C | 3 | 104 | 15137 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S3 | 4C | 3 | 104 | 15020 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S4 | 4C | 3 | 105 | 15005 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S5 | 4C | 3 | 105 | 14581 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S6 | 4C | 3 | 74 | 11676 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S7 | 4C | 3 | 130 | 14439 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S1 | 4D | 3 | 287 | 13872 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S2 | 4D | 3 | 308 | 15024 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S3 | 4D | 3 | 344 | 14688 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S4 | 4D | 3 | 324 | 14941 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S5 | 4D | 3 | 305 | 14023 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S6 | 4D | 3 | 266 | 11509 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S7 | 4D | 3 | 292 | 13924 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S1 | 5A | 3 | 57 | 14335 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S2 | 5A | 3 | 72 | 15370 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S3 | 5A | 3 | 93 | 15373 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S4 | 5A | 3 | 92 | 15258 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S5 | 5A | 3 | 66 | 14748 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S6 | 5A | 3 | 65 | 11926 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S7 | 5A | 3 | 71 | 13537 | 3/30/2013 13:40 | 3/30/2013 13:43 | PIC | Sr90S13 |
| S1 | 5B | 3 | 63 | 14174 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S2 | 5B | 3 | 69 | 15365 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S3 | 5B | 3 | 79 | 15151 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S4 | 5B | 3 | 82 | 15253 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S5 | 5B | 3 | 65 | 14820 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S6 | 5B | 3 | 49 | 11897 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S7 | 5B | 3 | 76 | 13533 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S1 | 5C | 3 | 76 | 14333 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S2 | 5C | 3 | 88 | 15507 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S3 | 5C | 3 | 87 | 15162 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S4 | 5C | 3 | 76 | 15436 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S5 | 5C | 3 | 75 | 14618 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S6 | 5C | 3 | 50 | 11698 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S7 | 5C | 3 | 60 | 13285 | 3/30/2013 13:54 | 3/30/2013 13:57 | PIC | Sr90S13 |
| S1 | 5D | 3 | 71 | 14052 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S2 | 5D | 3 | 93 | 15099 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S3 | 5D | 3 | 110 | 14907 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S4 | 5D | 3 | 82 | 15249 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S5 | 5D | 3 | 76 | 14837 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S6 | 5D | 3 | 84 | 11545 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S7 | 5D | 3 | 78 | 13288 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S1 | 6A | 3 | 0 | 13113 | 3/30/2013 13:54 | 3/30/2013 13:57 | PIC | Sr90S13 |
| S2 | 6A | 3 | 0 | 14330 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S3 | 6A | 3 | 0 | 14044 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S4 | 6A | 3 | 0 | 14336 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S5 | 6A | 3 | 0 | 13718 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S6 | 6A | 3 | 1 | 11049 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S7 | 6A | 3 | 0 | 12072 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S1 | 6B | 3 | 1 | 12617 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S2 | 6B | 3 | 0 | 13913 | 3/30/2013 13:54 | 3/30/2013 13:57 | PIC | Sr90S13 |
| S3 | 6B | 3 | 0 | 13094 | 3/30/2013 13:46 | 3/30/2013 13:49 | PIC | Sr90S13 |
| S4 | 6B | 3 | 0 | 13831 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S5 | 6B | 3 | 0 | 13414 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S6 | 6B | 3 | 0 | 10672 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S7 | 6B | 3 | 0 | 11765 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S1 | 6C | 3 | 2 | 14081 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S2 | 6C | 3 | 3 | 14961 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S3 | 6C | 3 | 3 | 15089 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S4 | 6C | 3 | 1 | 14784 | 3/30/2013 13:46 | 3/30/2013 13:49 | PIC | Sr90S13 |
| S5 | 6C | 3 | 0 | 14305 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S6 | 6C | 3 | 3 | 11626 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S7 | 6C | 3 | 1 | 14025 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S1 | 6D | 3 | 17 | 12095 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S2 | 6D | 3 | 16 | 12930 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S3 | 6D | 3 | 22 | 12868 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S4 | 6D | 3 | 17 | 12981 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S5 | 6D | 3 | 18 | 12417 | 3/30/2013 13:46 | 3/30/2013 13:49 | PIC | Sr90S13 |
| S6 | 6D | 3 | 13 | 9991 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S7 | 6D | 3 | 25 | 12032 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S1 | 7A | 3 | 137 | 14545 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S2 | 7A | 3 | 148 | 15303 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S3 | 7A | 3 | 143 | 15303 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S4 | 7A | 3 | 150 | 15216 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S5 | 7A | 3 | 129 | 14738 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S6 | 7A | 3 | 102 | 11695 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S7 | 7A | 3 | 112 | 13540 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S1 | 7B | 3 | 156 | 14155 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S2 | 7B | 3 | 155 | 15340 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S3 | 7B | 3 | 151 | 15172 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S4 | 7B | 3 | 152 | 15304 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S5 | 7B | 3 | 143 | 14547 | 3/30/2013 14:03 | 3/30/2013 14:06 | PIC | Sr90S13 |
| S6 | 7B | 3 | 104 | 11731 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S7 | 7B | 3 | 128 | 13123 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S1 | 7C | 3 | 52 | 14289 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S2 | 7C | 3 | 55 | 15396 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S3 | 7C | 3 | 67 | 15144 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S4 | 7C | 3 | 45 | 15243 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S5 | 7C | 3 | 47 | 14647 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S6 | 7C | 3 | 34 | 11785 | 3/30/2013 14:03 | 3/30/2013 14:06 | PIC | Sr90S13 |
| S7 | 7C | 3 | 44 | 13310 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S1 | 7D | 3 | 86 | 14208 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S2 | 7D | 3 | 82 | 15261 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S3 | 7D | 3 | 100 | 14845 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S4 | 7D | 3 | 107 | 15230 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S5 | 7D | 3 | 83 | 14768 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S6 | 7D | 3 | 53 | 11438 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S7 | 7D | 3 | 74 | 13266 | 3/30/2013 14:03 | 3/30/2013 14:06 | PIC | Sr90S13 |
| S1 | 8A | 3 | 7 | 13895 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S2 | 8A | 3 | 4 | 14992 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S3 | 8A | 3 | 3 | 14765 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S4 | 8A | 3 | 6 | 15068 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S5 | 8A | 3 | 5 | 14209 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S6 | 8A | 3 | 4 | 11132 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S7 | 8A | 3 | 2 | 12521 | 3/30/2013 14:12 | 3/30/2013 14:15 | PIC | Sr90S13 |
| S1 | 8B | 3 | 1 | 13736 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S2 | 8B | 3 | 1 | 14887 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S3 | 8B | 3 | 0 | 14532 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S4 | 8B | 3 | 0 | 14897 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S5 | 8B | 3 | 0 | 14465 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S6 | 8B | 3 | 0 | 11620 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S7 | 8B | 3 | 0 | 12555 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S1 | 8C | 3 | 13 | 14553 | 3/30/2013 14:12 | 3/30/2013 14:15 | PIC | Sr90S13 |
| S2 | 8C | 3 | 10 | 15356 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S3 | 8C | 3 | 17 | 14984 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S4 | 8C | 3 | 18 | 15283 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S5 | 8C | 3 | 6 | 14518 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S6 | 8C | 3 | 16 | 12272 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S7 | 8C | 3 | 13 | 13541 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S1 | 8D | 3 | 27 | 14393 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S2 | 8D | 3 | 24 | 15368 | 3/30/2013 14:12 | 3/30/2013 14:15 | PIC | Sr90S13 |
| S3 | 8D | 3 | 32 | 15551 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S4 | 8D | 3 | 19 | 15442 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S5 | 8D | 3 | 24 | 14977 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S6 | 8D | 3 | 20 | 11985 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S7 | 8D | 3 | 16 | 13737 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S1 | 9A | 3 | 28 | 14571 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S2 | 9A | 3 | 30 | 15738 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90S13 |
| S3 | 9A | 3 | 30 | 15197 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S4 | 9A | 3 | 34 | 15737 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S5 | 9A | 3 | 30 | 14772 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S6 | 9A | 3 | 27 | 11700 | 3/30/2013 14:42 | 3/30/2013 14:45 | PIC | Sr90S13 |
| S7 | 9A | 3 | 27 | 13004 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S1 | 9B | 3 | 16 | 14063 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S2 | 9B | 3 | 12 | 14946 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S3 | 9B | 3 | 23 | 14825 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |
| S4 | 9B | 3 | 19 | 15236 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S5 | 9B | 3 | 16 | 14428 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S6 | 9B | 3 | 16 | 11183 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S7 | 9B | 3 | 21 | 12700 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S1 | 9C | 3 | 44 | 14218 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S2 | 9C | 3 | 32 | 15402 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S3 | 9C | 3 | 30 | 15296 | 3/30/2013 14:21 | 3/30/2013 14:24 | PIC | Sr90S13 |
| S4 | 9C | 3 | 38 | 15315 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |
| S5 | 9C | 3 | 41 | 14853 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S6 | 9C | 3 | 26 | 10978 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S7 | 9C | 3 | 26 | 12385 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S1 | 9D | 3 | 2 | 13987 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S2 | 9D | 3 | 0 | 15196 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S3 | 9D | 3 | 1 | 14760 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S4 | 9D | 3 | 0 | 14958 | 3/30/2013 14:21 | 3/30/2013 14:24 | PIC | Sr90S13 |
| S5 | 9D | 3 | 2 | 14493 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |
| S6 | 9D | 3 | 1 | 10632 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S7 | 9D | 3 | 0 | 12459 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S1 | 10A | 3 | 12 | 14585 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S2 | 10A | 3 | 11 | 15225 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S3 | 10A | 3 | 9 | 15080 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S4 | 10A | 3 | 18 | 15107 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S5 | 10A | 3 | 9 | 14855 | 3/30/2013 14:21 | 3/30/2013 14:24 | PIC | Sr90S13 |
| S6 | 10A | 3 | 11 | 11188 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S7 | 10A | 3 | 9 | 12557 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S1 | 10B | 3 | 32 | 14134 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S2 | 10B | 3 | 32 | 15177 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S3 | 10B | 3 | 34 | 14709 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S4 | 10B | 3 | 38 | 15366 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S5 | 10B | 3 | 38 | 14785 | 3/30/2013 14:29 | 3/30/2013 14:32 | PIC | Sr90S13 |
| S6 | 10B | 3 | 31 | 11381 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S7 | 10B | 3 | 28 | 12244 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90S13 |
| S1 | 10C | 3 | 34 | 14391 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S2 | 10C | 3 | 48 | 15140 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S3 | 10C | 3 | 26 | 14971 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S4 | 10C | 3 | 40 | 15541 | 3/30/2013 14:42 | 3/30/2013 14:45 | PIC | Sr90S13 |
| S5 | 10C | 3 | 39 | 14457 | 3/30/2013 14:36 | 3/30/2013 14:39 | PIC | Sr90S13 |
| S6 | 10C | 3 | 28 | 11591 | 3/30/2013 14:29 | 3/30/2013 14:32 | PIC | Sr90S13 |
| S7 | 10C | 3 | 30 | 12946 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S1 | 10D | 3 | 20 | 14192 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90S13 |
| S2 | 10D | 3 | 26 | 15388 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S3 | 10D | 3 | 13 | 15273 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S4 | 10D | 3 | 19 | 15258 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S5 | 10D | 3 | 29 | 14721 | 3/30/2013 14:42 | 3/30/2013 14:45 | PIC | Sr90S13 |
| S6 | 10D | 3 | 22 | 11720 | 3/30/2013 14:36 | 3/30/2013 14:39 | PIC | Sr90S13 |
| S7 | 10D | 3 | 20 | 12821 | 3/30/2013 14:29 | 3/30/2013 14:32 | PIC | Sr90S13 |
| S1 | 11A | 3 | 2 | 13341 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S2 | 11A | 3 | 0 | 14364 | 3/30/2013 15:31 | 3/30/2013 15:34 | PIC | Sr90S13 |
| S3 | 11A | 3 | 0 | 14259 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S4 | 11A | 3 | 1 | 14370 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90S13 |
| S5 | 11A | 3 | 0 | 13698 | 3/30/2013 15:43 | 3/30/2013 15:46 | PIC | Sr90S13 |
| S6 | 11A | 3 | 0 | 9866 | 3/30/2013 15:47 | 3/30/2013 15:50 | PIC | Sr90S13 |
| S7 | 11A | 3 | 2 | 11413 | 3/30/2013 15:51 | 3/30/2013 15:54 | PIC | Sr90S13 |
| S1 | 11B | 3 | 0 | 14495 | 3/30/2013 15:54 | 3/30/2013 15:57 | PIC | Sr90S13 |
| S2 | 11B | 3 | 0 | 15572 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S3 | 11B | 3 | 0 | 15188 | 3/30/2013 15:31 | 3/30/2013 15:34 | PIC | Sr90S13 |
| S4 | 11B | 3 | 0 | 15612 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S5 | 11B | 3 | 0 | 14881 | 3/30/2013 15:39 | 3/30/2013 15:42 | PIC | Sr90S13 |
| S6 | 11B | 3 | 0 | 11037 | 3/30/2013 15:43 | 3/30/2013 15:46 | PIC | Sr90S13 |
| S7 | 11B | 3 | 0 | 12343 | 3/30/2013 15:47 | 3/30/2013 15:50 | PIC | Sr90S13 |
| S1 | 11C | 3 | 1 | 14267 | 3/30/2013 15:51 | 3/30/2013 15:54 | PIC | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S2 | 11C | 3 | 0 | 15354 | 3/30/2013 15:55 | 3/30/2013 15:58 | PIC | Sr90S13 |
| S3 | 11C | 3 | 0 | 15138 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S4 | 11C | 3 | 0 | 15373 | 3/30/2013 15:31 | 3/30/2013 15:34 | PIC | Sr90S13 |
| S5 | 11C | 3 | 1 | 14902 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S6 | 11C | 3 | 1 | 10342 | 3/30/2013 15:39 | 3/30/2013 15:42 | PIC | Sr90S13 |
| S7 | 11C | 3 | 0 | 12297 | 3/30/2013 15:43 | 3/30/2013 15:46 | PIC | Sr90S13 |
| S1 | 11D | 3 | 1 | 14538 | 3/30/2013 15:47 | 3/30/2013 15:50 | PIC | Sr90S13 |
| S2 | 11D | 3 | 0 | 15591 | 3/30/2013 15:51 | 3/30/2013 15:54 | PIC | Sr90S13 |
| S3 | 11D | 3 | 0 | 15511 | 3/30/2013 15:55 | 3/30/2013 15:58 | PIC | Sr90S13 |
| S4 | 11D | 3 | 0 | 15573 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S5 | 11D | 3 | 0 | 14769 | 3/30/2013 15:32 | 3/30/2013 15:35 | PIC | Sr90S13 |
| S6 | 11D | 3 | 0 | 10450 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S7 | 11D | 3 | 0 | 12426 | 3/30/2013 15:39 | 3/30/2013 15:42 | PIC | Sr90S13 |
| S1 | 13A | 3 | 0 | 14517 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S2 | 13A | 3 | 0 | 15416 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S3 | 13A | 3 | 1 | 15553 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S4 | 13A | 3 | 1 | 15547 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S5 | 13A | 3 | 0 | 14769 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S6 | 13A | 3 | 0 | 11476 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90S13 |
| S7 | 13A | 3 | 0 | 12935 | 3/30/2013 14:44 | 3/30/2013 14:47 | PIC | Sr90S13 |
| S1 | 13B | 3 | 2 | 14929 | 3/30/2013 14:37 | 3/30/2013 14:40 | PIC | Sr90S13 |
| S2 | 13B | 3 | 0 | 15677 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S3 | 13B | 3 | 0 | 15456 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S4 | 13B | 3 | 1 | 15818 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S5 | 13B | 3 | 0 | 15205 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S6 | 13B | 3 | 1 | 11264 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S7 | 13B | 3 | 0 | 12827 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90S13 |
| S1 | 13C | 3 | 1 | 13771 | 3/30/2013 14:44 | 3/30/2013 14:47 | PIC | Sr90S13 |
| S2 | 13C | 3 | 0 | 14798 | 3/30/2013 14:37 | 3/30/2013 14:40 | PIC | Sr90S13 |
| S3 | 13C | 3 | 0 | 14645 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S4 | 13C | 3 | 1 | 15000 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S5 | 13C | 3 | 0 | 14263 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S6 | 13C | 3 | 1 | 10434 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S7 | 13C | 3 | 1 | 12050 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S1 | 13D | 3 | 0 | 14215 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90S13 |
| S2 | 13D | 3 | 1 | 15393 | 3/30/2013 14:44 | 3/30/2013 14:47 | PIC | Sr90S13 |
| S3 | 13D | 3 | 0 | 15231 | 3/30/2013 14:37 | 3/30/2013 14:40 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S4 | 13D | 3 | 0 | 15518 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S5 | 13D | 3 | 0 | 14852 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S6 | 13D | 3 | 1 | 11056 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S7 | 13D | 3 | 1 | 12768 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S1 | 14A | 3 | 0 | 13882 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S2 | 14A | 3 | 1 | 14985 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S3 | 14A | 3 | 0 | 14874 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S4 | 14A | 3 | 0 | 15344 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |
| S5 | 14A | 3 | 1 | 14151 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S6 | 14A | 3 | 1 | 10357 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90S13 |
| S7 | 14A | 3 | 0 | 11816 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S1 | 14B | 3 | 0 | 14442 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S2 | 14B | 3 | 0 | 15221 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S3 | 14B | 3 | 1 | 14787 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S4 | 14B | 3 | 0 | 15252 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S5 | 14B | 3 | 0 | 14644 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |
| S6 | 14B | 3 | 0 | 11477 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S7 | 14B | 3 | 1 | 12308 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90S13 |
| S1 | 14C | 3 | 1 | 14188 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S2 | 14C | 3 | 1 | 15087 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S3 | 14C | 3 | 0 | 14907 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S4 | 14C | 3 | 0 | 15149 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S5 | 14C | 3 | 0 | 14790 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S6 | 14C | 3 | 1 | 11904 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |
| S7 | 14C | 3 | 0 | 12979 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S1 | 14D | 3 | 0 | 13129 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90S13 |
| S2 | 14D | 3 | 0 | 14162 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S3 | 14D | 3 | 0 | 14253 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S4 | 14D | 3 | 0 | 14346 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S5 | 14D | 3 | 0 | 13660 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S6 | 14D | 3 | 0 | 10732 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S7 | 14D | 3 | 0 | 12093 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |

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## Y-90 Calibration - PIC - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

| | |
|---|---|
| Separation Date/Time | 3/29/2013 13:05 |
| Y-90 Half Life (days) | 2.668875 |

The following detectors were not calibrated:
12A, 12B, 12C, 12D

| Carrier Data | | Std ID | 1892786 | |
|---|---|---|---|---|
| | | Std weight | 31.85 | mg/mL |
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 15.9 | 0.5 | 15.93 | 99.8% |
| 2 | 16.1 | 0.5 | 15.93 | 100.0% |
| 3 | 16.0 | 0.5 | 15.93 | 100.0% |
| 4 | 16.1 | 0.5 | 15.93 | 100.0% |
| 5 | 16.0 | 0.5 | 15.93 | 100.0% |
| 6 | 16.2 | 0.5 | 15.93 | 100.0% |
| 7 | 15.9 | 0.5 | 15.93 | 99.8% |
| 8 | 16.4 | 0.5 | 15.93 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered negligible.
**Decay corrected to mid-point of cou

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A | 1 | 3/30/2013 14:46 | 3 | 11551 | 3850.33 | 99.8% | 0.75713 | 5093.40 | 9576.92 | 0.5318 | |
| 1A | 2 | 3/30/2013 15:50 | 3 | 11713 | 3904.33 | 100.0% | 0.74845 | 5216.59 | 9576.89 | 0.5447 | |
| 1A | 3 | 3/30/2013 15:42 | 3 | 11569 | 3856.33 | 100.0% | 0.74950 | 5145.23 | 9576.89 | 0.5373 | |
| 1A | 4 | 3/30/2013 15:34 | 3 | 11605 | 3868.33 | 100.0% | 0.75061 | 5153.60 | 9576.89 | 0.5381 | |
| 1A | 5 | 3/30/2013 15:24 | 3 | 11518 | 3839.33 | 100.0% | 0.75196 | 5105.76 | 9576.90 | 0.5331 | |
| 1A | 6 | 3/30/2013 15:14 | 3 | 10892 | 3630.67 | 100.0% | 0.75326 | 4819.97 | 9576.90 | 0.5033 | |
| 1A | 7 | 3/30/2013 15:06 | 3 | 11867 | 3955.67 | 99.8% | 0.75430 | 5252.42 | 9576.91 | 0.5484 | |
| 1A | 8 | 3/30/2013 14:56 | 3 | 11847 | 3949.00 | 100.0% | 0.75572 | 5225.48 | 9576.91 | 0.5456 | 0.5353 |
| 1B | 1 | 3/30/2013 14:56 | 3 | 11717 | 3905.67 | 99.8% | 0.75569 | 5176.46 | 9576.91 | 0.5405 | |
| 1B | 2 | 3/30/2013 14:46 | 3 | 11796 | 3932.00 | 100.0% | 0.75708 | 5193.61 | 9576.91 | 0.5423 | |
| 1B | 3 | 3/30/2013 15:49 | 3 | 11430 | 3810.00 | 100.0% | 0.74847 | 5090.40 | 9576.89 | 0.5315 | |
| 1B | 4 | 3/30/2013 15:42 | 3 | 11535 | 3845.00 | 100.0% | 0.74953 | 5129.91 | 9576.89 | 0.5357 | |
| 1B | 5 | 3/30/2013 15:33 | 3 | 11451 | 3817.00 | 100.0% | 0.75064 | 5084.98 | 9576.89 | 0.5310 | |
| 1B | 6 | 3/30/2013 15:24 | 3 | 10732 | 3577.33 | 100.0% | 0.75196 | 4757.32 | 9576.90 | 0.4967 | |
| 1B | 7 | 3/30/2013 15:14 | 3 | 11951 | 3983.67 | 99.8% | 0.75328 | 5296.74 | 9576.90 | 0.5531 | |
| 1B | 8 | 3/30/2013 15:07 | 3 | 11648 | 3882.67 | 100.0% | 0.75428 | 5147.52 | 9576.91 | 0.5375 | 0.5335 |
| 1C | 1 | 3/30/2013 15:07 | 3 | 11759 | 3919.67 | 99.8% | 0.75428 | 5204.74 | 9576.91 | 0.5435 | |
| 1C | 2 | 3/30/2013 14:56 | 3 | 11847 | 3949.00 | 100.0% | 0.75569 | 5225.68 | 9576.91 | 0.5457 | |
| 1C | 3 | 3/30/2013 14:47 | 3 | 11562 | 3854.00 | 100.0% | 0.75700 | 5091.13 | 9576.91 | 0.5316 | |
| 1C | 4 | 3/30/2013 15:49 | 3 | 11823 | 3941.00 | 100.0% | 0.74847 | 5265.42 | 9576.89 | 0.5498 | |
| 1C | 5 | 3/30/2013 15:42 | 3 | 11680 | 3893.33 | 100.0% | 0.74953 | 5194.39 | 9576.89 | 0.5424 | |
| 1C | 6 | 3/30/2013 15:33 | 3 | 10544 | 3514.67 | 100.0% | 0.75064 | 4682.23 | 9576.89 | 0.4889 | |
| 1C | 7 | 3/30/2013 15:24 | 3 | 11779 | 3926.33 | 99.8% | 0.75196 | 5229.67 | 9576.90 | 0.5461 | |
| 1C | 8 | 3/30/2013 15:14 | 3 | 11722 | 3907.33 | 100.0% | 0.75328 | 5187.09 | 9576.90 | 0.5416 | 0.5362 |
| 1D | 1 | 3/30/2013 15:14 | 3 | 11522 | 3840.67 | 99.8% | 0.75328 | 5106.61 | 9576.90 | 0.5332 | |
| 1D | 2 | 3/30/2013 15:07 | 3 | 11771 | 3923.67 | 100.0% | 0.75426 | 5201.98 | 9576.91 | 0.5432 | |
| 1D | 3 | 3/30/2013 14:56 | 3 | 11535 | 3845.00 | 100.0% | 0.75569 | 5088.06 | 9576.91 | 0.5313 | |
| 1D | 4 | 3/30/2013 14:48 | 3 | 11874 | 3958.00 | 100.0% | 0.75682 | 5229.77 | 9576.91 | 0.5461 | |
| 1D | 5 | 3/30/2013 15:49 | 3 | 11432 | 3810.67 | 100.0% | 0.74847 | 5091.29 | 9576.89 | 0.5316 | |
| 1D | 6 | 3/30/2013 15:42 | 3 | 10327 | 3442.33 | 100.0% | 0.74952 | 4592.69 | 9576.89 | 0.4796 | |
| 1D | 7 | 3/30/2013 15:33 | 3 | 11718 | 3906.00 | 99.8% | 0.75064 | 5211.74 | 9576.89 | 0.5442 | |
| 1D | 8 | 3/30/2013 15:24 | 3 | 11631 | 3877.00 | 100.0% | 0.75196 | 5155.83 | 9576.90 | 0.5384 | 0.5309 |
| 2A | 1 | 3/30/2013 15:24 | 3 | 11102 | 3700.67 | 99.8% | 0.75196 | 4929.12 | 9576.90 | 0.5147 | |
| 2A | 2 | 3/30/2013 15:14 | 3 | 11053 | 3684.33 | 100.0% | 0.75326 | 4891.20 | 9576.90 | 0.5107 | |
| 2A | 3 | 3/30/2013 15:07 | 3 | 11160 | 3720.00 | 100.0% | 0.75426 | 4931.98 | 9576.91 | 0.5150 | |
| 2A | 4 | 3/30/2013 14:56 | 3 | 11334 | 3778.00 | 100.0% | 0.75569 | 4999.43 | 9576.91 | 0.5220 | |
| 2A | 5 | 3/30/2013 14:49 | 3 | 11092 | 3697.33 | 100.0% | 0.75673 | 4885.96 | 9576.91 | 0.5102 | |
| 2A | 6 | 3/30/2013 15:50 | 3 | 10202 | 3400.67 | 100.0% | 0.74845 | 4543.64 | 9576.89 | 0.4744 | |
| 2A | 7 | 3/30/2013 15:42 | 3 | 11309 | 3769.67 | 99.8% | 0.74949 | 5037.55 | 9576.89 | 0.5260 | |
| 2A | 8 | 3/30/2013 15:33 | 3 | 11236 | 3745.33 | 100.0% | 0.75064 | 4989.55 | 9576.89 | 0.5210 | 0.5118 |
| 2B | 1 | 3/30/2013 15:34 | 3 | 11237 | 3745.67 | 99.8% | 0.75060 | 4998.08 | 9576.89 | 0.5219 | |
| 2B | 2 | 3/30/2013 15:23 | 3 | 11258 | 3752.67 | 100.0% | 0.75200 | 4990.23 | 9576.90 | 0.5211 | |
| 2B | 3 | 3/30/2013 15:14 | 3 | 11080 | 3693.33 | 100.0% | 0.75330 | 4902.85 | 9576.90 | 0.5119 | |
| 2B | 4 | 3/30/2013 15:06 | 3 | 11228 | 3742.67 | 100.0% | 0.75430 | 4961.81 | 9576.91 | 0.5181 | |
| 2B | 5 | 3/30/2013 14:56 | 3 | 11031 | 3677.00 | 100.0% | 0.75572 | 4865.54 | 9576.91 | 0.5080 | |
| 2B | 6 | 3/30/2013 14:49 | 3 | 10699 | 3566.33 | 100.0% | 0.75673 | 4712.85 | 9576.91 | 0.4921 | |
| 2B | 7 | 3/30/2013 15:50 | 3 | 11366 | 3788.67 | 99.8% | 0.74844 | 5070.02 | 9576.89 | 0.5294 | |
| 2B | 8 | 3/30/2013 15:42 | 3 | 11316 | 3772.00 | 100.0% | 0.74949 | 5032.75 | 9576.89 | 0.5255 | 0.5160 |
| 2C | 1 | 3/30/2013 15:42 | 3 | 11254 | 3751.33 | 99.8% | 0.74949 | 5013.06 | 9576.89 | 0.5235 | |
| 2C | 2 | 3/30/2013 15:34 | 3 | 11196 | 3732.00 | 100.0% | 0.75060 | 4972.00 | 9576.89 | 0.5192 | |
| 2C | 3 | 3/30/2013 15:23 | 3 | 11123 | 3707.67 | 100.0% | 0.75200 | 4930.41 | 9576.90 | 0.5148 | |
| 2C | 4 | 3/30/2013 15:14 | 3 | 11257 | 3752.33 | 100.0% | 0.75330 | 4981.17 | 9576.90 | 0.5201 | |
| 2C | 5 | 3/30/2013 15:06 | 3 | 11037 | 3679.00 | 100.0% | 0.75430 | 4877.40 | 9576.91 | 0.5093 | |
| 2C | 6 | 3/30/2013 14:56 | 3 | 10818 | 3606.00 | 100.0% | 0.75572 | 4771.59 | 9576.91 | 0.4982 | |
| 2C | 7 | 3/30/2013 14:49 | 3 | 11625 | 3875.00 | 99.8% | 0.75666 | 5129.23 | 9576.91 | 0.5356 | |
| 2C | 8 | 3/30/2013 15:50 | 3 | 11273 | 3757.67 | 100.0% | 0.74844 | 5020.64 | 9576.89 | 0.5242 | 0.5181 |
| 2D | 1 | 3/30/2013 15:50 | 3 | 11170 | 3723.33 | 99.8% | 0.74844 | 4982.59 | 9576.89 | 0.5203 | |
| 2D | 2 | 3/30/2013 15:42 | 3 | 11062 | 3687.33 | 100.0% | 0.74949 | 4919.80 | 9576.89 | 0.5137 | |
| 2D | 3 | 3/30/2013 15:34 | 3 | 11193 | 3731.00 | 100.0% | 0.75060 | 4970.68 | 9576.89 | 0.5190 | |
| 2D | 4 | 3/30/2013 15:23 | 3 | 11423 | 3807.67 | 100.0% | 0.75200 | 5063.39 | 9576.90 | 0.5287 | |
| 2D | 5 | 3/30/2013 15:14 | 3 | 11240 | 3746.67 | 100.0% | 0.75330 | 4973.67 | 9576.90 | 0.5193 | |
| 2D | 6 | 3/30/2013 15:06 | 3 | 10285 | 3428.33 | 100.0% | 0.75430 | 4545.08 | 9576.91 | 0.4746 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2D | 7 | 3/30/2013 14:56 | 3 | 11687 | 3895.67 | 99.8% | 0.75572 | 5163.01 | 9576.91 | 0.5391 | |
| 2D | 8 | 3/30/2013 14:49 | 3 | 11832 | 3944.00 | 100.0% | 0.75666 | 5212.35 | 9576.91 | 0.5443 | 0.5199 |
| 3A | 1 | 3/30/2013 14:53 | 3 | 11701 | 3900.33 | 99.8% | 0.75616 | 5166.20 | 9576.91 | 0.5394 | |
| 3A | 2 | 3/30/2013 16:22 | 3 | 11614 | 3871.33 | 100.0% | 0.74414 | 5202.44 | 9576.87 | 0.5432 | |
| 3A | 3 | 3/30/2013 15:46 | 3 | 11501 | 3833.67 | 100.0% | 0.74893 | 5118.83 | 9576.89 | 0.5345 | |
| 3A | 4 | 3/30/2013 15:38 | 3 | 11680 | 3893.33 | 100.0% | 0.75002 | 5191.00 | 9576.89 | 0.5420 | |
| 3A | 5 | 3/30/2013 15:28 | 3 | 11179 | 3726.33 | 100.0% | 0.75134 | 4959.57 | 9576.90 | 0.5179 | |
| 3A | 6 | 3/30/2013 15:19 | 3 | 10626 | 3542.00 | 100.0% | 0.75252 | 4706.82 | 9576.90 | 0.4915 | |
| 3A | 7 | 3/30/2013 15:10 | 3 | 11829 | 3943.00 | 99.8% | 0.75379 | 5239.13 | 9576.90 | 0.5471 | |
| 3A | 8 | 3/30/2013 15:03 | 3 | 11508 | 3836.00 | 100.0% | 0.75475 | 5082.48 | 9576.91 | 0.5307 | 0.5308 |
| 3B | 1 | 3/30/2013 15:03 | 3 | 11658 | 3886.00 | 99.8% | 0.75475 | 5156.83 | 9576.91 | 0.5385 | |
| 3B | 2 | 3/30/2013 14:53 | 3 | 11625 | 3875.00 | 100.0% | 0.75616 | 5124.60 | 9576.91 | 0.5351 | |
| 3B | 3 | 3/30/2013 16:22 | 3 | 11173 | 3724.33 | 100.0% | 0.74414 | 5004.89 | 9576.87 | 0.5226 | |
| 3B | 4 | 3/30/2013 15:46 | 3 | 11497 | 3832.33 | 100.0% | 0.74893 | 5117.05 | 9576.89 | 0.5343 | |
| 3B | 5 | 3/30/2013 15:38 | 3 | 11424 | 3808.00 | 100.0% | 0.75002 | 5077.23 | 9576.89 | 0.5302 | |
| 3B | 6 | 3/30/2013 15:28 | 3 | 10607 | 3535.67 | 100.0% | 0.75134 | 4705.79 | 9576.90 | 0.4914 | |
| 3B | 7 | 3/30/2013 15:19 | 3 | 11866 | 3955.33 | 99.8% | 0.75252 | 5264.35 | 9576.90 | 0.5497 | |
| 3B | 8 | 3/30/2013 15:10 | 3 | 11767 | 3922.33 | 100.0% | 0.75379 | 5203.48 | 9576.90 | 0.5433 | 0.5306 |
| 3C | 1 | 3/30/2013 15:10 | 3 | 11610 | 3870.00 | 99.8% | 0.75379 | 5142.14 | 9576.90 | 0.5369 | |
| 3C | 2 | 3/30/2013 15:03 | 3 | 11528 | 3842.67 | 100.0% | 0.75475 | 5091.32 | 9576.91 | 0.5316 | |
| 3C | 3 | 3/30/2013 14:53 | 3 | 11751 | 3917.00 | 100.0% | 0.75616 | 5180.14 | 9576.91 | 0.5409 | |
| 3C | 4 | 3/30/2013 16:22 | 3 | 11509 | 3836.33 | 100.0% | 0.74414 | 5155.40 | 9576.87 | 0.5383 | |
| 3C | 5 | 3/30/2013 15:46 | 3 | 11490 | 3830.00 | 100.0% | 0.74893 | 5113.94 | 9576.89 | 0.5340 | |
| 3C | 6 | 3/30/2013 15:38 | 3 | 10363 | 3454.33 | 100.0% | 0.75002 | 4605.67 | 9576.89 | 0.4809 | |
| 3C | 7 | 3/30/2013 15:28 | 3 | 11782 | 3927.33 | 99.8% | 0.75134 | 5235.32 | 9576.90 | 0.5467 | |
| 3C | 8 | 3/30/2013 15:19 | 3 | 11810 | 3936.67 | 100.0% | 0.75252 | 5231.28 | 9576.90 | 0.5462 | 0.5319 |
| 3D | 1 | 3/30/2013 15:19 | 3 | 11458 | 3819.33 | 99.8% | 0.75252 | 5083.34 | 9576.90 | 0.5308 | |
| 3D | 2 | 3/30/2013 15:10 | 3 | 11260 | 3753.33 | 100.0% | 0.75379 | 4979.30 | 9576.90 | 0.5199 | |
| 3D | 3 | 3/30/2013 15:03 | 3 | 11499 | 3833.00 | 100.0% | 0.75475 | 5078.49 | 9576.91 | 0.5303 | |
| 3D | 4 | 3/30/2013 14:53 | 3 | 11444 | 3814.67 | 100.0% | 0.75616 | 5044.78 | 9576.91 | 0.5268 | |
| 3D | 5 | 3/30/2013 16:22 | 3 | 11039 | 3679.67 | 100.0% | 0.74414 | 4944.87 | 9576.87 | 0.5163 | |
| 3D | 6 | 3/30/2013 15:46 | 3 | 10203 | 3401.00 | 100.0% | 0.74893 | 4541.12 | 9576.89 | 0.4742 | |
| 3D | 7 | 3/30/2013 15:38 | 3 | 11594 | 3864.67 | 99.8% | 0.75002 | 5160.87 | 9576.89 | 0.5389 | |
| 3D | 8 | 3/30/2013 15:28 | 3 | 11466 | 3822.00 | 100.0% | 0.75134 | 5086.90 | 9576.90 | 0.5312 | 0.5210 |
| 4A | 1 | 3/30/2013 15:28 | 3 | 11533 | 3844.33 | 99.8% | 0.75137 | 5124.48 | 9576.90 | 0.5351 | |
| 4A | 2 | 3/30/2013 15:19 | 3 | 11688 | 3896.00 | 100.0% | 0.75252 | 5177.27 | 9576.90 | 0.5406 | |
| 4A | 3 | 3/30/2013 15:10 | 3 | 11649 | 3883.00 | 100.0% | 0.75382 | 5151.12 | 9576.90 | 0.5379 | |
| 4A | 4 | 3/30/2013 15:03 | 3 | 11603 | 3867.67 | 100.0% | 0.75477 | 5124.27 | 9576.91 | 0.5351 | |
| 4A | 5 | 3/30/2013 14:53 | 3 | 11409 | 3803.00 | 100.0% | 0.75618 | 5029.20 | 9576.91 | 0.5251 | |
| 4A | 6 | 3/30/2013 16:21 | 3 | 10217 | 3405.67 | 100.0% | 0.74416 | 4576.51 | 9576.87 | 0.4779 | |
| 4A | 7 | 3/30/2013 15:46 | 3 | 11782 | 3927.33 | 99.8% | 0.74895 | 5252.00 | 9576.89 | 0.5484 | |
| 4A | 8 | 3/30/2013 15:38 | 3 | 11639 | 3879.67 | 100.0% | 0.75001 | 5172.80 | 9576.89 | 0.5401 | 0.5300 |
| 4B | 1 | 3/30/2013 15:38 | 3 | 11605 | 3868.33 | 99.8% | 0.75001 | 5165.80 | 9576.89 | 0.5394 | |
| 4B | 2 | 3/30/2013 15:28 | 3 | 11505 | 3835.00 | 100.0% | 0.75137 | 5104.03 | 9576.90 | 0.5330 | |
| 4B | 3 | 3/30/2013 15:19 | 3 | 11446 | 3815.33 | 100.0% | 0.75252 | 5070.08 | 9576.90 | 0.5294 | |
| 4B | 4 | 3/30/2013 15:10 | 3 | 11555 | 3851.67 | 100.0% | 0.75383 | 5109.47 | 9576.90 | 0.5335 | |
| 4B | 5 | 3/30/2013 15:03 | 3 | 11501 | 3833.67 | 100.0% | 0.75477 | 5079.23 | 9576.91 | 0.5304 | |
| 4B | 6 | 3/30/2013 14:53 | 3 | 11310 | 3770.00 | 100.0% | 0.75618 | 4985.57 | 9576.91 | 0.5206 | |
| 4B | 7 | 3/30/2013 16:21 | 3 | 11770 | 3923.33 | 99.8% | 0.74416 | 5280.43 | 9576.87 | 0.5514 | |
| 4B | 8 | 3/30/2013 15:46 | 3 | 11638 | 3879.33 | 100.0% | 0.74895 | 5179.67 | 9576.89 | 0.5409 | 0.5348 |
| 4C | 1 | 3/30/2013 15:46 | 3 | 11691 | 3897.00 | 99.8% | 0.74895 | 5211.44 | 9576.89 | 0.5442 | |
| 4C | 2 | 3/30/2013 15:38 | 3 | 11555 | 3851.67 | 100.0% | 0.75001 | 5135.47 | 9576.89 | 0.5362 | |
| 4C | 3 | 3/30/2013 15:28 | 3 | 11702 | 3900.67 | 100.0% | 0.75137 | 5191.43 | 9576.90 | 0.5421 | |
| 4C | 4 | 3/30/2013 15:19 | 3 | 11727 | 3909.00 | 100.0% | 0.75252 | 5194.56 | 9576.90 | 0.5424 | |
| 4C | 5 | 3/30/2013 15:10 | 3 | 11434 | 3811.33 | 100.0% | 0.75383 | 5055.97 | 9576.90 | 0.5279 | |
| 4C | 6 | 3/30/2013 15:03 | 3 | 10920 | 3640.00 | 100.0% | 0.75477 | 4822.65 | 9576.91 | 0.5036 | |
| 4C | 7 | 3/30/2013 14:53 | 3 | 12089 | 4029.67 | 99.8% | 0.75618 | 5337.34 | 9576.91 | 0.5573 | |
| 4C | 8 | 3/30/2013 16:21 | 3 | 11653 | 3884.33 | 100.0% | 0.74416 | 5219.73 | 9576.87 | 0.5450 | 0.5373 |
| 4D | 1 | 3/30/2013 16:21 | 3 | 11486 | 3828.67 | 99.8% | 0.74416 | 5153.02 | 9576.87 | 0.5381 | |
| 4D | 2 | 3/30/2013 15:46 | 3 | 11498 | 3832.67 | 100.0% | 0.74896 | 5117.33 | 9576.89 | 0.5343 | |
| 4D | 3 | 3/30/2013 15:38 | 3 | 11268 | 3756.00 | 100.0% | 0.75001 | 5007.91 | 9576.89 | 0.5229 | |
| 4D | 4 | 3/30/2013 15:28 | 3 | 11646 | 3882.00 | 100.0% | 0.75137 | 5166.55 | 9576.90 | 0.5395 | |
| 4D | 5 | 3/30/2013 15:19 | 3 | 11638 | 3879.33 | 100.0% | 0.75252 | 5155.14 | 9576.90 | 0.5383 | |
| 4D | 6 | 3/30/2013 15:10 | 3 | 10716 | 3572.00 | 100.0% | 0.75383 | 4738.48 | 9576.90 | 0.4948 | |
| 4D | 7 | 3/30/2013 15:03 | 3 | 11892 | 3964.00 | 99.8% | 0.75478 | 5260.15 | 9576.91 | 0.5493 | |
| 4D | 8 | 3/30/2013 14:53 | 3 | 11641 | 3880.33 | 100.0% | 0.75618 | 5131.48 | 9576.91 | 0.5358 | 0.5316 |
| 5A | 1 | 3/30/2013 16:26 | 3 | 11655 | 3885.00 | 99.8% | 0.74359 | 5232.90 | 9576.87 | 0.5464 | |
| 5A | 2 | 3/30/2013 17:24 | 3 | 11486 | 3828.67 | 100.0% | 0.73586 | 5202.99 | 9576.85 | 0.5433 | |
| 5A | 3 | 3/30/2013 17:16 | 3 | 11067 | 3689.00 | 100.0% | 0.73693 | 5005.90 | 9576.85 | 0.5227 | |
| 5A | 4 | 3/30/2013 17:08 | 3 | 11784 | 3928.00 | 100.0% | 0.73797 | 5322.71 | 9576.85 | 0.5558 | |
| 5A | 5 | 3/30/2013 16:59 | 3 | 11476 | 3825.33 | 100.0% | 0.73910 | 5175.65 | 9576.86 | 0.5404 | |
| 5A | 6 | 3/30/2013 16:51 | 3 | 10191 | 3397.00 | 100.0% | 0.74024 | 4589.06 | 9576.86 | 0.4792 | |
| 5A | 7 | 3/30/2013 16:43 | 3 | 11950 | 3983.33 | 99.8% | 0.74133 | 5381.71 | 9576.86 | 0.5619 | |
| 5A | 8 | 3/30/2013 16:34 | 3 | 11683 | 3894.33 | 100.0% | 0.74243 | 5245.41 | 9576.87 | 0.5477 | 0.5372 |
| 5B | 1 | 3/30/2013 16:34 | 3 | 11610 | 3870.00 | 99.8% | 0.74244 | 5220.72 | 9576.87 | 0.5451 | |
| 5B | 2 | 3/30/2013 16:26 | 3 | 11459 | 3819.67 | 100.0% | 0.74358 | 5136.88 | 9576.87 | 0.5364 | |
| 5B | 3 | 3/30/2013 17:24 | 3 | 11519 | 3839.67 | 100.0% | 0.73586 | 5217.94 | 9576.85 | 0.5448 | |
| 5B | 4 | 3/30/2013 17:15 | 3 | 11560 | 3853.33 | 100.0% | 0.73695 | 5228.79 | 9576.85 | 0.5460 | |
| 5B | 5 | 3/30/2013 17:08 | 3 | 11373 | 3791.00 | 100.0% | 0.73798 | 5136.99 | 9576.85 | 0.5364 | |
| 5B | 6 | 3/30/2013 16:59 | 3 | 10226 | 3408.67 | 100.0% | 0.73912 | 4611.80 | 9576.86 | 0.4816 | |
| 5B | 7 | 3/30/2013 16:51 | 3 | 11833 | 3944.33 | 99.8% | 0.74025 | 5336.74 | 9576.86 | 0.5573 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5B | 8 | 3/30/2013 16:42 | 3 | 11831 | 3943.67 | 100.0% | 0.74134 | 5319.62 | 9576.86 | 0.5555 | 0.5379 |
| 5C | 1 | 3/30/2013 16:42 | 3 | 11633 | 3877.67 | 99.8% | 0.74134 | 5238.82 | 9576.86 | 0.5470 | |
| 5C | 2 | 3/30/2013 16:34 | 3 | 11756 | 3918.67 | 100.0% | 0.74244 | 5278.07 | 9576.87 | 0.5511 | |
| 5C | 3 | 3/30/2013 16:26 | 3 | 11398 | 3799.33 | 100.0% | 0.74355 | 5109.72 | 9576.87 | 0.5335 | |
| 5C | 4 | 3/30/2013 17:24 | 3 | 11733 | 3911.00 | 100.0% | 0.73586 | 5314.89 | 9576.85 | 0.5550 | |
| 5C | 5 | 3/30/2013 17:15 | 3 | 11330 | 3776.67 | 100.0% | 0.73695 | 5124.75 | 9576.85 | 0.5351 | |
| 5C | 6 | 3/30/2013 17:08 | 3 | 10272 | 3424.00 | 100.0% | 0.73798 | 4639.68 | 9576.85 | 0.4845 | |
| 5C | 7 | 3/30/2013 16:59 | 3 | 11798 | 3932.67 | 99.8% | 0.73912 | 5329.12 | 9576.86 | 0.5565 | |
| 5C | 8 | 3/30/2013 16:51 | 3 | 11698 | 3899.33 | 100.0% | 0.74025 | 5267.58 | 9576.86 | 0.5500 | 0.5391 |
| 5D | 1 | 3/30/2013 16:51 | 3 | 11647 | 3882.33 | 99.8% | 0.74025 | 5252.87 | 9576.86 | 0.5485 | |
| 5D | 2 | 3/30/2013 16:42 | 3 | 11618 | 3872.67 | 100.0% | 0.74134 | 5223.87 | 9576.86 | 0.5455 | |
| 5D | 3 | 3/30/2013 16:34 | 3 | 11265 | 3755.00 | 100.0% | 0.74244 | 5057.63 | 9576.87 | 0.5281 | |
| 5D | 4 | 3/30/2013 16:26 | 3 | 11705 | 3901.67 | 100.0% | 0.74354 | 5247.44 | 9576.87 | 0.5479 | |
| 5D | 5 | 3/30/2013 17:24 | 3 | 11262 | 3754.00 | 100.0% | 0.73586 | 5101.53 | 9576.85 | 0.5327 | |
| 5D | 6 | 3/30/2013 17:15 | 3 | 10373 | 3457.67 | 100.0% | 0.73695 | 4691.88 | 9576.85 | 0.4899 | |
| 5D | 7 | 3/30/2013 17:08 | 3 | 11696 | 3898.67 | 99.8% | 0.73798 | 5291.19 | 9576.85 | 0.5525 | |
| 5D | 8 | 3/30/2013 16:59 | 3 | 11921 | 3973.67 | 100.0% | 0.73912 | 5376.23 | 9576.86 | 0.5614 | 0.5383 |
| 6A | 1 | 3/30/2013 16:59 | 3 | 10267 | 3422.33 | 99.8% | 0.73912 | 4637.59 | 9576.86 | 0.4842 | |
| 6A | 2 | 3/30/2013 16:51 | 3 | 10393 | 3464.33 | 100.0% | 0.74025 | 4679.94 | 9576.86 | 0.4887 | |
| 6A | 3 | 3/30/2013 16:42 | 3 | 10000 | 3333.33 | 100.0% | 0.74134 | 4496.37 | 9576.86 | 0.4695 | |
| 6A | 4 | 3/30/2013 16:34 | 3 | 10268 | 3422.67 | 100.0% | 0.74244 | 4610.02 | 9576.87 | 0.4814 | |
| 6A | 5 | 3/30/2013 16:26 | 3 | 10193 | 3397.67 | 100.0% | 0.74353 | 4569.67 | 9576.87 | 0.4772 | |
| 6A | 6 | 3/30/2013 17:24 | 3 | 9216 | 3072.00 | 100.0% | 0.73587 | 4174.64 | 9576.85 | 0.4359 | |
| 6A | 7 | 3/30/2013 17:15 | 3 | 10341 | 3447.00 | 99.8% | 0.73695 | 4684.77 | 9576.85 | 0.4892 | |
| 6A | 8 | 3/30/2013 17:08 | 3 | 10688 | 3562.67 | 100.0% | 0.73798 | 4827.57 | 9576.85 | 0.5041 | 0.4788 |
| 6B | 1 | 3/30/2013 17:07 | 3 | 9650 | 3216.67 | 99.8% | 0.73802 | 4365.37 | 9576.85 | 0.4558 | |
| 6B | 2 | 3/30/2013 16:59 | 3 | 9600 | 3200.00 | 100.0% | 0.73916 | 4329.24 | 9576.86 | 0.4521 | |
| 6B | 3 | 3/30/2013 16:50 | 3 | 9488 | 3162.67 | 100.0% | 0.74029 | 4272.20 | 9576.86 | 0.4461 | |
| 6B | 4 | 3/30/2013 16:42 | 3 | 9316 | 3105.33 | 100.0% | 0.74138 | 4188.59 | 9576.86 | 0.4374 | |
| 6B | 5 | 3/30/2013 16:34 | 3 | 9565 | 3188.33 | 100.0% | 0.74249 | 4294.14 | 9576.87 | 0.4484 | |
| 6B | 6 | 3/30/2013 16:26 | 3 | 8925 | 2975.00 | 100.0% | 0.74351 | 4001.29 | 9576.87 | 0.4178 | |
| 6B | 7 | 3/30/2013 17:23 | 3 | 9759 | 3253.00 | 99.8% | 0.73591 | 4427.33 | 9576.85 | 0.4623 | |
| 6B | 8 | 3/30/2013 17:15 | 3 | 9976 | 3325.33 | 100.0% | 0.73695 | 4512.30 | 9576.85 | 0.4712 | 0.4489 |
| 6C | 1 | 3/30/2013 17:15 | 3 | 11087 | 3695.67 | 99.8% | 0.73695 | 5022.71 | 9576.85 | 0.5245 | |
| 6C | 2 | 3/30/2013 17:07 | 3 | 10791 | 3597.00 | 100.0% | 0.73802 | 4873.84 | 9576.85 | 0.5089 | |
| 6C | 3 | 3/30/2013 16:59 | 3 | 10739 | 3579.67 | 100.0% | 0.73916 | 4842.90 | 9576.86 | 0.5057 | |
| 6C | 4 | 3/30/2013 16:50 | 3 | 11188 | 3729.33 | 100.0% | 0.74029 | 5037.67 | 9576.86 | 0.5260 | |
| 6C | 5 | 3/30/2013 16:42 | 3 | 10825 | 3608.33 | 100.0% | 0.74138 | 4867.06 | 9576.86 | 0.5082 | |
| 6C | 6 | 3/30/2013 16:34 | 3 | 9783 | 3261.00 | 100.0% | 0.74249 | 4392.01 | 9576.87 | 0.4586 | |
| 6C | 7 | 3/30/2013 16:26 | 3 | 11152 | 3717.33 | 99.8% | 0.74350 | 5007.66 | 9576.87 | 0.5229 | |
| 6C | 8 | 3/30/2013 17:23 | 3 | 11124 | 3708.00 | 100.0% | 0.73591 | 5038.67 | 9576.85 | 0.5261 | 0.5101 |
| 6D | 1 | 3/30/2013 17:23 | 3 | 9649 | 3216.33 | 99.8% | 0.73591 | 4377.44 | 9576.85 | 0.4571 | |
| 6D | 2 | 3/30/2013 17:15 | 3 | 9827 | 3275.67 | 100.0% | 0.73695 | 4444.91 | 9576.85 | 0.4641 | |
| 6D | 3 | 3/30/2013 17:07 | 3 | 9547 | 3182.33 | 100.0% | 0.73802 | 4311.98 | 9576.85 | 0.4503 | |
| 6D | 4 | 3/30/2013 16:59 | 3 | 9754 | 3251.33 | 100.0% | 0.73916 | 4398.70 | 9576.86 | 0.4593 | |
| 6D | 5 | 3/30/2013 16:50 | 3 | 9554 | 3184.67 | 100.0% | 0.74029 | 4301.92 | 9576.86 | 0.4492 | |
| 6D | 6 | 3/30/2013 16:42 | 3 | 8807 | 2935.67 | 100.0% | 0.74138 | 3959.73 | 9576.86 | 0.4136 | |
| 6D | 7 | 3/30/2013 16:34 | 3 | 9897 | 3299.00 | 99.8% | 0.74249 | 4450.17 | 9576.87 | 0.4647 | |
| 6D | 8 | 3/30/2013 16:26 | 3 | 10375 | 3458.33 | 100.0% | 0.74348 | 4651.53 | 9576.87 | 0.4857 | 0.4555 |
| 7A | 1 | 3/30/2013 16:30 | 3 | 11560 | 3853.33 | 99.8% | 0.74307 | 5193.85 | 9576.87 | 0.5423 | |
| 7A | 2 | 3/30/2013 17:27 | 3 | 11626 | 3875.33 | 100.0% | 0.73534 | 5270.10 | 9576.84 | 0.5503 | |
| 7A | 3 | 3/30/2013 17:19 | 3 | 11273 | 3757.67 | 100.0% | 0.73642 | 5102.60 | 9576.85 | 0.5328 | |
| 7A | 4 | 3/30/2013 17:11 | 3 | 11725 | 3908.33 | 100.0% | 0.73748 | 5299.56 | 9576.85 | 0.5534 | |
| 7A | 5 | 3/30/2013 17:03 | 3 | 11401 | 3800.33 | 100.0% | 0.73857 | 5145.55 | 9576.85 | 0.5373 | |
| 7A | 6 | 3/30/2013 16:55 | 3 | 10164 | 3388.00 | 100.0% | 0.73970 | 4580.23 | 9576.86 | 0.4783 | |
| 7A | 7 | 3/30/2013 16:47 | 3 | 11939 | 3979.67 | 99.8% | 0.74080 | 5380.59 | 9576.86 | 0.5618 | |
| 7A | 8 | 3/30/2013 16:38 | 3 | 11566 | 3855.33 | 100.0% | 0.74190 | 5196.58 | 9576.87 | 0.5426 | 0.5374 |
| 7B | 1 | 3/30/2013 16:38 | 3 | 11760 | 3920.00 | 99.8% | 0.74190 | 5292.07 | 9576.87 | 0.5526 | |
| 7B | 2 | 3/30/2013 16:30 | 3 | 11681 | 3893.67 | 100.0% | 0.74307 | 5239.97 | 9576.87 | 0.5471 | |
| 7B | 3 | 3/30/2013 17:27 | 3 | 11371 | 3790.33 | 100.0% | 0.73534 | 5154.50 | 9576.84 | 0.5382 | |
| 7B | 4 | 3/30/2013 17:19 | 3 | 11697 | 3899.00 | 100.0% | 0.73642 | 5294.52 | 9576.85 | 0.5528 | |
| 7B | 5 | 3/30/2013 17:11 | 3 | 11369 | 3789.67 | 100.0% | 0.73748 | 5138.65 | 9576.85 | 0.5366 | |
| 7B | 6 | 3/30/2013 17:03 | 3 | 10315 | 3438.33 | 100.0% | 0.73857 | 4655.41 | 9576.85 | 0.4861 | |
| 7B | 7 | 3/30/2013 16:55 | 3 | 11866 | 3955.33 | 99.8% | 0.73970 | 5355.63 | 9576.86 | 0.5592 | |
| 7B | 8 | 3/30/2013 16:46 | 3 | 11568 | 3856.00 | 100.0% | 0.74080 | 5205.17 | 9576.86 | 0.5435 | 0.5395 |
| 7C | 1 | 3/30/2013 16:47 | 3 | 11611 | 3870.33 | 99.8% | 0.74080 | 5232.75 | 9576.86 | 0.5464 | |
| 7C | 2 | 3/30/2013 16:38 | 3 | 11340 | 3780.00 | 100.0% | 0.74190 | 5095.05 | 9576.87 | 0.5320 | |
| 7C | 3 | 3/30/2013 16:30 | 3 | 11305 | 3768.33 | 100.0% | 0.74307 | 5071.30 | 9576.87 | 0.5295 | |
| 7C | 4 | 3/30/2013 17:27 | 3 | 11354 | 3784.67 | 100.0% | 0.73534 | 5146.80 | 9576.84 | 0.5374 | |
| 7C | 5 | 3/30/2013 17:19 | 3 | 11424 | 3808.00 | 100.0% | 0.73642 | 5170.95 | 9576.85 | 0.5399 | |
| 7C | 6 | 3/30/2013 17:11 | 3 | 10295 | 3431.67 | 100.0% | 0.73748 | 4653.22 | 9576.85 | 0.4859 | |
| 7C | 7 | 3/30/2013 17:03 | 3 | 11620 | 3873.33 | 99.8% | 0.73857 | 5252.65 | 9576.85 | 0.5485 | |
| 7C | 8 | 3/30/2013 16:55 | 3 | 11421 | 3807.00 | 100.0% | 0.73970 | 5146.69 | 9576.86 | 0.5374 | 0.5321 |
| 7D | 1 | 3/30/2013 16:55 | 3 | 11688 | 3896.00 | 99.8% | 0.73970 | 5275.29 | 9576.86 | 0.5508 | |
| 7D | 2 | 3/30/2013 16:47 | 3 | 11681 | 3893.67 | 100.0% | 0.74080 | 5256.03 | 9576.86 | 0.5488 | |
| 7D | 3 | 3/30/2013 16:38 | 3 | 11287 | 3762.33 | 100.0% | 0.74190 | 5071.24 | 9576.87 | 0.5295 | |
| 7D | 4 | 3/30/2013 16:30 | 3 | 11695 | 3898.33 | 100.0% | 0.74307 | 5246.25 | 9576.87 | 0.5478 | |
| 7D | 5 | 3/30/2013 17:27 | 3 | 11332 | 3777.33 | 100.0% | 0.73534 | 5136.82 | 9576.84 | 0.5364 | |
| 7D | 6 | 3/30/2013 17:19 | 3 | 10278 | 3426.00 | 100.0% | 0.73642 | 4652.24 | 9576.85 | 0.4858 | |
| 7D | 7 | 3/30/2013 17:11 | 3 | 11645 | 3881.67 | 99.8% | 0.73748 | 5271.68 | 9576.85 | 0.5505 | |
| 7D | 8 | 3/30/2013 17:03 | 3 | 11537 | 3845.67 | 100.0% | 0.73857 | 5206.94 | 9576.85 | 0.5437 | 0.5367 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8A | 1 | 3/30/2013 17:03 | 3 | 11089 | 3696.33 | 99.8% | 0.73859 | 5012.42 | 9576.85 | 0.5234 | |
| 8A | 2 | 3/30/2013 16:55 | 3 | 11355 | 3785.00 | 100.0% | 0.73972 | 5116.78 | 9576.86 | 0.5343 | |
| 8A | 3 | 3/30/2013 16:46 | 3 | 11121 | 3707.00 | 100.0% | 0.74083 | 5003.86 | 9576.86 | 0.5225 | |
| 8A | 4 | 3/30/2013 16:38 | 3 | 11478 | 3826.00 | 100.0% | 0.74193 | 5156.82 | 9576.87 | 0.5385 | |
| 8A | 5 | 3/30/2013 16:30 | 3 | 11256 | 3752.00 | 100.0% | 0.74304 | 5049.52 | 9576.87 | 0.5273 | |
| 8A | 6 | 3/30/2013 17:27 | 3 | 10002 | 3334.00 | 100.0% | 0.73537 | 4533.77 | 9576.84 | 0.4734 | |
| 8A | 7 | 3/30/2013 17:19 | 3 | 11411 | 3803.67 | 99.8% | 0.73645 | 5173.02 | 9576.85 | 0.5402 | |
| 8A | 8 | 3/30/2013 17:11 | 3 | 11544 | 3848.00 | 100.0% | 0.73750 | 5217.59 | 9576.85 | 0.5448 | 0.5255 |
| 8B | 1 | 3/30/2013 17:11 | 3 | 11077 | 3692.33 | 99.8% | 0.73750 | 5014.41 | 9576.85 | 0.5236 | |
| 8B | 2 | 3/30/2013 17:03 | 3 | 11109 | 3703.00 | 100.0% | 0.73859 | 5013.58 | 9576.85 | 0.5235 | |
| 8B | 3 | 3/30/2013 16:55 | 3 | 11001 | 3667.00 | 100.0% | 0.73973 | 4957.23 | 9576.86 | 0.5176 | |
| 8B | 4 | 3/30/2013 16:46 | 3 | 11116 | 3705.33 | 100.0% | 0.74083 | 5001.61 | 9576.86 | 0.5223 | |
| 8B | 5 | 3/30/2013 16:38 | 3 | 10804 | 3601.33 | 100.0% | 0.74193 | 4854.01 | 9576.87 | 0.5068 | |
| 8B | 6 | 3/30/2013 16:30 | 3 | 9694 | 3231.33 | 100.0% | 0.74305 | 4348.77 | 9576.87 | 0.4541 | |
| 8B | 7 | 3/30/2013 17:27 | 3 | 11250 | 3750.00 | 99.8% | 0.73537 | 5107.49 | 9576.84 | 0.5333 | |
| 8B | 8 | 3/30/2013 17:19 | 3 | 11031 | 3677.00 | 100.0% | 0.73645 | 4992.90 | 9576.85 | 0.5214 | 0.5128 |
| 8C | 1 | 3/30/2013 17:19 | 3 | 11611 | 3870.33 | 99.8% | 0.73645 | 5263.69 | 9576.85 | 0.5496 | |
| 8C | 2 | 3/30/2013 17:11 | 3 | 11556 | 3852.00 | 100.0% | 0.73751 | 5223.00 | 9576.85 | 0.5454 | |
| 8C | 3 | 3/30/2013 17:03 | 3 | 11315 | 3771.67 | 100.0% | 0.73859 | 5106.55 | 9576.85 | 0.5332 | |
| 8C | 4 | 3/30/2013 16:55 | 3 | 11562 | 3854.00 | 100.0% | 0.73973 | 5210.03 | 9576.86 | 0.5440 | |
| 8C | 5 | 3/30/2013 16:46 | 3 | 11426 | 3808.67 | 100.0% | 0.74083 | 5141.09 | 9576.86 | 0.5368 | |
| 8C | 6 | 3/30/2013 16:38 | 3 | 10288 | 3429.33 | 100.0% | 0.74193 | 4622.18 | 9576.87 | 0.4826 | |
| 8C | 7 | 3/30/2013 16:30 | 3 | 11706 | 3902.00 | 99.8% | 0.74305 | 5259.62 | 9576.87 | 0.5492 | |
| 8C | 8 | 3/30/2013 17:27 | 3 | 11532 | 3844.00 | 100.0% | 0.73537 | 5227.30 | 9576.84 | 0.5458 | 0.5358 |
| 8D | 1 | 3/30/2013 17:27 | 3 | 11532 | 3844.00 | 99.8% | 0.73537 | 5235.52 | 9576.84 | 0.5467 | |
| 8D | 2 | 3/30/2013 17:19 | 3 | 11838 | 3946.00 | 100.0% | 0.73644 | 5358.18 | 9576.85 | 0.5595 | |
| 8D | 3 | 3/30/2013 17:11 | 3 | 11402 | 3800.67 | 100.0% | 0.73751 | 5153.40 | 9576.85 | 0.5381 | |
| 8D | 4 | 3/30/2013 17:03 | 3 | 11541 | 3847.00 | 100.0% | 0.73859 | 5208.56 | 9576.85 | 0.5439 | |
| 8D | 5 | 3/30/2013 16:55 | 3 | 11561 | 3853.67 | 100.0% | 0.73972 | 5209.59 | 9576.86 | 0.5440 | |
| 8D | 6 | 3/30/2013 16:46 | 3 | 10407 | 3469.00 | 100.0% | 0.74083 | 4682.61 | 9576.86 | 0.4890 | |
| 8D | 7 | 3/30/2013 16:38 | 3 | 11975 | 3991.67 | 99.8% | 0.74193 | 5388.58 | 9576.87 | 0.5627 | |
| 8D | 8 | 3/30/2013 16:30 | 3 | 11785 | 3928.33 | 100.0% | 0.74304 | 5286.82 | 9576.87 | 0.5520 | 0.5420 |
| 9A | 1 | 3/30/2013 17:32 | 3 | 11659 | 3886.33 | 99.8% | 0.73476 | 5297.57 | 9576.84 | 0.5532 | |
| 9A | 2 | 3/30/2013 18:41 | 3 | 11487 | 3829.00 | 100.0% | 0.72567 | 5276.49 | 9576.81 | 0.5510 | |
| 9A | 3 | 3/30/2013 18:30 | 3 | 11268 | 3756.00 | 100.0% | 0.72712 | 5165.61 | 9576.82 | 0.5394 | |
| 9A | 4 | 3/30/2013 18:17 | 3 | 11367 | 3789.00 | 100.0% | 0.72882 | 5198.80 | 9576.82 | 0.5429 | |
| 9A | 5 | 3/30/2013 18:07 | 3 | 11199 | 3733.00 | 100.0% | 0.73018 | 5112.42 | 9576.83 | 0.5338 | |
| 9A | 6 | 3/30/2013 17:58 | 3 | 10112 | 3370.67 | 100.0% | 0.73134 | 4608.90 | 9576.83 | 0.4813 | |
| 9A | 7 | 3/30/2013 17:49 | 3 | 11654 | 3884.67 | 99.8% | 0.73244 | 5312.08 | 9576.83 | 0.5547 | |
| 9A | 8 | 3/30/2013 17:40 | 3 | 11504 | 3834.67 | 100.0% | 0.73364 | 5226.88 | 9576.84 | 0.5458 | 0.5377 |
| 9B | 1 | 3/30/2013 17:40 | 3 | 11269 | 3756.33 | 99.8% | 0.73367 | 5128.00 | 9576.84 | 0.5355 | |
| 9B | 2 | 3/30/2013 17:32 | 3 | 11252 | 3750.67 | 100.0% | 0.73474 | 5104.75 | 9576.84 | 0.5330 | |
| 9B | 3 | 3/30/2013 18:41 | 3 | 10930 | 3643.33 | 100.0% | 0.72567 | 5020.64 | 9576.81 | 0.5242 | |
| 9B | 4 | 3/30/2013 18:30 | 3 | 11070 | 3690.00 | 100.0% | 0.72713 | 5074.72 | 9576.82 | 0.5299 | |
| 9B | 5 | 3/30/2013 18:17 | 3 | 10957 | 3652.33 | 100.0% | 0.72881 | 5011.36 | 9576.82 | 0.5233 | |
| 9B | 6 | 3/30/2013 18:06 | 3 | 9962 | 3320.67 | 100.0% | 0.73021 | 4547.57 | 9576.83 | 0.4749 | |
| 9B | 7 | 3/30/2013 17:58 | 3 | 11504 | 3834.67 | 99.8% | 0.73136 | 5251.47 | 9576.83 | 0.5484 | |
| 9B | 8 | 3/30/2013 17:49 | 3 | 11466 | 3822.00 | 100.0% | 0.73246 | 5218.04 | 9576.83 | 0.5449 | 0.5267 |
| 9C | 1 | 3/30/2013 17:49 | 3 | 11302 | 3767.33 | 99.8% | 0.73246 | 5151.50 | 9576.83 | 0.5379 | |
| 9C | 2 | 3/30/2013 17:40 | 3 | 11541 | 3847.00 | 100.0% | 0.73367 | 5243.53 | 9576.84 | 0.5475 | |
| 9C | 3 | 3/30/2013 17:32 | 3 | 11133 | 3711.00 | 100.0% | 0.73474 | 5050.76 | 9576.84 | 0.5274 | |
| 9C | 4 | 3/30/2013 18:41 | 3 | 11241 | 3747.00 | 100.0% | 0.72567 | 5163.51 | 9576.81 | 0.5392 | |
| 9C | 5 | 3/30/2013 18:30 | 3 | 11355 | 3785.00 | 100.0% | 0.72713 | 5205.37 | 9576.82 | 0.5435 | |
| 9C | 6 | 3/30/2013 18:17 | 3 | 9940 | 3313.33 | 100.0% | 0.72880 | 4546.26 | 9576.82 | 0.4747 | |
| 9C | 7 | 3/30/2013 18:06 | 3 | 11315 | 3771.67 | 99.8% | 0.73021 | 5173.32 | 9576.83 | 0.5402 | |
| 9C | 8 | 3/30/2013 17:58 | 3 | 11501 | 3833.67 | 100.0% | 0.73136 | 5241.86 | 9576.83 | 0.5473 | 0.5322 |
| 9D | 1 | 3/30/2013 17:58 | 3 | 10904 | 3634.67 | 99.8% | 0.73136 | 4977.58 | 9576.83 | 0.5198 | |
| 9D | 2 | 3/30/2013 17:49 | 3 | 10843 | 3614.33 | 100.0% | 0.73246 | 4934.52 | 9576.83 | 0.5153 | |
| 9D | 3 | 3/30/2013 17:40 | 3 | 10806 | 3602.00 | 100.0% | 0.73367 | 4909.59 | 9576.84 | 0.5127 | |
| 9D | 4 | 3/30/2013 17:32 | 3 | 11058 | 3686.00 | 100.0% | 0.73474 | 5016.75 | 9576.84 | 0.5238 | |
| 9D | 5 | 3/30/2013 18:41 | 3 | 10540 | 3513.33 | 100.0% | 0.72567 | 4841.51 | 9576.81 | 0.5055 | |
| 9D | 6 | 3/30/2013 18:30 | 3 | 9592 | 3197.33 | 100.0% | 0.72713 | 4397.17 | 9576.82 | 0.4591 | |
| 9D | 7 | 3/30/2013 18:17 | 3 | 10852 | 3617.33 | 99.8% | 0.72879 | 4971.26 | 9576.82 | 0.5191 | |
| 9D | 8 | 3/30/2013 18:06 | 3 | 11020 | 3673.33 | 100.0% | 0.73021 | 5030.55 | 9576.83 | 0.5253 | 0.5101 |
| 10A | 1 | 3/30/2013 18:07 | 3 | 11136 | 3712.00 | 99.8% | 0.73019 | 5091.62 | 9576.83 | 0.5317 | |
| 10A | 2 | 3/30/2013 17:58 | 3 | 11627 | 3875.67 | 100.0% | 0.73134 | 5299.43 | 9576.83 | 0.5534 | |
| 10A | 3 | 3/30/2013 17:49 | 3 | 11376 | 3792.00 | 100.0% | 0.73244 | 5177.22 | 9576.83 | 0.5406 | |
| 10A | 4 | 3/30/2013 17:40 | 3 | 11242 | 3747.33 | 100.0% | 0.73364 | 5107.84 | 9576.84 | 0.5334 | |
| 10A | 5 | 3/30/2013 17:32 | 3 | 11144 | 3714.67 | 100.0% | 0.73473 | 5055.83 | 9576.84 | 0.5279 | |
| 10A | 6 | 3/30/2013 18:41 | 3 | 10013 | 3337.67 | 100.0% | 0.72567 | 4599.43 | 9576.81 | 0.4803 | |
| 10A | 7 | 3/30/2013 18:30 | 3 | 11308 | 3769.33 | 99.8% | 0.72711 | 5192.11 | 9576.82 | 0.5422 | |
| 10A | 8 | 3/30/2013 18:17 | 3 | 11203 | 3734.33 | 100.0% | 0.72878 | 5124.07 | 9576.82 | 0.5350 | 0.5305 |
| 10B | 1 | 3/30/2013 18:17 | 3 | 11287 | 3762.33 | 99.8% | 0.72877 | 5170.67 | 9576.82 | 0.5399 | |
| 10B | 2 | 3/30/2013 18:06 | 3 | 11442 | 3814.00 | 100.0% | 0.73022 | 5223.05 | 9576.83 | 0.5454 | |
| 10B | 3 | 3/30/2013 17:57 | 3 | 11205 | 3735.00 | 100.0% | 0.73138 | 5106.77 | 9576.83 | 0.5332 | |
| 10B | 4 | 3/30/2013 17:49 | 3 | 11271 | 3757.00 | 100.0% | 0.73243 | 5129.49 | 9576.83 | 0.5356 | |
| 10B | 5 | 3/30/2013 17:40 | 3 | 10906 | 3635.33 | 100.0% | 0.73366 | 4955.07 | 9576.84 | 0.5174 | |
| 10B | 6 | 3/30/2013 17:32 | 3 | 10051 | 3350.33 | 100.0% | 0.73477 | 4559.71 | 9576.84 | 0.4761 | |
| 10B | 7 | 3/30/2013 18:41 | 3 | 11185 | 3728.33 | 99.8% | 0.72567 | 5145.86 | 9576.81 | 0.5373 | |
| 10B | 8 | 3/30/2013 18:30 | 3 | 11060 | 3686.67 | 100.0% | 0.72715 | 5069.99 | 9576.82 | 0.5294 | 0.5268 |
| 10C | 1 | 3/30/2013 18:30 | 3 | 11164 | 3721.33 | 99.8% | 0.72715 | 5125.72 | 9576.82 | 0.5352 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10C | 2 | 3/30/2013 18:17 | 3 | 11215 | 3738.33 | 100.0% | 0.72876 | 5129.69 | 9576.82 | 0.5356 | |
| 10C | 3 | 3/30/2013 18:06 | 3 | 11291 | 3763.67 | 100.0% | 0.73023 | 5154.07 | 9576.83 | 0.5382 | |
| 10C | 4 | 3/30/2013 17:57 | 3 | 11187 | 3729.00 | 100.0% | 0.73138 | 5098.56 | 9576.83 | 0.5324 | |
| 10C | 5 | 3/30/2013 17:49 | 3 | 11206 | 3735.33 | 100.0% | 0.73249 | 5099.52 | 9576.83 | 0.5325 | |
| 10C | 6 | 3/30/2013 17:40 | 3 | 9876 | 3292.00 | 100.0% | 0.73366 | 4487.10 | 9576.84 | 0.4685 | |
| 10C | 7 | 3/30/2013 17:32 | 3 | 11580 | 3860.00 | 99.8% | 0.73477 | 5261.61 | 9576.84 | 0.5494 | |
| 10C | 8 | 3/30/2013 18:41 | 3 | 11286 | 3762.00 | 100.0% | 0.72567 | 5184.18 | 9576.81 | 0.5413 | 0.5291 |
| 10D | 1 | 3/30/2013 18:41 | 3 | 11152 | 3717.33 | 99.8% | 0.72567 | 5130.70 | 9576.81 | 0.5357 | |
| 10D | 2 | 3/30/2013 18:30 | 3 | 11354 | 3784.67 | 100.0% | 0.72715 | 5204.77 | 9576.82 | 0.5435 | |
| 10D | 3 | 3/30/2013 18:17 | 3 | 11090 | 3696.67 | 100.0% | 0.72875 | 5072.60 | 9576.82 | 0.5297 | |
| 10D | 4 | 3/30/2013 18:06 | 3 | 11325 | 3775.00 | 100.0% | 0.73024 | 5169.56 | 9576.83 | 0.5398 | |
| 10D | 5 | 3/30/2013 17:57 | 3 | 11230 | 3743.33 | 100.0% | 0.73138 | 5118.17 | 9576.83 | 0.5344 | |
| 10D | 6 | 3/30/2013 17:49 | 3 | 10120 | 3373.33 | 100.0% | 0.73249 | 4605.27 | 9576.83 | 0.4809 | |
| 10D | 7 | 3/30/2013 17:40 | 3 | 11635 | 3878.33 | 99.8% | 0.73366 | 5294.61 | 9576.84 | 0.5529 | |
| 10D | 8 | 3/30/2013 17:32 | 3 | 11605 | 3868.33 | 100.0% | 0.73477 | 5264.69 | 9576.84 | 0.5497 | 0.5333 |
| 11A | 1 | 3/30/2013 18:56 | 3 | 9741 | 3247.00 | 99.8% | 0.72375 | 4493.38 | 9576.81 | 0.4692 | |
| 11A | 2 | 3/30/2013 18:59 | 3 | 9916 | 3305.33 | 100.0% | 0.72328 | 4569.91 | 9576.80 | 0.4772 | |
| 11A | 3 | 3/30/2013 19:03 | 3 | 9726 | 3242.00 | 100.0% | 0.72283 | 4485.17 | 9576.80 | 0.4683 | |
| 11A | 4 | 3/30/2013 19:06 | 3 | 9922 | 3307.33 | 100.0% | 0.72238 | 4578.41 | 9576.80 | 0.4781 | |
| 11A | 5 | 3/30/2013 19:10 | 3 | 9559 | 3186.33 | 100.0% | 0.72188 | 4413.92 | 9576.80 | 0.4609 | |
| 11A | 6 | 3/30/2013 19:14 | 3 | 8701 | 2900.33 | 100.0% | 0.72142 | 4020.33 | 9576.80 | 0.4198 | |
| 11A | 7 | 3/30/2013 19:17 | 3 | 9858 | 3286.00 | 99.8% | 0.72096 | 4564.98 | 9576.80 | 0.4767 | |
| 11A | 8 | 3/30/2013 19:21 | 3 | 10182 | 3394.00 | 100.0% | 0.72050 | 4710.64 | 9576.79 | 0.4919 | 0.4678 |
| 11B | 1 | 3/30/2013 19:21 | 3 | 11084 | 3694.67 | 99.8% | 0.72049 | 5136.07 | 9576.79 | 0.5363 | |
| 11B | 2 | 3/30/2013 18:55 | 3 | 11264 | 3754.67 | 100.0% | 0.72377 | 5187.67 | 9576.81 | 0.5417 | |
| 11B | 3 | 3/30/2013 18:59 | 3 | 11176 | 3725.33 | 100.0% | 0.72327 | 5150.67 | 9576.80 | 0.5378 | |
| 11B | 4 | 3/30/2013 19:03 | 3 | 11078 | 3692.67 | 100.0% | 0.72282 | 5108.71 | 9576.80 | 0.5334 | |
| 11B | 5 | 3/30/2013 19:06 | 3 | 11235 | 3745.00 | 100.0% | 0.72237 | 5184.34 | 9576.80 | 0.5413 | |
| 11B | 6 | 3/30/2013 19:10 | 3 | 9954 | 3318.00 | 100.0% | 0.72187 | 4596.41 | 9576.80 | 0.4800 | |
| 11B | 7 | 3/30/2013 19:14 | 3 | 11315 | 3771.67 | 99.8% | 0.72141 | 5236.42 | 9576.80 | 0.5468 | |
| 11B | 8 | 3/30/2013 19:17 | 3 | 11208 | 3736.00 | 100.0% | 0.72095 | 5182.04 | 9576.80 | 0.5411 | 0.5323 |
| 11C | 1 | 3/30/2013 19:17 | 3 | 11241 | 3747.00 | 99.8% | 0.72094 | 5205.55 | 9576.80 | 0.5436 | |
| 11C | 2 | 3/30/2013 19:21 | 3 | 11141 | 3713.67 | 100.0% | 0.72048 | 5154.43 | 9576.79 | 0.5382 | |
| 11C | 3 | 3/30/2013 18:55 | 3 | 10818 | 3606.00 | 100.0% | 0.72377 | 4982.26 | 9576.81 | 0.5202 | |
| 11C | 4 | 3/30/2013 18:59 | 3 | 11117 | 3705.67 | 100.0% | 0.72326 | 5123.54 | 9576.80 | 0.5350 | |
| 11C | 5 | 3/30/2013 19:03 | 3 | 10902 | 3634.00 | 100.0% | 0.72280 | 5027.64 | 9576.80 | 0.5250 | |
| 11C | 6 | 3/30/2013 19:06 | 3 | 9885 | 3295.00 | 100.0% | 0.72234 | 4561.54 | 9576.80 | 0.4763 | |
| 11C | 7 | 3/30/2013 19:10 | 3 | 11500 | 3833.33 | 99.8% | 0.72186 | 5318.74 | 9576.80 | 0.5554 | |
| 11C | 8 | 3/30/2013 19:14 | 3 | 11232 | 3744.00 | 100.0% | 0.72140 | 5189.91 | 9576.80 | 0.5419 | 0.5295 |
| 11D | 1 | 3/30/2013 19:14 | 3 | 11225 | 3741.67 | 99.8% | 0.72139 | 5194.91 | 9576.80 | 0.5424 | |
| 11D | 2 | 3/30/2013 19:17 | 3 | 11169 | 3723.00 | 100.0% | 0.72093 | 5164.15 | 9576.80 | 0.5392 | |
| 11D | 3 | 3/30/2013 19:21 | 3 | 11003 | 3667.67 | 100.0% | 0.72047 | 5090.67 | 9576.79 | 0.5316 | |
| 11D | 4 | 3/30/2013 18:55 | 3 | 11450 | 3816.67 | 100.0% | 0.72377 | 5273.35 | 9576.81 | 0.5506 | |
| 11D | 5 | 3/30/2013 18:59 | 3 | 11115 | 3705.00 | 100.0% | 0.72325 | 5122.70 | 9576.80 | 0.5349 | |
| 11D | 6 | 3/30/2013 19:03 | 3 | 10052 | 3350.67 | 100.0% | 0.72279 | 4635.72 | 9576.80 | 0.4841 | |
| 11D | 7 | 3/30/2013 19:06 | 3 | 11275 | 3758.33 | 99.8% | 0.72234 | 5211.21 | 9576.80 | 0.5441 | |
| 11D | 8 | 3/30/2013 19:10 | 3 | 11312 | 3770.67 | 100.0% | 0.72185 | 5223.62 | 9576.80 | 0.5454 | 0.5341 |
| 13A | 1 | 3/30/2013 17:42 | 3 | 11235 | 3745.00 | 99.8% | 0.73343 | 5114.19 | 9576.84 | 0.5340 | |
| 13A | 2 | 3/30/2013 18:52 | 3 | 11208 | 3736.00 | 100.0% | 0.72422 | 5158.67 | 9576.81 | 0.5387 | |
| 13A | 3 | 3/30/2013 18:42 | 3 | 11169 | 3723.00 | 100.0% | 0.72553 | 5131.41 | 9576.81 | 0.5358 | |
| 13A | 4 | 3/30/2013 18:32 | 3 | 11398 | 3799.33 | 100.0% | 0.72684 | 5227.20 | 9576.82 | 0.5458 | |
| 13A | 5 | 3/30/2013 18:16 | 3 | 10869 | 3623.00 | 100.0% | 0.72900 | 4969.84 | 9576.82 | 0.5189 | |
| 13A | 6 | 3/30/2013 18:08 | 3 | 9992 | 3330.67 | 100.0% | 0.73004 | 4562.30 | 9576.83 | 0.4764 | |
| 13A | 7 | 3/30/2013 17:59 | 3 | 11451 | 3817.00 | 99.8% | 0.73116 | 5228.66 | 9576.83 | 0.5460 | |
| 13A | 8 | 3/30/2013 17:50 | 3 | 11458 | 3819.33 | 100.0% | 0.73234 | 5215.25 | 9576.83 | 0.5446 | 0.5300 |
| 13B | 1 | 3/30/2013 17:50 | 3 | 11616 | 3872.00 | 99.8% | 0.73234 | 5295.45 | 9576.83 | 0.5529 | |
| 13B | 2 | 3/30/2013 17:42 | 3 | 11784 | 3928.00 | 100.0% | 0.73342 | 5355.74 | 9576.84 | 0.5592 | |
| 13B | 3 | 3/30/2013 18:52 | 3 | 11414 | 3804.67 | 100.0% | 0.72422 | 5253.48 | 9576.81 | 0.5486 | |
| 13B | 4 | 3/30/2013 18:42 | 3 | 11721 | 3907.00 | 100.0% | 0.72553 | 5385.02 | 9576.81 | 0.5623 | |
| 13B | 5 | 3/30/2013 18:32 | 3 | 11341 | 3780.33 | 100.0% | 0.72684 | 5201.06 | 9576.82 | 0.5431 | |
| 13B | 6 | 3/30/2013 18:16 | 3 | 10020 | 3340.00 | 100.0% | 0.72900 | 4581.64 | 9576.82 | 0.4784 | |
| 13B | 7 | 3/30/2013 18:08 | 3 | 11591 | 3863.67 | 99.8% | 0.73004 | 5300.72 | 9576.83 | 0.5535 | |
| 13B | 8 | 3/30/2013 17:59 | 3 | 11611 | 3870.33 | 100.0% | 0.73116 | 5293.39 | 9576.83 | 0.5527 | 0.5438 |
| 13C | 1 | 3/30/2013 17:59 | 3 | 10571 | 3523.67 | 99.8% | 0.73116 | 4826.86 | 9576.83 | 0.5040 | |
| 13C | 2 | 3/30/2013 17:50 | 3 | 10471 | 3490.33 | 100.0% | 0.73234 | 4765.97 | 9576.83 | 0.4977 | |
| 13C | 3 | 3/30/2013 17:42 | 3 | 10006 | 3335.33 | 100.0% | 0.73342 | 4547.65 | 9576.84 | 0.4749 | |
| 13C | 4 | 3/30/2013 18:52 | 3 | 10545 | 3515.00 | 100.0% | 0.72422 | 4853.51 | 9576.81 | 0.5068 | |
| 13C | 5 | 3/30/2013 18:42 | 3 | 10119 | 3373.00 | 100.0% | 0.72553 | 4649.02 | 9576.81 | 0.4854 | |
| 13C | 6 | 3/30/2013 18:32 | 3 | 9281 | 3093.67 | 100.0% | 0.72684 | 4256.33 | 9576.82 | 0.4444 | |
| 13C | 7 | 3/30/2013 18:16 | 3 | 10583 | 3527.67 | 99.8% | 0.72900 | 4846.68 | 9576.82 | 0.5061 | |
| 13C | 8 | 3/30/2013 18:08 | 3 | 10593 | 3531.00 | 100.0% | 0.73004 | 4836.72 | 9576.83 | 0.5050 | 0.4905 |
| 13D | 1 | 3/30/2013 18:08 | 3 | 11247 | 3749.00 | 99.8% | 0.73004 | 5143.41 | 9576.83 | 0.5371 | |
| 13D | 2 | 3/30/2013 17:59 | 3 | 11383 | 3794.33 | 100.0% | 0.73116 | 5189.47 | 9576.83 | 0.5419 | |
| 13D | 3 | 3/30/2013 17:50 | 3 | 11166 | 3722.00 | 100.0% | 0.73234 | 5082.31 | 9576.83 | 0.5307 | |
| 13D | 4 | 3/30/2013 17:42 | 3 | 11081 | 3693.67 | 100.0% | 0.73342 | 5036.23 | 9576.84 | 0.5259 | |
| 13D | 5 | 3/30/2013 18:52 | 3 | 10857 | 3619.00 | 100.0% | 0.72422 | 4997.11 | 9576.81 | 0.5218 | |
| 13D | 6 | 3/30/2013 18:42 | 3 | 9916 | 3305.33 | 100.0% | 0.72553 | 4555.75 | 9576.81 | 0.4757 | |
| 13D | 7 | 3/30/2013 18:32 | 3 | 11472 | 3824.00 | 99.8% | 0.72684 | 5269.41 | 9576.82 | 0.5502 | |
| 13D | 8 | 3/30/2013 18:16 | 3 | 11052 | 3684.00 | 100.0% | 0.72900 | 5053.50 | 9576.82 | 0.5277 | 0.5264 |
| 14A | 1 | 3/30/2013 18:16 | 3 | 10482 | 3494.00 | 99.8% | 0.72899 | 4800.44 | 9576.82 | 0.5013 | |
| 14A | 2 | 3/30/2013 18:08 | 3 | 10501 | 3500.33 | 100.0% | 0.73004 | 4794.74 | 9576.83 | 0.5007 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14A | 3 | 3/30/2013 17:59 | 3 | 10445 | 3481.67 | 100.0% | 0.73117 | 4761.81 | 9576.83 | 0.4972 | |
| 14A | 4 | 3/30/2013 17:50 | 3 | 10843 | 3614.33 | 100.0% | 0.73235 | 4935.26 | 9576.83 | 0.5153 | |
| 14A | 5 | 3/30/2013 17:42 | 3 | 10518 | 3506.00 | 100.0% | 0.73342 | 4780.36 | 9576.84 | 0.4992 | |
| 14A | 6 | 3/30/2013 18:52 | 3 | 9358 | 3119.33 | 100.0% | 0.72421 | 4307.20 | 9576.81 | 0.4498 | |
| 14A | 7 | 3/30/2013 18:42 | 3 | 10784 | 3594.67 | 99.8% | 0.72553 | 4962.36 | 9576.81 | 0.5182 | |
| 14A | 8 | 3/30/2013 18:32 | 3 | 10628 | 3542.67 | 100.0% | 0.72683 | 4874.13 | 9576.82 | 0.5090 | 0.4988 |
| 14B | 1 | 3/30/2013 18:32 | 3 | 11086 | 3695.33 | 99.8% | 0.72683 | 5092.17 | 9576.82 | 0.5317 | |
| 14B | 2 | 3/30/2013 18:16 | 3 | 11179 | 3726.33 | 100.0% | 0.72899 | 5111.61 | 9576.82 | 0.5337 | |
| 14B | 3 | 3/30/2013 18:08 | 3 | 10895 | 3631.67 | 100.0% | 0.73003 | 4974.65 | 9576.83 | 0.5194 | |
| 14B | 4 | 3/30/2013 17:59 | 3 | 11247 | 3749.00 | 100.0% | 0.73117 | 5127.40 | 9576.83 | 0.5354 | |
| 14B | 5 | 3/30/2013 17:50 | 3 | 10884 | 3628.00 | 100.0% | 0.73235 | 4953.93 | 9576.83 | 0.5173 | |
| 14B | 6 | 3/30/2013 17:42 | 3 | 10007 | 3335.67 | 100.0% | 0.73342 | 4548.12 | 9576.84 | 0.4749 | |
| 14B | 7 | 3/30/2013 18:52 | 3 | 11217 | 3739.00 | 99.8% | 0.72421 | 5170.98 | 9576.81 | 0.5399 | |
| 14B | 8 | 3/30/2013 18:42 | 3 | 10856 | 3618.67 | 100.0% | 0.72553 | 4987.65 | 9576.81 | 0.5208 | 0.5217 |
| 14C | 1 | 3/30/2013 18:42 | 3 | 11122 | 3707.33 | 99.8% | 0.72553 | 5117.90 | 9576.81 | 0.5344 | |
| 14C | 2 | 3/30/2013 18:32 | 3 | 11162 | 3720.67 | 100.0% | 0.72683 | 5119.03 | 9576.82 | 0.5345 | |
| 14C | 3 | 3/30/2013 18:16 | 3 | 11091 | 3697.00 | 100.0% | 0.72899 | 5071.37 | 9576.82 | 0.5295 | |
| 14C | 4 | 3/30/2013 18:08 | 3 | 11118 | 3706.00 | 100.0% | 0.73003 | 5076.48 | 9576.83 | 0.5301 | |
| 14C | 5 | 3/30/2013 17:59 | 3 | 11059 | 3686.33 | 100.0% | 0.73117 | 5041.69 | 9576.83 | 0.5264 | |
| 14C | 6 | 3/30/2013 17:50 | 3 | 9894 | 3298.00 | 100.0% | 0.73235 | 4503.32 | 9576.83 | 0.4702 | |
| 14C | 7 | 3/30/2013 17:42 | 3 | 11536 | 3845.33 | 99.8% | 0.73342 | 5251.28 | 9576.84 | 0.5483 | |
| 14C | 8 | 3/30/2013 18:52 | 3 | 11305 | 3768.33 | 100.0% | 0.72421 | 5203.36 | 9576.81 | 0.5433 | 0.5271 |
| 14D | 1 | 3/30/2013 18:52 | 3 | 9871 | 3290.33 | 99.8% | 0.72421 | 4550.48 | 9576.81 | 0.4752 | |
| 14D | 2 | 3/30/2013 18:42 | 3 | 10046 | 3348.67 | 100.0% | 0.72553 | 4615.51 | 9576.81 | 0.4819 | |
| 14D | 3 | 3/30/2013 18:32 | 3 | 9868 | 3289.33 | 100.0% | 0.72683 | 4525.58 | 9576.82 | 0.4726 | |
| 14D | 4 | 3/30/2013 18:16 | 3 | 10294 | 3431.33 | 100.0% | 0.72899 | 4706.94 | 9576.82 | 0.4915 | |
| 14D | 5 | 3/30/2013 18:08 | 3 | 9934 | 3311.33 | 100.0% | 0.73003 | 4535.86 | 9576.83 | 0.4736 | |
| 14D | 6 | 3/30/2013 17:59 | 3 | 8873 | 2957.67 | 100.0% | 0.73117 | 4045.13 | 9576.83 | 0.4224 | |
| 14D | 7 | 3/30/2013 17:50 | 3 | 10119 | 3373.00 | 99.8% | 0.73235 | 4612.99 | 9576.83 | 0.4817 | |
| 14D | 8 | 3/30/2013 17:42 | 3 | 9971 | 3323.67 | 100.0% | 0.73342 | 4531.76 | 9576.84 | 0.4732 | 0.4715 |

Current Calibration - PIC

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Y-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **Protean** | A0 | A1 | A2 | A3 | A4 |
| **1A** | 5.353041E-01 | | | | |
| **1B** | 5.335355E-01 | | | | |
| **1C** | 5.361905E-01 | | | | |
| **1D** | 5.309386E-01 | | | | |
| **2A** | 5.117578E-01 | | | | |
| **2B** | 5.160091E-01 | | | | |
| **2C** | 5.181153E-01 | | | | |
| **2D** | 5.198782E-01 | | | | |
| **3A** | 5.307887E-01 | | | | |
| **3B** | 5.306288E-01 | | | | |
| **3C** | 5.319471E-01 | | | | |
| **3D** | 5.210413E-01 | | | | |
| **4A** | 5.300209E-01 | | | | |
| **4B** | 5.348062E-01 | | | | |
| **4C** | 5.373425E-01 | | | | |
| **4D** | 5.316186E-01 | | | | |
| **5A** | 5.371844E-01 | | | | |
| **5B** | 5.378783E-01 | | | | |
| **5C** | 5.390942E-01 | | | | |
| **5D** | 5.383112E-01 | | | | |
| **6A** | 4.787655E-01 | | | | |
| **6B** | 4.488744E-01 | | | | |
| **6C** | 5.101166E-01 | | | | |
| **6D** | 4.554777E-01 | | | | |
| **7A** | 5.373508E-01 | | | | |
| **7B** | 5.395290E-01 | | | | |
| **7C** | 5.321346E-01 | | | | |
| **7D** | 5.366649E-01 | | | | |
| **8A** | 5.255350E-01 | | | | |
| **8B** | 5.128248E-01 | | | | |
| **8C** | 5.358420E-01 | | | | |
| **8D** | 5.419739E-01 | | | | |
| **9A** | 5.377399E-01 | | | | |
| **9B** | 5.267472E-01 | | | | |
| **9C** | 5.322234E-01 | | | | |
| **9D** | 5.100714E-01 | | | | |
| **10A** | 5.305456E-01 | | | | |
| **10B** | 5.268003E-01 | | | | |
| **10C** | 5.291475E-01 | | | | |
| **10D** | 5.333235E-01 | | | | |
| **11A** | 4.677546E-01 | | | | |
| **11B** | 5.323064E-01 | | | | |
| **11C** | 5.294515E-01 | | | | |
| **11D** | 5.340554E-01 | | | | |
| **12A** | #N/A | | | | |
| **12B** | #N/A | | | | |
| **12C** | #N/A | | | | |
| **12D** | #N/A | | | | |
| **13A** | 5.300233E-01 | | | | |
| **13B** | 5.438454E-01 | | | | |
| **13C** | 4.905428E-01 | | | | |
| **13D** | 5.263644E-01 | | | | |
| **14A** | 4.988124E-01 | | | | |
| **14B** | 5.216565E-01 | | | | |
| **14C** | 5.271115E-01 | | | | |
| **14D** | 4.715060E-01 | | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| Y1 | 1A | 3 | 10 | 11551 | 3/30/2013 14:46 | 3/30/2013 14:49 | PIC | Sr90Y13 |
| Y2 | 1A | 3 | 5 | 11713 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y3 | 1A | 3 | 10 | 11569 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y4 | 1A | 3 | 5 | 11605 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y5 | 1A | 3 | 13 | 11518 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y6 | 1A | 3 | 6 | 10892 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y7 | 1A | 3 | 6 | 11867 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y8 | 1A | 3 | 5 | 11847 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y1 | 1B | 3 | 12 | 11717 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y2 | 1B | 3 | 8 | 11796 | 3/30/2013 14:46 | 3/30/2013 14:49 | PIC | Sr90Y13 |
| Y3 | 1B | 3 | 10 | 11430 | 3/30/2013 15:49 | 3/30/2013 15:52 | PIC | Sr90Y13 |
| Y4 | 1B | 3 | 12 | 11535 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y5 | 1B | 3 | 9 | 11451 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y6 | 1B | 3 | 8 | 10732 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y7 | 1B | 3 | 14 | 11951 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y8 | 1B | 3 | 16 | 11648 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y1 | 1C | 3 | 96 | 11759 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y2 | 1C | 3 | 104 | 11847 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y3 | 1C | 3 | 98 | 11562 | 3/30/2013 14:47 | 3/30/2013 14:50 | PIC | Sr90Y13 |
| Y4 | 1C | 3 | 91 | 11823 | 3/30/2013 15:49 | 3/30/2013 15:52 | PIC | Sr90Y13 |
| Y5 | 1C | 3 | 106 | 11680 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y6 | 1C | 3 | 88 | 10544 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y7 | 1C | 3 | 100 | 11779 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y8 | 1C | 3 | 89 | 11722 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y1 | 1D | 3 | 68 | 11522 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y2 | 1D | 3 | 83 | 11771 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y3 | 1D | 3 | 75 | 11535 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y4 | 1D | 3 | 73 | 11874 | 3/30/2013 14:48 | 3/30/2013 14:51 | PIC | Sr90Y13 |
| Y5 | 1D | 3 | 66 | 11432 | 3/30/2013 15:49 | 3/30/2013 15:52 | PIC | Sr90Y13 |
| Y6 | 1D | 3 | 79 | 10327 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y7 | 1D | 3 | 79 | 11718 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y8 | 1D | 3 | 91 | 11631 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y1 | 2A | 3 | 2 | 11102 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y2 | 2A | 3 | 0 | 11053 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y3 | 2A | 3 | 1 | 11160 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y4 | 2A | 3 | 2 | 11334 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y5 | 2A | 3 | 0 | 11092 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y6 | 2A | 3 | 2 | 10202 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y7 | 2A | 3 | 0 | 11309 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y8 | 2A | 3 | 0 | 11236 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y1 | 2B | 3 | 0 | 11237 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y2 | 2B | 3 | 1 | 11258 | 3/30/2013 15:23 | 3/30/2013 15:26 | PIC | Sr90Y13 |
| Y3 | 2B | 3 | 2 | 11080 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y4 | 2B | 3 | 0 | 11228 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y5 | 2B | 3 | 1 | 11031 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y6 | 2B | 3 | 0 | 10699 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y7 | 2B | 3 | 0 | 11366 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y8 | 2B | 3 | 0 | 11316 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y1 | 2C | 3 | 8 | 11254 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y2 | 2C | 3 | 8 | 11196 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y3 | 2C | 3 | 8 | 11123 | 3/30/2013 15:23 | 3/30/2013 15:26 | PIC | Sr90Y13 |
| Y4 | 2C | 3 | 12 | 11257 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y5 | 2C | 3 | 9 | 11037 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y6 | 2C | 3 | 19 | 10818 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y7 | 2C | 3 | 7 | 11625 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y8 | 2C | 3 | 13 | 11273 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y1 | 2D | 3 | 5 | 11170 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y2 | 2D | 3 | 3 | 11062 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y3 | 2D | 3 | 6 | 11193 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y4 | 2D | 3 | 7 | 11423 | 3/30/2013 15:23 | 3/30/2013 15:26 | PIC | Sr90Y13 |
| Y5 | 2D | 3 | 5 | 11240 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y6 | 2D | 3 | 4 | 10285 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y7 | 2D | 3 | 8 | 11687 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y8 | 2D | 3 | 9 | 11832 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y1 | 3A | 3 | 168 | 11701 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y2 | 3A | 3 | 156 | 11614 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y3 | 3A | 3 | 144 | 11501 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y4 | 3A | 3 | 161 | 11680 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y5 | 3A | 3 | 140 | 11179 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y6 | 3A | 3 | 125 | 10626 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y7 | 3A | 3 | 148 | 11829 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y8 | 3A | 3 | 152 | 11508 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y1 | 3B | 3 | 142 | 11658 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y2 | 3B | 3 | 130 | 11625 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y3 | 3B | 3 | 124 | 11173 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y4 | 3B | 3 | 111 | 11497 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y5 | 3B | 3 | 125 | 11424 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y6 | 3B | 3 | 114 | 10607 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y7 | 3B | 3 | 141 | 11866 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y8 | 3B | 3 | 141 | 11767 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y1 | 3C | 3 | 63 | 11610 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y2 | 3C | 3 | 60 | 11528 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y3 | 3C | 3 | 47 | 11751 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y4 | 3C | 3 | 74 | 11509 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y5 | 3C | 3 | 64 | 11490 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y6 | 3C | 3 | 48 | 10363 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y7 | 3C | 3 | 57 | 11782 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y8 | 3C | 3 | 67 | 11810 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y1 | 3D | 3 | 62 | 11458 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y2 | 3D | 3 | 54 | 11260 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y3 | 3D | 3 | 50 | 11499 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y4 | 3D | 3 | 45 | 11444 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y5 | 3D | 3 | 56 | 11039 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y6 | 3D | 3 | 42 | 10203 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y7 | 3D | 3 | 70 | 11594 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y8 | 3D | 3 | 61 | 11466 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y1 | 4A | 3 | 48 | 11533 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y2 | 4A | 3 | 53 | 11688 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y3 | 4A | 3 | 58 | 11649 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y4 | 4A | 3 | 51 | 11603 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y5 | 4A | 3 | 36 | 11409 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y6 | 4A | 3 | 50 | 10217 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y7 | 4A | 3 | 47 | 11782 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y8 | 4A | 3 | 53 | 11639 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y1 | 4B | 3 | 0 | 11605 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y2 | 4B | 3 | 1 | 11505 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y3 | 4B | 3 | 0 | 11446 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y4 | 4B | 3 | 0 | 11555 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y5 | 4B | 3 | 2 | 11501 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y6 | 4B | 3 | 0 | 11310 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y7 | 4B | 3 | 1 | 11770 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y8 | 4B | 3 | 1 | 11638 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y1 | 4C | 3 | 39 | 11691 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y2 | 4C | 3 | 59 | 11555 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y3 | 4C | 3 | 39 | 11702 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y4 | 4C | 3 | 39 | 11727 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y5 | 4C | 3 | 49 | 11434 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y6 | 4C | 3 | 39 | 10920 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y7 | 4C | 3 | 46 | 12089 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y8 | 4C | 3 | 43 | 11653 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y1 | 4D | 3 | 122 | 11486 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y2 | 4D | 3 | 123 | 11498 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y3 | 4D | 3 | 114 | 11268 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y4 | 4D | 3 | 115 | 11646 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y5 | 4D | 3 | 125 | 11638 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y6 | 4D | 3 | 107 | 10716 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y7 | 4D | 3 | 133 | 11892 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y8 | 4D | 3 | 137 | 11641 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y1 | 5A | 3 | 28 | 11655 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y2 | 5A | 3 | 27 | 11486 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y3 | 5A | 3 | 28 | 11067 | 3/30/2013 17:16 | 3/30/2013 17:19 | PIC | Sr90Y13 |
| Y4 | 5A | 3 | 28 | 11784 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y5 | 5A | 3 | 27 | 11476 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y6 | 5A | 3 | 26 | 10191 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y7 | 5A | 3 | 23 | 11950 | 3/30/2013 16:43 | 3/30/2013 16:46 | PIC | Sr90Y13 |
| Y8 | 5A | 3 | 29 | 11683 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y1 | 5B | 3 | 30 | 11610 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y2 | 5B | 3 | 15 | 11459 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y3 | 5B | 3 | 24 | 11519 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y4 | 5B | 3 | 25 | 11560 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y5 | 5B | 3 | 33 | 11373 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y6 | 5B | 3 | 36 | 10226 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y7 | 5B | 3 | 28 | 11833 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y8 | 5B | 3 | 30 | 11831 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y1 | 5C | 3 | 38 | 11633 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y2 | 5C | 3 | 19 | 11756 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y3 | 5C | 3 | 36 | 11398 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y4 | 5C | 3 | 37 | 11733 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y5 | 5C | 3 | 27 | 11330 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y6 | 5C | 3 | 25 | 10272 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y7 | 5C | 3 | 27 | 11798 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y8 | 5C | 3 | 22 | 11698 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y1 | 5D | 3 | 28 | 11647 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y2 | 5D | 3 | 28 | 11618 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y3 | 5D | 3 | 36 | 11265 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y4 | 5D | 3 | 31 | 11705 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y5 | 5D | 3 | 36 | 11262 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y6 | 5D | 3 | 36 | 10373 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y7 | 5D | 3 | 42 | 11696 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y8 | 5D | 3 | 31 | 11921 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y1 | 6A | 3 | 0 | 10267 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y2 | 6A | 3 | 0 | 10393 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y3 | 6A | 3 | 0 | 10000 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y4 | 6A | 3 | 0 | 10268 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y5 | 6A | 3 | 1 | 10193 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y6 | 6A | 3 | 0 | 9216 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y7 | 6A | 3 | 0 | 10341 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y8 | 6A | 3 | 0 | 10688 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y1 | 6B | 3 | 0 | 9650 | 3/30/2013 17:07 | 3/30/2013 17:10 | PIC | Sr90Y13 |
| Y2 | 6B | 3 | 0 | 9600 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y3 | 6B | 3 | 0 | 9488 | 3/30/2013 16:50 | 3/30/2013 16:53 | PIC | Sr90Y13 |
| Y4 | 6B | 3 | 0 | 9316 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y5 | 6B | 3 | 0 | 9565 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y6 | 6B | 3 | 0 | 8925 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y7 | 6B | 3 | 0 | 9759 | 3/30/2013 17:23 | 3/30/2013 17:26 | PIC | Sr90Y13 |
| Y8 | 6B | 3 | 0 | 9976 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y1 | 6C | 3 | 0 | 11087 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y2 | 6C | 3 | 2 | 10791 | 3/30/2013 17:07 | 3/30/2013 17:10 | PIC | Sr90Y13 |
| Y3 | 6C | 3 | 3 | 10739 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y4 | 6C | 3 | 2 | 11188 | 3/30/2013 16:50 | 3/30/2013 16:53 | PIC | Sr90Y13 |
| Y5 | 6C | 3 | 1 | 10825 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y6 | 6C | 3 | 3 | 9783 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y7 | 6C | 3 | 1 | 11152 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y8 | 6C | 3 | 0 | 11124 | 3/30/2013 17:23 | 3/30/2013 17:26 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y1 | 6D | 3 | 15 | 9649 | 3/30/2013 17:23 | 3/30/2013 17:26 | PIC | Sr90Y13 |
| Y2 | 6D | 3 | 12 | 9827 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y3 | 6D | 3 | 14 | 9547 | 3/30/2013 17:07 | 3/30/2013 17:10 | PIC | Sr90Y13 |
| Y4 | 6D | 3 | 20 | 9754 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y5 | 6D | 3 | 19 | 9554 | 3/30/2013 16:50 | 3/30/2013 16:53 | PIC | Sr90Y13 |
| Y6 | 6D | 3 | 6 | 8807 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y7 | 6D | 3 | 17 | 9897 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y8 | 6D | 3 | 20 | 10375 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y1 | 7A | 3 | 54 | 11560 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y2 | 7A | 3 | 51 | 11626 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y3 | 7A | 3 | 43 | 11273 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y4 | 7A | 3 | 61 | 11725 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y5 | 7A | 3 | 53 | 11401 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y6 | 7A | 3 | 50 | 10164 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y7 | 7A | 3 | 43 | 11939 | 3/30/2013 16:47 | 3/30/2013 16:50 | PIC | Sr90Y13 |
| Y8 | 7A | 3 | 53 | 11566 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y1 | 7B | 3 | 58 | 11760 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y2 | 7B | 3 | 58 | 11681 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y3 | 7B | 3 | 79 | 11371 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y4 | 7B | 3 | 53 | 11697 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y5 | 7B | 3 | 65 | 11369 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y6 | 7B | 3 | 52 | 10315 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y7 | 7B | 3 | 65 | 11866 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y8 | 7B | 3 | 45 | 11568 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y1 | 7C | 3 | 20 | 11611 | 3/30/2013 16:47 | 3/30/2013 16:50 | PIC | Sr90Y13 |
| Y2 | 7C | 3 | 22 | 11340 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y3 | 7C | 3 | 33 | 11305 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y4 | 7C | 3 | 26 | 11354 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y5 | 7C | 3 | 18 | 11424 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y6 | 7C | 3 | 17 | 10295 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y7 | 7C | 3 | 28 | 11620 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y8 | 7C | 3 | 19 | 11421 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y1 | 7D | 3 | 52 | 11688 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y2 | 7D | 3 | 42 | 11681 | 3/30/2013 16:47 | 3/30/2013 16:50 | PIC | Sr90Y13 |
| Y3 | 7D | 3 | 28 | 11287 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y4 | 7D | 3 | 39 | 11695 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y5 | 7D | 3 | 27 | 11332 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y6 | 7D | 3 | 31 | 10278 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y7 | 7D | 3 | 27 | 11645 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y8 | 7D | 3 | 31 | 11537 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y1 | 8A | 3 | 1 | 11089 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y2 | 8A | 3 | 4 | 11355 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y3 | 8A | 3 | 0 | 11121 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y4 | 8A | 3 | 5 | 11478 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y5 | 8A | 3 | 0 | 11256 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y6 | 8A | 3 | 3 | 10002 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y7 | 8A | 3 | 1 | 11411 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y8 | 8A | 3 | 3 | 11544 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y1 | 8B | 3 | 0 | 11077 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y2 | 8B | 3 | 0 | 11109 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y3 | 8B | 3 | 0 | 11001 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y4 | 8B | 3 | 0 | 11116 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y5 | 8B | 3 | 1 | 10804 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y6 | 8B | 3 | 0 | 9694 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y7 | 8B | 3 | 0 | 11250 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y8 | 8B | 3 | 0 | 11031 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y1 | 8C | 3 | 6 | 11611 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y2 | 8C | 3 | 4 | 11556 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y3 | 8C | 3 | 7 | 11315 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y4 | 8C | 3 | 6 | 11562 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y5 | 8C | 3 | 4 | 11426 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y6 | 8C | 3 | 12 | 10288 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y7 | 8C | 3 | 9 | 11706 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y8 | 8C | 3 | 3 | 11532 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y1 | 8D | 3 | 12 | 11532 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y2 | 8D | 3 | 10 | 11838 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y3 | 8D | 3 | 11 | 11402 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y4 | 8D | 3 | 20 | 11541 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y5 | 8D | 3 | 15 | 11561 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y6 | 8D | 3 | 12 | 10407 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y7 | 8D | 3 | 15 | 11975 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y8 | 8D | 3 | 12 | 11785 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y1 | 9A | 3 | 10 | 11659 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y2 | 9A | 3 | 15 | 11487 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y3 | 9A | 3 | 12 | 11268 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y4 | 9A | 3 | 12 | 11367 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y5 | 9A | 3 | 12 | 11199 | 3/30/2013 18:07 | 3/30/2013 18:10 | PIC | Sr90Y13 |
| Y6 | 9A | 3 | 12 | 10112 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y7 | 9A | 3 | 9 | 11654 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y8 | 9A | 3 | 9 | 11504 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y1 | 9B | 3 | 7 | 11269 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y2 | 9B | 3 | 8 | 11252 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y3 | 9B | 3 | 13 | 10930 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y4 | 9B | 3 | 8 | 11070 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y5 | 9B | 3 | 13 | 10957 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y6 | 9B | 3 | 6 | 9962 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y7 | 9B | 3 | 8 | 11504 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y8 | 9B | 3 | 7 | 11466 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y1 | 9C | 3 | 14 | 11302 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y2 | 9C | 3 | 16 | 11541 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y3 | 9C | 3 | 17 | 11133 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y4 | 9C | 3 | 21 | 11241 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y5 | 9C | 3 | 14 | 11355 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y6 | 9C | 3 | 10 | 9940 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y7 | 9C | 3 | 17 | 11315 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y8 | 9C | 3 | 20 | 11501 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y1 | 9D | 3 | 0 | 10904 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y2 | 9D | 3 | 2 | 10843 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y3 | 9D | 3 | 0 | 10806 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y4 | 9D | 3 | 0 | 11058 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y5 | 9D | 3 | 0 | 10540 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y6 | 9D | 3 | 2 | 9592 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y7 | 9D | 3 | 0 | 10852 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y8 | 9D | 3 | 0 | 11020 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y1 | 10A | 3 | 4 | 11136 | 3/30/2013 18:07 | 3/30/2013 18:10 | PIC | Sr90Y13 |
| Y2 | 10A | 3 | 4 | 11627 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y3 | 10A | 3 | 6 | 11376 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y4 | 10A | 3 | 9 | 11242 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y5 | 10A | 3 | 4 | 11144 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y6 | 10A | 3 | 3 | 10013 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y7 | 10A | 3 | 8 | 11308 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y8 | 10A | 3 | 6 | 11203 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y1 | 10B | 3 | 11 | 11287 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y2 | 10B | 3 | 14 | 11442 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y3 | 10B | 3 | 14 | 11205 | 3/30/2013 17:57 | 3/30/2013 18:00 | PIC | Sr90Y13 |
| Y4 | 10B | 3 | 19 | 11271 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y5 | 10B | 3 | 10 | 10906 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y6 | 10B | 3 | 11 | 10051 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y7 | 10B | 3 | 17 | 11185 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y8 | 10B | 3 | 18 | 11060 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y1 | 10C | 3 | 7 | 11164 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y2 | 10C | 3 | 10 | 11215 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y3 | 10C | 3 | 13 | 11291 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y4 | 10C | 3 | 14 | 11187 | 3/30/2013 17:57 | 3/30/2013 18:00 | PIC | Sr90Y13 |
| Y5 | 10C | 3 | 17 | 11206 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y6 | 10C | 3 | 7 | 9876 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y7 | 10C | 3 | 22 | 11580 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y8 | 10C | 3 | 16 | 11286 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y1 | 10D | 3 | 6 | 11152 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y2 | 10D | 3 | 11 | 11354 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y3 | 10D | 3 | 15 | 11090 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y4 | 10D | 3 | 11 | 11325 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y5 | 10D | 3 | 9 | 11230 | 3/30/2013 17:57 | 3/30/2013 18:00 | PIC | Sr90Y13 |
| Y6 | 10D | 3 | 6 | 10120 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y7 | 10D | 3 | 6 | 11635 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y8 | 10D | 3 | 10 | 11605 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y1 | 11A | 3 | 1 | 9741 | 3/30/2013 18:56 | 3/30/2013 18:59 | PIC | Sr90Y13 |
| Y2 | 11A | 3 | 1 | 9916 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y3 | 11A | 3 | 0 | 9726 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |
| Y4 | 11A | 3 | 0 | 9922 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y5 | 11A | 3 | 0 | 9559 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y6 | 11A | 3 | 1 | 8701 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y7 | 11A | 3 | 1 | 9858 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y8 | 11A | 3 | 0 | 10182 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y1 | 11B | 3 | 0 | 11084 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y2 | 11B | 3 | 0 | 11264 | 3/30/2013 18:55 | 3/30/2013 18:58 | PIC | Sr90Y13 |
| Y3 | 11B | 3 | 1 | 11176 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y4 | 11B | 3 | 0 | 11078 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y5 | 11B | 3 | 0 | 11235 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y6 | 11B | 3 | 0 | 9954 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y7 | 11B | 3 | 0 | 11315 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y8 | 11B | 3 | 0 | 11208 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y1 | 11C | 3 | 1 | 11241 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y2 | 11C | 3 | 0 | 11141 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y3 | 11C | 3 | 0 | 10818 | 3/30/2013 18:55 | 3/30/2013 18:58 | PIC | Sr90Y13 |
| Y4 | 11C | 3 | 0 | 11117 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y5 | 11C | 3 | 0 | 10902 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |
| Y6 | 11C | 3 | 0 | 9885 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y7 | 11C | 3 | 0 | 11500 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y8 | 11C | 3 | 0 | 11232 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y1 | 11D | 3 | 0 | 11225 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y2 | 11D | 3 | 0 | 11169 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y3 | 11D | 3 | 0 | 11003 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y4 | 11D | 3 | 1 | 11450 | 3/30/2013 18:55 | 3/30/2013 18:58 | PIC | Sr90Y13 |
| Y5 | 11D | 3 | 0 | 11115 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y6 | 11D | 3 | 0 | 10052 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |
| Y7 | 11D | 3 | 0 | 11275 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y8 | 11D | 3 | 0 | 11312 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y1 | 13A | 3 | 0 | 11235 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y2 | 13A | 3 | 1 | 11208 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y3 | 13A | 3 | 0 | 11169 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y4 | 13A | 3 | 0 | 11398 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y5 | 13A | 3 | 0 | 10869 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y6 | 13A | 3 | 2 | 9992 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y7 | 13A | 3 | 0 | 11451 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y8 | 13A | 3 | 0 | 11458 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y1 | 13B | 3 | 0 | 11616 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y2 | 13B | 3 | 0 | 11784 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y3 | 13B | 3 | 1 | 11414 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y4 | 13B | 3 | 0 | 11721 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y5 | 13B | 3 | 0 | 11341 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y6 | 13B | 3 | 0 | 10020 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y7 | 13B | 3 | 3 | 11591 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y8 | 13B | 3 | 0 | 11611 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y1 | 13C | 3 | 0 | 10571 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y2 | 13C | 3 | 0 | 10471 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y3 | 13C | 3 | 0 | 10006 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y4 | 13C | 3 | 0 | 10545 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y5 | 13C | 3 | 0 | 10119 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y6 | 13C | 3 | 0 | 9281 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y7 | 13C | 3 | 0 | 10583 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y8 | 13C | 3 | 0 | 10593 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y1 | 13D | 3 | 0 | 11247 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y2 | 13D | 3 | 0 | 11383 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y3 | 13D | 3 | 0 | 11166 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y4 | 13D | 3 | 1 | 11081 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y5 | 13D | 3 | 1 | 10857 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y6 | 13D | 3 | 0 | 9916 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y7 | 13D | 3 | 2 | 11472 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y8 | 13D | 3 | 0 | 11052 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y1 | 14A | 3 | 0 | 10482 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y2 | 14A | 3 | 0 | 10501 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y3 | 14A | 3 | 0 | 10445 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y4 | 14A | 3 | 0 | 10843 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y5 | 14A | 3 | 0 | 10518 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y6 | 14A | 3 | 0 | 9358 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y7 | 14A | 3 | 0 | 10784 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y8 | 14A | 3 | 0 | 10628 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y1 | 14B | 3 | 2 | 11086 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y2 | 14B | 3 | 0 | 11179 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y3 | 14B | 3 | 0 | 10895 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y4 | 14B | 3 | 0 | 11247 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y5 | 14B | 3 | 0 | 10884 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y6 | 14B | 3 | 1 | 10007 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y7 | 14B | 3 | 0 | 11217 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y8 | 14B | 3 | 1 | 10856 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y1 | 14C | 3 | 0 | 11122 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y2 | 14C | 3 | 0 | 11162 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y3 | 14C | 3 | 0 | 11091 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y4 | 14C | 3 | 0 | 11118 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y5 | 14C | 3 | 0 | 11059 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y6 | 14C | 3 | 2 | 9894 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y7 | 14C | 3 | 1 | 11536 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y8 | 14C | 3 | 0 | 11305 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y1 | 14D | 3 | 0 | 9871 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y2 | 14D | 3 | 0 | 10046 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y3 | 14D | 3 | 0 | 9868 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y4 | 14D | 3 | 0 | 10294 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y5 | 14D | 3 | 1 | 9934 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y6 | 14D | 3 | 0 | 8873 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y7 | 14D | 3 | 0 | 10119 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y8 | 14D | 3 | 0 | 9971 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |

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# Strontium-89 & 90 Liquid

Filename : SR8990.XLS
File type : Excel
Version # : 1.3.9

Batch : 1082959
Analyst : AF1
Prep Date : 2/14/2014
Sr-89 Method Uncertainty : 0.0829
Sr-90 Method Uncertainty : 0.0821

Geometry: Tuffryn Filter

Sr Carrier S/N : 2046474
Carrier Exp Date : 12/5/2014
Carrier Volume Added: 2.00
Carrier Weight (mg/ml): 16.40
Carrier Weight StDev.: 0.16

Y Carrier S/N : 2073992
Carrier Exp Date : 5/14/2014
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 33.18
Carrier Weight StDev.: 0.29

Procedure Code : GFCGANBL
Parmname1 : Strontium-89
Parmname2 : Strontium-90
Required MDA Sr-89 : 1 pCi/L
Required MDA Sr-90 : 1 pCi/L
Sr-89 Abundance : 1.00
Sr-90 Abundance : 1.00
Halflife of Sr-89 : 50.53 days
Halflife of Sr-90 : 28.9 years
Halflife of Y-90 : 64.053 hours

| Sample Characteristics | | | | | Carrier Calculations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Net Weight (mg) | | Net Weight StDev. (mg) | | Carrier Aliquot (mL) | | Carrier Aliquot StDev. (mL) | |
| Pos. | Sample ID | Sample Aliquot L | Sample Aliquot StDev. L | Sample Date/Time | Sr | Y | Sr | Y | Sr | Y | Sr | Y |
| 1 | 1202347886.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 2 | 1202347887.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 3 | 1202347888.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 4 | 1202347889.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 5 | 1202347890.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 6 | 1202347891.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 7 | 1202347892.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 8 | 1202347893.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 9 | 1202347894.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 10 | 1202347895.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 11 | 1202347896.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 12 | 1202347897.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 13 | 1202347898.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 14 | 1202347899.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 15 | 1202347900.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 16 | 1202347901.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 17 | 1202347902.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 18 | 1202347903.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 19 | 1202347904.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 20 | 1202347905.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 21 | 1202347906.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 22 | 1202347907.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 23 | 1202347908.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 24 | ~~1202347909.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~10.5~~ | ~~16.0~~ | ~~0.052459~~ | ~~0.076098~~ | ~~2.1~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| 25 | 1202347910.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 26 | 1202347911.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 27 | 1202347912.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 28 | 1202347913.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 29 | 1202347914.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 30 | 1202347915.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 31 | 1202347916.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 32 | 1202347917.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 33 | 1202347918.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 34 | 1202347919.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 35 | 1202347920.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 36 | 1202347921.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 37 | 1202347922.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 38 | 1202347923.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 39 | 1202347924.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 40 | 1202347925.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |



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**Pipet, 0.1 ml Stdev : +/-** 0.000200 ml
**Pipet, 0.5 ml Stdev : +/-** 0.001000 ml
**Pipet, 1 ml Stdev : +/-** 0.002000 ml
**Pipet, 5 ml Stdev : +/-** 0.010000 ml

**Analytical SOP:** GL-RAD-A-001
**Instrument SOP:** GL-RAD-I-016

| 1st Count Raw Data | | | | | | | 1st Count Calibration Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Counting | | | | Count | | | Calibration | Detector Efficiency (cpm/dpm) | | Detector Efficiency | | | Weekly Bkg Count | Weekly Bkg Count |
| Pos. | Detector ID | Time (min.) | Gross Counts Alpha | Beta | Gross Beta CPM | Start Date/Time | Counted on | Calibration Date | Due Date | Sr-89 | Sr-90 | Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Start Date/Time | Time (min.) |
| 1 | 1A | 15 | 10 | 5104 | 340.211 | 2/15/2014 14:51 | PIC | 3/1/2013 | 2/28/2014 | 0.5158 | 0.4082 | 0.00738 | 0.08357 | 0.640 | 2/8/2014 18:42 | 500 |
| 2 | 1B | 15 | 24 | 5583 | 372.049 | 2/15/2014 14:51 | PIC | 3/1/2013 | 2/28/2014 | 0.5138 | 0.4024 | 0.00711 | 0.09452 | 0.542 | 2/8/2014 18:42 | 500 |
| 3 | 1C | 15 | 123 | 5897 | 392.833 | 2/15/2014 14:51 | PIC | 3/1/2013 | 2/28/2014 | 0.5101 | 0.4036 | 0.00847 | 0.03664 | 0.488 | 2/8/2014 18:42 | 500 |
| 4 | 1D | 15 | 86 | 5453 | 363.268 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.5062 | 0.3926 | 0.00692 | 0.04635 | 0.566 | 2/8/2014 18:42 | 500 |
| 5 | 2A | 15 | 2 | 4218 | 281.173 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4857 | 0.3838 | 0.01914 | 0.20325 | 0.362 | 2/8/2014 18:42 | 500 |
| 6 | 2B | 15 | 1 | 3707 | 247.116 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4648 | 0.3804 | 0.02111 | 0.26439 | 1.410 | 2/8/2014 18:42 | 500 |
| 7 | 2C | 15 | 5 | 2564 | 170.907 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4860 | 0.3835 | 0.01274 | 0.07815 | 0.434 | 2/8/2014 18:42 | 500 |
| 8 | 2D | 15 | 3 | 2004 | 133.551 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4854 | 0.3804 | 0.00745 | 0.24410 | 1.518 | 2/8/2014 18:42 | 500 |
| 9 | 3A | 15 | 127 | 5014 | 333.882 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.5153 | 0.3951 | 0.01401 | 0.04546 | 1.412 | 2/8/2014 18:42 | 500 |
| 10 | 3B | 15 | 97 | 5701 | 379.878 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.5108 | 0.3877 | 0.01614 | 0.02910 | 0.610 | 2/8/2014 18:42 | 500 |
| 11 | 3C | 15 | 82 | 5706 | 380.129 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.5071 | 0.3981 | 0.00988 | 0.04957 | 0.702 | 2/8/2014 18:42 | 500 |
| 12 | 3D | 15 | 60 | 5332 | 355.228 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.4963 | 0.3866 | 0.02297 | 0.05968 | 0.478 | 2/8/2014 18:42 | 500 |
| 13 | 4A | 15 | 62 | 4309 | 287.080 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4922 | 0.3915 | 0.01123 | 0.04520 | 0.978 | 2/8/2014 18:42 | 500 |
| 14 | 4B | 15 | 4 | 3768 | 251.143 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4910 | 0.3895 | 0.01519 | 0.21231 | 1.680 | 2/8/2014 18:42 | 500 |
| 15 | 4C | 15 | 28 | 2625 | 174.883 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4980 | 0.3896 | 0.00889 | 0.06258 | 0.566 | 2/8/2014 18:42 | 500 |
| 16 | 4D | 15 | 65 | 2050 | 136.509 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4908 | 0.3802 | 0.00773 | 0.03636 | 1.640 | 2/8/2014 18:42 | 500 |
| 17 | 5A | 15 | 17 | 5215 | 347.617 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5277 | 0.4186 | 0.00851 | 0.04340 | 0.406 | 2/8/2014 18:43 | 500 |
| 18 | 5B | 15 | 34 | 5889 | 392.500 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5224 | 0.4088 | 0.00426 | 0.04404 | 0.634 | 2/8/2014 18:43 | 500 |
| 19 | 5C | 15 | 37 | 5870 | 391.196 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5134 | 0.4057 | 0.00657 | 0.05568 | 0.602 | 2/8/2014 18:43 | 500 |
| 20 | 5D | 15 | 37 | 5637 | 375.702 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5056 | 0.3950 | 0.00925 | 0.03986 | 0.618 | 2/8/2014 18:42 | 500 |
| 21 | 6A | 15 | 22 | 4417 | 294.385 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4802 | 0.3725 | 0.02228 | 0.05539 | 1.296 | 2/8/2014 18:42 | 500 |
| 22 | 6B | 15 | 47 | 3783 | 252.071 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4960 | 0.3578 | 0.00851 | 0.04114 | 0.612 | 2/8/2014 18:42 | 500 |
| 23 | 6C | 15 | 1 | 2590 | 172.664 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4895 | 0.3881 | 0.01970 | 0.04464 | 0.886 | 2/8/2014 18:42 | 500 |
| ~~24~~ | ~~6D~~ | ~~15~~ | ~~0~~ | ~~0~~ | ~~0.000~~ | ~~2/15/2014 15:23~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.2693~~ | ~~0.3293~~ | ~~0.01311~~ | ~~0.00000~~ | ~~0.000~~ | ~~12:00:00 AM~~ | 0 |
| 25 | 7A | 15 | 9 | 5352 | 356.767 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5254 | 0.4202 | 0.00594 | 0.05453 | 0.530 | 2/15/2014 16:09 | 500 |
| 26 | 7B | 15 | 4 | 5898 | 393.187 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5190 | 0.4096 | 0.00627 | 0.04721 | 0.656 | 2/15/2014 16:09 | 500 |
| 27 | 7C | 15 | 4 | 6053 | 403.512 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5084 | 0.4042 | 0.00790 | 0.07920 | 0.362 | 2/15/2014 16:09 | 500 |
| 28 | 7D | 15 | 2 | 5843 | 389.525 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5067 | 0.3973 | 0.01113 | 0.06531 | 0.616 | 2/15/2014 16:09 | 500 |
| 29 | 8A | 15 | 4 | 4531 | 301.991 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.4953 | 0.3855 | 0.01579 | 0.28356 | 0.820 | 2/15/2014 16:09 | 500 |
| 30 | 8B | 15 | 0 | 4022 | 268.133 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.4857 | 0.3823 | 0.02148 | 0.29967 | 0.694 | 2/15/2014 16:09 | 500 |
| 31 | 8C | 15 | 2 | 2590 | 172.626 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.4993 | 0.3928 | 0.01955 | 0.30761 | 0.450 | 2/15/2014 16:09 | 500 |
| 32 | 8D | 15 | 8 | 2127 | 141.761 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.5073 | 0.3936 | 0.00609 | 0.07307 | 0.954 | 2/15/2014 16:09 | 500 |
| 33 | 9A | 15 | 9 | 5371 | 357.871 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5216 | 0.4275 | 0.00758 | 0.32569 | 0.676 | 2/15/2014 16:09 | 500 |
| 34 | 9B | 15 | 10 | 5928 | 395.160 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5037 | 0.4026 | 0.00754 | 0.05980 | 0.948 | 2/15/2014 16:09 | 500 |
| 35 | 9C | 15 | 17 | 6174 | 411.527 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5029 | 0.4050 | 0.00584 | 0.06471 | 0.600 | 2/15/2014 16:09 | 500 |
| 36 | 9D | 15 | 21 | 5971 | 397.996 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4814 | 0.3951 | 0.02610 | 0.05015 | 0.608 | 2/15/2014 16:09 | 500 |
| 37 | 10A | 15 | 1 | 4544 | 302.924 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5022 | 0.3939 | 0.00651 | 0.13452 | 0.582 | 2/15/2014 16:09 | 500 |
| 38 | 10B | 15 | 0 | 3861 | 257.400 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4970 | 0.3859 | 0.00652 | 0.07336 | 0.398 | 2/15/2014 16:09 | 500 |
| 39 | 10C | 15 | 3 | 2820 | 187.984 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4984 | 0.3874 | 0.00638 | 0.07912 | 0.612 | 2/15/2014 16:09 | 500 |
| 40 | 10D | 15 | 8 | 2184 | 145.549 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4973 | 0.3846 | 0.00557 | 0.09654 | 0.662 | 2/15/2014 16:09 | 500 |

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| 2nd Count Raw Data | | | | | | | 2nd Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency Y-90 (cpm/dpm) | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | 1A | 15 | 3 | 1321 | 88.050 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5353 | 0.00738 | 0.08357 | 0.460 | 2/22/2014 17:15 | 500 |
| 2 | 1B | 15 | 3 | 1427 | 95.114 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5335 | 0.00711 | 0.09452 | 0.552 | 2/22/2014 17:15 | 500 |
| 3 | 1C | 15 | 19 | 1518 | 101.154 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5362 | 0.00847 | 0.03664 | 0.574 | 2/22/2014 17:15 | 500 |
| 4 | 1D | 15 | 11 | 1364 | 90.899 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5309 | 0.00692 | 0.04635 | 0.516 | 2/22/2014 17:15 | 500 |
| 5 | 2A | 15 | 1 | 1111 | 74.053 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5118 | 0.01914 | 0.20325 | 0.400 | 2/22/2014 17:15 | 500 |
| 6 | 2B | 15 | 8 | 939 | 62.459 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5160 | 0.02111 | 0.26439 | 1.516 | 2/22/2014 17:15 | 500 |
| 7 | 2C | 15 | 2 | 677 | 45.123 | 2/27/2014 4:39 | PIC | 3/1/2013 | 2/28/2014 | 0.5181 | 0.01274 | 0.07815 | 0.342 | 2/22/2014 17:15 | 500 |
| 8 | 2D | 15 | 1 | 535 | 35.650 | 2/27/2014 4:39 | PIC | 3/1/2013 | 2/28/2014 | 0.5199 | 0.00745 | 0.24410 | 1.346 | 2/22/2014 17:15 | 500 |
| 9 | 3A | 15 | 21 | 1287 | 85.736 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5308 | 0.01401 | 0.04546 | 2.460 | 2/22/2014 17:15 | 500 |
| 10 | 3B | 15 | 9 | 1421 | 94.716 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5306 | 0.01614 | 0.02910 | 0.506 | 2/22/2014 17:15 | 500 |
| 11 | 3C | 15 | 8 | 1490 | 99.307 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5319 | 0.00988 | 0.04957 | 0.664 | 2/22/2014 17:15 | 500 |
| 12 | 3D | 15 | 4 | 1424 | 94.917 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5210 | 0.02297 | 0.05968 | 0.412 | 2/22/2014 17:15 | 500 |
| 13 | 4A | 15 | 2 | 1208 | 80.527 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5300 | 0.01123 | 0.04520 | 0.810 | 2/22/2014 17:15 | 500 |
| 14 | 4B | 15 | 1 | 869 | 57.919 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5348 | 0.01519 | 0.21231 | 1.834 | 2/22/2014 17:15 | 500 |
| 15 | 4C | 15 | 2 | 682 | 45.458 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5373 | 0.00889 | 0.06258 | 0.566 | 2/22/2014 17:15 | 500 |
| 16 | 4D | 15 | 14 | 563 | 37.499 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5316 | 0.00773 | 0.03636 | 1.624 | 2/22/2014 17:15 | 500 |
| 17 | 5A | 15 | 1 | 1301 | 86.730 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5372 | 0.00851 | 0.04340 | 0.482 | 2/22/2014 17:15 | 500 |
| 18 | 5B | 15 | 6 | 1417 | 94.449 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5379 | 0.00426 | 0.04404 | 0.612 | 2/22/2014 17:15 | 500 |
| 19 | 5C | 15 | 5 | 1493 | 99.515 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5391 | 0.00657 | 0.05568 | 0.474 | 2/22/2014 17:15 | 500 |
| 20 | 5D | 15 | 11 | 1486 | 99.037 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5383 | 0.00925 | 0.03986 | 0.876 | 2/22/2014 17:15 | 500 |
| 21 | 6A | 15 | 7 | 1100 | 73.307 | 2/27/2014 5:17 | PIC | 3/1/2013 | 2/28/2014 | 0.4788 | 0.02228 | 0.05539 | 1.448 | 2/22/2014 17:15 | 500 |
| 22 | 6B | 15 | 8 | 910 | 60.645 | 2/27/2014 5:17 | PIC | 3/1/2013 | 2/28/2014 | 0.4489 | 0.00851 | 0.04114 | 0.634 | 2/22/2014 17:15 | 500 |
| 23 | 6C | 15 | 1 | 679 | 45.264 | 2/27/2014 5:17 | PIC | 3/1/2013 | 2/28/2014 | 0.5101 | 0.01970 | 0.04464 | 1.042 | 2/22/2014 17:15 | 500 |
| ~~24~~ | ~~6D~~ | ~~15~~ | ~~0~~ | ~~0~~ | ~~0.000~~ | ~~2/27/2014 5:17~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.4655~~ | ~~0.01311~~ | ~~0.00000~~ | FAIL | ~~12:00:00 AM~~ | ~~0~~ |
| 25 | 7A | 15 | 6 | 1230 | 81.978 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5374 | 0.00594 | 0.05453 | 0.588 | 2/22/2014 17:15 | 500 |
| 26 | 7B | 15 | 2 | 1365 | 90.994 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5395 | 0.00627 | 0.04721 | 0.592 | 2/22/2014 17:15 | 500 |
| 27 | 7C | 15 | 2 | 1504 | 100.256 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5321 | 0.00790 | 0.07920 | 0.344 | 2/22/2014 17:15 | 500 |
| 28 | 7D | 15 | 3 | 1383 | 92.187 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5367 | 0.01113 | 0.06531 | 0.398 | 2/22/2014 17:15 | 500 |
| 29 | 8A | 15 | 2 | 1096 | 73.029 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5255 | 0.01579 | 0.28356 | 0.600 | 2/22/2014 17:15 | 500 |
| 30 | 8B | 15 | 2 | 891 | 59.360 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5128 | 0.02148 | 0.29967 | 0.450 | 2/22/2014 17:15 | 500 |
| 31 | 8C | 15 | 1 | 582 | 38.779 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5358 | 0.01955 | 0.30761 | 0.468 | 2/22/2014 17:15 | 500 |
| 32 | 8D | 15 | 2 | 551 | 36.724 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5420 | 0.00609 | 0.07307 | 1.088 | 2/22/2014 17:15 | 500 |
| 33 | 9A | 15 | 8 | 1336 | 88.893 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5377 | 0.00758 | 0.32569 | 0.666 | 2/22/2014 17:15 | 500 |
| 34 | 9B | 15 | 2 | 1397 | 93.125 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5267 | 0.00754 | 0.05980 | 0.594 | 2/22/2014 17:15 | 500 |
| 35 | 9C | 15 | 3 | 1539 | 102.587 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5322 | 0.00584 | 0.06471 | 0.618 | 2/22/2014 17:15 | 500 |
| 36 | 9D | 15 | 7 | 1467 | 97.777 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5101 | 0.02610 | 0.05015 | 0.572 | 2/22/2014 17:15 | 500 |
| 37 | 10A | 15 | 1 | 1106 | 73.724 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5305 | 0.00651 | 0.13452 | 0.462 | 2/22/2014 17:15 | 500 |
| 38 | 10B | 15 | 3 | 842 | 56.119 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5268 | 0.00652 | 0.07336 | 0.454 | 2/22/2014 17:15 | 500 |
| 39 | 10C | 15 | 0 | 649 | 43.267 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5291 | 0.00638 | 0.07912 | 0.504 | 2/22/2014 17:15 | 500 |
| 40 | 10D | 15 | 2 | 580 | 38.654 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5333 | 0.00557 | 0.09654 | 0.528 | 2/22/2014 17:15 | 500 |

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**Correction Factors**

| Pos. | Separation Date/Time Strontium | Separation Date/Time Yttrium | Yttrium Ingrowth (Sr-89 calc) | Yttrium Ingrowth (Sr-90 calc) | Yttrium Decay | Decay from Sample Date Sr-89 | Decay from Sample Date Sr-90 | Net Count Rate Y-90 | Net Count Rate Sr-90 | Gross CPM Sr-89 | Calculated Sample Recovery % Sr | Calculated Sample Recovery % Y | Sample Recovery % Error Sr | Sample Recovery % Error Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0370 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 4.8684 | 88.2034 | 247.139121 | 85.4% | 97.0% | 1.68% | 1.12% |
| 2 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 4.0906 | 91.3272 | 276.630926 | 110% | 100% | 1.33% | 1.12% |
| 3 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 5.0556 | 103.1656 | 284.611671 | 94.5% | 94.0% | 1.25% | 1.12% |
| 4 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 5.1056 | 80.7418 | 277.420138 | 84.1% | 106% | 1.25% | 1.12% |
| 5 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.3449 | 69.0777 | 206.750322 | 65.5% | 102% | 1.22% | 1.12% |
| 6 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.1150 | 58.6012 | 183.39947 | 56.7% | 98.3% | 1.23% | 1.12% |
| 7 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0372 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.4660 | 44.3262 | 121.115078 | 39.0% | 95.8% | 1.21% | 1.12% |
| 8 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0372 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.3640 | 33.3555 | 94.8316603 | 30.5% | 96.4% | 1.20% | 1.12% |
| 9 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 4.9946 | 82.0819 | 246.805305 | 85.4% | 97.0% | 1.68% | 1.12% |
| 10 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 4.3947 | 88.4109 | 287.072927 | 110% | 100% | 1.33% | 1.12% |
| 11 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 5.3436 | 100.9022 | 273.863259 | 94.5% | 94.0% | 1.25% | 1.12% |
| 12 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 5.7506 | 84.9505 | 264.526914 | 84.1% | 106% | 1.25% | 1.12% |
| 13 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 6.7625 | 73.8554 | 206.461915 | 65.5% | 102% | 1.22% | 1.12% |
| 14 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 5.4992 | 53.4323 | 192.211899 | 56.7% | 98.3% | 1.23% | 1.12% |
| 15 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 6.3962 | 43.6501 | 124.836829 | 39.0% | 95.8% | 1.21% | 1.12% |
| 16 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 6.5440 | 34.1862 | 95.7788528 | 30.5% | 96.4% | 1.20% | 1.12% |
| 17 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 5.5445 | 89.2900 | 252.782978 | 85.4% | 97.0% | 1.68% | 1.12% |
| 18 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 4.6919 | 91.8976 | 295.910697 | 110% | 100% | 1.33% | 1.12% |
| 19 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 5.7502 | 102.2128 | 283.233019 | 94.5% | 94.0% | 1.25% | 1.12% |
| 20 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 6.4018 | 87.5555 | 281.744368 | 84.1% | 106% | 1.25% | 1.12% |
| 21 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8223 | 0.9777 | 0.9999 | 6.0292 | 70.4143 | 217.941918 | 65.5% | 102% | 1.22% | 1.12% |
| 22 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8223 | 0.9777 | 0.9999 | 5.8203 | 62.8391 | 183.411772 | 56.7% | 98.3% | 1.23% | 1.12% |
| 23 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8222 | 0.9777 | 0.9999 | 6.2330 | 45.3031 | 121.127575 | 39.0% | 95.8% | 1.21% | 1.12% |
| ~~24~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.0426~~ | ~~0.9424~~ | ~~0.8222~~ | ~~0.9777~~ | ~~0.9999~~ | #VALUE! | #VALUE! | #VALUE! | ~~30.5%~~ | ~~96.4%~~ | ~~1.20%~~ | ~~1.12%~~ |
| 25 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2041 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 25.1972 | 84.9041 | 246.665958 | 85.4% | 97.0% | 1.68% | 1.12% |
| 26 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2042 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 21.7700 | 88.7856 | 282.631812 | 110% | 100% | 1.33% | 1.12% |
| 27 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2042 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 27.9432 | 104.4786 | 271.090383 | 94.5% | 94.0% | 1.25% | 1.12% |
| 28 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2042 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 28.8365 | 82.9169 | 277.771264 | 84.1% | 106% | 1.25% | 1.12% |
| 29 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 29.2240 | 67.1193 | 205.647716 | 65.5% | 102% | 1.22% | 1.12% |
| 30 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 27.4725 | 57.8638 | 182.797097 | 56.7% | 98.3% | 1.23% | 1.12% |
| 31 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 25.9670 | 37.9386 | 108.720078 | 39.0% | 95.8% | 1.21% | 1.12% |
| 32 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 30.9205 | 34.7373 | 76.103306 | 30.5% | 96.4% | 1.20% | 1.12% |
| 33 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 27.7440 | 93.8385 | 236.288741 | 85.4% | 97.0% | 1.68% | 1.12% |
| 34 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 22.6315 | 91.7799 | 280.748787 | 110% | 100% | 1.33% | 1.12% |
| 35 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 28.9623 | 107.1372 | 275.427172 | 94.5% | 94.0% | 1.25% | 1.12% |
| 36 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 31.0100 | 92.1444 | 274.842134 | 84.1% | 106% | 1.25% | 1.12% |
| 37 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 30.0025 | 68.9189 | 204.002987 | 65.5% | 102% | 1.22% | 1.12% |
| 38 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 26.3500 | 53.8912 | 177.158783 | 56.7% | 98.3% | 1.23% | 1.12% |
| 39 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 29.4144 | 42.4178 | 116.151967 | 39.0% | 95.8% | 1.21% | 1.12% |
| 40 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 33.5679 | 37.0139 | 74.9666967 | 30.5% | 96.4% | 1.20% | 1.12% |

M-9139

DCN: ITSI-0808-0004-0076, 8 May 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-89 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-89 LCS S/N :** 1680-A
**LCS Exp Date :** 3/24/2014
**LCS Activity (dpm/ml):** 2849.70
**LCS Volume Added:** 0.20
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-89 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.5547 | 1.8037 | 1 | 4.6534 | 1289.2558 | 2.46% | 246.4991 | 4.0592 | 41.6123 | 220.7315 | | LCS | | | 1283.6485 | 100.4% |
| 2 | 1.8356 | 1.2959 | 1 | 3.4086 | 1127.4500 | 2.17% | 276.0889 | 4.2945 | 34.3734 | 191.0559 | | LCS | | | 1283.6485 | 87.8% |
| 3 | 2.0375 | 1.4385 | 1 | 3.8324 | 1357.2562 | 2.15% | 284.1237 | 4.3560 | 40.7852 | 230.2264 | | LCS | | | 1283.6485 | 105.7% |
| 4 | 2.4837 | 1.7535 | 1 | 4.5884 | 1496.9580 | 2.11% | 276.8541 | 4.3007 | 45.5776 | 253.1659 | | LCS | | | 1283.6485 | 116.6% |
| 5 | 2.6574 | 1.8761 | 1 | 5.1990 | 1492.9767 | 2.90% | 206.3883 | 3.7127 | 52.6396 | 264.8673 | | LCS | | | 1283.6485 | 116.3% |
| 6 | 6.3343 | 4.4721 | 1 | 10.6915 | 1590.0292 | 3.11% | 181.9895 | 3.4971 | 59.8850 | 285.7860 | | LCS | | | 1283.6485 | 123.9% |
| 7 | 4.8842 | 3.4483 | 1 | 9.3251 | 1465.4049 | 2.94% | 120.6811 | 2.8417 | 67.6319 | 258.5682 | | LCS | | | 1283.6485 | 114.2% |
| 8 | 11.7071 | 8.2653 | 1 | 19.6432 | 1452.2154 | 3.04% | 93.3137 | 2.5150 | 76.7145 | 256.6145 | | LCS | | | 1283.6485 | 113.1% |
| 9 | 3.7988 | 2.6820 | 1 | 6.4112 | 1284.8885 | 2.74% | 245.3933 | 4.0567 | 41.6320 | 224.0413 | | LCS | | | 1283.6485 | 100.1% |
| 10 | 1.9593 | 1.3833 | 1 | 3.5884 | 1177.0214 | 2.59% | 286.4629 | 4.3749 | 35.2319 | 204.7869 | | LCS | | | 1283.6485 | 91.7% |
| 11 | 2.4587 | 1.7359 | 1 | 4.4330 | 1313.0009 | 2.23% | 273.1813 | 4.2732 | 40.2554 | 223.7059 | | LCS | | | 1283.6485 | 102.3% |
| 12 | 2.3284 | 1.6439 | 1 | 4.3910 | 1456.4930 | 3.06% | 264.0489 | 4.1995 | 45.4026 | 262.0776 | | LCS | | | 1283.6485 | 113.5% |
| 13 | 4.3117 | 3.0441 | 1 | 7.5164 | 1467.3415 | 2.45% | 205.4839 | 3.7103 | 51.9296 | 252.7955 | | LCS | | | 1283.6485 | 114.3% |
| 14 | 6.5481 | 4.6230 | 1 | 10.9010 | 1576.5302 | 2.71% | 190.5319 | 3.5802 | 58.0620 | 275.4183 | | LCS | | | 1283.6485 | 122.8% |
| 15 | 5.4449 | 3.8441 | 1 | 10.0590 | 1473.0553 | 2.76% | 124.2708 | 2.8851 | 67.0288 | 256.8151 | | LCS | | | 1283.6485 | 114.8% |
| 16 | 12.0388 | 8.4995 | 1 | 20.0784 | 1449.4466 | 3.04% | 94.1389 | 2.5276 | 76.2764 | 256.3172 | | LCS | | | 1283.6485 | 112.9% |
| 17 | 1.9895 | 1.4046 | 1 | 3.8320 | 1290.6260 | 2.49% | 252.3770 | 4.1052 | 41.1477 | 221.3036 | | LCS | | | 1283.6485 | 100.5% |
| 18 | 1.9532 | 1.3790 | 1 | 3.5615 | 1186.3420 | 2.05% | 295.2767 | 4.4417 | 34.9772 | 199.8033 | | LCS | | | 1283.6485 | 92.4% |
| 19 | 2.2492 | 1.5880 | 1 | 4.1256 | 1341.9241 | 2.09% | 282.6310 | 4.3455 | 40.4394 | 226.7714 | | LCS | | | 1283.6485 | 104.5% |
| 20 | 2.5990 | 1.8349 | 1 | 4.7527 | 1522.2294 | 2.19% | 281.1264 | 4.3341 | 45.9971 | 258.7562 | | LCS | | | 1283.6485 | 118.6% |
| 21 | 5.0876 | 3.5919 | 1 | 8.6476 | 1585.7306 | 3.09% | 216.6459 | 3.8121 | 54.6888 | 285.3155 | | LCS | | | 1283.6485 | 123.5% |
| 22 | 3.9123 | 2.7621 | 1 | 7.1625 | 1497.2958 | 2.43% | 182.7598 | 3.4970 | 56.1407 | 256.7697 | | LCS | | | 1283.6485 | 116.6% |
| 23 | 6.9308 | 4.8932 | 1 | 12.1983 | 1450.0789 | 3.31% | 120.2416 | 2.8420 | 67.1764 | 263.0017 | | LCS | | | 1283.6485 | 113.0% |
| 24 | #DIV/0! | #DIV/0! | 1 | #DIV/0! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | | LCS | | | 1283.6486 | #VALUE! |
| 25 | 2.3057 | 1.6278 | 1 | 4.2931 | 1276.7506 | 2.42% | 246.1360 | 4.0553 | 41.2297 | 217.9509 | | LCS | | | 1283.6485 | 99.5% |
| 26 | 2.0196 | 1.4258 | 1 | 3.6685 | 1151.5795 | 2.13% | 281.9758 | 4.3409 | 34.7471 | 194.6979 | | LCS | | | 1283.6485 | 89.7% |
| 27 | 1.7786 | 1.2557 | 1 | 3.4798 | 1310.7893 | 2.16% | 270.7284 | 4.2513 | 40.3437 | 222.3543 | | LCS | | | 1283.6485 | 102.1% |
| 28 | 2.6146 | 1.8459 | 1 | 4.7831 | 1512.1999 | 2.28% | 277.1553 | 4.3034 | 46.0208 | 258.3554 | | LCS | | | 1283.6485 | 117.8% |
| 29 | 3.9613 | 2.7967 | 1 | 7.0264 | 1467.5373 | 2.69% | 204.8277 | 3.7029 | 51.9995 | 256.6651 | | LCS | | | 1283.6485 | 114.3% |
| 30 | 4.2961 | 3.0331 | 1 | 7.7554 | 1538.0812 | 3.13% | 182.1031 | 3.4911 | 57.7939 | 276.8450 | | LCS | | | 1283.6485 | 119.8% |
| 31 | 4.8905 | 3.4527 | 1 | 9.2935 | 1292.7748 | 3.39% | 108.2701 | 2.6924 | 63.0096 | 235.2797 | | LCS | | | 1283.6485 | 100.7% |
| 32 | 8.9697 | 6.3327 | 1 | 15.6736 | 1130.3198 | 3.29% | 75.1493 | 2.2529 | 66.4156 | 203.3409 | | LCS | | | 1283.6485 | 88.1% |
| 33 | 2.6230 | 1.8519 | 1 | 4.7468 | 1231.1230 | 2.49% | 235.6127 | 3.9691 | 40.6493 | 211.1751 | | LCS | | | 1283.6485 | 95.9% |
| 34 | 2.5020 | 1.7665 | 1 | 4.3747 | 1177.6339 | 2.17% | 279.8008 | 4.3265 | 35.6905 | 199.6368 | | LCS | | | 1283.6485 | 91.7% |
| 35 | 2.3151 | 1.6345 | 1 | 4.2481 | 1345.3374 | 2.08% | 274.8272 | 4.2852 | 41.1149 | 227.2880 | | LCS | | | 1283.6485 | 104.8% |
| 36 | 2.7345 | 1.9306 | 1 | 5.0100 | 1575.1635 | 3.29% | 274.2341 | 4.2807 | 48.1915 | 288.3190 | | LCS | | | 1283.6485 | 122.7% |
| 37 | 3.2925 | 2.3246 | 1 | 6.0629 | 1437.9276 | 2.28% | 203.4210 | 3.6880 | 51.0962 | 244.9366 | | LCS | | | 1283.6485 | 112.0% |
| 38 | 3.1799 | 2.2451 | 1 | 6.1412 | 1459.2627 | 2.39% | 176.7608 | 3.4368 | 55.6101 | 249.4452 | | LCS | | | 1283.6485 | 113.7% |
| 39 | 5.7134 | 4.0337 | 1 | 10.4598 | 1382.0497 | 2.77% | 115.5400 | 2.7829 | 65.2453 | 240.7107 | | LCS | | | 1283.6485 | 107.7% |
| 40 | 7.6239 | 5.3826 | 1 | 13.8345 | 1140.3485 | 3.29% | 74.3047 | 2.2359 | 67.2548 | 205.4815 | | LCS | | | 1283.6485 | 88.8% |





M-9140

DCN: ITSI-0808-0004-0076, 8 May 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-90 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-90 LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 506.15
**LCS Volume Added:** 0.50
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-90 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.6949 | 1.9026 | 1 | 5.1069 | 570.0264 | 3.07% | 87.5900 | 2.4230 | 24.1217 | 97.9478 | | LCS | | | 569.9889 | 100.0% |
| 2 | 2.2344 | 1.5775 | 1 | 4.1401 | 465.7794 | 2.98% | 94.5624 | 2.5183 | 18.9750 | 79.7206 | | LCS | | | 569.9889 | 81.7% |
| 3 | 2.8017 | 1.9780 | 1 | 5.1674 | 609.1867 | 2.94% | 100.5796 | 2.5971 | 24.0611 | 104.1230 | | LCS | | | 569.9889 | 106.9% |
| 4 | 2.6708 | 1.8856 | 1 | 4.9892 | 550.4038 | 3.02% | 90.3833 | 2.4619 | 22.9322 | 94.3871 | | LCS | | | 569.9889 | 96.6% |
| 5 | 3.2425 | 2.2892 | 1 | 6.2578 | 618.4597 | 3.74% | 73.6531 | 2.2221 | 28.5397 | 109.3794 | | LCS | | | 569.9889 | 108.5% |
| 6 | 7.5475 | 5.3286 | 1 | 12.6652 | 611.8586 | 4.11% | 60.9430 | 2.0413 | 31.3467 | 110.1300 | | LCS | | | 569.9889 | 107.3% |
| 7 | 5.3187 | 3.7550 | 1 | 10.4893 | 667.0469 | 4.23% | 44.7809 | 1.7346 | 39.5192 | 120.7415 | | LCS | | | 569.9889 | 117.0% |
| 8 | 13.3763 | 9.4438 | 1 | 22.6643 | 647.7920 | 4.69% | 34.3044 | 1.5425 | 44.5503 | 120.0725 | | LCS | | | 569.9889 | 113.6% |
| 9 | 6.3037 | 4.4505 | 1 | 10.2175 | 548.1804 | 3.39% | 83.2763 | 2.3918 | 24.0136 | 95.4205 | | LCS | | | 569.9889 | 96.2% |
| 10 | 2.1573 | 1.5231 | 1 | 4.0396 | 467.9532 | 3.31% | 94.2099 | 2.5130 | 19.0388 | 81.1996 | | LCS | | | 569.9889 | 82.1% |
| 11 | 3.0462 | 2.1507 | 1 | 5.5259 | 603.9708 | 3.01% | 98.6429 | 2.5733 | 24.0311 | 103.5002 | | LCS | | | 569.9889 | 106.0% |
| 12 | 2.4389 | 1.7219 | 1 | 4.6884 | 588.1241 | 3.69% | 94.5054 | 2.5157 | 23.8782 | 103.7549 | | LCS | | | 569.9889 | 103.2% |
| 13 | 4.4679 | 3.1544 | 1 | 7.9349 | 648.1626 | 3.31% | 79.7173 | 2.3173 | 28.7377 | 112.4622 | | LCS | | | 569.9889 | 113.7% |
| 14 | 8.0323 | 5.6709 | 1 | 13.2846 | 544.8290 | 3.98% | 56.0852 | 1.9659 | 29.1283 | 97.4360 | | LCS | | | 569.9889 | 95.6% |
| 15 | 6.6159 | 4.6709 | 1 | 12.2223 | 646.5810 | 4.13% | 44.8923 | 1.7412 | 38.2494 | 116.4908 | | LCS | | | 569.9889 | 113.4% |
| 16 | 14.4082 | 10.1723 | 1 | 24.0482 | 664.3327 | 4.62% | 35.8754 | 1.5822 | 44.6857 | 122.6366 | | LCS | | | 569.9889 | 116.6% |
| 17 | 2.7661 | 1.9529 | 1 | 5.2109 | 562.8148 | 3.12% | 86.2484 | 2.4048 | 23.8566 | 96.8974 | | LCS | | | 569.9889 | 98.7% |
| 18 | 2.3482 | 1.6579 | 1 | 4.2990 | 461.3273 | 2.93% | 93.8370 | 2.5095 | 18.7560 | 78.8219 | | LCS | | | 569.9889 | 80.9% |
| 19 | 2.5480 | 1.7989 | 1 | 4.8102 | 600.3459 | 2.91% | 99.0408 | 2.5759 | 23.7366 | 102.4853 | | LCS | | | 569.9889 | 105.3% |
| 20 | 3.4537 | 2.4383 | 1 | 6.0853 | 593.2512 | 2.99% | 98.1614 | 2.5699 | 23.6100 | 101.6099 | | LCS | | | 569.9889 | 104.1% |
| 21 | 6.6406 | 4.6883 | 1 | 11.1844 | 649.5001 | 3.96% | 71.8595 | 2.2113 | 30.3590 | 116.0394 | | LCS | | | 569.9889 | 113.9% |
| 22 | 5.6503 | 3.9891 | 1 | 10.3028 | 697.4684 | 3.63% | 60.0107 | 2.0110 | 35.5005 | 122.7396 | | LCS | | | 569.9889 | 122.4% |
| 23 | 9.4956 | 6.7040 | 1 | 16.4550 | 673.7429 | 4.54% | 44.2217 | 1.7377 | 40.2108 | 123.8669 | | LCS | | | 569.9889 | 118.2% |
| ~~24~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#VALUE!~~ |
| 25 | 3.0664 | 2.1649 | 1 | 5.6398 | 533.0740 | 3.14% | 81.3902 | 2.3380 | 23.1883 | 91.8406 | | LCS | | | 569.9889 | 93.5% |
| 26 | 2.3116 | 1.6320 | 1 | 4.2482 | 444.8448 | 3.01% | 90.4017 | 2.4632 | 18.3543 | 76.2473 | | LCS | | | 569.9889 | 78.0% |
| 27 | 2.2078 | 1.5587 | 1 | 4.3505 | 615.9813 | 2.93% | 99.9121 | 2.5854 | 24.1371 | 105.2403 | | LCS | | | 569.9889 | 108.1% |
| 28 | 2.3442 | 1.6551 | 1 | 4.5273 | 558.6279 | 3.13% | 91.7889 | 2.4792 | 22.8482 | 96.1950 | | LCS | | | 569.9889 | 98.0% |
| 29 | 3.9063 | 2.7579 | 1 | 7.1678 | 598.2425 | 3.61% | 72.4289 | 2.2068 | 27.6011 | 105.1595 | | LCS | | | 569.9889 | 105.0% |
| 30 | 4.1795 | 2.9507 | 1 | 7.9423 | 601.1383 | 4.16% | 58.9100 | 1.9895 | 30.7427 | 108.4232 | | LCS | | | 569.9889 | 105.5% |
| 31 | 6.0766 | 4.2902 | 1 | 11.4900 | 557.3653 | 4.76% | 38.3115 | 1.6082 | 35.4283 | 103.6964 | | LCS | | | 569.9889 | 97.8% |
| 32 | 11.6519 | 8.2264 | 1 | 20.1119 | 651.9870 | 4.57% | 35.6356 | 1.5654 | 43.3693 | 120.1000 | | LCS | | | 569.9889 | 114.4% |
| 33 | 3.2709 | 2.3093 | 1 | 5.9314 | 579.1572 | 3.07% | 88.2270 | 2.4347 | 24.1291 | 99.5119 | | LCS | | | 569.9889 | 101.6% |
| 34 | 2.3788 | 1.6795 | 1 | 4.3700 | 467.7647 | 3.01% | 92.5314 | 2.4919 | 19.0186 | 80.1771 | | LCS | | | 569.9889 | 82.1% |
| 35 | 2.9675 | 2.0951 | 1 | 5.4267 | 630.4337 | 2.86% | 101.9691 | 2.6154 | 24.4130 | 107.4252 | | LCS | | | 569.9889 | 110.6% |
| 36 | 2.9657 | 2.0938 | 1 | 5.4721 | 624.2849 | 3.87% | 97.2046 | 2.5533 | 24.7582 | 111.0460 | | LCS | | | 569.9889 | 109.5% |
| 37 | 3.4055 | 2.4043 | 1 | 6.4499 | 601.1954 | 3.29% | 73.2624 | 2.2172 | 27.4696 | 104.2273 | | LCS | | | 569.9889 | 105.5% |
| 38 | 4.0988 | 2.8938 | 1 | 7.7802 | 554.5974 | 3.71% | 55.6647 | 1.9345 | 29.0988 | 97.9285 | | LCS | | | 569.9889 | 97.3% |
| 39 | 6.4048 | 4.5219 | 1 | 11.9989 | 631.8690 | 4.18% | 42.7627 | 1.6987 | 37.8952 | 114.0776 | | LCS | | | 569.9889 | 110.9% |
| 40 | 8.2733 | 5.8411 | 1 | 15.4117 | 710.9750 | 4.39% | 38.1258 | 1.6056 | 45.2053 | 129.7585 | | LCS | | | 569.9889 | 124.7% |

M-9141

# Strontium-89 & 90 Liquid

DCN: ITSI-0808-0004-0076, 8 May 2019

Filename : SR8990.XLS
File type : Excel
Version # : 1.3.9

**Batch :** 1082959
**Analyst :** AF1
**Prep Date :** 2/14/2014
**Sr-89 Method Uncertainty :** 0.0829
**Sr-90 Method Uncertainty :** 0.0821

**Geometry:** Tuffryn Filter

| | |
|---|---|
| **Sr Carrier S/N :** | 2046474 |
| **Carrier Exp Date :** | 12/5/2014 |
| **Carrier Volume Added:** | 2.00 |
| **Carrier Weight (mg/ml):** | 16.40 |
| **Carrier Weight StDev.:** | 0.16 |
| **Y Carrier S/N :** | 2073992 |
| **Carrier Exp Date :** | 5/14/2014 |
| **Carrier Volume Added:** | 0.50 |
| **Carrier Weight (mg/ml):** | 33.18 |
| **Carrier Weight StDev.:** | 0.29 |

| | | |
|---|---|---|
| **Procedure Code :** | GFCGANBL | |
| **Parmname1 :** | Strontium-89 | |
| **Parmname2 :** | Strontium-90 | |
| **Required MDA Sr-89 :** | 1 | pCi/L |
| **Required MDA Sr-90 :** | 1 | pCi/L |
| **Sr-89 Abundance :** | 1.00 | |
| **Sr-90 Abundance :** | 1.00 | |
| **Halflife of Sr-89 :** | 50.53 | days |
| **Halflife of Sr-90 :** | 28.9 | years |
| **Halflife of Y-90 :** | 64.053 | hours |

| Sample Characteristics | | | | | Carrier Calculations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Net Weight (mg) | | Net Weight StDev. (mg) | | Carrier Aliquot (mL) | | Carrier Aliquot StDev. (mL) | |
| Pos. | Sample ID | Sample Aliquot L | Sample Aliquot StDev. L | Sample Date/Time | Sr | Y | Sr | Y | Sr | Y | Sr | Y |
| 1 | 1202347886.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 2 | 1202347887.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 3 | 1202347888.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 4 | 1202347889.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| ~~5~~ | ~~1202347890.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~8.6~~ | ~~17.0~~ | ~~0.044293~~ | ~~0.080396~~ | ~~0.8~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| ~~6~~ | ~~1202347891.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~9.3~~ | ~~16.3~~ | ~~0.047301~~ | ~~0.077387~~ | ~~1.0~~ | ~~0.5~~ | ~~0.002000~~ | ~~0.001000~~ |
| ~~7~~ | ~~1202347892.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~9.6~~ | ~~15.9~~ | ~~0.048591~~ | ~~0.075668~~ | ~~1.5~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| ~~8~~ | ~~1202347893.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~10.5~~ | ~~16.0~~ | ~~0.052459~~ | ~~0.076098~~ | ~~2.1~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| 9 | 1202347894.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 10 | 1202347895.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 11 | 1202347896.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 12 | 1202347897.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 13 | 1202347898.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 14 | 1202347899.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 15 | 1202347900.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 16 | 1202347901.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |

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DCN: ITSI-0808-0004-0076, 8 May 2014

**Pipet, 0.1 ml Stdev : +/-** 0.000200 ml
**Pipet, 0.5 ml Stdev : +/-** 0.001000 ml
**Pipet, 1 ml Stdev : +/-** 0.002000 ml
**Pipet, 5 ml Stdev : +/-** 0.010000 ml

**Analytical SOP:** GL-RAD-A-001
**Instrument SOP:** GL-RAD-I-016

| 1st Count Raw Data | | | | | | | 1st Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency (cpm/dpm) Sr-89 | Detector Efficiency (cpm/dpm) Sr-90 | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | 11A | 15 | 5 | 5433 | 362.144 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.4310 | 0.4048 | 0.01317 | 0.16835 | 0.414 | 2/15/2014 16:11 | 500 |
| 2 | 11B | 15 | 0 | 5998 | 399.867 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.5052 | 0.4187 | 0.00697 | 0.10683 | 1.744 | 2/15/2014 16:11 | 500 |
| 3 | 11C | 15 | 0 | 6114 | 407.600 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.5007 | 0.4010 | 0.01278 | 0.11616 | 0.380 | 2/15/2014 16:11 | 500 |
| 4 | 11D | 15 | 0 | 5851 | 390.067 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.5036 | 0.4044 | 0.01068 | 0.10178 | 0.508 | 2/15/2014 16:11 | 500 |
| ~~5~~ | ~~12A~~ | ~~15~~ | ~~3~~ | ~~4446~~ | ~~296.369~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.0000~~ | ~~0.01964~~ | ~~0.15696~~ | ~~0.528~~ | ~~2/15/2014 16:11~~ | ~~500~~ |
| ~~6~~ | ~~12B~~ | ~~15~~ | ~~2~~ | ~~4077~~ | ~~271.766~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.2500~~ | ~~0.0000~~ | ~~0.01114~~ | ~~0.25754~~ | ~~0.684~~ | ~~2/15/2014 16:11~~ | ~~500~~ |
| ~~7~~ | ~~12C~~ | ~~15~~ | ~~3~~ | ~~2736~~ | ~~182.387~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.2174~~ | ~~0.0000~~ | ~~0.01666~~ | ~~0.06736~~ | ~~0.806~~ | ~~2/15/2014 16:11~~ | ~~500~~ |
| ~~8~~ | ~~12D~~ | ~~15~~ | ~~0~~ | ~~2182~~ | ~~146.133~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.4787~~ | ~~0.0000~~ | ~~0.01845~~ | ~~0.09744~~ | ~~1.514~~ | ~~2/15/2014 16:12~~ | ~~500~~ |
| 9 | 13A | 15 | 6 | 4729 | 315.238 | 2/16/2014 9:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5038 | 0.4278 | 0.00714 | 0.07148 | 0.583 | 2/15/2014 15:40 | 1000 |
| 10 | 13B | 15 | 0 | 5994 | 399.600 | 2/16/2014 9:29 | PIC | 3/1/2013 | 2/28/2014 | 0.5128 | 0.4276 | 0.00967 | 0.08951 | 0.394 | 2/15/2014 15:40 | 1000 |
| 11 | 13C | 15 | 3 | 6028 | 401.811 | 2/16/2014 9:29 | PIC | 3/1/2013 | 2/28/2014 | 0.5049 | 0.3956 | 0.01708 | 0.27848 | 0.309 | 2/15/2014 15:40 | 1000 |
| 12 | 13D | 15 | 1 | 5501 | 366.728 | 2/16/2014 9:28 | PIC | 3/1/2013 | 2/28/2014 | 0.4942 | 0.4026 | 0.01144 | 0.08747 | 0.609 | 2/15/2014 15:40 | 1000 |
| 13 | 14A | 15 | 1 | 4185 | 278.980 | 2/16/2014 9:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4895 | 0.3891 | 0.02119 | 0.30489 | 0.618 | 2/15/2014 15:40 | 1000 |
| 14 | 14B | 15 | 1 | 3590 | 239.318 | 2/16/2014 9:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5004 | 0.3888 | 0.01028 | 0.23739 | 0.790 | 2/15/2014 15:40 | 1000 |
| 15 | 14C | 15 | 1 | 2816 | 187.706 | 2/16/2014 9:24 | PIC | 3/1/2013 | 2/28/2014 | 0.5039 | 0.3843 | 0.01828 | 0.40549 | 0.423 | 2/15/2014 15:40 | 1000 |
| 16 | 14D | 15 | 3 | 2177 | 145.073 | 2/16/2014 9:24 | PIC | 3/1/2013 | 2/28/2014 | 0.4864 | 0.3621 | 0.00738 | 0.29929 | 0.535 | 2/15/2014 15:40 | 1000 |

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DCN: ITSI-0808-0004-0076, 8 May 2019

| 2nd Count Raw Data | | | | | | | 2nd Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency Y-90 (cpm/dpm) | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | 11A | 15 | 2 | 1267 | 84.444 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.4678 | 0.01317 | 0.16835 | 0.420 | 2/22/2014 17:16 | 500 |
| 2 | 11B | 15 | 1 | 1438 | 95.860 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.5323 | 0.00697 | 0.10683 | 1.984 | 2/22/2014 17:16 | 500 |
| 3 | 11C | 15 | 4 | 1552 | 103.436 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.5295 | 0.01278 | 0.11616 | 0.404 | 2/22/2014 17:17 | 500 |
| 4 | 11D | 15 | 1 | 1371 | 91.393 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.5341 | 0.01068 | 0.10178 | 0.496 | 2/22/2014 17:17 | 500 |
| ~~5~~ | ~~12A~~ | ~~15~~ | 4 | ~~1089~~ | ~~72.558~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01964~~ | ~~0.15696~~ | ~~1.528~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| ~~6~~ | ~~12B~~ | ~~15~~ | ~~2~~ | ~~947~~ | ~~63.099~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01114~~ | ~~0.25754~~ | ~~0.844~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| ~~7~~ | ~~12C~~ | ~~15~~ | ~~1~~ | ~~664~~ | ~~44.262~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01666~~ | ~~0.06736~~ | ~~0.756~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| ~~8~~ | ~~12D~~ | ~~15~~ | ~~11~~ | ~~636~~ | ~~42.329~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01845~~ | ~~0.09744~~ | ~~1.314~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| 9 | 13A | 15 | 4 | 1269 | 84.581 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.5300 | 0.00714 | 0.07148 | 0.660 | 2/22/2014 17:17 | 1000 |
| 10 | 13B | 15 | 4 | 1412 | 94.109 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.5438 | 0.00967 | 0.08951 | 0.613 | 2/22/2014 17:18 | 1000 |
| 11 | 13C | 15 | 7 | 1408 | 93.737 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.4905 | 0.01708 | 0.27848 | 0.307 | 2/22/2014 17:18 | 1000 |
| 12 | 13D | 15 | 0 | 1433 | 95.533 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.5264 | 0.01144 | 0.08747 | 0.672 | 2/22/2014 17:18 | 1000 |
| 13 | 14A | 15 | 0 | 1158 | 77.200 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.4988 | 0.02119 | 0.30489 | 2.141 | 2/22/2014 17:18 | 1000 |
| 14 | 14B | 15 | 1 | 922 | 61.451 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.5217 | 0.01028 | 0.23739 | 2.871 | 2/22/2014 17:18 | 1000 |
| 15 | 14C | 15 | 3 | 625 | 41.586 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.5271 | 0.01828 | 0.40549 | 0.539 | 2/22/2014 17:18 | 1000 |
| 16 | 14D | 15 | 0 | 486 | 32.400 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.4715 | 0.00738 | 0.29929 | 1.015 | 2/22/2014 17:18 | 1000 |

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DCN: ITSI-0808-0004-0076, 8 May 2019

**Correction Factors**

| Pos. | Separation Date/Time Strontium | Separation Date/Time Yttrium | Yttrium Ingrowth (Sr-89 calc) | Yttrium Ingrowth (Sr-90 calc) | Yttrium Decay | Decay from Sample Date Sr-89 | Decay from Sample Date Sr-90 | Net Count Rate Y-90 | Net Count Rate Sr-90 | Gross CPM Sr-89 | Calculated Sample Recovery % Sr | Calculated Sample Recovery % Y | Sample Recovery % Error Sr | Sample Recovery % Error Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 26.8590 | 97.6478 | 237.63702 | 85.4% | 97.0% | 1.68% | 1.12% |
| 2 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 23.3399 | 96.1635 | 280.363252 | 110% | 100% | 1.33% | 1.12% |
| 3 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 29.7480 | 108.1470 | 269.705003 | 94.5% | 94.0% | 1.25% | 1.12% |
| 4 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 29.4775 | 84.5490 | 276.040157 | 84.1% | 106% | 1.25% | 1.12% |
| ~~5~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~65.5%~~ | ~~102%~~ | ~~1.22%~~ | ~~1.12%~~ |
| ~~6~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~56.7%~~ | ~~98.3%~~ | ~~1.23%~~ | ~~1.12%~~ |
| ~~7~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~39.0%~~ | ~~95.8%~~ | ~~1.21%~~ | ~~1.12%~~ |
| ~~8~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~30.5%~~ | ~~96.4%~~ | ~~1.20%~~ | ~~1.12%~~ |
| 9 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2126 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 27.3440 | 91.2960 | 196.598045 | 85.4% | 97.0% | 1.68% | 1.12% |
| 10 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2128 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 23.7170 | 96.1098 | 279.773204 | 110% | 100% | 1.33% | 1.12% |
| 11 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2128 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 27.5226 | 104.8101 | 269.478254 | 94.5% | 94.0% | 1.25% | 1.12% |
| 12 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2127 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 31.3658 | 89.4535 | 245.908178 | 84.1% | 106% | 1.25% | 1.12% |
| 13 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2120 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 31.7555 | 74.7357 | 172.488454 | 65.5% | 102% | 1.22% | 1.12% |
| 14 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2120 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 28.6512 | 58.1379 | 152.528335 | 56.7% | 98.3% | 1.23% | 1.12% |
| 15 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2121 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 29.1853 | 40.8421 | 117.678932 | 39.0% | 95.8% | 1.21% | 1.12% |
| 16 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2121 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 28.5644 | 32.6968 | 83.8123247 | 30.5% | 96.4% | 1.20% | 1.12% |

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DCN: ITSI-0808-0004-0076, 8 May 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-89 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-89 LCS S/N :** 1680-A
**LCS Exp Date :** 3/24/2014
**LCS Activity (dpm/ml):** 2849.70
**LCS Volume Added:** 0.20
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-89 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.4848 | 1.7543 | 1 | 4.7736 | **1500.4318** | 2.71% | 237.2230 | 3.9804 | 49.3444 | 261.0889 | | LCS | | | 1283.6485 | 116.9% |
| 2 | 3.3841 | 2.3892 | 1 | 5.6179 | **1169.3837** | 2.16% | 278.6193 | 4.3237 | 35.5678 | 198.0842 | | LCS | | | 1283.6485 | 91.1% |
| 3 | 1.8509 | 1.3067 | 1 | 3.5970 | **1324.4517** | 2.38% | 269.3250 | 4.2404 | 40.8718 | 227.7531 | | LCS | | | 1283.6485 | 103.2% |
| 4 | 2.3899 | 1.6873 | 1 | 4.4729 | **1513.1570** | 2.27% | 275.5322 | 4.2900 | 46.1764 | 258.2081 | | LCS | | | 1283.6485 | 117.9% |
| ~~5~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| ~~6~~ | ~~8.2878~~ | ~~5.8513~~ | ~~1~~ | ~~14.9851~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| ~~7~~ | ~~15.0384~~ | ~~10.6172~~ | ~~1~~ | ~~26.7215~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| ~~8~~ | ~~11.9797~~ | ~~8.4578~~ | ~~1~~ | ~~20.1047~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| 9 | 2.5047 | 1.7684 | 1 | 4.6192 | **1060.8940** | 2.59% | 196.0150 | 3.6204 | 38.4054 | 182.9747 | | LCS | | | 1283.6485 | 82.6% |
| 10 | 1.5732 | 1.1107 | 1 | 3.0485 | **1155.3012** | 2.26% | 279.3792 | 4.3188 | 35.0041 | 196.8223 | | LCS | | | 1283.6485 | 90.0% |
| 11 | 1.6433 | 1.1602 | 1 | 3.2959 | **1312.8677** | 2.64% | 269.1693 | 4.2386 | 40.5202 | 229.3745 | | LCS | | | 1283.6485 | 102.3% |
| 12 | 2.6475 | 1.8691 | 1 | 4.8577 | **1373.0110** | 2.37% | 245.2992 | 4.0490 | 44.4204 | 235.6685 | | LCS | | | 1283.6485 | 107.0% |
| 13 | 3.4564 | 2.4403 | 1 | 6.3314 | **1246.7860** | 3.14% | 171.8705 | 3.3911 | 48.2162 | 225.0686 | | LCS | | | 1283.6485 | 97.1% |
| 14 | 4.4186 | 3.1196 | 1 | 7.8795 | **1244.5768** | 2.64% | 151.7383 | 3.1889 | 51.2659 | 216.1910 | | LCS | | | 1283.6485 | 97.0% |
| 15 | 4.6661 | 3.2943 | 1 | 8.9560 | **1387.9603** | 3.24% | 117.2559 | 2.8010 | 64.9851 | 250.2109 | | LCS | | | 1283.6485 | 108.1% |
| 16 | 6.9578 | 4.9123 | 1 | 12.9635 | **1307.0142** | 3.17% | 83.2773 | 2.3639 | 72.7175 | 232.5962 | | LCS | | | 1283.6485 | 101.8% |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-90 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-90 LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 506.15
**LCS Volume Added:** 0.50
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-90 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.9970 | 2.1159 | 1 | 5.7466 | **636.4092** | 3.31% | 84.0242 | 2.3729 | 27.0353 | 110.4249 | | LCS | | | 569.9889 | 111.7% |
| 2 | 4.3178 | 3.0484 | 1 | 7.1009 | **471.3181** | 3.00% | 93.8755 | 2.5288 | 19.0984 | 80.7449 | | LCS | | | 569.9889 | 82.7% |
| 3 | 2.4207 | 1.7090 | 1 | 4.6656 | **642.6763** | 3.06% | 103.0317 | 2.6261 | 24.6413 | 110.3840 | | LCS | | | 569.9889 | 112.8% |
| 4 | 2.6473 | 1.8690 | 1 | 4.9692 | **559.5984** | 3.12% | 90.8972 | 2.4686 | 22.8613 | 96.3502 | | LCS | | | 569.9889 | 98.2% |
| ~~5~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~3.83%~~ | ~~71.0301~~ | ~~2.2001~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| ~~6~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~3.65%~~ | ~~62.2550~~ | ~~2.0514~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| ~~7~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~4.43%~~ | ~~43.5062~~ | ~~1.7182~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| ~~8~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~4.63%~~ | ~~41.0145~~ | ~~1.6806~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| 9 | 3.3037 | 2.3325 | 1 | 6.0068 | **563.0656** | 3.13% | 83.9209 | 2.3747 | 23.8781 | 96.9527 | | LCS | | | 569.9889 | 98.8% |
| 10 | 2.3408 | 1.6526 | 1 | 4.2917 | **461.1880** | 3.06% | 93.4965 | 2.5049 | 18.5169 | 79.2010 | | LCS | | | 569.9889 | 80.9% |
| 11 | 2.2694 | 1.6022 | 1 | 4.5560 | **631.3798** | 3.37% | 93.4297 | 2.4999 | 25.3174 | 109.8108 | | LCS | | | 569.9889 | 110.8% |
| 12 | 3.1152 | 2.1994 | 1 | 5.6527 | **594.7711** | 3.10% | 94.8613 | 2.5238 | 23.7142 | 102.3204 | | LCS | | | 569.9889 | 104.3% |
| 13 | 7.7987 | 5.5059 | 1 | 12.7706 | **660.0442** | 3.86% | 75.0590 | 2.2691 | 29.9013 | 117.3526 | | LCS | | | 569.9889 | 115.8% |
| 14 | 10.4105 | 7.3499 | 1 | 16.7271 | **593.8241** | 3.78% | 58.5798 | 2.0247 | 30.7572 | 105.1783 | | LCS | | | 569.9889 | 104.2% |
| 15 | 6.6500 | 4.6950 | 1 | 12.3789 | **613.4260** | 4.59% | 41.0466 | 1.6652 | 37.2924 | 113.0822 | | LCS | | | 569.9889 | 107.6% |
| 16 | 12.9767 | 9.1617 | 1 | 22.5736 | **666.9753** | 4.87% | 31.3850 | 1.4700 | 46.8148 | 124.8046 | | LCS | | | 569.9889 | 117.0% |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 1st Count | | | | | | | | |
| V1 | 1A | 15 | 10 | 5104 | 2/15/2014 14:51 | 2/15/2014 15:06 | PIC | SR89V14 |
| V2 | 1B | 15 | 24 | 5583 | 2/15/2014 14:51 | 2/15/2014 15:06 | PIC | SR89V14 |
| V3 | 1C | 15 | 123 | 5897 | 2/15/2014 14:51 | 2/15/2014 15:06 | PIC | SR89V14 |
| V4 | 1D | 15 | 86 | 5453 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V5 | 2A | 15 | 2 | 4218 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V6 | 2B | 15 | 1 | 3707 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V7 | 2C | 15 | 5 | 2564 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V8 | 2D | 15 | 3 | 2004 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V1 | 3A | 15 | 127 | 5014 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V2 | 3B | 15 | 97 | 5701 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V3 | 3C | 15 | 82 | 5706 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V4 | 3D | 15 | 60 | 5332 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V5 | 4A | 15 | 62 | 4309 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V6 | 4B | 15 | 4 | 3768 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V7 | 4C | 15 | 28 | 2625 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V8 | 4D | 15 | 65 | 2050 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V1 | 5A | 15 | 17 | 5215 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V2 | 5B | 15 | 34 | 5889 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V3 | 5C | 15 | 37 | 5870 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V4 | 5D | 15 | 37 | 5637 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V5 | 6A | 15 | 22 | 4417 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V6 | 6B | 15 | 47 | 3783 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V7 | 6C | 15 | 1 | 2590 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V8 | 6D | 15 | 0 | 0 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V1 | 7A | 15 | 9 | 5352 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V2 | 7B | 15 | 4 | 5898 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V3 | 7C | 15 | 4 | 6053 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V4 | 7D | 15 | 2 | 5843 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V5 | 8A | 15 | 4 | 4531 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V6 | 8B | 15 | 0 | 4022 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V7 | 8C | 15 | 2 | 2590 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V8 | 8D | 15 | 8 | 2127 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V1 | 9A | 15 | 9 | 5371 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V2 | 9B | 15 | 10 | 5928 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V3 | 9C | 15 | 17 | 6174 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V4 | 9D | 15 | 21 | 5971 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V5 | 10A | 15 | 1 | 4544 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V6 | 10B | 15 | 0 | 3861 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V7 | 10C | 15 | 3 | 2820 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V8 | 10D | 15 | 8 | 2184 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V1 | 11A | 15 | 5 | 5433 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V2 | 11B | 15 | 0 | 5998 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V3 | 11C | 15 | 0 | 6114 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V4 | 11D | 15 | 0 | 5851 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V5 | 12A | 15 | 3 | 4446 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V6 | 12B | 15 | 2 | 4077 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V7 | 12C | 15 | 3 | 2736 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V8 | 12D | 15 | 0 | 2192 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V1 | 13A | 15 | 6 | 4729 | 2/16/2014 9:28 | 2/16/2014 9:43 | PIC | SR89V14 |
| V2 | 13B | 15 | 0 | 5994 | 2/16/2014 9:29 | 2/16/2014 9:44 | PIC | SR89V14 |
| V3 | 13C | 15 | 3 | 6028 | 2/16/2014 9:29 | 2/16/2014 9:44 | PIC | SR89V14 |
| V4 | 13D | 15 | 1 | 5501 | 2/16/2014 9:28 | 2/16/2014 9:43 | PIC | SR89V14 |
| V5 | 14A | 15 | 1 | 4185 | 2/16/2014 9:23 | 2/16/2014 9:38 | PIC | SR89V14 |
| V6 | 14B | 15 | 1 | 3590 | 2/16/2014 9:23 | 2/16/2014 9:38 | PIC | SR89V14 |
| V7 | 14C | 15 | 1 | 2816 | 2/16/2014 9:24 | 2/16/2014 9:39 | PIC | SR89V14 |
| V8 | 14D | 15 | 3 | 2177 | 2/16/2014 9:24 | 2/16/2014 9:39 | PIC | SR89V14 |

2nd Count

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV1 | 1A | 15 | 3 | 1321 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV2 | 1B | 15 | 3 | 1427 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV3 | 1C | 15 | 19 | 1518 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV4 | 1D | 15 | 11 | 1364 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV5 | 2A | 15 | 1 | 1111 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV6 | 2B | 15 | 8 | 939 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV7 | 2C | 15 | 2 | 677 | 2/27/2014 4:39 | 2/27/2014 4:54 | PIC | SR90V14 |
| SV8 | 2D | 15 | 1 | 535 | 2/27/2014 4:39 | 2/27/2014 4:54 | PIC | SR90V14 |
| SV1 | 3A | 15 | 21 | 1287 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV2 | 3B | 15 | 9 | 1421 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV3 | 3C | 15 | 8 | 1490 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV4 | 3D | 15 | 4 | 1424 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV5 | 4A | 15 | 2 | 1208 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV6 | 4B | 15 | 1 | 869 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV7 | 4C | 15 | 2 | 682 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV8 | 4D | 15 | 14 | 563 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV1 | 5A | 15 | 1 | 1301 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV2 | 5B | 15 | 6 | 1417 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV3 | 5C | 15 | 5 | 1493 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV4 | 5D | 15 | 11 | 1486 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV5 | 6A | 15 | 7 | 1100 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV6 | 6B | 15 | 8 | 910 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV7 | 6C | 15 | 1 | 679 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV8 | 6D | 15 | 0 | 0 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV1 | 7A | 15 | 6 | 1230 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV2 | 7B | 15 | 2 | 1365 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV3 | 7C | 15 | 2 | 1504 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV4 | 7D | 15 | 3 | 1383 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV5 | 8A | 15 | 2 | 1096 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV6 | 8B | 15 | 2 | 891 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV7 | 8C | 15 | 1 | 582 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV8 | 8D | 15 | 2 | 551 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV1 | 9A | 15 | 8 | 1336 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV2 | 9B | 15 | 2 | 1397 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV3 | 9C | 15 | 3 | 1539 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV4 | 9D | 15 | 7 | 1467 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV5 | 10A | 15 | 1 | 1106 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV6 | 10B | 15 | 3 | 842 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV7 | 10C | 15 | 0 | 649 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV8 | 10D | 15 | 2 | 580 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV1 | 11A | 15 | 2 | 1267 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV2 | 11B | 15 | 1 | 1438 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV3 | 11C | 15 | 4 | 1552 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV4 | 11D | 15 | 1 | 1371 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV5 | 12A | 15 | 4 | 1089 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV6 | 12B | 15 | 2 | 947 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV7 | 12C | 15 | 1 | 664 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV8 | 12D | 15 | 11 | 636 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV1 | 13A | 15 | 4 | 1269 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |
| SV2 | 13B | 15 | 4 | 1412 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV3 | 13C | 15 | 7 | 1408 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |
| SV4 | 13D | 15 | 0 | 1433 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |
| SV5 | 14A | 15 | 0 | 1158 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |
| SV6 | 14B | 15 | 1 | 922 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |
| SV7 | 14C | 15 | 3 | 625 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |
| SV8 | 14D | 15 | 0 | 486 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |

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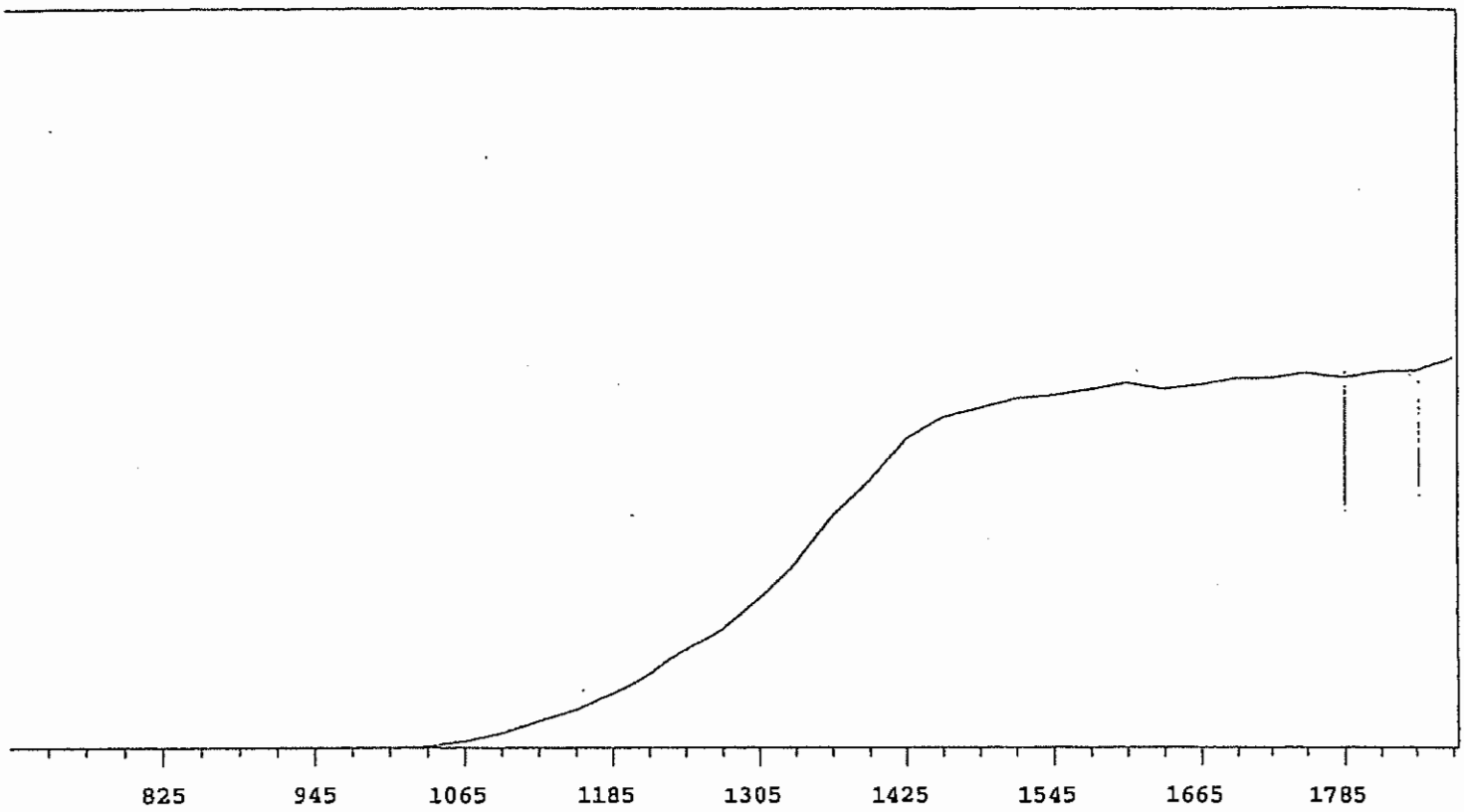
MPC 9600 Plateau  Instrument 1  MPC 9604 Detector A  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575



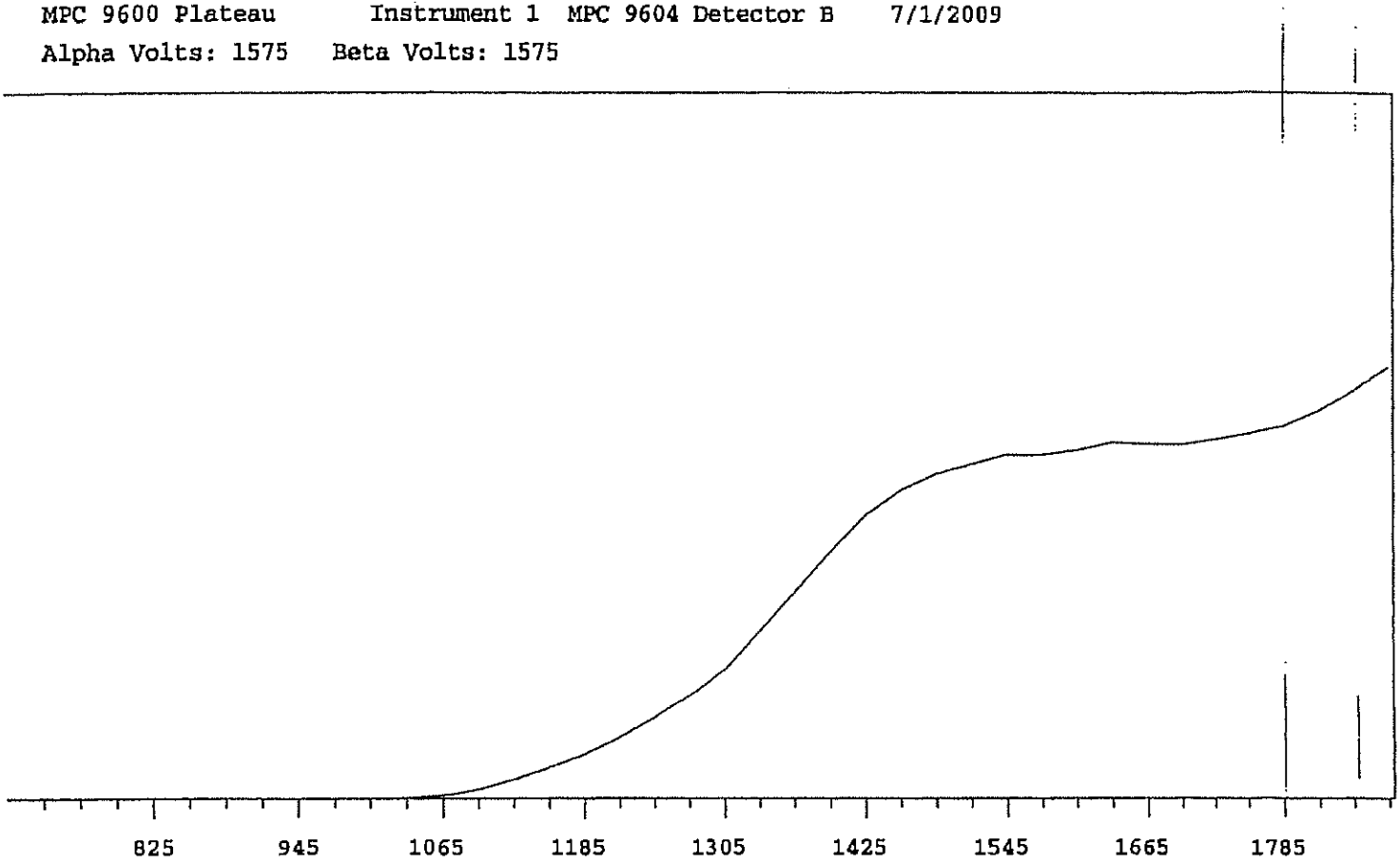

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | +0.00 |
| 825 | 0 | >100 |
| 855 | 1 | >100 |
| 885 | 0 | +55.56 |
| 915 | 2 | +66.67 |
| 945 | 0 | >100 |
| 975 | 2 | >100 |
| 1005 | 42 | >100 |
| 1035 | 145 | >100 |
| 1065 | 544 | >100 |
| 1095 | 1136 | >100 |
| 1125 | 1967 | >100 |
| 1155 | 2845 | >100 |
| 1185 | 4078 | >100 |
| 1215 | 5483 | +93.18 |
| 1245 | 7400 | +83.35 |
| 1275 | 9328 | +75.40 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 11640 | +69.78 |
| 1335 | 14241 | +62.88 |
| 1365 | 17534 | +55.91 |
| 1395 | 20127 | +45.04 |
| 1425 | 23254 | +31.29 |
| 1455 | 24902 | +20.41 |
| 1485 | 25605 | +10.49 |
| 1515 | 26310 | +6.44 |
| 1545 | 26535 | +5.31 |
| 1575 | 26953 | +2.79 |
| 1605 | 27399 | +1.83 |
| 1635 | 27000 | +1.71 |
| 1665 | 27255 | +1.62 |
| 1695 | 27723 | +3.14 |
| 1725 | 27705 | +1.56 |
| 1755 | 28072 | +1.15 |
| 1785 | 27729 | +1.43 |
| 1815 | 28194 | +3.24 |
| 1845 | 28243 | |
| 1875 | 29191 | |

9/1/09

MPC 9600 Plateau  Instrument 1  MPC 9604 Detector B  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575

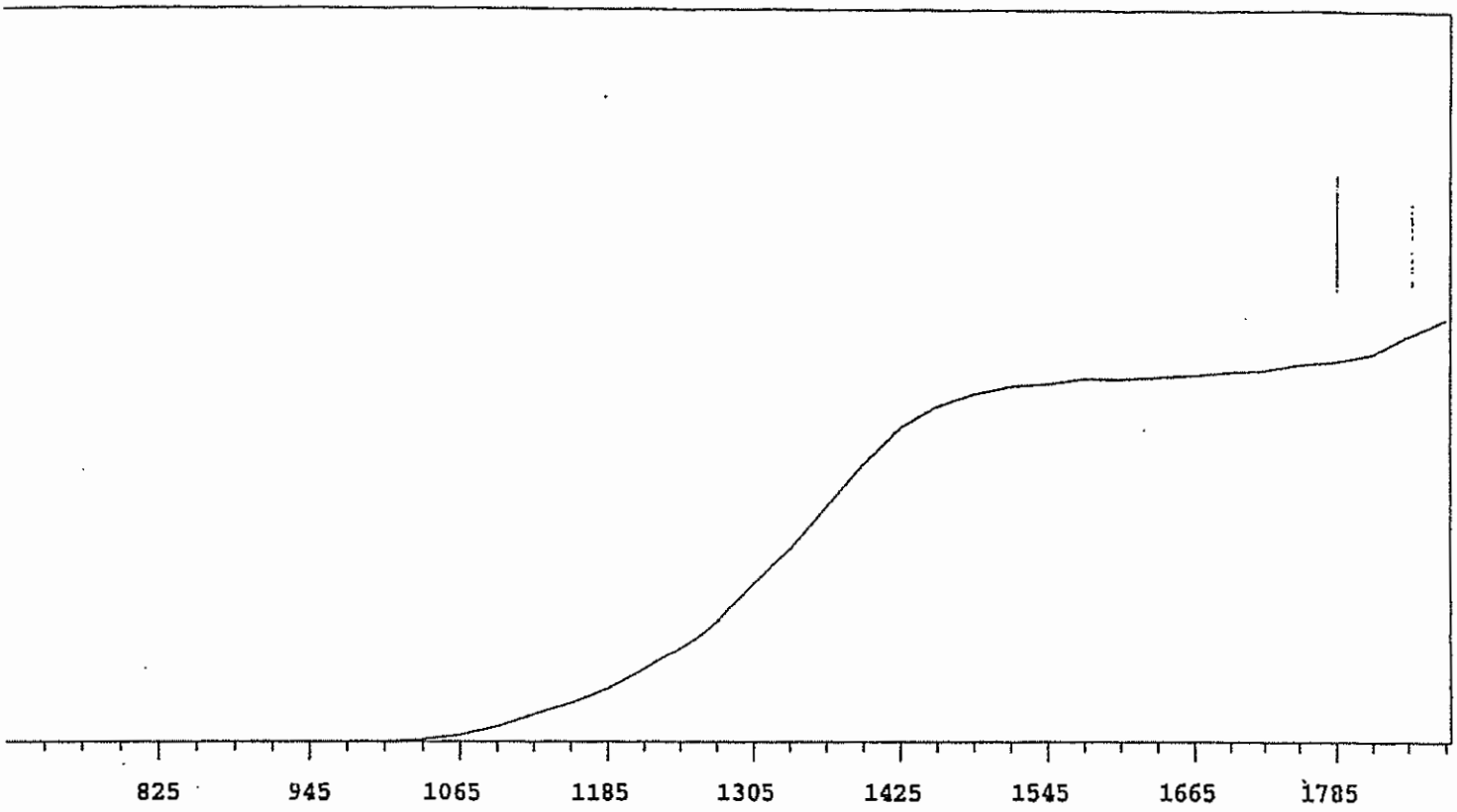



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +55.56 |
| 795 | 1 | +83.33 |
| 825 | 1 | +55.56 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | +0.00 |
| 945 | 1 | >100 |
| 975 | 0 | >100 |
| 1005 | 4 | >100 |
| 1035 | 56 | >100 |
| 1065 | 292 | >100 |
| 1095 | 890 | >100 |
| 1125 | 1841 | >100 |
| 1155 | 2936 | >100 |
| 1185 | 4179 | >100 |
| 1215 | 5837 | >100 |
| 1245 | 7821 | +91.28 |
| 1275 | 10638 | +83.88 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13188 | +75.92 |
| 1335 | 16818 | +67.60 |
| 1365 | 20420 | +59.86 |
| 1395 | 24341 | +47.85 |
| 1425 | 27854 | +35.51 |
| 1455 | 30288 | +23.26 |
| 1485 | 31798 | +14.54 |
| 1515 | 32622 | +8.32 |
| 1545 | 33496 | +5.11 |
| 1575 | 33475 | +4.43 |
| 1605 | 33903 | +3.09 |
| 1635 | 34654 | +2.46 |
| 1665 | 34485 | +1.74 |
| 1695 | 34445 | +1.84 |
| 1725 | 34908 | +3.91 |
| 1755 | 35401 | +6.80 |
| 1785 | 36062 | +10.27 |
| 1815 | 37505 | +14.30 |
| 1845 | 39508 | |
| 1875 | 41843 | |

MPC 9600 Plateau  Instrument 1  MPC 9604 Detector C  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575

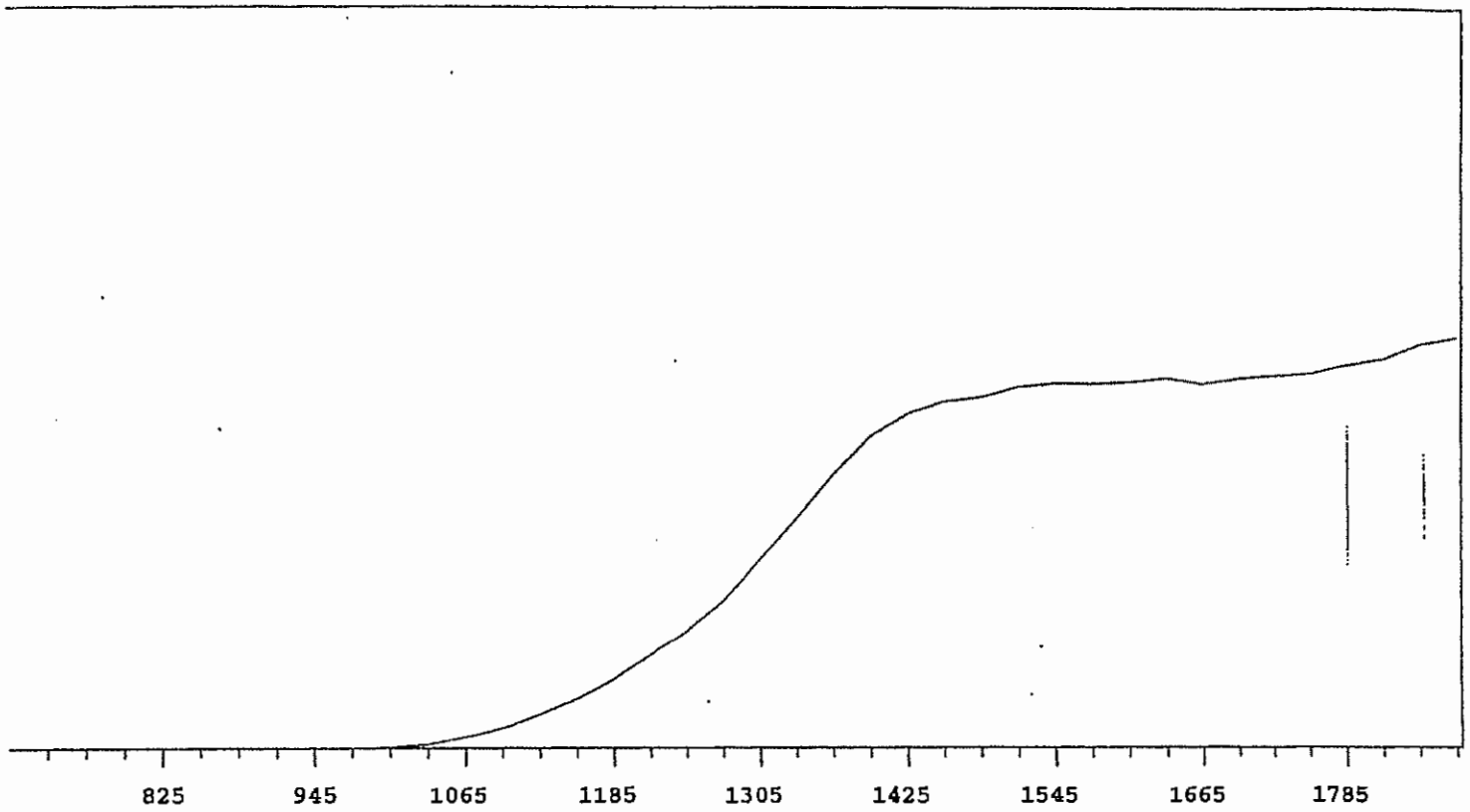



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 1 | -55.56 |
| 855 | 1 | +55.56 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 32 | >100 |
| 1035 | 206 | >100 |
| 1065 | 639 | >100 |
| 1095 | 1416 | >100 |
| 1125 | 2551 | >100 |
| 1155 | 3619 | >100 |
| 1185 | 5037 | +98.68 |
| 1215 | 6875 | +91.19 |
| 1245 | 8915 | +85.53 |
| 1275 | 11519 | +77.28 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14817 | +71.06 |
| 1335 | 17823 | +63.34 |
| 1365 | 21704 | +53.63 |
| 1395 | 25422 | +42.55 |
| 1425 | 28424 | +29.21 |
| 1455 | 30244 | +18.11 |
| 1485 | 31305 | +10.10 |
| 1515 | 31989 | +6.07 |
| 1545 | 32223 | +3.43 |
| 1575 | 32671 | +2.15 |
| 1605 | 32621 | +1.68 |
| 1635 | 32837 | +1.52 |
| 1665 | 32961 | +2.01 |
| 1695 | 33249 | +2.64 |
| 1725 | 33409 | +3.21 |
| 1755 | 33931 | +4.07 |
| 1785 | 34234 | +7.20 |
| 1815 | 34909 | +10.28 |
| 1845 | 36660 | |
| 1875 | 38205 | |

MPC 9600 Plateau  Instrument 1  MPC 9604 Detector D  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575

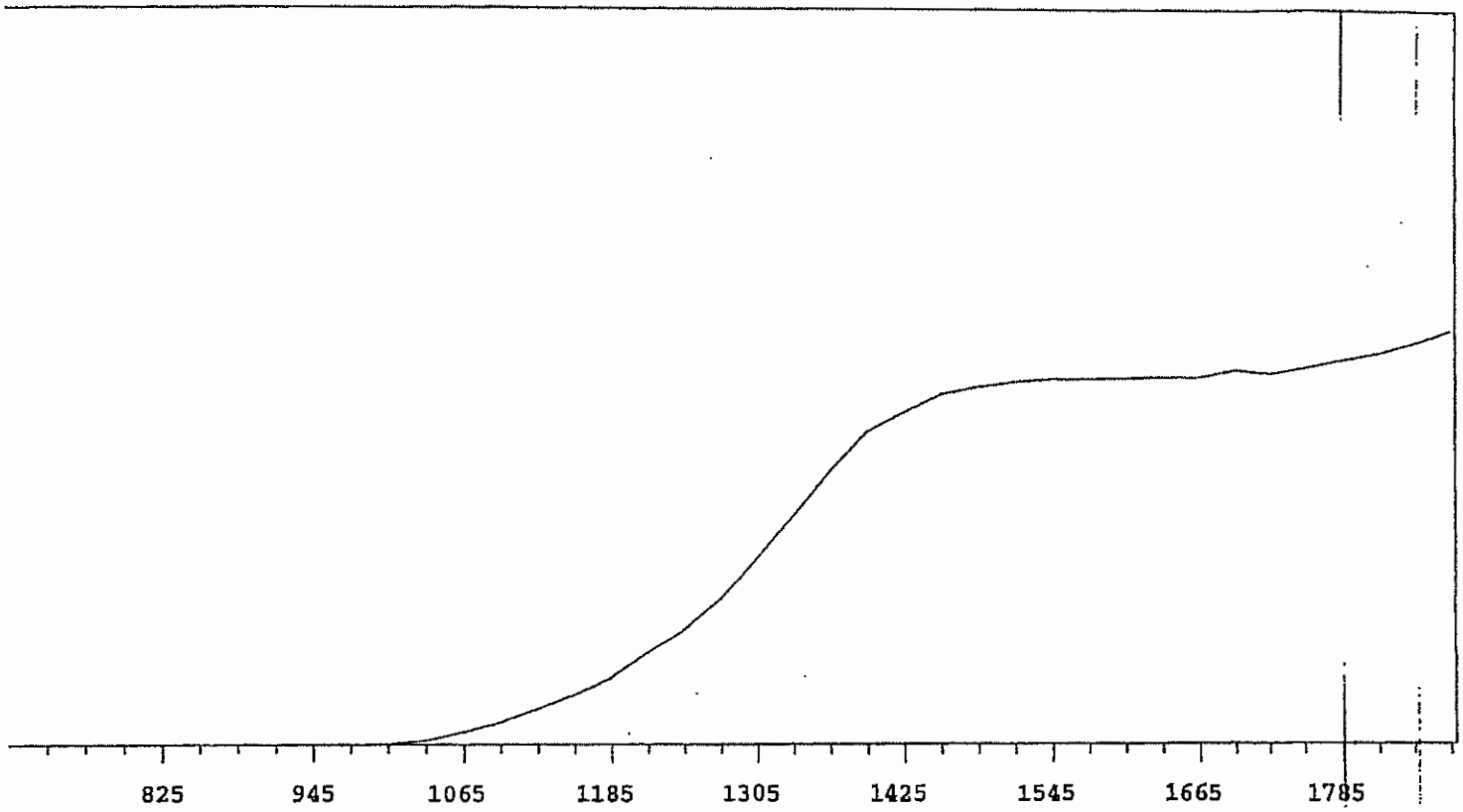



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +0.00 |
| 795 | 1 | +0.00 |
| 825 | 0 | +0.00 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 8 | >100 |
| 1005 | 75 | >100 |
| 1035 | 303 | >100 |
| 1065 | 872 | >100 |
| 1095 | 1656 | >100 |
| 1125 | 2729 | >100 |
| 1155 | 3862 | >100 |
| 1185 | 5425 | +98.19 |
| 1215 | 7256 | +88.82 |
| 1245 | 9510 | +81.89 |
| 1275 | 11944 | +74.07 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15202 | +66.36 |
| 1335 | 18216 | +57.86 |
| 1365 | 21597 | +45.58 |
| 1395 | 24648 | +32.96 |
| 1425 | 26505 | +19.92 |
| 1455 | 27475 | +11.42 |
| 1485 | 27836 | +7.08 |
| 1515 | 28609 | +4.51 |
| 1545 | 28896 | +2.93 |
| 1575 | 28862 | +1.66 |
| 1605 | 28969 | +0.36 |
| 1635 | 29292 | +0.80 |
| 1665 | 28836 | +1.06 |
| 1695 | 29279 | +1.48 |
| 1725 | 29439 | +3.59 |
| 1755 | 29642 | +4.07 |
| 1785 | 30243 | +6.51 |
| 1815 | 30699 | +7.79 |
| 1845 | 31876 | |
| 1875 | 32444 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

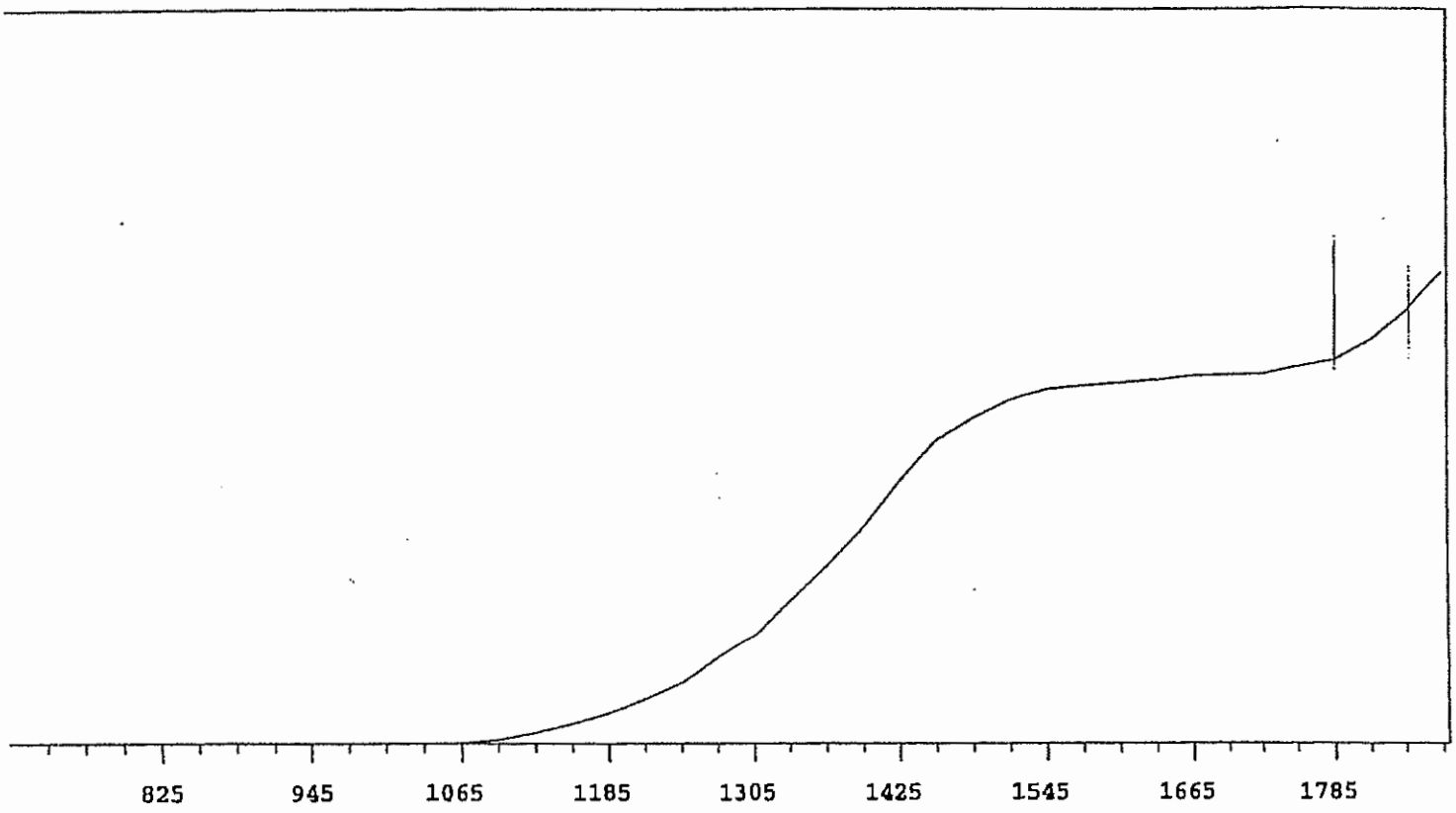



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +83.33 |
| 795 | 0 | -83.33 |
| 825 | 1 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +100.00 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 12 | >100 |
| 1005 | 91 | >100 |
| 1035 | 421 | >100 |
| 1065 | 1239 | >100 |
| 1095 | 2155 | >100 |
| 1125 | 3527 | >100 |
| 1155 | 4974 | >100 |
| 1185 | 6647 | +97.44 |
| 1215 | 9250 | +89.00 |
| 1245 | 12041 | +82.15 |
| 1275 | 15094 | +73.81 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19017 | +67.45 |
| 1335 | 23157 | +59.23 |
| 1365 | 27625 | +45.78 |
| 1395 | 31465 | +32.72 |
| 1425 | 33352 | +20.41 |
| 1455 | 35084 | +11.74 |
| 1485 | 35819 | +7.11 |
| 1515 | 36292 | +3.35 |
| 1545 | 36527 | +1.63 |
| 1575 | 36540 | +0.87 |
| 1605 | 36585 | +0.48 |
| 1635 | 36742 | +1.76 |
| 1665 | 36691 | +1.53 |
| 1695 | 37461 | +1.89 |
| 1725 | 37073 | +3.07 |
| 1755 | 37603 | +4.02 |
| 1785 | 38346 | +6.58 |
| 1815 | 39111 | +7.95 |
| 1845 | 40115 | |
| 1875 | 41409 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector B  7/1/2009

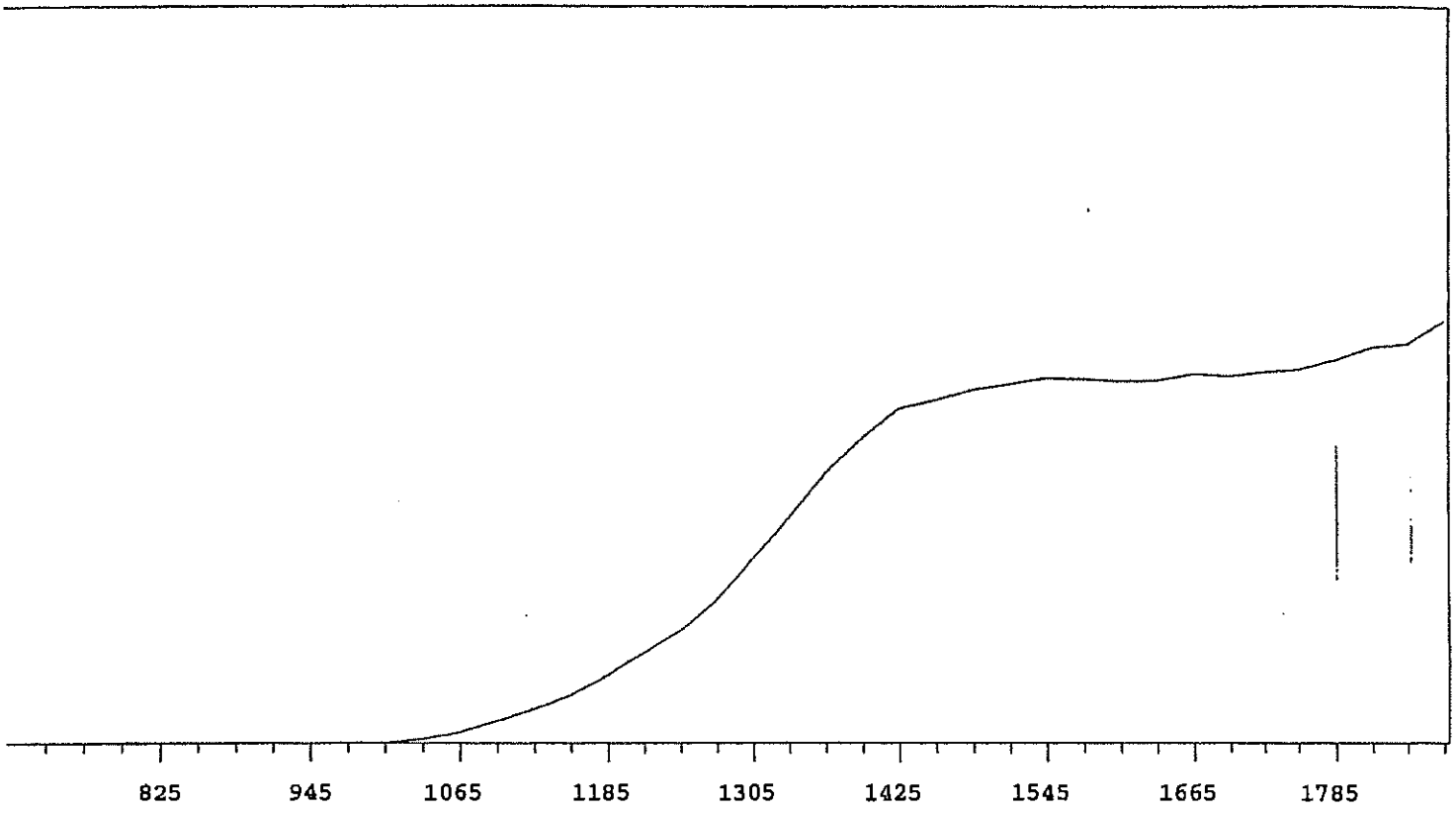
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 2 | >100 |
| 1005 | 3 | >100 |
| 1035 | 14 | >100 |
| 1065 | 127 | >100 |
| 1095 | 500 | >100 |
| 1125 | 1332 | >100 |
| 1155 | 2373 | >100 |
| 1185 | 3614 | >100 |
| 1215 | 5227 | >100 |
| 1245 | 7060 | +97.33 |
| 1275 | 9574 | +90.30 |
| 1305 | 12541 | +83.18 |
| 1335 | 16192 | +74.48 |
| 1365 | 20083 | +67.17 |
| 1395 | 24273 | +58.43 |
| 1425 | 29090 | +46.86 |
| 1455 | 33223 | +34.56 |
| 1485 | 35608 | +22.67 |
| 1515 | 37581 | +13.63 |
| 1545 | 38762 | +8.18 |
| 1575 | 39185 | +4.42 |
| 1605 | 39484 | +3.06 |
| 1635 | 39806 | +2.61 |
| 1665 | 40264 | +2.03 |
| 1695 | 40353 | +2.32 |
| 1725 | 40431 | +3.28 |
| 1755 | 41127 | +7.09 |
| 1785 | 41882 | +12.40 |
| 1815 | 44049 | +18.52 |
| 1845 | 46950 | |
| 1875 | 51097 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector C  7/1/2009

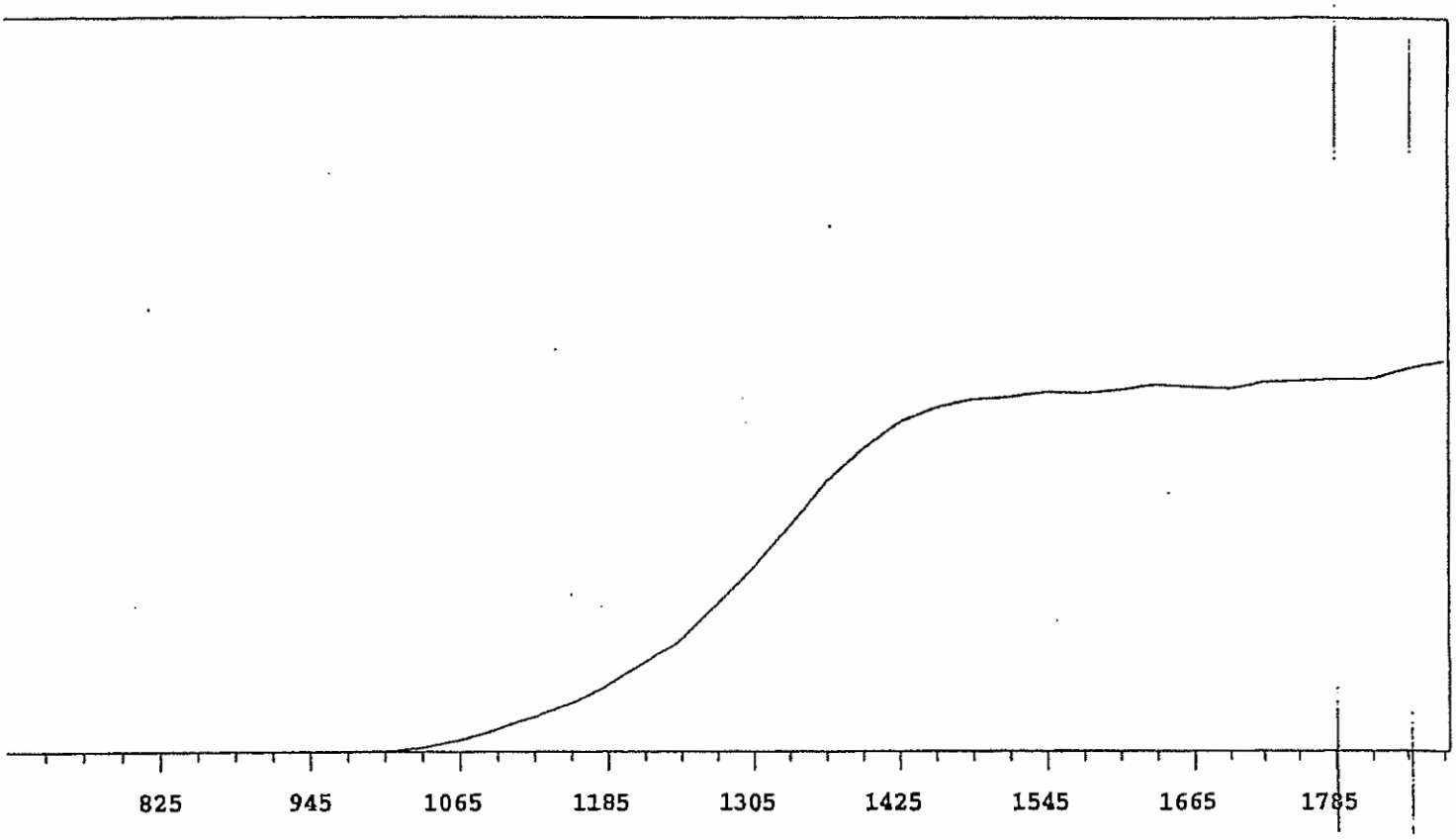
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 17 | >100 |
| 1005 | 87 | >100 |
| 1035 | 438 | >100 |
| 1065 | 1055 | >100 |
| 1095 | 2114 | >100 |
| 1125 | 3282 | >100 |
| 1155 | 4625 | >100 |
| 1185 | 6554 | +97.66 |
| 1215 | 8743 | +88.09 |
| 1245 | 11345 | +81.31 |
| 1275 | 14261 | +74.60 |
| 1305 | 18216 | +67.74 |
| 1335 | 21995 | +58.11 |
| 1365 | 26173 | +46.11 |
| 1395 | 29479 | +32.75 |
| 1425 | 32186 | +20.62 |
| 1455 | 33022 | +12.13 |
| 1485 | 33981 | +7.22 |
| 1515 | 34520 | +4.95 |
| 1545 | 35095 | +2.07 |
| 1575 | 35014 | +0.38 |
| 1605 | 34812 | +0.55 |
| 1635 | 34859 | +1.11 |
| 1665 | 35460 | +1.94 |
| 1695 | 35273 | +1.95 |
| 1725 | 35629 | +2.73 |
| 1755 | 35811 | +5.77 |
| 1785 | 36656 | +6.44 |
| 1815 | 37896 | +9.21 |
| 1845 | 38145 | |
| 1875 | 40283 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

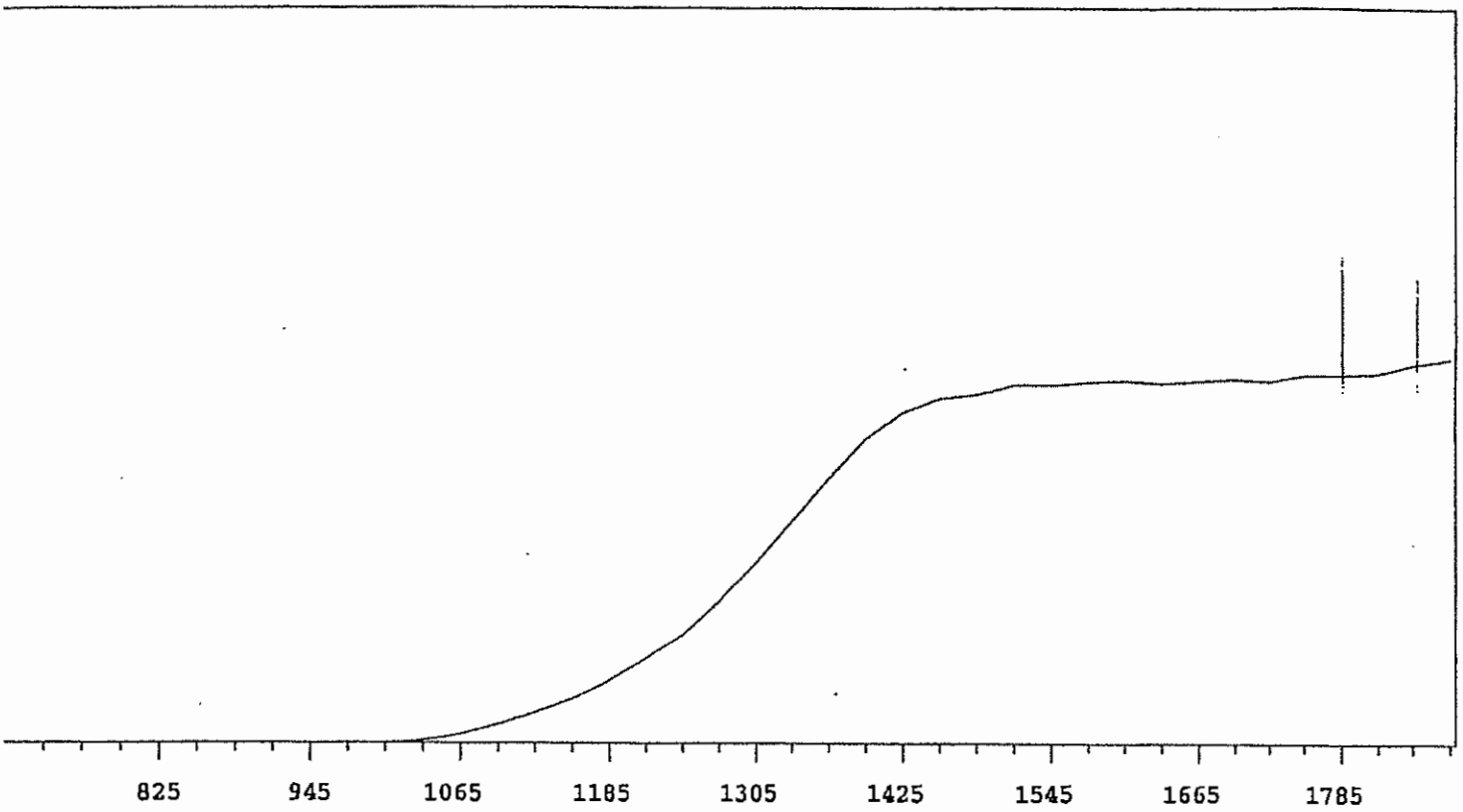



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +83.33 |
| 795 | 2 | +55.56 |
| 825 | 1 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 9 | >100 |
| 1005 | 89 | >100 |
| 1035 | 439 | >100 |
| 1065 | 1198 | >100 |
| 1095 | 2164 | >100 |
| 1125 | 3436 | >100 |
| 1155 | 4917 | >100 |
| 1185 | 6762 | +96.59 |
| 1215 | 9006 | +89.14 |
| 1245 | 11800 | +81.34 |
| 1275 | 15132 | +73.59 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18675 | +65.94 |
| 1335 | 22620 | +55.69 |
| 1365 | 26869 | +44.63 |
| 1395 | 29957 | +32.08 |
| 1425 | 32494 | +20.49 |
| 1455 | 33836 | +11.98 |
| 1485 | 34627 | +6.45 |
| 1515 | 34849 | +3.22 |
| 1545 | 35298 | +1.98 |
| 1575 | 35180 | +2.37 |
| 1605 | 35503 | +1.57 |
| 1635 | 36006 | +0.99 |
| 1665 | 35722 | +0.89 |
| 1695 | 35597 | +0.93 |
| 1725 | 36188 | +1.86 |
| 1755 | 36272 | +1.90 |
| 1785 | 36389 | +2.55 |
| 1815 | 36529 | +4.39 |
| 1845 | 37459 | |
| 1875 | 38170 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

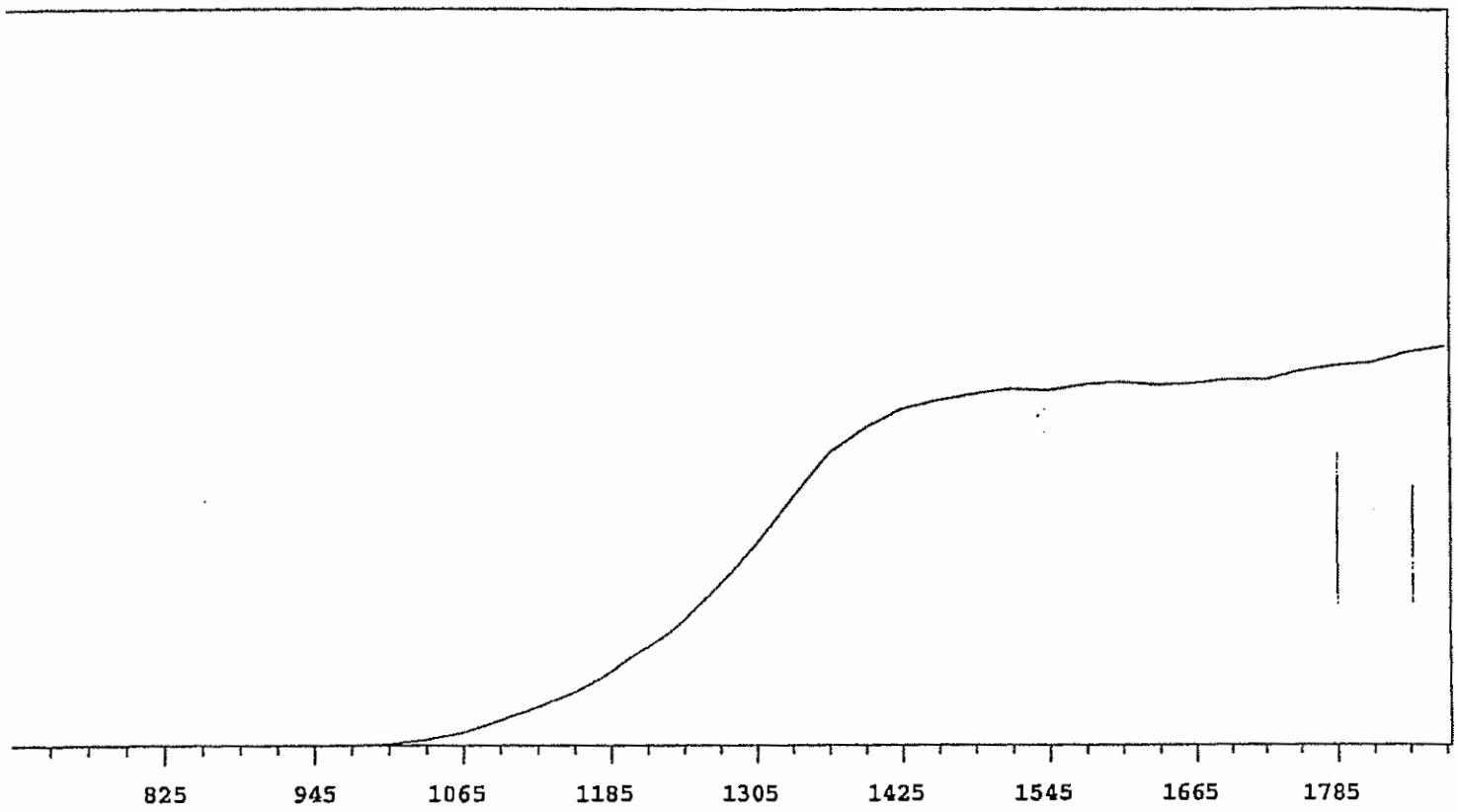



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +55.56 |
| 795 | 1 | >100 |
| 825 | 1 | +0.00 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 9 | >100 |
| 1005 | 53 | >100 |
| 1035 | 302 | >100 |
| 1065 | 878 | >100 |
| 1095 | 1805 | >100 |
| 1125 | 2887 | >100 |
| 1155 | 4163 | >100 |
| 1185 | 5842 | +99.81 |
| 1215 | 7959 | +90.90 |
| 1245 | 10323 | +83.03 |
| 1275 | 13250 | +75.91 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16654 | +68.57 |
| 1335 | 20416 | +59.26 |
| 1365 | 24191 | +47.28 |
| 1395 | 27643 | +34.04 |
| 1425 | 29891 | +21.08 |
| 1455 | 31183 | +12.30 |
| 1485 | 31558 | +6.67 |
| 1515 | 32444 | +4.05 |
| 1545 | 32413 | +2.90 |
| 1575 | 32704 | +0.81 |
| 1605 | 32837 | +0.71 |
| 1635 | 32629 | +0.49 |
| 1665 | 32797 | +0.16 |
| 1695 | 32964 | +1.32 |
| 1725 | 32746 | +1.40 |
| 1755 | 33308 | +1.56 |
| 1785 | 33318 | +3.21 |
| 1815 | 33456 | +3.92 |
| 1845 | 34283 | |
| 1875 | 34815 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector B  7/1/2009

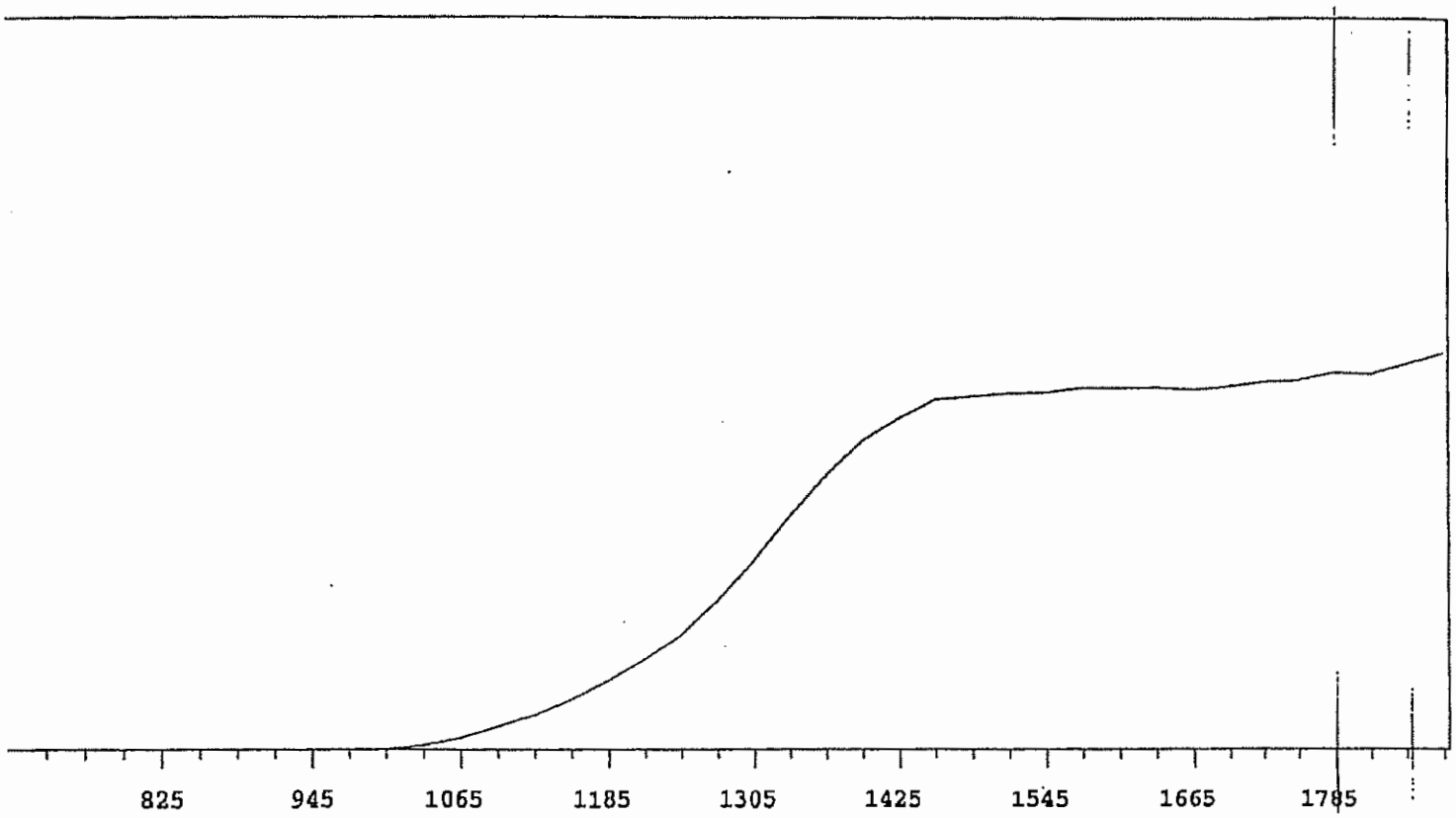
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts | VOLTS | COUNTS | %/100 Volts |
|---|---|---|---|---|---|
| 705 | 1 | | 1305 | 19810 | +64.73 |
| 735 | 1 | | 1335 | 23962 | +52.62 |
| 765 | 0 | -55.56 | 1365 | 28091 | +39.27 |
| 795 | 0 | >100 | 1395 | 30594 | +25.61 |
| 825 | 1 | >100 | 1425 | 32381 | +14.86 |
| 855 | 3 | +33.33 | 1455 | 33206 | +8.91 |
| 885 | 0 | +0.00 | 1485 | 33832 | +4.41 |
| 915 | 1 | >100 | 1515 | 34260 | +3.01 |
| 945 | 2 | >100 | 1545 | 34071 | +2.33 |
| 975 | 29 | >100 | 1575 | 34623 | +1.34 |
| 1005 | 165 | >100 | 1605 | 34848 | +1.22 |
| 1035 | 613 | >100 | 1635 | 34564 | +0.89 |
| 1065 | 1394 | >100 | 1665 | 34733 | +1.01 |
| 1095 | 2558 | >100 | 1695 | 35144 | +2.76 |
| 1125 | 3702 | >100 | 1725 | 35084 | +3.66 |
| 1155 | 5222 | >100 | 1755 | 35839 | +3.97 |
| 1185 | 7161 | +96.06 | 1785 | 36332 | +5.39 |
| 1215 | 9507 | +89.18 | 1815 | 36654 | +5.35 |
| 1245 | 12552 | +81.52 | 1845 | 37609 | |
| 1275 | 16030 | +73.64 | 1875 | 38164 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector C  7/1/2009

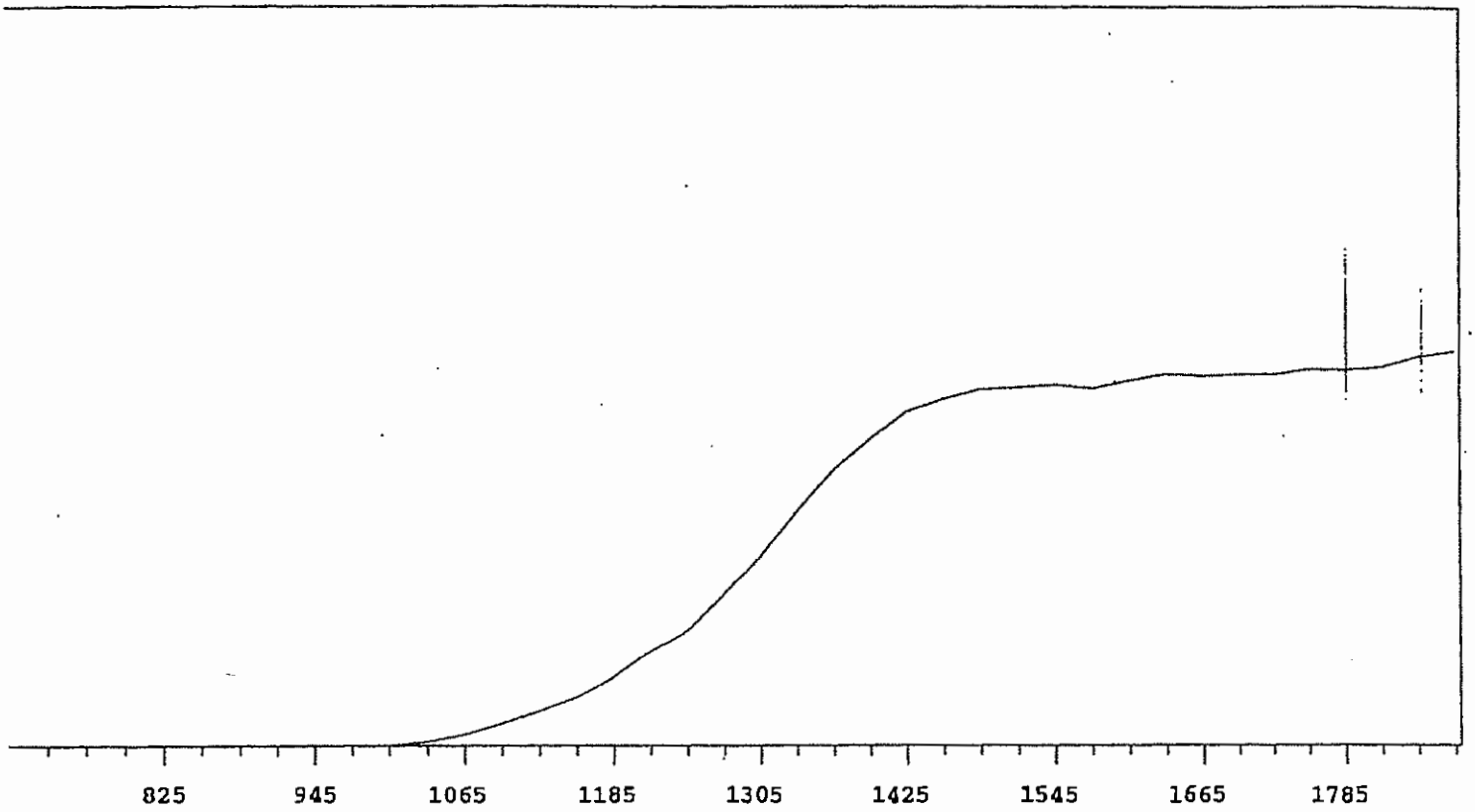
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 1 | |
| 765 | 1 | |
| 795 | 0 | >100 |
| 825 | 0 | +0.00 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 1 | >100 |
| 945 | 1 | >100 |
| 975 | 17 | >100 |
| 1005 | 122 | >100 |
| 1035 | 533 | >100 |
| 1065 | 1287 | >100 |
| 1095 | 2493 | >100 |
| 1125 | 3753 | >100 |
| 1155 | 5482 | >100 |
| 1185 | 7538 | +99.39 |
| 1215 | 10305 | +90.31 |
| 1245 | 13415 | +82.57 |
| 1275 | 17141 | +75.13 |
| 1305 | 21412 | +66.80 |
| 1335 | 26262 | +56.32 |
| 1365 | 30679 | +43.71 |
| 1395 | 34466 | +31.61 |
| 1425 | 36949 | +20.14 |
| 1455 | 38998 | +11.16 |
| 1485 | 39313 | +5.34 |
| 1515 | 39625 | +2.44 |
| 1545 | 39751 | +2.04 |
| 1575 | 40227 | +1.45 |
| 1605 | 40228 | +0.56 |
| 1635 | 40255 | +0.13 |
| 1665 | 40075 | +1.22 |
| 1695 | 40384 | +1.95 |
| 1725 | 40900 | +3.50 |
| 1755 | 41028 | +3.05 |
| 1785 | 41899 | +3.71 |
| 1815 | 41767 | +5.64 |
| 1845 | 42852 | |
| 1875 | 44132 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

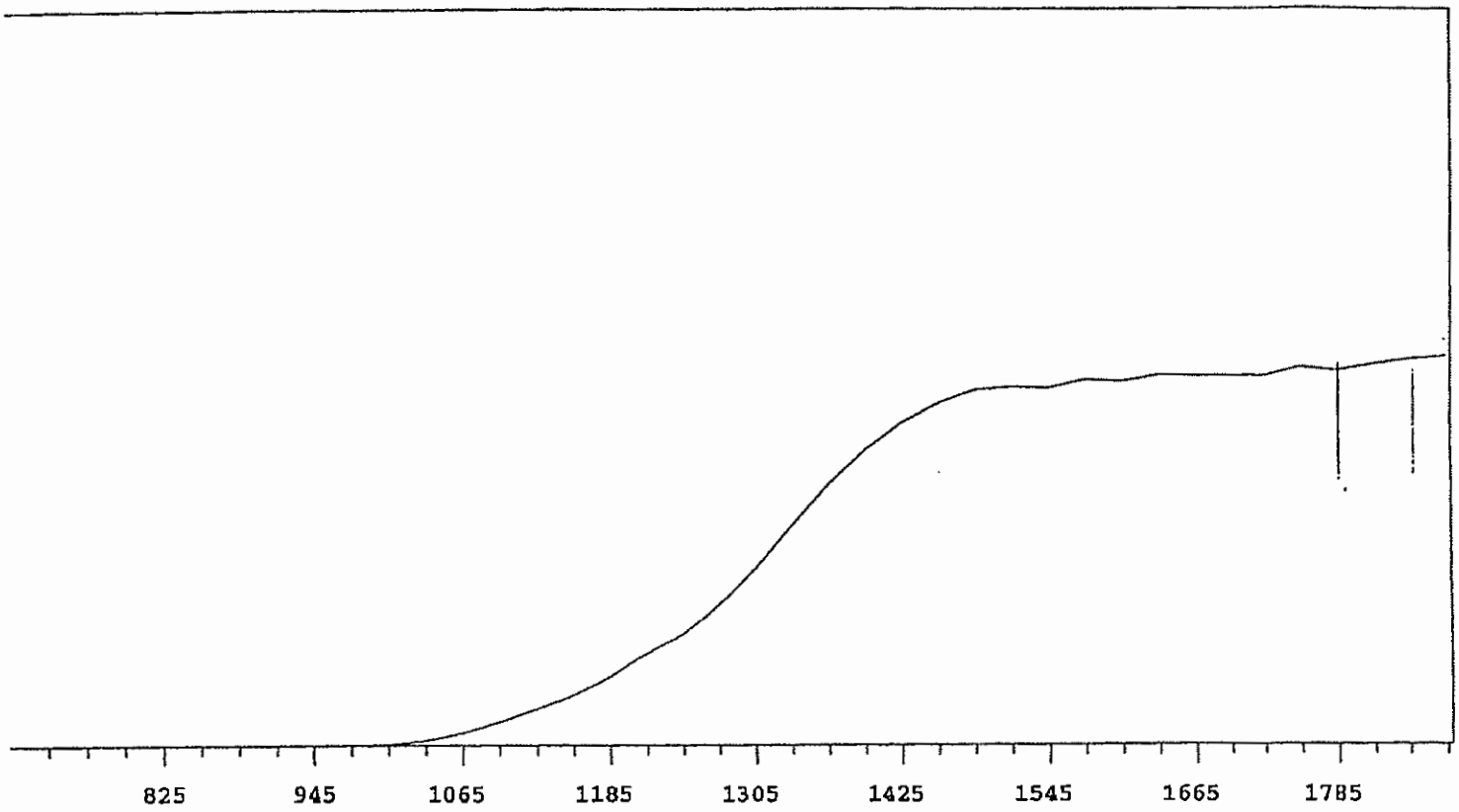



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +0.00 |
| 795 | 1 | >100 |
| 825 | 0 | +83.33 |
| 855 | 0 | -83.33 |
| 885 | 1 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 12 | >100 |
| 1005 | 51 | >100 |
| 1035 | 298 | >100 |
| 1065 | 848 | >100 |
| 1095 | 1649 | >100 |
| 1125 | 2535 | >100 |
| 1155 | 3602 | >100 |
| 1185 | 5036 | +98.31 |
| 1215 | 6880 | +91.37 |
| 1245 | 8822 | +82.29 |
| 1275 | 11546 | +74.61 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14171 | +66.45 |
| 1335 | 17362 | +54.90 |
| 1365 | 20310 | +43.83 |
| 1395 | 22647 | +30.82 |
| 1425 | 24551 | +20.19 |
| 1455 | 25440 | +11.69 |
| 1485 | 26124 | +5.90 |
| 1515 | 26245 | +2.21 |
| 1545 | 26428 | +1.39 |
| 1575 | 26151 | +2.69 |
| 1605 | 26721 | +2.72 |
| 1635 | 27168 | +2.80 |
| 1665 | 27007 | +0.87 |
| 1695 | 27135 | +0.70 |
| 1725 | 27089 | +1.24 |
| 1755 | 27414 | +1.43 |
| 1785 | 27373 | +3.21 |
| 1815 | 27581 | +4.34 |
| 1845 | 28332 | |
| 1875 | 28750 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

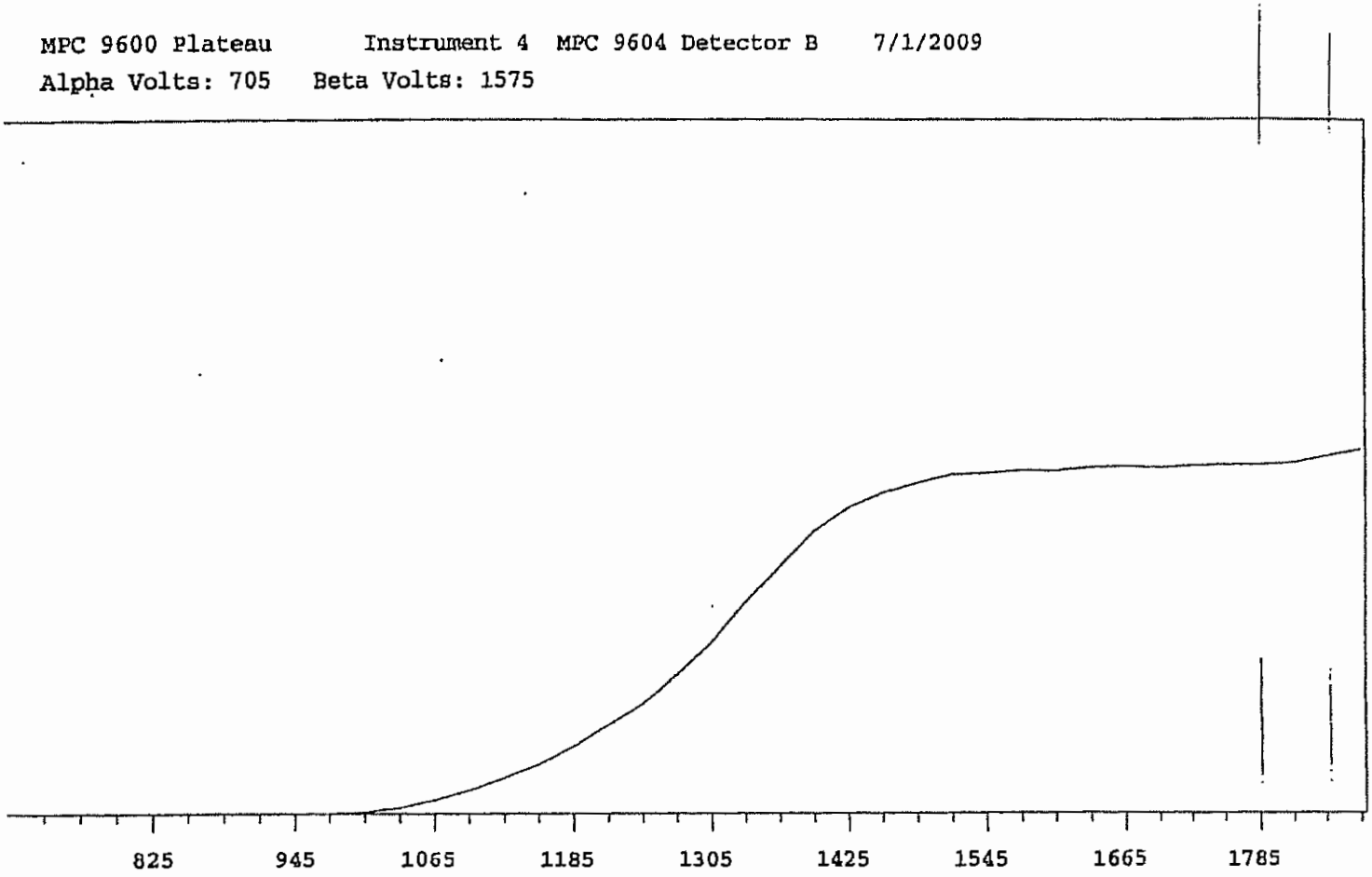



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 2 | +55.56 |
| 855 | 1 | >100 |
| 885 | 0 | -55.56 |
| 915 | 3 | >100 |
| 945 | 0 | >100 |
| 975 | 16 | >100 |
| 1005 | 114 | >100 |
| 1035 | 451 | >100 |
| 1065 | 1100 | >100 |
| 1095 | 2068 | >100 |
| 1125 | 3189 | >100 |
| 1155 | 4386 | >100 |
| 1185 | 6094 | +94.81 |
| 1215 | 8184 | +87.09 |
| 1245 | 10489 | +78.88 |
| 1275 | 13273 | +72.66 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16442 | +66.24 |
| 1335 | 20146 | +57.40 |
| 1365 | 23769 | +46.40 |
| 1395 | 26926 | +34.68 |
| 1425 | 29276 | +24.40 |
| 1455 | 31037 | +15.28 |
| 1485 | 32197 | +7.91 |
| 1515 | 32425 | +4.33 |
| 1545 | 32314 | +2.14 |
| 1575 | 33071 | +2.66 |
| 1605 | 32918 | +2.52 |
| 1635 | 33435 | +1.02 |
| 1665 | 33382 | +0.73 |
| 1695 | 33349 | +1.07 |
| 1725 | 33324 | +1.28 |
| 1755 | 34001 | +2.26 |
| 1785 | 33701 | +3.08 |
| 1815 | 34304 | +2.97 |
| 1845 | 34744 | |
| 1875 | 35012 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

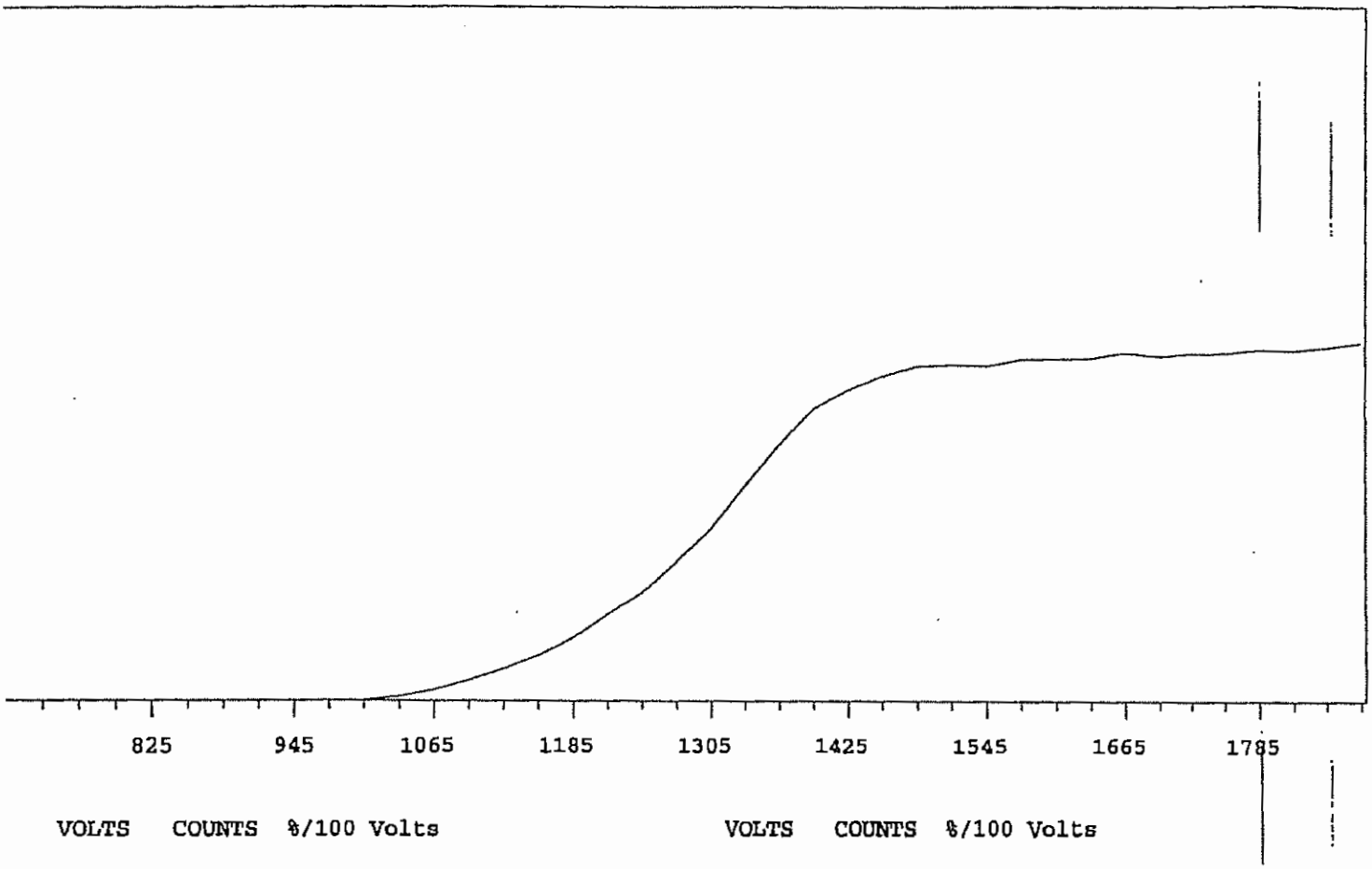



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +0.00 |
| 795 | 1 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 31 | >100 |
| 1005 | 176 | >100 |
| 1035 | 550 | >100 |
| 1065 | 1218 | >100 |
| 1095 | 2114 | >100 |
| 1125 | 3212 | >100 |
| 1155 | 4416 | >100 |
| 1185 | 6066 | +92.28 |
| 1215 | 7936 | +85.60 |
| 1245 | 10288 | +76.79 |
| 1275 | 13020 | +70.59 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15747 | +62.38 |
| 1335 | 19230 | +54.19 |
| 1365 | 22255 | +44.46 |
| 1395 | 25299 | +32.45 |
| 1425 | 27370 | +22.24 |
| 1455 | 28625 | +14.10 |
| 1485 | 29467 | +8.56 |
| 1515 | 30213 | +5.29 |
| 1545 | 30326 | +2.77 |
| 1575 | 30564 | +1.57 |
| 1605 | 30548 | +1.52 |
| 1635 | 30820 | +0.85 |
| 1665 | 30898 | +0.79 |
| 1695 | 30779 | +0.44 |
| 1725 | 30934 | +0.45 |
| 1755 | 31008 | +0.96 |
| 1785 | 30991 | +2.01 |
| 1815 | 31196 | +3.80 |
| 1845 | 31781 | |
| 1875 | 32406 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

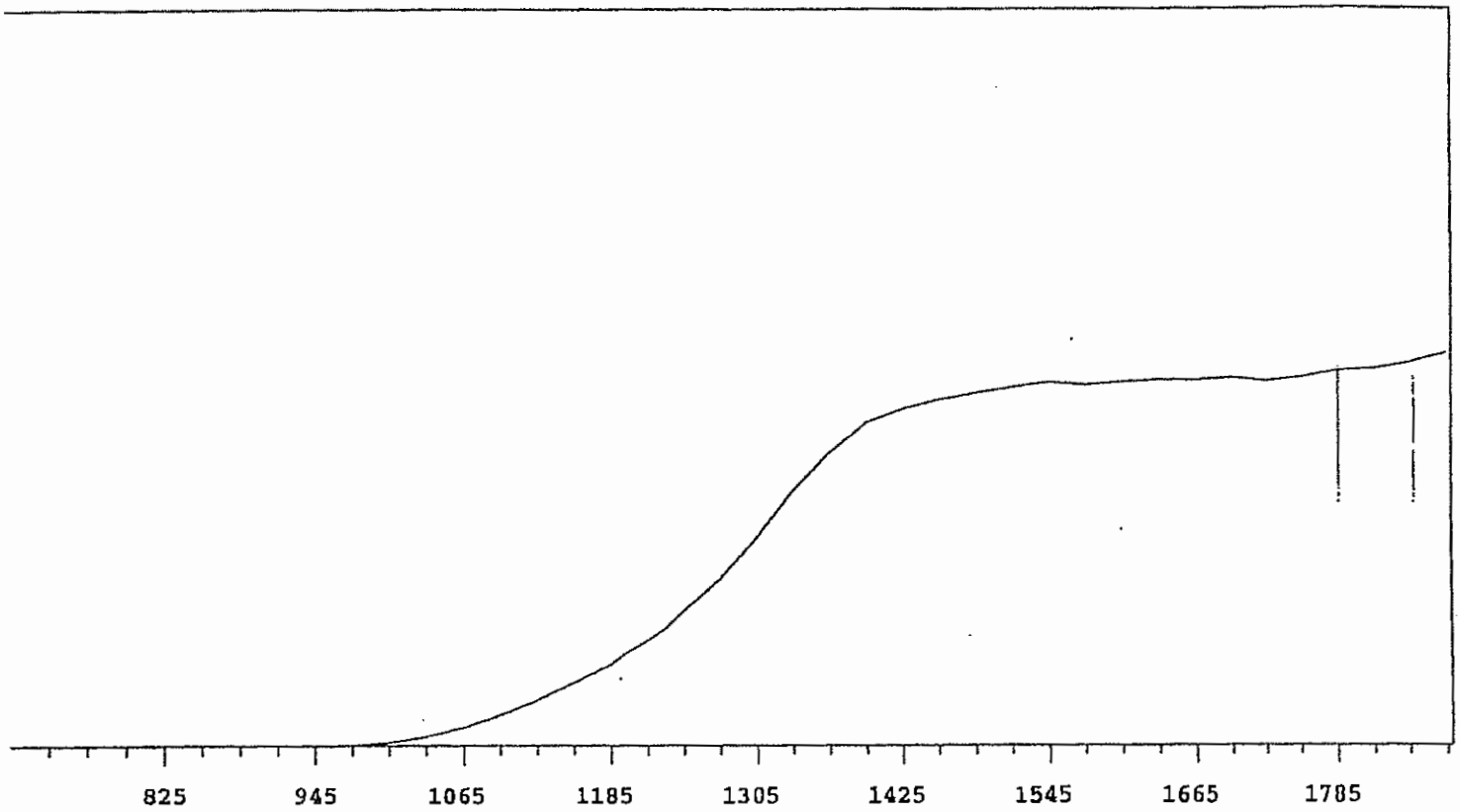



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +55.56 |
| 795 | 2 | +0.00 |
| 825 | 0 | -55.56 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 24 | >100 |
| 1005 | 134 | >100 |
| 1035 | 558 | >100 |
| 1065 | 1361 | >100 |
| 1095 | 2511 | >100 |
| 1125 | 3762 | >100 |
| 1155 | 5246 | >100 |
| 1185 | 7268 | +96.29 |
| 1215 | 9733 | +88.98 |
| 1245 | 12701 | +79.94 |
| 1275 | 16176 | +73.13 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19796 | +65.77 |
| 1335 | 24338 | +57.55 |
| 1365 | 28686 | +45.86 |
| 1395 | 32750 | +32.27 |
| 1425 | 34919 | +20.83 |
| 1455 | 36434 | +11.45 |
| 1485 | 37407 | +5.80 |
| 1515 | 37623 | +3.32 |
| 1545 | 37528 | +2.07 |
| 1575 | 38277 | +2.12 |
| 1605 | 38338 | +2.70 |
| 1635 | 38426 | +1.12 |
| 1665 | 39007 | +1.06 |
| 1695 | 38592 | +0.64 |
| 1725 | 38870 | +0.63 |
| 1755 | 38868 | +1.30 |
| 1785 | 39238 | +1.45 |
| 1815 | 39169 | +2.34 |
| 1845 | 39570 | |
| 1875 | 40086 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

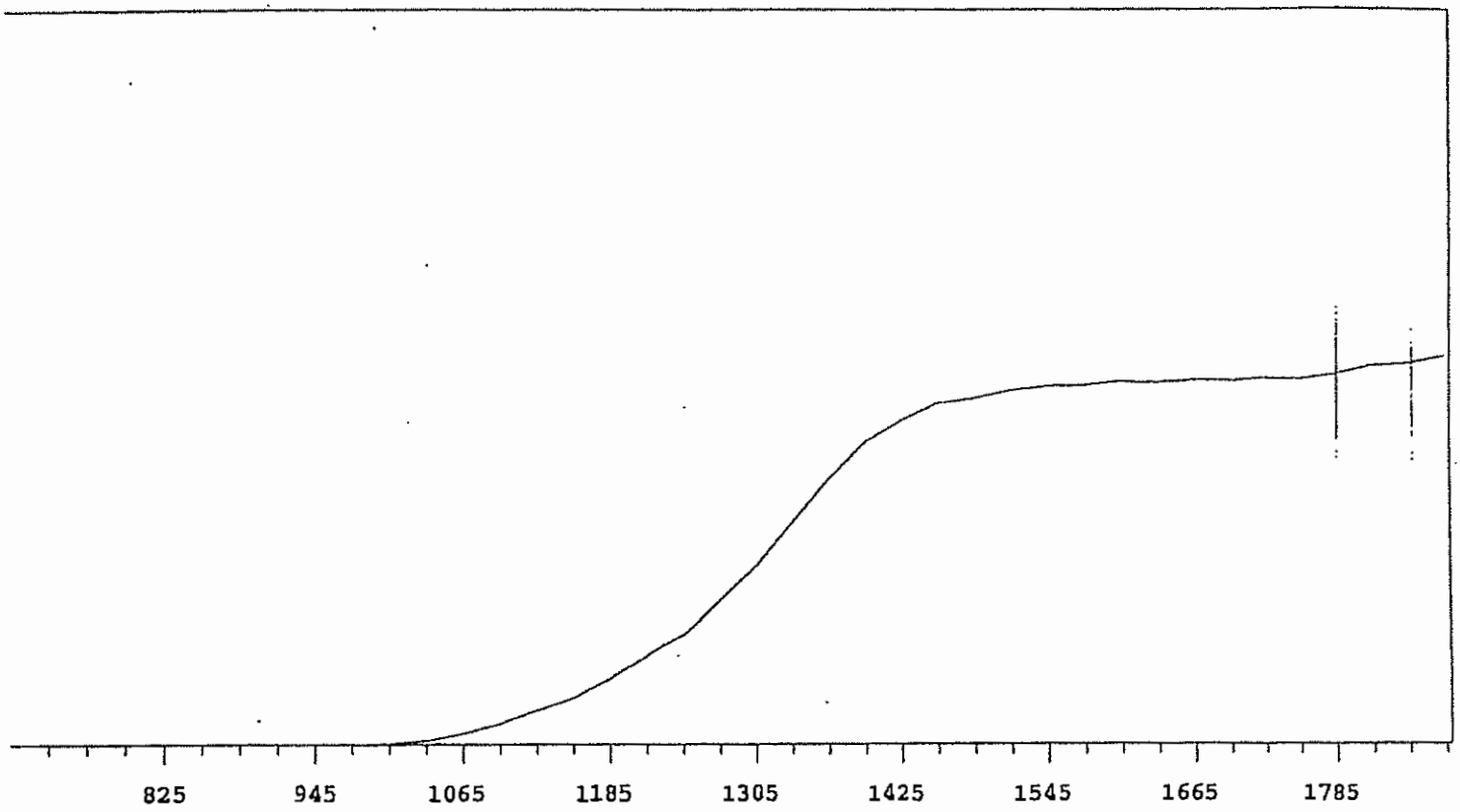



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +0.00 |
| 795 | 0 | >100 |
| 825 | 1 | +83.33 |
| 855 | 1 | +55.56 |
| 885 | 0 | +0.00 |
| 915 | 1 | >100 |
| 945 | 1 | >100 |
| 975 | 60 | >100 |
| 1005 | 297 | >100 |
| 1035 | 855 | >100 |
| 1065 | 1647 | >100 |
| 1095 | 2700 | >100 |
| 1125 | 3921 | >100 |
| 1155 | 5471 | +96.54 |
| 1185 | 7042 | +90.21 |
| 1215 | 9405 | +82.23 |
| 1245 | 12266 | +76.33 |
| 1275 | 14989 | +69.38 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18491 | +61.09 |
| 1335 | 22444 | +51.56 |
| 1365 | 25756 | +37.44 |
| 1395 | 28379 | +23.82 |
| 1425 | 29517 | +14.00 |
| 1455 | 30309 | +8.08 |
| 1485 | 30874 | +6.03 |
| 1515 | 31345 | +3.66 |
| 1545 | 31782 | +2.17 |
| 1575 | 31567 | +1.31 |
| 1605 | 31789 | +0.78 |
| 1635 | 31963 | +1.34 |
| 1665 | 31956 | +0.29 |
| 1695 | 32123 | +0.20 |
| 1725 | 31850 | +1.46 |
| 1755 | 32114 | +2.39 |
| 1785 | 32665 | +3.95 |
| 1815 | 32876 | +4.96 |
| 1845 | 33399 | |
| 1875 | 34206 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

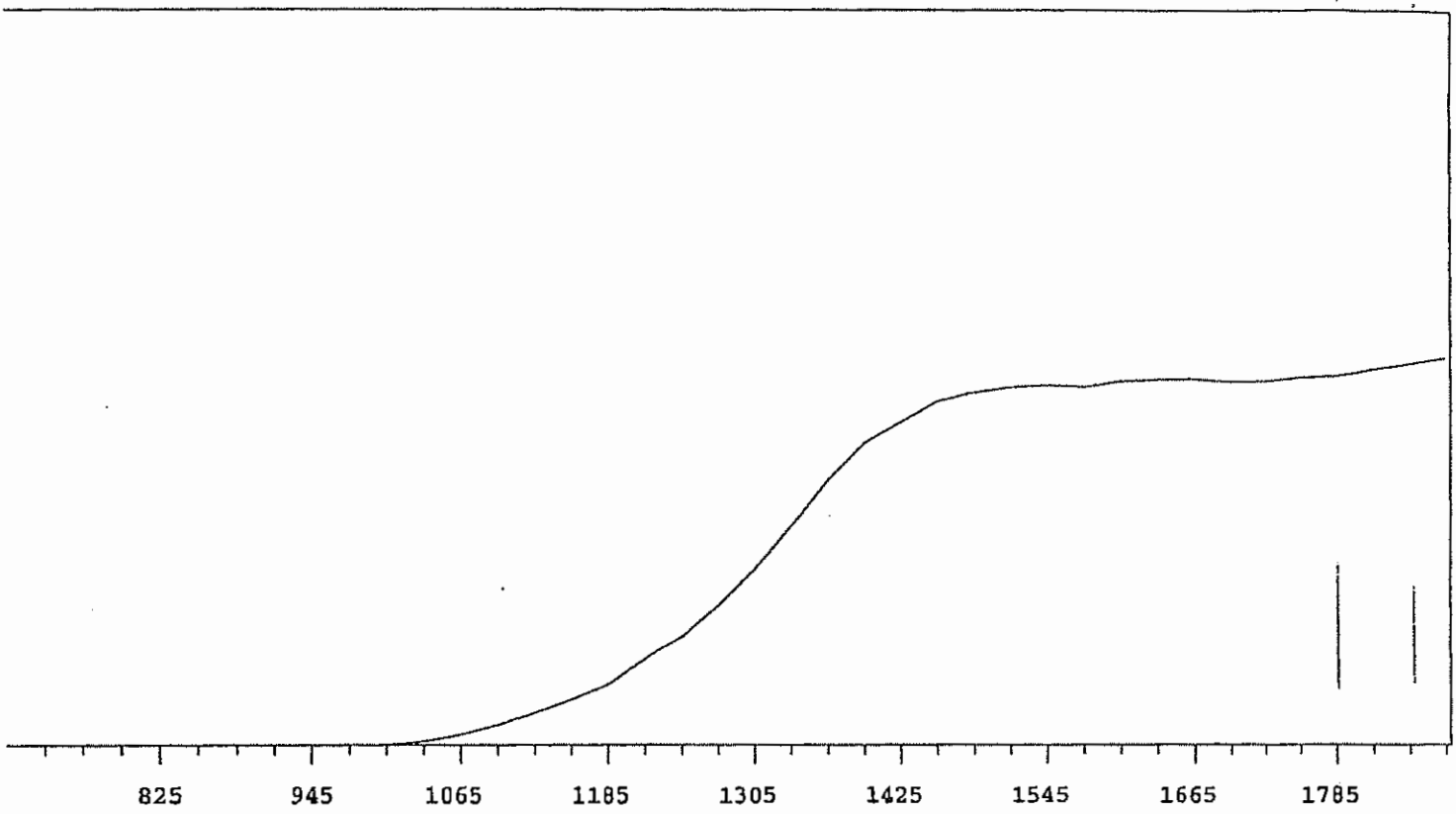



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | |
| 795 | 1 | +83.33 |
| 825 | 1 | -83.33 |
| 855 | 1 | >100 |
| 885 | 0 | -55.56 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 9 | >100 |
| 1005 | 76 | >100 |
| 1035 | 308 | >100 |
| 1065 | 814 | >100 |
| 1095 | 1600 | >100 |
| 1125 | 2598 | >100 |
| 1155 | 3596 | >100 |
| 1185 | 5065 | +96.05 |
| 1215 | 6773 | +90.23 |
| 1245 | 8717 | +81.43 |
| 1275 | 11391 | +74.83 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13974 | +68.00 |
| 1335 | 17170 | +58.62 |
| 1365 | 20456 | +47.04 |
| 1395 | 23332 | +33.83 |
| 1425 | 24996 | +21.10 |
| 1455 | 26290 | +12.40 |
| 1485 | 26683 | +7.74 |
| 1515 | 27270 | +4.43 |
| 1545 | 27590 | +3.48 |
| 1575 | 27635 | +1.71 |
| 1605 | 27932 | +1.20 |
| 1635 | 27807 | +0.88 |
| 1665 | 28006 | +0.62 |
| 1695 | 27964 | +0.63 |
| 1725 | 28112 | +0.98 |
| 1755 | 28020 | +2.84 |
| 1785 | 28392 | +3.76 |
| 1815 | 29028 | +5.17 |
| 1845 | 29220 | |
| 1875 | 29849 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

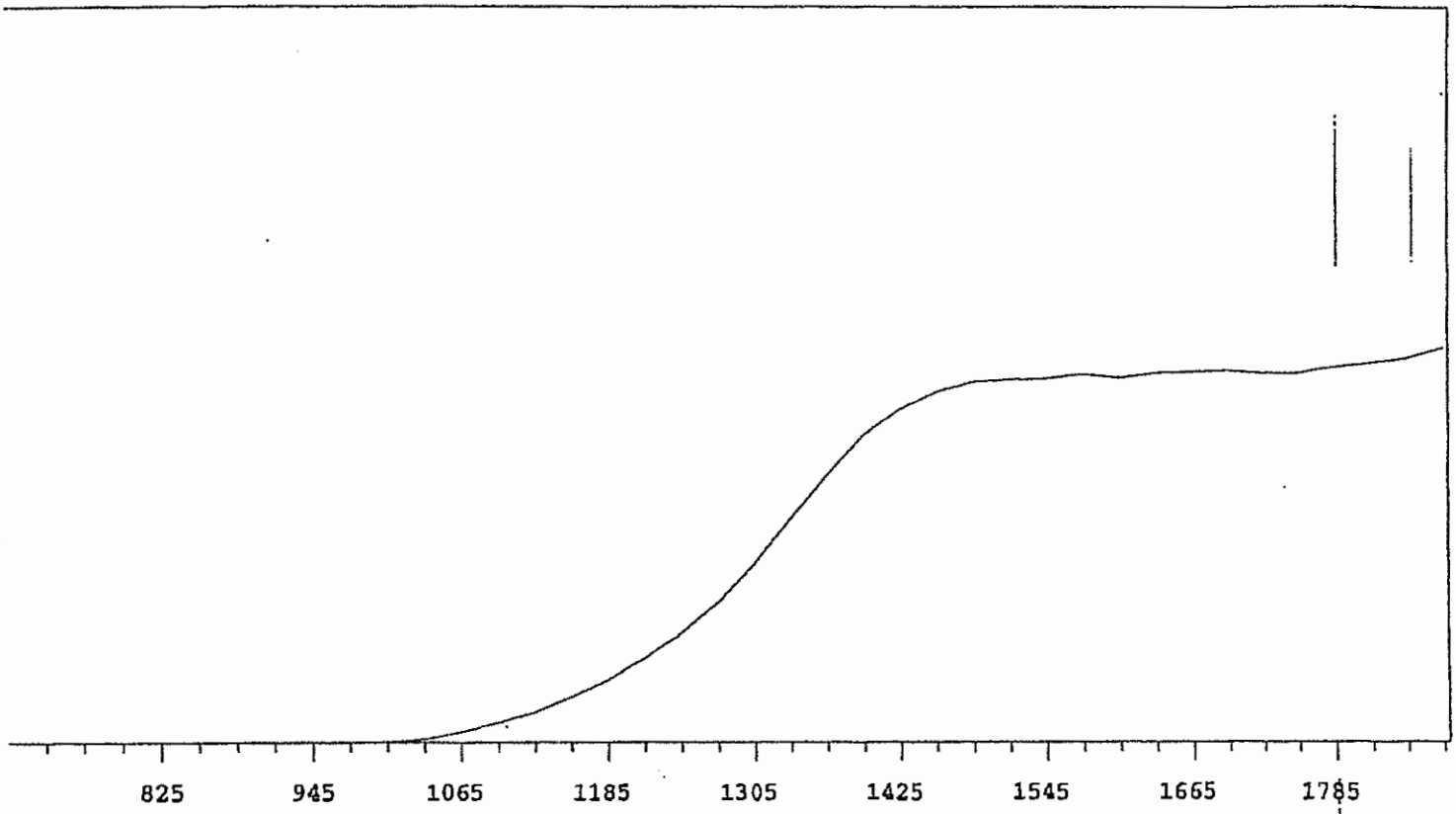



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 1 | >100 |
| 855 | 1 | +41.67 |
| 885 | 2 | -33.33 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 17 | >100 |
| 1005 | 87 | >100 |
| 1035 | 336 | >100 |
| 1065 | 1010 | >100 |
| 1095 | 1955 | >100 |
| 1125 | 3124 | >100 |
| 1155 | 4486 | >100 |
| 1185 | 6017 | >100 |
| 1215 | 8507 | +91.20 |
| 1245 | 11148 | +82.59 |
| 1275 | 14003 | +74.21 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 17414 | +68.46 |
| 1335 | 21540 | +59.98 |
| 1365 | 25854 | +46.75 |
| 1395 | 29222 | +33.38 |
| 1425 | 31128 | +21.52 |
| 1455 | 32995 | +13.26 |
| 1485 | 33846 | +8.09 |
| 1515 | 34289 | +3.25 |
| 1545 | 34528 | +2.00 |
| 1575 | 34311 | +1.78 |
| 1605 | 34866 | +1.78 |
| 1635 | 35046 | +1.14 |
| 1665 | 35087 | -0.26 |
| 1695 | 34795 | +0.11 |
| 1725 | 34857 | +0.93 |
| 1755 | 35220 | +2.81 |
| 1785 | 35363 | +3.98 |
| 1815 | 36028 | +4.79 |
| 1845 | 36577 | |
| 1875 | 37207 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector C  7/1/2009

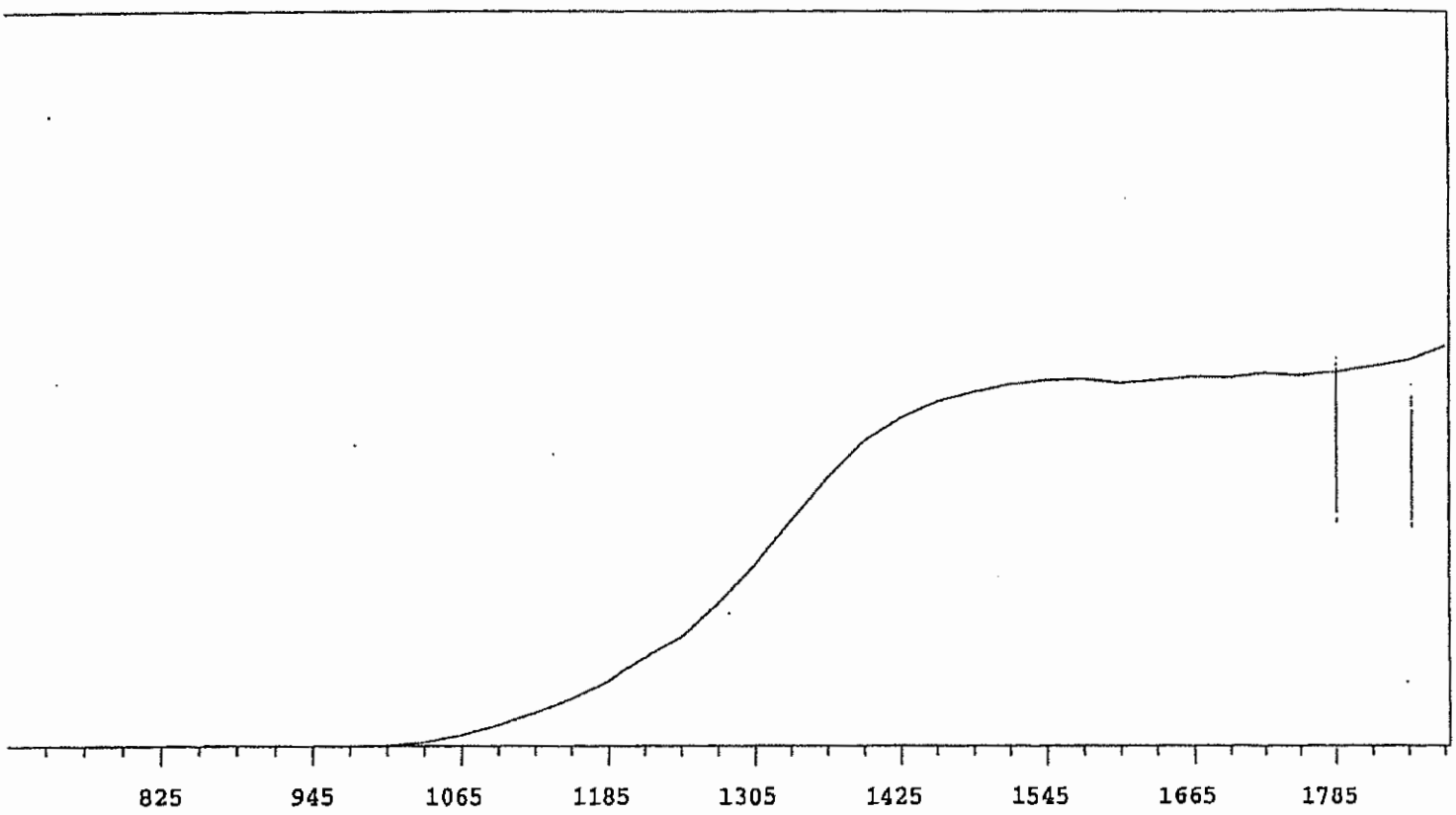
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 7 | >100 |
| 1005 | 56 | >100 |
| 1035 | 305 | >100 |
| 1065 | 982 | >100 |
| 1095 | 1874 | >100 |
| 1125 | 2890 | >100 |
| 1155 | 4260 | >100 |
| 1185 | 6001 | >100 |
| 1215 | 8050 | +91.54 |
| 1245 | 10895 | +82.98 |
| 1275 | 13556 | +76.26 |
| 1305 | 17085 | +68.24 |
| 1335 | 21135 | +59.99 |
| 1365 | 25066 | +47.39 |
| 1395 | 28530 | +33.93 |
| 1425 | 30823 | +22.30 |
| 1455 | 32287 | +12.93 |
| 1485 | 33217 | +6.71 |
| 1515 | 33474 | +3.57 |
| 1545 | 33517 | +1.17 |
| 1575 | 33921 | +1.13 |
| 1605 | 33584 | +1.27 |
| 1635 | 34014 | +1.12 |
| 1665 | 34116 | +0.98 |
| 1695 | 34225 | -0.22 |
| 1725 | 33980 | +0.58 |
| 1755 | 33971 | +1.96 |
| 1785 | 34541 | +3.64 |
| 1815 | 34954 | +5.38 |
| 1845 | 35375 | |
| 1875 | 36384 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

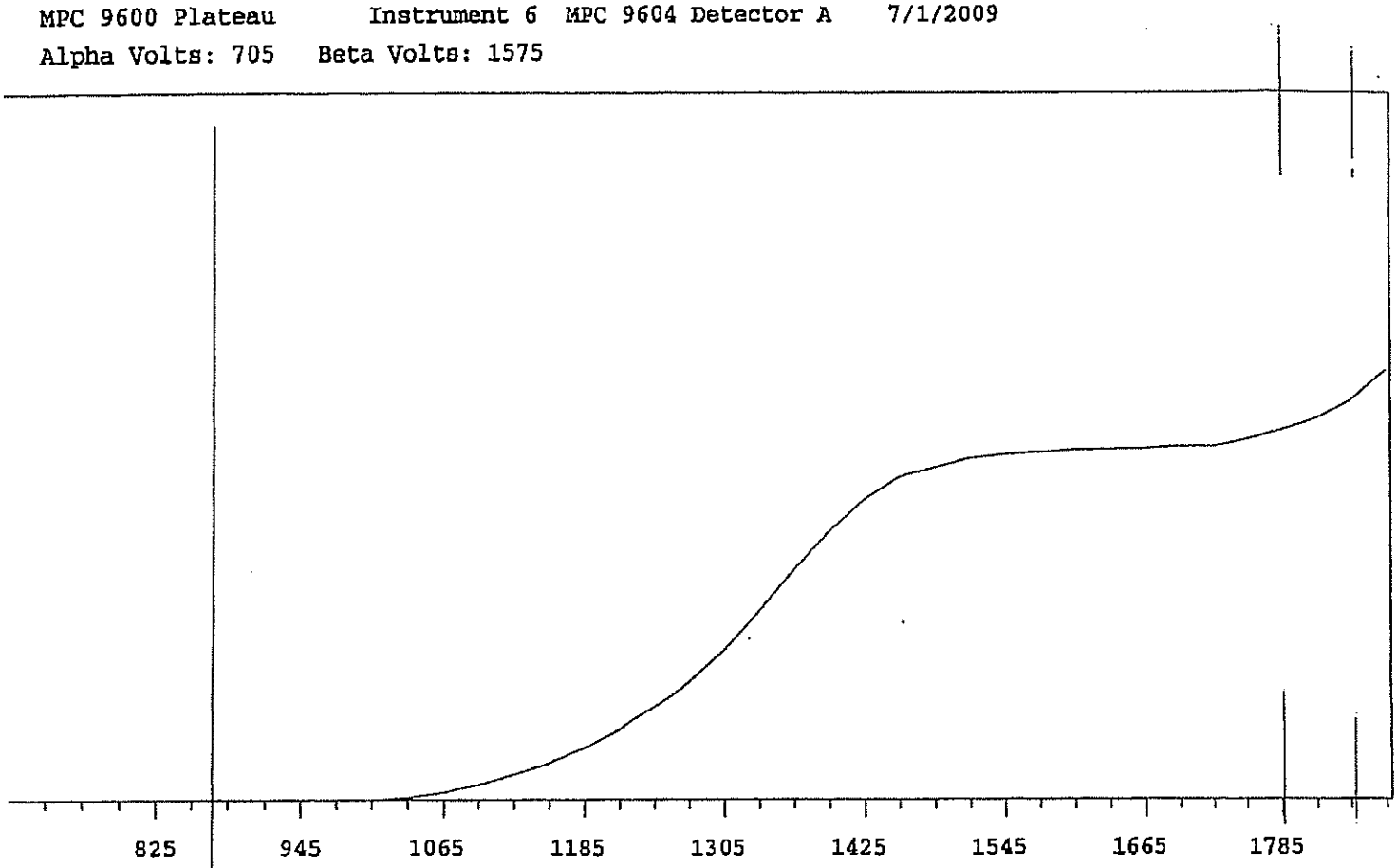



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 6 | >100 |
| 1005 | 81 | >100 |
| 1035 | 318 | >100 |
| 1065 | 897 | >100 |
| 1095 | 1710 | >100 |
| 1125 | 2714 | >100 |
| 1155 | 3925 | >100 |
| 1185 | 5395 | +97.31 |
| 1215 | 7282 | +88.49 |
| 1245 | 9426 | +81.36 |
| 1275 | 12007 | +75.65 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15025 | +68.87 |
| 1335 | 18640 | +58.97 |
| 1365 | 22048 | +45.84 |
| 1395 | 24877 | +32.08 |
| 1425 | 26653 | +20.83 |
| 1455 | 27899 | +13.08 |
| 1485 | 28670 | +8.43 |
| 1515 | 29257 | +5.13 |
| 1545 | 29568 | +2.06 |
| 1575 | 29683 | +0.52 |
| 1605 | 29362 | +0.57 |
| 1635 | 29589 | +0.80 |
| 1665 | 29870 | +1.82 |
| 1695 | 29783 | +0.90 |
| 1725 | 30077 | +0.75 |
| 1755 | 29889 | +2.02 |
| 1785 | 30152 | +3.33 |
| 1815 | 30656 | +6.54 |
| 1845 | 31211 | |
| 1875 | 32389 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

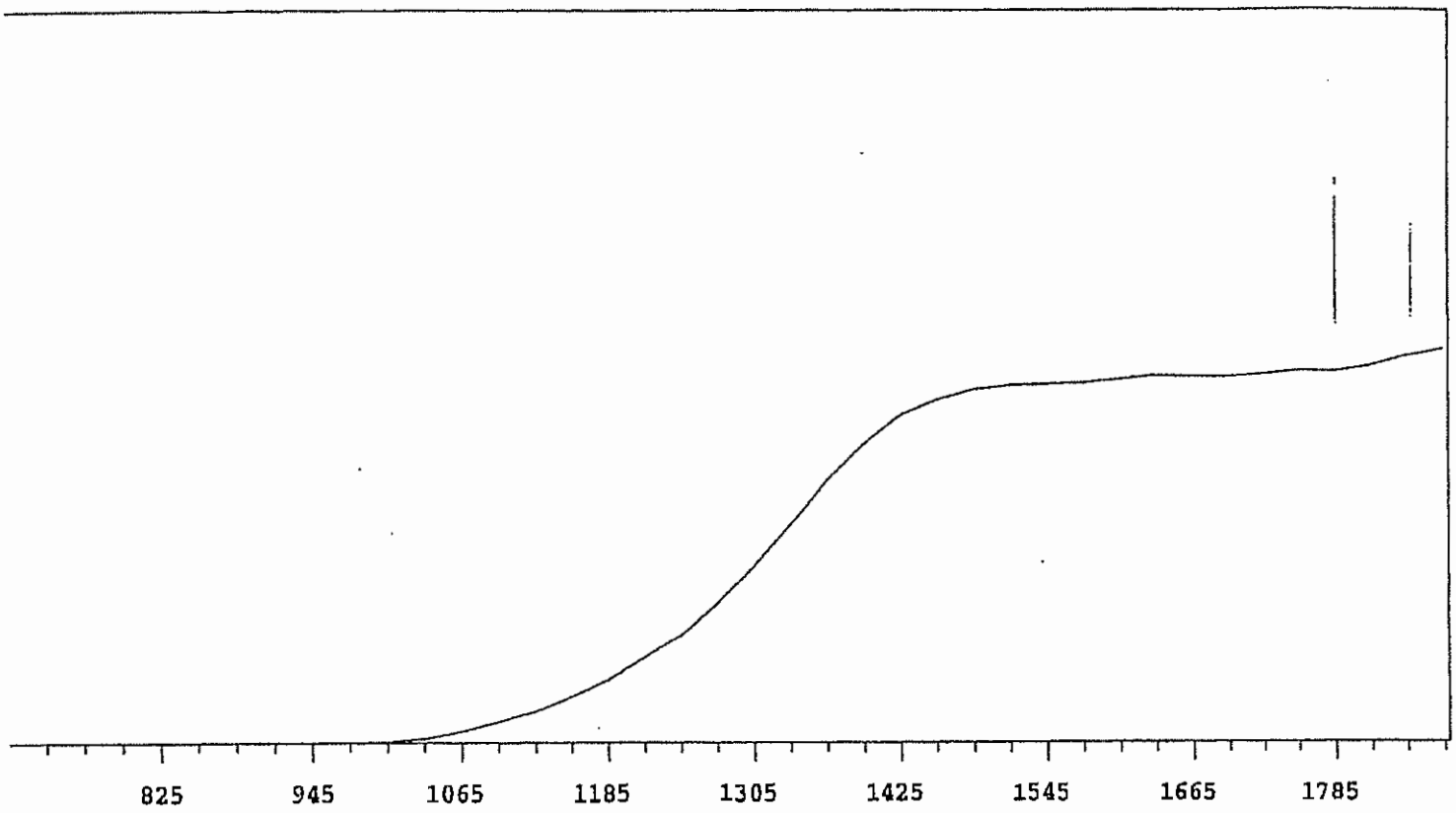



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 7 | >100 |
| 1005 | 31 | >100 |
| 1035 | 238 | >100 |
| 1065 | 810 | >100 |
| 1095 | 1637 | >100 |
| 1125 | 2743 | >100 |
| 1155 | 3932 | >100 |
| 1185 | 5579 | >100 |
| 1215 | 7602 | +94.41 |
| 1245 | 10078 | +84.86 |
| 1275 | 13091 | +77.67 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16217 | +71.57 |
| 1335 | 20184 | +63.76 |
| 1365 | 24605 | +53.98 |
| 1395 | 28528 | +41.40 |
| 1425 | 31675 | +28.02 |
| 1455 | 33899 | +17.93 |
| 1485 | 34826 | +10.65 |
| 1515 | 35815 | +6.13 |
| 1545 | 36225 | +4.15 |
| 1575 | 36456 | +2.28 |
| 1605 | 36747 | +1.47 |
| 1635 | 36801 | +1.26 |
| 1665 | 36859 | +0.85 |
| 1695 | 37095 | +1.85 |
| 1725 | 37072 | +4.01 |
| 1755 | 37724 | +6.65 |
| 1785 | 38802 | +10.33 |
| 1815 | 40036 | +14.71 |
| 1845 | 41975 | |
| 1875 | 45123 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector B  7/1/2009

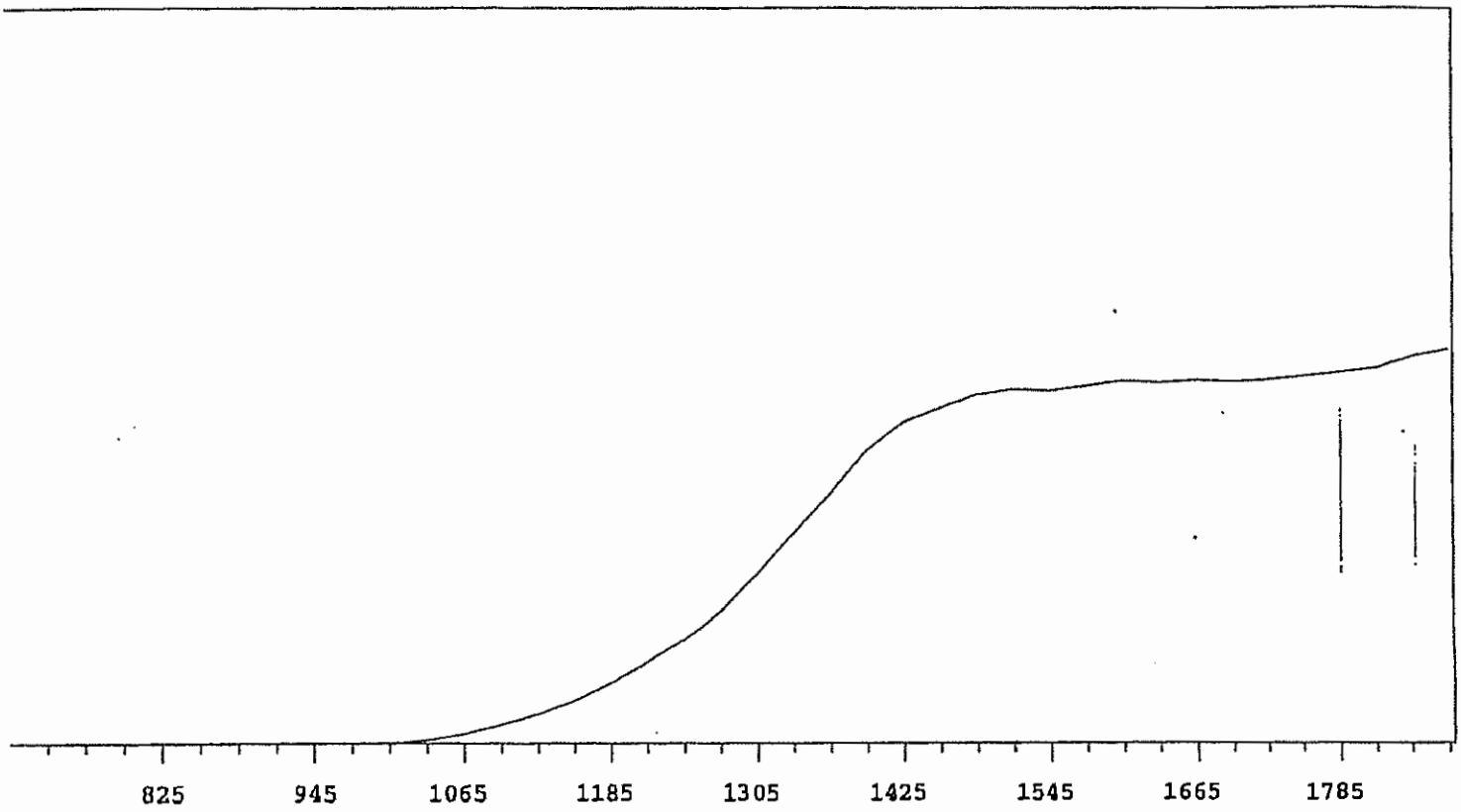
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts | VOLTS | COUNTS | %/100 Volts |
|---|---|---|---|---|---|
| 705 | 0 | | 1305 | 20094 | +68.67 |
| 735 | 0 | | 1335 | 24665 | +59.40 |
| 765 | 0 | | 1365 | 29591 | +47.86 |
| 795 | 0 | >100 | 1395 | 33376 | +34.51 |
| 825 | 1 | +83.33 | 1425 | 36440 | +22.50 |
| 855 | 1 | -83.33 | 1455 | 38024 | +13.58 |
| 885 | 0 | >100 | 1485 | 39187 | +7.04 |
| 915 | 0 | >100 | 1515 | 39608 | +3.63 |
| 945 | 5 | >100 | 1545 | 39722 | +2.10 |
| 975 | 18 | >100 | 1575 | 39894 | +2.32 |
| 1005 | 125 | >100 | 1605 | 40298 | +2.09 |
| 1035 | 482 | >100 | 1635 | 40711 | +1.41 |
| 1065 | 1255 | >100 | 1665 | 40574 | +0.80 |
| 1095 | 2318 | >100 | 1695 | 40608 | +1.02 |
| 1125 | 3540 | >100 | 1725 | 40839 | +1.28 |
| 1155 | 5288 | >100 | 1755 | 41201 | +1.97 |
| 1185 | 7168 | +98.51 | 1785 | 41065 | +3.74 |
| 1215 | 9760 | +88.48 | 1815 | 41711 | +5.42 |
| 1245 | 12656 | +81.52 | 1845 | 42917 | |
| 1275 | 16065 | +74.58 | 1875 | 43699 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

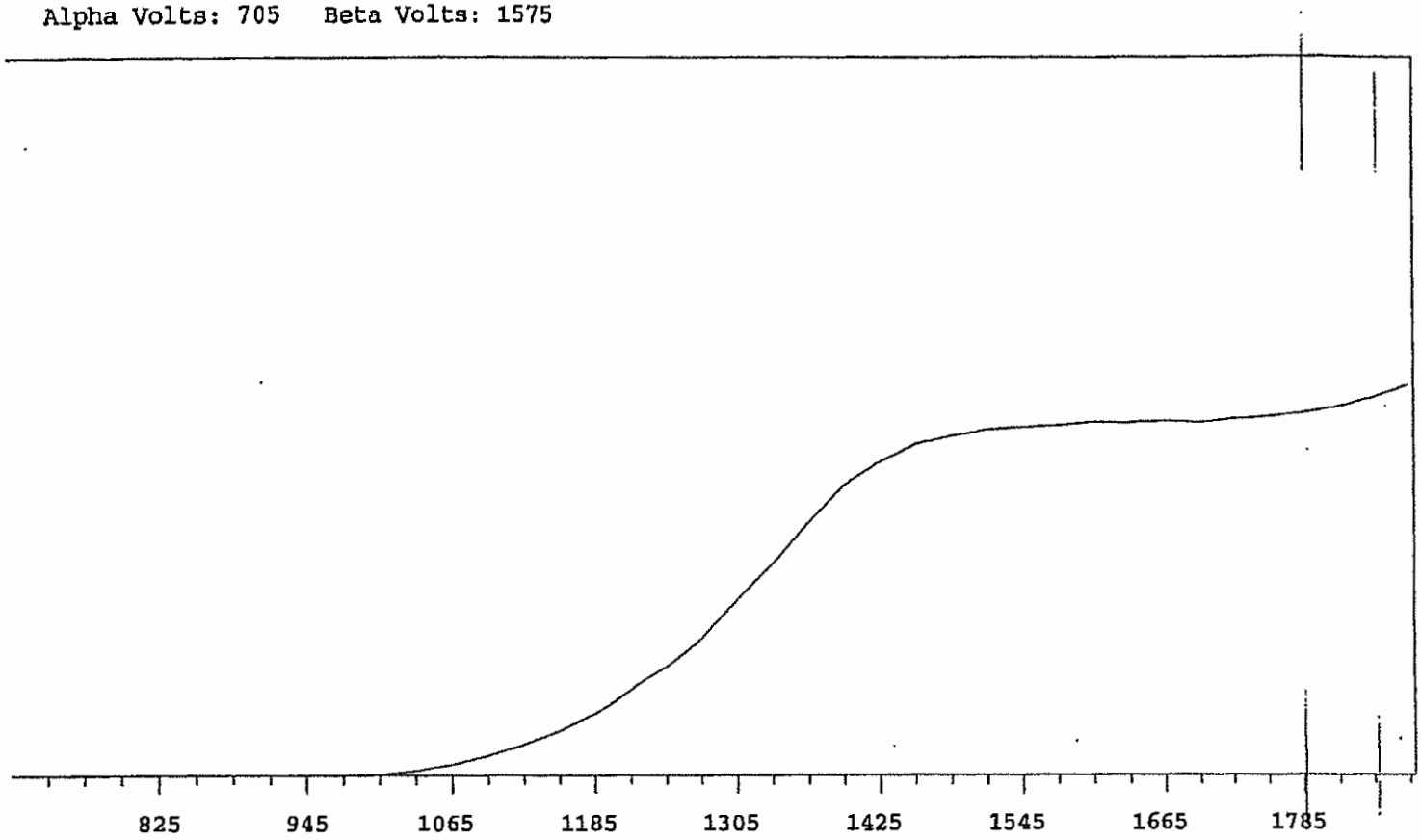



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 0 | +0.00 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 8 | >100 |
| 1005 | 70 | >100 |
| 1035 | 353 | >100 |
| 1065 | 990 | >100 |
| 1095 | 1956 | >100 |
| 1125 | 3024 | >100 |
| 1155 | 4400 | >100 |
| 1185 | 6173 | +99.75 |
| 1215 | 8230 | +89.85 |
| 1245 | 10904 | +82.36 |
| 1275 | 13747 | +76.18 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 17350 | +67.80 |
| 1335 | 21371 | +60.27 |
| 1365 | 25084 | +49.32 |
| 1395 | 29177 | +36.15 |
| 1425 | 31927 | +24.86 |
| 1455 | 33217 | +14.70 |
| 1485 | 34545 | +7.74 |
| 1515 | 35097 | +4.64 |
| 1545 | 34927 | +2.96 |
| 1575 | 35439 | +2.21 |
| 1605 | 35939 | +2.41 |
| 1635 | 35763 | +0.94 |
| 1665 | 36053 | +0.35 |
| 1695 | 35886 | +1.15 |
| 1725 | 36066 | +1.77 |
| 1755 | 36379 | +3.03 |
| 1785 | 36768 | +4.80 |
| 1815 | 37193 | +6.14 |
| 1845 | 38320 | |
| 1875 | 39061 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

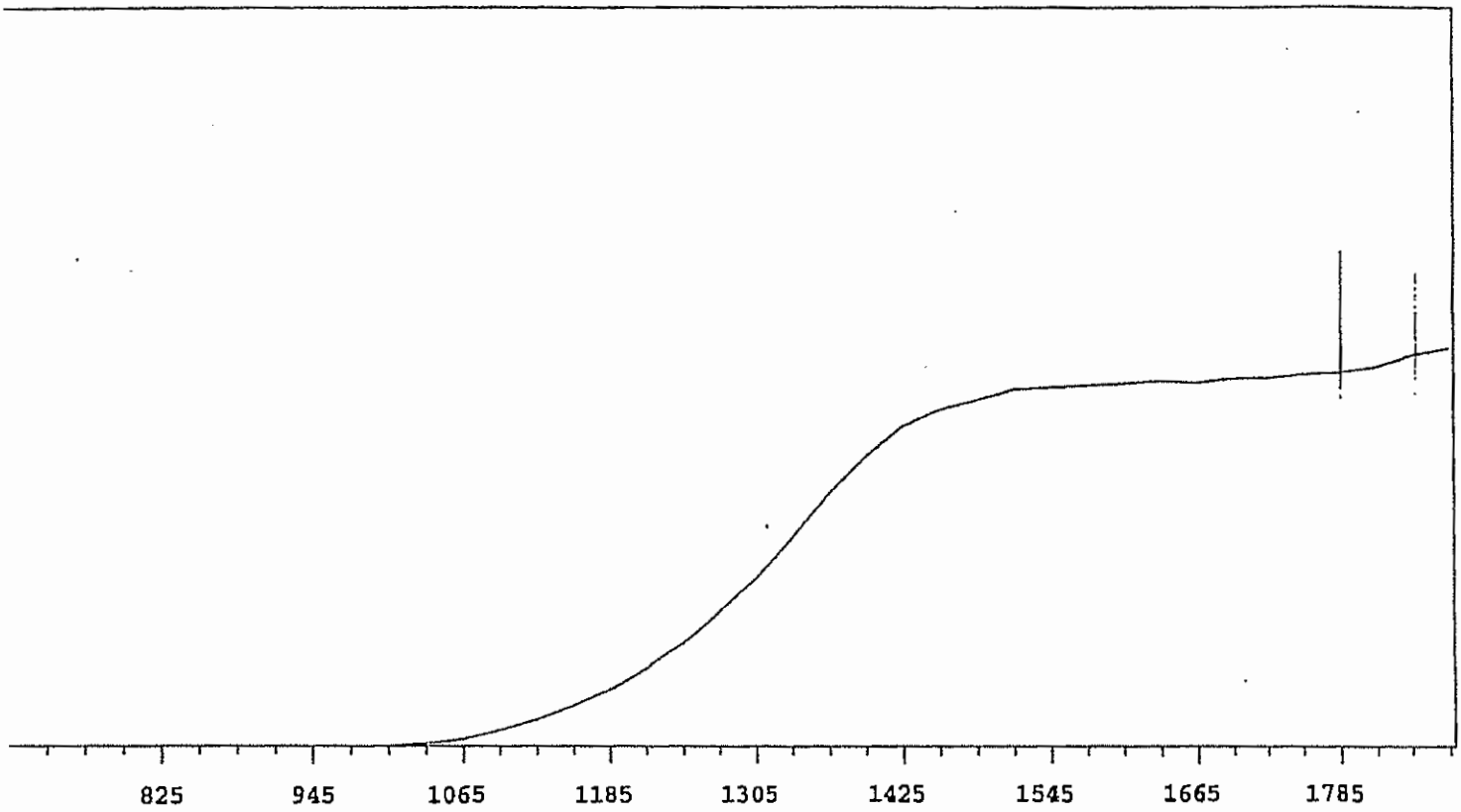



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 1 | +0.00 |
| 825 | 0 | >100 |
| 855 | 0 | +0.00 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 14 | >100 |
| 1005 | 109 | >100 |
| 1035 | 481 | >100 |
| 1065 | 1177 | >100 |
| 1095 | 2133 | >100 |
| 1125 | 3243 | >100 |
| 1155 | 4554 | >100 |
| 1185 | 6285 | +98.38 |
| 1215 | 8468 | +89.75 |
| 1245 | 11266 | +83.13 |
| 1275 | 14088 | +74.43 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 17954 | +65.82 |
| 1335 | 21482 | +57.64 |
| 1365 | 25373 | +45.78 |
| 1395 | 29042 | +34.80 |
| 1425 | 31373 | +23.29 |
| 1455 | 33143 | +14.25 |
| 1485 | 34006 | +8.49 |
| 1515 | 34662 | +4.71 |
| 1545 | 34892 | +3.14 |
| 1575 | 35129 | +1.86 |
| 1605 | 35411 | +1.49 |
| 1635 | 35380 | +0.62 |
| 1665 | 35554 | +0.65 |
| 1695 | 35385 | +1.18 |
| 1725 | 35755 | +1.89 |
| 1755 | 35907 | +3.26 |
| 1785 | 36305 | +4.62 |
| 1815 | 36870 | +6.98 |
| 1845 | 37807 | |
| 1875 | 39047 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

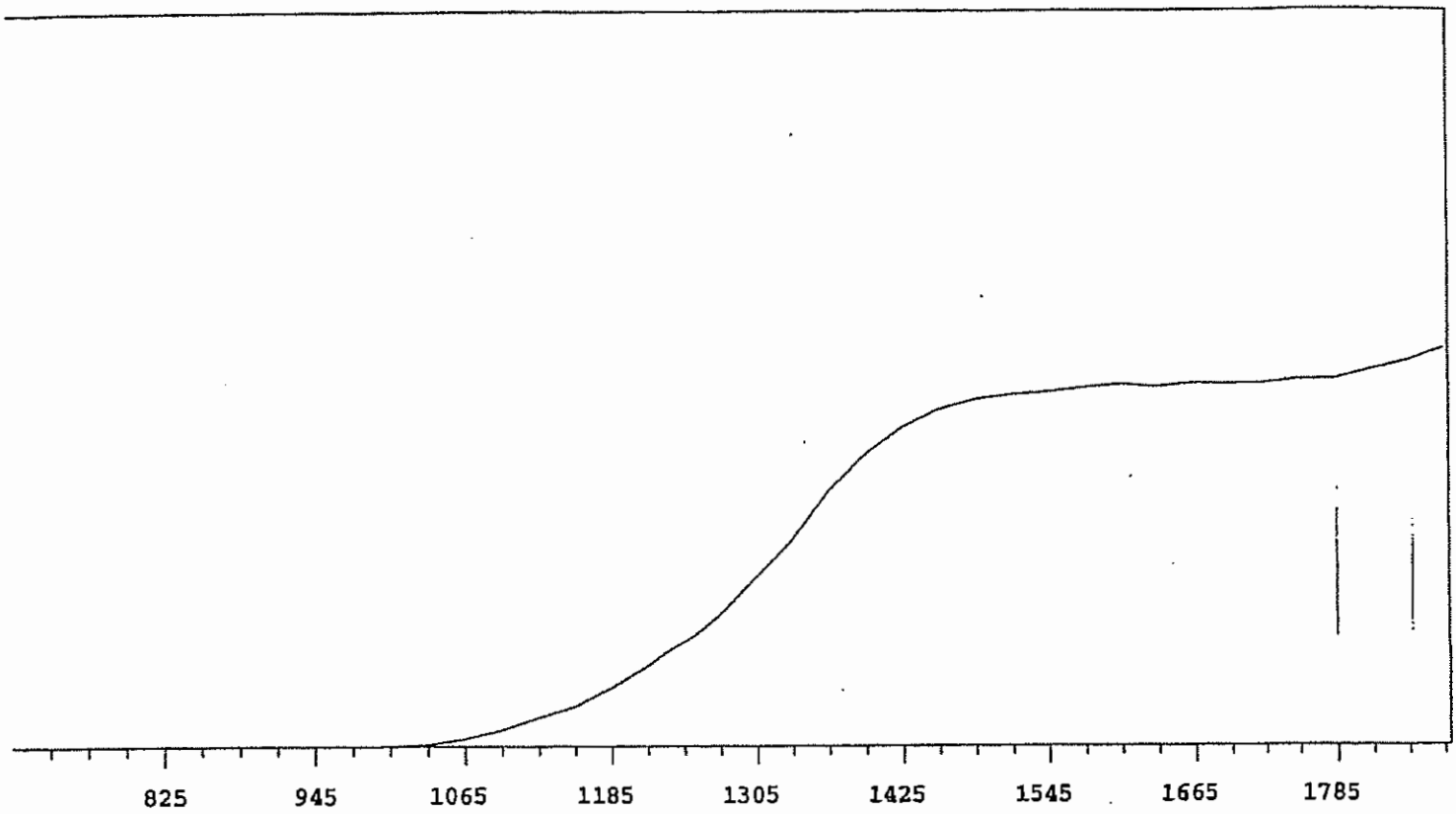



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 1 | +83.33 |
| 855 | 1 | -83.33 |
| 885 | 0 | -55.56 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 3 | >100 |
| 1005 | 42 | >100 |
| 1035 | 242 | >100 |
| 1065 | 613 | >100 |
| 1095 | 1353 | >100 |
| 1125 | 2213 | >100 |
| 1155 | 3256 | >100 |
| 1185 | 4474 | >100 |
| 1215 | 5932 | +94.10 |
| 1245 | 8072 | +87.32 |
| 1275 | 10579 | +79.61 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13228 | +70.36 |
| 1335 | 16271 | +60.12 |
| 1365 | 19506 | +49.19 |
| 1395 | 22188 | +36.46 |
| 1425 | 24373 | +24.43 |
| 1455 | 25649 | +15.99 |
| 1485 | 26433 | +9.58 |
| 1515 | 27195 | +5.74 |
| 1545 | 27367 | +3.24 |
| 1575 | 27490 | +1.86 |
| 1605 | 27608 | +1.22 |
| 1635 | 27841 | +1.33 |
| 1665 | 27695 | +1.11 |
| 1695 | 27999 | +1.42 |
| 1725 | 27992 | +2.04 |
| 1755 | 28289 | +2.52 |
| 1785 | 28408 | +4.56 |
| 1815 | 28863 | +5.70 |
| 1845 | 29664 | |
| 1875 | 30148 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

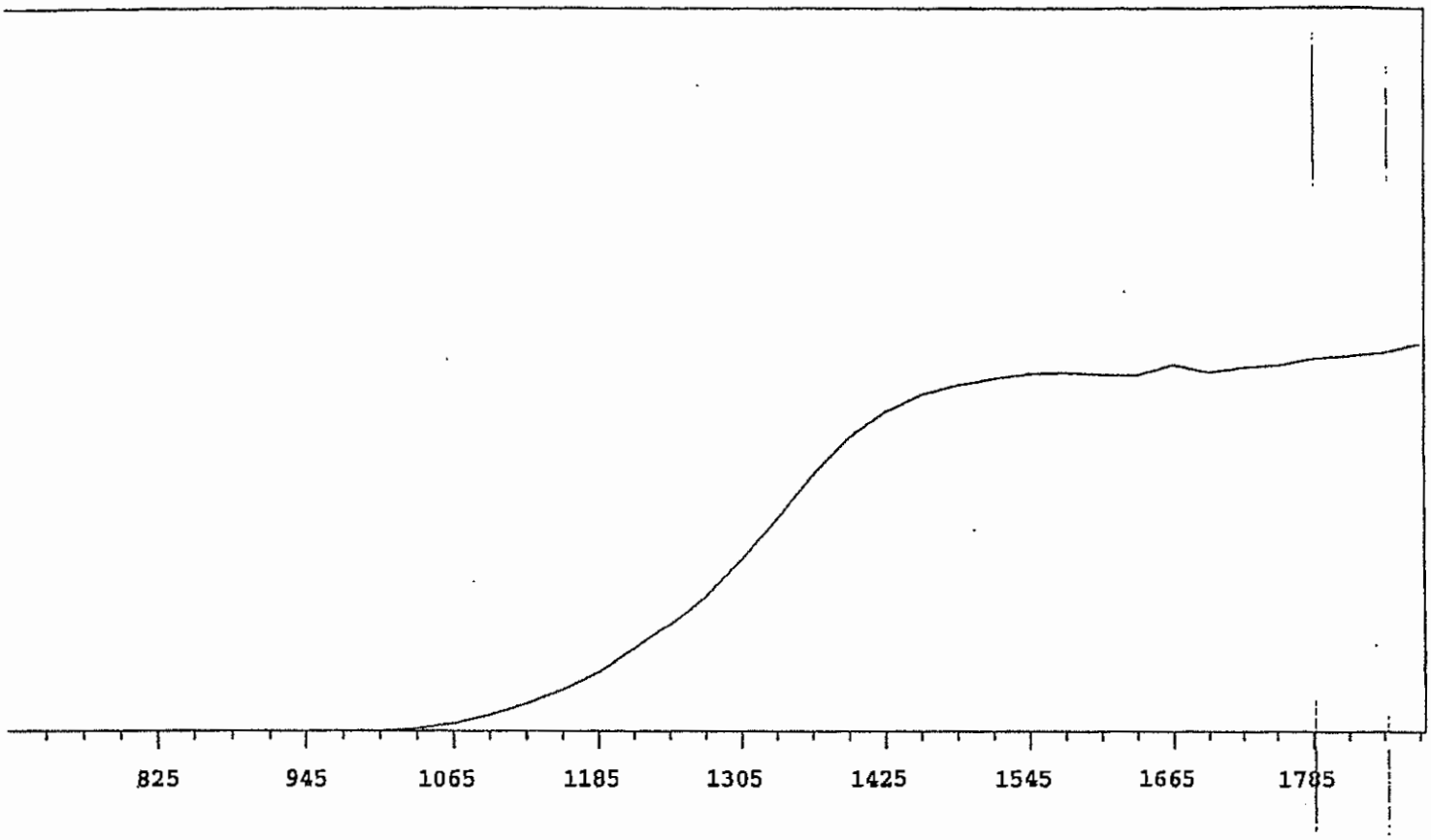



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 1 | >100 |
| 975 | 3 | >100 |
| 1005 | 34 | >100 |
| 1035 | 221 | >100 |
| 1065 | 825 | >100 |
| 1095 | 1709 | >100 |
| 1125 | 2873 | >100 |
| 1155 | 4078 | >100 |
| 1185 | 5858 | >100 |
| 1215 | 7809 | +91.82 |
| 1245 | 10336 | +85.02 |
| 1275 | 13215 | +77.79 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16978 | +70.97 |
| 1335 | 20569 | +61.39 |
| 1365 | 24989 | +48.97 |
| 1395 | 28389 | +36.69 |
| 1425 | 30977 | +24.05 |
| 1455 | 32727 | +14.93 |
| 1485 | 33697 | +8.42 |
| 1515 | 34195 | +4.89 |
| 1545 | 34437 | +3.49 |
| 1575 | 34850 | +2.11 |
| 1605 | 35174 | +1.62 |
| 1635 | 34923 | +0.68 |
| 1665 | 35250 | +0.35 |
| 1695 | 35171 | +1.24 |
| 1725 | 35237 | +1.02 |
| 1755 | 35584 | +2.79 |
| 1785 | 35587 | +4.59 |
| 1815 | 36485 | +6.74 |
| 1845 | 37270 | |
| 1875 | 38453 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

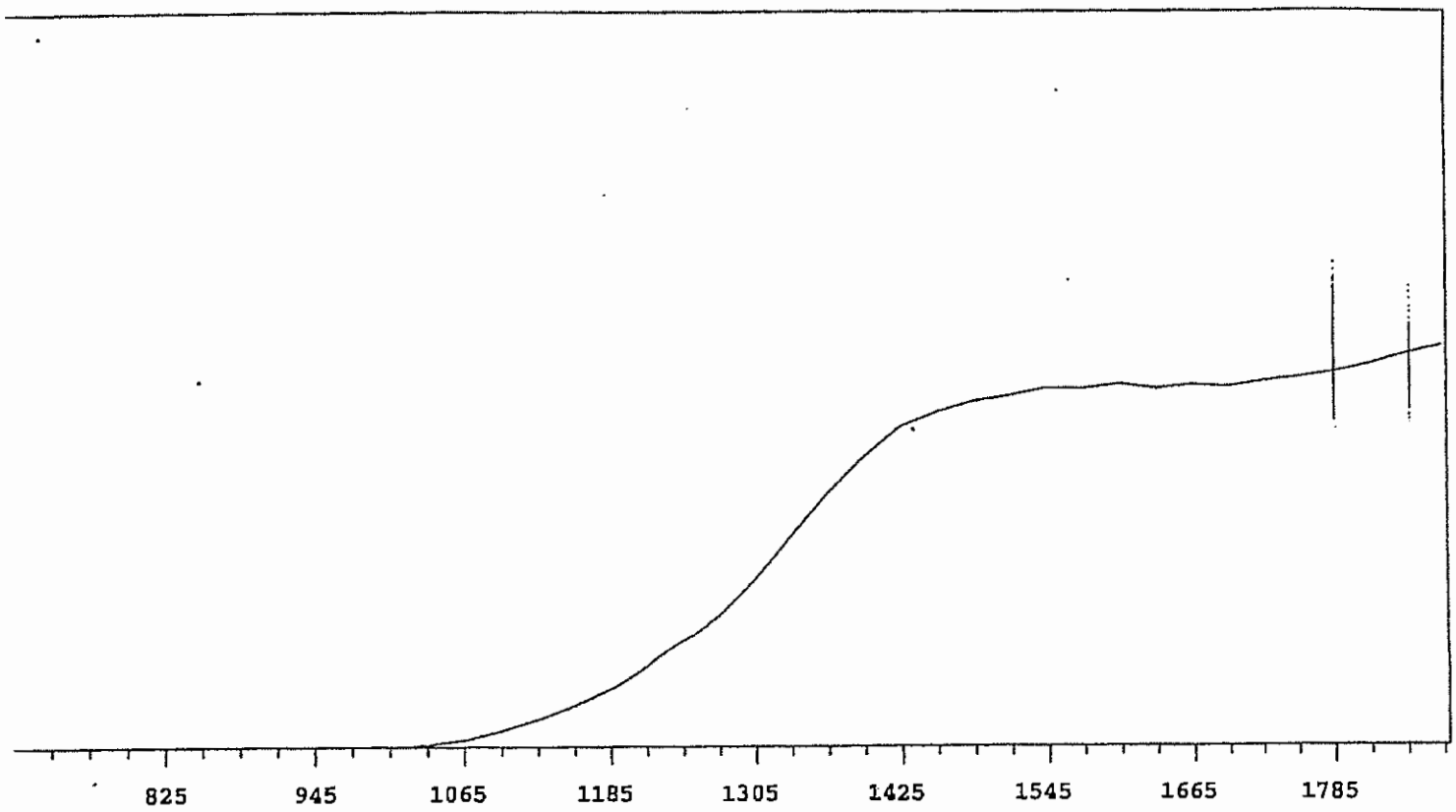



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 57 | >100 |
| 1035 | 277 | >100 |
| 1065 | 817 | >100 |
| 1095 | 1666 | >100 |
| 1125 | 2766 | >100 |
| 1155 | 4077 | >100 |
| 1185 | 5667 | >100 |
| 1215 | 7694 | +91.50 |
| 1245 | 10209 | +84.83 |
| 1275 | 12950 | +77.50 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16543 | +70.03 |
| 1335 | 20257 | +60.71 |
| 1365 | 24245 | +48.17 |
| 1395 | 27602 | +35.50 |
| 1425 | 30019 | +23.48 |
| 1455 | 31614 | +14.53 |
| 1485 | 32522 | +8.91 |
| 1515 | 33103 | +5.28 |
| 1545 | 33572 | +2.60 |
| 1575 | 33695 | +0.70 |
| 1605 | 33525 | +1.48 |
| 1635 | 33477 | +0.99 |
| 1665 | 34432 | +1.49 |
| 1695 | 33745 | +1.43 |
| 1725 | 34149 | +1.60 |
| 1755 | 34350 | +3.69 |
| 1785 | 34955 | +3.62 |
| 1815 | 35251 | +4.44 |
| 1845 | 35592 | |
| 1875 | 36382 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

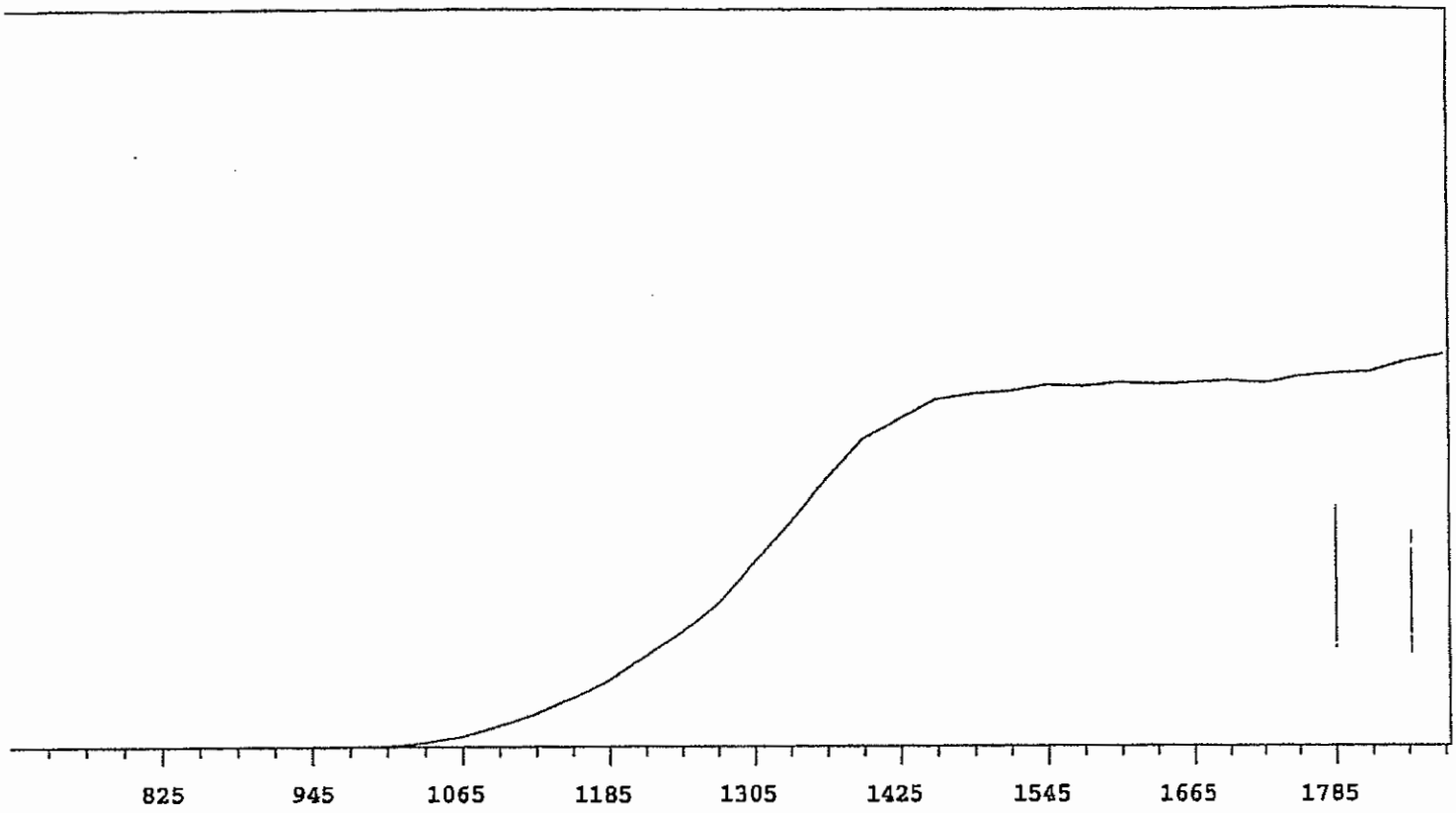



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 5 | >100 |
| 1005 | 29 | >100 |
| 1035 | 204 | >100 |
| 1065 | 609 | >100 |
| 1095 | 1354 | >100 |
| 1125 | 2316 | >100 |
| 1155 | 3418 | >100 |
| 1185 | 4654 | >100 |
| 1215 | 6455 | +92.99 |
| 1245 | 8669 | +86.45 |
| 1275 | 10931 | +79.15 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14016 | +71.42 |
| 1335 | 17436 | +62.21 |
| 1365 | 20814 | +50.32 |
| 1395 | 23760 | +36.91 |
| 1425 | 26302 | +24.91 |
| 1455 | 27519 | +15.17 |
| 1485 | 28410 | +8.91 |
| 1515 | 28843 | +5.41 |
| 1545 | 29396 | +3.58 |
| 1575 | 29357 | +1.54 |
| 1605 | 29719 | +0.51 |
| 1635 | 29358 | +0.23 |
| 1665 | 29623 | +0.57 |
| 1695 | 29509 | +2.12 |
| 1725 | 29896 | +2.84 |
| 1755 | 30165 | +4.42 |
| 1785 | 30570 | +5.65 |
| 1815 | 31180 | +6.95 |
| 1845 | 31995 | |
| 1875 | 32717 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

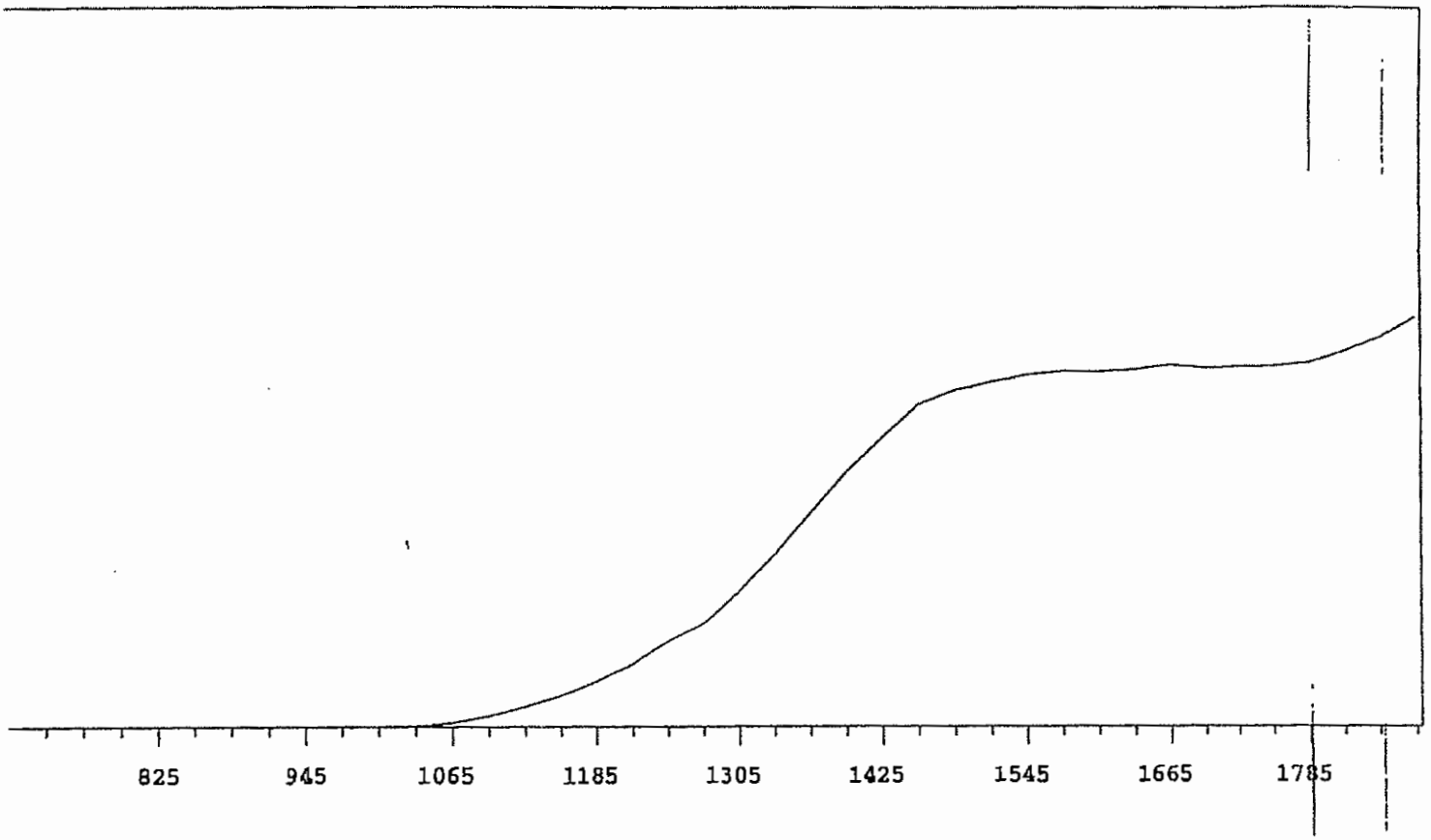



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 9 | >100 |
| 1005 | 96 | >100 |
| 1035 | 468 | >100 |
| 1065 | 1084 | >100 |
| 1095 | 2286 | >100 |
| 1125 | 3479 | >100 |
| 1155 | 4912 | >100 |
| 1185 | 6819 | +98.23 |
| 1215 | 9153 | +89.05 |
| 1245 | 12105 | +83.21 |
| 1275 | 15122 | +75.24 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19482 | +67.45 |
| 1335 | 23344 | +59.35 |
| 1365 | 27793 | +45.86 |
| 1395 | 31916 | +34.29 |
| 1425 | 33979 | +21.61 |
| 1455 | 35993 | +11.71 |
| 1485 | 36530 | +7.04 |
| 1515 | 36796 | +3.11 |
| 1545 | 37393 | +2.44 |
| 1575 | 37279 | +1.41 |
| 1605 | 37650 | +0.49 |
| 1635 | 37458 | +0.91 |
| 1665 | 37579 | +0.12 |
| 1695 | 37828 | +1.10 |
| 1725 | 37535 | +1.72 |
| 1755 | 38104 | +2.18 |
| 1785 | 38416 | +4.12 |
| 1815 | 38633 | +4.92 |
| 1845 | 39649 | |
| 1875 | 40366 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

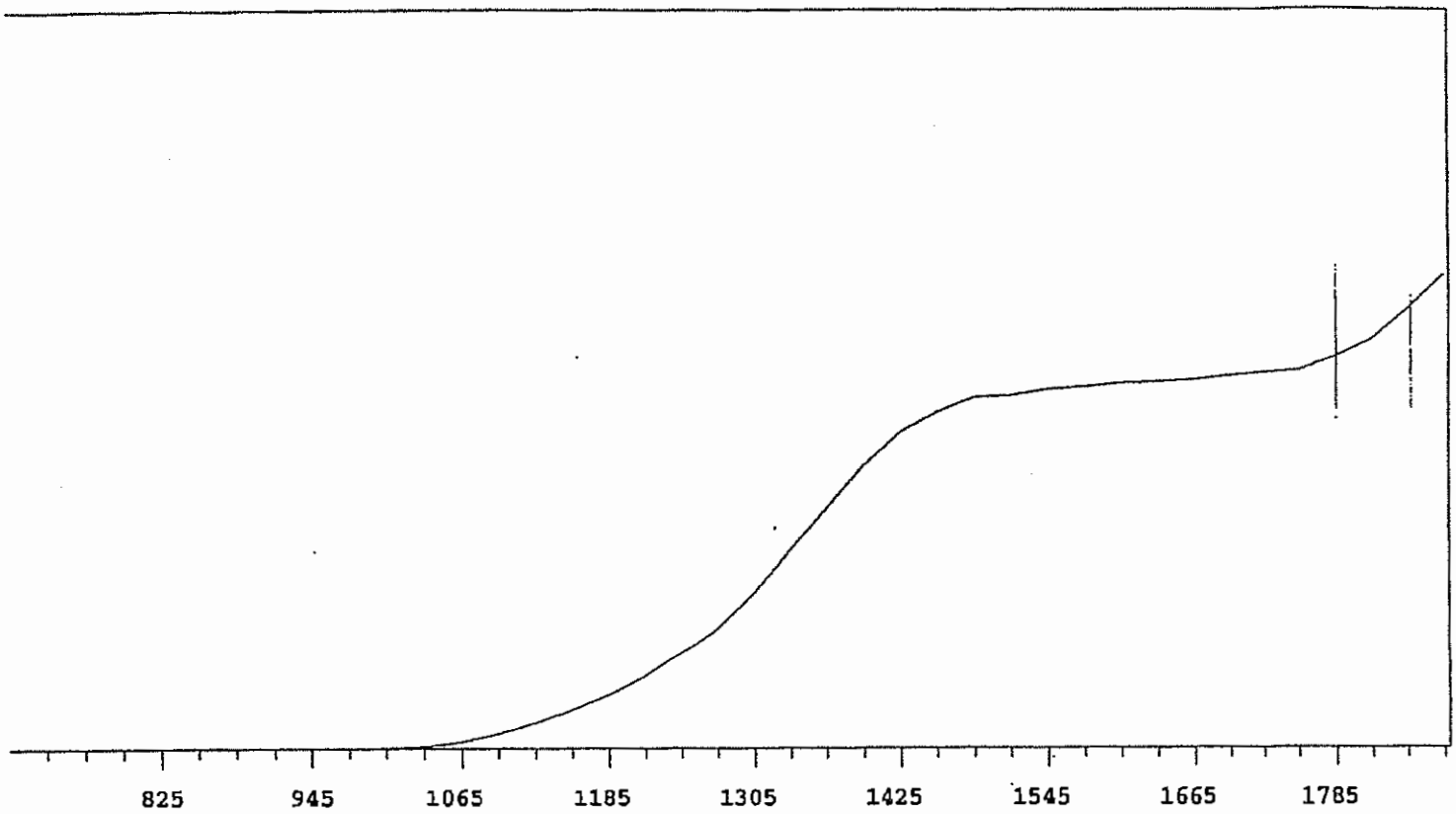



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 0 | >100 |
| 1005 | 20 | >100 |
| 1035 | 122 | >100 |
| 1065 | 511 | >100 |
| 1095 | 1263 | >100 |
| 1125 | 2390 | >100 |
| 1155 | 3641 | >100 |
| 1185 | 5246 | >100 |
| 1215 | 7212 | +98.32 |
| 1245 | 9897 | +89.80 |
| 1275 | 12742 | +82.40 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16337 | +74.91 |
| 1335 | 20471 | +68.07 |
| 1365 | 25012 | +57.86 |
| 1395 | 29694 | +47.48 |
| 1425 | 33409 | +35.17 |
| 1455 | 37013 | +23.27 |
| 1485 | 38629 | +14.35 |
| 1515 | 39529 | +7.69 |
| 1545 | 40284 | +4.34 |
| 1575 | 40711 | +2.52 |
| 1605 | 40642 | +1.97 |
| 1635 | 40879 | +1.11 |
| 1665 | 41405 | +0.98 |
| 1695 | 41011 | +0.30 |
| 1725 | 41182 | +0.41 |
| 1755 | 41178 | +3.28 |
| 1785 | 41573 | +6.47 |
| 1815 | 42858 | +10.82 |
| 1845 | 44440 | |
| 1875 | 46780 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector C  7/1/2009 .

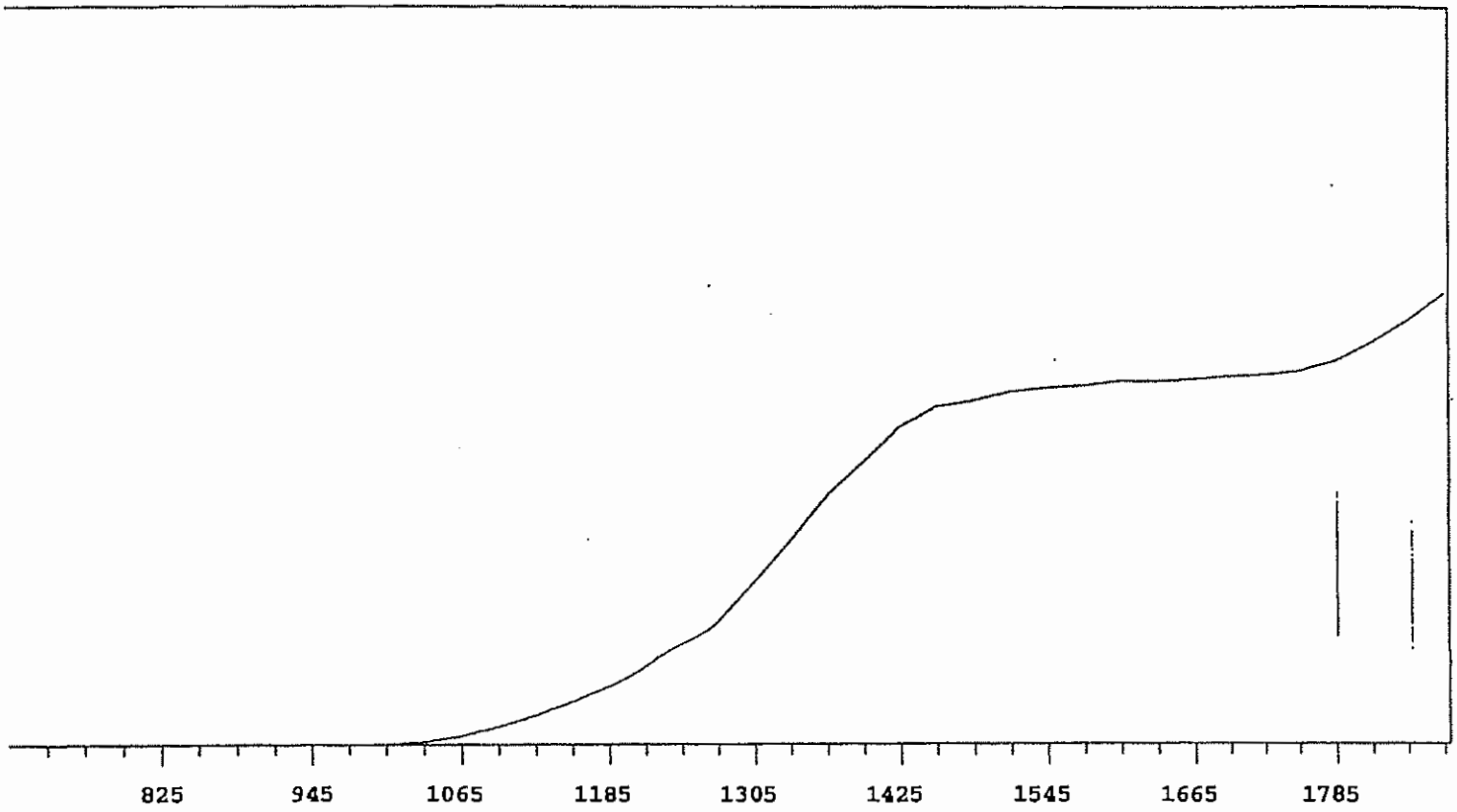
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 46 | >100 |
| 1035 | 202 | >100 |
| 1065 | 697 | >100 |
| 1095 | 1532 | >100 |
| 1125 | 2614 | >100 |
| 1155 | 3953 | >100 |
| 1185 | 5474 | >100 |
| 1215 | 7466 | +93.09 |
| 1245 | 9842 | +86.73 |
| 1275 | 12814 | +80.29 |
| 1305 | 16303 | +72.82 |
| 1335 | 20309 | +64.32 |
| 1365 | 24364 | +53.82 |
| 1395 | 28527 | +40.95 |
| 1425 | 31774 | +28.74 |
| 1455 | 33631 | +16.87 |
| 1485 | 35030 | +9.25 |
| 1515 | 35208 | +5.21 |
| 1545 | 35741 | +3.27 |
| 1575 | 36019 | +2.95 |
| 1605 | 36373 | +2.21 |
| 1635 | 36484 | +2.27 |
| 1665 | 36713 | +2.28 |
| 1695 | 37093 | +2.46 |
| 1725 | 37325 | +4.17 |
| 1755 | 37543 | +7.52 |
| 1785 | 38833 | +13.43 |
| 1815 | 40656 | +19.49 |
| 1845 | 43753 | |
| 1875 | 47246 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

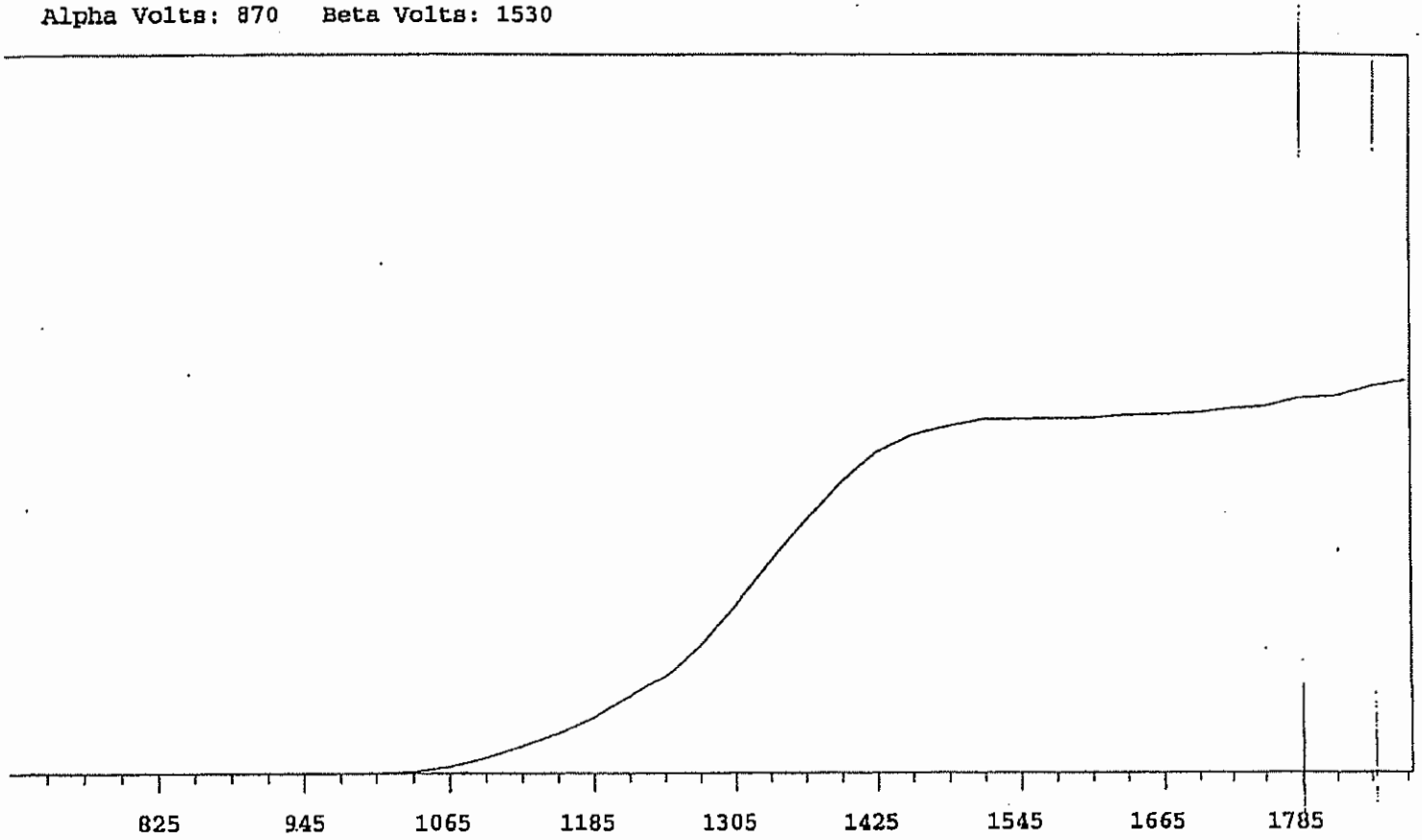



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 5 | >100 |
| 1005 | 47 | >100 |
| 1035 | 243 | >100 |
| 1065 | 792 | >100 |
| 1095 | 1744 | >100 |
| 1125 | 2933 | >100 |
| 1155 | 4123 | >100 |
| 1185 | 5780 | >100 |
| 1215 | 7791 | +91.58 |
| 1245 | 10478 | +84.93 |
| 1275 | 13118 | +77.50 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16889 | +70.18 |
| 1335 | 20600 | +61.29 |
| 1365 | 24824 | +50.40 |
| 1395 | 28208 | +38.85 |
| 1425 | 31539 | +25.79 |
| 1455 | 33391 | +16.06 |
| 1485 | 33991 | +8.60 |
| 1515 | 34782 | +5.01 |
| 1545 | 35201 | +4.10 |
| 1575 | 35380 | +2.50 |
| 1605 | 35849 | +1.87 |
| 1635 | 35784 | +1.79 |
| 1665 | 36000 | +1.43 |
| 1695 | 36269 | +2.10 |
| 1725 | 36381 | +3.46 |
| 1755 | 36733 | +6.86 |
| 1785 | 37669 | +11.78 |
| 1815 | 39465 | +16.64 |
| 1845 | 41803 | |
| 1875 | 44665 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector A  7/1/2009

Alpha Volts: 870  Beta Volts: 1530

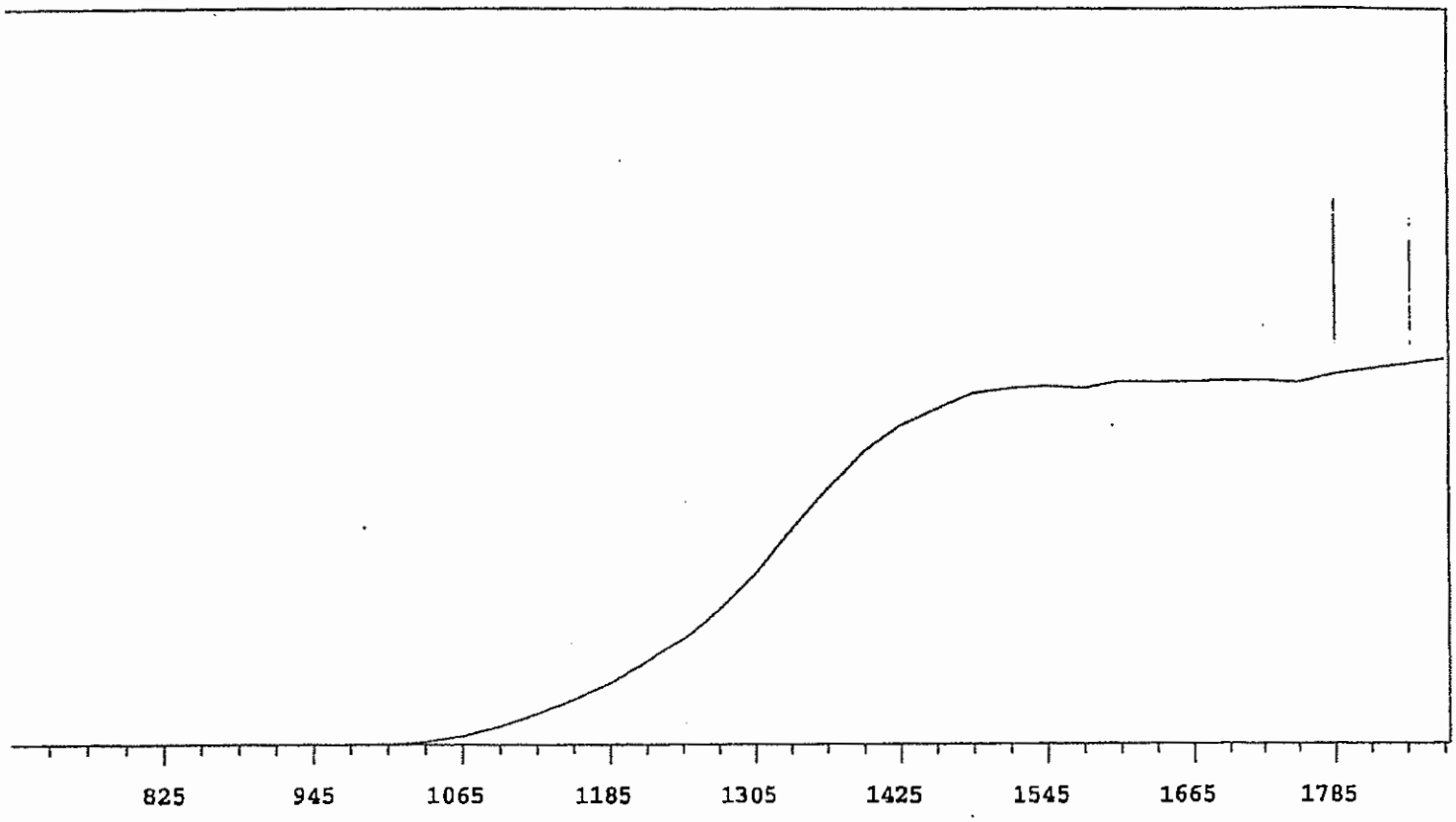



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 2 | >100 |
| 1005 | 33 | >100 |
| 1035 | 203 | >100 |
| 1065 | 668 | >100 |
| 1095 | 1403 | >100 |
| 1125 | 2545 | >100 |
| 1155 | 3800 | >100 |
| 1185 | 5363 | >100 |
| 1215 | 7355 | +95.00 |
| 1245 | 9807 | +87.69 |
| 1275 | 12700 | +80.28 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16226 | +71.71 |
| 1335 | 20083 | +61.95 |
| 1365 | 23913 | +49.99 |
| 1395 | 27526 | +36.97 |
| 1425 | 30193 | +24.54 |
| 1455 | 31747 | +14.71 |
| 1485 | 32544 | +7.71 |
| 1515 | 33198 | +3.66 |
| 1545 | 33188 | +1.51 |
| 1575 | 33227 | +0.73 |
| 1605 | 33278 | +1.04 |
| 1635 | 33518 | +1.38 |
| 1665 | 33565 | +1.95 |
| 1695 | 33774 | +1.99 |
| 1725 | 34135 | +3.30 |
| 1755 | 34244 | +3.67 |
| 1785 | 35022 | +4.84 |
| 1815 | 35229 | +5.93 |
| 1845 | 36179 | |
| 1875 | 36821 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector B  7/1/2009

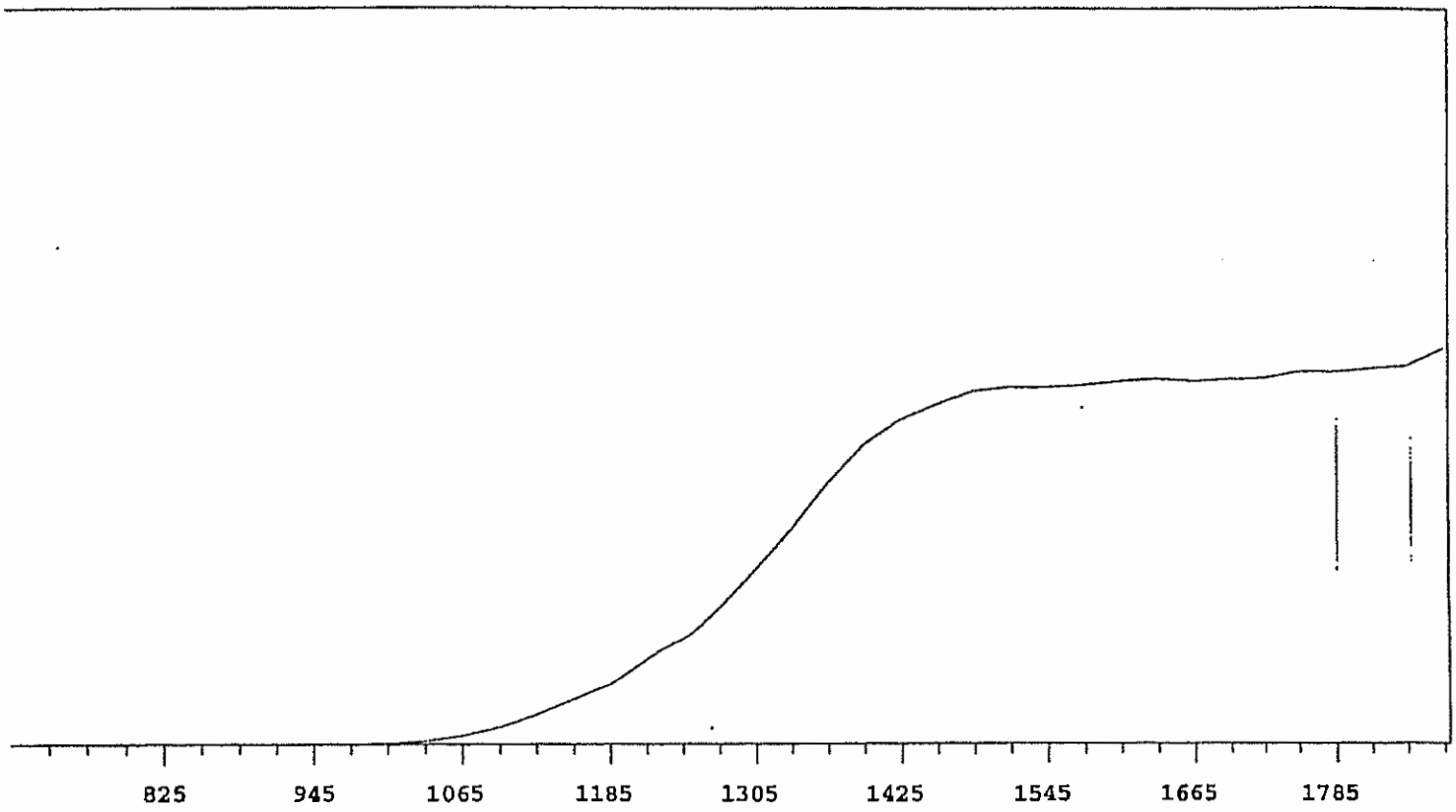
Alpha Volts: 870  Beta Volts: 1530




| VOLTS | COUNTS | %/100 Volts | VOLTS | COUNTS | %/100 Volts |
|---|---|---|---|---|---|
| 705 | 0 | | 1305 | 16723 | +68.78 |
| 735 | 0 | | 1335 | 20749 | +60.55 |
| 765 | 0 | | 1365 | 24686 | +48.78 |
| 795 | 0 | >100 | 1395 | 28343 | +35.24 |
| 825 | 0 | >100 | 1425 | 30657 | +24.31 |
| 855 | 0 | >100 | 1455 | 32208 | +15.22 |
| 885 | 0 | >100 | 1485 | 33662 | +9.32 |
| 915 | 0 | >100 | 1515 | 34098 | +4.47 |
| 945 | 0 | >100 | 1545 | 34326 | +2.17 |
| 975 | 4 | >100 | 1575 | 34133 | +1.60 |
| 1005 | 45 | >100 | 1605 | 34758 | +1.41 |
| 1035 | 300 | >100 | 1635 | 34706 | +1.35 |
| 1065 | 836 | >100 | 1665 | 34769 | +0.30 |
| 1095 | 1742 | >100 | 1695 | 34830 | -0.10 |
| 1125 | 2896 | >100 | 1725 | 34850 | +0.90 |
| 1155 | 4198 | >100 | 1755 | 34613 | +2.41 |
| 1185 | 5849 | >100 | 1785 | 35351 | +3.87 |
| 1215 | 7887 | +92.20 | 1815 | 35849 | +4.97 |
| 1245 | 10561 | +83.55 | 1845 | 36285 | |
| 1275 | 13442 | +76.62 | 1875 | 36814 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector C  7/1/2009

Alpha Volts: 870  Beta Volts: 1530

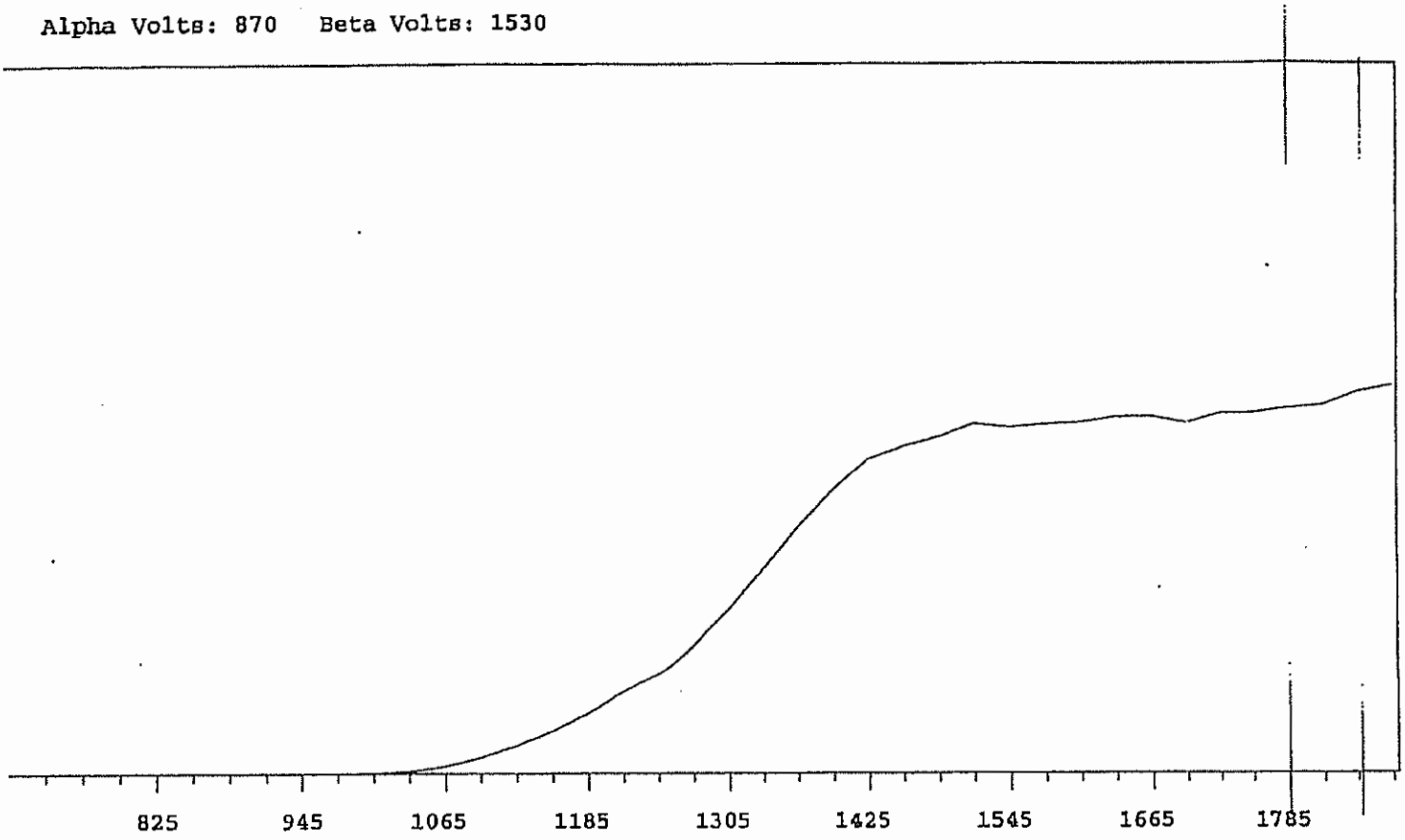



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 3 | >100 |
| 1005 | 64 | >100 |
| 1035 | 349 | >100 |
| 1065 | 970 | >100 |
| 1095 | 1982 | >100 |
| 1125 | 3328 | >100 |
| 1155 | 5012 | >100 |
| 1185 | 6669 | >100 |
| 1215 | 9448 | +92.67 |
| 1245 | 12293 | +86.58 |
| 1275 | 15917 | +76.99 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 20192 | +70.39 |
| 1335 | 24524 | +60.97 |
| 1365 | 29650 | +48.44 |
| 1395 | 33904 | +35.09 |
| 1425 | 36549 | +22.73 |
| 1455 | 38217 | +13.58 |
| 1485 | 39628 | +7.51 |
| 1515 | 40035 | +3.73 |
| 1545 | 40020 | +1.92 |
| 1575 | 40236 | +2.06 |
| 1605 | 40680 | +1.62 |
| 1635 | 40953 | +1.03 |
| 1665 | 40643 | +0.43 |
| 1695 | 40882 | +1.41 |
| 1725 | 40979 | +2.18 |
| 1755 | 41654 | +2.20 |
| 1785 | 41602 | +2.27 |
| 1815 | 41935 | +4.50 |
| 1845 | 42259 | |
| 1875 | 44183 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector D  7/1/2009

Alpha Volts: 870  Beta Volts: 1530

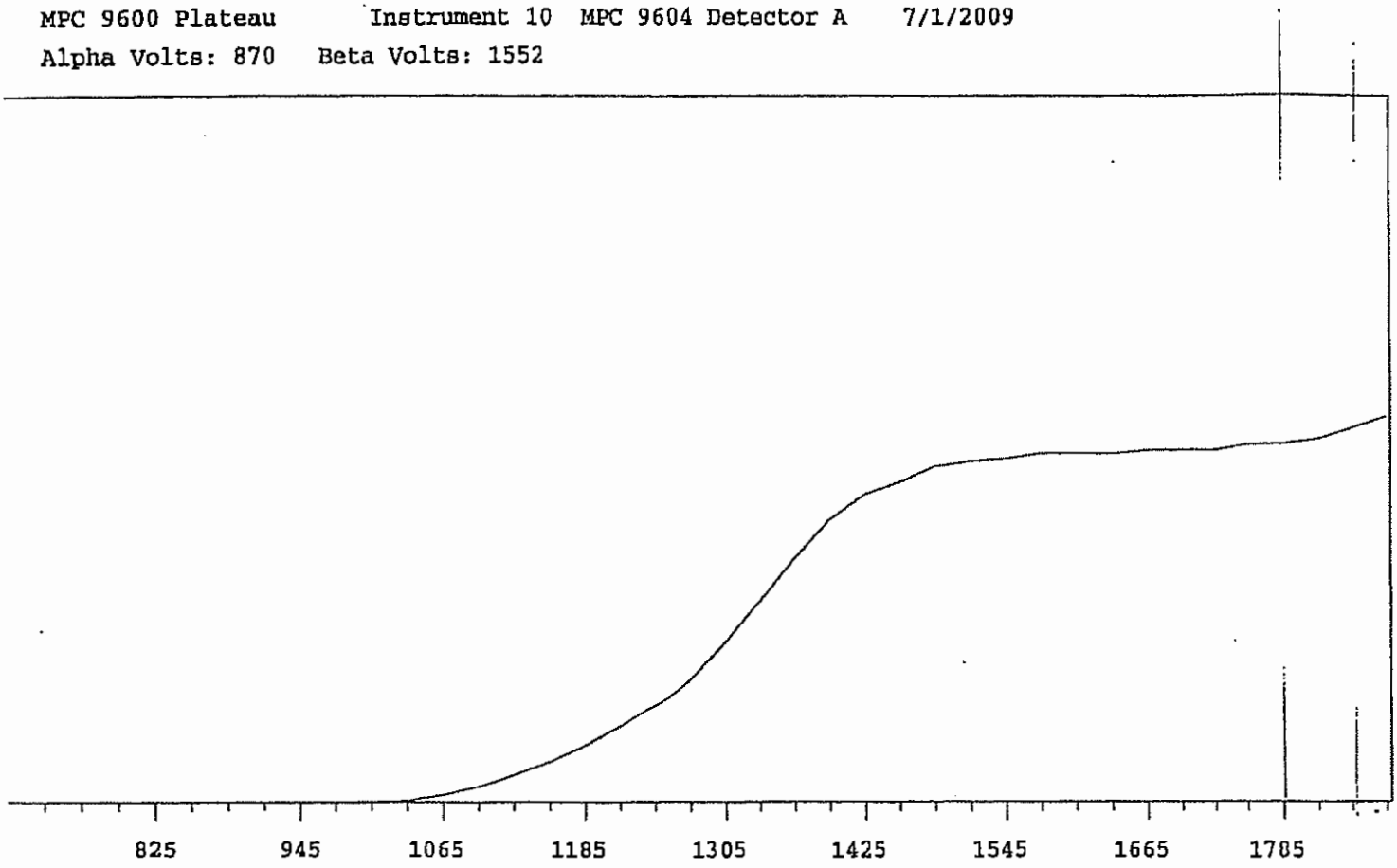



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 5 | >100 |
| 1005 | 35 | >100 |
| 1035 | 186 | >100 |
| 1065 | 618 | >100 |
| 1095 | 1280 | >100 |
| 1125 | 2141 | >100 |
| 1155 | 3268 | >100 |
| 1185 | 4659 | >100 |
| 1215 | 6343 | +90.68 |
| 1245 | 8064 | +83.46 |
| 1275 | 10497 | +77.03 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13319 | +70.94 |
| 1335 | 16319 | +61.35 |
| 1365 | 19577 | +50.27 |
| 1395 | 22498 | +36.85 |
| 1425 | 24782 | +23.90 |
| 1455 | 25761 | +15.37 |
| 1485 | 26486 | +8.38 |
| 1515 | 27503 | +5.11 |
| 1545 | 27223 | +2.67 |
| 1575 | 27453 | +1.71 |
| 1605 | 27604 | +2.70 |
| 1635 | 28021 | +0.78 |
| 1665 | 28059 | +1.05 |
| 1695 | 27548 | +0.90 |
| 1725 | 28280 | +2.16 |
| 1755 | 28290 | +3.51 |
| 1785 | 28600 | +4.46 |
| 1815 | 28879 | +6.35 |
| 1845 | 29913 | |
| 1875 | 30417 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector A  7/1/2009

Alpha Volts: 870  Beta Volts: 1552

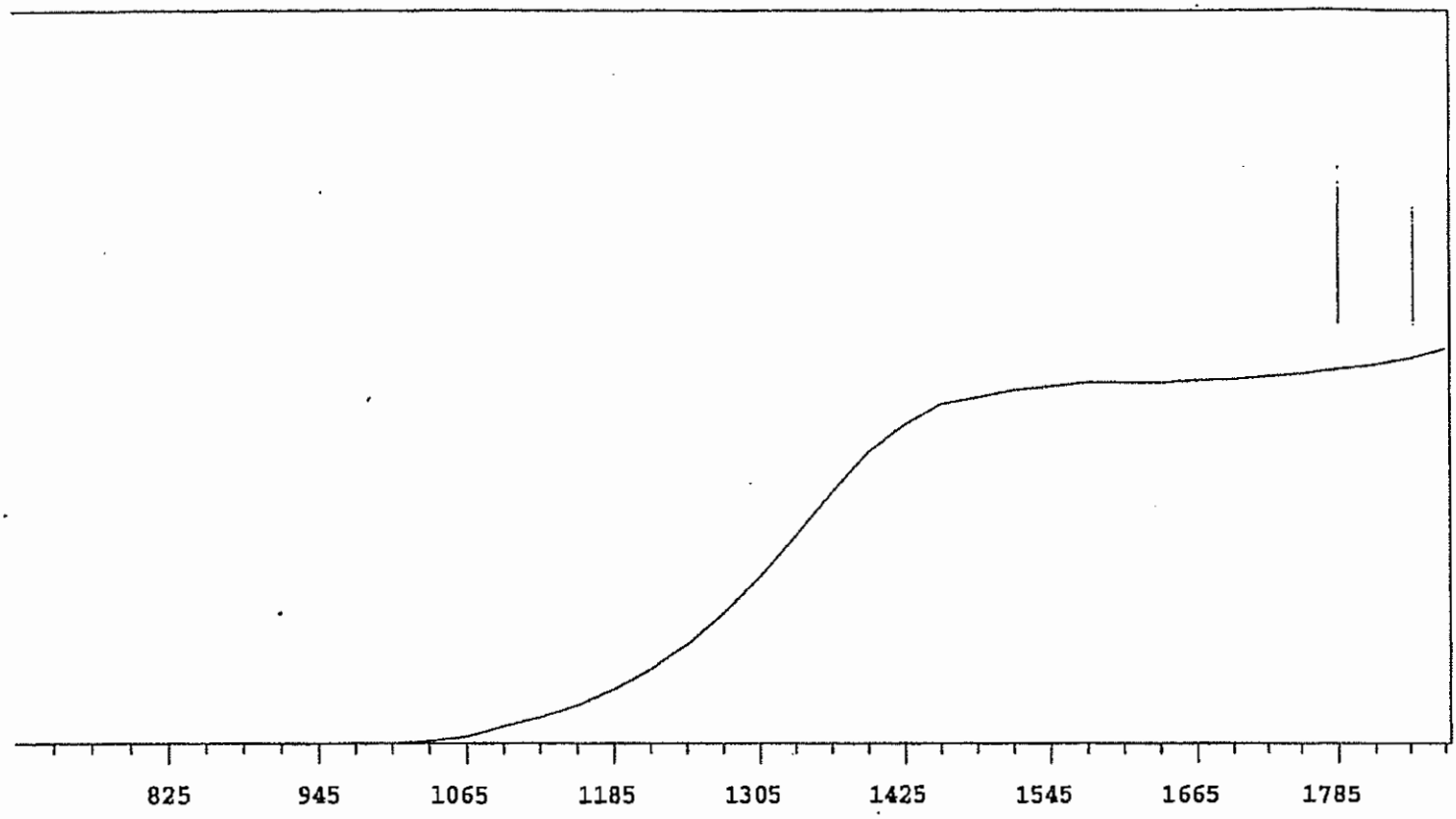



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 37 | >100 |
| 1035 | 198 | >100 |
| 1065 | 687 | >100 |
| 1095 | 1491 | >100 |
| 1125 | 2580 | >100 |
| 1155 | 3920 | >100 |
| 1185 | 5588 | >100 |
| 1215 | 7384 | +91.32 |
| 1245 | 9794 | +84.81 |
| 1275 | 12572 | +79.73 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16076 | +72.76 |
| 1335 | 19985 | +63.85 |
| 1365 | 24102 | +50.95 |
| 1395 | 27819 | +36.01 |
| 1425 | 30228 | +23.86 |
| 1455 | 31343 | +14.40 |
| 1485 | 32811 | +8.77 |
| 1515 | 33243 | +6.10 |
| 1545 | 33518 | +3.25 |
| 1575 | 34010 | +1.98 |
| 1605 | 34061 | +1.59 |
| 1635 | 33973 | +0.97 |
| 1665 | 34346 | +0.93 |
| 1695 | 34366 | +1.72 |
| 1725 | 34341 | +1.54 |
| 1755 | 34860 | +2.47 |
| 1785 | 34897 | +4.50 |
| 1815 | 35377 | +6.60 |
| 1845 | 36458 | |
| 1875 | 37630 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector B  7/1/2009

Alpha Volts: 870  Beta Volts: 1552

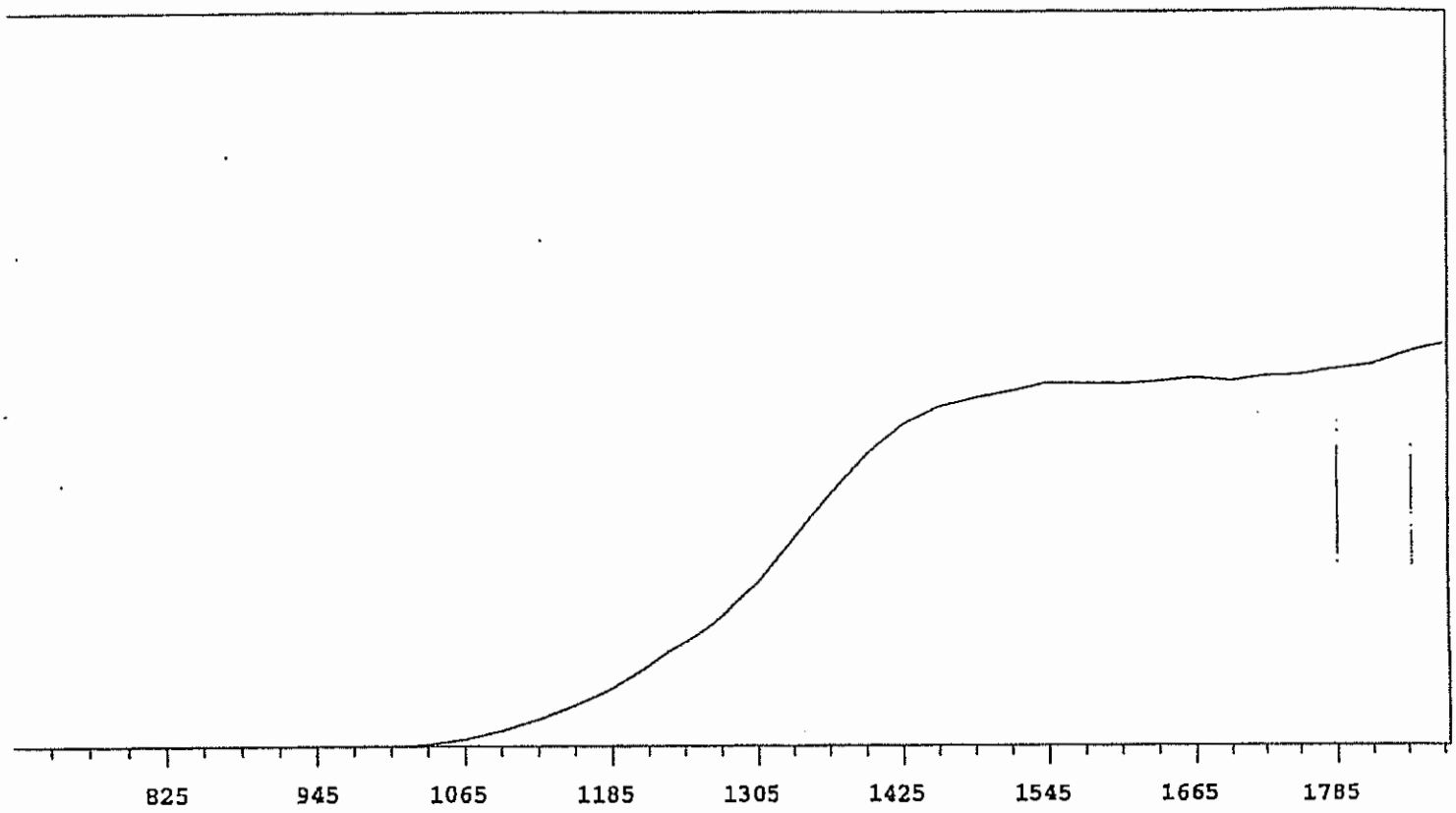



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 7 | >100 |
| 1005 | 28 | >100 |
| 1035 | 190 | >100 |
| 1065 | 597 | >100 |
| 1095 | 1474 | >100 |
| 1125 | 2383 | >100 |
| 1155 | 3680 | >100 |
| 1185 | 5131 | >100 |
| 1215 | 6808 | +89.95 |
| 1245 | 8990 | +83.03 |
| 1275 | 11493 | +77.30 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14469 | +71.08 |
| 1335 | 17904 | +63.07 |
| 1365 | 21677 | +51.20 |
| 1395 | 25027 | +38.06 |
| 1425 | 27237 | +24.55 |
| 1455 | 28914 | +14.61 |
| 1485 | 29480 | +8.48 |
| 1515 | 30075 | +5.06 |
| 1545 | 30374 | +3.42 |
| 1575 | 30738 | +1.68 |
| 1605 | 30703 | +1.08 |
| 1635 | 30679 | +0.77 |
| 1665 | 30902 | +1.46 |
| 1695 | 30992 | +1.89 |
| 1725 | 31224 | +2.40 |
| 1755 | 31397 | +3.27 |
| 1785 | 31826 | +4.13 |
| 1815 | 32236 | +5.59 |
| 1845 | 32782 | |
| 1875 | 33632 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector C  7/1/2009

Alpha Volts: 870  Beta Volts: 1552

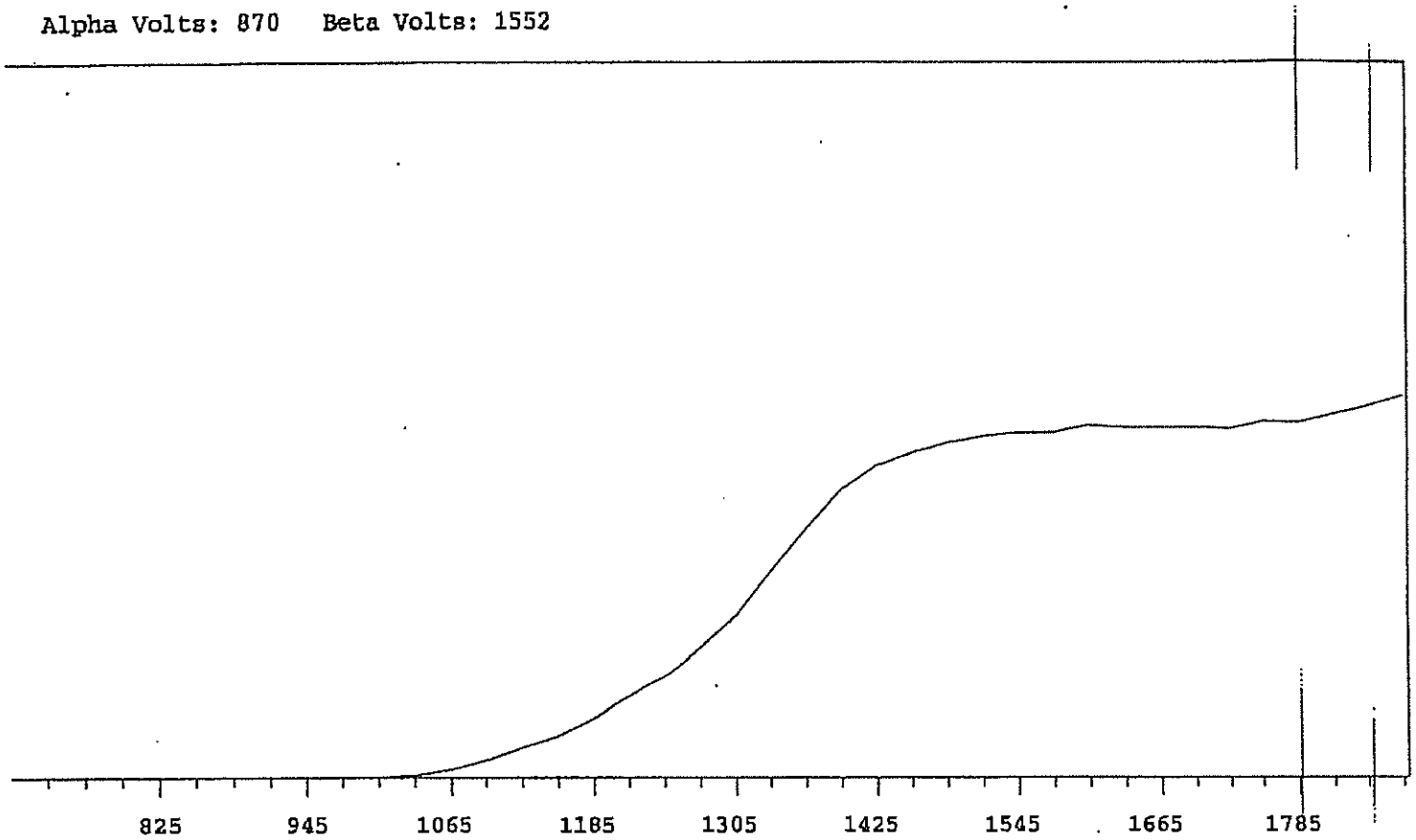



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 2 | >100 |
| 1005 | 36 | >100 |
| 1035 | 220 | >100 |
| 1065 | 780 | >100 |
| 1095 | 1712 | >100 |
| 1125 | 2926 | >100 |
| 1155 | 4297 | >100 |
| 1185 | 6097 | >100 |
| 1215 | 8397 | +95.11 |
| 1245 | 11155 | +85.84 |
| 1275 | 14430 | +78.79 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18051 | +71.16 |
| 1335 | 22586 | +62.34 |
| 1365 | 26973 | +51.47 |
| 1395 | 31137 | +38.24 |
| 1425 | 34321 | +25.70 |
| 1455 | 36267 | +15.37 |
| 1485 | 37197 | +9.21 |
| 1515 | 37851 | +5.38 |
| 1545 | 38622 | +3.00 |
| 1575 | 38600 | +1.55 |
| 1605 | 38538 | +1.03 |
| 1635 | 38786 | +0.91 |
| 1665 | 39129 | +1.38 |
| 1695 | 38832 | +1.20 |
| 1725 | 39323 | +2.00 |
| 1755 | 39390 | +3.35 |
| 1785 | 40031 | +4.86 |
| 1815 | 40466 | +6.64 |
| 1845 | 41713 | |
| 1875 | 42620 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector D  7/1/2009

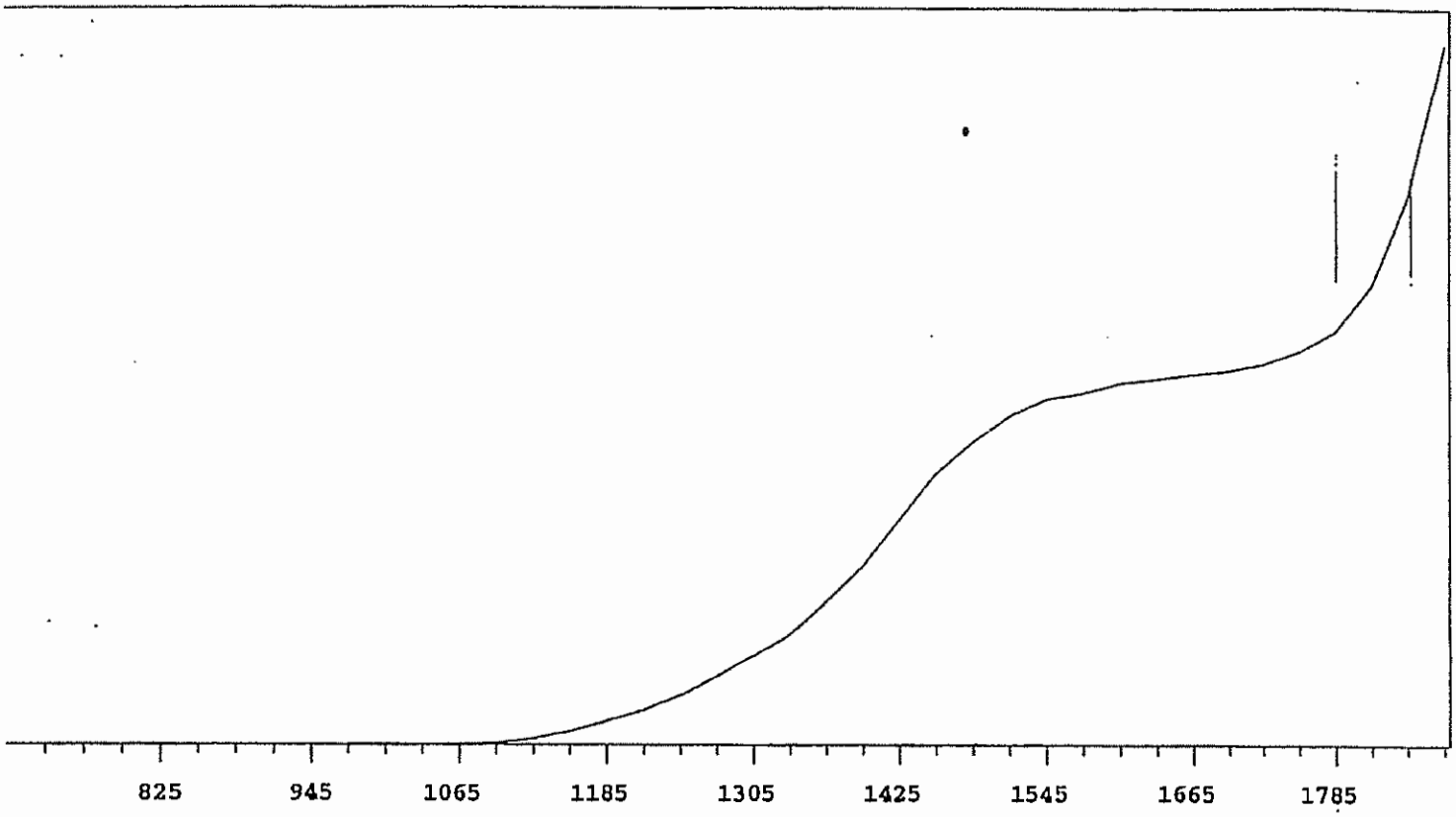
Alpha Volts: 870  Beta Volts: 1552




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 3 | >100 |
| 1005 | 49 | >100 |
| 1035 | 244 | >100 |
| 1065 | 764 | >100 |
| 1095 | 1584 | >100 |
| 1125 | 2677 | >100 |
| 1155 | 3763 | >100 |
| 1185 | 5395 | >100 |
| 1215 | 7350 | +93.71 |
| 1245 | 9655 | +83.52 |
| 1275 | 12504 | +76.82 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15430 | +69.87 |
| 1335 | 19258 | +61.49 |
| 1365 | 23018 | +50.06 |
| 1395 | 26562 | +35.34 |
| 1425 | 28750 | +22.67 |
| 1455 | 29911 | +13.20 |
| 1485 | 30798 | +8.01 |
| 1515 | 31375 | +4.83 |
| 1545 | 31684 | +3.74 |
| 1575 | 31721 | +2.38 |
| 1605 | 32398 | +1.44 |
| 1635 | 32154 | +0.64 |
| 1665 | 32157 | -0.77 |
| 1695 | 32152 | +0.99 |
| 1725 | 32029 | +1.41 |
| 1755 | 32699 | +3.00 |
| 1785 | 32566 | +4.71 |
| 1815 | 33351 | +5.92 |
| 1845 | 34031 | |
| 1875 | 34941 | |

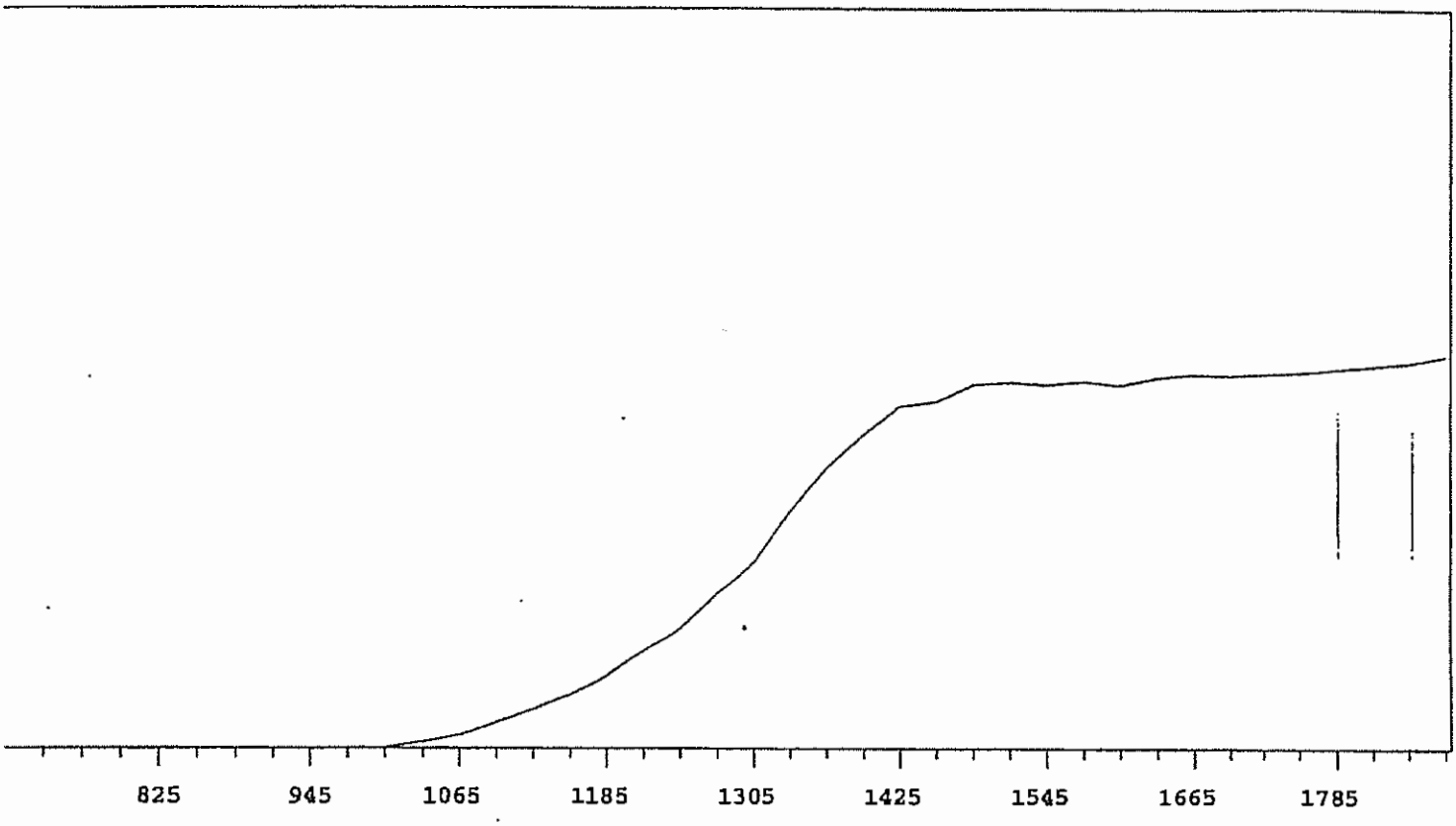
Plateau 7/1/09 Instrument 11 MPC 9604 Detector A 7/1/2009
Alpha Volts: 1515 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | +0.00 |
| 975 | 0 | >100 |
| 1005 | 0 | >100 |
| 1035 | 2 | >100 |
| 1065 | 9 | >100 |
| 1095 | 61 | >100 |
| 1125 | 248 | >100 |
| 1155 | 528 | >100 |
| 1185 | 882 | >100 |
| 1215 | 1270 | >100 |
| 1245 | 1786 | >100 |
| 1275 | 2478 | +93.67 |
| 1305 | 3225 | +87.64 |
| 1335 | 4189 | +80.15 |
| 1365 | 5428 | +75.12 |
| 1395 | 6662 | +68.60 |
| 1425 | 8241 | +58.14 |
| 1455 | 9857 | +46.65 |
| 1485 | 11018 | +33.24 |
| 1515 | 11953 | +21.01 |
| 1545 | 12538 | +13.57 |
| 1575 | 12760 | +8.35 |
| 1605 | 13114 | +5.84 |
| 1635 | 13258 | +4.78 |
| 1665 | 13430 | +3.99 |
| 1695 | 13551 | +5.46 |
| 1725 | 13771 | +8.65 |
| 1755 | 14204 | +16.44 |
| 1785 | 14916 | +30.03 |
| 1815 | 16579 | +48.74 |
| 1845 | 19717 | |
| 1875 | 25029 | |

Plateau 7/1/09 Instrument 11 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

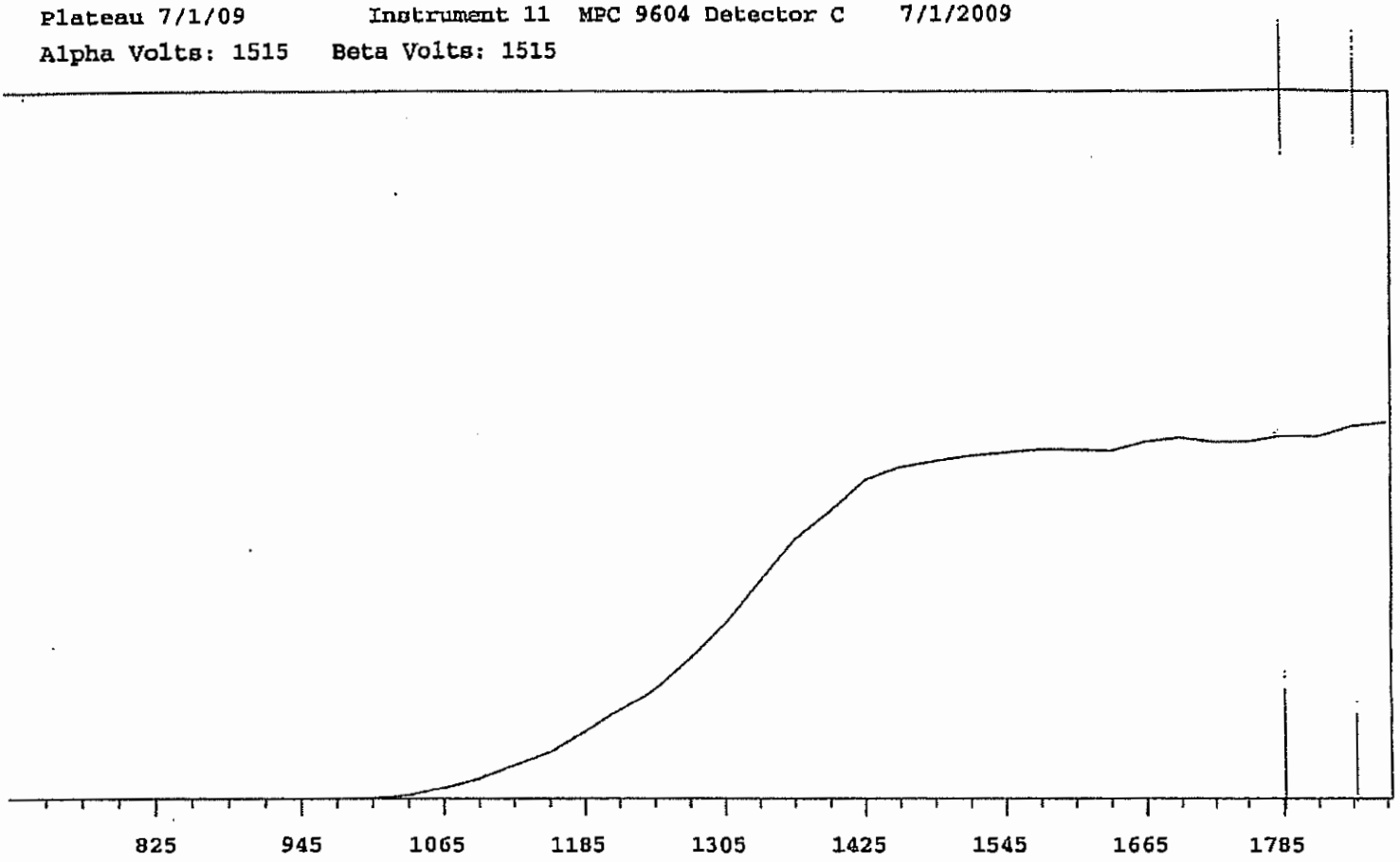



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 11 | >100 |
| 1005 | 47 | >100 |
| 1035 | 280 | >100 |
| 1065 | 610 | >100 |
| 1095 | 1192 | >100 |
| 1125 | 1789 | >100 |
| 1155 | 2466 | >100 |
| 1185 | 3337 | +94.91 |
| 1215 | 4526 | +88.85 |
| 1245 | 5885 | +78.40 |
| 1275 | 7518 | +72.09 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8947 | +65.63 |
| 1335 | 11238 | +56.58 |
| 1365 | 13246 | +46.66 |
| 1395 | 14838 | +30.69 |
| 1425 | 16166 | +20.11 |
| 1455 | 16396 | +11.95 |
| 1485 | 17161 | +5.61 |
| 1515 | 17274 | +3.59 |
| 1545 | 17144 | -0.00 |
| 1575 | 17323 | +0.80 |
| 1605 | 17136 | +2.21 |
| 1635 | 17484 | +1.94 |
| 1665 | 17638 | +2.16 |
| 1695 | 17580 | +0.85 |
| 1725 | 17655 | +1.05 |
| 1755 | 17700 | +1.98 |
| 1785 | 17857 | +2.38 |
| 1815 | 18006 | +3.36 |
| 1845 | 18140 | |
| 1875 | 18468 | |

Plateau 7/1/09 Instrument 11 MPC 9604 Detector C 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

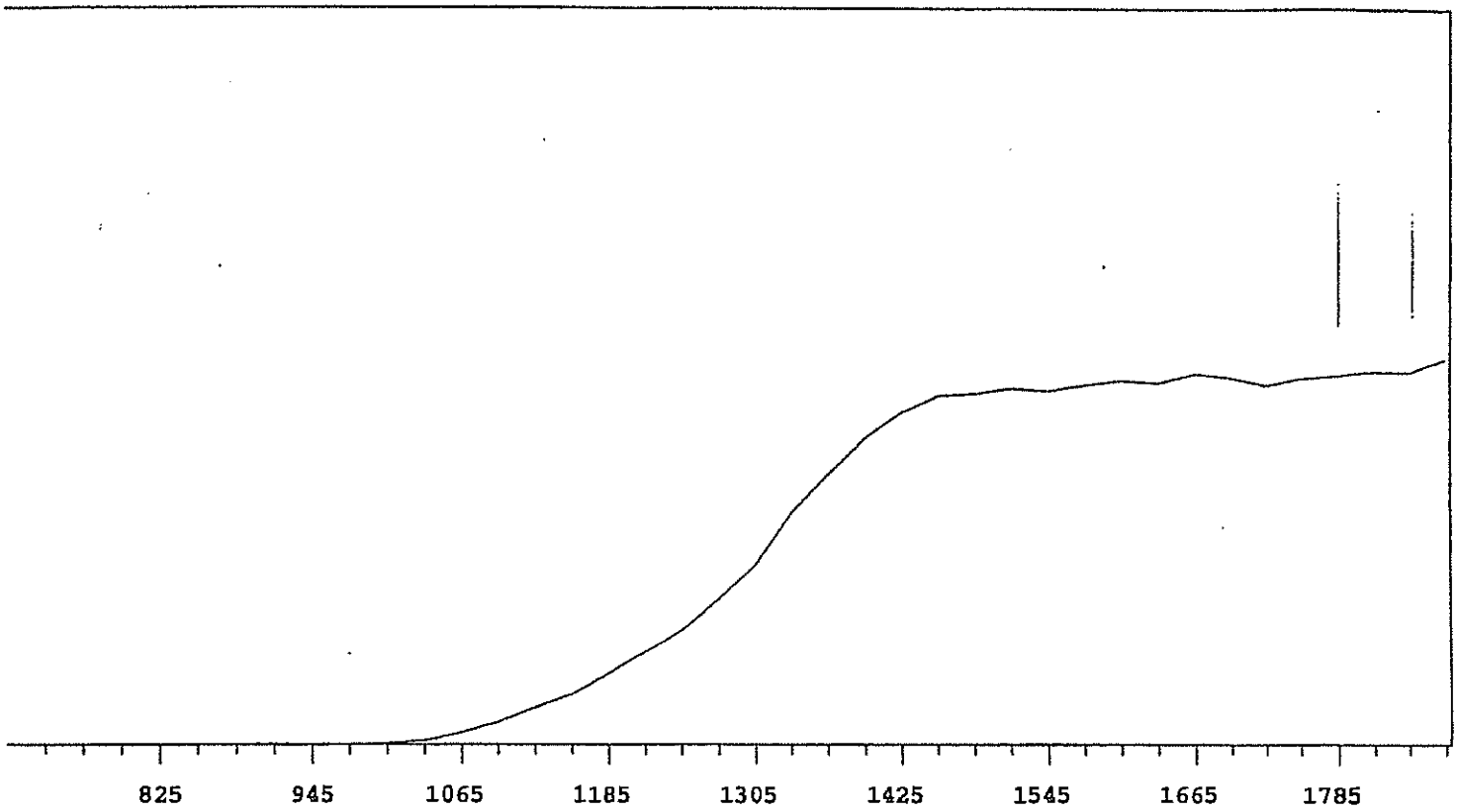



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +0.00 |
| 795 | 0 | >100 |
| 825 | 1 | +0.00 |
| 855 | 0 | >100 |
| 885 | 0 | +0.00 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 7 | >100 |
| 1005 | 46 | >100 |
| 1035 | 191 | >100 |
| 1065 | 540 | >100 |
| 1095 | 957 | >100 |
| 1125 | 1597 | >100 |
| 1155 | 2217 | >100 |
| 1185 | 3154 | +98.74 |
| 1215 | 4239 | +89.75 |
| 1245 | 5550 | +79.98 |
| 1275 | 6980 | +73.12 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8636 | +66.44 |
| 1335 | 10593 | +56.56 |
| 1365 | 12582 | +46.23 |
| 1395 | 13957 | +33.45 |
| 1425 | 15443 | +21.49 |
| 1455 | 16048 | +13.14 |
| 1485 | 16331 | +6.45 |
| 1515 | 16603 | +4.19 |
| 1545 | 16736 | +2.73 |
| 1575 | 16884 | +1.11 |
| 1605 | 16875 | +1.91 |
| 1635 | 16813 | +2.86 |
| 1665 | 17257 | +2.60 |
| 1695 | 17425 | +1.58 |
| 1725 | 17238 | +0.49 |
| 1755 | 17230 | +0.63 |
| 1785 | 17482 | +3.27 |
| 1815 | 17468 | +4.46 |
| 1845 | 17977 | |
| 1875 | 18163 | |

Plateau 7/1/09 Instrument 11 MPC 9604 Detector D 7/1/2009

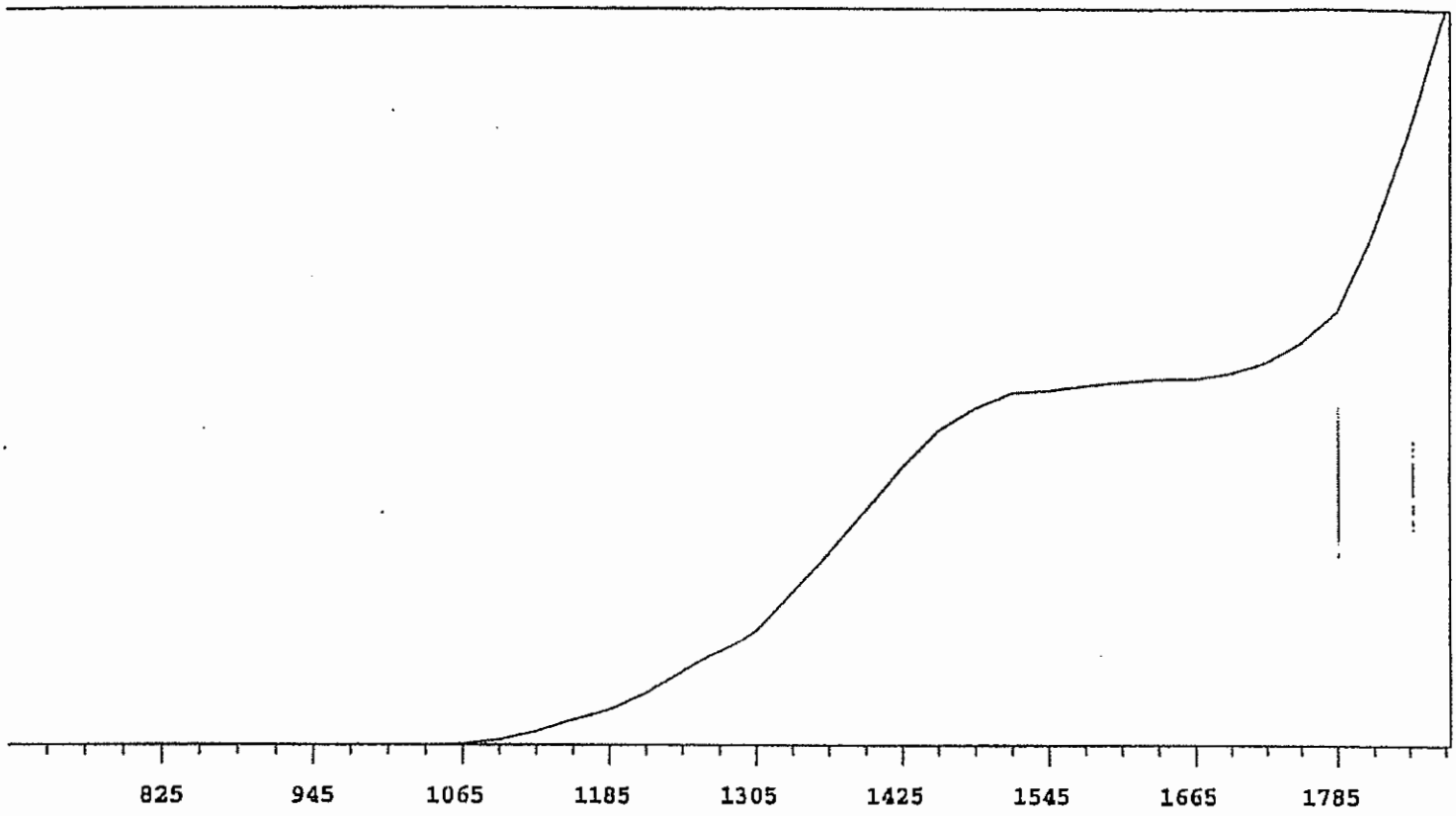
Alpha Volts: 1515 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts | VOLTS | COUNTS | %/100 Volts |
|---|---|---|---|---|---|
| 705 | 0 | | 1305 | 7679 | +65.97 |
| 735 | 0 | | 1335 | 9737 | +57.57 |
| 765 | 0 | | 1365 | 11301 | +45.87 |
| 795 | 0 | >100 | 1395 | 12767 | +31.71 |
| 825 | 0 | >100 | 1425 | 13767 | +19.90 |
| 855 | 1 | +83.33 | 1455 | 14399 | +10.72 |
| 885 | 1 | +55.56 | 1485 | 14467 | +4.38 |
| 915 | 0 | >100 | 1515 | 14671 | +2.12 |
| 945 | 1 | >100 | 1545 | 14576 | +2.61 |
| 975 | 9 | >100 | 1575 | 14808 | +1.80 |
| 1005 | 60 | >100 | 1605 | 14974 | +3.15 |
| 1035 | 173 | >100 | 1635 | 14872 | +1.76 |
| 1065 | 480 | >100 | 1665 | 15248 | -0.41 |
| 1095 | 911 | >100 | 1695 | 15067 | -0.27 |
| 1125 | 1508 | >100 | 1725 | 14784 | -0.43 |
| 1155 | 2024 | >100 | 1755 | 15044 | +2.01 |
| 1185 | 2872 | +97.38 | 1785 | 15163 | +2.82 |
| 1215 | 3858 | +89.30 | 1815 | 15333 | +3.61 |
| 1245 | 5070 | +78.02 | 1845 | 15278 | |
| 1275 | 6322 | +73.30 | 1875 | 15817 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector A 7/1/2009

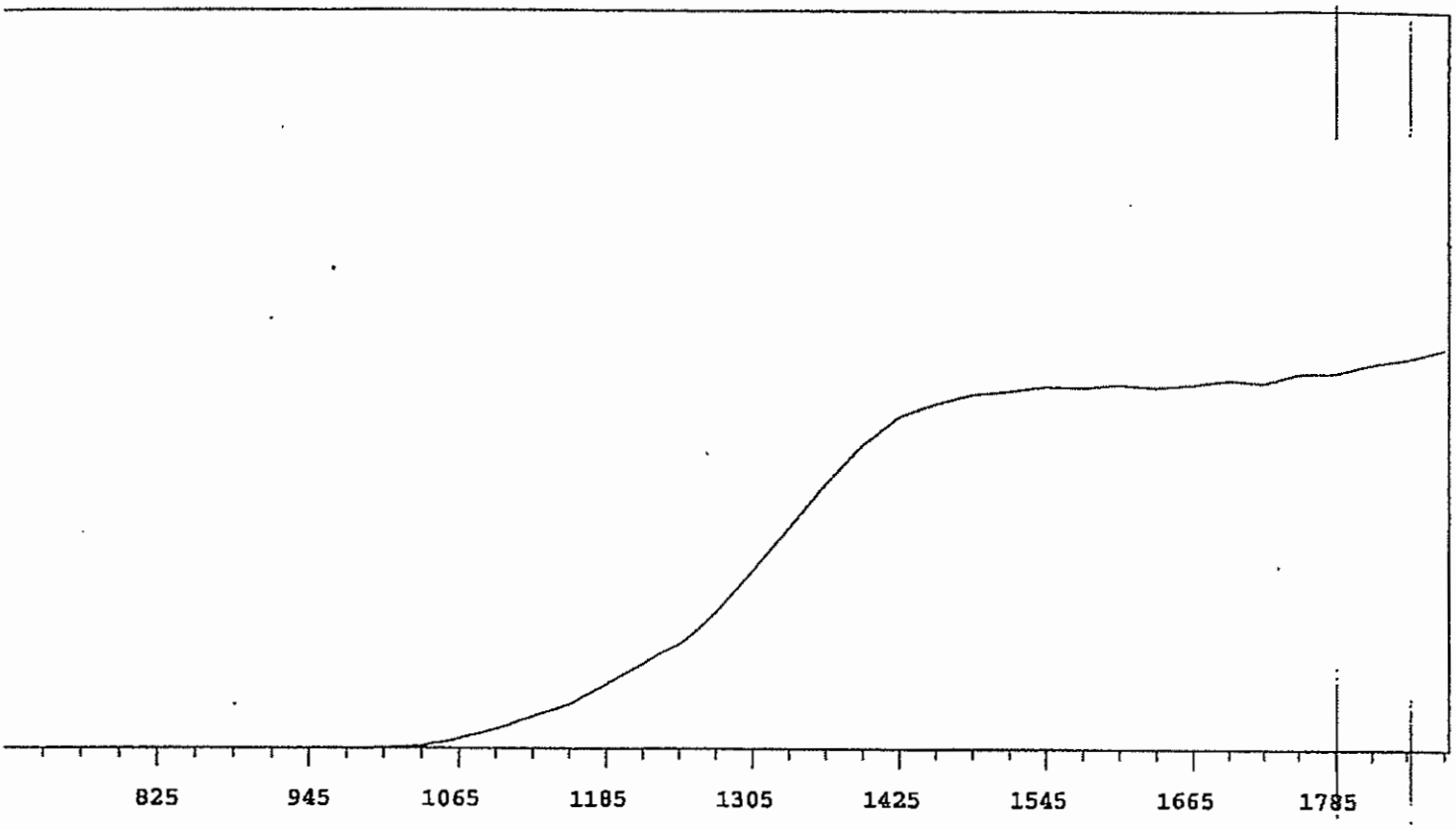
Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 3 | >100 |
| 1035 | 17 | >100 |
| 1065 | 84 | >100 |
| 1095 | 267 | >100 |
| 1125 | 709 | >100 |
| 1155 | 1299 | >100 |
| 1185 | 1813 | >100 |
| 1215 | 2638 | >100 |
| 1245 | 3777 | +96.47 |
| 1275 | 4915 | +87.98 |
| 1305 | 6302 | +80.03 |
| 1335 | 8191 | +73.78 |
| 1365 | 10140 | +66.18 |
| 1395 | 12247 | +55.83 |
| 1425 | 14468 | +43.92 |
| 1455 | 16303 | +31.28 |
| 1485 | 17411 | +18.64 |
| 1515 | 18150 | +9.87 |
| 1545 | 18275 | +5.30 |
| 1575 | 18496 | +3.16 |
| 1605 | 18685 | +2.66 |
| 1635 | 18820 | +2.63 |
| 1665 | 18855 | +4.16 |
| 1695 | 19152 | +7.70 |
| 1725 | 19706 | +13.90 |
| 1755 | 20640 | +26.51 |
| 1785 | 22308 | +40.92 |
| 1815 | 26460 | +51.46 |
| 1845 | 31616 | |
| 1875 | 37348 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

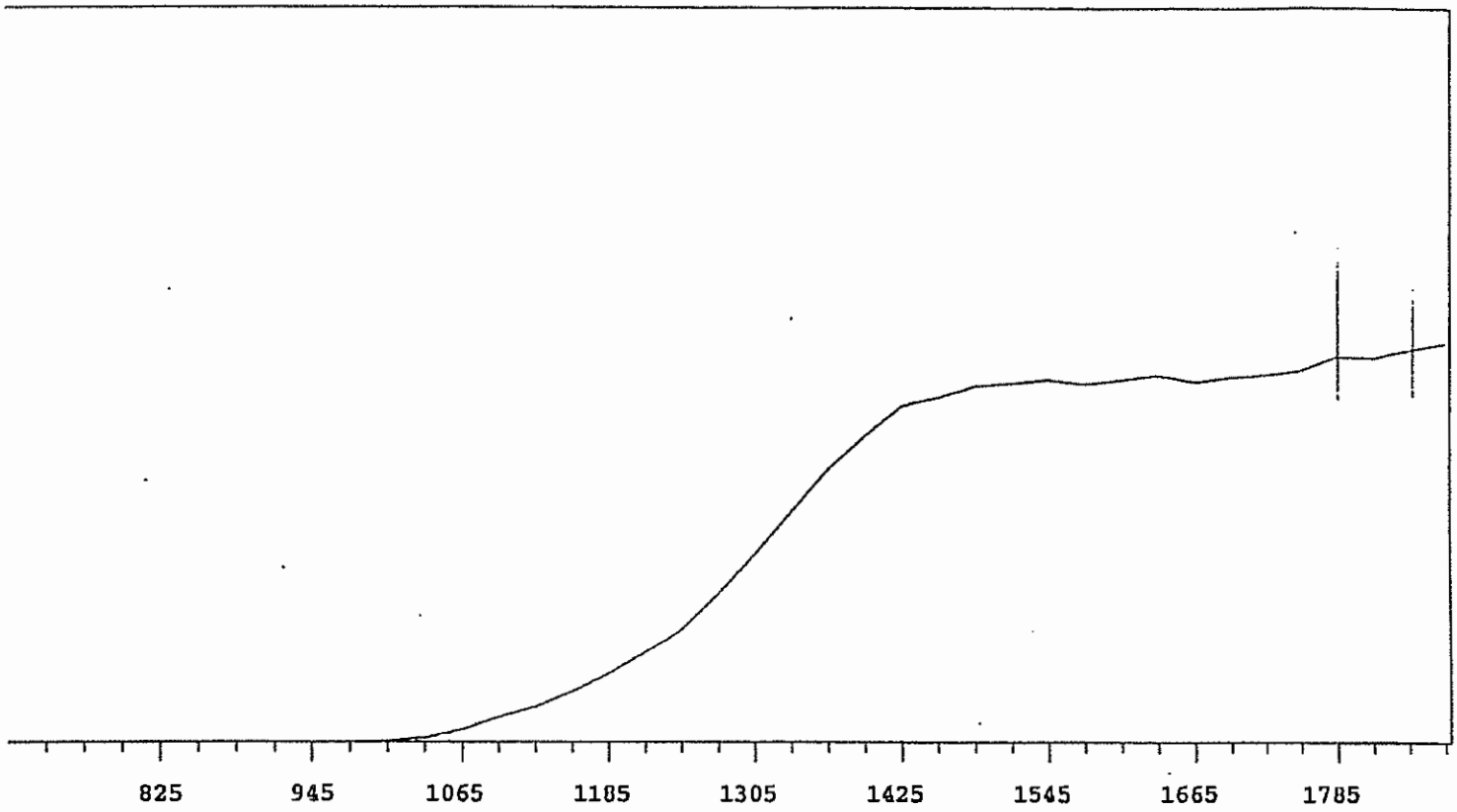



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 1 | +83.33 |
| 885 | 1 | -83.33 |
| 915 | 0 | -55.56 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 43 | >100 |
| 1035 | 165 | >100 |
| 1065 | 557 | >100 |
| 1095 | 1055 | >100 |
| 1125 | 1775 | >100 |
| 1155 | 2470 | >100 |
| 1185 | 3617 | +98.46 |
| 1215 | 4757 | +90.95 |
| 1245 | 6186 | +83.59 |
| 1275 | 8021 | +77.85 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 10207 | +70.42 |
| 1335 | 12473 | +60.75 |
| 1365 | 14900 | +48.87 |
| 1395 | 17101 | +35.36 |
| 1425 | 18643 | +22.53 |
| 1455 | 19350 | +12.34 |
| 1485 | 19848 | +6.68 |
| 1515 | 20014 | +3.51 |
| 1545 | 20278 | +2.03 |
| 1575 | 20186 | +0.80 |
| 1605 | 20375 | +0.32 |
| 1635 | 20209 | +1.36 |
| 1665 | 20364 | +0.83 |
| 1695 | 20607 | +2.43 |
| 1725 | 20429 | +2.51 |
| 1755 | 20924 | +3.64 |
| 1785 | 20984 | +5.11 |
| 1815 | 21470 | +5.63 |
| 1845 | 21773 | |
| 1875 | 22346 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

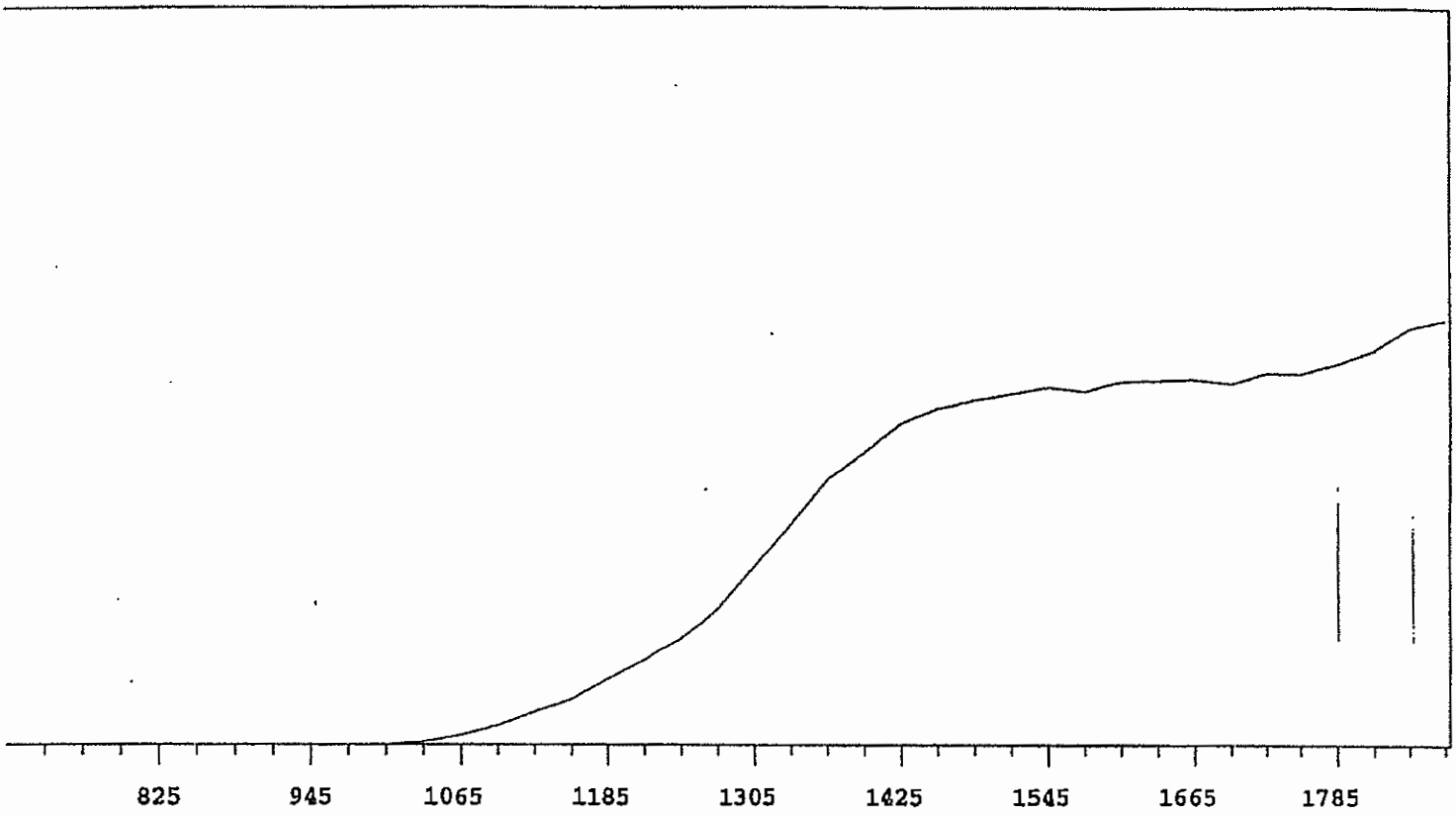



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 7 | >100 |
| 1005 | 52 | >100 |
| 1035 | 214 | >100 |
| 1065 | 590 | >100 |
| 1095 | 1201 | >100 |
| 1125 | 1759 | >100 |
| 1155 | 2569 | >100 |
| 1185 | 3440 | +95.13 |
| 1215 | 4583 | +87.74 |
| 1245 | 5985 | +81.67 |
| 1275 | 7682 | +74.54 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 9543 | +67.01 |
| 1335 | 11617 | +56.47 |
| 1365 | 13791 | +45.47 |
| 1395 | 15387 | +31.66 |
| 1425 | 16819 | +20.02 |
| 1455 | 17210 | +11.63 |
| 1485 | 17742 | +6.05 |
| 1515 | 17892 | +3.04 |
| 1545 | 18070 | +1.09 |
| 1575 | 17856 | +1.43 |
| 1605 | 18054 | +0.42 |
| 1635 | 18287 | +1.06 |
| 1665 | 17969 | +0.78 |
| 1695 | 18187 | +1.48 |
| 1725 | 18317 | +4.89 |
| 1755 | 18518 | +4.76 |
| 1785 | 19156 | +5.18 |
| 1815 | 19100 | +5.18 |
| 1845 | 19496 | |
| 1875 | 19842 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector D 7/1/2009

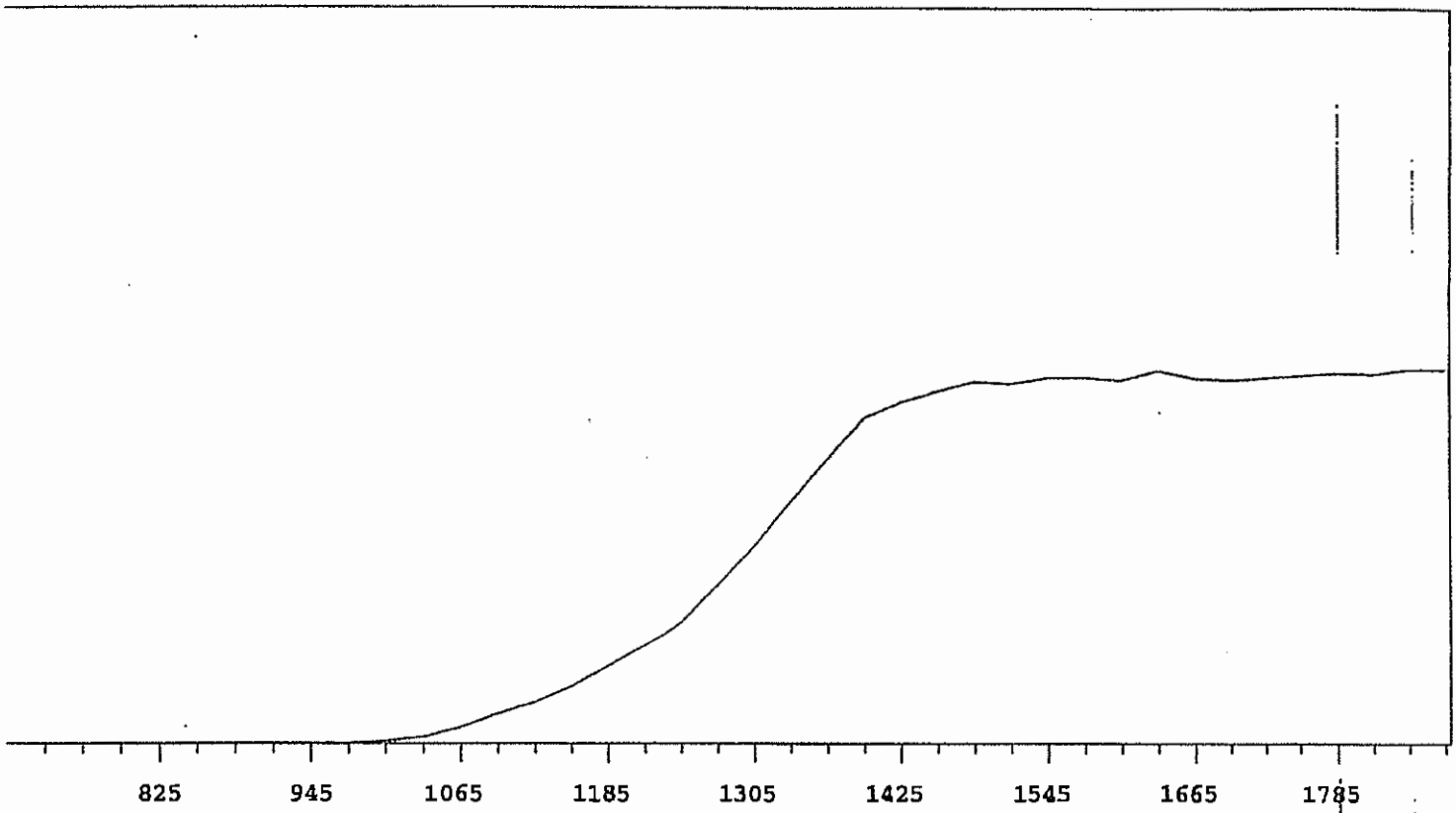
Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 26 | >100 |
| 1035 | 169 | >100 |
| 1065 | 483 | >100 |
| 1095 | 955 | >100 |
| 1125 | 1639 | >100 |
| 1155 | 2233 | >100 |
| 1185 | 3262 | +98.61 |
| 1215 | 4306 | +89.77 |
| 1245 | 5662 | +82.36 |
| 1275 | 7113 | +76.36 |
| 1305 | 9144 | +69.92 |
| 1335 | 11120 | +58.43 |
| 1365 | 13399 | +45.40 |
| 1395 | 14711 | +32.57 |
| 1425 | 16134 | +20.69 |
| 1455 | 16805 | +13.46 |
| 1485 | 17209 | +7.90 |
| 1515 | 17500 | +4.31 |
| 1545 | 17812 | +3.48 |
| 1575 | 17629 | +2.80 |
| 1605 | 18066 | +2.23 |
| 1635 | 18122 | +1.44 |
| 1665 | 18166 | +1.20 |
| 1695 | 17967 | +1.60 |
| 1725 | 18469 | +3.41 |
| 1755 | 18409 | +6.35 |
| 1785 | 18884 | +9.47 |
| 1815 | 19535 | +11.98 |
| 1845 | 20630 | |
| 1875 | 21076 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

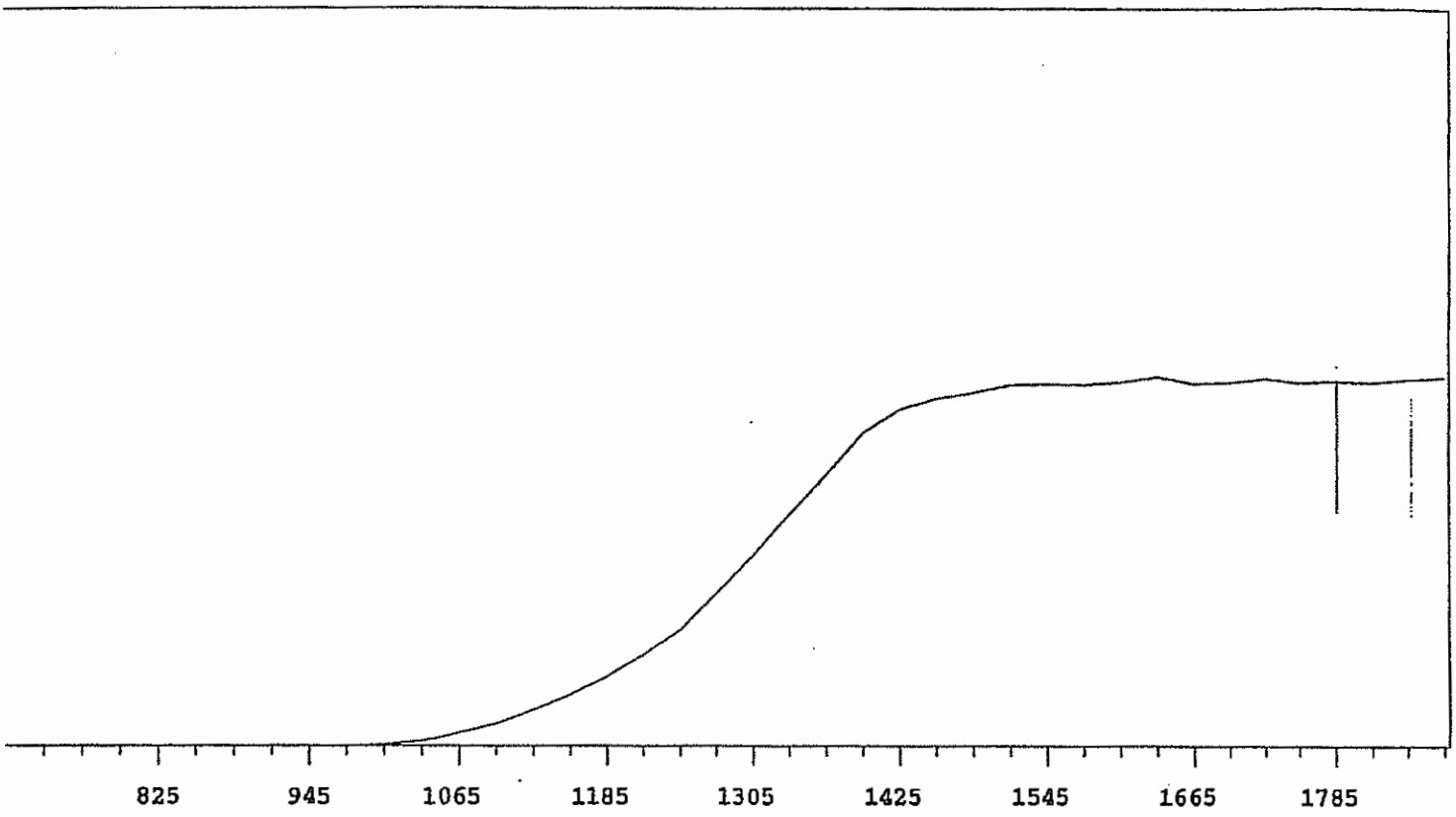



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +55.56 |
| 795 | 2 | >100 |
| 825 | 0 | +0.00 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 14 | >100 |
| 1005 | 104 | >100 |
| 1035 | 281 | >100 |
| 1065 | 720 | >100 |
| 1095 | 1302 | >100 |
| 1125 | 1834 | >100 |
| 1155 | 2544 | >100 |
| 1185 | 3485 | +92.28 |
| 1215 | 4624 | +85.50 |
| 1245 | 5878 | +77.82 |
| 1275 | 7515 | +71.49 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 9209 | +64.55 |
| 1335 | 11200 | +55.94 |
| 1365 | 13123 | +43.27 |
| 1395 | 14957 | +29.04 |
| 1425 | 15658 | +17.41 |
| 1455 | 16123 | +8.01 |
| 1485 | 16530 | +4.92 |
| 1515 | 16437 | +2.71 |
| 1545 | 16704 | +0.83 |
| 1575 | 16707 | +2.14 |
| 1605 | 16602 | +0.55 |
| 1635 | 17024 | -0.28 |
| 1665 | 16684 | -0.42 |
| 1695 | 16597 | -0.85 |
| 1725 | 16711 | +1.27 |
| 1755 | 16796 | +1.51 |
| 1785 | 16903 | +1.57 |
| 1815 | 16880 | +1.46 |
| 1845 | 17066 | |
| 1875 | 17085 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

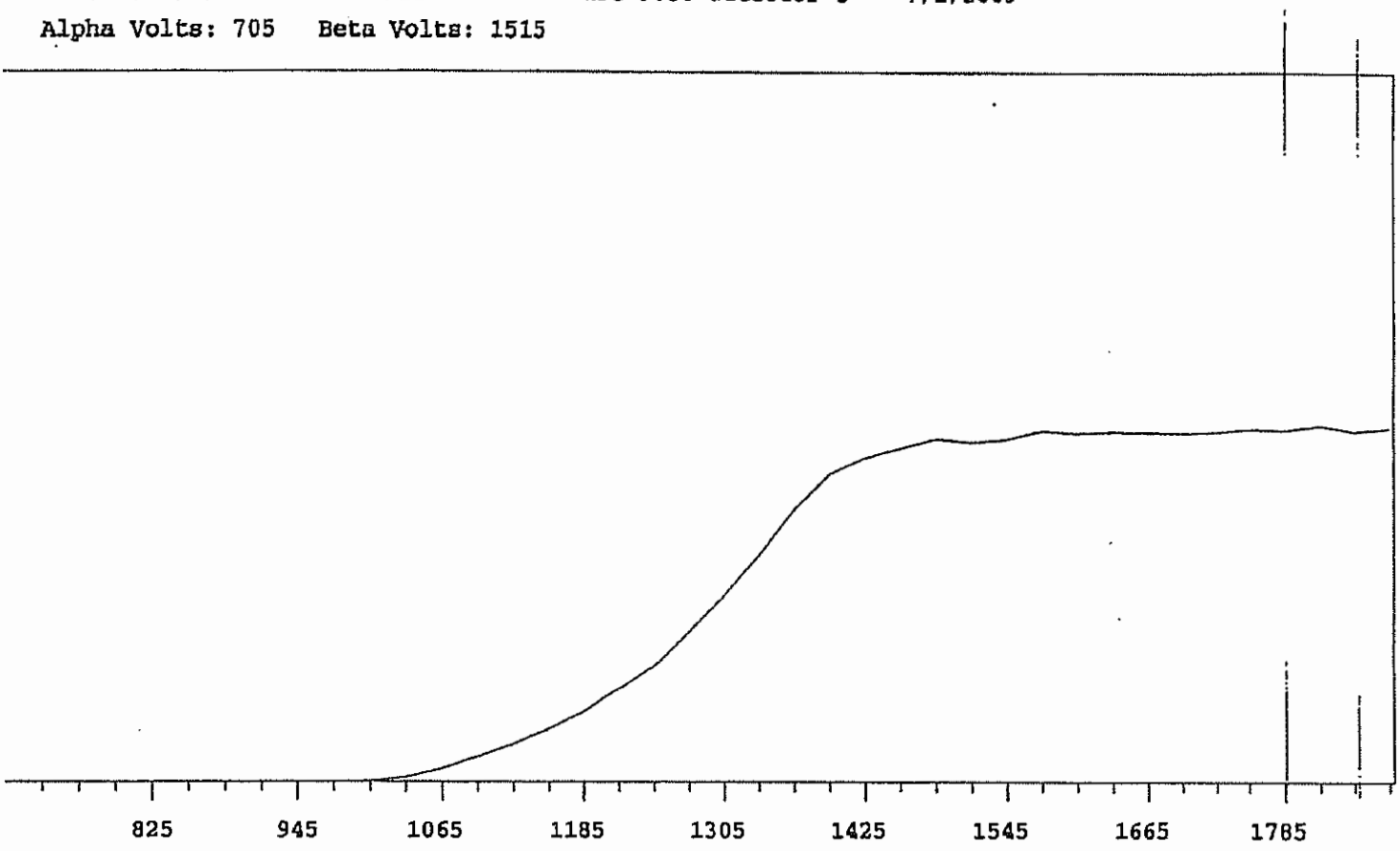



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 70 | >100 |
| 1035 | 257 | >100 |
| 1065 | 648 | >100 |
| 1095 | 1116 | >100 |
| 1125 | 1784 | >100 |
| 1155 | 2560 | >100 |
| 1185 | 3531 | +96.11 |
| 1215 | 4568 | +89.22 |
| 1245 | 6137 | +81.65 |
| 1275 | 7855 | +74.42 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 9666 | +64.39 |
| 1335 | 11722 | +55.91 |
| 1365 | 13680 | +44.91 |
| 1395 | 15677 | +31.56 |
| 1425 | 16786 | +19.46 |
| 1455 | 17283 | +10.57 |
| 1485 | 17608 | +5.95 |
| 1515 | 17972 | +3.32 |
| 1545 | 18006 | +1.84 |
| 1575 | 17970 | +1.58 |
| 1605 | 18104 | +0.74 |
| 1635 | 18351 | +0.24 |
| 1665 | 18016 | +0.16 |
| 1695 | 18080 | -0.63 |
| 1725 | 18283 | +0.29 |
| 1755 | 18047 | -0.47 |
| 1785 | 18110 | -0.32 |
| 1815 | 18040 | +1.17 |
| 1845 | 18200 | |
| 1875 | 18320 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

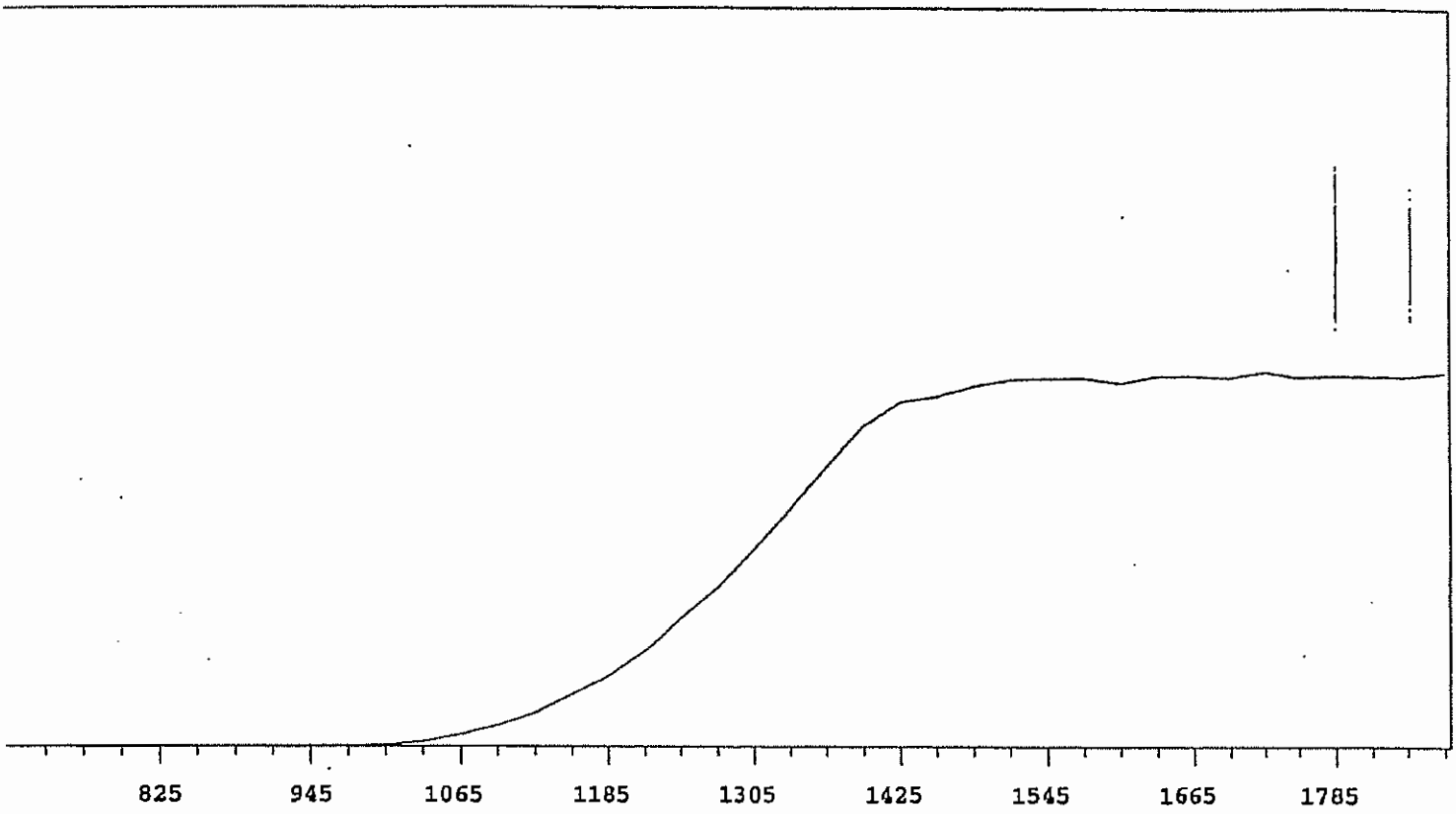



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 9 | >100 |
| 1005 | 93 | >100 |
| 1035 | 325 | >100 |
| 1065 | 834 | >100 |
| 1095 | 1525 | >100 |
| 1125 | 2318 | >100 |
| 1155 | 3233 | >100 |
| 1185 | 4357 | +92.07 |
| 1215 | 5755 | +85.64 |
| 1245 | 7438 | +78.35 |
| 1275 | 9463 | +70.89 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 11573 | +64.95 |
| 1335 | 13929 | +56.47 |
| 1365 | 16726 | +43.82 |
| 1395 | 18834 | +29.38 |
| 1425 | 19743 | +16.84 |
| 1455 | 20314 | +7.95 |
| 1485 | 20860 | +4.16 |
| 1515 | 20670 | +3.23 |
| 1545 | 20844 | +2.09 |
| 1575 | 21330 | +2.48 |
| 1605 | 21188 | +1.16 |
| 1635 | 21280 | -0.32 |
| 1665 | 21237 | +0.08 |
| 1695 | 21202 | +0.42 |
| 1725 | 21254 | +0.60 |
| 1755 | 21406 | +1.41 |
| 1785 | 21326 | +0.42 |
| 1815 | 21619 | +0.16 |
| 1845 | 21282 | |
| 1875 | 21478 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

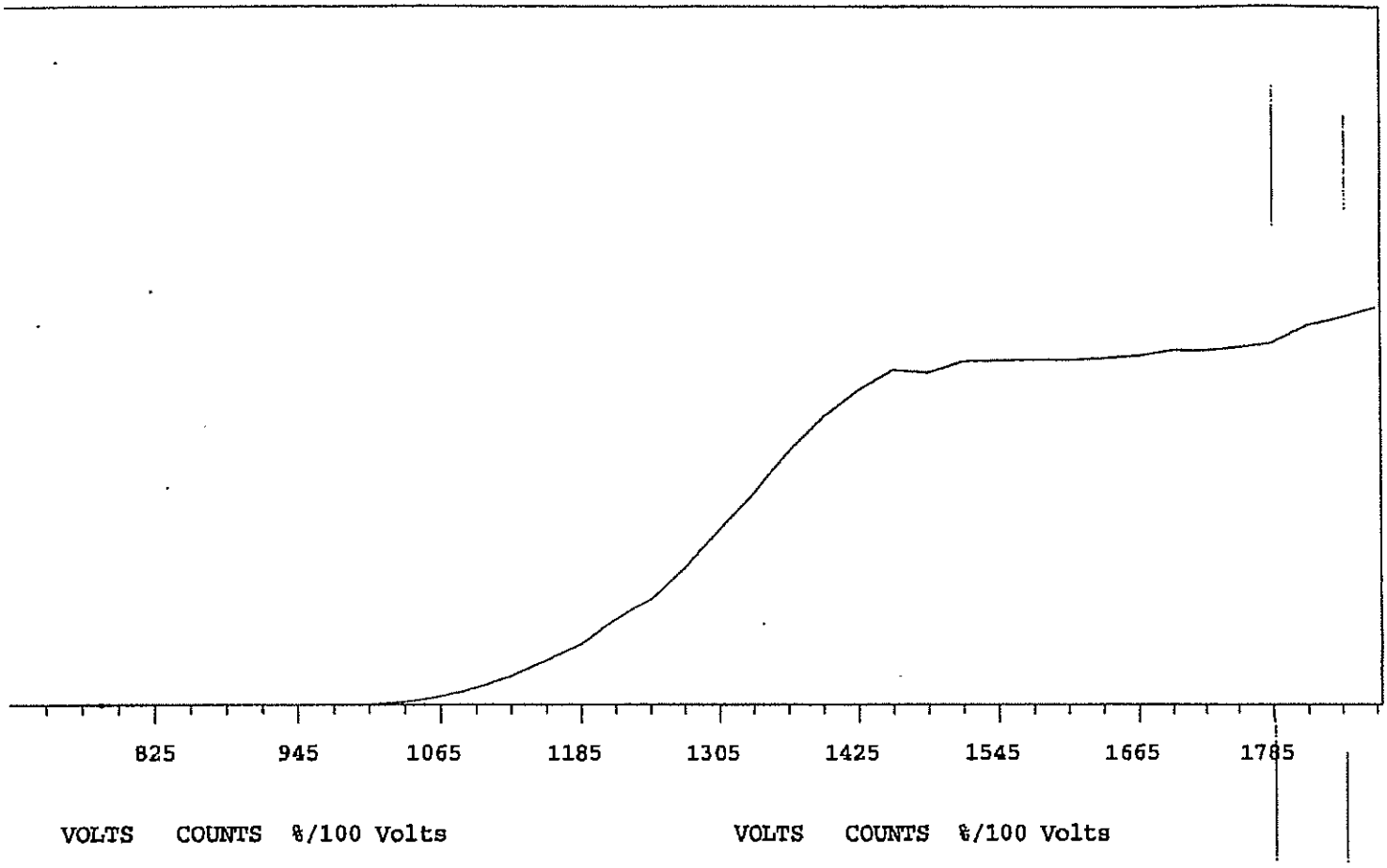



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 9 | >100 |
| 1005 | 58 | >100 |
| 1035 | 228 | >100 |
| 1065 | 544 | >100 |
| 1095 | 936 | >100 |
| 1125 | 1468 | >100 |
| 1155 | 2110 | >100 |
| 1185 | 2770 | +94.71 |
| 1215 | 3670 | +85.91 |
| 1245 | 4937 | +79.46 |
| 1275 | 6066 | +70.79 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 7524 | +61.93 |
| 1335 | 9002 | +55.36 |
| 1365 | 10542 | +44.70 |
| 1395 | 12064 | +31.21 |
| 1425 | 12981 | +19.20 |
| 1455 | 13192 | +10.41 |
| 1485 | 13570 | +5.93 |
| 1515 | 13820 | +4.08 |
| 1545 | 13866 | +0.75 |
| 1575 | 13880 | +0.21 |
| 1605 | 13695 | +0.59 |
| 1635 | 13950 | +0.77 |
| 1665 | 13954 | +1.92 |
| 1695 | 13911 | +0.19 |
| 1725 | 14116 | +0.02 |
| 1755 | 13908 | -0.24 |
| 1785 | 13960 | -0.81 |
| 1815 | 13939 | +0.71 |
| 1845 | 13931 | |
| 1875 | 14071 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector A 7/1/2009

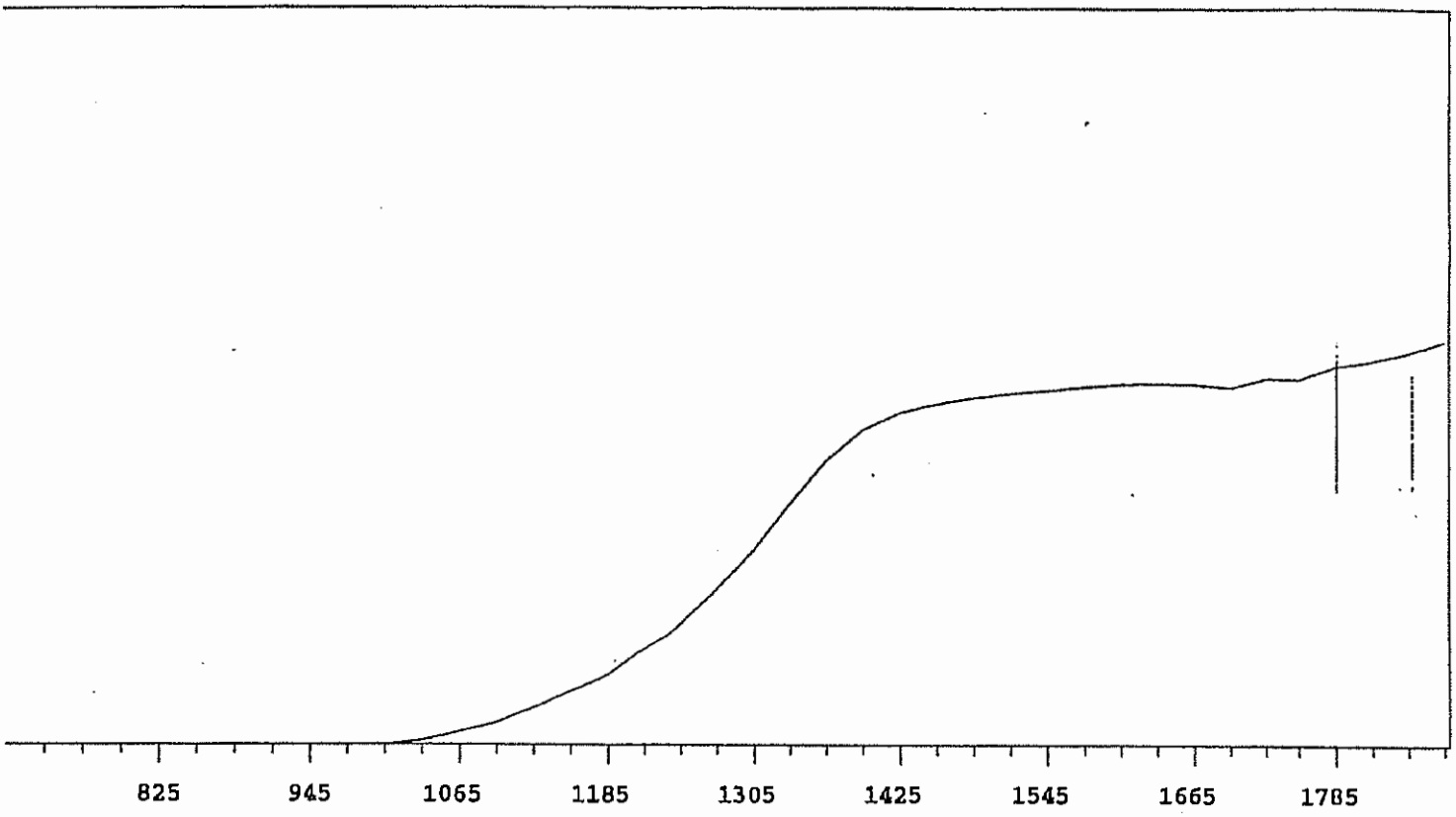
Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts | VOLTS | COUNTS | %/100 Volts |
|---|---|---|---|---|---|
| 705 | 0 | | 1305 | 8778 | +67.49 |
| 735 | 0 | | 1335 | 10502 | +57.68 |
| 765 | 0 | | 1365 | 12516 | +46.36 |
| 795 | 0 | >100 | 1395 | 14215 | +35.88 |
| 825 | 0 | >100 | 1425 | 15472 | +22.01 |
| 855 | 0 | >100 | 1455 | 16469 | +12.99 |
| 885 | 1 | +0.00 | 1485 | 16342 | +6.70 |
| 915 | 0 | >100 | 1515 | 16874 | +3.07 |
| 945 | 0 | >100 | 1545 | 16918 | +2.53 |
| 975 | 0 | >100 | 1575 | 16950 | +0.58 |
| 1005 | 18 | >100 | 1605 | 16943 | +0.95 |
| 1035 | 137 | >100 | 1635 | 17008 | +2.13 |
| 1065 | 430 | >100 | 1665 | 17130 | +2.45 |
| 1095 | 865 | >100 | 1695 | 17403 | +2.43 |
| 1125 | 1444 | >100 | 1725 | 17377 | +2.43 |
| 1155 | 2151 | >100 | 1755 | 17515 | +4.88 |
| 1185 | 2981 | >100 | 1785 | 17710 | +7.54 |
| 1215 | 4168 | +92.14 | 1815 | 18533 | +9.04 |
| 1245 | 5377 | +84.73 | 1845 | 18905 | |
| 1275 | 6924 | +74.92 | 1875 | 19415 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

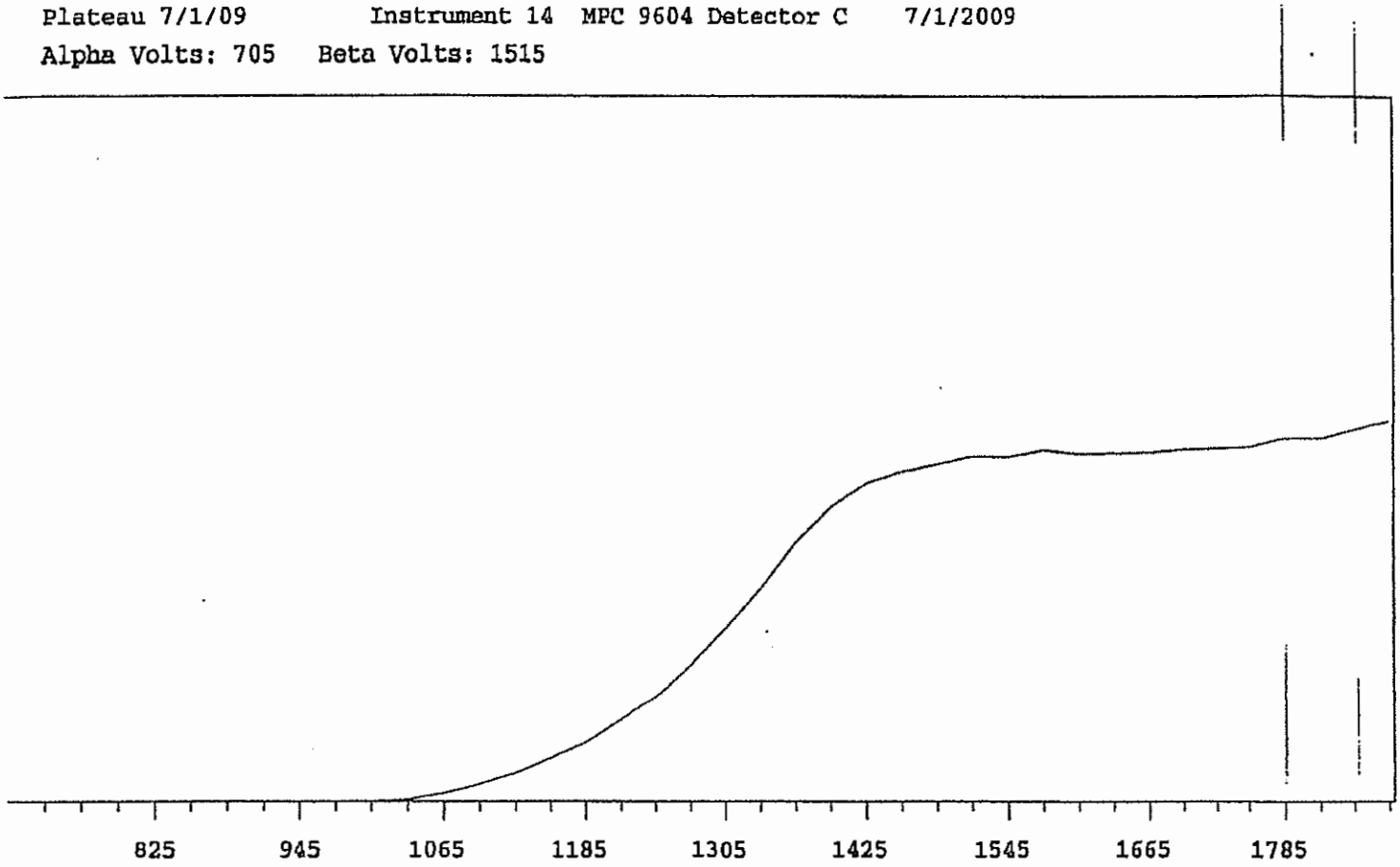



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 1 | +0.00 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 3 | >100 |
| 1005 | 40 | >100 |
| 1035 | 210 | >100 |
| 1065 | 590 | >100 |
| 1095 | 983 | >100 |
| 1125 | 1645 | >100 |
| 1155 | 2342 | >100 |
| 1185 | 3045 | +96.43 |
| 1215 | 4201 | +90.42 |
| 1245 | 5579 | +83.64 |
| 1275 | 7121 | +74.44 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8797 | +65.44 |
| 1335 | 10726 | +54.47 |
| 1365 | 12570 | +41.11 |
| 1395 | 13917 | +26.79 |
| 1425 | 14687 | +15.44 |
| 1455 | 15048 | +8.47 |
| 1485 | 15318 | +5.00 |
| 1515 | 15494 | +3.76 |
| 1545 | 15606 | +3.04 |
| 1575 | 15776 | +2.35 |
| 1605 | 15889 | +1.44 |
| 1635 | 15907 | -0.16 |
| 1665 | 15881 | +0.64 |
| 1695 | 15741 | +1.21 |
| 1725 | 16124 | +3.63 |
| 1755 | 16076 | +5.41 |
| 1785 | 16588 | +5.79 |
| 1815 | 16830 | +7.53 |
| 1845 | 17185 | |
| 1875 | 17682 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

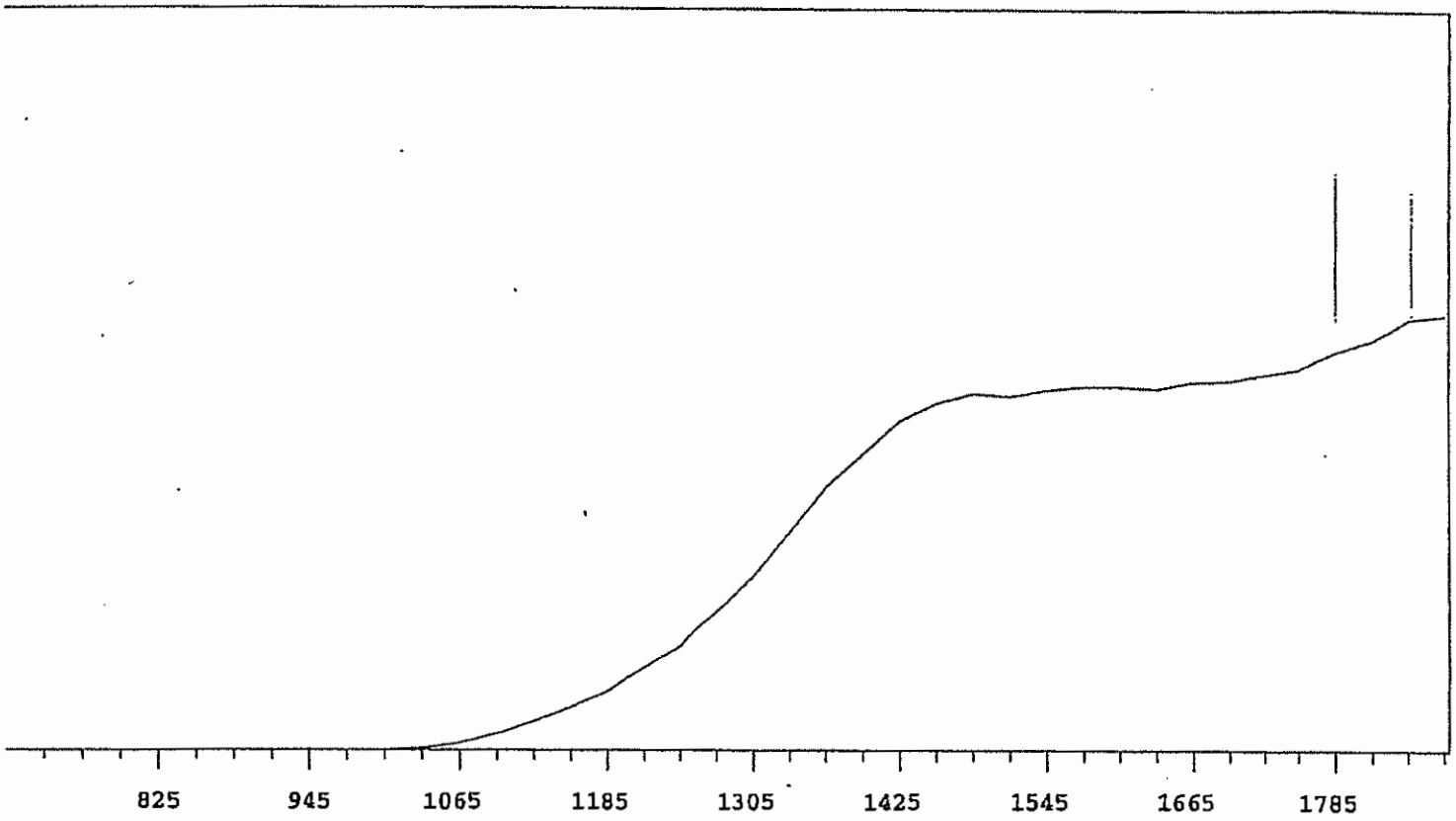



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 2 | >100 |
| 1005 | 21 | >100 |
| 1035 | 132 | >100 |
| 1065 | 491 | >100 |
| 1095 | 1036 | >100 |
| 1125 | 1698 | >100 |
| 1155 | 2517 | >100 |
| 1185 | 3468 | >100 |
| 1215 | 4721 | +91.83 |
| 1245 | 6175 | +85.13 |
| 1275 | 8025 | +76.82 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 10118 | +69.76 |
| 1335 | 12269 | +59.65 |
| 1365 | 14810 | +47.35 |
| 1395 | 16773 | +33.46 |
| 1425 | 18104 | +20.13 |
| 1455 | 18720 | +11.98 |
| 1485 | 19122 | +6.50 |
| 1515 | 19580 | +4.77 |
| 1545 | 19527 | +2.48 |
| 1575 | 19902 | +0.81 |
| 1605 | 19690 | +0.53 |
| 1635 | 19739 | +0.23 |
| 1665 | 19765 | +1.29 |
| 1695 | 19932 | +1.40 |
| 1725 | 19976 | +2.72 |
| 1755 | 20051 | +2.92 |
| 1785 | 20523 | +4.26 |
| 1815 | 20542 | +5.57 |
| 1845 | 21035 | |
| 1875 | 21528 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 14 | >100 |
| 1035 | 130 | >100 |
| 1065 | 363 | >100 |
| 1095 | 785 | >100 |
| 1125 | 1357 | >100 |
| 1155 | 1996 | >100 |
| 1185 | 2735 | +99.45 |
| 1215 | 3785 | +94.20 |
| 1245 | 4857 | +86.43 |
| 1275 | 6571 | +78.80 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8095 | +71.16 |
| 1335 | 10052 | +58.38 |
| 1365 | 11990 | +47.92 |
| 1395 | 13400 | +35.01 |
| 1425 | 14808 | +23.58 |
| 1455 | 15554 | +13.45 |
| 1485 | 15987 | +6.39 |
| 1515 | 15861 | +3.45 |
| 1545 | 16156 | +2.18 |
| 1575 | 16297 | +1.72 |
| 1605 | 16297 | +1.33 |
| 1635 | 16208 | +1.62 |
| 1665 | 16526 | +2.92 |
| 1695 | 16581 | +3.94 |
| 1725 | 16832 | +5.91 |
| 1755 | 17039 | +8.68 |
| 1785 | 17800 | +11.53 |
| 1815 | 18351 | +11.46 |
| 1845 | 19265 | |
| 1875 | 19468 | |

showfile.cgi

DCN: ITSI-0808-0004-0076, 8 May 2019

# Standardization of Strontium Carrier 1858443

v1.2

| Analyst | VXC2 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Strontium |
| Serial Number | 1858443 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 12/11/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 1747929 |
| Parent Exp. Date | 3/5/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Strontium/mL | mg Strontium/g |
|---|---|---|---|---|---|---|
| 1 | 1.0326 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.24 |
| 2 | 1.0306 | 0.0248 | 0.0423 | 0.0175 | 17.50 | 16.98 |
| 3 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |
| 4 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |

Mean Value (mg/mL) = 17.73
Stdev (mg/mL) = ± 0.15
1.0% of Mean Value = 0.177250
Pass
Expiration Date 12/11/2013

Mean Value (mg/1.0mL) = 17.73

Standardization Rule
A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

V. [illegible]
12/11/12

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

# Standardization of Yttrium Carrier 1892786

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1892786 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 3/15/2013 |

| Parent Information | |
|---|---|
| Parent Serial # | 1731870.1 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium /mL | mg Yttrium /g |
|---|---|---|---|---|---|---|
| 1 | 1.0100 | 0.0242 | 0.0560 | 0.0318 | 31.80 | 31.49 |
| 2 | 1.0200 | 0.0242 | 0.0562 | 0.0320 | 32.00 | 31.37 |
| 3 | 1.0100 | 0.0242 | 0.0559 | 0.0317 | 31.70 | 31.39 |
| 4 | 1.0100 | 0.0242 | 0.0561 | 0.0319 | 31.90 | 31.58 |

Mean Value (mg/mL) = 31.85
Stdev (mg/mL) = ± 0.13
1.0% of Mean Value = 0.318500
Pass
Expiration Date 1/26/2014

Mean Value (mg/1.0mL) = 31.85

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

Jennifer L. Robb

showfile.cgi

DCN: ITSI-0808-0004-0076, 8 May 2019

# Standardization of Yttrium Carrier 1840837

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1840837 |
| Amount of Std. (mL) | 0.5 |
| Standard Prepared | 10/25/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 17318701 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium/mL | mg Yttrium/g |
|---|---|---|---|---|---|---|
| 1 | 0.5000 | 0.0241 | 0.0399 | 0.0158 | 31.60 | 31.60 |
| 2 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |
| 3 | 0.5000 | 0.0244 | 0.0400 | 0.0156 | 31.20 | 31.20 |
| 4 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |

Mean Value (mg/mL) = 31.20
Stdev (mg/mL) = ± 0.28
1.0% of Mean Value = 0.312000
Pass
Expiration Date 10/25/2013

Mean Value (mg/0.5mL) = 15.60

Jennifer L. Robb

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

92552
Sr-89 5 mL Liquid in Flame Sealed Vial

1633

**Customer:** General Engineering Labs
**P.O. No.:** GEL1202747, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty*, % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 2.121E+05 | 0.1 | 0.9 | 1.8 | 12/13/2012 |

*Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.07181 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: K. Eardley
K. Eardley, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 11 DEC 12

REVIEWED 12/14/12 AM

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-062

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1633 |
| Prepared By: | Ashley Drochter |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 12/13/2012 |
| Ampoule Mass (g): | 5.07181 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-062 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Bethany Fiem |
| Prep Date: | 01/08/2013 |
| Verification Date: | 01/09/2013 |
| Expiration Date: | 08/22/2013 |
| Primary Code: | 1633-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.9257 g |
| Density(g/mL): | 0.9986 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / (5.07181 g * 100 mL ) = 123593.8614 dpm/mL |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / ( 0.9986 g/mL)/ (5.07181 g * 100 mL) = 123767.0118 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1633-A

v1.0.2

| | |
|---|---|
| Instrument | Silver |
| Analyst | BF1 |
| Verification Prep Date | 1/8/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1633-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 12/13/2012 |
| Ref. Act. (DPM/mL) | 123593.8614 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 1/8/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 1/9/2013 | 89.20 | 8539.17 | 44.60 |
| 2 | 1/9/2013 | 88.90 | 8565.00 | 44.60 |
| 3 | 1/9/2013 | 88.90 | 8571.67 | 44.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 8494.57 | 1.011371 | 83990.64 | 8399.06 |
| 2 | 8520.40 | 1.011371 | 84246.04 | 8424.60 |
| 3 | 8527.07 | 1.011371 | 84311.99 | 8431.20 |

| | dpm/mL |
|---|---|
| Mean Value = | 84182.89 |
| Stdev = | 169.7251269 |
| Certificate Value* = | 85338.6 |
| Two sigma = | 339.450 |
| 10 % of Mean = | 8418.289 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.65% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 8/22/2013 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-89 source 1633-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Sr-89 source 1618-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

1-11-13

Amanda L. [illegible]
1/11/13

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-004

Isotope: Sr-89

Date Standards Prepared: 2-14-13

Standard ID: 1633-A

Matrix of Planchett/Filter: Sr Carbonate ppt on 25mm 0.45um filter

Amount Used (g or ml): 1.0

Standard Activity (DPM/g or mL): 123593.861 *

Residue/Carrier Agent: Sr Carrier 1858443 exp 12-11-1

Reference Date: 12-13-12

Pipette ID Used: 4043264

Expiration Date: 8-22-13

Balance ID Used: 1113021018

*Not decay corrected

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | $C_1$ | 0.1 | 0.0246 | 0.0265 | 1.9 |
| | $C_2$ | 0.2 | 0.0241 | 0.0276 | 3.5 |
| | $C_3$ | 0.4 | 0.0246 | 0.0315 | 6.9 |
| | $C_4$ | 0.5 | 0.0242 | 0.0325 | 8.3 |
| | $C_5$ | 0.8 | 0.0236 | 0.0371 | 13.5 |
| | $C_6$ | 1.0 | 0.0236 | 0.0412 | 17.6 |
| | $C_7$ | 1.5 | 0.0236 | 0.0502 | 26.6 |
| | $C_8$ | 2.1 | 0.0238 | 0.0599 | 36.1 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

W/✓ WL 2/25/13

2/14/13

Prepared By: [signature] Date: 2-14-13

Reviewed By: [signature] Date: 2/25/13

Eckert & Ziegler
Analytics

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www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1244

78351-278

Sr-90 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 2

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.691 E4 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
5.01862 grams 0.1M HCl solution with 30 µg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED 10/7/08
RC-S-048-125

End of Certificate

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1244 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 5.01862 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-125 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 02/12/2013 |
| Verification Date: | 02/12/2013 |
| Expiration Date: | 02/12/2014 |
| Primary Code: | 1244-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.8346 g |
| Density(g/mL): | 0.9984 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / (5.01862 g * 100 mL ) = 21333.9626 dpm/mL |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / ( 0.9984 g/mL)/ (5.01862 g * 100 mL) = 21367.7236 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

DCN: ITSI-0808-0004-0076, 8 May 2019

showfile.cgi

# Verification for Sr-90 Standard 1244-A

v1.0.2

| | |
|---|---|
| Instrument | GOLD |
| Analyst | BF |
| Verification Prep Date | 2/12/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1244-A |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 21333.9626 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 2/12/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 2/12/2013 | 57.70 | 3807.92 | 38.20 |
| 2 | 2/12/2013 | 55.70 | 3846.92 | 38.20 |
| 3 | 2/12/2013 | 56.20 | 3861.54 | 38.20 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 3769.72 | 2.046222 | 18422.83 | 1842.28 |
| 2 | 3808.72 | 2.046222 | 18613.42 | 1861.34 |
| 3 | 3823.34 | 2.046222 | 18684.87 | 1868.49 |

| | dpm/mL |
|---|---|
| Mean Value = | 18573.71 |
| Stdev = | 135.4612019 |
| Certificate Value* = | 19212.6 |
| Two sigma = | 270.922 |
| 10 % of Mean = | 1857.371 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 96.67% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 2/12/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1244-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,

B = BKG cpm,

C = System efficiency (cpm/dpm), and

D = volume used for standard verification.

RAD-M-001

Amanda Litchi 2/14/13

2-13-13

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

5/8/2019 10:39 AM

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet
Sr-90 (Sr portion)

Applicable SOP Number: GL-RAD-A-004 | Isotope: Sr-90

Date Standards Prepared: 3/29/13

Standard ID: 1244-A | Matrix of Planchet/Filter: Sr Carbonate ppt on 25mm 0.45µm filter

Amount Used (g or ml): 0.5

Standard Activity (DPM/g or mL): ~~2133.9629~~ 21333.9626 (AP 3/29/13) | Residue/Carrier Agent: Sr carrier 1858443

Reference Date: 10/1/08 | Pipette ID Used: 1795419 / 2154115 / 4043269 / 11518634

Expiration Date: 2/12/14 | Balance ID Used: 1113021018

Std carrier wt. 121 mg/mL | Sep Date/Time: 3-29-13 / 1410

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) | |
|---|---|---|---|---|---|---|
| | $S_1$ | 0.2 | 0.0239 | 0.0272 | 3.3 | |
| | $S_2$ | 0.4 | 0.0241 | 0.0314 | 7.3 | |
| | $S_3$ | 0.5 | ~~0.0247~~ 0.0243 | 0.0328 | 8.5 | 0.0243 |
| | $S_4$ | 0.7 | 0.0243 | 0.0365 | 12.2 | |
| | $S_5$ | 1.0 | 0.0245 | 0.0417 | 17.2 | |
| | $S_6$ | 1.5 | 0.0246 | 0.0512 | 26.6 | |
| | $S_7$ | 1.8 | 0.0246 | 0.0556 | 31.0 | |
| | ~~$S_8$~~ | 2.1 | 0.0247 | 0.0608 | ~~36.1~~ | (AP 3/29/13) |

(AP 3/29/13) (AP 3/29/13) (AP 3/29/13) *RR 4/1/13

Prepared By: [signature] Date: 3-29-13

Reviewed By: [signature] Date: 4/1/13

**General Engineering Laboratories**
**GFC Calibration Source Preparation Sheet**
Sr-90 Yttrium Portion

Applicable SOP Number: GL-RAD-A-004
Isotope: Sr-90 (Y-90)
Date Standards Prepared: 3/29/13
Standard ID: 1244-A
Matrix of Planchet/Filter: Yttrium oxalate ppt on 25 mm 0.45 µm filter
Amount Used (g or ml): 0.5
Standard Activity (DPM/g or mL): 21333.9626
Residue/Carrier Agent: YH carrier 1892786
Reference Date: 10/1/08
Pipette ID Used: 2154115
Expiration Date: 2/12/14
Balance ID Used: ~~93~~ 8 3-29-13 1113021018

Std carrier YH. 31.86 mg/mL
Sep date/time: 3/29/13 1305

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | Y1 | 0.5 | 0.0239 | 0.0398 | 15.9 |
| | Y2 | 0.5 | 0.0240 | 0.0401 | 16.1 |
| | Y3 | 0.5 | 0.0242 | 0.0402 | 16.0 |
| | Y4 | 0.5 | 0.0242 | 0.0403 | 16.1 |
| | Y5 | 0.5 | 0.0244 | 0.0404 | 16.0 |
| | Y6 | 0.5 | 0.0245 | 0.0407 | 16.2 |
| | Y7 | 0.5 | 0.0245 | 0.0404 | 15.9 |
| | Y8 | 0.5 | 0.0249 | 0.0413 | 16.4 |

wt ✓

AP 3/29/13

Prepared By: [signature] Date: 3-29-13
Reviewed By: [signature] Date: 4/1/13

Eckert & Ziegler
Analytics

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# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

1680

94136

Sr-89 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs, LLC
**P.O. No.:** GEL1304373, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty* , % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 1.878E+05 | 0.1 | 0.9 | 1.8 | 07/15/2013 |

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.02926 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: R. Ormsby
R. Ormsby, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 15 Jul 13

RECEIVED 7/17/13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-109

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1680 |
| Prepared By: | Gregory Ramsay |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 07/15/2013 |
| Ampoule Mass (g): | 5.02926 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-109 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 11/07/2013 |
| Verification Date: | 11/07/2013 |
| Expiration Date: | 03/24/2014 |
| Primary Code: | 1680-A |
| Dilution(mL): | 200 mL |
| Mass of Parent(g): | 4.7905 g |
| Density(g/mL): | 0.9979 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / (5.02926 g * 200 mL ) = 53665.3046 dpm/mL |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / ( 0.9979 g/mL)/ (5.02926 g * 200 mL) = 53778.2389 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1680-A

v1.0.1

| | |
|---|---|
| Instrument | RED |
| Analyst | GXR1 |
| Verification Prep Date | 11/7/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1680-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 7/15/2013 |
| Ref. Act. (DPM/mL) | 53665.3046 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 11/7/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 11/8/2013 | 61.90 | 1139.80 | 39.60 |
| 2 | 11/8/2013 | 60.50 | 1139.20 | 39.60 |
| 3 | 11/8/2013 | 62.00 | 1128.40 | 39.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 1100.20 | 1.021162 | 10774.00 | 1077.40 |
| 2 | 1099.60 | 1.021162 | 10768.12 | 1076.81 |
| 3 | 1088.80 | 1.021162 | 10662.36 | 1066.24 |

| | dpm/mL |
|---|---|
| Mean Value = | 10734.83 |
| Stdev = | 62.82650264 |
| Certificate Value* = | 10930.2 |
| Two sigma = | 125.653 |
| 10 % of Mean = | 1073.483 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.21% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 3/24/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-89 source 1680-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRED for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 11/7/2013 using Sr-89 source 1657-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

11/25/13

11/14/13

11/25/13

Eckert & Ziegler
Analytics

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www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.856 E5 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED

# Verification for Sr-90 Standard 1243-L

v1.0.1

| | |
|---|---|
| Instrument | GREEN |
| Analyst | GXR1 |
| Verification Prep Date | 12/4/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1243-L |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 575.747476 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 12/4/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 12/5/2013 | 63.60 | 146.60 | 48.40 |
| 2 | 12/5/2013 | 63.10 | 147.60 | 48.40 |
| 3 | 12/5/2013 | 62.70 | 140.00 | 48.40 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 98.20 | 1.961352 | 500.67 | 50.07 |
| 2 | 99.20 | 1.961352 | 505.77 | 50.58 |
| 3 | 91.60 | 1.961352 | 467.02 | 46.70 |

| | dpm/mL |
|---|---|
| Mean Value = | 491.16 |
| Stdev = | 21.05469752 |
| **Certificate Value* =** | **508.5** |
| **Two sigma =** | 42.109 |
| **10 % of Mean =** | 49.116 |
| **Rule A (Pass/Fail)** | **Pass** |
| **% Recovery** | 96.59% |
| **Rule B (Pass/Fail)** | **Pass** |
| **Expiration Date** | **12/4/2014** |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-L by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/4/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12/13/13

Amanda L. Fehn 12/13/13

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1243 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 10.41484 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-124 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Daniel Roy |
| Prep Date: | 12/19/2008 |
| Verification Date: | 12/04/2013 |
| Expiration Date: | 12/04/2014 |
| Primary Code: | 1243-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 10.2164 g |
| Density(g/mL): | 0.9991 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL ) = 226951.7634 dpm/mL |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / ( 0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|
| 01/21/2010 | Bethany Fiem | 2.2467 | 1000 | 1243-B | 510.329369 dpm/mL | 01/21/2010 | 01/21/2011 |
| 08/03/2010 | Bethany Fiem | 2.5604 | 1000 | 1243-C | 581.5851 dpm/mL | 08/03/2010 | 08/03/2011 |
| 01/12/2011 | Bethany Fiem | 2.4946 | 1000 | 1243-D | 566.6389 dpm/mL | 01/12/2011 | 01/12/2012 |
| 08/12/2011 | Tim Chandler | 3.3115 | 100 | 1243-G | 18.7877 dpm/mL | 08/11/2011 | 08/11/2012 |
| 08/17/2011 | Tim Chandler | 2.5541 | 100 | 1243-H | 14.49064 dpm/mL | 08/18/2011 | 08/16/2012 |
| 06/21/2011 | Tim Chandler | .0235 | 100 | 1243-E | 53.37936 dpm/mL | 06/25/2012 | 06/20/2013 |
| 07/05/2011 | Bethany Fiem | 2.6072 | 1000 | 1243-F | 592.2156 dpm/mL | 07/05/2011 | 07/05/2012 |
| 01/31/2012 | Gregory Ramsay | 2.6792 | 1000 | 1243-I | 608.5701 dpm/ml | 01/31/2012 | 01/31/2013 |
| 08/29/2012 | Bethany Fiem | 2.6799 | 1000 | 1243-J | 608.729104 dpm/mL | 09/14/2012 | 09/11/2013 |
| 02/12/2013 | Gregory Ramsay | 2.6526 | 1000 | 1243-K | 602.528 dpm/ml | 01/15/2014 | 01/15/2015 |
| 12/04/2013 | Gregory Ramsay | 2.5347 | 1000 | 1243-L | 575.747476 dpm/ml | 12/04/2013 | 12/04/2014 |

GEL Laboratories LLC
Version 1.0 9/18/2000

# Strontium 89/90 Queue Sheet

02/27/14

Batch #: 1366732 Analyst: AF1 First Client Due Date: Internal Due Date: 03/13/2014 Comments

Sr-89/90 Spike Code(s): — / — Expiration Date: — / — Vol(s): — / — Sr Sep. Date/time: 2/15/14 11:30

Sr-89/90 LCS Code(s): 1680-A / 1243-L Expiration Date: 3/24/14 / 12/9/14 Vol(s): 0.2 / 0.5 Y Sep. Date/time: 2/26/14 11:20

Sr Carrier Code: 2046474 Exp Date: 12/15/14 Vol: * Sdt Wt: 8.2 Y Carrier Code: 2073992 Exp Date: 5/19/14 Vol: 0.5 Sdt Wt: 16.59

Prep Date: 2/14/14 Initials: AF1 Pipet ID: — Balance #: — Analytical Scale #: 1118210 18 Witness: —

| Sample ID | Client Description | Type | RDL (Carrier Volume) | Date Collected | Matrix | Client | Rad | Pos # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr wt (mg) | Initial Y wt (g) | Final Y wt (g) | Net Y wt (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1203036037-1 | LCS for batch 1366732 | LCS | 0.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V1 | 200 | | 0.0270 | 0.0284 | 1.4 | 0.0259 | 0.0426 | 16.1 |
| 1203036038-1 | LCS for batch 1366732 | LCS | 0.2 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V2 | 200 | | 0.0240 | 0.0276 | 3.6 | 0.0278 | 0.0444 | 16.6 |
| 1203036039-1 | LCS for batch 1366732 | LCS | 0.4 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V3 | 200 | | 0.0280 | 0.0342 | 6.2 | 0.0271 | 0.0427 | 15.6 |
| 1203036040-1 | LCS for batch 1366732 | LCS | 0.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V4 | 200 | | 0.0243 | 0.0312 | 6.9 | 0.0281 | 0.0457 | 17.6 |
| 1203036041-1 | LCS for batch 1366732 | LCS | 0.8 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V5 | 200 | | 0.0231 | 0.0325 | 8.6 | 0.0271 | 0.0441 | 17.0 |
| 1203036042-1 | LCS for batch 1366732 | LCS | 1.0 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V6 | 200 | | 0.0261 | 0.0354 | 9.3 | 0.0282 | 0.0445 | 16.3 |
| 1203036043-1 | LCS for batch 1366732 | LCS | 1.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V7 | 200 | | 0.0280 | 0.0376 | 9.6 | 0.0275 | 0.0434 | 15.9 |
| 1203036044-1 | LCS for batch 1366732 | LCS | 2.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V8 | 200 | | 0.0262 | 0.0367 | 10.5 | 0.0266 | 0.0426 | 16.0 |

WH ✓ WH ✓

Solid Sample Dissolution by: LEACH or DIGESTION (Circle One)

Data Reviewed By: [signature]

*GEL Laboratories LLC, Radiochemistry Division*

Page 1 of 1

DCN: ITSI-0808-0004-0076, 8 May 2019

M-9226

# Continuing Calibration Data

# Gas Flow Proportional Counter Backgrounds as of 10-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Above | Beta bkg | 05-Apr 15:37 | 1000 | 2.149 | 0.676 | 1.605 | +6.51 |
| LB4100B3 | Above | Beta bkg | 05-Apr 15:34 | 1000 | 2.111 | 0.777 | 1.874 | +4.30 |
| LB4100C4 | Above | Beta bkg | 07-Apr 11:14 | 500 | 6.836 | 0.555 | 2.577 | +15.64 |
| LB4100G2 | Above | Beta bkg | 05-Apr 15:32 | 1000 | 1.685 | 0.526 | 1.544 | +3.83 |
| LB4100J4 | Above | Alpha bkg | 05-Apr 15:33 | 1000 | 0.551 | -6.68E-2 | 0.397 | +5.00 |
| PIC3A | Above | Alpha bkg | 05-Apr 15:34 | 1000 | 1.132 | -1.09E-1 | 0.333 | +13.83 |
| PIC3A | Above | Beta bkg | 05-Apr 15:34 | 1000 | 9.320 | -1.30E-1 | 1.970 | +24.00 |
| PIC11B | Above | Beta bkg | 05-Apr 14:28 | 1000 | 2.286 | 1.057 | 2.312 | +2.88 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Beta bkg

**Reviewed by** R Bird

**Date** 4-10-14

GEL Laboratories LLC

# Gas Flow Proportional Counter Backgrounds as of 14-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Above | Beta bkg | 12-Apr 16:08 | 500 | 1.932 | 0.676 | 1.605 | +5.11 |
| LB4100C4 | Above | Beta bkg | 12-Apr 17:05 | 500 | 10.316 | 0.555 | 2.577 | +25.96 |
| LB4100D2 | Above | Alpha bkg | 12-Apr 18:19 | 500 | 0.302 | -3.71E-2 | 0.386 | +1.80 |
| LB4100G2 | Above | Beta bkg | 12-Apr 16:23 | 500 | 1.566 | 0.526 | 1.544 | +3.13 |
| LB4100G4 | Above | Beta bkg | 12-Apr 16:23 | 500 | 1.762 | 0.465 | 1.556 | +4.13 |
| LB4100J4 | Above | Alpha bkg | 12-Apr 16:03 | 500 | 0.570 | -6.68E-2 | 0.397 | +5.25 |
| PIC3A | Above | Alpha bkg | 12-Apr 16:00 | 500 | 1.042 | -1.09E-1 | 0.333 | +12.61 |
| PIC3A | Above | Beta bkg | 12-Apr 16:00 | 500 | 3.122 | -1.30E-1 | 1.970 | +6.29 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Beta bkg

**Reviewed by** KMJ

**Date** 4/14/14

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 12-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM or dec | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Below | Alpha eff | 12-Apr 11:49 | 5 | 7255 | 7717 | 9555 | -4.51 |
| LB4100A3 | need 2nd | Alpha XTalk | 12-Apr 11:49 | 5 | 0.366 | 0.262 | 0.374 | +2.60 |
| LB4100B3 | Below | Alpha eff | 12-Apr 11:49 | 5 | 17409 | 17650 | 21120 | -3.42 |
| LB4100C1 | Above | Alpha eff | 12-Apr 12:05 | 5 | 12101 | 10840 | 11520 | +8.12 |
| LB4100C1 | Above | Beta eff | 12-Apr 11:49 | 5 | 18560 | 16250 | 17770 | +6.12 |
| LB4100C3 | Below | Alpha eff | 12-Apr 12:05 | 5 | 8224 | 8458 | 10100 | -3.85 |
| LB4100C4 | Below | Alpha eff | 12-Apr 12:05 | 5 | 7593 | 7639 | 9591 | -3.14 |
| LB4100C4 | Above | Beta bkg | 12-Apr 10:26 | 60 | 8.850 | 0.555 | 2.577 | +21.61 |
| LB4100D1 | Below | Alpha eff | 12-Apr 12:08 | 5 | 2757 | 10830 | 12970 | -25.64 |
| LB4100D1 | Above | Alpha XTalk | 12-Apr 12:08 | 5 | 0.268 | 0.215 | 0.264 | +3.48 |
| LB4100D1 | Below | Beta eff | 12-Apr 11:57 | 5 | 24956 | 50120 | 59690 | -18.78 |
| LB4100D2 | Above | Alpha bkg | 12-Apr 10:37 | 60 | 0.383 | -3.71E-2 | 0.386 | +2.96 |
| LB4100D2 | Above | Alpha eff | 12-Apr 12:08 | 5 | 9450 | 7641 | 9274 | +3.65 |
| LB4100D2 | need 2nd | Beta bkg | 12-Apr 10:37 | 60 | 1.567 | 0.598 | 1.647 | +2.54 |
| LB4100D2 | Above | Beta eff | 12-Apr 11:57 | 5 | 27469 | 21520 | 24360 | +9.57 |
| LB4100G1 | Below | Beta eff | 12-Apr 12:22 | 5 | 15265 | 17550 | 18960 | -12.73 |
| LB4100G2 | need 2nd | Beta bkg | 12-Apr 10:19 | 60 | 1.467 | 0.526 | 1.544 | +2.54 |
| LB4100G2 | Below | Beta eff | 12-Apr 12:22 | 5 | 17815 | 18900 | 20650 | -6.72 |
| LB4100G3 | Below | Beta eff | 12-Apr 12:22 | 5 | 20746 | 23020 | 24680 | -11.22 |
| LB4100G4 | Below | Alpha eff | 12-Apr 12:14 | 5 | 10042 | 10090 | 11040 | -3.30 |
| LB4100G4 | Below | Beta eff | 12-Apr 12:22 | 5 | 18908 | 21470 | 22720 | -15.30 |
| LB4100H1 | Above | Beta bkg | 12-Apr 10:16 | 60 | 1.850 | 0.446 | 1.647 | +4.01 |
| LB4100H3 | need 2nd | Alpha eff | 12-Apr 12:14 | 5 | 19770 | 19690 | 22880 | -2.85 |
| LB4100I4 | Below | Beta eff | 12-Apr 12:04 | 5 | 20756 | 20880 | 22380 | -3.49 |
| LB4100J4 | Above | Alpha bkg | 12-Apr 10:16 | 60 | 0.433 | -6.68E-2 | 0.397 | +3.48 |
| PIC1B | Above | Alpha bkg | 12-Apr 11:05 | 60 | 0.417 | -5.36E-2 | 0.391 | +3.35 |
| PIC2B | Below | Alpha eff | 12-Apr 10:02 | 5 | 8742 | 8756 | 9768 | -3.08 |
| PIC2B | Below | Beta eff | 12-Apr 10:58 | 5 | 19306 | 19470 | 23090 | -3.27 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC3A | Above | Alpha bkg | 12-Apr 11:06 | 60 | 1.150 | -1.09E-1 | 0.333 | +14.08 |
| PIC3A | Above | Beta bkg | 12-Apr 11:06 | 60 | 7.900 | -1.30E-1 | 1.970 | +19.94 |
| PIC5A | Above | Beta bkg | 12-Apr 11:11 | 60 | 2.267 | -7.85E-1 | 1.927 | +3.75 |
| PIC5C | Above | Alpha bkg | 12-Apr 11:11 | 60 | 0.383 | -5.16E-2 | 0.393 | +2.86 |
| PIC5D | Above | Alpha bkg | 12-Apr 11:11 | 60 | 0.800 | -3.69E-2 | 0.380 | +9.05 |
| PIC5D | Above | Beta bkg | 12-Apr 11:11 | 60 | 3.750 | 0.169 | 2.772 | +5.25 |
| PIC6A | Above | Beta bkg | 12-Apr 11:11 | 60 | 2.283 | -2.48E-2 | 2.460 | +2.57 |
| PIC6B | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.417 | 0.093 | 0.372 | +3.96 |
| PIC6C | Above | Beta bkg | 12-Apr 11:12 | 60 | 1.583 | 0.299 | 1.531 | +3.25 |
| PIC7A | Above | Beta bkg | 12-Apr 11:12 | 60 | 1.533 | 0.118 | 1.095 | +5.69 |
| PIC7B | Below | Beta eff | 12-Apr 12:37 | 5 | 22679 | 22750 | 23860 | -3.38 |
| PIC8A | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.217 | -3.33E-2 | 0.185 | +3.89 |
| PIC8C | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.767 | 0.062 | 0.348 | +11.80 |
| PIC8C | Above | Beta bkg | 12-Apr 11:12 | 60 | 1.183 | 0.117 | 0.850 | +5.73 |
| PIC8C | Below | Beta eff | 12-Apr 10:15 | 5 | 24352 | 24390 | 27310 | -3.08 |
| PIC8D | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.317 | -3.46E-2 | 0.358 | +2.37 |
| PIC9D | Above | Alpha bkg | 12-Apr 11:23 | 60 | 0.417 | 0.055 | 0.363 | +4.04 |
| PIC9D | Below | Alpha eff | 12-Apr 11:09 | 5 | 10978 | 11050 | 11500 | -3.96 |
| PIC10A | Above | Beta bkg | 12-Apr 11:23 | 60 | 1.433 | 0.036 | 1.391 | +3.19 |
| PIC11A | Above | Beta bkg | 12-Apr 11:32 | 60 | 0.833 | 0.090 | 0.751 | +3.74 |
| PIC11B | need 2nd | Alpha eff | 12-Apr 11:24 | 5 | 13458 | 13320 | 14870 | -2.47 |
| PIC11B | need 2nd | Alpha XTalk | 12-Apr 11:24 | 5 | 0.311 | 0.241 | 0.311 | +2.98 |
| PIC11B | Above | Beta bkg | 12-Apr 11:32 | 60 | 2.267 | 1.057 | 2.312 | +2.78 |
| PIC11B | Below | Beta eff | 12-Apr 11:10 | 5 | 21404 | 21580 | 23950 | -3.45 |
| PIC11C | Above | Alpha bkg | 12-Apr 11:32 | 60 | 0.683 | -7.52E-2 | 0.367 | +7.29 |
| PIC11C | Above | Beta bkg | 12-Apr 11:32 | 60 | 1.867 | -3.45E-1 | 1.788 | +3.22 |
| PIC12A | Above | Alpha bkg | 12-Apr 11:32 | 60 | 0.383 | -3.97E-2 | 0.326 | +3.95 |
| PIC12A | Above | Beta bkg | 12-Apr 11:32 | 60 | 2.117 | -2.40E-1 | 2.007 | +3.29 |
| PIC12B | need 2nd | Alpha bkg | 12-Apr 11:32 | 60 | 0.083 | -5.26E-3 | 0.318 | -1.36 |
| PIC12B | Above | Beta bkg | 12-Apr 11:32 | 60 | 1.500 | 0.018 | 1.302 | +3.93 |
| PIC12C | Above | Beta bkg | 12-Apr 11:33 | 60 | 1.783 | 0.162 | 1.384 | +4.96 |
| PIC12D | Above | Alpha XTalk | 12-Apr 11:24 | 5 | 0.295 | 0.265 | 0.284 | +6.31 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC12D | Below | Beta eff | 12-Apr 11:10 | 5 | 44281 | 45230 | 48150 | -4.95 |
| PIC13A | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.433 | -6.82E-2 | 0.394 | +3.51 |
| PIC13B | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.517 | -7.18E-2 | 0.387 | +4.70 |
| PIC13B | Above | Beta bkg | 12-Apr 11:33 | 60 | 2.100 | -4.61E-1 | 2.120 | +2.95 |
| PIC13C | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.350 | -8.64E-2 | 0.370 | +2.74 |
| PIC13C | Below | Alpha eff | 12-Apr 11:15 | 5 | 9835 | 9893 | 11400 | -3.23 |
| PIC13C | need 2nd | Beta bkg | 12-Apr 11:33 | 60 | 1.217 | -5.86E-1 | 1.840 | +1.46 |
| PIC13D | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.500 | -2.30E-2 | 0.391 | +4.58 |
| PIC13D | need 2nd | Alpha eff | 12-Apr 11:15 | 5 | 11162 | 11070 | 11520 | -1.77 |
| PIC13D | Above | Beta bkg | 12-Apr 11:33 | 60 | 1.933 | -1.82E-1 | 1.915 | +3.05 |
| PIC14B | Below | Alpha eff | 12-Apr 11:31 | 5 | 9792 | 9895 | 11040 | -3.54 |
| PIC14B | need 2nd | Beta bkg | 12-Apr 11:39 | 60 | 0.900 | -1.22E-1 | 1.083 | +2.09 |
| PIC14B | Below | Beta eff | 12-Apr 11:25 | 5 | 22775 | 23580 | 26300 | -4.78 |
| PIC14D | Below | Alpha eff | 12-Apr 11:32 | 5 | 14763 | 15070 | 16840 | -4.04 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

**Reviewed by** R. Brink

**Date** 4-12-14

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 14-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM or dec | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | need 2nd | Beta bkg | 14-Apr 05:47 | 60 | 1.083 | 0.676 | 1.605 | -0.37 |
| LB4100C1 | Above | Alpha eff | 14-Apr 08:51 | 5 | 12163 | 10840 | 11520 | +8.67 |
| LB4100C1 | Above | Beta eff | 14-Apr 07:05 | 5 | 18170 | 16250 | 17770 | +4.58 |
| LB4100C2 | Below | Alpha eff | 14-Apr 08:59 | 5 | 12483 | 12650 | 14880 | -3.45 |
| LB4100C2 | Above | Alpha XTalk | 14-Apr 08:59 | 5 | 0.290 | 0.215 | 0.282 | +3.77 |
| LB4100C2 | need 2nd | Beta bkg | 14-Apr 07:45 | 60 | 1.733 | 0.772 | 1.985 | +1.75 |
| LB4100C3 | Below | Alpha eff | 14-Apr 08:51 | 5 | 8082 | 8458 | 10100 | -4.37 |
| LB4100C4 | Above | Beta bkg | 14-Apr 05:54 | 60 | 12.200 | 0.555 | 2.577 | +31.55 |
| LB4100C4 | need 2nd | Beta XTalk | 14-Apr 07:05 | 5 | 8.94E-5 | 5.82E-5 | 3.79E-4 | -2.42 |
| LB4100D1 | Below | Alpha eff | 14-Apr 08:05 | 5 | 2343 | 10830 | 12970 | -26.80 |
| LB4100D1 | Above | Alpha XTalk | 14-Apr 08:05 | 5 | 0.279 | 0.215 | 0.264 | +4.86 |
| LB4100D1 | Below | Beta bkg | 14-Apr 06:06 | 60 | 0.283 | 0.411 | 1.470 | -3.72 |
| LB4100D1 | Below | Beta eff | 14-Apr 07:41 | 5 | 23715 | 50120 | 59690 | -19.55 |
| LB4100D2 | need 2nd | Alpha bkg | 14-Apr 06:06 | 60 | 0.217 | -3.71E-2 | 0.386 | +0.60 |
| LB4100D2 | Above | Alpha eff | 14-Apr 08:05 | 5 | 9937 | 7641 | 9274 | +5.44 |
| LB4100D2 | Above | Beta eff | 14-Apr 07:41 | 5 | 29600 | 21520 | 24360 | +14.07 |
| LB4100D3 | Above | Alpha eff | 14-Apr 08:08 | 5 | 21883 | 18220 | 20980 | +4.96 |
| LB4100D4 | Above | Alpha eff | 14-Apr 08:05 | 5 | 19104 | 15600 | 18200 | +5.09 |
| LB4100G2 | Above | Beta bkg | 14-Apr 05:46 | 60 | 1.717 | 0.526 | 1.544 | +4.02 |
| LB4100G4 | need 2nd | Beta bkg | 14-Apr 05:46 | 60 | 0.833 | 0.465 | 1.556 | -0.98 |
| LB4100G4 | Below | Beta eff | 14-Apr 06:50 | 5 | 21396 | 21470 | 22720 | -3.35 |
| LB4100J4 | Above | Alpha bkg | 14-Apr 05:47 | 60 | 0.633 | -6.68E-2 | 0.397 | +6.07 |
| PIC3A | Above | Alpha bkg | 14-Apr 05:56 | 60 | 1.400 | -1.09E-1 | 0.333 | +17.47 |
| PIC3A | Above | Beta bkg | 14-Apr 05:56 | 60 | 10.667 | -1.30E-1 | 1.970 | +27.84 |
| PIC4B | need 2nd | Alpha eff | 14-Apr 05:48 | 5 | 9060 | 8981 | 9434 | -1.96 |
| PIC4B | Above | Beta bkg | 14-Apr 08:12 | 60 | 2.150 | 0.393 | 2.054 | +3.35 |
| PIC5D | Above | Beta bkg | 14-Apr 10:02 | 60 | 2.183 | 0.169 | 2.772 | +1.64 |
| PIC6A | Above | Beta bkg | 14-Apr 10:02 | 60 | 2.283 | -2.48E-2 | 2.460 | +2.57 |
| PIC10D | Below | Alpha eff | 14-Apr 06:08 | 5 | 16885 | 16900 | 17890 | -3.09 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC10D | need 2nd | Beta eff | 14-Apr 06:17 | 5 | 44557 | 44060 | 46690 | -1.87 |
| PIC11B | need 2nd | Alpha XTalk | 14-Apr 06:17 | 5 | 0.308 | 0.241 | 0.311 | +2.70 |
| PIC11B | Above | Beta bkg | 14-Apr 06:41 | 60 | 3.083 | 1.057 | 2.312 | +6.69 |
| PIC11B | Below | Beta eff | 14-Apr 06:09 | 5 | 21166 | 21580 | 23950 | -4.05 |
| PIC12D | Above | Alpha XTalk | 14-Apr 08:32 | 5 | 0.291 | 0.265 | 0.284 | +5.27 |
| PIC12D | Below | Beta eff | 14-Apr 06:09 | 5 | 44447 | 45230 | 48150 | -4.61 |
| PIC13C | Below | Alpha eff | 14-Apr 06:24 | 5 | 9859 | 9893 | 11400 | -3.13 |
| PIC14B | Below | Alpha eff | 14-Apr 06:24 | 5 | 9841 | 9895 | 11040 | -3.29 |
| PIC14B | Above | Beta bkg | 14-Apr 07:50 | 60 | 1.883 | -1.22E-1 | 1.083 | +6.98 |
| PIC14D | Below | Alpha eff | 14-Apr 06:24 | 5 | 14698 | 15070 | 16840 | -4.26 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

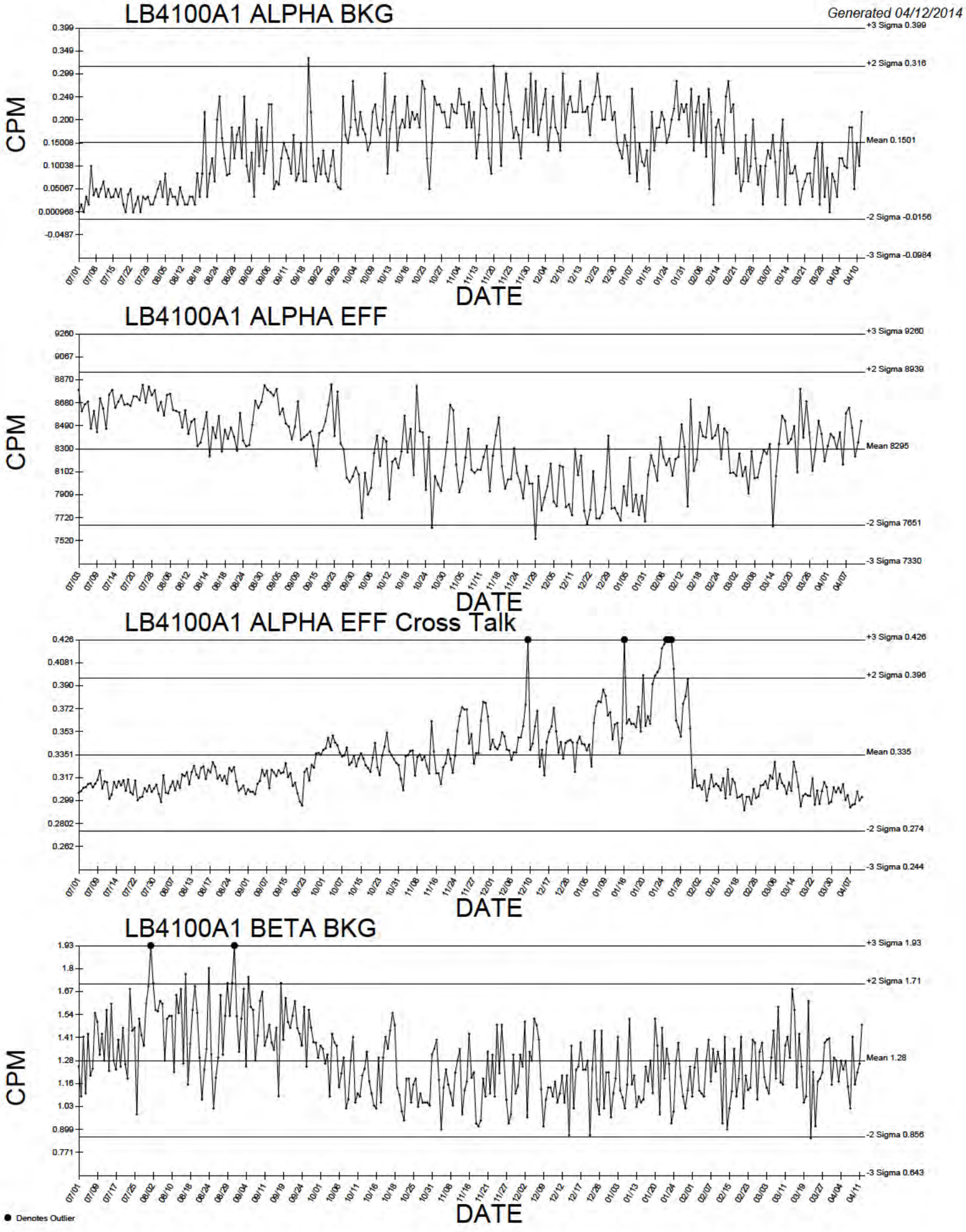
PIC6D Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

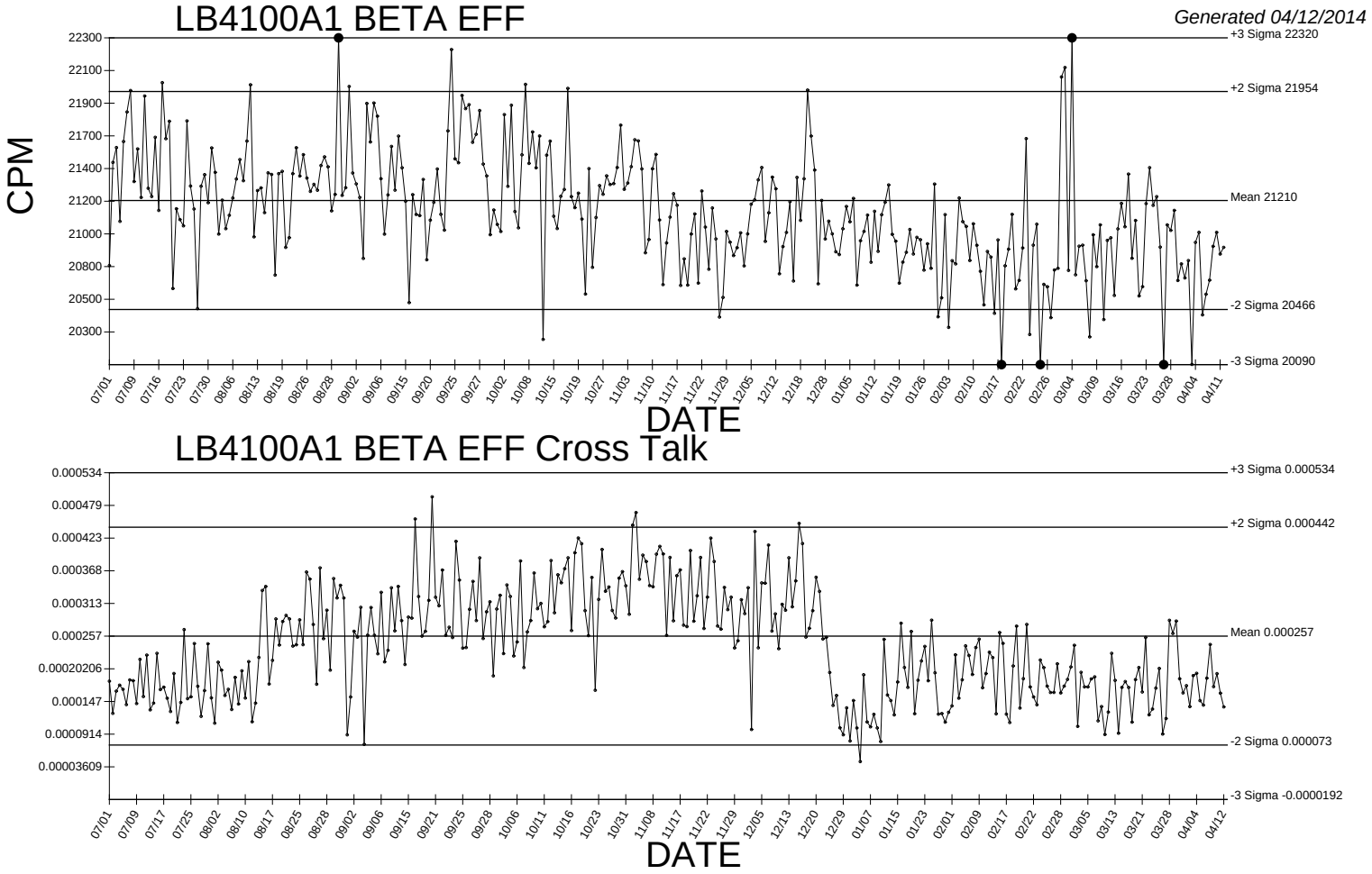
**Reviewed by** _____

**Date** 4/14/14

GEL Laboratories LLC

# Background and Efficiency Data

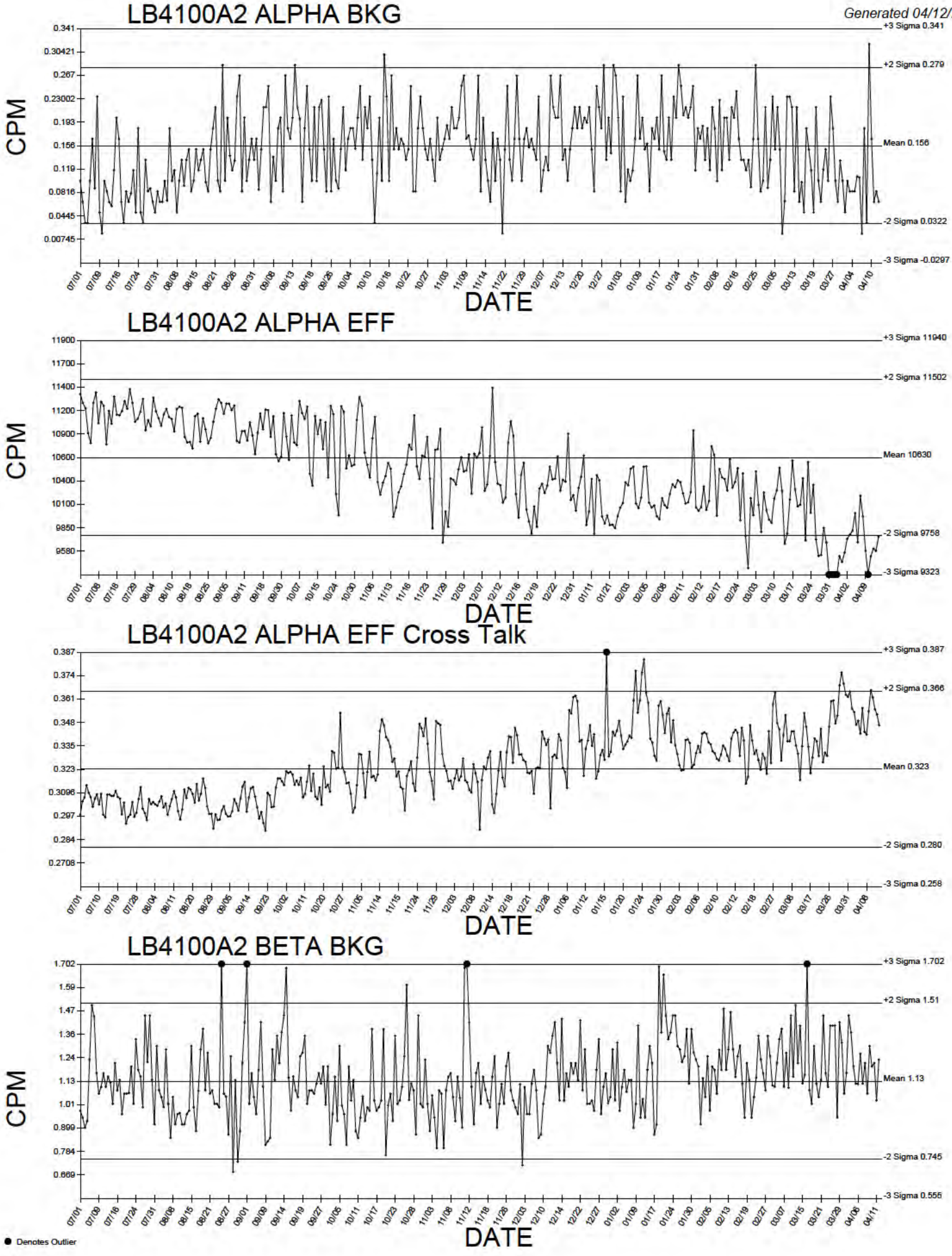

LB4100A1 ALPHA BKG
Generated 04/12/2014
CPM
DATE
+3 Sigma 0.399
+2 Sigma 0.316
Mean 0.1501
-2 Sigma -0.0156
-3 Sigma -0.0984
LB4100A1 ALPHA EFF
+3 Sigma 9260
+2 Sigma 8939
Mean 8295
-2 Sigma 7651
-3 Sigma 7330
LB4100A1 ALPHA EFF Cross Talk
+3 Sigma 0.426
+2 Sigma 0.396
Mean 0.335
-2 Sigma 0.274
-3 Sigma 0.244
LB4100A1 BETA BKG
+3 Sigma 1.93
+2 Sigma 1.71
Mean 1.28
-2 Sigma 0.856
-3 Sigma 0.643
● Denotes Outlier

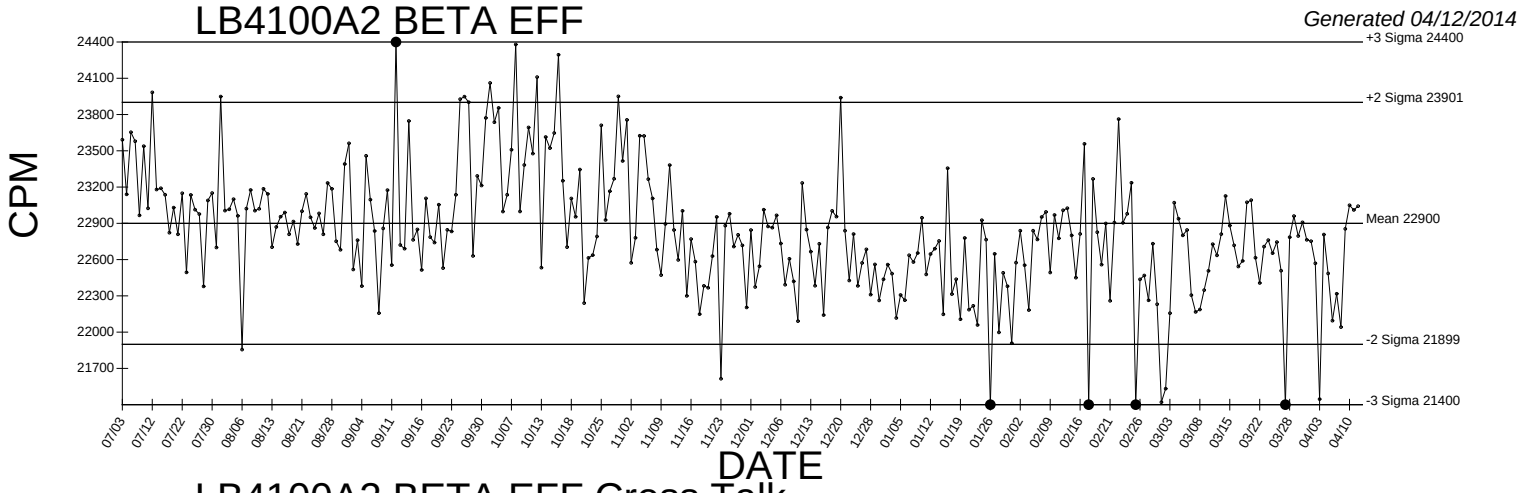


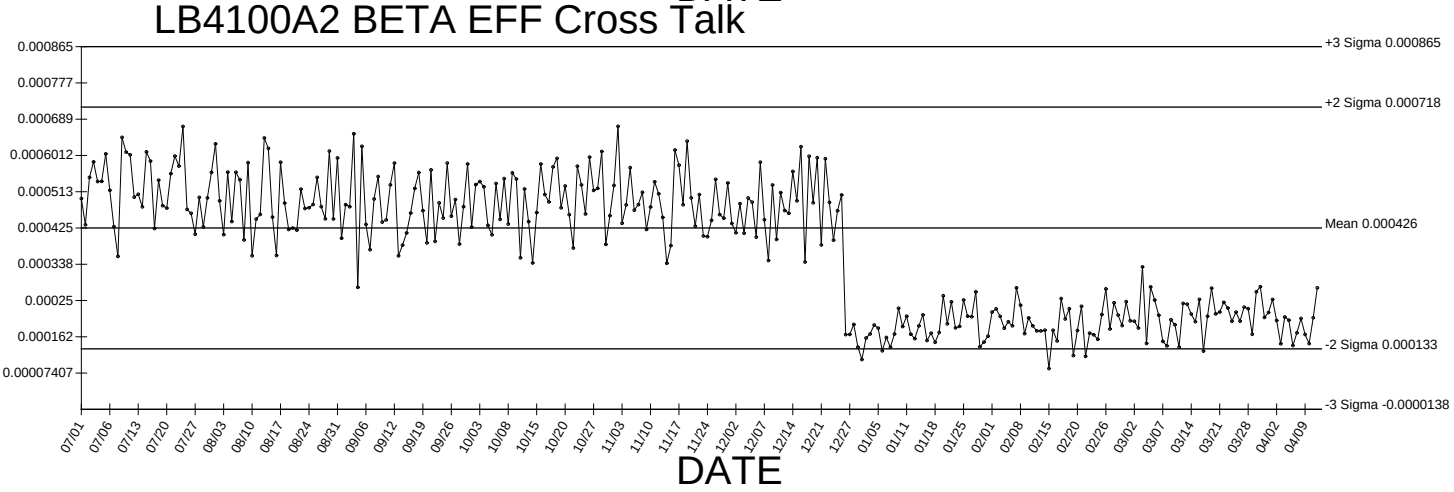




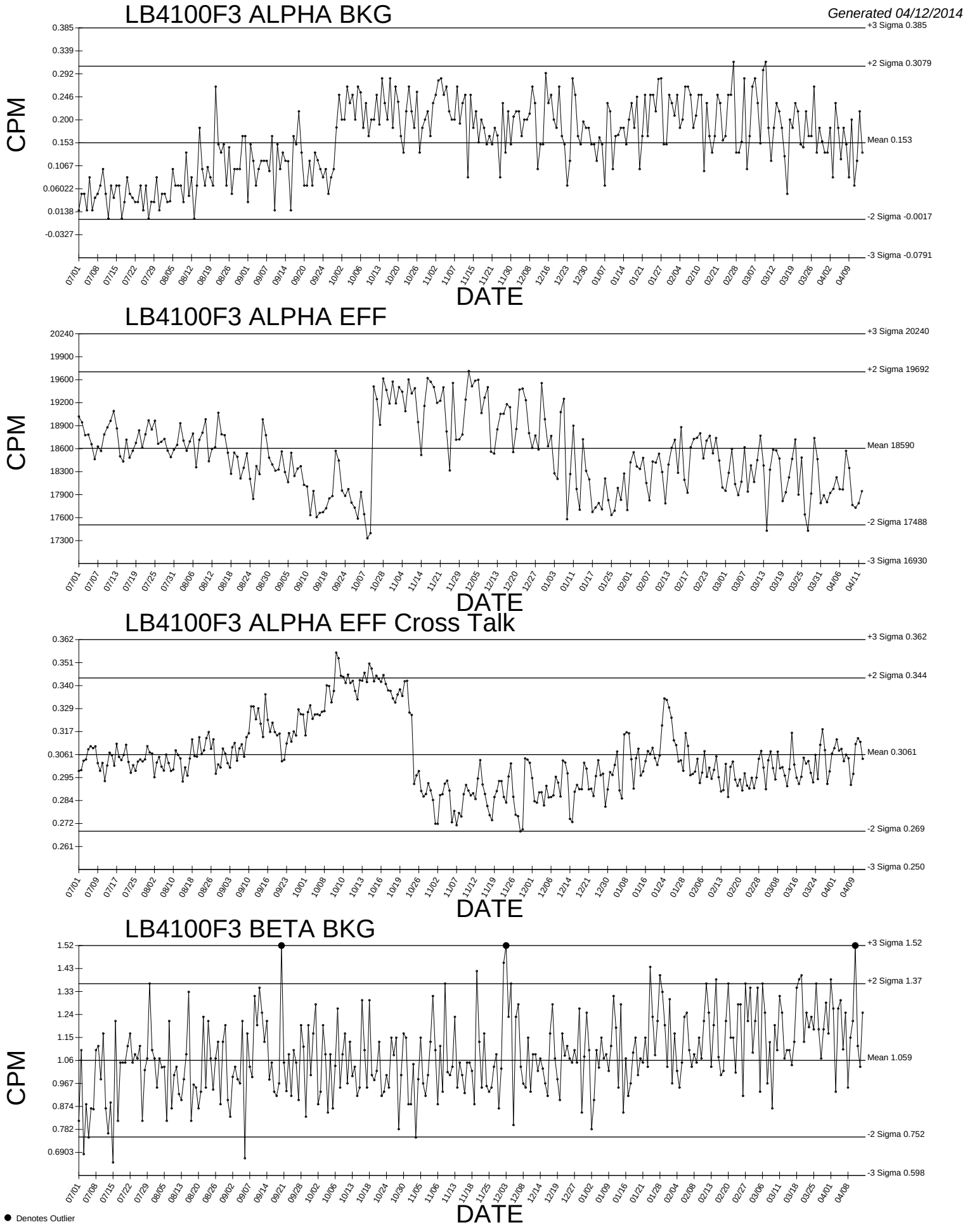
● Denotes Outlier

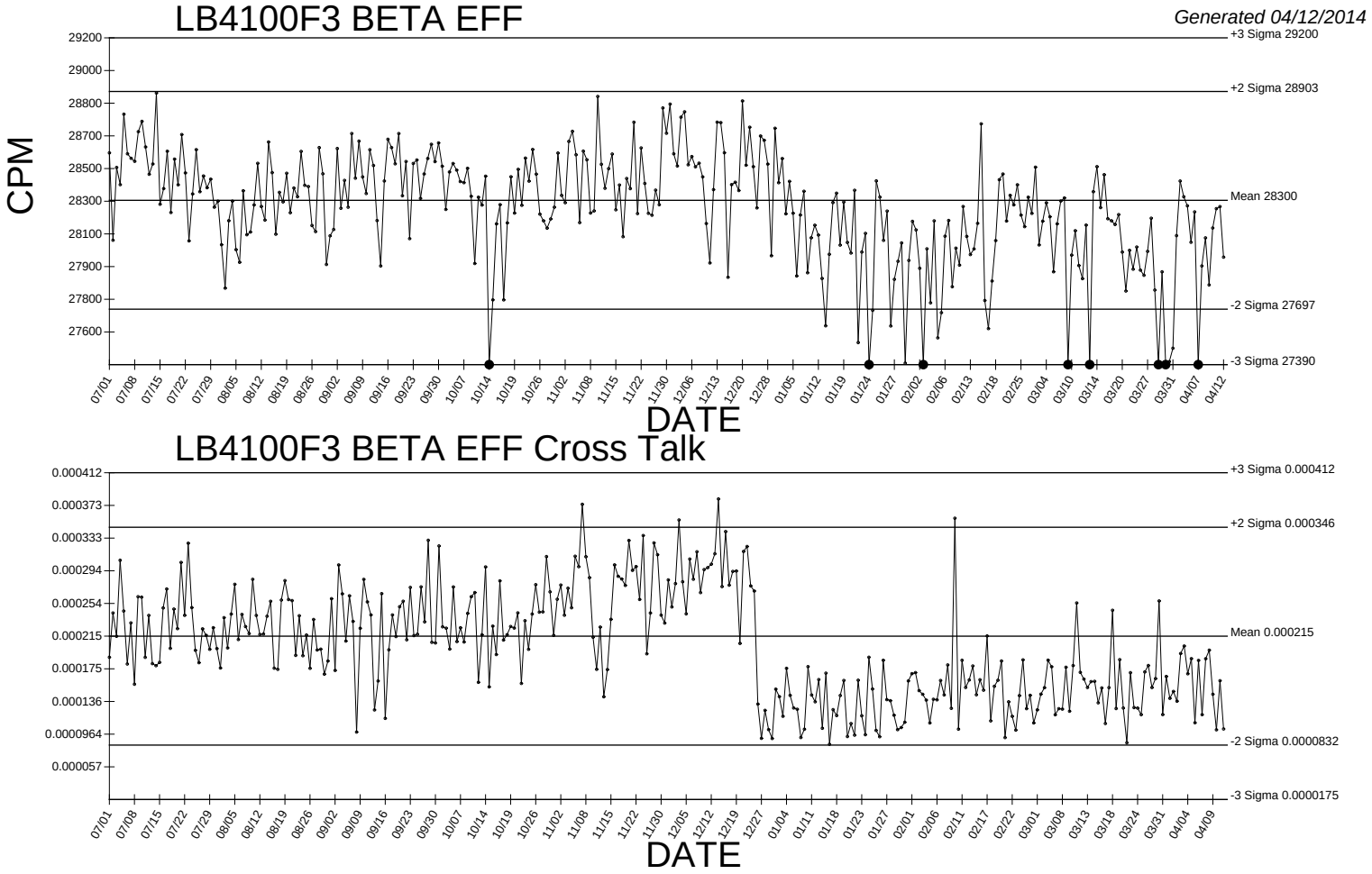

LB4100A2 ALPHA BKG
Generated 04/12/2014
CPM
DATE
+3 Sigma 0.341
+2 Sigma 0.279
Mean 0.156
-2 Sigma 0.0322
-3 Sigma -0.0297
LB4100A2 ALPHA EFF
+3 Sigma 11940
+2 Sigma 11502
Mean 10630
-2 Sigma 9758
-3 Sigma 9323
LB4100A2 ALPHA EFF Cross Talk
+3 Sigma 0.387
+2 Sigma 0.366
Mean 0.323
-2 Sigma 0.280
-3 Sigma 0.258
LB4100A2 BETA BKG
+3 Sigma 1.702
+2 Sigma 1.51
Mean 1.13
-2 Sigma 0.745
-3 Sigma 0.555
Denotes Outlier



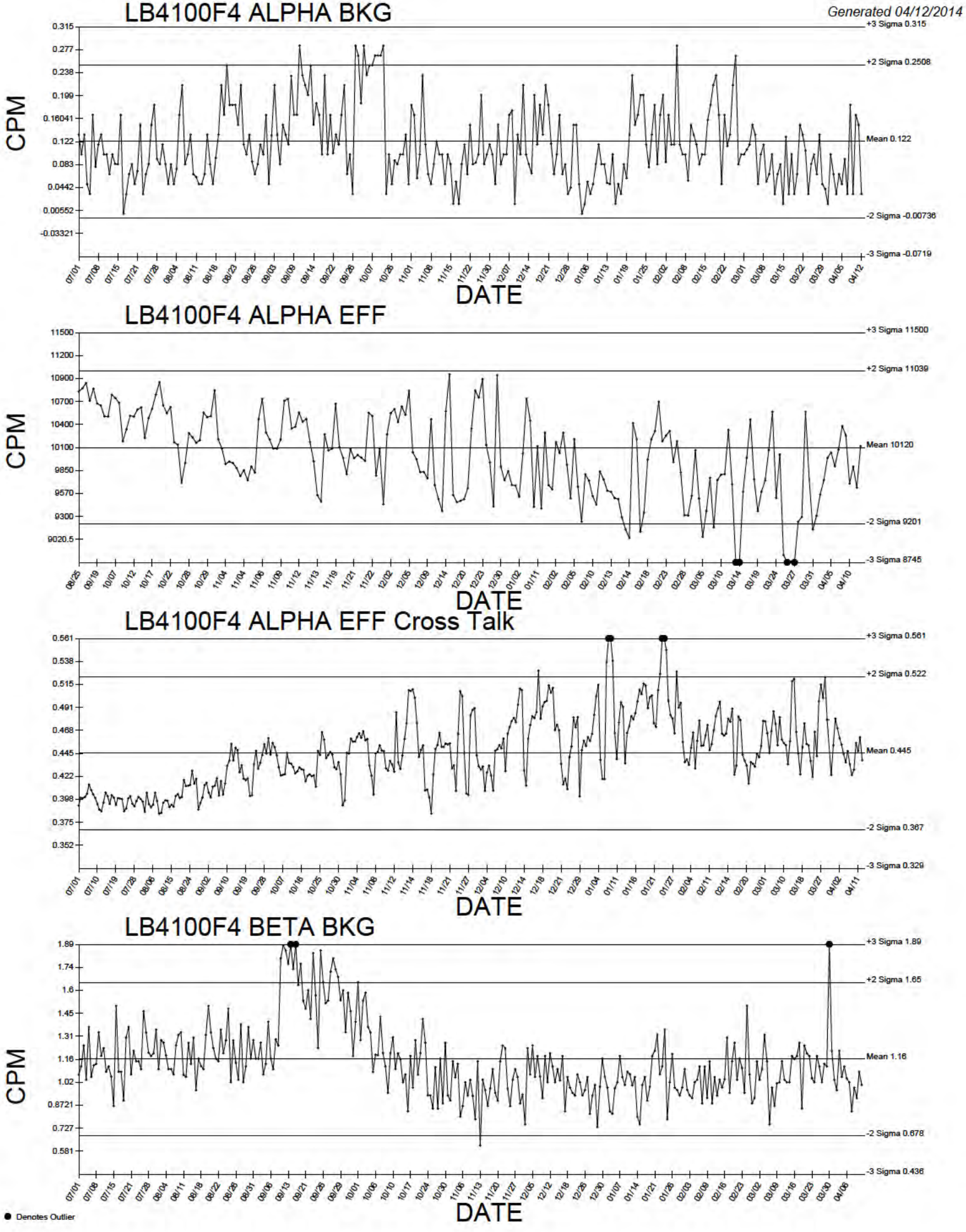



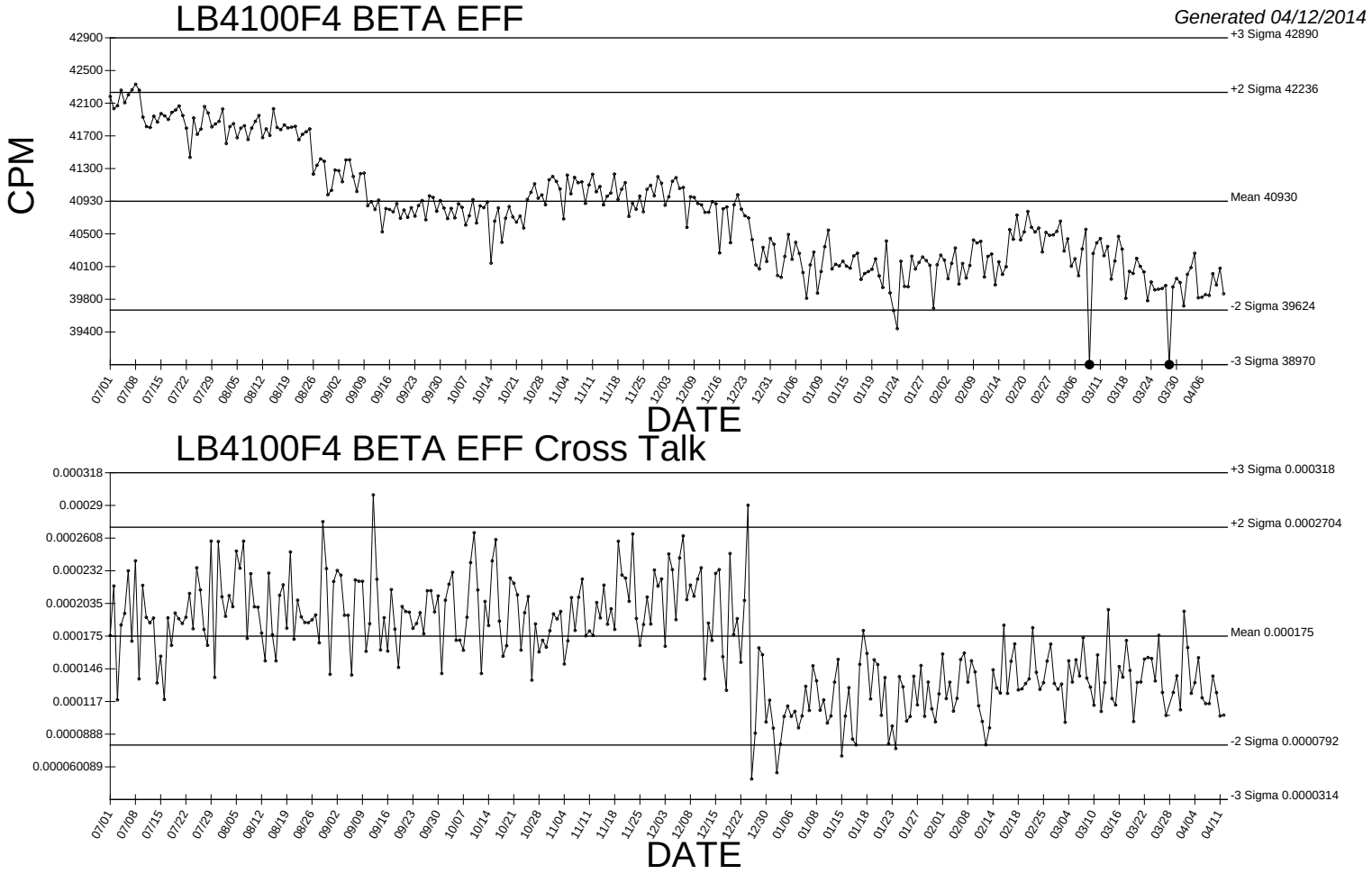

● Denotes Outlier


LB4100F3 ALPHA BKG
Generated 04/12/2014
CPM
0.385
0.339
0.292
0.246
0.200
0.153
0.1067
0.06022
0.0138
-0.0327
+3 Sigma 0.385
+2 Sigma 0.3079
Mean 0.153
-2 Sigma -0.0017
-3 Sigma -0.0791
07/01 07/08 07/15 07/22 07/29 08/05 08/12 08/19 08/26 09/01 09/07 09/14 09/20 09/24 10/02 10/06 10/13 10/20 10/26 11/02 11/07 11/15 11/21 11/30 12/08 12/16 12/23 12/30 01/07 01/14 01/21 01/27 02/04 02/10 02/21 02/28 03/07 03/12 03/19 03/26 04/02 04/09
DATE
LB4100F3 ALPHA EFF
CPM
20240
19900
19600
19200
18900
18600
18300
17900
17600
17300
+3 Sigma 20240
+2 Sigma 19692
Mean 18590
-2 Sigma 17488
-3 Sigma 16930
07/01 07/07 07/13 07/19 07/25 07/31 08/06 08/12 08/18 08/24 08/30 09/05 09/10 09/18 09/24 10/07 10/28 11/04 11/14 11/21 11/29 12/05 12/13 12/20 12/27 01/03 01/11 01/17 01/25 02/01 02/07 02/13 02/17 02/23 03/01 03/07 03/13 03/19 03/25 03/31 04/06 04/11
DATE
LB4100F3 ALPHA EFF Cross Talk
0.362
0.351
0.340
0.329
0.317
0.3061
0.295
0.284
0.272
0.261
+3 Sigma 0.362
+2 Sigma 0.344
Mean 0.3061
-2 Sigma 0.269
-3 Sigma 0.250
07/01 07/09 07/17 07/25 08/02 08/10 08/18 08/26 09/03 09/10 09/16 09/23 10/01 10/08 10/10 10/13 10/16 10/19 10/26 11/02 11/07 11/12 11/19 11/26 12/01 12/06 12/14 12/21 12/30 01/08 01/16 01/24 01/28 02/06 02/13 02/20 02/28 03/08 03/16 03/24 04/01 04/09
DATE
LB4100F3 BETA BKG
CPM
1.52
1.43
1.33
1.24
1.15
1.06
0.967
0.874
0.782
0.6903
+3 Sigma 1.52
+2 Sigma 1.37
Mean 1.059
-2 Sigma 0.752
-3 Sigma 0.598
07/01 07/08 07/15 07/22 07/29 08/05 08/13 08/20 08/26 09/02 09/07 09/14 09/21 09/28 10/02 10/06 10/13 10/18 10/24 10/30 11/05 11/06 11/13 11/18 11/25 12/03 12/08 12/14 12/19 12/27 01/02 01/09 01/16 01/21 01/28 02/04 02/08 02/13 02/20 02/27 03/06 03/11 03/18 03/25 04/01 04/08
DATE
● Denotes Outlier




● Denotes Outlier

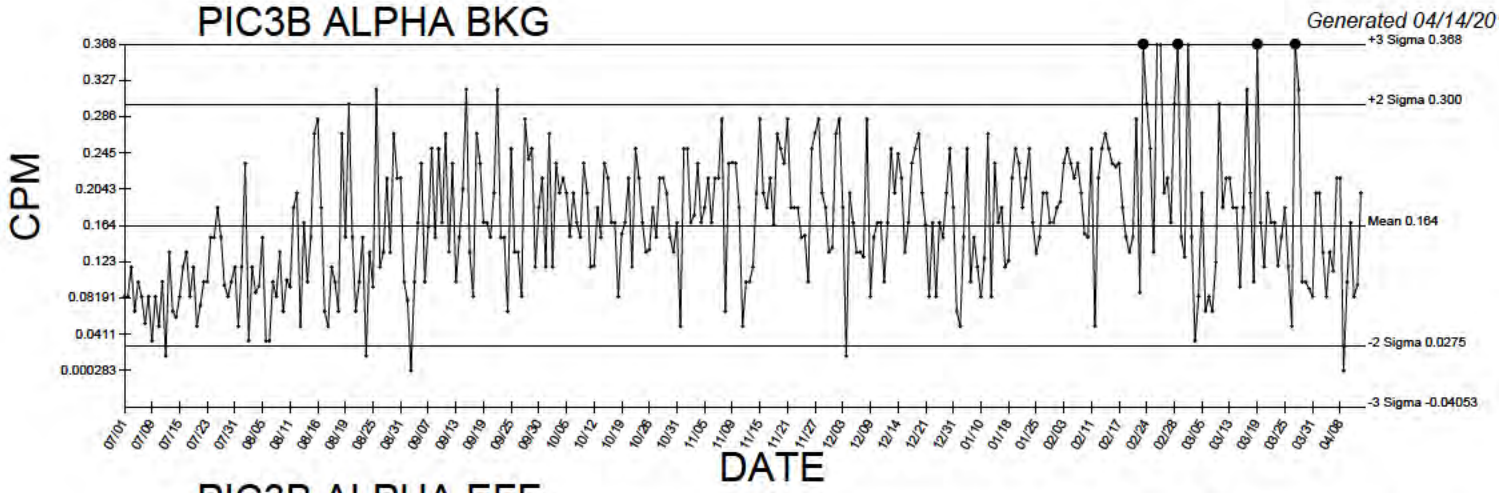

LB4100F4 ALPHA BKG
Generated 04/12/2014
CPM
0.315
0.277
0.238
0.199
0.16041
0.122
0.083
0.0442
0.00552
-0.03321
+3 Sigma 0.315
+2 Sigma 0.2508
Mean 0.122
-2 Sigma -0.00736
-3 Sigma -0.0719
07/01 07/08 07/15 07/21 07/28 08/04 08/11 08/18 08/23 08/26 09/03 09/09 09/14 09/22 09/26 10/07 10/26 11/01 11/08 11/15 11/22 11/30 12/07 12/14 12/21 12/28 01/06 01/13 01/19 01/25 02/02 02/08 02/15 02/22 03/01 03/08 03/15 03/22 03/29 04/05 04/12
DATE
LB4100F4 ALPHA EFF
CPM
11500
11200
10900
10700
10400
10100
9850
9570
9300
9020.5
+3 Sigma 11500
+2 Sigma 11039
Mean 10120
-2 Sigma 9201
-3 Sigma 8745
08/25 09/19 10/07 10/12 10/17 10/22 10/28 10/29 11/04 11/04 11/06 11/09 11/12 11/13 11/19 11/21 11/22 12/02 12/05 12/09 12/14 12/20 12/23 12/30 01/02 01/11 02/02 02/05 02/10 02/13 02/14 02/18 02/23 02/28 03/05 03/10 03/14 03/19 03/24 03/27 03/31 04/05 04/10
DATE
LB4100F4 ALPHA EFF Cross Talk
0.561
0.538
0.515
0.491
0.468
0.445
0.422
0.398
0.375
0.352
+3 Sigma 0.561
+2 Sigma 0.522
Mean 0.445
-2 Sigma 0.367
-3 Sigma 0.329
07/01 07/10 07/19 07/28 08/06 08/15 08/24 09/02 09/10 09/19 09/28 10/07 10/16 10/25 10/30 11/04 11/08 11/12 11/14 11/18 11/21 11/27 12/04 12/10 12/14 12/18 12/21 12/29 01/04 01/11 01/16 01/21 01/27 02/04 02/11 02/14 02/20 03/01 03/10 03/18 03/27 04/02 04/11
DATE
LB4100F4 BETA BKG
CPM
1.89
1.74
1.6
1.45
1.31
1.16
1.02
0.8721
0.727
0.581
+3 Sigma 1.89
+2 Sigma 1.65
Mean 1.16
-2 Sigma 0.678
-3 Sigma 0.436
07/01 07/08 07/15 07/21 07/28 08/04 08/11 08/18 08/22 08/28 08/31 09/06 09/13 09/21 09/26 09/29 10/01 10/06 10/10 10/17 10/24 10/30 11/06 11/13 11/20 11/27 12/05 12/12 12/18 12/26 12/30 01/07 01/14 01/21 01/28 02/03 02/09 02/16 02/23 03/02 03/09 03/16 03/23 03/30 04/06
DATE
Denotes Outlier

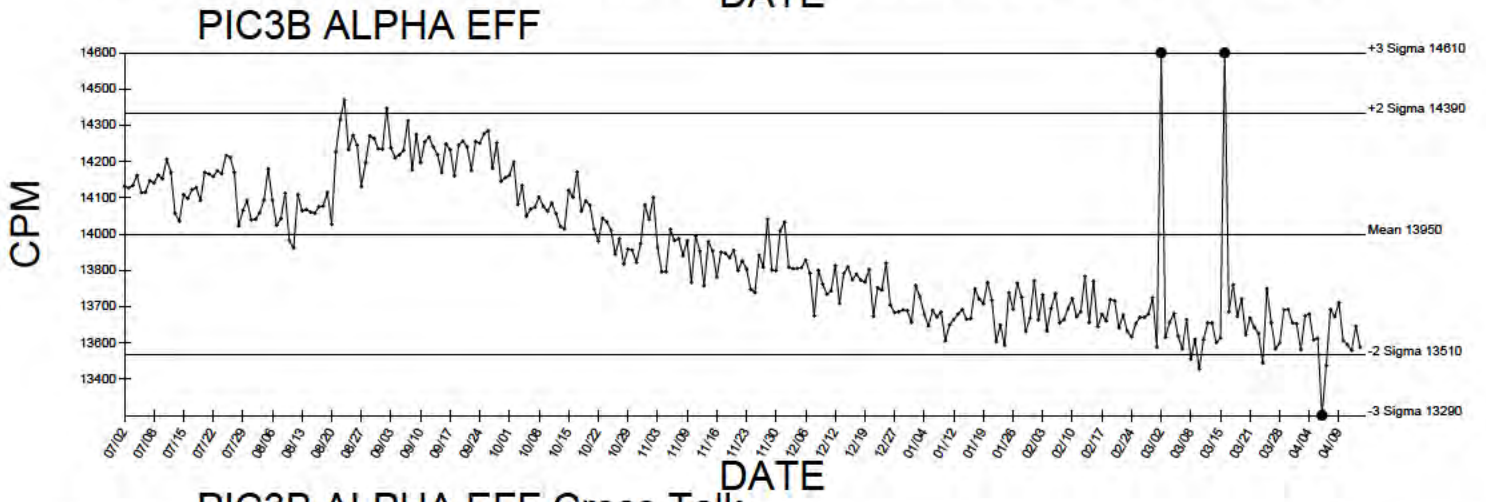


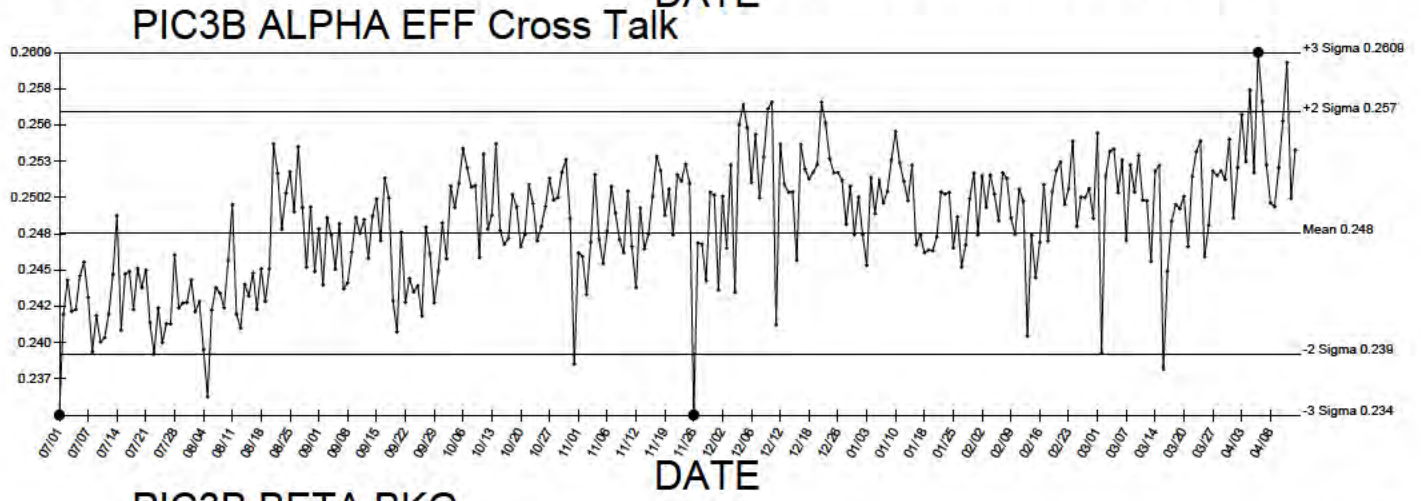


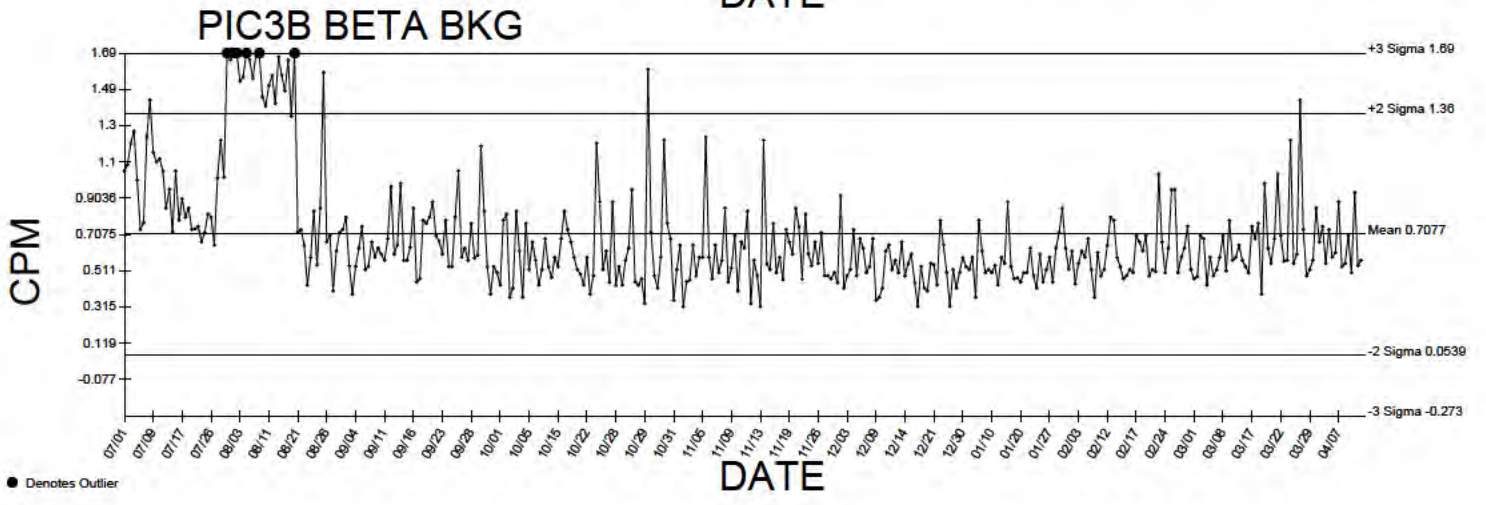


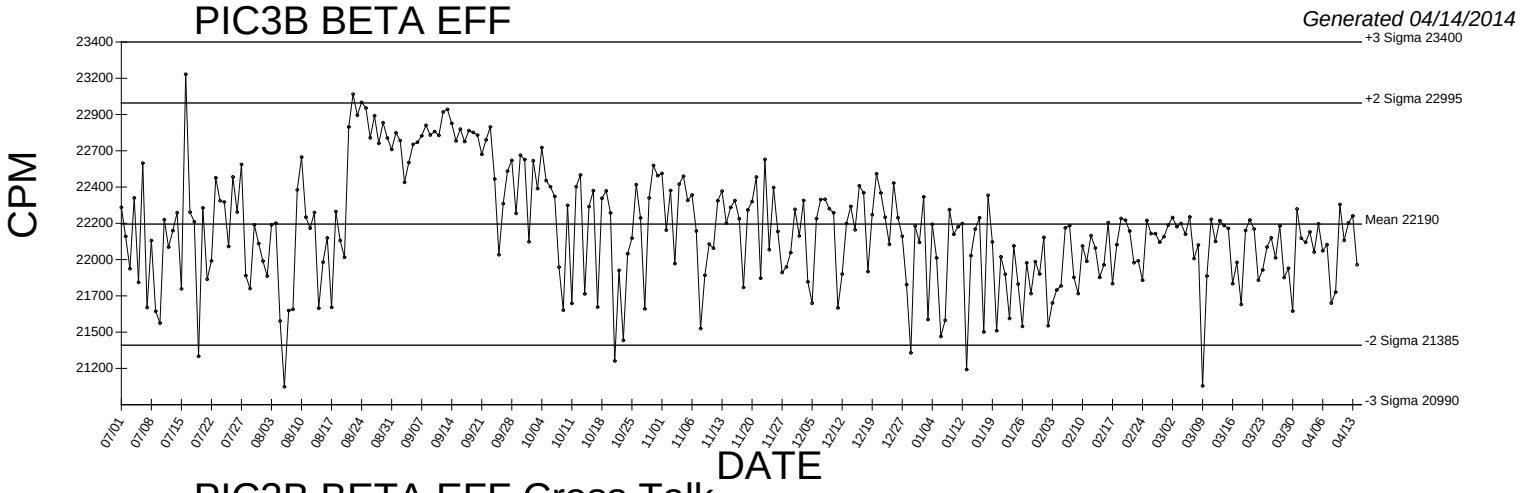
● Denotes Outlier

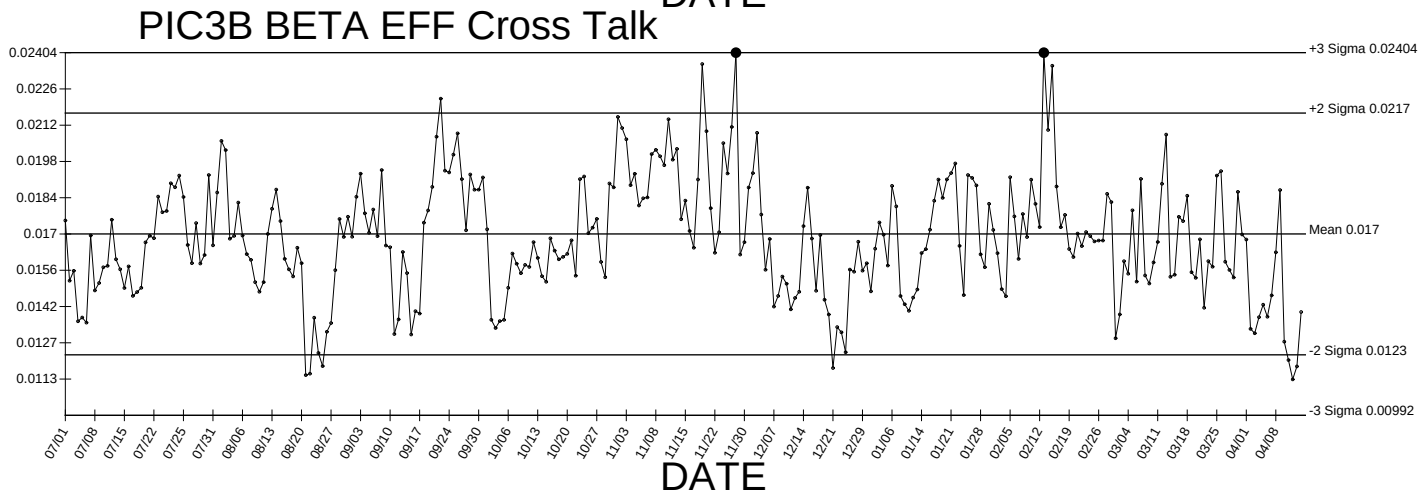

PIC3B ALPHA BKG
Generated 04/14/2014
CPM
0.368
0.327
0.286
0.245
0.2043
0.164
0.123
0.08191
0.0411
0.000283
+3 Sigma 0.368
+2 Sigma 0.300
Mean 0.164
-2 Sigma 0.0275
-3 Sigma -0.04053
DATE


PIC3B ALPHA EFF
CPM
14600
14500
14300
14200
14100
14000
13800
13700
13600
13400
+3 Sigma 14610
+2 Sigma 14390
Mean 13950
-2 Sigma 13510
-3 Sigma 13290
DATE

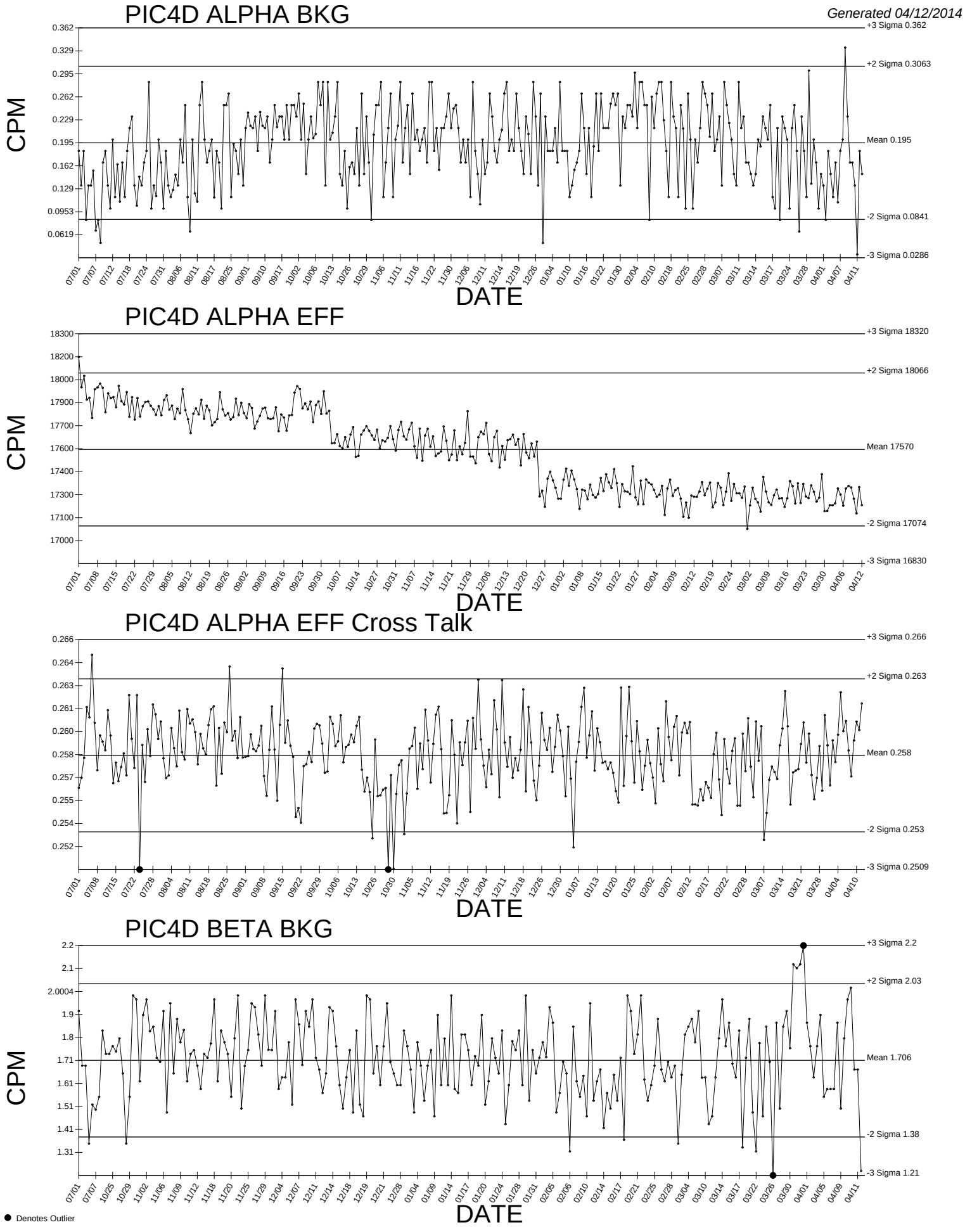

PIC3B ALPHA EFF Cross Talk
0.2609
0.258
0.256
0.253
0.2502
0.248
0.245
0.242
0.240
0.237
+3 Sigma 0.2609
+2 Sigma 0.257
Mean 0.248
-2 Sigma 0.239
-3 Sigma 0.234
DATE

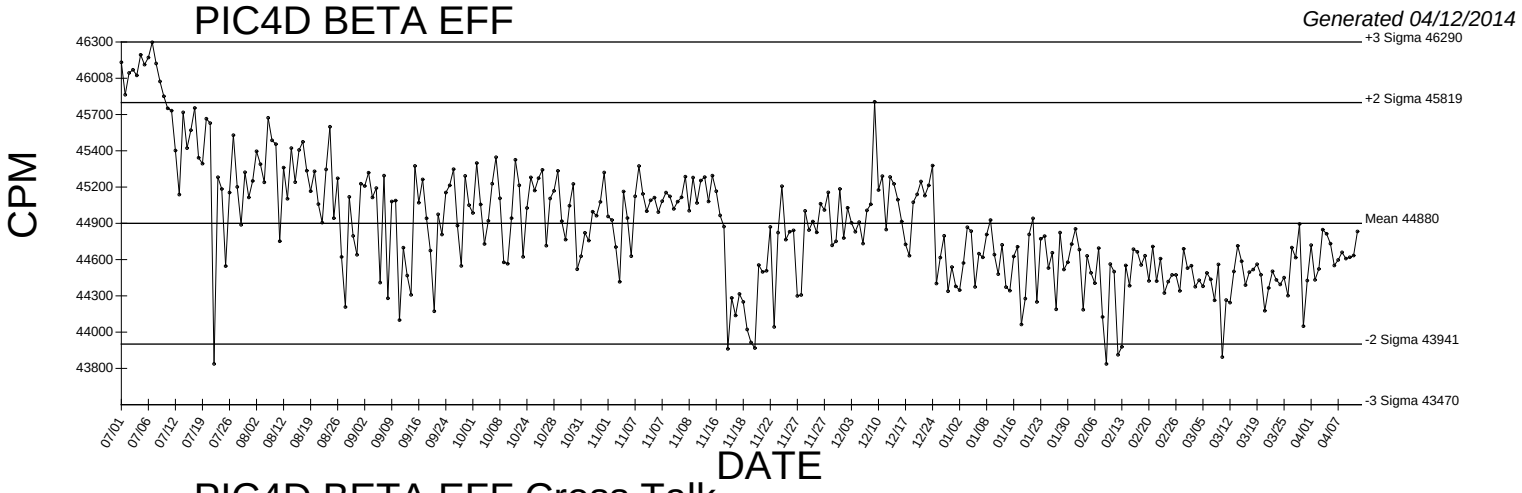

PIC3B BETA BKG
CPM
1.69
1.49
1.3
1.1
0.9036
0.7075
0.511
0.315
0.119
-0.077
+3 Sigma 1.69
+2 Sigma 1.36
Mean 0.7077
-2 Sigma 0.0539
-3 Sigma -0.273
DATE
Denotes Outlier

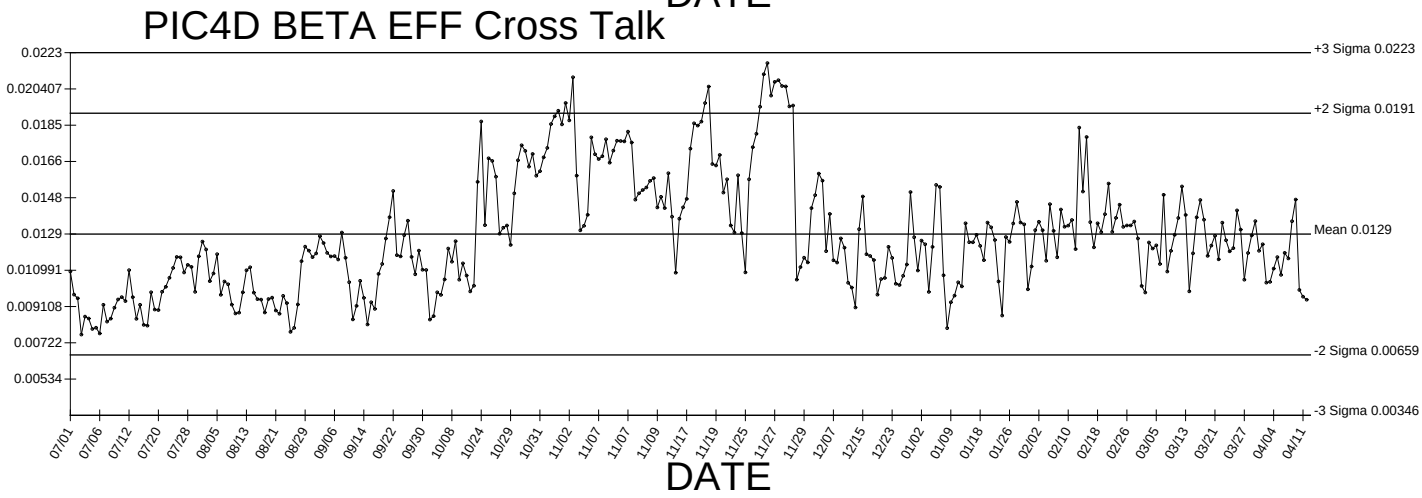



● Denotes Outlier


PIC4D ALPHA BKG
Generated 04/12/2014
CPM
DATE
+3 Sigma 0.362
+2 Sigma 0.3063
Mean 0.195
-2 Sigma 0.0841
-3 Sigma 0.0286
PIC4D ALPHA EFF
+3 Sigma 18320
+2 Sigma 18066
Mean 17570
-2 Sigma 17074
-3 Sigma 16830
PIC4D ALPHA EFF Cross Talk
+3 Sigma 0.266
+2 Sigma 0.263
Mean 0.258
-2 Sigma 0.253
-3 Sigma 0.2509
PIC4D BETA BKG
+3 Sigma 2.2
+2 Sigma 2.03
Mean 1.706
-2 Sigma 1.38
-3 Sigma 1.21
Denotes Outlier




● Denotes Outlier

# RAD Standards Traceability

# Standardization of Strontium Carrier 2046474

v1.2

| Analyst | AF1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Strontium |
| Serial Number | 2046474 |
| Amount of Std. (mL) | 0.5 |
| Standard Prepared | 12/5/2013 |

| Parent Information | |
|---|---|
| Parent Serial # | 1949033 |
| Parent Exp. Date | 8/5/2015 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Strontium/mL | mg Strontium/g |
|---|---|---|---|---|---|---|
| 1 | 0.5000 | 0.0238 | 0.0320 | 0.0082 | 16.40 | 16.40 |
| 2 | 0.5100 | 0.0242 | 0.0325 | 0.0083 | 16.60 | 16.27 |
| 3 | 0.5200 | 0.0244 | 0.0325 | 0.0081 | 16.20 | 15.58 |
| 4 | 0.5100 | 0.0248 | 0.0330 | 0.0082 | 16.40 | 16.08 |

| | |
|---|---|
| **Mean Value (mg/mL) =** | 16.40 |
| **Stdev (mg/mL) =** | ± 0.16 |
| **1.0% of Mean Value =** | 0.164000 |
| | **Pass** |
| **Expiration Date** | **12/5/2014** |
| **Mean Value (mg/0.5mL) =** | 8.20 |

**Standardization Rule**

**A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.**

M 12/10/13

Amanda L. Fehn

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.856 E5 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: W. Mao, Radiochemist

QA Approved: D. M. Montgomery, QA Manager  Date: 10/3/08

RECEIVED

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1243 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 10.41484 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-124 |

| A Solution Material Info | | | |
|---|---|---|---|
| Isotope: | Strontium-90 | | |
| Prepared By: | Daniel Roy | | |
| Prep Date: | 12/19/2008 | | |
| Verification Date: | 12/04/2013 | | |
| Expiration Date: | 12/04/2014 | | |
| Primary Code: | 1243-A | | |
| Dilution(mL): | 100 mL | | |
| Mass of Parent(g): | 10.2164 g | | |
| Density(g/mL): | 0.9991 | Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL) |
|---|
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g) |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL ) = 226951.7634 dpm/mL |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / ( 0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|
| 01/21/2010 | Bethany Fiem | 2.2467 | 1000 | 1243-B | 510.329369 dpm/mL | 01/21/2010 | 01/21/2011 |
| 08/03/2010 | Bethany Fiem | 2.5604 | 1000 | 1243-C | 581.5851 dpm/mL | 08/03/2010 | 08/03/2011 |
| 01/12/2011 | Bethany Fiem | 2.4946 | 1000 | 1243-D | 566.6389 dpm/mL | 01/12/2011 | 01/12/2012 |
| 08/12/2011 | Tim Chandler | 3.3115 | 100 | 1243-G | 18.7877 dpm/mL | 03/26/2014 | 03/25/2015 |
| 08/17/2011 | Tim Chandler | 2.5541 | 100 | 1243-H | 14.49064 dpm/mL | 03/26/2014 | 03/25/2015 |
| 06/21/2011 | Tim Chandler | .0235 | 100 | 1243-E | 53.37936 dpm/mL | 03/19/2014 | 06/20/2014 |
| 07/05/2011 | Bethany Fiem | 2.6072 | 1000 | 1243-F | 592.2156 dpm/mL | 07/05/2011 | 07/05/2012 |
| 01/31/2012 | Gregory Ramsay | 2.6792 | 1000 | 1243-I | 608.5701 dpm/ml | 01/31/2012 | 01/31/2013 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 08/29/2012 | Bethany Fiem | 2.6799 | 1000 | 1243-J | 608.729104 dpm/mL | 09/14/2012 | 09/11/2013 |
| 02/12/2013 | Gregory Ramsay | 2.6526 | 1000 | 1243-K | 602.528 dpm/ml | 01/15/2014 | 01/15/2015 |
| 12/04/2013 | Gregory Ramsay | 2.5347 | 1000 | 1243-L | 575.747476 dpm/ml | 12/04/2013 | 12/04/2014 |

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1243-L

v1.0.1

| | |
|---|---|
| Instrument | GREEN |
| Analyst | GXR1 |
| Verification Prep Date | 12/4/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1243-L |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 575.747476 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 12/4/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 12/5/2013 | 63.60 | 146.60 | 48.40 |
| 2 | 12/5/2013 | 63.10 | 147.60 | 48.40 |
| 3 | 12/5/2013 | 62.70 | 140.00 | 48.40 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 98.20 | 1.961352 | 500.67 | 50.07 |
| 2 | 99.20 | 1.961352 | 505.77 | 50.58 |
| 3 | 91.60 | 1.961352 | 467.02 | 46.70 |

| | dpm/mL |
|---|---|
| **Mean Value =** | 491.16 |
| **Stdev =** | 21.05469752 |
| **Certificate Value* =** | **508.5** |
| **Two sigma =** | 42.109 |
| **10 % of Mean =** | 49.116 |
| **Rule A (Pass/Fail)** | **Pass** |
| **% Recovery** | 96.59% |
| **Rule B (Pass/Fail)** | **Pass** |
| **Expiration Date** | **12/4/2014** |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-L by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/4/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12/13/13

Amanda L. Tehu 12/13/13

# Runlogs

# Instrument Run Log

**Instrument Type: GFPC** **Batch ID: 1377649**

| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 345760002 | SAMPLE | KSD1 | PIC4C | APR-12-14 12:53:26 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345762001 | SAMPLE | KSD1 | PIC4B | APR-12-14 12:53:37 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345763001 | SAMPLE | KSD1 | PIC4D | APR-12-14 12:53:44 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345760001 | SAMPLE | KSD1 | PIC10D | APR-12-14 12:54:46 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345760003 | SAMPLE | KSD1 | PIC10B | APR-12-14 12:54:51 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345761002 | SAMPLE | KSD1 | PIC10C | APR-12-14 12:55:02 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345761001 | SAMPLE | KSD1 | PIC14A | APR-12-14 12:55:56 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345761003 | SAMPLE | KSD1 | PIC14C | APR-12-14 12:56:03 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345762002 | SAMPLE | KSD1 | PIC11D | APR-12-14 12:56:09 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345763002 | SAMPLE | KSD1 | LB4100A1 | APR-12-14 13:04:38 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345763003 | SAMPLE | KSD1 | LB4100A2 | APR-12-14 13:04:38 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345764001 | SAMPLE | KSD1 | LB4100F1 | APR-12-14 13:05:04 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345764002 | SAMPLE | KSD1 | LB4100F2 | APR-12-14 13:05:05 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203062517 | MB | KSD1 | LB4100F3 | APR-12-14 13:05:05 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203062518 | DUP | KSD1 | LB4100F4 | APR-12-14 13:05:06 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203062519 | LCS | KSD1 | PIC3B | APR-14-14 10:58:28 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |

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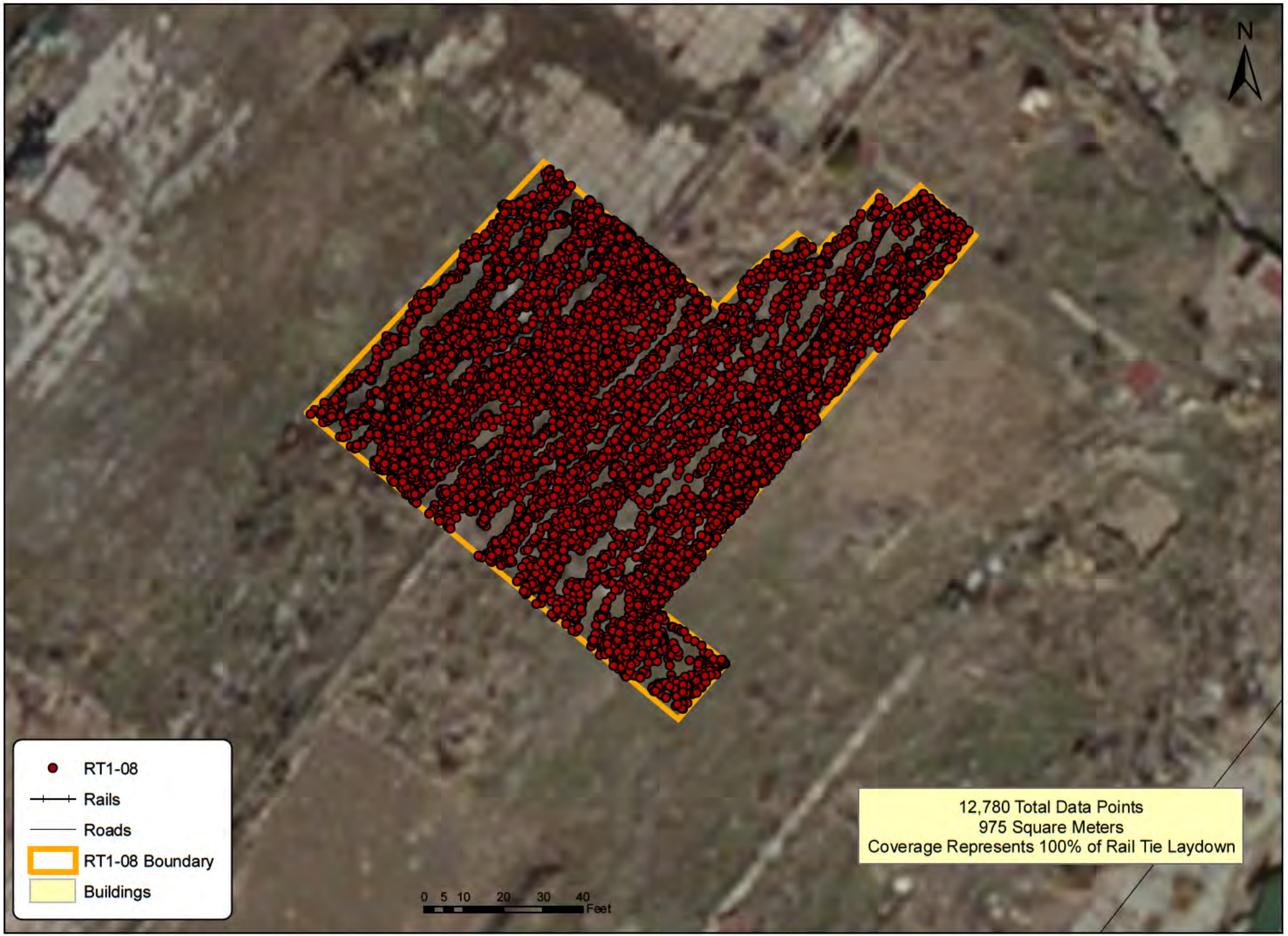
**RT1-08**
**Coverage Area**

DCN: ITSI-0808-0004-0076, 8 May 2019




M-9257

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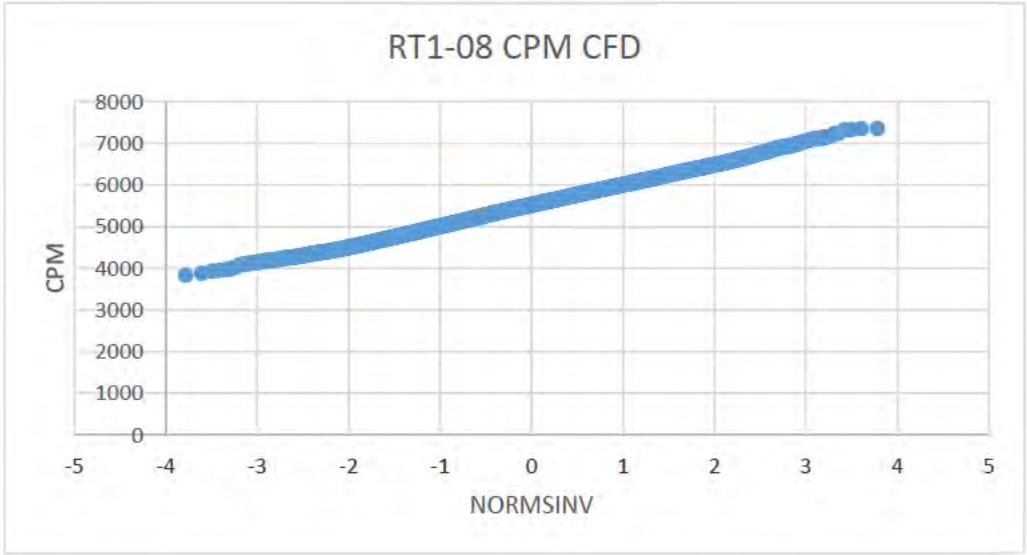
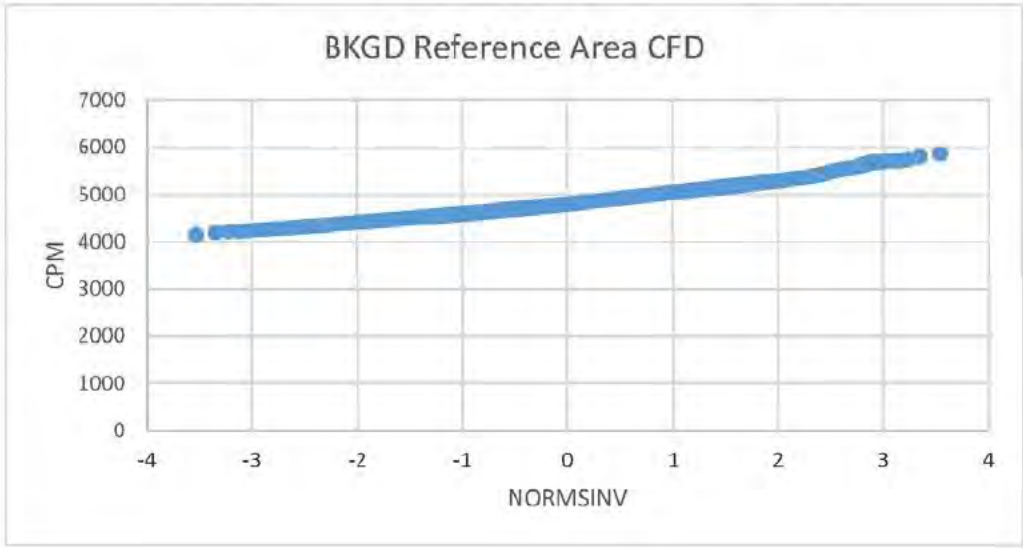
**RT1-08 GWS SUMMARY**

| Statistical Parameter | cpm |
|---|---|
| Mean | 5,512 |
| Median | 5,521 |
| Mode | 5,418 |
| Low CPS | 3,835 |
| High CPS | 7,353 |
| Range | 3,518 |
| Standard Deviation | 495 |
| # of Data Points | 12,780 |
| | |
| Mean (BKGD Ref. Area) | 4,819 |
| Median (BKGD Ref. Area) | 4,803 |
| Mode (BKGD Ref. Area) | 4,736 |
| Low CPM (BKGD Ref. Area) | 4,148 |
| High CPM (BKGD Ref. Area) | 5,868 |
| Range (BKGD Ref. Area) | 1,720 |
| Standard Deviation (BKGD Ref. Area) | 226 |



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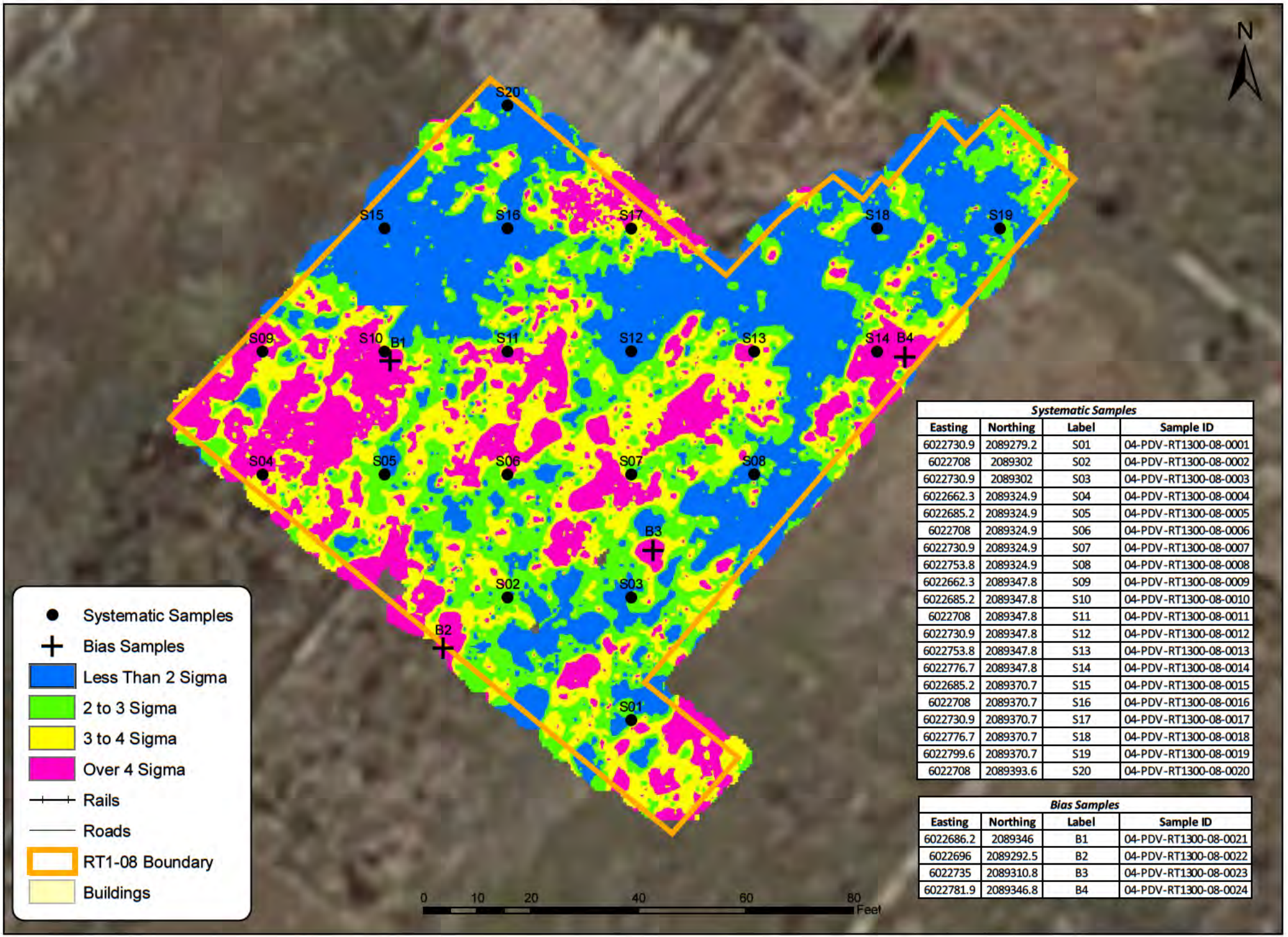
# RT1-08
## Sample Locations /BA sigma Values

DCN: ITSI-0808-0004-0076, 8 May 2019




| *Systematic Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022730.9 | 2089279.2 | S01 | 04-PDV-RT1300-08-0001 |
| 6022708 | 2089302 | S02 | 04-PDV-RT1300-08-0002 |
| 6022730.9 | 2089302 | S03 | 04-PDV-RT1300-08-0003 |
| 6022662.3 | 2089324.9 | S04 | 04-PDV-RT1300-08-0004 |
| 6022685.2 | 2089324.9 | S05 | 04-PDV-RT1300-08-0005 |
| 6022708 | 2089324.9 | S06 | 04-PDV-RT1300-08-0006 |
| 6022730.9 | 2089324.9 | S07 | 04-PDV-RT1300-08-0007 |
| 6022753.8 | 2089324.9 | S08 | 04-PDV-RT1300-08-0008 |
| 6022662.3 | 2089347.8 | S09 | 04-PDV-RT1300-08-0009 |
| 6022685.2 | 2089347.8 | S10 | 04-PDV-RT1300-08-0010 |
| 6022708 | 2089347.8 | S11 | 04-PDV-RT1300-08-0011 |
| 6022730.9 | 2089347.8 | S12 | 04-PDV-RT1300-08-0012 |
| 6022753.8 | 2089347.8 | S13 | 04-PDV-RT1300-08-0013 |
| 6022776.7 | 2089347.8 | S14 | 04-PDV-RT1300-08-0014 |
| 6022685.2 | 2089370.7 | S15 | 04-PDV-RT1300-08-0015 |
| 6022708 | 2089370.7 | S16 | 04-PDV-RT1300-08-0016 |
| 6022730.9 | 2089370.7 | S17 | 04-PDV-RT1300-08-0017 |
| 6022776.7 | 2089370.7 | S18 | 04-PDV-RT1300-08-0018 |
| 6022799.6 | 2089370.7 | S19 | 04-PDV-RT1300-08-0019 |
| 6022708 | 2089393.6 | S20 | 04-PDV-RT1300-08-0020 |

| *Bias Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022686.2 | 2089346 | B1 | 04-PDV-RT1300-08-0021 |
| 6022696 | 2089292.5 | B2 | 04-PDV-RT1300-08-0022 |
| 6022735 | 2089310.8 | B3 | 04-PDV-RT1300-08-0023 |
| 6022781.9 | 2089346.8 | B4 | 04-PDV-RT1300-08-0024 |

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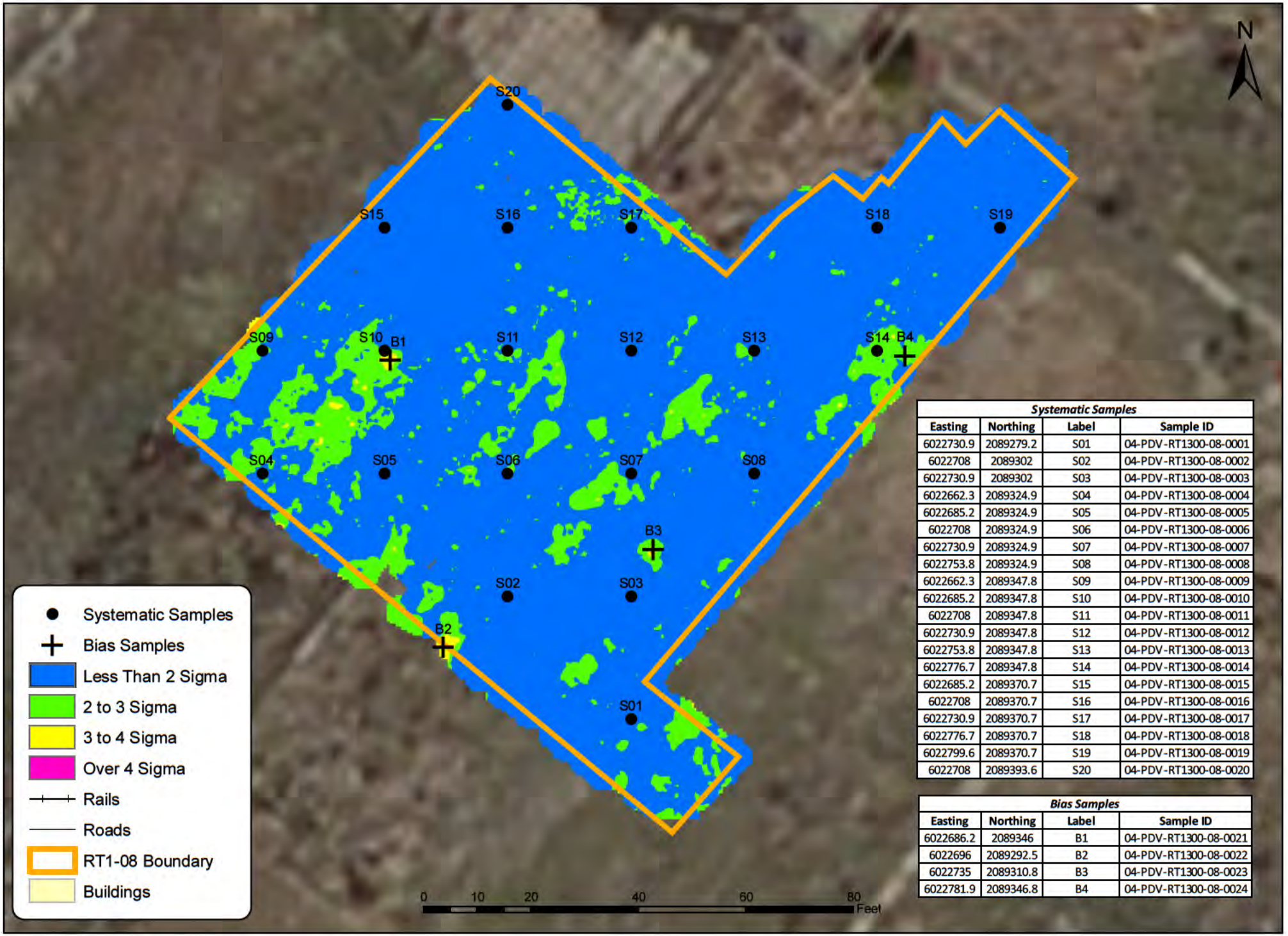
# RT1-08
## Sample Locations /CA sigma Values

DCN: ITSI-0808-0004-0076, 8 May 2019




*Systematic Samples*

| Easting | Northing | Label | Sample ID |
|---|---|---|---|
| 6022730.9 | 2089279.2 | S01 | 04-PDV-RT1300-08-0001 |
| 6022708 | 2089302 | S02 | 04-PDV-RT1300-08-0002 |
| 6022730.9 | 2089302 | S03 | 04-PDV-RT1300-08-0003 |
| 6022662.3 | 2089324.9 | S04 | 04-PDV-RT1300-08-0004 |
| 6022685.2 | 2089324.9 | S05 | 04-PDV-RT1300-08-0005 |
| 6022708 | 2089324.9 | S06 | 04-PDV-RT1300-08-0006 |
| 6022730.9 | 2089324.9 | S07 | 04-PDV-RT1300-08-0007 |
| 6022753.8 | 2089324.9 | S08 | 04-PDV-RT1300-08-0008 |
| 6022662.3 | 2089347.8 | S09 | 04-PDV-RT1300-08-0009 |
| 6022685.2 | 2089347.8 | S10 | 04-PDV-RT1300-08-0010 |
| 6022708 | 2089347.8 | S11 | 04-PDV-RT1300-08-0011 |
| 6022730.9 | 2089347.8 | S12 | 04-PDV-RT1300-08-0012 |
| 6022753.8 | 2089347.8 | S13 | 04-PDV-RT1300-08-0013 |
| 6022776.7 | 2089347.8 | S14 | 04-PDV-RT1300-08-0014 |
| 6022685.2 | 2089370.7 | S15 | 04-PDV-RT1300-08-0015 |
| 6022708 | 2089370.7 | S16 | 04-PDV-RT1300-08-0016 |
| 6022730.9 | 2089370.7 | S17 | 04-PDV-RT1300-08-0017 |
| 6022776.7 | 2089370.7 | S18 | 04-PDV-RT1300-08-0018 |
| 6022799.6 | 2089370.7 | S19 | 04-PDV-RT1300-08-0019 |
| 6022708 | 2089393.6 | S20 | 04-PDV-RT1300-08-0020 |

*Bias Samples*

| Easting | Northing | Label | Sample ID |
|---|---|---|---|
| 6022686.2 | 2089346 | B1 | 04-PDV-RT1300-08-0021 |
| 6022696 | 2089292.5 | B2 | 04-PDV-RT1300-08-0022 |
| 6022735 | 2089310.8 | B3 | 04-PDV-RT1300-08-0023 |
| 6022781.9 | 2089346.8 | B4 | 04-PDV-RT1300-08-0024 |

M-9263

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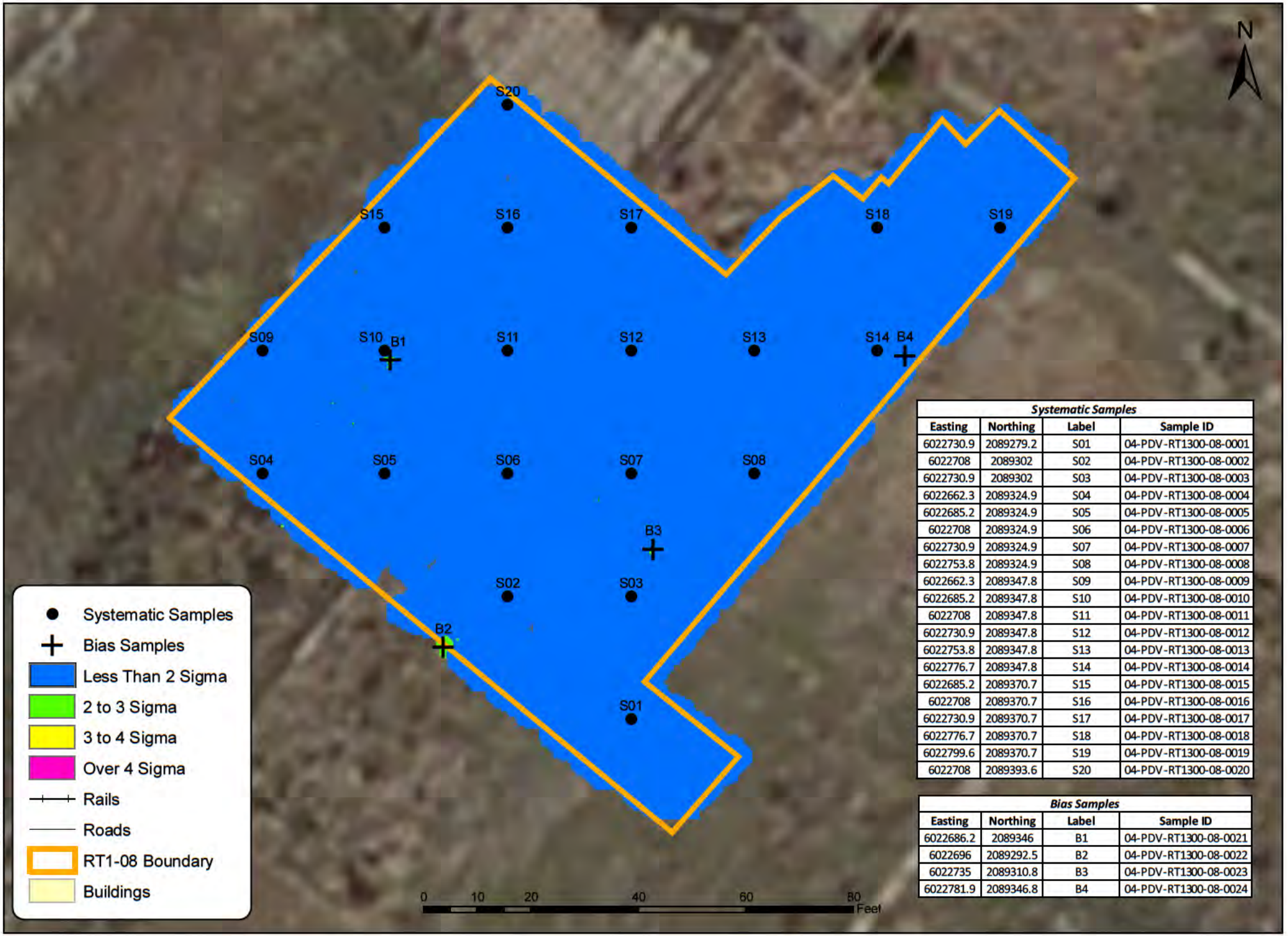
# RT1-08
## Sample Locations / IA sigma Values

DCN: ITSI-0808-0004-0076, 8 May 2019




*Systematic Samples*

| Easting | Northing | Label | Sample ID |
|---|---|---|---|
| 6022730.9 | 2089279.2 | S01 | 04-PDV-RT1300-08-0001 |
| 6022708 | 2089302 | S02 | 04-PDV-RT1300-08-0002 |
| 6022730.9 | 2089302 | S03 | 04-PDV-RT1300-08-0003 |
| 6022662.3 | 2089324.9 | S04 | 04-PDV-RT1300-08-0004 |
| 6022685.2 | 2089324.9 | S05 | 04-PDV-RT1300-08-0005 |
| 6022708 | 2089324.9 | S06 | 04-PDV-RT1300-08-0006 |
| 6022730.9 | 2089324.9 | S07 | 04-PDV-RT1300-08-0007 |
| 6022753.8 | 2089324.9 | S08 | 04-PDV-RT1300-08-0008 |
| 6022662.3 | 2089347.8 | S09 | 04-PDV-RT1300-08-0009 |
| 6022685.2 | 2089347.8 | S10 | 04-PDV-RT1300-08-0010 |
| 6022708 | 2089347.8 | S11 | 04-PDV-RT1300-08-0011 |
| 6022730.9 | 2089347.8 | S12 | 04-PDV-RT1300-08-0012 |
| 6022753.8 | 2089347.8 | S13 | 04-PDV-RT1300-08-0013 |
| 6022776.7 | 2089347.8 | S14 | 04-PDV-RT1300-08-0014 |
| 6022685.2 | 2089370.7 | S15 | 04-PDV-RT1300-08-0015 |
| 6022708 | 2089370.7 | S16 | 04-PDV-RT1300-08-0016 |
| 6022730.9 | 2089370.7 | S17 | 04-PDV-RT1300-08-0017 |
| 6022776.7 | 2089370.7 | S18 | 04-PDV-RT1300-08-0018 |
| 6022799.6 | 2089370.7 | S19 | 04-PDV-RT1300-08-0019 |
| 6022708 | 2089393.6 | S20 | 04-PDV-RT1300-08-0020 |

*Bias Samples*

| Easting | Northing | Label | Sample ID |
|---|---|---|---|
| 6022686.2 | 2089346 | B1 | 04-PDV-RT1300-08-0021 |
| 6022696 | 2089292.5 | B2 | 04-PDV-RT1300-08-0022 |
| 6022735 | 2089310.8 | B3 | 04-PDV-RT1300-08-0023 |
| 6022781.9 | 2089346.8 | B4 | 04-PDV-RT1300-08-0024 |

M-9265

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| GILBANE | | | | | RADIOLOGICAL SURVEY FORM | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTRACT NO / TO NO: N62473-10-D-0808 | | | PROJECT TITLE / LOCATION: Rad Remediation D-1, Phase II / HPNS | | | | | ITSI GILBANE PROJECT NO: 07204.0004 | | | |
| Survey No.: 07204.0004-0636-G | | | Date: 1/10/14 | | Location: Zone RT1 | | | Survey Type: Gamma | | | |
| Donte Love | | | Signature | | Ed Palser | | | Signature | | | |
| Tech Printed Name | | | | | RSO Printed Name | | | | | | |
| Instrument(s) | | | | | | | | | | | |
| Model | Serial | Cal Due Date | Probe Model | Probe Serial | Cal Due Date | BKG α | BKG β | BKG γ | BKG µr/Hr | Eff. α | Eff. β |
| 2221 | 144867 | 10/11/14 | 44-10 | RN19769 | 10/11/14 | n/a | n/a | 4274 | n/a | n/a | n/a |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Map

Rail Road Tie - RT-08
Zone RT1

| Sample Location | Gamma Readings |
|---|---|
| 1 | 4336 |
| 2 | 4767 |
| 3 | 4180 |
| 4 | 4578 |
| 5 | 4977 |
| 6 | 4672 |
| 7 | 4216 |
| 8 | 4017 |
| 9 | 4558 |
| 10 | 5049 |
| 11 | 4372 |
| 12 | 4506 |
| 13 | 4851 |
| 14 | 4380 |
| 15 | 4969 |
| 16 | 4775 |
| 17 | 4560 |
| 18 | 4852 |
| 19 | 4948 |
| 20 | 4438 |
| 21 | 4792 |
| 22 | 4577 |
| 23 | 4285 |
| 24 | 4498 |

**Comments**: Gamma BKGD values represent the average CPM of the background reference area for the specfic instrument. The 3 sigma investigative value for instrument 144867/RN19769 is 5010 CPM. All static locations are co-located with the sample locations. Elevated readings are consistant with the BKGD values for the specfic area being surveyed. Please refer to the sample analysis for all static readings above the 3 sigma value.

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# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250639 11/8/13 BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-08-0001 | SN | 11/7/2013 | 0930 | JL | X | | RT1300-08-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-08-0002 | SN | 11/7/2013 | 0936 | JL | X | | RT1300-08-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-08-0003 | SN | 11/7/2013 | 0939 | JL | X | | RT1300-08-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-08-0004 | SN | 11/7/2013 | 0949 | JL | X | | RT1300-08-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-08-0005 | SN | 11/7/2013 | 0953 | JL | X | | RT1300-08-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-08-0006 | SN | 11/7/2013 | 0958 | JL | X | | RT1300-08-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-08-0007 | SN | 11/7/2013 | 1004 | JL | X | | RT1300-08-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-08-0008 | SN | 11/7/2013 | 1009 | JL | X | | RT1300-08-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-08-0009 | SN | 11/7/2013 | 1012 | JL | X | | RT1300-08-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-08-0010 | SN | 11/7/2013 | 1018 | JL | X | | RT1300-08-0010 | N1 | 0.00 | 0.00 |

**Cooler # 4** — **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R. Slutz | 12/10/13 | 0953 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| Susan Urquhart | 11-8-13 | 1000 |
| Susan Urquhart | 12-10-13 | 0953 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

11/08/13 1055 OK

M-9269

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250639 11/8/13 @ BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-08-0011 | SN | 11/7/2013 | 1022 | JL | X | | RT1300-08-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-08-0012 | SN | 11/7/2013 | 1026 | JL | X | | RT1300-08-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-08-0013 | SN | 11/7/2013 | 1029 | JL | X | | RT1300-08-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-08-0014 | SN | 11/7/2013 | 1033 | JL | X | | RT1300-08-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-08-0015 | SN | 11/7/2013 | 1037 | JL | X | | RT1300-08-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-08-0016 | SN | 11/7/2013 | 1042 | JL | X | | RT1300-08-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-08-0017 | SN | 11/7/2013 | 1100 | JL | X | | RT1300-08-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-08-0018 | SN | 11/7/2013 | 1110 | JL | X | | RT1300-08-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-08-0019 | SN | 11/7/2013 | 1115 | JL | X | | RT1300-08-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-08-0020 | SN | 11/7/2013 | 1120 | JL | X | | RT1300-08-0020 | N1 | 0.00 | 0.00 |
| **Cooler # 4** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R Stutz | 12/10/13 | 0953 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| Susan L Mente | 11-8-13 | 1000 |
| Susan L Mente | 12-10-13 | 0953 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11/08/13 1055 OK



DCN: ITSI-0808-0004-0076, 8 May 2019

M-9270

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250 639 11/8/13 @ BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PDV-RT1300-08-0021 | SN | 11/7/2013 | 1453 | JL | X | X | RT1300-08-0021 | N1 | 0.00 | 0.00 |
| 22 | 04-PDV-RT1300-08-0022 | SN | 11/7/2013 | 1458 | JL | X | X | RT1300-08-0022 | N1 | 0.00 | 0.00 |
| 23 | 04-PDV-RT1300-08-0023 | SN | 11/7/2013 | 1502 | JL | X | X | RT1300-08-0023 | N1 | 0.00 | 0.00 |
| 24 | 04-PDV-RT1300-08-0024 | SN | 11/7/2013 | 1506 | JL | X | X | RT1300-08-0024 | N1 | 0.00 | 0.00 |

**Cooler # 4** — **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| [signature] | 12/10/13 | 0953 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 11-8-13 | 1000 |
| [signature] | 12-05-13 | 0953 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| Shipping Date: 11/8/2013 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| [signature] 11/8/13 1055 OK |

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# Summary of Definitive Laboratory Results* for Decision Unit: 08

Gilbane

| Sample ID | Nuclide | Activity | Flags | Activity Units |
|---|---|---|---|---|
| Sample Delivery Group (SDG): 341146 | | | | |
| Analysis Type: GA01R – Gamma Spec by DOE HASL 300, Ga-01-R | | | | |
| 04-PDV-RT1300-08-0001 | | | | |
| | Cesium 137 | .0413 | U | pCi/g |
| | Radium 226 | .113 | U | pCi/g |
| 04-PDV-RT1300-08-0002 | | | | |
| | Cesium 137 | -.0212 | U | pCi/g |
| | Radium 226 | .0851 | | pCi/g |
| 04-PDV-RT1300-08-0003 | | | | |
| | Cesium 137 | -.0415 | U | pCi/g |
| | Radium 226 | .0671 | U | pCi/g |
| 04-PDV-RT1300-08-0004 | | | | |
| | Cesium 137 | .0115 | U | pCi/g |
| | Radium 226 | .0732 | U | pCi/g |
| 04-PDV-RT1300-08-0005 | | | | |
| | Cesium 137 | -.00564 | U | pCi/g |
| | Radium 226 | .0361 | U | pCi/g |
| 04-PDV-RT1300-08-0006 | | | | |
| | Cesium 137 | .0216 | U | pCi/g |
| | Radium 226 | .0462 | U | pCi/g |
| 04-PDV-RT1300-08-0007 | | | | |
| | Cesium 137 | -.00798 | U | pCi/g |
| | Radium 226 | .064 | U | pCi/g |
| 04-PDV-RT1300-08-0008 | | | | |
| | Cesium 137 | -.00361 | U | pCi/g |
| | Radium 226 | .0432 | U | pCi/g |
| 04-PDV-RT1300-08-0009 | | | | |
| | Cesium 137 | -.016 | U | pCi/g |
| | Radium 226 | .126 | U | pCi/g |
| 04-PDV-RT1300-08-0010 | | | | |
| | Cesium 137 | .00151 | U | pCi/g |
| | Radium 226 | .0526 | U | pCi/g |
| 04-PDV-RT1300-08-0011 | | | | |
| | Cesium 137 | .0313 | U | pCi/g |
| | Radium 226 | .0514 | U | pCi/g |
| 04-PDV-RT1300-08-0012 | | | | |
| | Cesium 137 | -.0144 | U | pCi/g |
| | Radium 226 | .0558 | U | pCi/g |
| 04-PDV-RT1300-08-0013 | | | | |
| | Cesium 137 | -.00632 | U | pCi/g |
| | Radium 226 | 0 | UI | pCi/g |

3/18/2014 *Results for both preliminary and definitive analyses are unvalidated at the time of this summary report.

# Summary of Definitive Laboratory Results* for Decision Unit: 08

| Sample ID | Nuclide | Activity | Flags | Activity Units |
|---|---|---|---|---|
| 04-PDV-RT1300-08-0014 | | | | |
| | Cesium 137 | .00854 | U | pCi/g |
| | Radium 226 | .0466 | U | pCi/g |
| 04-PDV-RT1300-08-0015 | | | | |
| | Cesium 137 | .0205 | U | pCi/g |
| | Radium 226 | .0663 | U | pCi/g |
| 04-PDV-RT1300-08-0016 | | | | |
| | Cesium 137 | .0367 | U | pCi/g |
| | Radium 226 | .0351 | U | pCi/g |
| 04-PDV-RT1300-08-0017 | | | | |
| | Cesium 137 | -.0353 | U | pCi/g |
| | Radium 226 | .0552 | U | pCi/g |
| 04-PDV-RT1300-08-0018 | | | | |
| | Cesium 137 | .00312 | U | pCi/g |
| | Radium 226 | .0534 | U | pCi/g |
| 04-PDV-RT1300-08-0019 | | | | |
| | Cesium 137 | .00923 | U | pCi/g |
| | Radium 226 | .0577 | U | pCi/g |
| 04-PDV-RT1300-08-0020 | | | | |
| | Cesium 137 | .0314 | U | pCi/g |
| | Radium 226 | .0278 | U | pCi/g |
| 04-PDV-RT1300-08-0021 | | | | |
| | Cesium 137 | -.0244 | U | pCi/g |
| | Radium 226 | -.0919 | U | pCi/g |
| 04-PDV-RT1300-08-0022 | | | | |
| | Cesium 137 | -.00025 | U | pCi/g |
| | Radium 226 | .0182 | U | pCi/g |
| 04-PDV-RT1300-08-0023 | | | | |
| | Cesium 137 | .00484 | U | pCi/g |
| | Radium 226 | -.0638 | U | pCi/g |
| 04-PDV-RT1300-08-0024 | | | | |
| | Cesium 137 | -.0179 | U | pCi/g |
| | Radium 226 | .00569 | U | pCi/g |



*Results for both preliminary and definitive analyses are unvalidated at the time of this summary report.

# Packing Slip:

**Curtis & Tompkins**
**HPSD1**
**SDG: 341146**
**Attn:John Goyette**

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# DODQSM Cover Sheet

# DOD-QSM Cover Sheet

## HPSD1

February 13, 2014

**GEL Laboratories, LLC**
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Project Manager:** Valerie Davis
**Phone Extension:** 4485
**Email:** Valerie.Davis@gel.com

**Contract Purchase Order:** PO#

**Work Order:** 341146 **SDG:** 341146

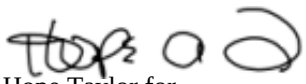
**Client Contact:**
John Goyette
Curtis & Tompkins
2323 5th Street
Berkeley, California 94710

**Project Identification:** HPSD1

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 11, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,



Hope Taylor for
Valerie Davis
Project Manager

# Case Narrative

**DODQSM Case Narrative**
**for**
**Curtis & Tompkins**
**SDG: 341146**

**February 13, 2014**

**Laboratory Identification:**

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

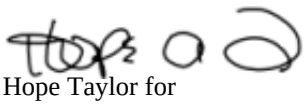
**Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on December 11, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

**Sample Identification** The laboratory received the following samples:

| Laboratory ID | Client ID |
|---|---|
| 341146001 | 04-PDV-RT1300-08-0001 |
| 341146002 | 04-PDV-RT1300-08-0002 |
| 341146003 | 04-PDV-RT1300-08-0003 |
| 341146004 | 04-PDV-RT1300-08-0004 |
| 341146005 | 04-PDV-RT1300-08-0005 |
| 341146006 | 04-PDV-RT1300-08-0006 |
| 341146007 | 04-PDV-RT1300-08-0007 |
| 341146008 | 04-PDV-RT1300-08-0008 |
| 341146009 | 04-PDV-RT1300-08-0009 |
| 341146010 | 04-PDV-RT1300-08-0010 |
| 341146011 | 04-PDV-RT1300-08-0011 |
| 341146012 | 04-PDV-RT1300-08-0012 |
| 341146013 | 04-PDV-RT1300-08-0013 |
| 341146014 | 04-PDV-RT1300-08-0014 |
| 341146015 | 04-PDV-RT1300-08-0015 |
| 341146016 | 04-PDV-RT1300-08-0016 |
| 341146017 | 04-PDV-RT1300-08-0017 |
| 341146018 | 04-PDV-RT1300-08-0018 |
| 341146019 | 04-PDV-RT1300-08-0019 |
| 341146020 | 04-PDV-RT1300-08-0020 |
| 341146021 | 04-PDV-RT1300-08-0021 |
| 341146022 | 04-PDV-RT1300-08-0022 |
| 341146023 | 04-PDV-RT1300-08-0023 |
| 341146024 | 04-PDV-RT1300-08-0024 |

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.



Hope Taylor for
Valerie Davis
Project Manager

# Chain of Custody and Supporting Documentation

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

~~334224~~ Relay 341146

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag. |

250639 11/8/13 BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-08-0001 | SN | 11/7/2013 | 0930 | JL | X | | RT1300-08-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-08-0002 | SN | 11/7/2013 | 0936 | JL | X | | RT1300-08-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-08-0003 | SN | 11/7/2013 | 0939 | JL | X | | RT1300-08-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-08-0004 | SN | 11/7/2013 | 0949 | JL | X | | RT1300-08-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-08-0005 | SN | 11/7/2013 | 0953 | JL | X | | RT1300-08-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-08-0006 | SN | 11/7/2013 | 0958 | JL | X | | RT1300-08-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-08-0007 | SN | 11/7/2013 | 1004 | JL | X | | RT1300-08-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-08-0008 | SN | 11/7/2013 | 1009 | JL | X | | RT1300-08-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-08-0009 | SN | 11/7/2013 | 1012 | JL | X | | RT1300-08-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-08-0010 | SN | 11/7/2013 | 1018 | JL | X | | RT1300-08-0010 | N1 | 0.00 | 0.00 |

**Cooler # 4** | **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R. Slutz | 12/10/13 | 0952 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| Shannon McGuire | 11-8-13 | 1000 |
| Susan Lamont | 12-10-13 | 0953 |
| [illegible] | 12/11/13 | ~~1020~~ |
| | | 1030 |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/08/13 1055 OK

M-9285

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250639 11/8/13 @ BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-08-0011 | SN | 11/7/2013 | 1022 | JL | X | | RT1300-08-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-08-0012 | SN | 11/7/2013 | 1026 | JL | X | | RT1300-08-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-08-0013 | SN | 11/7/2013 | 1029 | JL | X | | RT1300-08-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-08-0014 | SN | 11/7/2013 | 1033 | JL | X | | RT1300-08-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-08-0015 | SN | 11/7/2013 | 1037 | JL | X | | RT1300-08-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-08-0016 | SN | 11/7/2013 | 1042 | JL | X | | RT1300-08-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-08-0017 | SN | 11/7/2013 | 1100 | JL | X | | RT1300-08-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-08-0018 | SN | 11/7/2013 | 1110 | JL | X | | RT1300-08-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-08-0019 | SN | 11/7/2013 | 1115 | JL | X | | RT1300-08-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-08-0020 | SN | 11/7/2013 | 1120 | JL | X | | RT1300-08-0020 | N1 | 0.00 | 0.00 |

**Cooler # 4** — **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R. Stutz | 12/10/13 | 0953 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| Susan Fitzpatrick | 11-8-13 | 1000 |
| Susan Fitzpatrick | 12-10-13 | 0953 |
| | 12/11/13 | 1030 |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

11/08/13 1055 OK

M-9286

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250639 11/8/13 @ BIN 10

| | Event: Railroad Tie Survey | | | | Analytical Test Method | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample ID | Matrix | Date | Time | Samp Init. | | | Location ID | | | |
| 21 | 04-PDV-RT1300-08-0021 | SN | 11/7/2013 | 1453 | JL | X | X | RT1300-08-0021 | N1 | 0.00 | 0.00 |
| 22 | 04-PDV-RT1300-08-0022 | SN | 11/7/2013 | 1458 | JL | X | X | RT1300-08-0022 | N1 | 0.00 | 0.00 |
| 23 | 04-PDV-RT1300-08-0023 | SN | 11/7/2013 | 1502 | JL | X | X | RT1300-08-0023 | N1 | 0.00 | 0.00 |
| 24 | 04-PDV-RT1300-08-0024 | SN | 11/7/2013 | 1506 | JL | X | X | RT1300-08-0024 | N1 | 0.00 | 0.00 |
| Cooler # 4 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| [signature] | 12/10/13 | 0953 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 11-8-13 | 1000 |
| [signature] | 12-05-13 | 0953 |
| [signature] | 121113 | 1630 |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11/8/13 1055 OK

M-9287

GEL | Laboratories LLC

# SAMPLE RECEIPT & REVIEW FORM

| | |
|---|---|
| Client: CURL | SDG/AR/COC/Work Order: 351224 |
| Received By: JP | Date Received: 12-11-13 |

| Suspected Hazard Information | Yes | No | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. |
|---|---|---|---|
| COC/Samples marked as radioactive? | | ✓ | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0cpm |
| Classified Radioactive II or III by RSO? | | ✓ | If yes, Were swipes taken of sample contatiners < action levels? |
| COC/Samples marked containing PCBs? | | ✓ | |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | | ✓ | If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group. |
| Shipped as a DOT Hazardous? | | ✓ | Hazard Class Shipped: UN#: |
| Samples identified as Foreign Soil? | | ✓ | |

| | Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|---|---|---|---|---|
| 1 | Shipping containers received intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 | Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | | ✓ | | Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius. See continuation form |
| 2a | Daily check performed and passed on IR temperature gun? | ✓ | | | Temperature Device Serial #: 130462940 Secondary Temperature Device Serial # (If Applicable): |
| 3 | Chain of custody documents included with shipment? | ✓ | | | |
| 4 | Sample containers intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 | Samples requiring chemical preservation at proper pH? | | ✓ | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 | VOA vials free of headspace (defined as < 6mm bubble)? | | ✓ | | Sample ID's and containers affected: |
| 7 | Are Encore containers present? | | | ✓ | (If yes, immediately deliver to Volatiles laboratory) |
| 8 | Samples received within holding time? | ✓ | | | ID's and tests affected: |
| 9 | Sample ID's on COC match ID's on bottles? | ✓ | | | Sample ID's and containers affected: |
| 10 | Date & time on COC match date & time on bottles? | ✓ | | | Sample ID's affected: |
| 11 | Number of containers received match number indicated on COC? | | | ✓ | Sample ID's affected: received 2 bags with handwritten ID of Clean Railroad Ties 12-4-13@1430 |
| 12 | Are sample containers identifiable as GEL provided? | | | ✓ | |
| 13 | COC form is properly signed in relinquished/received sections? | ✓ | | | |
| 14 | Carrier and tracking number. | | | | Circle Applicable: (FedEx Air) FedEx Ground UPS Field Services Courier Other. See continuation form |

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HH Date 12/13/13 Page 1 of 2

M-9288

GEL | Laboratories LLC **SAMPLE RECEIPT & REVIEW CONTINUATION FORM**

Client: CURL Received By: JP Date Received: 12/13 SDG/AR/COC/Work Order: 339224

| | | |
|---|---|---|
| 7973 | 6520 | 5520 |
| " | " | 5531 |
| 8040 | 9124 | 7657 |
| 7973 | 6520 | 5510 |
| " | " | 5483 |
| " | " | 5472 |
| " | " | 5494 |
| " | " | 5461 |
| " | " | 5509 |

PM (or PMA) review: Initials HH Date 12/13/13 Page 2 of 2

(b) (4)

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(b) (4)

(b) (4)

# Laboratory Certifications

**List of current GEL Certifications as of 13 February 2014**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−13−8 |
| Utah NELAP | SC000122013−11 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780−12 |
| Wisconsin | 999887790 |

# Radiological Analysis

**Radiochemistry Case Narrative**
**Curtis & Tompkins (CURL)**
**SDG 341146**

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid (Standard List)** |
| Analytical Method: | DOE HASL 300, 4.5.2.3/Ga-01-R |
| Analytical Batch Number: | 1359492 |

| Sample ID | Client ID |
|---|---|
| 341146001 | 04-PDV-RT1300-08-0001 |
| 341146002 | 04-PDV-RT1300-08-0002 |
| 341146003 | 04-PDV-RT1300-08-0003 |
| 341146004 | 04-PDV-RT1300-08-0004 |
| 341146005 | 04-PDV-RT1300-08-0005 |
| 341146006 | 04-PDV-RT1300-08-0006 |
| 341146007 | 04-PDV-RT1300-08-0007 |
| 341146008 | 04-PDV-RT1300-08-0008 |
| 341146009 | 04-PDV-RT1300-08-0009 |
| 341146010 | 04-PDV-RT1300-08-0010 |
| 341146011 | 04-PDV-RT1300-08-0011 |
| 341146012 | 04-PDV-RT1300-08-0012 |
| 341146013 | 04-PDV-RT1300-08-0013 |
| 341146014 | 04-PDV-RT1300-08-0014 |
| 341146015 | 04-PDV-RT1300-08-0015 |
| 341146016 | 04-PDV-RT1300-08-0016 |
| 341146017 | 04-PDV-RT1300-08-0017 |
| 341146018 | 04-PDV-RT1300-08-0018 |
| 341146019 | 04-PDV-RT1300-08-0019 |
| 341146020 | 04-PDV-RT1300-08-0020 |
| 1203017834 | Method Blank (MB) |
| 1203017835 | 341146001(04-PDV-RT1300-08-0001) Sample Duplicate (DUP) |
| 1203017836 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 341146001 (04-PDV-RT1300-08-0001).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

| Qualifier | Reason | Analyte | Sample | Client Sample |
|---|---|---|---|---|
| UI | Data rejected due to high counting uncertainty. | Cesium-137 | 1203017834 | MB for batch 1359492 |
| UI | Data rejected due to low abundance. | Bismuth-214 | 341146013 | 04-PDV-RT1300-08-0013 |
| | | Lead-212 | 1203017835 | 04-PDV-RT1300-08-0001(341146001DUP) |

| | | | | |
|---|---|---|---|---|
| | | Radium-226 | 341146013 | 04-PDV-RT1300-08-0013 |
| | | Uranium-235 | 341146012 | 04-PDV-RT1300-08-0012 |
| UI | Data rejected due to no valid peak. | Lead-212 | 341146019 | 04-PDV-RT1300-08-0019 |
| | | Potassium-40 | 341146007 | 04-PDV-RT1300-08-0007 |
| | | Thallium-208 | 341146018 | 04-PDV-RT1300-08-0018 |

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid (Standard List)** |
| Analytical Method: | DOE HASL 300, 4.5.2.3/Ga-01-R |
| Analytical Batch Number: | 1361908 |

| Sample ID | Client ID |
|---|---|
| 341146021 | 04-PDV-RT1300-08-0021 |
| 341146022 | 04-PDV-RT1300-08-0022 |
| 341146023 | 04-PDV-RT1300-08-0023 |
| 341146024 | 04-PDV-RT1300-08-0024 |
| 1203023699 | Method Blank (MB) |
| 1203023700 | 341140021(04-PDV-RT1300-06-0021) Sample Duplicate (DUP) |
| 1203023701 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 341140021 (04-PDV-RT1300-06-0021).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

| Qualifier | Reason | Analyte | Sample | Client Sample |
|---|---|---|---|---|
| UI | Data rejected due to high counting uncertainty. | Lead-212 | 341146023 | 04-PDV-RT1300-08-0023 |
| | | Lead-214 | 341146023 | 04-PDV-RT1300-08-0023 |

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Qualifier Definition Report
## for

CURL001 Curtis & Tompkins

Client SDG: 341146 GEL Work Order: 341146

**The Qualifiers in this report are defined as follows:**

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

UI Gamma Spectroscopy--Uncertain identification

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:** Heather McCarty **Name: Heather McCarty**

**Date: 14 FEB 2014** **Title: Analyst II**

# Sample Data Summary

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street
Berkeley, California 94710
Report Date: February 14, 2014
Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0001
Sample ID: 341146001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0903 | +/-0.211 | 0.319 | +/-0.215 | | pCi/g | | RXF2 | 02/10/14 | 1207 | 1359492 | 1 |
| Bismuth-212 | U | -0.0153 | +/-0.420 | 0.801 | +/-0.421 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.113 | +/-0.108 | 0.185 | +/-0.120 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0413 | +/-0.0378 | 0.0645 | +/-0.0379 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0128 | +/-0.0327 | 0.0732 | +/-0.0332 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0984 | +/-0.0851 | 0.120 | +/-0.0963 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0108 | +/-0.0973 | 0.202 | +/-0.0975 | | pCi/g | | | | | | |
| Lead-212 | U | 0.00424 | +/-0.0729 | 0.085 | +/-0.0729 | | pCi/g | | | | | | |
| Lead-214 | | 0.169 | +/-0.0879 | 0.112 | +/-0.089 | | pCi/g | | | | | | |
| Potassium-40 | | 1.78 | +/-0.573 | 0.664 | +/-0.594 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.102 | +/-0.224 | 0.414 | +/-0.257 | | pCi/g | | | | | | |
| Radium-226 | U | 0.113 | +/-0.108 | 0.185 | +/-0.120 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0103 | +/-0.034 | 0.0678 | +/-0.0343 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.122 | +/-0.116 | 0.272 | +/-0.130 | | pCi/g | | | | | | |
| Thorium-234 | U | 1.09 | +/-1.90 | 2.96 | +/-1.98 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0444 | +/-0.176 | 0.326 | +/-0.177 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0002
Sample ID: 341146002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0547 | +/-0.133 | 0.231 | +/-0.135 | | pCi/g | | RXF2 | 02/10/14 | 1207 | 1359492 | 1 |
| Bismuth-212 | U | 0.0361 | +/-0.381 | 0.738 | +/-0.381 | | pCi/g | | | | | | |
| Bismuth-214 | | 0.0851 | +/-0.069 | 0.0809 | +/-0.0694 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0212 | +/-0.0299 | 0.0499 | +/-0.0314 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.000223 | +/-0.0146 | 0.0342 | +/-0.0146 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00795 | +/-0.0688 | 0.125 | +/-0.0688 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0635 | +/-0.0736 | 0.133 | +/-0.0792 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0308 | +/-0.0471 | 0.0873 | +/-0.0472 | | pCi/g | | | | | | |
| Lead-214 | | 0.111 | +/-0.0653 | 0.0903 | +/-0.066 | | pCi/g | | | | | | |
| Potassium-40 | | 1.25 | +/-0.520 | 0.550 | +/-0.531 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.101 | +/-0.178 | 0.323 | +/-0.217 | | pCi/g | | | | | | |
| Radium-226 | | 0.0851 | +/-0.069 | 0.0809 | +/-0.0694 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0151 | +/-0.0321 | 0.046 | +/-0.0321 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0178 | +/-0.126 | 0.207 | +/-0.126 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.438 | +/-1.22 | 2.33 | +/-1.24 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.018 | +/-0.166 | 0.255 | +/-0.166 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0003
Sample ID: 341146003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0764 | +/-0.208 | 0.332 | +/-0.211 | | pCi/g | | RXF2 | 02/10/14 | 1322 | 1359492 | 1 |
| Bismuth-212 | U | 0.500 | +/-0.332 | 0.890 | +/-0.404 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0671 | +/-0.072 | 0.137 | +/-0.0783 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0415 | +/-0.0283 | 0.0384 | +/-0.0341 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00463 | +/-0.0241 | 0.053 | +/-0.0242 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00463 | +/-0.086 | 0.164 | +/-0.0861 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0373 | +/-0.0771 | 0.149 | +/-0.079 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0113 | +/-0.0832 | 0.122 | +/-0.0833 | | pCi/g | | | | | | |
| Lead-214 | U | 0.138 | +/-0.0873 | 0.150 | +/-0.108 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.232 | +/-0.339 | 0.913 | +/-0.355 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0471 | +/-0.218 | 0.432 | +/-0.226 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0671 | +/-0.072 | 0.137 | +/-0.0783 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0273 | +/-0.0312 | 0.0559 | +/-0.0336 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0818 | +/-0.109 | 0.272 | +/-0.115 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.254 | +/-1.63 | 2.73 | +/-1.63 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.06 | +/-0.179 | 0.308 | +/-0.181 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0004
Sample ID: 341146004
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.209 | +/-0.212 | 0.454 | +/-0.233 | | pCi/g | | RXF2 | 02/10/14 | 1322 | 1359492 | 1 |
| Bismuth-212 | U | -0.28 | +/-0.361 | 0.618 | +/-0.383 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0732 | +/-0.0969 | 0.174 | +/-0.103 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0115 | +/-0.0318 | 0.0679 | +/-0.0322 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00647 | +/-0.0246 | 0.0619 | +/-0.0248 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0254 | +/-0.0858 | 0.158 | +/-0.0866 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0369 | +/-0.0879 | 0.171 | +/-0.0895 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0356 | +/-0.0645 | 0.110 | +/-0.0665 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0966 | +/-0.088 | 0.131 | +/-0.0985 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.428 | +/-0.428 | 0.518 | +/-0.430 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.206 | +/-0.232 | 0.568 | +/-0.345 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0732 | +/-0.0969 | 0.174 | +/-0.103 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0211 | +/-0.0319 | 0.0698 | +/-0.0334 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0668 | +/-0.128 | 0.281 | +/-0.132 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.913 | +/-1.50 | 2.66 | +/-1.57 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0756 | +/-0.151 | 0.295 | +/-0.155 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0005
Sample ID: 341146005
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.218 | +/-0.209 | 0.346 | +/-0.231 | | pCi/g | | RXF2 | 02/10/14 | 1323 | 1359492 | 1 |
| Bismuth-212 | U | 0.253 | +/-0.342 | 0.748 | +/-0.362 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0361 | +/-0.0642 | 0.130 | +/-0.0664 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00564 | +/-0.0232 | 0.0438 | +/-0.0234 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0148 | +/-0.0287 | 0.0524 | +/-0.0295 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0226 | +/-0.0671 | 0.120 | +/-0.0679 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0507 | +/-0.0684 | 0.117 | +/-0.0723 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0652 | +/-0.0605 | 0.0966 | +/-0.0676 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0984 | +/-0.116 | 0.128 | +/-0.125 | | pCi/g | | | | | | |
| Potassium-40 | | 0.800 | +/-0.390 | 0.362 | +/-0.397 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.132 | +/-0.222 | 0.377 | +/-0.275 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0361 | +/-0.0642 | 0.130 | +/-0.0664 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.000136 | +/-0.0296 | 0.0567 | +/-0.0296 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0402 | +/-0.115 | 0.214 | +/-0.117 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.544 | +/-1.75 | 3.07 | +/-1.77 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0343 | +/-0.162 | 0.282 | +/-0.163 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0006
Sample ID: 341146006
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.00668 | +/-0.126 | 0.234 | +/-0.126 | | pCi/g | | RXF2 | 02/10/14 | 1323 | 1359492 | 1 |
| Bismuth-212 | U | 0.220 | +/-0.352 | 0.762 | +/-0.366 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0462 | +/-0.0923 | 0.140 | +/-0.0947 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0216 | +/-0.028 | 0.0598 | +/-0.0297 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00209 | +/-0.0308 | 0.0622 | +/-0.0308 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00906 | +/-0.0781 | 0.142 | +/-0.0783 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0398 | +/-0.0801 | 0.182 | +/-0.0822 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0613 | +/-0.0794 | 0.0968 | +/-0.0842 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0666 | +/-0.0887 | 0.143 | +/-0.0938 | | pCi/g | | | | | | |
| Potassium-40 | | 1.11 | +/-0.475 | 0.397 | +/-0.485 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0764 | +/-0.215 | 0.467 | +/-0.235 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0462 | +/-0.0923 | 0.140 | +/-0.0947 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00606 | +/-0.0264 | 0.0443 | +/-0.0264 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0409 | +/-0.0983 | 0.198 | +/-0.100 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.648 | +/-1.15 | 2.01 | +/-1.19 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.161 | +/-0.243 | 0.257 | +/-0.243 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0007
Sample ID: 341146007
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0613 | +/-0.0791 | 0.115 | +/-0.0839 | | pCi/g | | RXF2 | 02/10/14 | 1324 | 1359492 | 1 |
| Bismuth-212 | U | 0.0649 | +/-0.344 | 0.679 | +/-0.345 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.064 | +/-0.0803 | 0.135 | +/-0.0855 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00798 | +/-0.0253 | 0.0459 | +/-0.0256 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0329 | +/-0.0333 | 0.0778 | +/-0.0366 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0145 | +/-0.0702 | 0.115 | +/-0.0706 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0141 | +/-0.0763 | 0.164 | +/-0.0766 | | pCi/g | | | | | | |
| Lead-212 | | 0.0911 | +/-0.0558 | 0.0755 | +/-0.0563 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0712 | +/-0.0701 | 0.081 | +/-0.0703 | | pCi/g | | | | | | |
| Potassium-40 | UI | 0.00 | +/-0.629 | 0.591 | +/-0.632 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.126 | +/-0.193 | 0.336 | +/-0.248 | | pCi/g | | | | | | |
| Radium-226 | U | 0.064 | +/-0.0803 | 0.135 | +/-0.0855 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0165 | +/-0.0341 | 0.0364 | +/-0.0341 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.078 | +/-0.0877 | 0.209 | +/-0.0949 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.277 | +/-0.792 | 1.27 | +/-0.804 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0579 | +/-0.130 | 0.232 | +/-0.133 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0008
Sample ID: 341146008
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.00624 | +/-0.125 | 0.242 | +/-0.125 | | pCi/g | | RXF2 | 02/10/14 | 1324 | 1359492 | 1 |
| Bismuth-212 | U | -0.0441 | +/-0.267 | 0.537 | +/-0.268 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0432 | +/-0.0756 | 0.113 | +/-0.0781 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00361 | +/-0.0228 | 0.0428 | +/-0.0229 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0147 | +/-0.0247 | 0.045 | +/-0.0256 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0582 | +/-0.0613 | 0.121 | +/-0.0669 | | pCi/g | | | | | | |
| Europium-154 | U | -0.00955 | +/-0.0467 | 0.103 | +/-0.0469 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0517 | +/-0.061 | 0.0809 | +/-0.0654 | | pCi/g | | | | | | |
| Lead-214 | U | 0.00838 | +/-0.0535 | 0.105 | +/-0.0537 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.245 | +/-0.341 | 0.485 | +/-0.341 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0497 | +/-0.168 | 0.372 | +/-0.179 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0432 | +/-0.0756 | 0.113 | +/-0.0781 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.000744 | +/-0.0262 | 0.0519 | +/-0.0262 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0173 | +/-0.0831 | 0.176 | +/-0.0835 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.151 | +/-1.21 | 2.46 | +/-1.22 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0335 | +/-0.139 | 0.253 | +/-0.140 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0009
Sample ID: 341146009
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.104 | +/-0.144 | 0.220 | +/-0.151 | | pCi/g | | RXF2 | 02/10/14 | 1325 | 1359492 | 1 |
| Bismuth-212 | U | 0.149 | +/-0.499 | 0.924 | +/-0.504 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.126 | +/-0.108 | 0.202 | +/-0.122 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.016 | +/-0.0325 | 0.0686 | +/-0.0333 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0221 | +/-0.0371 | 0.0711 | +/-0.0385 | | pCi/g | | | | | | |
| Europium-152 | U | -0.000401 | +/-0.0937 | 0.176 | +/-0.0937 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0152 | +/-0.108 | 0.216 | +/-0.108 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0943 | +/-0.115 | 0.144 | +/-0.123 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0915 | +/-0.114 | 0.170 | +/-0.122 | | pCi/g | | | | | | |
| Potassium-40 | | 2.82 | +/-0.758 | 0.868 | +/-0.799 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0204 | +/-0.286 | 0.571 | +/-0.287 | | pCi/g | | | | | | |
| Radium-226 | U | 0.126 | +/-0.108 | 0.202 | +/-0.122 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | | 0.0664 | +/-0.0512 | 0.0552 | +/-0.0515 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.169 | +/-0.222 | 0.342 | +/-0.236 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.637 | +/-2.15 | 1.94 | +/-2.15 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.136 | +/-0.209 | 0.394 | +/-0.218 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0010
Sample ID: 341146010
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.152 | +/-0.159 | 0.260 | +/-0.174 | | pCi/g | | RXF2 | 02/10/14 | 1325 | 1359492 | 1 |
| Bismuth-212 | U | 0.404 | +/-0.475 | 1.01 | +/-0.510 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0526 | +/-0.0692 | 0.143 | +/-0.0733 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00151 | +/-0.0266 | 0.0528 | +/-0.0266 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0192 | +/-0.0374 | 0.0673 | +/-0.0384 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0214 | +/-0.0819 | 0.160 | +/-0.0825 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0633 | +/-0.0755 | 0.193 | +/-0.0809 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0521 | +/-0.0572 | 0.106 | +/-0.0621 | | pCi/g | | | | | | |
| Lead-214 | U | -0.00299 | +/-0.0648 | 0.121 | +/-0.0648 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.0464 | +/-0.310 | 0.663 | +/-0.311 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.00758 | +/-0.211 | 0.434 | +/-0.211 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0526 | +/-0.0692 | 0.143 | +/-0.0733 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0307 | +/-0.0413 | 0.0518 | +/-0.0414 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0634 | +/-0.113 | 0.217 | +/-0.117 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.200 | +/-1.36 | 2.46 | +/-1.36 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0697 | +/-0.189 | 0.344 | +/-0.191 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0011
Sample ID: 341146011
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0204 | +/-0.0481 | 0.0795 | +/-0.049 | | pCi/g | | RXF2 | 02/10/14 | 1325 | 1359492 | 1 |
| Bismuth-212 | U | 0.0443 | +/-0.458 | 0.957 | +/-0.458 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0514 | +/-0.112 | 0.184 | +/-0.115 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0313 | +/-0.0412 | 0.0857 | +/-0.0437 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0177 | +/-0.0333 | 0.0629 | +/-0.0343 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0179 | +/-0.0955 | 0.188 | +/-0.0959 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0634 | +/-0.115 | 0.200 | +/-0.119 | | pCi/g | | | | | | |
| Lead-212 | U | 0.028 | +/-0.0787 | 0.109 | +/-0.0798 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0808 | +/-0.104 | 0.168 | +/-0.110 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.0995 | +/-0.391 | 0.894 | +/-0.394 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.158 | +/-0.221 | 0.563 | +/-0.294 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0514 | +/-0.112 | 0.184 | +/-0.115 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00687 | +/-0.0455 | 0.0732 | +/-0.0455 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0332 | +/-0.157 | 0.337 | +/-0.158 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.242 | +/-0.583 | 1.06 | +/-0.596 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0983 | +/-0.145 | 0.258 | +/-0.152 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0012
Sample ID: 341146012
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0364 | +/-0.163 | 0.300 | +/-0.164 | | pCi/g | | RXF2 | 02/10/14 | 1326 | 1359492 | 1 |
| Bismuth-212 | U | 0.0197 | +/-0.566 | 0.957 | +/-0.566 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0558 | +/-0.0936 | 0.185 | +/-0.0971 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0144 | +/-0.0406 | 0.0724 | +/-0.0411 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00665 | +/-0.0417 | 0.0874 | +/-0.0418 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0146 | +/-0.110 | 0.194 | +/-0.110 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0293 | +/-0.0971 | 0.218 | +/-0.098 | | pCi/g | | | | | | |
| Lead-212 | U | 0.00648 | +/-0.0698 | 0.127 | +/-0.0699 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0104 | +/-0.156 | 0.201 | +/-0.157 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.115 | +/-0.373 | 0.880 | +/-0.376 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.215 | +/-0.312 | 0.541 | +/-0.409 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0558 | +/-0.0936 | 0.185 | +/-0.0971 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0199 | +/-0.0438 | 0.0803 | +/-0.0448 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0621 | +/-0.133 | 0.333 | +/-0.136 | | pCi/g | | | | | | |
| Thorium-234 | U | -1.1 | +/-1.47 | 2.60 | +/-1.57 | | pCi/g | | | | | | |
| Uranium-235 | UI | 0.00 | +/-0.469 | 0.406 | +/-0.510 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0013
Sample ID: 341146013
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0248 | +/-0.0876 | 0.146 | +/-0.0883 | | pCi/g | | RXF2 | 02/10/14 | 1326 | 1359492 | 1 |
| Bismuth-212 | U | 0.201 | +/-0.265 | 0.612 | +/-0.280 | | pCi/g | | | | | | |
| Bismuth-214 | UI | 0.00 | +/-0.056 | 0.129 | +/-0.0925 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00632 | +/-0.0212 | 0.040 | +/-0.0214 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0138 | +/-0.0224 | 0.0546 | +/-0.0232 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0205 | +/-0.0542 | 0.0964 | +/-0.055 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0324 | +/-0.049 | 0.0864 | +/-0.0512 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0157 | +/-0.0582 | 0.0839 | +/-0.0586 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0753 | +/-0.0716 | 0.111 | +/-0.0795 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.0286 | +/-0.348 | 0.476 | +/-0.348 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0565 | +/-0.207 | 0.424 | +/-0.219 | | pCi/g | | | | | | |
| Radium-226 | UI | 0.00 | +/-0.056 | 0.129 | +/-0.0925 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0258 | +/-0.0232 | 0.0409 | +/-0.0261 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0148 | +/-0.0877 | 0.188 | +/-0.088 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.492 | +/-1.45 | 1.14 | +/-1.45 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0162 | +/-0.123 | 0.236 | +/-0.123 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0014
Sample ID: 341146014
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.043 | +/-0.0709 | 0.117 | +/-0.0736 | | pCi/g | | RXF2 | 02/10/14 | 1327 | 1359492 | 1 |
| Bismuth-212 | U | 0.202 | +/-0.419 | 0.634 | +/-0.429 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0466 | +/-0.0752 | 0.0816 | +/-0.0753 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00854 | +/-0.0225 | 0.046 | +/-0.0228 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00438 | +/-0.0187 | 0.0379 | +/-0.0188 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0114 | +/-0.0574 | 0.109 | +/-0.0577 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0339 | +/-0.0592 | 0.139 | +/-0.0612 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0441 | +/-0.0692 | 0.0796 | +/-0.0721 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0523 | +/-0.0665 | 0.107 | +/-0.0707 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.000238 | +/-0.434 | 0.788 | +/-0.434 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0287 | +/-0.146 | 0.281 | +/-0.151 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0466 | +/-0.0752 | 0.0816 | +/-0.0753 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00507 | +/-0.0368 | 0.0388 | +/-0.0368 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.00332 | +/-0.102 | 0.197 | +/-0.102 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.531 | +/-0.633 | 1.10 | +/-0.687 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0653 | +/-0.119 | 0.230 | +/-0.123 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0015
Sample ID: 341146015
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0168 | +/-0.0412 | 0.0642 | +/-0.0419 | | pCi/g | | RXF2 | 02/10/14 | 1327 | 1359492 | 1 |
| Bismuth-212 | U | 0.263 | +/-0.350 | 0.757 | +/-0.370 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0663 | +/-0.0629 | 0.138 | +/-0.0699 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0205 | +/-0.0309 | 0.0665 | +/-0.0323 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0393 | +/-0.0272 | 0.0139 | +/-0.0326 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00524 | +/-0.0775 | 0.142 | +/-0.0776 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0577 | +/-0.0845 | 0.208 | +/-0.0886 | | pCi/g | | | | | | |
| Lead-212 | U | -0.0108 | +/-0.0478 | 0.0877 | +/-0.048 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0058 | +/-0.0645 | 0.122 | +/-0.0646 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.152 | +/-0.417 | 0.818 | +/-0.423 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0306 | +/-0.180 | 0.402 | +/-0.184 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0663 | +/-0.0629 | 0.138 | +/-0.0699 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0447 | +/-0.0316 | 0.0412 | +/-0.0377 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0256 | +/-0.145 | 0.276 | +/-0.146 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.451 | +/-0.661 | 0.636 | +/-0.670 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.118 | +/-0.128 | 0.229 | +/-0.139 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0016
Sample ID: 341146016
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0236 | +/-0.0742 | 0.134 | +/-0.075 | | pCi/g | | RXF2 | 02/10/14 | 1327 | 1359492 | 1 |
| Bismuth-212 | U | 0.0581 | +/-0.390 | 0.790 | +/-0.391 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0351 | +/-0.0715 | 0.127 | +/-0.0733 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0367 | +/-0.0231 | 0.0427 | +/-0.0233 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00819 | +/-0.0239 | 0.0548 | +/-0.0242 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0312 | +/-0.0702 | 0.124 | +/-0.0716 | | pCi/g | | | | | | |
| Europium-154 | U | -0.00836 | +/-0.0672 | 0.138 | +/-0.0673 | | pCi/g | | | | | | |
| Lead-212 | U | 0.00227 | +/-0.0692 | 0.0747 | +/-0.0692 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0637 | +/-0.0641 | 0.130 | +/-0.0705 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.230 | +/-0.404 | 0.909 | +/-0.418 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0632 | +/-0.205 | 0.427 | +/-0.220 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0351 | +/-0.0715 | 0.127 | +/-0.0733 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.016 | +/-0.0321 | 0.0652 | +/-0.0329 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0651 | +/-0.130 | 0.237 | +/-0.133 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.365 | +/-0.799 | 1.52 | +/-0.820 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.150 | +/-0.203 | 0.290 | +/-0.214 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0017
Sample ID: 341146017
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0129 | +/-0.138 | 0.258 | +/-0.138 | | pCi/g | | RXF2 | 02/10/14 | 1328 | 1359492 | 1 |
| Bismuth-212 | U | -0.507 | +/-0.401 | 0.599 | +/-0.464 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0552 | +/-0.0936 | 0.144 | +/-0.097 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0353 | +/-0.0342 | 0.0613 | +/-0.0378 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.000476 | +/-0.025 | 0.0538 | +/-0.025 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00786 | +/-0.0786 | 0.143 | +/-0.0787 | | pCi/g | | | | | | |
| Europium-154 | U | -0.00656 | +/-0.0867 | 0.188 | +/-0.0868 | | pCi/g | | | | | | |
| Lead-212 | U | -0.00328 | +/-0.0501 | 0.0949 | +/-0.0501 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0156 | +/-0.0617 | 0.118 | +/-0.0621 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.0924 | +/-0.340 | 0.772 | +/-0.342 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0394 | +/-0.193 | 0.417 | +/-0.199 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0552 | +/-0.0936 | 0.144 | +/-0.097 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0144 | +/-0.0314 | 0.0539 | +/-0.0314 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0165 | +/-0.104 | 0.207 | +/-0.105 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.607 | +/-1.56 | 2.70 | +/-1.59 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0455 | +/-0.153 | 0.276 | +/-0.155 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0018
Sample ID: 341146018
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0287 | +/-0.104 | 0.194 | +/-0.105 | | pCi/g | | RXF2 | 02/10/14 | 1328 | 1359492 | 1 |
| Bismuth-212 | U | 0.313 | +/-0.329 | 0.723 | +/-0.360 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0534 | +/-0.072 | 0.118 | +/-0.076 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00312 | +/-0.0251 | 0.0429 | +/-0.0252 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0108 | +/-0.0278 | 0.0505 | +/-0.0282 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0191 | +/-0.0657 | 0.119 | +/-0.0663 | | pCi/g | | | | | | |
| Europium-154 | U | 0.00827 | +/-0.0598 | 0.128 | +/-0.060 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0614 | +/-0.0448 | 0.0669 | +/-0.0451 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0607 | +/-0.0658 | 0.108 | +/-0.0715 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.125 | +/-0.274 | 0.634 | +/-0.280 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.073 | +/-0.171 | 0.316 | +/-0.193 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0534 | +/-0.072 | 0.118 | +/-0.076 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | UI | 0.00 | +/-0.0246 | 0.0241 | +/-0.0248 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0361 | +/-0.0967 | 0.187 | +/-0.0982 | | pCi/g | | | | | | |
| Thorium-234 | U | -1.04 | +/-1.03 | 1.75 | +/-1.15 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.00646 | +/-0.142 | 0.242 | +/-0.142 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0019
Sample ID: 341146019
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0723 | +/-0.094 | 0.184 | +/-0.0996 | | pCi/g | | RXF2 | 02/10/14 | 1328 | 1359492 | 1 |
| Bismuth-212 | U | -0.084 | +/-0.290 | 0.544 | +/-0.293 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0577 | +/-0.0923 | 0.125 | +/-0.096 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00923 | +/-0.0343 | 0.0455 | +/-0.0343 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00357 | +/-0.0252 | 0.0517 | +/-0.0252 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0149 | +/-0.0599 | 0.109 | +/-0.0603 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0542 | +/-0.0596 | 0.0934 | +/-0.0646 | | pCi/g | | | | | | |
| Lead-212 | UI | 0.00 | +/-0.0642 | 0.0573 | +/-0.0647 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0589 | +/-0.0791 | 0.129 | +/-0.0835 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.382 | +/-0.328 | 0.417 | +/-0.330 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.149 | +/-0.206 | 0.460 | +/-0.276 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0577 | +/-0.0923 | 0.125 | +/-0.096 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0254 | +/-0.039 | 0.0391 | +/-0.0391 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0369 | +/-0.108 | 0.214 | +/-0.110 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.383 | +/-0.843 | 1.46 | +/-0.865 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0456 | +/-0.130 | 0.233 | +/-0.132 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

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Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0020
Sample ID: 341146020
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.215 | +/-0.191 | 0.336 | +/-0.192 | | pCi/g | | RXF2 | 02/10/14 | 1329 | 1359492 | 1 |
| Bismuth-212 | U | -0.00688 | +/-0.338 | 0.686 | +/-0.338 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0278 | +/-0.0684 | 0.138 | +/-0.0696 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0314 | +/-0.0314 | 0.0502 | +/-0.0315 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0139 | +/-0.0255 | 0.0628 | +/-0.0263 | | pCi/g | | | | | | |
| Europium-152 | U | 0.014 | +/-0.077 | 0.146 | +/-0.0773 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0211 | +/-0.0946 | 0.181 | +/-0.0951 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0784 | +/-0.0432 | 0.103 | +/-0.0562 | | pCi/g | | | | | | |
| Lead-214 | U | 0.104 | +/-0.0923 | 0.140 | +/-0.104 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.484 | +/-0.470 | 0.601 | +/-0.472 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0501 | +/-0.158 | 0.312 | +/-0.170 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0278 | +/-0.0684 | 0.138 | +/-0.0696 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0102 | +/-0.0291 | 0.0592 | +/-0.0295 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0319 | +/-0.0799 | 0.167 | +/-0.0813 | | pCi/g | | | | | | |
| Thorium-234 | U | 1.21 | +/-2.67 | 3.81 | +/-2.74 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.166 | +/-0.180 | 0.289 | +/-0.196 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0021
Sample ID: 341146021
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.194 | +/-0.078 | 0.298 | +/-0.0799 | | pCi/g | | RXF2 | 02/12/14 | 1146 | 1361908 | 1 |
| Bismuth-212 | U | -0.208 | +/-0.504 | 0.868 | +/-0.513 | | pCi/g | | | | | | |
| Bismuth-214 | U | -0.0919 | +/-0.102 | 0.147 | +/-0.110 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0244 | +/-0.0412 | 0.0695 | +/-0.0427 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0299 | +/-0.0404 | 0.0824 | +/-0.0427 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0337 | +/-0.109 | 0.199 | +/-0.110 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0466 | +/-0.118 | 0.212 | +/-0.120 | | pCi/g | | | | | | |
| Lead-212 | U | -0.00491 | +/-0.0832 | 0.137 | +/-0.0832 | | pCi/g | | | | | | |
| Lead-214 | U | -0.00677 | +/-0.0873 | 0.155 | +/-0.0874 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.100 | +/-0.749 | 0.583 | +/-0.749 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0108 | +/-0.299 | 0.567 | +/-0.300 | | pCi/g | | | | | | |
| Radium-226 | U | -0.0919 | +/-0.102 | 0.147 | +/-0.110 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.015 | +/-0.0504 | 0.081 | +/-0.0509 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.177 | +/-0.207 | 0.309 | +/-0.223 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.281 | +/-2.14 | 2.55 | +/-2.14 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0538 | +/-0.246 | 0.414 | +/-0.247 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0022
Sample ID: 341146022
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.128 | +/-0.212 | 0.332 | +/-0.220 | | pCi/g | | RXF2 | 02/12/14 | 1152 | 1361908 | 1 |
| Bismuth-212 | U | 0.873 | +/-0.592 | 1.16 | +/-0.716 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0182 | +/-0.112 | 0.176 | +/-0.112 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00025 | +/-0.0437 | 0.0782 | +/-0.0437 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0125 | +/-0.0452 | 0.0796 | +/-0.0456 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0195 | +/-0.126 | 0.223 | +/-0.126 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0366 | +/-0.122 | 0.214 | +/-0.123 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0382 | +/-0.115 | 0.154 | +/-0.117 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0359 | +/-0.162 | 0.182 | +/-0.162 | | pCi/g | | | | | | |
| Potassium-40 | | 1.08 | +/-0.653 | 0.693 | +/-0.661 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0282 | +/-0.291 | 0.534 | +/-0.293 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0182 | +/-0.112 | 0.176 | +/-0.112 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0494 | +/-0.0783 | 0.0676 | +/-0.0784 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.124 | +/-0.241 | 0.339 | +/-0.248 | | pCi/g | | | | | | |
| Thorium-234 | U | 1.81 | +/-2.83 | 3.53 | +/-2.97 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.149 | +/-0.296 | 0.458 | +/-0.304 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0023
Sample ID: 341146023
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0499 | +/-0.146 | 0.262 | +/-0.148 | | pCi/g | | RXF2 | 02/12/14 | 1152 | 1361908 | 1 |
| Bismuth-212 | U | 0.565 | +/-0.419 | 0.751 | +/-0.493 | | pCi/g | | | | | | |
| Bismuth-214 | U | -0.0638 | +/-0.0803 | 0.129 | +/-0.0855 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00484 | +/-0.0282 | 0.0515 | +/-0.0283 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0311 | +/-0.0612 | 0.0612 | +/-0.0628 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0394 | +/-0.0892 | 0.139 | +/-0.091 | | pCi/g | | | | | | |
| Europium-154 | U | 0.00491 | +/-0.0883 | 0.159 | +/-0.0883 | | pCi/g | | | | | | |
| Lead-212 | UI | 0.00 | +/-0.102 | 0.0832 | +/-0.103 | | pCi/g | | | | | | |
| Lead-214 | UI | 0.00 | +/-0.100 | 0.0934 | +/-0.101 | | pCi/g | | | | | | |
| Potassium-40 | | 2.75 | +/-0.643 | 0.538 | +/-0.695 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0583 | +/-0.207 | 0.371 | +/-0.219 | | pCi/g | | | | | | |
| Radium-226 | U | -0.0638 | +/-0.0803 | 0.129 | +/-0.0855 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.00343 | +/-0.0385 | 0.0631 | +/-0.0386 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.159 | +/-0.141 | 0.189 | +/-0.143 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.479 | +/-1.50 | 2.39 | +/-1.52 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0557 | +/-0.195 | 0.282 | +/-0.197 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-08-0024
Sample ID: 341146024
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.188 | +/-0.277 | 0.454 | +/-0.290 | | pCi/g | | RXF2 | 02/12/14 | 1153 | 1361908 | 1 |
| Bismuth-212 | U | 0.381 | +/-0.588 | 1.17 | +/-0.614 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00569 | +/-0.144 | 0.186 | +/-0.144 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0179 | +/-0.0431 | 0.073 | +/-0.0438 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00717 | +/-0.0424 | 0.0816 | +/-0.0425 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0696 | +/-0.145 | 0.215 | +/-0.148 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0899 | +/-0.163 | 0.279 | +/-0.168 | | pCi/g | | | | | | |
| Lead-212 | U | 0.00255 | +/-0.127 | 0.144 | +/-0.127 | | pCi/g | | | | | | |
| Lead-214 | U | 0.074 | +/-0.163 | 0.181 | +/-0.167 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.759 | +/-0.487 | 1.12 | +/-0.599 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.00294 | +/-0.317 | 0.599 | +/-0.317 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00569 | +/-0.144 | 0.186 | +/-0.144 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.049 | +/-0.0631 | 0.0704 | +/-0.0633 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.135 | +/-0.182 | 0.362 | +/-0.193 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.703 | +/-2.28 | 4.15 | +/-2.28 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.154 | +/-0.235 | 0.389 | +/-0.246 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# Quality Control Data

## QC Summary

**Report Date: February 14, 2014**



**Curtis & Tompkins Laboratories**
**2323 5th Street**
**Berkeley, California**

**Contact:** **John Goyette**

**Workorder:** **341146**

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359492 | | | | | | | | | | | |
| QC1203017835 341146001 DUP | | | | | | | | | | | |
| Americium-241 | U | -0.0903 | U | 0.239 | pCi/g | N/A | | N/A | RXF2 | 02/10/14 | 13:21 |
| | Uncertainty | +/-0.211 | | +/-0.190 | | | | | | | |
| Bismuth-212 | U | -0.0153 | U | -0.0383 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.420 | | +/-0.330 | | | | | | | |
| Bismuth-214 | U | 0.113 | U | 0.0869 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0784 | | | | | | | |
| Cesium-137 | U | 0.0413 | U | 0.00601 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0378 | | +/-0.0255 | | | | | | | |
| Cobalt-60 | U | 0.0128 | U | -0.0168 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0327 | | +/-0.0267 | | | | | | | |
| Europium-152 | U | -0.0984 | U | 0.00247 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0851 | | +/-0.0572 | | | | | | | |
| Europium-154 | U | 0.0108 | U | 0.0848 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0973 | | +/-0.0849 | | | | | | | |
| Lead-212 | U | 0.00424 | UI | 0.00 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0729 | | +/-0.0897 | | | | | | | |
| Lead-214 | | 0.169 | U | 0.0383 | pCi/g | 22.4 | | (0% - 100%) | | | |
| | Uncertainty | +/-0.0879 | | +/-0.0668 | | | | | | | |
| Potassium-40 | | 1.78 | | 1.28 | pCi/g | 32.3 | | (0% - 100%) | | | |
| | Uncertainty | +/-0.573 | | +/-0.540 | | | | | | | |
| Protactinium-234 | U | -0.102 | U | 0.169 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.224 | | +/-0.157 | | | | | | | |
| Radium-226 | U | 0.113 | U | 0.0869 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0784 | | | | | | | |
| Thallium-208 | U | -0.0103 | U | 0.00221 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.034 | | +/-0.0312 | | | | | | | |
| Thorium-232 | U | 0.122 | U | -0.051 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.116 | | +/-0.126 | | | | | | | |
| Thorium-234 | U | 1.09 | U | 0.167 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-1.90 | | +/-1.41 | | | | | | | |
| Uranium-235 | U | 0.0444 | U | -0.0292 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.176 | | +/-0.148 | | | | | | | |
| QC1203017836 LCS | | | | | | | | | | | |
| Americium-241 | 329 | | | 326 | pCi/g | | 99.1 | (75%-125%) | | 02/10/14 | 11:15 |
| | Uncertainty | | | +/-6.42 | | | | | | | |
| Bismuth-212 | | | U | -0.702 | pCi/g | | | | | | |
| | Uncertainty | | | +/-7.04 | | | | | | | |
| Bismuth-214 | | | U | 0.213 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.954 | | | | | | | |
| Cesium-137 | 135 | | | 137 | pCi/g | | 101 | (75%-125%) | | | |

## QC Summary

**Workorder:** **341146**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359492 | | | | | | | | | | | |
| | Uncertainty | | | +/-2.26 | | | | | | | |
| Cobalt-60 | 177 | | | 176 | pCi/g | | 99.4 | (75%-125%) | RXF2 | 02/10/14 | 11:15 |
| | Uncertainty | | | +/-2.93 | | | | | | | |
| Europium-152 | | | U | -0.626 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.34 | | | | | | | |
| Europium-154 | | | U | -0.168 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.961 | | | | | | | |
| Lead-212 | | | U | -0.139 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.745 | | | | | | | |
| Lead-214 | | | U | -0.205 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.987 | | | | | | | |
| Potassium-40 | | | U | -0.273 | pCi/g | | | | | | |
| | Uncertainty | | | +/-2.50 | | | | | | | |
| Protactinium-234 | | | U | -0.708 | pCi/g | | | | | | |
| | Uncertainty | | | +/-5.89 | | | | | | | |
| Radium-226 | | | U | 0.213 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.954 | | | | | | | |
| Thallium-208 | | | U | -0.109 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.494 | | | | | | | |
| Thorium-232 | | | U | -0.374 | pCi/g | | | | | | |
| | Uncertainty | | | +/-2.56 | | | | | | | |
| Thorium-234 | | | U | -61.6 | pCi/g | | | | | | |
| | Uncertainty | | | +/-25.8 | | | | | | | |
| Uranium-235 | | | U | 1.62 | pCi/g | | | | | | |
| | Uncertainty | | | +/-2.46 | | | | | | | |
| QC1203017834 MB | | | | | | | | | | | |
| Americium-241 | | | U | 0.0484 | pCi/g | | | | | 02/10/14 | 13:21 |
| | Uncertainty | | | +/-0.120 | | | | | | | |
| Bismuth-212 | | | U | -0.0285 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.290 | | | | | | | |
| Bismuth-214 | | | U | 0.026 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0503 | | | | | | | |
| Cesium-137 | | | UI | 0.00 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0236 | | | | | | | |
| Cobalt-60 | | | U | 0.00795 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0167 | | | | | | | |
| Europium-152 | | | U | 0.0118 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0517 | | | | | | | |
| Europium-154 | | | U | 0.028 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0432 | | | | | | | |
| Lead-212 | | | U | 0.00616 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0294 | | | | | | | |
| Lead-214 | | | U | -0.00854 | pCi/g | | | | | | |
| | Uncertainty | | | | | | | | | | |

## QC Summary

**Workorder:** **341146**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359492 | | | | | | | | | | | |
| | | | | +/-0.0427 | | | | | | | |
| Potassium-40 | | | U | 0.0324 | pCi/g | | | | RXF2 | 02/10/14 | 13:21 |
| | Uncertainty | | | +/-0.244 | | | | | | | |
| Protactinium-234 | | | U | 0.106 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.174 | | | | | | | |
| Radium-226 | | | U | 0.026 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0503 | | | | | | | |
| Thallium-208 | | | U | 0.0109 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.021 | | | | | | | |
| Thorium-232 | | | U | 0.00988 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0689 | | | | | | | |
| Thorium-234 | | | U | 0.833 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.90 | | | | | | | |
| Uranium-235 | | | U | 0.0487 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.134 | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| QC1203023700 341140021 DUP | | | | | | | | | | | |
| Americium-241 | U | -0.0173 | U | -0.0186 | pCi/g | N/A | | N/A | RXF2 | 02/12/14 | 14:38 |
| | Uncertainty | +/-0.062 | | +/-0.196 | | | | | | | |
| Bismuth-212 | U | 0.253 | U | -0.333 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.579 | | +/-0.581 | | | | | | | |
| Bismuth-214 | U | 0.0696 | U | -0.0498 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0752 | | | | | | | |
| Cesium-137 | U | 0.0271 | U | 0.0177 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0463 | | +/-0.0422 | | | | | | | |
| Cobalt-60 | U | -0.00483 | U | 0.0318 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0417 | | +/-0.0422 | | | | | | | |
| Europium-152 | U | 0.0815 | U | 0.0195 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.112 | | +/-0.121 | | | | | | | |
| Europium-154 | U | -0.128 | U | 0.100 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.142 | | +/-0.124 | | | | | | | |
| Lead-212 | U | 0.0132 | U | 0.0699 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0843 | | +/-0.079 | | | | | | | |
| Lead-214 | U | -0.0845 | U | 0.0675 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0838 | | +/-0.0941 | | | | | | | |
| Potassium-40 | U | 0.182 | U | 0.0504 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.587 | | +/-0.366 | | | | | | | |
| Protactinium-234 | U | -0.194 | U | 0.171 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.271 | | +/-0.289 | | | | | | | |
| Radium-226 | U | 0.0696 | U | -0.0498 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0752 | | | | | | | |
| Thallium-208 | U | -0.0305 | U | 0.00172 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0573 | | +/-0.0349 | | | | | | | |

## QC Summary

**Workorder:** **341146**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| Thorium-232 | U | -0.0645 | U | 0.0627 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.189 | | +/-0.128 | | | | | | | |
| Thorium-234 | U | -0.0897 | U | -1.55 | pCi/g | N/A | | N/A | RXF2 | 02/12/14 | 14:38 |
| | Uncertainty | +/-0.716 | | +/-1.68 | | | | | | | |
| Uranium-235 | U | -0.0492 | U | -0.0487 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.192 | | +/-0.186 | | | | | | | |
| QC1203023701 LCS | | | | | | | | | | | |
| Americium-241 | 424 | | | 478 | pCi/g | | 113 | (75%-125%) | | 02/12/14 | 16:15 |
| | Uncertainty | | | +/-10.9 | | | | | | | |
| Bismuth-212 | | | U | -7.66 | pCi/g | | | | | | |
| | Uncertainty | | | +/-10.0 | | | | | | | |
| Bismuth-214 | | | U | -0.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.33 | | | | | | | |
| Cesium-137 | 174 | | | 184 | pCi/g | | 105 | (75%-125%) | | | |
| | Uncertainty | | | +/-3.26 | | | | | | | |
| Cobalt-60 | 228 | | | 231 | pCi/g | | 101 | (75%-125%) | | | |
| | Uncertainty | | | +/-4.09 | | | | | | | |
| Europium-152 | | | U | 0.182 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.85 | | | | | | | |
| Europium-154 | | | U | -0.291 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.31 | | | | | | | |
| Lead-212 | | | U | 0.193 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.00 | | | | | | | |
| Lead-214 | | | U | -0.377 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.44 | | | | | | | |
| Potassium-40 | | | U | -0.516 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.43 | | | | | | | |
| Protactinium-234 | | | U | -2.14 | pCi/g | | | | | | |
| | Uncertainty | | | +/-9.07 | | | | | | | |
| Radium-226 | | | U | -0.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.33 | | | | | | | |
| Thallium-208 | | | U | -0.374 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.673 | | | | | | | |
| Thorium-232 | | | U | -4.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.96 | | | | | | | |
| Thorium-234 | | | U | -52.6 | pCi/g | | | | | | |
| | Uncertainty | | | +/-30.4 | | | | | | | |
| Uranium-235 | | | U | 0.871 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.30 | | | | | | | |
| QC1203023699 MB | | | | | | | | | | | |
| Americium-241 | | | U | 0.0211 | pCi/g | | | | | 02/12/14 | 14:36 |
| | Uncertainty | | | +/-0.0752 | | | | | | | |
| Bismuth-212 | | | U | -0.198 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.344 | | | | | | | |
| Bismuth-214 | | | U | 0.000196 | pCi/g | | | | | | |

## QC Summary

**Workorder:** 341146



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| | Uncertainty | | | +/-0.0778 | | | | | | | |
| Cesium-137 | | | U | -0.00326 | pCi/g | | | | RXF2 | 02/12/14 | 14:36 |
| | Uncertainty | | | +/-0.0267 | | | | | | | |
| Cobalt-60 | | | U | 0.00792 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0284 | | | | | | | |
| Europium-152 | | | U | 0.0274 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0722 | | | | | | | |
| Europium-154 | | | U | 0.0217 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.067 | | | | | | | |
| Lead-212 | | | U | 0.0387 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0457 | | | | | | | |
| Lead-214 | | | U | 0.0111 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0612 | | | | | | | |
| Potassium-40 | | | U | 0.379 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.334 | | | | | | | |
| Protactinium-234 | | | U | 0.185 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.204 | | | | | | | |
| Radium-226 | | | U | 0.000196 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0778 | | | | | | | |
| Thallium-208 | | | U | -0.0173 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0249 | | | | | | | |
| Thorium-232 | | | U | 0.101 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0809 | | | | | | | |
| Thorium-234 | | | U | 0.116 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Uranium-235 | | | U | -0.0569 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.151 | | | | | | | |

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD

## QC Summary

**Workorder:** **341146**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---|---|
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Y | Other specific qualifiers were required to properly define the results. Consult case narrative. |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. |
| h | Preparation or preservation holding time was exceeded |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Summary of Definitive Laboratory Results* for Decision Unit: 08

| Sample ID | Nuclide | Activity | Flags | Activity Units |
|---|---|---|---|---|
| Sample Delivery Group (SDG): 345763 | | | | |
| 04-PDV-RT1300-08-0007 | | | | |
| | Analysis Type: E905.0 – Gas Flow Proportional Counting | | | |
| | Strontium Total | 0 | U | pCi/g |
| 04-PDV-RT1300-08-0008 | | | | |
| | Analysis Type: E905.0 – Gas Flow Proportional Counting | | | |
| | Strontium Total | 0 | U | pCi/g |
| 04-PDV-RT1300-08-0020 | | | | |
| | Analysis Type: E905.0 – Gas Flow Proportional Counting | | | |
| | Strontium Total | 0 | U | pCi/g |



*Results for both preliminary and definitive analyses are unvalidated at the time of this summary report.

**GEL LABORATORIES LLC**
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

# Certificate of Analysis Report
for

ITSI003 ITSI Gilbane Company

Client SDG: 345763 GEL Work Order: 345763

**The Qualifiers in this report are defined as follows:**

* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

** Indicates the analyte is a Tracer compound.

** Indicates the analyte is a surrogate compound.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by Heather Shaffer

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive
Walnut Creek, California 94598
Report Date: April 14, 2014
Contact: Ms. Kriston Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-08-0007
Sample ID: 345763001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.131 | +/-0.102 | 0.165 | +/-0.107 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1253 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 72.0 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 14, 2014

Contact: Ms. Kriston Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-08-0008
Sample ID: 345763002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.0297 | +/-0.0791 | 0.139 | +/-0.0794 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1304 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 69.5 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 14, 2014

Contact: Ms. Kriston Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-08-0020
Sample ID: 345763003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | -0.0482 | +/-0.0653 | 0.129 | +/-0.0653 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1304 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 61.0 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## QC Summary

**Client :** **ITSI Gilbane Company**
**2730 Shadelands Drive**
**Walnut Creek, California**
**Contact:** **Ms. Kriston Carlyon**
**Workorder:** **345763**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow** | | | | | | | | | | |
| Batch 1377649 | | | | | | | | | | |
| QC1203062518 345763001 DUP | | | | | | | | | | |
| Total Strontium | U | 0.131 | U | 0.00903 | pCi/g | 0 | | N/A | KSD1 | 04/12/1413:05 |
| | Uncert: | +/-0.102 | | +/-0.0698 | | | | | | |
| | TPU: | +/-0.107 | | +/-0.0698 | | | | | | |
| QC1203062519 LCS | | | | | | | | | | |
| Total Strontium | 3.88 | | | 4.03 | pCi/g | | 104 | (75%-125%) | KSD1 | 04/14/1410:58 |
| | Uncert: | | | +/-0.202 | | | | | | |
| | TPU: | | | +/-1.05 | | | | | | |
| QC1203062517 MB | | | | | | | | | | |
| Total Strontium | | | U | 0.0386 | pCi/g | | | | KSD1 | 04/12/1413:05 |
| | Uncert: | | | +/-0.0554 | | | | | | |
| | TPU: | | | +/-0.0563 | | | | | | |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

| | |
|---|---|
| ** | Analyte is a Tracer compound |
| < | Result is less than value reported |
| > | Result is greater than value reported |
| BD | Results are either below the MDC or tracer recovery is low |
| FA | Failed analysis. |
| H | Analytical holding time was exceeded |
| J | Value is estimated |
| K | Analyte present. Reported value may be biased high. Actual value is expected to be lower. |
| L | Analyte present. Reported value may be biased low. Actual value is expected to be higher. |
| M | M if above MDC and less than LLD |
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |

## QC Summary

**Workorder:** **345763**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|

Y Other specific qualifiers were required to properly define the results. Consult case narrative.

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**There are no "Data Exception Reports" associated with this analytical report.**

Relog 345763

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

COC # HPSD1-0034

Gilbane

~~339224~~ Relog 341146

| | |
|---|---|
| Project Name: HPSD1 | Laboratory: Curtis & Tompkins, Berkeley, CA |
| Project Number: 07204.0004 | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| WBS Code: 0058000 | Ship to: 2323 5th St., Berkley, CA 94710 |

Comments:

Equipment:

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250639 11/8/13 BIN 10

Analytical Test Method: E901.1 - Solid Ra-226 and CS-137; GS186 - Ra-226 and CS-137 Screening

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 | GS186 | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-08-0001 | SN | 11/7/2013 | 0930 | JL | X | | RT1300-08-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-08-0002 | SN | 11/7/2013 | 0936 | JL | X | | RT1300-08-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-08-0003 | SN | 11/7/2013 | 0939 | JL | X | | RT1300-08-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-08-0004 | SN | 11/7/2013 | 0949 | JL | X | | RT1300-08-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-08-0005 | SN | 11/7/2013 | 0953 | JL | X | | RT1300-08-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-08-0006 | SN | 11/7/2013 | 0958 | JL | X | | RT1300-08-0006 | N1 | 0.00 | 0.00 |
| * 7 | 04-PDV-RT1300-08-0007 | SN | 11/7/2013 | 1004 | JL | X | | RT1300-08-0007 | N1 | 0.00 | 0.00 |
| * 8 | 04-PDV-RT1300-08-0008 | SN | 11/7/2013 | 1009 | JL | X | | RT1300-08-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-08-0009 | SN | 11/7/2013 | 1012 | JL | X | | RT1300-08-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-08-0010 | SN | 11/7/2013 | 1018 | JL | X | | RT1300-08-0010 | N1 | 0.00 | 0.00 |

Cooler # 4 — Turnaround Time: 0 Days

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| [signature] | 12/10/13 | 0953 | [signature] | 12-10-13 | 0953 |
| | | | [signature] | 121113 | ~~1020~~ 1030 |
| | | | | | |

Shipping Date / Carrier / Airbill Number

Shipping Date: 11/8/2013

Recevied by Laboratory: (Signature, Date, Time) & condition

[signature] 11/08/13 1055 OK



DCN: ITSI-0808-0004-0076, 8 May 2019

M-9343

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0034**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag, |

250639 11/8/13 @ BIN 10

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-08-0011 | SN | 11/7/2013 | 1022 | JL | X | | RT1300-08-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-08-0012 | SN | 11/7/2013 | 1026 | JL | X | | RT1300-08-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-08-0013 | SN | 11/7/2013 | 1029 | JL | X | | RT1300-08-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-08-0014 | SN | 11/7/2013 | 1033 | JL | X | | RT1300-08-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-08-0015 | SN | 11/7/2013 | 1037 | JL | X | | RT1300-08-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-08-0016 | SN | 11/7/2013 | 1042 | JL | X | | RT1300-08-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-08-0017 | SN | 11/7/2013 | 1100 | JL | X | | RT1300-08-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-08-0018 | SN | 11/7/2013 | 1110 | JL | X | | RT1300-08-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-08-0019 | SN | 11/7/2013 | 1115 | JL | X | | RT1300-08-0019 | N1 | 0.00 | 0.00 |
| * 20 | 04-PDV-RT1300-08-0020 | SN | 11/7/2013 | 1120 | JL | X | | RT1300-08-0020 | N1 | 0.00 | 0.00 |
| Cooler # 4 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| R. Stritz | 12/10/13 | 0953 | [signature] | 12-10-13 | 0953 |
| | | | [signature] | 12/11/13 | 1030 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11/08/13 1055 OK

# Packing Slip:

**Curtis & Tompkins**
**HPSD1**
**SDG: 341147**
**Attn:John Goyette**

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# DODQSM Cover Sheet

# DOD-QSM Cover Sheet

## HPSD1

February 13, 2014

**GEL Laboratories, LLC**
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Project Manager:** Valerie Davis
**Phone Extension:** 4485
**Email:** Valerie.Davis@gel.com

**Contract Purchase Order:** PO#

**Work Order:** 341147 **SDG:** 341147

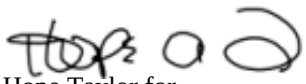
**Client Contact:**
John Goyette
Curtis & Tompkins
2323 5th Street
Berkeley, California 94710

**Project Identification:** HPSD1

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 11, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,



Hope Taylor for
Valerie Davis
Project Manager

# Case Narrative

**DODQSM Case Narrative**
**for**
**Curtis & Tompkins**
**SDG: 341147**

**February 13, 2014**

**Laboratory Identification:**

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

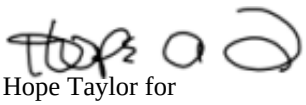
**Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on December 11, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

**Sample Identification** The laboratory received the following samples:

| Laboratory ID | Client ID |
|---|---|
| 341147001 | 04-PDV-RT1300-09-0001 |
| 341147002 | 04-PDV-RT1300-09-0002 |
| 341147003 | 04-PDV-RT1300-09-0003 |
| 341147004 | 04-PDV-RT1300-09-0004 |
| 341147005 | 04-PDV-RT1300-09-0005 |
| 341147006 | 04-PDV-RT1300-09-0006 |
| 341147007 | 04-PDV-RT1300-09-0007 |
| 341147008 | 04-PDV-RT1300-09-0008 |
| 341147009 | 04-PDV-RT1300-09-0009 |
| 341147010 | 04-PDV-RT1300-09-0010 |
| 341147011 | 04-PDV-RT1300-09-0011 |
| 341147012 | 04-PDV-RT1300-09-0012 |
| 341147013 | 04-PDV-RT1300-09-0013 |
| 341147014 | 04-PDV-RT1300-09-0014 |
| 341147015 | 04-PDV-RT1300-09-0015 |
| 341147016 | 04-PDV-RT1300-09-0016 |
| 341147017 | 04-PDV-RT1300-09-0017 |
| 341147018 | 04-PDV-RT1300-09-0018 |
| 341147019 | 04-PDV-RT1300-09-0019 |
| 341147020 | 04-PDV-RT1300-09-0020 |
| 341147021 | 04-PDV-RT1300-09-0021 |
| 341147022 | 04-PDV-RT1300-09-0022 |
| 341147023 | 04-PDV-RT1300-09-0023 |
| 341147024 | 04-PDV-RT1300-09-0024 |

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.



Hope Taylor for
Valerie Davis
Project Manager

# Chain of Custody and Supporting Documentation

Relog 341147

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

COC # HPSD1-0035

Gilbane

~~339225~~

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag, |

250 640 @ 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-09-0001 | SN | 11/7/2013 | 1130 | JL | X | | RT1300-09-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-09-0002 | SN | 11/7/2013 | 1140 | JL | X | | RT1300-09-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-09-0003 | SN | 11/7/2013 | 1143 | JL | X | | RT1300-09-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-09-0004 | SN | 11/7/2013 | 1145 | JL | X | | RT1300-09-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-09-0005 | SN | 11/7/2013 | 1150 | JL | X | | RT1300-09-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-09-0006 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-09-0007 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-09-0008 | SN | 11/7/2013 | 1311 | JL | X | | RT1300-09-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-09-0009 | SN | 11/7/2013 | 1315 | JL | X | | RT1300-09-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-09-0010 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0010 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Lou | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| R. Hurtz | 12/10/13 | 0955 | [signature] | 12-10-13 | 0955 |
| | | | [signature] | 121113 | 1030 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11-08-13 1102 OK

M-9355

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag, |

250640 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-09-0011 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-09-0012 | SN | 11/7/2013 | 1325 | JL | X | | RT1300-09-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-09-0013 | SN | 11/7/2013 | 1330 | JL | X | | RT1300-09-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-09-0014 | SN | 11/7/2013 | 1335 | JL | X | | RT1300-09-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-09-0015 | SN | 11/7/2013 | 1342 | JL | X | | RT1300-09-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-09-0016 | SN | 11/7/2013 | 1344 | JL | X | | RT1300-09-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-09-0017 | SN | 11/7/2013 | 1350 | JL | X | | RT1300-09-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-09-0018 | SN | 11/7/2013 | 1355 | JL | X | | RT1300-09-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-09-0019 | SN | 11/7/2013 | 1356 | JL | X | | RT1300-09-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-09-0020 | SN | 11/7/2013 | 1400 | | X | | RT1300-09-0020 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R Stutz | 12/10/13 | 0955 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| [illegible] | 11-8-13 | 1000 |
| [illegible] | 12-10-13 | 0955 |
| [illegible] | 121113 | 1030 |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/8/13 1102 OK

M-9356

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250640 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PDV-RT1300-09-0021 | SN | 11/7/2013 | 1500 | JL | X | X | RT1300-09-0021 | N1 | 0.00 | 0.00 |
| 22 | 04-PDV-RT1300-09-0022 | SN | 11/7/2013 | 1555 | JL | X | X | RT1300-09-0022 | N1 | 0.00 | 0.00 |
| 23 | 04-PDV-RT1300-09-0023 | SN | 11/7/2013 | 1545 | JL | X | X | RT1300-09-0023 | N1 | 0.00 | 0.00 |
| 24 | 04-PDV-RT1300-09-0024 | SN | 11/7/2013 | 1548 | JL | X | X | RT1300-09-0024 | N1 | 0.00 | 0.00 |

**Cooler # 3** **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [illegible] | 11-8-13 | 1000 |
| [illegible] | 12/10/13 | 0955 | [illegible] | 12-10-13 | 0955 |
| | | | [illegible] | 121113 | 1630 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/08/13 1100 OK



M-9357

GEL Laboratories LLC

# SAMPLE RECEIPT & REVIEW FORM

| | |
|---|---|
| Client: CURL | SDG/AR/COC/Work Order: 335225 |
| Received By: JP | Date Received: 12-11-13 |

| Suspected Hazard Information | Yes | No | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. |
|---|---|---|---|
| COC/Samples marked as radioactive? | | ✓ | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0cpm |
| Classified Radioactive II or III by RSO? | | ✓ | If yes, Were swipes taken of sample contatiners < action levels? |
| COC/Samples marked containing PCBs? | | ✓ | |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | | ✓ | If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group. |
| Shipped as a DOT Hazardous? | | ✓ | Hazard Class Shipped: UN#: |
| Samples identified as Foreign Soil? | | ✓ | |

| | Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|---|---|---|---|---|
| 1 | Shipping containers received intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 | Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | | | ✓ | Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius. See continuation form |
| 2a | Daily check performed and passed on IR temperature gun? | ✓ | | | Temperature Device Serial #: 130402460 Secondary Temperature Device Serial # (If Applicable): |
| 3 | Chain of custody documents included with shipment? | ✓ | | | |
| 4 | Sample containers intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 | Samples requiring chemical preservation at proper pH? | | ✓ | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 | VOA vials free of headspace (defined as < 6mm bubble)? | | ✓ | | Sample ID's and containers affected: |
| 7 | Are Encore containers present? | | | ✓ | (If yes, immediately deliver to Volatiles laboratory) |
| 8 | Samples received within holding time? | ✓ | | | ID's and tests affected: |
| 9 | Sample ID's on COC match ID's on bottles? | ✓ | | | Sample ID's and containers affected: |
| 10 | Date & time on COC match date & time on bottles? | ✓ | | | Sample ID's affected: |
| 11 | Number of containers received match number indicated on COC? | | | ✓ | Sample ID's affected: Received 2 bags with handwritten ID of Clean Railroad Ties 12-4-13@1430 |
| 12 | Are sample containers identifiable as GEL provided? | | | ✓ | |
| 13 | COC form is properly signed in relinquished/received sections? | ✓ | | | |
| 14 | Carrier and tracking number. | | | | Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other |
| | | | | | See continuation form |

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AT Date 12/13 Page 1 of 2

M-9358

GEL | Laboratories LLC **SAMPLE RECEIPT & REVIEW CONTINUATION FORM**

Client: CURL Received By: JP Date Received: 12113 SDG/AR/COC/Work Order: 337225

| | | |
|---|---|---|
| 7973 | 6520 | 5520 |
| " | " | 5531 |
| 8040 | 9124 | 7657 |
| 7973 | 6520 | 5510 |
| " | " | 5483 |
| " | " | 5472 |
| " | " | 5494 |
| " | " | 5461 |
| " | " | 5509 |

PM (or PMA) review: Initials HH Date 12/3/13 Page 2 of 2

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

# Laboratory Certifications

**List of current GEL Certifications as of 13 February 2014**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−13−8 |
| Utah NELAP | SC000122013−11 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780−12 |
| Wisconsin | 999887790 |

# Radiological Analysis

**Radiochemistry Case Narrative**
**Curtis & Tompkins (CURL)**
**SDG 341147**

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid (Standard List)** |
| Analytical Method: | DOE HASL 300, 4.5.2.3/Ga-01-R |
| Analytical Batch Number: | 1359496 |

| Sample ID | Client ID |
|---|---|
| 341147001 | 04-PDV-RT1300-09-0001 |
| 341147002 | 04-PDV-RT1300-09-0002 |
| 341147003 | 04-PDV-RT1300-09-0003 |
| 341147004 | 04-PDV-RT1300-09-0004 |
| 341147005 | 04-PDV-RT1300-09-0005 |
| 341147006 | 04-PDV-RT1300-09-0006 |
| 341147007 | 04-PDV-RT1300-09-0007 |
| 341147008 | 04-PDV-RT1300-09-0008 |
| 341147009 | 04-PDV-RT1300-09-0009 |
| 341147010 | 04-PDV-RT1300-09-0010 |
| 341147011 | 04-PDV-RT1300-09-0011 |
| 341147012 | 04-PDV-RT1300-09-0012 |
| 341147013 | 04-PDV-RT1300-09-0013 |
| 341147014 | 04-PDV-RT1300-09-0014 |
| 341147015 | 04-PDV-RT1300-09-0015 |
| 341147016 | 04-PDV-RT1300-09-0016 |
| 341147017 | 04-PDV-RT1300-09-0017 |
| 341147018 | 04-PDV-RT1300-09-0018 |
| 341147019 | 04-PDV-RT1300-09-0019 |
| 341147020 | 04-PDV-RT1300-09-0020 |
| 1203017838 | Method Blank (MB) |
| 1203017839 | 341147001(04-PDV-RT1300-09-0001) Sample Duplicate (DUP) |
| 1203017840 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 341147001 (04-PDV-RT1300-09-0001).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid (Standard List)** |
| Analytical Method: | DOE HASL 300, 4.5.2.3/Ga-01-R |
| Analytical Batch Number: | 1361908 |

| Sample ID | Client ID |
|---|---|
| 341147021 | 04-PDV-RT1300-09-0021 |
| 341147022 | 04-PDV-RT1300-09-0022 |
| 341147023 | 04-PDV-RT1300-09-0023 |
| 341147024 | 04-PDV-RT1300-09-0024 |
| 1203023699 | Method Blank (MB) |
| 1203023700 | 341140021(04-PDV-RT1300-06-0021) Sample Duplicate (DUP) |
| 1203023701 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 341140021 (04-PDV-RT1300-06-0021).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

| Qualifier | Reason | Analyte | Sample | Client Sample |
|---|---|---|---|---|
| UI | Data rejected due to no valid peak. | Uranium-235 | 341147022 | 04-PDV-RT1300-09-0022 |

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Qualifier Definition Report
## for

CURL001 Curtis & Tompkins

Client SDG: 341147 GEL Work Order: 341147

**The Qualifiers in this report are defined as follows:**

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

UI Gamma Spectroscopy--Uncertain identification

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:** Heather McCarty **Name: Heather McCarty**

**Date: 14 FEB 2014** **Title: Analyst II**

# Sample Data Summary

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street
Berkeley, California 94710
Report Date: February 14, 2014
Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0001
Sample ID: 341147001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.136 | +/-0.165 | 0.331 | +/-0.177 | | pCi/g | | RXF2 | 02/07/14 | 0842 | 1359496 | 1 |
| Bismuth-212 | U | 0.270 | +/-0.471 | 1.00 | +/-0.487 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0468 | +/-0.0717 | 0.144 | +/-0.0748 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00236 | +/-0.0386 | 0.077 | +/-0.0386 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0152 | +/-0.0296 | 0.0738 | +/-0.0304 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0404 | +/-0.0975 | 0.190 | +/-0.0992 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0645 | +/-0.0766 | 0.115 | +/-0.0821 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0256 | +/-0.0763 | 0.111 | +/-0.0772 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0229 | +/-0.0962 | 0.152 | +/-0.0967 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.166 | +/-0.451 | 1.07 | +/-0.458 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0434 | +/-0.194 | 0.446 | +/-0.201 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0468 | +/-0.0717 | 0.144 | +/-0.0748 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0129 | +/-0.0392 | 0.0798 | +/-0.0396 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.141 | +/-0.122 | 0.216 | +/-0.139 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.622 | +/-1.47 | 2.63 | +/-1.50 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0532 | +/-0.186 | 0.314 | +/-0.187 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0002
Sample ID: 341147002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0644 | +/-0.147 | 0.230 | +/-0.150 | | pCi/g | | RXF2 | 02/07/14 | 0842 | 1359496 | 1 |
| Bismuth-212 | U | -0.577 | +/-0.561 | 0.878 | +/-0.621 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0114 | +/-0.0732 | 0.138 | +/-0.0734 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.027 | +/-0.0363 | 0.0749 | +/-0.0383 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0134 | +/-0.0326 | 0.0634 | +/-0.0331 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0392 | +/-0.107 | 0.184 | +/-0.108 | | pCi/g | | | | | | |
| Europium-154 | U | -0.041 | +/-0.0835 | 0.151 | +/-0.0856 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0126 | +/-0.0576 | 0.095 | +/-0.0579 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0208 | +/-0.0735 | 0.142 | +/-0.0741 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.167 | +/-0.327 | 0.639 | +/-0.336 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.147 | +/-0.256 | 0.557 | +/-0.315 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0114 | +/-0.0732 | 0.138 | +/-0.0734 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.00189 | +/-0.0333 | 0.0619 | +/-0.0333 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0318 | +/-0.110 | 0.215 | +/-0.112 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.521 | +/-1.69 | 2.42 | +/-1.71 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0178 | +/-0.181 | 0.328 | +/-0.181 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0003
Sample ID: 341147003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.00265 | +/-0.0975 | 0.151 | +/-0.0975 | | pCi/g | | RXF2 | 02/07/14 | 0843 | 1359496 | 1 |
| Bismuth-212 | U | -0.148 | +/-0.425 | 0.767 | +/-0.430 | | pCi/g | | | | | | |
| Bismuth-214 | U | -0.0221 | +/-0.071 | 0.133 | +/-0.0717 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00771 | +/-0.0342 | 0.065 | +/-0.0344 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0276 | +/-0.0291 | 0.0585 | +/-0.0318 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0245 | +/-0.0807 | 0.154 | +/-0.0815 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0215 | +/-0.079 | 0.139 | +/-0.0796 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0144 | +/-0.0614 | 0.0785 | +/-0.0614 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0612 | +/-0.0674 | 0.135 | +/-0.073 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.572 | +/-0.577 | 0.822 | +/-0.579 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.046 | +/-0.172 | 0.379 | +/-0.181 | | pCi/g | | | | | | |
| Radium-226 | U | -0.0221 | +/-0.071 | 0.133 | +/-0.0717 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00715 | +/-0.0378 | 0.0494 | +/-0.0378 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0433 | +/-0.111 | 0.226 | +/-0.112 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.534 | +/-0.934 | 1.77 | +/-0.972 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.212 | +/-0.170 | 0.269 | +/-0.196 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0004
Sample ID: 341147004
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0124 | +/-0.0423 | 0.0676 | +/-0.0427 | | pCi/g | | RXF2 | 02/07/14 | 0843 | 1359496 | 1 |
| Bismuth-212 | U | -0.181 | +/-0.411 | 0.728 | +/-0.419 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0397 | +/-0.0744 | 0.152 | +/-0.0766 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0122 | +/-0.0363 | 0.0656 | +/-0.0367 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00792 | +/-0.0325 | 0.0663 | +/-0.0327 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0625 | +/-0.0846 | 0.174 | +/-0.0895 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0291 | +/-0.0597 | 0.117 | +/-0.0612 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0175 | +/-0.0601 | 0.0982 | +/-0.0606 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0537 | +/-0.0861 | 0.135 | +/-0.0896 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.283 | +/-0.453 | 1.12 | +/-0.471 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.246 | +/-0.266 | 0.421 | +/-0.403 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0397 | +/-0.0744 | 0.152 | +/-0.0766 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0182 | +/-0.0375 | 0.0697 | +/-0.0385 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0257 | +/-0.150 | 0.298 | +/-0.150 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.228 | +/-0.819 | 1.21 | +/-0.828 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.112 | +/-0.158 | 0.285 | +/-0.167 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0005
Sample ID: 341147005
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0207 | +/-0.255 | 0.429 | +/-0.255 | | pCi/g | | RXF2 | 02/07/14 | 0843 | 1359496 | 1 |
| Bismuth-212 | U | -0.367 | +/-0.374 | 0.638 | +/-0.410 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0106 | +/-0.0782 | 0.141 | +/-0.0783 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00238 | +/-0.039 | 0.0637 | +/-0.039 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0269 | +/-0.0335 | 0.0838 | +/-0.0357 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0178 | +/-0.0852 | 0.163 | +/-0.0856 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0303 | +/-0.042 | 0.141 | +/-0.0442 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0176 | +/-0.0639 | 0.124 | +/-0.0644 | | pCi/g | | | | | | |
| Lead-214 | U | 0.107 | +/-0.0727 | 0.146 | +/-0.0878 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.342 | +/-0.541 | 0.641 | +/-0.542 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.167 | +/-0.283 | 0.625 | +/-0.351 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0106 | +/-0.0782 | 0.141 | +/-0.0783 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0104 | +/-0.0337 | 0.0579 | +/-0.0341 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0142 | +/-0.129 | 0.271 | +/-0.129 | | pCi/g | | | | | | |
| Thorium-234 | U | 1.70 | +/-2.85 | 3.91 | +/-2.98 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0684 | +/-0.189 | 0.327 | +/-0.191 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0006
Sample ID: 341147006
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.124 | +/-0.122 | 0.186 | +/-0.135 | | pCi/g | | RXF2 | 02/07/14 | 0844 | 1359496 | 1 |
| Bismuth-212 | U | -0.0433 | +/-0.469 | 0.983 | +/-0.469 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0236 | +/-0.0827 | 0.168 | +/-0.0834 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.015 | +/-0.0335 | 0.0756 | +/-0.0342 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0142 | +/-0.0325 | 0.0629 | +/-0.0332 | | pCi/g | | | | | | |
| Europium-152 | U | 0.082 | +/-0.163 | 0.211 | +/-0.167 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0108 | +/-0.0989 | 0.216 | +/-0.0991 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0435 | +/-0.0675 | 0.123 | +/-0.0704 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0386 | +/-0.0807 | 0.168 | +/-0.0826 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.112 | +/-0.607 | 1.34 | +/-0.609 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.268 | +/-0.323 | 0.498 | +/-0.462 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0236 | +/-0.0827 | 0.168 | +/-0.0834 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0302 | +/-0.0346 | 0.0683 | +/-0.0373 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.00602 | +/-0.137 | 0.304 | +/-0.137 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.135 | +/-1.03 | 1.83 | +/-1.03 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0174 | +/-0.172 | 0.313 | +/-0.172 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0007
Sample ID: 341147007
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.149 | +/-0.195 | 0.360 | +/-0.195 | | pCi/g | | RXF2 | 02/07/14 | 0859 | 1359496 | 1 |
| Bismuth-212 | U | 0.0671 | +/-0.410 | 0.830 | +/-0.411 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00939 | +/-0.0784 | 0.146 | +/-0.0785 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00831 | +/-0.033 | 0.0611 | +/-0.0332 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0172 | +/-0.0389 | 0.0701 | +/-0.0397 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0179 | +/-0.0842 | 0.162 | +/-0.0846 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0512 | +/-0.0929 | 0.163 | +/-0.0958 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0121 | +/-0.0691 | 0.135 | +/-0.0693 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0749 | +/-0.0589 | 0.133 | +/-0.0681 | | pCi/g | | | | | | |
| Potassium-40 | | 1.23 | +/-0.794 | 0.705 | +/-0.801 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0257 | +/-0.230 | 0.467 | +/-0.232 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00939 | +/-0.0784 | 0.146 | +/-0.0785 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00678 | +/-0.0391 | 0.0791 | +/-0.0392 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.134 | +/-0.134 | 0.309 | +/-0.148 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.943 | +/-2.18 | 2.72 | +/-2.19 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0446 | +/-0.195 | 0.348 | +/-0.196 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0008
Sample ID: 341147008
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0522 | +/-0.169 | 0.327 | +/-0.171 | | pCi/g | | RXF2 | 02/07/14 | 0900 | 1359496 | 1 |
| Bismuth-212 | U | -0.238 | +/-0.454 | 0.687 | +/-0.467 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0202 | +/-0.0692 | 0.139 | +/-0.0698 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00465 | +/-0.0295 | 0.059 | +/-0.0295 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00758 | +/-0.0377 | 0.0754 | +/-0.0379 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0172 | +/-0.0777 | 0.147 | +/-0.0781 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0086 | +/-0.102 | 0.217 | +/-0.102 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0828 | +/-0.0615 | 0.122 | +/-0.0723 | | pCi/g | | | | | | |
| Lead-214 | U | -0.0283 | +/-0.0717 | 0.134 | +/-0.0729 | | pCi/g | | | | | | |
| Potassium-40 | | 1.68 | +/-0.580 | 0.585 | +/-0.599 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.000542 | +/-0.248 | 0.503 | +/-0.248 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0202 | +/-0.0692 | 0.139 | +/-0.0698 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0103 | +/-0.0361 | 0.0751 | +/-0.0364 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0315 | +/-0.0899 | 0.212 | +/-0.0911 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.807 | +/-2.25 | 2.55 | +/-2.26 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0165 | +/-0.157 | 0.287 | +/-0.157 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0009
Sample ID: 341147009
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0928 | +/-0.238 | 0.424 | +/-0.242 | | pCi/g | | RXF2 | 02/07/14 | 0900 | 1359496 | 1 |
| Bismuth-212 | U | 0.024 | +/-0.430 | 0.826 | +/-0.430 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.008 | +/-0.0678 | 0.136 | +/-0.0679 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.023 | +/-0.0343 | 0.0732 | +/-0.0359 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0104 | +/-0.0277 | 0.0663 | +/-0.0281 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00225 | +/-0.0859 | 0.165 | +/-0.0859 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0253 | +/-0.0644 | 0.128 | +/-0.0655 | | pCi/g | | | | | | |
| Lead-212 | U | -0.00044 | +/-0.0604 | 0.104 | +/-0.0604 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0105 | +/-0.0691 | 0.135 | +/-0.0693 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.361 | +/-0.354 | 0.875 | +/-0.391 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0747 | +/-0.224 | 0.487 | +/-0.243 | | pCi/g | | | | | | |
| Radium-226 | U | 0.008 | +/-0.0678 | 0.136 | +/-0.0679 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.00689 | +/-0.0337 | 0.0646 | +/-0.0339 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.045 | +/-0.144 | 0.296 | +/-0.145 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.0221 | +/-1.96 | 3.76 | +/-1.96 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0422 | +/-0.188 | 0.329 | +/-0.189 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0010
Sample ID: 341147010
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0649 | +/-0.0825 | 0.134 | +/-0.0877 | | pCi/g | | RXF2 | 02/07/14 | 0905 | 1359496 | 1 |
| Bismuth-212 | U | 0.369 | +/-0.229 | 0.682 | +/-0.285 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0851 | +/-0.0609 | 0.128 | +/-0.0723 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00695 | +/-0.0319 | 0.064 | +/-0.0321 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00923 | +/-0.0281 | 0.0631 | +/-0.0284 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0217 | +/-0.0606 | 0.121 | +/-0.0614 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0211 | +/-0.0431 | 0.084 | +/-0.0441 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0317 | +/-0.0509 | 0.0575 | +/-0.051 | | pCi/g | | | | | | |
| Lead-214 | U | 0.021 | +/-0.0462 | 0.0922 | +/-0.0472 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.572 | +/-0.341 | 0.900 | +/-0.431 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0424 | +/-0.190 | 0.402 | +/-0.198 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0851 | +/-0.0609 | 0.128 | +/-0.0723 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00124 | +/-0.0294 | 0.0577 | +/-0.0294 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.109 | +/-0.0934 | 0.171 | +/-0.0948 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.946 | +/-0.791 | 1.44 | +/-0.924 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0703 | +/-0.159 | 0.246 | +/-0.162 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0011
Sample ID: 341147011
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0393 | +/-0.0672 | 0.131 | +/-0.0695 | | pCi/g | | RXF2 | 02/07/14 | 0905 | 1359496 | 1 |
| Bismuth-212 | U | 0.144 | +/-0.320 | 0.666 | +/-0.326 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0708 | +/-0.0575 | 0.117 | +/-0.066 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0298 | +/-0.0491 | 0.0502 | +/-0.0492 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0114 | +/-0.0291 | 0.0637 | +/-0.0296 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00844 | +/-0.0644 | 0.110 | +/-0.0645 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0778 | +/-0.0668 | 0.0957 | +/-0.0758 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0616 | +/-0.0585 | 0.085 | +/-0.065 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0386 | +/-0.0657 | 0.113 | +/-0.0681 | | pCi/g | | | | | | |
| Potassium-40 | | 0.904 | +/-0.459 | 0.488 | +/-0.467 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.034 | +/-0.165 | 0.316 | +/-0.170 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0708 | +/-0.0575 | 0.117 | +/-0.066 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0138 | +/-0.0314 | 0.0466 | +/-0.0314 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.113 | +/-0.108 | 0.189 | +/-0.121 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.514 | +/-0.655 | 1.21 | +/-0.704 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0663 | +/-0.142 | 0.266 | +/-0.145 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0012
Sample ID: 341147012
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0442 | +/-0.160 | 0.289 | +/-0.161 | | pCi/g | | RXF2 | 02/07/14 | 0906 | 1359496 | 1 |
| Bismuth-212 | U | 0.179 | +/-0.246 | 0.611 | +/-0.260 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00319 | +/-0.0618 | 0.120 | +/-0.0618 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.010 | +/-0.0226 | 0.0491 | +/-0.0231 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00528 | +/-0.0196 | 0.0496 | +/-0.0198 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0221 | +/-0.0639 | 0.118 | +/-0.0647 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0699 | +/-0.0703 | 0.0921 | +/-0.0773 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0218 | +/-0.0488 | 0.0881 | +/-0.0498 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0315 | +/-0.0619 | 0.126 | +/-0.0635 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.0895 | +/-0.376 | 0.788 | +/-0.378 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0241 | +/-0.181 | 0.366 | +/-0.183 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00319 | +/-0.0618 | 0.120 | +/-0.0618 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0186 | +/-0.0261 | 0.0491 | +/-0.0274 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0181 | +/-0.0835 | 0.176 | +/-0.084 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.287 | +/-1.95 | 3.21 | +/-1.96 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.153 | +/-0.257 | 0.323 | +/-0.257 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0013
Sample ID: 341147013
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0502 | +/-0.112 | 0.199 | +/-0.114 | | pCi/g | | RXF2 | 02/07/14 | 0910 | 1359496 | 1 |
| Bismuth-212 | U | -0.178 | +/-0.390 | 0.693 | +/-0.398 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.137 | +/-0.090 | 0.157 | +/-0.110 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00136 | +/-0.0365 | 0.0759 | +/-0.0365 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0108 | +/-0.0283 | 0.0676 | +/-0.0287 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0153 | +/-0.0866 | 0.167 | +/-0.0869 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0678 | +/-0.103 | 0.240 | +/-0.108 | | pCi/g | | | | | | |
| Lead-212 | U | -0.0356 | +/-0.0548 | 0.0994 | +/-0.0571 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0136 | +/-0.0863 | 0.154 | +/-0.0865 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.391 | +/-0.436 | 1.05 | +/-0.472 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.00576 | +/-0.220 | 0.453 | +/-0.221 | | pCi/g | | | | | | |
| Radium-226 | U | 0.137 | +/-0.090 | 0.157 | +/-0.110 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0252 | +/-0.0269 | 0.0409 | +/-0.027 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.011 | +/-0.102 | 0.234 | +/-0.102 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.365 | +/-1.13 | 2.21 | +/-1.15 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0357 | +/-0.173 | 0.305 | +/-0.174 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0014
Sample ID: 341147014
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0131 | +/-0.0499 | 0.0767 | +/-0.0503 | | pCi/g | | RXF2 | 02/07/14 | 0911 | 1359496 | 1 |
| Bismuth-212 | U | 0.339 | +/-0.355 | 0.890 | +/-0.388 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0696 | +/-0.129 | 0.176 | +/-0.133 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00206 | +/-0.0237 | 0.0503 | +/-0.0237 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00845 | +/-0.0394 | 0.0883 | +/-0.0396 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0532 | +/-0.0664 | 0.144 | +/-0.0708 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0409 | +/-0.0868 | 0.157 | +/-0.0888 | | pCi/g | | | | | | |
| Lead-212 | U | 0.028 | +/-0.0617 | 0.101 | +/-0.0631 | | pCi/g | | | | | | |
| Lead-214 | U | 0.120 | +/-0.151 | 0.161 | +/-0.160 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.228 | +/-0.557 | 0.990 | +/-0.557 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.258 | +/-0.218 | 0.274 | +/-0.386 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0696 | +/-0.129 | 0.176 | +/-0.133 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0143 | +/-0.038 | 0.0742 | +/-0.0386 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0385 | +/-0.130 | 0.273 | +/-0.132 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.0314 | +/-0.729 | 0.779 | +/-0.729 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0568 | +/-0.134 | 0.267 | +/-0.137 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0015
Sample ID: 341147015
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.221 | +/-0.182 | 0.246 | +/-0.182 | | pCi/g | | RXF2 | 02/07/14 | 0911 | 1359496 | 1 |
| Bismuth-212 | U | 0.278 | +/-0.307 | 0.687 | +/-0.332 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0953 | +/-0.0526 | 0.112 | +/-0.0684 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0107 | +/-0.029 | 0.0572 | +/-0.0294 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0152 | +/-0.0256 | 0.0594 | +/-0.0266 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0039 | +/-0.0668 | 0.123 | +/-0.0668 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0216 | +/-0.0795 | 0.151 | +/-0.0801 | | pCi/g | | | | | | |
| Lead-212 | U | -0.0387 | +/-0.0433 | 0.0746 | +/-0.0468 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0372 | +/-0.0571 | 0.113 | +/-0.0596 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.451 | +/-0.323 | 0.559 | +/-0.325 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0286 | +/-0.178 | 0.353 | +/-0.181 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0953 | +/-0.0526 | 0.112 | +/-0.0684 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0102 | +/-0.0233 | 0.0499 | +/-0.0238 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0291 | +/-0.0769 | 0.151 | +/-0.0782 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.682 | +/-1.19 | 2.06 | +/-1.24 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.124 | +/-0.145 | 0.246 | +/-0.156 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0016
Sample ID: 341147016
Matrix: Solid
Collect Date: 07-DEC-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0874 | +/-0.120 | 0.201 | +/-0.126 | | pCi/g | | RXF2 | 02/07/14 | 0911 | 1359496 | 1 |
| Bismuth-212 | U | 0.143 | +/-0.354 | 0.741 | +/-0.361 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00806 | +/-0.078 | 0.134 | +/-0.0781 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00457 | +/-0.026 | 0.0478 | +/-0.0261 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00655 | +/-0.0286 | 0.0606 | +/-0.0288 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0659 | +/-0.0611 | 0.133 | +/-0.0682 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0197 | +/-0.0585 | 0.137 | +/-0.0592 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0409 | +/-0.0479 | 0.071 | +/-0.048 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0177 | +/-0.0542 | 0.078 | +/-0.0542 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.0753 | +/-0.287 | 0.701 | +/-0.290 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0671 | +/-0.147 | 0.344 | +/-0.169 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00806 | +/-0.078 | 0.134 | +/-0.0781 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0153 | +/-0.0264 | 0.0558 | +/-0.0273 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0594 | +/-0.115 | 0.246 | +/-0.118 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.881 | +/-1.08 | 1.93 | +/-1.16 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.018 | +/-0.154 | 0.272 | +/-0.155 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0017
Sample ID: 341147017
Matrix: Solid
Collect Date: 07-DEC-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0135 | +/-0.0647 | 0.111 | +/-0.065 | | pCi/g | | RXF2 | 02/07/14 | 0912 | 1359496 | 1 |
| Bismuth-212 | U | -0.102 | +/-0.228 | 0.417 | +/-0.233 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0622 | +/-0.0482 | 0.0977 | +/-0.056 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00373 | +/-0.0205 | 0.0292 | +/-0.0205 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00626 | +/-0.0244 | 0.0554 | +/-0.0245 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0331 | +/-0.0558 | 0.0798 | +/-0.0579 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0058 | +/-0.0536 | 0.111 | +/-0.0537 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0462 | +/-0.0464 | 0.0749 | +/-0.051 | | pCi/g | | | | | | |
| Lead-214 | U | 0.035 | +/-0.0665 | 0.091 | +/-0.0684 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.449 | +/-0.280 | 0.456 | +/-0.282 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0168 | +/-0.150 | 0.293 | +/-0.152 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0622 | +/-0.0482 | 0.0977 | +/-0.056 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0173 | +/-0.0297 | 0.0356 | +/-0.0298 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0868 | +/-0.0608 | 0.0862 | +/-0.073 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.277 | +/-0.986 | 0.968 | +/-0.988 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0441 | +/-0.0999 | 0.180 | +/-0.102 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0018
Sample ID: 341147018
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0706 | +/-0.179 | 0.328 | +/-0.182 | | pCi/g | | RXF2 | 02/07/14 | 0917 | 1359496 | 1 |
| Bismuth-212 | U | 0.0874 | +/-0.314 | 0.693 | +/-0.317 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0756 | +/-0.0664 | 0.143 | +/-0.0749 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00315 | +/-0.0217 | 0.0464 | +/-0.0217 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00116 | +/-0.0316 | 0.0703 | +/-0.0316 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0292 | +/-0.0628 | 0.114 | +/-0.0642 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0031 | +/-0.0756 | 0.170 | +/-0.0756 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0222 | +/-0.0486 | 0.0978 | +/-0.0496 | | pCi/g | | | | | | |
| Lead-214 | U | 0.011 | +/-0.0648 | 0.124 | +/-0.065 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.399 | +/-0.447 | 1.04 | +/-0.483 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.259 | +/-0.202 | 0.289 | +/-0.378 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0756 | +/-0.0664 | 0.143 | +/-0.0749 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0191 | +/-0.0253 | 0.059 | +/-0.0268 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0195 | +/-0.115 | 0.233 | +/-0.116 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.363 | +/-1.58 | 3.06 | +/-1.59 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0353 | +/-0.149 | 0.265 | +/-0.150 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0019
Sample ID: 341147019
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0203 | +/-0.193 | 0.370 | +/-0.193 | | pCi/g | | RXF2 | 02/07/14 | 0917 | 1359496 | 1 |
| Bismuth-212 | U | 0.140 | +/-0.404 | 0.861 | +/-0.409 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0237 | +/-0.0649 | 0.129 | +/-0.0658 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00786 | +/-0.0334 | 0.0598 | +/-0.0336 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.000592 | +/-0.0322 | 0.0732 | +/-0.0322 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00267 | +/-0.0756 | 0.130 | +/-0.0756 | | pCi/g | | | | | | |
| Europium-154 | U | 0.00956 | +/-0.0858 | 0.185 | +/-0.0859 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0451 | +/-0.0901 | 0.113 | +/-0.0925 | | pCi/g | | | | | | |
| Lead-214 | U | 0.034 | +/-0.0604 | 0.119 | +/-0.0624 | | pCi/g | | | | | | |
| Potassium-40 | | 1.22 | +/-0.528 | 0.536 | +/-0.538 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.125 | +/-0.208 | 0.488 | +/-0.259 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0237 | +/-0.0649 | 0.129 | +/-0.0658 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0175 | +/-0.0325 | 0.0686 | +/-0.0335 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.116 | +/-0.102 | 0.254 | +/-0.116 | | pCi/g | | | | | | |
| Thorium-234 | U | -1.05 | +/-1.63 | 2.91 | +/-1.71 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.110 | +/-0.159 | 0.298 | +/-0.167 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0020
Sample ID: 341147020
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0464 | +/-0.197 | 0.322 | +/-0.198 | | pCi/g | | RXF2 | 02/07/14 | 1000 | 1359496 | 1 |
| Bismuth-212 | U | -0.214 | +/-0.399 | 0.723 | +/-0.411 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0439 | +/-0.0839 | 0.140 | +/-0.0863 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00133 | +/-0.031 | 0.0566 | +/-0.031 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0189 | +/-0.0203 | 0.0637 | +/-0.0221 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0238 | +/-0.0806 | 0.154 | +/-0.0814 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0487 | +/-0.0784 | 0.203 | +/-0.0815 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0166 | +/-0.0467 | 0.0937 | +/-0.0473 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0499 | +/-0.0736 | 0.146 | +/-0.0772 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.118 | +/-0.286 | 0.735 | +/-0.291 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.241 | +/-0.241 | 0.364 | +/-0.383 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0439 | +/-0.0839 | 0.140 | +/-0.0863 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0145 | +/-0.0318 | 0.0684 | +/-0.0325 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.00507 | +/-0.096 | 0.205 | +/-0.096 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.187 | +/-1.69 | 2.82 | +/-1.69 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.122 | +/-0.193 | 0.358 | +/-0.201 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0021
Sample ID: 341147021
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0146 | +/-0.221 | 0.408 | +/-0.221 | | pCi/g | | RXF2 | 02/12/14 | 1429 | 1361908 | 1 |
| Bismuth-212 | U | 0.307 | +/-0.416 | 0.957 | +/-0.439 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0563 | +/-0.076 | 0.164 | +/-0.0803 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00682 | +/-0.031 | 0.0659 | +/-0.0312 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0261 | +/-0.0434 | 0.101 | +/-0.045 | | pCi/g | | | | | | |
| Europium-152 | U | 0.00606 | +/-0.0897 | 0.156 | +/-0.0898 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0534 | +/-0.112 | 0.258 | +/-0.115 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0792 | +/-0.0936 | 0.0889 | +/-0.0941 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0672 | +/-0.0845 | 0.147 | +/-0.0901 | | pCi/g | | | | | | |
| Potassium-40 | | 1.40 | +/-0.626 | 0.544 | +/-0.638 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0448 | +/-0.276 | 0.577 | +/-0.282 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0563 | +/-0.076 | 0.164 | +/-0.0803 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0123 | +/-0.0472 | 0.0671 | +/-0.0472 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.118 | +/-0.148 | 0.321 | +/-0.158 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.106 | +/-1.80 | 3.49 | +/-1.80 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.229 | +/-0.368 | 0.378 | +/-0.368 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0022
Sample ID: 341147022
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.243 | +/-0.402 | 0.721 | +/-0.417 | | pCi/g | | RXF2 | 02/12/14 | 1430 | 1361908 | 1 |
| Bismuth-212 | U | 0.115 | +/-0.649 | 1.35 | +/-0.651 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.128 | +/-0.183 | 0.260 | +/-0.192 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00729 | +/-0.0491 | 0.101 | +/-0.0492 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0289 | +/-0.0643 | 0.144 | +/-0.0656 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0613 | +/-0.126 | 0.223 | +/-0.129 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0147 | +/-0.147 | 0.306 | +/-0.147 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0337 | +/-0.091 | 0.159 | +/-0.0923 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0432 | +/-0.129 | 0.221 | +/-0.130 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.653 | +/-0.766 | 1.84 | +/-0.823 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.114 | +/-0.354 | 0.672 | +/-0.381 | | pCi/g | | | | | | |
| Radium-226 | U | 0.128 | +/-0.183 | 0.260 | +/-0.192 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0134 | +/-0.0538 | 0.108 | +/-0.0541 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0245 | +/-0.178 | 0.377 | +/-0.178 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.244 | +/-3.70 | 5.76 | +/-3.70 | | pCi/g | | | | | | |
| Uranium-235 | UI | 0.00 | +/-0.382 | 0.634 | +/-0.387 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0023
Sample ID: 341147023
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.112 | +/-0.0683 | 0.107 | +/-0.0864 | | pCi/g | | RXF2 | 02/12/14 | 1430 | 1361908 | 1 |
| Bismuth-212 | U | 0.405 | +/-0.743 | 1.42 | +/-0.767 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0759 | +/-0.130 | 0.213 | +/-0.135 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0122 | +/-0.0536 | 0.097 | +/-0.0539 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0139 | +/-0.0556 | 0.103 | +/-0.056 | | pCi/g | | | | | | |
| Europium-152 | U | -0.057 | +/-0.164 | 0.248 | +/-0.166 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0109 | +/-0.153 | 0.290 | +/-0.153 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0308 | +/-0.122 | 0.135 | +/-0.122 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0897 | +/-0.186 | 0.220 | +/-0.191 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.717 | +/-0.832 | 0.984 | +/-0.835 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0744 | +/-0.416 | 0.751 | +/-0.426 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0759 | +/-0.130 | 0.213 | +/-0.135 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0478 | +/-0.0721 | 0.0739 | +/-0.0723 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.232 | +/-0.288 | 0.432 | +/-0.309 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.26 | +/-0.812 | 1.48 | +/-0.823 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.367 | +/-0.310 | 0.459 | +/-0.314 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0024
Sample ID: 341147024
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.113 | +/-0.250 | 0.415 | +/-0.256 | | pCi/g | | RXF2 | 02/12/14 | 1431 | 1361908 | 1 |
| Bismuth-212 | U | 0.0525 | +/-0.692 | 1.29 | +/-0.693 | | pCi/g | | | | | | |
| Bismuth-214 | U | -0.0678 | +/-0.144 | 0.234 | +/-0.147 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0289 | +/-0.0712 | 0.107 | +/-0.0724 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.020 | +/-0.0719 | 0.123 | +/-0.0725 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0503 | +/-0.150 | 0.274 | +/-0.152 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0516 | +/-0.207 | 0.319 | +/-0.208 | | pCi/g | | | | | | |
| Lead-212 | U | 0.156 | +/-0.125 | 0.157 | +/-0.125 | | pCi/g | | | | | | |
| Lead-214 | U | -0.0477 | +/-0.164 | 0.232 | +/-0.165 | | pCi/g | | | | | | |
| Potassium-40 | | 2.69 | +/-1.00 | 1.13 | +/-1.03 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0163 | +/-0.345 | 0.679 | +/-0.345 | | pCi/g | | | | | | |
| Radium-226 | U | -0.0678 | +/-0.144 | 0.234 | +/-0.147 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0301 | +/-0.0758 | 0.109 | +/-0.077 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0768 | +/-0.314 | 0.447 | +/-0.316 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.725 | +/-2.92 | 3.69 | +/-2.94 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0952 | +/-0.397 | 0.529 | +/-0.399 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# Quality Control Data

## QC Summary

**Report Date: February 14, 2014**



**Curtis & Tompkins Laboratories**
**2323 5th Street**
**Berkeley, California**

**Contact:** **John Goyette**

**Workorder:** **341147**

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359496 | | | | | | | | | | | |
| QC1203017839 341147001 DUP | | | | | | | | | | | |
| Americium-241 | U | 0.136 | U | 0.0354 | pCi/g | N/A | | N/A | RXF2 | 02/07/14 | 10:01 |
| | Uncertainty | +/-0.165 | | +/-0.0754 | | | | | | | |
| Bismuth-212 | U | 0.270 | U | 0.307 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.471 | | +/-0.351 | | | | | | | |
| Bismuth-214 | U | 0.0468 | U | -0.0196 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0717 | | +/-0.0717 | | | | | | | |
| Cesium-137 | U | 0.00236 | U | 0.00682 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0386 | | +/-0.0263 | | | | | | | |
| Cobalt-60 | U | 0.0152 | U | -0.0216 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0296 | | +/-0.0264 | | | | | | | |
| Europium-152 | U | 0.0404 | U | 0.0385 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0975 | | +/-0.0822 | | | | | | | |
| Europium-154 | U | -0.0645 | U | 0.0145 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0766 | | +/-0.0542 | | | | | | | |
| Lead-212 | U | 0.0256 | U | 0.00315 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0763 | | +/-0.050 | | | | | | | |
| Lead-214 | U | 0.0229 | U | 0.0587 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0962 | | +/-0.0685 | | | | | | | |
| Potassium-40 | U | 0.166 | U | -0.13 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.451 | | +/-0.470 | | | | | | | |
| Protactinium-234 | U | 0.0434 | U | 0.118 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.194 | | +/-0.247 | | | | | | | |
| Radium-226 | U | 0.0468 | U | -0.0196 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0717 | | +/-0.0717 | | | | | | | |
| Thallium-208 | U | 0.0129 | U | 0.0069 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0392 | | +/-0.0332 | | | | | | | |
| Thorium-232 | U | -0.141 | U | -0.0039 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.122 | | +/-0.133 | | | | | | | |
| Thorium-234 | U | -0.622 | U | 1.62 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-1.47 | | +/-1.26 | | | | | | | |
| Uranium-235 | U | -0.0532 | U | -0.0575 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.186 | | +/-0.166 | | | | | | | |
| QC1203017840 LCS | | | | | | | | | | | |
| Americium-241 | 322 | | | 347 | pCi/g | | 108 | (75%-125%) | | 02/07/14 | 08:45 |
| | Uncertainty | | | +/-10.3 | | | | | | | |
| Bismuth-212 | | | U | -0.798 | pCi/g | | | | | | |
| | Uncertainty | | | +/-8.89 | | | | | | | |
| Bismuth-214 | | | U | -0.39 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Cesium-137 | 132 | | | 136 | pCi/g | | 102 | (75%-125%) | | | |

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359496 | | | | | | | | | | | |
| | Uncertainty | | | +/-2.47 | | | | | | | |
| Cobalt-60 | 174 | | | 172 | pCi/g | | 99.2 | (75%-125%) | RXF2 | 02/07/14 | 08:45 |
| | Uncertainty | | | +/-3.23 | | | | | | | |
| Europium-152 | | | U | 0.0499 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.74 | | | | | | | |
| Europium-154 | | | U | 0.925 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.07 | | | | | | | |
| Lead-212 | | | U | -0.0109 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.928 | | | | | | | |
| Lead-214 | | | U | 0.530 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.42 | | | | | | | |
| Potassium-40 | | | U | -0.725 | pCi/g | | | | | | |
| | Uncertainty | | | +/-2.85 | | | | | | | |
| Protactinium-234 | | | U | -0.466 | pCi/g | | | | | | |
| | Uncertainty | | | +/-7.38 | | | | | | | |
| Radium-226 | | | U | -0.39 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Thallium-208 | | | U | 0.237 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.595 | | | | | | | |
| Thorium-232 | | | U | -0.489 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.15 | | | | | | | |
| Thorium-234 | | | U | 15.8 | pCi/g | | | | | | |
| | Uncertainty | | | +/-40.4 | | | | | | | |
| Uranium-235 | | | U | -2.0 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.08 | | | | | | | |
| QC1203017838 MB | | | | | | | | | | | |
| Americium-241 | | | U | -0.0104 | pCi/g | | | | | 02/07/14 | 10:01 |
| | Uncertainty | | | +/-0.118 | | | | | | | |
| Bismuth-212 | | | U | 0.175 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.351 | | | | | | | |
| Bismuth-214 | | | U | 0.0215 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0579 | | | | | | | |
| Cesium-137 | | | U | -0.0207 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0226 | | | | | | | |
| Cobalt-60 | | | U | 0.0188 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.030 | | | | | | | |
| Europium-152 | | | U | -0.0458 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0723 | | | | | | | |
| Europium-154 | | | U | 0.0104 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0694 | | | | | | | |
| Lead-212 | | | U | -0.0187 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0468 | | | | | | | |
| Lead-214 | | | U | 0.0423 | pCi/g | | | | | | |
| | Uncertainty | | | | | | | | | | |

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359496 | | | | | | | | | | | |
| | | | | +/-0.0577 | | | | | | | |
| Potassium-40 | | | U | -0.0472 | pCi/g | | | | RXF2 | 02/07/14 | 10:01 |
| | Uncertainty | | | +/-0.270 | | | | | | | |
| Protactinium-234 | | | U | -0.0535 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.164 | | | | | | | |
| Radium-226 | | | U | 0.0215 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0579 | | | | | | | |
| Thallium-208 | | | U | -0.0099 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0265 | | | | | | | |
| Thorium-232 | | | U | -0.0502 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0964 | | | | | | | |
| Thorium-234 | | | U | 0.184 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.946 | | | | | | | |
| Uranium-235 | | | U | -0.0139 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.140 | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| QC1203023700 341140021 DUP | | | | | | | | | | | |
| Americium-241 | U | -0.0173 | U | -0.0186 | pCi/g | N/A | | N/A | RXF2 | 02/12/14 | 14:38 |
| | Uncertainty | +/-0.062 | | +/-0.196 | | | | | | | |
| Bismuth-212 | U | 0.253 | U | -0.333 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.579 | | +/-0.581 | | | | | | | |
| Bismuth-214 | U | 0.0696 | U | -0.0498 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0752 | | | | | | | |
| Cesium-137 | U | 0.0271 | U | 0.0177 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0463 | | +/-0.0422 | | | | | | | |
| Cobalt-60 | U | -0.00483 | U | 0.0318 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0417 | | +/-0.0422 | | | | | | | |
| Europium-152 | U | 0.0815 | U | 0.0195 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.112 | | +/-0.121 | | | | | | | |
| Europium-154 | U | -0.128 | U | 0.100 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.142 | | +/-0.124 | | | | | | | |
| Lead-212 | U | 0.0132 | U | 0.0699 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0843 | | +/-0.079 | | | | | | | |
| Lead-214 | U | -0.0845 | U | 0.0675 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0838 | | +/-0.0941 | | | | | | | |
| Potassium-40 | U | 0.182 | U | 0.0504 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.587 | | +/-0.366 | | | | | | | |
| Protactinium-234 | U | -0.194 | U | 0.171 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.271 | | +/-0.289 | | | | | | | |
| Radium-226 | U | 0.0696 | U | -0.0498 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0752 | | | | | | | |
| Thallium-208 | U | -0.0305 | U | 0.00172 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0573 | | +/-0.0349 | | | | | | | |

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| Thorium-232 | U | -0.0645 | U | 0.0627 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.189 | | +/-0.128 | | | | | | | |
| Thorium-234 | U | -0.0897 | U | -1.55 | pCi/g | N/A | | N/A | RXF2 | 02/12/14 | 14:38 |
| | Uncertainty | +/-0.716 | | +/-1.68 | | | | | | | |
| Uranium-235 | U | -0.0492 | U | -0.0487 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.192 | | +/-0.186 | | | | | | | |
| QC1203023701 LCS | | | | | | | | | | | |
| Americium-241 | 424 | | | 478 | pCi/g | | 113 | (75%-125%) | | 02/12/14 | 16:15 |
| | Uncertainty | | | +/-10.9 | | | | | | | |
| Bismuth-212 | | | U | -7.66 | pCi/g | | | | | | |
| | Uncertainty | | | +/-10.0 | | | | | | | |
| Bismuth-214 | | | U | -0.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.33 | | | | | | | |
| Cesium-137 | 174 | | | 184 | pCi/g | | 105 | (75%-125%) | | | |
| | Uncertainty | | | +/-3.26 | | | | | | | |
| Cobalt-60 | 228 | | | 231 | pCi/g | | 101 | (75%-125%) | | | |
| | Uncertainty | | | +/-4.09 | | | | | | | |
| Europium-152 | | | U | 0.182 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.85 | | | | | | | |
| Europium-154 | | | U | -0.291 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.31 | | | | | | | |
| Lead-212 | | | U | 0.193 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.00 | | | | | | | |
| Lead-214 | | | U | -0.377 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.44 | | | | | | | |
| Potassium-40 | | | U | -0.516 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.43 | | | | | | | |
| Protactinium-234 | | | U | -2.14 | pCi/g | | | | | | |
| | Uncertainty | | | +/-9.07 | | | | | | | |
| Radium-226 | | | U | -0.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.33 | | | | | | | |
| Thallium-208 | | | U | -0.374 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.673 | | | | | | | |
| Thorium-232 | | | U | -4.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.96 | | | | | | | |
| Thorium-234 | | | U | -52.6 | pCi/g | | | | | | |
| | Uncertainty | | | +/-30.4 | | | | | | | |
| Uranium-235 | | | U | 0.871 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.30 | | | | | | | |
| QC1203023699 MB | | | | | | | | | | | |
| Americium-241 | | | U | 0.0211 | pCi/g | | | | | 02/12/14 | 14:36 |
| | Uncertainty | | | +/-0.0752 | | | | | | | |
| Bismuth-212 | | | U | -0.198 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.344 | | | | | | | |
| Bismuth-214 | | | U | 0.000196 | pCi/g | | | | | | |

## QC Summary

**Workorder:** 341147



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| | Uncertainty | | | +/-0.0778 | | | | | | | |
| Cesium-137 | | | U | -0.00326 | pCi/g | | | | RXF2 | 02/12/14 | 14:36 |
| | Uncertainty | | | +/-0.0267 | | | | | | | |
| Cobalt-60 | | | U | 0.00792 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0284 | | | | | | | |
| Europium-152 | | | U | 0.0274 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0722 | | | | | | | |
| Europium-154 | | | U | 0.0217 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.067 | | | | | | | |
| Lead-212 | | | U | 0.0387 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0457 | | | | | | | |
| Lead-214 | | | U | 0.0111 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0612 | | | | | | | |
| Potassium-40 | | | U | 0.379 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.334 | | | | | | | |
| Protactinium-234 | | | U | 0.185 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.204 | | | | | | | |
| Radium-226 | | | U | 0.000196 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0778 | | | | | | | |
| Thallium-208 | | | U | -0.0173 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0249 | | | | | | | |
| Thorium-232 | | | U | 0.101 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0809 | | | | | | | |
| Thorium-234 | | | U | 0.116 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Uranium-235 | | | U | -0.0569 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.151 | | | | | | | |

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---|---|
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Y | Other specific qualifiers were required to properly define the results. Consult case narrative. |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. |
| h | Preparation or preservation holding time was exceeded |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Gamma Spectroscopy Raw Data

## Gamma Solid

Batch# 1359496 Product: CURL Date: 2/7/14

| Criteria: | Yes | No | Comments |
|---|---|---|---|
| Sample Solids are less than or equal to 100 mg for GAB. | | | n/a |
| Samples have been blank corrected (if required). Blank correction reported included (if required). | | | n/a |
| If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay. | ✓ | | |
| Instrument source check is within limits. Instrument bkg check is within limits. | ✓ | | |
| Method RDL/ LLD has been met. | ✓ | | |
| If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater S* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria. | ✓ | | |
| Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria). | | | n/a |
| Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity) | ✓ | | |
| Sample was run within hold time. | ✓ | | |
| Sample was correctly preserved if required. | ✓ | | |
| Smears Taken for Radioactive batches. | | | n/a |
| Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria). | ✓ | | |
| No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent. | ✓ | | |
| Aux data is correct. | ✓ | | |
| Client Special requirements page has been checked. | ✓ | | |
| Raw Data and/ or spectrum are included and properly statused. | ✓ | | |
| MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified | ✓ | | |
| Hit notification complete (if necessary) | ✓ | | |
| Batch entered into Case Narrative. | ✓ | | |
| Batch Data Exception Reports (DER) completed, if applicable. | | | n/a |
| Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed. | | | n/a |
| Aliquot Correction completed if required. | | | n/a |
| Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.) | ✓ | | |

Primary Review Performed By: SC 2/7/14

Secondary Review Performed By: S Mideau 2/7/14

# Gamma Spec Queue Sheet

02/07/2014

Batch #:1359496 Analyst: ~~CRO~~ RAFL 1/17/14 First Client DueDate 02/17/2014 Internal Due Date: 01/13/2014

Gamma LCS Isotope: Mixed Gamma LCS Code: 1605 Expiration Date: 9/10/39 Vol: 1.0

Initials: RF Prep Date: 1/17/14 Library: Solid Balance ID:

Wet/Dry MP 2/7/14

| Sample ID | Client Description / Container ID | Type | Hazard Code | Client | Matrix | Collect Date | Geometry | Aliquot (I/g/F) | Detector | Sealing Date/Time (if Applicable) |
|---|---|---|---|---|---|---|---|---|---|---|
| 341147001-1 | 04-PDV-RT1300-09-0001 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:30:00 RF | 500mlMB | 130.47 g | 6 | 1/17/14 |
| 341147002-1 | 04-PDV-RT1300-09-0002 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:40:00 RF | | 130.4 g | 19 | |
| 341147003-1 | 04-PDV-RT1300-09-0003 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:43:00 RF | | 115.96 g | 24 | |
| 341147004-1 | 04-PDV-RT1300-09-0004 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:45:00 RF | | 115.04 g | 25 | |
| 341147005-1 | 04-PDV-RT1300-09-0005 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:50:00 RF | | 112.63 g | 32 | |
| 341147006-1 | 04-PDV-RT1300-09-0006 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:55:00 RF | | 143.51 g | 36 | |
| 341147007-1 | 04-PDV-RT1300-09-0007 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 11:55:00 RF | | 128.21 g | 8 | |
| 341147008-1 | 04-PDV-RT1300-09-0008 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:11:00 RF | | 115.65 g | 9 | |
| 341147009-1 | 04-PDV-RT1300-09-0009 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:15:00 RF | | 125.85 g | 12 | |
| 341147010-1 | 04-PDV-RT1300-09-0010 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:20:00 RF | | 128.55 g | 20 | |
| 341147011-1 | 04-PDV-RT1300-09-0011 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:20:00 RF | | 138.98 g | 27 | |
| 341147012-1 | 04-PDV-RT1300-09-0012 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:25:00 RF | | 131.52 g | 33 | |
| 341147013-1 | 04-PDV-RT1300-09-0013 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:30:00 RF | | 111.94 g | 11 | |
| 341147014-1 | 04-PDV-RT1300-09-0014 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:35:00 RF | | 135.03 g | 17 | |
| 341147015-1 | 04-PDV-RT1300-09-0015 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:42:00 RF | | 146.5 g | 28 | |
| 341147016-1 | 04-PDV-RT1300-09-0016 | SAMPLE | | CURL001 | SOLID | 07-DEC-13 13:44:00 RF | | 130.63 g | 29 | |
| 341147017-1 | 04-PDV-RT1300-09-0017 | SAMPLE | | CURL001 | SOLID | 07-DEC-13 13:50:00 RF | | 171.78 g | 30 | |
| 341147018-1 | 04-PDV-RT1300-09-0018 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:55:00 RF | | 141.48 g | 4 | |
| 341147019-1 | 04-PDV-RT1300-09-0019 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 13:56:00 RF | | 135.84 g | 40 | |
| 341147020-1 | 04-PDV-RT1300-09-0020 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:00:00 RF | | 130.97 g | 1 | |
| 1203017838-1 | MB | MB | | QC ACCOUNT | SOLID | 1/17/14 RF | | 171.78 | 6 | |
| 1203017839-1 | DUP 04-PDV-RT1300-09-0001(341147001) | DUP | | QC ACCOUNT | SOLID | 07-NOV-13 11:30:00 RF | | 130.47 | 7 | |
| 1203017840-1 | LCS | LCS | | QC ACCOUNT | SOLID | 1/17/14 RF | | 171.78 | 14 | |

*GEL Laboratories LLC, Radiochemistry Division*

Data Reviewed By: J. Merideau 2/7/14



DCN: ITSI-0808-0004-0076, 8 May 2019

M-9407

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:42:55.17

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147001.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;375
                                        Background date  : 2-FEB-2014 16:26:23.
Sample date      : 7-NOV-2013 11:30:00. Acquisition date : 7-FEB-2014 08:42:23.
Sample ID        : G341147001           Sample quantity  : 1.30470E+02 GRAM
Detector name    : GAM06                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.22  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 92.54* | 5 | 36 | 1.71 | 184.65 | 181 | 9 | 1.29E-03 | 283.9 | |
| 2 | 0 | 185.43* | 12 | 40 | 1.28 | 370.38 | 364 | 11 | 3.33E-03 | 117.3 | |
| 3 | 0 | 220.22 | 22 | 21 | 1.07 | 439.94 | 436 | 10 | 6.20E-03 | 43.2 | |
| 4 | 0 | 238.60* | 8 | 30 | 0.98 | 476.71 | 471 | 10 | 2.17E-03 | 151.8 | |
| 5 | 0 | 264.53 | 25 | 19 | 2.61 | 528.56 | 523 | 11 | 6.94E-03 | 39.4 | |
| 6 | 0 | 291.73 | 7 | 17 | 0.84 | 582.95 | 578 | 6 | 1.91E-03 | 101.6 | |
| 7 | 0 | 352.63* | 4 | 19 | 0.78 | 704.74 | 702 | 9 | 1.21E-03 | 214.3 | |
| 8 | 1 | 513.61 | 17 | 4 | 1.71 | 1026.69 | 1016 | 14 | 4.85E-03 | 36.9 | 7.11E-01 |
| 9 | 0 | 527.06 | 15 | 3 | 2.91 | 1053.58 | 1048 | 11 | 4.29E-03 | 32.7 | |
| 10 | 0 | 575.68 | 8 | 5 | 1.34 | 1150.82 | 1144 | 10 | 2.31E-03 | 60.8 | |
| 11 | 0 | 609.48* | 8 | 5 | 0.70 | 1218.44 | 1214 | 8 | 2.10E-03 | 78.2 | |
| 12 | 0 | 836.53 | 8 | 4 | 1.45 | 1672.62 | 1668 | 8 | 2.29E-03 | 54.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:42:56

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147001.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:30:00 | Acquisition date | : 7-FEB-2014 08:42:23 |
| Sample ID | : G341147001 | Sample quantity | : 130.47 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA6 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.22  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| KR-85 | 514.00 | 17 | 0.43* | 2.339E+00 | 9.895E+00 | 1.006E+01 | 73.81 |
| SR-85 | 514.00 | 17 | 96.00* | 2.339E+00 | 4.473E-02 | 1.195E-01 | 73.81 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:42:57.59

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147001.CNF;1    *
* Acquisition date :  7-FEB-2014 08:42:23 Sensitivity     : 3.000          *
* Detector ID      : GAM06                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.22     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:30:00 Nuclide Library : SOLID          *
* Sample ID        : G341147001           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3047E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| KR-85 | 1.006E+01 | 7.277E+00 | 9.740E+00 |
| SR-85 | 1.195E-01 | 8.643E-02 | 1.157E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 6.999E-01 | 8.637E-01 | 1.852E+00 | NOT IDENT. |
| NA-22 | -2.367E-02 | 2.810E-02 | 4.215E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 8.967E-03 | 1.567E-02 | 5.652E-02 | NOT IDENT. |
| K-40 | 1.658E-01 | 4.511E-01 | 1.066E+00 | NOT IDENT. |
| SC-46 | -4.241E-02 | 6.832E-02 | 1.150E-01 | NOT IDENT. |
| V-48 | 3.910E-01 | 1.705E+00 | 3.678E+00 | NOT IDENT. |
| CR-51 | -2.444E-01 | 2.121E+00 | 3.945E+00 | NOT IDENT. |
| MN-54 | 4.136E-02 | 3.962E-02 | 9.173E-02 | NOT IDENT. |
| CO-56 | 4.619E-02 | 6.286E-02 | 1.456E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.751E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.573E-02 | 2.727E-02 | 5.222E-02 | NOT IDENT. |
| CO-58 | 9.927E-03 | 7.455E-02 | 1.508E-01 | NOT IDENT. |
| FE-59 | 1.092E-01 | 2.431E-01 | 5.506E-01 | NOT IDENT. |
| CO-60 | 1.518E-02 | 2.963E-02 | 7.378E-02 | NOT IDENT. |
| ZN-65 | 2.541E-02 | 8.195E-02 | 1.826E-01 | NOT IDENT. |
| GE-68 | -3.397E-01 | 8.492E-01 | 1.675E+00 | NOT IDENT. |
| AS-73 | -8.441E-01 | 1.922E+00 | 3.420E+00 | NOT IDENT. |
| AS-74 | 1.138E-01 | 1.397E+00 | 2.861E+00 | NOT IDENT. |
| SE-75 | 1.104E-01 | 8.527E-02 | 1.413E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 6.292E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | 8.651E-01 | 2.607E+00 | 5.381E+00 | NOT IDENT. |
| RB-83 | -4.238E-02 | 1.187E-01 | 1.985E-01 | NOT IDENT. |
| RB-86 | -4.623E+00 | 8.226E+00 | 1.504E+01 | NOT IDENT. |
| Y-88 | 1.322E-02 | 5.764E-02 | 1.417E-01 | NOT IDENT. |
| Y-91 | -5.628E+00 | 3.039E+01 | 6.302E+01 | NOT IDENT. |
| NB-94 | -2.199E-02 | 3.395E-02 | 5.810E-02 | NOT IDENT. |
| NB-95 | 7.495E-03 | 5.511E-02 | 1.204E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95M | 1.835E-02 | 2.673E-01 | 4.459E-01 | NOT IDENT. |
| ZR-95 | 1.387E-02 | 9.996E-02 | 2.187E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.284E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.508E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.705E-02 | 3.076E-02 | 5.145E-02 | NOT IDENT. |
| RH-102 | -5.757E-03 | 5.641E-02 | 1.078E-01 | NOT IDENT. |
| RU-103 | -2.408E-02 | 1.349E-01 | 2.597E-01 | FAIL ABUN |
| RH-106 | -1.778E-02 | 2.912E-01 | 5.764E-01 | NOT IDENT. |
| RU-106 | -1.778E-02 | 2.912E-01 | 5.764E-01 | NOT IDENT. |
| AG-108M | 2.248E-02 | 3.052E-02 | 6.217E-02 | NOT IDENT. |
| CD-109 | 7.032E-01 | 7.823E-01 | 1.434E+00 | NOT IDENT. |
| AG-110M | 1.492E-02 | 6.054E-02 | 1.234E-01 | NOT IDENT. |
| SN-113 | 2.769E-02 | 6.393E-02 | 1.275E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.379E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 8.635E-01 | 2.296E+00 | 4.285E+00 | NOT IDENT. |
| TE-123M | 1.925E-02 | 3.722E-02 | 7.059E-02 | NOT IDENT. |
| SB-124 | 2.068E-01 | 2.123E-01 | 5.796E-01 | NOT IDENT. |
| SB-125 | 4.056E-02 | 8.362E-02 | 1.699E-01 | NOT IDENT. |
| TE-125M | 9.606E+00 | 2.283E+01 | 4.240E+01 | NOT IDENT. |
| I-126 | -3.518E+00 | 1.085E+01 | 2.111E+01 | NOT IDENT. |
| SB-126 | 9.972E+00 | 9.117E+00 | 2.138E+01 | NOT IDENT. |
| SN-126 | 9.377E-03 | 6.895E-02 | 1.212E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.115E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.758E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.142E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.044E-02 | 3.737E-02 | 6.986E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.486E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.178E-03 | 4.068E-02 | 8.265E-02 | NOT IDENT. |
| CS-135 | -7.302E-02 | 1.660E-01 | 2.522E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.521E+00 | 4.627E+00 | 1.088E+01 | NOT IDENT. |
| BA-137M | 2.235E-03 | 3.655E-02 | 7.290E-02 | NOT IDENT. |
| CS-137 | 2.361E-03 | 3.861E-02 | 7.701E-02 | NOT IDENT. |
| CE-139 | 2.458E-02 | 3.854E-02 | 7.717E-02 | NOT IDENT. |
| BA-140 | -2.869E+00 | 3.246E+00 | 2.728E+00 | NOT IDENT. |
| LA-140 | -2.869E+00 | 3.246E+00 | 2.728E+00 | NOT IDENT. |
| CE-141 | 2.552E-01 | 2.779E-01 | 5.461E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 8.411E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.287E-01 | 2.157E-01 | 4.289E-01 | NOT IDENT. |
| PM-144 | -1.354E-02 | 4.872E-02 | 7.804E-02 | NOT IDENT. |
| PR-144 | -1.055E+00 | 3.796E+00 | 6.080E+00 | NOT IDENT. |
| PM-146 | 9.633E-03 | 3.907E-02 | 7.627E-02 | NOT IDENT. |
| ND-147 | 3.599E+00 | 5.674E+01 | 1.031E+02 | FAIL ABUN |
| PM-147 | 5.912E+02 | 7.249E+02 | 1.412E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.720E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -8.852E-03 | 2.664E-02 | 4.728E-02 | NOT IDENT. |
| EU-152 | 4.043E-02 | 9.748E-02 | 1.901E-01 | NOT IDENT. |
| GD-153 | 5.969E-02 | 1.067E-01 | 1.857E-01 | NOT IDENT. |
| EU-154 | -6.448E-02 | 7.657E-02 | 1.149E-01 | NOT IDENT. |
| EU-155 | 3.258E-02 | 8.623E-02 | 1.648E-01 | NOT IDENT. |
| TB-160 | -1.627E-01 | 2.514E-01 | 4.204E-01 | NOT IDENT. |
| HO-166M | -5.395E-02 | 5.888E-02 | 9.453E-02 | FAIL ABUN |
| TM-171 | 8.557E+00 | 2.292E+01 | 4.460E+01 | NOT IDENT. |
| LU-176 | -5.672E-03 | 2.606E-02 | 4.717E-02 | NOT IDENT. |
| HF-181 | -3.715E-02 | 1.415E-01 | 2.676E-01 | NOT IDENT. |
| TA-182 | -1.030E-01 | 2.369E-01 | 4.362E-01 | NOT IDENT. |
| RE-183 | -1.301E-01 | 4.737E-01 | 8.536E-01 | NOT IDENT. |
| RE-184 | -2.114E-02 | 4.512E-01 | 9.325E-01 | NOT IDENT. |
| W-188 | 6.967E+00 | 1.387E+01 | 3.001E+01 | FAIL ABUN |
| IR-192 | -2.002E-02 | 6.254E-02 | 1.125E-01 | NOT IDENT. |
| HG-203 | -8.724E-02 | 1.116E-01 | 1.881E-01 | NOT IDENT. |
| BI-207 | -5.246E-03 | 4.832E-02 | 9.621E-02 | NOT IDENT. |
| TL-208 | 1.292E-02 | 3.915E-02 | 7.975E-02 | NOT IDENT. |
| PB-210 | 1.567E-01 | 5.126E+00 | 9.405E+00 | NOT IDENT. |
| BI-211 | 4.738E-02 | 2.456E-01 | 4.253E-01 | NOT IDENT. |
| PB-211 | -1.579E-01 | 7.521E-01 | 1.342E+00 | NOT IDENT. |
| BI-212 | 2.701E-01 | 4.706E-01 | 1.003E+00 | NOT IDENT. |
| PB-212 | 2.563E-02 | 7.626E-02 | 1.111E-01 | FAIL ABUN |
| BI-214 | 4.676E-02 | 7.166E-02 | 1.436E-01 | FAIL ABUN |
| PB-214 | 2.289E-02 | 9.616E-02 | 1.522E-01 | FAIL ABUN |
| RN-219 | 1.192E-01 | 4.174E-01 | 7.995E-01 | NOT IDENT. |
| RN-222 | 4.676E-02 | 7.166E-02 | 1.436E-01 | FAIL ABUN |
| RA-223 | 2.341E-01 | 5.789E-01 | 1.141E+00 | NOT IDENT. |
| RA-224 | 3.507E-01 | 5.505E-01 | 1.009E+00 | NOT IDENT. |
| RA-226 | 4.676E-02 | 7.166E-02 | 1.436E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| AC-227 | -6.982E-02 | 2.326E-01 | 4.206E-01 | NOT IDENT. |
| TH-227 | -6.982E-02 | 2.326E-01 | 4.206E-01 | NOT IDENT. |
| AC-228 | -1.412E-01 | 1.219E-01 | 2.156E-01 | FAIL ABUN |
| RA-228 | -1.412E-01 | 1.219E-01 | 2.156E-01 | FAIL ABUN |
| TH-228 | 2.563E-02 | 7.626E-02 | 1.111E-01 | FAIL ABUN |
| TH-229 | -5.529E-01 | 4.769E-01 | 7.899E-01 | NOT IDENT. |
| TH-230 | 4.676E-02 | 7.165E-02 | 1.436E-01 | FAIL ABUN |
| PA-231 | 1.543E-01 | 1.469E+00 | 2.755E+00 | NOT IDENT. |
| TH-231 | 2.341E-01 | 5.789E-01 | 1.141E+00 | NOT IDENT. |
| TH-232 | -1.412E-01 | 1.219E-01 | 2.156E-01 | NOT IDENT. |
| PA-233 | 3.583E-02 | 6.239E-02 | 1.243E-01 | NOT IDENT. |
| PA-234 | 4.336E-02 | 1.939E-01 | 4.456E-01 | NOT IDENT. |
| PA-234M | 2.082E-01 | 4.603E+00 | 9.618E+00 | NOT IDENT. |
| TH-234 | -6.223E-01 | 1.465E+00 | 2.626E+00 | FAIL ABUN |
| U-234 | 4.676E-02 | 7.165E-02 | 1.436E-01 | FAIL ABUN |
| U-235 | -5.319E-02 | 1.856E-01 | 3.141E-01 | FAIL ABUN |
| NP-237 | 3.583E-02 | 6.239E-02 | 1.243E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.361E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -6.223E-01 | 1.465E+00 | 2.626E+00 | FAIL ABUN |
| NP-239 | -2.022E-01 | 3.718E-01 | 6.261E-01 | NOT IDENT. |
| PU-239 | 2.437E+02 | 3.068E+02 | 5.945E+02 | NOT IDENT. |
| AM-241 | 1.357E-01 | 1.652E-01 | 3.309E-01 | NOT IDENT. |
| AM-243 | 2.999E-03 | 5.169E-02 | 9.162E-02 | NOT IDENT. |
| CM-243 | -2.001E-03 | 9.321E-02 | 1.687E-01 | NOT IDENT. |
| CM-247 | 2.107E-02 | 3.791E-02 | 7.520E-02 | NOT IDENT. |
| CF-249 | -6.532E-03 | 4.174E-02 | 7.530E-02 | NOT IDENT. |
| CF-251 | -9.196E-02 | 1.067E-01 | 1.842E-01 | NOT IDENT. |
| ANH-511 | -2.931E-02 | 4.865E-02 | 1.050E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:42:53.16

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 92.54 | 40 | 36 | 1.71 | 184.65 | 181 | 9 | 1.11E-02 | 31.3 | |
| 2 | 0 | 185.43 | 34 | 40 | 1.28 | 370.38 | 364 | 11 | 9.38E-03 | 40.5 | |
| 3 | 0 | 220.22 | 22 | 21 | 1.07 | 439.94 | 436 | 10 | 6.20E-03 | 43.2 | |
| 4 | 0 | 238.60 | 25 | 30 | 0.98 | 476.71 | 471 | 10 | 7.05E-03 | 45.0 | |
| 5 | 0 | 264.53 | 25 | 19 | 2.61 | 528.56 | 523 | 11 | 6.94E-03 | 39.4 | |
| 6 | 0 | 291.73 | 7 | 17 | 0.84 | 582.95 | 578 | 6 | 1.91E-03 | 101.6 | |
| 7 | 0 | 352.63 | 12 | 19 | 0.78 | 704.74 | 702 | 9 | 3.46E-03 | 72.5 | |
| 8 | 1 | 510.92 | 46 | 17 | 1.70 | 1021.31 | 1016 | 14 | 1.27E-02 | 22.9 | 7.11E-01 |
| 9 | 1 | 513.61 | 17 | 4 | 1.71 | 1026.69 | 1016 | 14 | 4.85E-03 | 36.9 | |
| 10 | 0 | 527.06 | 15 | 3 | 2.91 | 1053.58 | 1048 | 11 | 4.29E-03 | 32.7 | |
| 11 | 0 | 575.68 | 8 | 5 | 1.34 | 1150.82 | 1144 | 10 | 2.31E-03 | 60.8 | |
| 12 | 0 | 609.48 | 14 | 5 | 0.70 | 1218.44 | 1214 | 8 | 3.76E-03 | 41.1 | |
| 13 | 0 | 836.53 | 8 | 4 | 1.45 | 1672.62 | 1668 | 8 | 2.29E-03 | 54.2 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:42:55.81

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| KR-85 | 514.00 | 17 | 0.43* | 2.339E+00 | 9.895E+00 | 1.006E+01 | 73.81 |
| SR-85 | 514.00 | 17 | 96.00* | 2.339E+00 | 4.473E-02 | 1.195E-01 | 73.81 |

Flag: "*" = Keyline

Sample ID : G341147001 Acquisition date : 7-FEB-2014 08:42:23

| | | |
|---|---|---|
| Total number of lines in spectrum | 12 | |
| Number of unidentified lines | 2 | |
| Number of lines tentatively identified by NID | 10 | 83.33% |

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| KR-85 | 10.56Y | 1.02 | 9.895E+00 | 1.006E+01 | 0.743E+01 | 73.81 | |
| SR-85 | 64.84D | 2.67 | 4.473E-02 | 1.195E-01 | 0.882E-01 | 73.81 | |
| Total Activity : | | | 9.940E+00 | 1.018E+01 | | | |
| Grand Total Activity : | | | 9.940E+00 | 1.018E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147001 Acquisition date : 7-FEB-2014 08:42:23

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.54 | 5 | 36 | 1.71 | 184.65 | 181 | 9 | 1.29E-03 | **** | 4.45E+00 | T |
| 0 | 185.43 | 12 | 40 | 1.28 | 370.38 | 364 | 11 | 3.33E-03 | **** | 4.68E+00 | T |
| 0 | 220.22 | 22 | 21 | 1.07 | 439.94 | 436 | 10 | 6.20E-03 | 86.4 | 4.24E+00 | |
| 0 | 238.60 | 8 | 30 | 0.98 | 476.71 | 471 | 10 | 2.17E-03 | **** | 4.03E+00 | T |
| 0 | 264.53 | 25 | 19 | 2.61 | 528.56 | 523 | 11 | 6.94E-03 | 78.8 | 3.76E+00 | T |
| 0 | 291.73 | 7 | 17 | 0.84 | 582.95 | 578 | 6 | 1.91E-03 | **** | 3.52E+00 | T |
| 0 | 352.63 | 4 | 19 | 0.78 | 704.74 | 702 | 9 | 1.21E-03 | **** | 3.08E+00 | T |
| 0 | 527.06 | 15 | 3 | 2.91 | 1053.58 | 1048 | 11 | 4.29E-03 | 65.5 | 2.29E+00 | T |
| 0 | 575.68 | 8 | 5 | 1.34 | 1150.82 | 1144 | 10 | 2.31E-03 | **** | 2.14E+00 | |
| 0 | 609.48 | 8 | 5 | 0.70 | 1218.44 | 1214 | 8 | 2.10E-03 | **** | 2.05E+00 | T |
| 0 | 836.53 | 8 | 4 | 1.45 | 1672.62 | 1668 | 8 | 2.29E-03 | **** | 1.57E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:43:08.20

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147001.CNF;1    *
* Acquisition date :  7-FEB-2014 08:42:23 Sensitivity     : 3.000            *
* Detector ID      : GAM06                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.22     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 11:30:00 Nuclide Library : SOLID            *
* Sample ID        : G341147001           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.3047E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8          *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| KR-85 | 4.091E+00 |
| SR-85 | 4.860E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 8.266E-01 | NOT IDENT. |
| NA-22 | 1.332E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.860E-02 | NOT IDENT. |
| K-40 | 4.564E-01 | NOT IDENT. |
| SC-46 | 4.634E-02 | NOT IDENT. |
| V-48 | 1.530E+00 | NOT IDENT. |
| CR-51 | 1.736E+00 | NOT IDENT. |
| MN-54 | 3.982E-02 | NOT IDENT. |
| CO-56 | 6.142E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.391E-02 | NOT IDENT. |
| CO-58 | 6.353E-02 | NOT IDENT. |
| FE-59 | 2.285E-01 | NOT IDENT. |
| CO-60 | 2.910E-02 | NOT IDENT. |
| ZN-65 | 7.485E-02 | NOT IDENT. |
| GE-68 | 5.934E-01 | NOT IDENT. |
| AS-73 | 1.543E+00 | NOT IDENT. |
| AS-74 | 1.203E+00 | NOT IDENT. |
| SE-75 | 6.472E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.312E+00 | NOT IDENT. |
| RB-83 | 8.364E-02 | NOT IDENT. |
| RB-86 | 5.329E+00 | NOT IDENT. |
| Y-88 | 5.304E-02 | NOT IDENT. |
| Y-91 | 2.365E+01 | NOT IDENT. |
| NB-94 | 2.479E-02 | NOT IDENT. |
| NB-95 | 4.777E-02 | NOT IDENT. |
| NB-95M | 2.021E-01 | NOT IDENT. |

| | | |
|---|---|---|
| ZR-95 | 8.679E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.341E-02 | NOT IDENT. |
| RH-102 | 4.661E-02 | NOT IDENT. |
| RU-103 | 1.118E-01 | FAIL ABUN |
| RH-106 | 2.421E-01 | NOT IDENT. |
| RU-106 | 2.421E-01 | NOT IDENT. |
| AG-108M | 2.785E-02 | NOT IDENT. |
| CD-109 | 6.601E-01 | NOT IDENT. |
| AG-110M | 5.247E-02 | NOT IDENT. |
| SN-113 | 5.647E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.949E+00 | NOT IDENT. |
| TE-123M | 3.215E-02 | NOT IDENT. |
| SB-124 | 2.343E-01 | NOT IDENT. |
| SB-125 | 7.459E-02 | NOT IDENT. |
| TE-125M | 1.947E+01 | NOT IDENT. |
| I-126 | 8.844E+00 | NOT IDENT. |
| SB-126 | 9.285E+00 | NOT IDENT. |
| SN-126 | 5.558E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.077E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.530E-02 | NOT IDENT. |
| CS-135 | 1.131E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.484E+00 | NOT IDENT. |
| BA-137M | 3.192E-02 | NOT IDENT. |
| CS-137 | 3.372E-02 | NOT IDENT. |
| CE-139 | 3.546E-02 | NOT IDENT. |
| BA-140 | 0.000E+00 | NOT IDENT. |
| LA-140 | 0.000E+00 | NOT IDENT. |
| CE-141 | 2.509E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.977E-01 | NOT IDENT. |
| PM-144 | 3.396E-02 | NOT IDENT. |
| PR-144 | 2.646E+00 | NOT IDENT. |
| PM-146 | 3.333E-02 | NOT IDENT. |
| ND-147 | 4.294E+01 | FAIL ABUN |
| PM-147 | 6.498E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.110E-02 | NOT IDENT. |
| EU-152 | 8.563E-02 | NOT IDENT. |
| GD-153 | 8.541E-02 | NOT IDENT. |
| EU-154 | 3.631E-02 | NOT IDENT. |
| EU-155 | 7.469E-02 | NOT IDENT. |
| TB-160 | 1.688E-01 | NOT IDENT. |
| HO-166M | 3.931E-02 | FAIL ABUN |
| TM-171 | 2.030E+01 | NOT IDENT. |
| LU-176 | 2.115E-02 | NOT IDENT. |
| HF-181 | 1.161E-01 | NOT IDENT. |
| TA-182 | 1.731E-01 | NOT IDENT. |
| RE-183 | 3.879E-01 | NOT IDENT. |
| RE-184 | 3.823E-01 | NOT IDENT. |
| W-188 | 1.364E+01 | FAIL ABUN |
| IR-192 | 4.954E-02 | NOT IDENT. |
| HG-203 | 8.376E-02 | NOT IDENT. |
| BI-207 | 3.984E-02 | NOT IDENT. |
| TL-208 | 3.557E-02 | NOT IDENT. |
| PB-210 | 4.296E+00 | NOT IDENT. |
| BI-211 | 1.932E-01 | NOT IDENT. |
| PB-211 | 5.976E-01 | NOT IDENT. |
| BI-212 | 4.356E-01 | NOT IDENT. |
| PB-212 | 5.116E-02 | FAIL ABUN |
| BI-214 | 6.349E-02 | FAIL ABUN |
| PB-214 | 6.906E-02 | FAIL ABUN |
| RN-219 | 3.578E-01 | NOT IDENT. |
| RN-222 | 6.349E-02 | FAIL ABUN |
| RA-223 | 5.111E-01 | NOT IDENT. |
| RA-224 | 4.572E-01 | NOT IDENT. |
| RA-226 | 6.349E-02 | FAIL ABUN |
| AC-227 | 1.891E-01 | NOT IDENT. |

| | | |
|---|---|---|
| TH-227 | 1.891E-01 | NOT IDENT. |
| AC-228 | 8.712E-02 | FAIL ABUN |
| RA-228 | 8.712E-02 | FAIL ABUN |
| TH-228 | 5.116E-02 | FAIL ABUN |
| TH-229 | 3.565E-01 | NOT IDENT. |
| TH-230 | 6.349E-02 | FAIL ABUN |
| PA-231 | 1.250E+00 | NOT IDENT. |
| TH-231 | 5.111E-01 | NOT IDENT. |
| TH-232 | 8.712E-02 | NOT IDENT. |
| PA-233 | 5.615E-02 | NOT IDENT. |
| PA-234 | 1.768E-01 | NOT IDENT. |
| PA-234M | 4.119E+00 | NOT IDENT. |
| TH-234 | 1.209E+00 | FAIL ABUN |
| U-234 | 6.349E-02 | FAIL ABUN |
| U-235 | 1.433E-01 | FAIL ABUN |
| NP-237 | 5.615E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.209E+00 | FAIL ABUN |
| NP-239 | 2.844E-01 | NOT IDENT. |
| PU-239 | 2.737E+02 | NOT IDENT. |
| AM-241 | 1.520E-01 | NOT IDENT. |
| AM-243 | 4.217E-02 | NOT IDENT. |
| CM-243 | 7.673E-02 | NOT IDENT. |
| CM-247 | 3.375E-02 | NOT IDENT. |
| CF-249 | 3.356E-02 | NOT IDENT. |
| CF-251 | 8.269E-02 | NOT IDENT. |
| ANH-511 | 4.921E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:43:12.77

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147001.CNF;1    *
* Acquisition date :  7-FEB-2014 08:42:23 Sensitivity     : 3.000          *
* Detector ID      : GAM06                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.22     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:30:00 Nuclide Library : SOLID          *
* Sample ID        : G341147001           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3047E+02 GRAM*
*                                         Quantity Err(%) : 1.5329E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| KR-85 | 1.006E+01 | 7.322E+00 | 7.322E+00 |
| SR-85 | 1.195E-01 | 8.697E-02 | 8.697E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 6.999E-01 | 8.656E-01 | 9.213E-01 | NOT IDENT. |
| NA-22 | -2.367E-02 | 2.817E-02 | 3.012E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 4.989E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 8.967E-03 | 1.569E-02 | 1.620E-02 | NOT IDENT. |
| K-40 | 1.658E-01 | 4.514E-01 | 4.575E-01 | NOT IDENT. |
| SC-46 | -4.241E-02 | 6.851E-02 | 7.113E-02 | NOT IDENT. |
| V-48 | 3.910E-01 | 1.706E+00 | 1.715E+00 | NOT IDENT. |
| CR-51 | -2.444E-01 | 2.121E+00 | 2.124E+00 | NOT IDENT. |
| MN-54 | 4.136E-02 | 3.988E-02 | 4.402E-02 | NOT IDENT. |
| CO-56 | 4.619E-02 | 6.307E-02 | 6.642E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.754E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.573E-02 | 2.731E-02 | 2.822E-02 | NOT IDENT. |
| CO-58 | 9.927E-03 | 7.456E-02 | 7.469E-02 | NOT IDENT. |
| FE-59 | 1.092E-01 | 2.437E-01 | 2.486E-01 | NOT IDENT. |
| CO-60 | 1.518E-02 | 2.965E-02 | 3.043E-02 | NOT IDENT. |
| ZN-65 | 2.541E-02 | 8.204E-02 | 8.284E-02 | NOT IDENT. |
| GE-68 | -3.397E-01 | 8.506E-01 | 8.643E-01 | NOT IDENT. |
| AS-73 | -8.441E-01 | 1.930E+00 | 1.967E+00 | NOT IDENT. |
| AS-74 | 1.138E-01 | 1.397E+00 | 1.398E+00 | NOT IDENT. |
| SE-75 | 1.104E-01 | 8.583E-02 | 9.920E-02 | FAIL ABUN |
| BR-77 | 2.115E+10 | 8.433E+10 | 8.486E+10 | SHORT HLIF |
| SR-82 | 8.651E-01 | 2.609E+00 | 2.638E+00 | NOT IDENT. |
| RB-83 | -4.238E-02 | 1.189E-01 | 1.204E-01 | NOT IDENT. |
| RB-86 | -4.623E+00 | 8.253E+00 | 8.512E+00 | NOT IDENT. |
| Y-88 | 1.322E-02 | 5.765E-02 | 5.796E-02 | NOT IDENT. |
| Y-91 | -5.628E+00 | 3.039E+01 | 3.050E+01 | NOT IDENT. |
| NB-94 | -2.199E-02 | 3.400E-02 | 3.541E-02 | NOT IDENT. |
| NB-95 | 7.495E-03 | 5.511E-02 | 5.522E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95M | 1.835E-02 | 2.674E-01 | 2.675E-01 | NOT IDENT. |
| ZR-95 | 1.387E-02 | 9.997E-02 | 1.002E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 6.323E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 2.200E+38 | 1.284E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -2.229E+09 | 2.518E+09 | 2.711E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 2.853E+43 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.705E-02 | 3.094E-02 | 3.189E-02 | NOT IDENT. |
| RH-102 | -5.757E-03 | 5.641E-02 | 5.647E-02 | NOT IDENT. |
| RU-103 | -2.408E-02 | 1.349E-01 | 1.353E-01 | FAIL ABUN |
| RH-106 | -1.778E-02 | 2.912E-01 | 2.913E-01 | NOT IDENT. |
| RU-106 | -1.778E-02 | 2.912E-01 | 2.913E-01 | NOT IDENT. |
| AG-108M | 2.248E-02 | 3.057E-02 | 3.221E-02 | NOT IDENT. |
| CD-109 | 7.032E-01 | 7.859E-01 | 8.474E-01 | NOT IDENT. |
| AG-110M | 1.492E-02 | 6.056E-02 | 6.094E-02 | NOT IDENT. |
| SN-113 | 2.769E-02 | 6.397E-02 | 6.518E-02 | NOT IDENT. |
| CD-115 | 3.708E+11 | 2.411E+11 | 2.934E+11 | SHORT HLIF |
| SN-117M | 8.635E-01 | 2.298E+00 | 2.330E+00 | NOT IDENT. |
| TE-123M | 1.925E-02 | 3.725E-02 | 3.825E-02 | NOT IDENT. |
| SB-124 | 2.068E-01 | 2.129E-01 | 2.324E-01 | NOT IDENT. |
| SB-125 | 4.056E-02 | 8.368E-02 | 8.566E-02 | NOT IDENT. |
| TE-125M | 9.606E+00 | 2.285E+01 | 2.325E+01 | NOT IDENT. |
| I-126 | -3.518E+00 | 1.086E+01 | 1.097E+01 | NOT IDENT. |
| SB-126 | 9.972E+00 | 9.215E+00 | 1.025E+01 | NOT IDENT. |
| SN-126 | 9.377E-03 | 6.896E-02 | 6.909E-02 | NOT IDENT. |
| SB-127 | 6.755E+05 | 1.152E+06 | 1.191E+06 | SHORT HLIF |
| I-131 | 2.535E+01 | 7.761E+01 | 7.845E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.180E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.262E+06 | 1.142E+07 | 1.143E+07 | SHORT HLIF |
| BA-133 | 2.044E-02 | 3.741E-02 | 3.853E-02 | NOT IDENT. |
| I-133 | 8.190E+29 | 2.528E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.178E-03 | 4.069E-02 | 4.090E-02 | NOT IDENT. |
| CS-135 | -7.302E-02 | 1.662E-01 | 1.694E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 5.247E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.521E+00 | 4.644E+00 | 4.781E+00 | NOT IDENT. |
| BA-137M | 2.235E-03 | 3.655E-02 | 3.657E-02 | NOT IDENT. |
| CS-137 | 2.361E-03 | 3.862E-02 | 3.863E-02 | NOT IDENT. |
| CE-139 | 2.458E-02 | 3.888E-02 | 4.043E-02 | NOT IDENT. |
| BA-140 | -2.869E+00 | 3.255E+00 | 3.502E+00 | NOT IDENT. |
| LA-140 | -2.869E+00 | 3.255E+00 | 3.502E+00 | NOT IDENT. |
| CE-141 | 2.552E-01 | 2.788E-01 | 3.016E-01 | NOT IDENT. |
| CE-143 | 4.933E+17 | 8.411E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.287E-01 | 2.169E-01 | 2.401E-01 | NOT IDENT. |
| PM-144 | -1.354E-02 | 4.873E-02 | 4.912E-02 | NOT IDENT. |
| PR-144 | -1.055E+00 | 3.797E+00 | 3.826E+00 | NOT IDENT. |
| PM-146 | 9.633E-03 | 3.908E-02 | 3.932E-02 | NOT IDENT. |
| ND-147 | 3.599E+00 | 5.674E+01 | 5.676E+01 | FAIL ABUN |
| PM-147 | 5.912E+02 | 7.273E+02 | 7.745E+02 | NOT IDENT. |
| PM-149 | 2.636E+12 | 2.754E+12 | 2.999E+12 | SHORT HLIF |
| EU-150 | -8.852E-03 | 2.665E-02 | 2.695E-02 | NOT IDENT. |
| EU-152 | 4.043E-02 | 9.755E-02 | 9.924E-02 | NOT IDENT. |
| GD-153 | 5.969E-02 | 1.068E-01 | 1.101E-01 | NOT IDENT. |
| EU-154 | -6.448E-02 | 7.677E-02 | 8.209E-02 | NOT IDENT. |
| EU-155 | 3.258E-02 | 8.629E-02 | 8.754E-02 | NOT IDENT. |
| TB-160 | -1.627E-01 | 2.522E-01 | 2.627E-01 | NOT IDENT. |
| HO-166M | -5.395E-02 | 5.910E-02 | 6.391E-02 | FAIL ABUN |
| TM-171 | 8.557E+00 | 2.293E+01 | 2.325E+01 | NOT IDENT. |
| LU-176 | -5.672E-03 | 2.606E-02 | 2.619E-02 | NOT IDENT. |
| HF-181 | -3.715E-02 | 1.415E-01 | 1.425E-01 | NOT IDENT. |
| TA-182 | -1.030E-01 | 2.371E-01 | 2.416E-01 | NOT IDENT. |
| RE-183 | -1.301E-01 | 4.739E-01 | 4.775E-01 | NOT IDENT. |
| RE-184 | -2.114E-02 | 4.512E-01 | 4.513E-01 | NOT IDENT. |
| W-188 | 6.967E+00 | 1.390E+01 | 1.425E+01 | FAIL ABUN |
| IR-192 | -2.002E-02 | 6.256E-02 | 6.321E-02 | NOT IDENT. |
| HG-203 | -8.724E-02 | 1.118E-01 | 1.185E-01 | NOT IDENT. |
| BI-207 | -5.246E-03 | 4.833E-02 | 4.839E-02 | NOT IDENT. |
| TL-208 | 1.292E-02 | 3.916E-02 | 3.959E-02 | NOT IDENT. |
| PB-210 | 1.567E-01 | 5.126E+00 | 5.127E+00 | NOT IDENT. |
| BI-211 | 4.738E-02 | 2.456E-01 | 2.466E-01 | NOT IDENT. |
| PB-211 | -1.579E-01 | 7.522E-01 | 7.555E-01 | NOT IDENT. |
| BI-212 | 2.701E-01 | 4.712E-01 | 4.867E-01 | NOT IDENT. |
| PB-212 | 2.563E-02 | 7.629E-02 | 7.716E-02 | FAIL ABUN |
| BI-214 | 4.676E-02 | 7.176E-02 | 7.479E-02 | FAIL ABUN |
| PB-214 | 2.289E-02 | 9.618E-02 | 9.673E-02 | FAIL ABUN |
| RN-219 | 1.192E-01 | 4.177E-01 | 4.212E-01 | NOT IDENT. |
| RN-222 | 4.676E-02 | 7.176E-02 | 7.479E-02 | FAIL ABUN |
| RA-223 | 2.341E-01 | 5.794E-01 | 5.889E-01 | NOT IDENT. |
| RA-224 | 3.507E-01 | 5.514E-01 | 5.736E-01 | NOT IDENT. |
| RA-226 | 4.676E-02 | 7.176E-02 | 7.479E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| AC-227 | -6.982E-02 | 2.328E-01 | 2.349E-01 | NOT IDENT. |
| TH-227 | -6.982E-02 | 2.328E-01 | 2.349E-01 | NOT IDENT. |
| AC-228 | -1.412E-01 | 1.232E-01 | 1.387E-01 | FAIL ABUN |
| RA-228 | -1.412E-01 | 1.232E-01 | 1.387E-01 | FAIL ABUN |
| TH-228 | 2.563E-02 | 7.629E-02 | 7.716E-02 | FAIL ABUN |
| TH-229 | -5.529E-01 | 4.789E-01 | 5.399E-01 | NOT IDENT. |
| TH-230 | 4.676E-02 | 7.175E-02 | 7.479E-02 | FAIL ABUN |
| PA-231 | 1.543E-01 | 1.469E+00 | 1.471E+00 | NOT IDENT. |
| TH-231 | 2.341E-01 | 5.794E-01 | 5.889E-01 | NOT IDENT. |
| TH-232 | -1.412E-01 | 1.232E-01 | 1.387E-01 | NOT IDENT. |
| PA-233 | 3.583E-02 | 6.247E-02 | 6.453E-02 | NOT IDENT. |
| PA-234 | 4.336E-02 | 2.002E-01 | 2.011E-01 | NOT IDENT. |
| PA-234M | 2.082E-01 | 4.603E+00 | 4.604E+00 | NOT IDENT. |
| TH-234 | -6.223E-01 | 1.472E+00 | 1.498E+00 | FAIL ABUN |
| U-234 | 4.676E-02 | 7.175E-02 | 7.479E-02 | FAIL ABUN |
| U-235 | -5.319E-02 | 1.856E-01 | 1.872E-01 | FAIL ABUN |
| NP-237 | 3.583E-02 | 6.247E-02 | 6.453E-02 | NOT IDENT. |
| NP-238 | -5.459E+11 | 1.363E+12 | 1.385E+12 | SHORT HLIF |
| U-238 | -6.223E-01 | 1.472E+00 | 1.498E+00 | FAIL ABUN |
| NP-239 | -2.022E-01 | 3.726E-01 | 3.836E-01 | NOT IDENT. |
| PU-239 | 2.437E+02 | 3.077E+02 | 3.267E+02 | NOT IDENT. |
| AM-241 | 1.357E-01 | 1.656E-01 | 1.766E-01 | NOT IDENT. |
| AM-243 | 2.999E-03 | 5.169E-02 | 5.170E-02 | NOT IDENT. |
| CM-243 | -2.001E-03 | 9.321E-02 | 9.322E-02 | NOT IDENT. |
| CM-247 | 2.107E-02 | 3.810E-02 | 3.927E-02 | NOT IDENT. |
| CF-249 | -6.532E-03 | 4.175E-02 | 4.185E-02 | NOT IDENT. |
| CF-251 | -9.196E-02 | 1.073E-01 | 1.151E-01 | NOT IDENT. |
| ANH-511 | -2.931E-02 | 4.871E-02 | 5.047E-02 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 36.2897 | 94.67 | 36.2695 | 193.51 | 48.1978 |
| 45.60 | 36.5229 | 94.87 | 36.2832 | 197.03 | 34.6952 |
| 46.54 | 32.8704 | 97.43 | 33.2867 | 198.01 | 38.3897 |
| 49.72 | 0.0000 | 98.43 | 43.4055 | 201.83 | 32.1281 |
| 51.35 | 31.4297 | 98.44 | 43.4063 | 205.31 | 27.6443 |
| 52.39 | 28.6560 | 99.53 | 32.8848 | 210.85 | 25.9569 |
| 53.44 | 35.4454 | 100.11 | 36.1053 | 215.65 | 29.8171 |
| 57.36 | 0.0000 | 103.18 | 35.2371 | 222.11 | 31.5200 |
| 57.53 | 37.7745 | 103.37 | 34.1808 | 227.09 | 30.1729 |
| 57.98 | 37.8188 | 105.21 | 25.7190 | 227.38 | 32.0683 |
| 59.32 | 34.0581 | 105.31 | 25.7235 | 228.16 | 0.0000 |
| 59.54 | 29.2091 | 106.12 | 42.9333 | 228.18 | 36.8139 |
| 63.29 | 43.2461 | 109.28 | 32.3761 | 235.69 | 30.4346 |
| 63.58 | 53.1126 | 111.00 | 45.4594 | 235.96 | 31.9648 |
| 64.28 | 44.3365 | 111.76 | 0.0000 | 238.63 | 30.5229 |
| 66.73 | 43.6081 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 34.7303 | 117.23 | 42.6509 | 240.99 | 21.4155 |
| 67.75 | 33.7786 | 121.12 | 31.9140 | 242.00 | 26.0300 |
| 69.67 | 39.9186 | 121.22 | 30.8184 | 244.70 | 30.7036 |
| 70.83 | 38.0238 | 121.78 | 30.8459 | 252.40 | 0.0000 |
| 72.81 | 41.2104 | 122.06 | 29.7574 | 252.80 | 37.7095 |
| 72.87 | 41.2160 | 123.07 | 44.1555 | 254.15 | 0.0000 |
| 74.66 | 42.3901 | 127.23 | 44.4418 | 256.23 | 31.0406 |
| 74.82 | 42.4050 | 129.30 | 31.2080 | 260.90 | 0.0000 |
| 74.97 | 41.4091 | 131.20 | 41.3581 | 264.66 | 28.3500 |
| 77.11 | 45.6619 | 133.02 | 35.8669 | 268.22 | 32.9525 |
| 79.69 | 41.8335 | 133.52 | 28.0418 | 269.46 | 29.8475 |
| 80.12 | 41.8715 | 136.00 | 48.4091 | 271.23 | 29.5015 |
| 80.19 | 0.0000 | 136.47 | 43.9365 | 273.65 | 27.5941 |
| 80.57 | 36.8000 | 140.51 | 0.0000 | 276.40 | 22.7217 |
| 81.00 | 37.8565 | 143.76 | 37.5688 | 277.37 | 24.7185 |
| 81.07 | 37.8619 | 144.24 | 35.3159 | 277.60 | 30.6571 |
| 83.79 | 42.1920 | 145.44 | 27.3875 | 278.00 | 33.6358 |
| 85.43 | 43.3655 | 152.43 | 36.8701 | 279.20 | 33.6711 |
| 86.55 | 48.6375 | 153.25 | 39.2177 | 279.54 | 29.7189 |
| 86.79 | 48.6605 | 154.21 | 38.1136 | 280.46 | 26.7685 |
| 86.94 | 42.4614 | 156.02 | 30.1019 | 283.69 | 30.8203 |
| 87.09 | 43.5101 | 158.56 | 27.8801 | 284.31 | 0.0000 |
| 87.57 | 38.5744 | 159.00 | 26.7339 | 285.41 | 27.3101 |
| 88.03 | 28.0231 | 162.33 | 40.2756 | 285.90 | 0.0000 |
| 88.34 | 28.0403 | 163.33 | 35.9441 | 287.50 | 28.7271 |
| 88.47 | 34.2803 | 165.86 | 32.5430 | 290.67 | 31.0047 |
| 89.96 | 35.9435 | 176.31 | 33.8614 | 293.27 | 0.0000 |
| 91.11 | 36.0238 | 176.60 | 33.8736 | 295.22 | 40.1599 |
| 92.59 | 40.8386 | 177.52 | 39.2661 | 295.96 | 35.5924 |
| 93.35 | 40.8979 | 181.07 | 0.0000 | 298.58 | 24.1637 |
| 94.56 | 36.2620 | 184.41 | 44.0911 | 299.98 | 23.1839 |
| 94.65 | 36.2681 | 185.72 | 47.5837 | 300.09 | 27.2184 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 27.2192 | 497.08 | 14.7441 | 711.68 | 17.3893 |
| 301.36 | 36.3290 | 505.52 | 13.8882 | 720.70 | 5.1340 |
| 302.85 | 30.3113 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 25.2937 | 511.00 | 15.7876 | 722.78 | 16.4434 |
| 306.78 | 28.3820 | 514.00 | 9.3022 | 722.91 | 16.4441 |
| 308.46 | 28.4204 | 514.00 | 9.3022 | 723.31 | 21.5865 |
| 311.90 | 21.3749 | 520.40 | 13.3353 | 724.19 | 18.5093 |
| 316.51 | 22.4753 | 520.69 | 0.0000 | 727.33 | 9.2670 |
| 319.41 | 20.4791 | 522.65 | 0.0000 | 733.00 | 14.4491 |
| 320.08 | 19.4655 | 527.90 | 0.0000 | 735.93 | 5.1666 |
| 321.04 | 22.5562 | 529.59 | 10.9446 | 737.46 | 11.3738 |
| 323.87 | 19.5236 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 26.7447 | 531.02 | 7.8237 | 747.24 | 11.4195 |
| 328.76 | 28.8810 | 546.56 | 0.0000 | 748.06 | 11.4232 |
| 333.37 | 25.8785 | 552.55 | 12.3440 | 752.31 | 4.1611 |
| 333.97 | 27.9616 | 563.25 | 11.4574 | 753.82 | 3.1228 |
| 334.37 | 30.0417 | 569.33 | 11.1736 | 756.73 | 4.1686 |
| 338.28 | 21.8190 | 569.50 | 9.5781 | 756.80 | 4.1687 |
| 338.32 | 21.8200 | 569.70 | 6.3861 | 763.94 | 6.2710 |
| 340.48 | 32.2630 | 583.19 | 12.5373 | 765.81 | 4.1838 |
| 340.55 | 32.2644 | 584.27 | 8.6843 | 766.42 | 5.2310 |
| 344.28 | 21.9177 | 595.83 | 8.7339 | 766.84 | 5.2319 |
| 345.93 | 20.8997 | 600.60 | 3.8907 | 772.60 | 0.0000 |
| 351.06 | 21.8185 | 602.52 | 0.0000 | 776.52 | 9.4537 |
| 351.93 | 20.1530 | 602.73 | 10.9542 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 11.3707 | 778.90 | 12.6167 |
| 356.01 | 11.7910 | 609.32 | 5.8607 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 8.1439 | 785.37 | 13.7030 |
| 366.42 | 0.0000 | 614.28 | 13.0547 | 792.07 | 12.6820 |
| 375.05 | 16.0078 | 618.01 | 9.8086 | 794.95 | 10.5801 |
| 383.85 | 22.5477 | 620.36 | 11.7832 | 795.86 | 9.5256 |
| 388.16 | 24.7681 | 621.93 | 9.8267 | 801.95 | 12.7307 |
| 388.63 | 19.3900 | 630.19 | 0.0000 | 810.29 | 9.5785 |
| 391.69 | 15.1125 | 631.29 | 14.8048 | 810.45 | 9.5792 |
| 400.66 | 23.8916 | 633.25 | 12.8426 | 810.76 | 8.5158 |
| 401.81 | 20.6493 | 634.78 | 11.8632 | 815.77 | 13.8646 |
| 402.40 | 18.4830 | 635.95 | 12.8588 | 818.51 | 10.6760 |
| 404.85 | 25.0471 | 636.99 | 0.0000 | 832.01 | 7.1536 |
| 410.95 | 22.9607 | 645.85 | 6.9556 | 834.85 | 5.3710 |
| 413.71 | 16.4301 | 657.76 | 11.9886 | 835.71 | 4.2981 |
| 414.70 | 15.3445 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 8.8381 | 661.66 | 13.0105 | 846.75 | 0.0000 |
| 427.87 | 12.1585 | 664.57 | 0.0000 | 846.77 | 4.3158 |
| 433.94 | 15.5336 | 666.33 | 9.0261 | 856.80 | 4.3316 |
| 439.40 | 16.6999 | 666.50 | 10.0298 | 860.56 | 14.0972 |
| 453.88 | 13.4788 | 667.71 | 0.0000 | 871.09 | 7.6198 |
| 463.37 | 11.7482 | 677.62 | 5.0398 | 873.19 | 5.4468 |
| 468.07 | 19.9372 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 13.2031 | 879.38 | 10.9180 |
| 475.06 | 18.1992 | 696.49 | 11.1791 | 880.51 | 8.7379 |
| 476.78 | 17.3064 | 696.51 | 11.1791 | 883.24 | 6.5597 |
| 477.60 | 13.6696 | 697.00 | 12.1980 | 884.68 | 8.7508 |
| 482.18 | 17.3607 | 697.49 | 10.1672 | 889.28 | 10.9563 |
| 487.02 | 15.5764 | 702.65 | 18.3415 | 894.76 | 5.4888 |
| 492.35 | 0.0000 | 706.68 | 10.2073 | 898.04 | 6.5941 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 7.3403 | 1312.11 | 4.1458 | | |
| 911.20 | 7.3605 | 1332.49 | 2.0837 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 10.1744 | 1365.19 | 6.3027 | | |
| 937.49 | 5.5704 | 1368.63 | 0.0000 | | |
| 944.13 | 4.6525 | 1384.29 | 4.2217 | | |
| 946.00 | 3.7244 | 1408.01 | 4.2463 | | |
| 949.00 | 5.5922 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 3.2250 | | |
| 962.31 | 4.6809 | 1489.16 | 3.2463 | | |
| 964.08 | 11.2407 | 1505.03 | 3.7236 | | |
| 966.17 | 13.1233 | 1596.21 | 2.8502 | | |
| 968.97 | 3.7529 | 1620.50 | 6.6853 | | |
| 983.53 | 6.5991 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 0.9694 | | |
| 996.26 | 8.5197 | 1750.46 | 0.0000 | | |
| 1001.03 | 8.5327 | 1764.49 | 1.9680 | | |
| 1004.73 | 11.3906 | 1770.23 | 4.9255 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.9560 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.0000 | | |
| 1037.84 | 8.6327 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.9958 | | |
| 1046.59 | 5.7710 | | | | |
| 1048.07 | 3.8490 | | | | |
| 1049.04 | 2.8877 | | | | |
| 1050.41 | 7.7038 | | | | |
| 1063.66 | 8.7019 | | | | |
| 1077.00 | 4.8541 | | | | |
| 1077.34 | 3.8836 | | | | |
| 1085.87 | 0.9734 | | | | |
| 1099.45 | 4.8869 | | | | |
| 1112.07 | 7.8483 | | | | |
| 1112.84 | 6.8687 | | | | |
| 1115.54 | 4.9103 | | | | |
| 1120.29 | 4.9170 | | | | |
| 1120.55 | 5.9009 | | | | |
| 1121.30 | 5.9021 | | | | |
| 1129.67 | 5.9165 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.9910 | | | | |
| 1177.95 | 4.9990 | | | | |
| 1189.05 | 4.0117 | | | | |
| 1204.77 | 4.0291 | | | | |
| 1221.41 | 8.0954 | | | | |
| 1231.02 | 10.1457 | | | | |
| 1235.36 | 2.0315 | | | | |
| 1238.28 | 2.0331 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.0257 | | | | |
| 1274.44 | 5.1318 | | | | |
| 1274.54 | 5.1320 | | | | |
| 1291.59 | 5.1550 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:43:39.90

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147002.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM19.CNF;419
                                        Background date  : 2-FEB-2014 16:27:26.
Sample date      : 7-NOV-2013 11:40:00. Acquisition date : 7-FEB-2014 08:42:45.
Sample ID        : G341147002           Sample quantity  : 1.30400E+02 GRAM
Detector name    : GAM19                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.37  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.17* | 8 | 50 | 0.89 | 127.26 | 123 | 9 | 2.34E-03 | 165.5 | |
| 2 | 0 | 169.06 | 19 | 51 | 3.71 | 339.07 | 333 | 13 | 5.31E-03 | 80.8 | |
| 3 | 0 | 187.21 | 45 | 82 | 5.15 | 375.37 | 366 | 17 | 1.24E-02 | 49.5 | |
| 4 | 0 | 209.81 | 14 | 21 | 1.48 | 420.57 | 417 | 6 | 3.89E-03 | 58.2 | |
| 5 | 0 | 239.26* | 4 | 30 | 0.54 | 479.47 | 475 | 8 | 1.25E-03 | 233.5 | |
| 6 | 0 | 269.61 | 12 | 27 | 2.19 | 540.18 | 537 | 7 | 3.30E-03 | 77.5 | |
| 7 | 0 | 340.86 | 37 | 41 | 4.12 | 682.70 | 674 | 17 | 1.02E-02 | 43.9 | |
| 8 | 0 | 460.25 | 7 | 9 | 0.91 | 921.52 | 917 | 6 | 1.87E-03 | 86.4 | |
| 9 | 0 | 503.11 | 24 | 15 | 7.84 | 1007.24 | 996 | 20 | 6.72E-03 | 44.1 | |
| 10 | 0 | 511.16* | 18 | 19 | 2.36 | 1023.34 | 1017 | 15 | 4.87E-03 | 81.2 | |
| 11 | 0 | 648.60 | 13 | 4 | 1.55 | 1298.27 | 1294 | 9 | 3.50E-03 | 41.4 | |
| 12 | 0 | 703.79 | 45 | 8 | 8.30 | 1408.66 | 1398 | 27 | 1.26E-02 | 22.0 | |
| 13 | 0 | 801.91* | 14 | 6 | 4.22 | 1604.93 | 1598 | 12 | 3.82E-03 | 47.6 | |
| 14 | 0 | 919.01 | 8 | 4 | 0.87 | 1839.19 | 1836 | 8 | 2.22E-03 | 55.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:43:41

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147002.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:40:00 | Acquisition date | : 7-FEB-2014 08:42:45 |
| Sample ID | : G341147002 | Sample quantity | : 130.40 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA19 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.37  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CS-135 | 268.22 | 12 | 16.00* | 4.367E+00 | 9.802E-02 | 9.802E-02 | 154.93 |
| ANH-511 | 511.00 | 18 | 100.00* | 2.808E+00 | 3.592E-02 | 3.592E-02 | 162.36 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:43:42.13

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147002.CNF;1 | | |
| Acquisition date | : 7-FEB-2014 08:42:45 | Sensitivity | : 3.000 |
| Detector ID | : GAM19 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.37 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:40:00 | Nuclide Library | : SOLID |
| Sample ID | : G341147002 | Analyst initials | : RXF2 |
| Batch Number | : 1359496 | Sample Quantity | : 1.3040E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 12-JUN-2013 07:52:05 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM19_500MLMB.CNF;9 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CS-135 | 9.802E-02 | 1.488E-01 | 2.808E-01 |
| ANH-511 | 3.592E-02 | 5.715E-02 | 4.634E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -2.542E-01 | 7.752E-01 | 1.407E+00 | NOT IDENT. |
| NA-22 | -1.445E-02 | 3.082E-02 | 5.595E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.707E-02 | 2.887E-02 | 7.879E-02 | NOT IDENT. |
| K-40 | -1.668E-01 | 3.266E-01 | 6.392E-01 | NOT IDENT. |
| SC-46 | 4.657E-02 | 6.154E-02 | 1.377E-01 | NOT IDENT. |
| V-48 | -6.444E-01 | 1.682E+00 | 3.113E+00 | NOT IDENT. |
| CR-51 | -5.962E-01 | 2.625E+00 | 4.807E+00 | NOT IDENT. |
| MN-54 | 8.279E-03 | 3.515E-02 | 7.256E-02 | NOT IDENT. |
| CO-56 | 3.846E-02 | 7.533E-02 | 1.576E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.946E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -3.426E-03 | 2.548E-02 | 4.622E-02 | NOT IDENT. |
| CO-58 | -4.116E-02 | 6.756E-02 | 1.209E-01 | NOT IDENT. |
| FE-59 | 2.909E-04 | 1.736E-01 | 3.675E-01 | NOT IDENT. |
| CO-60 | -1.335E-02 | 3.255E-02 | 6.339E-02 | NOT IDENT. |
| ZN-65 | -6.142E-02 | 6.410E-02 | 1.037E-01 | NOT IDENT. |
| GE-68 | 5.979E-02 | 1.004E+00 | 2.110E+00 | NOT IDENT. |
| AS-73 | -3.850E-01 | 1.603E+00 | 2.898E+00 | NOT IDENT. |
| AS-74 | 9.495E-01 | 1.700E+00 | 3.457E+00 | NOT IDENT. |
| SE-75 | -2.562E-02 | 7.725E-02 | 1.143E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.741E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | 9.416E-01 | 2.255E+00 | 4.639E+00 | NOT IDENT. |
| RB-83 | 9.847E-03 | 1.301E-01 | 2.467E-01 | NOT IDENT. |
| KR-85 | 1.259E+01 | 8.656E+00 | 1.680E+01 | NOT IDENT. |
| SR-85 | 1.492E-01 | 1.028E-01 | 1.995E-01 | NOT IDENT. |
| RB-86 | -2.546E+00 | 9.582E+00 | 1.850E+01 | NOT IDENT. |
| Y-88 | -5.145E-02 | 6.106E-02 | 9.751E-02 | NOT IDENT. |
| Y-91 | 1.304E+01 | 3.577E+01 | 7.771E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | 0.000E+00 | 5.088E-02 | 6.896E-02 | FAIL ABUN |
| NB-95 | 3.935E-02 | 8.769E-02 | 1.755E-01 | NOT IDENT. |
| NB-95M | -2.084E-01 | 2.948E-01 | 4.124E-01 | NOT IDENT. |
| ZR-95 | -3.759E-03 | 1.461E-01 | 2.757E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.335E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.684E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.560E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.075E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.330E-03 | 2.829E-02 | 5.062E-02 | NOT IDENT. |
| RH-102 | 1.149E-02 | 5.337E-02 | 1.038E-01 | NOT IDENT. |
| RU-103 | 3.426E-02 | 1.275E-01 | 2.293E-01 | NOT IDENT. |
| RH-106 | 3.163E-02 | 3.762E-01 | 7.091E-01 | NOT IDENT. |
| RU-106 | 3.163E-02 | 3.762E-01 | 7.091E-01 | NOT IDENT. |
| AG-108M | -1.307E-02 | 3.132E-02 | 5.630E-02 | NOT IDENT. |
| CD-109 | -6.289E-01 | 7.518E-01 | 1.283E+00 | NOT IDENT. |
| AG-110M | -3.386E-02 | 5.484E-02 | 9.712E-02 | NOT IDENT. |
| SN-113 | 3.302E-02 | 6.037E-02 | 1.224E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.726E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 8.254E-01 | 2.512E+00 | 4.667E+00 | NOT IDENT. |
| TE-123M | 2.528E-02 | 3.997E-02 | 7.632E-02 | NOT IDENT. |
| SB-124 | -9.219E-02 | 1.655E-01 | 3.044E-01 | NOT IDENT. |
| SB-125 | -1.722E-02 | 9.458E-02 | 1.739E-01 | NOT IDENT. |
| TE-125M | 2.442E+01 | 2.184E+01 | 4.368E+01 | NOT IDENT. |
| I-126 | -6.964E+00 | 1.355E+01 | 2.335E+01 | NOT IDENT. |
| SB-126 | 6.074E+00 | 1.044E+01 | 2.114E+01 | NOT IDENT. |
| SN-126 | -2.603E-02 | 6.483E-02 | 1.151E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 9.739E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.365E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.672E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.145E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -3.668E-02 | 4.161E-02 | 7.076E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.584E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.523E-02 | 3.556E-02 | 6.910E-02 | FAIL ABUN |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.567E+00 | 4.881E+00 | 9.164E+00 | FAIL ABUN |
| BA-137M | 2.558E-02 | 3.434E-02 | 7.092E-02 | NOT IDENT. |
| CS-137 | 2.703E-02 | 3.628E-02 | 7.493E-02 | NOT IDENT. |
| CE-139 | 1.397E-02 | 4.348E-02 | 7.189E-02 | NOT IDENT. |
| BA-140 | 1.533E-01 | 3.764E+00 | 8.677E+00 | NOT IDENT. |
| LA-140 | 1.533E-01 | 3.764E+00 | 8.677E+00 | NOT IDENT. |
| CE-141 | 1.945E-02 | 2.863E-01 | 5.218E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 7.898E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.143E-01 | 2.170E-01 | 3.756E-01 | NOT IDENT. |
| PM-144 | -7.892E-04 | 4.681E-02 | 7.471E-02 | NOT IDENT. |
| PR-144 | -3.247E-02 | 3.650E+00 | 5.835E+00 | NOT IDENT. |
| PM-146 | -2.006E-02 | 4.960E-02 | 7.842E-02 | NOT IDENT. |
| ND-147 | 4.596E+01 | 6.677E+01 | 1.375E+02 | NOT IDENT. |
| PM-147 | -2.699E+02 | 6.643E+02 | 1.172E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.407E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.724E-02 | 3.132E-02 | 4.463E-02 | NOT IDENT. |
| EU-152 | 3.922E-02 | 1.066E-01 | 1.841E-01 | NOT IDENT. |
| GD-153 | 4.457E-02 | 9.190E-02 | 1.760E-01 | NOT IDENT. |
| EU-154 | -4.095E-02 | 8.352E-02 | 1.507E-01 | NOT IDENT. |
| EU-155 | -2.143E-02 | 9.413E-02 | 1.694E-01 | NOT IDENT. |
| TB-160 | 1.254E-01 | 2.553E-01 | 5.390E-01 | NOT IDENT. |
| HO-166M | 6.640E-03 | 5.345E-02 | 9.505E-02 | NOT IDENT. |
| TM-171 | -2.339E+00 | 1.928E+01 | 3.526E+01 | NOT IDENT. |
| LU-176 | -4.154E-03 | 2.506E-02 | 4.649E-02 | NOT IDENT. |
| HF-181 | 5.966E-02 | 1.437E-01 | 2.857E-01 | NOT IDENT. |
| TA-182 | -1.319E-01 | 1.950E-01 | 3.314E-01 | NOT IDENT. |
| RE-183 | 1.340E-01 | 3.948E-01 | 7.197E-01 | NOT IDENT. |
| RE-184 | -6.107E-02 | 3.669E-01 | 7.343E-01 | NOT IDENT. |
| W-188 | -7.726E+00 | 1.557E+01 | 2.618E+01 | FAIL ABUN |
| IR-192 | -1.742E-02 | 7.558E-02 | 1.383E-01 | NOT IDENT. |
| HG-203 | 3.630E-02 | 1.222E-01 | 2.237E-01 | NOT IDENT. |
| BI-207 | -6.320E-02 | 1.087E-01 | 2.563E-01 | NOT IDENT. |
| TL-208 | -1.888E-03 | 3.330E-02 | 6.185E-02 | NOT IDENT. |
| PB-210 | 1.878E+00 | 4.006E+00 | 7.683E+00 | NOT IDENT. |
| BI-211 | 1.146E-01 | 2.011E-01 | 4.002E-01 | NOT IDENT. |
| PB-211 | -3.899E-01 | 6.069E-01 | 1.059E+00 | NOT IDENT. |
| BI-212 | -5.770E-01 | 5.614E-01 | 8.783E-01 | NOT IDENT. |
| PB-212 | 1.258E-02 | 5.757E-02 | 9.496E-02 | FAIL ABUN |
| BI-214 | 1.140E-02 | 7.324E-02 | 1.382E-01 | NOT IDENT. |
| PB-214 | 2.082E-02 | 7.346E-02 | 1.424E-01 | NOT IDENT. |
| RN-219 | 7.966E-04 | 3.698E-01 | 6.993E-01 | NOT IDENT. |
| RN-222 | 1.140E-02 | 7.324E-02 | 1.382E-01 | NOT IDENT. |
| RA-223 | 3.160E-01 | 6.251E-01 | 1.229E+00 | FAIL ABUN |
| RA-224 | 1.458E-01 | 5.849E-01 | 9.557E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 1.140E-02 | 7.324E-02 | 1.382E-01 | NOT IDENT. |
| AC-227 | -9.934E-02 | 2.381E-01 | 4.070E-01 | NOT IDENT. |
| TH-227 | -9.934E-02 | 2.381E-01 | 4.070E-01 | NOT IDENT. |
| AC-228 | -3.179E-02 | 1.104E-01 | 2.154E-01 | NOT IDENT. |
| RA-228 | -3.179E-02 | 1.104E-01 | 2.154E-01 | NOT IDENT. |
| TH-228 | 1.258E-02 | 5.757E-02 | 9.496E-02 | FAIL ABUN |
| TH-229 | 2.064E-01 | 5.908E-01 | 9.631E-01 | FAIL ABUN |
| TH-230 | 1.140E-02 | 7.323E-02 | 1.382E-01 | NOT IDENT. |
| PA-231 | -2.207E-01 | 1.422E+00 | 2.495E+00 | NOT IDENT. |
| TH-231 | 3.160E-01 | 6.251E-01 | 1.229E+00 | FAIL ABUN |
| TH-232 | -3.179E-02 | 1.104E-01 | 2.154E-01 | NOT IDENT. |
| PA-233 | -1.966E-03 | 6.346E-02 | 1.189E-01 | FAIL ABUN |
| PA-234 | 1.474E-01 | 2.563E-01 | 5.567E-01 | NOT IDENT. |
| PA-234M | -1.413E+00 | 2.663E+00 | 5.272E+00 | NOT IDENT. |
| TH-234 | 5.209E-01 | 1.689E+00 | 2.423E+00 | FAIL ABUN |
| U-234 | 1.140E-02 | 7.323E-02 | 1.382E-01 | NOT IDENT. |
| U-235 | -1.777E-02 | 1.809E-01 | 3.277E-01 | FAIL ABUN |
| NP-237 | -1.966E-03 | 6.346E-02 | 1.189E-01 | FAIL ABUN |
| NP-238 | 0.000E+00 | 1.318E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.209E-01 | 1.689E+00 | 2.423E+00 | FAIL ABUN |
| NP-239 | -2.143E-01 | 3.650E-01 | 6.315E-01 | NOT IDENT. |
| PU-239 | 1.042E+02 | 2.888E+02 | 5.445E+02 | NOT IDENT. |
| AM-241 | -6.443E-02 | 1.470E-01 | 2.297E-01 | NOT IDENT. |
| AM-243 | 3.484E-02 | 4.354E-02 | 8.584E-02 | NOT IDENT. |
| CM-243 | 3.594E-02 | 9.408E-02 | 1.785E-01 | NOT IDENT. |
| CM-247 | -1.496E-02 | 3.371E-02 | 6.036E-02 | NOT IDENT. |
| CF-249 | -1.136E-02 | 3.566E-02 | 6.503E-02 | NOT IDENT. |
| CF-251 | -6.808E-02 | 1.121E-01 | 1.906E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:43:38.36

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.17 | 21 | 50 | 0.89 | 127.26 | 123 | 9 | 5.80E-03 | 64.7 | |
| 2 | 0 | 93.89 | 21 | 92 | 1.39 | 188.71 | 182 | 12 | 5.71E-03 | 95.2 | |
| 3 | 0 | 169.06 | 19 | 51 | 3.71 | 339.07 | 333 | 13 | 5.31E-03 | 80.8 | |
| 4 | 0 | 187.21 | 45 | 82 | 5.15 | 375.37 | 366 | 17 | 1.24E-02 | 49.5 | |
| 5 | 0 | 209.81 | 14 | 21 | 1.48 | 420.57 | 417 | 6 | 3.89E-03 | 58.2 | |
| 6 | 0 | 239.26 | 12 | 30 | 0.54 | 479.47 | 475 | 8 | 3.40E-03 | 82.4 | |
| 7 | 0 | 269.61 | 12 | 27 | 2.19 | 540.18 | 537 | 7 | 3.30E-03 | 77.5 | |
| 8 | 0 | 340.86 | 37 | 41 | 4.12 | 682.70 | 674 | 17 | 1.02E-02 | 43.9 | |
| 9 | 0 | 460.25 | 7 | 9 | 0.91 | 921.52 | 917 | 6 | 1.87E-03 | 86.4 | |
| 10 | 0 | 503.11 | 24 | 15 | 7.84 | 1007.24 | 996 | 20 | 6.72E-03 | 44.1 | |
| 11 | 0 | 511.16 | 96 | 19 | 2.36 | 1023.34 | 1017 | 15 | 2.66E-02 | 14.2 | |
| 12 | 0 | 569.69 | 119 | 18 | 1.42 | 1140.42 | 1134 | 14 | 3.29E-02 | 11.9 | |
| 13 | 0 | 648.60 | 13 | 4 | 1.55 | 1298.27 | 1294 | 9 | 3.50E-03 | 41.4 | |
| 14 | 0 | 703.79 | 45 | 8 | 8.30 | 1408.66 | 1398 | 27 | 1.26E-02 | 22.0 | |
| 15 | 0 | 801.91 | 17 | 6 | 4.22 | 1604.93 | 1598 | 12 | 4.79E-03 | 37.1 | |
| 16 | 0 | 919.01 | 8 | 4 | 0.87 | 1839.19 | 1836 | 8 | 2.22E-03 | 55.9 | |
| 17 | 0 | 1063.87 | 108 | 3 | 1.77 | 2128.96 | 2123 | 11 | 3.00E-02 | 10.1 | |
| 18 | 0 | 1771.41 | 8 | 2 | 0.59 | 3544.40 | 3540 | 9 | 2.25E-03 | 47.9 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:43:40.40

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CS-135 | 268.22 | 12 | 16.00* | 4.367E+00 | 9.802E-02 | 9.802E-02 | 154.93 |
| ANH-511 | 511.00 | 18 | 100.00* | 2.808E+00 | 3.592E-02 | 3.592E-02 | 162.36 |

Flag: "*" = Keyline

Sample ID : G341147002 Acquisition date : 7-FEB-2014 08:42:45

Total number of lines in spectrum 14
Number of unidentified lines 5
Number of lines tentatively identified by NID 9 64.29%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CS-135 | 2.30E+06Y | 1.00 | 9.802E-02 | 9.802E-02 | 15.19E-02 | 154.93 | |
| ANH-511 | 1.00E+09Y | 1.00 | 3.592E-02 | 3.592E-02 | 5.832E-02 | 162.36 | |
| Total Activity : | | | 1.339E-01 | 1.339E-01 | | | |
| Grand Total Activity : | | | 1.339E-01 | 1.339E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147002 Acquisition date : 7-FEB-2014 08:42:45

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.17 | 8 | 50 | 0.89 | 127.26 | 123 | 9 | 2.34E-03 | **** | 2.51E+00 | T |
| 0 | 169.06 | 19 | 51 | 3.71 | 339.07 | 333 | 13 | 5.31E-03 | **** | 5.67E+00 | |
| 0 | 187.21 | 45 | 82 | 5.15 | 375.37 | 366 | 17 | 1.24E-02 | 99.0 | 5.42E+00 | T |
| 0 | 209.81 | 14 | 21 | 1.48 | 420.57 | 417 | 6 | 3.89E-03 | **** | 5.10E+00 | T |
| 0 | 239.26 | 4 | 30 | 0.54 | 479.47 | 475 | 8 | 1.25E-03 | **** | 4.71E+00 | T |
| 0 | 340.86 | 37 | 41 | 4.12 | 682.70 | 674 | 17 | 1.02E-02 | 87.9 | 3.73E+00 | T |
| 0 | 460.25 | 7 | 9 | 0.91 | 921.52 | 917 | 6 | 1.87E-03 | **** | 3.03E+00 | |
| 0 | 503.11 | 24 | 15 | 7.84 | 1007.24 | 996 | 20 | 6.72E-03 | 88.2 | 2.84E+00 | |
| 0 | 648.60 | 13 | 4 | 1.55 | 1298.27 | 1294 | 9 | 3.50E-03 | 82.7 | 2.35E+00 | |
| 0 | 703.79 | 45 | 8 | 8.30 | 1408.66 | 1398 | 27 | 1.26E-02 | 43.9 | 2.21E+00 | T |
| 0 | 801.91 | 14 | 6 | 4.22 | 1604.93 | 1598 | 12 | 3.82E-03 | 95.3 | 1.99E+00 | T |
| 0 | 919.01 | 8 | 4 | 0.87 | 1839.19 | 1836 | 8 | 2.22E-03 | **** | 1.77E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:43:52.72

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147002.CNF;1    *
* Acquisition date :  7-FEB-2014 08:42:45 Sensitivity     : 3.000          *
* Detector ID      : GAM19                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:40:00 Nuclide Library : SOLID          *
* Sample ID        : G341147002           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3040E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-JUN-2013 07:52:05 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_500MLMB.CNF;9       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| CS-135 | 1.293E-01 |
| ANH-511 | 2.040E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 6.199E-01 | NOT IDENT. |
| NA-22 | 2.175E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.170E-02 | NOT IDENT. |
| K-40 | 2.584E-01 | NOT IDENT. |
| SC-46 | 5.974E-02 | NOT IDENT. |
| V-48 | 1.306E+00 | NOT IDENT. |
| CR-51 | 2.203E+00 | NOT IDENT. |
| MN-54 | 3.132E-02 | NOT IDENT. |
| CO-56 | 6.949E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.121E-02 | NOT IDENT. |
| CO-58 | 5.068E-02 | NOT IDENT. |
| FE-59 | 1.459E-01 | NOT IDENT. |
| CO-60 | 2.545E-02 | NOT IDENT. |
| ZN-65 | 3.853E-02 | NOT IDENT. |
| GE-68 | 8.577E-01 | NOT IDENT. |
| AS-73 | 1.325E+00 | NOT IDENT. |
| AS-74 | 1.539E+00 | NOT IDENT. |
| SE-75 | 5.210E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.008E+00 | NOT IDENT. |
| RB-83 | 1.103E-01 | NOT IDENT. |
| KR-85 | 7.753E+00 | NOT IDENT. |
| SR-85 | 9.203E-02 | NOT IDENT. |
| RB-86 | 7.477E+00 | NOT IDENT. |
| Y-88 | 3.455E-02 | NOT IDENT. |
| Y-91 | 3.253E+01 | NOT IDENT. |
| NB-94 | 3.096E-02 | FAIL ABUN |

| | | |
|---|---|---|
| NB-95 | 7.756E-02 | NOT IDENT. |
| NB-95M | 1.884E-01 | NOT IDENT. |
| ZR-95 | 1.193E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.332E-02 | NOT IDENT. |
| RH-102 | 4.587E-02 | NOT IDENT. |
| RU-103 | 9.958E-02 | NOT IDENT. |
| RH-106 | 3.163E-01 | NOT IDENT. |
| RU-106 | 3.163E-01 | NOT IDENT. |
| AG-108M | 2.543E-02 | NOT IDENT. |
| CD-109 | 5.930E-01 | NOT IDENT. |
| AG-110M | 4.102E-02 | NOT IDENT. |
| SN-113 | 5.508E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.167E+00 | NOT IDENT. |
| TE-123M | 3.545E-02 | NOT IDENT. |
| SB-124 | 1.079E-01 | NOT IDENT. |
| SB-125 | 7.827E-02 | NOT IDENT. |
| TE-125M | 2.035E+01 | NOT IDENT. |
| I-126 | 1.026E+01 | NOT IDENT. |
| SB-126 | 9.409E+00 | NOT IDENT. |
| SN-126 | 5.331E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.187E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.960E-02 | FAIL ABUN |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.806E+00 | FAIL ABUN |
| BA-137M | 3.171E-02 | NOT IDENT. |
| CS-137 | 3.350E-02 | NOT IDENT. |
| CE-139 | 3.325E-02 | NOT IDENT. |
| BA-140 | 3.252E+00 | NOT IDENT. |
| LA-140 | 3.252E+00 | NOT IDENT. |
| CE-141 | 2.418E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.733E-01 | NOT IDENT. |
| PM-144 | 3.317E-02 | NOT IDENT. |
| PR-144 | 2.592E+00 | NOT IDENT. |
| PM-146 | 3.518E-02 | NOT IDENT. |
| ND-147 | 6.159E+01 | NOT IDENT. |
| PM-147 | 5.374E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.017E-02 | NOT IDENT. |
| EU-152 | 8.411E-02 | NOT IDENT. |
| GD-153 | 8.161E-02 | NOT IDENT. |
| EU-154 | 5.837E-02 | NOT IDENT. |
| EU-155 | 7.808E-02 | NOT IDENT. |
| TB-160 | 2.356E-01 | NOT IDENT. |
| HO-166M | 4.095E-02 | NOT IDENT. |
| TM-171 | 1.615E+01 | NOT IDENT. |
| LU-176 | 2.118E-02 | NOT IDENT. |
| HF-181 | 1.281E-01 | NOT IDENT. |
| TA-182 | 1.295E-01 | NOT IDENT. |
| RE-183 | 3.299E-01 | NOT IDENT. |
| RE-184 | 2.985E-01 | NOT IDENT. |
| W-188 | 1.193E+01 | FAIL ABUN |
| IR-192 | 6.347E-02 | NOT IDENT. |
| HG-203 | 1.031E-01 | NOT IDENT. |
| BI-207 | 1.215E-01 | NOT IDENT. |
| TL-208 | 2.734E-02 | NOT IDENT. |
| PB-210 | 3.562E+00 | NOT IDENT. |
| BI-211 | 1.837E-01 | NOT IDENT. |
| PB-211 | 4.674E-01 | NOT IDENT. |
| BI-212 | 3.850E-01 | NOT IDENT. |
| PB-212 | 4.372E-02 | FAIL ABUN |
| BI-214 | 6.220E-02 | NOT IDENT. |
| PB-214 | 6.526E-02 | NOT IDENT. |
| RN-219 | 3.144E-01 | NOT IDENT. |
| RN-222 | 6.220E-02 | NOT IDENT. |
| RA-223 | 5.642E-01 | FAIL ABUN |
| RA-224 | 4.376E-01 | NOT IDENT. |
| RA-226 | 6.220E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.854E-01 | NOT IDENT. |
| TH-227 | 1.854E-01 | NOT IDENT. |
| AC-228 | 9.082E-02 | NOT IDENT. |
| RA-228 | 9.082E-02 | NOT IDENT. |
| TH-228 | 4.372E-02 | FAIL ABUN |
| TH-229 | 4.486E-01 | FAIL ABUN |
| TH-230 | 6.220E-02 | NOT IDENT. |
| PA-231 | 1.139E+00 | NOT IDENT. |
| TH-231 | 5.642E-01 | FAIL ABUN |
| TH-232 | 9.082E-02 | NOT IDENT. |
| PA-233 | 5.439E-02 | FAIL ABUN |
| PA-234 | 2.409E-01 | NOT IDENT. |
| PA-234M | 2.074E+00 | NOT IDENT. |
| TH-234 | 1.129E+00 | FAIL ABUN |
| U-234 | 6.220E-02 | NOT IDENT. |
| U-235 | 1.520E-01 | FAIL ABUN |
| NP-237 | 5.439E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.129E+00 | FAIL ABUN |
| NP-239 | 2.911E-01 | NOT IDENT. |
| PU-239 | 2.519E+02 | NOT IDENT. |
| AM-241 | 1.044E-01 | NOT IDENT. |
| AM-243 | 3.991E-02 | NOT IDENT. |
| CM-243 | 8.270E-02 | NOT IDENT. |
| CM-247 | 2.694E-02 | NOT IDENT. |
| CF-249 | 2.907E-02 | NOT IDENT. |
| CF-251 | 8.721E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:43:57.26

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147002.CNF;1    *
* Acquisition date :  7-FEB-2014 08:42:45 Sensitivity     : 3.000          *
* Detector ID      : GAM19                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:40:00 Nuclide Library : SOLID          *
* Sample ID        : G341147002           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3040E+02 GRAM*
*                                         Quantity Err(%) : 1.5337E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-JUN-2013 07:52:05 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_500MLMB.CNF;9       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CS-135 | 9.802E-02 | 1.491E-01 | 1.491E-01 |
| ANH-511 | 3.592E-02 | 5.722E-02 | 5.722E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -2.542E-01 | 7.754E-01 | 7.839E-01 | NOT IDENT. |
| NA-22 | -1.445E-02 | 3.084E-02 | 3.152E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 4.390E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.707E-02 | 2.895E-02 | 3.141E-02 | NOT IDENT. |
| K-40 | -1.668E-01 | 3.269E-01 | 3.355E-01 | NOT IDENT. |
| SC-46 | 4.657E-02 | 6.182E-02 | 6.529E-02 | NOT IDENT. |
| V-48 | -6.444E-01 | 1.684E+00 | 1.709E+00 | NOT IDENT. |
| CR-51 | -5.962E-01 | 2.625E+00 | 2.639E+00 | NOT IDENT. |
| MN-54 | 8.279E-03 | 3.517E-02 | 3.536E-02 | NOT IDENT. |
| CO-56 | 3.846E-02 | 7.546E-02 | 7.743E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.949E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -3.426E-03 | 2.548E-02 | 2.553E-02 | NOT IDENT. |
| CO-58 | -4.116E-02 | 6.771E-02 | 7.020E-02 | NOT IDENT. |
| FE-59 | 2.909E-04 | 1.736E-01 | 1.736E-01 | NOT IDENT. |
| CO-60 | -1.335E-02 | 3.257E-02 | 3.312E-02 | NOT IDENT. |
| ZN-65 | -6.142E-02 | 6.483E-02 | 7.050E-02 | NOT IDENT. |
| GE-68 | 5.979E-02 | 1.004E+00 | 1.004E+00 | NOT IDENT. |
| AS-73 | -3.850E-01 | 1.605E+00 | 1.614E+00 | NOT IDENT. |
| AS-74 | 9.495E-01 | 1.703E+00 | 1.756E+00 | NOT IDENT. |
| SE-75 | -2.562E-02 | 7.727E-02 | 7.813E-02 | NOT IDENT. |
| BR-77 | 1.036E+10 | 5.481E+10 | 5.501E+10 | SHORT HLIF |
| SR-82 | 9.416E-01 | 2.257E+00 | 2.296E+00 | NOT IDENT. |
| RB-83 | 9.847E-03 | 1.301E-01 | 1.302E-01 | NOT IDENT. |
| KR-85 | 1.259E+01 | 8.715E+00 | 1.040E+01 | NOT IDENT. |
| SR-85 | 1.492E-01 | 1.035E-01 | 1.234E-01 | NOT IDENT. |
| RB-86 | -2.546E+00 | 9.590E+00 | 9.658E+00 | NOT IDENT. |
| Y-88 | -5.145E-02 | 6.119E-02 | 6.544E-02 | NOT IDENT. |
| Y-91 | 1.304E+01 | 3.579E+01 | 3.626E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | 1.182E-01 | 5.191E-02 | 7.437E-02 | FAIL ABUN |
| NB-95 | 3.935E-02 | 8.778E-02 | 8.956E-02 | NOT IDENT. |
| NB-95M | -2.084E-01 | 2.956E-01 | 3.102E-01 | NOT IDENT. |
| ZR-95 | -3.759E-03 | 1.461E-01 | 1.461E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.337E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.040E+39 | 1.686E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 5.764E+08 | 2.561E+09 | 2.574E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.082E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.330E-03 | 2.832E-02 | 2.846E-02 | NOT IDENT. |
| RH-102 | 1.149E-02 | 5.338E-02 | 5.364E-02 | NOT IDENT. |
| RU-103 | 3.426E-02 | 1.275E-01 | 1.284E-01 | NOT IDENT. |
| RH-106 | 3.163E-02 | 3.762E-01 | 3.765E-01 | NOT IDENT. |
| RU-106 | 3.163E-02 | 3.762E-01 | 3.765E-01 | NOT IDENT. |
| AG-108M | -1.307E-02 | 3.134E-02 | 3.189E-02 | NOT IDENT. |
| CD-109 | -6.289E-01 | 7.565E-01 | 8.079E-01 | NOT IDENT. |
| AG-110M | -3.386E-02 | 5.502E-02 | 5.710E-02 | NOT IDENT. |
| SN-113 | 3.302E-02 | 6.042E-02 | 6.223E-02 | NOT IDENT. |
| CD-115 | -2.879E+11 | 2.743E+11 | 3.035E+11 | SHORT HLIF |
| SN-117M | 8.254E-01 | 2.513E+00 | 2.540E+00 | NOT IDENT. |
| TE-123M | 2.528E-02 | 4.003E-02 | 4.162E-02 | NOT IDENT. |
| SB-124 | -9.219E-02 | 1.656E-01 | 1.708E-01 | NOT IDENT. |
| SB-125 | -1.722E-02 | 9.459E-02 | 9.491E-02 | NOT IDENT. |
| TE-125M | 2.442E+01 | 2.197E+01 | 2.458E+01 | NOT IDENT. |
| I-126 | -6.964E+00 | 1.357E+01 | 1.393E+01 | NOT IDENT. |
| SB-126 | 6.074E+00 | 1.047E+01 | 1.083E+01 | NOT IDENT. |
| SN-126 | -2.603E-02 | 6.491E-02 | 6.596E-02 | FAIL ABUN |
| SB-127 | 4.414E+05 | 9.921E+05 | 1.012E+06 | SHORT HLIF |
| I-131 | -2.837E+01 | 8.368E+01 | 8.465E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 5.906E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.816E+06 | 1.146E+07 | 1.149E+07 | SHORT HLIF |
| BA-133 | -3.668E-02 | 4.170E-02 | 4.486E-02 | NOT IDENT. |
| I-133 | 1.084E+29 | 2.585E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.523E-02 | 3.560E-02 | 3.625E-02 | FAIL ABUN |
| I-135 | -1.000E+41 | 5.515E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.567E+00 | 4.888E+00 | 4.939E+00 | FAIL ABUN |
| BA-137M | 2.558E-02 | 3.440E-02 | 3.628E-02 | NOT IDENT. |
| CS-137 | 2.703E-02 | 3.634E-02 | 3.833E-02 | NOT IDENT. |
| CE-139 | 1.397E-02 | 4.358E-02 | 4.403E-02 | NOT IDENT. |
| BA-140 | 1.533E-01 | 3.764E+00 | 3.765E+00 | NOT IDENT. |
| LA-140 | 1.533E-01 | 3.764E+00 | 3.765E+00 | NOT IDENT. |
| CE-141 | 1.945E-02 | 2.863E-01 | 2.864E-01 | NOT IDENT. |
| CE-143 | 4.188E+17 | 7.898E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.143E-01 | 2.172E-01 | 2.232E-01 | NOT IDENT. |
| PM-144 | -7.892E-04 | 4.681E-02 | 4.681E-02 | NOT IDENT. |
| PR-144 | -3.247E-02 | 3.650E+00 | 3.650E+00 | NOT IDENT. |
| PM-146 | -2.006E-02 | 4.964E-02 | 5.046E-02 | NOT IDENT. |
| ND-147 | 4.596E+01 | 6.688E+01 | 7.001E+01 | NOT IDENT. |
| PM-147 | -2.699E+02 | 6.647E+02 | 6.758E+02 | NOT IDENT. |
| PM-149 | -8.186E+11 | 2.411E+12 | 2.439E+12 | SHORT HLIF |
| EU-150 | -2.724E-02 | 3.139E-02 | 3.371E-02 | NOT IDENT. |
| EU-152 | 3.922E-02 | 1.067E-01 | 1.082E-01 | NOT IDENT. |
| GD-153 | 4.457E-02 | 9.202E-02 | 9.419E-02 | NOT IDENT. |
| EU-154 | -4.095E-02 | 8.359E-02 | 8.561E-02 | NOT IDENT. |
| EU-155 | -2.143E-02 | 9.416E-02 | 9.466E-02 | NOT IDENT. |
| TB-160 | 1.254E-01 | 2.559E-01 | 2.620E-01 | NOT IDENT. |
| HO-166M | 6.640E-03 | 5.346E-02 | 5.354E-02 | NOT IDENT. |
| TM-171 | -2.339E+00 | 1.928E+01 | 1.931E+01 | NOT IDENT. |
| LU-176 | -4.154E-03 | 2.506E-02 | 2.513E-02 | NOT IDENT. |
| HF-181 | 5.966E-02 | 1.438E-01 | 1.463E-01 | NOT IDENT. |
| TA-182 | -1.319E-01 | 1.954E-01 | 2.043E-01 | NOT IDENT. |
| RE-183 | 1.340E-01 | 3.952E-01 | 3.998E-01 | NOT IDENT. |
| RE-184 | -6.107E-02 | 3.670E-01 | 3.681E-01 | NOT IDENT. |
| W-188 | -7.726E+00 | 1.561E+01 | 1.599E+01 | FAIL ABUN |
| IR-192 | -1.742E-02 | 7.559E-02 | 7.600E-02 | NOT IDENT. |
| HG-203 | 3.630E-02 | 1.222E-01 | 1.233E-01 | NOT IDENT. |
| BI-207 | -6.320E-02 | 1.091E-01 | 1.127E-01 | NOT IDENT. |
| TL-208 | -1.888E-03 | 3.330E-02 | 3.331E-02 | NOT IDENT. |
| PB-210 | 1.878E+00 | 4.010E+00 | 4.098E+00 | NOT IDENT. |
| BI-211 | 1.146E-01 | 2.013E-01 | 2.078E-01 | NOT IDENT. |
| PB-211 | -3.899E-01 | 6.077E-01 | 6.326E-01 | NOT IDENT. |
| BI-212 | -5.770E-01 | 5.641E-01 | 6.212E-01 | NOT IDENT. |
| PB-212 | 1.258E-02 | 5.758E-02 | 5.786E-02 | FAIL ABUN |
| BI-214 | 1.140E-02 | 7.325E-02 | 7.343E-02 | NOT IDENT. |
| PB-214 | 2.082E-02 | 7.347E-02 | 7.407E-02 | NOT IDENT. |
| RN-219 | 7.966E-04 | 3.698E-01 | 3.698E-01 | NOT IDENT. |
| RN-222 | 1.140E-02 | 7.325E-02 | 7.343E-02 | NOT IDENT. |
| RA-223 | 3.160E-01 | 6.257E-01 | 6.417E-01 | FAIL ABUN |
| RA-224 | 1.458E-01 | 5.850E-01 | 5.887E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 1.140E-02 | 7.325E-02 | 7.343E-02 | NOT IDENT. |
| AC-227 | -9.934E-02 | 2.385E-01 | 2.427E-01 | NOT IDENT. |
| TH-227 | -9.934E-02 | 2.385E-01 | 2.427E-01 | NOT IDENT. |
| AC-228 | -3.179E-02 | 1.105E-01 | 1.115E-01 | NOT IDENT. |
| RA-228 | -3.179E-02 | 1.105E-01 | 1.115E-01 | NOT IDENT. |
| TH-228 | 1.258E-02 | 5.758E-02 | 5.786E-02 | FAIL ABUN |
| TH-229 | 2.064E-01 | 5.910E-01 | 5.983E-01 | FAIL ABUN |
| TH-230 | 1.140E-02 | 7.324E-02 | 7.342E-02 | NOT IDENT. |
| PA-231 | -2.207E-01 | 1.422E+00 | 1.426E+00 | NOT IDENT. |
| TH-231 | 3.160E-01 | 6.257E-01 | 6.417E-01 | FAIL ABUN |
| TH-232 | -3.179E-02 | 1.105E-01 | 1.115E-01 | NOT IDENT. |
| PA-233 | -1.966E-03 | 6.346E-02 | 6.347E-02 | FAIL ABUN |
| PA-234 | 1.474E-01 | 3.074E-01 | 3.145E-01 | NOT IDENT. |
| PA-234M | -1.413E+00 | 2.671E+00 | 2.746E+00 | NOT IDENT. |
| TH-234 | 5.209E-01 | 1.694E+00 | 1.710E+00 | FAIL ABUN |
| U-234 | 1.140E-02 | 7.324E-02 | 7.342E-02 | NOT IDENT. |
| U-235 | -1.777E-02 | 1.809E-01 | 1.811E-01 | FAIL ABUN |
| NP-237 | -1.966E-03 | 6.346E-02 | 6.347E-02 | FAIL ABUN |
| NP-238 | 3.272E+11 | 1.319E+12 | 1.327E+12 | SHORT HLIF |
| U-238 | 5.209E-01 | 1.694E+00 | 1.710E+00 | FAIL ABUN |
| NP-239 | -2.143E-01 | 3.658E-01 | 3.784E-01 | NOT IDENT. |
| PU-239 | 1.042E+02 | 2.889E+02 | 2.927E+02 | NOT IDENT. |
| AM-241 | -6.443E-02 | 1.471E-01 | 1.500E-01 | NOT IDENT. |
| AM-243 | 3.484E-02 | 4.371E-02 | 4.644E-02 | NOT IDENT. |
| CM-243 | 3.594E-02 | 9.419E-02 | 9.557E-02 | NOT IDENT. |
| CM-247 | -1.496E-02 | 3.382E-02 | 3.449E-02 | NOT IDENT. |
| CF-249 | -1.136E-02 | 3.568E-02 | 3.604E-02 | NOT IDENT. |
| CF-251 | -6.808E-02 | 1.125E-01 | 1.166E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 52.3077 | 94.67 | 58.6214 | 193.51 | 53.4477 |
| 45.60 | 39.3950 | 94.87 | 71.8768 | 197.03 | 53.3902 |
| 46.54 | 37.7142 | 97.43 | 45.5435 | 198.01 | 53.4319 |
| 49.72 | 0.0000 | 98.43 | 59.8507 | 201.83 | 67.2554 |
| 51.35 | 41.6029 | 98.44 | 59.8515 | 205.31 | 26.9756 |
| 52.39 | 34.5878 | 99.53 | 57.0788 | 210.85 | 42.3300 |
| 53.44 | 34.6540 | 100.11 | 49.5038 | 215.65 | 39.2984 |
| 57.36 | 0.0000 | 103.18 | 41.0898 | 222.11 | 44.8250 |
| 57.53 | 34.6079 | 103.37 | 45.8784 | 227.09 | 47.1313 |
| 57.98 | 34.6346 | 105.21 | 50.7696 | 227.38 | 48.2128 |
| 59.32 | 41.6571 | 105.31 | 50.7756 | 228.16 | 0.0000 |
| 59.54 | 41.6727 | 106.12 | 59.4554 | 228.18 | 45.0249 |
| 63.29 | 39.7650 | 109.28 | 40.4268 | 235.69 | 53.4599 |
| 63.58 | 41.9539 | 111.00 | 57.8682 | 235.96 | 48.2959 |
| 64.28 | 44.8983 | 111.76 | 0.0000 | 238.63 | 42.1227 |
| 66.73 | 46.5291 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 34.9250 | 117.23 | 58.2800 | 240.99 | 34.6196 |
| 67.75 | 36.4093 | 121.12 | 48.7764 | 242.00 | 31.1796 |
| 69.67 | 44.7352 | 121.22 | 48.7818 | 244.70 | 40.9073 |
| 70.83 | 51.2170 | 121.78 | 46.8591 | 252.40 | 0.0000 |
| 72.81 | 53.2057 | 122.06 | 43.9439 | 252.80 | 37.0840 |
| 72.87 | 53.2103 | 123.07 | 50.8354 | 254.15 | 0.0000 |
| 74.66 | 43.2340 | 127.23 | 50.0807 | 256.23 | 42.6362 |
| 74.82 | 43.2442 | 129.30 | 44.2856 | 260.90 | 0.0000 |
| 74.97 | 37.7321 | 131.20 | 48.3185 | 264.66 | 42.2162 |
| 77.11 | 53.5446 | 133.02 | 51.3736 | 268.22 | 45.8409 |
| 79.69 | 69.4960 | 133.52 | 58.3194 | 269.46 | 28.6740 |
| 80.12 | 64.9024 | 136.00 | 39.6390 | 271.23 | 38.8647 |
| 80.19 | 0.0000 | 136.47 | 44.6151 | 273.65 | 44.2334 |
| 80.57 | 62.1605 | 140.51 | 0.0000 | 276.40 | 36.5570 |
| 81.00 | 64.9831 | 143.76 | 47.9374 | 277.37 | 32.1458 |
| 81.07 | 64.9895 | 144.24 | 49.9584 | 277.60 | 38.8020 |
| 83.79 | 49.3933 | 145.44 | 52.0179 | 278.00 | 42.1389 |
| 85.43 | 55.1088 | 152.43 | 39.2761 | 279.20 | 41.0610 |
| 86.55 | 54.2571 | 153.25 | 41.3222 | 279.54 | 42.1800 |
| 86.79 | 58.9534 | 154.21 | 44.3860 | 280.46 | 37.7618 |
| 86.94 | 49.6058 | 156.02 | 54.5661 | 283.69 | 40.0649 |
| 87.09 | 49.6159 | 158.56 | 49.6307 | 284.31 | 0.0000 |
| 87.57 | 60.8889 | 159.00 | 44.5841 | 285.41 | 44.5642 |
| 88.03 | 67.4879 | 162.33 | 58.2716 | 285.90 | 0.0000 |
| 88.34 | 67.5159 | 163.33 | 47.2022 | 287.50 | 34.5827 |
| 88.47 | 80.6578 | 165.86 | 44.0470 | 290.67 | 44.7101 |
| 89.96 | 68.6010 | 176.31 | 48.2167 | 293.27 | 0.0000 |
| 91.11 | 44.2346 | 176.60 | 48.3759 | 295.22 | 41.4726 |
| 92.59 | 54.6927 | 177.52 | 50.4741 | 295.96 | 43.7343 |
| 93.35 | 48.1391 | 181.07 | 0.0000 | 298.58 | 53.9128 |
| 94.56 | 58.6132 | 184.41 | 53.8777 | 299.98 | 33.7239 |
| 94.65 | 58.6200 | 185.72 | 53.9368 | 300.09 | 29.2294 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 29.2302 | 497.08 | 11.5848 | 711.68 | 8.9624 |
| 301.36 | 34.2019 | 505.52 | 19.9304 | 720.70 | 15.1013 |
| 302.85 | 42.3407 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 37.8738 | 511.00 | 18.3115 | 722.78 | 22.6668 |
| 306.78 | 37.9251 | 514.00 | 21.6677 | 722.91 | 21.5884 |
| 308.46 | 37.0592 | 514.00 | 21.6683 | 723.31 | 19.4322 |
| 311.90 | 38.9462 | 520.40 | 23.0623 | 724.19 | 18.3580 |
| 316.51 | 46.3165 | 520.69 | 0.0000 | 727.33 | 31.3485 |
| 319.41 | 40.0270 | 522.65 | 0.0000 | 733.00 | 11.9123 |
| 320.08 | 44.5923 | 527.90 | 0.0000 | 735.93 | 17.3434 |
| 321.04 | 39.1540 | 529.59 | 22.1429 | 737.46 | 15.1830 |
| 323.87 | 33.7453 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 48.3761 | 531.02 | 16.1133 | 747.24 | 17.4059 |
| 328.76 | 38.4127 | 546.56 | 0.0000 | 748.06 | 14.1461 |
| 333.37 | 44.3207 | 552.55 | 25.3943 | 752.31 | 14.1651 |
| 333.97 | 44.3354 | 563.25 | 26.5211 | 753.82 | 15.2619 |
| 334.37 | 42.8163 | 569.33 | 16.3590 | 756.73 | 14.1848 |
| 338.28 | 29.1173 | 569.50 | 16.3602 | 756.80 | 14.1851 |
| 338.32 | 29.1181 | 569.70 | 15.3387 | 763.94 | 14.2168 |
| 340.48 | 28.5391 | 583.19 | 14.3903 | 765.81 | 14.2251 |
| 340.55 | 28.5403 | 584.27 | 17.4810 | 766.42 | 14.2276 |
| 344.28 | 30.7520 | 595.83 | 15.4918 | 766.84 | 17.5133 |
| 345.93 | 30.7796 | 600.60 | 18.6231 | 772.60 | 0.0000 |
| 351.06 | 27.7793 | 602.52 | 0.0000 | 776.52 | 9.8807 |
| 351.93 | 30.5717 | 602.73 | 22.7799 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 26.9414 | 778.90 | 12.0852 |
| 356.01 | 41.7805 | 609.32 | 24.9111 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 29.0736 | 785.37 | 11.0083 |
| 366.42 | 0.0000 | 614.28 | 24.9563 | 792.07 | 14.7077 |
| 375.05 | 26.2592 | 618.01 | 32.2791 | 794.95 | 3.1544 |
| 383.85 | 24.4940 | 620.36 | 19.8006 | 795.86 | 7.8882 |
| 388.16 | 28.3246 | 621.93 | 21.8977 | 801.95 | 11.0637 |
| 388.63 | 27.3868 | 630.19 | 0.0000 | 810.29 | 14.7887 |
| 391.69 | 19.8626 | 631.29 | 16.7402 | 810.45 | 14.7894 |
| 400.66 | 19.9515 | 633.25 | 16.7520 | 810.76 | 14.7907 |
| 401.81 | 26.6171 | 634.78 | 18.8561 | 815.77 | 9.2580 |
| 402.40 | 29.4776 | 635.95 | 16.7680 | 818.51 | 18.5311 |
| 404.85 | 27.6091 | 636.99 | 0.0000 | 832.01 | 12.0931 |
| 410.95 | 25.7818 | 645.85 | 15.7753 | 834.85 | 11.1721 |
| 413.71 | 21.9918 | 657.76 | 20.0655 | 835.71 | 13.9685 |
| 414.70 | 22.0022 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 33.6807 | 661.66 | 14.8049 | 846.75 | 0.0000 |
| 427.87 | 29.8424 | 664.57 | 0.0000 | 846.77 | 13.0791 |
| 433.94 | 28.9625 | 666.33 | 24.3617 | 856.80 | 10.3062 |
| 439.40 | 19.3574 | 666.50 | 25.4227 | 860.56 | 20.6344 |
| 453.88 | 30.6216 | 667.71 | 0.0000 | 871.09 | 16.9332 |
| 463.37 | 24.4623 | 677.62 | 14.8863 | 873.19 | 16.0022 |
| 468.07 | 25.4941 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 10.6956 | 879.38 | 11.3152 |
| 475.06 | 21.6385 | 696.49 | 21.4019 | 880.51 | 12.2621 |
| 476.78 | 20.6706 | 696.51 | 21.4019 | 883.24 | 16.0471 |
| 477.60 | 22.6474 | 697.00 | 21.4053 | 884.68 | 16.0537 |
| 482.18 | 19.7327 | 697.49 | 23.1927 | 889.28 | 7.5645 |
| 487.02 | 25.7064 | 702.65 | 17.1566 | 894.76 | 14.2047 |
| 492.35 | 0.0000 | 706.68 | 17.1793 | 898.04 | 8.5307 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 7.5938 | 1312.11 | 9.4138 | | |
| 911.20 | 9.5127 | 1332.49 | 5.2519 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 9.5524 | 1365.19 | 7.4016 | | |
| 937.49 | 10.5388 | 1368.63 | 0.0000 | | |
| 944.13 | 7.6781 | 1384.29 | 7.4298 | | |
| 946.00 | 8.6422 | 1408.01 | 5.3320 | | |
| 949.00 | 16.3370 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 5.3868 | | |
| 962.31 | 12.5369 | 1489.16 | 5.4156 | | |
| 964.08 | 15.4372 | 1505.03 | 10.2427 | | |
| 966.17 | 8.6882 | 1596.21 | 2.8401 | | |
| 968.97 | 8.6946 | 1620.50 | 1.9016 | | |
| 983.53 | 12.6064 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 4.8122 | | |
| 996.26 | 7.7832 | 1750.46 | 0.0000 | | |
| 1001.03 | 3.8963 | 1764.49 | 9.7433 | | |
| 1004.73 | 9.7500 | 1770.23 | 4.8762 | | |
| 1021.30 | 0.0000 | 1771.35 | 3.9018 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.9814 | | |
| 1037.84 | 8.8480 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 6.8997 | | |
| 1046.59 | 8.8671 | | | | |
| 1048.07 | 10.8416 | | | | |
| 1049.04 | 10.8442 | | | | |
| 1050.41 | 8.8755 | | | | |
| 1063.66 | 3.9575 | | | | |
| 1077.00 | 7.9404 | | | | |
| 1077.34 | 5.9558 | | | | |
| 1085.87 | 6.9627 | | | | |
| 1099.45 | 4.9896 | | | | |
| 1112.07 | 5.0045 | | | | |
| 1112.84 | 8.0085 | | | | |
| 1115.54 | 8.0137 | | | | |
| 1120.29 | 8.0225 | | | | |
| 1120.55 | 8.0231 | | | | |
| 1121.30 | 7.0214 | | | | |
| 1129.67 | 8.0400 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.0755 | | | | |
| 1177.95 | 4.0646 | | | | |
| 1189.05 | 3.0560 | | | | |
| 1204.77 | 6.1335 | | | | |
| 1221.41 | 9.2340 | | | | |
| 1231.02 | 6.1689 | | | | |
| 1235.36 | 3.0874 | | | | |
| 1238.28 | 0.0000 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 6.2234 | | | | |
| 1274.44 | 7.2643 | | | | |
| 1274.54 | 7.2646 | | | | |
| 1291.59 | 6.2493 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:44:24.79

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM24.CNF;188
                                        Background date  : 2-FEB-2014 16:27:51.
Sample date      : 7-NOV-2013 11:43:00. Acquisition date : 7-FEB-2014 08:43:08.
Sample ID        : G341147003           Sample quantity  : 1.15960E+02 GRAM
Detector name    : GAM24                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:04.56  0.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 63.27* | 13 | 30 | 1.25 | 125.77 | 118 | 15 | 3.62E-03 | 89.2 | 1.78E+00 |
| 2 | 0 | 76.45 | 29 | 66 | 0.55 | 152.15 | 146 | 12 | 7.98E-03 | 61.4 | |
| 3 | 0 | 123.79 | 19 | 32 | 2.28 | 246.82 | 243 | 8 | 5.15E-03 | 57.9 | |
| 4 | 0 | 185.65* | 9 | 49 | 1.40 | 370.55 | 366 | 10 | 2.45E-03 | 172.4 | |
| 5 | 0 | 239.37* | 5 | 29 | 1.23 | 477.98 | 472 | 10 | 1.46E-03 | 218.3 | |
| 6 | 0 | 308.41* | 8 | 13 | 0.74 | 616.08 | 613 | 6 | 2.17E-03 | 93.1 | |
| 7 | 0 | 370.83 | 8 | 12 | 1.01 | 740.94 | 737 | 8 | 2.17E-03 | 88.8 | |
| 8 | 0 | 452.74 | 9 | 6 | 0.73 | 904.78 | 902 | 6 | 2.50E-03 | 54.4 | |
| 9 | 0 | 562.98 | 6 | 3 | 1.31 | 1125.29 | 1122 | 6 | 1.79E-03 | 57.0 | |
| 10 | 0 | 583.67* | 3 | 12 | 1.06 | 1166.69 | 1161 | 10 | 7.68E-04 | 269.9 | |
| 11 | 0 | 689.33 | 10 | 10 | 2.38 | 1378.05 | 1372 | 10 | 2.81E-03 | 66.4 | |
| 12 | 0 | 692.76 | 19 | 5 | 2.55 | 1384.91 | 1381 | 8 | 5.24E-03 | 31.8 | |
| 13 | 0 | 713.07 | 9 | 4 | 0.77 | 1425.53 | 1421 | 7 | 2.59E-03 | 47.0 | |
| 14 | 0 | 886.26 | 8 | 0 | 0.58 | 1772.00 | 1766 | 9 | 2.22E-03 | 35.4 | |
| 15 | 0 | 1266.09 | 8 | 2 | 1.45 | 2531.95 | 2526 | 9 | 2.11E-03 | 51.1 | |
| 16 | 0 | 1459.86* | 13 | 5 | 1.92 | 2919.66 | 2913 | 12 | 3.64E-03 | 51.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:44:26

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147003.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:43:00 | Acquisition date | : 7-FEB-2014 08:43:08 |
| Sample ID | : G341147003 | Sample quantity | : 115.96 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA24 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:04.56  0.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 13 | 10.66* | 1.391E+00 | 5.723E-01 | 5.723E-01 | 102.80 |
| TL-208 | 277.37 | ------ | 6.60 | 4.945E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 3 | 85.00* | 2.947E+00 | 7.146E-03 | 7.146E-03 | 539.72 |
| | 860.56 | ------ | 12.50 | 2.171E+00 | ------ | Line Not Found | ------ |
| PB-212 | 74.82 | ------ | 10.28 | 5.615E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 29 | 17.10 | 5.765E+00 | 1.887E-01 | 1.887E-01 | 122.74 |
| | 238.63 | 5 | 43.60* | 5.426E+00 | 1.435E-02 | 1.435E-02 | 436.60 |
| | 300.09 | ------ | 3.30 | 4.697E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 5.615E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 29 | 17.10 | 5.765E+00 | 1.887E-01 | 1.887E-01 | 122.74 |
| | 238.63 | 5 | 43.60* | 5.426E+00 | 1.435E-02 | 1.435E-02 | 436.60 |
| | 300.09 | ------ | 3.30 | 4.697E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:44:27.07

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147003.CNF;1 | | |
| Acquisition date | : 7-FEB-2014 08:43:08 | Sensitivity | : 3.000 |
| Detector ID | : GAM24 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:04.56 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:43:00 | Nuclide Library | : SOLID |
| Sample ID | : G341147003 | Analyst initials | : RXF2 |
| Batch Number | : 1359496 | Sample Quantity | : 1.1596E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 6-JUN-2013 10:31:48 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM24_500MLMB.CNF;5 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 5.723E-01 | 5.766E-01 | 8.223E-01 |
| TL-208 | 7.146E-03 | 3.780E-02 | 4.941E-02 |
| PB-212 | 1.435E-02 | 6.140E-02 | 7.850E-02 |
| TH-228 | 1.435E-02 | 6.140E-02 | 7.850E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -2.735E-01 | 7.074E-01 | 1.302E+00 | NOT IDENT. |
| NA-22 | -8.519E-03 | 2.881E-02 | 5.038E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.577E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -6.192E-03 | 1.946E-02 | 4.048E-02 | NOT IDENT. |
| SC-46 | -1.499E-02 | 5.321E-02 | 8.423E-02 | NOT IDENT. |
| V-48 | 1.182E-01 | 1.071E+00 | 2.327E+00 | NOT IDENT. |
| CR-51 | -1.447E-01 | 2.039E+00 | 3.724E+00 | NOT IDENT. |
| MN-54 | -2.988E-02 | 3.186E-02 | 5.059E-02 | NOT IDENT. |
| CO-56 | -5.056E-02 | 5.598E-02 | 8.805E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.107E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.497E-02 | 2.437E-02 | 4.377E-02 | NOT IDENT. |
| CO-58 | 3.251E-02 | 6.963E-02 | 1.452E-01 | NOT IDENT. |
| FE-59 | 5.836E-03 | 1.257E-01 | 2.921E-01 | NOT IDENT. |
| CO-60 | -2.759E-02 | 2.913E-02 | 5.846E-02 | NOT IDENT. |
| ZN-65 | 4.434E-02 | 7.749E-02 | 1.738E-01 | NOT IDENT. |
| GE-68 | -6.822E-01 | 1.064E+00 | 1.903E+00 | NOT IDENT. |
| AS-73 | -5.024E-01 | 9.110E-01 | 1.508E+00 | NOT IDENT. |
| AS-74 | 6.227E-02 | 1.732E+00 | 3.318E+00 | NOT IDENT. |
| SE-75 | -7.518E-03 | 5.694E-02 | 1.032E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 5.054E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.114E+00 | 1.960E+00 | 3.429E+00 | NOT IDENT. |
| RB-83 | -8.599E-02 | 1.078E-01 | 1.847E-01 | NOT IDENT. |
| KR-85 | -1.000E+01 | 8.994E+00 | 1.493E+01 | NOT IDENT. |
| SR-85 | -1.190E-01 | 1.068E-01 | 1.772E-01 | NOT IDENT. |
| RB-86 | -7.724E+00 | 9.717E+00 | 1.665E+01 | NOT IDENT. |
| Y-88 | -2.306E-02 | 5.098E-02 | 9.431E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 1.838E+01 | 3.005E+01 | 7.127E+01 | NOT IDENT. |
| NB-94 | 9.659E-03 | 2.715E-02 | 5.525E-02 | NOT IDENT. |
| NB-95 | 9.193E-02 | 7.436E-02 | 1.679E-01 | NOT IDENT. |
| NB-95M | 4.384E-02 | 2.063E-01 | 3.498E-01 | NOT IDENT. |
| ZR-95 | 6.480E-02 | 1.264E-01 | 2.686E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.886E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.354E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.414E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 8.719E-03 | 3.051E-02 | 5.151E-02 | NOT IDENT. |
| RH-102 | 9.258E-03 | 4.296E-02 | 8.725E-02 | NOT IDENT. |
| RU-103 | -7.958E-02 | 1.135E-01 | 1.987E-01 | NOT IDENT. |
| RH-106 | 3.979E-02 | 3.061E-01 | 6.029E-01 | NOT IDENT. |
| RU-106 | 3.979E-02 | 3.061E-01 | 6.029E-01 | NOT IDENT. |
| AG-108M | 2.915E-03 | 2.296E-02 | 4.555E-02 | NOT IDENT. |
| CD-109 | -5.310E-01 | 5.694E-01 | 9.808E-01 | NOT IDENT. |
| AG-110M | 3.120E-02 | 3.718E-02 | 8.991E-02 | NOT IDENT. |
| SN-113 | -8.075E-03 | 6.223E-02 | 1.117E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.596E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.033E+00 | 2.072E+00 | 4.028E+00 | NOT IDENT. |
| TE-123M | 1.544E-02 | 3.431E-02 | 6.627E-02 | NOT IDENT. |
| SB-124 | 1.484E-01 | 1.855E-01 | 4.687E-01 | NOT IDENT. |
| SB-125 | 7.430E-03 | 7.230E-02 | 1.370E-01 | NOT IDENT. |
| TE-125M | 1.325E+01 | 2.048E+01 | 3.936E+01 | NOT IDENT. |
| I-126 | -3.604E+00 | 1.016E+01 | 1.866E+01 | NOT IDENT. |
| SB-126 | 1.141E+01 | 9.793E+00 | 2.156E+01 | NOT IDENT. |
| SN-126 | -2.868E-02 | 4.837E-02 | 8.618E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.032E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.578E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.015E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.533E-02 | 3.847E-02 | 6.408E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.673E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.327E-03 | 3.023E-02 | 6.276E-02 | FAIL ABUN |
| CS-135 | 3.798E-02 | 1.290E-01 | 2.441E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -4.615E-02 | 4.784E+00 | 9.688E+00 | NOT IDENT. |
| BA-137M | -7.296E-03 | 3.239E-02 | 6.155E-02 | NOT IDENT. |
| CS-137 | -7.708E-03 | 3.422E-02 | 6.503E-02 | NOT IDENT. |
| CE-139 | 3.805E-04 | 3.539E-02 | 6.538E-02 | NOT IDENT. |
| BA-140 | -1.005E-01 | 4.863E+00 | 1.015E+01 | NOT IDENT. |
| LA-140 | -1.005E-01 | 4.863E+00 | 1.015E+01 | NOT IDENT. |
| CE-141 | -2.344E-02 | 2.514E-01 | 4.491E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.802E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.057E-01 | 1.834E-01 | 3.228E-01 | NOT IDENT. |
| PM-144 | 1.311E-02 | 3.283E-02 | 6.120E-02 | NOT IDENT. |
| PR-144 | 9.931E-01 | 2.553E+00 | 4.751E+00 | NOT IDENT. |
| PM-146 | 2.609E-02 | 2.784E-02 | 7.020E-02 | FAIL ABUN |
| ND-147 | -3.378E+01 | 4.623E+01 | 8.014E+01 | NOT IDENT. |
| PM-147 | 2.646E+02 | 5.792E+02 | 1.030E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.219E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.138E-02 | 2.293E-02 | 3.929E-02 | FAIL ABUN |
| EU-152 | 2.447E-02 | 8.074E-02 | 1.543E-01 | NOT IDENT. |
| GD-153 | -3.646E-03 | 7.848E-02 | 1.438E-01 | NOT IDENT. |
| EU-154 | -2.151E-02 | 7.902E-02 | 1.394E-01 | FAIL ABUN |
| EU-155 | 3.137E-02 | 8.361E-02 | 1.610E-01 | NOT IDENT. |
| TB-160 | 7.928E-02 | 1.357E-01 | 3.194E-01 | NOT IDENT. |
| HO-166M | 4.410E-02 | 4.061E-02 | 1.001E-01 | FAIL ABUN |
| TM-171 | -1.419E+01 | 1.089E+01 | 1.632E+01 | NOT IDENT. |
| LU-176 | 3.360E-03 | 2.871E-02 | 4.637E-02 | NOT IDENT. |
| HF-181 | 6.698E-02 | 1.290E-01 | 2.659E-01 | NOT IDENT. |
| TA-182 | -1.637E-02 | 1.918E-01 | 3.888E-01 | NOT IDENT. |
| RE-183 | 5.488E-02 | 2.699E-01 | 4.342E-01 | NOT IDENT. |
| RE-184 | -2.382E-02 | 3.980E-01 | 7.813E-01 | NOT IDENT. |
| W-188 | -6.944E+00 | 1.358E+01 | 2.333E+01 | FAIL ABUN |
| IR-192 | -2.851E-02 | 6.254E-02 | 1.079E-01 | FAIL ABUN |
| HG-203 | 7.103E-03 | 1.065E-01 | 1.910E-01 | NOT IDENT. |
| BI-207 | 1.283E-02 | 3.428E-02 | 7.690E-02 | FAIL ABUN |
| PB-210 | -3.982E-01 | 1.911E+00 | 3.368E+00 | NOT IDENT. |
| BI-211 | 1.714E-01 | 1.825E-01 | 3.680E-01 | NOT IDENT. |
| PB-211 | 4.549E-01 | 5.584E-01 | 1.152E+00 | NOT IDENT. |
| BI-212 | -1.480E-01 | 4.249E-01 | 7.669E-01 | NOT IDENT. |
| BI-214 | -2.209E-02 | 7.103E-02 | 1.327E-01 | NOT IDENT. |
| PB-214 | 6.118E-02 | 6.742E-02 | 1.352E-01 | FAIL ABUN |
| RN-219 | 8.942E-02 | 3.455E-01 | 6.558E-01 | NOT IDENT. |
| RN-222 | -2.209E-02 | 7.103E-02 | 1.327E-01 | NOT IDENT. |
| RA-223 | 3.946E-01 | 4.718E-01 | 9.739E-01 | NOT IDENT. |
| RA-224 | -1.239E-01 | 5.407E-01 | 8.406E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | -2.209E-02 | 7.103E-02 | 1.327E-01 | NOT IDENT. |
| AC-227 | 7.514E-02 | 2.387E-01 | 4.470E-01 | NOT IDENT. |
| TH-227 | 7.514E-02 | 2.387E-01 | 4.470E-01 | NOT IDENT. |
| AC-228 | -4.327E-02 | 1.105E-01 | 2.257E-01 | NOT IDENT. |
| RA-228 | -4.327E-02 | 1.105E-01 | 2.257E-01 | NOT IDENT. |
| TH-229 | 5.058E-03 | 4.283E-01 | 7.884E-01 | NOT IDENT. |
| TH-230 | -2.209E-02 | 7.102E-02 | 1.327E-01 | NOT IDENT. |
| PA-231 | -1.677E-01 | 1.301E+00 | 2.339E+00 | NOT IDENT. |
| TH-231 | 3.946E-01 | 4.718E-01 | 9.739E-01 | NOT IDENT. |
| TH-232 | -4.327E-02 | 1.105E-01 | 2.257E-01 | NOT IDENT. |
| PA-233 | 4.409E-02 | 5.880E-02 | 1.070E-01 | NOT IDENT. |
| PA-234 | 4.596E-02 | 1.716E-01 | 3.791E-01 | NOT IDENT. |
| PA-234M | -9.518E-01 | 3.359E+00 | 6.808E+00 | NOT IDENT. |
| TH-234 | 5.343E-01 | 9.337E-01 | 1.772E+00 | FAIL ABUN |
| U-234 | -2.209E-02 | 7.102E-02 | 1.327E-01 | NOT IDENT. |
| U-235 | -2.123E-01 | 1.696E-01 | 2.694E-01 | FAIL ABUN |
| NP-237 | 4.409E-02 | 5.880E-02 | 1.070E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.044E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.343E-01 | 9.337E-01 | 1.772E+00 | FAIL ABUN |
| NP-239 | -3.693E-02 | 2.457E-01 | 4.603E-01 | NOT IDENT. |
| PU-239 | 1.686E+02 | 2.859E+02 | 5.398E+02 | NOT IDENT. |
| AM-241 | -2.654E-03 | 9.746E-02 | 1.514E-01 | NOT IDENT. |
| AM-243 | 1.076E-03 | 4.363E-02 | 6.839E-02 | NOT IDENT. |
| CM-243 | 3.121E-02 | 8.135E-02 | 1.570E-01 | NOT IDENT. |
| CM-247 | -2.370E-02 | 3.260E-02 | 5.329E-02 | NOT IDENT. |
| CF-249 | -2.639E-02 | 3.268E-02 | 5.274E-02 | NOT IDENT. |
| CF-251 | 4.172E-02 | 1.090E-01 | 2.072E-01 | NOT IDENT. |
| ANH-511 | -6.979E-02 | 4.408E-02 | 8.995E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:44:23.26

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 61.88 | 18 | 30 | 1.13 | 123.00 | 118 | 15 | 5.02E-03 | 60.2 | 1.78E+00 |
| 2 | 1 | 63.27 | 37 | 30 | 1.25 | 125.77 | 118 | 15 | 1.04E-02 | 30.1 | |
| 3 | 0 | 76.45 | 29 | 66 | 0.55 | 152.15 | 146 | 12 | 7.98E-03 | 61.4 | |
| 4 | 0 | 92.95 | 42 | 45 | 1.31 | 185.14 | 181 | 8 | 1.16E-02 | 32.0 | |
| 5 | 0 | 123.79 | 19 | 32 | 2.28 | 246.82 | 243 | 8 | 5.15E-03 | 57.9 | |
| 6 | 0 | 185.65 | 41 | 49 | 1.40 | 370.55 | 366 | 10 | 1.13E-02 | 35.9 | |
| 7 | 0 | 239.37 | 19 | 29 | 1.23 | 477.98 | 472 | 10 | 5.19E-03 | 59.4 | |
| 8 | 0 | 308.41 | 12 | 13 | 0.74 | 616.08 | 613 | 6 | 3.41E-03 | 54.8 | |
| 9 | 0 | 370.83 | 8 | 12 | 1.01 | 740.94 | 737 | 8 | 2.17E-03 | 88.8 | |
| 10 | 0 | 452.74 | 9 | 6 | 0.73 | 904.78 | 902 | 6 | 2.50E-03 | 54.4 | |
| 11 | 0 | 510.73 | 62 | 39 | 2.36 | 1020.78 | 1013 | 17 | 1.72E-02 | 26.3 | |
| 12 | 0 | 562.98 | 6 | 3 | 1.31 | 1125.29 | 1122 | 6 | 1.79E-03 | 57.0 | |
| 13 | 0 | 583.67 | 9 | 12 | 1.06 | 1166.69 | 1161 | 10 | 2.49E-03 | 80.7 | |
| 14 | 0 | 689.33 | 10 | 10 | 2.38 | 1378.05 | 1372 | 10 | 2.81E-03 | 66.4 | |
| 15 | 0 | 692.76 | 19 | 5 | 2.55 | 1384.91 | 1381 | 8 | 5.24E-03 | 31.8 | |
| 16 | 0 | 713.07 | 9 | 4 | 0.77 | 1425.53 | 1421 | 7 | 2.59E-03 | 47.0 | |
| 17 | 0 | 886.26 | 8 | 0 | 0.58 | 1772.00 | 1766 | 9 | 2.22E-03 | 35.4 | |
| 18 | 0 | 910.64 | 4 | 3 | 1.33 | 1820.79 | 1817 | 6 | 1.15E-03 | 81.9 | |
| 19 | 0 | 1266.09 | 8 | 2 | 1.45 | 2531.95 | 2526 | 9 | 2.11E-03 | 51.1 | |
| 20 | 0 | 1459.86 | 20 | 5 | 1.92 | 2919.66 | 2913 | 12 | 5.44E-03 | 33.5 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:44:25.30

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 13 | 10.66* | 1.391E+00 | 5.723E-01 | 5.723E-01 | 102.80 |
| TL-208 | 277.37 | ------ | 6.60 | 4.945E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 3 | 85.00* | 2.947E+00 | 7.146E-03 | 7.146E-03 | 539.72 |
| | 860.56 | ------ | 12.50 | 2.171E+00 | ------ | Line Not Found | ------ |
| PB-212 | 74.82 | ------ | 10.28 | 5.615E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 29 | 17.10 | 5.765E+00 | 1.887E-01 | 1.887E-01 | 122.74 |
| | 238.63 | 5 | 43.60* | 5.426E+00 | 1.435E-02 | 1.435E-02 | 436.60 |
| | 300.09 | ------ | 3.30 | 4.697E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 5.615E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 29 | 17.10 | 5.765E+00 | 1.887E-01 | 1.887E-01 | 122.74 |
| | 238.63 | 5 | 43.60* | 5.426E+00 | 1.435E-02 | 1.435E-02 | 436.60 |
| | 300.09 | ------ | 3.30 | 4.697E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341147003 Acquisition date : 7-FEB-2014 08:43:08

Total number of lines in spectrum 16
Number of unidentified lines 5
Number of lines tentatively identified by NID 11 68.75%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 5.723E-01 | 5.723E-01 | 5.883E-01 | 102.80 | |
| TL-208 | 1.41E+10Y | 1.00 | 7.146E-03 | 7.146E-03 | 38.57E-03 | 539.72 | |
| PB-212 | 1.41E+10Y | 1.00 | 1.435E-02 | 1.435E-02 | 6.266E-02 | 436.60 | |
| TH-228 | 1.41E+10Y | 1.00 | 1.435E-02 | 1.435E-02 | 6.266E-02 | 436.60 | |
| | Total Activity : | | 6.081E-01 | 6.081E-01 | | | |
| | Grand Total Activity : | | 6.081E-01 | 6.081E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147003 Acquisition date : 7-FEB-2014 08:43:08

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 63.27 | 13 | 30 | 1.25 | 125.77 | 118 | 15 | 3.62E-03 | **** | 4.27E+00 | T |
| 0 | 123.79 | 19 | 32 | 2.28 | 246.82 | 243 | 8 | 5.15E-03 | **** | 7.17E+00 | T |
| 0 | 185.65 | 9 | 49 | 1.40 | 370.55 | 366 | 10 | 2.45E-03 | **** | 6.27E+00 | T |
| 0 | 308.41 | 8 | 13 | 0.74 | 616.08 | 613 | 6 | 2.17E-03 | **** | 4.61E+00 | T |
| 0 | 370.83 | 8 | 12 | 1.01 | 740.94 | 737 | 8 | 2.17E-03 | **** | 4.07E+00 | |
| 0 | 452.74 | 9 | 6 | 0.73 | 904.78 | 902 | 6 | 2.50E-03 | **** | 3.55E+00 | T |
| 0 | 562.98 | 6 | 3 | 1.31 | 1125.29 | 1122 | 6 | 1.79E-03 | **** | 3.03E+00 | T |
| 0 | 689.33 | 10 | 10 | 2.38 | 1378.05 | 1372 | 10 | 2.81E-03 | **** | 2.59E+00 | |
| 0 | 692.76 | 19 | 5 | 2.55 | 1384.91 | 1381 | 8 | 5.24E-03 | 63.6 | 2.58E+00 | |
| 0 | 713.07 | 9 | 4 | 0.77 | 1425.53 | 1421 | 7 | 2.59E-03 | 94.0 | 2.53E+00 | T |
| 0 | 886.26 | 8 | 0 | 0.58 | 1772.00 | 1766 | 9 | 2.22E-03 | 70.7 | 2.12E+00 | |
| 0 | 1266.09 | 8 | 2 | 1.45 | 2531.95 | 2526 | 9 | 2.11E-03 | **** | 1.57E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:44:37.84

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147003.CNF;1  *
* Acquisition date :  7-FEB-2014 08:43:08 Sensitivity     : 3.000           *
* Detector ID      : GAM24                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:04.56     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:43:00 Nuclide Library : SOLID           *
* Sample ID        : G341147003           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.1596E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  6-JUN-2013 10:31:48 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_500MLMB.CNF;5         *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 3.522E-01 |
| TL-208 | 2.122E-02 |
| PB-212 | 3.557E-02 |
| TH-228 | 3.557E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.698E-01 | NOT IDENT. |
| NA-22 | 1.917E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.279E-02 | NOT IDENT. |
| SC-46 | 3.325E-02 | NOT IDENT. |
| V-48 | 9.201E-01 | NOT IDENT. |
| CR-51 | 1.667E+00 | NOT IDENT. |
| MN-54 | 2.047E-02 | NOT IDENT. |
| CO-56 | 3.494E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.009E-02 | NOT IDENT. |
| CO-58 | 6.314E-02 | NOT IDENT. |
| FE-59 | 1.093E-01 | NOT IDENT. |
| CO-60 | 2.320E-02 | NOT IDENT. |
| ZN-65 | 7.403E-02 | NOT IDENT. |
| GE-68 | 7.602E-01 | NOT IDENT. |
| AS-73 | 6.873E-01 | NOT IDENT. |
| AS-74 | 1.475E+00 | NOT IDENT. |
| SE-75 | 4.665E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.411E+00 | NOT IDENT. |
| RB-83 | 7.967E-02 | NOT IDENT. |
| KR-85 | 6.834E+00 | NOT IDENT. |
| SR-85 | 8.113E-02 | NOT IDENT. |
| RB-86 | 6.608E+00 | NOT IDENT. |
| Y-88 | 3.341E-02 | NOT IDENT. |
| Y-91 | 2.952E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 2.420E-02 | NOT IDENT. |
| NB-95 | 7.402E-02 | NOT IDENT. |
| NB-95M | 1.575E-01 | NOT IDENT. |
| ZR-95 | 1.163E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.387E-02 | NOT IDENT. |
| RH-102 | 3.774E-02 | NOT IDENT. |
| RU-103 | 8.465E-02 | NOT IDENT. |
| RH-106 | 2.643E-01 | NOT IDENT. |
| RU-106 | 2.643E-01 | NOT IDENT. |
| AG-108M | 2.013E-02 | NOT IDENT. |
| CD-109 | 4.492E-01 | NOT IDENT. |
| AG-110M | 3.764E-02 | NOT IDENT. |
| SN-113 | 4.991E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.852E+00 | NOT IDENT. |
| TE-123M | 3.050E-02 | NOT IDENT. |
| SB-124 | 1.916E-01 | NOT IDENT. |
| SB-125 | 6.001E-02 | NOT IDENT. |
| TE-125M | 1.831E+01 | NOT IDENT. |
| I-126 | 7.955E+00 | NOT IDENT. |
| SB-126 | 9.655E+00 | NOT IDENT. |
| SN-126 | 3.949E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.862E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.657E-02 | FAIL ABUN |
| CS-135 | 1.113E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.093E+00 | NOT IDENT. |
| BA-137M | 2.713E-02 | NOT IDENT. |
| CS-137 | 2.866E-02 | NOT IDENT. |
| CE-139 | 3.007E-02 | NOT IDENT. |
| BA-140 | 4.029E+00 | NOT IDENT. |
| LA-140 | 4.029E+00 | NOT IDENT. |
| CE-141 | 2.061E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.475E-01 | NOT IDENT. |
| PM-144 | 2.653E-02 | NOT IDENT. |
| PR-144 | 2.058E+00 | NOT IDENT. |
| PM-146 | 3.118E-02 | FAIL ABUN |
| ND-147 | 3.308E+01 | NOT IDENT. |
| PM-147 | 4.697E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.755E-02 | FAIL ABUN |
| EU-152 | 6.939E-02 | NOT IDENT. |
| GD-153 | 6.627E-02 | NOT IDENT. |
| EU-154 | 5.331E-02 | FAIL ABUN |
| EU-155 | 7.447E-02 | NOT IDENT. |
| TB-160 | 1.268E-01 | NOT IDENT. |
| HO-166M | 4.368E-02 | FAIL ABUN |
| TM-171 | 7.389E+00 | NOT IDENT. |
| LU-176 | 2.117E-02 | NOT IDENT. |
| HF-181 | 1.186E-01 | NOT IDENT. |
| TA-182 | 1.594E-01 | NOT IDENT. |
| RE-183 | 1.991E-01 | NOT IDENT. |
| RE-184 | 3.241E-01 | NOT IDENT. |
| W-188 | 1.054E+01 | FAIL ABUN |
| IR-192 | 4.846E-02 | FAIL ABUN |
| HG-203 | 8.696E-02 | NOT IDENT. |
| BI-207 | 3.197E-02 | FAIL ABUN |
| PB-210 | 1.564E+00 | NOT IDENT. |
| BI-211 | 1.681E-01 | NOT IDENT. |
| PB-211 | 5.157E-01 | NOT IDENT. |
| BI-212 | 3.308E-01 | NOT IDENT. |
| BI-214 | 5.961E-02 | NOT IDENT. |
| PB-214 | 6.178E-02 | FAIL ABUN |
| RN-219 | 2.936E-01 | NOT IDENT. |
| RN-222 | 5.961E-02 | NOT IDENT. |
| RA-223 | 4.380E-01 | NOT IDENT. |
| RA-224 | 3.809E-01 | NOT IDENT. |
| RA-226 | 5.961E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 2.059E-01 | NOT IDENT. |
| TH-227 | 2.059E-01 | NOT IDENT. |
| AC-228 | 9.651E-02 | NOT IDENT. |
| RA-228 | 9.651E-02 | NOT IDENT. |
| TH-229 | 3.620E-01 | NOT IDENT. |
| TH-230 | 5.961E-02 | NOT IDENT. |
| PA-231 | 1.064E+00 | NOT IDENT. |
| TH-231 | 4.380E-01 | NOT IDENT. |
| TH-232 | 9.651E-02 | NOT IDENT. |
| PA-233 | 4.858E-02 | NOT IDENT. |
| PA-234 | 1.532E-01 | NOT IDENT. |
| PA-234M | 2.860E+00 | NOT IDENT. |
| TH-234 | 8.309E-01 | FAIL ABUN |
| U-234 | 5.960E-02 | NOT IDENT. |
| U-235 | 1.233E-01 | FAIL ABUN |
| NP-237 | 4.858E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 8.309E-01 | FAIL ABUN |
| NP-239 | 2.071E-01 | NOT IDENT. |
| PU-239 | 2.505E+02 | NOT IDENT. |
| AM-241 | 6.922E-02 | NOT IDENT. |
| AM-243 | 3.188E-02 | NOT IDENT. |
| CM-243 | 7.258E-02 | NOT IDENT. |
| CM-247 | 2.350E-02 | NOT IDENT. |
| CF-249 | 2.301E-02 | NOT IDENT. |
| CF-251 | 9.573E-02 | NOT IDENT. |
| ANH-511 | 4.230E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:44:43.02

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147003.CNF;1  *
* Acquisition date :  7-FEB-2014 08:43:08 Sensitivity     : 3.000           *
* Detector ID      : GAM24                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:04.56     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:43:00 Nuclide Library : SOLID           *
* Sample ID        : G341147003           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.1596E+02 GRAM *
*                                         Quantity Err(%) : 1.7247E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  6-JUN-2013 10:31:48 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_500MLMB.CNF;5         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 5.723E-01 | 5.790E-01 | 5.790E-01 |
| TL-208 | 7.146E-03 | 3.780E-02 | 3.780E-02 |
| PB-212 | 1.435E-02 | 6.141E-02 | 6.141E-02 |
| TH-228 | 1.435E-02 | 6.141E-02 | 6.141E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -2.735E-01 | 7.078E-01 | 7.184E-01 | NOT IDENT. |
| NA-22 | -8.519E-03 | 2.882E-02 | 2.908E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.585E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -6.192E-03 | 1.947E-02 | 1.967E-02 | NOT IDENT. |
| SC-46 | -1.499E-02 | 5.324E-02 | 5.367E-02 | NOT IDENT. |
| V-48 | 1.182E-01 | 1.072E+00 | 1.073E+00 | NOT IDENT. |
| CR-51 | -1.447E-01 | 2.039E+00 | 2.040E+00 | NOT IDENT. |
| MN-54 | -2.988E-02 | 3.204E-02 | 3.476E-02 | NOT IDENT. |
| CO-56 | -5.056E-02 | 5.628E-02 | 6.072E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.113E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.497E-02 | 2.441E-02 | 2.532E-02 | NOT IDENT. |
| CO-58 | 3.251E-02 | 6.972E-02 | 7.125E-02 | NOT IDENT. |
| FE-59 | 5.836E-03 | 1.257E-01 | 1.257E-01 | NOT IDENT. |
| CO-60 | -2.759E-02 | 2.923E-02 | 3.177E-02 | NOT IDENT. |
| ZN-65 | 4.434E-02 | 7.795E-02 | 8.048E-02 | NOT IDENT. |
| GE-68 | -6.822E-01 | 1.071E+00 | 1.114E+00 | NOT IDENT. |
| AS-73 | -5.024E-01 | 9.169E-01 | 9.444E-01 | NOT IDENT. |
| AS-74 | 6.227E-02 | 1.732E+00 | 1.733E+00 | NOT IDENT. |
| SE-75 | -7.518E-03 | 5.694E-02 | 5.704E-02 | NOT IDENT. |
| BR-77 | 1.181E+10 | 5.947E+10 | 5.971E+10 | SHORT HLIF |
| SR-82 | -1.114E+00 | 1.963E+00 | 2.027E+00 | NOT IDENT. |
| RB-83 | -8.599E-02 | 1.086E-01 | 1.153E-01 | NOT IDENT. |
| KR-85 | -1.000E+01 | 9.031E+00 | 1.009E+01 | NOT IDENT. |
| SR-85 | -1.190E-01 | 1.072E-01 | 1.199E-01 | NOT IDENT. |
| RB-86 | -7.724E+00 | 9.814E+00 | 1.041E+01 | NOT IDENT. |
| Y-88 | -2.306E-02 | 5.102E-02 | 5.206E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 1.838E+01 | 3.012E+01 | 3.123E+01 | NOT IDENT. |
| NB-94 | 9.659E-03 | 2.716E-02 | 2.751E-02 | NOT IDENT. |
| NB-95 | 9.193E-02 | 7.493E-02 | 8.562E-02 | NOT IDENT. |
| NB-95M | 4.384E-02 | 2.063E-01 | 2.073E-01 | NOT IDENT. |
| ZR-95 | 6.480E-02 | 1.265E-01 | 1.299E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 1.888E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.688E+39 | 1.361E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -7.724E+08 | 2.416E+09 | 2.441E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 4.188E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 8.719E-03 | 3.055E-02 | 3.081E-02 | NOT IDENT. |
| RH-102 | 9.258E-03 | 4.297E-02 | 4.317E-02 | NOT IDENT. |
| RU-103 | -7.958E-02 | 1.137E-01 | 1.192E-01 | NOT IDENT. |
| RH-106 | 3.979E-02 | 3.061E-01 | 3.066E-01 | NOT IDENT. |
| RU-106 | 3.979E-02 | 3.061E-01 | 3.066E-01 | NOT IDENT. |
| AG-108M | 2.915E-03 | 2.296E-02 | 2.300E-02 | NOT IDENT. |
| CD-109 | -5.310E-01 | 5.722E-01 | 6.203E-01 | NOT IDENT. |
| AG-110M | 3.120E-02 | 3.739E-02 | 3.995E-02 | NOT IDENT. |
| SN-113 | -8.075E-03 | 6.223E-02 | 6.234E-02 | NOT IDENT. |
| CD-115 | 5.736E+10 | 1.597E+11 | 1.618E+11 | SHORT HLIF |
| SN-117M | 1.033E+00 | 2.073E+00 | 2.125E+00 | NOT IDENT. |
| TE-123M | 1.544E-02 | 3.433E-02 | 3.503E-02 | NOT IDENT. |
| SB-124 | 1.484E-01 | 1.859E-01 | 1.976E-01 | NOT IDENT. |
| SB-125 | 7.430E-03 | 7.231E-02 | 7.238E-02 | NOT IDENT. |
| TE-125M | 1.325E+01 | 2.052E+01 | 2.137E+01 | NOT IDENT. |
| I-126 | -3.604E+00 | 1.016E+01 | 1.029E+01 | NOT IDENT. |
| SB-126 | 1.141E+01 | 9.915E+00 | 1.117E+01 | NOT IDENT. |
| SN-126 | -2.868E-02 | 4.844E-02 | 5.014E-02 | FAIL ABUN |
| SB-127 | -5.098E+04 | 1.032E+06 | 1.033E+06 | SHORT HLIF |
| I-131 | 1.479E+01 | 6.579E+01 | 6.613E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.229E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -2.990E+06 | 1.016E+07 | 1.025E+07 | SHORT HLIF |
| BA-133 | -2.533E-02 | 3.852E-02 | 4.017E-02 | NOT IDENT. |
| I-133 | -5.360E+29 | 1.700E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.327E-03 | 3.024E-02 | 3.042E-02 | FAIL ABUN |
| CS-135 | 3.798E-02 | 1.290E-01 | 1.302E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 5.389E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -4.615E-02 | 4.784E+00 | 4.784E+00 | NOT IDENT. |
| BA-137M | -7.296E-03 | 3.239E-02 | 3.256E-02 | NOT IDENT. |
| CS-137 | -7.708E-03 | 3.422E-02 | 3.440E-02 | NOT IDENT. |
| CE-139 | 3.805E-04 | 3.539E-02 | 3.539E-02 | NOT IDENT. |
| BA-140 | -1.005E-01 | 4.863E+00 | 4.863E+00 | NOT IDENT. |
| LA-140 | -1.005E-01 | 4.863E+00 | 4.863E+00 | NOT IDENT. |
| CE-141 | -2.344E-02 | 2.514E-01 | 2.516E-01 | NOT IDENT. |
| CE-143 | 3.570E+18 | 6.809E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.057E-01 | 1.837E-01 | 1.898E-01 | NOT IDENT. |
| PM-144 | 1.311E-02 | 3.285E-02 | 3.338E-02 | NOT IDENT. |
| PR-144 | 9.931E-01 | 2.554E+00 | 2.593E+00 | NOT IDENT. |
| PM-146 | 2.609E-02 | 2.796E-02 | 3.034E-02 | FAIL ABUN |
| ND-147 | -3.378E+01 | 4.632E+01 | 4.876E+01 | NOT IDENT. |
| PM-147 | 2.646E+02 | 5.797E+02 | 5.918E+02 | NOT IDENT. |
| PM-149 | -2.094E+11 | 2.219E+12 | 2.221E+12 | SHORT HLIF |
| EU-150 | -1.138E-02 | 2.295E-02 | 2.351E-02 | FAIL ABUN |
| EU-152 | 2.447E-02 | 8.077E-02 | 8.152E-02 | NOT IDENT. |
| GD-153 | -3.646E-03 | 7.848E-02 | 7.850E-02 | NOT IDENT. |
| EU-154 | -2.151E-02 | 7.904E-02 | 7.964E-02 | FAIL ABUN |
| EU-155 | 3.137E-02 | 8.367E-02 | 8.485E-02 | NOT IDENT. |
| TB-160 | 7.928E-02 | 1.361E-01 | 1.407E-01 | NOT IDENT. |
| HO-166M | 4.410E-02 | 4.083E-02 | 4.541E-02 | FAIL ABUN |
| TM-171 | -1.419E+01 | 1.096E+01 | 1.269E+01 | NOT IDENT. |
| LU-176 | 3.360E-03 | 2.871E-02 | 2.875E-02 | NOT IDENT. |
| HF-181 | 6.698E-02 | 1.291E-01 | 1.326E-01 | NOT IDENT. |
| TA-182 | -1.637E-02 | 1.918E-01 | 1.920E-01 | NOT IDENT. |
| RE-183 | 5.488E-02 | 2.700E-01 | 2.711E-01 | NOT IDENT. |
| RE-184 | -2.382E-02 | 3.980E-01 | 3.982E-01 | NOT IDENT. |
| W-188 | -6.944E+00 | 1.361E+01 | 1.397E+01 | FAIL ABUN |
| IR-192 | -2.851E-02 | 6.258E-02 | 6.388E-02 | FAIL ABUN |
| HG-203 | 7.103E-03 | 1.065E-01 | 1.066E-01 | NOT IDENT. |
| BI-207 | 1.283E-02 | 3.436E-02 | 3.484E-02 | FAIL ABUN |
| PB-210 | -3.982E-01 | 1.911E+00 | 1.920E+00 | NOT IDENT. |
| BI-211 | 1.714E-01 | 1.830E-01 | 1.986E-01 | NOT IDENT. |
| PB-211 | 4.549E-01 | 5.597E-01 | 5.961E-01 | NOT IDENT. |
| BI-212 | -1.480E-01 | 4.251E-01 | 4.303E-01 | NOT IDENT. |
| BI-214 | -2.209E-02 | 7.105E-02 | 7.174E-02 | NOT IDENT. |
| PB-214 | 6.118E-02 | 6.759E-02 | 7.300E-02 | FAIL ABUN |
| RN-219 | 8.942E-02 | 3.458E-01 | 3.481E-01 | NOT IDENT. |
| RN-222 | -2.209E-02 | 7.105E-02 | 7.174E-02 | NOT IDENT. |
| RA-223 | 3.946E-01 | 4.731E-01 | 5.055E-01 | NOT IDENT. |
| RA-224 | -1.239E-01 | 5.408E-01 | 5.437E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | -2.209E-02 | 7.105E-02 | 7.174E-02 | NOT IDENT. |
| AC-227 | 7.514E-02 | 2.390E-01 | 2.414E-01 | NOT IDENT. |
| TH-227 | 7.514E-02 | 2.390E-01 | 2.414E-01 | NOT IDENT. |
| AC-228 | -4.327E-02 | 1.106E-01 | 1.124E-01 | NOT IDENT. |
| RA-228 | -4.327E-02 | 1.106E-01 | 1.124E-01 | NOT IDENT. |
| TH-229 | 5.058E-03 | 4.283E-01 | 4.283E-01 | NOT IDENT. |
| TH-230 | -2.209E-02 | 7.104E-02 | 7.174E-02 | NOT IDENT. |
| PA-231 | -1.677E-01 | 1.302E+00 | 1.304E+00 | NOT IDENT. |
| TH-231 | 3.946E-01 | 4.731E-01 | 5.055E-01 | NOT IDENT. |
| TH-232 | -4.327E-02 | 1.106E-01 | 1.124E-01 | NOT IDENT. |
| PA-233 | 4.409E-02 | 5.892E-02 | 6.218E-02 | NOT IDENT. |
| PA-234 | 4.596E-02 | 1.795E-01 | 1.807E-01 | NOT IDENT. |
| PA-234M | -9.518E-01 | 3.363E+00 | 3.390E+00 | NOT IDENT. |
| TH-234 | 5.343E-01 | 9.414E-01 | 9.717E-01 | FAIL ABUN |
| U-234 | -2.209E-02 | 7.104E-02 | 7.174E-02 | NOT IDENT. |
| U-235 | -2.123E-01 | 1.705E-01 | 1.956E-01 | FAIL ABUN |
| NP-237 | 4.409E-02 | 5.892E-02 | 6.218E-02 | NOT IDENT. |
| NP-238 | -3.591E+11 | 1.045E+12 | 1.058E+12 | SHORT HLIF |
| U-238 | 5.343E-01 | 9.414E-01 | 9.717E-01 | FAIL ABUN |
| NP-239 | -3.693E-02 | 2.458E-01 | 2.463E-01 | NOT IDENT. |
| PU-239 | 1.686E+02 | 2.862E+02 | 2.961E+02 | NOT IDENT. |
| AM-241 | -2.654E-03 | 9.746E-02 | 9.747E-02 | NOT IDENT. |
| AM-243 | 1.076E-03 | 4.363E-02 | 4.363E-02 | NOT IDENT. |
| CM-243 | 3.121E-02 | 8.143E-02 | 8.264E-02 | NOT IDENT. |
| CM-247 | -2.370E-02 | 3.288E-02 | 3.458E-02 | NOT IDENT. |
| CF-249 | -2.639E-02 | 3.280E-02 | 3.489E-02 | NOT IDENT. |
| CF-251 | 4.172E-02 | 1.091E-01 | 1.107E-01 | NOT IDENT. |
| ANH-511 | -6.979E-02 | 4.444E-02 | 5.445E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 45.9174 | 94.67 | 64.7850 | 193.51 | 42.0361 |
| 45.60 | 37.3227 | 94.87 | 63.0258 | 197.03 | 41.1726 |
| 46.54 | 47.2879 | 97.43 | 41.8536 | 198.01 | 35.3180 |
| 49.72 | 0.0000 | 98.43 | 49.9290 | 201.83 | 54.1180 |
| 51.35 | 34.3976 | 98.44 | 49.9297 | 205.31 | 34.5308 |
| 52.39 | 47.8021 | 99.53 | 47.3176 | 210.85 | 38.6385 |
| 53.44 | 37.8676 | 100.11 | 48.2441 | 215.65 | 40.7654 |
| 57.36 | 0.0000 | 103.18 | 39.4544 | 222.11 | 43.9554 |
| 57.53 | 40.3792 | 103.37 | 43.0508 | 227.09 | 41.1051 |
| 57.98 | 33.6748 | 105.21 | 44.0429 | 227.38 | 43.1191 |
| 59.32 | 35.4377 | 105.31 | 44.0479 | 228.16 | 0.0000 |
| 59.54 | 35.4506 | 106.12 | 58.4862 | 228.18 | 42.1404 |
| 63.29 | 39.6303 | 109.28 | 43.3473 | 117.23 | 42.1404 |
| 63.58 | 39.6486 | 111.00 | 36.1934 | 235.69 | 24.2078 |
| 64.28 | 39.6926 | 111.76 | 0.0000 | 235.96 | 24.2124 |
| 66.73 | 42.6910 | 116.30 | 0.0000 | 238.63 | 31.3321 |
| 67.24 | 42.7246 | 117.23 | 29.1559 | 238.98 | 0.0000 |
| 67.75 | 39.3373 | 121.12 | 27.8149 | 240.99 | 35.6351 |
| 69.67 | 48.0289 | 121.22 | 27.8179 | 242.00 | 35.6595 |
| 70.83 | 56.7039 | 121.78 | 27.8345 | 244.70 | 25.5181 |
| 72.81 | 56.8701 | 122.06 | 30.7736 | 252.40 | 0.0000 |
| 72.87 | 53.4281 | 123.07 | 33.7407 | 252.80 | 28.5727 |
| 74.66 | 55.2952 | 127.23 | 47.1485 | 254.15 | 0.0000 |
| 74.82 | 55.3081 | 129.30 | 44.2962 | 256.23 | 39.8882 |
| 74.97 | 46.1001 | 131.20 | 50.8550 | 260.90 | 0.0000 |
| 77.11 | 46.2410 | 133.02 | 41.6856 | 264.66 | 31.8808 |
| 79.69 | 38.2870 | 133.52 | 48.1942 | 268.22 | 30.9229 |
| 80.12 | 36.5685 | 136.00 | 52.0305 | 269.46 | 30.9471 |
| 80.19 | 0.0000 | 136.47 | 53.9139 | 271.23 | 34.0801 |
| 80.57 | 36.5912 | 140.51 | 0.0000 | 273.65 | 31.0295 |
| 81.00 | 43.5867 | 143.76 | 53.3627 | 276.40 | 34.1914 |
| 81.07 | 43.5909 | 144.24 | 48.7040 | 277.37 | 36.2855 |
| 83.79 | 42.8774 | 145.44 | 32.8192 | 277.60 | 30.0695 |
| 85.43 | 38.5866 | 152.43 | 30.2036 | 278.00 | 28.0028 |
| 86.55 | 44.7919 | 153.25 | 36.8386 | 279.20 | 31.1371 |
| 86.79 | 44.8059 | 323.87 | 43.4889 | 279.54 | 31.1440 |
| 86.94 | 44.8149 | 156.02 | 46.4018 | 280.46 | 33.2393 |
| 87.09 | 44.8236 | 158.56 | 35.1191 | 283.69 | 36.4275 |
| 87.57 | 51.0080 | 159.00 | 37.0320 | 284.31 | 0.0000 |
| 88.03 | 57.1986 | 162.33 | 48.5709 | 285.41 | 27.0890 |
| 88.34 | 57.2216 | 163.33 | 43.8480 | 285.90 | 0.0000 |
| 88.47 | 67.7971 | 165.86 | 43.9455 | 287.50 | 38.5994 |
| 89.96 | 76.7499 | 176.31 | 38.5580 | 290.67 | 37.6282 |
| 91.11 | 48.5918 | 176.60 | 38.5675 | 293.27 | 0.0000 |
| 92.59 | 49.5685 | 177.52 | 42.4572 | 351.93 | 25.1543 |
| 93.35 | 48.7301 | 181.07 | 0.0000 | 295.96 | 26.2142 |
| 94.56 | 64.7761 | 184.41 | 43.4762 | 879.38 | 47.2591 |
| 94.65 | 64.7834 | 143.76 | 37.8881 | 299.98 | 31.5321 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 30.4831 | 487.02 | 25.8368 | 702.65 | 12.9908 |
| 300.13 | 30.4837 | 492.35 | 0.0000 | 706.68 | 15.7235 |
| 301.36 | 29.4539 | 497.08 | 18.5330 | 711.68 | 17.0378 |
| 302.85 | 22.8620 | 505.52 | 49.2851 | 720.70 | 11.0564 |
| 256.23 | 38.7827 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 30.3921 | 511.00 | 23.3000 | 722.78 | 16.0926 |
| 308.46 | 28.5202 | 514.00 | 60.6538 | 722.91 | 16.0934 |
| 311.90 | 20.3215 | 514.00 | 60.6538 | 723.31 | 16.0953 |
| 316.51 | 32.8978 | 520.40 | 22.4537 | 724.19 | 17.1063 |
| 319.41 | 24.4484 | 520.69 | 0.0000 | 727.33 | 14.1015 |
| 320.08 | 25.5209 | 522.65 | 0.0000 | 733.00 | 10.0906 |
| 321.04 | 26.5987 | 527.90 | 0.0000 | 735.93 | 12.1198 |
| 323.87 | 15.9849 | 529.59 | 10.3292 | 333.97 | 10.1047 |
| 325.23 | 23.4623 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 22.4400 | 531.02 | 14.0933 | 747.24 | 10.1357 |
| 333.37 | 31.0678 | 546.56 | 0.0000 | 748.06 | 7.0967 |
| 333.97 | 31.0780 | 552.55 | 16.1081 | 752.31 | 20.3032 |
| 334.37 | 27.8690 | 563.25 | 12.3687 | 753.82 | 13.2034 |
| 338.28 | 25.7805 | 569.33 | 9.5364 | 756.73 | 9.1490 |
| 338.32 | 25.7813 | 946.00 | 11.4445 | 756.80 | 9.1492 |
| 311.90 | 33.3396 | 569.70 | 13.3530 | 884.68 | 11.2068 |
| 340.48 | 33.3396 | 583.19 | 12.4620 | 765.81 | 5.0969 |
| 340.55 | 33.3410 | 584.27 | 22.3769 | 766.42 | 7.1371 |
| 344.28 | 22.6313 | 595.83 | 21.1884 | 766.84 | 13.2561 |
| 345.93 | 25.8875 | 427.87 | 21.2255 | 772.60 | 0.0000 |
| 351.06 | 22.7137 | 602.52 | 0.0000 | 776.52 | 12.2725 |
| 351.93 | 23.8064 | 602.73 | 18.3455 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 26.0884 | 778.90 | 10.2346 |
| 356.01 | 33.6177 | 609.32 | 22.2605 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 19.3643 | 785.37 | 6.1526 |
| 366.42 | 0.0000 | 614.28 | 19.3916 | 792.07 | 11.3027 |
| 375.05 | 19.2752 | 618.01 | 16.5049 | 794.95 | 6.1704 |
| 356.01 | 19.8009 | 620.36 | 11.6602 | 795.86 | 8.2293 |
| 388.16 | 26.4580 | 621.93 | 15.5559 | 810.29 | 13.4297 |
| 388.63 | 24.2589 | 630.19 | 0.0000 | 344.28 | 11.3642 |
| 391.69 | 25.3998 | 631.29 | 11.7056 | 810.76 | 10.3320 |
| 264.66 | 22.1838 | 633.25 | 10.7374 | 815.77 | 11.3819 |
| 401.81 | 21.0865 | 634.78 | 12.6966 | 1048.07 | 11.3910 |
| 402.40 | 28.8636 | 635.95 | 12.7017 | 832.01 | 3.1188 |
| 404.85 | 14.4489 | 636.99 | 0.0000 | 834.85 | 11.4447 |
| 410.95 | 21.1793 | 645.85 | 14.7063 | 835.71 | 12.4884 |
| 413.71 | 17.8586 | 657.76 | 11.8134 | 836.80 | 0.0000 |
| 414.70 | 16.7503 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 11.2320 | 661.66 | 15.7723 | 846.77 | 12.5276 |
| 427.87 | 15.7306 | 664.57 | 0.0000 | 856.80 | 12.5634 |
| 433.94 | 18.0281 | 666.33 | 14.8099 | 860.56 | 16.7688 |
| 439.40 | 14.4586 | 666.50 | 14.8107 | 871.09 | 10.5115 |
| 453.88 | 22.7393 | 667.71 | 0.0000 | 873.19 | 5.2588 |
| 463.37 | 20.0946 | 677.62 | 12.8838 | 875.33 | 0.0000 |
| 468.07 | 11.8984 | 685.70 | 0.0000 | 879.38 | 1.7559 |
| 473.00 | 0.0000 | 695.00 | 9.9680 | 880.51 | 3.5129 |
| 475.06 | 10.0985 | 696.49 | 9.9729 | 883.24 | 5.2733 |
| 476.78 | 14.6996 | 696.51 | 9.9729 | 884.68 | 3.1653 |
| 477.60 | 21.1380 | 697.00 | 14.9615 | 889.28 | 7.0428 |
| 482.18 | 16.5753 | 697.49 | 16.6268 | 894.76 | 5.2900 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 8.4717 | 1298.22 | 0.0000 | | |
| 903.28 | 8.4836 | 1312.11 | 1.9447 | | |
| 911.20 | 7.4390 | 1332.49 | 4.8818 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 12.8048 | 1365.19 | 4.9139 | | |
| 937.49 | 7.4912 | 1368.63 | 0.0000 | | |
| 944.13 | 4.2882 | 1384.29 | 4.9325 | | |
| 946.00 | 4.2902 | 1408.01 | 4.9552 | | |
| 949.00 | 7.5139 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 12.0127 | | |
| 962.31 | 14.0026 | 1489.16 | 4.0254 | | |
| 964.08 | 17.2418 | 1505.03 | 6.0559 | | |
| 966.17 | 8.6256 | 1596.21 | 5.1298 | | |
| 968.97 | 18.3427 | 1620.50 | 4.1213 | | |
| 983.53 | 3.2490 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.0854 | | |
| 1274.44 | 8.6918 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.5266 | 1764.49 | 5.2773 | | |
| 1004.73 | 9.7991 | 1063.66 | 3.1693 | | |
| 507.63 | 0.0000 | 1771.35 | 3.1699 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.1259 | | |
| 1037.84 | 10.9771 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 4.2703 | | |
| 631.29 | 11.9172 | | | | |
| 1048.07 | 10.0874 | | | | |
| 1049.04 | 8.2551 | | | | |
| 1050.41 | 3.6702 | | | | |
| 1063.66 | 5.5229 | | | | |
| 1077.00 | 11.0811 | | | | |
| 1077.34 | 10.1585 | | | | |
| 1085.87 | 10.1791 | | | | |
| 1099.45 | 2.7849 | | | | |
| 1112.07 | 6.5172 | | | | |
| 1112.84 | 7.4495 | | | | |
| 1115.54 | 6.5223 | | | | |
| 1120.29 | 6.5297 | | | | |
| 1120.55 | 6.5300 | | | | |
| 1221.41 | 9.3302 | | | | |
| 1129.67 | 3.7393 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 3.7762 | | | | |
| 1177.95 | 5.6702 | | | | |
| 1189.05 | 6.6314 | | | | |
| 1204.77 | 3.8024 | | | | |
| 1221.41 | 7.6322 | | | | |
| 1231.02 | 5.7361 | | | | |
| 1235.36 | 9.5691 | | | | |
| 1238.28 | 3.8299 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.2858 | | | | |
| 1274.44 | 2.8945 | | | | |
| 1274.54 | 2.8945 | | | | |
| 1291.59 | 2.9048 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:45:09.95

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147004.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM25.CNF;227
                                        Background date  : 2-FEB-2014 16:27:57.
Sample date      : 7-NOV-2013 11:45:00. Acquisition date : 7-FEB-2014 08:43:28.
Sample ID        : G341147004           Sample quantity  : 1.15040E+02 GRAM
Detector name    : GAM25                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.31  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.10* | 9 | 54 | 0.91 | 125.88 | 121 | 11 | 2.49E-03 | 183.5 | |
| 2 | 0 | 85.09* | 31 | 33 | 3.48 | 169.80 | 164 | 11 | 8.68E-03 | 41.7 | |
| 3 | 0 | 110.15 | 18 | 53 | 1.46 | 219.88 | 212 | 14 | 4.96E-03 | 89.4 | |
| 4 | 0 | 163.11* | 12 | 26 | 1.44 | 325.69 | 321 | 8 | 3.40E-03 | 83.4 | |
| 5 | 0 | 185.33* | 11 | 25 | 0.97 | 370.09 | 365 | 11 | 2.99E-03 | 114.1 | |
| 6 | 0 | 238.62* | 6 | 23 | 0.90 | 476.58 | 471 | 9 | 1.53E-03 | 175.4 | |
| 7 | 0 | 246.02 | 14 | 6 | 1.02 | 491.36 | 489 | 6 | 3.89E-03 | 38.5 | |
| 8 | 0 | 353.11 | 10 | 17 | 0.80 | 705.36 | 698 | 10 | 2.85E-03 | 81.8 | |
| 9 | 0 | 377.92 | 5 | 11 | 1.34 | 754.94 | 750 | 9 | 1.41E-03 | 127.0 | |
| 10 | 0 | 636.40* | 12 | 7 | 0.86 | 1271.57 | 1263 | 15 | 3.31E-03 | 61.5 | |
| 11 | 0 | 648.27 | 9 | 2 | 2.43 | 1295.29 | 1291 | 8 | 2.51E-03 | 42.8 | |
| 12 | 0 | 1121.46 | 11 | 0 | 0.81 | 2241.36 | 2236 | 11 | 3.06E-03 | 30.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:45:11

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147004.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:45:00 | Acquisition date | : 7-FEB-2014 08:43:28 |
| Sample ID | : G341147004 | Sample quantity | : 115.04 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA25 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.31  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-125M | 109.28 | 18 | 0.27* | 7.063E+00 | 6.107E+00 | 1.853E+01 | 178.88 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:45:12.07

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147004.CNF;1    *
* Acquisition date :  7-FEB-2014 08:43:28 Sensitivity     : 3.000          *
* Detector ID      : GAM25                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.31     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:45:00 Nuclide Library : SOLID          *
* Sample ID        : G341147004           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1504E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  8-NOV-2013 08:03:16 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM25_500MLMB.CNF;8       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| TE-125M | 1.853E+01 | 3.248E+01 | 2.760E+01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.955E-01 | 8.621E-01 | 1.744E+00 | NOT IDENT. |
| NA-22 | -1.069E-02 | 2.190E-02 | 4.286E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.026E-04 | 2.823E-02 | 6.894E-02 | NOT IDENT. |
| K-40 | 2.829E-01 | 4.529E-01 | 1.119E+00 | NOT IDENT. |
| SC-46 | -1.307E-02 | 6.674E-02 | 1.305E-01 | FAIL ABUN |
| V-48 | -1.504E-02 | 1.854E+00 | 3.736E+00 | NOT IDENT. |
| CR-51 | 1.380E+00 | 2.454E+00 | 4.831E+00 | NOT IDENT. |
| MN-54 | -3.472E-02 | 3.528E-02 | 5.594E-02 | NOT IDENT. |
| CO-56 | 3.201E-02 | 6.683E-02 | 1.551E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -6.881E-04 | 2.216E-02 | 3.968E-02 | NOT IDENT. |
| CO-58 | -6.406E-02 | 7.376E-02 | 1.227E-01 | NOT IDENT. |
| FE-59 | -1.691E-02 | 3.188E-01 | 6.185E-01 | NOT IDENT. |
| CO-60 | -7.920E-03 | 3.254E-02 | 6.633E-02 | NOT IDENT. |
| ZN-65 | 5.974E-02 | 7.666E-02 | 1.826E-01 | NOT IDENT. |
| GE-68 | -4.540E-01 | 1.383E+00 | 2.588E+00 | NOT IDENT. |
| AS-73 | 5.430E-02 | 3.516E-01 | 6.647E-01 | NOT IDENT. |
| AS-74 | -1.802E-01 | 1.882E+00 | 3.553E+00 | NOT IDENT. |
| SE-75 | -3.226E-02 | 6.202E-02 | 1.077E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.945E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -6.242E-01 | 2.282E+00 | 4.435E+00 | NOT IDENT. |
| RB-83 | 1.191E-01 | 1.348E-01 | 2.904E-01 | NOT IDENT. |
| KR-85 | -8.790E+00 | 1.041E+01 | 1.748E+01 | NOT IDENT. |
| SR-85 | -1.050E-01 | 1.236E-01 | 2.074E-01 | NOT IDENT. |
| RB-86 | -4.720E+00 | 1.225E+01 | 2.260E+01 | NOT IDENT. |
| Y-88 | 1.605E-02 | 4.672E-02 | 1.302E-01 | NOT IDENT. |
| Y-91 | 9.916E+00 | 3.794E+01 | 8.352E+01 | NOT IDENT. |
| NB-94 | -1.124E-02 | 3.685E-02 | 6.596E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | 6.930E-02 | 7.949E-02 | 1.851E-01 | NOT IDENT. |
| NB-95M | -2.230E-01 | 2.461E-01 | 3.371E-01 | NOT IDENT. |
| ZR-95 | 1.140E-01 | 1.339E-01 | 3.173E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.939E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.606E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.785E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.327E-03 | 2.358E-02 | 4.261E-02 | NOT IDENT. |
| RH-102 | 6.343E-03 | 5.509E-02 | 9.716E-02 | NOT IDENT. |
| RU-103 | -3.802E-02 | 1.511E-01 | 2.811E-01 | NOT IDENT. |
| RH-106 | 2.087E-01 | 2.998E-01 | 6.699E-01 | NOT IDENT. |
| RU-106 | 2.087E-01 | 2.998E-01 | 6.699E-01 | NOT IDENT. |
| AG-108M | -1.363E-02 | 2.629E-02 | 4.739E-02 | NOT IDENT. |
| CD-109 | 2.042E-01 | 5.357E-01 | 9.115E-01 | NOT IDENT. |
| AG-110M | -1.336E-03 | 4.256E-02 | 9.037E-02 | NOT IDENT. |
| SN-113 | 8.394E-03 | 6.375E-02 | 1.263E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.259E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -9.117E-01 | 2.243E+00 | 3.523E+00 | NOT IDENT. |
| TE-123M | -7.452E-03 | 3.644E-02 | 5.918E-02 | NOT IDENT. |
| SB-124 | -3.585E-02 | 2.300E-01 | 4.731E-01 | NOT IDENT. |
| SB-125 | 5.234E-02 | 8.091E-02 | 1.737E-01 | FAIL ABUN |
| I-126 | -3.411E+00 | 1.227E+01 | 2.333E+01 | NOT IDENT. |
| SB-126 | 4.255E-01 | 8.593E+00 | 1.721E+01 | NOT IDENT. |
| SN-126 | 3.854E-02 | 4.369E-02 | 7.995E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.178E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.030E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 9.898E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.659E-02 | 4.447E-02 | 6.216E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.196E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.016E-03 | 3.422E-02 | 7.003E-02 | NOT IDENT. |
| CS-135 | 5.188E-03 | 1.330E-01 | 2.486E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 9.384E-01 | 6.400E+00 | 1.297E+01 | NOT IDENT. |
| BA-137M | -1.151E-02 | 3.435E-02 | 6.212E-02 | NOT IDENT. |
| CS-137 | -1.216E-02 | 3.629E-02 | 6.562E-02 | NOT IDENT. |
| CE-139 | -6.279E-03 | 3.525E-02 | 5.764E-02 | NOT IDENT. |
| BA-140 | 3.052E+00 | 4.519E+00 | 1.232E+01 | NOT IDENT. |
| LA-140 | 3.052E+00 | 4.519E+00 | 1.232E+01 | NOT IDENT. |
| CE-141 | 6.516E-02 | 2.233E-01 | 4.399E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.994E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -9.862E-03 | 1.961E-01 | 3.453E-01 | NOT IDENT. |
| PM-144 | 2.679E-02 | 3.982E-02 | 8.450E-02 | NOT IDENT. |
| PR-144 | 2.099E+00 | 3.104E+00 | 6.590E+00 | NOT IDENT. |
| PM-146 | -2.410E-02 | 3.388E-02 | 5.882E-02 | NOT IDENT. |
| ND-147 | 1.248E+01 | 5.406E+01 | 1.134E+02 | NOT IDENT. |
| PM-147 | -6.145E+01 | 5.445E+02 | 9.680E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.347E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.102E-02 | 2.219E-02 | 3.819E-02 | NOT IDENT. |
| EU-152 | 6.249E-02 | 8.463E-02 | 1.742E-01 | FAIL ABUN |
| GD-153 | 2.356E-02 | 6.779E-02 | 1.270E-01 | NOT IDENT. |
| EU-154 | -2.914E-02 | 5.968E-02 | 1.168E-01 | NOT IDENT. |
| EU-155 | 2.443E-02 | 6.155E-02 | 1.099E-01 | FAIL ABUN |
| TB-160 | 3.852E-02 | 2.222E-01 | 4.786E-01 | NOT IDENT. |
| HO-166M | -3.867E-02 | 6.081E-02 | 1.011E-01 | FAIL ABUN |
| TM-171 | 2.487E+00 | 3.810E+00 | 7.580E+00 | NOT IDENT. |
| LU-176 | 1.489E-02 | 2.349E-02 | 4.728E-02 | NOT IDENT. |
| HF-181 | -9.226E-02 | 1.586E-01 | 2.792E-01 | NOT IDENT. |
| TA-182 | 4.320E-02 | 1.934E-01 | 4.444E-01 | FAIL ABUN |
| RE-183 | -1.291E-02 | 1.193E-01 | 1.960E-01 | FAIL ABUN |
| RE-184 | -1.132E-01 | 5.856E-01 | 1.122E+00 | NOT IDENT. |
| W-188 | -8.446E+00 | 1.499E+01 | 2.563E+01 | FAIL ABUN |
| IR-192 | 2.866E-04 | 6.828E-02 | 1.259E-01 | NOT IDENT. |
| HG-203 | -3.559E-02 | 1.052E-01 | 1.868E-01 | NOT IDENT. |
| BI-207 | -5.015E-03 | 4.936E-02 | 9.696E-02 | NOT IDENT. |
| TL-208 | -1.822E-02 | 3.753E-02 | 6.965E-02 | NOT IDENT. |
| PB-210 | -1.525E-01 | 5.380E-01 | 1.087E+00 | NOT IDENT. |
| BI-211 | 5.014E-02 | 2.248E-01 | 3.807E-01 | NOT IDENT. |
| PB-211 | 4.148E-01 | 6.879E-01 | 1.424E+00 | NOT IDENT. |
| BI-212 | -1.807E-01 | 4.105E-01 | 7.283E-01 | NOT IDENT. |
| PB-212 | 1.748E-02 | 6.010E-02 | 9.822E-02 | FAIL ABUN |
| BI-214 | 3.971E-02 | 7.441E-02 | 1.517E-01 | FAIL ABUN |
| PB-214 | 5.366E-02 | 8.608E-02 | 1.349E-01 | FAIL ABUN |
| RN-219 | 1.819E-02 | 3.995E-01 | 7.741E-01 | NOT IDENT. |
| RN-222 | 3.971E-02 | 7.441E-02 | 1.517E-01 | FAIL ABUN |
| RA-223 | 3.794E-02 | 6.531E-01 | 1.120E+00 | FAIL ABUN |
| RA-224 | -3.733E-02 | 6.236E-01 | 9.371E-01 | NOT IDENT. |
| RA-226 | 3.971E-02 | 7.441E-02 | 1.517E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| AC-227 | -2.196E-01 | 2.286E-01 | 3.730E-01 | NOT IDENT. |
| TH-227 | -2.196E-01 | 2.286E-01 | 3.730E-01 | NOT IDENT. |
| AC-228 | -2.571E-02 | 1.498E-01 | 2.982E-01 | NOT IDENT. |
| RA-228 | -2.571E-02 | 1.498E-01 | 2.982E-01 | NOT IDENT. |
| TH-228 | 1.748E-02 | 6.010E-02 | 9.822E-02 | FAIL ABUN |
| TH-229 | 2.542E-02 | 3.850E-01 | 7.349E-01 | FAIL ABUN |
| TH-230 | 3.971E-02 | 7.440E-02 | 1.517E-01 | FAIL ABUN |
| PA-231 | 6.277E-01 | 1.319E+00 | 2.584E+00 | NOT IDENT. |
| TH-231 | 3.794E-02 | 6.531E-01 | 1.120E+00 | FAIL ABUN |
| TH-232 | -2.571E-02 | 1.498E-01 | 2.982E-01 | NOT IDENT. |
| PA-233 | -2.773E-02 | 5.979E-02 | 1.035E-01 | NOT IDENT. |
| PA-234 | -2.456E-01 | 2.657E-01 | 4.209E-01 | FAIL ABUN |
| PA-234M | -2.061E+00 | 5.000E+00 | 9.179E+00 | NOT IDENT. |
| TH-234 | 2.278E-01 | 8.194E-01 | 1.206E+00 | FAIL ABUN |
| U-234 | 3.971E-02 | 7.440E-02 | 1.517E-01 | FAIL ABUN |
| U-235 | -1.118E-01 | 1.583E-01 | 2.845E-01 | FAIL ABUN |
| NP-237 | -2.773E-02 | 5.979E-02 | 1.035E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.571E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.278E-01 | 8.194E-01 | 1.206E+00 | FAIL ABUN |
| NP-239 | 4.261E-03 | 2.759E-01 | 4.991E-01 | NOT IDENT. |
| PU-239 | -7.570E+01 | 2.506E+02 | 4.310E+02 | NOT IDENT. |
| AM-241 | -1.236E-02 | 4.232E-02 | 6.763E-02 | NOT IDENT. |
| AM-243 | -1.795E-02 | 2.462E-02 | 4.293E-02 | NOT IDENT. |
| CM-243 | -2.916E-02 | 6.783E-02 | 1.019E-01 | NOT IDENT. |
| CM-247 | 9.439E-03 | 3.556E-02 | 7.101E-02 | NOT IDENT. |
| CF-249 | 1.027E-02 | 3.221E-02 | 6.643E-02 | NOT IDENT. |
| CF-251 | -7.375E-02 | 8.535E-02 | 1.455E-01 | NOT IDENT. |
| ANH-511 | -2.904E-02 | 4.890E-02 | 1.090E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:45:08.39

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.70 | 37 | 58 | 0.97 | 93.10 | 88 | 11 | 1.02E-02 | 43.2 | |
| 2 | 0 | 63.10 | 67 | 54 | 0.91 | 125.88 | 121 | 11 | 1.86E-02 | 24.3 | |
| 3 | 0 | 85.09 | 38 | 33 | 3.48 | 169.80 | 164 | 11 | 1.06E-02 | 33.3 | |
| 4 | 0 | 92.12 | 63 | 38 | 1.27 | 183.85 | 179 | 10 | 1.76E-02 | 22.0 | |
| 5 | 0 | 110.15 | 18 | 53 | 1.46 | 219.88 | 212 | 14 | 4.96E-03 | 89.4 | |
| 6 | 0 | 163.11 | 18 | 26 | 1.44 | 325.69 | 321 | 8 | 5.03E-03 | 54.1 | |
| 7 | 0 | 185.33 | 47 | 25 | 0.97 | 370.09 | 365 | 11 | 1.30E-02 | 25.3 | |
| 8 | 0 | 238.62 | 16 | 23 | 0.90 | 476.58 | 471 | 9 | 4.31E-03 | 60.7 | |
| 9 | 0 | 246.02 | 14 | 6 | 1.02 | 491.36 | 489 | 6 | 3.89E-03 | 38.5 | |
| 10 | 0 | 353.11 | 10 | 17 | 0.80 | 705.36 | 698 | 10 | 2.85E-03 | 81.8 | |
| 11 | 0 | 377.92 | 5 | 11 | 1.34 | 754.94 | 750 | 9 | 1.41E-03 | 127.0 | |
| 12 | 0 | 511.02 | 74 | 7 | 2.40 | 1020.95 | 1014 | 14 | 2.06E-02 | 13.9 | |
| 13 | 0 | 636.40 | 15 | 7 | 0.86 | 1271.57 | 1263 | 15 | 4.19E-03 | 46.9 | |
| 14 | 0 | 648.27 | 9 | 2 | 2.43 | 1295.29 | 1291 | 8 | 2.51E-03 | 42.8 | |
| 15 | 0 | 1121.46 | 11 | 0 | 0.81 | 2241.36 | 2236 | 11 | 3.06E-03 | 30.2 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:45:10.44

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-125M | 109.28 | 18 | 0.27* | 7.063E+00 | 6.107E+00 | 1.853E+01 | 178.88 |

Flag: "*" = Keyline

Sample ID : G341147004 Acquisition date : 7-FEB-2014 08:43:28

| | |
|---|---|
| Total number of lines in spectrum | 12 |
| Number of unidentified lines | 2 |
| Number of lines tentatively identified by NID | 10 83.33% |

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TE-125M | 57.40D | 3.03 | 6.107E+00 | 1.853E+01 | 3.314E+01 | 178.88 | |
| | Total Activity : | | 6.107E+00 | 1.853E+01 | | | |
| | Grand Total Activity : | | 6.107E+00 | 1.853E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147004 Acquisition date : 7-FEB-2014 08:43:28

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.10 | 9 | 54 | 0.91 | 125.88 | 121 | 11 | 2.49E-03 | **** | 6.95E+00 | T |
| 0 | 85.09 | 31 | 33 | 3.48 | 169.80 | 164 | 11 | 8.68E-03 | 83.4 | 7.32E+00 | T |
| 0 | 163.11 | 12 | 26 | 1.44 | 325.69 | 321 | 8 | 3.40E-03 | **** | 6.01E+00 | T |
| 0 | 185.33 | 11 | 25 | 0.97 | 370.09 | 365 | 11 | 2.99E-03 | **** | 5.58E+00 | T |
| 0 | 238.62 | 6 | 23 | 0.90 | 476.58 | 471 | 9 | 1.53E-03 | **** | 4.72E+00 | T |
| 0 | 246.02 | 14 | 6 | 1.02 | 491.36 | 489 | 6 | 3.89E-03 | 76.9 | 4.62E+00 | T |
| 0 | 353.11 | 10 | 17 | 0.80 | 705.36 | 698 | 10 | 2.85E-03 | **** | 3.51E+00 | T |
| 0 | 377.92 | 5 | 11 | 1.34 | 754.94 | 750 | 9 | 1.41E-03 | **** | 3.33E+00 | |
| 0 | 636.40 | 12 | 7 | 0.86 | 1271.57 | 1263 | 15 | 3.31E-03 | **** | 2.16E+00 | T |
| 0 | 648.27 | 9 | 2 | 2.43 | 1295.29 | 1291 | 8 | 2.51E-03 | 85.6 | 2.13E+00 | |
| 0 | 1121.46 | 11 | 0 | 0.81 | 2241.36 | 2236 | 11 | 3.06E-03 | 60.3 | 1.34E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:45:22.21

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147004.CNF;1    *
* Acquisition date :  7-FEB-2014 08:43:28 Sensitivity     : 3.000          *
* Detector ID      : GAM25                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.31     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:45:00 Nuclide Library : SOLID          *
* Sample ID        : G341147004           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1504E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  8-NOV-2013 08:03:16 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM25_500MLMB.CNF;8       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| TE-125M | 1.240E+01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.701E-01 | NOT IDENT. |
| NA-22 | 1.355E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.442E-02 | NOT IDENT. |
| K-40 | 4.820E-01 | NOT IDENT. |
| SC-46 | 5.366E-02 | FAIL ABUN |
| V-48 | 1.550E+00 | NOT IDENT. |
| CR-51 | 2.183E+00 | NOT IDENT. |
| MN-54 | 2.167E-02 | NOT IDENT. |
| CO-56 | 6.570E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.794E-02 | NOT IDENT. |
| CO-58 | 4.897E-02 | NOT IDENT. |
| FE-59 | 2.613E-01 | NOT IDENT. |
| CO-60 | 2.526E-02 | NOT IDENT. |
| ZN-65 | 7.445E-02 | NOT IDENT. |
| GE-68 | 1.044E+00 | NOT IDENT. |
| AS-73 | 3.029E-01 | NOT IDENT. |
| AS-74 | 1.541E+00 | NOT IDENT. |
| SE-75 | 4.803E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.822E+00 | NOT IDENT. |
| RB-83 | 1.292E-01 | NOT IDENT. |
| KR-85 | 7.944E+00 | NOT IDENT. |
| SR-85 | 9.422E-02 | NOT IDENT. |
| RB-86 | 9.055E+00 | NOT IDENT. |
| Y-88 | 4.649E-02 | NOT IDENT. |
| Y-91 | 3.376E+01 | NOT IDENT. |
| NB-94 | 2.854E-02 | NOT IDENT. |
| NB-95 | 7.965E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95M | 1.484E-01 | NOT IDENT. |
| ZR-95 | 1.352E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.928E-02 | NOT IDENT. |
| RH-102 | 4.100E-02 | NOT IDENT. |
| RU-103 | 1.221E-01 | NOT IDENT. |
| RH-106 | 2.871E-01 | NOT IDENT. |
| RU-106 | 2.871E-01 | NOT IDENT. |
| AG-108M | 2.042E-02 | NOT IDENT. |
| CD-109 | 4.185E-01 | NOT IDENT. |
| AG-110M | 3.561E-02 | NOT IDENT. |
| SN-113 | 5.585E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.581E+00 | NOT IDENT. |
| TE-123M | 2.666E-02 | NOT IDENT. |
| SB-124 | 1.795E-01 | NOT IDENT. |
| SB-125 | 7.640E-02 | FAIL ABUN |
| I-126 | 9.887E+00 | NOT IDENT. |
| SB-126 | 7.144E+00 | NOT IDENT. |
| SN-126 | 3.673E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.694E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.874E-02 | NOT IDENT. |
| CS-135 | 1.117E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.504E+00 | NOT IDENT. |
| BA-137M | 2.634E-02 | NOT IDENT. |
| CS-137 | 2.783E-02 | NOT IDENT. |
| CE-139 | 2.589E-02 | NOT IDENT. |
| BA-140 | 4.773E+00 | NOT IDENT. |
| LA-140 | 4.773E+00 | NOT IDENT. |
| CE-141 | 1.997E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.577E-01 | NOT IDENT. |
| PM-144 | 3.698E-02 | NOT IDENT. |
| PR-144 | 2.885E+00 | NOT IDENT. |
| PM-146 | 2.452E-02 | NOT IDENT. |
| ND-147 | 4.783E+01 | NOT IDENT. |
| PM-147 | 4.359E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.658E-02 | NOT IDENT. |
| EU-152 | 7.776E-02 | FAIL ABUN |
| GD-153 | 5.803E-02 | NOT IDENT. |
| EU-154 | 3.691E-02 | NOT IDENT. |
| EU-155 | 4.888E-02 | FAIL ABUN |
| TB-160 | 1.963E-01 | NOT IDENT. |
| HO-166M | 4.226E-02 | FAIL ABUN |
| TM-171 | 3.466E+00 | NOT IDENT. |
| LU-176 | 2.124E-02 | NOT IDENT. |
| HF-181 | 1.216E-01 | NOT IDENT. |
| TA-182 | 1.764E-01 | FAIL ABUN |
| RE-183 | 8.848E-02 | FAIL ABUN |
| RE-184 | 4.738E-01 | NOT IDENT. |
| W-188 | 1.148E+01 | FAIL ABUN |
| IR-192 | 5.639E-02 | NOT IDENT. |
| HG-203 | 8.334E-02 | NOT IDENT. |
| BI-207 | 3.999E-02 | NOT IDENT. |
| TL-208 | 3.036E-02 | NOT IDENT. |
| PB-210 | 5.077E-01 | NOT IDENT. |
| BI-211 | 1.711E-01 | NOT IDENT. |
| PB-211 | 6.380E-01 | NOT IDENT. |
| BI-212 | 2.957E-01 | NOT IDENT. |
| PB-212 | 4.485E-02 | FAIL ABUN |
| BI-214 | 6.721E-02 | FAIL ABUN |
| PB-214 | 6.045E-02 | FAIL ABUN |
| RN-219 | 3.449E-01 | NOT IDENT. |
| RN-222 | 6.721E-02 | FAIL ABUN |
| RA-223 | 5.013E-01 | FAIL ABUN |
| RA-224 | 4.229E-01 | NOT IDENT. |
| RA-226 | 6.721E-02 | FAIL ABUN |
| AC-227 | 1.658E-01 | NOT IDENT. |

| | | |
|---|---|---|
| TH-227 | 1.658E-01 | NOT IDENT. |
| AC-228 | 1.277E-01 | NOT IDENT. |
| RA-228 | 1.277E-01 | NOT IDENT. |
| TH-228 | 4.485E-02 | FAIL ABUN |
| TH-229 | 3.308E-01 | FAIL ABUN |
| TH-230 | 6.720E-02 | FAIL ABUN |
| PA-231 | 1.168E+00 | NOT IDENT. |
| TH-231 | 5.013E-01 | FAIL ABUN |
| TH-232 | 1.277E-01 | NOT IDENT. |
| PA-233 | 4.585E-02 | NOT IDENT. |
| PA-234 | 1.629E-01 | FAIL ABUN |
| PA-234M | 3.878E+00 | NOT IDENT. |
| TH-234 | 5.690E-01 | FAIL ABUN |
| U-234 | 6.720E-02 | FAIL ABUN |
| U-235 | 1.297E-01 | FAIL ABUN |
| NP-237 | 4.585E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.690E-01 | FAIL ABUN |
| NP-239 | 2.254E-01 | NOT IDENT. |
| PU-239 | 1.947E+02 | NOT IDENT. |
| AM-241 | 3.020E-02 | NOT IDENT. |
| AM-243 | 1.966E-02 | NOT IDENT. |
| CM-243 | 4.505E-02 | NOT IDENT. |
| CM-247 | 3.164E-02 | NOT IDENT. |
| CF-249 | 2.911E-02 | NOT IDENT. |
| CF-251 | 6.387E-02 | NOT IDENT. |
| ANH-511 | 5.114E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:45:26.75

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147004.CNF;1 | | |
| Acquisition date | : 7-FEB-2014 08:43:28 | Sensitivity | : 3.000 |
| Detector ID | : GAM25 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.31 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:45:00 | Nuclide Library | : SOLID |
| Sample ID | : G341147004 | Analyst initials | : RXF2 |
| Batch Number | : 1359496 | Sample Quantity | : 1.1504E+02 GRAM |
| | | Quantity Err(%) | : 1.7385E-03 % |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 8-NOV-2013 08:03:16 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM25_500MLMB.CNF;8 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| TE-125M | 1.853E+01 | 3.253E+01 | 3.253E+01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.955E-01 | 8.625E-01 | 8.727E-01 | NOT IDENT. |
| NA-22 | -1.069E-02 | 2.192E-02 | 2.244E-02 | NOT IDENT. |
| NA-24 | 6.375E+40 | 4.075E+42 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.026E-04 | 2.823E-02 | 2.823E-02 | NOT IDENT. |
| K-40 | 2.829E-01 | 4.536E-01 | 4.712E-01 | NOT IDENT. |
| SC-46 | -1.307E-02 | 6.676E-02 | 6.702E-02 | FAIL ABUN |
| V-48 | -1.504E-02 | 1.854E+00 | 1.854E+00 | NOT IDENT. |
| CR-51 | 1.380E+00 | 2.458E+00 | 2.536E+00 | NOT IDENT. |
| MN-54 | -3.472E-02 | 3.547E-02 | 3.877E-02 | NOT IDENT. |
| CO-56 | 3.201E-02 | 6.692E-02 | 6.846E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 2.111E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -6.881E-04 | 2.216E-02 | 2.216E-02 | NOT IDENT. |
| CO-58 | -6.406E-02 | 7.405E-02 | 7.948E-02 | NOT IDENT. |
| FE-59 | -1.691E-02 | 3.188E-01 | 3.189E-01 | NOT IDENT. |
| CO-60 | -7.920E-03 | 3.254E-02 | 3.274E-02 | NOT IDENT. |
| ZN-65 | 5.974E-02 | 7.712E-02 | 8.169E-02 | NOT IDENT. |
| GE-68 | -4.540E-01 | 1.385E+00 | 1.400E+00 | NOT IDENT. |
| AS-73 | 5.430E-02 | 3.518E-01 | 3.526E-01 | NOT IDENT. |
| AS-74 | -1.802E-01 | 1.882E+00 | 1.884E+00 | NOT IDENT. |
| SE-75 | -3.226E-02 | 6.213E-02 | 6.381E-02 | NOT IDENT. |
| BR-77 | 1.438E+10 | 6.247E+10 | 6.281E+10 | SHORT HLIF |
| SR-82 | -6.242E-01 | 2.283E+00 | 2.300E+00 | NOT IDENT. |
| RB-83 | 1.191E-01 | 1.361E-01 | 1.463E-01 | NOT IDENT. |
| KR-85 | -8.790E+00 | 1.044E+01 | 1.117E+01 | NOT IDENT. |
| SR-85 | -1.050E-01 | 1.240E-01 | 1.327E-01 | NOT IDENT. |
| RB-86 | -4.720E+00 | 1.227E+01 | 1.245E+01 | NOT IDENT. |
| Y-88 | 1.605E-02 | 4.673E-02 | 4.729E-02 | NOT IDENT. |
| Y-91 | 9.916E+00 | 3.795E+01 | 3.821E+01 | NOT IDENT. |
| NB-94 | -1.124E-02 | 3.687E-02 | 3.722E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | 6.930E-02 | 7.978E-02 | 8.568E-02 | NOT IDENT. |
| NB-95M | -2.230E-01 | 2.476E-01 | 2.672E-01 | NOT IDENT. |
| ZR-95 | 1.140E-01 | 1.344E-01 | 1.439E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 1.941E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -2.823E+39 | 1.626E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.855E+08 | 2.786E+09 | 2.789E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 3.488E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.327E-03 | 2.358E-02 | 2.359E-02 | NOT IDENT. |
| RH-102 | 6.343E-03 | 5.510E-02 | 5.517E-02 | NOT IDENT. |
| RU-103 | -3.802E-02 | 1.511E-01 | 1.521E-01 | NOT IDENT. |
| RH-106 | 2.087E-01 | 3.006E-01 | 3.149E-01 | NOT IDENT. |
| RU-106 | 2.087E-01 | 3.006E-01 | 3.149E-01 | NOT IDENT. |
| AG-108M | -1.363E-02 | 2.631E-02 | 2.702E-02 | NOT IDENT. |
| CD-109 | 2.042E-01 | 5.361E-01 | 5.440E-01 | NOT IDENT. |
| AG-110M | -1.336E-03 | 4.256E-02 | 4.257E-02 | NOT IDENT. |
| SN-113 | 8.394E-03 | 6.375E-02 | 6.386E-02 | NOT IDENT. |
| CD-115 | -1.410E+11 | 2.265E+11 | 2.352E+11 | SHORT HLIF |
| SN-117M | -9.117E-01 | 2.244E+00 | 2.282E+00 | NOT IDENT. |
| TE-123M | -7.452E-03 | 3.644E-02 | 3.660E-02 | NOT IDENT. |
| SB-124 | -3.585E-02 | 2.300E-01 | 2.305E-01 | NOT IDENT. |
| SB-125 | 5.234E-02 | 8.103E-02 | 8.440E-02 | FAIL ABUN |
| I-126 | -3.411E+00 | 1.227E+01 | 1.237E+01 | NOT IDENT. |
| SB-126 | 4.255E-01 | 8.593E+00 | 8.595E+00 | NOT IDENT. |
| SN-126 | 3.854E-02 | 4.384E-02 | 4.716E-02 | FAIL ABUN |
| SB-127 | 9.961E+03 | 1.178E+06 | 1.178E+06 | SHORT HLIF |
| I-131 | -4.695E+01 | 7.045E+01 | 7.356E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.959E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.677E+06 | 9.918E+06 | 1.006E+07 | SHORT HLIF |
| BA-133 | -2.659E-02 | 4.454E-02 | 4.613E-02 | NOT IDENT. |
| I-133 | -2.873E+29 | 2.202E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.016E-03 | 3.422E-02 | 3.423E-02 | NOT IDENT. |
| CS-135 | 5.188E-03 | 1.330E-01 | 1.331E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 4.480E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 9.384E-01 | 6.401E+00 | 6.415E+00 | NOT IDENT. |
| BA-137M | -1.151E-02 | 3.437E-02 | 3.476E-02 | NOT IDENT. |
| CS-137 | -1.216E-02 | 3.630E-02 | 3.672E-02 | NOT IDENT. |
| CE-139 | -6.279E-03 | 3.527E-02 | 3.538E-02 | NOT IDENT. |
| BA-140 | 3.052E+00 | 4.526E+00 | 4.731E+00 | NOT IDENT. |
| LA-140 | 3.052E+00 | 4.526E+00 | 4.731E+00 | NOT IDENT. |
| CE-141 | 6.516E-02 | 2.234E-01 | 2.254E-01 | NOT IDENT. |
| CE-143 | 1.314E+18 | 6.996E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -9.862E-03 | 1.961E-01 | 1.962E-01 | NOT IDENT. |
| PM-144 | 2.679E-02 | 3.990E-02 | 4.168E-02 | NOT IDENT. |
| PR-144 | 2.099E+00 | 3.110E+00 | 3.251E+00 | NOT IDENT. |
| PM-146 | -2.410E-02 | 3.397E-02 | 3.567E-02 | NOT IDENT. |
| ND-147 | 1.248E+01 | 5.407E+01 | 5.437E+01 | NOT IDENT. |
| PM-147 | -6.145E+01 | 5.446E+02 | 5.453E+02 | NOT IDENT. |
| PM-149 | 7.771E+11 | 2.351E+12 | 2.377E+12 | SHORT HLIF |
| EU-150 | -1.102E-02 | 2.222E-02 | 2.276E-02 | NOT IDENT. |
| EU-152 | 6.249E-02 | 8.490E-02 | 8.945E-02 | FAIL ABUN |
| GD-153 | 2.356E-02 | 6.783E-02 | 6.865E-02 | NOT IDENT. |
| EU-154 | -2.914E-02 | 5.973E-02 | 6.116E-02 | NOT IDENT. |
| EU-155 | 2.443E-02 | 6.161E-02 | 6.259E-02 | FAIL ABUN |
| TB-160 | 3.852E-02 | 2.222E-01 | 2.229E-01 | NOT IDENT. |
| HO-166M | -3.867E-02 | 6.093E-02 | 6.337E-02 | FAIL ABUN |
| TM-171 | 2.487E+00 | 3.820E+00 | 3.981E+00 | NOT IDENT. |
| LU-176 | 1.489E-02 | 2.355E-02 | 2.449E-02 | NOT IDENT. |
| HF-181 | -9.226E-02 | 1.588E-01 | 1.642E-01 | NOT IDENT. |
| TA-182 | 4.320E-02 | 1.934E-01 | 1.944E-01 | FAIL ABUN |
| RE-183 | -1.291E-02 | 1.193E-01 | 1.195E-01 | FAIL ABUN |
| RE-184 | -1.132E-01 | 5.858E-01 | 5.880E-01 | NOT IDENT. |
| W-188 | -8.446E+00 | 1.504E+01 | 1.552E+01 | FAIL ABUN |
| IR-192 | 2.866E-04 | 6.828E-02 | 6.828E-02 | NOT IDENT. |
| HG-203 | -3.559E-02 | 1.053E-01 | 1.065E-01 | NOT IDENT. |
| BI-207 | -5.015E-03 | 4.937E-02 | 4.942E-02 | NOT IDENT. |
| TL-208 | -1.822E-02 | 3.757E-02 | 3.845E-02 | NOT IDENT. |
| PB-210 | -1.525E-01 | 5.382E-01 | 5.426E-01 | NOT IDENT. |
| BI-211 | 5.014E-02 | 2.249E-01 | 2.260E-01 | NOT IDENT. |
| PB-211 | 4.148E-01 | 6.889E-01 | 7.139E-01 | NOT IDENT. |
| BI-212 | -1.807E-01 | 4.109E-01 | 4.189E-01 | NOT IDENT. |
| PB-212 | 1.748E-02 | 6.012E-02 | 6.064E-02 | FAIL ABUN |
| BI-214 | 3.971E-02 | 7.449E-02 | 7.661E-02 | FAIL ABUN |
| PB-214 | 5.366E-02 | 8.624E-02 | 8.957E-02 | FAIL ABUN |
| RN-219 | 1.819E-02 | 3.995E-01 | 3.995E-01 | NOT IDENT. |
| RN-222 | 3.971E-02 | 7.449E-02 | 7.661E-02 | FAIL ABUN |
| RA-223 | 3.794E-02 | 6.531E-01 | 6.534E-01 | FAIL ABUN |
| RA-224 | -3.733E-02 | 6.236E-01 | 6.238E-01 | NOT IDENT. |
| RA-226 | 3.971E-02 | 7.449E-02 | 7.661E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| AC-227 | -2.196E-01 | 2.315E-01 | 2.518E-01 | NOT IDENT. |
| TH-227 | -2.196E-01 | 2.315E-01 | 2.518E-01 | NOT IDENT. |
| AC-228 | -2.571E-02 | 1.499E-01 | 1.503E-01 | NOT IDENT. |
| RA-228 | -2.571E-02 | 1.499E-01 | 1.503E-01 | NOT IDENT. |
| TH-228 | 1.748E-02 | 6.012E-02 | 6.064E-02 | FAIL ABUN |
| TH-229 | 2.542E-02 | 3.850E-01 | 3.852E-01 | FAIL ABUN |
| TH-230 | 3.971E-02 | 7.449E-02 | 7.661E-02 | FAIL ABUN |
| PA-231 | 6.277E-01 | 1.321E+00 | 1.351E+00 | NOT IDENT. |
| TH-231 | 3.794E-02 | 6.531E-01 | 6.534E-01 | FAIL ABUN |
| TH-232 | -2.571E-02 | 1.499E-01 | 1.503E-01 | NOT IDENT. |
| PA-233 | -2.773E-02 | 5.987E-02 | 6.116E-02 | NOT IDENT. |
| PA-234 | -2.456E-01 | 3.877E-01 | 4.032E-01 | FAIL ABUN |
| PA-234M | -2.061E+00 | 5.006E+00 | 5.092E+00 | NOT IDENT. |
| TH-234 | 2.278E-01 | 8.211E-01 | 8.275E-01 | FAIL ABUN |
| U-234 | 3.971E-02 | 7.449E-02 | 7.661E-02 | FAIL ABUN |
| U-235 | -1.118E-01 | 1.587E-01 | 1.665E-01 | FAIL ABUN |
| NP-237 | -2.773E-02 | 5.987E-02 | 6.116E-02 | NOT IDENT. |
| NP-238 | -2.209E+11 | 1.571E+12 | 1.574E+12 | SHORT HLIF |
| U-238 | 2.278E-01 | 8.211E-01 | 8.275E-01 | FAIL ABUN |
| NP-239 | 4.261E-03 | 2.759E-01 | 2.759E-01 | NOT IDENT. |
| PU-239 | -7.570E+01 | 2.508E+02 | 2.531E+02 | NOT IDENT. |
| AM-241 | -1.236E-02 | 4.234E-02 | 4.270E-02 | NOT IDENT. |
| AM-243 | -1.795E-02 | 2.468E-02 | 2.597E-02 | NOT IDENT. |
| CM-243 | -2.916E-02 | 6.793E-02 | 6.919E-02 | NOT IDENT. |
| CM-247 | 9.439E-03 | 3.560E-02 | 3.586E-02 | NOT IDENT. |
| CF-249 | 1.027E-02 | 3.223E-02 | 3.256E-02 | NOT IDENT. |
| CF-251 | -7.375E-02 | 8.590E-02 | 9.211E-02 | NOT IDENT. |
| ANH-511 | -2.904E-02 | 4.897E-02 | 5.069E-02 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 64.5143 | 94.67 | 92.1759 | 193.51 | 26.3434 |
| 45.60 | 33.9034 | 94.87 | 96.5034 | 197.03 | 34.9636 |
| 46.54 | 31.1779 | 97.43 | 28.0270 | 198.01 | 31.2215 |
| 49.72 | 0.0000 | 98.43 | 28.0844 | 201.83 | 41.8234 |
| 51.35 | 35.5129 | 98.44 | 28.0849 | 205.31 | 27.6813 |
| 52.39 | 27.9259 | 99.53 | 29.2298 | 210.85 | 35.5502 |
| 53.44 | 32.8479 | 100.11 | 32.5156 | 215.65 | 25.1212 |
| 57.36 | 0.0000 | 103.18 | 24.8634 | 222.11 | 27.2540 |
| 57.53 | 28.1698 | 103.37 | 26.1819 | 227.09 | 29.3639 |
| 57.98 | 30.8512 | 105.21 | 16.4227 | 227.38 | 29.3736 |
| 59.32 | 28.0219 | 105.31 | 16.4259 | 228.16 | 0.0000 |
| 59.54 | 28.0397 | 106.12 | 23.0324 | 228.18 | 31.3594 |
| 63.29 | 33.8063 | 109.28 | 26.4824 | 235.69 | 33.1988 |
| 63.58 | 33.8332 | 111.00 | 26.5682 | 235.96 | 33.2086 |
| 64.28 | 33.8983 | 111.76 | 0.0000 | 238.63 | 34.8898 |
| 66.73 | 39.1412 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 43.7166 | 117.23 | 29.1135 | 240.99 | 29.8105 |
| 67.75 | 33.2091 | 121.12 | 30.4434 | 242.00 | 27.8530 |
| 69.67 | 41.4675 | 121.22 | 29.3210 | 244.70 | 23.9421 |
| 70.83 | 38.5479 | 121.78 | 33.8652 | 252.40 | 0.0000 |
| 72.81 | 34.6637 | 122.06 | 30.4937 | 252.80 | 24.1439 |
| 72.87 | 34.6691 | 123.07 | 28.2847 | 254.15 | 0.0000 |
| 74.66 | 41.9935 | 127.23 | 29.6270 | 256.23 | 30.2855 |
| 74.82 | 42.0099 | 129.30 | 34.3048 | 260.90 | 0.0000 |
| 74.97 | 32.8005 | 131.20 | 35.5612 | 264.66 | 30.5424 |
| 77.11 | 42.2452 | 133.02 | 28.7649 | 268.22 | 25.5413 |
| 79.69 | 27.9919 | 133.52 | 38.0008 | 269.46 | 17.3891 |
| 80.12 | 15.5668 | 136.00 | 40.4673 | 271.23 | 23.5671 |
| 80.19 | 0.0000 | 136.47 | 40.4983 | 273.65 | 21.5681 |
| 80.57 | 23.3749 | 140.51 | 0.0000 | 276.40 | 19.5656 |
| 81.00 | 29.6379 | 143.76 | 36.8721 | 277.37 | 17.5224 |
| 81.07 | 29.6429 | 144.24 | 35.1425 | 277.60 | 18.5570 |
| 83.79 | 33.4925 | 145.44 | 28.1663 | 278.00 | 17.5328 |
| 85.43 | 33.6172 | 152.43 | 24.9082 | 279.20 | 27.8779 |
| 86.55 | 25.2762 | 153.25 | 18.7039 | 279.54 | 27.8870 |
| 86.79 | 25.2896 | 154.21 | 18.7305 | 280.46 | 28.9451 |
| 86.94 | 25.2981 | 156.02 | 33.9841 | 283.69 | 22.8120 |
| 87.09 | 25.3065 | 158.56 | 28.7244 | 284.31 | 0.0000 |
| 87.57 | 26.9168 | 159.00 | 27.3053 | 285.41 | 25.9644 |
| 88.03 | 34.8690 | 162.33 | 32.4904 | 285.90 | 0.0000 |
| 88.34 | 34.8928 | 163.33 | 26.0292 | 287.50 | 31.2181 |
| 88.47 | 55.5270 | 165.86 | 29.0247 | 290.67 | 33.3970 |
| 89.96 | 92.3158 | 176.31 | 19.3224 | 293.27 | 0.0000 |
| 91.11 | 30.8485 | 176.60 | 20.2504 | 295.22 | 19.9121 |
| 92.59 | 30.9464 | 177.52 | 28.5696 | 295.96 | 17.8283 |
| 93.35 | 33.1340 | 181.07 | 0.0000 | 298.58 | 26.2802 |
| 94.56 | 92.1545 | 184.41 | 29.7598 | 299.98 | 23.1558 |
| 94.65 | 92.1720 | 185.72 | 29.8103 | 300.09 | 18.9473 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 18.9481 | 497.08 | 17.5036 | 711.68 | 14.1346 |
| 301.36 | 18.9690 | 505.52 | 36.1626 | 720.70 | 7.6419 |
| 302.85 | 17.9390 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 21.1359 | 511.00 | 10.7861 | 722.78 | 4.3709 |
| 306.78 | 18.0018 | 514.00 | 48.1324 | 722.91 | 4.3711 |
| 308.46 | 23.3310 | 514.00 | 48.1324 | 723.31 | 4.3719 |
| 311.90 | 26.5923 | 520.40 | 11.8318 | 724.19 | 5.4670 |
| 316.51 | 24.5628 | 520.69 | 0.0000 | 727.33 | 9.8543 |
| 319.41 | 25.6948 | 522.65 | 0.0000 | 733.00 | 10.9768 |
| 320.08 | 21.4246 | 527.90 | 0.0000 | 735.93 | 6.5946 |
| 321.04 | 25.7307 | 529.59 | 9.9124 | 737.46 | 7.6988 |
| 323.87 | 22.5685 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 31.2019 | 531.02 | 7.9363 | 747.24 | 4.6023 |
| 328.76 | 17.2661 | 546.56 | 0.0000 | 748.06 | 6.4454 |
| 333.37 | 21.6656 | 552.55 | 15.0626 | 752.31 | 3.6899 |
| 333.97 | 20.5925 | 563.25 | 12.1213 | 753.82 | 6.4615 |
| 334.37 | 17.3467 | 569.33 | 10.1345 | 756.73 | 4.6212 |
| 338.28 | 21.7532 | 569.50 | 9.1219 | 756.80 | 4.6213 |
| 338.32 | 21.7542 | 569.70 | 9.1230 | 763.94 | 13.9063 |
| 340.48 | 25.0615 | 583.19 | 15.3153 | 765.81 | 5.5669 |
| 340.55 | 27.2423 | 584.27 | 15.3241 | 766.42 | 6.4964 |
| 344.28 | 14.2088 | 595.83 | 15.4178 | 766.84 | 7.4258 |
| 345.93 | 21.8887 | 600.60 | 13.3951 | 772.60 | 0.0000 |
| 351.06 | 19.3413 | 602.52 | 0.0000 | 776.52 | 9.3203 |
| 351.93 | 10.9970 | 602.73 | 9.2839 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 14.4563 | 778.90 | 8.3967 |
| 356.01 | 22.9477 | 609.32 | 11.3856 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 11.3916 | 785.37 | 7.4839 |
| 366.42 | 0.0000 | 614.28 | 13.4897 | 792.07 | 7.5047 |
| 375.05 | 17.9131 | 618.01 | 15.5947 | 794.95 | 6.5745 |
| 383.85 | 12.3967 | 620.36 | 11.4498 | 795.86 | 7.5166 |
| 388.16 | 13.5668 | 621.93 | 6.2502 | 801.95 | 8.4772 |
| 388.63 | 14.4764 | 630.19 | 0.0000 | 810.29 | 12.2867 |
| 391.69 | 18.1360 | 631.29 | 8.7217 | 810.45 | 12.2875 |
| 400.66 | 19.1666 | 633.25 | 10.4763 | 810.76 | 12.2891 |
| 401.81 | 21.9229 | 634.78 | 12.5813 | 815.77 | 8.5250 |
| 402.40 | 19.1907 | 635.95 | 12.5883 | 818.51 | 12.3277 |
| 404.85 | 17.3934 | 636.99 | 0.0000 | 832.01 | 4.7670 |
| 410.95 | 17.4685 | 645.85 | 10.5415 | 834.85 | 11.4539 |
| 413.71 | 22.1083 | 657.76 | 10.6028 | 835.71 | 10.5030 |
| 414.70 | 15.6708 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 12.0864 | 661.66 | 13.8093 | 846.75 | 0.0000 |
| 427.87 | 11.1627 | 664.57 | 0.0000 | 846.77 | 3.8359 |
| 433.94 | 18.6812 | 666.33 | 10.6465 | 856.80 | 1.9255 |
| 439.40 | 17.8120 | 666.50 | 10.6472 | 860.56 | 9.6413 |
| 453.88 | 15.1434 | 667.71 | 0.0000 | 871.09 | 10.6484 |
| 463.37 | 17.1409 | 677.62 | 9.6330 | 873.19 | 4.8441 |
| 468.07 | 19.1023 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 9.7113 | 879.38 | 5.8265 |
| 475.06 | 17.2681 | 696.49 | 9.7181 | 880.51 | 11.6582 |
| 476.78 | 16.3264 | 696.51 | 9.7181 | 883.24 | 3.8901 |
| 477.60 | 15.3738 | 697.00 | 8.6402 | 884.68 | 4.8652 |
| 482.18 | 22.1628 | 697.49 | 9.7225 | 889.28 | 8.7726 |
| 487.02 | 13.5307 | 702.65 | 17.3254 | 894.76 | 7.8138 |
| 492.35 | 0.0000 | 706.68 | 10.8481 | 898.04 | 11.7351 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 11.7581 | 1312.11 | 3.8214 | | |
| 911.20 | 9.8271 | 1332.49 | 4.8029 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 7.9058 | 1365.19 | 1.9378 | | |
| 937.49 | 4.9607 | 1368.63 | 0.0000 | | |
| 944.13 | 12.9286 | 1384.29 | 4.8687 | | |
| 946.00 | 10.9470 | 1408.01 | 4.8985 | | |
| 949.00 | 8.9661 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 1.9855 | | |
| 962.31 | 8.0075 | 1489.16 | 7.9972 | | |
| 964.08 | 7.0110 | 1505.03 | 5.0174 | | |
| 966.17 | 11.0253 | 1596.21 | 1.0251 | | |
| 968.97 | 5.0164 | 1620.50 | 4.1233 | | |
| 983.53 | 8.0671 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 4.1882 | | |
| 996.26 | 12.1536 | 1750.46 | 0.0000 | | |
| 1001.03 | 11.1589 | 1764.49 | 6.3817 | | |
| 1004.73 | 7.1101 | 1770.23 | 4.2595 | | |
| 1021.30 | 0.0000 | 1771.35 | 3.1953 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.8784 | | |
| 1037.84 | 7.1891 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 0.9445 | | |
| 1046.59 | 11.3299 | | | | |
| 1048.07 | 9.2743 | | | | |
| 1049.04 | 5.1540 | | | | |
| 1050.41 | 7.2190 | | | | |
| 1063.66 | 8.2858 | | | | |
| 1077.00 | 8.3216 | | | | |
| 1077.34 | 8.3223 | | | | |
| 1085.87 | 8.3451 | | | | |
| 1099.45 | 10.4761 | | | | |
| 1112.07 | 8.4141 | | | | |
| 1112.84 | 6.8858 | | | | |
| 1115.54 | 1.8050 | | | | |
| 1120.29 | 7.2305 | | | | |
| 1120.55 | 6.3271 | | | | |
| 1121.30 | 7.3834 | | | | |
| 1129.67 | 1.0575 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.3577 | | | | |
| 1177.95 | 6.4382 | | | | |
| 1189.05 | 8.6123 | | | | |
| 1204.77 | 4.3260 | | | | |
| 1221.41 | 3.7259 | | | | |
| 1231.02 | 6.5383 | | | | |
| 1235.36 | 6.5464 | | | | |
| 1238.28 | 7.4880 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.7794 | | | | |
| 1274.44 | 2.8366 | | | | |
| 1274.54 | 2.8367 | | | | |
| 1291.59 | 6.6501 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:45:53.78

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147005.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM32.CNF;135
                                        Background date  : 2-FEB-2014 16:28:30.
Sample date      : 7-NOV-2013 11:50:00. Acquisition date : 7-FEB-2014 08:43:54.
Sample ID        : G341147005           Sample quantity  : 1.12630E+02 GRAM
Detector name    : GAM32                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.32  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.16* | 14 | 33 | 2.74 | 127.85 | 123 | 10 | 3.94E-03 | 85.7 | |
| 2 | 0 | 185.97* | 27 | 28 | 1.41 | 373.42 | 369 | 12 | 7.51E-03 | 48.9 | |
| 3 | 0 | 296.24* | 22 | 14 | 1.99 | 593.93 | 588 | 14 | 6.09E-03 | 44.7 | |
| 4 | 0 | 351.29* | 20 | 3 | 1.46 | 704.02 | 698 | 12 | 5.52E-03 | 34.6 | |
| 5 | 0 | 372.17 | 6 | 5 | 0.84 | 745.77 | 742 | 6 | 1.59E-03 | 78.1 | |
| 6 | 0 | 381.01 | 13 | 12 | 4.52 | 763.45 | 758 | 11 | 3.63E-03 | 60.6 | |
| 7 | 0 | 385.57 | 12 | 4 | 1.76 | 772.57 | 769 | 7 | 3.19E-03 | 40.0 | |
| 8 | 0 | 452.30 | 13 | 14 | 0.61 | 906.00 | 900 | 14 | 3.61E-03 | 67.1 | |
| 9 | 0 | 470.62 | 7 | 3 | 0.94 | 942.64 | 939 | 6 | 1.94E-03 | 54.4 | |
| 10 | 0 | 510.89* | 7 | 7 | 2.93 | 1023.17 | 1017 | 11 | 1.87E-03 | 172.2 | |
| 11 | 0 | 579.15 | 9 | 2 | 0.62 | 1159.68 | 1156 | 8 | 2.45E-03 | 43.9 | |
| 12 | 0 | 592.51 | 9 | 10 | 2.26 | 1186.39 | 1178 | 11 | 2.39E-03 | 81.6 | |
| 13 | 0 | 605.43 | 9 | 14 | 0.67 | 1212.24 | 1208 | 9 | 2.36E-03 | 85.1 | |
| 14 | 0 | 661.39* | 1 | 6 | 0.98 | 1324.13 | 1320 | 9 | 1.87E-04 | 837.9 | |
| 15 | 0 | 700.28 | 7 | 9 | 1.16 | 1401.90 | 1397 | 8 | 1.98E-03 | 84.2 | |
| 16 | 0 | 1030.27 | 10 | 0 | 3.35 | 2061.80 | 2057 | 9 | 2.78E-03 | 31.6 | |
| 17 | 0 | 1460.73* | 6 | 4 | 1.80 | 2922.61 | 2917 | 9 | 1.73E-03 | 80.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:45:55

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147005.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:50:00 | Acquisition date | : 7-FEB-2014 08:43:54 |
| Sample ID | : G341147005 | Sample quantity | : 112.63 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA32 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.32  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 6 | 10.66* | 1.141E+00 | 3.421E-01 | 3.421E-01 | 161.31 |
| BA-137M | 661.66 | 1 | 89.90* | 2.237E+00 | 2.235E-03 | 2.248E-03 | 1675.78 |
| CS-137 | 661.66 | 1 | 85.10* | 2.237E+00 | 2.361E-03 | 2.375E-03 | 1675.78 |
| BI-211 | 72.87 | ------ | 1.23 | 2.567E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 20 | 12.92* | 3.469E+00 | 2.956E-01 | 2.956E-01 | 69.16 |
| ANH-511 | 511.00 | 7 | 100.00* | 2.696E+00 | 1.664E-02 | 1.664E-02 | 344.37 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:45:56.04

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147005.CNF;1    *
* Acquisition date :  7-FEB-2014 08:43:54 Sensitivity     : 3.000          *
* Detector ID      : GAM32                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.32     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:50:00 Nuclide Library : SOLID          *
* Sample ID        : G341147005           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1263E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 23-AUG-2013 13:31:39 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_500MLMB.CNF;3       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 3.421E-01 | 5.409E-01 | 6.405E-01 |
| BA-137M | 2.248E-03 | 3.692E-02 | 6.031E-02 |
| CS-137 | 2.375E-03 | 3.901E-02 | 6.371E-02 |
| BI-211 | 2.956E-01 | 2.004E-01 | 3.160E-01 |
| ANH-511 | 1.664E-02 | 5.617E-02 | 5.193E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 4.254E-02 | 6.936E-01 | 1.365E+00 | NOT IDENT. |
| NA-22 | 1.112E-02 | 1.541E-02 | 5.161E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -6.667E-03 | 2.986E-02 | 6.360E-02 | NOT IDENT. |
| SC-46 | 1.106E-02 | 5.713E-02 | 1.231E-01 | NOT IDENT. |
| V-48 | -4.087E-03 | 1.237E+00 | 2.674E+00 | NOT IDENT. |
| CR-51 | 5.215E-02 | 2.167E+00 | 4.162E+00 | NOT IDENT. |
| MN-54 | -4.599E-03 | 3.644E-02 | 7.185E-02 | NOT IDENT. |
| CO-56 | 4.407E-02 | 8.008E-02 | 1.715E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.793E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -3.353E-02 | 3.062E-02 | 4.741E-02 | NOT IDENT. |
| CO-58 | -3.085E-02 | 7.991E-02 | 1.418E-01 | NOT IDENT. |
| FE-59 | 7.553E-02 | 1.933E-01 | 4.538E-01 | NOT IDENT. |
| CO-60 | 2.692E-02 | 3.351E-02 | 8.384E-02 | NOT IDENT. |
| ZN-65 | 1.364E-02 | 8.632E-02 | 1.816E-01 | NOT IDENT. |
| GE-68 | 8.316E-01 | 1.245E+00 | 2.906E+00 | NOT IDENT. |
| AS-73 | -1.830E+00 | 3.194E+00 | 5.522E+00 | NOT IDENT. |
| AS-74 | 4.929E-01 | 2.388E+00 | 4.020E+00 | NOT IDENT. |
| SE-75 | -4.032E-03 | 6.306E-02 | 1.189E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 5.190E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | 6.214E-01 | 2.108E+00 | 4.577E+00 | NOT IDENT. |
| RB-83 | 2.935E-03 | 9.740E-02 | 1.930E-01 | NOT IDENT. |
| KR-85 | 7.427E+00 | 8.448E+00 | 1.595E+01 | NOT IDENT. |
| SR-85 | 8.766E-02 | 1.003E-01 | 1.892E-01 | NOT IDENT. |
| RB-86 | 6.765E+00 | 1.099E+01 | 2.553E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | -6.281E-02 | 6.524E-02 | 9.295E-02 | NOT IDENT. |
| Y-91 | 2.465E+01 | 3.655E+01 | 8.740E+01 | NOT IDENT. |
| NB-94 | -1.370E-02 | 3.403E-02 | 5.325E-02 | NOT IDENT. |
| NB-95 | 2.168E-02 | 8.076E-02 | 1.693E-01 | NOT IDENT. |
| NB-95M | -1.729E-01 | 2.962E-01 | 5.209E-01 | NOT IDENT. |
| ZR-95 | 1.171E-01 | 1.058E-01 | 2.741E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 9.580E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.604E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.334E-02 | 3.039E-02 | 5.161E-02 | NOT IDENT. |
| RH-102 | 5.679E-03 | 4.500E-02 | 9.401E-02 | NOT IDENT. |
| RU-103 | 2.608E-02 | 1.663E-01 | 3.180E-01 | NOT IDENT. |
| RH-106 | -5.490E-02 | 3.613E-01 | 6.620E-01 | NOT IDENT. |
| RU-106 | -5.490E-02 | 3.613E-01 | 6.620E-01 | NOT IDENT. |
| AG-108M | -9.358E-03 | 2.889E-02 | 5.194E-02 | NOT IDENT. |
| CD-109 | 2.214E-01 | 8.596E-01 | 1.601E+00 | NOT IDENT. |
| AG-110M | -3.865E-02 | 4.075E-02 | 6.245E-02 | NOT IDENT. |
| SN-113 | 1.340E-02 | 5.844E-02 | 1.167E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.485E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.440E-01 | 2.582E+00 | 4.555E+00 | NOT IDENT. |
| TE-123M | 4.984E-03 | 4.064E-02 | 7.347E-02 | NOT IDENT. |
| SB-124 | -1.384E-01 | 1.914E-01 | 3.223E-01 | NOT IDENT. |
| SB-125 | 4.598E-02 | 7.316E-02 | 1.582E-01 | NOT IDENT. |
| TE-125M | 2.425E+01 | 2.323E+01 | 4.685E+01 | NOT IDENT. |
| I-126 | 3.165E+00 | 1.146E+01 | 2.198E+01 | NOT IDENT. |
| SB-126 | -7.357E+00 | 7.638E+00 | 1.234E+01 | NOT IDENT. |
| SN-126 | 3.266E-02 | 7.815E-02 | 1.474E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.097E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.551E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.743E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.089E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -4.152E-02 | 5.200E-02 | 7.271E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.595E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 8.356E-03 | 3.522E-02 | 7.484E-02 | FAIL ABUN |
| CS-135 | -3.019E-02 | 1.266E-01 | 2.350E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.547E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.862E+00 | 4.339E+00 | 7.424E+00 | NOT IDENT. |
| CE-139 | -3.246E-03 | 4.304E-02 | 7.542E-02 | NOT IDENT. |
| BA-140 | 5.831E-01 | 4.742E+00 | 1.104E+01 | NOT IDENT. |
| LA-140 | 5.831E-01 | 4.742E+00 | 1.104E+01 | NOT IDENT. |
| CE-141 | -8.109E-02 | 2.971E-01 | 5.121E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 7.331E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 3.822E-02 | 2.254E-01 | 4.111E-01 | NOT IDENT. |
| PM-144 | 1.113E-02 | 4.256E-02 | 7.758E-02 | NOT IDENT. |
| PR-144 | 9.016E-01 | 3.321E+00 | 6.065E+00 | NOT IDENT. |
| PM-146 | 1.026E-03 | 3.766E-02 | 7.257E-02 | NOT IDENT. |
| ND-147 | -7.011E+00 | 6.940E+01 | 1.292E+02 | NOT IDENT. |
| PM-147 | 8.622E+01 | 7.505E+02 | 1.367E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.320E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.036E-02 | 2.516E-02 | 4.500E-02 | NOT IDENT. |
| EU-152 | 1.778E-02 | 8.522E-02 | 1.632E-01 | NOT IDENT. |
| GD-153 | -3.184E-02 | 1.065E-01 | 1.858E-01 | NOT IDENT. |
| EU-154 | 3.029E-02 | 4.198E-02 | 1.406E-01 | NOT IDENT. |
| EU-155 | 7.086E-02 | 1.032E-01 | 2.016E-01 | NOT IDENT. |
| TB-160 | 2.647E-02 | 1.909E-01 | 4.165E-01 | NOT IDENT. |
| HO-166M | -3.041E-02 | 5.728E-02 | 1.038E-01 | NOT IDENT. |
| TM-171 | -3.520E+00 | 3.711E+01 | 6.901E+01 | NOT IDENT. |
| LU-176 | -4.977E-03 | 2.671E-02 | 4.914E-02 | NOT IDENT. |
| HF-181 | -3.612E-02 | 1.261E-01 | 2.310E-01 | NOT IDENT. |
| TA-182 | 1.898E-01 | 2.030E-01 | 5.127E-01 | NOT IDENT. |
| RE-183 | 2.183E-02 | 7.760E-01 | 1.295E+00 | NOT IDENT. |
| RE-184 | 4.093E-02 | 4.190E-01 | 8.893E-01 | NOT IDENT. |
| W-188 | 1.191E+01 | 1.516E+01 | 2.882E+01 | FAIL ABUN |
| IR-192 | -4.432E-02 | 6.015E-02 | 1.027E-01 | FAIL ABUN |
| HG-203 | 2.438E-02 | 1.214E-01 | 2.326E-01 | NOT IDENT. |
| BI-207 | -4.292E-03 | 4.395E-02 | 8.541E-02 | NOT IDENT. |
| TL-208 | -1.040E-02 | 3.374E-02 | 5.791E-02 | NOT IDENT. |
| PB-210 | 3.270E+00 | 1.116E+01 | 2.113E+01 | NOT IDENT. |
| PB-211 | -6.623E-02 | 6.186E-01 | 1.163E+00 | NOT IDENT. |
| BI-212 | -3.670E-01 | 3.737E-01 | 6.384E-01 | NOT IDENT. |
| PB-212 | 1.756E-02 | 6.390E-02 | 1.240E-01 | NOT IDENT. |
| BI-214 | 1.055E-02 | 7.818E-02 | 1.413E-01 | NOT IDENT. |
| PB-214 | 1.073E-01 | 7.273E-02 | 1.457E-01 | FAIL ABUN |
| RN-219 | -1.487E-01 | 3.071E-01 | 5.455E-01 | NOT IDENT. |
| RN-222 | 1.055E-02 | 7.818E-02 | 1.413E-01 | NOT IDENT. |
| RA-223 | -1.132E-01 | 5.936E-01 | 1.097E+00 | NOT IDENT. |
| RA-224 | -6.361E-01 | 6.111E-01 | 1.020E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 1.055E-02 | 7.818E-02 | 1.413E-01 | NOT IDENT. |
| AC-227 | -3.234E-02 | 2.083E-01 | 3.916E-01 | NOT IDENT. |
| TH-227 | -3.234E-02 | 2.083E-01 | 3.916E-01 | NOT IDENT. |
| AC-228 | 1.421E-02 | 1.291E-01 | 2.713E-01 | NOT IDENT. |
| RA-228 | 1.421E-02 | 1.291E-01 | 2.713E-01 | NOT IDENT. |
| TH-228 | 1.756E-02 | 6.390E-02 | 1.240E-01 | NOT IDENT. |
| TH-229 | -1.959E-01 | 4.219E-01 | 7.661E-01 | NOT IDENT. |
| TH-230 | 1.055E-02 | 7.817E-02 | 1.413E-01 | NOT IDENT. |
| PA-231 | 1.200E+00 | 1.303E+00 | 2.743E+00 | NOT IDENT. |
| TH-231 | -1.132E-01 | 5.936E-01 | 1.097E+00 | NOT IDENT. |
| TH-232 | 1.421E-02 | 1.291E-01 | 2.713E-01 | NOT IDENT. |
| PA-233 | 5.408E-02 | 6.276E-02 | 1.304E-01 | NOT IDENT. |
| PA-234 | 1.674E-01 | 2.833E-01 | 6.252E-01 | NOT IDENT. |
| PA-234M | 6.852E-01 | 3.746E+00 | 8.684E+00 | NOT IDENT. |
| TH-234 | 1.695E+00 | 2.847E+00 | 3.905E+00 | FAIL ABUN |
| U-234 | 1.055E-02 | 7.817E-02 | 1.413E-01 | NOT IDENT. |
| U-235 | -6.835E-02 | 1.886E-01 | 3.271E-01 | FAIL ABUN |
| NP-237 | 5.408E-02 | 6.276E-02 | 1.304E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.017E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.695E+00 | 2.847E+00 | 3.905E+00 | FAIL ABUN |
| NP-239 | -2.283E-02 | 3.826E-01 | 6.839E-01 | NOT IDENT. |
| PU-239 | -2.435E+01 | 2.909E+02 | 5.196E+02 | NOT IDENT. |
| AM-241 | 2.065E-02 | 2.545E-01 | 4.293E-01 | NOT IDENT. |
| AM-243 | 2.539E-02 | 6.042E-02 | 1.148E-01 | NOT IDENT. |
| CM-243 | -2.531E-02 | 9.984E-02 | 1.756E-01 | NOT IDENT. |
| CM-247 | -7.224E-03 | 2.827E-02 | 5.256E-02 | NOT IDENT. |
| CF-249 | 7.386E-03 | 3.460E-02 | 6.206E-02 | NOT IDENT. |
| CF-251 | -5.692E-02 | 1.168E-01 | 2.111E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:45:52.28

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.16 | 26 | 33 | 2.74 | 127.85 | 123 | 10 | 7.31E-03 | 45.0 | |
| 2 | 0 | 92.95 | 41 | 30 | 0.81 | 187.42 | 184 | 6 | 1.14E-02 | 26.2 | |
| 3 | 0 | 185.97 | 56 | 28 | 1.41 | 373.42 | 369 | 12 | 1.57E-02 | 22.8 | |
| 4 | 0 | 296.24 | 28 | 14 | 1.99 | 593.93 | 588 | 14 | 7.78E-03 | 34.1 | |
| 5 | 0 | 351.29 | 29 | 3 | 1.46 | 704.02 | 698 | 12 | 8.06E-03 | 22.1 | |
| 6 | 0 | 372.17 | 6 | 5 | 0.84 | 745.77 | 742 | 6 | 1.59E-03 | 78.1 | |
| 7 | 0 | 381.01 | 13 | 12 | 4.52 | 763.45 | 758 | 11 | 3.63E-03 | 60.6 | |
| 8 | 0 | 385.57 | 12 | 4 | 1.76 | 772.57 | 769 | 7 | 3.19E-03 | 40.0 | |
| 9 | 0 | 452.30 | 13 | 14 | 0.61 | 906.00 | 900 | 14 | 3.61E-03 | 67.1 | |
| 10 | 0 | 470.62 | 7 | 3 | 0.94 | 942.64 | 939 | 6 | 1.94E-03 | 54.4 | |
| 11 | 0 | 510.89 | 87 | 7 | 2.93 | 1023.17 | 1017 | 11 | 2.41E-02 | 12.5 | |
| 12 | 0 | 579.15 | 9 | 2 | 0.62 | 1159.68 | 1156 | 8 | 2.45E-03 | 43.9 | |
| 13 | 0 | 592.51 | 9 | 10 | 2.26 | 1186.39 | 1178 | 11 | 2.39E-03 | 81.6 | |
| 14 | 0 | 605.43 | 9 | 14 | 0.67 | 1212.24 | 1208 | 9 | 2.36E-03 | 85.1 | |
| 15 | 0 | 609.84 | 7 | 11 | 0.94 | 1221.03 | 1217 | 9 | 2.02E-03 | 90.4 | |
| 16 | 0 | 661.39 | 8 | 6 | 0.98 | 1324.13 | 1320 | 9 | 2.15E-03 | 69.7 | |
| 17 | 0 | 700.28 | 7 | 9 | 1.16 | 1401.90 | 1397 | 8 | 1.98E-03 | 84.2 | |
| 18 | 0 | 1030.27 | 10 | 0 | 3.35 | 2061.80 | 2057 | 9 | 2.78E-03 | 31.6 | |
| 19 | 0 | 1460.73 | 10 | 4 | 1.80 | 2922.61 | 2917 | 9 | 2.82E-03 | 48.4 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:45:54.28

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 6 | 10.66* | 1.141E+00 | 3.421E-01 | 3.421E-01 | 161.31 |
| BA-137M | 661.66 | 1 | 89.90* | 2.237E+00 | 2.235E-03 | 2.248E-03 | 1675.78 |
| CS-137 | 661.66 | 1 | 85.10* | 2.237E+00 | 2.361E-03 | 2.375E-03 | 1675.78 |
| BI-211 | 72.87 | ------ | 1.23 | 2.567E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 20 | 12.92* | 3.469E+00 | 2.956E-01 | 2.956E-01 | 69.16 |
| ANH-511 | 511.00 | 7 | 100.00* | 2.696E+00 | 1.664E-02 | 1.664E-02 | 344.37 |

Flag: "*" = Keyline

Sample ID : G341147005 Acquisition date : 7-FEB-2014 08:43:54

Total number of lines in spectrum 17
Number of unidentified lines 9
Number of lines tentatively identified by NID 8 47.06%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 3.421E-01 | 3.421E-01 | 5.519E-01 | 161.31 | |
| BA-137M | 30.08Y | 1.01 | 2.235E-03 | 2.248E-03 | 37.68E-03 | 1675.78 | |
| CS-137 | 30.08Y | 1.01 | 2.361E-03 | 2.375E-03 | 39.80E-03 | 1675.78 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.956E-01 | 2.956E-01 | 2.045E-01 | 69.16 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.664E-02 | 1.664E-02 | 5.731E-02 | 344.37 | |
| | Total Activity : | | 6.590E-01 | 6.590E-01 | | | |
| | Grand Total Activity : | | 6.590E-01 | 6.590E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147005 Acquisition date : 7-FEB-2014 08:43:54

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.16 | 14 | 33 | 2.74 | 127.85 | 123 | 10 | 3.94E-03 | **** | 1.51E+00 | T |
| 0 | 185.97 | 27 | 28 | 1.41 | 373.42 | 369 | 12 | 7.51E-03 | 97.8 | 5.12E+00 | T |
| 0 | 296.24 | 22 | 14 | 1.99 | 593.93 | 588 | 14 | 6.09E-03 | 89.4 | 3.88E+00 | T |
| 0 | 372.17 | 6 | 5 | 0.84 | 745.77 | 742 | 6 | 1.59E-03 | **** | 3.34E+00 | |
| 0 | 381.01 | 13 | 12 | 4.52 | 763.45 | 758 | 11 | 3.63E-03 | **** | 3.29E+00 | |
| 0 | 385.57 | 12 | 4 | 1.76 | 772.57 | 769 | 7 | 3.19E-03 | 79.9 | 3.26E+00 | |
| 0 | 452.30 | 13 | 14 | 0.61 | 906.00 | 900 | 14 | 3.61E-03 | **** | 2.93E+00 | |
| 0 | 470.62 | 7 | 3 | 0.94 | 942.64 | 939 | 6 | 1.94E-03 | **** | 2.85E+00 | |
| 0 | 579.15 | 9 | 2 | 0.62 | 1159.68 | 1156 | 8 | 2.45E-03 | 87.8 | 2.47E+00 | |
| 0 | 592.51 | 9 | 10 | 2.26 | 1186.39 | 1178 | 11 | 2.39E-03 | **** | 2.43E+00 | |
| 0 | 605.43 | 9 | 14 | 0.67 | 1212.24 | 1208 | 9 | 2.36E-03 | **** | 2.39E+00 | T |
| 0 | 700.28 | 7 | 9 | 1.16 | 1401.90 | 1397 | 8 | 1.98E-03 | **** | 2.14E+00 | |
| 0 | 1030.27 | 10 | 0 | 3.35 | 2061.80 | 2057 | 9 | 2.78E-03 | 63.2 | 1.55E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:46:06.40

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147005.CNF;1    *
* Acquisition date :  7-FEB-2014 08:43:54 Sensitivity     : 3.000          *
* Detector ID      : GAM32                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.32     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:50:00 Nuclide Library : SOLID          *
* Sample ID        : G341147005           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1263E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 23-AUG-2013 13:31:39 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_500MLMB.CNF;3       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 2.461E-01 |
| BA-137M | 2.565E-02 |
| CS-137 | 2.710E-02 |
| BI-211 | 1.379E-01 |
| ANH-511 | 2.263E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.814E-01 | NOT IDENT. |
| NA-22 | 1.829E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.253E-02 | NOT IDENT. |
| SC-46 | 5.063E-02 | NOT IDENT. |
| V-48 | 1.036E+00 | NOT IDENT. |
| CR-51 | 1.836E+00 | NOT IDENT. |
| MN-54 | 2.998E-02 | NOT IDENT. |
| CO-56 | 7.459E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.128E-02 | NOT IDENT. |
| CO-58 | 5.925E-02 | NOT IDENT. |
| FE-59 | 1.813E-01 | NOT IDENT. |
| CO-60 | 3.437E-02 | NOT IDENT. |
| ZN-65 | 7.480E-02 | NOT IDENT. |
| GE-68 | 1.216E+00 | NOT IDENT. |
| AS-73 | 2.447E+00 | NOT IDENT. |
| AS-74 | 1.783E+00 | NOT IDENT. |
| SE-75 | 5.323E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.915E+00 | NOT IDENT. |
| RB-83 | 8.078E-02 | NOT IDENT. |
| KR-85 | 7.193E+00 | NOT IDENT. |
| SR-85 | 8.530E-02 | NOT IDENT. |
| RB-86 | 1.063E+01 | NOT IDENT. |
| Y-88 | 2.938E-02 | NOT IDENT. |

| | | |
|---|---|---|
| Y-91 | 3.607E+01 | NOT IDENT. |
| NB-94 | 2.240E-02 | NOT IDENT. |
| NB-95 | 7.241E-02 | NOT IDENT. |
| NB-95M | 2.387E-01 | NOT IDENT. |
| ZR-95 | 1.148E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.329E-02 | NOT IDENT. |
| RH-102 | 3.973E-02 | NOT IDENT. |
| RU-103 | 1.408E-01 | NOT IDENT. |
| RH-106 | 2.851E-01 | NOT IDENT. |
| RU-106 | 2.851E-01 | NOT IDENT. |
| AG-108M | 2.267E-02 | NOT IDENT. |
| CD-109 | 7.315E-01 | NOT IDENT. |
| AG-110M | 2.219E-02 | NOT IDENT. |
| SN-113 | 5.088E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.071E+00 | NOT IDENT. |
| TE-123M | 3.338E-02 | NOT IDENT. |
| SB-124 | 1.076E-01 | NOT IDENT. |
| SB-125 | 6.853E-02 | NOT IDENT. |
| TE-125M | 2.148E+01 | NOT IDENT. |
| I-126 | 9.293E+00 | NOT IDENT. |
| SB-126 | 4.782E+00 | NOT IDENT. |
| SN-126 | 6.763E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.207E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.150E-02 | FAIL ABUN |
| CS-135 | 1.039E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.779E+00 | NOT IDENT. |
| CE-139 | 3.439E-02 | NOT IDENT. |
| BA-140 | 4.207E+00 | NOT IDENT. |
| LA-140 | 4.207E+00 | NOT IDENT. |
| CE-141 | 2.322E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.874E-01 | NOT IDENT. |
| PM-144 | 3.378E-02 | NOT IDENT. |
| PR-144 | 2.642E+00 | NOT IDENT. |
| PM-146 | 3.140E-02 | NOT IDENT. |
| ND-147 | 5.595E+01 | NOT IDENT. |
| PM-147 | 6.219E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.987E-02 | NOT IDENT. |
| EU-152 | 7.188E-02 | NOT IDENT. |
| GD-153 | 8.426E-02 | NOT IDENT. |
| EU-154 | 4.983E-02 | NOT IDENT. |
| EU-155 | 9.206E-02 | NOT IDENT. |
| TB-160 | 1.677E-01 | NOT IDENT. |
| HO-166M | 4.401E-02 | NOT IDENT. |
| TM-171 | 3.063E+01 | NOT IDENT. |
| LU-176 | 2.204E-02 | NOT IDENT. |
| HF-181 | 9.760E-02 | NOT IDENT. |
| TA-182 | 2.127E-01 | NOT IDENT. |
| RE-183 | 5.821E-01 | NOT IDENT. |
| RE-184 | 3.625E-01 | NOT IDENT. |
| W-188 | 1.299E+01 | FAIL ABUN |
| IR-192 | 4.441E-02 | FAIL ABUN |
| HG-203 | 1.056E-01 | NOT IDENT. |
| BI-207 | 3.465E-02 | NOT IDENT. |
| TL-208 | 2.464E-02 | NOT IDENT. |
| PB-210 | 9.605E+00 | NOT IDENT. |
| PB-211 | 5.063E-01 | NOT IDENT. |
| BI-212 | 2.542E-01 | NOT IDENT. |
| PB-212 | 5.736E-02 | NOT IDENT. |
| BI-214 | 6.233E-02 | NOT IDENT. |
| PB-214 | 6.554E-02 | FAIL ABUN |
| RN-219 | 2.298E-01 | NOT IDENT. |
| RN-222 | 6.233E-02 | NOT IDENT. |
| RA-223 | 4.868E-01 | NOT IDENT. |
| RA-224 | 4.605E-01 | NOT IDENT. |
| RA-226 | 6.233E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.736E-01 | NOT IDENT. |
| TH-227 | 1.736E-01 | NOT IDENT. |
| AC-228 | 1.154E-01 | NOT IDENT. |
| RA-228 | 1.154E-01 | NOT IDENT. |
| TH-228 | 5.736E-02 | NOT IDENT. |
| TH-229 | 3.425E-01 | NOT IDENT. |
| TH-230 | 6.232E-02 | NOT IDENT. |
| PA-231 | 1.239E+00 | NOT IDENT. |
| TH-231 | 4.868E-01 | NOT IDENT. |
| TH-232 | 1.154E-01 | NOT IDENT. |
| PA-233 | 5.898E-02 | NOT IDENT. |
| PA-234 | 2.677E-01 | NOT IDENT. |
| PA-234M | 3.669E+00 | NOT IDENT. |
| TH-234 | 1.793E+00 | FAIL ABUN |
| U-234 | 6.232E-02 | NOT IDENT. |
| U-235 | 1.488E-01 | FAIL ABUN |
| NP-237 | 5.898E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.793E+00 | FAIL ABUN |
| NP-239 | 3.103E-01 | NOT IDENT. |
| PU-239 | 2.341E+02 | NOT IDENT. |
| AM-241 | 1.927E-01 | NOT IDENT. |
| AM-243 | 5.258E-02 | NOT IDENT. |
| CM-243 | 7.911E-02 | NOT IDENT. |
| CM-247 | 2.234E-02 | NOT IDENT. |
| CF-249 | 2.683E-02 | NOT IDENT. |
| CF-251 | 9.564E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:46:11.07

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147005.CNF;1    *
* Acquisition date :  7-FEB-2014 08:43:54 Sensitivity     : 3.000            *
* Detector ID      : GAM32                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.32     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 11:50:00 Nuclide Library : SOLID            *
* Sample ID        : G341147005           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.1263E+02 GRAM  *
*                                         Quantity Err(%) : 1.7757E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 23-AUG-2013 13:31:39 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_500MLMB.CNF;3          *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 3.421E-01 | 5.417E-01 | 5.417E-01 |
| BA-137M | 2.248E-03 | 3.692E-02 | 3.692E-02 |
| CS-137 | 2.375E-03 | 3.901E-02 | 3.901E-02 |
| BI-211 | 2.956E-01 | 2.019E-01 | 2.019E-01 |
| ANH-511 | 1.664E-02 | 5.618E-02 | 5.618E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 4.254E-02 | 6.936E-01 | 6.939E-01 | NOT IDENT. |
| NA-22 | 1.112E-02 | 1.543E-02 | 1.623E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.508E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -6.667E-03 | 2.986E-02 | 3.001E-02 | NOT IDENT. |
| SC-46 | 1.106E-02 | 5.715E-02 | 5.737E-02 | NOT IDENT. |
| V-48 | -4.087E-03 | 1.237E+00 | 1.237E+00 | NOT IDENT. |
| CR-51 | 5.215E-02 | 2.167E+00 | 2.167E+00 | NOT IDENT. |
| MN-54 | -4.599E-03 | 3.645E-02 | 3.651E-02 | NOT IDENT. |
| CO-56 | 4.407E-02 | 8.026E-02 | 8.268E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.797E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -3.353E-02 | 3.078E-02 | 3.430E-02 | NOT IDENT. |
| CO-58 | -3.085E-02 | 7.999E-02 | 8.119E-02 | NOT IDENT. |
| FE-59 | 7.553E-02 | 1.937E-01 | 1.967E-01 | NOT IDENT. |
| CO-60 | 2.692E-02 | 3.358E-02 | 3.571E-02 | NOT IDENT. |
| ZN-65 | 1.364E-02 | 8.635E-02 | 8.657E-02 | NOT IDENT. |
| GE-68 | 8.316E-01 | 1.252E+00 | 1.307E+00 | NOT IDENT. |
| AS-73 | -1.830E+00 | 3.219E+00 | 3.323E+00 | NOT IDENT. |
| AS-74 | 4.929E-01 | 2.389E+00 | 2.399E+00 | NOT IDENT. |
| SE-75 | -4.032E-03 | 6.306E-02 | 6.308E-02 | NOT IDENT. |
| BR-77 | 2.824E+09 | 5.244E+10 | 5.246E+10 | SHORT HLIF |
| SR-82 | 6.214E-01 | 2.109E+00 | 2.128E+00 | NOT IDENT. |
| RB-83 | 2.935E-03 | 9.740E-02 | 9.741E-02 | NOT IDENT. |
| KR-85 | 7.427E+00 | 8.471E+00 | 9.109E+00 | NOT IDENT. |
| SR-85 | 8.766E-02 | 1.005E-01 | 1.080E-01 | NOT IDENT. |
| RB-86 | 6.765E+00 | 1.104E+01 | 1.145E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | -6.281E-02 | 6.543E-02 | 7.129E-02 | NOT IDENT. |
| Y-91 | 2.465E+01 | 3.662E+01 | 3.827E+01 | NOT IDENT. |
| NB-94 | -1.370E-02 | 3.405E-02 | 3.461E-02 | NOT IDENT. |
| NB-95 | 2.168E-02 | 8.080E-02 | 8.138E-02 | NOT IDENT. |
| NB-95M | -1.729E-01 | 2.968E-01 | 3.069E-01 | NOT IDENT. |
| ZR-95 | 1.171E-01 | 1.065E-01 | 1.188E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 2.414E+42 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.014E+39 | 9.617E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | -6.064E+08 | 2.605E+09 | 2.619E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 8.235E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.334E-02 | 3.050E-02 | 3.109E-02 | NOT IDENT. |
| RH-102 | 5.679E-03 | 4.500E-02 | 4.508E-02 | NOT IDENT. |
| RU-103 | 2.608E-02 | 1.663E-01 | 1.667E-01 | NOT IDENT. |
| RH-106 | -5.490E-02 | 3.613E-01 | 3.621E-01 | NOT IDENT. |
| RU-106 | -5.490E-02 | 3.613E-01 | 3.621E-01 | NOT IDENT. |
| AG-108M | -9.358E-03 | 2.890E-02 | 2.921E-02 | NOT IDENT. |
| CD-109 | 2.214E-01 | 8.600E-01 | 8.657E-01 | NOT IDENT. |
| AG-110M | -3.865E-02 | 4.109E-02 | 4.463E-02 | NOT IDENT. |
| SN-113 | 1.340E-02 | 5.845E-02 | 5.877E-02 | NOT IDENT. |
| CD-115 | 1.238E+11 | 2.489E+11 | 2.551E+11 | SHORT HLIF |
| SN-117M | -1.440E-01 | 2.582E+00 | 2.582E+00 | NOT IDENT. |
| TE-123M | 4.984E-03 | 4.064E-02 | 4.070E-02 | NOT IDENT. |
| SB-124 | -1.384E-01 | 1.918E-01 | 2.017E-01 | NOT IDENT. |
| SB-125 | 4.598E-02 | 7.326E-02 | 7.613E-02 | NOT IDENT. |
| TE-125M | 2.425E+01 | 2.335E+01 | 2.578E+01 | NOT IDENT. |
| I-126 | 3.165E+00 | 1.147E+01 | 1.155E+01 | NOT IDENT. |
| SB-126 | -7.357E+00 | 7.703E+00 | 8.387E+00 | NOT IDENT. |
| SN-126 | 3.266E-02 | 7.823E-02 | 7.960E-02 | FAIL ABUN |
| SB-127 | -1.037E+04 | 1.097E+06 | 1.098E+06 | SHORT HLIF |
| I-131 | 1.299E+01 | 8.552E+01 | 8.572E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 5.927E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.631E+05 | 1.089E+07 | 1.089E+07 | SHORT HLIF |
| BA-133 | -4.152E-02 | 5.210E-02 | 5.536E-02 | NOT IDENT. |
| I-133 | 1.923E+29 | 2.598E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 8.356E-03 | 3.523E-02 | 3.544E-02 | FAIL ABUN |
| CS-135 | -3.019E-02 | 1.266E-01 | 1.273E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.591E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.862E+00 | 4.366E+00 | 4.553E+00 | NOT IDENT. |
| CE-139 | -3.246E-03 | 4.305E-02 | 4.307E-02 | NOT IDENT. |
| BA-140 | 5.831E-01 | 4.742E+00 | 4.750E+00 | NOT IDENT. |
| LA-140 | 5.831E-01 | 4.742E+00 | 4.750E+00 | NOT IDENT. |
| CE-141 | -8.109E-02 | 2.972E-01 | 2.995E-01 | NOT IDENT. |
| CE-143 | 3.197E+18 | 7.335E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 3.822E-02 | 2.254E-01 | 2.261E-01 | NOT IDENT. |
| PM-144 | 1.113E-02 | 4.257E-02 | 4.286E-02 | NOT IDENT. |
| PR-144 | 9.016E-01 | 3.322E+00 | 3.347E+00 | NOT IDENT. |
| PM-146 | 1.026E-03 | 3.766E-02 | 3.766E-02 | NOT IDENT. |
| ND-147 | -7.011E+00 | 6.940E+01 | 6.947E+01 | NOT IDENT. |
| PM-147 | 8.622E+01 | 7.506E+02 | 7.516E+02 | NOT IDENT. |
| PM-149 | -7.520E+11 | 2.323E+12 | 2.348E+12 | SHORT HLIF |
| EU-150 | -1.036E-02 | 2.517E-02 | 2.560E-02 | NOT IDENT. |
| EU-152 | 1.778E-02 | 8.523E-02 | 8.561E-02 | NOT IDENT. |
| GD-153 | -3.184E-02 | 1.065E-01 | 1.075E-01 | NOT IDENT. |
| EU-154 | 3.029E-02 | 4.206E-02 | 4.422E-02 | NOT IDENT. |
| EU-155 | 7.086E-02 | 1.035E-01 | 1.083E-01 | NOT IDENT. |
| TB-160 | 2.647E-02 | 1.910E-01 | 1.913E-01 | NOT IDENT. |
| HO-166M | -3.041E-02 | 5.735E-02 | 5.897E-02 | NOT IDENT. |
| TM-171 | -3.520E+00 | 3.711E+01 | 3.714E+01 | NOT IDENT. |
| LU-176 | -4.977E-03 | 2.672E-02 | 2.681E-02 | NOT IDENT. |
| HF-181 | -3.612E-02 | 1.261E-01 | 1.271E-01 | NOT IDENT. |
| TA-182 | 1.898E-01 | 2.036E-01 | 2.209E-01 | NOT IDENT. |
| RE-183 | 2.183E-02 | 7.760E-01 | 7.761E-01 | NOT IDENT. |
| RE-184 | 4.093E-02 | 4.191E-01 | 4.195E-01 | NOT IDENT. |
| W-188 | 1.191E+01 | 1.524E+01 | 1.616E+01 | FAIL ABUN |
| IR-192 | -4.432E-02 | 6.025E-02 | 6.348E-02 | FAIL ABUN |
| HG-203 | 2.438E-02 | 1.215E-01 | 1.220E-01 | NOT IDENT. |
| BI-207 | -4.292E-03 | 4.396E-02 | 4.400E-02 | NOT IDENT. |
| TL-208 | -1.040E-02 | 3.375E-02 | 3.408E-02 | NOT IDENT. |
| PB-210 | 3.270E+00 | 1.117E+01 | 1.127E+01 | NOT IDENT. |
| PB-211 | -6.623E-02 | 6.187E-01 | 6.194E-01 | NOT IDENT. |
| BI-212 | -3.670E-01 | 3.754E-01 | 4.102E-01 | NOT IDENT. |
| PB-212 | 1.756E-02 | 6.392E-02 | 6.441E-02 | NOT IDENT. |
| BI-214 | 1.055E-02 | 7.819E-02 | 7.833E-02 | NOT IDENT. |
| PB-214 | 1.073E-01 | 7.324E-02 | 8.778E-02 | FAIL ABUN |
| RN-219 | -1.487E-01 | 3.079E-01 | 3.151E-01 | NOT IDENT. |
| RN-222 | 1.055E-02 | 7.819E-02 | 7.833E-02 | NOT IDENT. |
| RA-223 | -1.132E-01 | 5.937E-01 | 5.959E-01 | NOT IDENT. |
| RA-224 | -6.361E-01 | 6.137E-01 | 6.774E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 1.055E-02 | 7.819E-02 | 7.833E-02 | NOT IDENT. |
| AC-227 | -3.234E-02 | 2.084E-01 | 2.089E-01 | NOT IDENT. |
| TH-227 | -3.234E-02 | 2.084E-01 | 2.089E-01 | NOT IDENT. |
| AC-228 | 1.421E-02 | 1.292E-01 | 1.293E-01 | NOT IDENT. |
| RA-228 | 1.421E-02 | 1.292E-01 | 1.293E-01 | NOT IDENT. |
| TH-228 | 1.756E-02 | 6.392E-02 | 6.441E-02 | NOT IDENT. |
| TH-229 | -1.959E-01 | 4.223E-01 | 4.314E-01 | NOT IDENT. |
| TH-230 | 1.055E-02 | 7.818E-02 | 7.832E-02 | NOT IDENT. |
| PA-231 | 1.200E+00 | 1.307E+00 | 1.414E+00 | NOT IDENT. |
| TH-231 | -1.132E-01 | 5.937E-01 | 5.959E-01 | NOT IDENT. |
| TH-232 | 1.421E-02 | 1.292E-01 | 1.293E-01 | NOT IDENT. |
| PA-233 | 5.408E-02 | 6.291E-02 | 6.747E-02 | NOT IDENT. |
| PA-234 | 1.674E-01 | 3.427E-01 | 3.509E-01 | NOT IDENT. |
| PA-234M | 6.852E-01 | 3.748E+00 | 3.760E+00 | NOT IDENT. |
| TH-234 | 1.695E+00 | 2.875E+00 | 2.975E+00 | FAIL ABUN |
| U-234 | 1.055E-02 | 7.818E-02 | 7.832E-02 | NOT IDENT. |
| U-235 | -6.835E-02 | 1.887E-01 | 1.912E-01 | FAIL ABUN |
| NP-237 | 5.408E-02 | 6.291E-02 | 6.747E-02 | NOT IDENT. |
| NP-238 | -3.540E+09 | 1.017E+12 | 1.017E+12 | SHORT HLIF |
| U-238 | 1.695E+00 | 2.875E+00 | 2.975E+00 | FAIL ABUN |
| NP-239 | -2.283E-02 | 3.826E-01 | 3.827E-01 | NOT IDENT. |
| PU-239 | -2.435E+01 | 2.909E+02 | 2.911E+02 | NOT IDENT. |
| AM-241 | 2.065E-02 | 2.545E-01 | 2.547E-01 | NOT IDENT. |
| AM-243 | 2.539E-02 | 6.048E-02 | 6.155E-02 | NOT IDENT. |
| CM-243 | -2.531E-02 | 9.989E-02 | 1.005E-01 | NOT IDENT. |
| CM-247 | -7.224E-03 | 2.830E-02 | 2.848E-02 | NOT IDENT. |
| CF-249 | 7.386E-03 | 3.461E-02 | 3.477E-02 | NOT IDENT. |
| CF-251 | -5.692E-02 | 1.171E-01 | 1.199E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 28.7498 | 94.67 | 67.8982 | 193.51 | 30.4229 |
| 45.60 | 31.8607 | 94.87 | 67.9161 | 197.03 | 34.1009 |
| 46.54 | 24.9389 | 97.43 | 36.7754 | 198.01 | 26.9435 |
| 49.72 | 0.0000 | 98.43 | 37.9058 | 201.83 | 39.6400 |
| 51.35 | 25.1760 | 98.44 | 37.9063 | 205.31 | 33.4268 |
| 52.39 | 22.1987 | 99.53 | 24.9446 | 210.85 | 29.9443 |
| 53.44 | 28.3086 | 100.11 | 21.7071 | 215.65 | 30.0566 |
| 57.36 | 0.0000 | 103.18 | 32.6865 | 222.11 | 34.7822 |
| 57.53 | 26.8910 | 103.37 | 31.6044 | 227.09 | 26.6439 |
| 57.98 | 25.9949 | 105.21 | 26.2150 | 227.38 | 22.9738 |
| 59.32 | 24.5237 | 105.31 | 26.2183 | 228.16 | 0.0000 |
| 59.54 | 24.5332 | 106.12 | 32.8053 | 228.18 | 33.1021 |
| 63.29 | 31.8933 | 109.28 | 24.1497 | 117.23 | 33.1021 |
| 63.58 | 31.9088 | 111.00 | 30.7992 | 235.69 | 50.8529 |
| 64.28 | 34.0073 | 111.76 | 0.0000 | 235.96 | 50.8630 |
| 66.73 | 34.1451 | 116.30 | 0.0000 | 238.63 | 32.4301 |
| 67.24 | 32.6201 | 117.23 | 33.2404 | 238.98 | 0.0000 |
| 67.75 | 32.6470 | 121.12 | 30.0490 | 240.99 | 46.4077 |
| 69.67 | 32.2280 | 121.22 | 32.2785 | 242.00 | 50.1566 |
| 70.83 | 34.3701 | 121.78 | 40.0952 | 244.70 | 26.0571 |
| 72.81 | 40.7448 | 122.06 | 44.5642 | 252.40 | 0.0000 |
| 72.87 | 40.7486 | 123.07 | 39.0377 | 252.80 | 23.3982 |
| 74.66 | 32.4790 | 127.23 | 35.8556 | 254.15 | 0.0000 |
| 74.82 | 32.4869 | 129.30 | 29.1982 | 256.23 | 22.5157 |
| 74.97 | 38.7835 | 131.20 | 27.0073 | 260.90 | 0.0000 |
| 77.11 | 43.1152 | 133.02 | 39.4622 | 264.66 | 25.4761 |
| 79.69 | 28.5013 | 133.52 | 32.7144 | 268.22 | 22.6992 |
| 80.12 | 36.9694 | 136.00 | 30.5379 | 269.46 | 21.7717 |
| 80.19 | 0.0000 | 136.47 | 33.9474 | 271.23 | 26.5358 |
| 80.57 | 34.8797 | 140.51 | 0.0000 | 273.65 | 34.1719 |
| 81.00 | 31.7287 | 143.76 | 30.7820 | 276.40 | 29.4788 |
| 81.07 | 31.7319 | 144.24 | 23.9533 | 277.37 | 24.7400 |
| 83.79 | 30.7939 | 145.44 | 36.5443 | 277.60 | 25.6952 |
| 85.43 | 38.3154 | 152.43 | 43.6963 | 278.00 | 23.7984 |
| 86.55 | 28.7816 | 153.25 | 42.5803 | 279.20 | 29.5327 |
| 86.79 | 29.8574 | 323.87 | 35.7085 | 279.54 | 32.3979 |
| 86.94 | 25.5974 | 156.02 | 31.1550 | 280.46 | 37.1844 |
| 87.09 | 25.6028 | 158.56 | 34.7006 | 283.69 | 17.1980 |
| 87.57 | 34.1597 | 159.00 | 31.2435 | 284.31 | 0.0000 |
| 88.03 | 33.1131 | 162.33 | 38.3060 | 285.41 | 20.0864 |
| 88.34 | 36.3332 | 163.33 | 31.3704 | 285.90 | 0.0000 |
| 88.47 | 39.5460 | 165.86 | 37.2669 | 287.50 | 24.9019 |
| 89.96 | 81.3952 | 176.31 | 36.1500 | 290.67 | 16.8907 |
| 91.11 | 47.1969 | 176.60 | 36.1590 | 293.27 | 0.0000 |
| 92.59 | 31.1687 | 177.52 | 38.8364 | 351.93 | 27.9110 |
| 93.35 | 38.7314 | 181.07 | 0.0000 | 295.96 | 27.9238 |
| 94.56 | 35.5605 | 184.41 | 31.2555 | 879.38 | 20.0608 |
| 94.65 | 67.8962 | 143.76 | 31.1129 | 299.98 | 13.9003 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 13.9012 | 487.02 | 12.7623 | 702.65 | 13.8640 |
| 300.13 | 18.5355 | 492.35 | 0.0000 | 706.68 | 12.0317 |
| 301.36 | 29.3702 | 497.08 | 18.1595 | 711.68 | 15.7603 |
| 302.85 | 29.3971 | 505.52 | 12.0077 | 720.70 | 11.1583 |
| 256.23 | 18.3918 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 28.1110 | 511.00 | 15.4746 | 722.78 | 4.6526 |
| 308.46 | 37.8431 | 514.00 | 15.4942 | 722.91 | 4.6527 |
| 311.90 | 18.4747 | 514.00 | 15.4942 | 723.31 | 3.7227 |
| 316.51 | 22.4258 | 520.40 | 8.6311 | 724.19 | 3.7237 |
| 319.41 | 14.6507 | 520.69 | 0.0000 | 727.33 | 10.2510 |
| 320.08 | 18.5651 | 522.65 | 0.0000 | 733.00 | 10.2701 |
| 321.04 | 18.5756 | 527.90 | 0.0000 | 735.93 | 10.2800 |
| 323.87 | 23.5031 | 529.59 | 11.9134 | 333.97 | 11.2201 |
| 325.23 | 18.6214 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 16.6955 | 531.02 | 15.1715 | 747.24 | 7.5037 |
| 333.37 | 25.6025 | 546.56 | 0.0000 | 748.06 | 7.5057 |
| 333.97 | 24.6262 | 552.55 | 5.4663 | 752.31 | 7.5160 |
| 334.37 | 19.7055 | 563.25 | 7.6855 | 753.82 | 7.5197 |
| 338.28 | 15.7998 | 569.33 | 7.7041 | 756.73 | 1.8817 |
| 338.32 | 15.8000 | 946.00 | 8.8052 | 756.80 | 2.8225 |
| 311.90 | 25.7068 | 569.70 | 8.8059 | 884.68 | 6.6010 |
| 340.48 | 25.7068 | 583.19 | 8.8525 | 765.81 | 9.4355 |
| 340.55 | 23.7301 | 584.27 | 8.8562 | 766.42 | 10.3813 |
| 344.28 | 15.8535 | 595.83 | 17.7910 | 766.84 | 10.3826 |
| 345.93 | 7.9341 | 427.87 | 24.9525 | 772.60 | 0.0000 |
| 351.06 | 15.9136 | 602.52 | 0.0000 | 776.52 | 6.6273 |
| 351.93 | 15.9214 | 602.73 | 17.8379 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 17.8511 | 778.90 | 6.6322 |
| 356.01 | 31.9146 | 609.32 | 8.9409 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 10.7332 | 785.37 | 7.5949 |
| 366.42 | 0.0000 | 614.28 | 16.7953 | 792.07 | 9.5134 |
| 375.05 | 4.0305 | 618.01 | 17.9399 | 794.95 | 8.5698 |
| 356.01 | 4.0492 | 620.36 | 14.5889 | 795.86 | 7.6196 |
| 388.16 | 11.3632 | 621.93 | 14.5976 | 810.29 | 13.3933 |
| 388.63 | 14.6134 | 630.19 | 0.0000 | 344.28 | 13.3940 |
| 391.69 | 13.2134 | 631.29 | 9.0139 | 810.76 | 11.4817 |
| 264.66 | 14.2950 | 633.25 | 9.9226 | 815.77 | 7.6660 |
| 401.81 | 14.3033 | 634.78 | 9.0254 | 1048.07 | 9.5906 |
| 402.40 | 13.2856 | 635.95 | 8.1264 | 832.01 | 7.7035 |
| 404.85 | 16.3718 | 636.99 | 0.0000 | 834.85 | 9.6375 |
| 410.95 | 20.5270 | 645.85 | 15.4050 | 835.71 | 10.6039 |
| 413.71 | 15.4166 | 657.76 | 10.6171 | 836.80 | 0.0000 |
| 414.70 | 19.5372 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 15.5177 | 661.66 | 10.9354 | 846.77 | 9.6716 |
| 427.87 | 8.2792 | 664.57 | 0.0000 | 856.80 | 8.7300 |
| 433.94 | 19.7207 | 666.33 | 7.6066 | 860.56 | 4.8553 |
| 439.40 | 24.9752 | 666.50 | 9.1284 | 871.09 | 6.8182 |
| 453.88 | 13.6203 | 667.71 | 0.0000 | 873.19 | 5.8477 |
| 463.37 | 14.7321 | 677.62 | 11.9130 | 875.33 | 0.0000 |
| 468.07 | 10.1237 | 685.70 | 0.0000 | 879.38 | 4.8817 |
| 473.00 | 0.0000 | 695.00 | 10.7552 | 880.51 | 2.9300 |
| 475.06 | 5.6420 | 696.49 | 12.2979 | 883.24 | 4.8871 |
| 476.78 | 13.7631 | 696.51 | 12.2979 | 884.68 | 7.8225 |
| 477.60 | 10.5908 | 697.00 | 9.2251 | 889.28 | 5.8746 |
| 482.18 | 12.7350 | 697.49 | 12.3021 | 894.76 | 7.8449 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 11.7782 | 1298.22 | 0.0000 | | |
| 903.28 | 5.8978 | 1312.11 | 6.5101 | | |
| 911.20 | 6.8959 | 1332.49 | 2.1793 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 7.9145 | 1365.19 | 2.1940 | | |
| 937.49 | 10.9151 | 1368.63 | 0.0000 | | |
| 944.13 | 8.9468 | 1384.29 | 7.3418 | | |
| 946.00 | 6.9621 | 1408.01 | 5.5327 | | |
| 949.00 | 9.9539 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 3.7269 | | |
| 962.31 | 1.9979 | 1489.16 | 1.8736 | | |
| 964.08 | 4.9971 | 1505.03 | 4.6983 | | |
| 966.17 | 4.9999 | 1596.21 | 2.8668 | | |
| 968.97 | 5.0037 | 1620.50 | 2.8794 | | |
| 983.53 | 4.0184 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 4.8586 | | |
| 1274.44 | 13.1031 | 1750.46 | 0.0000 | | |
| 1001.03 | 2.0184 | 1764.49 | 0.0000 | | |
| 1004.73 | 11.1115 | 1063.66 | 4.9243 | | |
| 507.63 | 0.0000 | 1771.35 | 1.9701 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.9734 | | |
| 1037.84 | 7.1309 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.9734 | | |
| 631.29 | 6.1257 | | | | |
| 1048.07 | 7.1494 | | | | |
| 1049.04 | 5.1079 | | | | |
| 1050.41 | 3.0658 | | | | |
| 1063.66 | 5.1265 | | | | |
| 1077.00 | 4.1146 | | | | |
| 1077.34 | 4.1150 | | | | |
| 1085.87 | 5.1545 | | | | |
| 1099.45 | 3.1030 | | | | |
| 1112.07 | 6.2247 | | | | |
| 1112.84 | 10.3765 | | | | |
| 1115.54 | 6.2300 | | | | |
| 1120.29 | 6.2370 | | | | |
| 1120.55 | 7.2769 | | | | |
| 1221.41 | 6.2385 | | | | |
| 1129.67 | 4.1672 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.3146 | | | | |
| 1177.95 | 6.3214 | | | | |
| 1189.05 | 7.3937 | | | | |
| 1204.77 | 3.1800 | | | | |
| 1221.41 | 2.1279 | | | | |
| 1231.02 | 4.2648 | | | | |
| 1235.36 | 4.2689 | | | | |
| 1238.28 | 6.4075 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.2273 | | | | |
| 1274.44 | 0.0000 | | | | |
| 1274.54 | 0.0000 | | | | |
| 1291.59 | 4.3213 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:46:37.91

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147006.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM36.CNF;156
                                        Background date  : 2-FEB-2014 16:28:43.
Sample date      : 7-NOV-2013 11:55:00. Acquisition date : 7-FEB-2014 08:44:15.
Sample ID        : G341147006           Sample quantity  : 1.43510E+02 GRAM
Detector name    : GAM36                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.18  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 63.93* | 2 | 18 | 1.45 | 128.08 | 125 | 13 | 6.23E-04 | 388.5 | 1.21E+00 |
| 2 | 4 | 67.10* | 8 | 18 | 1.46 | 134.43 | 125 | 13 | 2.15E-03 | 104.6 | |
| 3 | 0 | 114.55 | 12 | 34 | 0.65 | 229.35 | 223 | 12 | 3.41E-03 | 98.0 | |
| 4 | 0 | 136.91 | 18 | 11 | 1.51 | 274.07 | 270 | 8 | 5.07E-03 | 39.9 | |
| 5 | 0 | 183.98 | 10 | 19 | 0.98 | 368.24 | 365 | 6 | 2.73E-03 | 77.7 | |
| 6 | 0 | 238.51* | 11 | 14 | 1.45 | 477.33 | 473 | 8 | 3.10E-03 | 79.2 | |
| 7 | 0 | 284.66 | 7 | 1 | 0.89 | 569.65 | 567 | 5 | 1.89E-03 | 45.4 | |
| 8 | 0 | 294.97* | 24 | 11 | 4.49 | 590.29 | 584 | 14 | 6.54E-03 | 37.6 | |
| 9 | 0 | 306.19 | 14 | 11 | 1.40 | 612.73 | 607 | 9 | 3.89E-03 | 50.6 | |
| 10 | 0 | 325.02 | 11 | 11 | 1.83 | 650.40 | 644 | 9 | 3.10E-03 | 61.6 | |
| 11 | 0 | 330.65 | 12 | 12 | 1.00 | 661.67 | 656 | 12 | 3.33E-03 | 64.5 | |
| 12 | 0 | 344.04 | 9 | 18 | 3.47 | 688.45 | 683 | 13 | 2.61E-03 | 101.1 | |
| 13 | 0 | 365.23 | 18 | 3 | 3.75 | 730.85 | 725 | 12 | 5.08E-03 | 30.0 | |
| 14 | 0 | 511.07* | 12 | 3 | 2.03 | 1022.61 | 1017 | 12 | 3.27E-03 | 78.3 | |
| 15 | 0 | 612.51 | 9 | 0 | 0.83 | 1225.56 | 1223 | 6 | 2.50E-03 | 33.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:46:39

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147006.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:55:00 | Acquisition date | : 7-FEB-2014 08:44:15 |
| Sample ID | : G341147006 | Sample quantity | : 143.51 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA36 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.18  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| ANH-511 | 511.00 | 12 | 100.00* | 1.633E+00 | 3.776E-02 | 3.776E-02 | 156.68 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:46:40.09

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147006.CNF;1    *
* Acquisition date :  7-FEB-2014 08:44:15 Sensitivity     : 3.000          *
* Detector ID      : GAM36                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 11:55:00 Nuclide Library : SOLID          *
* Sample ID        : G341147006           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.4351E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-AUG-2013 07:02:15 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM36_500MLMB.CNF;4       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| ANH-511 | 3.776E-02 | 5.798E-02 | 5.153E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.289E-01 | 5.715E-01 | 1.351E+00 | NOT IDENT. |
| NA-22 | -2.379E-03 | 3.696E-02 | 8.150E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.351E-02 | 4.874E-02 | 1.309E-01 | NOT IDENT. |
| K-40 | 1.123E-01 | 6.072E-01 | 1.344E+00 | NOT IDENT. |
| SC-46 | 7.661E-03 | 6.830E-02 | 1.470E-01 | NOT IDENT. |
| V-48 | 4.084E-01 | 1.950E+00 | 4.367E+00 | NOT IDENT. |
| CR-51 | -8.024E-02 | 2.626E+00 | 4.399E+00 | NOT IDENT. |
| MN-54 | 8.009E-03 | 4.796E-02 | 9.816E-02 | NOT IDENT. |
| CO-56 | 2.089E-03 | 8.190E-02 | 1.672E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 4.641E-03 | 2.562E-02 | 4.770E-02 | FAIL ABUN |
| CO-58 | -3.804E-02 | 5.421E-02 | 8.756E-02 | NOT IDENT. |
| FE-59 | -7.394E-03 | 3.582E-01 | 7.321E-01 | NOT IDENT. |
| CO-60 | -1.420E-02 | 3.254E-02 | 6.289E-02 | NOT IDENT. |
| ZN-65 | -4.174E-02 | 8.603E-02 | 1.626E-01 | NOT IDENT. |
| GE-68 | 5.372E-01 | 1.499E+00 | 3.473E+00 | NOT IDENT. |
| AS-73 | 1.061E-01 | 1.237E+00 | 2.343E+00 | NOT IDENT. |
| AS-74 | 1.962E-01 | 1.641E+00 | 3.468E+00 | NOT IDENT. |
| SE-75 | 3.368E-02 | 5.468E-02 | 1.166E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 5.541E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -4.468E-01 | 2.272E+00 | 4.549E+00 | NOT IDENT. |
| RB-83 | -4.914E-02 | 1.262E-01 | 2.382E-01 | NOT IDENT. |
| KR-85 | 8.049E+00 | 9.100E+00 | 1.827E+01 | NOT IDENT. |
| SR-85 | 9.499E-02 | 1.080E-01 | 2.167E-01 | NOT IDENT. |
| RB-86 | 2.712E+00 | 1.408E+01 | 3.117E+01 | NOT IDENT. |
| Y-88 | -7.817E-03 | 8.385E-02 | 1.860E-01 | NOT IDENT. |
| Y-91 | -2.345E+01 | 4.094E+01 | 7.386E+01 | NOT IDENT. |
| NB-94 | 1.691E-02 | 2.354E-02 | 5.979E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | -1.082E-02 | 8.306E-02 | 1.664E-01 | NOT IDENT. |
| NB-95M | 1.042E-01 | 2.761E-01 | 4.916E-01 | NOT IDENT. |
| ZR-95 | -3.735E-02 | 1.585E-01 | 3.070E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.152E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.379E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -5.694E-03 | 2.752E-02 | 4.854E-02 | FAIL ABUN |
| RH-102 | 4.343E-03 | 4.068E-02 | 9.058E-02 | NOT IDENT. |
| RU-103 | 1.585E-02 | 1.718E-01 | 3.467E-01 | NOT IDENT. |
| RH-106 | 3.232E-03 | 3.025E-01 | 6.358E-01 | NOT IDENT. |
| RU-106 | 3.232E-03 | 3.025E-01 | 6.358E-01 | NOT IDENT. |
| AG-108M | -1.724E-02 | 2.839E-02 | 4.782E-02 | NOT IDENT. |
| CD-109 | -4.411E-01 | 6.306E-01 | 1.057E+00 | NOT IDENT. |
| AG-110M | -6.316E-03 | 6.481E-02 | 1.287E-01 | NOT IDENT. |
| SN-113 | 3.908E-02 | 5.848E-02 | 1.294E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.569E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.401E+00 | 2.262E+00 | 4.428E+00 | NOT IDENT. |
| TE-123M | 3.016E-02 | 3.599E-02 | 7.256E-02 | NOT IDENT. |
| SB-124 | 5.752E-03 | 2.185E-01 | 5.307E-01 | NOT IDENT. |
| SB-125 | 6.307E-02 | 8.666E-02 | 1.915E-01 | NOT IDENT. |
| TE-125M | 4.508E+00 | 2.208E+01 | 3.716E+01 | NOT IDENT. |
| I-126 | -5.465E+00 | 1.174E+01 | 2.162E+01 | NOT IDENT. |
| SB-126 | -2.702E+00 | 7.877E+00 | 1.529E+01 | NOT IDENT. |
| SN-126 | -2.147E-02 | 5.344E-02 | 9.349E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.215E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.830E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.006E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.689E-02 | 4.250E-02 | 7.229E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.292E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.029E-02 | 3.601E-02 | 9.108E-02 | NOT IDENT. |
| CS-135 | 4.195E-03 | 1.275E-01 | 2.480E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.235E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -7.588E-01 | 4.856E+00 | 1.039E+01 | NOT IDENT. |
| BA-137M | 1.415E-02 | 3.170E-02 | 7.155E-02 | NOT IDENT. |
| CS-137 | 1.495E-02 | 3.348E-02 | 7.559E-02 | NOT IDENT. |
| CE-139 | 1.308E-02 | 3.427E-02 | 6.924E-02 | NOT IDENT. |
| BA-140 | -2.072E+00 | 7.474E+00 | 1.529E+01 | NOT IDENT. |
| LA-140 | -2.072E+00 | 7.474E+00 | 1.529E+01 | NOT IDENT. |
| CE-141 | -6.858E-02 | 2.841E-01 | 5.071E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.854E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.023E-02 | 2.174E-01 | 3.657E-01 | NOT IDENT. |
| PM-144 | 4.309E-03 | 3.256E-02 | 7.031E-02 | NOT IDENT. |
| PR-144 | 3.043E-01 | 2.527E+00 | 5.448E+00 | NOT IDENT. |
| PM-146 | -4.924E-02 | 4.015E-02 | 5.388E-02 | NOT IDENT. |
| ND-147 | 2.086E+01 | 6.351E+01 | 1.392E+02 | NOT IDENT. |
| PM-147 | -1.374E+02 | 6.431E+02 | 1.138E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.228E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -5.020E-04 | 2.522E-02 | 4.289E-02 | NOT IDENT. |
| EU-152 | 8.202E-02 | 1.625E-01 | 2.108E-01 | FAIL ABUN |
| GD-153 | 5.682E-02 | 7.119E-02 | 1.466E-01 | NOT IDENT. |
| EU-154 | -1.077E-02 | 9.894E-02 | 2.159E-01 | NOT IDENT. |
| EU-155 | 8.042E-03 | 9.205E-02 | 1.692E-01 | NOT IDENT. |
| TB-160 | -4.787E-02 | 3.102E-01 | 6.012E-01 | NOT IDENT. |
| HO-166M | 3.095E-02 | 5.172E-02 | 1.224E-01 | FAIL ABUN |
| TM-171 | 3.347E+00 | 1.351E+01 | 2.630E+01 | FAIL ABUN |
| LU-176 | 3.111E-02 | 3.085E-02 | 5.471E-02 | FAIL ABUN |
| HF-181 | -7.375E-02 | 9.272E-02 | 1.580E-01 | NOT IDENT. |
| TA-182 | 9.197E-02 | 2.521E-01 | 5.974E-01 | FAIL ABUN |
| RE-183 | -3.827E-02 | 3.234E-01 | 5.951E-01 | FAIL ABUN |
| RE-184 | -3.508E-01 | 6.654E-01 | 1.157E+00 | NOT IDENT. |
| W-188 | 5.662E+00 | 1.110E+01 | 2.232E+01 | FAIL ABUN |
| IR-192 | -4.263E-02 | 6.555E-02 | 1.123E-01 | FAIL ABUN |
| HG-203 | 2.157E-02 | 9.305E-02 | 1.839E-01 | NOT IDENT. |
| BI-207 | -6.708E-03 | 4.209E-02 | 8.986E-02 | NOT IDENT. |
| TL-208 | -3.021E-02 | 3.464E-02 | 6.828E-02 | NOT IDENT. |
| PB-210 | 6.023E-01 | 2.306E+00 | 4.565E+00 | NOT IDENT. |
| BI-211 | 5.472E-02 | 2.349E-01 | 4.480E-01 | NOT IDENT. |
| PB-211 | -1.943E-01 | 5.686E-01 | 1.039E+00 | NOT IDENT. |
| BI-212 | -4.331E-02 | 4.687E-01 | 9.825E-01 | NOT IDENT. |
| PB-212 | 4.345E-02 | 6.747E-02 | 1.230E-01 | FAIL ABUN |
| BI-214 | 2.356E-02 | 8.271E-02 | 1.675E-01 | NOT IDENT. |
| PB-214 | 3.857E-02 | 8.069E-02 | 1.676E-01 | FAIL ABUN |
| RN-219 | 1.844E-01 | 3.862E-01 | 8.041E-01 | NOT IDENT. |
| RN-222 | 2.356E-02 | 8.271E-02 | 1.675E-01 | NOT IDENT. |
| RA-223 | 6.105E-01 | 7.376E-01 | 1.310E+00 | FAIL ABUN |
| RA-224 | 8.958E-02 | 6.907E-01 | 1.168E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.356E-02 | 8.271E-02 | 1.675E-01 | NOT IDENT. |
| AC-227 | 5.800E-02 | 2.428E-01 | 4.759E-01 | NOT IDENT. |
| TH-227 | 5.800E-02 | 2.428E-01 | 4.759E-01 | NOT IDENT. |
| AC-228 | -6.022E-03 | 1.369E-01 | 3.035E-01 | NOT IDENT. |
| RA-228 | -6.022E-03 | 1.369E-01 | 3.035E-01 | NOT IDENT. |
| TH-228 | 4.345E-02 | 6.747E-02 | 1.230E-01 | FAIL ABUN |
| TH-229 | -4.478E-01 | 4.804E-01 | 8.187E-01 | NOT IDENT. |
| TH-230 | 2.356E-02 | 8.270E-02 | 1.675E-01 | NOT IDENT. |
| PA-231 | 7.836E-01 | 6.971E-01 | 2.158E+00 | FAIL ABUN |
| TH-231 | 6.105E-01 | 7.376E-01 | 1.310E+00 | FAIL ABUN |
| TH-232 | -6.022E-03 | 1.369E-01 | 3.035E-01 | NOT IDENT. |
| PA-233 | 3.314E-02 | 5.929E-02 | 1.235E-01 | NOT IDENT. |
| PA-234 | -2.683E-01 | 3.229E-01 | 4.979E-01 | NOT IDENT. |
| PA-234M | -1.916E+00 | 4.208E+00 | 8.524E+00 | NOT IDENT. |
| TH-234 | 1.347E-01 | 1.025E+00 | 1.827E+00 | FAIL ABUN |
| U-234 | 2.356E-02 | 8.270E-02 | 1.675E-01 | NOT IDENT. |
| U-235 | -1.741E-02 | 1.717E-01 | 3.130E-01 | NOT IDENT. |
| NP-237 | 3.314E-02 | 5.929E-02 | 1.235E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.687E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.347E-01 | 1.025E+00 | 1.827E+00 | FAIL ABUN |
| NP-239 | -2.067E-02 | 3.641E-01 | 5.858E-01 | NOT IDENT. |
| PU-239 | -1.339E+01 | 2.771E+02 | 4.997E+02 | NOT IDENT. |
| AM-241 | -1.241E-01 | 1.221E-01 | 1.864E-01 | NOT IDENT. |
| AM-243 | -8.641E-03 | 4.266E-02 | 7.424E-02 | NOT IDENT. |
| CM-243 | 4.911E-02 | 8.751E-02 | 1.705E-01 | NOT IDENT. |
| CM-247 | -5.300E-05 | 3.532E-02 | 6.793E-02 | NOT IDENT. |
| CF-249 | 1.676E-02 | 3.709E-02 | 7.722E-02 | NOT IDENT. |
| CF-251 | 4.270E-02 | 1.053E-01 | 2.124E-01 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:46:36.40

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 63.93 | 16 | 18 | 1.45 | 128.08 | 125 | 13 | 4.35E-03 | 52.5 | 1.21E+00 |
| 2 | 4 | 67.10 | 13 | 18 | 1.46 | 134.43 | 125 | 13 | 3.58E-03 | 60.9 | |
| 3 | 0 | 93.12 | 18 | 18 | 1.39 | 186.49 | 184 | 7 | 4.86E-03 | 46.3 | |
| 4 | 0 | 114.55 | 12 | 34 | 0.65 | 229.35 | 223 | 12 | 3.41E-03 | 98.0 | |
| 5 | 0 | 136.91 | 18 | 11 | 1.51 | 274.07 | 270 | 8 | 5.07E-03 | 39.9 | |
| 6 | 0 | 183.98 | 10 | 19 | 0.98 | 368.24 | 365 | 6 | 2.73E-03 | 77.7 | |
| 7 | 0 | 238.51 | 26 | 14 | 1.45 | 477.33 | 473 | 8 | 7.24E-03 | 31.6 | |
| 8 | 0 | 284.66 | 7 | 1 | 0.89 | 569.65 | 567 | 5 | 1.89E-03 | 45.4 | |
| 9 | 0 | 294.97 | 27 | 11 | 4.49 | 590.29 | 584 | 14 | 7.54E-03 | 31.9 | |
| 10 | 0 | 306.19 | 14 | 11 | 1.40 | 612.73 | 607 | 9 | 3.89E-03 | 50.6 | |
| 11 | 0 | 325.02 | 11 | 11 | 1.83 | 650.40 | 644 | 9 | 3.10E-03 | 61.6 | |
| 12 | 0 | 330.65 | 12 | 12 | 1.00 | 661.67 | 656 | 12 | 3.33E-03 | 64.5 | |
| 13 | 0 | 344.04 | 9 | 18 | 3.47 | 688.45 | 683 | 13 | 2.61E-03 | 101.1 | |
| 14 | 0 | 365.23 | 18 | 3 | 3.75 | 730.85 | 725 | 12 | 5.08E-03 | 30.0 | |
| 15 | 0 | 511.07 | 63 | 3 | 2.03 | 1022.61 | 1017 | 12 | 1.76E-02 | 13.7 | |
| 16 | 0 | 612.51 | 9 | 0 | 0.83 | 1225.56 | 1223 | 6 | 2.50E-03 | 33.3 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:46:38.41

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| ANH-511 | 511.00 | 12 | 100.00* | 1.633E+00 | 3.776E-02 | 3.776E-02 | 156.68 |

Flag: "*" = Keyline

Sample ID : G341147006 Acquisition date : 7-FEB-2014 08:44:15

Total number of lines in spectrum 15
Number of unidentified lines 3
Number of lines tentatively identified by NID 12 80.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| ANH-511 | 1.00E+09Y | 1.00 | 3.776E-02 | 3.776E-02 | 5.916E-02 | 156.68 | |
| Total Activity : | | | 3.776E-02 | 3.776E-02 | | | |
| Grand Total Activity : | | | 3.776E-02 | 3.776E-02 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147006 Acquisition date : 7-FEB-2014 08:44:15

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 63.93 | 2 | 18 | 1.45 | 128.08 | 125 | 13 | 6.23E-04 | **** | 2.35E+00 | T |
| 4 | 67.10 | 8 | 18 | 1.46 | 134.43 | 125 | 13 | 2.15E-03 | **** | 2.64E+00 | T |
| 0 | 114.55 | 12 | 34 | 0.65 | 229.35 | 223 | 12 | 3.41E-03 | **** | 4.44E+00 | |
| 0 | 136.91 | 18 | 11 | 1.51 | 274.07 | 270 | 8 | 5.07E-03 | 79.8 | 4.33E+00 | T |
| 0 | 183.98 | 10 | 19 | 0.98 | 368.24 | 365 | 6 | 2.73E-03 | **** | 3.73E+00 | T |
| 0 | 238.51 | 11 | 14 | 1.45 | 477.33 | 473 | 8 | 3.10E-03 | **** | 3.09E+00 | T |
| 0 | 284.66 | 7 | 1 | 0.89 | 569.65 | 567 | 5 | 1.89E-03 | 90.8 | 2.68E+00 | T |
| 0 | 294.97 | 24 | 11 | 4.49 | 590.29 | 584 | 14 | 6.54E-03 | 75.3 | 2.60E+00 | T |
| 0 | 306.19 | 14 | 11 | 1.40 | 612.73 | 607 | 9 | 3.89E-03 | **** | 2.52E+00 | T |
| 0 | 325.02 | 11 | 11 | 1.83 | 650.40 | 644 | 9 | 3.10E-03 | **** | 2.40E+00 | T |
| 0 | 330.65 | 12 | 12 | 1.00 | 661.67 | 656 | 12 | 3.33E-03 | **** | 2.36E+00 | |
| 0 | 344.04 | 9 | 18 | 3.47 | 688.45 | 683 | 13 | 2.61E-03 | **** | 2.28E+00 | T |
| 0 | 365.23 | 18 | 3 | 3.75 | 730.85 | 725 | 12 | 5.08E-03 | 59.9 | 2.17E+00 | T |
| 0 | 612.51 | 9 | 0 | 0.83 | 1225.56 | 1223 | 6 | 2.50E-03 | 66.7 | 1.40E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:46:51.29

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147006.CNF;1    *
* Acquisition date :  7-FEB-2014 08:44:15 Sensitivity     : 3.000            *
* Detector ID      : GAM36                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 11:55:00 Nuclide Library : SOLID            *
* Sample ID        : G341147006           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.4351E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  3-AUG-2013 07:02:15 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM36_500MLMB.CNF;4          *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| ANH-511 | 2.144E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.461E-01 | NOT IDENT. |
| NA-22 | 3.013E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 5.194E-02 | NOT IDENT. |
| K-40 | 5.666E-01 | NOT IDENT. |
| SC-46 | 5.833E-02 | NOT IDENT. |
| V-48 | 1.764E+00 | NOT IDENT. |
| CR-51 | 1.907E+00 | NOT IDENT. |
| MN-54 | 4.088E-02 | NOT IDENT. |
| CO-56 | 6.816E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.150E-02 | FAIL ABUN |
| CO-58 | 2.768E-02 | NOT IDENT. |
| FE-59 | 3.021E-01 | NOT IDENT. |
| CO-60 | 2.075E-02 | NOT IDENT. |
| ZN-65 | 5.883E-02 | NOT IDENT. |
| GE-68 | 1.403E+00 | NOT IDENT. |
| AS-73 | 1.058E+00 | NOT IDENT. |
| AS-74 | 1.432E+00 | NOT IDENT. |
| SE-75 | 5.112E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.762E+00 | NOT IDENT. |
| RB-83 | 9.862E-02 | NOT IDENT. |
| KR-85 | 8.119E+00 | NOT IDENT. |
| SR-85 | 9.627E-02 | NOT IDENT. |
| RB-86 | 1.260E+01 | NOT IDENT. |
| Y-88 | 6.800E-02 | NOT IDENT. |
| Y-91 | 2.617E+01 | NOT IDENT. |
| NB-94 | 2.416E-02 | NOT IDENT. |
| NB-95 | 6.645E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95M | 2.211E-01 | NOT IDENT. |
| ZR-95 | 1.231E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.179E-02 | FAIL ABUN |
| RH-102 | 3.555E-02 | NOT IDENT. |
| RU-103 | 1.498E-01 | NOT IDENT. |
| RH-106 | 2.565E-01 | NOT IDENT. |
| RU-106 | 2.565E-01 | NOT IDENT. |
| AG-108M | 1.975E-02 | NOT IDENT. |
| CD-109 | 4.735E-01 | NOT IDENT. |
| AG-110M | 5.181E-02 | NOT IDENT. |
| SN-113 | 5.544E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.997E+00 | NOT IDENT. |
| TE-123M | 3.276E-02 | NOT IDENT. |
| SB-124 | 1.880E-01 | NOT IDENT. |
| SB-125 | 8.249E-02 | NOT IDENT. |
| TE-125M | 1.679E+01 | NOT IDENT. |
| I-126 | 8.522E+00 | NOT IDENT. |
| SB-126 | 5.755E+00 | NOT IDENT. |
| SN-126 | 4.192E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.093E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.740E-02 | NOT IDENT. |
| CS-135 | 1.083E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.891E+00 | NOT IDENT. |
| BA-137M | 2.971E-02 | NOT IDENT. |
| CS-137 | 3.139E-02 | NOT IDENT. |
| CE-139 | 3.110E-02 | NOT IDENT. |
| BA-140 | 5.764E+00 | NOT IDENT. |
| LA-140 | 5.764E+00 | NOT IDENT. |
| CE-141 | 2.291E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.646E-01 | NOT IDENT. |
| PM-144 | 2.836E-02 | NOT IDENT. |
| PR-144 | 2.194E+00 | NOT IDENT. |
| PM-146 | 2.072E-02 | NOT IDENT. |
| ND-147 | 5.831E+01 | NOT IDENT. |
| PM-147 | 5.095E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.829E-02 | NOT IDENT. |
| EU-152 | 9.366E-02 | FAIL ABUN |
| GD-153 | 6.587E-02 | NOT IDENT. |
| EU-154 | 7.901E-02 | NOT IDENT. |
| EU-155 | 7.668E-02 | NOT IDENT. |
| TB-160 | 2.444E-01 | NOT IDENT. |
| HO-166M | 5.048E-02 | FAIL ABUN |
| TM-171 | 1.182E+01 | FAIL ABUN |
| LU-176 | 2.436E-02 | FAIL ABUN |
| HF-181 | 5.597E-02 | NOT IDENT. |
| TA-182 | 2.371E-01 | FAIL ABUN |
| RE-183 | 2.689E-01 | FAIL ABUN |
| RE-184 | 4.646E-01 | NOT IDENT. |
| W-188 | 9.496E+00 | FAIL ABUN |
| IR-192 | 4.787E-02 | FAIL ABUN |
| HG-203 | 7.943E-02 | NOT IDENT. |
| BI-207 | 3.364E-02 | NOT IDENT. |
| TL-208 | 2.843E-02 | NOT IDENT. |
| PB-210 | 2.051E+00 | NOT IDENT. |
| BI-211 | 1.997E-01 | NOT IDENT. |
| PB-211 | 4.255E-01 | NOT IDENT. |
| BI-212 | 4.028E-01 | NOT IDENT. |
| PB-212 | 5.629E-02 | FAIL ABUN |
| BI-214 | 7.268E-02 | NOT IDENT. |
| PB-214 | 7.495E-02 | FAIL ABUN |
| RN-219 | 3.487E-01 | NOT IDENT. |
| RN-222 | 7.268E-02 | NOT IDENT. |
| RA-223 | 5.812E-01 | FAIL ABUN |
| RA-224 | 5.277E-01 | NOT IDENT. |
| RA-226 | 7.268E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 2.125E-01 | NOT IDENT. |
| TH-227 | 2.125E-01 | NOT IDENT. |
| AC-228 | 1.236E-01 | NOT IDENT. |
| RA-228 | 1.236E-01 | NOT IDENT. |
| TH-228 | 5.629E-02 | FAIL ABUN |
| TH-229 | 3.649E-01 | NOT IDENT. |
| TH-230 | 7.267E-02 | NOT IDENT. |
| PA-231 | 9.243E-01 | FAIL ABUN |
| TH-231 | 5.812E-01 | FAIL ABUN |
| TH-232 | 1.236E-01 | NOT IDENT. |
| PA-233 | 5.436E-02 | NOT IDENT. |
| PA-234 | 1.864E-01 | NOT IDENT. |
| PA-234M | 3.320E+00 | NOT IDENT. |
| TH-234 | 8.305E-01 | FAIL ABUN |
| U-234 | 7.267E-02 | NOT IDENT. |
| U-235 | 1.414E-01 | NOT IDENT. |
| NP-237 | 5.436E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 8.305E-01 | FAIL ABUN |
| NP-239 | 2.627E-01 | NOT IDENT. |
| PU-239 | 2.244E+02 | NOT IDENT. |
| AM-241 | 8.305E-02 | NOT IDENT. |
| AM-243 | 3.388E-02 | NOT IDENT. |
| CM-243 | 7.746E-02 | NOT IDENT. |
| CM-247 | 2.907E-02 | NOT IDENT. |
| CF-249 | 3.342E-02 | NOT IDENT. |
| CF-251 | 9.549E-02 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:46:55.66

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147006.CNF;1  *
* Acquisition date :  7-FEB-2014 08:44:15 Sensitivity     : 3.000           *
* Detector ID      : GAM36                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:55:00 Nuclide Library : SOLID           *
* Sample ID        : G341147006           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.4351E+02 GRAM *
*                                         Quantity Err(%) : 1.3936E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  3-AUG-2013 07:02:15 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM36_500MLMB.CNF;4         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| ANH-511 | 3.776E-02 | 5.807E-02 | 5.807E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.289E-01 | 5.719E-01 | 5.811E-01 | NOT IDENT. |
| NA-22 | -2.379E-03 | 3.696E-02 | 3.698E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 5.813E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.351E-02 | 4.881E-02 | 5.110E-02 | NOT IDENT. |
| K-40 | 1.123E-01 | 6.073E-01 | 6.094E-01 | NOT IDENT. |
| SC-46 | 7.661E-03 | 6.831E-02 | 6.839E-02 | NOT IDENT. |
| V-48 | 4.084E-01 | 1.951E+00 | 1.959E+00 | NOT IDENT. |
| CR-51 | -8.024E-02 | 2.626E+00 | 2.626E+00 | NOT IDENT. |
| MN-54 | 8.009E-03 | 4.796E-02 | 4.810E-02 | NOT IDENT. |
| CO-56 | 2.089E-03 | 8.190E-02 | 8.190E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 3.220E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | 4.641E-03 | 2.562E-02 | 2.571E-02 | FAIL ABUN |
| CO-58 | -3.804E-02 | 5.433E-02 | 5.697E-02 | NOT IDENT. |
| FE-59 | -7.394E-03 | 3.582E-01 | 3.583E-01 | NOT IDENT. |
| CO-60 | -1.420E-02 | 3.256E-02 | 3.318E-02 | NOT IDENT. |
| ZN-65 | -4.174E-02 | 8.617E-02 | 8.820E-02 | NOT IDENT. |
| GE-68 | 5.372E-01 | 1.501E+00 | 1.520E+00 | NOT IDENT. |
| AS-73 | 1.061E-01 | 1.237E+00 | 1.238E+00 | NOT IDENT. |
| AS-74 | 1.962E-01 | 1.641E+00 | 1.643E+00 | NOT IDENT. |
| SE-75 | 3.368E-02 | 5.475E-02 | 5.682E-02 | FAIL ABUN |
| BR-77 | 3.569E+10 | 1.097E+11 | 1.109E+11 | SHORT HLIF |
| SR-82 | -4.468E-01 | 2.272E+00 | 2.281E+00 | NOT IDENT. |
| RB-83 | -4.914E-02 | 1.264E-01 | 1.283E-01 | NOT IDENT. |
| KR-85 | 8.049E+00 | 9.127E+00 | 9.822E+00 | NOT IDENT. |
| SR-85 | 9.499E-02 | 1.083E-01 | 1.165E-01 | NOT IDENT. |
| RB-86 | 2.712E+00 | 1.408E+01 | 1.414E+01 | NOT IDENT. |
| Y-88 | -7.817E-03 | 8.385E-02 | 8.393E-02 | NOT IDENT. |
| Y-91 | -2.345E+01 | 4.098E+01 | 4.233E+01 | NOT IDENT. |
| NB-94 | 1.691E-02 | 2.358E-02 | 2.479E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | -1.082E-02 | 8.306E-02 | 8.321E-02 | NOT IDENT. |
| NB-95M | 1.042E-01 | 2.763E-01 | 2.803E-01 | NOT IDENT. |
| ZR-95 | -3.735E-02 | 1.586E-01 | 1.595E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 6.082E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.221E+39 | 1.157E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.690E+09 | 2.385E+09 | 2.504E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.754E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -5.694E-03 | 2.754E-02 | 2.766E-02 | FAIL ABUN |
| RH-102 | 4.343E-03 | 4.069E-02 | 4.073E-02 | NOT IDENT. |
| RU-103 | 1.585E-02 | 1.718E-01 | 1.719E-01 | NOT IDENT. |
| RH-106 | 3.232E-03 | 3.025E-01 | 3.025E-01 | NOT IDENT. |
| RU-106 | 3.232E-03 | 3.025E-01 | 3.025E-01 | NOT IDENT. |
| AG-108M | -1.724E-02 | 2.843E-02 | 2.947E-02 | NOT IDENT. |
| CD-109 | -4.411E-01 | 6.331E-01 | 6.636E-01 | NOT IDENT. |
| AG-110M | -6.316E-03 | 6.481E-02 | 6.488E-02 | NOT IDENT. |
| SN-113 | 3.908E-02 | 5.857E-02 | 6.116E-02 | NOT IDENT. |
| CD-115 | -6.911E+10 | 2.570E+11 | 2.589E+11 | SHORT HLIF |
| SN-117M | 1.401E+00 | 2.266E+00 | 2.352E+00 | NOT IDENT. |
| TE-123M | 3.016E-02 | 3.609E-02 | 3.856E-02 | NOT IDENT. |
| SB-124 | 5.752E-03 | 2.185E-01 | 2.185E-01 | NOT IDENT. |
| SB-125 | 6.307E-02 | 8.683E-02 | 9.137E-02 | NOT IDENT. |
| TE-125M | 4.508E+00 | 2.209E+01 | 2.218E+01 | NOT IDENT. |
| I-126 | -5.465E+00 | 1.175E+01 | 1.200E+01 | NOT IDENT. |
| SB-126 | -2.702E+00 | 7.885E+00 | 7.978E+00 | NOT IDENT. |
| SN-126 | -2.147E-02 | 5.350E-02 | 5.437E-02 | FAIL ABUN |
| SB-127 | -1.729E+05 | 1.218E+06 | 1.220E+06 | SHORT HLIF |
| I-131 | 1.504E+02 | 8.922E+01 | 1.121E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.582E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -8.928E+05 | 1.006E+07 | 1.007E+07 | SHORT HLIF |
| BA-133 | -2.689E-02 | 4.256E-02 | 4.425E-02 | NOT IDENT. |
| I-133 | 9.917E+29 | 2.359E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.029E-02 | 3.612E-02 | 3.862E-02 | NOT IDENT. |
| CS-135 | 4.195E-03 | 1.275E-01 | 1.276E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.417E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -7.588E-01 | 4.857E+00 | 4.869E+00 | NOT IDENT. |
| BA-137M | 1.415E-02 | 3.172E-02 | 3.235E-02 | NOT IDENT. |
| CS-137 | 1.495E-02 | 3.351E-02 | 3.418E-02 | NOT IDENT. |
| CE-139 | 1.308E-02 | 3.439E-02 | 3.489E-02 | NOT IDENT. |
| BA-140 | -2.072E+00 | 7.476E+00 | 7.534E+00 | NOT IDENT. |
| LA-140 | -2.072E+00 | 7.476E+00 | 7.534E+00 | NOT IDENT. |
| CE-141 | -6.858E-02 | 2.842E-01 | 2.859E-01 | NOT IDENT. |
| CE-143 | 6.678E+18 | 6.877E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.023E-02 | 2.174E-01 | 2.186E-01 | NOT IDENT. |
| PM-144 | 4.309E-03 | 3.256E-02 | 3.262E-02 | NOT IDENT. |
| PR-144 | 3.043E-01 | 2.527E+00 | 2.531E+00 | NOT IDENT. |
| PM-146 | -4.924E-02 | 4.048E-02 | 4.617E-02 | NOT IDENT. |
| ND-147 | 2.086E+01 | 6.354E+01 | 6.423E+01 | NOT IDENT. |
| PM-147 | -1.374E+02 | 6.432E+02 | 6.462E+02 | NOT IDENT. |
| PM-149 | 1.381E+12 | 1.247E+12 | 1.394E+12 | SHORT HLIF |
| EU-150 | -5.020E-04 | 2.522E-02 | 2.522E-02 | NOT IDENT. |
| EU-152 | 8.202E-02 | 1.626E-01 | 1.668E-01 | FAIL ABUN |
| GD-153 | 5.682E-02 | 7.143E-02 | 7.589E-02 | NOT IDENT. |
| EU-154 | -1.077E-02 | 9.895E-02 | 9.907E-02 | NOT IDENT. |
| EU-155 | 8.042E-03 | 9.205E-02 | 9.212E-02 | NOT IDENT. |
| TB-160 | -4.787E-02 | 3.102E-01 | 3.110E-01 | NOT IDENT. |
| HO-166M | 3.095E-02 | 5.180E-02 | 5.365E-02 | FAIL ABUN |
| TM-171 | 3.347E+00 | 1.352E+01 | 1.360E+01 | FAIL ABUN |
| LU-176 | 3.111E-02 | 3.095E-02 | 3.398E-02 | FAIL ABUN |
| HF-181 | -7.375E-02 | 9.294E-02 | 9.871E-02 | NOT IDENT. |
| TA-182 | 9.197E-02 | 2.522E-01 | 2.556E-01 | FAIL ABUN |
| RE-183 | -3.827E-02 | 3.235E-01 | 3.239E-01 | FAIL ABUN |
| RE-184 | -3.508E-01 | 6.672E-01 | 6.857E-01 | NOT IDENT. |
| W-188 | 5.662E+00 | 1.112E+01 | 1.141E+01 | FAIL ABUN |
| IR-192 | -4.263E-02 | 6.564E-02 | 6.839E-02 | FAIL ABUN |
| HG-203 | 2.157E-02 | 9.307E-02 | 9.358E-02 | NOT IDENT. |
| BI-207 | -6.708E-03 | 4.209E-02 | 4.220E-02 | NOT IDENT. |
| TL-208 | -3.021E-02 | 3.474E-02 | 3.731E-02 | NOT IDENT. |
| PB-210 | 6.023E-01 | 2.307E+00 | 2.323E+00 | NOT IDENT. |
| BI-211 | 5.472E-02 | 2.350E-01 | 2.363E-01 | NOT IDENT. |
| PB-211 | -1.943E-01 | 5.689E-01 | 5.756E-01 | NOT IDENT. |
| BI-212 | -4.331E-02 | 4.687E-01 | 4.691E-01 | NOT IDENT. |
| PB-212 | 4.345E-02 | 6.758E-02 | 7.036E-02 | FAIL ABUN |
| BI-214 | 2.356E-02 | 8.274E-02 | 8.341E-02 | NOT IDENT. |
| PB-214 | 3.857E-02 | 8.075E-02 | 8.260E-02 | FAIL ABUN |
| RN-219 | 1.844E-01 | 3.872E-01 | 3.960E-01 | NOT IDENT. |
| RN-222 | 2.356E-02 | 8.274E-02 | 8.341E-02 | NOT IDENT. |
| RA-223 | 6.105E-01 | 7.397E-01 | 7.893E-01 | FAIL ABUN |
| RA-224 | 8.958E-02 | 6.908E-01 | 6.920E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.356E-02 | 8.274E-02 | 8.341E-02 | NOT IDENT. |
| AC-227 | 5.800E-02 | 2.429E-01 | 2.443E-01 | NOT IDENT. |
| TH-227 | 5.800E-02 | 2.429E-01 | 2.443E-01 | NOT IDENT. |
| AC-228 | -6.022E-03 | 1.369E-01 | 1.370E-01 | NOT IDENT. |
| RA-228 | -6.022E-03 | 1.369E-01 | 1.370E-01 | NOT IDENT. |
| TH-228 | 4.345E-02 | 6.758E-02 | 7.036E-02 | FAIL ABUN |
| TH-229 | -4.478E-01 | 4.821E-01 | 5.227E-01 | NOT IDENT. |
| TH-230 | 2.356E-02 | 8.273E-02 | 8.341E-02 | NOT IDENT. |
| PA-231 | 7.836E-01 | 6.998E-01 | 7.839E-01 | FAIL ABUN |
| TH-231 | 6.105E-01 | 7.397E-01 | 7.893E-01 | FAIL ABUN |
| TH-232 | -6.022E-03 | 1.369E-01 | 1.370E-01 | NOT IDENT. |
| PA-233 | 3.314E-02 | 5.935E-02 | 6.121E-02 | NOT IDENT. |
| PA-234 | -2.683E-01 | 4.463E-01 | 4.624E-01 | NOT IDENT. |
| PA-234M | -1.916E+00 | 4.214E+00 | 4.301E+00 | NOT IDENT. |
| TH-234 | 1.347E-01 | 1.026E+00 | 1.028E+00 | FAIL ABUN |
| U-234 | 2.356E-02 | 8.273E-02 | 8.341E-02 | NOT IDENT. |
| U-235 | -1.741E-02 | 1.717E-01 | 1.719E-01 | NOT IDENT. |
| NP-237 | 3.314E-02 | 5.935E-02 | 6.121E-02 | NOT IDENT. |
| NP-238 | -2.950E+11 | 1.687E+12 | 1.693E+12 | SHORT HLIF |
| U-238 | 1.347E-01 | 1.026E+00 | 1.028E+00 | FAIL ABUN |
| NP-239 | -2.067E-02 | 3.641E-01 | 3.642E-01 | NOT IDENT. |
| PU-239 | -1.339E+01 | 2.771E+02 | 2.772E+02 | NOT IDENT. |
| AM-241 | -1.241E-01 | 1.227E-01 | 1.348E-01 | NOT IDENT. |
| AM-243 | -8.641E-03 | 4.267E-02 | 4.285E-02 | NOT IDENT. |
| CM-243 | 4.911E-02 | 8.772E-02 | 9.047E-02 | NOT IDENT. |
| CM-247 | -5.300E-05 | 3.532E-02 | 3.532E-02 | NOT IDENT. |
| CF-249 | 1.676E-02 | 3.714E-02 | 3.790E-02 | NOT IDENT. |
| CF-251 | 4.270E-02 | 1.055E-01 | 1.072E-01 | FAIL ABUN |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 24.4724 | 94.67 | 23.2516 | 193.51 | 32.7038 |
| 45.60 | 17.0455 | 94.87 | 28.5462 | 197.03 | 21.8862 |
| 46.54 | 16.1420 | 97.43 | 15.9313 | 198.01 | 21.9095 |
| 49.72 | 0.0000 | 98.43 | 25.5349 | 201.83 | 27.4990 |
| 51.35 | 19.2445 | 98.44 | 25.5353 | 205.31 | 34.0405 |
| 52.39 | 23.1573 | 99.53 | 27.7159 | 210.85 | 24.9839 |
| 53.44 | 28.0591 | 100.11 | 25.6096 | 215.65 | 15.8079 |
| 57.36 | 0.0000 | 103.18 | 23.5991 | 222.11 | 15.9108 |
| 57.53 | 28.3532 | 103.37 | 24.6798 | 227.09 | 13.1674 |
| 57.98 | 31.3211 | 105.21 | 34.4435 | 227.38 | 15.9935 |
| 59.32 | 38.8878 | 105.31 | 30.1431 | 228.16 | 0.0000 |
| 59.54 | 38.9087 | 106.12 | 25.8718 | 228.18 | 20.7136 |
| 63.29 | 25.2801 | 109.28 | 26.0067 | 235.69 | 21.2432 |
| 63.58 | 25.2973 | 111.00 | 21.1895 | 235.96 | 21.2487 |
| 64.28 | 27.8227 | 111.76 | 0.0000 | 238.63 | 27.3887 |
| 66.73 | 27.9791 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 28.5116 | 117.23 | 26.3378 | 240.99 | 27.4496 |
| 67.75 | 30.0464 | 121.12 | 27.5996 | 242.00 | 27.4755 |
| 69.67 | 30.1750 | 121.22 | 27.6038 | 244.70 | 21.0409 |
| 70.83 | 33.2766 | 121.78 | 25.4171 | 252.40 | 0.0000 |
| 72.81 | 31.3936 | 122.06 | 25.4279 | 252.80 | 20.2338 |
| 72.87 | 31.3975 | 123.07 | 24.3594 | 254.15 | 0.0000 |
| 74.66 | 38.6336 | 127.23 | 28.9667 | 256.23 | 20.2963 |
| 74.82 | 38.6465 | 129.30 | 26.8194 | 260.90 | 0.0000 |
| 74.97 | 38.6587 | 131.20 | 24.6522 | 264.66 | 10.7110 |
| 77.11 | 35.7653 | 133.02 | 26.9636 | 268.22 | 15.6279 |
| 79.69 | 32.8717 | 133.52 | 23.6098 | 269.46 | 16.6226 |
| 80.12 | 33.9284 | 136.00 | 32.1544 | 271.23 | 17.6270 |
| 80.19 | 0.0000 | 136.47 | 20.3214 | 273.65 | 14.7196 |
| 80.57 | 33.9589 | 140.51 | 0.0000 | 276.40 | 19.6722 |
| 81.00 | 30.8983 | 143.76 | 21.6665 | 277.37 | 20.6728 |
| 81.07 | 30.9026 | 144.24 | 25.1036 | 277.60 | 17.7229 |
| 83.79 | 28.9972 | 145.44 | 24.0012 | 278.00 | 14.7741 |
| 85.43 | 23.8949 | 152.43 | 25.3769 | 279.20 | 11.2678 |
| 86.55 | 32.2753 | 153.25 | 24.2490 | 279.54 | 11.2711 |
| 86.79 | 30.2067 | 154.21 | 19.6543 | 280.46 | 15.7917 |
| 86.94 | 30.2154 | 156.02 | 32.4471 | 283.69 | 8.9068 |
| 87.09 | 32.3084 | 158.56 | 19.7636 | 284.31 | 0.0000 |
| 87.57 | 31.2947 | 159.00 | 17.4481 | 285.41 | 8.9195 |
| 88.03 | 35.4981 | 162.33 | 30.6616 | 285.90 | 0.0000 |
| 88.34 | 33.4295 | 163.33 | 32.4538 | 287.50 | 7.9421 |
| 88.47 | 33.4377 | 165.86 | 21.1166 | 290.67 | 6.3702 |
| 89.96 | 28.2916 | 176.31 | 22.2731 | 293.27 | 0.0000 |
| 91.11 | 30.4520 | 176.60 | 22.2807 | 295.22 | 13.9863 |
| 92.59 | 29.4818 | 177.52 | 21.4124 | 295.96 | 13.9947 |
| 93.35 | 31.6313 | 181.07 | 0.0000 | 298.58 | 11.2193 |
| 94.56 | 23.2470 | 184.41 | 21.5826 | 299.98 | 18.7196 |
| 94.65 | 23.2507 | 185.72 | 27.3784 | 300.09 | 20.0586 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 20.0592 | 497.08 | 12.7748 | 711.68 | 3.0287 |
| 301.36 | 20.0790 | 505.52 | 7.6389 | 720.70 | 5.0665 |
| 302.85 | 19.2984 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 9.6618 | 511.00 | 8.2742 | 722.78 | 7.0991 |
| 306.78 | 11.2925 | 514.00 | 10.7430 | 722.91 | 7.0995 |
| 308.46 | 14.5380 | 514.00 | 10.7430 | 723.31 | 7.1007 |
| 311.90 | 12.1474 | 520.40 | 11.0874 | 724.19 | 4.0590 |
| 316.51 | 18.2859 | 520.69 | 0.0000 | 727.33 | 5.0802 |
| 319.41 | 13.0320 | 522.65 | 0.0000 | 733.00 | 2.0367 |
| 320.08 | 14.6685 | 527.90 | 0.0000 | 735.93 | 6.1173 |
| 321.04 | 13.0482 | 529.59 | 5.5704 | 737.46 | 6.1210 |
| 323.87 | 12.8427 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 4.0905 | 531.02 | 6.5035 | 747.24 | 2.0483 |
| 328.76 | 12.3040 | 546.56 | 0.0000 | 748.06 | 2.0490 |
| 333.37 | 8.2306 | 552.55 | 7.5146 | 752.31 | 5.1310 |
| 333.97 | 11.5280 | 563.25 | 7.5547 | 753.82 | 7.1876 |
| 334.37 | 13.1787 | 569.33 | 8.5245 | 756.73 | 7.1958 |
| 338.28 | 6.6083 | 569.50 | 8.5252 | 756.80 | 7.1960 |
| 338.32 | 6.6085 | 569.70 | 8.5260 | 763.94 | 8.2471 |
| 340.48 | 8.2736 | 583.19 | 6.6750 | 765.81 | 6.1898 |
| 340.55 | 8.2739 | 584.27 | 9.5405 | 766.42 | 5.1594 |
| 344.28 | 13.4814 | 595.83 | 6.7153 | 766.84 | 7.2242 |
| 345.93 | 13.2898 | 600.60 | 7.6920 | 772.60 | 0.0000 |
| 351.06 | 13.8942 | 602.52 | 0.0000 | 776.52 | 5.1796 |
| 351.93 | 12.5125 | 602.73 | 7.6996 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 17.3404 | 778.90 | 3.1105 |
| 356.01 | 18.8229 | 609.32 | 6.4362 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 8.0489 | 785.37 | 6.2364 |
| 366.42 | 0.0000 | 614.28 | 3.2255 | 792.07 | 5.2102 |
| 375.05 | 14.8331 | 618.01 | 7.7545 | 794.95 | 4.1728 |
| 383.85 | 17.0522 | 620.36 | 8.7333 | 795.86 | 2.0871 |
| 388.16 | 9.6192 | 621.93 | 5.8263 | 801.95 | 3.1378 |
| 388.63 | 7.4840 | 630.19 | 0.0000 | 810.29 | 3.1476 |
| 391.69 | 6.4276 | 631.29 | 3.9008 | 810.45 | 3.1477 |
| 400.66 | 6.4651 | 633.25 | 7.8084 | 810.76 | 4.1975 |
| 401.81 | 9.7048 | 634.78 | 6.8371 | 815.77 | 1.0513 |
| 402.40 | 11.8659 | 635.95 | 7.8180 | 818.51 | 5.2618 |
| 404.85 | 9.7236 | 636.99 | 0.0000 | 832.01 | 8.4605 |
| 410.95 | 10.8458 | 645.85 | 2.9447 | 834.85 | 6.3520 |
| 413.71 | 8.6918 | 657.76 | 7.8939 | 835.71 | 8.4721 |
| 414.70 | 11.9586 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 10.9550 | 661.66 | 4.9421 | 846.75 | 0.0000 |
| 427.87 | 6.5761 | 664.57 | 0.0000 | 846.77 | 6.3794 |
| 433.94 | 13.2008 | 666.33 | 7.9234 | 856.80 | 7.4691 |
| 439.40 | 11.0370 | 666.50 | 6.9335 | 860.56 | 6.4107 |
| 453.88 | 14.4713 | 667.71 | 0.0000 | 871.09 | 4.2896 |
| 463.37 | 11.1931 | 677.62 | 8.9574 | 873.19 | 6.4392 |
| 468.07 | 4.4893 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 2.0052 | 879.38 | 7.5286 |
| 475.06 | 3.6057 | 696.49 | 5.0161 | 880.51 | 9.6833 |
| 476.78 | 2.7069 | 696.51 | 5.0162 | 883.24 | 4.3078 |
| 477.60 | 3.6109 | 697.00 | 8.0275 | 884.68 | 6.4649 |
| 482.18 | 6.3352 | 697.49 | 8.0291 | 889.28 | 4.3168 |
| 487.02 | 8.1672 | 702.65 | 2.0116 | 894.76 | 8.6498 |
| 492.35 | 0.0000 | 706.68 | 7.0525 | 898.04 | 5.4122 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 9.7594 | 1312.11 | 4.0701 | | |
| 911.20 | 3.2619 | 1332.49 | 3.0681 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 2.1858 | 1365.19 | 2.0618 | | |
| 937.49 | 6.5813 | 1368.63 | 0.0000 | | |
| 944.13 | 6.5956 | 1384.29 | 2.0714 | | |
| 946.00 | 8.7996 | 1408.01 | 2.0831 | | |
| 949.00 | 3.6701 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 5.2720 | | |
| 962.31 | 3.6860 | 1489.16 | 4.2448 | | |
| 964.08 | 3.6881 | 1505.03 | 2.1300 | | |
| 966.17 | 2.7679 | 1596.21 | 4.6559 | | |
| 968.97 | 3.6939 | 1620.50 | 0.0000 | | |
| 983.53 | 4.6389 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.8993 | | |
| 996.26 | 4.6576 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.6645 | 1764.49 | 0.0000 | | |
| 1004.73 | 2.8019 | 1770.23 | 0.9647 | | |
| 1021.30 | 0.0000 | 1771.35 | 0.9649 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.9719 | | |
| 1037.84 | 5.6614 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.9310 | | |
| 1046.59 | 6.6223 | | | | |
| 1048.07 | 3.7858 | | | | |
| 1049.04 | 1.8935 | | | | |
| 1050.41 | 1.8943 | | | | |
| 1063.66 | 3.8035 | | | | |
| 1077.00 | 4.7734 | | | | |
| 1077.34 | 3.8190 | | | | |
| 1085.87 | 1.9143 | | | | |
| 1099.45 | 7.6875 | | | | |
| 1112.07 | 2.8933 | | | | |
| 1112.84 | 2.8939 | | | | |
| 1115.54 | 4.8271 | | | | |
| 1120.29 | 1.9334 | | | | |
| 1120.55 | 2.9004 | | | | |
| 1121.30 | 3.8680 | | | | |
| 1129.67 | 1.9386 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 3.9246 | | | | |
| 1177.95 | 4.9121 | | | | |
| 1189.05 | 4.9270 | | | | |
| 1204.77 | 4.9479 | | | | |
| 1221.41 | 2.9821 | | | | |
| 1231.02 | 4.9827 | | | | |
| 1235.36 | 0.9977 | | | | |
| 1238.28 | 3.9938 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.0288 | | | | |
| 1274.44 | 3.0236 | | | | |
| 1274.54 | 3.0237 | | | | |
| 1291.59 | 3.0369 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:59:51.61

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147007.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM08.CNF;180
                                        Background date  : 2-FEB-2014 16:26:34.
Sample date      : 7-NOV-2013 11:55:00. Acquisition date : 7-FEB-2014 08:59:23.
Sample ID        : G341147007           Sample quantity  : 1.28210E+02 GRAM
Detector name    : GAM08                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.83  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 47.87* | 4 | 25 | 0.79 | 95.88 | 91 | 7 | 1.24E-03 | 207.6 | |
| 2 | 3 | 59.77 | 13 | 25 | 1.40 | 119.70 | 116 | 15 | 3.52E-03 | 66.8 | 2.84E+00 |
| 3 | 3 | 63.37* | 11 | 38 | 1.41 | 126.91 | 116 | 15 | 2.92E-03 | 118.1 | |
| 4 | 0 | 77.91* | 36 | 36 | 3.40 | 156.02 | 152 | 11 | 9.90E-03 | 38.9 | |
| 5 | 0 | 92.91* | 0 | 47 | 0.92 | 186.05 | 182 | 9 | 7.75E-05 | ***** | |
| 6 | 0 | 109.91 | 21 | 18 | 1.73 | 220.07 | 217 | 7 | 5.69E-03 | 40.4 | |
| 7 | 0 | 232.99 | 17 | 18 | 1.06 | 466.49 | 463 | 7 | 4.68E-03 | 48.1 | |
| 8 | 0 | 273.62 | 4 | 24 | 0.70 | 547.82 | 540 | 10 | 1.06E-03 | 241.3 | |
| 9 | 0 | 301.45 | 14 | 21 | 5.60 | 603.55 | 595 | 12 | 3.84E-03 | 74.8 | |
| 10 | 0 | 320.18 | 48 | 15 | 8.55 | 641.03 | 631 | 21 | 1.33E-02 | 25.3 | |
| 11 | 0 | 352.04* | 14 | 2 | 1.03 | 704.82 | 700 | 9 | 3.94E-03 | 40.1 | |
| 12 | 0 | 356.35 | 9 | 12 | 1.44 | 713.45 | 710 | 9 | 2.52E-03 | 75.0 | |
| 13 | 0 | 512.02* | 4 | 26 | 2.10 | 1025.09 | 1016 | 20 | 1.05E-03 | 430.1 | |
| 14 | 0 | 527.10 | 10 | 2 | 1.01 | 1055.27 | 1050 | 9 | 2.70E-03 | 42.5 | |
| 15 | 0 | 652.78 | 14 | 3 | 4.68 | 1306.87 | 1299 | 13 | 3.78E-03 | 38.6 | |
| 16 | 0 | 755.12* | 1 | 6 | 4.19 | 1511.73 | 1503 | 11 | 2.92E-04 | 539.2 | |
| 17 | 0 | 966.00 | 9 | 0 | 1.07 | 1933.89 | 1929 | 9 | 2.50E-03 | 33.3 | |
| 18 | 0 | 998.08 | 7 | 5 | 1.01 | 1998.11 | 1992 | 9 | 2.06E-03 | 63.4 | |
| 19 | 0 | 1461.89* | 22 | 7 | 1.56 | 2926.53 | 2919 | 13 | 6.22E-03 | 33.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:59:53

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147007.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:55:00 | Acquisition date | : 7-FEB-2014 08:59:23 |
| Sample ID | : G341147007 | Sample quantity | : 128.21 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA8 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.83  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 22 | 10.66* | 1.001E+00 | 1.228E+00 | 1.228E+00 | 65.95 |
| CR-51 | 320.08 | 48 | 9.91* | 3.324E+00 | 8.484E-01 | 8.459E+00 | 50.58 |
| TE-125M | 109.28 | 21 | 0.27* | 5.002E+00 | 8.889E+00 | 2.697E+01 | 80.82 |
| PB-210 | 46.54 | 4 | 4.25* | 3.933E-01 | 1.570E+00 | 1.582E+00 | 415.13 |
| BI-211 | 72.87 | ------ | 1.23 | 2.772E+00 | ------ Line Not Found | | ------ |
| | 351.06 | 14 | 12.92* | 3.117E+00 | 2.065E-01 | 2.065E-01 | 80.14 |
| PA-231 | 283.69 | ------ | 1.70* | 3.604E+00 | ------ Line Not Found | | ------ |
| | 301.36 | 14 | 5.35 | 3.461E+00 | 4.373E-01 | 4.373E-01 | 149.60 |
| TH-234 | 63.29 | 11 | 3.70* | 1.766E+00 | 9.427E-01 | 9.427E-01 | 236.23 |
| | 92.59 | 0 | 4.23 | 4.363E+00 | 8.847E-03 | 8.847E-03 | 10916.24 |
| U-238 | 63.29 | 11 | 3.70* | 1.766E+00 | 9.427E-01 | 9.427E-01 | 236.23 |
| | 92.59 | 0 | 4.23 | 4.363E+00 | 8.847E-03 | 8.847E-03 | 10916.24 |
| AM-241 | 59.54 | 13 | 35.90* | 1.387E+00 | 1.489E-01 | 1.489E-01 | 133.55 |
| ANH-511 | 511.00 | 4 | 100.00* | 2.405E+00 | 9.166E-03 | 9.166E-03 | 860.26 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:59:53.79

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147007.CNF;1 | | |
| Acquisition date | : 7-FEB-2014 08:59:23 | Sensitivity | : 3.000 |
| Detector ID | : GAM08 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.83 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:55:00 | Nuclide Library | : SOLID |
| Sample ID | : G341147007 | Analyst initials | : RXF2 |
| Batch Number | : 1359496 | Sample Quantity | : 1.2821E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 8-JUL-2013 09:26:34 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM08_500MLMB.CNF;9 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.228E+00 | 7.936E-01 | 7.049E-01 |
| CR-51 | 8.459E+00 | 4.194E+00 | 4.590E+00 |
| TE-125M | 2.697E+01 | 2.136E+01 | 4.060E+01 |
| PB-210 | 1.582E+00 | 6.438E+00 | 1.338E+01 |
| BI-211 | 2.065E-01 | 1.621E-01 | 2.188E-01 |
| PA-231 | -5.158E-01 | 1.361E+00 | 2.389E+00 |
| TH-234 | 9.427E-01 | 2.182E+00 | 2.722E+00 |
| U-238 | 9.427E-01 | 2.182E+00 | 2.722E+00 |
| AM-241 | 1.489E-01 | 1.949E-01 | 3.601E-01 |
| ANH-511 | 9.166E-03 | 7.727E-02 | 4.006E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 4.903E-01 | 7.771E-01 | 1.655E+00 | NOT IDENT. |
| NA-22 | -1.878E-02 | 3.409E-02 | 5.988E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.231E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -4.720E-04 | 3.314E-02 | 7.345E-02 | NOT IDENT. |
| SC-46 | -2.053E-02 | 5.935E-02 | 1.136E-01 | NOT IDENT. |
| V-48 | -1.310E+00 | 1.601E+00 | 2.645E+00 | NOT IDENT. |
| MN-54 | -9.348E-03 | 3.417E-02 | 6.640E-02 | NOT IDENT. |
| CO-56 | -3.829E-02 | 6.316E-02 | 1.134E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.617E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -7.325E-03 | 2.516E-02 | 4.656E-02 | NOT IDENT. |
| CO-58 | 5.980E-03 | 6.508E-02 | 1.370E-01 | NOT IDENT. |
| FE-59 | -2.342E-01 | 2.025E-01 | 2.606E-01 | NOT IDENT. |
| CO-60 | -1.715E-02 | 3.890E-02 | 7.014E-02 | NOT IDENT. |
| ZN-65 | -5.138E-02 | 9.340E-02 | 1.651E-01 | NOT IDENT. |
| GE-68 | -1.704E-01 | 1.342E+00 | 2.650E+00 | NOT IDENT. |
| AS-73 | 3.159E+00 | 2.452E+00 | 5.137E+00 | NOT IDENT. |
| AS-74 | 2.671E-01 | 1.300E+00 | 2.732E+00 | NOT IDENT. |
| SE-75 | -2.502E-02 | 7.014E-02 | 1.220E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 5.716E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -5.052E-01 | 2.472E+00 | 4.598E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | 5.783E-02 | 1.287E-01 | 2.123E-01 | NOT IDENT. |
| KR-85 | 0.000E+00 | 8.287E+00 | 1.961E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 9.836E-02 | 2.327E-01 | NOT IDENT. |
| RB-86 | -5.303E-01 | 1.149E+01 | 2.327E+01 | NOT IDENT. |
| Y-88 | 2.480E-02 | 4.966E-02 | 1.354E-01 | NOT IDENT. |
| Y-91 | -6.878E+00 | 3.402E+01 | 6.784E+01 | NOT IDENT. |
| NB-94 | 1.227E-02 | 2.514E-02 | 5.474E-02 | NOT IDENT. |
| NB-95 | -2.418E-02 | 7.992E-02 | 1.471E-01 | NOT IDENT. |
| NB-95M | -9.997E-01 | 3.990E-01 | 4.078E-01 | NOT IDENT. |
| ZR-95 | 2.010E-02 | 1.944E-01 | 3.275E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.193E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.897E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -9.293E-03 | 2.698E-02 | 4.947E-02 | NOT IDENT. |
| RH-102 | 3.276E-02 | 4.254E-02 | 9.765E-02 | NOT IDENT. |
| RU-103 | -3.248E-02 | 1.375E-01 | 2.586E-01 | NOT IDENT. |
| RH-106 | -6.812E-02 | 3.010E-01 | 5.669E-01 | NOT IDENT. |
| RU-106 | -6.812E-02 | 3.010E-01 | 5.669E-01 | NOT IDENT. |
| AG-108M | -5.066E-03 | 3.078E-02 | 5.779E-02 | NOT IDENT. |
| CD-109 | -5.227E-02 | 9.215E-01 | 1.446E+00 | NOT IDENT. |
| AG-110M | 3.019E-03 | 4.774E-02 | 1.005E-01 | NOT IDENT. |
| SN-113 | 7.895E-03 | 5.731E-02 | 1.153E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.923E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.790E-01 | 2.305E+00 | 4.242E+00 | NOT IDENT. |
| TE-123M | 1.250E-02 | 3.725E-02 | 7.155E-02 | NOT IDENT. |
| SB-124 | -1.704E-02 | 1.828E-01 | 4.017E-01 | NOT IDENT. |
| SB-125 | 3.380E-02 | 9.328E-02 | 1.884E-01 | FAIL ABUN |
| I-126 | -2.421E+00 | 1.015E+01 | 1.918E+01 | FAIL ABUN |
| SB-126 | 1.092E+00 | 9.168E+00 | 1.828E+01 | NOT IDENT. |
| SN-126 | -3.856E-02 | 7.911E-02 | 1.255E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.220E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.652E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.190E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.815E-02 | 4.140E-02 | 7.242E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | 2.542E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.123E-02 | 4.287E-02 | 8.206E-02 | NOT IDENT. |
| CS-135 | 3.514E-02 | 1.385E-01 | 2.392E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.984E+00 | 5.457E+00 | 1.217E+01 | FAIL ABUN |
| BA-137M | -7.867E-03 | 3.120E-02 | 5.785E-02 | NOT IDENT. |
| CS-137 | -8.311E-03 | 3.296E-02 | 6.111E-02 | NOT IDENT. |
| CE-139 | 1.132E-02 | 4.070E-02 | 7.775E-02 | NOT IDENT. |
| BA-140 | 2.715E+00 | 4.918E+00 | 1.248E+01 | NOT IDENT. |
| LA-140 | 2.715E+00 | 4.918E+00 | 1.248E+01 | NOT IDENT. |
| CE-141 | 2.187E-02 | 3.186E-01 | 5.838E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 7.139E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 8.279E-02 | 1.947E-01 | 3.854E-01 | NOT IDENT. |
| PM-144 | -2.001E-02 | 3.457E-02 | 5.941E-02 | NOT IDENT. |
| PR-144 | -1.536E+00 | 2.698E+00 | 4.647E+00 | NOT IDENT. |
| PM-146 | -4.045E-03 | 4.149E-02 | 7.915E-02 | NOT IDENT. |
| ND-147 | -1.690E+01 | 7.450E+01 | 1.191E+02 | FAIL ABUN |
| PM-147 | -2.440E+02 | 6.316E+02 | 1.158E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.403E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -5.484E-03 | 2.796E-02 | 4.970E-02 | NOT IDENT. |
| EU-152 | 1.788E-02 | 8.424E-02 | 1.621E-01 | NOT IDENT. |
| GD-153 | 9.573E-03 | 1.103E-01 | 1.787E-01 | NOT IDENT. |
| EU-154 | -5.116E-02 | 9.289E-02 | 1.632E-01 | NOT IDENT. |
| EU-155 | 5.781E-02 | 1.127E-01 | 2.012E-01 | NOT IDENT. |
| TB-160 | 3.185E-02 | 2.191E-01 | 4.668E-01 | FAIL ABUN |
| HO-166M | 1.493E-02 | 4.808E-02 | 1.008E-01 | NOT IDENT. |
| TM-171 | 1.043E+01 | 2.987E+01 | 5.712E+01 | NOT IDENT. |
| LU-176 | 1.987E-03 | 2.536E-02 | 4.584E-02 | NOT IDENT. |
| HF-181 | 9.795E-02 | 1.355E-01 | 2.927E-01 | NOT IDENT. |
| TA-182 | -8.060E-02 | 2.429E-01 | 4.528E-01 | NOT IDENT. |
| RE-183 | -3.453E-01 | 6.120E-01 | 9.074E-01 | FAIL ABUN |
| RE-184 | -2.119E-01 | 4.900E-01 | 9.098E-01 | NOT IDENT. |
| W-188 | 2.613E-01 | 1.391E+01 | 2.585E+01 | FAIL ABUN |
| IR-192 | 3.070E-02 | 7.158E-02 | 1.262E-01 | NOT IDENT. |
| HG-203 | 1.122E-01 | 1.082E-01 | 2.254E-01 | NOT IDENT. |
| BI-207 | -1.185E-02 | 4.682E-02 | 8.959E-02 | NOT IDENT. |
| TL-208 | 6.782E-03 | 3.910E-02 | 7.908E-02 | NOT IDENT. |
| PB-211 | 3.259E-01 | 6.089E-01 | 1.276E+00 | NOT IDENT. |
| BI-212 | 6.711E-02 | 4.098E-01 | 8.303E-01 | NOT IDENT. |
| PB-212 | 1.211E-02 | 6.909E-02 | 1.352E-01 | FAIL ABUN |
| BI-214 | 9.386E-03 | 7.835E-02 | 1.460E-01 | NOT IDENT. |
| PB-214 | 7.493E-02 | 5.885E-02 | 1.333E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | -1.009E-01 | 3.441E-01 | 6.463E-01 | NOT IDENT. |
| RN-222 | 9.386E-03 | 7.835E-02 | 1.460E-01 | NOT IDENT. |
| RA-223 | 2.570E-01 | 6.363E-01 | 1.116E+00 | NOT IDENT. |
| RA-224 | 5.755E-01 | 6.938E-01 | 1.355E+00 | NOT IDENT. |
| RA-226 | 9.386E-03 | 7.835E-02 | 1.460E-01 | NOT IDENT. |
| AC-227 | 7.167E-02 | 2.176E-01 | 4.228E-01 | FAIL ABUN |
| TH-227 | 7.167E-02 | 2.176E-01 | 4.228E-01 | FAIL ABUN |
| AC-228 | 1.342E-01 | 1.339E-01 | 3.090E-01 | NOT IDENT. |
| RA-228 | 1.342E-01 | 1.339E-01 | 3.090E-01 | NOT IDENT. |
| TH-228 | 1.211E-02 | 6.909E-02 | 1.352E-01 | FAIL ABUN |
| TH-229 | -1.314E-01 | 4.938E-01 | 8.894E-01 | NOT IDENT. |
| TH-230 | 9.386E-03 | 7.834E-02 | 1.460E-01 | NOT IDENT. |
| TH-231 | 2.570E-01 | 6.363E-01 | 1.116E+00 | NOT IDENT. |
| TH-232 | 1.342E-01 | 1.339E-01 | 3.090E-01 | NOT IDENT. |
| PA-233 | -1.799E-02 | 7.167E-02 | 1.098E-01 | FAIL ABUN |
| PA-234 | -2.565E-02 | 2.302E-01 | 4.674E-01 | FAIL ABUN |
| PA-234M | 6.749E-01 | 4.133E+00 | 8.373E+00 | NOT IDENT. |
| U-234 | 9.385E-03 | 7.834E-02 | 1.460E-01 | NOT IDENT. |
| U-235 | -4.458E-02 | 1.949E-01 | 3.479E-01 | FAIL ABUN |
| NP-237 | -1.799E-02 | 7.167E-02 | 1.098E-01 | FAIL ABUN |
| NP-238 | 0.000E+00 | 1.480E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.639E-01 | 3.160E-01 | 5.720E-01 | NOT IDENT. |
| PU-239 | 1.136E+02 | 2.759E+02 | 5.453E+02 | NOT IDENT. |
| AM-243 | 1.014E-02 | 6.543E-02 | 1.058E-01 | NOT IDENT. |
| CM-243 | 2.398E-02 | 1.057E-01 | 1.918E-01 | NOT IDENT. |
| CM-247 | 7.349E-03 | 3.186E-02 | 6.432E-02 | NOT IDENT. |
| CF-249 | 4.752E-03 | 3.499E-02 | 6.959E-02 | NOT IDENT. |
| CF-251 | -2.708E-03 | 1.176E-01 | 2.186E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:59:50.09

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 47.87 | 10 | 25 | 0.79 | 95.88 | 91 | 7 | 2.84E-03 | 88.1 | |
| 2 | 3 | 59.77 | 13 | 25 | 1.40 | 119.70 | 116 | 15 | 3.52E-03 | 66.8 | 2.84E+00 |
| 3 | 3 | 63.37 | 33 | 38 | 1.41 | 126.91 | 116 | 15 | 9.21E-03 | 36.1 | |
| 4 | 0 | 77.91 | 43 | 36 | 3.40 | 156.02 | 152 | 11 | 1.20E-02 | 31.4 | |
| 5 | 0 | 92.91 | 59 | 47 | 0.92 | 186.05 | 182 | 9 | 1.64E-02 | 24.7 | |
| 6 | 0 | 109.91 | 21 | 18 | 1.73 | 220.07 | 217 | 7 | 5.69E-03 | 40.4 | |
| 7 | 0 | 186.19 | 26 | 45 | 1.10 | 372.79 | 368 | 12 | 7.32E-03 | 53.3 | |
| 8 | 0 | 232.99 | 17 | 18 | 1.06 | 466.49 | 463 | 7 | 4.68E-03 | 48.1 | |
| 9 | 0 | 273.62 | 4 | 24 | 0.70 | 547.82 | 540 | 10 | 1.06E-03 | 241.3 | |
| 10 | 0 | 301.45 | 14 | 21 | 5.60 | 603.55 | 595 | 12 | 3.84E-03 | 74.8 | |
| 11 | 0 | 320.18 | 48 | 15 | 8.55 | 641.03 | 631 | 21 | 1.33E-02 | 25.3 | |
| 12 | 0 | 352.04 | 21 | 2 | 1.03 | 704.82 | 700 | 9 | 5.80E-03 | 25.4 | |
| 13 | 0 | 356.35 | 9 | 12 | 1.44 | 713.45 | 710 | 9 | 2.52E-03 | 75.0 | |
| 14 | 0 | 512.02 | 72 | 26 | 2.10 | 1025.09 | 1016 | 20 | 1.99E-02 | 22.0 | |
| 15 | 0 | 527.10 | 10 | 2 | 1.01 | 1055.27 | 1050 | 9 | 2.70E-03 | 42.5 | |
| 16 | 0 | 652.78 | 14 | 3 | 4.68 | 1306.87 | 1299 | 13 | 3.78E-03 | 38.6 | |
| 17 | 0 | 755.12 | 8 | 6 | 4.19 | 1511.73 | 1503 | 11 | 2.08E-03 | 70.7 | |
| 18 | 0 | 966.00 | 9 | 0 | 1.07 | 1933.89 | 1929 | 9 | 2.50E-03 | 33.3 | |
| 19 | 0 | 998.08 | 7 | 5 | 1.01 | 1998.11 | 1992 | 9 | 2.06E-03 | 63.4 | |
| 20 | 0 | 1461.89 | 26 | 7 | 1.56 | 2926.53 | 2919 | 13 | 7.08E-03 | 28.6 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:59:52.10

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 22 | 10.66* | 1.001E+00 | 1.228E+00 | 1.228E+00 | 65.95 |
| CR-51 | 320.08 | 48 | 9.91* | 3.324E+00 | 8.484E-01 | 8.459E+00 | 50.58 |
| TE-125M | 109.28 | 21 | 0.27* | 5.002E+00 | 8.889E+00 | 2.697E+01 | 80.82 |
| PB-210 | 46.54 | 4 | 4.25* | 3.933E-01 | 1.570E+00 | 1.582E+00 | 415.13 |
| BI-211 | 72.87 | ------ | 1.23 | 2.772E+00 | ------ Line Not Found | | ------ |
| | 351.06 | 14 | 12.92* | 3.117E+00 | 2.065E-01 | 2.065E-01 | 80.14 |
| PA-231 | 283.69 | ------ | 1.70* | 3.604E+00 | ------ Line Not Found | | ------ |
| | 301.36 | 14 | 5.35 | 3.461E+00 | 4.373E-01 | 4.373E-01 | 149.60 |
| TH-234 | 63.29 | 11 | 3.70* | 1.766E+00 | 9.427E-01 | 9.427E-01 | 236.23 |
| | 92.59 | 0 | 4.23 | 4.363E+00 | 8.847E-03 | 8.847E-03 | 10916.24 |
| U-238 | 63.29 | 11 | 3.70* | 1.766E+00 | 9.427E-01 | 9.427E-01 | 236.23 |
| | 92.59 | 0 | 4.23 | 4.363E+00 | 8.847E-03 | 8.847E-03 | 10916.24 |
| AM-241 | 59.54 | 13 | 35.90* | 1.387E+00 | 1.489E-01 | 1.489E-01 | 133.55 |
| ANH-511 | 511.00 | 4 | 100.00* | 2.405E+00 | 9.166E-03 | 9.166E-03 | 860.26 |

Flag: "*" = Keyline

Sample ID : G341147007 Acquisition date : 7-FEB-2014 08:59:23

Total number of lines in spectrum 19
Number of unidentified lines 3
Number of lines tentatively identified by NID 16 84.21%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.228E+00 | 1.228E+00 | 0.810E+00 | 65.95 | |
| CR-51 | 27.70D | 9.97 | 8.484E-01 | 8.459E+00 | 4.279E+00 | 50.58 | |
| TE-125M | 57.40D | 3.03 | 8.889E+00 | 2.697E+01 | 2.179E+01 | 80.82 | |
| PB-210 | 22.20Y | 1.01 | 1.570E+00 | 1.582E+00 | 6.569E+00 | 415.13 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.065E-01 | 2.065E-01 | 1.655E-01 | 80.14 | |
| PA-231 | 7.04E+08Y | 1.00 | 4.373E-01 | 4.373E-01 | 6.543E-01 | 149.60 | K |
| TH-234 | 4.47E+09Y | 1.00 | 9.427E-01 | 9.427E-01 | 22.27E-01 | 236.23 | |
| U-238 | 4.47E+09Y | 1.00 | 9.427E-01 | 9.427E-01 | 22.27E-01 | 236.23 | |
| AM-241 | 432.60Y | 1.00 | 1.489E-01 | 1.489E-01 | 1.989E-01 | 133.55 | |
| ANH-511 | 1.00E+09Y | 1.00 | 9.166E-03 | 9.166E-03 | 78.85E-03 | 860.26 | |
| Total Activity : | | | 1.522E+01 | 4.092E+01 | | | |

Grand Total Activity : 1.522E+01 4.092E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147007 Acquisition date : 7-FEB-2014 08:59:23

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 77.91 | 36 | 36 | 3.40 | 156.02 | 152 | 11 | 9.90E-03 | 77.8 | 3.26E+00 | T |
| 0 | 232.99 | 17 | 18 | 1.06 | 466.49 | 463 | 7 | 4.68E-03 | 96.2 | 4.10E+00 | |
| 0 | 273.62 | 4 | 24 | 0.70 | 547.82 | 540 | 10 | 1.06E-03 | **** | 3.69E+00 | T |
| 0 | 356.35 | 9 | 12 | 1.44 | 713.45 | 710 | 9 | 2.52E-03 | **** | 3.09E+00 | T |
| 0 | 527.10 | 10 | 2 | 1.01 | 1055.27 | 1050 | 9 | 2.70E-03 | 85.1 | 2.36E+00 | T |
| 0 | 652.78 | 14 | 3 | 4.68 | 1306.87 | 1299 | 13 | 3.78E-03 | 77.1 | 2.01E+00 | |
| 0 | 755.12 | 1 | 6 | 4.19 | 1511.73 | 1503 | 11 | 2.92E-04 | **** | 1.79E+00 | T |
| 0 | 966.00 | 9 | 0 | 1.07 | 1933.89 | 1929 | 9 | 2.50E-03 | 66.7 | 1.45E+00 | T |
| 0 | 998.08 | 7 | 5 | 1.01 | 1998.11 | 1992 | 9 | 2.06E-03 | **** | 1.40E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:00:04.22

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147007.CNF;1    *
* Acquisition date :  7-FEB-2014 08:59:23 Sensitivity     : 3.000           *
* Detector ID      : GAM08                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.83     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:55:00 Nuclide Library : SOLID           *
* Sample ID        : G341147007           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.2821E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   :  8-JUL-2013 09:26:34 Eff. Geometry   : 500MLMB        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM08_500MLMB.CNF;9       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 2.783E-01 |
| CR-51 | 2.056E+00 |
| TE-125M | 1.852E+01 |
| PB-210 | 6.107E+00 |
| BI-211 | 8.981E-02 |
| PA-231 | 1.066E+00 |
| TH-234 | 1.240E+00 |
| U-238 | 1.240E+00 |
| AM-241 | 1.639E-01 |
| ANH-511 | 1.674E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 7.282E-01 | NOT IDENT. |
| NA-22 | 2.242E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.750E-02 | NOT IDENT. |
| SC-46 | 4.592E-02 | NOT IDENT. |
| V-48 | 1.022E+00 | NOT IDENT. |
| MN-54 | 2.729E-02 | NOT IDENT. |
| CO-56 | 4.558E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.103E-02 | NOT IDENT. |
| CO-58 | 5.687E-02 | NOT IDENT. |
| FE-59 | 8.468E-02 | NOT IDENT. |
| CO-60 | 2.751E-02 | NOT IDENT. |
| ZN-65 | 6.655E-02 | NOT IDENT. |
| GE-68 | 1.088E+00 | NOT IDENT. |
| AS-73 | 2.354E+00 | NOT IDENT. |
| AS-74 | 1.142E+00 | NOT IDENT. |
| SE-75 | 5.498E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.928E+00 | NOT IDENT. |
| RB-83 | 9.069E-02 | NOT IDENT. |

| | | |
|---|---|---|
| KR-85 | 9.034E+00 | NOT IDENT. |
| SR-85 | 1.072E-01 | NOT IDENT. |
| RB-86 | 9.505E+00 | NOT IDENT. |
| Y-88 | 5.068E-02 | NOT IDENT. |
| Y-91 | 2.628E+01 | NOT IDENT. |
| NB-94 | 2.318E-02 | NOT IDENT. |
| NB-95 | 6.140E-02 | NOT IDENT. |
| NB-95M | 1.827E-01 | NOT IDENT. |
| ZR-95 | 1.417E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.238E-02 | NOT IDENT. |
| RH-102 | 4.164E-02 | NOT IDENT. |
| RU-103 | 1.114E-01 | NOT IDENT. |
| RH-106 | 2.381E-01 | NOT IDENT. |
| RU-106 | 2.381E-01 | NOT IDENT. |
| AG-108M | 2.567E-02 | NOT IDENT. |
| CD-109 | 6.630E-01 | NOT IDENT. |
| AG-110M | 4.124E-02 | NOT IDENT. |
| SN-113 | 5.034E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.924E+00 | NOT IDENT. |
| TE-123M | 3.258E-02 | NOT IDENT. |
| SB-124 | 1.474E-01 | NOT IDENT. |
| SB-125 | 8.384E-02 | FAIL ABUN |
| I-126 | 7.908E+00 | FAIL ABUN |
| SB-126 | 7.764E+00 | NOT IDENT. |
| SN-126 | 5.748E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.203E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.514E-02 | NOT IDENT. |
| CS-135 | 1.064E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.153E+00 | FAIL ABUN |
| BA-137M | 2.447E-02 | NOT IDENT. |
| CS-137 | 2.585E-02 | NOT IDENT. |
| CE-139 | 3.570E-02 | NOT IDENT. |
| BA-140 | 4.926E+00 | NOT IDENT. |
| LA-140 | 4.926E+00 | NOT IDENT. |
| CE-141 | 2.694E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.756E-01 | NOT IDENT. |
| PM-144 | 2.473E-02 | NOT IDENT. |
| PR-144 | 1.936E+00 | NOT IDENT. |
| PM-146 | 3.478E-02 | NOT IDENT. |
| ND-147 | 5.103E+01 | FAIL ABUN |
| PM-147 | 5.216E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.229E-02 | NOT IDENT. |
| EU-152 | 7.154E-02 | NOT IDENT. |
| GD-153 | 8.164E-02 | NOT IDENT. |
| EU-154 | 6.108E-02 | NOT IDENT. |
| EU-155 | 9.268E-02 | NOT IDENT. |
| TB-160 | 1.930E-01 | FAIL ABUN |
| HO-166M | 4.262E-02 | NOT IDENT. |
| TM-171 | 2.596E+01 | NOT IDENT. |
| LU-176 | 2.045E-02 | NOT IDENT. |
| HF-181 | 1.288E-01 | NOT IDENT. |
| TA-182 | 1.827E-01 | NOT IDENT. |
| RE-183 | 4.063E-01 | FAIL ABUN |
| RE-184 | 3.730E-01 | NOT IDENT. |
| W-188 | 1.154E+01 | FAIL ABUN |
| IR-192 | 5.635E-02 | NOT IDENT. |
| HG-203 | 1.023E-01 | NOT IDENT. |
| BI-207 | 3.675E-02 | NOT IDENT. |
| TL-208 | 3.529E-02 | NOT IDENT. |
| PB-211 | 5.645E-01 | NOT IDENT. |
| BI-212 | 3.508E-01 | NOT IDENT. |
| PB-212 | 6.311E-02 | FAIL ABUN |
| BI-214 | 6.480E-02 | NOT IDENT. |
| PB-214 | 5.953E-02 | FAIL ABUN |
| RN-219 | 2.811E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RN-222 | 6.480E-02 | NOT IDENT. |
| RA-223 | 4.978E-01 | NOT IDENT. |
| RA-224 | 6.296E-01 | NOT IDENT. |
| RA-226 | 6.480E-02 | NOT IDENT. |
| AC-227 | 1.899E-01 | FAIL ABUN |
| TH-227 | 1.899E-01 | FAIL ABUN |
| AC-228 | 1.344E-01 | NOT IDENT. |
| RA-228 | 1.344E-01 | NOT IDENT. |
| TH-228 | 6.311E-02 | FAIL ABUN |
| TH-229 | 4.056E-01 | NOT IDENT. |
| TH-230 | 6.480E-02 | NOT IDENT. |
| TH-231 | 4.978E-01 | NOT IDENT. |
| TH-232 | 1.344E-01 | NOT IDENT. |
| PA-233 | 4.883E-02 | FAIL ABUN |
| PA-234 | 1.889E-01 | FAIL ABUN |
| PA-234M | 3.514E+00 | NOT IDENT. |
| U-234 | 6.480E-02 | NOT IDENT. |
| U-235 | 1.600E-01 | FAIL ABUN |
| NP-237 | 4.883E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 2.567E-01 | NOT IDENT. |
| PU-239 | 2.486E+02 | NOT IDENT. |
| AM-243 | 4.892E-02 | NOT IDENT. |
| CM-243 | 8.803E-02 | NOT IDENT. |
| CM-247 | 2.831E-02 | NOT IDENT. |
| CF-249 | 3.069E-02 | NOT IDENT. |
| CF-251 | 9.974E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:00:08.82

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147007.CNF;1 | | |
| Acquisition date | : 7-FEB-2014 08:59:23 | Sensitivity | : 3.000 |
| Detector ID | : GAM08 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.83 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 11:55:00 | Nuclide Library | : SOLID |
| Sample ID | : G341147007 | Analyst initials | : RXF2 |
| Batch Number | : 1359496 | Sample Quantity | : 1.2821E+02 GRAM |
| | | Quantity Err(%) | : 1.5599E-03 % |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 8-JUL-2013 09:26:34 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM08_500MLMB.CNF;9 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.228E+00 | 8.008E-01 | 8.008E-01 |
| CR-51 | 8.459E+00 | 4.251E+00 | 4.251E+00 |
| TE-125M | 2.697E+01 | 2.154E+01 | 2.154E+01 |
| PB-210 | 1.582E+00 | 6.440E+00 | 6.440E+00 |
| BI-211 | 2.065E-01 | 1.631E-01 | 1.631E-01 |
| PA-231 | -5.158E-01 | 1.362E+00 | 1.362E+00 |
| TH-234 | 9.427E-01 | 2.193E+00 | 2.193E+00 |
| U-238 | 9.427E-01 | 2.193E+00 | 2.193E+00 |
| AM-241 | 1.489E-01 | 1.954E-01 | 1.954E-01 |
| ANH-511 | 9.166E-03 | 7.727E-02 | 7.727E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 4.903E-01 | 7.782E-01 | 8.090E-01 | NOT IDENT. |
| NA-22 | -1.878E-02 | 3.412E-02 | 3.516E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.241E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -4.720E-04 | 3.314E-02 | 3.314E-02 | NOT IDENT. |
| SC-46 | -2.053E-02 | 5.941E-02 | 6.012E-02 | NOT IDENT. |
| V-48 | -1.310E+00 | 1.611E+00 | 1.716E+00 | NOT IDENT. |
| MN-54 | -9.348E-03 | 3.419E-02 | 3.444E-02 | NOT IDENT. |
| CO-56 | -3.829E-02 | 6.333E-02 | 6.564E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.622E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -7.325E-03 | 2.517E-02 | 2.539E-02 | NOT IDENT. |
| CO-58 | 5.980E-03 | 6.508E-02 | 6.513E-02 | NOT IDENT. |
| FE-59 | -2.342E-01 | 2.058E-01 | 2.313E-01 | NOT IDENT. |
| CO-60 | -1.715E-02 | 3.893E-02 | 3.969E-02 | NOT IDENT. |
| ZN-65 | -5.138E-02 | 9.370E-02 | 9.652E-02 | NOT IDENT. |
| GE-68 | -1.704E-01 | 1.342E+00 | 1.344E+00 | NOT IDENT. |
| AS-73 | 3.159E+00 | 2.544E+00 | 2.916E+00 | NOT IDENT. |
| AS-74 | 2.671E-01 | 1.301E+00 | 1.306E+00 | NOT IDENT. |
| SE-75 | -2.502E-02 | 7.017E-02 | 7.107E-02 | NOT IDENT. |
| BR-77 | 2.312E+10 | 8.385E+10 | 8.449E+10 | SHORT HLIF |
| SR-82 | -5.052E-01 | 2.472E+00 | 2.483E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-83 | 5.783E-02 | 1.291E-01 | 1.317E-01 | NOT IDENT. |
| KR-85 | 2.134E+01 | 8.482E+00 | 1.283E+01 | NOT IDENT. |
| SR-85 | 2.529E-01 | 1.007E-01 | 1.521E-01 | NOT IDENT. |
| RB-86 | -5.303E-01 | 1.149E+01 | 1.149E+01 | NOT IDENT. |
| Y-88 | 2.480E-02 | 4.970E-02 | 5.094E-02 | NOT IDENT. |
| Y-91 | -6.878E+00 | 3.403E+01 | 3.417E+01 | NOT IDENT. |
| NB-94 | 1.227E-02 | 2.516E-02 | 2.576E-02 | NOT IDENT. |
| NB-95 | -2.418E-02 | 7.995E-02 | 8.069E-02 | NOT IDENT. |
| NB-95M | -9.997E-01 | 4.125E-01 | 6.109E-01 | NOT IDENT. |
| ZR-95 | 2.010E-02 | 1.944E-01 | 1.946E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 3.092E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 8.231E+38 | 1.195E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.127E+08 | 1.897E+09 | 1.900E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 3.722E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -9.293E-03 | 2.705E-02 | 2.737E-02 | NOT IDENT. |
| RH-102 | 3.276E-02 | 4.268E-02 | 4.517E-02 | NOT IDENT. |
| RU-103 | -3.248E-02 | 1.376E-01 | 1.384E-01 | NOT IDENT. |
| RH-106 | -6.812E-02 | 3.010E-01 | 3.026E-01 | NOT IDENT. |
| RU-106 | -6.812E-02 | 3.010E-01 | 3.026E-01 | NOT IDENT. |
| AG-108M | -5.066E-03 | 3.078E-02 | 3.086E-02 | NOT IDENT. |
| CD-109 | -5.227E-02 | 9.215E-01 | 9.218E-01 | NOT IDENT. |
| AG-110M | 3.019E-03 | 4.774E-02 | 4.776E-02 | NOT IDENT. |
| SN-113 | 7.895E-03 | 5.732E-02 | 5.743E-02 | NOT IDENT. |
| CD-115 | 2.306E+11 | 1.939E+11 | 2.200E+11 | SHORT HLIF |
| SN-117M | -1.790E-01 | 2.305E+00 | 2.307E+00 | NOT IDENT. |
| TE-123M | 1.250E-02 | 3.727E-02 | 3.769E-02 | NOT IDENT. |
| SB-124 | -1.704E-02 | 1.828E-01 | 1.830E-01 | NOT IDENT. |
| SB-125 | 3.380E-02 | 9.332E-02 | 9.456E-02 | FAIL ABUN |
| I-126 | -2.421E+00 | 1.015E+01 | 1.021E+01 | FAIL ABUN |
| SB-126 | 1.092E+00 | 9.169E+00 | 9.182E+00 | NOT IDENT. |
| SN-126 | -3.856E-02 | 7.918E-02 | 8.107E-02 | FAIL ABUN |
| SB-127 | 4.954E+04 | 1.220E+06 | 1.221E+06 | SHORT HLIF |
| I-131 | -2.670E+01 | 6.656E+01 | 6.764E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 1.042E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | 7.800E+06 | 1.196E+07 | 1.247E+07 | SHORT HLIF |
| BA-133 | 2.815E-02 | 4.146E-02 | 4.336E-02 | FAIL ABUN |
| I-133 | 8.499E+29 | 2.587E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.123E-02 | 4.289E-02 | 4.318E-02 | NOT IDENT. |
| CS-135 | 3.514E-02 | 1.386E-01 | 1.395E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.972E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.984E+00 | 5.478E+00 | 5.640E+00 | FAIL ABUN |
| BA-137M | -7.867E-03 | 3.121E-02 | 3.141E-02 | NOT IDENT. |
| CS-137 | -8.311E-03 | 3.297E-02 | 3.318E-02 | NOT IDENT. |
| CE-139 | 1.132E-02 | 4.077E-02 | 4.109E-02 | NOT IDENT. |
| BA-140 | 2.715E+00 | 4.923E+00 | 5.073E+00 | NOT IDENT. |
| LA-140 | 2.715E+00 | 4.923E+00 | 5.073E+00 | NOT IDENT. |
| CE-141 | 2.187E-02 | 3.186E-01 | 3.187E-01 | NOT IDENT. |
| CE-143 | -4.863E+18 | 7.152E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 8.279E-02 | 1.949E-01 | 1.985E-01 | NOT IDENT. |
| PM-144 | -2.001E-02 | 3.461E-02 | 3.577E-02 | NOT IDENT. |
| PR-144 | -1.536E+00 | 2.701E+00 | 2.788E+00 | NOT IDENT. |
| PM-146 | -4.045E-03 | 4.149E-02 | 4.153E-02 | NOT IDENT. |
| ND-147 | -1.690E+01 | 7.452E+01 | 7.491E+01 | FAIL ABUN |
| PM-147 | -2.440E+02 | 6.322E+02 | 6.417E+02 | NOT IDENT. |
| PM-149 | 4.036E+11 | 2.403E+12 | 2.410E+12 | SHORT HLIF |
| EU-150 | -5.484E-03 | 2.796E-02 | 2.807E-02 | NOT IDENT. |
| EU-152 | 1.788E-02 | 8.426E-02 | 8.464E-02 | NOT IDENT. |
| GD-153 | 9.573E-03 | 1.103E-01 | 1.104E-01 | NOT IDENT. |
| EU-154 | -5.116E-02 | 9.298E-02 | 9.580E-02 | NOT IDENT. |
| EU-155 | 5.781E-02 | 1.129E-01 | 1.158E-01 | NOT IDENT. |
| TB-160 | 3.185E-02 | 2.191E-01 | 2.196E-01 | FAIL ABUN |
| HO-166M | 1.493E-02 | 4.810E-02 | 4.857E-02 | NOT IDENT. |
| TM-171 | 1.043E+01 | 2.989E+01 | 3.026E+01 | NOT IDENT. |
| LU-176 | 1.987E-03 | 2.536E-02 | 2.538E-02 | NOT IDENT. |
| HF-181 | 9.795E-02 | 1.358E-01 | 1.428E-01 | NOT IDENT. |
| TA-182 | -8.060E-02 | 2.430E-01 | 2.457E-01 | NOT IDENT. |
| RE-183 | -3.453E-01 | 6.134E-01 | 6.329E-01 | FAIL ABUN |
| RE-184 | -2.119E-01 | 4.912E-01 | 5.004E-01 | NOT IDENT. |
| W-188 | 2.613E-01 | 1.391E+01 | 1.391E+01 | FAIL ABUN |
| IR-192 | 3.070E-02 | 7.162E-02 | 7.295E-02 | NOT IDENT. |
| HG-203 | 1.122E-01 | 1.086E-01 | 1.198E-01 | NOT IDENT. |
| BI-207 | -1.185E-02 | 4.685E-02 | 4.716E-02 | NOT IDENT. |
| TL-208 | 6.782E-03 | 3.910E-02 | 3.922E-02 | NOT IDENT. |
| PB-211 | 3.259E-01 | 6.096E-01 | 6.271E-01 | NOT IDENT. |
| BI-212 | 6.711E-02 | 4.098E-01 | 4.110E-01 | NOT IDENT. |
| PB-212 | 1.211E-02 | 6.909E-02 | 6.931E-02 | FAIL ABUN |
| BI-214 | 9.386E-03 | 7.835E-02 | 7.847E-02 | NOT IDENT. |
| PB-214 | 7.493E-02 | 5.917E-02 | 6.814E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RN-219 | -1.009E-01 | 3.445E-01 | 3.474E-01 | NOT IDENT. |
| RN-222 | 9.386E-03 | 7.835E-02 | 7.847E-02 | NOT IDENT. |
| RA-223 | 2.570E-01 | 6.368E-01 | 6.472E-01 | NOT IDENT. |
| RA-224 | 5.755E-01 | 6.956E-01 | 7.424E-01 | NOT IDENT. |
| RA-226 | 9.386E-03 | 7.835E-02 | 7.847E-02 | NOT IDENT. |
| AC-227 | 7.167E-02 | 2.179E-01 | 2.202E-01 | FAIL ABUN |
| TH-227 | 7.167E-02 | 2.179E-01 | 2.202E-01 | FAIL ABUN |
| AC-228 | 1.342E-01 | 1.352E-01 | 1.481E-01 | NOT IDENT. |
| RA-228 | 1.342E-01 | 1.352E-01 | 1.481E-01 | NOT IDENT. |
| TH-228 | 1.211E-02 | 6.909E-02 | 6.931E-02 | FAIL ABUN |
| TH-229 | -1.314E-01 | 4.939E-01 | 4.974E-01 | NOT IDENT. |
| TH-230 | 9.386E-03 | 7.834E-02 | 7.846E-02 | NOT IDENT. |
| TH-231 | 2.570E-01 | 6.368E-01 | 6.472E-01 | NOT IDENT. |
| TH-232 | 1.342E-01 | 1.352E-01 | 1.481E-01 | NOT IDENT. |
| PA-233 | -1.799E-02 | 7.169E-02 | 7.215E-02 | FAIL ABUN |
| PA-234 | -2.565E-02 | 2.321E-01 | 2.324E-01 | FAIL ABUN |
| PA-234M | 6.749E-01 | 4.134E+00 | 4.145E+00 | NOT IDENT. |
| U-234 | 9.385E-03 | 7.834E-02 | 7.846E-02 | NOT IDENT. |
| U-235 | -4.458E-02 | 1.949E-01 | 1.960E-01 | FAIL ABUN |
| NP-237 | -1.799E-02 | 7.169E-02 | 7.215E-02 | FAIL ABUN |
| NP-238 | -1.861E+12 | 1.502E+12 | 1.721E+12 | SHORT HLIF |
| NP-239 | -1.639E-01 | 3.167E-01 | 3.252E-01 | NOT IDENT. |
| PU-239 | 1.136E+02 | 2.762E+02 | 2.809E+02 | NOT IDENT. |
| AM-243 | 1.014E-02 | 6.544E-02 | 6.560E-02 | NOT IDENT. |
| CM-243 | 2.398E-02 | 1.058E-01 | 1.063E-01 | NOT IDENT. |
| CM-247 | 7.349E-03 | 3.189E-02 | 3.206E-02 | NOT IDENT. |
| CF-249 | 4.752E-03 | 3.499E-02 | 3.506E-02 | NOT IDENT. |
| CF-251 | -2.708E-03 | 1.176E-01 | 1.176E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 31.7644 | 94.67 | 30.4717 | 193.51 | 40.6039 |
| 45.60 | 25.8658 | 94.87 | 30.4823 | 197.03 | 34.9338 |
| 46.54 | 36.6120 | 97.43 | 30.6175 | 198.01 | 36.9128 |
| 49.72 | 0.0000 | 98.43 | 37.4854 | 201.83 | 49.7389 |
| 51.35 | 37.0871 | 98.44 | 37.4860 | 205.31 | 36.2150 |
| 52.39 | 27.8901 | 99.53 | 37.5554 | 210.85 | 28.5451 |
| 53.44 | 20.7147 | 100.11 | 31.8963 | 215.65 | 30.6601 |
| 57.36 | 0.0000 | 103.18 | 41.2200 | 222.11 | 25.8784 |
| 57.53 | 39.2354 | 103.37 | 37.7969 | 227.09 | 29.7175 |
| 57.98 | 34.5645 | 105.21 | 35.8430 | 227.38 | 29.7256 |
| 59.32 | 34.6753 | 105.31 | 35.8489 | 228.16 | 0.0000 |
| 59.54 | 34.6933 | 106.12 | 43.1442 | 228.18 | 24.0275 |
| 63.29 | 34.9963 | 109.28 | 36.4252 | 117.23 | 24.0275 |
| 63.58 | 42.9784 | 111.00 | 29.5673 | 235.69 | 88.7251 |
| 64.28 | 39.8577 | 111.76 | 0.0000 | 235.96 | 88.7473 |
| 66.73 | 24.0453 | 116.30 | 0.0000 | 238.63 | 35.3845 |
| 67.24 | 22.4674 | 117.23 | 33.3647 | 238.98 | 0.0000 |
| 67.75 | 35.3452 | 121.12 | 33.5595 | 240.99 | 36.4746 |
| 69.67 | 38.7186 | 121.22 | 33.5646 | 242.00 | 73.0162 |
| 70.83 | 37.7358 | 121.78 | 35.3603 | 244.70 | 42.6976 |
| 72.81 | 50.6681 | 122.06 | 33.6062 | 252.40 | 0.0000 |
| 72.87 | 50.6743 | 123.07 | 29.2276 | 252.80 | 30.7198 |
| 74.66 | 47.2750 | 127.23 | 35.6413 | 254.15 | 0.0000 |
| 74.82 | 37.5063 | 129.30 | 29.4908 | 256.23 | 21.5689 |
| 74.97 | 37.5178 | 131.20 | 34.9465 | 260.90 | 0.0000 |
| 77.11 | 60.6159 | 133.02 | 33.2385 | 264.66 | 30.0036 |
| 79.69 | 39.5197 | 133.52 | 28.7668 | 268.22 | 18.2644 |
| 80.12 | 42.8491 | 136.00 | 39.6897 | 269.46 | 21.6077 |
| 80.19 | 0.0000 | 136.47 | 39.7152 | 271.23 | 26.6340 |
| 80.57 | 44.5360 | 140.51 | 0.0000 | 273.65 | 35.0279 |
| 81.00 | 46.2242 | 143.76 | 41.0164 | 276.40 | 33.4360 |
| 81.07 | 46.2304 | 144.24 | 48.3390 | 277.37 | 31.7897 |
| 83.79 | 34.8538 | 145.44 | 39.2801 | 277.60 | 27.8910 |
| 85.43 | 43.2859 | 152.43 | 25.8084 | 278.00 | 29.2954 |
| 86.55 | 51.1616 | 153.25 | 22.1444 | 279.20 | 17.8041 |
| 86.79 | 51.1843 | 323.87 | 23.0949 | 279.54 | 12.5711 |
| 86.94 | 51.1985 | 156.02 | 39.8135 | 280.46 | 24.1129 |
| 87.09 | 51.2128 | 158.56 | 29.7219 | 283.69 | 28.3810 |
| 87.57 | 49.4753 | 159.00 | 26.0206 | 284.31 | 0.0000 |
| 88.03 | 41.8219 | 162.33 | 42.9221 | 285.41 | 28.4205 |
| 88.34 | 41.8455 | 163.33 | 41.1057 | 285.90 | 0.0000 |
| 88.47 | 40.1814 | 165.86 | 37.4823 | 287.50 | 21.0880 |
| 89.96 | 33.5753 | 176.31 | 29.4052 | 290.67 | 23.2555 |
| 91.11 | 43.7383 | 176.60 | 27.5172 | 293.27 | 0.0000 |
| 92.59 | 42.7293 | 177.52 | 37.0445 | 351.93 | 22.0667 |
| 93.35 | 42.7867 | 181.07 | 0.0000 | 295.96 | 18.6828 |
| 94.56 | 30.4658 | 184.41 | 37.3320 | 879.38 | 30.6347 |
| 94.65 | 30.4706 | 143.76 | 33.5516 | 299.98 | 20.2324 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 20.2342 | 487.02 | 14.4183 | 702.65 | 6.3806 |
| 300.13 | 20.2348 | 492.35 | 0.0000 | 706.68 | 11.7168 |
| 301.36 | 13.6449 | 497.08 | 15.4631 | 711.68 | 7.4713 |
| 302.85 | 15.3683 | 505.52 | 17.7978 | 720.70 | 9.6409 |
| 256.23 | 23.9371 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 22.0213 | 511.00 | 8.7623 | 722.78 | 11.7930 |
| 308.46 | 13.9343 | 514.00 | 8.7759 | 722.91 | 12.8660 |
| 311.90 | 25.7922 | 514.00 | 8.7759 | 723.31 | 11.7957 |
| 316.51 | 17.2546 | 520.40 | 6.5223 | 724.19 | 15.0179 |
| 319.41 | 24.8576 | 520.69 | 0.0000 | 727.33 | 8.5924 |
| 320.08 | 24.8699 | 522.65 | 0.0000 | 733.00 | 8.6117 |
| 321.04 | 24.8878 | 527.90 | 0.0000 | 735.93 | 6.4663 |
| 323.87 | 17.3494 | 529.59 | 8.1913 | 333.97 | 7.5486 |
| 325.23 | 19.1034 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 23.2155 | 531.02 | 14.7554 | 747.24 | 3.6083 |
| 333.37 | 26.2050 | 546.56 | 0.0000 | 748.06 | 5.4142 |
| 333.97 | 28.4010 | 552.55 | 13.9207 | 752.31 | 7.2308 |
| 334.37 | 27.3167 | 563.25 | 7.9963 | 753.82 | 5.4263 |
| 338.28 | 24.1061 | 569.33 | 13.0324 | 756.73 | 12.6755 |
| 338.32 | 24.1068 | 946.00 | 13.0333 | 756.80 | 9.0542 |
| 311.90 | 25.2415 | 569.70 | 13.0346 | 884.68 | 6.5369 |
| 340.48 | 25.2415 | 583.19 | 13.1187 | 765.81 | 9.8123 |
| 340.55 | 25.2426 | 584.27 | 12.1157 | 766.42 | 10.9053 |
| 344.28 | 16.5060 | 595.83 | 7.1058 | 766.84 | 8.7256 |
| 345.93 | 19.0959 | 427.87 | 14.2430 | 772.60 | 0.0000 |
| 351.06 | 7.0761 | 602.52 | 0.0000 | 776.52 | 10.9470 |
| 351.93 | 10.6206 | 602.73 | 12.2203 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 17.3283 | 778.90 | 8.7654 |
| 356.01 | 8.8754 | 609.32 | 16.3434 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 13.2850 | 785.37 | 6.5900 |
| 366.42 | 0.0000 | 614.28 | 18.4276 | 792.07 | 11.0110 |
| 375.05 | 19.1040 | 618.01 | 13.3313 | 794.95 | 9.1856 |
| 356.01 | 14.4674 | 620.36 | 11.2925 | 795.86 | 11.9452 |
| 388.16 | 17.2280 | 621.93 | 11.3002 | 810.29 | 8.3137 |
| 388.63 | 19.9542 | 630.19 | 0.0000 | 344.28 | 8.3143 |
| 391.69 | 14.5406 | 631.29 | 5.1581 | 810.76 | 7.3913 |
| 264.66 | 16.4516 | 633.25 | 14.4549 | 815.77 | 9.2560 |
| 401.81 | 18.2927 | 634.78 | 14.4648 | 1048.07 | 7.4121 |
| 402.40 | 15.5546 | 635.95 | 12.4049 | 832.01 | 7.4482 |
| 404.85 | 13.7457 | 636.99 | 0.0000 | 834.85 | 9.3197 |
| 410.95 | 16.5575 | 645.85 | 10.3823 | 835.71 | 10.2548 |
| 413.71 | 17.5070 | 657.76 | 8.6967 | 836.80 | 0.0000 |
| 414.70 | 14.7518 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 17.6499 | 661.66 | 12.5443 | 846.77 | 10.2950 |
| 427.87 | 17.6580 | 664.57 | 0.0000 | 856.80 | 12.2097 |
| 433.94 | 23.3185 | 666.33 | 9.4269 | 860.56 | 3.7618 |
| 439.40 | 20.5863 | 666.50 | 8.3801 | 871.09 | 5.6632 |
| 453.88 | 18.8726 | 667.71 | 0.0000 | 873.19 | 11.3347 |
| 463.37 | 18.9746 | 677.62 | 11.5771 | 875.33 | 0.0000 |
| 468.07 | 15.2199 | 685.70 | 0.0000 | 879.38 | 6.6259 |
| 473.00 | 0.0000 | 695.00 | 11.6609 | 880.51 | 7.5754 |
| 475.06 | 19.0989 | 696.49 | 13.7896 | 883.24 | 4.7391 |
| 476.78 | 14.3379 | 696.51 | 13.7896 | 884.68 | 6.6380 |
| 477.60 | 11.4754 | 697.00 | 10.6096 | 889.28 | 8.5477 |
| 482.18 | 10.5456 | 697.49 | 12.7342 | 894.76 | 9.5152 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 6.6680 | 1298.22 | 0.0000 | | |
| 903.28 | 10.4967 | 1312.11 | 6.4355 | | |
| 911.20 | 3.8271 | 1332.49 | 7.5457 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.8080 | 1365.19 | 1.8626 | | |
| 937.49 | 6.7555 | 1368.63 | 0.0000 | | |
| 944.13 | 1.9343 | 1384.29 | 1.8710 | | |
| 946.00 | 6.7740 | 1408.01 | 2.8222 | | |
| 949.00 | 11.6238 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 4.7611 | | |
| 962.31 | 3.3352 | 1489.16 | 5.7497 | | |
| 964.08 | 3.3371 | 1505.03 | 3.8467 | | |
| 966.17 | 3.8959 | 1596.21 | 1.9614 | | |
| 968.97 | 5.0134 | 1620.50 | 5.9140 | | |
| 983.53 | 9.7931 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.9998 | | |
| 1274.44 | 7.8656 | 1750.46 | 0.0000 | | |
| 1001.03 | 3.3759 | 1764.49 | 1.0145 | | |
| 1004.73 | 7.5276 | 1063.66 | 4.0624 | | |
| 507.63 | 0.0000 | 1771.35 | 4.0632 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.0692 | | |
| 1037.84 | 5.9741 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.0283 | | |
| 631.29 | 6.9880 | | | | |
| 1048.07 | 5.9924 | | | | |
| 1049.04 | 7.9922 | | | | |
| 1050.41 | 11.9932 | | | | |
| 1063.66 | 9.0300 | | | | |
| 1077.00 | 7.0507 | | | | |
| 1077.34 | 8.0589 | | | | |
| 1085.87 | 11.1083 | | | | |
| 1099.45 | 8.1104 | | | | |
| 1112.07 | 6.1045 | | | | |
| 1112.84 | 6.1060 | | | | |
| 1115.54 | 10.1843 | | | | |
| 1120.29 | 6.1187 | | | | |
| 1120.55 | 6.1191 | | | | |
| 1221.41 | 5.1003 | | | | |
| 1129.67 | 4.0898 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 2.0696 | | | | |
| 1177.95 | 9.3248 | | | | |
| 1189.05 | 4.1567 | | | | |
| 1204.77 | 5.2177 | | | | |
| 1221.41 | 8.3851 | | | | |
| 1231.02 | 6.3047 | | | | |
| 1235.36 | 3.1559 | | | | |
| 1238.28 | 2.1055 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 5.3092 | | | | |
| 1274.44 | 6.3752 | | | | |
| 1274.54 | 6.3755 | | | | |
| 1291.59 | 4.2686 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:00:59.17

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147008.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM09.CNF;207
                                        Background date  : 2-FEB-2014 16:26:41.
Sample date      : 7-NOV-2013 13:11:00. Acquisition date : 7-FEB-2014 09:00:35.
Sample ID        : G341147008           Sample quantity  : 1.15650E+02 GRAM
Detector name    : GAM09                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.26  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.65* | 9 | 50 | 0.59 | 127.59 | 125 | 7 | 2.54E-03 | 142.4 | |
| 2 | 4 | 86.79 | 19 | 16 | 1.31 | 173.83 | 172 | 22 | 5.31E-03 | 36.6 | 1.56E+00 |
| 3 | 4 | 92.45* | 5 | 34 | 1.32 | 185.13 | 172 | 22 | 1.45E-03 | 271.5 | |
| 4 | 0 | 128.09 | 27 | 16 | 1.74 | 256.32 | 253 | 7 | 7.41E-03 | 32.2 | |
| 5 | 0 | 185.73* | 19 | 22 | 1.25 | 371.46 | 367 | 8 | 5.22E-03 | 61.5 | |
| 6 | 0 | 197.98* | 15 | 22 | 1.42 | 395.95 | 392 | 8 | 4.03E-03 | 66.0 | |
| 7 | 1 | 236.94 | 13 | 18 | 1.22 | 473.78 | 470 | 16 | 3.49E-03 | 64.9 | 1.19E+00 |
| 8 | 1 | 238.56* | 26 | 18 | 1.11 | 477.00 | 470 | 16 | 7.19E-03 | 37.9 | |
| 9 | 0 | 269.90 | 16 | 22 | 1.74 | 539.62 | 533 | 12 | 4.50E-03 | 62.0 | |
| 10 | 0 | 284.06 | 9 | 17 | 0.64 | 567.90 | 561 | 10 | 2.40E-03 | 96.7 | |
| 11 | 0 | 362.65 | 18 | 9 | 1.06 | 724.91 | 719 | 12 | 4.95E-03 | 41.2 | |
| 12 | 0 | 462.80 | 20 | 23 | 5.31 | 925.01 | 914 | 19 | 5.44E-03 | 63.8 | |
| 13 | 0 | 469.08 | 9 | 10 | 1.34 | 937.56 | 933 | 10 | 2.50E-03 | 73.7 | |
| 14 | 0 | 484.86 | 8 | 4 | 0.87 | 969.07 | 965 | 7 | 2.08E-03 | 55.2 | |
| 15 | 0 | 545.96 | 9 | 2 | 0.82 | 1091.15 | 1086 | 8 | 2.63E-03 | 41.0 | |
| 16 | 0 | 669.75* | 14 | 0 | 0.55 | 1338.50 | 1333 | 11 | 3.89E-03 | 29.7 | |
| 17 | 0 | 731.73 | 10 | 2 | 0.78 | 1462.34 | 1458 | 8 | 2.80E-03 | 39.7 | |
| 18 | 0 | 755.31 | 11 | 0 | 0.63 | 1509.45 | 1505 | 9 | 3.06E-03 | 30.2 | |
| 19 | 0 | 801.80 | 16 | 4 | 0.98 | 1602.34 | 1597 | 9 | 4.47E-03 | 34.1 | |
| 20 | 0 | 1460.39 | 32 | 0 | 2.61 | 2918.56 | 2913 | 10 | 8.89E-03 | 17.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:01:00

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147008.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:11:00 | Acquisition date | : 7-FEB-2014 09:00:35 |
| Sample ID | : G341147008 | Sample quantity | : 115.65 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA9 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.26  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 32 | 10.66* | 1.164E+00 | 1.675E+00 | 1.675E+00 | 35.36 |
| NB-95M | 235.69 | 13 | 24.80* | 4.673E+00 | 7.045E-02 | 1.904E-01 | 129.79 |
| RH-101 | 127.23 | 27 | 68.00* | 5.858E+00 | 4.349E-02 | 4.585E-02 | 64.31 |
| | 198.01 | 15 | 73.00 | 5.187E+00 | 2.490E-02 | 2.625E-02 | 132.05 |
| | 325.23 | ------ | 11.80 | 3.798E+00 | ------ | Line Not Found | ------ |
| CD-109 | 88.03 | 19 | 3.70* | 4.402E+00 | 7.620E-01 | 8.747E-01 | 73.24 |
| SN-126 | 64.28 | 9 | 9.60 | 1.991E+00 | 3.108E-01 | 3.108E-01 | 284.77 |
| | 86.94 | 19 | 8.90 | 4.402E+00 | 3.168E-01 | 3.168E-01 | 73.24 |
| | 87.57 | 19 | 37.00* | 4.402E+00 | 7.620E-02 | 7.620E-02 | 73.24 |
| TH-234 | 63.29 | 9 | 3.70* | 1.991E+00 | 8.065E-01 | 8.065E-01 | 284.77 |
| | 92.59 | 5 | 4.23 | 4.808E+00 | 1.667E-01 | 1.667E-01 | 542.95 |
| U-238 | 63.29 | 9 | 3.70* | 1.991E+00 | 8.065E-01 | 8.065E-01 | 284.77 |
| | 92.59 | 5 | 4.23 | 4.808E+00 | 1.667E-01 | 1.667E-01 | 542.95 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:01:01.41

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147008.CNF;1  *
* Acquisition date :  7-FEB-2014 09:00:35 Sensitivity     : 3.000           *
* Detector ID      : GAM09                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.26     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:11:00 Nuclide Library : SOLID           *
* Sample ID        : G341147008           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.1565E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  5-JUN-2013 11:45:38 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_500MLMB.CNF;10        *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.675E+00 | 5.803E-01 | 5.845E-01 |
| NB-95M | 1.904E-01 | 2.422E-01 | 4.138E-01 |
| RH-101 | 4.585E-02 | 2.890E-02 | 3.929E-02 |
| CD-109 | 8.747E-01 | 6.278E-01 | 1.269E+00 |
| SN-126 | 7.620E-02 | 5.469E-02 | 1.114E-01 |
| TH-234 | 8.065E-01 | 2.251E+00 | 2.550E+00 |
| U-238 | 8.065E-01 | 2.251E+00 | 2.550E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.049E-01 | 6.350E-01 | 1.326E+00 | NOT IDENT. |
| NA-22 | -6.741E-03 | 3.973E-02 | 7.965E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.052E-02 | 2.100E-02 | 3.910E-02 | NOT IDENT. |
| SC-46 | -6.796E-03 | 4.477E-02 | 9.266E-02 | NOT IDENT. |
| V-48 | -4.294E-01 | 1.451E+00 | 2.790E+00 | NOT IDENT. |
| CR-51 | 5.260E-02 | 2.003E+00 | 3.921E+00 | NOT IDENT. |
| MN-54 | 2.359E-03 | 3.609E-02 | 7.344E-02 | NOT IDENT. |
| CO-56 | -1.132E-02 | 7.369E-02 | 1.437E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.655E-02 | 2.587E-02 | 5.154E-02 | NOT IDENT. |
| CO-58 | 1.098E-02 | 6.096E-02 | 1.305E-01 | NOT IDENT. |
| FE-59 | -1.241E-01 | 2.479E-01 | 4.403E-01 | NOT IDENT. |
| CO-60 | -7.575E-03 | 3.770E-02 | 7.540E-02 | NOT IDENT. |
| ZN-65 | 7.689E-03 | 8.181E-02 | 1.696E-01 | NOT IDENT. |
| GE-68 | -4.756E-01 | 1.140E+00 | 2.099E+00 | NOT IDENT. |
| AS-73 | 7.224E-01 | 2.514E+00 | 4.581E+00 | NOT IDENT. |
| AS-74 | -3.482E-01 | 1.810E+00 | 3.307E+00 | NOT IDENT. |
| SE-75 | 6.388E-02 | 5.204E-02 | 1.085E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.994E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -4.743E-01 | 2.402E+00 | 4.648E+00 | NOT IDENT. |
| RB-83 | -2.163E-02 | 1.027E-01 | 1.959E-01 | NOT IDENT. |
| KR-85 | -1.805E+01 | 1.012E+01 | 1.473E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | -2.146E-01 | 1.201E-01 | 1.747E-01 | NOT IDENT. |
| RB-86 | 9.067E-01 | 9.868E+00 | 2.091E+01 | NOT IDENT. |
| Y-88 | 2.427E-02 | 3.364E-02 | 1.127E-01 | NOT IDENT. |
| Y-91 | -2.412E+01 | 4.193E+01 | 7.199E+01 | NOT IDENT. |
| NB-94 | 1.002E-02 | 2.535E-02 | 5.503E-02 | NOT IDENT. |
| NB-95 | -2.979E-03 | 7.443E-02 | 1.494E-01 | NOT IDENT. |
| ZR-95 | 1.721E-01 | 1.017E-01 | 2.916E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | 1.072E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.518E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.441E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-102 | 8.177E-02 | 4.286E-02 | 1.122E-01 | NOT IDENT. |
| RU-103 | 2.129E-03 | 1.137E-01 | 2.252E-01 | NOT IDENT. |
| RH-106 | 5.686E-02 | 3.413E-01 | 6.660E-01 | NOT IDENT. |
| RU-106 | 5.686E-02 | 3.413E-01 | 6.660E-01 | NOT IDENT. |
| AG-108M | -2.282E-03 | 2.219E-02 | 4.291E-02 | NOT IDENT. |
| AG-110M | 3.718E-03 | 4.685E-02 | 9.796E-02 | NOT IDENT. |
| SN-113 | -1.649E-02 | 5.928E-02 | 1.102E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.966E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 5.227E-02 | 2.028E+00 | 3.791E+00 | NOT IDENT. |
| TE-123M | -6.614E-03 | 3.451E-02 | 6.257E-02 | NOT IDENT. |
| SB-124 | 1.325E-03 | 2.383E-01 | 5.015E-01 | NOT IDENT. |
| SB-125 | -5.207E-03 | 7.124E-02 | 1.386E-01 | FAIL ABUN |
| TE-125M | 3.761E-01 | 1.921E+01 | 3.641E+01 | NOT IDENT. |
| I-126 | -1.917E+00 | 1.123E+01 | 1.819E+01 | FAIL ABUN |
| SB-126 | 1.716E-01 | 8.793E+00 | 1.779E+01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.098E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.021E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.355E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 9.273E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | 5.024E-03 | 3.630E-02 | 6.948E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.820E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.237E-03 | 3.708E-02 | 6.684E-02 | FAIL ABUN |
| CS-135 | 2.459E-02 | 1.260E-01 | 2.360E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.812E+00 | 4.915E+00 | 8.611E+00 | NOT IDENT. |
| BA-137M | 4.397E-03 | 2.788E-02 | 5.585E-02 | NOT IDENT. |
| CS-137 | 4.645E-03 | 2.946E-02 | 5.900E-02 | NOT IDENT. |
| CE-139 | -6.975E-03 | 3.256E-02 | 5.894E-02 | NOT IDENT. |
| BA-140 | -1.822E+00 | 6.274E+00 | 1.215E+01 | NOT IDENT. |
| LA-140 | -1.822E+00 | 6.274E+00 | 1.215E+01 | NOT IDENT. |
| CE-141 | -3.175E-01 | 2.646E-01 | 4.189E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 5.846E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 3.611E-02 | 2.044E-01 | 3.861E-01 | NOT IDENT. |
| PM-144 | 5.126E-03 | 3.377E-02 | 6.925E-02 | NOT IDENT. |
| PR-144 | 3.773E-01 | 2.627E+00 | 5.381E+00 | NOT IDENT. |
| PM-146 | -1.633E-02 | 3.404E-02 | 5.532E-02 | NOT IDENT. |
| ND-147 | 6.509E+00 | 4.400E+01 | 9.243E+01 | FAIL ABUN |
| PM-147 | 8.279E+01 | 6.823E+02 | 1.288E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.559E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -8.951E-03 | 2.360E-02 | 4.333E-02 | NOT IDENT. |
| EU-152 | -1.720E-02 | 7.774E-02 | 1.469E-01 | NOT IDENT. |
| GD-153 | -5.831E-02 | 9.109E-02 | 1.373E-01 | NOT IDENT. |
| EU-154 | 8.595E-03 | 1.019E-01 | 2.174E-01 | FAIL ABUN |
| EU-155 | 2.760E-02 | 7.134E-02 | 1.446E-01 | FAIL ABUN |
| TB-160 | -1.569E-03 | 2.195E-01 | 4.478E-01 | FAIL ABUN |
| HO-166M | 5.549E-03 | 4.658E-02 | 9.698E-02 | FAIL ABUN |
| TM-171 | 1.730E+01 | 2.897E+01 | 5.525E+01 | NOT IDENT. |
| LU-176 | -1.302E-02 | 2.023E-02 | 3.618E-02 | NOT IDENT. |
| HF-181 | 2.315E-03 | 1.131E-01 | 2.011E-01 | NOT IDENT. |
| TA-182 | 1.320E-02 | 1.626E-01 | 3.590E-01 | NOT IDENT. |
| RE-183 | -2.763E-01 | 5.376E-01 | 8.748E-01 | NOT IDENT. |
| RE-184 | 1.841E-01 | 4.080E-01 | 9.235E-01 | NOT IDENT. |
| W-188 | -1.169E+01 | 1.203E+01 | 2.050E+01 | FAIL ABUN |
| IR-192 | -5.464E-02 | 5.930E-02 | 1.011E-01 | FAIL ABUN |
| HG-203 | -6.953E-02 | 1.143E-01 | 1.609E-01 | NOT IDENT. |
| BI-207 | 2.740E-02 | 4.370E-02 | 9.904E-02 | NOT IDENT. |
| TL-208 | 1.026E-02 | 3.612E-02 | 7.510E-02 | NOT IDENT. |
| PB-210 | 5.132E-01 | 7.097E+00 | 1.258E+01 | NOT IDENT. |
| BI-211 | -8.004E-03 | 1.999E-01 | 3.871E-01 | NOT IDENT. |
| PB-211 | -2.525E-01 | 6.380E-01 | 1.157E+00 | NOT IDENT. |
| BI-212 | -2.380E-01 | 4.541E-01 | 6.874E-01 | NOT IDENT. |
| PB-212 | 8.284E-02 | 6.154E-02 | 1.224E-01 | FAIL ABUN |
| BI-214 | 2.019E-02 | 6.916E-02 | 1.393E-01 | NOT IDENT. |
| PB-214 | -2.826E-02 | 7.169E-02 | 1.337E-01 | FAIL ABUN |
| RN-219 | 1.494E-01 | 3.736E-01 | 7.509E-01 | FAIL ABUN |
| RN-222 | 2.019E-02 | 6.916E-02 | 1.393E-01 | NOT IDENT. |
| RA-223 | 2.000E-01 | 5.695E-01 | 1.128E+00 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 5.152E-01 | 4.873E-01 | 1.006E+00 | NOT IDENT. |
| RA-226 | 2.019E-02 | 6.916E-02 | 1.393E-01 | NOT IDENT. |
| AC-227 | 4.409E-03 | 1.877E-01 | 3.480E-01 | FAIL ABUN |
| TH-227 | 4.409E-03 | 1.877E-01 | 3.480E-01 | FAIL ABUN |
| AC-228 | 3.151E-02 | 8.991E-02 | 2.124E-01 | NOT IDENT. |
| RA-228 | 3.151E-02 | 8.991E-02 | 2.124E-01 | NOT IDENT. |
| TH-228 | 8.284E-02 | 6.154E-02 | 1.224E-01 | FAIL ABUN |
| TH-229 | 2.318E-01 | 4.588E-01 | 8.140E-01 | FAIL ABUN |
| TH-230 | 2.019E-02 | 6.915E-02 | 1.393E-01 | NOT IDENT. |
| PA-231 | 7.929E-01 | 1.503E+00 | 2.209E+00 | FAIL ABUN |
| TH-231 | 2.000E-01 | 5.695E-01 | 1.128E+00 | FAIL ABUN |
| TH-232 | 3.151E-02 | 8.991E-02 | 2.124E-01 | NOT IDENT. |
| PA-233 | 2.838E-02 | 6.013E-02 | 1.212E-01 | NOT IDENT. |
| PA-234 | 5.420E-04 | 2.481E-01 | 5.028E-01 | FAIL ABUN |
| PA-234M | -1.509E+00 | 4.104E+00 | 7.552E+00 | NOT IDENT. |
| U-234 | 2.019E-02 | 6.915E-02 | 1.393E-01 | NOT IDENT. |
| U-235 | -1.651E-02 | 1.568E-01 | 2.865E-01 | FAIL ABUN |
| NP-237 | 2.838E-02 | 6.013E-02 | 1.212E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.237E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.561E-01 | 3.281E-01 | 5.838E-01 | NOT IDENT. |
| PU-239 | 4.687E+02 | 2.954E+02 | 4.787E+02 | FAIL ABUN |
| AM-241 | 5.215E-02 | 1.689E-01 | 3.272E-01 | NOT IDENT. |
| AM-243 | 7.107E-03 | 4.810E-02 | 9.081E-02 | NOT IDENT. |
| CM-243 | -5.553E-02 | 7.375E-02 | 1.279E-01 | NOT IDENT. |
| CM-247 | 1.648E-02 | 3.229E-02 | 6.639E-02 | NOT IDENT. |
| CF-249 | -2.960E-03 | 3.344E-02 | 6.396E-02 | NOT IDENT. |
| CF-251 | 3.977E-02 | 1.047E-01 | 2.011E-01 | FAIL ABUN |
| ANH-511 | -2.721E-02 | 4.837E-02 | 1.057E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:00:57.53

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.65 | 25 | 50 | 0.59 | 127.59 | 125 | 7 | 7.06E-03 | 49.9 | |
| 2 | 4 | 86.79 | 19 | 16 | 1.31 | 173.83 | 172 | 22 | 5.31E-03 | 36.6 | 1.56E+00 |
| 3 | 4 | 92.45 | 61 | 34 | 1.32 | 185.13 | 172 | 22 | 1.69E-02 | 22.6 | |
| 4 | 0 | 128.09 | 27 | 16 | 1.74 | 256.32 | 253 | 7 | 7.41E-03 | 32.2 | |
| 5 | 0 | 185.73 | 56 | 22 | 1.25 | 371.46 | 367 | 8 | 1.56E-02 | 19.7 | |
| 6 | 0 | 197.98 | 20 | 22 | 1.42 | 395.95 | 392 | 8 | 5.61E-03 | 46.0 | |
| 7 | 1 | 236.94 | 13 | 18 | 1.22 | 473.78 | 470 | 16 | 3.49E-03 | 64.9 | 1.19E+00 |
| 8 | 1 | 238.56 | 36 | 18 | 1.11 | 477.00 | 470 | 16 | 1.01E-02 | 26.3 | |
| 9 | 0 | 269.90 | 16 | 22 | 1.74 | 539.62 | 533 | 12 | 4.50E-03 | 62.0 | |
| 10 | 0 | 284.06 | 9 | 17 | 0.64 | 567.90 | 561 | 10 | 2.40E-03 | 96.7 | |
| 11 | 0 | 362.65 | 18 | 9 | 1.06 | 724.91 | 719 | 12 | 4.95E-03 | 41.2 | |
| 12 | 0 | 462.80 | 20 | 23 | 5.31 | 925.01 | 914 | 19 | 5.44E-03 | 63.8 | |
| 13 | 0 | 469.08 | 9 | 10 | 1.34 | 937.56 | 933 | 10 | 2.50E-03 | 73.7 | |
| 14 | 0 | 484.86 | 8 | 4 | 0.87 | 969.07 | 965 | 7 | 2.08E-03 | 55.2 | |
| 15 | 0 | 510.99 | 70 | 27 | 2.16 | 1021.28 | 1015 | 15 | 1.95E-02 | 19.9 | |
| 16 | 0 | 545.96 | 9 | 2 | 0.82 | 1091.15 | 1086 | 8 | 2.63E-03 | 41.0 | |
| 17 | 0 | 583.65 | 9 | 11 | 1.42 | 1166.45 | 1160 | 9 | 2.46E-03 | 76.1 | |
| 18 | 0 | 669.75 | 16 | 0 | 0.55 | 1338.50 | 1333 | 11 | 4.44E-03 | 25.0 | |
| 19 | 0 | 731.73 | 10 | 2 | 0.78 | 1462.34 | 1458 | 8 | 2.80E-03 | 39.7 | |
| 20 | 0 | 755.31 | 11 | 0 | 0.63 | 1509.45 | 1505 | 9 | 3.06E-03 | 30.2 | |
| 21 | 0 | 801.80 | 16 | 4 | 0.98 | 1602.34 | 1597 | 9 | 4.47E-03 | 34.1 | |
| 22 | 0 | 1460.39 | 32 | 0 | 2.61 | 2918.56 | 2913 | 10 | 8.89E-03 | 17.7 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:00:59.70

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 32 | 10.66* | 1.164E+00 | 1.675E+00 | 1.675E+00 | 35.36 |
| NB-95M | 235.69 | 13 | 24.80* | 4.673E+00 | 7.045E-02 | 1.904E-01 | 129.79 |
| RH-101 | 127.23 | 27 | 68.00* | 5.858E+00 | 4.349E-02 | 4.585E-02 | 64.31 |
| | 198.01 | 15 | 73.00 | 5.187E+00 | 2.490E-02 | 2.625E-02 | 132.05 |
| | 325.23 | ------ | 11.80 | 3.798E+00 | ------ | Line Not Found | ------ |
| CD-109 | 88.03 | 19 | 3.70* | 4.402E+00 | 7.620E-01 | 8.747E-01 | 73.24 |
| SN-126 | 64.28 | 9 | 9.60 | 1.991E+00 | 3.108E-01 | 3.108E-01 | 284.77 |
| | 86.94 | 19 | 8.90 | 4.402E+00 | 3.168E-01 | 3.168E-01 | 73.24 |
| | 87.57 | 19 | 37.00* | 4.402E+00 | 7.620E-02 | 7.620E-02 | 73.24 |
| TH-234 | 63.29 | 9 | 3.70* | 1.991E+00 | 8.065E-01 | 8.065E-01 | 284.77 |
| | 92.59 | 5 | 4.23 | 4.808E+00 | 1.667E-01 | 1.667E-01 | 542.95 |
| U-238 | 63.29 | 9 | 3.70* | 1.991E+00 | 8.065E-01 | 8.065E-01 | 284.77 |
| | 92.59 | 5 | 4.23 | 4.808E+00 | 1.667E-01 | 1.667E-01 | 542.95 |

Flag: "*" = Keyline

Sample ID : G341147008 Acquisition date : 7-FEB-2014 09:00:35

Total number of lines in spectrum 20
Number of unidentified lines 3
Number of lines tentatively identified by NID 17 85.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.675E+00 | 1.675E+00 | 0.592E+00 | 35.36 | |
| NB-95M | 64.03D | 2.70 | 7.045E-02 | 1.904E-01 | 2.471E-01 | 129.79 | |
| RH-101 | 3.30Y | 1.05 | 4.349E-02 | 4.585E-02 | 2.949E-02 | 64.31 | |
| CD-109 | 461.40D | 1.15 | 7.620E-01 | 8.747E-01 | 6.406E-01 | 73.24 | |
| SN-126 | 2.30E+05Y | 1.00 | 7.620E-02 | 7.620E-02 | 5.580E-02 | 73.24 | |
| TH-234 | 4.47E+09Y | 1.00 | 8.065E-01 | 8.065E-01 | 22.97E-01 | 284.77 | |
| U-238 | 4.47E+09Y | 1.00 | 8.065E-01 | 8.065E-01 | 22.97E-01 | 284.77 | |
| Total Activity : | | | 4.240E+00 | 4.475E+00 | | | |

Grand Total Activity : 4.240E+00 4.475E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147008 Acquisition date : 7-FEB-2014 09:00:35

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 185.73 | 19 | 22 | 1.25 | 371.46 | 367 | 8 | 5.22E-03 | **** | 5.36E+00 | T |
| 1 | 238.56 | 26 | 18 | 1.11 | 477.00 | 470 | 16 | 7.19E-03 | 75.8 | 4.65E+00 | T |
| 0 | 269.90 | 16 | 22 | 1.74 | 539.62 | 533 | 12 | 4.50E-03 | **** | 4.30E+00 | T |
| 0 | 284.06 | 9 | 17 | 0.64 | 567.90 | 561 | 10 | 2.40E-03 | **** | 4.16E+00 | T |
| 0 | 362.65 | 18 | 9 | 1.06 | 724.91 | 719 | 12 | 4.95E-03 | 82.5 | 3.53E+00 | |
| 0 | 462.80 | 20 | 23 | 5.31 | 925.01 | 914 | 19 | 5.44E-03 | **** | 2.98E+00 | T |
| 0 | 469.08 | 9 | 10 | 1.34 | 937.56 | 933 | 10 | 2.50E-03 | **** | 2.95E+00 | T |
| 0 | 484.86 | 8 | 4 | 0.87 | 969.07 | 965 | 7 | 2.08E-03 | **** | 2.88E+00 | |
| 0 | 545.96 | 9 | 2 | 0.82 | 1091.15 | 1086 | 8 | 2.63E-03 | 81.9 | 2.65E+00 | T |
| 0 | 669.75 | 14 | 0 | 0.55 | 1338.50 | 1333 | 11 | 3.89E-03 | 59.4 | 2.27E+00 | |
| 0 | 731.73 | 10 | 2 | 0.78 | 1462.34 | 1458 | 8 | 2.80E-03 | 79.3 | 2.12E+00 | T |
| 0 | 755.31 | 11 | 0 | 0.63 | 1509.45 | 1505 | 9 | 3.06E-03 | 60.3 | 2.06E+00 | T |
| 0 | 801.80 | 16 | 4 | 0.98 | 1602.34 | 1597 | 9 | 4.47E-03 | 68.2 | 1.96E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:01:15.10

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147008.CNF;1    *
* Acquisition date :  7-FEB-2014 09:00:35 Sensitivity     : 3.000           *
* Detector ID      : GAM09                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.26     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:11:00 Nuclide Library : SOLID           *
* Sample ID        : G341147008           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.1565E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-JUN-2013 11:45:38 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_500MLMB.CNF;10        *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 2.214E-01 |
| NB-95M | 1.866E-01 |
| RH-101 | 1.732E-02 |
| CD-109 | 5.743E-01 |
| SN-126 | 5.040E-02 |
| TH-234 | 1.154E+00 |
| U-238 | 1.154E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.678E-01 | NOT IDENT. |
| NA-22 | 3.266E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.064E-02 | NOT IDENT. |
| SC-46 | 3.590E-02 | NOT IDENT. |
| V-48 | 1.108E+00 | NOT IDENT. |
| CR-51 | 1.732E+00 | NOT IDENT. |
| MN-54 | 3.105E-02 | NOT IDENT. |
| CO-56 | 6.118E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.355E-02 | NOT IDENT. |
| CO-58 | 5.410E-02 | NOT IDENT. |
| FE-59 | 1.767E-01 | NOT IDENT. |
| CO-60 | 3.050E-02 | NOT IDENT. |
| ZN-65 | 6.953E-02 | NOT IDENT. |
| GE-68 | 8.228E-01 | NOT IDENT. |
| AS-73 | 2.081E+00 | NOT IDENT. |
| AS-74 | 1.438E+00 | NOT IDENT. |
| SE-75 | 4.844E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.969E+00 | NOT IDENT. |
| RB-83 | 8.309E-02 | NOT IDENT. |
| KR-85 | 6.625E+00 | NOT IDENT. |
| SR-85 | 7.857E-02 | NOT IDENT. |

| | | |
|---|---|---|
| RB-86 | 8.425E+00 | NOT IDENT. |
| Y-88 | 3.993E-02 | NOT IDENT. |
| Y-91 | 2.871E+01 | NOT IDENT. |
| NB-94 | 2.350E-02 | NOT IDENT. |
| NB-95 | 6.306E-02 | NOT IDENT. |
| ZR-95 | 1.246E-01 | FAIL ABUN |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-102 | 4.918E-02 | NOT IDENT. |
| RU-103 | 9.540E-02 | NOT IDENT. |
| RH-106 | 2.894E-01 | NOT IDENT. |
| RU-106 | 2.894E-01 | NOT IDENT. |
| AG-108M | 1.834E-02 | NOT IDENT. |
| AG-110M | 4.036E-02 | NOT IDENT. |
| SN-113 | 4.809E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.704E+00 | NOT IDENT. |
| TE-123M | 2.817E-02 | NOT IDENT. |
| SB-124 | 1.995E-01 | NOT IDENT. |
| SB-125 | 5.932E-02 | FAIL ABUN |
| TE-125M | 1.644E+01 | NOT IDENT. |
| I-126 | 7.483E+00 | FAIL ABUN |
| SB-126 | 7.576E+00 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.072E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.777E-02 | FAIL ABUN |
| CS-135 | 1.053E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.417E+00 | NOT IDENT. |
| BA-137M | 2.364E-02 | NOT IDENT. |
| CS-137 | 2.497E-02 | NOT IDENT. |
| CE-139 | 2.638E-02 | NOT IDENT. |
| BA-140 | 4.820E+00 | NOT IDENT. |
| LA-140 | 4.820E+00 | NOT IDENT. |
| CE-141 | 1.874E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.762E-01 | NOT IDENT. |
| PM-144 | 2.985E-02 | NOT IDENT. |
| PR-144 | 2.319E+00 | NOT IDENT. |
| PM-146 | 2.305E-02 | NOT IDENT. |
| ND-147 | 3.804E+01 | FAIL ABUN |
| PM-147 | 5.875E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.921E-02 | NOT IDENT. |
| EU-152 | 6.434E-02 | NOT IDENT. |
| GD-153 | 6.093E-02 | NOT IDENT. |
| EU-154 | 8.916E-02 | FAIL ABUN |
| EU-155 | 6.438E-02 | FAIL ABUN |
| TB-160 | 1.852E-01 | FAIL ABUN |
| HO-166M | 4.100E-02 | FAIL ABUN |
| TM-171 | 2.508E+01 | NOT IDENT. |
| LU-176 | 1.572E-02 | NOT IDENT. |
| HF-181 | 8.363E-02 | NOT IDENT. |
| TA-182 | 1.378E-01 | NOT IDENT. |
| RE-183 | 3.904E-01 | NOT IDENT. |
| RE-184 | 3.834E-01 | NOT IDENT. |
| W-188 | 8.926E+00 | FAIL ABUN |
| IR-192 | 4.405E-02 | FAIL ABUN |
| HG-203 | 7.045E-02 | NOT IDENT. |
| BI-207 | 4.184E-02 | NOT IDENT. |
| TL-208 | 3.347E-02 | NOT IDENT. |
| PB-210 | 5.730E+00 | NOT IDENT. |
| BI-211 | 1.748E-01 | NOT IDENT. |
| PB-211 | 5.075E-01 | NOT IDENT. |
| BI-212 | 2.818E-01 | NOT IDENT. |
| PB-212 | 5.689E-02 | FAIL ABUN |
| BI-214 | 6.175E-02 | NOT IDENT. |
| PB-214 | 6.000E-02 | FAIL ABUN |
| RN-219 | 3.351E-01 | FAIL ABUN |
| RN-222 | 6.175E-02 | NOT IDENT. |
| RA-223 | 5.065E-01 | FAIL ABUN |
| RA-224 | 4.567E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 6.175E-02 | NOT IDENT. |
| AC-227 | 1.533E-01 | FAIL ABUN |
| TH-227 | 1.533E-01 | FAIL ABUN |
| AC-228 | 8.689E-02 | NOT IDENT. |
| RA-228 | 8.689E-02 | NOT IDENT. |
| TH-228 | 5.689E-02 | FAIL ABUN |
| TH-229 | 3.692E-01 | FAIL ABUN |
| TH-230 | 6.174E-02 | NOT IDENT. |
| PA-231 | 9.809E-01 | FAIL ABUN |
| TH-231 | 5.065E-01 | FAIL ABUN |
| TH-232 | 8.689E-02 | NOT IDENT. |
| PA-233 | 5.480E-02 | NOT IDENT. |
| PA-234 | 2.085E-01 | FAIL ABUN |
| PA-234M | 3.133E+00 | NOT IDENT. |
| U-234 | 6.174E-02 | NOT IDENT. |
| U-235 | 1.296E-01 | FAIL ABUN |
| NP-237 | 5.480E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 2.629E-01 | NOT IDENT. |
| PU-239 | 2.157E+02 | FAIL ABUN |
| AM-241 | 1.476E-01 | NOT IDENT. |
| AM-243 | 4.141E-02 | NOT IDENT. |
| CM-243 | 5.611E-02 | NOT IDENT. |
| CM-247 | 2.949E-02 | NOT IDENT. |
| CF-249 | 2.804E-02 | NOT IDENT. |
| CF-251 | 9.129E-02 | FAIL ABUN |
| ANH-511 | 4.972E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:01:19.82

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147008.CNF;1    *
* Acquisition date :  7-FEB-2014 09:00:35 Sensitivity     : 3.000          *
* Detector ID      : GAM09                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.26     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:11:00 Nuclide Library : SOLID          *
* Sample ID        : G341147008           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1565E+02 GRAM*
*                                         Quantity Err(%) : 1.7294E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   :  5-JUN-2013 11:45:38 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_500MLMB.CNF;10      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.675E+00 | 5.986E-01 | 5.986E-01 |
| NB-95M | 1.904E-01 | 2.430E-01 | 2.430E-01 |
| RH-101 | 4.585E-02 | 3.030E-02 | 3.030E-02 |
| CD-109 | 8.747E-01 | 6.346E-01 | 6.346E-01 |
| SN-126 | 7.620E-02 | 5.513E-02 | 5.513E-02 |
| TH-234 | 8.065E-01 | 2.258E+00 | 2.258E+00 |
| U-238 | 8.065E-01 | 2.258E+00 | 2.258E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.049E-01 | 6.352E-01 | 6.419E-01 | NOT IDENT. |
| NA-22 | -6.741E-03 | 3.974E-02 | 3.985E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 5.123E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.052E-02 | 2.102E-02 | 2.155E-02 | NOT IDENT. |
| SC-46 | -6.796E-03 | 4.478E-02 | 4.488E-02 | NOT IDENT. |
| V-48 | -4.294E-01 | 1.452E+00 | 1.465E+00 | NOT IDENT. |
| CR-51 | 5.260E-02 | 2.003E+00 | 2.003E+00 | NOT IDENT. |
| MN-54 | 2.359E-03 | 3.609E-02 | 3.611E-02 | NOT IDENT. |
| CO-56 | -1.132E-02 | 7.370E-02 | 7.388E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 6.703E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.655E-02 | 2.592E-02 | 2.697E-02 | NOT IDENT. |
| CO-58 | 1.098E-02 | 6.097E-02 | 6.117E-02 | NOT IDENT. |
| FE-59 | -1.241E-01 | 2.488E-01 | 2.550E-01 | NOT IDENT. |
| CO-60 | -7.575E-03 | 3.770E-02 | 3.786E-02 | NOT IDENT. |
| ZN-65 | 7.689E-03 | 8.182E-02 | 8.190E-02 | NOT IDENT. |
| GE-68 | -4.756E-01 | 1.142E+00 | 1.162E+00 | NOT IDENT. |
| AS-73 | 7.224E-01 | 2.518E+00 | 2.539E+00 | NOT IDENT. |
| AS-74 | -3.482E-01 | 1.810E+00 | 1.817E+00 | NOT IDENT. |
| SE-75 | 6.388E-02 | 5.230E-02 | 5.970E-02 | NOT IDENT. |
| BR-77 | 6.722E+10 | 1.851E+11 | 1.876E+11 | SHORT HLIF |
| SR-82 | -4.743E-01 | 2.402E+00 | 2.412E+00 | NOT IDENT. |
| RB-83 | -2.163E-02 | 1.028E-01 | 1.033E-01 | NOT IDENT. |
| KR-85 | -1.805E+01 | 1.023E+01 | 1.307E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | -2.146E-01 | 1.214E-01 | 1.552E-01 | NOT IDENT. |
| RB-86 | 9.067E-01 | 9.869E+00 | 9.877E+00 | NOT IDENT. |
| Y-88 | 2.427E-02 | 3.370E-02 | 3.543E-02 | NOT IDENT. |
| Y-91 | -2.412E+01 | 4.198E+01 | 4.337E+01 | NOT IDENT. |
| NB-94 | 1.002E-02 | 2.537E-02 | 2.577E-02 | NOT IDENT. |
| NB-95 | -2.979E-03 | 7.443E-02 | 7.444E-02 | NOT IDENT. |
| ZR-95 | 1.721E-01 | 1.031E-01 | 1.291E-01 | FAIL ABUN |
| NB-97 | -1.000E+41 | 1.075E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -3.607E+39 | 1.547E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -2.041E+09 | 2.450E+09 | 2.617E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 3.969E+41 | 0.000E+00 | SHORT HLIF |
| RH-102 | 8.177E-02 | 4.374E-02 | 5.720E-02 | NOT IDENT. |
| RU-103 | 2.129E-03 | 1.137E-01 | 1.137E-01 | NOT IDENT. |
| RH-106 | 5.686E-02 | 3.413E-01 | 3.423E-01 | NOT IDENT. |
| RU-106 | 5.686E-02 | 3.413E-01 | 3.423E-01 | NOT IDENT. |
| AG-108M | -2.282E-03 | 2.219E-02 | 2.221E-02 | NOT IDENT. |
| AG-110M | 3.718E-03 | 4.685E-02 | 4.688E-02 | NOT IDENT. |
| SN-113 | -1.649E-02 | 5.930E-02 | 5.976E-02 | NOT IDENT. |
| CD-115 | 6.750E+10 | 1.967E+11 | 1.991E+11 | SHORT HLIF |
| SN-117M | 5.227E-02 | 2.028E+00 | 2.028E+00 | NOT IDENT. |
| TE-123M | -6.614E-03 | 3.452E-02 | 3.464E-02 | NOT IDENT. |
| SB-124 | 1.325E-03 | 2.383E-01 | 2.383E-01 | NOT IDENT. |
| SB-125 | -5.207E-03 | 7.124E-02 | 7.128E-02 | FAIL ABUN |
| TE-125M | 3.761E-01 | 1.921E+01 | 1.921E+01 | NOT IDENT. |
| I-126 | -1.917E+00 | 1.123E+01 | 1.126E+01 | FAIL ABUN |
| SB-126 | 1.716E-01 | 8.793E+00 | 8.794E+00 | NOT IDENT. |
| SB-127 | 2.750E+04 | 1.098E+06 | 1.098E+06 | SHORT HLIF |
| I-131 | 4.076E+01 | 7.029E+01 | 7.265E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 5.821E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -9.588E+05 | 9.274E+06 | 9.284E+06 | SHORT HLIF |
| BA-133 | 5.024E-03 | 3.631E-02 | 3.638E-02 | NOT IDENT. |
| I-133 | -7.430E+29 | 1.867E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.237E-03 | 3.708E-02 | 3.709E-02 | FAIL ABUN |
| CS-135 | 2.459E-02 | 1.260E-01 | 1.265E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 1.035E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.812E+00 | 4.938E+00 | 5.098E+00 | NOT IDENT. |
| BA-137M | 4.397E-03 | 2.789E-02 | 2.796E-02 | NOT IDENT. |
| CS-137 | 4.645E-03 | 2.946E-02 | 2.953E-02 | NOT IDENT. |
| CE-139 | -6.975E-03 | 3.259E-02 | 3.275E-02 | NOT IDENT. |
| BA-140 | -1.822E+00 | 6.276E+00 | 6.329E+00 | NOT IDENT. |
| LA-140 | -1.822E+00 | 6.276E+00 | 6.329E+00 | NOT IDENT. |
| CE-141 | -3.175E-01 | 2.661E-01 | 3.022E-01 | NOT IDENT. |
| CE-143 | 4.771E+18 | 5.860E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 3.611E-02 | 2.045E-01 | 2.051E-01 | NOT IDENT. |
| PM-144 | 5.126E-03 | 3.378E-02 | 3.385E-02 | NOT IDENT. |
| PR-144 | 3.773E-01 | 2.627E+00 | 2.632E+00 | NOT IDENT. |
| PM-146 | -1.633E-02 | 3.408E-02 | 3.486E-02 | NOT IDENT. |
| ND-147 | 6.509E+00 | 4.400E+01 | 4.410E+01 | FAIL ABUN |
| PM-147 | 8.279E+01 | 6.824E+02 | 6.834E+02 | NOT IDENT. |
| PM-149 | -1.383E+11 | 2.559E+12 | 2.560E+12 | SHORT HLIF |
| EU-150 | -8.951E-03 | 2.361E-02 | 2.395E-02 | NOT IDENT. |
| EU-152 | -1.720E-02 | 7.776E-02 | 7.814E-02 | NOT IDENT. |
| GD-153 | -5.831E-02 | 9.124E-02 | 9.495E-02 | NOT IDENT. |
| EU-154 | 8.595E-03 | 1.019E-01 | 1.020E-01 | FAIL ABUN |
| EU-155 | 2.760E-02 | 7.140E-02 | 7.247E-02 | FAIL ABUN |
| TB-160 | -1.569E-03 | 2.195E-01 | 2.195E-01 | FAIL ABUN |
| HO-166M | 5.549E-03 | 4.658E-02 | 4.665E-02 | FAIL ABUN |
| TM-171 | 1.730E+01 | 2.902E+01 | 3.005E+01 | NOT IDENT. |
| LU-176 | -1.302E-02 | 2.026E-02 | 2.109E-02 | NOT IDENT. |
| HF-181 | 2.315E-03 | 1.131E-01 | 1.131E-01 | NOT IDENT. |
| TA-182 | 1.320E-02 | 1.626E-01 | 1.627E-01 | NOT IDENT. |
| RE-183 | -2.763E-01 | 5.386E-01 | 5.529E-01 | NOT IDENT. |
| RE-184 | 1.841E-01 | 4.091E-01 | 4.175E-01 | NOT IDENT. |
| W-188 | -1.169E+01 | 1.213E+01 | 1.322E+01 | FAIL ABUN |
| IR-192 | -5.464E-02 | 5.947E-02 | 6.437E-02 | FAIL ABUN |
| HG-203 | -6.953E-02 | 1.145E-01 | 1.187E-01 | NOT IDENT. |
| BI-207 | 2.740E-02 | 4.390E-02 | 4.561E-02 | NOT IDENT. |
| TL-208 | 1.026E-02 | 3.613E-02 | 3.643E-02 | NOT IDENT. |
| PB-210 | 5.132E-01 | 7.097E+00 | 7.101E+00 | NOT IDENT. |
| BI-211 | -8.004E-03 | 1.999E-01 | 1.999E-01 | NOT IDENT. |
| PB-211 | -2.525E-01 | 6.383E-01 | 6.484E-01 | NOT IDENT. |
| BI-212 | -2.380E-01 | 4.546E-01 | 4.671E-01 | NOT IDENT. |
| PB-212 | 8.284E-02 | 6.194E-02 | 7.233E-02 | FAIL ABUN |
| BI-214 | 2.019E-02 | 6.918E-02 | 6.978E-02 | NOT IDENT. |
| PB-214 | -2.826E-02 | 7.173E-02 | 7.285E-02 | FAIL ABUN |
| RN-219 | 1.494E-01 | 3.742E-01 | 3.802E-01 | FAIL ABUN |
| RN-222 | 2.019E-02 | 6.918E-02 | 6.978E-02 | NOT IDENT. |
| RA-223 | 2.000E-01 | 5.698E-01 | 5.769E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 5.152E-01 | 4.893E-01 | 5.416E-01 | NOT IDENT. |
| RA-226 | 2.019E-02 | 6.918E-02 | 6.978E-02 | NOT IDENT. |
| AC-227 | 4.409E-03 | 1.877E-01 | 1.878E-01 | FAIL ABUN |
| TH-227 | 4.409E-03 | 1.877E-01 | 1.878E-01 | FAIL ABUN |
| AC-228 | 3.151E-02 | 9.001E-02 | 9.113E-02 | NOT IDENT. |
| RA-228 | 3.151E-02 | 9.001E-02 | 9.113E-02 | NOT IDENT. |
| TH-228 | 8.284E-02 | 6.194E-02 | 7.233E-02 | FAIL ABUN |
| TH-229 | 2.318E-01 | 4.592E-01 | 4.710E-01 | FAIL ABUN |
| TH-230 | 2.019E-02 | 6.917E-02 | 6.977E-02 | NOT IDENT. |
| PA-231 | 7.929E-01 | 1.505E+00 | 1.546E+00 | FAIL ABUN |
| TH-231 | 2.000E-01 | 5.698E-01 | 5.769E-01 | FAIL ABUN |
| TH-232 | 3.151E-02 | 9.001E-02 | 9.113E-02 | NOT IDENT. |
| PA-233 | 2.838E-02 | 6.018E-02 | 6.152E-02 | NOT IDENT. |
| PA-234 | 5.420E-04 | 2.481E-01 | 2.481E-01 | FAIL ABUN |
| PA-234M | -1.509E+00 | 4.110E+00 | 4.166E+00 | NOT IDENT. |
| U-234 | 2.019E-02 | 6.917E-02 | 6.977E-02 | NOT IDENT. |
| U-235 | -1.651E-02 | 1.568E-01 | 1.570E-01 | FAIL ABUN |
| NP-237 | 2.838E-02 | 6.018E-02 | 6.152E-02 | NOT IDENT. |
| NP-238 | -9.677E+11 | 1.245E+12 | 1.319E+12 | SHORT HLIF |
| NP-239 | -1.561E-01 | 3.286E-01 | 3.361E-01 | NOT IDENT. |
| PU-239 | 4.687E+02 | 2.989E+02 | 3.660E+02 | FAIL ABUN |
| AM-241 | 5.215E-02 | 1.690E-01 | 1.706E-01 | NOT IDENT. |
| AM-243 | 7.107E-03 | 4.810E-02 | 4.821E-02 | NOT IDENT. |
| CM-243 | -5.553E-02 | 7.404E-02 | 7.816E-02 | NOT IDENT. |
| CM-247 | 1.648E-02 | 3.242E-02 | 3.326E-02 | NOT IDENT. |
| CF-249 | -2.960E-03 | 3.344E-02 | 3.347E-02 | NOT IDENT. |
| CF-251 | 3.977E-02 | 1.048E-01 | 1.063E-01 | FAIL ABUN |
| ANH-511 | -2.721E-02 | 4.842E-02 | 4.995E-02 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 27.3901 | 94.67 | 30.8132 | 193.51 | 23.7655 |
| 45.60 | 23.9843 | 94.87 | 30.8256 | 197.03 | 27.0497 |
| 46.54 | 30.0735 | 97.43 | 27.3396 | 198.01 | 27.6126 |
| 49.72 | 0.0000 | 98.43 | 26.0243 | 201.83 | 33.6062 |
| 51.35 | 29.3146 | 98.44 | 26.0248 | 205.31 | 28.9234 |
| 52.39 | 23.2813 | 99.53 | 26.5383 | 210.85 | 26.9531 |
| 53.44 | 28.2719 | 100.11 | 21.0716 | 215.65 | 26.0166 |
| 57.36 | 0.0000 | 103.18 | 27.6486 | 222.11 | 26.2046 |
| 57.53 | 24.8799 | 103.37 | 26.7367 | 227.09 | 16.4673 |
| 57.98 | 31.1396 | 105.21 | 16.6534 | 227.38 | 19.7668 |
| 59.32 | 22.5052 | 105.31 | 17.5819 | 228.16 | 0.0000 |
| 59.54 | 24.0203 | 106.12 | 18.5355 | 228.18 | 24.1804 |
| 63.29 | 30.3344 | 109.28 | 28.8993 | 117.23 | 24.1804 |
| 63.58 | 29.5146 | 111.00 | 28.0553 | 235.69 | 28.2527 |
| 64.28 | 29.5695 | 111.76 | 0.0000 | 235.96 | 28.2608 |
| 66.73 | 30.6099 | 116.30 | 0.0000 | 238.63 | 17.7821 |
| 67.24 | 33.2042 | 117.23 | 34.9886 | 238.98 | 0.0000 |
| 67.75 | 26.8539 | 121.12 | 34.2729 | 240.99 | 17.8258 |
| 69.67 | 25.6999 | 121.22 | 34.2789 | 242.00 | 18.4020 |
| 70.83 | 30.9291 | 121.78 | 27.6400 | 244.70 | 13.4205 |
| 72.81 | 32.8066 | 122.06 | 27.6532 | 252.40 | 0.0000 |
| 72.87 | 35.4018 | 123.07 | 26.7455 | 252.80 | 20.2967 |
| 74.66 | 31.2191 | 127.23 | 18.7562 | 254.15 | 0.0000 |
| 74.82 | 29.4960 | 129.30 | 34.7449 | 256.23 | 18.1032 |
| 74.97 | 30.3743 | 131.20 | 27.5917 | 260.90 | 0.0000 |
| 77.11 | 34.8897 | 133.02 | 23.3032 | 264.66 | 8.5562 |
| 79.69 | 31.5888 | 133.52 | 34.0109 | 268.22 | 20.6052 |
| 80.12 | 30.7416 | 136.00 | 28.2917 | 269.46 | 20.6298 |
| 80.19 | 0.0000 | 136.47 | 36.1230 | 271.23 | 18.9422 |
| 80.57 | 29.0146 | 140.51 | 0.0000 | 273.65 | 34.5197 |
| 81.00 | 36.9638 | 143.76 | 23.6963 | 276.40 | 18.4580 |
| 81.07 | 36.9696 | 144.24 | 25.6898 | 277.37 | 12.4704 |
| 83.79 | 29.2248 | 145.44 | 35.6345 | 277.60 | 16.6307 |
| 85.43 | 29.3304 | 152.43 | 31.0038 | 278.00 | 17.3303 |
| 86.55 | 42.7664 | 153.25 | 27.0354 | 279.20 | 26.0243 |
| 86.79 | 42.7883 | 323.87 | 29.0785 | 279.54 | 26.0326 |
| 86.94 | 42.8025 | 156.02 | 27.1434 | 280.46 | 24.3176 |
| 87.09 | 30.3281 | 158.56 | 26.2325 | 283.69 | 24.3902 |
| 87.57 | 30.3596 | 159.00 | 30.2872 | 284.31 | 0.0000 |
| 88.03 | 30.3895 | 162.33 | 28.3999 | 285.41 | 26.1736 |
| 88.34 | 30.4096 | 163.33 | 25.3921 | 285.90 | 0.0000 |
| 88.47 | 30.4180 | 165.86 | 27.5191 | 287.50 | 17.4823 |
| 89.96 | 30.5142 | 176.31 | 32.0403 | 290.67 | 27.1751 |
| 91.11 | 30.5879 | 176.60 | 32.0523 | 293.27 | 0.0000 |
| 92.59 | 30.6821 | 177.52 | 26.9149 | 351.93 | 27.2858 |
| 93.35 | 30.7302 | 181.07 | 0.0000 | 295.96 | 27.3038 |
| 94.56 | 30.8063 | 184.41 | 31.3312 | 879.38 | 40.6094 |
| 94.65 | 30.8120 | 143.76 | 23.5373 | 299.98 | 22.9817 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 22.9837 | 487.02 | 6.4746 | 702.65 | 8.1439 |
| 300.13 | 22.1004 | 492.35 | 0.0000 | 706.68 | 11.7844 |
| 301.36 | 23.0095 | 497.08 | 10.1776 | 711.68 | 9.0852 |
| 302.85 | 23.9253 | 505.52 | 18.4109 | 720.70 | 10.9459 |
| 256.23 | 30.1718 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 22.2290 | 511.00 | 14.3654 | 722.78 | 12.7818 |
| 308.46 | 18.6993 | 514.00 | 59.6174 | 722.91 | 12.7825 |
| 311.90 | 23.2197 | 514.00 | 59.6178 | 723.31 | 11.8717 |
| 316.51 | 26.8973 | 520.40 | 10.3168 | 724.19 | 4.5677 |
| 319.41 | 17.9752 | 520.69 | 0.0000 | 727.33 | 12.1973 |
| 320.08 | 18.8845 | 522.65 | 0.0000 | 733.00 | 6.1138 |
| 321.04 | 22.4995 | 527.90 | 0.0000 | 735.93 | 3.0608 |
| 323.87 | 19.8462 | 529.59 | 8.2966 | 333.97 | 10.3368 |
| 325.23 | 18.9656 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 26.2666 | 531.02 | 6.2274 | 747.24 | 12.9179 |
| 333.37 | 22.7287 | 546.56 | 0.0000 | 748.06 | 9.2302 |
| 333.97 | 25.4686 | 552.55 | 11.5539 | 752.31 | 3.0823 |
| 334.37 | 27.2969 | 563.25 | 11.6207 | 753.82 | 6.1685 |
| 338.28 | 18.2553 | 569.33 | 11.6586 | 756.73 | 6.1761 |
| 338.32 | 18.2559 | 946.00 | 11.6596 | 756.80 | 6.1763 |
| 311.90 | 21.9448 | 569.70 | 9.5408 | 884.68 | 6.5046 |
| 340.48 | 21.9448 | 583.19 | 9.6089 | 765.81 | 10.2295 |
| 340.55 | 21.9459 | 584.27 | 10.6824 | 766.42 | 13.0228 |
| 344.28 | 19.2597 | 595.83 | 17.1943 | 766.84 | 12.0948 |
| 345.93 | 19.2847 | 427.87 | 15.0818 | 772.60 | 0.0000 |
| 351.06 | 19.3623 | 602.52 | 0.0000 | 776.52 | 12.1434 |
| 351.93 | 21.2207 | 602.73 | 18.3333 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 12.9543 | 778.90 | 9.3503 |
| 356.01 | 17.9825 | 609.32 | 9.7383 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 10.8258 | 785.37 | 10.3128 |
| 366.42 | 0.0000 | 614.28 | 16.2712 | 792.07 | 8.4608 |
| 375.05 | 17.8403 | 618.01 | 16.3014 | 794.95 | 7.0589 |
| 356.01 | 16.0656 | 620.36 | 11.9685 | 795.86 | 7.8461 |
| 388.16 | 18.0117 | 621.93 | 13.0664 | 810.29 | 4.7351 |
| 388.63 | 18.0178 | 630.19 | 0.0000 | 344.28 | 4.7354 |
| 391.69 | 19.0079 | 631.29 | 1.0939 | 810.76 | 6.6303 |
| 264.66 | 17.2161 | 633.25 | 7.6646 | 815.77 | 10.4398 |
| 401.81 | 18.1874 | 634.78 | 16.4365 | 1048.07 | 6.6509 |
| 402.40 | 15.3220 | 635.95 | 19.7353 | 832.01 | 7.6414 |
| 404.85 | 22.0630 | 636.99 | 0.0000 | 834.85 | 9.5623 |
| 410.95 | 16.3767 | 645.85 | 8.8132 | 835.71 | 11.4785 |
| 413.71 | 24.1287 | 657.76 | 14.4032 | 836.80 | 0.0000 |
| 414.70 | 15.4529 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 10.7133 | 661.66 | 8.8799 | 846.77 | 9.6064 |
| 427.87 | 12.6677 | 664.57 | 0.0000 | 856.80 | 6.7505 |
| 433.94 | 12.7189 | 666.33 | 8.8994 | 860.56 | 11.5887 |
| 439.40 | 15.7102 | 666.50 | 7.1199 | 871.09 | 2.9087 |
| 453.88 | 13.2147 | 667.71 | 0.0000 | 873.19 | 7.7629 |
| 463.37 | 12.7625 | 677.62 | 8.9463 | 875.33 | 0.0000 |
| 468.07 | 8.0000 | 685.70 | 0.0000 | 879.38 | 7.7809 |
| 473.00 | 0.0000 | 695.00 | 10.8211 | 880.51 | 6.8112 |
| 475.06 | 8.0347 | 696.49 | 11.7308 | 883.24 | 3.8960 |
| 476.78 | 6.0323 | 696.51 | 11.7308 | 884.68 | 6.8216 |
| 477.60 | 9.0530 | 697.00 | 12.6359 | 889.28 | 4.8809 |
| 482.18 | 8.0696 | 697.49 | 10.8334 | 894.76 | 7.8252 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 6.8554 | 1298.22 | 0.0000 | | |
| 903.28 | 4.9061 | 1312.11 | 4.6415 | | |
| 911.20 | 1.9681 | 1332.49 | 7.4668 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.9474 | 1365.19 | 1.8826 | | |
| 937.49 | 6.9535 | 1368.63 | 0.0000 | | |
| 944.13 | 7.9654 | 1384.29 | 2.8379 | | |
| 946.00 | 7.9707 | 1408.01 | 1.9033 | | |
| 949.00 | 2.9922 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 3.3057 | | |
| 962.31 | 6.0122 | 1489.16 | 4.8537 | | |
| 964.08 | 8.0211 | 1505.03 | 3.8978 | | |
| 966.17 | 5.0167 | 1596.21 | 6.9664 | | |
| 968.97 | 5.0216 | 1620.50 | 0.0000 | | |
| 983.53 | 7.0655 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 5.0808 | | |
| 1274.44 | 10.1370 | 1750.46 | 0.0000 | | |
| 1001.03 | 11.1684 | 1764.49 | 5.1601 | | |
| 1004.73 | 7.1160 | 1063.66 | 4.1330 | | |
| 507.63 | 0.0000 | 1771.35 | 3.1005 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0828 | | |
| 1037.84 | 5.1387 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 0.0000 | | |
| 631.29 | 4.1227 | | | | |
| 1048.07 | 9.2804 | | | | |
| 1049.04 | 8.2516 | | | | |
| 1050.41 | 3.0958 | | | | |
| 1063.66 | 5.1814 | | | | |
| 1077.00 | 5.2034 | | | | |
| 1077.34 | 7.2857 | | | | |
| 1085.87 | 5.2180 | | | | |
| 1099.45 | 9.4320 | | | | |
| 1112.07 | 6.3126 | | | | |
| 1112.84 | 5.2617 | | | | |
| 1115.54 | 6.3193 | | | | |
| 1120.29 | 7.3832 | | | | |
| 1120.55 | 8.4387 | | | | |
| 1221.41 | 7.3855 | | | | |
| 1129.67 | 9.5199 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 4.2863 | | | | |
| 1177.95 | 3.2191 | | | | |
| 1189.05 | 6.4591 | | | | |
| 1204.77 | 9.7326 | | | | |
| 1221.41 | 3.2597 | | | | |
| 1231.02 | 6.5370 | | | | |
| 1235.36 | 4.3633 | | | | |
| 1238.28 | 4.3670 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.5915 | | | | |
| 1274.44 | 6.4323 | | | | |
| 1274.54 | 8.2705 | | | | |
| 1291.59 | 2.7697 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:01:48.44

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147009.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM12.CNF;297
                                        Background date  : 2-FEB-2014 16:26:51.
Sample date      : 7-NOV-2013 13:15:00. Acquisition date : 7-FEB-2014 09:00:58.
Sample ID        : G341147009           Sample quantity  : 1.25850E+02 GRAM
Detector name    : GAM12                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.26  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 37.98* | 7 | 25 | 1.65 | 75.73 | 68 | 13 | 2.07E-03 | 146.0 | 1.82E+00 |
| 2 | 0 | 93.58* | 2 | 67 | 1.59 | 186.89 | 180 | 12 | 5.70E-04 | 901.8 | |
| 3 | 0 | 220.62 | 14 | 13 | 1.38 | 440.89 | 437 | 8 | 3.75E-03 | 52.4 | |
| 4 | 0 | 237.11 | 39 | 36 | 5.06 | 473.86 | 464 | 16 | 1.08E-02 | 38.0 | |
| 5 | 0 | 256.37 | 23 | 23 | 2.64 | 512.38 | 505 | 13 | 6.51E-03 | 46.8 | |
| 6 | 0 | 380.99 | 8 | 3 | 1.08 | 761.56 | 758 | 6 | 2.22E-03 | 49.2 | |
| 7 | 0 | 392.41 | 11 | 8 | 0.78 | 784.41 | 777 | 11 | 2.95E-03 | 60.9 | |
| 8 | 0 | 570.48* | 8 | 17 | 1.83 | 1140.53 | 1134 | 14 | 2.12E-03 | 131.3 | |
| 9 | 0 | 611.09* | 1 | 12 | 1.40 | 1221.74 | 1214 | 10 | 2.74E-04 | 742.3 | |
| 10 | 0 | 733.77 | 8 | 0 | 1.30 | 1467.13 | 1464 | 6 | 2.22E-03 | 35.4 | |
| 11 | 0 | 802.73 | 10 | 3 | 1.72 | 1605.07 | 1601 | 7 | 2.71E-03 | 44.8 | |
| 12 | 0 | 844.53 | 9 | 2 | 0.70 | 1688.68 | 1685 | 7 | 2.59E-03 | 40.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:01:49

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147009.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:15:00 | Acquisition date | : 7-FEB-2014 09:00:58 |
| Sample ID | : G341147009 | Sample quantity | : 125.85 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA12 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.26  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NB-95M | 235.69 | 39 | 24.80* | 4.433E+00 | 2.113E-01 | 5.710E-01 | 76.01 |
| SN-113 | 391.69 | 11 | 64.94* | 3.100E+00 | 3.143E-02 | 5.464E-02 | 121.76 |
| AC-227 | 79.69 | ------ | 2.64 | 3.100E+00 | ------ | Line Not Found | ------ |
| | 235.96 | 39 | 17.50 | 4.433E+00 | 2.994E-01 | 2.994E-01 | 76.01 |
| | 256.23 | 23 | 9.50* | 4.213E+00 | 3.492E-01 | 3.492E-01 | 93.51 |
| | 299.98 | ------ | 3.00 | 3.775E+00 | ------ | Line Not Found | ------ |
| | 304.50 | ------ | 1.56 | 3.735E+00 | ------ | Line Not Found | ------ |
| | 334.37 | ------ | 1.54 | 3.489E+00 | ------ | Line Not Found | ------ |
| TH-227 | 79.69 | ------ | 2.64 | 3.100E+00 | ------ | Line Not Found | ------ |
| | 235.96 | 39 | 17.50 | 4.433E+00 | 2.994E-01 | 2.994E-01 | 76.01 |
| | 256.23 | 23 | 9.50* | 4.213E+00 | 3.492E-01 | 3.492E-01 | 93.51 |
| | 299.98 | ------ | 3.00 | 3.775E+00 | ------ | Line Not Found | ------ |
| | 304.50 | ------ | 1.56 | 3.735E+00 | ------ | Line Not Found | ------ |
| | 334.37 | ------ | 1.54 | 3.489E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:01:50.73

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147009.CNF;1    *
* Acquisition date :  7-FEB-2014 09:00:58 Sensitivity     : 3.000          *
* Detector ID      : GAM12                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.26     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:15:00 Nuclide Library : SOLID          *
* Sample ID        : G341147009           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.2585E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 07:07:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM12_500MLMB.CNF;10      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| NB-95M | 5.710E-01 | 4.253E-01 | 4.009E-01 |
| SN-113 | 5.464E-02 | 6.520E-02 | 1.082E-01 |
| AC-227 | 3.492E-01 | 3.200E-01 | 3.733E-01 |
| TH-227 | 3.492E-01 | 3.200E-01 | 3.733E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -2.227E-01 | 8.332E-01 | 1.543E+00 | NOT IDENT. |
| NA-22 | -9.285E-03 | 2.363E-02 | 4.700E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.028E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.993E-02 | 2.255E-02 | 1.736E-02 | NOT IDENT. |
| K-40 | 3.608E-01 | 3.539E-01 | 8.751E-01 | NOT IDENT. |
| SC-46 | -1.779E-02 | 6.598E-02 | 1.222E-01 | NOT IDENT. |
| V-48 | -5.387E-01 | 1.711E+00 | 3.134E+00 | NOT IDENT. |
| CR-51 | -1.695E+00 | 2.230E+00 | 3.884E+00 | NOT IDENT. |
| MN-54 | 1.311E-02 | 3.527E-02 | 7.510E-02 | NOT IDENT. |
| CO-56 | 4.831E-02 | 7.736E-02 | 1.529E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.583E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.867E-02 | 2.644E-02 | 5.248E-02 | NOT IDENT. |
| CO-58 | -2.900E-02 | 7.164E-02 | 1.292E-01 | NOT IDENT. |
| FE-59 | 2.444E-02 | 2.499E-01 | 5.199E-01 | NOT IDENT. |
| CO-60 | 1.043E-02 | 2.773E-02 | 6.632E-02 | NOT IDENT. |
| ZN-65 | 2.160E-02 | 8.966E-02 | 1.889E-01 | NOT IDENT. |
| GE-68 | -4.012E-01 | 1.003E+00 | 1.943E+00 | NOT IDENT. |
| AS-73 | 1.708E+00 | 2.969E+00 | 5.856E+00 | NOT IDENT. |
| AS-74 | -7.226E-01 | 1.573E+00 | 2.828E+00 | NOT IDENT. |
| SE-75 | 1.586E-02 | 5.243E-02 | 1.014E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.699E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -3.183E-01 | 1.891E+00 | 3.696E+00 | NOT IDENT. |
| RB-83 | -7.214E-03 | 1.066E-01 | 2.075E-01 | NOT IDENT. |
| KR-85 | -4.672E+00 | 1.152E+01 | 2.024E+01 | NOT IDENT. |
| SR-85 | -5.565E-02 | 1.367E-01 | 2.402E-01 | NOT IDENT. |
| RB-86 | -5.840E+00 | 9.852E+00 | 1.792E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | 2.227E-02 | 6.674E-02 | 1.554E-01 | NOT IDENT. |
| Y-91 | 4.073E+00 | 2.887E+01 | 6.524E+01 | NOT IDENT. |
| NB-94 | -1.194E-02 | 2.519E-02 | 4.515E-02 | NOT IDENT. |
| NB-95 | -4.904E-02 | 8.044E-02 | 1.417E-01 | NOT IDENT. |
| ZR-95 | 1.549E-03 | 1.405E-01 | 2.763E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.560E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.879E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.615E-03 | 2.884E-02 | 5.475E-02 | NOT IDENT. |
| RH-102 | -7.147E-03 | 5.192E-02 | 9.855E-02 | NOT IDENT. |
| RU-103 | -3.405E-02 | 1.121E-01 | 2.116E-01 | FAIL ABUN |
| RH-106 | 1.573E-01 | 3.637E-01 | 7.410E-01 | NOT IDENT. |
| RU-106 | 1.573E-01 | 3.637E-01 | 7.410E-01 | NOT IDENT. |
| AG-108M | 9.196E-03 | 2.598E-02 | 5.284E-02 | NOT IDENT. |
| CD-109 | -1.109E+00 | 1.085E+00 | 1.495E+00 | NOT IDENT. |
| AG-110M | 5.917E-03 | 5.288E-02 | 1.075E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.680E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 9.041E-02 | 2.438E+00 | 4.444E+00 | NOT IDENT. |
| TE-123M | 3.304E-03 | 3.881E-02 | 7.125E-02 | NOT IDENT. |
| SB-124 | -3.952E-02 | 1.915E-01 | 3.927E-01 | NOT IDENT. |
| SB-125 | -3.016E-02 | 7.729E-02 | 1.422E-01 | NOT IDENT. |
| TE-125M | 1.960E+01 | 2.048E+01 | 4.202E+01 | NOT IDENT. |
| I-126 | -5.681E+00 | 1.319E+01 | 2.353E+01 | NOT IDENT. |
| SB-126 | 2.971E+00 | 8.464E+00 | 1.781E+01 | NOT IDENT. |
| SN-126 | -5.335E-02 | 8.326E-02 | 1.217E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.119E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.626E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.081E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.619E-02 | 3.404E-02 | 6.186E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.650E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.601E-02 | 3.535E-02 | 7.333E-02 | FAIL ABUN |
| CS-135 | 1.205E-01 | 1.211E-01 | 2.520E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -8.701E-01 | 3.785E+00 | 7.742E+00 | NOT IDENT. |
| BA-137M | 2.176E-02 | 3.242E-02 | 6.932E-02 | NOT IDENT. |
| CS-137 | 2.298E-02 | 3.425E-02 | 7.322E-02 | NOT IDENT. |
| CE-139 | 1.281E-02 | 3.386E-02 | 6.501E-02 | NOT IDENT. |
| BA-140 | 5.129E+00 | 4.853E+00 | 1.314E+01 | NOT IDENT. |
| LA-140 | 5.129E+00 | 4.853E+00 | 1.314E+01 | NOT IDENT. |
| CE-141 | 2.024E-01 | 2.840E-01 | 5.535E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.227E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.978E-02 | 1.879E-01 | 3.431E-01 | NOT IDENT. |
| PM-144 | -1.021E-02 | 3.381E-02 | 6.236E-02 | NOT IDENT. |
| PR-144 | -7.847E-01 | 2.637E+00 | 4.866E+00 | NOT IDENT. |
| PM-146 | 2.025E-02 | 3.546E-02 | 7.519E-02 | NOT IDENT. |
| ND-147 | -4.658E+01 | 4.950E+01 | 7.938E+01 | NOT IDENT. |
| PM-147 | 4.327E+02 | 6.679E+02 | 1.320E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.207E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.242E-02 | 2.386E-02 | 3.934E-02 | NOT IDENT. |
| EU-152 | -2.247E-03 | 8.593E-02 | 1.648E-01 | NOT IDENT. |
| GD-153 | -6.161E-02 | 1.076E-01 | 1.586E-01 | NOT IDENT. |
| EU-154 | -2.530E-02 | 6.440E-02 | 1.281E-01 | NOT IDENT. |
| EU-155 | -3.089E-02 | 9.594E-02 | 1.711E-01 | NOT IDENT. |
| TB-160 | 2.782E-02 | 2.234E-01 | 4.566E-01 | NOT IDENT. |
| HO-166M | -3.912E-02 | 4.838E-02 | 7.928E-02 | NOT IDENT. |
| TM-171 | 3.703E+01 | 3.645E+01 | 7.459E+01 | NOT IDENT. |
| LU-176 | 9.014E-03 | 2.066E-02 | 4.237E-02 | NOT IDENT. |
| HF-181 | 1.052E-01 | 1.323E-01 | 2.872E-01 | NOT IDENT. |
| TA-182 | 1.357E-01 | 2.003E-01 | 4.774E-01 | FAIL ABUN |
| RE-183 | -2.577E-01 | 6.344E-01 | 1.134E+00 | NOT IDENT. |
| RE-184 | -1.053E-01 | 4.444E-01 | 8.389E-01 | NOT IDENT. |
| W-188 | -6.501E+00 | 1.326E+01 | 2.250E+01 | NOT IDENT. |
| IR-192 | 4.324E-02 | 6.325E-02 | 1.307E-01 | NOT IDENT. |
| HG-203 | -2.710E-02 | 1.003E-01 | 1.763E-01 | NOT IDENT. |
| BI-207 | 1.914E-02 | 3.786E-02 | 8.760E-02 | FAIL ABUN |
| TL-208 | -6.886E-03 | 3.372E-02 | 6.455E-02 | NOT IDENT. |
| PB-210 | -4.622E+00 | 7.763E+00 | 1.360E+01 | NOT IDENT. |
| BI-211 | 6.435E-02 | 1.916E-01 | 3.812E-01 | NOT IDENT. |
| PB-211 | 6.657E-03 | 6.458E-01 | 1.244E+00 | NOT IDENT. |
| BI-212 | 2.400E-02 | 4.295E-01 | 8.259E-01 | NOT IDENT. |
| PB-212 | -4.403E-04 | 6.038E-02 | 1.039E-01 | NOT IDENT. |
| BI-214 | 7.997E-03 | 6.776E-02 | 1.364E-01 | NOT IDENT. |
| PB-214 | 1.046E-02 | 6.909E-02 | 1.350E-01 | NOT IDENT. |
| RN-219 | 7.873E-02 | 3.708E-01 | 7.318E-01 | NOT IDENT. |
| RN-222 | 7.997E-03 | 6.776E-02 | 1.364E-01 | NOT IDENT. |
| RA-223 | 2.094E-01 | 5.596E-01 | 1.121E+00 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | -3.069E-01 | 6.049E-01 | 8.710E-01 | NOT IDENT. |
| RA-226 | 7.997E-03 | 6.776E-02 | 1.364E-01 | NOT IDENT. |
| AC-228 | 4.498E-02 | 1.436E-01 | 2.959E-01 | NOT IDENT. |
| RA-228 | 4.498E-02 | 1.436E-01 | 2.959E-01 | NOT IDENT. |
| TH-228 | -4.403E-04 | 6.038E-02 | 1.039E-01 | NOT IDENT. |
| TH-229 | -7.842E-02 | 4.447E-01 | 7.919E-01 | NOT IDENT. |
| TH-230 | 7.996E-03 | 6.775E-02 | 1.363E-01 | NOT IDENT. |
| PA-231 | -1.286E-01 | 1.213E+00 | 2.188E+00 | NOT IDENT. |
| TH-231 | 2.094E-01 | 5.596E-01 | 1.121E+00 | FAIL ABUN |
| TH-232 | 4.498E-02 | 1.436E-01 | 2.959E-01 | NOT IDENT. |
| PA-233 | -5.754E-02 | 5.317E-02 | 8.807E-02 | NOT IDENT. |
| PA-234 | 7.466E-02 | 2.244E-01 | 4.865E-01 | FAIL ABUN |
| PA-234M | 7.075E-01 | 3.479E+00 | 7.415E+00 | NOT IDENT. |
| TH-234 | -2.212E-02 | 1.957E+00 | 3.757E+00 | FAIL ABUN |
| U-234 | 7.996E-03 | 6.775E-02 | 1.363E-01 | NOT IDENT. |
| U-235 | -4.221E-02 | 1.879E-01 | 3.288E-01 | FAIL ABUN |
| NP-237 | -5.754E-02 | 5.317E-02 | 8.807E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 1.402E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -2.212E-02 | 1.957E+00 | 3.757E+00 | FAIL ABUN |
| NP-239 | -4.285E-02 | 3.209E-01 | 5.871E-01 | NOT IDENT. |
| PU-239 | 1.925E+02 | 2.922E+02 | 5.726E+02 | NOT IDENT. |
| AM-241 | -9.280E-02 | 2.377E-01 | 4.236E-01 | NOT IDENT. |
| AM-243 | 7.124E-03 | 6.065E-02 | 1.128E-01 | NOT IDENT. |
| CM-243 | 6.114E-02 | 9.620E-02 | 1.902E-01 | NOT IDENT. |
| CM-247 | -5.824E-03 | 3.354E-02 | 6.311E-02 | NOT IDENT. |
| CF-249 | -2.793E-02 | 3.463E-02 | 5.052E-02 | NOT IDENT. |
| CF-251 | 6.698E-02 | 1.067E-01 | 2.083E-01 | NOT IDENT. |
| ANH-511 | -1.810E-02 | 5.271E-02 | 1.122E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:01:46.84

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 36.02 | 20 | 7 | 1.65 | 71.82 | 68 | 13 | 5.46E-03 | 42.0 | 1.82E+00 |
| 2 | 3 | 37.98 | 20 | 25 | 1.65 | 75.73 | 68 | 13 | 5.45E-03 | 53.9 | |
| 3 | 0 | 64.58 | 13 | 54 | 0.93 | 128.92 | 124 | 11 | 3.68E-03 | 109.6 | |
| 4 | 0 | 93.58 | 44 | 67 | 1.59 | 186.89 | 180 | 12 | 1.22E-02 | 41.0 | |
| 5 | 0 | 220.62 | 14 | 13 | 1.38 | 440.89 | 437 | 8 | 3.75E-03 | 52.4 | |
| 6 | 0 | 237.11 | 39 | 36 | 5.06 | 473.86 | 464 | 16 | 1.08E-02 | 38.0 | |
| 7 | 0 | 256.37 | 23 | 23 | 2.64 | 512.38 | 505 | 13 | 6.51E-03 | 46.8 | |
| 8 | 0 | 380.99 | 8 | 3 | 1.08 | 761.56 | 758 | 6 | 2.22E-03 | 49.2 | |
| 9 | 0 | 392.41 | 11 | 8 | 0.78 | 784.41 | 777 | 11 | 2.95E-03 | 60.9 | |
| 10 | 0 | 510.88 | 66 | 38 | 2.29 | 1021.33 | 1014 | 14 | 1.84E-02 | 23.3 | |
| 11 | 0 | 570.48 | 18 | 17 | 1.83 | 1140.53 | 1134 | 14 | 4.98E-03 | 54.8 | |
| 12 | 0 | 611.09 | 7 | 12 | 1.40 | 1221.74 | 1214 | 10 | 2.00E-03 | 98.3 | |
| 13 | 0 | 733.77 | 8 | 0 | 1.30 | 1467.13 | 1464 | 6 | 2.22E-03 | 35.4 | |
| 14 | 0 | 802.73 | 10 | 3 | 1.72 | 1605.07 | 1601 | 7 | 2.71E-03 | 44.8 | |
| 15 | 0 | 844.53 | 9 | 2 | 0.70 | 1688.68 | 1685 | 7 | 2.59E-03 | 40.2 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:01:48.99

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NB-95M | 235.69 | 39 | 24.80* | 4.433E+00 | 2.113E-01 | 5.710E-01 | 76.01 |
| SN-113 | 391.69 | 11 | 64.94* | 3.100E+00 | 3.143E-02 | 5.464E-02 | 121.76 |
| AC-227 | 79.69 | ------ | 2.64 | 3.100E+00 | ------ | Line Not Found | ------ |
| | 235.96 | 39 | 17.50 | 4.433E+00 | 2.994E-01 | 2.994E-01 | 76.01 |
| | 256.23 | 23 | 9.50* | 4.213E+00 | 3.492E-01 | 3.492E-01 | 93.51 |
| | 299.98 | ------ | 3.00 | 3.775E+00 | ------ | Line Not Found | ------ |
| | 304.50 | ------ | 1.56 | 3.735E+00 | ------ | Line Not Found | ------ |
| | 334.37 | ------ | 1.54 | 3.489E+00 | ------ | Line Not Found | ------ |
| TH-227 | 79.69 | ------ | 2.64 | 3.100E+00 | ------ | Line Not Found | ------ |
| | 235.96 | 39 | 17.50 | 4.433E+00 | 2.994E-01 | 2.994E-01 | 76.01 |
| | 256.23 | 23 | 9.50* | 4.213E+00 | 3.492E-01 | 3.492E-01 | 93.51 |
| | 299.98 | ------ | 3.00 | 3.775E+00 | ------ | Line Not Found | ------ |
| | 304.50 | ------ | 1.56 | 3.735E+00 | ------ | Line Not Found | ------ |
| | 334.37 | ------ | 1.54 | 3.489E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341147009 Acquisition date : 7-FEB-2014 09:00:58

Total number of lines in spectrum 12
Number of unidentified lines 3
Number of lines tentatively identified by NID 9 75.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| NB-95M | 64.03D | 2.70 | 2.113E-01 | 5.710E-01 | 4.340E-01 | 76.01 | |
| SN-113 | 115.09D | 1.74 | 3.143E-02 | 5.464E-02 | 6.653E-02 | 121.76 | |
| AC-227 | 7.04E+08Y | 1.00 | 3.492E-01 | 3.492E-01 | 3.265E-01 | 93.51 | |
| TH-227 | 7.04E+08Y | 1.00 | 3.492E-01 | 3.492E-01 | 3.265E-01 | 93.51 | |
| Total Activity : | | | 9.410E-01 | 1.324E+00 | | | |

Grand Total Activity : 9.410E-01 1.324E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147009 Acquisition date : 7-FEB-2014 09:00:58

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 37.98 | 7 | 25 | 1.65 | 75.73 | 68 | 13 | 2.07E-03 | **** | 5.47E-02 | |
| 0 | 93.58 | 2 | 67 | 1.59 | 186.89 | 180 | 12 | 5.70E-04 | **** | 4.15E+00 | T |
| 0 | 220.62 | 14 | 13 | 1.38 | 440.89 | 437 | 8 | 3.75E-03 | **** | 4.63E+00 | T |
| 0 | 380.99 | 8 | 3 | 1.08 | 761.56 | 758 | 6 | 2.22E-03 | 98.4 | 3.17E+00 | |
| 0 | 570.48 | 8 | 17 | 1.83 | 1140.53 | 1134 | 14 | 2.12E-03 | **** | 2.35E+00 | T |
| 0 | 611.09 | 1 | 12 | 1.40 | 1221.74 | 1214 | 10 | 2.74E-04 | **** | 2.23E+00 | T |
| 0 | 733.77 | 8 | 0 | 1.30 | 1467.13 | 1464 | 6 | 2.22E-03 | 70.7 | 1.95E+00 | T |
| 0 | 802.73 | 10 | 3 | 1.72 | 1605.07 | 1601 | 7 | 2.71E-03 | 89.5 | 1.82E+00 | T |
| 0 | 844.53 | 9 | 2 | 0.70 | 1688.68 | 1685 | 7 | 2.59E-03 | 80.5 | 1.75E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:02:02.77

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147009.CNF;1    *
* Acquisition date :  7-FEB-2014 09:00:58 Sensitivity     : 3.000          *
* Detector ID      : GAM12                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.26     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:15:00 Nuclide Library : SOLID          *
* Sample ID        : G341147009           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.2585E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 07:07:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM12_500MLMB.CNF;10      *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| NB-95M | 1.808E-01 |
| SN-113 | 4.716E-02 |
| AC-227 | 1.666E-01 |
| TH-227 | 1.666E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 6.763E-01 | NOT IDENT. |
| NA-22 | 1.665E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 0.000E+00 | NOT IDENT. |
| K-40 | 3.703E-01 | NOT IDENT. |
| SC-46 | 5.086E-02 | NOT IDENT. |
| V-48 | 1.288E+00 | NOT IDENT. |
| CR-51 | 1.718E+00 | NOT IDENT. |
| MN-54 | 3.196E-02 | NOT IDENT. |
| CO-56 | 6.593E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.397E-02 | NOT IDENT. |
| CO-58 | 5.358E-02 | NOT IDENT. |
| FE-59 | 2.181E-01 | NOT IDENT. |
| CO-60 | 2.630E-02 | NOT IDENT. |
| ZN-65 | 7.977E-02 | NOT IDENT. |
| GE-68 | 7.528E-01 | NOT IDENT. |
| AS-73 | 2.682E+00 | NOT IDENT. |
| AS-74 | 1.198E+00 | NOT IDENT. |
| SE-75 | 4.504E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.495E+00 | NOT IDENT. |
| RB-83 | 8.886E-02 | NOT IDENT. |
| KR-85 | 9.380E+00 | NOT IDENT. |
| SR-85 | 1.113E-01 | NOT IDENT. |
| RB-86 | 6.999E+00 | NOT IDENT. |
| Y-88 | 6.168E-02 | NOT IDENT. |

| | | |
|---|---|---|
| Y-91 | 2.565E+01 | NOT IDENT. |
| NB-94 | 1.857E-02 | NOT IDENT. |
| NB-95 | 5.931E-02 | NOT IDENT. |
| ZR-95 | 1.171E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.503E-02 | NOT IDENT. |
| RH-102 | 4.237E-02 | NOT IDENT. |
| RU-103 | 8.858E-02 | FAIL ABUN |
| RH-106 | 3.269E-01 | NOT IDENT. |
| RU-106 | 3.269E-01 | NOT IDENT. |
| AG-108M | 2.333E-02 | NOT IDENT. |
| CD-109 | 6.813E-01 | NOT IDENT. |
| AG-110M | 4.532E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.034E+00 | NOT IDENT. |
| TE-123M | 3.256E-02 | NOT IDENT. |
| SB-124 | 1.470E-01 | NOT IDENT. |
| SB-125 | 6.122E-02 | NOT IDENT. |
| TE-125M | 1.917E+01 | NOT IDENT. |
| I-126 | 1.016E+01 | NOT IDENT. |
| SB-126 | 7.594E+00 | NOT IDENT. |
| SN-126 | 5.505E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.697E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.107E-02 | FAIL ABUN |
| CS-135 | 1.137E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.012E+00 | NOT IDENT. |
| BA-137M | 3.038E-02 | NOT IDENT. |
| CS-137 | 3.210E-02 | NOT IDENT. |
| CE-139 | 2.948E-02 | NOT IDENT. |
| BA-140 | 5.373E+00 | NOT IDENT. |
| LA-140 | 5.373E+00 | NOT IDENT. |
| CE-141 | 2.549E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.546E-01 | NOT IDENT. |
| PM-144 | 2.642E-02 | NOT IDENT. |
| PR-144 | 2.062E+00 | NOT IDENT. |
| PM-146 | 3.300E-02 | NOT IDENT. |
| ND-147 | 3.150E+01 | NOT IDENT. |
| PM-147 | 6.022E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.726E-02 | NOT IDENT. |
| EU-152 | 7.345E-02 | NOT IDENT. |
| GD-153 | 7.106E-02 | NOT IDENT. |
| EU-154 | 4.537E-02 | NOT IDENT. |
| EU-155 | 7.724E-02 | NOT IDENT. |
| TB-160 | 1.903E-01 | NOT IDENT. |
| HO-166M | 3.217E-02 | NOT IDENT. |
| TM-171 | 3.431E+01 | NOT IDENT. |
| LU-176 | 1.887E-02 | NOT IDENT. |
| HF-181 | 1.267E-01 | NOT IDENT. |
| TA-182 | 1.989E-01 | FAIL ABUN |
| RE-183 | 5.121E-01 | NOT IDENT. |
| RE-184 | 3.427E-01 | NOT IDENT. |
| W-188 | 9.962E+00 | NOT IDENT. |
| IR-192 | 5.901E-02 | NOT IDENT. |
| HG-203 | 7.844E-02 | NOT IDENT. |
| BI-207 | 3.638E-02 | FAIL ABUN |
| TL-208 | 2.818E-02 | NOT IDENT. |
| PB-210 | 6.160E+00 | NOT IDENT. |
| BI-211 | 1.721E-01 | NOT IDENT. |
| PB-211 | 5.517E-01 | NOT IDENT. |
| BI-212 | 3.514E-01 | NOT IDENT. |
| PB-212 | 4.777E-02 | NOT IDENT. |
| BI-214 | 6.028E-02 | NOT IDENT. |
| PB-214 | 6.077E-02 | NOT IDENT. |
| RN-219 | 3.259E-01 | NOT IDENT. |
| RN-222 | 6.028E-02 | NOT IDENT. |
| RA-223 | 5.039E-01 | FAIL ABUN |
| RA-224 | 3.908E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 6.028E-02 | NOT IDENT. |
| AC-228 | 1.291E-01 | NOT IDENT. |
| RA-228 | 1.291E-01 | NOT IDENT. |
| TH-228 | 4.777E-02 | NOT IDENT. |
| TH-229 | 3.593E-01 | NOT IDENT. |
| TH-230 | 6.027E-02 | NOT IDENT. |
| PA-231 | 9.736E-01 | NOT IDENT. |
| TH-231 | 5.039E-01 | FAIL ABUN |
| TH-232 | 1.291E-01 | NOT IDENT. |
| PA-233 | 3.834E-02 | NOT IDENT. |
| PA-234 | 2.014E-01 | FAIL ABUN |
| PA-234M | 3.083E+00 | NOT IDENT. |
| TH-234 | 1.738E+00 | FAIL ABUN |
| U-234 | 6.027E-02 | NOT IDENT. |
| U-235 | 1.508E-01 | FAIL ABUN |
| NP-237 | 3.834E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.738E+00 | FAIL ABUN |
| NP-239 | 2.638E-01 | NOT IDENT. |
| PU-239 | 2.624E+02 | NOT IDENT. |
| AM-241 | 1.930E-01 | NOT IDENT. |
| AM-243 | 5.188E-02 | NOT IDENT. |
| CM-243 | 8.682E-02 | NOT IDENT. |
| CM-247 | 2.788E-02 | NOT IDENT. |
| CF-249 | 2.135E-02 | NOT IDENT. |
| CF-251 | 9.514E-02 | NOT IDENT. |
| ANH-511 | 5.296E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:02:07.46

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147009.CNF;1    *
* Acquisition date :  7-FEB-2014 09:00:58 Sensitivity     : 3.000          *
* Detector ID      : GAM12                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.26     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:15:00 Nuclide Library : SOLID          *
* Sample ID        : G341147009           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.2585E+02 GRAM*
*                                         Quantity Err(%) : 1.5892E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 07:07:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM12_500MLMB.CNF;10      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| NB-95M | 5.710E-01 | 4.314E-01 | 4.314E-01 |
| SN-113 | 5.464E-02 | 6.543E-02 | 6.543E-02 |
| AC-227 | 3.492E-01 | 3.255E-01 | 3.255E-01 |
| TH-227 | 3.492E-01 | 3.255E-01 | 3.255E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -2.227E-01 | 8.335E-01 | 8.396E-01 | NOT IDENT. |
| NA-22 | -9.285E-03 | 2.365E-02 | 2.402E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.040E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.993E-02 | 2.261E-02 | 2.433E-02 | NOT IDENT. |
| K-40 | 3.608E-01 | 3.555E-01 | 3.910E-01 | NOT IDENT. |
| SC-46 | -1.779E-02 | 6.601E-02 | 6.650E-02 | NOT IDENT. |
| V-48 | -5.387E-01 | 1.713E+00 | 1.730E+00 | NOT IDENT. |
| CR-51 | -1.695E+00 | 2.239E+00 | 2.366E+00 | NOT IDENT. |
| MN-54 | 1.311E-02 | 3.530E-02 | 3.579E-02 | NOT IDENT. |
| CO-56 | 4.831E-02 | 7.755E-02 | 8.055E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.587E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.867E-02 | 2.649E-02 | 2.779E-02 | NOT IDENT. |
| CO-58 | -2.900E-02 | 7.171E-02 | 7.289E-02 | NOT IDENT. |
| FE-59 | 2.444E-02 | 2.499E-01 | 2.502E-01 | NOT IDENT. |
| CO-60 | 1.043E-02 | 2.775E-02 | 2.814E-02 | NOT IDENT. |
| ZN-65 | 2.160E-02 | 8.972E-02 | 9.025E-02 | NOT IDENT. |
| GE-68 | -4.012E-01 | 1.004E+00 | 1.021E+00 | NOT IDENT. |
| AS-73 | 1.708E+00 | 2.991E+00 | 3.088E+00 | NOT IDENT. |
| AS-74 | -7.226E-01 | 1.575E+00 | 1.609E+00 | NOT IDENT. |
| SE-75 | 1.586E-02 | 5.246E-02 | 5.295E-02 | NOT IDENT. |
| BR-77 | 1.573E+10 | 6.285E+10 | 6.325E+10 | SHORT HLIF |
| SR-82 | -3.183E-01 | 1.891E+00 | 1.897E+00 | NOT IDENT. |
| RB-83 | -7.214E-03 | 1.066E-01 | 1.066E-01 | NOT IDENT. |
| KR-85 | -4.672E+00 | 1.153E+01 | 1.172E+01 | NOT IDENT. |
| SR-85 | -5.565E-02 | 1.368E-01 | 1.391E-01 | NOT IDENT. |
| RB-86 | -5.840E+00 | 9.886E+00 | 1.023E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | 2.227E-02 | 6.677E-02 | 6.752E-02 | NOT IDENT. |
| Y-91 | 4.073E+00 | 2.887E+01 | 2.893E+01 | NOT IDENT. |
| NB-94 | -1.194E-02 | 2.522E-02 | 2.579E-02 | NOT IDENT. |
| NB-95 | -4.904E-02 | 8.060E-02 | 8.357E-02 | NOT IDENT. |
| ZR-95 | 1.549E-03 | 1.405E-01 | 1.405E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 5.098E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -2.743E+39 | 1.585E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.402E+08 | 2.879E+09 | 2.881E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.828E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.615E-03 | 2.890E-02 | 2.922E-02 | NOT IDENT. |
| RH-102 | -7.147E-03 | 5.193E-02 | 5.203E-02 | NOT IDENT. |
| RU-103 | -3.405E-02 | 1.121E-01 | 1.132E-01 | FAIL ABUN |
| RH-106 | 1.573E-01 | 3.641E-01 | 3.710E-01 | NOT IDENT. |
| RU-106 | 1.573E-01 | 3.641E-01 | 3.710E-01 | NOT IDENT. |
| AG-108M | 9.196E-03 | 2.600E-02 | 2.633E-02 | NOT IDENT. |
| CD-109 | -1.109E+00 | 1.093E+00 | 1.202E+00 | NOT IDENT. |
| AG-110M | 5.917E-03 | 5.288E-02 | 5.295E-02 | NOT IDENT. |
| CD-115 | 1.095E+11 | 1.685E+11 | 1.756E+11 | SHORT HLIF |
| SN-117M | 9.041E-02 | 2.438E+00 | 2.438E+00 | NOT IDENT. |
| TE-123M | 3.304E-03 | 3.881E-02 | 3.884E-02 | NOT IDENT. |
| SB-124 | -3.952E-02 | 1.915E-01 | 1.923E-01 | NOT IDENT. |
| SB-125 | -3.016E-02 | 7.735E-02 | 7.854E-02 | NOT IDENT. |
| TE-125M | 1.960E+01 | 2.055E+01 | 2.237E+01 | NOT IDENT. |
| I-126 | -5.681E+00 | 1.320E+01 | 1.345E+01 | NOT IDENT. |
| SB-126 | 2.971E+00 | 8.475E+00 | 8.580E+00 | NOT IDENT. |
| SN-126 | -5.335E-02 | 8.344E-02 | 8.684E-02 | NOT IDENT. |
| SB-127 | -2.445E+05 | 1.124E+06 | 1.130E+06 | SHORT HLIF |
| I-131 | -8.580E+00 | 7.627E+01 | 7.637E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.333E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.405E+05 | 1.081E+07 | 1.081E+07 | SHORT HLIF |
| BA-133 | -1.619E-02 | 3.408E-02 | 3.486E-02 | NOT IDENT. |
| I-133 | -1.450E+30 | 1.842E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.601E-02 | 3.539E-02 | 3.612E-02 | FAIL ABUN |
| CS-135 | 1.205E-01 | 1.221E-01 | 1.336E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 5.453E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -8.701E-01 | 3.787E+00 | 3.807E+00 | NOT IDENT. |
| BA-137M | 2.176E-02 | 3.248E-02 | 3.393E-02 | NOT IDENT. |
| CS-137 | 2.298E-02 | 3.432E-02 | 3.585E-02 | NOT IDENT. |
| CE-139 | 1.281E-02 | 3.397E-02 | 3.446E-02 | NOT IDENT. |
| BA-140 | 5.129E+00 | 4.873E+00 | 5.394E+00 | NOT IDENT. |
| LA-140 | 5.129E+00 | 4.873E+00 | 5.394E+00 | NOT IDENT. |
| CE-141 | 2.024E-01 | 2.845E-01 | 2.987E-01 | NOT IDENT. |
| CE-143 | -5.213E+18 | 6.264E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.978E-02 | 1.879E-01 | 1.881E-01 | NOT IDENT. |
| PM-144 | -1.021E-02 | 3.383E-02 | 3.414E-02 | NOT IDENT. |
| PR-144 | -7.847E-01 | 2.638E+00 | 2.661E+00 | NOT IDENT. |
| PM-146 | 2.025E-02 | 3.554E-02 | 3.669E-02 | NOT IDENT. |
| ND-147 | -4.658E+01 | 4.973E+01 | 5.399E+01 | NOT IDENT. |
| PM-147 | 4.327E+02 | 6.689E+02 | 6.967E+02 | NOT IDENT. |
| PM-149 | 2.471E+10 | 2.207E+12 | 2.207E+12 | SHORT HLIF |
| EU-150 | -2.242E-02 | 2.400E-02 | 2.604E-02 | NOT IDENT. |
| EU-152 | -2.247E-03 | 8.593E-02 | 8.594E-02 | NOT IDENT. |
| GD-153 | -6.161E-02 | 1.078E-01 | 1.113E-01 | NOT IDENT. |
| EU-154 | -2.530E-02 | 6.445E-02 | 6.545E-02 | NOT IDENT. |
| EU-155 | -3.089E-02 | 9.598E-02 | 9.699E-02 | NOT IDENT. |
| TB-160 | 2.782E-02 | 2.235E-01 | 2.238E-01 | NOT IDENT. |
| HO-166M | -3.912E-02 | 4.855E-02 | 5.166E-02 | NOT IDENT. |
| TM-171 | 3.703E+01 | 3.664E+01 | 4.027E+01 | NOT IDENT. |
| LU-176 | 9.014E-03 | 2.069E-02 | 2.109E-02 | NOT IDENT. |
| HF-181 | 1.052E-01 | 1.327E-01 | 1.410E-01 | NOT IDENT. |
| TA-182 | 1.357E-01 | 2.008E-01 | 2.099E-01 | FAIL ABUN |
| RE-183 | -2.577E-01 | 6.352E-01 | 6.457E-01 | NOT IDENT. |
| RE-184 | -1.053E-01 | 4.446E-01 | 4.472E-01 | NOT IDENT. |
| W-188 | -6.501E+00 | 1.330E+01 | 1.362E+01 | NOT IDENT. |
| IR-192 | 4.324E-02 | 6.346E-02 | 6.639E-02 | NOT IDENT. |
| HG-203 | -2.710E-02 | 1.003E-01 | 1.011E-01 | NOT IDENT. |
| BI-207 | 1.914E-02 | 3.795E-02 | 3.892E-02 | FAIL ABUN |
| TL-208 | -6.886E-03 | 3.373E-02 | 3.387E-02 | NOT IDENT. |
| PB-210 | -4.622E+00 | 7.774E+00 | 8.048E+00 | NOT IDENT. |
| BI-211 | 6.435E-02 | 1.917E-01 | 1.939E-01 | NOT IDENT. |
| PB-211 | 6.657E-03 | 6.458E-01 | 6.458E-01 | NOT IDENT. |
| BI-212 | 2.400E-02 | 4.295E-01 | 4.296E-01 | NOT IDENT. |
| PB-212 | -4.403E-04 | 6.038E-02 | 6.038E-02 | NOT IDENT. |
| BI-214 | 7.997E-03 | 6.777E-02 | 6.786E-02 | NOT IDENT. |
| PB-214 | 1.046E-02 | 6.910E-02 | 6.926E-02 | NOT IDENT. |
| RN-219 | 7.873E-02 | 3.710E-01 | 3.727E-01 | NOT IDENT. |
| RN-222 | 7.997E-03 | 6.777E-02 | 6.786E-02 | NOT IDENT. |
| RA-223 | 2.094E-01 | 5.602E-01 | 5.681E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | -3.069E-01 | 6.059E-01 | 6.215E-01 | NOT IDENT. |
| RA-226 | 7.997E-03 | 6.777E-02 | 6.786E-02 | NOT IDENT. |
| AC-228 | 4.498E-02 | 1.437E-01 | 1.451E-01 | NOT IDENT. |
| RA-228 | 4.498E-02 | 1.437E-01 | 1.451E-01 | NOT IDENT. |
| TH-228 | -4.403E-04 | 6.038E-02 | 6.038E-02 | NOT IDENT. |
| TH-229 | -7.842E-02 | 4.448E-01 | 4.462E-01 | NOT IDENT. |
| TH-230 | 7.996E-03 | 6.776E-02 | 6.786E-02 | NOT IDENT. |
| PA-231 | -1.286E-01 | 1.213E+00 | 1.214E+00 | NOT IDENT. |
| TH-231 | 2.094E-01 | 5.602E-01 | 5.681E-01 | FAIL ABUN |
| TH-232 | 4.498E-02 | 1.437E-01 | 1.451E-01 | NOT IDENT. |
| PA-233 | -5.754E-02 | 5.364E-02 | 5.958E-02 | NOT IDENT. |
| PA-234 | 7.466E-02 | 2.403E-01 | 2.426E-01 | FAIL ABUN |
| PA-234M | 7.075E-01 | 3.480E+00 | 3.495E+00 | NOT IDENT. |
| TH-234 | -2.212E-02 | 1.957E+00 | 1.957E+00 | FAIL ABUN |
| U-234 | 7.996E-03 | 6.776E-02 | 6.786E-02 | NOT IDENT. |
| U-235 | -4.221E-02 | 1.879E-01 | 1.889E-01 | FAIL ABUN |
| NP-237 | -5.754E-02 | 5.364E-02 | 5.958E-02 | FAIL ABUN |
| NP-238 | -7.605E+11 | 1.406E+12 | 1.447E+12 | SHORT HLIF |
| U-238 | -2.212E-02 | 1.957E+00 | 1.957E+00 | FAIL ABUN |
| NP-239 | -4.285E-02 | 3.209E-01 | 3.215E-01 | NOT IDENT. |
| PU-239 | 1.925E+02 | 2.926E+02 | 3.052E+02 | NOT IDENT. |
| AM-241 | -9.280E-02 | 2.378E-01 | 2.415E-01 | NOT IDENT. |
| AM-243 | 7.124E-03 | 6.066E-02 | 6.074E-02 | NOT IDENT. |
| CM-243 | 6.114E-02 | 9.646E-02 | 1.003E-01 | NOT IDENT. |
| CM-247 | -5.824E-03 | 3.356E-02 | 3.366E-02 | NOT IDENT. |
| CF-249 | -2.793E-02 | 3.481E-02 | 3.701E-02 | NOT IDENT. |
| CF-251 | 6.698E-02 | 1.071E-01 | 1.112E-01 | NOT IDENT. |
| ANH-511 | -1.810E-02 | 5.274E-02 | 5.337E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 36.2548 | 94.67 | 25.3818 | 193.51 | 35.0910 |
| 45.60 | 41.3728 | 94.87 | 25.3863 | 197.03 | 41.5556 |
| 46.54 | 40.4837 | 97.43 | 34.9852 | 198.01 | 26.6533 |
| 49.72 | 0.0000 | 98.43 | 33.4241 | 201.83 | 41.6696 |
| 51.35 | 31.2640 | 98.44 | 33.4244 | 205.31 | 31.0459 |
| 52.39 | 27.5104 | 99.53 | 28.4490 | 210.85 | 35.4371 |
| 53.44 | 30.3960 | 100.11 | 29.8865 | 215.65 | 17.2268 |
| 57.36 | 0.0000 | 103.18 | 26.9685 | 222.11 | 32.8450 |
| 57.53 | 37.2294 | 103.37 | 26.9729 | 227.09 | 28.1653 |
| 57.98 | 35.3389 | 105.21 | 34.0185 | 227.38 | 27.0863 |
| 59.32 | 32.5247 | 105.31 | 34.0214 | 228.16 | 0.0000 |
| 59.54 | 42.1017 | 106.12 | 36.0470 | 228.18 | 32.2076 |
| 63.29 | 34.5949 | 109.28 | 22.0863 | 235.69 | 28.2919 |
| 63.58 | 38.4513 | 111.00 | 30.1600 | 235.96 | 28.2957 |
| 64.28 | 35.5953 | 111.76 | 0.0000 | 238.63 | 24.4113 |
| 66.73 | 52.0904 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 51.1541 | 117.23 | 28.2897 | 240.99 | 34.9150 |
| 67.75 | 42.4911 | 121.12 | 26.3486 | 242.00 | 38.4264 |
| 69.67 | 38.7080 | 121.22 | 26.3507 | 244.70 | 32.7944 |
| 70.83 | 39.7244 | 121.78 | 26.3620 | 252.40 | 0.0000 |
| 72.81 | 45.6322 | 122.06 | 26.3677 | 252.80 | 14.0487 |
| 72.87 | 42.7222 | 123.07 | 28.4180 | 254.15 | 0.0000 |
| 74.66 | 41.8282 | 127.23 | 32.5799 | 256.23 | 23.0876 |
| 74.82 | 41.8350 | 129.30 | 29.5711 | 260.90 | 0.0000 |
| 74.97 | 41.8414 | 131.20 | 34.7183 | 264.66 | 17.6624 |
| 77.11 | 34.1308 | 133.02 | 25.5621 | 268.22 | 15.4808 |
| 79.69 | 43.9953 | 133.52 | 29.6629 | 269.46 | 15.4900 |
| 80.12 | 46.9481 | 136.00 | 29.7162 | 271.23 | 17.7175 |
| 80.19 | 0.0000 | 136.47 | 30.7512 | 273.65 | 35.4756 |
| 80.57 | 49.9043 | 140.51 | 0.0000 | 276.40 | 19.9806 |
| 81.00 | 46.9885 | 143.76 | 42.2437 | 277.37 | 8.8843 |
| 81.07 | 46.9918 | 144.24 | 43.2885 | 277.60 | 8.8853 |
| 83.79 | 24.5393 | 145.44 | 33.0093 | 278.00 | 12.2194 |
| 85.43 | 42.2735 | 152.43 | 31.0938 | 279.20 | 25.5641 |
| 86.55 | 44.6144 | 153.25 | 22.8147 | 279.54 | 25.5679 |
| 86.79 | 44.6245 | 154.21 | 26.9801 | 280.46 | 30.0273 |
| 86.94 | 51.9816 | 156.02 | 39.4800 | 283.69 | 23.3895 |
| 87.09 | 51.9889 | 158.56 | 38.5054 | 284.31 | 0.0000 |
| 87.57 | 42.5555 | 159.00 | 36.4347 | 285.41 | 18.9491 |
| 88.03 | 58.3418 | 162.33 | 35.4705 | 285.90 | 0.0000 |
| 88.34 | 58.3586 | 163.33 | 34.4494 | 287.50 | 25.6616 |
| 88.47 | 55.2107 | 165.86 | 26.1404 | 290.67 | 26.8158 |
| 89.96 | 36.3313 | 176.31 | 17.8922 | 293.27 | 0.0000 |
| 91.11 | 42.6946 | 176.60 | 15.7901 | 295.22 | 29.1100 |
| 92.59 | 31.6681 | 177.52 | 27.3850 | 295.96 | 29.1195 |
| 93.35 | 31.6898 | 181.07 | 0.0000 | 298.58 | 22.4255 |
| 94.56 | 25.3793 | 184.41 | 31.7301 | 299.98 | 24.6835 |
| 94.65 | 25.3813 | 185.72 | 37.0476 | 300.09 | 24.6849 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 24.6852 | 497.08 | 11.5922 | 711.68 | 13.3418 |
| 301.36 | 33.6800 | 505.52 | 43.5877 | 720.70 | 8.2289 |
| 302.85 | 34.8253 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 20.2360 | 511.00 | 22.3165 | 722.78 | 17.4956 |
| 306.78 | 17.1051 | 514.00 | 62.1563 | 722.91 | 14.4084 |
| 308.46 | 18.0186 | 514.00 | 62.1563 | 723.31 | 14.4098 |
| 311.90 | 28.8727 | 520.40 | 12.6506 | 724.19 | 13.3837 |
| 316.51 | 19.8894 | 520.69 | 0.0000 | 727.33 | 8.0134 |
| 319.41 | 31.6812 | 522.65 | 0.0000 | 733.00 | 10.3174 |
| 320.08 | 29.8793 | 527.90 | 0.0000 | 735.93 | 12.0458 |
| 321.04 | 29.8913 | 529.59 | 10.7347 | 737.46 | 6.8859 |
| 323.87 | 21.7652 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 26.3149 | 531.02 | 12.6921 | 747.24 | 12.4242 |
| 328.76 | 21.8101 | 546.56 | 0.0000 | 748.06 | 13.4621 |
| 333.37 | 27.3149 | 552.55 | 13.7573 | 752.31 | 9.3296 |
| 333.97 | 28.2323 | 563.25 | 19.7158 | 753.82 | 11.4071 |
| 334.37 | 30.0585 | 569.33 | 16.4591 | 756.73 | 10.3772 |
| 338.28 | 18.2466 | 569.50 | 12.8388 | 756.80 | 10.3774 |
| 338.32 | 18.2471 | 569.70 | 12.8394 | 763.94 | 10.3953 |
| 340.48 | 24.6553 | 583.19 | 12.8899 | 765.81 | 10.3999 |
| 340.55 | 24.6560 | 584.27 | 15.8691 | 766.42 | 10.4014 |
| 344.28 | 22.8641 | 595.83 | 14.9264 | 766.84 | 7.2818 |
| 345.93 | 23.7948 | 600.60 | 4.9822 | 772.60 | 0.0000 |
| 351.06 | 20.1754 | 602.52 | 0.0000 | 776.52 | 7.2986 |
| 351.93 | 21.0998 | 602.73 | 16.2020 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 19.9521 | 778.90 | 11.4756 |
| 356.01 | 21.1343 | 609.32 | 11.9865 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 11.6570 | 785.37 | 9.4034 |
| 366.42 | 0.0000 | 614.28 | 11.6698 | 792.07 | 7.3252 |
| 375.05 | 16.2003 | 618.01 | 12.0155 | 794.95 | 7.3302 |
| 383.85 | 7.4307 | 620.36 | 13.0254 | 795.86 | 6.5462 |
| 388.16 | 15.5058 | 621.93 | 14.0332 | 801.95 | 10.4888 |
| 388.63 | 12.4067 | 630.19 | 0.0000 | 810.29 | 9.4581 |
| 391.69 | 15.5263 | 631.29 | 14.0694 | 810.45 | 10.5093 |
| 400.66 | 18.6936 | 633.25 | 13.0714 | 810.76 | 11.5610 |
| 401.81 | 19.6365 | 634.78 | 7.0414 | 815.77 | 8.4178 |
| 402.40 | 21.5111 | 635.95 | 6.0374 | 818.51 | 7.3702 |
| 404.85 | 20.5944 | 636.99 | 0.0000 | 832.01 | 6.3366 |
| 410.95 | 19.7019 | 645.85 | 6.0535 | 834.85 | 6.3407 |
| 413.71 | 14.0869 | 657.76 | 8.0969 | 835.71 | 8.4559 |
| 414.70 | 18.7891 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.0979 | 661.66 | 10.1316 | 846.75 | 0.0000 |
| 427.87 | 16.9897 | 664.57 | 0.0000 | 846.77 | 7.0641 |
| 433.94 | 15.1342 | 666.33 | 18.2593 | 856.80 | 8.4957 |
| 439.40 | 18.9536 | 666.50 | 14.2023 | 860.56 | 9.5658 |
| 453.88 | 11.4287 | 667.71 | 0.0000 | 871.09 | 5.3265 |
| 463.37 | 15.2870 | 677.62 | 19.3307 | 873.19 | 5.3290 |
| 468.07 | 15.3109 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 16.3516 | 879.38 | 7.4707 |
| 475.06 | 16.3056 | 696.49 | 13.2907 | 880.51 | 5.3375 |
| 476.78 | 17.2745 | 696.51 | 13.2907 | 883.24 | 9.6133 |
| 477.60 | 20.1589 | 697.00 | 8.1799 | 884.68 | 7.4794 |
| 482.18 | 10.5753 | 697.49 | 8.1809 | 889.28 | 10.6953 |
| 487.02 | 11.5548 | 702.65 | 11.2635 | 894.76 | 10.7080 |
| 492.35 | 0.0000 | 706.68 | 5.1250 | 898.04 | 9.6440 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.5820 | 1312.11 | 3.8587 | | |
| 911.20 | 9.6710 | 1332.49 | 2.9037 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.3121 | 1365.19 | 3.8919 | | |
| 937.49 | 8.6439 | 1368.63 | 0.0000 | | |
| 944.13 | 4.3279 | 1384.29 | 5.8555 | | |
| 946.00 | 5.4121 | 1408.01 | 3.9183 | | |
| 949.00 | 9.7477 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.9626 | | |
| 962.31 | 8.6883 | 1489.16 | 6.9425 | | |
| 964.08 | 10.8643 | 1505.03 | 5.9648 | | |
| 966.17 | 9.7820 | 1596.21 | 1.0074 | | |
| 968.97 | 7.6127 | 1620.50 | 2.0217 | | |
| 983.53 | 9.8165 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 4.0832 | | |
| 996.26 | 13.1221 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.3781 | 1764.49 | 6.1858 | | |
| 1004.73 | 13.1440 | 1770.23 | 5.1587 | | |
| 1021.30 | 0.0000 | 1771.35 | 3.0957 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.1108 | | |
| 1037.84 | 3.6750 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.1218 | | |
| 1046.59 | 2.7609 | | | | |
| 1048.07 | 5.5232 | | | | |
| 1049.04 | 8.2863 | | | | |
| 1050.41 | 3.6838 | | | | |
| 1063.66 | 4.6165 | | | | |
| 1077.00 | 8.3306 | | | | |
| 1077.34 | 6.4799 | | | | |
| 1085.87 | 7.4173 | | | | |
| 1099.45 | 8.3657 | | | | |
| 1112.07 | 11.1807 | | | | |
| 1112.84 | 13.0458 | | | | |
| 1115.54 | 6.5260 | | | | |
| 1120.29 | 6.5317 | | | | |
| 1120.55 | 6.5320 | | | | |
| 1121.30 | 8.3994 | | | | |
| 1129.67 | 3.7389 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.5365 | | | | |
| 1177.95 | 7.5430 | | | | |
| 1189.05 | 11.3364 | | | | |
| 1204.77 | 3.7892 | | | | |
| 1221.41 | 3.8003 | | | | |
| 1231.02 | 2.8549 | | | | |
| 1235.36 | 11.4282 | | | | |
| 1238.28 | 2.8584 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.9165 | | | | |
| 1274.44 | 3.8346 | | | | |
| 1274.54 | 3.8346 | | | | |
| 1291.59 | 2.8842 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:06:07.92

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147010.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM20.CNF;375
                                        Background date  : 3-FEB-2014 14:33:17.
Sample date      : 7-NOV-2013 13:20:00. Acquisition date : 7-FEB-2014 09:05:27.
Sample ID        : G341147010           Sample quantity  : 1.28550E+02 GRAM
Detector name    : GAM20                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:15.03  0.4%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 26.47* | 1 | 4 | 1.13 | 53.21 | 50 | 19 | 2.53E-04 | 930.4 | 1.60E+00 |
| 2 | 1 | 27.97* | 0 | 11 | 1.14 | 56.21 | 50 | 19 | 1.31E-05 | ***** | |
| 3 | 0 | 35.08* | 6 | 21 | 1.16 | 70.43 | 68 | 6 | 1.76E-03 | 135.3 | |
| 4 | 0 | 75.69 | 13 | 48 | 1.94 | 151.56 | 146 | 8 | 3.49E-03 | 98.4 | |
| 5 | 0 | 92.97* | 16 | 66 | 1.19 | 186.10 | 179 | 14 | 4.32E-03 | 128.3 | |
| 6 | 0 | 145.74 | 4 | 17 | 2.15 | 291.54 | 289 | 5 | 1.21E-03 | 147.5 | |
| 7 | 0 | 148.68 | 11 | 18 | 1.09 | 297.42 | 294 | 7 | 3.07E-03 | 70.0 | |
| 8 | 0 | 238.72* | 12 | 20 | 0.82 | 477.37 | 472 | 10 | 3.43E-03 | 81.9 | |
| 9 | 0 | 263.11 | 12 | 27 | 1.44 | 526.11 | 519 | 11 | 3.37E-03 | 88.2 | |
| 10 | 0 | 297.88 | 24 | 48 | 3.67 | 595.61 | 584 | 20 | 6.65E-03 | 77.8 | |
| 11 | 0 | 488.66 | 10 | 0 | 1.74 | 977.00 | 974 | 7 | 2.78E-03 | 31.6 | |
| 12 | 0 | 566.04 | 9 | 4 | 0.48 | 1131.73 | 1126 | 8 | 2.44E-03 | 52.3 | |
| 13 | 0 | 609.44* | 18 | 5 | 0.96 | 1218.52 | 1213 | 10 | 5.01E-03 | 36.5 | |
| 14 | 0 | 727.03 | 10 | 0 | 0.96 | 1453.70 | 1449 | 9 | 2.78E-03 | 31.6 | |
| 15 | 0 | 857.15 | 6 | 0 | 1.44 | 1714.00 | 1711 | 6 | 1.67E-03 | 40.8 | |
| 16 | 0 | 868.03* | 11 | 0 | 1.06 | 1735.75 | 1731 | 9 | 3.13E-03 | 32.0 | |
| 17 | 0 | 880.96 | 8 | 0 | 3.74 | 1761.63 | 1756 | 10 | 2.22E-03 | 35.4 | |
| 18 | 0 | 906.69 | 10 | 0 | 1.49 | 1813.10 | 1807 | 11 | 2.78E-03 | 31.6 | |
| 19 | 0 | 911.30* | 10 | 0 | 1.49 | 1822.33 | 1818 | 10 | 2.64E-03 | 43.8 | |
| 20 | 0 | 968.60 | 9 | 2 | 3.10 | 1936.98 | 1932 | 9 | 2.46E-03 | 45.2 | |
| 21 | 0 | 1238.21 | 6 | 2 | 0.97 | 2476.56 | 2470 | 10 | 1.67E-03 | 62.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:06:09

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147010.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:20:00 | Acquisition date | : 7-FEB-2014 09:05:27 |
| Sample ID | : G341147010 | Sample quantity | : 128.55 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA20 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:15.03  0.4% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CE-141 | 145.44 | 4 | 48.29* | 6.663E+00 | 7.909E-03 | 5.605E-02 | 295.03 |
| PB-212 | 74.82 | 13 | 10.28 | 5.183E+00 | 1.377E-01 | 1.377E-01 | 196.88 |
| | 77.11 | 13 | 17.10 | 5.183E+00 | 8.280E-02 | 8.280E-02 | 196.88 |
| | 238.63 | 12 | 43.60* | 5.212E+00 | 3.172E-02 | 3.172E-02 | 163.81 |
| | 300.09 | ------ | 3.30 | 4.492E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | 13 | 10.28 | 5.183E+00 | 1.377E-01 | 1.377E-01 | 196.88 |
| | 77.11 | 13 | 17.10 | 5.183E+00 | 8.280E-02 | 8.280E-02 | 196.88 |
| | 238.63 | 12 | 43.60* | 5.212E+00 | 3.172E-02 | 3.172E-02 | 163.81 |
| | 300.09 | ------ | 3.30 | 4.492E+00 | ------ | Line Not Found | ------ |
| TH-232 | 338.32 | ------ | 11.27 | 4.141E+00 | ------ | Line Not Found | ------ |
| | 911.20 | 10 | 25.80* | 1.979E+00 | 1.089E-01 | 1.089E-01 | 87.55 |
| | 968.97 | 9 | 15.80 | 1.881E+00 | 1.741E-01 | 1.741E-01 | 90.43 |
| AM-243 | 43.53 | ------ | 5.90 | 9.615E-01 | ------ | Line Not Found | ------ |
| | 74.66 | 13 | 67.20* | 5.183E+00 | 2.107E-02 | 2.107E-02 | 196.88 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:06:10.11

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147010.CNF;1    *
* Acquisition date :  7-FEB-2014 09:05:27 Sensitivity     : 3.000          *
* Detector ID      : GAM20                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:15.03     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:20:00 Nuclide Library : SOLID          *
* Sample ID        : G341147010           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.2855E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 12:34:02 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM20_500MLMB.CNF;6       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CE-141 | 5.605E-02 | 1.621E-01 | 3.827E-01 |
| PB-212 | 3.172E-02 | 5.092E-02 | 5.746E-02 |
| TH-228 | 3.172E-02 | 5.092E-02 | 5.746E-02 |
| TH-232 | 1.089E-01 | 9.340E-02 | 1.714E-01 |
| AM-243 | 2.107E-02 | 4.065E-02 | 6.006E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 5.057E-01 | 6.055E-01 | 1.329E+00 | NOT IDENT. |
| NA-22 | -7.741E-03 | 1.580E-02 | 3.084E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.660E-03 | 1.814E-02 | 3.814E-02 | NOT IDENT. |
| K-40 | 5.719E-01 | 3.414E-01 | 9.002E-01 | NOT IDENT. |
| SC-46 | 3.164E-02 | 5.412E-02 | 1.180E-01 | NOT IDENT. |
| V-48 | -3.566E-01 | 1.210E+00 | 2.281E+00 | NOT IDENT. |
| CR-51 | 5.396E-01 | 1.741E+00 | 3.396E+00 | NOT IDENT. |
| MN-54 | 1.713E-02 | 2.762E-02 | 6.160E-02 | NOT IDENT. |
| CO-56 | -5.612E-03 | 5.827E-02 | 1.123E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 6.477E-03 | 1.930E-02 | 3.787E-02 | NOT IDENT. |
| CO-58 | -2.065E-03 | 4.090E-02 | 8.518E-02 | NOT IDENT. |
| FE-59 | 1.079E-01 | 1.834E-01 | 4.179E-01 | NOT IDENT. |
| CO-60 | 9.233E-03 | 2.807E-02 | 6.309E-02 | NOT IDENT. |
| ZN-65 | 1.805E-03 | 7.599E-02 | 1.495E-01 | NOT IDENT. |
| GE-68 | 3.521E-01 | 8.962E-01 | 2.002E+00 | NOT IDENT. |
| AS-73 | 9.195E-01 | 9.179E-01 | 1.830E+00 | NOT IDENT. |
| AS-74 | 5.742E-02 | 1.421E+00 | 2.782E+00 | NOT IDENT. |
| SE-75 | 8.323E-03 | 6.318E-02 | 1.041E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.128E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -5.059E-01 | 1.749E+00 | 3.298E+00 | NOT IDENT. |
| RB-83 | -1.339E-02 | 8.059E-02 | 1.575E-01 | NOT IDENT. |
| KR-85 | -1.242E+01 | 7.734E+00 | 1.209E+01 | NOT IDENT. |
| SR-85 | -1.477E-01 | 9.177E-02 | 1.434E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 4.084E+00 | 7.501E+00 | 1.761E+01 | NOT IDENT. |
| Y-88 | 1.913E-02 | 2.652E-02 | 8.883E-02 | NOT IDENT. |
| Y-91 | -2.281E+01 | 2.983E+01 | 5.119E+01 | NOT IDENT. |
| NB-94 | 2.125E-02 | 2.669E-02 | 5.718E-02 | NOT IDENT. |
| NB-95 | 3.717E-02 | 5.672E-02 | 1.276E-01 | NOT IDENT. |
| NB-95M | -1.036E-01 | 1.856E-01 | 2.744E-01 | NOT IDENT. |
| ZR-95 | 4.249E-05 | 8.561E-02 | 1.778E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.919E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.049E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.967E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.874E-04 | 1.925E-02 | 3.673E-02 | NOT IDENT. |
| RH-102 | 1.797E-02 | 3.559E-02 | 7.770E-02 | NOT IDENT. |
| RU-103 | -1.105E-02 | 1.107E-01 | 2.148E-01 | FAIL ABUN |
| RH-106 | -1.088E-01 | 2.067E-01 | 3.755E-01 | NOT IDENT. |
| RU-106 | -1.088E-01 | 2.067E-01 | 3.755E-01 | NOT IDENT. |
| AG-108M | -8.974E-03 | 2.176E-02 | 3.824E-02 | NOT IDENT. |
| CD-109 | 3.571E-01 | 5.425E-01 | 9.476E-01 | NOT IDENT. |
| AG-110M | -1.852E-02 | 4.977E-02 | 7.559E-02 | NOT IDENT. |
| SN-113 | -4.887E-03 | 3.792E-02 | 7.175E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.619E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.261E-01 | 1.730E+00 | 3.303E+00 | NOT IDENT. |
| TE-123M | -1.848E-04 | 2.769E-02 | 5.219E-02 | NOT IDENT. |
| SB-124 | -5.039E-02 | 1.918E-01 | 3.735E-01 | NOT IDENT. |
| SB-125 | 8.165E-03 | 6.770E-02 | 1.293E-01 | NOT IDENT. |
| TE-125M | -5.850E+00 | 1.571E+01 | 2.868E+01 | NOT IDENT. |
| I-126 | -1.207E+01 | 9.886E+00 | 1.508E+01 | NOT IDENT. |
| SB-126 | 1.851E+00 | 6.160E+00 | 1.247E+01 | FAIL ABUN |
| SN-126 | 1.237E-02 | 4.926E-02 | 8.084E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 7.392E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.663E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 8.067E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.774E-04 | 2.701E-02 | 5.118E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.677E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.732E-02 | 3.042E-02 | 5.335E-02 | NOT IDENT. |
| CS-135 | 5.513E-03 | 1.184E-01 | 2.052E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 8.307E-01 | 3.676E+00 | 7.853E+00 | NOT IDENT. |
| BA-137M | 6.575E-03 | 3.022E-02 | 6.061E-02 | NOT IDENT. |
| CS-137 | 6.946E-03 | 3.193E-02 | 6.403E-02 | NOT IDENT. |
| CE-139 | -2.497E-02 | 2.950E-02 | 5.023E-02 | NOT IDENT. |
| BA-140 | 3.147E+00 | 4.129E+00 | 1.049E+01 | NOT IDENT. |
| LA-140 | 3.147E+00 | 4.129E+00 | 1.049E+01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.232E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.570E-02 | 1.359E-01 | 2.649E-01 | NOT IDENT. |
| PM-144 | -1.430E-02 | 3.246E-02 | 5.830E-02 | NOT IDENT. |
| PR-144 | -1.123E+00 | 2.527E+00 | 4.536E+00 | NOT IDENT. |
| PM-146 | -1.906E-02 | 2.994E-02 | 4.970E-02 | NOT IDENT. |
| ND-147 | -5.006E+00 | 4.837E+01 | 9.442E+01 | NOT IDENT. |
| PM-147 | 2.526E+02 | 5.007E+02 | 9.953E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.926E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.298E-02 | 1.832E-02 | 3.061E-02 | NOT IDENT. |
| EU-152 | 2.166E-02 | 6.055E-02 | 1.212E-01 | NOT IDENT. |
| GD-153 | 2.323E-03 | 7.007E-02 | 1.130E-01 | NOT IDENT. |
| EU-154 | -2.109E-02 | 4.306E-02 | 8.403E-02 | NOT IDENT. |
| EU-155 | 8.685E-03 | 6.737E-02 | 1.297E-01 | NOT IDENT. |
| TB-160 | 4.847E-02 | 1.813E-01 | 3.505E-01 | FAIL ABUN |
| HO-166M | -6.443E-03 | 3.522E-02 | 6.876E-02 | NOT IDENT. |
| TM-171 | 4.003E+00 | 1.073E+01 | 2.012E+01 | NOT IDENT. |
| LU-176 | -6.545E-03 | 1.874E-02 | 3.331E-02 | NOT IDENT. |
| HF-181 | -5.889E-02 | 1.053E-01 | 1.845E-01 | NOT IDENT. |
| TA-182 | -1.695E-02 | 1.227E-01 | 2.646E-01 | NOT IDENT. |
| RE-183 | 5.719E-02 | 2.272E-01 | 4.226E-01 | NOT IDENT. |
| RE-184 | -1.856E-01 | 4.510E-01 | 6.735E-01 | NOT IDENT. |
| W-188 | 8.846E-01 | 1.337E+01 | 2.189E+01 | NOT IDENT. |
| IR-192 | -3.904E-03 | 4.877E-02 | 9.039E-02 | NOT IDENT. |
| HG-203 | -4.139E-02 | 8.482E-02 | 1.479E-01 | NOT IDENT. |
| BI-207 | 1.260E-02 | 3.054E-02 | 6.847E-02 | FAIL ABUN |
| TL-208 | 1.237E-03 | 2.938E-02 | 5.767E-02 | NOT IDENT. |
| PB-210 | -1.130E+00 | 1.979E+00 | 3.450E+00 | NOT IDENT. |
| BI-211 | -4.362E-02 | 1.307E-01 | 2.297E-01 | NOT IDENT. |
| PB-211 | -2.144E-01 | 4.970E-01 | 8.644E-01 | NOT IDENT. |
| BI-212 | 3.686E-01 | 2.285E-01 | 6.816E-01 | FAIL ABUN |
| BI-214 | 8.512E-02 | 6.089E-02 | 1.279E-01 | FAIL ABUN |
| PB-214 | 2.100E-02 | 4.624E-02 | 9.224E-02 | FAIL ABUN |
| RN-219 | 2.774E-01 | 2.763E-01 | 5.952E-01 | NOT IDENT. |
| RN-222 | 8.512E-02 | 6.089E-02 | 1.279E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | -9.663E-02 | 4.254E-01 | 7.720E-01 | NOT IDENT. |
| RA-224 | -1.428E-02 | 4.624E-01 | 7.523E-01 | NOT IDENT. |
| RA-226 | 8.512E-02 | 6.089E-02 | 1.279E-01 | FAIL ABUN |
| AC-227 | -3.133E-02 | 1.722E-01 | 2.914E-01 | NOT IDENT. |
| TH-227 | -3.133E-02 | 1.722E-01 | 2.914E-01 | NOT IDENT. |
| AC-228 | 1.089E-01 | 9.340E-02 | 2.369E-01 | FAIL ABUN |
| RA-228 | 1.089E-01 | 9.340E-02 | 2.369E-01 | FAIL ABUN |
| TH-229 | 2.008E-01 | 3.610E-01 | 7.106E-01 | NOT IDENT. |
| TH-230 | 8.511E-02 | 6.088E-02 | 1.279E-01 | FAIL ABUN |
| PA-231 | 3.409E-01 | 1.103E+00 | 2.113E+00 | NOT IDENT. |
| TH-231 | -9.663E-02 | 4.254E-01 | 7.720E-01 | NOT IDENT. |
| PA-233 | 1.610E-02 | 5.158E-02 | 9.860E-02 | NOT IDENT. |
| PA-234 | 4.239E-02 | 1.904E-01 | 4.023E-01 | FAIL ABUN |
| PA-234M | 1.957E+00 | 2.533E+00 | 6.026E+00 | NOT IDENT. |
| TH-234 | -9.455E-01 | 7.913E-01 | 1.444E+00 | FAIL ABUN |
| U-234 | 8.511E-02 | 6.088E-02 | 1.279E-01 | FAIL ABUN |
| U-235 | -7.026E-02 | 1.590E-01 | 2.462E-01 | FAIL ABUN |
| NP-237 | 1.610E-02 | 5.158E-02 | 9.860E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 9.310E+11 | 0.000E+00 | SHORT HLIF |
| U-238 | -9.455E-01 | 7.913E-01 | 1.444E+00 | FAIL ABUN |
| NP-239 | -2.831E-03 | 2.541E-01 | 4.813E-01 | NOT IDENT. |
| PU-239 | 7.899E+00 | 2.013E+02 | 3.843E+02 | NOT IDENT. |
| AM-241 | -6.490E-02 | 8.250E-02 | 1.341E-01 | NOT IDENT. |
| CM-243 | -3.737E-02 | 6.399E-02 | 1.147E-01 | NOT IDENT. |
| CM-247 | 1.756E-02 | 2.572E-02 | 5.308E-02 | NOT IDENT. |
| CF-249 | -2.140E-03 | 2.456E-02 | 4.603E-02 | NOT IDENT. |
| CF-251 | 3.389E-02 | 8.549E-02 | 1.668E-01 | NOT IDENT. |
| ANH-511 | -2.800E-02 | 3.747E-02 | 8.372E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:06:06.43

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 26.47 | 25 | 4 | 1.13 | 53.21 | 50 | 19 | 6.86E-03 | 33.3 | 1.60E+00 |
| 2 | 1 | 27.97 | 24 | 11 | 1.14 | 56.21 | 50 | 19 | 6.81E-03 | 37.8 | |
| 3 | 0 | 35.08 | 14 | 21 | 1.16 | 70.43 | 68 | 6 | 3.89E-03 | 58.2 | |
| 4 | 0 | 63.71 | 18 | 29 | 1.07 | 127.62 | 124 | 7 | 4.97E-03 | 54.8 | |
| 5 | 0 | 75.69 | 13 | 48 | 1.94 | 151.56 | 146 | 8 | 3.49E-03 | 98.4 | |
| 6 | 0 | 92.97 | 80 | 66 | 1.19 | 186.10 | 179 | 14 | 2.23E-02 | 24.3 | |
| 7 | 0 | 145.74 | 4 | 17 | 2.15 | 291.54 | 289 | 5 | 1.21E-03 | 147.5 | |
| 8 | 0 | 148.68 | 11 | 18 | 1.09 | 297.42 | 294 | 7 | 3.07E-03 | 70.0 | |
| 9 | 0 | 185.58 | 31 | 50 | 1.12 | 371.15 | 367 | 11 | 8.53E-03 | 48.0 | |
| 10 | 0 | 238.72 | 27 | 20 | 0.82 | 477.37 | 472 | 10 | 7.50E-03 | 36.5 | |
| 11 | 0 | 263.11 | 12 | 27 | 1.44 | 526.11 | 519 | 11 | 3.37E-03 | 88.2 | |
| 12 | 0 | 297.88 | 24 | 48 | 3.67 | 595.61 | 584 | 20 | 6.65E-03 | 77.8 | |
| 13 | 0 | 488.66 | 10 | 0 | 1.74 | 977.00 | 974 | 7 | 2.78E-03 | 31.6 | |
| 14 | 0 | 511.05 | 77 | 11 | 3.30 | 1021.77 | 1014 | 15 | 2.14E-02 | 14.8 | |
| 15 | 0 | 566.04 | 9 | 4 | 0.48 | 1131.73 | 1126 | 8 | 2.44E-03 | 52.3 | |
| 16 | 0 | 609.44 | 22 | 5 | 0.96 | 1218.52 | 1213 | 10 | 6.11E-03 | 28.6 | |
| 17 | 0 | 727.03 | 10 | 0 | 0.96 | 1453.70 | 1449 | 9 | 2.78E-03 | 31.6 | |
| 18 | 0 | 857.15 | 6 | 0 | 1.44 | 1714.00 | 1711 | 6 | 1.67E-03 | 40.8 | |
| 19 | 0 | 868.03 | 12 | 0 | 1.06 | 1735.75 | 1731 | 9 | 3.33E-03 | 28.9 | |
| 20 | 0 | 880.96 | 8 | 0 | 3.74 | 1761.63 | 1756 | 10 | 2.22E-03 | 35.4 | |
| 21 | 0 | 906.69 | 10 | 0 | 1.49 | 1813.10 | 1807 | 11 | 2.78E-03 | 31.6 | |
| 22 | 0 | 911.30 | 15 | 0 | 1.49 | 1822.33 | 1818 | 10 | 4.17E-03 | 25.8 | |
| 23 | 0 | 968.60 | 9 | 2 | 3.10 | 1936.98 | 1932 | 9 | 2.46E-03 | 45.2 | |
| 24 | 0 | 1238.21 | 6 | 2 | 0.97 | 2476.56 | 2470 | 10 | 1.67E-03 | 62.9 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:06:08.42

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CE-141 | 145.44 | 4 | 48.29* | 6.663E+00 | 7.909E-03 | 5.605E-02 | 295.03 |
| PB-212 | 74.82 | 13 | 10.28 | 5.183E+00 | 1.377E-01 | 1.377E-01 | 196.88 |
| | 77.11 | 13 | 17.10 | 5.183E+00 | 8.280E-02 | 8.280E-02 | 196.88 |
| | 238.63 | 12 | 43.60* | 5.212E+00 | 3.172E-02 | 3.172E-02 | 163.81 |
| | 300.09 | ------ | 3.30 | 4.492E+00 | ------ Line Not Found | | ------ |
| TH-228 | 74.82 | 13 | 10.28 | 5.183E+00 | 1.377E-01 | 1.377E-01 | 196.88 |
| | 77.11 | 13 | 17.10 | 5.183E+00 | 8.280E-02 | 8.280E-02 | 196.88 |
| | 238.63 | 12 | 43.60* | 5.212E+00 | 3.172E-02 | 3.172E-02 | 163.81 |
| | 300.09 | ------ | 3.30 | 4.492E+00 | ------ Line Not Found | | ------ |
| TH-232 | 338.32 | ------ | 11.27 | 4.141E+00 | ------ Line Not Found | | ------ |
| | 911.20 | 10 | 25.80* | 1.979E+00 | 1.089E-01 | 1.089E-01 | 87.55 |
| | 968.97 | 9 | 15.80 | 1.881E+00 | 1.741E-01 | 1.741E-01 | 90.43 |
| AM-243 | 43.53 | ------ | 5.90 | 9.615E-01 | ------ Line Not Found | | ------ |
| | 74.66 | 13 | 67.20* | 5.183E+00 | 2.107E-02 | 2.107E-02 | 196.88 |

Flag: "*" = Keyline

Sample ID : G341147010 Acquisition date : 7-FEB-2014 09:05:27

Total number of lines in spectrum 21
Number of unidentified lines 9
Number of lines tentatively identified by NID 12 57.14%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CE-141 | 32.51D | 7.09 | 7.909E-03 | 5.605E-02 | 16.54E-02 | 295.03 | |
| PB-212 | 1.41E+10Y | 1.00 | 3.172E-02 | 3.172E-02 | 5.195E-02 | 163.81 | |
| TH-228 | 1.41E+10Y | 1.00 | 3.172E-02 | 3.172E-02 | 5.195E-02 | 163.81 | |
| TH-232 | 1.41E+10Y | 1.00 | 1.089E-01 | 1.089E-01 | 0.953E-01 | 87.55 | |
| AM-243 | 7370.00Y | 1.00 | 2.107E-02 | 2.107E-02 | 4.148E-02 | 196.88 | |
| | Total Activity : | | 2.013E-01 | 2.494E-01 | | | |

Grand Total Activity : 2.013E-01 2.494E-01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147010 Acquisition date : 7-FEB-2014 09:05:27

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 26.47 | 1 | 4 | 1.13 | 53.21 | 50 | 19 | 2.53E-04 | **** | 1.72E-02 | |
| 0 | 35.08 | 6 | 21 | 1.16 | 70.43 | 68 | 6 | 1.76E-03 | **** | 2.48E-01 | |
| 0 | 92.97 | 16 | 66 | 1.19 | 186.10 | 179 | 14 | 4.32E-03 | **** | 6.37E+00 | T |
| 0 | 148.68 | 11 | 18 | 1.09 | 297.42 | 294 | 7 | 3.07E-03 | **** | 6.62E+00 | |
| 0 | 263.11 | 12 | 27 | 1.44 | 526.11 | 519 | 11 | 3.37E-03 | **** | 4.90E+00 | |
| 0 | 297.88 | 24 | 48 | 3.67 | 595.61 | 584 | 20 | 6.65E-03 | **** | 4.51E+00 | T |
| 0 | 488.66 | 10 | 0 | 1.74 | 977.00 | 974 | 7 | 2.78E-03 | 63.2 | 3.20E+00 | |
| 0 | 566.04 | 9 | 4 | 0.48 | 1131.73 | 1126 | 8 | 2.44E-03 | **** | 2.87E+00 | |
| 0 | 609.44 | 18 | 5 | 0.96 | 1218.52 | 1213 | 10 | 5.01E-03 | 73.0 | 2.72E+00 | T |
| 0 | 727.03 | 10 | 0 | 0.96 | 1453.70 | 1449 | 9 | 2.78E-03 | 63.2 | 2.38E+00 | T |
| 0 | 857.15 | 6 | 0 | 1.44 | 1714.00 | 1711 | 6 | 1.67E-03 | 81.6 | 2.08E+00 | T |
| 0 | 868.03 | 11 | 0 | 1.06 | 1735.75 | 1731 | 9 | 3.13E-03 | 63.9 | 2.06E+00 | |
| 0 | 880.96 | 8 | 0 | 3.74 | 1761.63 | 1756 | 10 | 2.22E-03 | 70.7 | 2.04E+00 | T |
| 0 | 906.69 | 10 | 0 | 1.49 | 1813.10 | 1807 | 11 | 2.78E-03 | 63.2 | 1.99E+00 | |
| 0 | 1238.21 | 6 | 2 | 0.97 | 2476.56 | 2470 | 10 | 1.67E-03 | **** | 1.53E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:06:20.99

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147010.CNF;1    *
* Acquisition date :  7-FEB-2014 09:05:27 Sensitivity     : 3.000            *
* Detector ID      : GAM20                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:15.03     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 13:20:00 Nuclide Library : SOLID            *
* Sample ID        : G341147010           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.2855E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 11-JUN-2013 12:34:02 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM20_500MLMB.CNF;6          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| CE-141 | 1.740E-01 |
| PB-212 | 2.526E-02 |
| TH-228 | 2.526E-02 |
| TH-232 | 7.022E-02 |
| AM-243 | 2.773E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.876E-01 | NOT IDENT. |
| NA-22 | 9.747E-03 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.205E-02 | NOT IDENT. |
| K-40 | 3.946E-01 | NOT IDENT. |
| SC-46 | 5.063E-02 | NOT IDENT. |
| V-48 | 9.114E-01 | NOT IDENT. |
| CR-51 | 1.514E+00 | NOT IDENT. |
| MN-54 | 2.625E-02 | NOT IDENT. |
| CO-56 | 4.757E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.724E-02 | NOT IDENT. |
| CO-58 | 3.364E-02 | NOT IDENT. |
| FE-59 | 1.744E-01 | NOT IDENT. |
| CO-60 | 2.587E-02 | NOT IDENT. |
| ZN-65 | 6.261E-02 | NOT IDENT. |
| GE-68 | 8.209E-01 | NOT IDENT. |
| AS-73 | 8.419E-01 | NOT IDENT. |
| AS-74 | 1.217E+00 | NOT IDENT. |
| SE-75 | 4.739E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.363E+00 | NOT IDENT. |
| RB-83 | 6.678E-02 | NOT IDENT. |
| KR-85 | 5.449E+00 | NOT IDENT. |
| SR-85 | 6.462E-02 | NOT IDENT. |
| RB-86 | 7.191E+00 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 3.147E-02 | NOT IDENT. |
| Y-91 | 1.983E+01 | NOT IDENT. |
| NB-94 | 2.536E-02 | NOT IDENT. |
| NB-95 | 5.442E-02 | NOT IDENT. |
| NB-95M | 1.208E-01 | NOT IDENT. |
| ZR-95 | 7.187E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.658E-02 | NOT IDENT. |
| RH-102 | 3.328E-02 | NOT IDENT. |
| RU-103 | 9.353E-02 | FAIL ABUN |
| RH-106 | 1.525E-01 | NOT IDENT. |
| RU-106 | 1.525E-01 | NOT IDENT. |
| AG-108M | 1.662E-02 | NOT IDENT. |
| CD-109 | 4.339E-01 | NOT IDENT. |
| AG-110M | 3.089E-02 | NOT IDENT. |
| SN-113 | 3.023E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.500E+00 | NOT IDENT. |
| TE-123M | 2.362E-02 | NOT IDENT. |
| SB-124 | 1.465E-01 | NOT IDENT. |
| SB-125 | 5.663E-02 | NOT IDENT. |
| TE-125M | 1.304E+01 | NOT IDENT. |
| I-126 | 6.243E+00 | NOT IDENT. |
| SB-126 | 5.175E+00 | FAIL ABUN |
| SN-126 | 3.693E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.236E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.213E-02 | NOT IDENT. |
| CS-135 | 9.242E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.220E+00 | NOT IDENT. |
| BA-137M | 2.686E-02 | NOT IDENT. |
| CS-137 | 2.837E-02 | NOT IDENT. |
| CE-139 | 2.266E-02 | NOT IDENT. |
| BA-140 | 4.264E+00 | NOT IDENT. |
| LA-140 | 4.264E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.194E-01 | NOT IDENT. |
| PM-144 | 2.531E-02 | NOT IDENT. |
| PR-144 | 1.969E+00 | NOT IDENT. |
| PM-146 | 2.114E-02 | NOT IDENT. |
| ND-147 | 4.063E+01 | NOT IDENT. |
| PM-147 | 4.547E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.333E-02 | NOT IDENT. |
| EU-152 | 5.326E-02 | NOT IDENT. |
| GD-153 | 5.110E-02 | NOT IDENT. |
| EU-154 | 2.656E-02 | NOT IDENT. |
| EU-155 | 5.909E-02 | NOT IDENT. |
| TB-160 | 1.442E-01 | FAIL ABUN |
| HO-166M | 2.834E-02 | NOT IDENT. |
| TM-171 | 9.209E+00 | NOT IDENT. |
| LU-176 | 1.475E-02 | NOT IDENT. |
| HF-181 | 7.865E-02 | NOT IDENT. |
| TA-182 | 9.929E-02 | NOT IDENT. |
| RE-183 | 1.922E-01 | NOT IDENT. |
| RE-184 | 2.740E-01 | NOT IDENT. |
| W-188 | 9.885E+00 | NOT IDENT. |
| IR-192 | 3.999E-02 | NOT IDENT. |
| HG-203 | 6.592E-02 | NOT IDENT. |
| BI-207 | 2.812E-02 | FAIL ABUN |
| TL-208 | 2.554E-02 | NOT IDENT. |
| PB-210 | 1.585E+00 | NOT IDENT. |
| BI-211 | 9.973E-02 | NOT IDENT. |
| PB-211 | 3.752E-01 | NOT IDENT. |
| BI-212 | 2.910E-01 | FAIL ABUN |
| BI-214 | 5.758E-02 | FAIL ABUN |
| PB-214 | 4.063E-02 | FAIL ABUN |
| RN-219 | 2.651E-01 | NOT IDENT. |
| RN-222 | 5.758E-02 | FAIL ABUN |
| RA-223 | 3.397E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-224 | 3.391E-01 | NOT IDENT. |
| RA-226 | 5.758E-02 | FAIL ABUN |
| AC-227 | 1.291E-01 | NOT IDENT. |
| TH-227 | 1.291E-01 | NOT IDENT. |
| AC-228 | 1.030E-01 | FAIL ABUN |
| RA-228 | 1.030E-01 | FAIL ABUN |
| TH-229 | 3.251E-01 | NOT IDENT. |
| TH-230 | 5.758E-02 | FAIL ABUN |
| PA-231 | 9.574E-01 | NOT IDENT. |
| TH-231 | 3.397E-01 | NOT IDENT. |
| PA-233 | 4.463E-02 | NOT IDENT. |
| PA-234 | 1.669E-01 | FAIL ABUN |
| PA-234M | 2.500E+00 | NOT IDENT. |
| TH-234 | 6.651E-01 | FAIL ABUN |
| U-234 | 5.758E-02 | FAIL ABUN |
| U-235 | 1.124E-01 | FAIL ABUN |
| NP-237 | 4.463E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 6.651E-01 | FAIL ABUN |
| NP-239 | 2.188E-01 | NOT IDENT. |
| PU-239 | 1.739E+02 | NOT IDENT. |
| AM-241 | 6.017E-02 | NOT IDENT. |
| CM-243 | 5.169E-02 | NOT IDENT. |
| CM-247 | 2.356E-02 | NOT IDENT. |
| CF-249 | 1.984E-02 | NOT IDENT. |
| CF-251 | 7.601E-02 | NOT IDENT. |
| ANH-511 | 3.933E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:06:25.55

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147010.CNF;1    *
* Acquisition date :  7-FEB-2014 09:05:27 Sensitivity     : 3.000          *
* Detector ID      : GAM20                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:15.03     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:20:00 Nuclide Library : SOLID          *
* Sample ID        : G341147010           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.2855E+02 GRAM   *
*                                         Quantity Err(%) : 1.5558E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 12:34:02 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM20_500MLMB.CNF;6       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CE-141 | 5.605E-02 | 1.621E-01 | 1.621E-01 |
| PB-212 | 3.172E-02 | 5.098E-02 | 5.098E-02 |
| TH-228 | 3.172E-02 | 5.098E-02 | 5.098E-02 |
| TH-232 | 1.089E-01 | 9.475E-02 | 9.475E-02 |
| AM-243 | 2.107E-02 | 4.069E-02 | 4.069E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 5.057E-01 | 6.069E-01 | 6.483E-01 | NOT IDENT. |
| NA-22 | -7.741E-03 | 1.582E-02 | 1.620E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.063E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.660E-03 | 1.814E-02 | 1.832E-02 | NOT IDENT. |
| K-40 | 5.719E-01 | 3.451E-01 | 4.308E-01 | NOT IDENT. |
| SC-46 | 3.164E-02 | 5.430E-02 | 5.614E-02 | NOT IDENT. |
| V-48 | -3.566E-01 | 1.211E+00 | 1.222E+00 | NOT IDENT. |
| CR-51 | 5.396E-01 | 1.742E+00 | 1.759E+00 | NOT IDENT. |
| MN-54 | 1.713E-02 | 2.770E-02 | 2.876E-02 | NOT IDENT. |
| CO-56 | -5.612E-03 | 5.827E-02 | 5.833E-02 | FAIL ABUN |
| MN-56 | -1.000E+41 | 1.089E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | 6.477E-03 | 1.931E-02 | 1.953E-02 | NOT IDENT. |
| CO-58 | -2.065E-03 | 4.090E-02 | 4.091E-02 | NOT IDENT. |
| FE-59 | 1.079E-01 | 1.844E-01 | 1.907E-01 | NOT IDENT. |
| CO-60 | 9.233E-03 | 2.808E-02 | 2.839E-02 | NOT IDENT. |
| ZN-65 | 1.805E-03 | 7.599E-02 | 7.600E-02 | NOT IDENT. |
| GE-68 | 3.521E-01 | 8.979E-01 | 9.118E-01 | NOT IDENT. |
| AS-73 | 9.195E-01 | 9.373E-01 | 1.025E+00 | NOT IDENT. |
| AS-74 | 5.742E-02 | 1.421E+00 | 1.422E+00 | NOT IDENT. |
| SE-75 | 8.323E-03 | 6.318E-02 | 6.329E-02 | NOT IDENT. |
| BR-77 | 2.571E+10 | 7.972E+10 | 8.055E+10 | SHORT HLIF |
| SR-82 | -5.059E-01 | 1.750E+00 | 1.765E+00 | NOT IDENT. |
| RB-83 | -1.339E-02 | 8.062E-02 | 8.085E-02 | NOT IDENT. |
| KR-85 | -1.242E+01 | 7.802E+00 | 9.604E+00 | NOT IDENT. |
| SR-85 | -1.477E-01 | 9.258E-02 | 1.140E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 4.084E+00 | 7.529E+00 | 7.751E+00 | NOT IDENT. |
| Y-88 | 1.913E-02 | 2.656E-02 | 2.793E-02 | NOT IDENT. |
| Y-91 | -2.281E+01 | 2.990E+01 | 3.162E+01 | NOT IDENT. |
| NB-94 | 2.125E-02 | 2.676E-02 | 2.842E-02 | NOT IDENT. |
| NB-95 | 3.717E-02 | 5.685E-02 | 5.927E-02 | NOT IDENT. |
| NB-95M | -1.036E-01 | 1.859E-01 | 1.916E-01 | NOT IDENT. |
| ZR-95 | 4.249E-05 | 8.561E-02 | 8.561E-02 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.921E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.376E+39 | 1.055E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 9.456E+08 | 1.969E+09 | 2.015E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.511E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.874E-04 | 1.925E-02 | 1.925E-02 | NOT IDENT. |
| RH-102 | 1.797E-02 | 3.565E-02 | 3.656E-02 | NOT IDENT. |
| RU-103 | -1.105E-02 | 1.107E-01 | 1.108E-01 | FAIL ABUN |
| RH-106 | -1.088E-01 | 2.069E-01 | 2.127E-01 | NOT IDENT. |
| RU-106 | -1.088E-01 | 2.069E-01 | 2.127E-01 | NOT IDENT. |
| AG-108M | -8.974E-03 | 2.177E-02 | 2.215E-02 | NOT IDENT. |
| CD-109 | 3.571E-01 | 5.438E-01 | 5.671E-01 | NOT IDENT. |
| AG-110M | -1.852E-02 | 4.984E-02 | 5.054E-02 | NOT IDENT. |
| SN-113 | -4.887E-03 | 3.792E-02 | 3.798E-02 | NOT IDENT. |
| CD-115 | -8.826E+09 | 1.619E+11 | 1.620E+11 | SHORT HLIF |
| SN-117M | 2.261E-01 | 1.730E+00 | 1.733E+00 | NOT IDENT. |
| TE-123M | -1.848E-04 | 2.769E-02 | 2.769E-02 | NOT IDENT. |
| SB-124 | -5.039E-02 | 1.918E-01 | 1.931E-01 | NOT IDENT. |
| SB-125 | 8.165E-03 | 6.770E-02 | 6.780E-02 | NOT IDENT. |
| TE-125M | -5.850E+00 | 1.572E+01 | 1.594E+01 | NOT IDENT. |
| I-126 | -1.207E+01 | 9.960E+00 | 1.135E+01 | NOT IDENT. |
| SB-126 | 1.851E+00 | 6.165E+00 | 6.221E+00 | FAIL ABUN |
| SN-126 | 1.237E-02 | 4.927E-02 | 4.958E-02 | NOT IDENT. |
| SB-127 | 3.450E+05 | 7.539E+05 | 7.698E+05 | SHORT HLIF |
| I-131 | 2.738E+01 | 6.667E+01 | 6.780E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 8.581E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -2.475E+06 | 8.077E+06 | 8.153E+06 | SHORT HLIF |
| BA-133 | 3.774E-04 | 2.701E-02 | 2.701E-02 | NOT IDENT. |
| I-133 | 4.097E+28 | 1.677E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.732E-02 | 3.049E-02 | 3.147E-02 | NOT IDENT. |
| CS-135 | 5.513E-03 | 1.184E-01 | 1.185E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 9.537E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 8.307E-01 | 3.679E+00 | 3.698E+00 | NOT IDENT. |
| BA-137M | 6.575E-03 | 3.023E-02 | 3.037E-02 | NOT IDENT. |
| CS-137 | 6.946E-03 | 3.193E-02 | 3.209E-02 | NOT IDENT. |
| CE-139 | -2.497E-02 | 2.997E-02 | 3.201E-02 | NOT IDENT. |
| BA-140 | 3.147E+00 | 4.137E+00 | 4.374E+00 | NOT IDENT. |
| LA-140 | 3.147E+00 | 4.137E+00 | 4.374E+00 | NOT IDENT. |
| CE-143 | 2.684E+18 | 6.237E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.570E-02 | 1.359E-01 | 1.364E-01 | NOT IDENT. |
| PM-144 | -1.430E-02 | 3.248E-02 | 3.312E-02 | NOT IDENT. |
| PR-144 | -1.123E+00 | 2.529E+00 | 2.579E+00 | NOT IDENT. |
| PM-146 | -1.906E-02 | 3.000E-02 | 3.121E-02 | NOT IDENT. |
| ND-147 | -5.006E+00 | 4.838E+01 | 4.843E+01 | NOT IDENT. |
| PM-147 | 2.526E+02 | 5.012E+02 | 5.140E+02 | NOT IDENT. |
| PM-149 | 8.372E+11 | 1.930E+12 | 1.967E+12 | SHORT HLIF |
| EU-150 | -1.298E-02 | 1.835E-02 | 1.926E-02 | NOT IDENT. |
| EU-152 | 2.166E-02 | 6.058E-02 | 6.136E-02 | NOT IDENT. |
| GD-153 | 2.323E-03 | 7.007E-02 | 7.008E-02 | NOT IDENT. |
| EU-154 | -2.109E-02 | 4.310E-02 | 4.413E-02 | NOT IDENT. |
| EU-155 | 8.685E-03 | 6.738E-02 | 6.749E-02 | NOT IDENT. |
| TB-160 | 4.847E-02 | 1.815E-01 | 1.828E-01 | FAIL ABUN |
| HO-166M | -6.443E-03 | 3.523E-02 | 3.535E-02 | NOT IDENT. |
| TM-171 | 4.003E+00 | 1.074E+01 | 1.089E+01 | NOT IDENT. |
| LU-176 | -6.545E-03 | 1.875E-02 | 1.898E-02 | NOT IDENT. |
| HF-181 | -5.889E-02 | 1.055E-01 | 1.087E-01 | NOT IDENT. |
| TA-182 | -1.695E-02 | 1.227E-01 | 1.230E-01 | NOT IDENT. |
| RE-183 | 5.719E-02 | 2.273E-01 | 2.288E-01 | NOT IDENT. |
| RE-184 | -1.856E-01 | 4.521E-01 | 4.598E-01 | NOT IDENT. |
| W-188 | 8.846E-01 | 1.337E+01 | 1.338E+01 | NOT IDENT. |
| IR-192 | -3.904E-03 | 4.877E-02 | 4.880E-02 | NOT IDENT. |
| HG-203 | -4.139E-02 | 8.488E-02 | 8.690E-02 | NOT IDENT. |
| BI-207 | 1.260E-02 | 3.061E-02 | 3.113E-02 | FAIL ABUN |
| TL-208 | 1.237E-03 | 2.938E-02 | 2.939E-02 | NOT IDENT. |
| PB-210 | -1.130E+00 | 1.982E+00 | 2.046E+00 | NOT IDENT. |
| BI-211 | -4.362E-02 | 1.308E-01 | 1.322E-01 | NOT IDENT. |
| PB-211 | -2.144E-01 | 4.973E-01 | 5.066E-01 | NOT IDENT. |
| BI-212 | 3.686E-01 | 2.315E-01 | 2.850E-01 | FAIL ABUN |
| BI-214 | 8.512E-02 | 6.130E-02 | 7.232E-02 | FAIL ABUN |
| PB-214 | 2.100E-02 | 4.627E-02 | 4.723E-02 | FAIL ABUN |
| RN-219 | 2.774E-01 | 2.791E-01 | 3.059E-01 | NOT IDENT. |
| RN-222 | 8.512E-02 | 6.130E-02 | 7.232E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | -9.663E-02 | 4.255E-01 | 4.277E-01 | NOT IDENT. |
| RA-224 | -1.428E-02 | 4.624E-01 | 4.624E-01 | NOT IDENT. |
| RA-226 | 8.512E-02 | 6.130E-02 | 7.232E-02 | FAIL ABUN |
| AC-227 | -3.133E-02 | 1.722E-01 | 1.728E-01 | NOT IDENT. |
| TH-227 | -3.133E-02 | 1.722E-01 | 1.728E-01 | NOT IDENT. |
| AC-228 | 1.089E-01 | 9.475E-02 | 1.067E-01 | FAIL ABUN |
| RA-228 | 1.089E-01 | 9.475E-02 | 1.067E-01 | FAIL ABUN |
| TH-229 | 2.008E-01 | 3.614E-01 | 3.726E-01 | NOT IDENT. |
| TH-230 | 8.511E-02 | 6.130E-02 | 7.231E-02 | FAIL ABUN |
| PA-231 | 3.409E-01 | 1.104E+00 | 1.114E+00 | NOT IDENT. |
| TH-231 | -9.663E-02 | 4.255E-01 | 4.277E-01 | NOT IDENT. |
| PA-233 | 1.610E-02 | 5.160E-02 | 5.211E-02 | NOT IDENT. |
| PA-234 | 4.239E-02 | 1.966E-01 | 1.975E-01 | FAIL ABUN |
| PA-234M | 1.957E+00 | 2.551E+00 | 2.699E+00 | NOT IDENT. |
| TH-234 | -9.455E-01 | 8.197E-01 | 9.239E-01 | FAIL ABUN |
| U-234 | 8.511E-02 | 6.130E-02 | 7.231E-02 | FAIL ABUN |
| U-235 | -7.026E-02 | 1.591E-01 | 1.623E-01 | FAIL ABUN |
| NP-237 | 1.610E-02 | 5.160E-02 | 5.211E-02 | NOT IDENT. |
| NP-238 | -1.726E+11 | 9.313E+11 | 9.346E+11 | SHORT HLIF |
| U-238 | -9.455E-01 | 8.197E-01 | 9.239E-01 | FAIL ABUN |
| NP-239 | -2.831E-03 | 2.541E-01 | 2.541E-01 | NOT IDENT. |
| PU-239 | 7.899E+00 | 2.013E+02 | 2.013E+02 | NOT IDENT. |
| AM-241 | -6.490E-02 | 8.266E-02 | 8.769E-02 | NOT IDENT. |
| CM-243 | -3.737E-02 | 6.413E-02 | 6.631E-02 | NOT IDENT. |
| CM-247 | 1.756E-02 | 2.591E-02 | 2.710E-02 | NOT IDENT. |
| CF-249 | -2.140E-03 | 2.456E-02 | 2.458E-02 | NOT IDENT. |
| CF-251 | 3.389E-02 | 8.561E-02 | 8.696E-02 | NOT IDENT. |
| ANH-511 | -2.800E-02 | 3.754E-02 | 3.960E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 40.7301 | 94.67 | 24.3768 | 193.51 | 29.7496 |
| 45.60 | 37.6688 | 94.87 | 24.3830 | 197.03 | 32.7196 |
| 46.54 | 37.7376 | 97.43 | 24.4608 | 198.01 | 26.9665 |
| 49.72 | 0.0000 | 98.43 | 26.2404 | 201.83 | 46.3663 |
| 51.35 | 36.9915 | 98.44 | 20.9925 | 205.31 | 34.8681 |
| 52.39 | 32.7010 | 99.53 | 28.0273 | 210.85 | 36.9606 |
| 53.44 | 27.3021 | 100.11 | 28.0471 | 215.65 | 24.4038 |
| 57.36 | 0.0000 | 103.18 | 36.9480 | 222.11 | 23.5393 |
| 57.53 | 29.6969 | 103.37 | 36.9565 | 227.09 | 26.5773 |
| 57.98 | 29.7195 | 105.21 | 33.5098 | 227.38 | 30.5211 |
| 59.32 | 30.8898 | 105.31 | 33.5137 | 228.16 | 0.0000 |
| 59.54 | 38.6265 | 106.12 | 30.0145 | 228.18 | 31.5237 |
| 63.29 | 34.4227 | 109.28 | 39.8709 | 235.69 | 26.9379 |
| 63.58 | 34.4387 | 111.00 | 35.5107 | 235.96 | 23.7731 |
| 64.28 | 30.0286 | 111.76 | 0.0000 | 238.63 | 17.8631 |
| 66.73 | 50.2412 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 39.1074 | 117.23 | 33.9712 | 240.99 | 28.6277 |
| 67.75 | 34.6653 | 121.12 | 29.6265 | 242.00 | 31.8308 |
| 69.67 | 36.3374 | 121.22 | 29.6297 | 244.70 | 22.7785 |
| 70.83 | 26.9637 | 121.78 | 30.5460 | 252.40 | 0.0000 |
| 72.81 | 33.8042 | 122.06 | 29.6565 | 252.80 | 26.0527 |
| 72.87 | 32.1169 | 123.07 | 31.4879 | 254.15 | 0.0000 |
| 74.66 | 48.5843 | 127.23 | 28.9156 | 256.23 | 22.7645 |
| 74.82 | 48.5957 | 129.30 | 29.8833 | 260.90 | 0.0000 |
| 74.97 | 50.8669 | 131.20 | 29.0347 | 264.66 | 32.3159 |
| 77.11 | 45.9213 | 133.02 | 25.4525 | 268.22 | 26.9922 |
| 79.69 | 39.6024 | 133.52 | 25.4656 | 269.46 | 28.3640 |
| 80.12 | 38.7152 | 136.00 | 37.3821 | 271.23 | 25.3540 |
| 80.19 | 0.0000 | 136.47 | 33.7509 | 273.65 | 19.2986 |
| 80.57 | 39.8788 | 140.51 | 0.0000 | 276.40 | 28.4896 |
| 81.00 | 42.1828 | 143.76 | 45.5698 | 277.37 | 21.3800 |
| 81.07 | 42.1869 | 144.24 | 39.7083 | 277.60 | 21.3832 |
| 83.79 | 32.0443 | 145.44 | 33.8646 | 278.00 | 25.4627 |
| 85.43 | 36.7031 | 152.43 | 25.1962 | 279.20 | 29.5589 |
| 86.55 | 44.7988 | 153.25 | 34.6095 | 279.54 | 27.5261 |
| 86.79 | 44.8129 | 154.21 | 33.4031 | 280.46 | 26.5219 |
| 86.94 | 43.0981 | 156.02 | 31.6000 | 283.69 | 26.5753 |
| 87.09 | 41.3824 | 158.56 | 30.7419 | 284.31 | 0.0000 |
| 87.57 | 32.7818 | 159.00 | 30.7542 | 285.41 | 27.6266 |
| 88.03 | 27.6224 | 162.33 | 28.9769 | 285.90 | 0.0000 |
| 88.34 | 27.6337 | 163.33 | 32.7452 | 287.50 | 27.6621 |
| 88.47 | 31.0932 | 165.86 | 42.1954 | 290.67 | 27.9209 |
| 89.96 | 39.8074 | 176.31 | 31.2240 | 293.27 | 0.0000 |
| 91.11 | 31.2001 | 176.60 | 28.3926 | 295.22 | 19.5575 |
| 92.59 | 31.2593 | 177.52 | 29.3617 | 295.96 | 19.5662 |
| 93.35 | 31.2895 | 181.07 | 0.0000 | 298.58 | 19.5969 |
| 94.56 | 24.3735 | 184.41 | 31.4360 | 299.98 | 14.8647 |
| 94.65 | 24.3762 | 185.72 | 30.5164 | 300.09 | 14.8658 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 14.8660 | 497.08 | 16.3909 | 711.68 | 8.8675 |
| 301.36 | 16.5300 | 505.52 | 38.3804 | 720.70 | 5.6466 |
| 302.85 | 11.5813 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 21.5290 | 511.00 | 10.0748 | 722.78 | 3.2961 |
| 306.78 | 24.8745 | 514.00 | 55.9380 | 722.91 | 6.5923 |
| 308.46 | 20.7492 | 514.00 | 55.9380 | 723.31 | 6.5933 |
| 311.90 | 25.9884 | 520.40 | 11.9523 | 724.19 | 8.2438 |
| 316.51 | 20.8463 | 520.69 | 0.0000 | 727.33 | 7.9221 |
| 319.41 | 16.7046 | 522.65 | 0.0000 | 733.00 | 7.4403 |
| 320.08 | 18.7998 | 527.90 | 0.0000 | 735.93 | 8.9367 |
| 321.04 | 20.9003 | 529.59 | 10.1511 | 737.46 | 7.9475 |
| 323.87 | 20.9338 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 26.1871 | 531.02 | 13.8505 | 747.24 | 9.9651 |
| 328.76 | 18.8924 | 546.56 | 0.0000 | 748.06 | 6.9773 |
| 333.37 | 21.0452 | 552.55 | 15.8313 | 752.31 | 7.9846 |
| 333.97 | 24.2101 | 563.25 | 12.4681 | 753.82 | 6.9897 |
| 334.37 | 24.2157 | 569.33 | 10.9349 | 756.73 | 5.9966 |
| 338.28 | 10.5513 | 569.50 | 10.9358 | 756.80 | 5.9968 |
| 338.32 | 10.5515 | 569.70 | 10.9364 | 763.94 | 7.0118 |
| 340.48 | 27.4663 | 583.19 | 14.1332 | 765.81 | 6.0135 |
| 340.55 | 27.4675 | 584.27 | 13.1961 | 766.42 | 8.0195 |
| 344.28 | 13.7615 | 595.83 | 16.0927 | 766.84 | 8.0205 |
| 345.93 | 9.5357 | 600.60 | 17.0692 | 772.60 | 0.0000 |
| 351.06 | 14.8744 | 602.52 | 0.0000 | 776.52 | 10.0554 |
| 351.93 | 9.5665 | 602.73 | 21.6925 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 14.2460 | 778.90 | 10.0627 |
| 356.01 | 15.9789 | 609.32 | 12.6842 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 12.6888 | 785.37 | 9.0740 |
| 366.42 | 0.0000 | 614.28 | 14.2954 | 792.07 | 12.1233 |
| 375.05 | 20.4415 | 618.01 | 7.6344 | 794.95 | 12.1336 |
| 383.85 | 16.2101 | 620.36 | 17.1918 | 795.86 | 13.1485 |
| 388.16 | 14.0791 | 621.93 | 10.5120 | 801.95 | 6.0795 |
| 388.63 | 15.1657 | 630.19 | 0.0000 | 810.29 | 3.0472 |
| 391.69 | 10.8492 | 631.29 | 7.6707 | 810.45 | 5.0790 |
| 400.66 | 15.2561 | 633.25 | 14.3925 | 810.76 | 5.0795 |
| 401.81 | 10.9033 | 634.78 | 13.4401 | 815.77 | 5.0869 |
| 402.40 | 13.0876 | 635.95 | 13.4456 | 818.51 | 6.1093 |
| 404.85 | 19.6548 | 636.99 | 0.0000 | 832.01 | 12.2666 |
| 410.95 | 9.8564 | 645.85 | 15.4199 | 834.85 | 6.1383 |
| 413.71 | 15.3524 | 657.76 | 19.3545 | 835.71 | 7.1630 |
| 414.70 | 10.9712 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.4499 | 661.66 | 13.5663 | 846.75 | 0.0000 |
| 427.87 | 15.4554 | 664.57 | 0.0000 | 846.77 | 11.2922 |
| 433.94 | 16.6061 | 666.33 | 20.3817 | 856.80 | 9.2654 |
| 439.40 | 11.0985 | 666.50 | 20.3827 | 860.56 | 4.1223 |
| 453.88 | 17.8745 | 667.71 | 0.0000 | 871.09 | 5.1681 |
| 463.37 | 7.8531 | 677.62 | 11.6912 | 873.19 | 6.2054 |
| 468.07 | 14.6145 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 8.8194 | 879.38 | 5.1801 |
| 475.06 | 17.1399 | 696.49 | 19.6079 | 880.51 | 6.2180 |
| 476.78 | 13.5416 | 696.51 | 19.6084 | 883.24 | 10.3711 |
| 477.60 | 10.8371 | 697.00 | 20.5919 | 884.68 | 10.3752 |
| 482.18 | 17.0920 | 697.49 | 21.5757 | 889.28 | 7.2719 |
| 487.02 | 12.0898 | 702.65 | 11.7888 | 894.76 | 12.4849 |
| 492.35 | 0.0000 | 706.68 | 16.7228 | 898.04 | 7.2893 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 10.4282 | 1312.11 | 7.6530 | | |
| 911.20 | 6.9671 | 1332.49 | 4.8031 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 5.2468 | 1365.19 | 5.8015 | | |
| 937.49 | 6.3146 | 1368.63 | 0.0000 | | |
| 944.13 | 8.4342 | 1384.29 | 2.9117 | | |
| 946.00 | 6.3289 | 1408.01 | 5.8506 | | |
| 949.00 | 5.2782 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 0.0000 | | |
| 962.31 | 5.2965 | 1489.16 | 2.9707 | | |
| 964.08 | 8.8316 | 1505.03 | 8.9381 | | |
| 966.17 | 12.3708 | 1596.21 | 2.0192 | | |
| 968.97 | 4.2445 | 1620.50 | 5.0694 | | |
| 983.53 | 7.4556 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 6.1570 | | |
| 996.26 | 11.7541 | 1750.46 | 0.0000 | | |
| 1001.03 | 1.0698 | 1764.49 | 5.1937 | | |
| 1004.73 | 8.5666 | 1770.23 | 2.0794 | | |
| 1021.30 | 0.0000 | 1771.35 | 1.0399 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0923 | | |
| 1037.84 | 9.7167 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 0.0000 | | |
| 1046.59 | 9.7378 | | | | |
| 1048.07 | 5.4119 | | | | |
| 1049.04 | 6.4957 | | | | |
| 1050.41 | 8.6637 | | | | |
| 1063.66 | 4.3457 | | | | |
| 1077.00 | 3.2697 | | | | |
| 1077.34 | 4.3600 | | | | |
| 1085.87 | 4.3689 | | | | |
| 1099.45 | 4.3828 | | | | |
| 1112.07 | 9.8903 | | | | |
| 1112.84 | 7.6938 | | | | |
| 1115.54 | 8.7988 | | | | |
| 1120.29 | 7.3402 | | | | |
| 1120.55 | 7.3408 | | | | |
| 1121.30 | 7.3421 | | | | |
| 1129.67 | 1.8390 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.4290 | | | | |
| 1177.95 | 9.2961 | | | | |
| 1189.05 | 4.6596 | | | | |
| 1204.77 | 9.3514 | | | | |
| 1221.41 | 3.7541 | | | | |
| 1231.02 | 0.0000 | | | | |
| 1235.36 | 4.8413 | | | | |
| 1238.28 | 6.4590 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.8974 | | | | |
| 1274.44 | 2.8475 | | | | |
| 1274.54 | 2.8477 | | | | |
| 1291.59 | 2.8578 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:06:51.88

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147011.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM27.CNF;189
                                        Background date  : 2-FEB-2014 16:28:03.
Sample date      : 7-NOV-2013 13:20:00. Acquisition date : 7-FEB-2014 09:05:45.
Sample ID        : G341147011           Sample quantity  : 1.38980E+02 GRAM
Detector name    : GAM27                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.46  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.73* | 24 | 51 | 1.36 | 92.79 | 88 | 10 | 6.59E-03 | 66.6 | |
| 2 | 3 | 112.97 | 18 | 41 | 1.39 | 225.31 | 220 | 20 | 4.94E-03 | 66.8 | 1.58E+00 |
| 3 | 3 | 118.51 | 15 | 28 | 1.40 | 236.39 | 220 | 20 | 4.07E-03 | 76.3 | |
| 4 | 0 | 185.83* | 14 | 32 | 1.66 | 371.06 | 367 | 8 | 3.80E-03 | 95.9 | |
| 5 | 0 | 238.60* | 28 | 36 | 1.56 | 476.62 | 470 | 10 | 7.77E-03 | 48.5 | |
| 6 | 5 | 348.96 | 12 | 3 | 1.73 | 697.40 | 695 | 18 | 3.42E-03 | 33.5 | 6.02E-01 |
| 7 | 5 | 351.93* | 11 | 16 | 1.61 | 703.35 | 695 | 18 | 3.09E-03 | 87.0 | |
| 8 | 0 | 397.75 | 15 | 3 | 1.28 | 795.01 | 792 | 6 | 4.24E-03 | 31.0 | |
| 9 | 0 | 409.53 | 14 | 9 | 2.23 | 818.57 | 815 | 9 | 3.89E-03 | 47.0 | |
| 10 | 0 | 414.66 | 17 | 21 | 3.31 | 828.83 | 823 | 12 | 4.78E-03 | 58.4 | |
| 11 | 0 | 471.79 | 8 | 28 | 4.16 | 943.13 | 935 | 16 | 2.09E-03 | 161.9 | |
| 12 | 0 | 510.89* | 5 | 29 | 2.75 | 1021.37 | 1015 | 13 | 1.29E-03 | 335.2 | |
| 13 | 0 | 541.68 | 13 | 4 | 2.71 | 1082.96 | 1079 | 8 | 3.61E-03 | 38.5 | |
| 14 | 0 | 583.78* | 7 | 12 | 1.35 | 1167.20 | 1163 | 11 | 1.85E-03 | 116.3 | |
| 15 | 0 | 595.17 | 9 | 3 | 1.47 | 1189.99 | 1187 | 6 | 2.62E-03 | 43.1 | |
| 16 | 0 | 609.26* | 18 | 8 | 2.36 | 1218.18 | 1213 | 10 | 4.94E-03 | 41.4 | |
| 17 | 0 | 619.96 | 8 | 8 | 0.93 | 1239.58 | 1236 | 6 | 2.12E-03 | 71.2 | |
| 18 | 0 | 662.46 | 13 | 18 | 5.11 | 1324.61 | 1309 | 19 | 3.63E-03 | 84.3 | |
| 19 | 0 | 754.45 | 7 | 5 | 0.71 | 1508.66 | 1503 | 7 | 1.84E-03 | 69.5 | |
| 20 | 0 | 766.31 | 11 | 2 | 1.48 | 1532.40 | 1528 | 8 | 3.06E-03 | 37.5 | |
| 21 | 0 | 849.40 | 7 | 8 | 0.88 | 1698.65 | 1691 | 11 | 1.93E-03 | 88.5 | |
| 22 | 0 | 975.08 | 9 | 7 | 0.54 | 1950.13 | 1944 | 9 | 2.55E-03 | 60.8 | |
| 23 | 0 | 1055.22 | 10 | 0 | 0.58 | 2110.50 | 2106 | 9 | 2.78E-03 | 31.6 | |
| 24 | 0 | 1228.53 | 7 | 4 | 1.21 | 2457.31 | 2453 | 7 | 1.81E-03 | 61.8 | |
| 25 | 0 | 1460.59* | 26 | 3 | 1.61 | 2921.72 | 2916 | 11 | 7.28E-03 | 25.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:06:53

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147011.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:20:00 | Acquisition date | : 7-FEB-2014 09:05:45 |
| Sample ID | : G341147011 | Sample quantity | : 138.98 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA27 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.46  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 26 | 10.66* | 1.469E+00 | 9.042E-01 | 9.042E-01 | 51.78 |
| AS-74 | 595.83 | 9 | 59.00* | 3.036E+00 | 2.840E-02 | 1.021E+00 | 86.27 |
| | 634.78 | ------ | 15.40 | 2.895E+00 | ------ | Line Not Found | ------ |
| NB-95 | 765.81 | 11 | 99.81* | 2.509E+00 | 2.373E-02 | 6.414E-02 | 74.97 |
| BA-137M | 661.66 | 13 | 89.90* | 2.804E+00 | 2.799E-02 | 2.816E-02 | 168.57 |
| CS-137 | 661.66 | 13 | 85.10* | 2.804E+00 | 2.957E-02 | 2.975E-02 | 168.57 |
| TL-208 | 277.37 | ------ | 6.60 | 5.119E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 7 | 85.00* | 3.079E+00 | 1.378E-02 | 1.378E-02 | 232.60 |
| | 860.56 | ------ | 12.50 | 2.289E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 24 | 4.25* | 1.915E+00 | 1.575E+00 | 1.588E+00 | 133.22 |
| BI-211 | 72.87 | ------ | 1.23 | 5.654E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 11 | 12.92* | 4.379E+00 | 1.062E-01 | 1.062E-01 | 173.94 |
| ANH-511 | 511.00 | 5 | 100.00* | 3.389E+00 | 7.404E-03 | 7.404E-03 | 670.34 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:06:54.02

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147011.CNF;1    *
* Acquisition date :  7-FEB-2014 09:05:45 Sensitivity     : 3.000          *
* Detector ID      : GAM27                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.46     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:20:00 Nuclide Library : SOLID          *
* Sample ID        : G341147011           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3898E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 9.042E-01 | 4.588E-01 | 4.884E-01 |
| AS-74 | 1.021E+00 | 8.635E-01 | 2.288E+00 |
| NB-95 | 6.414E-02 | 4.712E-02 | 9.659E-02 |
| BA-137M | 2.816E-02 | 4.651E-02 | 4.754E-02 |
| CS-137 | 2.975E-02 | 4.914E-02 | 5.022E-02 |
| TL-208 | 1.378E-02 | 3.142E-02 | 4.656E-02 |
| PB-210 | 1.588E+00 | 2.073E+00 | 2.085E+00 |
| BI-211 | 1.062E-01 | 1.811E-01 | 2.028E-01 |
| ANH-511 | 7.404E-03 | 4.864E-02 | 3.908E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -1.926E-01 | 6.197E-01 | 9.463E-01 | NOT IDENT. |
| NA-22 | -1.770E-02 | 2.185E-02 | 3.612E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.801E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.481E-03 | 2.102E-02 | 4.932E-02 | NOT IDENT. |
| SC-46 | 4.269E-02 | 4.637E-02 | 1.056E-01 | NOT IDENT. |
| V-48 | -5.947E-01 | 1.244E+00 | 2.193E+00 | NOT IDENT. |
| CR-51 | 8.535E-01 | 1.697E+00 | 3.361E+00 | NOT IDENT. |
| MN-54 | -2.284E-02 | 2.745E-02 | 4.513E-02 | NOT IDENT. |
| CO-56 | -9.500E-03 | 6.909E-02 | 1.107E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 7.944E-03 | 2.128E-02 | 3.608E-02 | NOT IDENT. |
| CO-58 | -4.430E-02 | 4.899E-02 | 7.886E-02 | NOT IDENT. |
| FE-59 | -1.648E-02 | 2.051E-01 | 4.038E-01 | NOT IDENT. |
| CO-60 | 1.138E-02 | 2.909E-02 | 6.374E-02 | NOT IDENT. |
| ZN-65 | -2.888E-02 | 6.150E-02 | 1.142E-01 | NOT IDENT. |
| GE-68 | -8.694E-02 | 9.178E-01 | 1.769E+00 | NOT IDENT. |
| AS-73 | -6.036E-01 | 7.380E-01 | 1.231E+00 | NOT IDENT. |
| SE-75 | -1.673E-02 | 4.456E-02 | 8.063E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.745E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.310E+00 | 1.814E+00 | 3.918E+00 | NOT IDENT. |
| RB-83 | -1.498E-02 | 7.824E-02 | 1.432E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | 9.188E+00 | 6.493E+00 | 1.257E+01 | NOT IDENT. |
| SR-85 | 1.086E-01 | 7.702E-02 | 1.490E-01 | NOT IDENT. |
| RB-86 | -7.785E-01 | 8.226E+00 | 1.585E+01 | NOT IDENT. |
| Y-88 | 8.995E-03 | 4.600E-02 | 1.051E-01 | NOT IDENT. |
| Y-91 | -9.208E+00 | 2.438E+01 | 4.670E+01 | NOT IDENT. |
| NB-94 | 1.243E-03 | 1.830E-02 | 3.688E-02 | NOT IDENT. |
| NB-95M | 8.231E-02 | 1.966E-01 | 3.440E-01 | NOT IDENT. |
| ZR-95 | 1.094E-01 | 9.051E-02 | 2.105E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 8.699E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.632E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.850E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.108E-02 | 2.150E-02 | 4.051E-02 | NOT IDENT. |
| RH-102 | -1.368E-02 | 3.971E-02 | 7.341E-02 | FAIL ABUN |
| RU-103 | 7.896E-02 | 9.626E-02 | 2.044E-01 | FAIL ABUN |
| RH-106 | 5.756E-02 | 3.162E-01 | 5.467E-01 | NOT IDENT. |
| RU-106 | 5.756E-02 | 3.162E-01 | 5.467E-01 | NOT IDENT. |
| AG-108M | -7.916E-03 | 1.849E-02 | 3.253E-02 | NOT IDENT. |
| CD-109 | 8.970E-02 | 4.408E-01 | 8.230E-01 | NOT IDENT. |
| AG-110M | -8.167E-03 | 4.398E-02 | 8.213E-02 | FAIL ABUN |
| SN-113 | 2.302E-02 | 5.219E-02 | 1.016E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.654E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -6.973E-03 | 1.910E+00 | 3.381E+00 | NOT IDENT. |
| TE-123M | 1.809E-02 | 2.997E-02 | 5.644E-02 | NOT IDENT. |
| SB-124 | 1.246E-02 | 1.498E-01 | 3.226E-01 | NOT IDENT. |
| SB-125 | -1.578E-02 | 5.880E-02 | 1.065E-01 | NOT IDENT. |
| TE-125M | 2.751E+00 | 1.565E+01 | 2.611E+01 | NOT IDENT. |
| I-126 | 5.272E+00 | 8.821E+00 | 1.723E+01 | FAIL ABUN |
| SB-126 | 5.098E+00 | 6.216E+00 | 1.389E+01 | FAIL ABUN |
| SN-126 | -1.280E-02 | 3.905E-02 | 6.912E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 8.486E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.446E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 7.143E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -9.378E-03 | 3.142E-02 | 4.891E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.559E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 8.540E-03 | 2.282E-02 | 4.921E-02 | NOT IDENT. |
| CS-135 | 6.473E-02 | 9.994E-02 | 2.004E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -9.932E-01 | 3.853E+00 | 6.662E+00 | NOT IDENT. |
| CE-139 | 1.353E-02 | 2.795E-02 | 5.240E-02 | NOT IDENT. |
| BA-140 | -2.346E+00 | 4.351E+00 | 7.689E+00 | NOT IDENT. |
| LA-140 | -2.346E+00 | 4.351E+00 | 7.689E+00 | NOT IDENT. |
| CE-141 | 1.115E-01 | 2.259E-01 | 4.189E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 4.674E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.019E-01 | 1.531E-01 | 2.930E-01 | NOT IDENT. |
| PM-144 | -4.425E-03 | 3.170E-02 | 5.634E-02 | NOT IDENT. |
| PR-144 | -3.746E-01 | 2.465E+00 | 4.374E+00 | NOT IDENT. |
| PM-146 | 1.782E-02 | 2.748E-02 | 5.652E-02 | NOT IDENT. |
| ND-147 | -1.008E+01 | 4.097E+01 | 7.444E+01 | NOT IDENT. |
| PM-147 | 3.948E+01 | 5.235E+02 | 8.564E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.740E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.699E-02 | 1.708E-02 | 2.788E-02 | FAIL ABUN |
| EU-152 | -8.438E-03 | 6.439E-02 | 1.104E-01 | NOT IDENT. |
| GD-153 | -2.222E-02 | 5.908E-02 | 1.037E-01 | NOT IDENT. |
| EU-154 | -7.778E-02 | 6.675E-02 | 9.566E-02 | NOT IDENT. |
| EU-155 | 1.724E-02 | 6.663E-02 | 1.239E-01 | NOT IDENT. |
| TB-160 | 3.237E-03 | 2.046E-01 | 3.939E-01 | FAIL ABUN |
| HO-166M | 3.773E-02 | 4.099E-02 | 8.967E-02 | FAIL ABUN |
| TM-171 | -8.572E-01 | 7.884E+00 | 1.413E+01 | NOT IDENT. |
| LU-176 | 8.076E-03 | 1.672E-02 | 3.333E-02 | NOT IDENT. |
| HF-181 | -4.975E-02 | 1.043E-01 | 1.827E-01 | NOT IDENT. |
| TA-182 | 1.263E-01 | 1.814E-01 | 3.911E-01 | NOT IDENT. |
| RE-183 | -3.237E-02 | 1.924E-01 | 3.514E-01 | NOT IDENT. |
| RE-184 | 1.421E-01 | 4.257E-01 | 8.546E-01 | NOT IDENT. |
| W-188 | -4.446E+00 | 1.009E+01 | 1.801E+01 | NOT IDENT. |
| IR-192 | -4.579E-03 | 4.912E-02 | 9.096E-02 | NOT IDENT. |
| HG-203 | 6.363E-02 | 8.419E-02 | 1.685E-01 | NOT IDENT. |
| BI-207 | 1.040E-02 | 3.583E-02 | 7.269E-02 | NOT IDENT. |
| PB-211 | -1.237E-01 | 4.931E-01 | 7.725E-01 | NOT IDENT. |
| BI-212 | 1.436E-01 | 3.196E-01 | 6.662E-01 | NOT IDENT. |
| PB-212 | 6.162E-02 | 5.852E-02 | 8.498E-02 | FAIL ABUN |
| BI-214 | 7.079E-02 | 5.748E-02 | 1.165E-01 | FAIL ABUN |
| PB-214 | 3.856E-02 | 6.573E-02 | 1.133E-01 | FAIL ABUN |
| RN-219 | 1.352E-01 | 2.296E-01 | 4.416E-01 | NOT IDENT. |
| RN-222 | 7.079E-02 | 5.748E-02 | 1.165E-01 | FAIL ABUN |
| RA-223 | -9.203E-02 | 4.013E-01 | 7.348E-01 | NOT IDENT. |
| RA-224 | 3.425E-01 | 4.289E-01 | 7.884E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 7.079E-02 | 5.748E-02 | 1.165E-01 | FAIL ABUN |
| AC-227 | 1.362E-01 | 1.773E-01 | 3.557E-01 | NOT IDENT. |
| TH-227 | 1.362E-01 | 1.773E-01 | 3.557E-01 | NOT IDENT. |
| AC-228 | -1.130E-01 | 1.083E-01 | 1.891E-01 | NOT IDENT. |
| RA-228 | -1.130E-01 | 1.083E-01 | 1.891E-01 | NOT IDENT. |
| TH-228 | 6.162E-02 | 5.852E-02 | 8.498E-02 | FAIL ABUN |
| TH-229 | 2.726E-01 | 3.260E-01 | 6.342E-01 | NOT IDENT. |
| TH-230 | 7.078E-02 | 5.748E-02 | 1.165E-01 | FAIL ABUN |
| PA-231 | -8.747E-01 | 1.039E+00 | 1.765E+00 | NOT IDENT. |
| TH-231 | -9.203E-02 | 4.013E-01 | 7.348E-01 | NOT IDENT. |
| TH-232 | -1.130E-01 | 1.083E-01 | 1.891E-01 | NOT IDENT. |
| PA-233 | -8.929E-03 | 4.624E-02 | 8.440E-02 | NOT IDENT. |
| PA-234 | -3.402E-02 | 1.649E-01 | 3.155E-01 | NOT IDENT. |
| PA-234M | -5.736E-01 | 2.815E+00 | 5.275E+00 | FAIL ABUN |
| TH-234 | -5.137E-01 | 6.551E-01 | 1.206E+00 | NOT IDENT. |
| U-234 | 7.078E-02 | 5.748E-02 | 1.165E-01 | FAIL ABUN |
| U-235 | 6.631E-02 | 1.417E-01 | 2.661E-01 | FAIL ABUN |
| NP-237 | -8.929E-03 | 4.624E-02 | 8.440E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.005E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -5.137E-01 | 6.551E-01 | 1.206E+00 | NOT IDENT. |
| NP-239 | 2.032E-01 | 3.037E-01 | 4.661E-01 | FAIL ABUN |
| PU-239 | 3.961E+01 | 2.076E+02 | 3.816E+02 | FAIL ABUN |
| AM-241 | 3.926E-02 | 6.716E-02 | 1.314E-01 | NOT IDENT. |
| AM-243 | -2.699E-02 | 3.123E-02 | 5.336E-02 | NOT IDENT. |
| CM-243 | 3.300E-02 | 6.472E-02 | 1.234E-01 | NOT IDENT. |
| CM-247 | 2.556E-02 | 1.899E-02 | 4.323E-02 | NOT IDENT. |
| CF-249 | -1.370E-02 | 2.961E-02 | 5.169E-02 | NOT IDENT. |
| CF-251 | 2.292E-02 | 8.531E-02 | 1.557E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:06:50.40

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.73 | 51 | 51 | 1.36 | 92.79 | 88 | 10 | 1.42E-02 | 29.8 | |
| 2 | 0 | 93.17 | 69 | 77 | 1.18 | 185.70 | 181 | 12 | 1.92E-02 | 28.2 | |
| 3 | 3 | 112.97 | 18 | 41 | 1.39 | 225.31 | 220 | 20 | 4.94E-03 | 66.8 | 1.58E+00 |
| 4 | 3 | 118.51 | 15 | 28 | 1.40 | 236.39 | 220 | 20 | 4.07E-03 | 76.3 | |
| 5 | 0 | 185.83 | 58 | 32 | 1.66 | 371.06 | 367 | 8 | 1.61E-02 | 21.4 | |
| 6 | 0 | 238.60 | 44 | 36 | 1.56 | 476.62 | 470 | 10 | 1.21E-02 | 30.2 | |
| 7 | 5 | 348.96 | 12 | 3 | 1.73 | 697.40 | 695 | 18 | 3.42E-03 | 33.5 | 6.02E-01 |
| 8 | 5 | 351.93 | 21 | 16 | 1.61 | 703.35 | 695 | 18 | 5.70E-03 | 44.8 | |
| 9 | 0 | 397.75 | 15 | 3 | 1.28 | 795.01 | 792 | 6 | 4.24E-03 | 31.0 | |
| 10 | 0 | 409.53 | 14 | 9 | 2.23 | 818.57 | 815 | 9 | 3.89E-03 | 47.0 | |
| 11 | 0 | 414.66 | 17 | 21 | 3.31 | 828.83 | 823 | 12 | 4.78E-03 | 58.4 | |
| 12 | 0 | 471.79 | 8 | 28 | 4.16 | 943.13 | 935 | 16 | 2.09E-03 | 161.9 | |
| 13 | 0 | 510.89 | 99 | 29 | 2.75 | 1021.37 | 1015 | 13 | 2.74E-02 | 15.1 | |
| 14 | 0 | 541.68 | 13 | 4 | 2.71 | 1082.96 | 1079 | 8 | 3.61E-03 | 38.5 | |
| 15 | 0 | 583.78 | 14 | 12 | 1.35 | 1167.20 | 1163 | 11 | 3.85E-03 | 54.2 | |
| 16 | 0 | 595.17 | 9 | 3 | 1.47 | 1189.99 | 1187 | 6 | 2.62E-03 | 43.1 | |
| 17 | 0 | 609.26 | 24 | 8 | 2.36 | 1218.18 | 1213 | 10 | 6.79E-03 | 29.1 | |
| 18 | 0 | 619.96 | 8 | 8 | 0.93 | 1239.58 | 1236 | 6 | 2.12E-03 | 71.2 | |
| 19 | 0 | 662.46 | 13 | 18 | 5.11 | 1324.61 | 1309 | 19 | 3.63E-03 | 84.3 | |
| 20 | 0 | 754.45 | 7 | 5 | 0.71 | 1508.66 | 1503 | 7 | 1.84E-03 | 69.5 | |
| 21 | 0 | 766.31 | 11 | 2 | 1.48 | 1532.40 | 1528 | 8 | 3.06E-03 | 37.5 | |
| 22 | 0 | 849.40 | 7 | 8 | 0.88 | 1698.65 | 1691 | 11 | 1.93E-03 | 88.5 | |
| 23 | 0 | 975.08 | 9 | 7 | 0.54 | 1950.13 | 1944 | 9 | 2.55E-03 | 60.8 | |
| 24 | 0 | 1055.22 | 10 | 0 | 0.58 | 2110.50 | 2106 | 9 | 2.78E-03 | 31.6 | |
| 25 | 0 | 1228.53 | 7 | 4 | 1.21 | 2457.31 | 2453 | 7 | 1.81E-03 | 61.8 | |
| 26 | 0 | 1460.59 | 34 | 3 | 1.61 | 2921.72 | 2916 | 11 | 9.52E-03 | 19.5 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:06:52.37

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 26 | 10.66* | 1.469E+00 | 9.042E-01 | 9.042E-01 | 51.78 |
| AS-74 | 595.83 | 9 | 59.00* | 3.036E+00 | 2.840E-02 | 1.021E+00 | 86.27 |
| | 634.78 | ------ | 15.40 | 2.895E+00 | ------ | Line Not Found | ------ |
| NB-95 | 765.81 | 11 | 99.81* | 2.509E+00 | 2.373E-02 | 6.414E-02 | 74.97 |
| BA-137M | 661.66 | 13 | 89.90* | 2.804E+00 | 2.799E-02 | 2.816E-02 | 168.57 |
| CS-137 | 661.66 | 13 | 85.10* | 2.804E+00 | 2.957E-02 | 2.975E-02 | 168.57 |
| TL-208 | 277.37 | ------ | 6.60 | 5.119E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 7 | 85.00* | 3.079E+00 | 1.378E-02 | 1.378E-02 | 232.60 |
| | 860.56 | ------ | 12.50 | 2.289E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 24 | 4.25* | 1.915E+00 | 1.575E+00 | 1.588E+00 | 133.22 |
| BI-211 | 72.87 | ------ | 1.23 | 5.654E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 11 | 12.92* | 4.379E+00 | 1.062E-01 | 1.062E-01 | 173.94 |
| ANH-511 | 511.00 | 5 | 100.00* | 3.389E+00 | 7.404E-03 | 7.404E-03 | 670.34 |

Flag: "*" = Keyline

Sample ID : G341147011 Acquisition date : 7-FEB-2014 09:05:45

Total number of lines in spectrum 25
Number of unidentified lines 7
Number of lines tentatively identified by NID 18 72.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 9.042E-01 | 9.042E-01 | 4.682E-01 | 51.78 | |
| AS-74 | 17.77D | 36.0 | 2.840E-02 | 1.021E+00 | 0.881E+00 | 86.27 | |
| NB-95 | 64.03D | 2.70 | 2.373E-02 | 6.414E-02 | 4.808E-02 | 74.97 | |
| BA-137M | 30.08Y | 1.01 | 2.799E-02 | 2.816E-02 | 4.746E-02 | 168.57 | |
| CS-137 | 30.08Y | 1.01 | 2.957E-02 | 2.975E-02 | 5.014E-02 | 168.57 | |
| TL-208 | 1.41E+10Y | 1.00 | 1.378E-02 | 1.378E-02 | 3.206E-02 | 232.60 | |
| PB-210 | 22.20Y | 1.01 | 1.575E+00 | 1.588E+00 | 2.115E+00 | 133.22 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.062E-01 | 1.062E-01 | 1.848E-01 | 173.94 | |
| ANH-511 | 1.00E+09Y | 1.00 | 7.404E-03 | 7.404E-03 | 49.63E-03 | 670.34 | |
| | Total Activity : | | 2.717E+00 | 3.763E+00 | | | |

Grand Total Activity : 2.717E+00 3.763E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147011 Acquisition date : 7-FEB-2014 09:05:45

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 112.97 | 18 | 41 | 1.39 | 225.31 | 220 | 20 | 4.94E-03 | **** | 7.40E+00 | T |
| 3 | 118.51 | 15 | 28 | 1.40 | 236.39 | 220 | 20 | 4.07E-03 | **** | 7.41E+00 | T |
| 0 | 185.83 | 14 | 32 | 1.66 | 371.06 | 367 | 8 | 3.80E-03 | **** | 6.47E+00 | T |
| 0 | 238.60 | 28 | 36 | 1.56 | 476.62 | 470 | 10 | 7.77E-03 | 96.9 | 5.62E+00 | T |
| 5 | 348.96 | 12 | 3 | 1.73 | 697.40 | 695 | 18 | 3.42E-03 | 67.0 | 4.40E+00 | |
| 0 | 397.75 | 15 | 3 | 1.28 | 795.01 | 792 | 6 | 4.24E-03 | 62.1 | 4.03E+00 | |
| 0 | 409.53 | 14 | 9 | 2.23 | 818.57 | 815 | 9 | 3.89E-03 | 93.9 | 3.95E+00 | T |
| 0 | 414.66 | 17 | 21 | 3.31 | 828.83 | 823 | 12 | 4.78E-03 | **** | 3.92E+00 | T |
| 0 | 471.79 | 8 | 28 | 4.16 | 943.13 | 935 | 16 | 2.09E-03 | **** | 3.58E+00 | T |
| 0 | 541.68 | 13 | 4 | 2.71 | 1082.96 | 1079 | 8 | 3.61E-03 | 76.9 | 3.25E+00 | |
| 0 | 609.26 | 18 | 8 | 2.36 | 1218.18 | 1213 | 10 | 4.94E-03 | 82.9 | 2.98E+00 | T |
| 0 | 619.96 | 8 | 8 | 0.93 | 1239.58 | 1236 | 6 | 2.12E-03 | **** | 2.95E+00 | T |
| 0 | 754.45 | 7 | 5 | 0.71 | 1508.66 | 1503 | 7 | 1.84E-03 | **** | 2.54E+00 | T |
| 0 | 849.40 | 7 | 8 | 0.88 | 1698.65 | 1691 | 11 | 1.93E-03 | **** | 2.31E+00 | |
| 0 | 975.08 | 9 | 7 | 0.54 | 1950.13 | 1944 | 9 | 2.55E-03 | **** | 2.07E+00 | |
| 0 | 1055.22 | 10 | 0 | 0.58 | 2110.50 | 2106 | 9 | 2.78E-03 | 63.2 | 1.94E+00 | |
| 0 | 1228.53 | 7 | 4 | 1.21 | 2457.31 | 2453 | 7 | 1.81E-03 | **** | 1.70E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:07:04.08

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147011.CNF;1       *
* Acquisition date :  7-FEB-2014 09:05:45 Sensitivity     : 3.000                *
* Detector ID      : GAM27                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.46     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 13:20:00 Nuclide Library : SOLID                 *
* Sample ID        : G341147011           Analyst initials: RXF2                 *
* Batch Number     : 1359496              Sample Quantity : 1.3898E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.976E-01 |
| AS-74 | 9.976E-01 |
| NB-95 | 4.042E-02 |
| BA-137M | 2.086E-02 |
| CS-137 | 2.204E-02 |
| TL-208 | 2.050E-02 |
| PB-210 | 9.509E-01 |
| BI-211 | 8.853E-02 |
| ANH-511 | 1.739E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 4.081E-01 | NOT IDENT. |
| NA-22 | 1.332E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.872E-02 | NOT IDENT. |
| SC-46 | 4.580E-02 | NOT IDENT. |
| V-48 | 9.050E-01 | NOT IDENT. |
| CR-51 | 1.524E+00 | NOT IDENT. |
| MN-54 | 1.875E-02 | NOT IDENT. |
| CO-56 | 4.818E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.659E-02 | NOT IDENT. |
| CO-58 | 3.192E-02 | NOT IDENT. |
| FE-59 | 1.730E-01 | NOT IDENT. |
| CO-60 | 2.712E-02 | NOT IDENT. |
| ZN-65 | 4.696E-02 | NOT IDENT. |
| GE-68 | 7.337E-01 | NOT IDENT. |
| AS-73 | 5.632E-01 | NOT IDENT. |
| SE-75 | 3.633E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.719E+00 | NOT IDENT. |
| RB-83 | 6.146E-02 | NOT IDENT. |
| KR-85 | 5.779E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SR-85 | 6.852E-02 | NOT IDENT. |
| RB-86 | 6.576E+00 | NOT IDENT. |
| Y-88 | 4.160E-02 | NOT IDENT. |
| Y-91 | 1.853E+01 | NOT IDENT. |
| NB-94 | 1.572E-02 | NOT IDENT. |
| NB-95M | 1.580E-01 | NOT IDENT. |
| ZR-95 | 9.094E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.872E-02 | NOT IDENT. |
| RH-102 | 3.201E-02 | FAIL ABUN |
| RU-103 | 9.045E-02 | FAIL ABUN |
| RH-106 | 2.438E-01 | NOT IDENT. |
| RU-106 | 2.438E-01 | NOT IDENT. |
| AG-108M | 1.414E-02 | NOT IDENT. |
| CD-109 | 3.783E-01 | NOT IDENT. |
| AG-110M | 3.528E-02 | FAIL ABUN |
| SN-113 | 4.603E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.560E+00 | NOT IDENT. |
| TE-123M | 2.610E-02 | NOT IDENT. |
| SB-124 | 1.273E-01 | NOT IDENT. |
| SB-125 | 4.646E-02 | NOT IDENT. |
| TE-125M | 1.195E+01 | NOT IDENT. |
| I-126 | 7.524E+00 | FAIL ABUN |
| SB-126 | 6.051E+00 | FAIL ABUN |
| SN-126 | 3.166E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.171E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.079E-02 | NOT IDENT. |
| CS-135 | 9.149E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.740E+00 | NOT IDENT. |
| CE-139 | 2.408E-02 | NOT IDENT. |
| BA-140 | 3.017E+00 | NOT IDENT. |
| LA-140 | 3.017E+00 | NOT IDENT. |
| CE-141 | 1.946E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.353E-01 | NOT IDENT. |
| PM-144 | 2.494E-02 | NOT IDENT. |
| PR-144 | 1.935E+00 | NOT IDENT. |
| PM-146 | 2.512E-02 | NOT IDENT. |
| ND-147 | 3.165E+01 | NOT IDENT. |
| PM-147 | 3.914E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.226E-02 | FAIL ABUN |
| EU-152 | 4.894E-02 | NOT IDENT. |
| GD-153 | 4.730E-02 | NOT IDENT. |
| EU-154 | 3.492E-02 | NOT IDENT. |
| EU-155 | 5.707E-02 | NOT IDENT. |
| TB-160 | 1.710E-01 | FAIL ABUN |
| HO-166M | 3.976E-02 | FAIL ABUN |
| TM-171 | 6.464E+00 | NOT IDENT. |
| LU-176 | 1.504E-02 | NOT IDENT. |
| HF-181 | 7.983E-02 | NOT IDENT. |
| TA-182 | 1.680E-01 | NOT IDENT. |
| RE-183 | 1.615E-01 | NOT IDENT. |
| RE-184 | 3.748E-01 | NOT IDENT. |
| W-188 | 8.098E+00 | NOT IDENT. |
| IR-192 | 4.104E-02 | NOT IDENT. |
| HG-203 | 7.741E-02 | NOT IDENT. |
| BI-207 | 3.123E-02 | NOT IDENT. |
| PB-211 | 3.379E-01 | NOT IDENT. |
| BI-212 | 2.912E-01 | NOT IDENT. |
| PB-212 | 3.953E-02 | FAIL ABUN |
| BI-214 | 5.291E-02 | FAIL ABUN |
| PB-214 | 5.199E-02 | FAIL ABUN |
| RN-219 | 1.932E-01 | NOT IDENT. |
| RN-222 | 5.291E-02 | FAIL ABUN |
| RA-223 | 3.280E-01 | NOT IDENT. |
| RA-224 | 3.625E-01 | NOT IDENT. |
| RA-226 | 5.291E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.636E-01 | NOT IDENT. |
| TH-227 | 1.636E-01 | NOT IDENT. |
| AC-228 | 8.162E-02 | NOT IDENT. |
| RA-228 | 8.162E-02 | NOT IDENT. |
| TH-228 | 3.953E-02 | FAIL ABUN |
| TH-229 | 2.911E-01 | NOT IDENT. |
| TH-230 | 5.290E-02 | FAIL ABUN |
| PA-231 | 7.975E-01 | NOT IDENT. |
| TH-231 | 3.280E-01 | NOT IDENT. |
| TH-232 | 8.162E-02 | NOT IDENT. |
| PA-233 | 3.822E-02 | NOT IDENT. |
| PA-234 | 1.291E-01 | NOT IDENT. |
| PA-234M | 2.208E+00 | FAIL ABUN |
| TH-234 | 5.594E-01 | NOT IDENT. |
| U-234 | 5.290E-02 | FAIL ABUN |
| U-235 | 1.238E-01 | FAIL ABUN |
| NP-237 | 3.822E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 5.594E-01 | NOT IDENT. |
| NP-239 | 2.144E-01 | FAIL ABUN |
| PU-239 | 1.751E+02 | FAIL ABUN |
| AM-241 | 6.059E-02 | NOT IDENT. |
| AM-243 | 2.483E-02 | NOT IDENT. |
| CM-243 | 5.690E-02 | NOT IDENT. |
| CM-247 | 1.908E-02 | NOT IDENT. |
| CF-249 | 2.315E-02 | NOT IDENT. |
| CF-251 | 7.149E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:07:08.56

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147011.CNF;1    *
* Acquisition date :  7-FEB-2014 09:05:45 Sensitivity     : 3.000          *
* Detector ID      : GAM27                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.46     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:20:00 Nuclide Library : SOLID          *
* Sample ID        : G341147011           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3898E+02 GRAM   *
*                                         Quantity Err(%) : 1.4391E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 9.042E-01 | 4.666E-01 | 4.666E-01 |
| AS-74 | 1.021E+00 | 8.708E-01 | 8.708E-01 |
| NB-95 | 6.414E-02 | 4.756E-02 | 4.756E-02 |
| BA-137M | 2.816E-02 | 4.657E-02 | 4.657E-02 |
| CS-137 | 2.975E-02 | 4.920E-02 | 4.920E-02 |
| TL-208 | 1.378E-02 | 3.144E-02 | 3.144E-02 |
| PB-210 | 1.588E+00 | 2.077E+00 | 2.077E+00 |
| BI-211 | 1.062E-01 | 1.814E-01 | 1.814E-01 |
| ANH-511 | 7.404E-03 | 4.864E-02 | 4.864E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -1.926E-01 | 6.200E-01 | 6.260E-01 | NOT IDENT. |
| NA-22 | -1.770E-02 | 2.192E-02 | 2.332E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.808E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.481E-03 | 2.102E-02 | 2.105E-02 | NOT IDENT. |
| SC-46 | 4.269E-02 | 4.667E-02 | 5.049E-02 | NOT IDENT. |
| V-48 | -5.947E-01 | 1.246E+00 | 1.275E+00 | NOT IDENT. |
| CR-51 | 8.535E-01 | 1.699E+00 | 1.742E+00 | NOT IDENT. |
| MN-54 | -2.284E-02 | 2.758E-02 | 2.944E-02 | NOT IDENT. |
| CO-56 | -9.500E-03 | 6.910E-02 | 6.923E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 7.274E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 7.944E-03 | 2.129E-02 | 2.158E-02 | NOT IDENT. |
| CO-58 | -4.430E-02 | 4.923E-02 | 5.312E-02 | NOT IDENT. |
| FE-59 | -1.648E-02 | 2.051E-01 | 2.053E-01 | NOT IDENT. |
| CO-60 | 1.138E-02 | 2.910E-02 | 2.955E-02 | NOT IDENT. |
| ZN-65 | -2.888E-02 | 6.169E-02 | 6.305E-02 | NOT IDENT. |
| GE-68 | -8.694E-02 | 9.179E-01 | 9.188E-01 | NOT IDENT. |
| AS-73 | -6.036E-01 | 7.482E-01 | 7.961E-01 | NOT IDENT. |
| SE-75 | -1.673E-02 | 4.458E-02 | 4.522E-02 | NOT IDENT. |
| BR-77 | 4.997E+10 | 1.408E+11 | 1.425E+11 | SHORT HLIF |
| SR-82 | 1.310E+00 | 1.819E+00 | 1.913E+00 | NOT IDENT. |
| RB-83 | -1.498E-02 | 7.828E-02 | 7.857E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | 9.188E+00 | 6.547E+00 | 7.747E+00 | NOT IDENT. |
| SR-85 | 1.086E-01 | 7.766E-02 | 9.179E-02 | NOT IDENT. |
| RB-86 | -7.785E-01 | 8.227E+00 | 8.234E+00 | NOT IDENT. |
| Y-88 | 8.995E-03 | 4.601E-02 | 4.619E-02 | NOT IDENT. |
| Y-91 | -9.208E+00 | 2.440E+01 | 2.475E+01 | NOT IDENT. |
| NB-94 | 1.243E-03 | 1.830E-02 | 1.831E-02 | NOT IDENT. |
| NB-95M | 8.231E-02 | 1.968E-01 | 2.003E-01 | NOT IDENT. |
| ZR-95 | 1.094E-01 | 9.115E-02 | 1.036E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 7.699E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 4.007E+38 | 8.707E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | -7.695E+08 | 1.634E+09 | 1.670E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.854E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.108E-02 | 2.160E-02 | 2.217E-02 | NOT IDENT. |
| RH-102 | -1.368E-02 | 3.974E-02 | 4.021E-02 | FAIL ABUN |
| RU-103 | 7.896E-02 | 9.655E-02 | 1.029E-01 | FAIL ABUN |
| RH-106 | 5.756E-02 | 3.162E-01 | 3.173E-01 | NOT IDENT. |
| RU-106 | 5.756E-02 | 3.162E-01 | 3.173E-01 | NOT IDENT. |
| AG-108M | -7.916E-03 | 1.850E-02 | 1.884E-02 | NOT IDENT. |
| CD-109 | 8.970E-02 | 4.409E-01 | 4.428E-01 | NOT IDENT. |
| AG-110M | -8.167E-03 | 4.399E-02 | 4.414E-02 | FAIL ABUN |
| SN-113 | 2.302E-02 | 5.223E-02 | 5.325E-02 | NOT IDENT. |
| CD-115 | -3.745E+10 | 1.654E+11 | 1.663E+11 | SHORT HLIF |
| SN-117M | -6.973E-03 | 1.910E+00 | 1.910E+00 | NOT IDENT. |
| TE-123M | 1.809E-02 | 3.000E-02 | 3.109E-02 | NOT IDENT. |
| SB-124 | 1.246E-02 | 1.498E-01 | 1.499E-01 | NOT IDENT. |
| SB-125 | -1.578E-02 | 5.882E-02 | 5.925E-02 | NOT IDENT. |
| TE-125M | 2.751E+00 | 1.566E+01 | 1.571E+01 | NOT IDENT. |
| I-126 | 5.272E+00 | 8.836E+00 | 9.150E+00 | FAIL ABUN |
| SB-126 | 5.098E+00 | 6.254E+00 | 6.663E+00 | FAIL ABUN |
| SN-126 | -1.280E-02 | 3.907E-02 | 3.949E-02 | NOT IDENT. |
| SB-127 | -1.416E+05 | 8.507E+05 | 8.531E+05 | SHORT HLIF |
| I-131 | -1.714E+01 | 6.448E+01 | 6.494E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 7.116E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -2.291E+06 | 7.153E+06 | 7.227E+06 | SHORT HLIF |
| BA-133 | -9.378E-03 | 3.143E-02 | 3.171E-02 | NOT IDENT. |
| I-133 | -1.398E+30 | 1.747E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 8.540E-03 | 2.284E-02 | 2.316E-02 | NOT IDENT. |
| CS-135 | 6.473E-02 | 1.001E-01 | 1.043E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 4.723E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -9.932E-01 | 3.857E+00 | 3.882E+00 | NOT IDENT. |
| CE-139 | 1.353E-02 | 2.810E-02 | 2.875E-02 | NOT IDENT. |
| BA-140 | -2.346E+00 | 4.356E+00 | 4.482E+00 | NOT IDENT. |
| LA-140 | -2.346E+00 | 4.356E+00 | 4.482E+00 | NOT IDENT. |
| CE-141 | 1.115E-01 | 2.260E-01 | 2.316E-01 | NOT IDENT. |
| CE-143 | 3.381E+18 | 4.684E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.019E-01 | 1.533E-01 | 1.601E-01 | NOT IDENT. |
| PM-144 | -4.425E-03 | 3.170E-02 | 3.177E-02 | NOT IDENT. |
| PR-144 | -3.746E-01 | 2.465E+00 | 2.471E+00 | NOT IDENT. |
| PM-146 | 1.782E-02 | 2.755E-02 | 2.870E-02 | NOT IDENT. |
| ND-147 | -1.008E+01 | 4.098E+01 | 4.123E+01 | NOT IDENT. |
| PM-147 | 3.948E+01 | 5.235E+02 | 5.238E+02 | NOT IDENT. |
| PM-149 | 6.683E+11 | 1.743E+12 | 1.769E+12 | SHORT HLIF |
| EU-150 | -1.699E-02 | 1.715E-02 | 1.878E-02 | FAIL ABUN |
| EU-152 | -8.438E-03 | 6.439E-02 | 6.450E-02 | NOT IDENT. |
| GD-153 | -2.222E-02 | 5.911E-02 | 5.996E-02 | NOT IDENT. |
| EU-154 | -7.778E-02 | 6.715E-02 | 7.575E-02 | NOT IDENT. |
| EU-155 | 1.724E-02 | 6.666E-02 | 6.711E-02 | NOT IDENT. |
| TB-160 | 3.237E-03 | 2.046E-01 | 2.047E-01 | FAIL ABUN |
| HO-166M | 3.773E-02 | 4.115E-02 | 4.452E-02 | FAIL ABUN |
| TM-171 | -8.572E-01 | 7.884E+00 | 7.894E+00 | NOT IDENT. |
| LU-176 | 8.076E-03 | 1.673E-02 | 1.713E-02 | NOT IDENT. |
| HF-181 | -4.975E-02 | 1.044E-01 | 1.068E-01 | NOT IDENT. |
| TA-182 | 1.263E-01 | 1.819E-01 | 1.906E-01 | NOT IDENT. |
| RE-183 | -3.237E-02 | 1.925E-01 | 1.930E-01 | NOT IDENT. |
| RE-184 | 1.421E-01 | 4.263E-01 | 4.311E-01 | NOT IDENT. |
| W-188 | -4.446E+00 | 1.011E+01 | 1.030E+01 | NOT IDENT. |
| IR-192 | -4.579E-03 | 4.913E-02 | 4.917E-02 | NOT IDENT. |
| HG-203 | 6.363E-02 | 8.436E-02 | 8.910E-02 | NOT IDENT. |
| BI-207 | 1.040E-02 | 3.587E-02 | 3.618E-02 | NOT IDENT. |
| PB-211 | -1.237E-01 | 4.933E-01 | 4.964E-01 | NOT IDENT. |
| BI-212 | 1.436E-01 | 3.199E-01 | 3.264E-01 | NOT IDENT. |
| PB-212 | 6.162E-02 | 5.876E-02 | 6.500E-02 | FAIL ABUN |
| BI-214 | 7.079E-02 | 5.780E-02 | 6.603E-02 | FAIL ABUN |
| PB-214 | 3.856E-02 | 6.582E-02 | 6.808E-02 | FAIL ABUN |
| RN-219 | 1.352E-01 | 2.305E-01 | 2.384E-01 | NOT IDENT. |
| RN-222 | 7.079E-02 | 5.780E-02 | 6.603E-02 | FAIL ABUN |
| RA-223 | -9.203E-02 | 4.014E-01 | 4.035E-01 | NOT IDENT. |
| RA-224 | 3.425E-01 | 4.299E-01 | 4.568E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 7.079E-02 | 5.780E-02 | 6.603E-02 | FAIL ABUN |
| AC-227 | 1.362E-01 | 1.785E-01 | 1.888E-01 | NOT IDENT. |
| TH-227 | 1.362E-01 | 1.785E-01 | 1.888E-01 | NOT IDENT. |
| AC-228 | -1.130E-01 | 1.093E-01 | 1.206E-01 | NOT IDENT. |
| RA-228 | -1.130E-01 | 1.093E-01 | 1.206E-01 | NOT IDENT. |
| TH-228 | 6.162E-02 | 5.876E-02 | 6.500E-02 | FAIL ABUN |
| TH-229 | 2.726E-01 | 3.268E-01 | 3.491E-01 | NOT IDENT. |
| TH-230 | 7.078E-02 | 5.780E-02 | 6.602E-02 | FAIL ABUN |
| PA-231 | -8.747E-01 | 1.041E+00 | 1.113E+00 | NOT IDENT. |
| TH-231 | -9.203E-02 | 4.014E-01 | 4.035E-01 | NOT IDENT. |
| TH-232 | -1.130E-01 | 1.093E-01 | 1.206E-01 | NOT IDENT. |
| PA-233 | -8.929E-03 | 4.625E-02 | 4.642E-02 | NOT IDENT. |
| PA-234 | -3.402E-02 | 1.695E-01 | 1.702E-01 | NOT IDENT. |
| PA-234M | -5.736E-01 | 2.816E+00 | 2.828E+00 | FAIL ABUN |
| TH-234 | -5.137E-01 | 6.652E-01 | 7.044E-01 | NOT IDENT. |
| U-234 | 7.078E-02 | 5.780E-02 | 6.602E-02 | FAIL ABUN |
| U-235 | 6.631E-02 | 1.418E-01 | 1.449E-01 | FAIL ABUN |
| NP-237 | -8.929E-03 | 4.625E-02 | 4.642E-02 | NOT IDENT. |
| NP-238 | -5.007E+11 | 1.008E+12 | 1.033E+12 | SHORT HLIF |
| U-238 | -5.137E-01 | 6.652E-01 | 7.044E-01 | NOT IDENT. |
| NP-239 | 2.032E-01 | 3.045E-01 | 3.180E-01 | FAIL ABUN |
| PU-239 | 3.961E+01 | 2.077E+02 | 2.084E+02 | FAIL ABUN |
| AM-241 | 3.926E-02 | 6.722E-02 | 6.951E-02 | NOT IDENT. |
| AM-243 | -2.699E-02 | 3.131E-02 | 3.359E-02 | NOT IDENT. |
| CM-243 | 3.300E-02 | 6.483E-02 | 6.652E-02 | NOT IDENT. |
| CM-247 | 2.556E-02 | 1.959E-02 | 2.273E-02 | NOT IDENT. |
| CF-249 | -1.370E-02 | 2.966E-02 | 3.029E-02 | NOT IDENT. |
| CF-251 | 2.292E-02 | 8.536E-02 | 8.598E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 37.6830 | 94.67 | 87.7403 | 193.51 | 27.7698 |
| 45.60 | 36.1089 | 94.87 | 87.7722 | 197.03 | 41.8158 |
| 46.54 | 36.2074 | 97.43 | 42.5676 | 198.01 | 37.2093 |
| 49.72 | 0.0000 | 98.43 | 34.5205 | 201.83 | 47.2875 |
| 51.35 | 38.5309 | 98.44 | 34.5210 | 205.31 | 43.9472 |
| 52.39 | 37.7187 | 99.53 | 35.6046 | 210.85 | 42.4347 |
| 53.44 | 51.6619 | 100.11 | 38.6956 | 215.65 | 42.6453 |
| 57.36 | 0.0000 | 103.18 | 37.8773 | 222.11 | 33.9818 |
| 57.53 | 39.1564 | 103.37 | 37.8898 | 227.09 | 29.6567 |
| 57.98 | 46.6671 | 105.21 | 41.0899 | 227.38 | 34.1598 |
| 59.32 | 44.0131 | 105.31 | 41.0968 | 228.16 | 0.0000 |
| 59.54 | 36.5414 | 106.12 | 45.2680 | 228.18 | 35.0864 |
| 63.29 | 38.7639 | 109.28 | 35.6810 | 117.23 | 35.0864 |
| 63.58 | 32.1676 | 111.00 | 49.7830 | 235.69 | 34.7988 |
| 64.28 | 34.1158 | 111.76 | 0.0000 | 235.96 | 40.6092 |
| 66.73 | 43.8400 | 116.30 | 0.0000 | 238.63 | 47.9829 |
| 67.24 | 38.1659 | 117.23 | 38.7577 | 238.98 | 0.0000 |
| 67.75 | 33.4338 | 121.12 | 36.3574 | 240.99 | 29.1455 |
| 69.67 | 50.8467 | 121.22 | 36.3630 | 242.00 | 27.7144 |
| 70.83 | 60.5951 | 121.78 | 39.5588 | 244.70 | 43.8706 |
| 72.81 | 54.0948 | 122.06 | 36.4097 | 252.40 | 0.0000 |
| 72.87 | 54.1016 | 123.07 | 44.3928 | 252.80 | 38.6742 |
| 74.66 | 69.8258 | 127.23 | 40.4159 | 254.15 | 0.0000 |
| 74.82 | 69.8496 | 129.30 | 38.4055 | 256.23 | 31.4050 |
| 74.97 | 69.8719 | 131.20 | 51.3496 | 260.90 | 0.0000 |
| 77.11 | 65.3118 | 133.02 | 36.4684 | 264.66 | 33.5028 |
| 79.69 | 63.6987 | 133.52 | 36.4944 | 268.22 | 27.0729 |
| 80.12 | 51.9843 | 136.00 | 48.4721 | 269.46 | 28.0367 |
| 80.19 | 0.0000 | 136.47 | 50.6604 | 271.23 | 34.6316 |
| 80.57 | 45.1594 | 140.51 | 0.0000 | 273.65 | 26.2624 |
| 81.00 | 54.0416 | 143.76 | 38.1089 | 276.40 | 37.6062 |
| 81.07 | 51.1010 | 144.24 | 42.4916 | 277.37 | 38.5776 |
| 83.79 | 52.3660 | 145.44 | 46.9263 | 277.60 | 40.4680 |
| 85.43 | 38.6570 | 152.43 | 59.4800 | 278.00 | 37.6569 |
| 86.55 | 49.6676 | 153.25 | 54.0304 | 279.20 | 30.1563 |
| 86.79 | 52.6717 | 323.87 | 38.6412 | 279.54 | 29.2224 |
| 86.94 | 52.6870 | 156.02 | 42.0515 | 280.46 | 32.0753 |
| 87.09 | 47.7302 | 158.56 | 47.7394 | 283.69 | 43.5139 |
| 87.57 | 45.7833 | 159.00 | 38.8794 | 284.31 | 0.0000 |
| 88.03 | 39.8466 | 162.33 | 43.5045 | 285.41 | 38.8398 |
| 88.34 | 36.8797 | 163.33 | 53.6108 | 285.90 | 0.0000 |
| 88.47 | 36.8890 | 165.86 | 34.7325 | 287.50 | 23.7240 |
| 89.96 | 102.9796 | 176.31 | 51.0567 | 290.67 | 33.3006 |
| 91.11 | 50.0974 | 176.60 | 46.5341 | 293.27 | 0.0000 |
| 92.59 | 39.1829 | 177.52 | 37.4949 | 351.93 | 27.6946 |
| 93.35 | 37.2255 | 181.07 | 0.0000 | 295.96 | 31.5332 |
| 94.56 | 63.5236 | 184.41 | 42.9493 | 879.38 | 36.3881 |
| 94.65 | 87.7372 | 143.76 | 38.9988 | 299.98 | 21.0906 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 21.0923 | 487.02 | 18.4487 | 702.65 | 10.5910 |
| 300.13 | 19.1754 | 492.35 | 0.0000 | 706.68 | 17.3597 |
| 301.36 | 20.1541 | 497.08 | 10.9126 | 711.68 | 10.6307 |
| 302.85 | 32.6693 | 505.52 | 22.8027 | 720.70 | 7.7602 |
| 256.23 | 33.6745 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 22.1689 | 511.00 | 21.9905 | 722.78 | 13.5919 |
| 308.46 | 22.1981 | 514.00 | 19.3827 | 722.91 | 13.5926 |
| 311.90 | 33.8710 | 514.00 | 19.3827 | 723.31 | 18.4503 |
| 316.51 | 30.1074 | 520.40 | 14.3655 | 724.19 | 15.5426 |
| 319.41 | 27.2545 | 520.69 | 0.0000 | 727.33 | 11.6719 |
| 320.08 | 24.3469 | 522.65 | 0.0000 | 733.00 | 14.6232 |
| 321.04 | 32.1616 | 527.90 | 0.0000 | 735.93 | 5.8563 |
| 323.87 | 26.3705 | 529.59 | 21.0973 | 333.97 | 9.7664 |
| 325.23 | 19.5538 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 27.4484 | 531.02 | 13.3345 | 747.24 | 12.2559 |
| 333.37 | 26.5592 | 546.56 | 0.0000 | 748.06 | 9.8079 |
| 333.97 | 31.4917 | 552.55 | 21.3472 | 752.31 | 7.8596 |
| 334.37 | 32.4854 | 563.25 | 12.6513 | 753.82 | 10.8134 |
| 338.28 | 20.7321 | 569.33 | 18.1274 | 756.73 | 3.2805 |
| 338.32 | 20.7328 | 946.00 | 18.1289 | 756.80 | 3.2806 |
| 311.90 | 23.7319 | 569.70 | 20.8505 | 884.68 | 6.5796 |
| 340.48 | 23.7319 | 583.19 | 18.2505 | 765.81 | 8.8890 |
| 340.55 | 25.7112 | 584.27 | 16.4342 | 766.42 | 8.8910 |
| 344.28 | 22.4757 | 595.83 | 15.6075 | 766.84 | 8.2338 |
| 345.93 | 19.0608 | 427.87 | 19.5535 | 772.60 | 0.0000 |
| 351.06 | 15.9426 | 602.52 | 0.0000 | 776.52 | 9.9177 |
| 351.93 | 15.9526 | 602.73 | 13.1585 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 16.9024 | 778.90 | 17.8682 |
| 356.01 | 25.5980 | 609.32 | 10.7794 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 16.9471 | 785.37 | 12.9368 |
| 366.42 | 0.0000 | 614.28 | 15.4346 | 792.07 | 17.9587 |
| 375.05 | 28.3696 | 618.01 | 15.4614 | 794.95 | 4.9939 |
| 356.01 | 27.5187 | 620.36 | 16.7164 | 795.86 | 6.9938 |
| 388.16 | 31.6864 | 621.93 | 20.1364 | 810.29 | 16.0730 |
| 388.63 | 28.6289 | 630.19 | 0.0000 | 344.28 | 14.0646 |
| 391.69 | 24.5885 | 631.29 | 19.6003 | 810.76 | 14.0663 |
| 264.66 | 16.4885 | 633.25 | 11.2102 | 815.77 | 9.0595 |
| 401.81 | 9.9004 | 634.78 | 14.0222 | 1048.07 | 8.0609 |
| 402.40 | 5.5023 | 635.95 | 13.0946 | 832.01 | 14.1771 |
| 404.85 | 19.8396 | 636.99 | 0.0000 | 834.85 | 16.2191 |
| 410.95 | 0.0000 | 645.85 | 20.6685 | 835.71 | 12.1682 |
| 413.71 | 23.2767 | 657.76 | 17.0002 | 836.80 | 0.0000 |
| 414.70 | 21.6277 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 16.7654 | 661.66 | 17.3446 | 846.77 | 16.9678 |
| 427.87 | 18.8701 | 664.57 | 0.0000 | 856.80 | 7.1521 |
| 433.94 | 19.9927 | 666.33 | 9.4802 | 860.56 | 11.2541 |
| 439.40 | 20.0588 | 666.50 | 9.4807 | 871.09 | 11.2959 |
| 453.88 | 13.8430 | 667.71 | 0.0000 | 873.19 | 8.2215 |
| 463.37 | 20.8032 | 677.62 | 17.1479 | 875.33 | 0.0000 |
| 468.07 | 18.8963 | 685.70 | 0.0000 | 879.38 | 14.4187 |
| 473.00 | 0.0000 | 695.00 | 11.5166 | 880.51 | 9.2727 |
| 475.06 | 13.7977 | 696.49 | 12.4843 | 883.24 | 13.4069 |
| 476.78 | 13.8111 | 696.51 | 12.4843 | 884.68 | 14.4454 |
| 477.60 | 17.2720 | 697.00 | 16.3293 | 889.28 | 6.2007 |
| 482.18 | 18.3989 | 697.49 | 15.3719 | 894.76 | 10.3540 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 8.2926 | 1298.22 | 0.0000 | | |
| 903.28 | 13.4996 | 1312.11 | 7.7998 | | |
| 911.20 | 16.6598 | 1332.49 | 5.8796 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 8.3730 | 1365.19 | 10.8662 | | |
| 937.49 | 13.6560 | 1368.63 | 0.0000 | | |
| 944.13 | 11.5803 | 1384.29 | 0.9924 | | |
| 946.00 | 8.4273 | 1408.01 | 6.9863 | | |
| 949.00 | 8.4355 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 6.0627 | | |
| 962.31 | 13.7674 | 1489.16 | 5.0850 | | |
| 964.08 | 10.5964 | 1505.03 | 9.1857 | | |
| 966.17 | 8.4830 | 1596.21 | 8.3298 | | |
| 968.97 | 17.6888 | 1620.50 | 1.0466 | | |
| 983.53 | 11.7291 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 4.2479 | | |
| 1274.44 | 11.7767 | 1750.46 | 0.0000 | | |
| 1001.03 | 10.7222 | 1764.49 | 1.0777 | | |
| 1004.73 | 10.7346 | 1063.66 | 7.5523 | | |
| 507.63 | 0.0000 | 1771.35 | 6.4749 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.7951 | | |
| 1037.84 | 10.8452 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.7464 | | |
| 631.29 | 11.9614 | | | | |
| 1048.07 | 9.5190 | | | | |
| 1049.04 | 7.2546 | | | | |
| 1050.41 | 9.0723 | | | | |
| 1063.66 | 9.8372 | | | | |
| 1077.00 | 8.7789 | | | | |
| 1077.34 | 8.7797 | | | | |
| 1085.87 | 11.9193 | | | | |
| 1099.45 | 12.8869 | | | | |
| 1112.07 | 4.6193 | | | | |
| 1112.84 | 6.4685 | | | | |
| 1115.54 | 11.0977 | | | | |
| 1120.29 | 3.7043 | | | | |
| 1120.55 | 7.4089 | | | | |
| 1221.41 | 8.3368 | | | | |
| 1129.67 | 10.2140 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 4.6997 | | | | |
| 1177.95 | 9.4116 | | | | |
| 1189.05 | 9.4405 | | | | |
| 1204.77 | 7.5846 | | | | |
| 1221.41 | 6.3487 | | | | |
| 1231.02 | 8.1836 | | | | |
| 1235.36 | 8.3420 | | | | |
| 1238.28 | 7.6527 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 5.7900 | | | | |
| 1274.44 | 10.6222 | | | | |
| 1274.54 | 7.7253 | | | | |
| 1291.59 | 6.7892 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:07:36.46

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147012.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM33.CNF;114
                                        Background date  : 2-FEB-2014 16:28:36.
Sample date      : 7-NOV-2013 13:25:00. Acquisition date : 7-FEB-2014 09:06:12.
Sample ID        : G341147012           Sample quantity  : 1.31520E+02 GRAM
Detector name    : GAM33                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.41  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.29* | 4 | 42 | 0.65 | 126.78 | 124 | 7 | 9.78E-04 | 347.3 | |
| 2 | 0 | 144.19* | 17 | 45 | 0.98 | 288.59 | 283 | 11 | 4.68E-03 | 85.6 | |
| 3 | 0 | 185.85* | 4 | 18 | 1.06 | 371.91 | 368 | 9 | 1.25E-03 | 248.7 | |
| 4 | 1 | 233.01 | 11 | 10 | 1.26 | 466.23 | 464 | 24 | 3.09E-03 | 43.1 | 3.96E+00 |
| 5 | 1 | 236.01 | 19 | 18 | 1.26 | 472.23 | 464 | 24 | 5.25E-03 | 39.2 | |
| 6 | 1 | 238.51* | 8 | 16 | 1.27 | 477.23 | 464 | 24 | 2.12E-03 | 114.4 | |
| 7 | 1 | 240.51 | 10 | 14 | 1.27 | 481.23 | 464 | 24 | 2.89E-03 | 81.1 | |
| 8 | 0 | 266.34 | 61 | 21 | 8.04 | 532.90 | 520 | 30 | 1.69E-02 | 26.1 | |
| 9 | 0 | 295.73* | 6 | 10 | 1.29 | 591.68 | 589 | 6 | 1.55E-03 | 111.0 | |
| 10 | 0 | 337.57* | 11 | 14 | 1.15 | 675.36 | 669 | 11 | 3.08E-03 | 74.9 | |
| 11 | 0 | 390.90 | 28 | 9 | 5.37 | 782.05 | 775 | 14 | 7.72E-03 | 30.9 | |
| 12 | 0 | 457.79 | 11 | 2 | 0.93 | 915.82 | 912 | 7 | 3.15E-03 | 35.3 | |
| 13 | 0 | 540.76 | 7 | 2 | 0.53 | 1081.79 | 1078 | 6 | 2.04E-03 | 45.7 | |
| 14 | 0 | 577.18 | 9 | 2 | 0.59 | 1154.63 | 1149 | 10 | 2.40E-03 | 48.1 | |
| 15 | 0 | 760.11 | 7 | 4 | 1.11 | 1520.53 | 1514 | 10 | 1.89E-03 | 71.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:07:37

Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147012.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title     : RXF2
Sample date      : 7-NOV-2013 13:25:00  Acquisition date : 7-FEB-2014 09:06:12
Sample ID        : G341147012           Sample quantity  : 131.52 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA33              Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.41   0.0%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| U-235 | 143.76 | CE-141 | 145.44 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| NB-95M | 235.69 | 24.80* | 4.608E+00 | 9.442E-02 | 2.552E-01 | 78.47 | OK |
| SN-113 | 391.69 | 64.94* | 3.311E+00 | 7.379E-02 | 1.283E-01 | 61.79 | OK |
| CE-141 | 145.44 | 48.29* | 5.730E+00 | 3.279E-02 | 2.324E-01 | 183.61 | OK |
| RA-224 | 240.99 | 4.10* | 4.554E+00 | 3.178E-01 | 3.178E-01 | 162.11 | OK |
| U-235 | 89.96 | 3.47 | 4.543E+00 | ----- | Line Not Found | ----- | Absent |
| | 93.35 | 5.60 | 4.766E+00 | ----- | Line Not Found | ----- | Absent |
| | 143.76 | 10.96* | 5.733E+00 | ----- | Line Not Found | ----- | <<INT Reject |
| | 163.33 | 5.08 | 5.553E+00 | ----- | Line Not Found | ----- | Absent |
| | 185.72 | 57.20 | 5.263E+00 | 8.529E-03 | 8.529E-03 | 497.47 | OK |
| | 205.31 | 5.01 | 4.999E+00 | ----- | Line Not Found | ----- | Absent |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:07:38.65

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147012.CNF;1  *
* Acquisition date :  7-FEB-2014 09:06:12 Sensitivity     : 3.000           *
* Detector ID      : GAM33                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:25:00 Nuclide Library : SOLID           *
* Sample ID        : G341147012           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3152E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 23-AUG-2013 07:35:09 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_500MLMB.CNF;5         *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| NB-95M | 2.552E-01 | 1.962E-01 | 3.294E-01 |
| SN-113 | 1.283E-01 | 7.768E-02 | 8.279E-02 |
| CE-141 | 2.324E-01 | 4.182E-01 | 3.999E-01 |
| RA-224 | 3.178E-01 | 5.049E-01 | 7.492E-01 |
| U-235 | 1.530E-01 | 2.567E-01 | 3.231E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 1.164E-01 | 5.828E-01 | 1.182E+00 | NOT IDENT. |
| NA-22 | -2.564E-02 | 2.581E-02 | 3.380E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.248E-04 | 2.257E-02 | 5.272E-02 | NOT IDENT. |
| K-40 | -8.954E-02 | 3.760E-01 | 7.875E-01 | NOT IDENT. |
| SC-46 | -3.227E-02 | 5.042E-02 | 8.829E-02 | NOT IDENT. |
| V-48 | -1.921E-01 | 9.632E-01 | 1.988E+00 | NOT IDENT. |
| CR-51 | -2.761E-01 | 1.814E+00 | 3.442E+00 | NOT IDENT. |
| MN-54 | 1.071E-02 | 2.711E-02 | 6.021E-02 | NOT IDENT. |
| CO-56 | 3.869E-02 | 6.166E-02 | 1.359E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.565E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -4.446E-03 | 2.304E-02 | 4.169E-02 | NOT IDENT. |
| CO-58 | -2.164E-02 | 5.581E-02 | 1.052E-01 | NOT IDENT. |
| FE-59 | 4.132E-02 | 1.539E-01 | 3.548E-01 | NOT IDENT. |
| CO-60 | 5.278E-03 | 1.964E-02 | 4.964E-02 | NOT IDENT. |
| ZN-65 | -7.049E-02 | 9.215E-02 | 1.517E-01 | NOT IDENT. |
| GE-68 | -3.562E-01 | 9.152E-01 | 1.714E+00 | NOT IDENT. |
| AS-73 | 2.657E-01 | 1.993E+00 | 3.889E+00 | NOT IDENT. |
| AS-74 | -5.138E-01 | 1.463E+00 | 2.608E+00 | NOT IDENT. |
| SE-75 | -8.322E-04 | 5.041E-02 | 9.738E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.955E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.227E+00 | 1.822E+00 | 4.174E+00 | NOT IDENT. |
| RB-83 | -6.725E-02 | 7.812E-02 | 1.240E-01 | NOT IDENT. |
| KR-85 | -1.333E+01 | 9.578E+00 | 1.477E+01 | NOT IDENT. |
| SR-85 | -1.585E-01 | 1.137E-01 | 1.752E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -8.150E+00 | 9.166E+00 | 1.425E+01 | NOT IDENT. |
| Y-88 | 5.540E-03 | 3.330E-02 | 8.926E-02 | NOT IDENT. |
| Y-91 | 3.413E+00 | 2.087E+01 | 4.951E+01 | NOT IDENT. |
| NB-94 | -1.169E-02 | 2.573E-02 | 4.751E-02 | NOT IDENT. |
| NB-95 | -2.123E-02 | 7.453E-02 | 1.458E-01 | NOT IDENT. |
| ZR-95 | 1.672E-02 | 6.134E-02 | 1.436E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.261E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.375E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.055E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.144E-03 | 2.263E-02 | 4.177E-02 | NOT IDENT. |
| RH-102 | 2.206E-02 | 4.067E-02 | 8.671E-02 | NOT IDENT. |
| RU-103 | -1.721E-03 | 1.199E-01 | 2.294E-01 | NOT IDENT. |
| RH-106 | 1.506E-01 | 2.722E-01 | 5.743E-01 | NOT IDENT. |
| RU-106 | 1.506E-01 | 2.722E-01 | 5.743E-01 | NOT IDENT. |
| AG-108M | 5.372E-03 | 2.142E-02 | 4.310E-02 | NOT IDENT. |
| CD-109 | 7.833E-03 | 6.783E-01 | 1.264E+00 | NOT IDENT. |
| AG-110M | -9.376E-04 | 3.989E-02 | 8.197E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.855E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -6.722E-01 | 1.926E+00 | 3.379E+00 | NOT IDENT. |
| TE-123M | -2.260E-02 | 3.102E-02 | 5.161E-02 | NOT IDENT. |
| SB-124 | 9.747E-02 | 1.433E-01 | 3.923E-01 | NOT IDENT. |
| SB-125 | 3.599E-02 | 7.404E-02 | 1.520E-01 | NOT IDENT. |
| TE-125M | 1.682E+00 | 1.720E+01 | 3.252E+01 | NOT IDENT. |
| I-126 | -9.194E+00 | 1.019E+01 | 1.568E+01 | NOT IDENT. |
| SB-126 | -2.474E+00 | 6.056E+00 | 1.157E+01 | NOT IDENT. |
| SN-126 | -1.981E-02 | 5.941E-02 | 1.069E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 8.682E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 5.865E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 8.788E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -2.420E-02 | 3.245E-02 | 5.583E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.869E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 8.303E-03 | 2.433E-02 | 5.500E-02 | NOT IDENT. |
| CS-135 | -5.915E-02 | 1.015E-01 | 1.831E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.853E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.263E+00 | 3.946E+00 | 7.484E+00 | NOT IDENT. |
| BA-137M | 9.476E-03 | 2.138E-02 | 4.649E-02 | NOT IDENT. |
| CS-137 | 1.001E-02 | 2.259E-02 | 4.912E-02 | NOT IDENT. |
| CE-139 | 2.988E-03 | 2.900E-02 | 5.415E-02 | NOT IDENT. |
| BA-140 | -4.678E-01 | 3.603E+00 | 7.892E+00 | NOT IDENT. |
| LA-140 | -4.678E-01 | 3.603E+00 | 7.892E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.018E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 9.785E-02 | 1.414E-01 | 2.904E-01 | NOT IDENT. |
| PM-144 | -9.715E-03 | 3.025E-02 | 5.726E-02 | NOT IDENT. |
| PR-144 | -7.472E-01 | 2.359E+00 | 4.467E+00 | NOT IDENT. |
| PM-146 | 3.232E-03 | 2.517E-02 | 4.685E-02 | NOT IDENT. |
| ND-147 | -4.119E+00 | 5.033E+01 | 9.633E+01 | NOT IDENT. |
| PM-147 | -5.275E+01 | 6.019E+02 | 1.100E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.523E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.882E-02 | 2.398E-02 | 3.070E-02 | NOT IDENT. |
| EU-152 | -2.212E-02 | 6.386E-02 | 1.184E-01 | NOT IDENT. |
| GD-153 | -2.072E-02 | 8.865E-02 | 1.600E-01 | NOT IDENT. |
| EU-154 | -6.988E-02 | 7.034E-02 | 9.212E-02 | NOT IDENT. |
| EU-155 | -2.295E-03 | 7.408E-02 | 1.387E-01 | NOT IDENT. |
| TB-160 | -1.061E-01 | 2.019E-01 | 3.641E-01 | NOT IDENT. |
| HO-166M | 1.502E-02 | 4.339E-02 | 9.250E-02 | FAIL ABUN |
| TM-171 | 6.150E+00 | 2.216E+01 | 4.442E+01 | NOT IDENT. |
| LU-176 | -7.535E-03 | 1.480E-02 | 2.708E-02 | NOT IDENT. |
| HF-181 | -7.607E-02 | 1.242E-01 | 2.134E-01 | NOT IDENT. |
| TA-182 | -1.536E-02 | 2.042E-01 | 4.012E-01 | NOT IDENT. |
| RE-183 | -3.121E-01 | 4.474E-01 | 7.902E-01 | NOT IDENT. |
| RE-184 | 1.974E-01 | 3.393E-01 | 7.957E-01 | NOT IDENT. |
| W-188 | 6.659E+00 | 1.130E+01 | 2.281E+01 | FAIL ABUN |
| IR-192 | -3.104E-03 | 5.074E-02 | 9.766E-02 | FAIL ABUN |
| HG-203 | 2.894E-02 | 7.671E-02 | 1.574E-01 | NOT IDENT. |
| BI-207 | 6.333E-03 | 2.271E-02 | 5.547E-02 | NOT IDENT. |
| TL-208 | -1.859E-02 | 2.609E-02 | 4.913E-02 | NOT IDENT. |
| PB-210 | -9.764E-01 | 4.557E+00 | 8.714E+00 | NOT IDENT. |
| BI-211 | 2.428E-02 | 1.741E-01 | 3.409E-01 | NOT IDENT. |
| PB-211 | 3.109E-02 | 5.963E-01 | 1.166E+00 | NOT IDENT. |
| BI-212 | 1.790E-01 | 2.462E-01 | 6.111E-01 | NOT IDENT. |
| PB-212 | 2.178E-02 | 4.883E-02 | 8.813E-02 | FAIL ABUN |
| BI-214 | 3.191E-03 | 6.176E-02 | 1.201E-01 | NOT IDENT. |
| PB-214 | 3.152E-02 | 6.186E-02 | 1.264E-01 | FAIL ABUN |
| RN-219 | -2.490E-02 | 3.518E-01 | 6.596E-01 | NOT IDENT. |
| RN-222 | 3.191E-03 | 6.176E-02 | 1.201E-01 | NOT IDENT. |
| RA-223 | 3.197E-01 | 4.754E-01 | 9.903E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-226 | 3.191E-03 | 6.176E-02 | 1.201E-01 | NOT IDENT. |
| AC-227 | -1.745E-02 | 1.762E-01 | 3.282E-01 | FAIL ABUN |
| TH-227 | -1.745E-02 | 1.762E-01 | 3.282E-01 | FAIL ABUN |
| AC-228 | -1.809E-02 | 8.353E-02 | 1.757E-01 | FAIL ABUN |
| RA-228 | -1.809E-02 | 8.353E-02 | 1.757E-01 | FAIL ABUN |
| TH-228 | 2.178E-02 | 4.883E-02 | 8.813E-02 | FAIL ABUN |
| TH-229 | -3.467E-01 | 3.736E-01 | 5.931E-01 | NOT IDENT. |
| TH-230 | 3.191E-03 | 6.175E-02 | 1.201E-01 | NOT IDENT. |
| PA-231 | 1.672E-02 | 8.924E-01 | 1.763E+00 | NOT IDENT. |
| TH-231 | 3.197E-01 | 4.754E-01 | 9.903E-01 | FAIL ABUN |
| TH-232 | -1.809E-02 | 8.353E-02 | 1.757E-01 | FAIL ABUN |
| PA-233 | 2.454E-02 | 4.869E-02 | 9.950E-02 | NOT IDENT. |
| PA-234 | -2.405E-02 | 1.805E-01 | 3.658E-01 | NOT IDENT. |
| PA-234M | -1.241E+00 | 3.243E+00 | 6.661E+00 | NOT IDENT. |
| TH-234 | 2.867E-01 | 1.952E+00 | 3.214E+00 | FAIL ABUN |
| U-234 | 3.191E-03 | 6.175E-02 | 1.201E-01 | NOT IDENT. |
| NP-237 | 2.454E-02 | 4.869E-02 | 9.950E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 7.176E+11 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.867E-01 | 1.952E+00 | 3.214E+00 | FAIL ABUN |
| NP-239 | -1.654E-01 | 3.130E-01 | 5.440E-01 | NOT IDENT. |
| PU-239 | 2.022E+02 | 2.342E+02 | 4.761E+02 | NOT IDENT. |
| AM-241 | 4.421E-02 | 1.600E-01 | 2.891E-01 | NOT IDENT. |
| AM-243 | -2.486E-02 | 4.203E-02 | 7.405E-02 | NOT IDENT. |
| CM-243 | -1.014E-02 | 6.942E-02 | 1.289E-01 | NOT IDENT. |
| CM-247 | 1.701E-02 | 3.022E-02 | 6.177E-02 | NOT IDENT. |
| CF-249 | 2.565E-02 | 3.285E-02 | 6.412E-02 | NOT IDENT. |
| CF-251 | -1.284E-03 | 9.177E-02 | 1.673E-01 | NOT IDENT. |
| ANH-511 | -5.891E-02 | 4.691E-02 | 9.616E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:07:34.94

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.29 | 30 | 42 | 0.65 | 126.78 | 124 | 7 | 8.35E-03 | 39.7 | |
| 2 | 0 | 92.69 | 82 | 47 | 0.98 | 185.58 | 182 | 10 | 2.28E-02 | 19.2 | |
| 3 | 0 | 144.19 | 29 | 45 | 0.98 | 288.59 | 283 | 11 | 8.06E-03 | 49.1 | |
| 4 | 0 | 185.85 | 57 | 18 | 1.06 | 371.91 | 368 | 9 | 1.58E-02 | 18.9 | |
| 5 | 1 | 233.01 | 11 | 10 | 1.26 | 466.23 | 464 | 24 | 3.09E-03 | 43.1 | 3.96E+00 |
| 6 | 1 | 236.01 | 19 | 18 | 1.26 | 472.23 | 464 | 24 | 5.25E-03 | 39.2 | |
| 7 | 1 | 238.51 | 22 | 16 | 1.27 | 477.23 | 464 | 24 | 6.10E-03 | 37.8 | |
| 8 | 1 | 240.51 | 10 | 14 | 1.27 | 481.23 | 464 | 24 | 2.89E-03 | 81.1 | |
| 9 | 0 | 266.34 | 61 | 21 | 8.04 | 532.90 | 520 | 30 | 1.69E-02 | 26.1 | |
| 10 | 0 | 295.73 | 8 | 10 | 1.29 | 591.68 | 589 | 6 | 2.19E-03 | 73.6 | |
| 11 | 0 | 337.57 | 14 | 14 | 1.15 | 675.36 | 669 | 11 | 3.95E-03 | 57.0 | |
| 12 | 0 | 390.90 | 28 | 9 | 5.37 | 782.05 | 775 | 14 | 7.72E-03 | 30.9 | |
| 13 | 0 | 457.79 | 11 | 2 | 0.93 | 915.82 | 912 | 7 | 3.15E-03 | 35.3 | |
| 14 | 0 | 511.55 | 58 | 40 | 2.02 | 1023.37 | 1019 | 12 | 1.60E-02 | 27.0 | |
| 15 | 0 | 540.76 | 7 | 2 | 0.53 | 1081.79 | 1078 | 6 | 2.04E-03 | 45.7 | |
| 16 | 0 | 577.18 | 9 | 2 | 0.59 | 1154.63 | 1149 | 10 | 2.40E-03 | 48.1 | |
| 17 | 0 | 760.11 | 7 | 4 | 1.11 | 1520.53 | 1514 | 10 | 1.89E-03 | 71.1 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:07:36.94

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NB-95M | 235.69 | 19 | 24.80* | 4.608E+00 | 9.442E-02 | 2.552E-01 | 78.47 |
| SN-113 | 391.69 | 28 | 64.94* | 3.311E+00 | 7.379E-02 | 1.283E-01 | 61.79 |
| CE-141 | 145.44 | 17 | 48.29* | 5.730E+00 | 3.473E-02 | 2.461E-01 | 171.15 |
| RA-224 | 240.99 | 10 | 4.10* | 4.554E+00 | 3.178E-01 | 3.178E-01 | 162.11 |
| U-235 | 89.96 | ------ | 3.47 | 4.543E+00 | ------ | Line Not Found | ------ |
| | 93.35 | ------ | 5.60 | 4.766E+00 | ------ | Line Not Found | ------ |
| | 143.76 | 17 | 10.96* | 5.730E+00 | 1.530E-01 | 1.530E-01 | 171.15 |
| | 163.33 | ------ | 5.08 | 5.553E+00 | ------ | Line Not Found | ------ |
| | 185.72 | 4 | 57.20 | 5.263E+00 | 8.529E-03 | 8.529E-03 | 497.47 |
| | 205.31 | ------ | 5.01 | 4.999E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341147012 Acquisition date : 7-FEB-2014 09:06:12

Total number of lines in spectrum 15
Number of unidentified lines 6
Number of lines tentatively identified by NID 9 60.00%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| NB-95M | 64.03D | 2.70 | 9.442E-02 | 2.552E-01 | 2.002E-01 | 78.47 | |
| SN-113 | 115.09D | 1.74 | 7.379E-02 | 1.283E-01 | 0.793E-01 | 61.79 | |
| CE-141 | 32.51D | 7.09 | 3.473E-02 | 2.461E-01 | 4.212E-01 | 171.15 | |
| RA-224 | 1.41E+10Y | 1.00 | 3.178E-01 | 3.178E-01 | 5.152E-01 | 162.11 | |
| U-235 | 7.04E+08Y | 1.00 | 1.530E-01 | 1.530E-01 | 2.619E-01 | 171.15 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 6.738E-01 | 1.100E+00 | | | |
| | Grand Total Activity : | | 6.738E-01 | 1.100E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147012 Acquisition date : 7-FEB-2014 09:06:12

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.29 | 4 | 42 | 0.65 | 126.78 | 124 | 7 | 9.78E-04 | **** | 1.89E+00 | T |
| 1 | 233.01 | 11 | 10 | 1.26 | 466.23 | 464 | 24 | 3.09E-03 | 86.1 | 4.64E+00 | |
| 1 | 238.51 | 8 | 16 | 1.27 | 477.23 | 464 | 24 | 2.12E-03 | **** | 4.58E+00 | T |
| 0 | 266.34 | 61 | 21 | 8.04 | 532.90 | 520 | 30 | 1.69E-02 | 52.2 | 4.27E+00 | |
| 0 | 295.73 | 6 | 10 | 1.29 | 591.68 | 589 | 6 | 1.55E-03 | **** | 3.99E+00 | T |
| 0 | 337.57 | 11 | 14 | 1.15 | 675.36 | 669 | 11 | 3.08E-03 | **** | 3.65E+00 | T |
| 0 | 457.79 | 11 | 2 | 0.93 | 915.82 | 912 | 7 | 3.15E-03 | 70.6 | 2.98E+00 | |
| 0 | 540.76 | 7 | 2 | 0.53 | 1081.79 | 1078 | 6 | 2.04E-03 | 91.5 | 2.65E+00 | |
| 0 | 577.18 | 9 | 2 | 0.59 | 1154.63 | 1149 | 10 | 2.40E-03 | 96.2 | 2.53E+00 | |
| 0 | 760.11 | 7 | 4 | 1.11 | 1520.53 | 1514 | 10 | 1.89E-03 | **** | 2.06E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:07:48.83

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147012.CNF;1    *
* Acquisition date :  7-FEB-2014 09:06:12 Sensitivity     : 3.000            *
* Detector ID      : GAM33                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 13:25:00 Nuclide Library : SOLID            *
* Sample ID        : G341147012           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.3152E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 23-AUG-2013 07:35:09 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_500MLMB.CNF;5          *
*****************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| NB-95M | 1.465E-01 |
| SN-113 | 3.516E-02 |
| CE-141 | 1.802E-01 |
| RA-224 | 3.333E-01 |
| U-235 | 1.493E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.064E-01 | NOT IDENT. |
| NA-22 | 1.069E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.868E-02 | NOT IDENT. |
| K-40 | 3.327E-01 | NOT IDENT. |
| SC-46 | 3.504E-02 | NOT IDENT. |
| V-48 | 7.442E-01 | NOT IDENT. |
| CR-51 | 1.517E+00 | NOT IDENT. |
| MN-54 | 2.515E-02 | NOT IDENT. |
| CO-56 | 5.862E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.885E-02 | NOT IDENT. |
| CO-58 | 4.285E-02 | NOT IDENT. |
| FE-59 | 1.396E-01 | NOT IDENT. |
| CO-60 | 1.858E-02 | NOT IDENT. |
| ZN-65 | 6.258E-02 | NOT IDENT. |
| GE-68 | 6.599E-01 | NOT IDENT. |
| AS-73 | 1.753E+00 | NOT IDENT. |
| AS-74 | 1.114E+00 | NOT IDENT. |
| SE-75 | 4.350E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.776E+00 | NOT IDENT. |
| RB-83 | 4.881E-02 | NOT IDENT. |
| KR-85 | 6.729E+00 | NOT IDENT. |
| SR-85 | 7.980E-02 | NOT IDENT. |
| RB-86 | 5.357E+00 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 3.046E-02 | NOT IDENT. |
| Y-91 | 1.844E+01 | NOT IDENT. |
| NB-94 | 2.022E-02 | NOT IDENT. |
| NB-95 | 6.271E-02 | NOT IDENT. |
| ZR-95 | 5.322E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.881E-02 | NOT IDENT. |
| RH-102 | 3.727E-02 | NOT IDENT. |
| RU-103 | 9.947E-02 | NOT IDENT. |
| RH-106 | 2.487E-01 | NOT IDENT. |
| RU-106 | 2.487E-01 | NOT IDENT. |
| AG-108M | 1.879E-02 | NOT IDENT. |
| CD-109 | 5.776E-01 | NOT IDENT. |
| AG-110M | 3.346E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.518E+00 | NOT IDENT. |
| TE-123M | 2.302E-02 | NOT IDENT. |
| SB-124 | 1.519E-01 | NOT IDENT. |
| SB-125 | 6.714E-02 | NOT IDENT. |
| TE-125M | 1.468E+01 | NOT IDENT. |
| I-126 | 6.426E+00 | NOT IDENT. |
| SB-126 | 4.629E+00 | NOT IDENT. |
| SN-126 | 4.868E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.433E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.255E-02 | NOT IDENT. |
| CS-135 | 8.024E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.970E+00 | NOT IDENT. |
| BA-137M | 1.948E-02 | NOT IDENT. |
| CS-137 | 2.058E-02 | NOT IDENT. |
| CE-139 | 2.431E-02 | NOT IDENT. |
| BA-140 | 2.864E+00 | NOT IDENT. |
| LA-140 | 2.864E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.301E-01 | NOT IDENT. |
| PM-144 | 2.443E-02 | NOT IDENT. |
| PR-144 | 1.907E+00 | NOT IDENT. |
| PM-146 | 1.934E-02 | NOT IDENT. |
| ND-147 | 4.094E+01 | NOT IDENT. |
| PM-147 | 4.996E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.316E-02 | NOT IDENT. |
| EU-152 | 5.109E-02 | NOT IDENT. |
| GD-153 | 7.310E-02 | NOT IDENT. |
| EU-154 | 2.912E-02 | NOT IDENT. |
| EU-155 | 6.228E-02 | NOT IDENT. |
| TB-160 | 1.482E-01 | NOT IDENT. |
| HO-166M | 3.967E-02 | FAIL ABUN |
| TM-171 | 1.989E+01 | NOT IDENT. |
| LU-176 | 1.143E-02 | NOT IDENT. |
| HF-181 | 9.173E-02 | NOT IDENT. |
| TA-182 | 1.645E-01 | NOT IDENT. |
| RE-183 | 3.525E-01 | NOT IDENT. |
| RE-184 | 3.295E-01 | NOT IDENT. |
| W-188 | 1.023E+01 | FAIL ABUN |
| IR-192 | 4.305E-02 | FAIL ABUN |
| HG-203 | 6.975E-02 | NOT IDENT. |
| BI-207 | 2.105E-02 | NOT IDENT. |
| TL-208 | 2.095E-02 | NOT IDENT. |
| PB-210 | 3.845E+00 | NOT IDENT. |
| BI-211 | 1.537E-01 | NOT IDENT. |
| PB-211 | 5.201E-01 | NOT IDENT. |
| BI-212 | 2.512E-01 | NOT IDENT. |
| PB-212 | 4.021E-02 | FAIL ABUN |
| BI-214 | 5.309E-02 | NOT IDENT. |
| PB-214 | 5.711E-02 | FAIL ABUN |
| RN-219 | 2.939E-01 | NOT IDENT. |
| RN-222 | 5.309E-02 | NOT IDENT. |
| RA-223 | 4.438E-01 | FAIL ABUN |
| RA-226 | 5.309E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.456E-01 | FAIL ABUN |
| TH-227 | 1.456E-01 | FAIL ABUN |
| AC-228 | 7.101E-02 | FAIL ABUN |
| RA-228 | 7.101E-02 | FAIL ABUN |
| TH-228 | 4.021E-02 | FAIL ABUN |
| TH-229 | 2.627E-01 | NOT IDENT. |
| TH-230 | 5.308E-02 | NOT IDENT. |
| PA-231 | 7.711E-01 | NOT IDENT. |
| TH-231 | 4.438E-01 | FAIL ABUN |
| TH-232 | 7.101E-02 | FAIL ABUN |
| PA-233 | 4.456E-02 | NOT IDENT. |
| PA-234 | 1.455E-01 | NOT IDENT. |
| PA-234M | 2.770E+00 | NOT IDENT. |
| TH-234 | 1.497E+00 | FAIL ABUN |
| U-234 | 5.308E-02 | NOT IDENT. |
| NP-237 | 4.456E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.497E+00 | FAIL ABUN |
| NP-239 | 2.461E-01 | NOT IDENT. |
| PU-239 | 2.169E+02 | NOT IDENT. |
| AM-241 | 1.300E-01 | NOT IDENT. |
| AM-243 | 3.342E-02 | NOT IDENT. |
| CM-243 | 5.743E-02 | NOT IDENT. |
| CM-247 | 2.759E-02 | NOT IDENT. |
| CF-249 | 2.855E-02 | NOT IDENT. |
| CF-251 | 7.539E-02 | NOT IDENT. |
| ANH-511 | 4.530E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:07:53.36

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147012.CNF;1  *
* Acquisition date :  7-FEB-2014 09:06:12 Sensitivity     : 3.000           *
* Detector ID      : GAM33                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:25:00 Nuclide Library : SOLID           *
* Sample ID        : G341147012           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3152E+02 GRAM *
*                                         Quantity Err(%) : 1.5207E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 23-AUG-2013 07:35:09 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_500MLMB.CNF;5         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| NB-95M | 2.552E-01 | 1.981E-01 | 1.981E-01 |
| SN-113 | 1.283E-01 | 7.852E-02 | 7.852E-02 |
| CE-141 | 2.324E-01 | 4.187E-01 | 4.187E-01 |
| RA-224 | 3.178E-01 | 5.057E-01 | 5.057E-01 |
| U-235 | 1.530E-01 | 2.570E-01 | 2.570E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 1.164E-01 | 5.829E-01 | 5.853E-01 | NOT IDENT. |
| NA-22 | -2.564E-02 | 2.591E-02 | 2.837E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 3.457E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.248E-04 | 2.257E-02 | 2.257E-02 | NOT IDENT. |
| K-40 | -8.954E-02 | 3.761E-01 | 3.782E-01 | NOT IDENT. |
| SC-46 | -3.227E-02 | 5.058E-02 | 5.263E-02 | NOT IDENT. |
| V-48 | -1.921E-01 | 9.636E-01 | 9.675E-01 | NOT IDENT. |
| CR-51 | -2.761E-01 | 1.814E+00 | 1.818E+00 | NOT IDENT. |
| MN-54 | 1.071E-02 | 2.714E-02 | 2.757E-02 | NOT IDENT. |
| CO-56 | 3.869E-02 | 6.182E-02 | 6.423E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.569E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -4.446E-03 | 2.304E-02 | 2.313E-02 | NOT IDENT. |
| CO-58 | -2.164E-02 | 5.586E-02 | 5.670E-02 | NOT IDENT. |
| FE-59 | 4.132E-02 | 1.540E-01 | 1.552E-01 | NOT IDENT. |
| CO-60 | 5.278E-03 | 1.965E-02 | 1.979E-02 | NOT IDENT. |
| ZN-65 | -7.049E-02 | 9.283E-02 | 9.812E-02 | NOT IDENT. |
| GE-68 | -3.562E-01 | 9.168E-01 | 9.307E-01 | NOT IDENT. |
| AS-73 | 2.657E-01 | 1.993E+00 | 1.997E+00 | NOT IDENT. |
| AS-74 | -5.138E-01 | 1.465E+00 | 1.483E+00 | NOT IDENT. |
| SE-75 | -8.322E-04 | 5.041E-02 | 5.041E-02 | NOT IDENT. |
| BR-77 | 1.765E+10 | 6.128E+10 | 6.179E+10 | SHORT HLIF |
| SR-82 | 1.227E+00 | 1.826E+00 | 1.908E+00 | NOT IDENT. |
| RB-83 | -6.725E-02 | 7.884E-02 | 8.446E-02 | NOT IDENT. |
| KR-85 | -1.333E+01 | 9.650E+00 | 1.137E+01 | NOT IDENT. |
| SR-85 | -1.585E-01 | 1.145E-01 | 1.350E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -8.150E+00 | 9.250E+00 | 9.953E+00 | NOT IDENT. |
| Y-88 | 5.540E-03 | 3.330E-02 | 3.340E-02 | NOT IDENT. |
| Y-91 | 3.413E+00 | 2.087E+01 | 2.093E+01 | NOT IDENT. |
| NB-94 | -1.169E-02 | 2.575E-02 | 2.629E-02 | NOT IDENT. |
| NB-95 | -2.123E-02 | 7.456E-02 | 7.517E-02 | NOT IDENT. |
| ZR-95 | 1.672E-02 | 6.137E-02 | 6.183E-02 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.264E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -2.577E+39 | 1.394E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -8.247E+08 | 2.057E+09 | 2.090E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.156E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.144E-03 | 2.263E-02 | 2.263E-02 | NOT IDENT. |
| RH-102 | 2.206E-02 | 4.074E-02 | 4.193E-02 | NOT IDENT. |
| RU-103 | -1.721E-03 | 1.199E-01 | 1.199E-01 | NOT IDENT. |
| RH-106 | 1.506E-01 | 2.726E-01 | 2.809E-01 | NOT IDENT. |
| RU-106 | 1.506E-01 | 2.726E-01 | 2.809E-01 | NOT IDENT. |
| AG-108M | 5.372E-03 | 2.142E-02 | 2.156E-02 | NOT IDENT. |
| CD-109 | 7.833E-03 | 6.783E-01 | 6.783E-01 | NOT IDENT. |
| AG-110M | -9.376E-04 | 3.989E-02 | 3.989E-02 | NOT IDENT. |
| CD-115 | 1.076E+11 | 1.859E+11 | 1.921E+11 | SHORT HLIF |
| SN-117M | -6.722E-01 | 1.927E+00 | 1.950E+00 | NOT IDENT. |
| TE-123M | -2.260E-02 | 3.109E-02 | 3.272E-02 | NOT IDENT. |
| SB-124 | 9.747E-02 | 1.435E-01 | 1.501E-01 | NOT IDENT. |
| SB-125 | 3.599E-02 | 7.411E-02 | 7.586E-02 | NOT IDENT. |
| TE-125M | 1.682E+00 | 1.721E+01 | 1.722E+01 | NOT IDENT. |
| I-126 | -9.194E+00 | 1.023E+01 | 1.104E+01 | NOT IDENT. |
| SB-126 | -2.474E+00 | 6.065E+00 | 6.167E+00 | NOT IDENT. |
| SN-126 | -1.981E-02 | 5.944E-02 | 6.010E-02 | FAIL ABUN |
| SB-127 | -3.320E+05 | 8.798E+05 | 8.924E+05 | SHORT HLIF |
| I-131 | -4.876E+01 | 5.882E+01 | 6.279E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 1.668E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | 2.634E+06 | 8.798E+06 | 8.878E+06 | SHORT HLIF |
| BA-133 | -2.420E-02 | 3.252E-02 | 3.430E-02 | NOT IDENT. |
| I-133 | -3.468E+29 | 1.879E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 8.303E-03 | 2.435E-02 | 2.463E-02 | NOT IDENT. |
| CS-135 | -5.915E-02 | 1.017E-01 | 1.051E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.784E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.263E+00 | 3.951E+00 | 3.992E+00 | NOT IDENT. |
| BA-137M | 9.476E-03 | 2.140E-02 | 2.182E-02 | NOT IDENT. |
| CS-137 | 1.001E-02 | 2.260E-02 | 2.305E-02 | NOT IDENT. |
| CE-139 | 2.988E-03 | 2.901E-02 | 2.904E-02 | NOT IDENT. |
| BA-140 | -4.678E-01 | 3.603E+00 | 3.609E+00 | NOT IDENT. |
| LA-140 | -4.678E-01 | 3.603E+00 | 3.609E+00 | NOT IDENT. |
| CE-143 | 6.254E+17 | 6.018E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 9.785E-02 | 1.417E-01 | 1.484E-01 | NOT IDENT. |
| PM-144 | -9.715E-03 | 3.026E-02 | 3.058E-02 | NOT IDENT. |
| PR-144 | -7.472E-01 | 2.359E+00 | 2.383E+00 | NOT IDENT. |
| PM-146 | 3.232E-03 | 2.517E-02 | 2.521E-02 | NOT IDENT. |
| ND-147 | -4.119E+00 | 5.033E+01 | 5.036E+01 | NOT IDENT. |
| PM-147 | -5.275E+01 | 6.019E+02 | 6.024E+02 | NOT IDENT. |
| PM-149 | -9.064E+11 | 1.530E+12 | 1.584E+12 | SHORT HLIF |
| EU-150 | -2.882E-02 | 2.411E-02 | 2.739E-02 | NOT IDENT. |
| EU-152 | -2.212E-02 | 6.389E-02 | 6.466E-02 | NOT IDENT. |
| GD-153 | -2.072E-02 | 8.867E-02 | 8.916E-02 | NOT IDENT. |
| EU-154 | -6.988E-02 | 7.061E-02 | 7.732E-02 | NOT IDENT. |
| EU-155 | -2.295E-03 | 7.408E-02 | 7.409E-02 | NOT IDENT. |
| TB-160 | -1.061E-01 | 2.024E-01 | 2.079E-01 | NOT IDENT. |
| HO-166M | 1.502E-02 | 4.341E-02 | 4.394E-02 | FAIL ABUN |
| TM-171 | 6.150E+00 | 2.216E+01 | 2.234E+01 | NOT IDENT. |
| LU-176 | -7.535E-03 | 1.481E-02 | 1.519E-02 | NOT IDENT. |
| HF-181 | -7.607E-02 | 1.244E-01 | 1.290E-01 | NOT IDENT. |
| TA-182 | -1.536E-02 | 2.042E-01 | 2.043E-01 | NOT IDENT. |
| RE-183 | -3.121E-01 | 4.488E-01 | 4.704E-01 | NOT IDENT. |
| RE-184 | 1.974E-01 | 3.407E-01 | 3.521E-01 | NOT IDENT. |
| W-188 | 6.659E+00 | 1.133E+01 | 1.172E+01 | FAIL ABUN |
| IR-192 | -3.104E-03 | 5.074E-02 | 5.076E-02 | FAIL ABUN |
| HG-203 | 2.894E-02 | 7.674E-02 | 7.784E-02 | NOT IDENT. |
| BI-207 | 6.333E-03 | 2.273E-02 | 2.291E-02 | NOT IDENT. |
| TL-208 | -1.859E-02 | 2.613E-02 | 2.744E-02 | NOT IDENT. |
| PB-210 | -9.764E-01 | 4.558E+00 | 4.579E+00 | NOT IDENT. |
| BI-211 | 2.428E-02 | 1.741E-01 | 1.745E-01 | NOT IDENT. |
| PB-211 | 3.109E-02 | 5.963E-01 | 5.965E-01 | NOT IDENT. |
| BI-212 | 1.790E-01 | 2.468E-01 | 2.596E-01 | NOT IDENT. |
| PB-212 | 2.178E-02 | 4.887E-02 | 4.984E-02 | FAIL ABUN |
| BI-214 | 3.191E-03 | 6.176E-02 | 6.177E-02 | NOT IDENT. |
| PB-214 | 3.152E-02 | 6.192E-02 | 6.353E-02 | FAIL ABUN |
| RN-219 | -2.490E-02 | 3.519E-01 | 3.520E-01 | NOT IDENT. |
| RN-222 | 3.191E-03 | 6.176E-02 | 6.177E-02 | NOT IDENT. |
| RA-223 | 3.197E-01 | 4.764E-01 | 4.977E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-226 | 3.191E-03 | 6.176E-02 | 6.177E-02 | NOT IDENT. |
| AC-227 | -1.745E-02 | 1.762E-01 | 1.764E-01 | FAIL ABUN |
| TH-227 | -1.745E-02 | 1.762E-01 | 1.764E-01 | FAIL ABUN |
| AC-228 | -1.809E-02 | 8.356E-02 | 8.396E-02 | FAIL ABUN |
| RA-228 | -1.809E-02 | 8.356E-02 | 8.396E-02 | FAIL ABUN |
| TH-228 | 2.178E-02 | 4.887E-02 | 4.984E-02 | FAIL ABUN |
| TH-229 | -3.467E-01 | 3.749E-01 | 4.061E-01 | NOT IDENT. |
| TH-230 | 3.191E-03 | 6.175E-02 | 6.177E-02 | NOT IDENT. |
| PA-231 | 1.672E-02 | 8.924E-01 | 8.924E-01 | NOT IDENT. |
| TH-231 | 3.197E-01 | 4.764E-01 | 4.977E-01 | FAIL ABUN |
| TH-232 | -1.809E-02 | 8.356E-02 | 8.396E-02 | FAIL ABUN |
| PA-233 | 2.454E-02 | 4.873E-02 | 4.997E-02 | NOT IDENT. |
| PA-234 | -2.405E-02 | 1.826E-01 | 1.829E-01 | NOT IDENT. |
| PA-234M | -1.241E+00 | 3.248E+00 | 3.295E+00 | NOT IDENT. |
| TH-234 | 2.867E-01 | 1.953E+00 | 1.957E+00 | FAIL ABUN |
| U-234 | 3.191E-03 | 6.175E-02 | 6.177E-02 | NOT IDENT. |
| NP-237 | 2.454E-02 | 4.873E-02 | 4.997E-02 | NOT IDENT. |
| NP-238 | 2.871E+11 | 7.187E+11 | 7.303E+11 | SHORT HLIF |
| U-238 | 2.867E-01 | 1.953E+00 | 1.957E+00 | FAIL ABUN |
| NP-239 | -1.654E-01 | 3.136E-01 | 3.223E-01 | NOT IDENT. |
| PU-239 | 2.022E+02 | 2.349E+02 | 2.520E+02 | NOT IDENT. |
| AM-241 | 4.421E-02 | 1.600E-01 | 1.613E-01 | NOT IDENT. |
| AM-243 | -2.486E-02 | 4.209E-02 | 4.355E-02 | NOT IDENT. |
| CM-243 | -1.014E-02 | 6.943E-02 | 6.958E-02 | NOT IDENT. |
| CM-247 | 1.701E-02 | 3.039E-02 | 3.134E-02 | NOT IDENT. |
| CF-249 | 2.565E-02 | 3.298E-02 | 3.495E-02 | NOT IDENT. |
| CF-251 | -1.284E-03 | 9.177E-02 | 9.177E-02 | NOT IDENT. |
| ANH-511 | -5.891E-02 | 4.720E-02 | 5.416E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 25.6290 | 94.67 | 98.7937 | 193.51 | 34.0731 |
| 45.60 | 19.7683 | 94.87 | 99.7883 | 197.03 | 24.2735 |
| 46.54 | 21.5453 | 97.43 | 32.7717 | 198.01 | 22.0903 |
| 49.72 | 0.0000 | 98.43 | 23.1736 | 201.83 | 36.5983 |
| 51.35 | 21.8330 | 98.44 | 23.1740 | 205.31 | 27.8280 |
| 52.39 | 21.0178 | 99.53 | 29.0225 | 210.85 | 16.7932 |
| 53.44 | 26.3447 | 100.11 | 28.0833 | 215.65 | 25.8762 |
| 57.36 | 0.0000 | 103.18 | 25.3106 | 222.11 | 19.2502 |
| 57.53 | 29.2827 | 103.37 | 24.3450 | 227.09 | 20.4825 |
| 57.98 | 32.8686 | 105.21 | 26.3741 | 227.38 | 23.9031 |
| 59.32 | 16.0428 | 105.31 | 26.3784 | 228.16 | 0.0000 |
| 59.54 | 22.7395 | 106.12 | 33.2621 | 228.18 | 23.9217 |
| 63.29 | 33.2911 | 109.28 | 27.5350 | 235.69 | 21.8004 |
| 63.58 | 33.3136 | 111.00 | 33.5286 | 235.96 | 21.8060 |
| 64.28 | 32.4660 | 111.76 | 0.0000 | 238.63 | 21.8611 |
| 66.73 | 36.7295 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 43.5813 | 117.23 | 38.8401 | 240.99 | 21.9096 |
| 67.75 | 33.8141 | 121.12 | 32.0597 | 242.00 | 15.5820 |
| 69.67 | 23.7344 | 121.22 | 34.0687 | 244.70 | 20.8281 |
| 70.83 | 24.7098 | 121.78 | 33.0947 | 252.40 | 0.0000 |
| 72.81 | 37.6826 | 122.06 | 33.1086 | 252.80 | 16.3201 |
| 72.87 | 37.6874 | 123.07 | 30.1447 | 254.15 | 0.0000 |
| 74.66 | 33.2170 | 127.23 | 28.3091 | 256.23 | 22.0499 |
| 74.82 | 32.3051 | 129.30 | 22.3102 | 260.90 | 0.0000 |
| 74.97 | 32.3153 | 131.20 | 29.4897 | 264.66 | 23.8557 |
| 77.11 | 30.6043 | 133.02 | 26.5081 | 268.22 | 23.9295 |
| 79.69 | 33.5621 | 133.52 | 16.3242 | 269.46 | 23.9554 |
| 80.12 | 31.7249 | 136.00 | 21.5007 | 271.23 | 23.9917 |
| 80.19 | 0.0000 | 136.47 | 24.5884 | 273.65 | 14.2468 |
| 80.57 | 33.6213 | 140.51 | 0.0000 | 276.40 | 19.9920 |
| 81.00 | 34.5849 | 143.76 | 31.0449 | 277.37 | 20.0084 |
| 81.07 | 33.6548 | 144.24 | 31.0648 | 277.60 | 21.4420 |
| 83.79 | 37.5948 | 145.44 | 28.0033 | 278.00 | 17.3635 |
| 85.43 | 37.7142 | 152.43 | 26.1688 | 279.20 | 16.1031 |
| 86.55 | 43.4643 | 153.25 | 28.2923 | 279.54 | 17.0025 |
| 86.79 | 45.3748 | 154.21 | 35.6712 | 280.46 | 13.4333 |
| 86.94 | 45.3877 | 156.02 | 32.5994 | 283.69 | 16.1636 |
| 87.09 | 42.5631 | 158.56 | 31.6495 | 284.31 | 0.0000 |
| 87.57 | 40.7084 | 159.00 | 33.7780 | 285.41 | 18.8845 |
| 88.03 | 37.9012 | 162.33 | 19.0794 | 285.90 | 0.0000 |
| 88.34 | 35.0789 | 163.33 | 21.2256 | 287.50 | 17.1152 |
| 88.47 | 35.0876 | 165.86 | 24.4852 | 290.67 | 17.5470 |
| 89.96 | 95.0953 | 176.31 | 35.5724 | 293.27 | 0.0000 |
| 91.11 | 64.8025 | 176.60 | 37.7411 | 295.22 | 28.1008 |
| 92.59 | 35.3558 | 177.52 | 28.0664 | 295.96 | 28.1179 |
| 93.35 | 28.7064 | 181.07 | 0.0000 | 298.58 | 11.6344 |
| 94.56 | 77.6765 | 184.41 | 22.8491 | 299.98 | 13.3458 |
| 94.65 | 98.7901 | 185.72 | 26.1519 | 300.09 | 13.3472 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 13.3474 | 497.08 | 14.4881 | 711.68 | 9.1592 |
| 301.36 | 23.6847 | 505.52 | 32.2280 | 720.70 | 8.2738 |
| 302.85 | 16.4163 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 10.0453 | 511.00 | 28.1519 | 722.78 | 7.3607 |
| 306.78 | 14.6377 | 514.00 | 62.6587 | 722.91 | 7.3611 |
| 308.46 | 21.0691 | 514.00 | 62.6587 | 723.31 | 8.2826 |
| 311.90 | 18.3701 | 520.40 | 11.5264 | 724.19 | 8.2854 |
| 316.51 | 19.3571 | 520.69 | 0.0000 | 727.33 | 2.7653 |
| 319.41 | 24.0191 | 522.65 | 0.0000 | 733.00 | 6.4671 |
| 320.08 | 20.3343 | 527.90 | 0.0000 | 735.93 | 7.3998 |
| 321.04 | 18.4991 | 529.59 | 12.6346 | 737.46 | 12.0320 |
| 323.87 | 16.6847 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 19.4856 | 531.02 | 11.5905 | 747.24 | 10.2207 |
| 328.76 | 24.1885 | 546.56 | 0.0000 | 748.06 | 4.6472 |
| 333.37 | 20.9108 | 552.55 | 9.5875 | 752.31 | 8.1463 |
| 333.97 | 29.8857 | 563.25 | 11.7808 | 753.82 | 7.7631 |
| 334.37 | 26.9051 | 569.33 | 9.6677 | 756.73 | 1.5544 |
| 338.28 | 11.9920 | 569.50 | 9.6685 | 756.80 | 1.5544 |
| 338.32 | 11.9924 | 569.70 | 9.6693 | 763.94 | 14.9641 |
| 340.48 | 15.0139 | 583.19 | 8.6514 | 765.81 | 11.2313 |
| 340.55 | 15.0146 | 584.27 | 10.8200 | 766.42 | 10.2977 |
| 344.28 | 16.9371 | 595.83 | 15.2313 | 766.84 | 10.2993 |
| 345.93 | 16.0151 | 600.60 | 15.2659 | 772.60 | 0.0000 |
| 351.06 | 21.7471 | 602.52 | 0.0000 | 776.52 | 5.6388 |
| 351.93 | 17.9760 | 602.73 | 17.4639 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 17.4805 | 778.90 | 11.2878 |
| 356.01 | 24.6694 | 609.32 | 12.0433 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 13.1444 | 785.37 | 4.7148 |
| 366.42 | 0.0000 | 614.28 | 19.7529 | 792.07 | 4.7269 |
| 375.05 | 14.4200 | 618.01 | 12.0920 | 794.95 | 1.8928 |
| 383.85 | 15.4719 | 620.36 | 14.3060 | 795.86 | 4.7336 |
| 388.16 | 12.4129 | 621.93 | 8.8098 | 801.95 | 8.5401 |
| 388.63 | 15.5208 | 630.19 | 0.0000 | 810.29 | 8.5665 |
| 391.69 | 10.6920 | 631.29 | 7.7415 | 810.45 | 8.5671 |
| 400.66 | 23.4639 | 633.25 | 9.9621 | 810.76 | 9.5200 |
| 401.81 | 23.4811 | 634.78 | 13.2920 | 815.77 | 8.5839 |
| 402.40 | 16.6387 | 635.95 | 12.1907 | 818.51 | 7.6379 |
| 404.85 | 17.6449 | 636.99 | 0.0000 | 832.01 | 8.6350 |
| 410.95 | 9.8407 | 645.85 | 15.5842 | 834.85 | 5.7627 |
| 413.71 | 10.8436 | 657.76 | 10.0712 | 835.71 | 5.7645 |
| 414.70 | 11.8367 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.9036 | 661.66 | 5.6047 | 846.75 | 0.0000 |
| 427.87 | 13.9222 | 664.57 | 0.0000 | 846.77 | 7.7166 |
| 433.94 | 12.9754 | 666.33 | 15.7248 | 856.80 | 5.8081 |
| 439.40 | 17.0236 | 666.50 | 13.4795 | 860.56 | 8.7238 |
| 453.88 | 6.4640 | 667.71 | 0.0000 | 871.09 | 12.6477 |
| 463.37 | 9.1401 | 677.62 | 7.2234 | 873.19 | 10.7097 |
| 468.07 | 12.2195 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 17.2823 | 879.38 | 10.7329 |
| 475.06 | 9.2010 | 696.49 | 14.5629 | 880.51 | 8.7849 |
| 476.78 | 10.2333 | 696.51 | 14.5629 | 883.24 | 5.8622 |
| 477.60 | 10.2379 | 697.00 | 12.7453 | 884.68 | 6.8426 |
| 482.18 | 19.5018 | 697.49 | 11.8371 | 889.28 | 9.7905 |
| 487.02 | 9.2626 | 702.65 | 15.5125 | 894.76 | 5.8854 |
| 492.35 | 0.0000 | 706.68 | 10.9685 | 898.04 | 8.8381 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 3.9351 | 1312.11 | 3.6922 | | |
| 911.20 | 2.9592 | 1332.49 | 1.8555 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.9574 | 1365.19 | 2.8055 | | |
| 937.49 | 2.9853 | 1368.63 | 0.0000 | | |
| 944.13 | 1.9945 | 1384.29 | 3.7580 | | |
| 946.00 | 5.9873 | 1408.01 | 2.8345 | | |
| 949.00 | 7.9908 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 6.6955 | | |
| 962.31 | 6.0190 | 1489.16 | 3.8507 | | |
| 964.08 | 2.0075 | 1505.03 | 6.7627 | | |
| 966.17 | 9.0398 | 1596.21 | 2.9564 | | |
| 968.97 | 9.0479 | 1620.50 | 6.9339 | | |
| 983.53 | 4.0400 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.0050 | | |
| 996.26 | 9.1266 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.0935 | 1764.49 | 1.0199 | | |
| 1004.73 | 13.2180 | 1770.23 | 1.0210 | | |
| 1021.30 | 0.0000 | 1771.35 | 1.0212 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0572 | | |
| 1037.84 | 3.0814 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.0340 | | |
| 1046.59 | 7.2092 | | | | |
| 1048.07 | 7.2126 | | | | |
| 1049.04 | 5.1533 | | | | |
| 1050.41 | 3.0932 | | | | |
| 1063.66 | 2.0703 | | | | |
| 1077.00 | 9.3533 | | | | |
| 1077.34 | 6.2361 | | | | |
| 1085.87 | 5.2100 | | | | |
| 1099.45 | 3.1383 | | | | |
| 1112.07 | 6.2994 | | | | |
| 1112.84 | 7.3510 | | | | |
| 1115.54 | 14.7137 | | | | |
| 1120.29 | 7.3667 | | | | |
| 1120.55 | 8.4195 | | | | |
| 1121.30 | 10.5269 | | | | |
| 1129.67 | 6.3311 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.4084 | | | | |
| 1177.95 | 6.4169 | | | | |
| 1189.05 | 6.4362 | | | | |
| 1204.77 | 2.1545 | | | | |
| 1221.41 | 7.5746 | | | | |
| 1231.02 | 4.3393 | | | | |
| 1235.36 | 5.4304 | | | | |
| 1238.28 | 2.1738 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.0964 | | | | |
| 1274.44 | 6.5830 | | | | |
| 1274.54 | 6.5830 | | | | |
| 1291.59 | 1.8366 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:10:48.73

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147013.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;375
                                        Background date  : 2-FEB-2014 16:26:46.
Sample date      : 7-NOV-2013 13:30:00. Acquisition date : 7-FEB-2014 09:10:24.
Sample ID        : G341147013           Sample quantity  : 1.11940E+02 GRAM
Detector name    : GAM11                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.25  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 101.86 | 18 | 28 | 1.30 | 203.81 | 200 | 8 | 5.00E-03 | 56.1 | |
| 2 | 0 | 181.95 | 19 | 18 | 1.46 | 364.07 | 361 | 7 | 5.28E-03 | 43.3 | |
| 3 | 0 | 201.79 | 16 | 32 | 0.60 | 403.77 | 397 | 10 | 4.37E-03 | 73.9 | |
| 4 | 0 | 283.48 | 13 | 16 | 0.86 | 567.24 | 564 | 8 | 3.59E-03 | 62.4 | |
| 5 | 0 | 307.47 | 8 | 16 | 0.52 | 615.24 | 612 | 7 | 2.12E-03 | 94.2 | |
| 6 | 0 | 310.65 | 12 | 13 | 0.50 | 621.60 | 618 | 8 | 3.41E-03 | 59.4 | |
| 7 | 0 | 352.71* | 3 | 23 | 1.32 | 705.75 | 701 | 7 | 7.56E-04 | 323.4 | |
| 8 | 0 | 432.51 | 8 | 6 | 1.71 | 865.42 | 856 | 11 | 2.22E-03 | 67.5 | |
| 9 | 0 | 511.18* | 8 | 20 | 1.98 | 1022.83 | 1015 | 16 | 2.19E-03 | 179.4 | |
| 10 | 0 | 517.21 | 12 | 6 | 1.52 | 1034.88 | 1031 | 8 | 3.42E-03 | 44.5 | |
| 11 | 0 | 539.23 | 11 | 2 | 1.11 | 1078.94 | 1074 | 10 | 3.00E-03 | 40.6 | |
| 12 | 0 | 582.81* | 8 | 0 | 1.24 | 1166.13 | 1160 | 12 | 2.32E-03 | 54.5 | |
| 13 | 0 | 608.64* | 23 | 7 | 2.01 | 1217.81 | 1210 | 14 | 6.53E-03 | 33.6 | |
| 14 | 0 | 619.34 | 12 | 6 | 0.80 | 1239.22 | 1235 | 7 | 3.21E-03 | 47.6 | |
| 15 | 0 | 675.85 | 9 | 8 | 1.53 | 1352.28 | 1344 | 12 | 2.42E-03 | 76.2 | |
| 16 | 0 | 695.49 | 4 | 13 | 0.56 | 1391.57 | 1384 | 10 | 1.09E-03 | 177.6 | |
| 17 | 0 | 697.16 | 8 | 1 | 1.32 | 1394.90 | 1393 | 5 | 2.25E-03 | 40.1 | |
| 18 | 0 | 719.70 | 13 | 0 | 1.24 | 1440.00 | 1435 | 10 | 3.61E-03 | 27.7 | |
| 19 | 0 | 847.01 | 9 | 0 | 1.48 | 1694.67 | 1690 | 8 | 2.50E-03 | 33.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:10:50

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147013.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:30:00 | Acquisition date | : 7-FEB-2014 09:10:24 |
| Sample ID | : G341147013 | Sample quantity | : 111.94 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA11 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.25  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PM-144 | 476.78 | ------ | 43.80 | 3.037E+00 | ------ Line Not Found | | ------ |
| | 618.01 | 12 | 98.00 | 2.504E+00 | 3.158E-02 | 3.764E-02 | 95.19 |
| | 696.49 | 8 | 99.49* | 2.288E+00 | 2.390E-02 | 2.848E-02 | 80.14 |
| PR-144 | 696.51 | 8 | 1.34* | 2.288E+00 | 1.774E+00 | 2.218E+00 | 80.14 |
| | 1489.16 | ------ | 0.28 | 1.224E+00 | ------ Line Not Found | | ------ |
| LU-176 | 88.34 | ------ | 14.50 | 5.372E+00 | ------ Line Not Found | | ------ |
| | 201.83 | 16 | 78.00 | 5.433E+00 | 2.493E-02 | 2.493E-02 | 147.82 |
| | 306.78 | 8 | 93.60* | 4.145E+00 | 1.318E-02 | 1.318E-02 | 188.35 |
| TL-208 | 277.37 | ------ | 6.60 | 4.448E+00 | ------ Line Not Found | | ------ |
| | 583.19 | 8 | 85.00* | 2.621E+00 | 2.519E-02 | 2.519E-02 | 108.98 |
| | 860.56 | ------ | 12.50 | 1.938E+00 | ------ Line Not Found | | ------ |
| PA-233 | 300.13 | ------ | 6.63 | 4.215E+00 | ------ Line Not Found | | ------ |
| | 311.90 | 12 | 38.50* | 4.116E+00 | 5.189E-02 | 5.189E-02 | 118.76 |
| | 340.48 | ------ | 4.45 | 3.861E+00 | ------ Line Not Found | | ------ |
| ANH-511 | 511.00 | 8 | 100.00* | 2.886E+00 | 1.834E-02 | 1.834E-02 | 358.79 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:10:51.13

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147013.CNF;1    *
* Acquisition date :  7-FEB-2014 09:10:24 Sensitivity     : 3.000          *
* Detector ID      : GAM11                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:30:00 Nuclide Library : SOLID          *
* Sample ID        : G341147013           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1194E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| PM-144 | 2.848E-02 | 2.236E-02 | 7.464E-02 |
| PR-144 | 2.218E+00 | 1.742E+00 | 5.815E+00 |
| LU-176 | 1.318E-02 | 2.433E-02 | 4.069E-02 |
| TL-208 | 2.519E-02 | 2.690E-02 | 4.090E-02 |
| PA-233 | 5.189E-02 | 6.040E-02 | 1.036E-01 |
| ANH-511 | 1.834E-02 | 6.448E-02 | 4.925E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 9.800E-01 | 7.760E-01 | 1.739E+00 | NOT IDENT. |
| NA-22 | 2.414E-02 | 3.777E-02 | 8.752E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.150E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -7.559E-04 | 3.221E-02 | 6.994E-02 | NOT IDENT. |
| K-40 | 3.913E-01 | 4.359E-01 | 1.048E+00 | NOT IDENT. |
| SC-46 | 3.939E-03 | 6.172E-02 | 1.250E-01 | NOT IDENT. |
| V-48 | -1.456E+00 | 1.568E+00 | 2.395E+00 | NOT IDENT. |
| CR-51 | -3.117E-01 | 2.089E+00 | 3.897E+00 | NOT IDENT. |
| MN-54 | 2.570E-02 | 3.842E-02 | 8.399E-02 | NOT IDENT. |
| CO-56 | 7.016E-02 | 4.584E-02 | 1.299E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | 6.533E+40 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.234E-02 | 2.560E-02 | 4.894E-02 | NOT IDENT. |
| CO-58 | -1.088E-02 | 6.894E-02 | 1.335E-01 | NOT IDENT. |
| FE-59 | 9.471E-02 | 1.935E-01 | 4.512E-01 | NOT IDENT. |
| CO-60 | 1.078E-02 | 2.828E-02 | 6.761E-02 | NOT IDENT. |
| ZN-65 | 1.648E-02 | 7.488E-02 | 1.652E-01 | NOT IDENT. |
| GE-68 | 1.458E-02 | 1.189E+00 | 2.402E+00 | NOT IDENT. |
| AS-73 | 7.694E-01 | 1.320E+00 | 2.635E+00 | NOT IDENT. |
| AS-74 | 1.131E+00 | 1.598E+00 | 3.489E+00 | NOT IDENT. |
| SE-75 | -2.772E-02 | 5.147E-02 | 9.194E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.490E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.035E+00 | 2.258E+00 | 4.103E+00 | NOT IDENT. |
| RB-83 | 2.546E-02 | 1.003E-01 | 1.857E-01 | NOT IDENT. |
| KR-85 | 1.550E+01 | 9.331E+00 | 1.697E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | 1.833E-01 | 1.107E-01 | 2.012E-01 | NOT IDENT. |
| RB-86 | 3.583E+00 | 1.068E+01 | 2.313E+01 | NOT IDENT. |
| Y-88 | -6.395E-02 | 5.606E-02 | 3.213E-02 | NOT IDENT. |
| Y-91 | -8.559E+00 | 3.125E+01 | 6.280E+01 | NOT IDENT. |
| NB-94 | -6.496E-03 | 2.686E-02 | 4.827E-02 | NOT IDENT. |
| NB-95 | -3.609E-02 | 8.998E-02 | 1.634E-01 | NOT IDENT. |
| NB-95M | 1.052E-01 | 2.480E-01 | 4.839E-01 | NOT IDENT. |
| ZR-95 | -6.806E-02 | 1.627E-01 | 2.950E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.259E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.091E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.707E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.312E-03 | 2.725E-02 | 5.018E-02 | NOT IDENT. |
| RH-102 | 1.455E-02 | 5.274E-02 | 1.080E-01 | FAIL ABUN |
| RU-103 | 6.993E-02 | 1.210E-01 | 2.565E-01 | NOT IDENT. |
| RH-106 | -6.670E-02 | 3.174E-01 | 5.283E-01 | NOT IDENT. |
| RU-106 | -6.670E-02 | 3.174E-01 | 5.283E-01 | NOT IDENT. |
| AG-108M | 1.821E-02 | 2.407E-02 | 4.269E-02 | FAIL ABUN |
| CD-109 | 3.989E-01 | 6.880E-01 | 1.327E+00 | NOT IDENT. |
| AG-110M | -3.109E-03 | 4.259E-02 | 8.650E-02 | FAIL ABUN |
| SN-113 | 3.845E-02 | 5.546E-02 | 1.174E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.112E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.785E-01 | 2.186E+00 | 3.972E+00 | NOT IDENT. |
| TE-123M | -6.152E-03 | 3.515E-02 | 6.193E-02 | NOT IDENT. |
| SB-124 | 5.307E-02 | 2.025E-01 | 4.661E-01 | NOT IDENT. |
| SB-125 | -3.386E-02 | 7.415E-02 | 1.104E-01 | NOT IDENT. |
| TE-125M | 3.177E+00 | 2.013E+01 | 3.730E+01 | NOT IDENT. |
| I-126 | -8.934E+00 | 1.171E+01 | 2.012E+01 | NOT IDENT. |
| SB-126 | 1.257E+01 | 6.836E+00 | 1.885E+01 | FAIL ABUN |
| SN-126 | -1.258E-02 | 6.327E-02 | 1.129E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 1.038E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 8.101E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.057E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.092E-02 | 5.007E-02 | 7.861E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.386E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.617E-03 | 2.944E-02 | 6.083E-02 | NOT IDENT. |
| CS-135 | 2.487E-02 | 1.254E-01 | 2.441E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.662E-01 | 5.446E+00 | 1.096E+01 | NOT IDENT. |
| BA-137M | 1.290E-03 | 3.450E-02 | 7.182E-02 | NOT IDENT. |
| CS-137 | 1.362E-03 | 3.645E-02 | 7.588E-02 | NOT IDENT. |
| CE-139 | -3.383E-02 | 3.994E-02 | 6.389E-02 | NOT IDENT. |
| BA-140 | -3.045E-01 | 4.972E+00 | 1.053E+01 | NOT IDENT. |
| LA-140 | -3.045E-01 | 4.972E+00 | 1.053E+01 | NOT IDENT. |
| CE-141 | -5.403E-02 | 2.769E-01 | 4.849E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.354E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.147E-02 | 1.687E-01 | 3.218E-01 | NOT IDENT. |
| PM-146 | -2.513E-02 | 3.631E-02 | 6.060E-02 | NOT IDENT. |
| ND-147 | -2.830E+01 | 5.975E+01 | 1.034E+02 | NOT IDENT. |
| PM-147 | -3.871E+01 | 6.498E+02 | 1.172E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.460E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 8.946E-03 | 2.063E-02 | 4.197E-02 | FAIL ABUN |
| EU-152 | 1.531E-02 | 8.663E-02 | 1.673E-01 | NOT IDENT. |
| GD-153 | -1.198E-02 | 9.481E-02 | 1.521E-01 | FAIL ABUN |
| EU-154 | 6.777E-02 | 1.034E-01 | 2.400E-01 | NOT IDENT. |
| EU-155 | 9.238E-03 | 8.050E-02 | 1.367E-01 | NOT IDENT. |
| TB-160 | -6.044E-02 | 1.774E-01 | 3.390E-01 | NOT IDENT. |
| HO-166M | -3.585E-02 | 4.584E-02 | 7.763E-02 | NOT IDENT. |
| TM-171 | 1.403E+01 | 1.545E+01 | 3.182E+01 | NOT IDENT. |
| HF-181 | -1.196E-01 | 1.251E-01 | 1.937E-01 | NOT IDENT. |
| TA-182 | 8.447E-03 | 1.804E-01 | 3.924E-01 | NOT IDENT. |
| RE-183 | 1.830E-01 | 2.693E-01 | 5.601E-01 | NOT IDENT. |
| RE-184 | 3.221E-01 | 3.863E-01 | 9.390E-01 | NOT IDENT. |
| W-188 | 1.839E+01 | 1.297E+01 | 2.853E+01 | NOT IDENT. |
| IR-192 | 3.273E-02 | 5.853E-02 | 1.171E-01 | FAIL ABUN |
| HG-203 | -4.966E-03 | 1.176E-01 | 1.943E-01 | NOT IDENT. |
| BI-207 | 7.052E-05 | 3.264E-02 | 7.212E-02 | NOT IDENT. |
| PB-210 | -5.274E-01 | 2.653E+00 | 4.966E+00 | NOT IDENT. |
| BI-211 | 1.287E-01 | 2.464E-01 | 4.401E-01 | NOT IDENT. |
| PB-211 | 7.090E-01 | 5.998E-01 | 1.324E+00 | NOT IDENT. |
| BI-212 | -1.782E-01 | 3.897E-01 | 6.931E-01 | NOT IDENT. |
| PB-212 | -3.559E-02 | 5.476E-02 | 9.938E-02 | NOT IDENT. |
| BI-214 | 1.366E-01 | 9.003E-02 | 1.565E-01 | FAIL ABUN |
| PB-214 | 1.361E-02 | 8.628E-02 | 1.542E-01 | FAIL ABUN |
| RN-219 | -1.852E-01 | 3.853E-01 | 6.725E-01 | NOT IDENT. |
| RN-222 | 1.366E-01 | 9.003E-02 | 1.565E-01 | FAIL ABUN |
| RA-223 | -2.431E-01 | 5.626E-01 | 1.003E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | -4.286E-01 | 5.277E-01 | 9.089E-01 | NOT IDENT. |
| RA-226 | 1.366E-01 | 9.003E-02 | 1.565E-01 | FAIL ABUN |
| AC-227 | -4.036E-03 | 2.122E-01 | 4.023E-01 | NOT IDENT. |
| TH-227 | -4.036E-03 | 2.122E-01 | 4.023E-01 | NOT IDENT. |
| AC-228 | -1.104E-02 | 1.018E-01 | 2.341E-01 | NOT IDENT. |
| RA-228 | -1.104E-02 | 1.018E-01 | 2.341E-01 | NOT IDENT. |
| TH-228 | -3.559E-02 | 5.476E-02 | 9.938E-02 | NOT IDENT. |
| TH-229 | 1.863E-01 | 4.565E-01 | 8.969E-01 | NOT IDENT. |
| TH-230 | 1.366E-01 | 9.002E-02 | 1.565E-01 | FAIL ABUN |
| PA-231 | 1.162E+00 | 1.422E+00 | 2.458E+00 | FAIL ABUN |
| TH-231 | -2.431E-01 | 5.626E-01 | 1.003E+00 | NOT IDENT. |
| TH-232 | -1.104E-02 | 1.018E-01 | 2.341E-01 | NOT IDENT. |
| PA-234 | 5.760E-03 | 2.204E-01 | 4.527E-01 | NOT IDENT. |
| PA-234M | 2.108E+00 | 4.571E+00 | 9.664E+00 | NOT IDENT. |
| TH-234 | -3.645E-01 | 1.134E+00 | 2.212E+00 | NOT IDENT. |
| U-234 | 1.366E-01 | 9.002E-02 | 1.565E-01 | FAIL ABUN |
| U-235 | -3.570E-02 | 1.731E-01 | 3.046E-01 | NOT IDENT. |
| NP-237 | 5.189E-02 | 6.040E-02 | 1.005E-01 | FAIL ABUN |
| NP-238 | 0.000E+00 | 1.386E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -3.645E-01 | 1.134E+00 | 2.212E+00 | NOT IDENT. |
| NP-239 | 7.965E-02 | 3.358E-01 | 6.257E-01 | NOT IDENT. |
| PU-239 | 1.603E+02 | 2.750E+02 | 5.227E+02 | NOT IDENT. |
| AM-241 | -5.021E-02 | 1.115E-01 | 1.990E-01 | NOT IDENT. |
| AM-243 | -2.473E-02 | 4.649E-02 | 7.970E-02 | NOT IDENT. |
| CM-243 | 1.462E-02 | 8.530E-02 | 1.450E-01 | NOT IDENT. |
| CM-247 | -3.035E-02 | 3.592E-02 | 5.899E-02 | NOT IDENT. |
| CF-249 | -1.756E-02 | 3.652E-02 | 6.398E-02 | NOT IDENT. |
| CF-251 | 3.514E-03 | 1.270E-01 | 2.017E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:10:46.93

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 92.69 | 41 | 42 | 1.06 | 185.45 | 181 | 8 | 1.14E-02 | 32.2 | |
| 2 | 0 | 101.86 | 18 | 28 | 1.30 | 203.81 | 200 | 8 | 5.00E-03 | 56.1 | |
| 3 | 0 | 181.95 | 19 | 18 | 1.46 | 364.07 | 361 | 7 | 5.28E-03 | 43.3 | |
| 4 | 0 | 185.95 | 31 | 49 | 0.65 | 372.07 | 368 | 11 | 8.48E-03 | 47.3 | |
| 5 | 0 | 201.79 | 16 | 32 | 0.60 | 403.77 | 397 | 10 | 4.37E-03 | 73.9 | |
| 6 | 0 | 283.48 | 13 | 16 | 0.86 | 567.24 | 564 | 8 | 3.59E-03 | 62.4 | |
| 7 | 0 | 307.47 | 8 | 16 | 0.52 | 615.24 | 612 | 7 | 2.12E-03 | 94.2 | |
| 8 | 0 | 310.65 | 12 | 13 | 0.50 | 621.60 | 618 | 8 | 3.41E-03 | 59.4 | |
| 9 | 0 | 352.71 | 9 | 23 | 1.32 | 705.75 | 701 | 7 | 2.54E-03 | 92.7 | |
| 10 | 0 | 432.51 | 8 | 6 | 1.71 | 865.42 | 856 | 11 | 2.22E-03 | 67.5 | |
| 11 | 0 | 511.18 | 86 | 20 | 1.98 | 1022.83 | 1015 | 16 | 2.40E-02 | 15.8 | |
| 12 | 0 | 517.21 | 12 | 6 | 1.52 | 1034.88 | 1031 | 8 | 3.42E-03 | 44.5 | |
| 13 | 0 | 539.23 | 11 | 2 | 1.11 | 1078.94 | 1074 | 10 | 3.00E-03 | 40.6 | |
| 14 | 0 | 582.81 | 16 | 0 | 1.24 | 1166.13 | 1160 | 12 | 4.44E-03 | 25.0 | |
| 15 | 0 | 608.64 | 27 | 7 | 2.01 | 1217.81 | 1210 | 14 | 7.50E-03 | 28.3 | |
| 16 | 0 | 619.34 | 12 | 6 | 0.80 | 1239.22 | 1235 | 7 | 3.21E-03 | 47.6 | |
| 17 | 0 | 675.85 | 9 | 8 | 1.53 | 1352.28 | 1344 | 12 | 2.42E-03 | 76.2 | |
| 18 | 0 | 695.49 | 4 | 13 | 0.56 | 1391.57 | 1384 | 10 | 1.09E-03 | 177.6 | |
| 19 | 0 | 697.16 | 8 | 1 | 1.32 | 1394.90 | 1393 | 5 | 2.25E-03 | 40.1 | |
| 20 | 0 | 719.70 | 13 | 0 | 1.24 | 1440.00 | 1435 | 10 | 3.61E-03 | 27.7 | |
| 21 | 0 | 847.01 | 9 | 0 | 1.48 | 1694.67 | 1690 | 8 | 2.50E-03 | 33.3 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:10:49.27

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PM-144 | 476.78 | ------ | 43.80 | 3.037E+00 | ------ Line Not Found | | ------ |
| | 618.01 | 12 | 98.00 | 2.504E+00 | 3.158E-02 | 3.764E-02 | 95.19 |
| | 696.49 | 8 | 99.49* | 2.288E+00 | 2.390E-02 | 2.848E-02 | 80.14 |
| PR-144 | 696.51 | 8 | 1.34* | 2.288E+00 | 1.774E+00 | 2.218E+00 | 80.14 |
| | 1489.16 | ------ | 0.28 | 1.224E+00 | ------ Line Not Found | | ------ |
| LU-176 | 88.34 | ------ | 14.50 | 5.372E+00 | ------ Line Not Found | | ------ |
| | 201.83 | 16 | 78.00 | 5.433E+00 | 2.493E-02 | 2.493E-02 | 147.82 |
| | 306.78 | 8 | 93.60* | 4.145E+00 | 1.318E-02 | 1.318E-02 | 188.35 |
| TL-208 | 277.37 | ------ | 6.60 | 4.448E+00 | ------ Line Not Found | | ------ |
| | 583.19 | 8 | 85.00* | 2.621E+00 | 2.519E-02 | 2.519E-02 | 108.98 |
| | 860.56 | ------ | 12.50 | 1.938E+00 | ------ Line Not Found | | ------ |
| PA-233 | 300.13 | ------ | 6.63 | 4.215E+00 | ------ Line Not Found | | ------ |
| | 311.90 | 12 | 38.50* | 4.116E+00 | 5.189E-02 | 5.189E-02 | 118.76 |
| | 340.48 | ------ | 4.45 | 3.861E+00 | ------ Line Not Found | | ------ |
| ANH-511 | 511.00 | 8 | 100.00* | 2.886E+00 | 1.834E-02 | 1.834E-02 | 358.79 |

Flag: "*" = Keyline

Sample ID : G341147013 Acquisition date : 7-FEB-2014 09:10:24

Total number of lines in spectrum 19
Number of unidentified lines 3
Number of lines tentatively identified by NID 16 84.21%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| PM-144 | 363.00D | 1.19 | 2.390E-02 | 2.848E-02 | 2.282E-02 | 80.14 | |
| PR-144 | 284.91D | 1.25 | 1.774E+00 | 2.218E+00 | 1.778E+00 | 80.14 | |
| LU-176 | 3.76E+10Y | 1.00 | 1.318E-02 | 1.318E-02 | 2.483E-02 | 188.35 | |
| TL-208 | 1.41E+10Y | 1.00 | 2.519E-02 | 2.519E-02 | 2.745E-02 | 108.98 | |
| PA-233 | 2.14E+06Y | 1.00 | 5.189E-02 | 5.189E-02 | 6.163E-02 | 118.76 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.834E-02 | 1.834E-02 | 6.580E-02 | 358.79 | |
| Total Activity : | | | 1.907E+00 | 2.356E+00 | | | |

Grand Total Activity : 1.907E+00 2.356E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147013 Acquisition date : 7-FEB-2014 09:10:24

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 101.86 | 18 | 28 | 1.30 | 203.81 | 200 | 8 | 5.00E-03 | **** | 6.00E+00 | T |
| 0 | 181.95 | 19 | 18 | 1.46 | 364.07 | 361 | 7 | 5.28E-03 | 86.6 | 5.74E+00 | T |
| 0 | 283.48 | 13 | 16 | 0.86 | 567.24 | 564 | 8 | 3.59E-03 | **** | 4.38E+00 | T |
| 0 | 352.71 | 3 | 23 | 1.32 | 705.75 | 701 | 7 | 7.56E-04 | **** | 3.77E+00 | T |
| 0 | 432.51 | 8 | 6 | 1.71 | 865.42 | 856 | 11 | 2.22E-03 | **** | 3.26E+00 | T |
| 0 | 517.21 | 12 | 6 | 1.52 | 1034.88 | 1031 | 8 | 3.42E-03 | 89.0 | 2.86E+00 | |
| 0 | 539.23 | 11 | 2 | 1.11 | 1078.94 | 1074 | 10 | 3.00E-03 | 81.2 | 2.78E+00 | |
| 0 | 608.64 | 23 | 7 | 2.01 | 1217.81 | 1210 | 14 | 6.53E-03 | 67.3 | 2.54E+00 | T |
| 0 | 675.85 | 9 | 8 | 1.53 | 1352.28 | 1344 | 12 | 2.42E-03 | **** | 2.34E+00 | |
| 0 | 695.49 | 4 | 13 | 0.56 | 1391.57 | 1384 | 10 | 1.09E-03 | **** | 2.29E+00 | T |
| 0 | 719.70 | 13 | 0 | 1.24 | 1440.00 | 1435 | 10 | 3.61E-03 | 55.5 | 2.23E+00 | T |
| 0 | 847.01 | 9 | 0 | 1.48 | 1694.67 | 1690 | 8 | 2.50E-03 | 66.7 | 1.96E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:11:03.41

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                           Charleston, SC 29407                        *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147013.CNF;1    *
* Acquisition date :  7-FEB-2014 09:10:24 Sensitivity     : 3.000          *
* Detector ID      : GAM11                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:30:00 Nuclide Library : SOLID          *
* Sample ID        : G341147013           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1194E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| PM-144 | 3.259E-02 |
| PR-144 | 2.539E+00 |
| LU-176 | 1.802E-02 |
| TL-208 | 1.638E-02 |
| PA-233 | 4.606E-02 |
| ANH-511 | 2.149E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.752E-01 | NOT IDENT. |
| NA-22 | 3.682E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.629E-02 | NOT IDENT. |
| K-40 | 4.557E-01 | NOT IDENT. |
| SC-46 | 5.225E-02 | NOT IDENT. |
| V-48 | 9.161E-01 | NOT IDENT. |
| CR-51 | 1.723E+00 | NOT IDENT. |
| MN-54 | 3.640E-02 | NOT IDENT. |
| CO-56 | 5.440E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.236E-02 | NOT IDENT. |
| CO-58 | 5.576E-02 | NOT IDENT. |
| FE-59 | 1.832E-01 | NOT IDENT. |
| CO-60 | 2.683E-02 | NOT IDENT. |
| ZN-65 | 6.775E-02 | NOT IDENT. |
| GE-68 | 9.797E-01 | NOT IDENT. |
| AS-73 | 1.200E+00 | NOT IDENT. |
| AS-74 | 1.530E+00 | NOT IDENT. |
| SE-75 | 4.028E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.700E+00 | NOT IDENT. |
| RB-83 | 7.804E-02 | NOT IDENT. |
| KR-85 | 7.750E+00 | NOT IDENT. |
| SR-85 | 9.185E-02 | NOT IDENT. |

| | | |
|---|---|---|
| RB-86 | 9.581E+00 | NOT IDENT. |
| Y-88 | 0.000E+00 | NOT IDENT. |
| Y-91 | 2.433E+01 | NOT IDENT. |
| NB-94 | 2.014E-02 | NOT IDENT. |
| NB-95 | 7.018E-02 | NOT IDENT. |
| NB-95M | 2.221E-01 | NOT IDENT. |
| ZR-95 | 1.265E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.288E-02 | NOT IDENT. |
| RH-102 | 4.714E-02 | FAIL ABUN |
| RU-103 | 1.112E-01 | NOT IDENT. |
| RH-106 | 2.208E-01 | NOT IDENT. |
| RU-106 | 2.208E-01 | NOT IDENT. |
| AG-108M | 1.827E-02 | FAIL ABUN |
| CD-109 | 6.113E-01 | NOT IDENT. |
| AG-110M | 3.476E-02 | FAIL ABUN |
| SN-113 | 5.177E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.801E+00 | NOT IDENT. |
| TE-123M | 2.794E-02 | NOT IDENT. |
| SB-124 | 1.833E-01 | NOT IDENT. |
| SB-125 | 4.531E-02 | NOT IDENT. |
| TE-125M | 1.701E+01 | NOT IDENT. |
| I-126 | 8.461E+00 | NOT IDENT. |
| SB-126 | 8.116E+00 | FAIL ABUN |
| SN-126 | 5.184E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.535E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.482E-02 | NOT IDENT. |
| CS-135 | 1.096E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.614E+00 | NOT IDENT. |
| BA-137M | 3.166E-02 | NOT IDENT. |
| CS-137 | 3.345E-02 | NOT IDENT. |
| CE-139 | 2.895E-02 | NOT IDENT. |
| BA-140 | 4.052E+00 | NOT IDENT. |
| LA-140 | 4.052E+00 | NOT IDENT. |
| CE-141 | 2.212E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.448E-01 | NOT IDENT. |
| PM-146 | 2.573E-02 | NOT IDENT. |
| ND-147 | 4.359E+01 | NOT IDENT. |
| PM-147 | 5.323E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.857E-02 | FAIL ABUN |
| EU-152 | 7.468E-02 | NOT IDENT. |
| GD-153 | 6.911E-02 | FAIL ABUN |
| EU-154 | 1.011E-01 | NOT IDENT. |
| EU-155 | 6.104E-02 | NOT IDENT. |
| TB-160 | 1.313E-01 | NOT IDENT. |
| HO-166M | 3.137E-02 | NOT IDENT. |
| TM-171 | 1.453E+01 | NOT IDENT. |
| HF-181 | 8.006E-02 | NOT IDENT. |
| TA-182 | 1.557E-01 | NOT IDENT. |
| RE-183 | 2.507E-01 | NOT IDENT. |
| RE-184 | 3.924E-01 | NOT IDENT. |
| W-188 | 1.297E+01 | NOT IDENT. |
| IR-192 | 5.219E-02 | FAIL ABUN |
| HG-203 | 8.736E-02 | NOT IDENT. |
| BI-207 | 2.855E-02 | NOT IDENT. |
| PB-210 | 2.238E+00 | NOT IDENT. |
| BI-211 | 2.015E-01 | NOT IDENT. |
| PB-211 | 5.920E-01 | NOT IDENT. |
| BI-212 | 2.852E-01 | NOT IDENT. |
| PB-212 | 4.547E-02 | NOT IDENT. |
| BI-214 | 7.043E-02 | FAIL ABUN |
| PB-214 | 7.038E-02 | FAIL ABUN |
| RN-219 | 2.963E-01 | NOT IDENT. |
| RN-222 | 7.043E-02 | FAIL ABUN |
| RA-223 | 4.448E-01 | NOT IDENT. |
| RA-224 | 4.093E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 7.043E-02 | FAIL ABUN |
| AC-227 | 1.809E-01 | NOT IDENT. |
| TH-227 | 1.809E-01 | NOT IDENT. |
| AC-228 | 9.807E-02 | NOT IDENT. |
| RA-228 | 9.807E-02 | NOT IDENT. |
| TH-228 | 4.547E-02 | NOT IDENT. |
| TH-229 | 4.116E-01 | NOT IDENT. |
| TH-230 | 7.042E-02 | FAIL ABUN |
| PA-231 | 1.108E+00 | FAIL ABUN |
| TH-231 | 4.448E-01 | NOT IDENT. |
| TH-232 | 9.807E-02 | NOT IDENT. |
| PA-234 | 1.843E-01 | NOT IDENT. |
| PA-234M | 4.202E+00 | NOT IDENT. |
| TH-234 | 1.022E+00 | NOT IDENT. |
| U-234 | 7.042E-02 | FAIL ABUN |
| U-235 | 1.391E-01 | NOT IDENT. |
| NP-237 | 4.451E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.022E+00 | NOT IDENT. |
| NP-239 | 2.856E-01 | NOT IDENT. |
| PU-239 | 2.388E+02 | NOT IDENT. |
| AM-241 | 8.914E-02 | NOT IDENT. |
| AM-243 | 3.669E-02 | NOT IDENT. |
| CM-243 | 6.529E-02 | NOT IDENT. |
| CM-247 | 2.583E-02 | NOT IDENT. |
| CF-249 | 2.809E-02 | NOT IDENT. |
| CF-251 | 9.186E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:11:08.76

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147013.CNF;1    *
* Acquisition date :  7-FEB-2014 09:10:24 Sensitivity     : 3.000          *
* Detector ID      : GAM11                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.25     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:30:00 Nuclide Library : SOLID          *
* Sample ID        : G341147013           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.1194E+02 GRAM   *
*                                         Quantity Err(%) : 1.7867E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| PM-144 | 2.848E-02 | 2.250E-02 | 2.250E-02 |
| PR-144 | 2.218E+00 | 1.753E+00 | 1.753E+00 |
| LU-176 | 1.318E-02 | 2.435E-02 | 2.435E-02 |
| TL-208 | 2.519E-02 | 2.698E-02 | 2.698E-02 |
| PA-233 | 5.189E-02 | 6.054E-02 | 6.054E-02 |
| ANH-511 | 1.834E-02 | 6.450E-02 | 6.450E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 9.800E-01 | 7.803E-01 | 8.967E-01 | NOT IDENT. |
| NA-22 | 2.414E-02 | 3.783E-02 | 3.937E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 1.161E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -7.559E-04 | 3.221E-02 | 3.221E-02 | NOT IDENT. |
| K-40 | 3.913E-01 | 4.373E-01 | 4.715E-01 | NOT IDENT. |
| SC-46 | 3.939E-03 | 6.172E-02 | 6.175E-02 | NOT IDENT. |
| V-48 | -1.456E+00 | 1.581E+00 | 1.712E+00 | NOT IDENT. |
| CR-51 | -3.117E-01 | 2.089E+00 | 2.094E+00 | NOT IDENT. |
| MN-54 | 2.570E-02 | 3.853E-02 | 4.024E-02 | NOT IDENT. |
| CO-56 | 7.016E-02 | 4.655E-02 | 5.628E-02 | FAIL ABUN |
| MN-56 | 1.000E+41 | 6.634E+40 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.234E-02 | 2.562E-02 | 2.622E-02 | NOT IDENT. |
| CO-58 | -1.088E-02 | 6.895E-02 | 6.913E-02 | NOT IDENT. |
| FE-59 | 9.471E-02 | 1.942E-01 | 1.989E-01 | NOT IDENT. |
| CO-60 | 1.078E-02 | 2.829E-02 | 2.871E-02 | NOT IDENT. |
| ZN-65 | 1.648E-02 | 7.493E-02 | 7.530E-02 | NOT IDENT. |
| GE-68 | 1.458E-02 | 1.189E+00 | 1.189E+00 | NOT IDENT. |
| AS-73 | 7.694E-01 | 1.330E+00 | 1.374E+00 | NOT IDENT. |
| AS-74 | 1.131E+00 | 1.603E+00 | 1.682E+00 | NOT IDENT. |
| SE-75 | -2.772E-02 | 5.152E-02 | 5.301E-02 | NOT IDENT. |
| BR-77 | -3.767E+10 | 1.095E+11 | 1.108E+11 | SHORT HLIF |
| SR-82 | -1.035E+00 | 2.260E+00 | 2.308E+00 | NOT IDENT. |
| RB-83 | 2.546E-02 | 1.004E-01 | 1.011E-01 | NOT IDENT. |
| KR-85 | 1.550E+01 | 9.421E+00 | 1.173E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | 1.833E-01 | 1.117E-01 | 1.390E-01 | NOT IDENT. |
| RB-86 | 3.583E+00 | 1.070E+01 | 1.082E+01 | NOT IDENT. |
| Y-88 | -6.395E-02 | 5.628E-02 | 6.324E-02 | NOT IDENT. |
| Y-91 | -8.559E+00 | 3.126E+01 | 3.150E+01 | NOT IDENT. |
| NB-94 | -6.496E-03 | 2.687E-02 | 2.703E-02 | NOT IDENT. |
| NB-95 | -3.609E-02 | 9.005E-02 | 9.151E-02 | NOT IDENT. |
| NB-95M | 1.052E-01 | 2.482E-01 | 2.527E-01 | NOT IDENT. |
| ZR-95 | -6.806E-02 | 1.628E-01 | 1.657E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.261E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.197E+39 | 1.096E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 3.623E+08 | 2.707E+09 | 2.712E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 5.407E+42 | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.312E-03 | 2.726E-02 | 2.733E-02 | NOT IDENT. |
| RH-102 | 1.455E-02 | 5.276E-02 | 5.317E-02 | FAIL ABUN |
| RU-103 | 6.993E-02 | 1.211E-01 | 1.251E-01 | NOT IDENT. |
| RH-106 | -6.670E-02 | 3.175E-01 | 3.189E-01 | NOT IDENT. |
| RU-106 | -6.670E-02 | 3.175E-01 | 3.189E-01 | NOT IDENT. |
| AG-108M | 1.821E-02 | 2.412E-02 | 2.548E-02 | FAIL ABUN |
| CD-109 | 3.989E-01 | 6.893E-01 | 7.124E-01 | NOT IDENT. |
| AG-110M | -3.109E-03 | 4.259E-02 | 4.261E-02 | FAIL ABUN |
| SN-113 | 3.845E-02 | 5.555E-02 | 5.819E-02 | NOT IDENT. |
| CD-115 | 2.596E+11 | 2.130E+11 | 2.431E+11 | SHORT HLIF |
| SN-117M | 1.785E-01 | 2.186E+00 | 2.187E+00 | NOT IDENT. |
| TE-123M | -6.152E-03 | 3.516E-02 | 3.526E-02 | NOT IDENT. |
| SB-124 | 5.307E-02 | 2.026E-01 | 2.040E-01 | NOT IDENT. |
| SB-125 | -3.386E-02 | 7.420E-02 | 7.576E-02 | NOT IDENT. |
| TE-125M | 3.177E+00 | 2.013E+01 | 2.018E+01 | NOT IDENT. |
| I-126 | -8.934E+00 | 1.174E+01 | 1.242E+01 | NOT IDENT. |
| SB-126 | 1.257E+01 | 7.043E+00 | 9.041E+00 | FAIL ABUN |
| SN-126 | -1.258E-02 | 6.328E-02 | 6.354E-02 | NOT IDENT. |
| SB-127 | -3.127E+05 | 1.046E+06 | 1.056E+06 | SHORT HLIF |
| I-131 | -5.100E+01 | 8.112E+01 | 8.431E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 2.856E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.274E+06 | 1.057E+07 | 1.058E+07 | SHORT HLIF |
| BA-133 | -1.092E-02 | 5.008E-02 | 5.032E-02 | NOT IDENT. |
| I-133 | -3.327E+29 | 2.393E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.617E-03 | 2.944E-02 | 2.945E-02 | NOT IDENT. |
| CS-135 | 2.487E-02 | 1.254E-01 | 1.259E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 4.465E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.662E-01 | 5.447E+00 | 5.451E+00 | NOT IDENT. |
| BA-137M | 1.290E-03 | 3.450E-02 | 3.451E-02 | NOT IDENT. |
| CS-137 | 1.362E-03 | 3.645E-02 | 3.645E-02 | NOT IDENT. |
| CE-139 | -3.383E-02 | 4.058E-02 | 4.335E-02 | NOT IDENT. |
| BA-140 | -3.045E-01 | 4.972E+00 | 4.974E+00 | NOT IDENT. |
| LA-140 | -3.045E-01 | 4.972E+00 | 4.974E+00 | NOT IDENT. |
| CE-141 | -5.403E-02 | 2.769E-01 | 2.780E-01 | NOT IDENT. |
| CE-143 | -2.788E+18 | 6.358E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.147E-02 | 1.688E-01 | 1.704E-01 | NOT IDENT. |
| PM-146 | -2.513E-02 | 3.640E-02 | 3.812E-02 | NOT IDENT. |
| ND-147 | -2.830E+01 | 5.980E+01 | 6.115E+01 | NOT IDENT. |
| PM-147 | -3.871E+01 | 6.498E+02 | 6.500E+02 | NOT IDENT. |
| PM-149 | -3.271E+12 | 2.513E+12 | 2.914E+12 | SHORT HLIF |
| EU-150 | 8.946E-03 | 2.064E-02 | 2.103E-02 | FAIL ABUN |
| EU-152 | 1.531E-02 | 8.664E-02 | 8.692E-02 | NOT IDENT. |
| GD-153 | -1.198E-02 | 9.482E-02 | 9.497E-02 | FAIL ABUN |
| EU-154 | 6.777E-02 | 1.036E-01 | 1.080E-01 | NOT IDENT. |
| EU-155 | 9.238E-03 | 8.051E-02 | 8.061E-02 | NOT IDENT. |
| TB-160 | -6.044E-02 | 1.776E-01 | 1.797E-01 | NOT IDENT. |
| HO-166M | -3.585E-02 | 4.596E-02 | 4.872E-02 | NOT IDENT. |
| TM-171 | 1.403E+01 | 1.550E+01 | 1.674E+01 | NOT IDENT. |
| HF-181 | -1.196E-01 | 1.255E-01 | 1.366E-01 | NOT IDENT. |
| TA-182 | 8.447E-03 | 1.804E-01 | 1.804E-01 | NOT IDENT. |
| RE-183 | 1.830E-01 | 2.701E-01 | 2.824E-01 | NOT IDENT. |
| RE-184 | 3.221E-01 | 3.896E-01 | 4.158E-01 | NOT IDENT. |
| W-188 | 1.839E+01 | 1.318E+01 | 1.557E+01 | NOT IDENT. |
| IR-192 | 3.273E-02 | 5.858E-02 | 6.041E-02 | FAIL ABUN |
| HG-203 | -4.966E-03 | 1.176E-01 | 1.177E-01 | NOT IDENT. |
| BI-207 | 7.052E-05 | 3.264E-02 | 3.264E-02 | NOT IDENT. |
| PB-210 | -5.274E-01 | 2.654E+00 | 2.664E+00 | NOT IDENT. |
| BI-211 | 1.287E-01 | 2.466E-01 | 2.533E-01 | NOT IDENT. |
| PB-211 | 7.090E-01 | 6.030E-01 | 6.824E-01 | NOT IDENT. |
| BI-212 | -1.782E-01 | 3.901E-01 | 3.982E-01 | NOT IDENT. |
| PB-212 | -3.559E-02 | 5.484E-02 | 5.714E-02 | NOT IDENT. |
| BI-214 | 1.366E-01 | 9.073E-02 | 1.096E-01 | FAIL ABUN |
| PB-214 | 1.361E-02 | 8.629E-02 | 8.651E-02 | FAIL ABUN |
| RN-219 | -1.852E-01 | 3.862E-01 | 3.951E-01 | NOT IDENT. |
| RN-222 | 1.366E-01 | 9.073E-02 | 1.096E-01 | FAIL ABUN |
| RA-223 | -2.431E-01 | 5.631E-01 | 5.736E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | -4.286E-01 | 5.289E-01 | 5.631E-01 | NOT IDENT. |
| RA-226 | 1.366E-01 | 9.073E-02 | 1.096E-01 | FAIL ABUN |
| AC-227 | -4.036E-03 | 2.122E-01 | 2.122E-01 | NOT IDENT. |
| TH-227 | -4.036E-03 | 2.122E-01 | 2.122E-01 | NOT IDENT. |
| AC-228 | -1.104E-02 | 1.019E-01 | 1.020E-01 | NOT IDENT. |
| RA-228 | -1.104E-02 | 1.019E-01 | 1.020E-01 | NOT IDENT. |
| TH-228 | -3.559E-02 | 5.484E-02 | 5.714E-02 | NOT IDENT. |
| TH-229 | 1.863E-01 | 4.567E-01 | 4.644E-01 | NOT IDENT. |
| TH-230 | 1.366E-01 | 9.072E-02 | 1.096E-01 | FAIL ABUN |
| PA-231 | 1.162E+00 | 1.425E+00 | 1.518E+00 | FAIL ABUN |
| TH-231 | -2.431E-01 | 5.631E-01 | 5.736E-01 | NOT IDENT. |
| TH-232 | -1.104E-02 | 1.019E-01 | 1.020E-01 | NOT IDENT. |
| PA-234 | 5.760E-03 | 2.205E-01 | 2.205E-01 | NOT IDENT. |
| PA-234M | 2.108E+00 | 4.582E+00 | 4.679E+00 | NOT IDENT. |
| TH-234 | -3.645E-01 | 1.137E+00 | 1.148E+00 | NOT IDENT. |
| U-234 | 1.366E-01 | 9.072E-02 | 1.096E-01 | FAIL ABUN |
| U-235 | -3.570E-02 | 1.731E-01 | 1.739E-01 | NOT IDENT. |
| NP-237 | 5.189E-02 | 6.054E-02 | 6.490E-02 | FAIL ABUN |
| NP-238 | -7.066E+11 | 1.390E+12 | 1.426E+12 | SHORT HLIF |
| U-238 | -3.645E-01 | 1.137E+00 | 1.148E+00 | NOT IDENT. |
| NP-239 | 7.965E-02 | 3.359E-01 | 3.379E-01 | NOT IDENT. |
| PU-239 | 1.603E+02 | 2.753E+02 | 2.846E+02 | NOT IDENT. |
| AM-241 | -5.021E-02 | 1.116E-01 | 1.139E-01 | NOT IDENT. |
| AM-243 | -2.473E-02 | 4.653E-02 | 4.785E-02 | NOT IDENT. |
| CM-243 | 1.462E-02 | 8.531E-02 | 8.557E-02 | NOT IDENT. |
| CM-247 | -3.035E-02 | 3.634E-02 | 3.883E-02 | NOT IDENT. |
| CF-249 | -1.756E-02 | 3.656E-02 | 3.741E-02 | NOT IDENT. |
| CF-251 | 3.514E-03 | 1.270E-01 | 1.271E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

## GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 31.1687 | 94.67 | 68.6037 | 193.51 | 35.0113 |
| 45.60 | 30.4272 | 94.87 | 69.6515 | 197.03 | 43.5744 |
| 46.54 | 22.1857 | 97.43 | 35.4921 | 198.01 | 43.6187 |
| 49.72 | 0.0000 | 98.43 | 32.4603 | 201.83 | 29.6648 |
| 51.35 | 29.9577 | 98.44 | 32.4608 | 205.31 | 32.6051 |
| 52.39 | 23.4662 | 99.53 | 27.8742 | 210.85 | 33.8556 |
| 53.44 | 26.3513 | 100.11 | 31.0011 | 215.65 | 33.1208 |
| 57.36 | 0.0000 | 103.18 | 24.9260 | 222.11 | 33.3283 |
| 57.53 | 23.7630 | 103.37 | 24.9337 | 227.09 | 36.2012 |
| 57.98 | 16.1760 | 105.21 | 26.5707 | 227.38 | 39.8320 |
| 59.32 | 31.4993 | 105.31 | 21.8853 | 228.16 | 0.0000 |
| 59.54 | 31.5155 | 106.12 | 31.3051 | 228.18 | 36.2384 |
| 63.29 | 32.7490 | 109.28 | 33.5589 | 235.69 | 34.6668 |
| 63.58 | 32.7701 | 111.00 | 34.7001 | 235.96 | 33.7630 |
| 64.28 | 42.4743 | 111.76 | 0.0000 | 238.63 | 36.5895 |
| 66.73 | 41.7317 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 49.5502 | 117.23 | 32.9066 | 240.99 | 40.3346 |
| 67.75 | 50.5768 | 121.12 | 34.1632 | 242.00 | 33.0309 |
| 69.67 | 46.8770 | 121.22 | 34.1681 | 244.70 | 31.2714 |
| 70.83 | 31.3270 | 121.78 | 28.8528 | 252.40 | 0.0000 |
| 72.81 | 44.2335 | 122.06 | 29.9336 | 252.80 | 18.5269 |
| 72.87 | 44.2390 | 123.07 | 26.7654 | 254.15 | 0.0000 |
| 74.66 | 48.3460 | 127.23 | 33.3864 | 256.23 | 26.9440 |
| 74.82 | 47.3745 | 129.30 | 25.9226 | 260.90 | 0.0000 |
| 74.97 | 47.3889 | 131.20 | 34.6546 | 264.66 | 23.3952 |
| 77.11 | 41.6415 | 133.02 | 23.8848 | 268.22 | 23.4653 |
| 79.69 | 39.8582 | 133.52 | 22.8147 | 269.46 | 13.1541 |
| 80.12 | 38.8939 | 136.00 | 30.5219 | 271.23 | 24.4651 |
| 80.19 | 0.0000 | 136.47 | 43.6304 | 273.65 | 35.8279 |
| 80.57 | 32.9386 | 140.51 | 0.0000 | 276.40 | 18.8995 |
| 81.00 | 30.9677 | 143.76 | 33.0389 | 277.37 | 24.5888 |
| 81.07 | 30.9718 | 144.24 | 27.5495 | 277.60 | 26.4850 |
| 83.79 | 34.1434 | 145.44 | 39.7328 | 278.00 | 24.8715 |
| 85.43 | 42.3053 | 152.43 | 44.5398 | 279.20 | 27.2773 |
| 86.55 | 45.4200 | 153.25 | 36.7826 | 279.54 | 31.8322 |
| 86.79 | 49.4788 | 154.21 | 37.9425 | 280.46 | 27.3050 |
| 86.94 | 49.4925 | 156.02 | 19.0135 | 283.69 | 19.9618 |
| 87.09 | 49.5059 | 158.56 | 30.2915 | 284.31 | 0.0000 |
| 87.57 | 46.5154 | 159.00 | 31.4302 | 285.41 | 30.4600 |
| 88.03 | 35.4216 | 162.33 | 34.9371 | 285.90 | 0.0000 |
| 88.34 | 34.4287 | 163.33 | 38.3638 | 287.50 | 25.9341 |
| 88.47 | 34.4368 | 165.86 | 46.4003 | 290.67 | 14.3376 |
| 89.96 | 78.1973 | 176.31 | 44.6704 | 293.27 | 0.0000 |
| 91.11 | 39.6869 | 176.60 | 32.0813 | 295.22 | 23.0222 |
| 92.59 | 42.8509 | 177.52 | 34.4086 | 295.96 | 23.9952 |
| 93.35 | 40.8643 | 181.07 | 0.0000 | 298.58 | 18.2735 |
| 94.56 | 68.5908 | 184.41 | 41.6056 | 299.98 | 21.1816 |
| 94.65 | 68.6013 | 185.72 | 24.3045 | 300.09 | 23.1094 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 23.1097 | 497.08 | 8.7242 | 711.68 | 12.5115 |
| 301.36 | 25.0594 | 505.52 | 14.0207 | 720.70 | 4.8293 |
| 302.85 | 18.5265 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 15.4583 | 511.00 | 15.8181 | 722.78 | 3.2222 |
| 306.78 | 20.1306 | 514.00 | 8.8015 | 722.91 | 3.2224 |
| 308.46 | 23.2570 | 514.00 | 8.8015 | 723.31 | 4.8344 |
| 311.90 | 21.7625 | 520.40 | 7.0643 | 724.19 | 9.6721 |
| 316.51 | 15.5981 | 520.69 | 0.0000 | 727.33 | 6.7789 |
| 319.41 | 21.4934 | 522.65 | 0.0000 | 733.00 | 9.7056 |
| 320.08 | 21.5038 | 527.90 | 0.0000 | 735.93 | 7.7734 |
| 321.04 | 20.5411 | 529.59 | 11.0895 | 737.46 | 9.7224 |
| 323.87 | 26.4644 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 22.5662 | 531.02 | 14.4266 | 747.24 | 10.7352 |
| 328.76 | 15.7383 | 546.56 | 0.0000 | 748.06 | 10.7387 |
| 333.37 | 14.8034 | 552.55 | 12.3377 | 752.31 | 11.7340 |
| 333.97 | 14.8098 | 563.25 | 10.8234 | 753.82 | 8.8055 |
| 334.37 | 15.8015 | 569.33 | 10.8548 | 756.73 | 16.6514 |
| 338.28 | 20.7972 | 569.50 | 10.8557 | 756.80 | 16.6518 |
| 338.32 | 20.7975 | 569.70 | 10.8568 | 763.94 | 17.6792 |
| 340.48 | 22.8129 | 583.19 | 5.4630 | 765.81 | 16.7086 |
| 340.55 | 22.8140 | 584.27 | 9.1096 | 766.42 | 10.8142 |
| 344.28 | 20.8846 | 595.83 | 10.0743 | 766.84 | 10.8158 |
| 345.93 | 30.8647 | 600.60 | 17.2096 | 772.60 | 0.0000 |
| 351.06 | 23.9802 | 602.52 | 0.0000 | 776.52 | 11.8421 |
| 351.93 | 33.9922 | 602.73 | 12.2500 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 7.6632 | 778.90 | 9.8770 |
| 356.01 | 30.4775 | 609.32 | 18.4297 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 16.9015 | 785.37 | 9.9009 |
| 366.42 | 0.0000 | 614.28 | 4.6177 | 792.07 | 2.9776 |
| 375.05 | 18.2760 | 618.01 | 14.8016 | 794.95 | 5.9615 |
| 383.85 | 15.3170 | 620.36 | 6.1737 | 795.86 | 4.9696 |
| 388.16 | 23.5506 | 621.93 | 10.8116 | 801.95 | 9.9612 |
| 388.63 | 20.4852 | 630.19 | 0.0000 | 810.29 | 10.9906 |
| 391.69 | 11.2887 | 631.29 | 13.0276 | 810.45 | 9.9919 |
| 400.66 | 19.6085 | 633.25 | 15.8329 | 810.76 | 9.9932 |
| 401.81 | 24.7863 | 634.78 | 12.1158 | 815.77 | 11.0124 |
| 402.40 | 27.8948 | 635.95 | 11.1894 | 818.51 | 9.0189 |
| 404.85 | 10.3471 | 636.99 | 0.0000 | 832.01 | 10.0693 |
| 410.95 | 15.5788 | 645.85 | 10.3012 | 834.85 | 8.0635 |
| 413.71 | 18.7259 | 657.76 | 19.7665 | 835.71 | 9.0743 |
| 414.70 | 15.6143 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 16.7793 | 661.66 | 10.3710 | 846.75 | 0.0000 |
| 427.87 | 11.7510 | 664.57 | 0.0000 | 846.77 | 5.0608 |
| 433.94 | 11.7930 | 666.33 | 17.0042 | 856.80 | 6.0942 |
| 439.40 | 13.7318 | 666.50 | 17.0055 | 860.56 | 10.1699 |
| 453.88 | 18.1066 | 667.71 | 0.0000 | 871.09 | 7.1448 |
| 463.37 | 16.0618 | 677.62 | 11.0734 | 873.19 | 5.1071 |
| 468.07 | 15.0301 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 38.2383 | 879.38 | 6.1414 |
| 475.06 | 15.0880 | 696.49 | 15.9424 | 880.51 | 4.0958 |
| 476.78 | 14.0234 | 696.51 | 15.9424 | 883.24 | 7.1743 |
| 477.60 | 8.6335 | 697.00 | 14.3511 | 884.68 | 6.1523 |
| 482.18 | 17.3101 | 697.49 | 6.3796 | 889.28 | 8.2158 |
| 487.02 | 6.5082 | 702.65 | 10.7880 | 894.76 | 7.2020 |
| 492.35 | 0.0000 | 706.68 | 6.7235 | 898.04 | 7.2099 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 3.0954 | 1312.11 | 6.7576 | | |
| 911.20 | 3.1034 | 1332.49 | 2.9105 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 5.1982 | 1365.19 | 0.9778 | | |
| 937.49 | 5.2168 | 1368.63 | 0.0000 | | |
| 944.13 | 7.3191 | 1384.29 | 5.8933 | | |
| 946.00 | 6.2773 | 1408.01 | 3.9505 | | |
| 949.00 | 8.3777 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.9987 | | |
| 962.31 | 6.3098 | 1489.16 | 4.0236 | | |
| 964.08 | 13.6789 | 1505.03 | 2.0188 | | |
| 966.17 | 13.6878 | 1596.21 | 4.1169 | | |
| 968.97 | 8.4307 | 1620.50 | 3.1031 | | |
| 983.53 | 10.5862 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.1477 | | |
| 996.26 | 14.8788 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.4501 | 1764.49 | 2.1287 | | |
| 1004.73 | 9.5897 | 1770.23 | 5.3276 | | |
| 1021.30 | 0.0000 | 1771.35 | 3.1973 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.2198 | | |
| 1037.84 | 7.5332 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.3939 | | |
| 1046.59 | 8.6316 | | | | |
| 1048.07 | 7.5558 | | | | |
| 1049.04 | 5.3987 | | | | |
| 1050.41 | 3.2404 | | | | |
| 1063.66 | 2.1687 | | | | |
| 1077.00 | 5.4426 | | | | |
| 1077.34 | 6.5317 | | | | |
| 1085.87 | 3.2739 | | | | |
| 1099.45 | 3.2865 | | | | |
| 1112.07 | 4.3977 | | | | |
| 1112.84 | 5.4983 | | | | |
| 1115.54 | 5.5024 | | | | |
| 1120.29 | 8.2646 | | | | |
| 1120.55 | 8.2650 | | | | |
| 1121.30 | 6.4298 | | | | |
| 1129.67 | 4.6033 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 0.0000 | | | | |
| 1177.95 | 4.6641 | | | | |
| 1189.05 | 5.6135 | | | | |
| 1204.77 | 5.6370 | | | | |
| 1221.41 | 4.7178 | | | | |
| 1231.02 | 4.7296 | | | | |
| 1235.36 | 6.6289 | | | | |
| 1238.28 | 4.7384 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 8.6023 | | | | |
| 1274.44 | 4.7821 | | | | |
| 1274.54 | 4.7823 | | | | |
| 1291.59 | 3.8421 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:11:40.28

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147014.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM17.CNF;352
                                        Background date  : 2-FEB-2014 16:27:16.
Sample date      : 7-NOV-2013 13:35:00. Acquisition date : 7-FEB-2014 09:11:07.
Sample ID        : G341147014           Sample quantity  : 1.35030E+02 GRAM
Detector name    : GAM17                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:04.09  0.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.63* | 1 | 52 | 0.99 | 127.10 | 123 | 9 | 3.50E-04 | ***** | |
| 2 | 0 | 92.98* | 19 | 45 | 1.13 | 185.82 | 180 | 10 | 5.14E-03 | 82.4 | |
| 3 | 0 | 122.44 | 25 | 16 | 1.30 | 244.75 | 242 | 8 | 6.91E-03 | 35.3 | |
| 4 | 0 | 238.63* | 9 | 20 | 0.80 | 477.18 | 473 | 9 | 2.52E-03 | 112.3 | |
| 5 | 0 | 292.52 | 12 | 16 | 1.50 | 585.01 | 581 | 8 | 3.36E-03 | 64.0 | |
| 6 | 0 | 352.36* | 23 | 31 | 2.16 | 704.71 | 695 | 20 | 6.35E-03 | 64.3 | |
| 7 | 0 | 380.29 | 10 | 4 | 0.94 | 760.59 | 757 | 8 | 2.66E-03 | 49.0 | |
| 8 | 0 | 384.92 | 13 | 10 | 3.31 | 769.85 | 765 | 10 | 3.61E-03 | 53.3 | |
| 9 | 0 | 439.45 | 9 | 7 | 3.32 | 878.96 | 873 | 9 | 2.57E-03 | 60.4 | |
| 10 | 0 | 510.71* | 16 | 11 | 3.19 | 1021.52 | 1015 | 16 | 4.52E-03 | 75.8 | |
| 11 | 0 | 570.25* | 3 | 7 | 1.43 | 1140.67 | 1136 | 7 | 8.70E-04 | 164.2 | |
| 12 | 0 | 603.07 | 6 | 5 | 1.33 | 1206.32 | 1203 | 6 | 1.76E-03 | 66.7 | |
| 13 | 0 | 609.57* | 10 | 17 | 1.53 | 1219.34 | 1210 | 14 | 2.90E-03 | 94.6 | |
| 14 | 0 | 670.89* | 6 | 5 | 0.57 | 1342.03 | 1338 | 6 | 1.59E-03 | 78.4 | |
| 15 | 0 | 674.22 | 10 | 0 | 1.80 | 1348.70 | 1346 | 6 | 2.78E-03 | 31.6 | |
| 16 | 0 | 858.99 | 7 | 0 | 0.50 | 1718.43 | 1714 | 9 | 1.94E-03 | 37.8 | |
| 17 | 0 | 1460.64* | 4 | 4 | 0.77 | 2922.57 | 2916 | 9 | 1.03E-03 | 124.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:11:41

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147014.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:35:00 | Acquisition date | : 7-FEB-2014 09:11:07 |
| Sample ID | : G341147014 | Sample quantity | : 135.03 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA17 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:04.09  0.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 4 | 10.66* | 8.457E-01 | 2.284E-01 | 2.284E-01 | 248.69 |
| CO-57 | 122.06 | 25 | 85.60* | 6.167E+00 | 2.619E-02 | 3.310E-02 | 70.58 |
| | 136.47 | ------ | 10.68 | 5.899E+00 | ------ | Line Not Found | ------ |
| PM-147 | 121.22 | 25 | 0.00* | 6.167E+00 | 7.867E+02 | 8.407E+02 | 70.58 |
| BI-211 | 72.87 | ------ | 1.23 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 23 | 12.92* | 2.985E+00 | 3.294E-01 | 3.294E-01 | 128.51 |
| TH-234 | 63.29 | 1 | 3.70* | 6.028E+00 | 3.141E-02 | 3.141E-02 | 2368.03 |
| | 92.59 | 19 | 4.23 | 6.544E+00 | 3.716E-01 | 3.716E-01 | 164.74 |
| U-238 | 63.29 | 1 | 3.70* | 6.028E+00 | 3.141E-02 | 3.141E-02 | 2368.03 |
| | 92.59 | 19 | 4.23 | 6.544E+00 | 3.716E-01 | 3.716E-01 | 164.74 |
| ANH-511 | 511.00 | 16 | 100.00* | 2.150E+00 | 4.212E-02 | 4.212E-02 | 151.63 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:11:42.49

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147014.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:07 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.09     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341147014           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3503E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 2.284E-01 | 5.566E-01 | 9.903E-01 |
| CO-57 | 3.310E-02 | 2.290E-02 | 4.109E-02 |
| PM-147 | 8.407E+02 | 5.815E+02 | 9.026E+02 |
| BI-211 | 3.294E-01 | 4.148E-01 | 3.318E-01 |
| TH-234 | 3.141E-02 | 7.288E-01 | 7.786E-01 |
| U-238 | 3.141E-02 | 7.288E-01 | 7.786E-01 |
| ANH-511 | 4.212E-02 | 6.259E-02 | 5.082E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.321E-01 | 6.235E-01 | 1.344E+00 | NOT IDENT. |
| NA-22 | -1.453E-02 | 3.203E-02 | 5.844E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 6.533E+40 | 0.000E+00 | SHORT HLIF |
| AL-26 | -6.207E-04 | 3.205E-02 | 7.447E-02 | NOT IDENT. |
| SC-46 | -1.324E-02 | 5.054E-02 | 1.021E-01 | NOT IDENT. |
| V-48 | -2.577E-01 | 1.766E+00 | 3.514E+00 | NOT IDENT. |
| CR-51 | -3.118E-01 | 2.233E+00 | 4.246E+00 | NOT IDENT. |
| MN-54 | 4.379E-04 | 3.226E-02 | 6.831E-02 | NOT IDENT. |
| CO-56 | -4.075E-04 | 7.429E-02 | 1.509E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | 2.613E-02 | 6.505E-02 | 1.482E-01 | NOT IDENT. |
| FE-59 | -9.322E-02 | 2.380E-01 | 4.446E-01 | NOT IDENT. |
| CO-60 | 8.447E-03 | 3.942E-02 | 8.825E-02 | NOT IDENT. |
| ZN-65 | 2.202E-02 | 9.158E-02 | 1.980E-01 | NOT IDENT. |
| GE-68 | 4.301E-01 | 1.127E+00 | 2.641E+00 | NOT IDENT. |
| AS-73 | -1.232E-01 | 3.958E-01 | 6.676E-01 | NOT IDENT. |
| AS-74 | -1.340E+00 | 1.798E+00 | 2.959E+00 | NOT IDENT. |
| SE-75 | 4.689E-03 | 5.524E-02 | 1.025E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 4.996E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -8.880E-01 | 2.035E+00 | 3.872E+00 | NOT IDENT. |
| RB-83 | -6.350E-02 | 8.805E-02 | 1.474E-01 | NOT IDENT. |
| KR-85 | 4.317E+00 | 7.285E+00 | 1.385E+01 | NOT IDENT. |
| SR-85 | 5.094E-02 | 8.642E-02 | 1.642E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 5.808E+00 | 9.481E+00 | 2.379E+01 | NOT IDENT. |
| Y-88 | -1.322E-03 | 5.956E-02 | 1.380E-01 | NOT IDENT. |
| Y-91 | 9.917E-01 | 2.666E+01 | 6.180E+01 | NOT IDENT. |
| NB-94 | -1.808E-02 | 2.915E-02 | 4.856E-02 | NOT IDENT. |
| NB-95 | -1.769E-03 | 8.676E-02 | 1.749E-01 | NOT IDENT. |
| NB-95M | -3.388E-02 | 2.263E-01 | 3.592E-01 | NOT IDENT. |
| ZR-95 | -9.696E-02 | 1.259E-01 | 2.170E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.076E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.972E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 6.913E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.214E-02 | 2.099E-02 | 3.906E-02 | NOT IDENT. |
| RH-102 | 5.676E-03 | 5.302E-02 | 1.050E-01 | NOT IDENT. |
| RU-103 | 3.089E-03 | 1.474E-01 | 2.856E-01 | FAIL ABUN |
| RH-106 | 3.432E-02 | 2.746E-01 | 5.669E-01 | NOT IDENT. |
| RU-106 | 3.432E-02 | 2.746E-01 | 5.669E-01 | NOT IDENT. |
| AG-108M | 7.932E-03 | 2.698E-02 | 4.986E-02 | NOT IDENT. |
| CD-109 | 2.659E-01 | 5.133E-01 | 9.197E-01 | NOT IDENT. |
| AG-110M | 1.248E-02 | 4.911E-02 | 1.091E-01 | NOT IDENT. |
| SN-113 | 1.502E-02 | 6.072E-02 | 1.223E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.678E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.310E-01 | 1.705E+00 | 3.174E+00 | NOT IDENT. |
| TE-123M | -2.306E-02 | 2.948E-02 | 4.956E-02 | NOT IDENT. |
| SB-124 | -1.375E-01 | 1.950E-01 | 3.347E-01 | FAIL ABUN |
| SB-125 | 2.169E-02 | 8.115E-02 | 1.651E-01 | NOT IDENT. |
| TE-125M | 2.220E-01 | 1.511E+01 | 2.856E+01 | NOT IDENT. |
| I-126 | 9.490E+00 | 9.234E+00 | 2.250E+01 | NOT IDENT. |
| SB-126 | -6.488E+00 | 7.545E+00 | 1.268E+01 | NOT IDENT. |
| SN-126 | 6.932E-03 | 4.586E-02 | 7.871E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 8.901E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.132E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 8.268E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -9.617E-03 | 4.323E-02 | 7.062E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | 2.487E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.669E-03 | 4.052E-02 | 8.510E-02 | FAIL ABUN |
| CS-135 | -4.870E-03 | 1.155E-01 | 2.112E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 8.167E+40 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.045E+00 | 5.389E+00 | 9.502E+00 | NOT IDENT. |
| BA-137M | 1.947E-03 | 2.239E-02 | 4.759E-02 | NOT IDENT. |
| CS-137 | 2.056E-03 | 2.366E-02 | 5.028E-02 | NOT IDENT. |
| CE-139 | -3.054E-02 | 3.103E-02 | 5.046E-02 | NOT IDENT. |
| BA-140 | 3.752E+00 | 5.853E+00 | 1.487E+01 | NOT IDENT. |
| LA-140 | 3.752E+00 | 5.853E+00 | 1.487E+01 | NOT IDENT. |
| CE-141 | -1.410E-01 | 2.294E-01 | 4.050E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.803E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 8.103E-02 | 1.500E-01 | 2.999E-01 | NOT IDENT. |
| PM-144 | 2.201E-02 | 3.760E-02 | 8.019E-02 | NOT IDENT. |
| PR-144 | 1.727E+00 | 2.932E+00 | 6.256E+00 | NOT IDENT. |
| PM-146 | -2.144E-03 | 3.154E-02 | 6.233E-02 | NOT IDENT. |
| ND-147 | 3.389E+00 | 6.685E+01 | 1.307E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.107E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -2.208E-03 | 2.307E-02 | 4.419E-02 | FAIL ABUN |
| EU-152 | 5.321E-02 | 6.642E-02 | 1.438E-01 | FAIL ABUN |
| GD-153 | -1.316E-02 | 5.683E-02 | 1.008E-01 | NOT IDENT. |
| EU-154 | -4.085E-02 | 8.681E-02 | 1.572E-01 | FAIL ABUN |
| EU-155 | -2.258E-02 | 6.510E-02 | 1.186E-01 | NOT IDENT. |
| TB-160 | -9.217E-02 | 2.328E-01 | 4.404E-01 | NOT IDENT. |
| HO-166M | 2.424E-02 | 5.275E-02 | 1.165E-01 | NOT IDENT. |
| TM-171 | 1.882E-01 | 4.172E+00 | 7.392E+00 | NOT IDENT. |
| LU-176 | -5.932E-03 | 1.943E-02 | 3.677E-02 | NOT IDENT. |
| HF-181 | 3.833E-02 | 1.284E-01 | 2.652E-01 | NOT IDENT. |
| TA-182 | 1.026E-01 | 1.922E-01 | 4.744E-01 | NOT IDENT. |
| RE-183 | -6.635E-02 | 1.158E-01 | 1.873E-01 | NOT IDENT. |
| RE-184 | -4.971E-01 | 4.977E-01 | 7.709E-01 | NOT IDENT. |
| W-188 | -9.224E-01 | 1.376E+01 | 2.206E+01 | FAIL ABUN |
| IR-192 | 8.507E-03 | 5.799E-02 | 1.154E-01 | NOT IDENT. |
| HG-203 | -4.643E-02 | 9.700E-02 | 1.639E-01 | NOT IDENT. |
| BI-207 | 3.661E-02 | 5.233E-02 | 1.195E-01 | FAIL ABUN |
| TL-208 | -1.429E-02 | 3.803E-02 | 7.416E-02 | NOT IDENT. |
| PB-210 | -5.529E-01 | 5.795E-01 | 1.066E+00 | NOT IDENT. |
| PB-211 | 3.928E-01 | 5.524E-01 | 1.205E+00 | NOT IDENT. |
| BI-212 | 3.391E-01 | 3.547E-01 | 8.899E-01 | NOT IDENT. |
| PB-212 | 2.804E-02 | 6.174E-02 | 1.009E-01 | FAIL ABUN |
| BI-214 | 6.959E-02 | 1.290E-01 | 1.758E-01 | FAIL ABUN |
| PB-214 | 1.196E-01 | 1.506E-01 | 1.613E-01 | FAIL ABUN |
| RN-219 | -1.552E-01 | 3.416E-01 | 6.197E-01 | NOT IDENT. |
| RN-222 | 6.959E-02 | 1.290E-01 | 1.758E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | 1.789E-01 | 5.586E-01 | 1.121E+00 | NOT IDENT. |
| RA-224 | 9.298E-02 | 4.839E-01 | 8.231E-01 | NOT IDENT. |
| RA-226 | 6.959E-02 | 1.290E-01 | 1.758E-01 | FAIL ABUN |
| AC-227 | -2.813E-02 | 1.935E-01 | 3.482E-01 | NOT IDENT. |
| TH-227 | -2.813E-02 | 1.935E-01 | 3.482E-01 | NOT IDENT. |
| AC-228 | -3.851E-02 | 1.304E-01 | 2.727E-01 | NOT IDENT. |
| RA-228 | -3.851E-02 | 1.304E-01 | 2.727E-01 | NOT IDENT. |
| TH-228 | 2.804E-02 | 6.174E-02 | 1.009E-01 | FAIL ABUN |
| TH-229 | -1.734E-01 | 3.746E-01 | 6.506E-01 | NOT IDENT. |
| TH-230 | 6.959E-02 | 1.290E-01 | 1.758E-01 | FAIL ABUN |
| PA-231 | 2.212E-01 | 1.224E+00 | 2.285E+00 | NOT IDENT. |
| TH-231 | 1.789E-01 | 5.586E-01 | 1.121E+00 | NOT IDENT. |
| TH-232 | -3.851E-02 | 1.304E-01 | 2.727E-01 | NOT IDENT. |
| PA-233 | -3.233E-02 | 5.122E-02 | 9.182E-02 | NOT IDENT. |
| PA-234 | -2.584E-01 | 2.175E-01 | 2.742E-01 | FAIL ABUN |
| PA-234M | 1.733E+00 | 4.388E+00 | 9.511E+00 | NOT IDENT. |
| U-234 | 6.959E-02 | 1.290E-01 | 1.758E-01 | FAIL ABUN |
| U-235 | 5.683E-02 | 1.342E-01 | 2.666E-01 | FAIL ABUN |
| NP-237 | -3.233E-02 | 5.122E-02 | 9.182E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.316E+12 | 0.000E+00 | SHORT HLIF |
| NP-239 | -1.054E-01 | 2.578E-01 | 4.638E-01 | NOT IDENT. |
| PU-239 | -6.812E+01 | 2.010E+02 | 3.650E+02 | NOT IDENT. |
| AM-241 | -1.311E-02 | 4.989E-02 | 7.672E-02 | NOT IDENT. |
| AM-243 | -2.091E-02 | 2.255E-02 | 4.060E-02 | NOT IDENT. |
| CM-243 | -1.583E-02 | 5.847E-02 | 1.082E-01 | NOT IDENT. |
| CM-247 | 1.105E-02 | 2.907E-02 | 6.058E-02 | NOT IDENT. |
| CF-249 | 3.236E-03 | 3.750E-02 | 6.567E-02 | NOT IDENT. |
| CF-251 | -4.908E-02 | 9.117E-02 | 1.575E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:11:38.80

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.66 | 28 | 50 | 0.87 | 93.16 | 89 | 8 | 7.71E-03 | 48.1 | |
| 2 | 0 | 63.63 | 37 | 52 | 0.99 | 127.10 | 123 | 9 | 1.04E-02 | 38.9 | |
| 3 | 0 | 92.98 | 64 | 45 | 1.13 | 185.82 | 180 | 10 | 1.78E-02 | 23.2 | |
| 4 | 0 | 122.44 | 25 | 16 | 1.30 | 244.75 | 242 | 8 | 6.91E-03 | 35.3 | |
| 5 | 0 | 186.00 | 20 | 34 | 1.37 | 371.90 | 371 | 6 | 5.58E-03 | 55.9 | |
| 6 | 0 | 238.63 | 28 | 20 | 0.80 | 477.18 | 473 | 9 | 7.80E-03 | 34.5 | |
| 7 | 0 | 292.52 | 12 | 16 | 1.50 | 585.01 | 581 | 8 | 3.36E-03 | 64.0 | |
| 8 | 0 | 352.36 | 31 | 31 | 2.16 | 704.71 | 695 | 20 | 8.69E-03 | 46.5 | |
| 9 | 0 | 380.29 | 10 | 4 | 0.94 | 760.59 | 757 | 8 | 2.66E-03 | 49.0 | |
| 10 | 0 | 384.92 | 13 | 10 | 3.31 | 769.85 | 765 | 10 | 3.61E-03 | 53.3 | |
| 11 | 0 | 439.45 | 9 | 7 | 3.32 | 878.96 | 873 | 9 | 2.57E-03 | 60.4 | |
| 12 | 0 | 510.71 | 79 | 11 | 3.19 | 1021.52 | 1015 | 16 | 2.19E-02 | 14.9 | |
| 13 | 0 | 570.25 | 6 | 7 | 1.43 | 1140.67 | 1136 | 7 | 1.67E-03 | 83.7 | |
| 14 | 0 | 603.07 | 6 | 5 | 1.33 | 1206.32 | 1203 | 6 | 1.76E-03 | 66.7 | |
| 15 | 0 | 609.57 | 17 | 17 | 1.53 | 1219.34 | 1210 | 14 | 4.73E-03 | 57.3 | |
| 16 | 0 | 670.89 | 7 | 5 | 0.57 | 1342.03 | 1338 | 6 | 1.81E-03 | 64.8 | |
| 17 | 0 | 674.22 | 10 | 0 | 1.80 | 1348.70 | 1346 | 6 | 2.78E-03 | 31.6 | |
| 18 | 0 | 858.99 | 7 | 0 | 0.50 | 1718.43 | 1714 | 9 | 1.94E-03 | 37.8 | |
| 19 | 0 | 1460.64 | 6 | 4 | 0.77 | 2922.57 | 2916 | 9 | 1.67E-03 | 74.8 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:11:40.78

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 4 | 10.66* | 8.457E-01 | 2.284E-01 | 2.284E-01 | 248.69 |
| CO-57 | 122.06 | 25 | 85.60* | 6.167E+00 | 2.619E-02 | 3.310E-02 | 70.58 |
| | 136.47 | ------ | 10.68 | 5.899E+00 | ------ | Line Not Found | ------ |
| PM-147 | 121.22 | 25 | 0.00* | 6.167E+00 | 7.867E+02 | 8.407E+02 | 70.58 |
| BI-211 | 72.87 | ------ | 1.23 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 23 | 12.92* | 2.985E+00 | 3.294E-01 | 3.294E-01 | 128.51 |
| TH-234 | 63.29 | 1 | 3.70* | 6.028E+00 | 3.141E-02 | 3.141E-02 | 2368.03 |
| | 92.59 | 19 | 4.23 | 6.544E+00 | 3.716E-01 | 3.716E-01 | 164.74 |
| U-238 | 63.29 | 1 | 3.70* | 6.028E+00 | 3.141E-02 | 3.141E-02 | 2368.03 |
| | 92.59 | 19 | 4.23 | 6.544E+00 | 3.716E-01 | 3.716E-01 | 164.74 |
| ANH-511 | 511.00 | 16 | 100.00* | 2.150E+00 | 4.212E-02 | 4.212E-02 | 151.63 |

Flag: "*" = Keyline

Sample ID : G341147014 Acquisition date : 7-FEB-2014 09:11:07

Total number of lines in spectrum 17
Number of unidentified lines 4
Number of lines tentatively identified by NID 13 76.47%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 2.284E-01 | 2.284E-01 | 5.680E-01 | 248.69 | |
| CO-57 | 271.74D | 1.26 | 2.619E-02 | 3.310E-02 | 2.336E-02 | 70.58 | |
| PM-147 | 2.62Y | 1.07 | 7.867E+02 | 8.407E+02 | 5.933E+02 | 70.58 | |
| BI-211 | 7.04E+08Y | 1.00 | 3.294E-01 | 3.294E-01 | 4.233E-01 | 128.51 | |
| TH-234 | 4.47E+09Y | 1.00 | 3.141E-02 | 3.141E-02 | 74.37E-02 | 2368.03 | |
| U-238 | 4.47E+09Y | 1.00 | 3.141E-02 | 3.141E-02 | 74.37E-02 | 2368.03 | |
| ANH-511 | 1.00E+09Y | 1.00 | 4.212E-02 | 4.212E-02 | 6.387E-02 | 151.63 | |
| Total Activity : | | | 7.873E+02 | 8.414E+02 | | | |

Grand Total Activity : 7.873E+02 8.414E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147014 Acquisition date : 7-FEB-2014 09:11:07

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 238.63 | 9 | 20 | 0.80 | 477.18 | 473 | 9 | 2.52E-03 | **** | 4.13E+00 | T |
| 0 | 292.52 | 12 | 16 | 1.50 | 585.01 | 581 | 8 | 3.36E-03 | **** | 3.50E+00 | T |
| 0 | 380.29 | 10 | 4 | 0.94 | 760.59 | 757 | 8 | 2.66E-03 | 98.0 | 2.79E+00 | |
| 0 | 384.92 | 13 | 10 | 3.31 | 769.85 | 765 | 10 | 3.61E-03 | **** | 2.76E+00 | T |
| 0 | 439.45 | 9 | 7 | 3.32 | 878.96 | 873 | 9 | 2.57E-03 | **** | 2.46E+00 | T |
| 0 | 570.25 | 3 | 7 | 1.43 | 1140.67 | 1136 | 7 | 8.70E-04 | **** | 1.95E+00 | T |
| 0 | 603.07 | 6 | 5 | 1.33 | 1206.32 | 1203 | 6 | 1.76E-03 | **** | 1.85E+00 | T |
| 0 | 609.57 | 10 | 17 | 1.53 | 1219.34 | 1210 | 14 | 2.90E-03 | **** | 1.84E+00 | T |
| 0 | 670.89 | 6 | 5 | 0.57 | 1342.03 | 1338 | 6 | 1.59E-03 | **** | 1.69E+00 | |
| 0 | 674.22 | 10 | 0 | 1.80 | 1348.70 | 1346 | 6 | 2.78E-03 | 63.2 | 1.68E+00 | |
| 0 | 858.99 | 7 | 0 | 0.50 | 1718.43 | 1714 | 9 | 1.94E-03 | 75.6 | 1.35E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:11:53.57

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147014.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:07 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.09     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341147014           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3503E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 4.118E-01 |
| CO-57 | 1.876E-02 |
| PM-147 | 4.059E+02 |
| BI-211 | 1.465E-01 |
| TH-234 | 3.556E-01 |
| U-238 | 3.556E-01 |
| ANH-511 | 2.192E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 5.678E-01 | NOT IDENT. |
| NA-22 | 2.080E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.639E-02 | NOT IDENT. |
| SC-46 | 3.880E-02 | NOT IDENT. |
| V-48 | 1.420E+00 | NOT IDENT. |
| CR-51 | 1.891E+00 | NOT IDENT. |
| MN-54 | 2.751E-02 | NOT IDENT. |
| CO-56 | 6.297E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-58 | 6.107E-02 | NOT IDENT. |
| FE-59 | 1.712E-01 | NOT IDENT. |
| CO-60 | 3.567E-02 | NOT IDENT. |
| ZN-65 | 8.109E-02 | NOT IDENT. |
| GE-68 | 1.054E+00 | NOT IDENT. |
| AS-73 | 3.038E-01 | NOT IDENT. |
| AS-74 | 1.235E+00 | NOT IDENT. |
| SE-75 | 4.554E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.521E+00 | NOT IDENT. |
| RB-83 | 5.715E-02 | NOT IDENT. |
| KR-85 | 6.101E+00 | NOT IDENT. |
| SR-85 | 7.233E-02 | NOT IDENT. |
| RB-86 | 9.509E+00 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 4.889E-02 | NOT IDENT. |
| Y-91 | 2.235E+01 | NOT IDENT. |
| NB-94 | 1.963E-02 | NOT IDENT. |
| NB-95 | 7.390E-02 | NOT IDENT. |
| NB-95M | 1.600E-01 | NOT IDENT. |
| ZR-95 | 8.383E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.762E-02 | NOT IDENT. |
| RH-102 | 4.461E-02 | NOT IDENT. |
| RU-103 | 1.238E-01 | FAIL ABUN |
| RH-106 | 2.336E-01 | NOT IDENT. |
| RU-106 | 2.336E-01 | NOT IDENT. |
| AG-108M | 2.159E-02 | NOT IDENT. |
| CD-109 | 4.244E-01 | NOT IDENT. |
| AG-110M | 4.443E-02 | NOT IDENT. |
| SN-113 | 5.375E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.416E+00 | NOT IDENT. |
| TE-123M | 2.199E-02 | NOT IDENT. |
| SB-124 | 1.058E-01 | FAIL ABUN |
| SB-125 | 7.192E-02 | NOT IDENT. |
| TE-125M | 1.296E+01 | NOT IDENT. |
| I-126 | 9.398E+00 | NOT IDENT. |
| SB-126 | 4.812E+00 | NOT IDENT. |
| SN-126 | 3.627E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.116E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.595E-02 | FAIL ABUN |
| CS-135 | 9.314E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.708E+00 | NOT IDENT. |
| BA-137M | 1.887E-02 | NOT IDENT. |
| CS-137 | 1.993E-02 | NOT IDENT. |
| CE-139 | 2.243E-02 | NOT IDENT. |
| BA-140 | 5.946E+00 | NOT IDENT. |
| LA-140 | 5.946E+00 | NOT IDENT. |
| CE-141 | 1.833E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.358E-01 | NOT IDENT. |
| PM-144 | 3.458E-02 | NOT IDENT. |
| PR-144 | 2.698E+00 | NOT IDENT. |
| PM-146 | 2.617E-02 | NOT IDENT. |
| ND-147 | 5.624E+01 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.959E-02 | FAIL ABUN |
| EU-152 | 6.249E-02 | FAIL ABUN |
| GD-153 | 4.523E-02 | NOT IDENT. |
| EU-154 | 5.564E-02 | FAIL ABUN |
| EU-155 | 5.358E-02 | NOT IDENT. |
| TB-160 | 1.748E-01 | NOT IDENT. |
| HO-166M | 4.959E-02 | NOT IDENT. |
| TM-171 | 3.364E+00 | NOT IDENT. |
| LU-176 | 1.600E-02 | NOT IDENT. |
| HF-181 | 1.141E-01 | NOT IDENT. |
| TA-182 | 1.883E-01 | NOT IDENT. |
| RE-183 | 8.415E-02 | NOT IDENT. |
| RE-184 | 2.934E-01 | NOT IDENT. |
| W-188 | 9.709E+00 | FAIL ABUN |
| IR-192 | 5.112E-02 | NOT IDENT. |
| HG-203 | 7.204E-02 | NOT IDENT. |
| BI-207 | 5.070E-02 | FAIL ABUN |
| TL-208 | 3.246E-02 | NOT IDENT. |
| PB-210 | 4.951E-01 | NOT IDENT. |
| PB-211 | 5.272E-01 | NOT IDENT. |
| BI-212 | 3.732E-01 | NOT IDENT. |
| PB-212 | 4.628E-02 | FAIL ABUN |
| BI-214 | 7.892E-02 | FAIL ABUN |
| PB-214 | 7.360E-02 | FAIL ABUN |
| RN-219 | 2.671E-01 | NOT IDENT. |
| RN-222 | 7.892E-02 | FAIL ABUN |
| RA-223 | 5.018E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-224 | 3.669E-01 | NOT IDENT. |
| RA-226 | 7.892E-02 | FAIL ABUN |
| AC-227 | 1.538E-01 | NOT IDENT. |
| TH-227 | 1.538E-01 | NOT IDENT. |
| AC-228 | 1.137E-01 | NOT IDENT. |
| RA-228 | 1.137E-01 | NOT IDENT. |
| TH-228 | 4.628E-02 | FAIL ABUN |
| TH-229 | 2.900E-01 | NOT IDENT. |
| TH-230 | 7.892E-02 | FAIL ABUN |
| PA-231 | 1.020E+00 | NOT IDENT. |
| TH-231 | 5.018E-01 | NOT IDENT. |
| TH-232 | 1.137E-01 | NOT IDENT. |
| PA-233 | 4.003E-02 | NOT IDENT. |
| PA-234 | 8.668E-02 | FAIL ABUN |
| PA-234M | 4.000E+00 | NOT IDENT. |
| U-234 | 7.892E-02 | FAIL ABUN |
| U-235 | 1.214E-01 | FAIL ABUN |
| NP-237 | 4.003E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 2.092E-01 | NOT IDENT. |
| PU-239 | 1.628E+02 | NOT IDENT. |
| AM-241 | 3.476E-02 | NOT IDENT. |
| AM-243 | 1.856E-02 | NOT IDENT. |
| CM-243 | 4.849E-02 | NOT IDENT. |
| CM-247 | 2.637E-02 | NOT IDENT. |
| CF-249 | 2.869E-02 | NOT IDENT. |
| CF-251 | 7.026E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:11:58.64

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147014.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:07 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.09     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341147014           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3503E+02 GRAM   *
*                                         Quantity Err(%) : 1.4812E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 2.284E-01 | 5.571E-01 | 5.571E-01 |
| CO-57 | 3.310E-02 | 2.309E-02 | 2.309E-02 |
| PM-147 | 8.407E+02 | 5.863E+02 | 5.863E+02 |
| BI-211 | 3.294E-01 | 4.157E-01 | 4.157E-01 |
| TH-234 | 3.141E-02 | 7.289E-01 | 7.289E-01 |
| U-238 | 3.141E-02 | 7.289E-01 | 7.289E-01 |
| ANH-511 | 4.212E-02 | 6.269E-02 | 6.269E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.321E-01 | 6.238E-01 | 6.325E-01 | NOT IDENT. |
| NA-22 | -1.453E-02 | 3.206E-02 | 3.272E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 6.728E+40 | 0.000E+00 | SHORT HLIF |
| AL-26 | -6.207E-04 | 3.205E-02 | 3.205E-02 | NOT IDENT. |
| SC-46 | -1.324E-02 | 5.056E-02 | 5.091E-02 | NOT IDENT. |
| V-48 | -2.577E-01 | 1.766E+00 | 1.770E+00 | NOT IDENT. |
| CR-51 | -3.118E-01 | 2.233E+00 | 2.237E+00 | NOT IDENT. |
| MN-54 | 4.379E-04 | 3.226E-02 | 3.226E-02 | NOT IDENT. |
| CO-56 | -4.075E-04 | 7.429E-02 | 7.429E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 1.822E+43 | 0.000E+00 | SHORT HLIF |
| CO-58 | 2.613E-02 | 6.510E-02 | 6.615E-02 | NOT IDENT. |
| FE-59 | -9.322E-02 | 2.383E-01 | 2.420E-01 | NOT IDENT. |
| CO-60 | 8.447E-03 | 3.943E-02 | 3.961E-02 | NOT IDENT. |
| ZN-65 | 2.202E-02 | 9.162E-02 | 9.215E-02 | NOT IDENT. |
| GE-68 | 4.301E-01 | 1.128E+00 | 1.144E+00 | NOT IDENT. |
| AS-73 | -1.232E-01 | 3.967E-01 | 4.005E-01 | NOT IDENT. |
| AS-74 | -1.340E+00 | 1.804E+00 | 1.903E+00 | NOT IDENT. |
| SE-75 | 4.689E-03 | 5.524E-02 | 5.528E-02 | FAIL ABUN |
| BR-77 | 2.269E+10 | 7.820E+10 | 7.887E+10 | SHORT HLIF |
| SR-82 | -8.880E-01 | 2.036E+00 | 2.075E+00 | NOT IDENT. |
| RB-83 | -6.350E-02 | 8.861E-02 | 9.312E-02 | NOT IDENT. |
| KR-85 | 4.317E+00 | 7.295E+00 | 7.550E+00 | NOT IDENT. |
| SR-85 | 5.094E-02 | 8.653E-02 | 8.953E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | 5.808E+00 | 9.506E+00 | 9.860E+00 | NOT IDENT. |
| Y-88 | -1.322E-03 | 5.956E-02 | 5.957E-02 | NOT IDENT. |
| Y-91 | 9.917E-01 | 2.666E+01 | 2.666E+01 | NOT IDENT. |
| NB-94 | -1.808E-02 | 2.920E-02 | 3.031E-02 | NOT IDENT. |
| NB-95 | -1.769E-03 | 8.676E-02 | 8.676E-02 | NOT IDENT. |
| NB-95M | -3.388E-02 | 2.263E-01 | 2.268E-01 | NOT IDENT. |
| ZR-95 | -9.696E-02 | 1.262E-01 | 1.336E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.474E+43 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 2.277E+39 | 1.094E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -1.202E+09 | 2.975E+09 | 3.024E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 7.020E+40 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.214E-02 | 2.112E-02 | 2.182E-02 | NOT IDENT. |
| RH-102 | 5.676E-03 | 5.302E-02 | 5.308E-02 | NOT IDENT. |
| RU-103 | 3.089E-03 | 1.474E-01 | 1.474E-01 | FAIL ABUN |
| RH-106 | 3.432E-02 | 2.747E-01 | 2.751E-01 | NOT IDENT. |
| RU-106 | 3.432E-02 | 2.747E-01 | 2.751E-01 | NOT IDENT. |
| AG-108M | 7.932E-03 | 2.699E-02 | 2.723E-02 | NOT IDENT. |
| CD-109 | 2.659E-01 | 5.141E-01 | 5.279E-01 | NOT IDENT. |
| AG-110M | 1.248E-02 | 4.913E-02 | 4.945E-02 | NOT IDENT. |
| SN-113 | 1.502E-02 | 6.073E-02 | 6.111E-02 | NOT IDENT. |
| CD-115 | 1.219E+11 | 2.682E+11 | 2.737E+11 | SHORT HLIF |
| SN-117M | -1.310E-01 | 1.705E+00 | 1.706E+00 | NOT IDENT. |
| TE-123M | -2.306E-02 | 2.954E-02 | 3.131E-02 | NOT IDENT. |
| SB-124 | -1.375E-01 | 1.954E-01 | 2.050E-01 | FAIL ABUN |
| SB-125 | 2.169E-02 | 8.117E-02 | 8.176E-02 | NOT IDENT. |
| TE-125M | 2.220E-01 | 1.511E+01 | 1.511E+01 | NOT IDENT. |
| I-126 | 9.490E+00 | 9.286E+00 | 1.022E+01 | NOT IDENT. |
| SB-126 | -6.488E+00 | 7.596E+00 | 8.139E+00 | NOT IDENT. |
| SN-126 | 6.932E-03 | 4.586E-02 | 4.597E-02 | FAIL ABUN |
| SB-127 | 5.061E+05 | 9.163E+05 | 9.442E+05 | SHORT HLIF |
| I-131 | -6.003E+00 | 7.132E+01 | 7.137E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.024E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.718E+06 | 8.273E+06 | 8.309E+06 | SHORT HLIF |
| BA-133 | -9.617E-03 | 4.323E-02 | 4.345E-02 | FAIL ABUN |
| I-133 | 1.005E+30 | 2.550E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.669E-03 | 4.052E-02 | 4.067E-02 | FAIL ABUN |
| CS-135 | -4.870E-03 | 1.155E-01 | 1.155E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.232E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.045E+00 | 5.406E+00 | 5.577E+00 | NOT IDENT. |
| BA-137M | 1.947E-03 | 2.239E-02 | 2.241E-02 | NOT IDENT. |
| CS-137 | 2.056E-03 | 2.366E-02 | 2.368E-02 | NOT IDENT. |
| CE-139 | -3.054E-02 | 3.169E-02 | 3.455E-02 | NOT IDENT. |
| BA-140 | 3.752E+00 | 5.862E+00 | 6.101E+00 | NOT IDENT. |
| LA-140 | 3.752E+00 | 5.862E+00 | 6.101E+00 | NOT IDENT. |
| CE-141 | -1.410E-01 | 2.297E-01 | 2.383E-01 | NOT IDENT. |
| CE-143 | 5.425E+18 | 6.820E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 8.103E-02 | 1.502E-01 | 1.546E-01 | NOT IDENT. |
| PM-144 | 2.201E-02 | 3.765E-02 | 3.893E-02 | NOT IDENT. |
| PR-144 | 1.727E+00 | 2.936E+00 | 3.037E+00 | NOT IDENT. |
| PM-146 | -2.144E-03 | 3.154E-02 | 3.155E-02 | NOT IDENT. |
| ND-147 | 3.389E+00 | 6.685E+01 | 6.687E+01 | NOT IDENT. |
| PM-149 | -6.376E+11 | 2.109E+12 | 2.129E+12 | SHORT HLIF |
| EU-150 | -2.208E-03 | 2.307E-02 | 2.309E-02 | FAIL ABUN |
| EU-152 | 5.321E-02 | 6.659E-02 | 7.078E-02 | FAIL ABUN |
| GD-153 | -1.316E-02 | 5.684E-02 | 5.715E-02 | NOT IDENT. |
| EU-154 | -4.085E-02 | 8.689E-02 | 8.882E-02 | FAIL ABUN |
| EU-155 | -2.258E-02 | 6.514E-02 | 6.593E-02 | NOT IDENT. |
| TB-160 | -9.217E-02 | 2.330E-01 | 2.366E-01 | NOT IDENT. |
| HO-166M | 2.424E-02 | 5.280E-02 | 5.392E-02 | NOT IDENT. |
| TM-171 | 1.882E-01 | 4.172E+00 | 4.173E+00 | NOT IDENT. |
| LU-176 | -5.932E-03 | 1.944E-02 | 1.962E-02 | NOT IDENT. |
| HF-181 | 3.833E-02 | 1.284E-01 | 1.296E-01 | NOT IDENT. |
| TA-182 | 1.026E-01 | 1.925E-01 | 1.979E-01 | NOT IDENT. |
| RE-183 | -6.635E-02 | 1.160E-01 | 1.198E-01 | NOT IDENT. |
| RE-184 | -4.971E-01 | 5.023E-01 | 5.500E-01 | NOT IDENT. |
| W-188 | -9.224E-01 | 1.376E+01 | 1.376E+01 | FAIL ABUN |
| IR-192 | 8.507E-03 | 5.800E-02 | 5.812E-02 | NOT IDENT. |
| HG-203 | -4.643E-02 | 9.707E-02 | 9.931E-02 | NOT IDENT. |
| BI-207 | 3.661E-02 | 5.250E-02 | 5.504E-02 | FAIL ABUN |
| TL-208 | -1.429E-02 | 3.805E-02 | 3.859E-02 | NOT IDENT. |
| PB-210 | -5.529E-01 | 5.815E-01 | 6.327E-01 | NOT IDENT. |
| PB-211 | 3.928E-01 | 5.534E-01 | 5.811E-01 | NOT IDENT. |
| BI-212 | 3.391E-01 | 3.561E-01 | 3.875E-01 | NOT IDENT. |
| PB-212 | 2.804E-02 | 6.178E-02 | 6.306E-02 | FAIL ABUN |
| BI-214 | 6.959E-02 | 1.292E-01 | 1.329E-01 | FAIL ABUN |
| PB-214 | 1.196E-01 | 1.509E-01 | 1.602E-01 | FAIL ABUN |
| RN-219 | -1.552E-01 | 3.423E-01 | 3.494E-01 | NOT IDENT. |
| RN-222 | 6.959E-02 | 1.292E-01 | 1.329E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | 1.789E-01 | 5.588E-01 | 5.646E-01 | NOT IDENT. |
| RA-224 | 9.298E-02 | 4.839E-01 | 4.858E-01 | NOT IDENT. |
| RA-226 | 6.959E-02 | 1.292E-01 | 1.329E-01 | FAIL ABUN |
| AC-227 | -2.813E-02 | 1.936E-01 | 1.940E-01 | NOT IDENT. |
| TH-227 | -2.813E-02 | 1.936E-01 | 1.940E-01 | NOT IDENT. |
| AC-228 | -3.851E-02 | 1.305E-01 | 1.316E-01 | NOT IDENT. |
| RA-228 | -3.851E-02 | 1.305E-01 | 1.316E-01 | NOT IDENT. |
| TH-228 | 2.804E-02 | 6.178E-02 | 6.306E-02 | FAIL ABUN |
| TH-229 | -1.734E-01 | 3.749E-01 | 3.829E-01 | NOT IDENT. |
| TH-230 | 6.959E-02 | 1.292E-01 | 1.329E-01 | FAIL ABUN |
| PA-231 | 2.212E-01 | 1.224E+00 | 1.229E+00 | NOT IDENT. |
| TH-231 | 1.789E-01 | 5.588E-01 | 5.646E-01 | NOT IDENT. |
| TH-232 | -3.851E-02 | 1.305E-01 | 1.316E-01 | NOT IDENT. |
| PA-233 | -3.233E-02 | 5.130E-02 | 5.333E-02 | NOT IDENT. |
| PA-234 | -2.584E-01 | 3.678E-01 | 3.858E-01 | FAIL ABUN |
| PA-234M | 1.733E+00 | 4.392E+00 | 4.461E+00 | NOT IDENT. |
| U-234 | 6.959E-02 | 1.292E-01 | 1.329E-01 | FAIL ABUN |
| U-235 | 5.683E-02 | 1.343E-01 | 1.367E-01 | FAIL ABUN |
| NP-237 | -3.233E-02 | 5.130E-02 | 5.333E-02 | NOT IDENT. |
| NP-238 | 6.079E+11 | 1.318E+12 | 1.346E+12 | SHORT HLIF |
| NP-239 | -1.054E-01 | 2.581E-01 | 2.624E-01 | NOT IDENT. |
| PU-239 | -6.812E+01 | 2.011E+02 | 2.034E+02 | NOT IDENT. |
| AM-241 | -1.311E-02 | 4.990E-02 | 5.025E-02 | NOT IDENT. |
| AM-243 | -2.091E-02 | 2.262E-02 | 2.451E-02 | NOT IDENT. |
| CM-243 | -1.583E-02 | 5.850E-02 | 5.893E-02 | NOT IDENT. |
| CM-247 | 1.105E-02 | 2.914E-02 | 2.956E-02 | NOT IDENT. |
| CF-249 | 3.236E-03 | 3.750E-02 | 3.753E-02 | NOT IDENT. |
| CF-251 | -4.908E-02 | 9.139E-02 | 9.403E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 34.0157 | 94.67 | 34.9010 | 193.51 | 29.2778 |
| 45.60 | 40.1657 | 94.87 | 34.9155 | 197.03 | 26.2545 |
| 46.54 | 34.3675 | 97.43 | 29.1591 | 198.01 | 29.4401 |
| 49.72 | 0.0000 | 98.43 | 26.1520 | 201.83 | 14.7883 |
| 51.35 | 34.9068 | 98.44 | 26.1526 | 205.31 | 30.7603 |
| 52.39 | 28.9821 | 99.53 | 29.8250 | 210.85 | 26.6907 |
| 53.44 | 35.1332 | 100.11 | 28.0499 | 215.65 | 21.4709 |
| 57.36 | 0.0000 | 103.18 | 28.2200 | 222.11 | 25.9541 |
| 57.53 | 33.1114 | 103.37 | 29.1411 | 227.09 | 19.5734 |
| 57.98 | 35.6104 | 105.21 | 34.7286 | 227.38 | 22.8429 |
| 59.32 | 36.1584 | 105.31 | 34.7351 | 228.16 | 0.0000 |
| 59.54 | 36.1810 | 106.12 | 33.8738 | 228.18 | 21.7743 |
| 63.29 | 37.3916 | 109.28 | 32.2348 | 117.23 | 21.7743 |
| 63.58 | 37.4211 | 111.00 | 30.4904 | 235.69 | 24.6961 |
| 64.28 | 37.4922 | 111.76 | 0.0000 | 235.96 | 23.0563 |
| 66.73 | 23.9006 | 116.30 | 0.0000 | 238.63 | 23.1219 |
| 67.24 | 27.7113 | 117.23 | 34.5751 | 238.98 | 0.0000 |
| 67.75 | 35.3159 | 121.12 | 26.8153 | 240.99 | 19.8682 |
| 69.67 | 28.7313 | 121.22 | 26.8199 | 242.00 | 21.5469 |
| 70.83 | 28.8160 | 121.78 | 36.7367 | 244.70 | 28.8102 |
| 72.81 | 44.2905 | 122.06 | 36.7545 | 252.40 | 0.0000 |
| 72.87 | 44.2971 | 123.07 | 33.0423 | 252.80 | 18.9948 |
| 74.66 | 42.7813 | 127.23 | 19.9661 | 254.15 | 0.0000 |
| 74.82 | 42.7979 | 129.30 | 27.6678 | 256.23 | 21.3031 |
| 74.97 | 42.8136 | 131.20 | 27.7551 | 260.90 | 0.0000 |
| 77.11 | 43.0349 | 133.02 | 23.0381 | 264.66 | 20.3514 |
| 79.69 | 53.6887 | 133.52 | 23.0569 | 268.22 | 19.2876 |
| 80.12 | 45.9413 | 136.00 | 27.9722 | 269.46 | 15.9030 |
| 80.19 | 0.0000 | 136.47 | 22.2015 | 271.23 | 19.3439 |
| 80.57 | 32.9734 | 140.51 | 0.0000 | 273.65 | 20.5294 |
| 81.00 | 33.0061 | 143.76 | 19.5276 | 276.40 | 20.5833 |
| 81.07 | 29.5366 | 144.24 | 19.5420 | 277.37 | 16.0237 |
| 83.79 | 39.3356 | 145.44 | 31.3249 | 277.60 | 13.7375 |
| 85.43 | 42.1123 | 152.43 | 25.7199 | 278.00 | 13.7429 |
| 86.55 | 38.6987 | 153.25 | 24.7607 | 279.20 | 24.0770 |
| 86.79 | 37.8389 | 323.87 | 23.8037 | 279.54 | 22.9378 |
| 86.94 | 37.8516 | 156.02 | 22.8720 | 280.46 | 19.5141 |
| 87.09 | 35.9268 | 158.56 | 23.9543 | 283.69 | 20.7246 |
| 87.57 | 39.6668 | 159.00 | 31.9590 | 284.31 | 0.0000 |
| 88.03 | 34.4124 | 162.33 | 14.0484 | 285.41 | 23.0640 |
| 88.34 | 31.7867 | 163.33 | 19.0926 | 285.90 | 0.0000 |
| 88.47 | 31.7957 | 165.86 | 36.3032 | 287.50 | 18.0245 |
| 89.96 | 49.1762 | 176.31 | 21.4794 | 290.67 | 19.1201 |
| 91.11 | 38.6384 | 176.60 | 23.5341 | 293.27 | 0.0000 |
| 92.59 | 32.9678 | 177.52 | 30.7339 | 351.93 | 26.1804 |
| 93.35 | 33.0203 | 181.07 | 0.0000 | 295.96 | 26.1978 |
| 94.56 | 34.8931 | 184.41 | 19.6403 | 879.38 | 23.6337 |
| 94.65 | 34.8996 | 143.76 | 25.8860 | 299.98 | 16.6520 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 18.4064 | 487.02 | 18.0868 | 702.65 | 11.2485 |
| 300.13 | 18.4070 | 492.35 | 0.0000 | 706.68 | 10.8182 |
| 301.36 | 20.1822 | 497.08 | 14.1534 | 711.68 | 7.2285 |
| 302.85 | 18.4516 | 505.52 | 11.3798 | 720.70 | 9.0720 |
| 256.23 | 23.7581 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 18.5157 | 511.00 | 13.2513 | 722.78 | 5.4482 |
| 308.46 | 11.4787 | 514.00 | 11.4365 | 722.91 | 5.4485 |
| 311.90 | 23.0261 | 514.00 | 11.4365 | 723.31 | 5.4495 |
| 316.51 | 18.6720 | 520.40 | 9.2244 | 724.19 | 8.1773 |
| 319.41 | 24.0662 | 520.69 | 0.0000 | 727.33 | 2.7296 |
| 320.08 | 24.0798 | 522.65 | 0.0000 | 733.00 | 7.2971 |
| 321.04 | 20.5293 | 527.90 | 0.0000 | 735.93 | 6.3931 |
| 323.87 | 20.5781 | 529.59 | 15.4555 | 333.97 | 4.5696 |
| 325.23 | 22.3930 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 17.0689 | 531.02 | 12.3743 | 747.24 | 11.0136 |
| 333.37 | 18.0359 | 546.56 | 0.0000 | 748.06 | 9.1812 |
| 333.97 | 21.6537 | 552.55 | 12.5244 | 752.31 | 5.5188 |
| 334.37 | 21.6606 | 563.25 | 8.3987 | 753.82 | 8.2835 |
| 338.28 | 14.4866 | 569.33 | 9.4796 | 756.73 | 9.2153 |
| 338.32 | 14.4871 | 946.00 | 9.4804 | 756.80 | 7.3725 |
| 311.90 | 22.6757 | 569.70 | 9.4815 | 884.68 | 11.0924 |
| 340.48 | 22.6757 | 583.19 | 12.7332 | 765.81 | 10.1761 |
| 340.55 | 22.6768 | 584.27 | 7.4317 | 766.42 | 9.2534 |
| 344.28 | 7.2784 | 595.83 | 16.0217 | 766.84 | 10.1806 |
| 345.93 | 8.7457 | 427.87 | 8.5662 | 772.60 | 0.0000 |
| 351.06 | 19.2091 | 602.52 | 0.0000 | 776.52 | 7.4342 |
| 351.93 | 19.2222 | 602.73 | 18.8660 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 17.1685 | 778.90 | 3.7208 |
| 356.01 | 22.0386 | 609.32 | 13.7672 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 12.0524 | 785.37 | 8.3942 |
| 366.42 | 0.0000 | 614.28 | 10.3515 | 792.07 | 3.7411 |
| 375.05 | 7.4540 | 618.01 | 8.6423 | 794.95 | 9.3638 |
| 356.01 | 7.5028 | 620.36 | 7.5710 | 795.86 | 8.4305 |
| 388.16 | 15.0532 | 621.93 | 6.4946 | 810.29 | 5.6534 |
| 388.63 | 18.0700 | 630.19 | 0.0000 | 344.28 | 4.7115 |
| 391.69 | 15.0918 | 631.29 | 9.7874 | 810.76 | 4.7120 |
| 264.66 | 18.0372 | 633.25 | 9.7968 | 815.77 | 7.5545 |
| 401.81 | 18.0520 | 634.78 | 8.7148 | 1048.07 | 5.6722 |
| 402.40 | 11.4060 | 635.95 | 8.7200 | 832.01 | 6.6531 |
| 404.85 | 9.5215 | 636.99 | 0.0000 | 834.85 | 5.7089 |
| 410.95 | 7.6499 | 645.85 | 6.5717 | 835.71 | 5.7110 |
| 413.71 | 12.4549 | 657.76 | 7.7109 | 836.80 | 0.0000 |
| 414.70 | 12.4634 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 12.5697 | 661.66 | 4.4146 | 846.77 | 8.6036 |
| 427.87 | 12.5763 | 664.57 | 0.0000 | 856.80 | 3.1989 |
| 433.94 | 10.8792 | 666.33 | 1.7697 | 860.56 | 6.4071 |
| 439.40 | 14.0385 | 666.50 | 7.0795 | 871.09 | 10.6141 |
| 453.88 | 9.8416 | 667.71 | 0.0000 | 873.19 | 7.7256 |
| 463.37 | 10.8916 | 677.62 | 10.6749 | 875.33 | 0.0000 |
| 468.07 | 11.9171 | 685.70 | 0.0000 | 879.38 | 7.7436 |
| 473.00 | 0.0000 | 695.00 | 8.9675 | 880.51 | 3.8734 |
| 475.06 | 10.9720 | 696.49 | 7.8519 | 883.24 | 5.8162 |
| 476.78 | 5.9910 | 696.51 | 7.8519 | 884.68 | 4.8494 |
| 477.60 | 6.9932 | 697.00 | 5.6097 | 889.28 | 4.8578 |
| 482.18 | 10.0185 | 697.49 | 7.8556 | 894.76 | 5.8412 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 3.8989 | 1298.22 | 0.0000 | | |
| 903.28 | 10.7427 | 1312.11 | 3.7002 | | |
| 911.20 | 5.8768 | 1332.49 | 4.6505 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.9246 | 1365.19 | 1.8762 | | |
| 937.49 | 5.9329 | 1368.63 | 0.0000 | | |
| 944.13 | 2.9735 | 1384.29 | 3.7710 | | |
| 946.00 | 7.9346 | 1408.01 | 4.7424 | | |
| 949.00 | 3.9715 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 8.2377 | | |
| 962.31 | 2.9925 | 1489.16 | 3.8708 | | |
| 964.08 | 4.9907 | 1505.03 | 0.9714 | | |
| 966.17 | 7.9910 | 1596.21 | 1.9845 | | |
| 968.97 | 5.9990 | 1620.50 | 5.9863 | | |
| 983.53 | 7.0342 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.0400 | | |
| 1274.44 | 9.0833 | 1750.46 | 0.0000 | | |
| 1001.03 | 5.0544 | 1764.49 | 2.0586 | | |
| 1004.73 | 9.1094 | 1063.66 | 3.0916 | | |
| 507.63 | 0.0000 | 1771.35 | 2.0615 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0774 | | |
| 1037.84 | 6.1400 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.0889 | | |
| 631.29 | 6.1576 | | | | |
| 1048.07 | 8.2145 | | | | |
| 1049.04 | 7.1897 | | | | |
| 1050.41 | 6.1655 | | | | |
| 1063.66 | 5.1599 | | | | |
| 1077.00 | 2.0728 | | | | |
| 1077.34 | 3.1094 | | | | |
| 1085.87 | 4.1572 | | | | |
| 1099.45 | 6.2625 | | | | |
| 1112.07 | 5.2393 | | | | |
| 1112.84 | 6.2886 | | | | |
| 1115.54 | 5.2449 | | | | |
| 1120.29 | 5.2524 | | | | |
| 1120.55 | 6.3035 | | | | |
| 1221.41 | 6.3050 | | | | |
| 1129.67 | 3.1605 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 8.5395 | | | | |
| 1177.95 | 7.4823 | | | | |
| 1189.05 | 3.2172 | | | | |
| 1204.77 | 2.1546 | | | | |
| 1221.41 | 2.1649 | | | | |
| 1231.02 | 7.5981 | | | | |
| 1235.36 | 1.0868 | | | | |
| 1238.28 | 8.7016 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 2.1959 | | | | |
| 1274.44 | 4.3949 | | | | |
| 1274.54 | 4.3949 | | | | |
| 1291.59 | 6.4395 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:12:26.09

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147015.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM28.CNF;114
                                        Background date  : 2-FEB-2014 16:28:08.
Sample date      : 7-NOV-2013 13:42:00. Acquisition date : 7-FEB-2014 09:11:35.
Sample ID        : G341147015           Sample quantity  : 1.46500E+02 GRAM
Detector name    : GAM28                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.19  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 58.60 | 26 | 30 | 1.19 | 117.85 | 114 | 8 | 7.15E-03 | 41.9 | |
| 2 | 3 | 104.44 | 14 | 43 | 1.51 | 209.53 | 205 | 19 | 4.03E-03 | 80.5 | 2.05E+00 |
| 3 | 3 | 110.18 | 14 | 16 | 1.14 | 221.00 | 205 | 19 | 3.93E-03 | 48.7 | |
| 4 | 0 | 204.98 | 17 | 20 | 1.79 | 410.58 | 407 | 7 | 4.72E-03 | 50.5 | |
| 5 | 0 | 372.19* | 9 | 13 | 1.11 | 744.96 | 741 | 8 | 2.38E-03 | 82.6 | |
| 6 | 0 | 452.59* | 20 | 5 | 3.26 | 905.76 | 900 | 10 | 5.45E-03 | 33.6 | |
| 7 | 0 | 540.92 | 12 | 8 | 1.09 | 1082.39 | 1076 | 10 | 3.44E-03 | 50.2 | |
| 8 | 0 | 552.54 | 11 | 10 | 0.58 | 1105.64 | 1099 | 8 | 2.99E-03 | 59.5 | |
| 9 | 0 | 571.35* | 6 | 13 | 0.57 | 1143.25 | 1136 | 11 | 1.65E-03 | 132.2 | |
| 10 | 0 | 609.41* | 23 | 3 | 0.87 | 1219.36 | 1213 | 13 | 6.35E-03 | 28.2 | |
| 11 | 0 | 615.23* | 13 | 0 | 4.22 | 1231.00 | 1226 | 11 | 3.56E-03 | 32.7 | |
| 12 | 0 | 670.76* | 6 | 4 | 1.40 | 1342.05 | 1338 | 8 | 1.63E-03 | 84.1 | |
| 13 | 0 | 1460.29* | 12 | 0 | 2.42 | 2921.05 | 2916 | 10 | 3.45E-03 | 36.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:12:27

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147015.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:42:00 | Acquisition date | : 7-FEB-2014 09:11:35 |
| Sample ID | : G341147015 | Sample quantity | : 146.50 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA28 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.19  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 12 | 10.66* | 1.324E+00 | 4.512E-01 | 4.512E-01 | 72.97 |
| TE-125M | 109.28 | 14 | 0.27* | 5.983E+00 | 4.488E+00 | 1.360E+01 | 97.49 |
| AM-241 | 59.54 | 26 | 35.90* | 1.661E+00 | 2.211E-01 | 2.212E-01 | 83.71 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:12:28.22

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147015.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:35 Sensitivity     : 3.000           *
* Detector ID      : GAM28                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.19     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:42:00 Nuclide Library : SOLID           *
* Sample ID        : G341147015           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.4650E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 4.512E-01 | 3.226E-01 | 5.586E-01 |
| TE-125M | 1.360E+01 | 1.300E+01 | 2.930E+01 |
| AM-241 | 2.212E-01 | 1.815E-01 | 2.462E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 1.985E-01 | 5.343E-01 | 1.107E+00 | NOT IDENT. |
| NA-22 | -3.040E-03 | 2.852E-02 | 5.634E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.901E-02 | 2.822E-02 | 6.893E-02 | NOT IDENT. |
| SC-46 | 2.291E-02 | 4.504E-02 | 9.746E-02 | NOT IDENT. |
| V-48 | 4.968E-02 | 1.123E+00 | 2.336E+00 | NOT IDENT. |
| CR-51 | 3.568E-01 | 1.760E+00 | 3.334E+00 | NOT IDENT. |
| MN-54 | 4.426E-04 | 2.455E-02 | 4.861E-02 | NOT IDENT. |
| CO-56 | 4.038E-02 | 5.468E-02 | 1.181E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.367E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.437E-02 | 2.211E-02 | 4.355E-02 | NOT IDENT. |
| CO-58 | 1.959E-02 | 5.735E-02 | 1.169E-01 | NOT IDENT. |
| FE-59 | 2.503E-03 | 1.498E-01 | 3.150E-01 | NOT IDENT. |
| CO-60 | 1.521E-02 | 2.564E-02 | 5.943E-02 | NOT IDENT. |
| ZN-65 | 7.541E-03 | 5.868E-02 | 1.235E-01 | NOT IDENT. |
| GE-68 | 3.253E-02 | 9.017E-01 | 1.856E+00 | NOT IDENT. |
| AS-73 | 1.362E+00 | 1.799E+00 | 3.420E+00 | NOT IDENT. |
| AS-74 | 3.250E-01 | 1.181E+00 | 2.395E+00 | NOT IDENT. |
| SE-75 | -1.423E-02 | 4.479E-02 | 8.021E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.428E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -2.787E-01 | 1.877E+00 | 3.517E+00 | NOT IDENT. |
| RB-83 | -1.997E-02 | 8.029E-02 | 1.517E-01 | FAIL ABUN |
| KR-85 | -1.908E+01 | 7.799E+00 | 1.093E+01 | NOT IDENT. |
| SR-85 | -2.267E-01 | 9.254E-02 | 1.296E-01 | NOT IDENT. |
| RB-86 | 8.460E-01 | 7.712E+00 | 1.625E+01 | NOT IDENT. |
| Y-88 | 6.862E-03 | 3.579E-02 | 8.812E-02 | NOT IDENT. |
| Y-91 | -7.458E+00 | 2.542E+01 | 4.912E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | -9.256E-03 | 2.218E-02 | 3.969E-02 | NOT IDENT. |
| NB-95 | -5.046E-02 | 6.824E-02 | 1.170E-01 | NOT IDENT. |
| NB-95M | 4.426E-03 | 1.859E-01 | 3.440E-01 | NOT IDENT. |
| ZR-95 | -6.054E-02 | 1.073E-01 | 1.859E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 8.576E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.146E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.774E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.553E-03 | 1.921E-02 | 3.544E-02 | NOT IDENT. |
| RH-102 | -2.938E-03 | 2.945E-02 | 5.815E-02 | NOT IDENT. |
| RU-103 | -4.575E-02 | 1.001E-01 | 1.823E-01 | FAIL ABUN |
| RH-106 | 3.691E-02 | 2.120E-01 | 4.021E-01 | NOT IDENT. |
| RU-106 | 3.691E-02 | 2.120E-01 | 4.021E-01 | NOT IDENT. |
| AG-108M | 2.619E-03 | 1.757E-02 | 3.544E-02 | FAIL ABUN |
| CD-109 | 2.141E-01 | 5.887E-01 | 1.092E+00 | NOT IDENT. |
| AG-110M | 2.896E-02 | 3.944E-02 | 8.729E-02 | NOT IDENT. |
| SN-113 | 5.780E-03 | 5.103E-02 | 9.515E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.511E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -2.514E-01 | 1.802E+00 | 3.334E+00 | NOT IDENT. |
| TE-123M | -1.261E-02 | 3.008E-02 | 5.406E-02 | NOT IDENT. |
| SB-124 | 3.699E-03 | 1.234E-01 | 2.831E-01 | NOT IDENT. |
| SB-125 | -1.723E-02 | 6.418E-02 | 1.205E-01 | NOT IDENT. |
| I-126 | -8.601E+00 | 1.153E+01 | 1.573E+01 | NOT IDENT. |
| SB-126 | -2.995E+00 | 6.174E+00 | 1.098E+01 | NOT IDENT. |
| SN-126 | -2.916E-02 | 5.351E-02 | 8.977E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 6.235E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.097E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 8.161E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.818E-02 | 2.995E-02 | 5.045E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.492E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.922E-02 | 2.832E-02 | 6.112E-02 | NOT IDENT. |
| CS-135 | 1.063E-01 | 9.165E-02 | 1.961E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.332E+00 | 3.506E+00 | 5.624E+00 | NOT IDENT. |
| BA-137M | -1.017E-02 | 2.745E-02 | 5.417E-02 | NOT IDENT. |
| CS-137 | -1.074E-02 | 2.900E-02 | 5.723E-02 | NOT IDENT. |
| CE-139 | -1.968E-02 | 3.085E-02 | 5.405E-02 | NOT IDENT. |
| BA-140 | -2.815E+00 | 3.624E+00 | 6.135E+00 | NOT IDENT. |
| LA-140 | -2.815E+00 | 3.624E+00 | 6.135E+00 | NOT IDENT. |
| CE-141 | -1.646E-01 | 2.256E-01 | 3.850E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 5.734E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -4.263E-02 | 1.448E-01 | 2.673E-01 | NOT IDENT. |
| PM-144 | -1.196E-02 | 2.412E-02 | 4.274E-02 | NOT IDENT. |
| PR-144 | -9.392E-01 | 1.878E+00 | 3.324E+00 | NOT IDENT. |
| PM-146 | 4.814E-02 | 3.166E-02 | 6.268E-02 | FAIL ABUN |
| ND-147 | 8.237E+00 | 4.007E+01 | 8.249E+01 | NOT IDENT. |
| PM-147 | 1.348E+02 | 5.515E+02 | 1.002E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.748E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -4.448E-03 | 1.824E-02 | 3.262E-02 | NOT IDENT. |
| EU-152 | -3.897E-03 | 6.678E-02 | 1.225E-01 | NOT IDENT. |
| GD-153 | -9.121E-03 | 7.911E-02 | 1.386E-01 | FAIL ABUN |
| EU-154 | -2.156E-02 | 7.951E-02 | 1.509E-01 | NOT IDENT. |
| EU-155 | 6.295E-02 | 9.926E-02 | 1.366E-01 | FAIL ABUN |
| TB-160 | 3.013E-02 | 1.753E-01 | 3.537E-01 | NOT IDENT. |
| HO-166M | 2.008E-02 | 3.232E-02 | 7.201E-02 | NOT IDENT. |
| TM-171 | 1.282E+01 | 2.162E+01 | 4.162E+01 | NOT IDENT. |
| LU-176 | 9.276E-03 | 1.573E-02 | 3.200E-02 | NOT IDENT. |
| HF-181 | 3.082E-02 | 9.101E-02 | 1.889E-01 | FAIL ABUN |
| TA-182 | 5.677E-02 | 1.239E-01 | 2.954E-01 | NOT IDENT. |
| RE-183 | 5.747E-01 | 4.714E-01 | 8.270E-01 | FAIL ABUN |
| RE-184 | 1.030E-01 | 2.735E-01 | 6.083E-01 | NOT IDENT. |
| W-188 | -4.461E+00 | 1.170E+01 | 2.051E+01 | NOT IDENT. |
| IR-192 | 2.087E-02 | 5.312E-02 | 1.020E-01 | NOT IDENT. |
| HG-203 | 3.190E-02 | 8.223E-02 | 1.587E-01 | NOT IDENT. |
| BI-207 | 4.429E-03 | 2.026E-02 | 4.769E-02 | NOT IDENT. |
| TL-208 | 1.022E-02 | 2.332E-02 | 4.988E-02 | NOT IDENT. |
| PB-210 | -3.196E+00 | 4.739E+00 | 8.199E+00 | NOT IDENT. |
| BI-211 | 1.024E-01 | 1.572E-01 | 3.117E-01 | NOT IDENT. |
| PB-211 | 8.457E-03 | 4.430E-01 | 8.289E-01 | NOT IDENT. |
| BI-212 | 2.781E-01 | 3.065E-01 | 6.870E-01 | NOT IDENT. |
| PB-212 | -3.868E-02 | 4.329E-02 | 7.459E-02 | NOT IDENT. |
| BI-214 | 9.528E-02 | 5.258E-02 | 1.117E-01 | FAIL ABUN |
| PB-214 | 3.717E-02 | 5.714E-02 | 1.133E-01 | NOT IDENT. |
| RN-219 | -1.306E-01 | 2.724E-01 | 4.714E-01 | NOT IDENT. |
| RN-222 | 9.528E-02 | 5.258E-02 | 1.117E-01 | FAIL ABUN |
| RA-223 | 1.836E-03 | 4.843E-01 | 8.864E-01 | NOT IDENT. |
| RA-224 | -8.036E-02 | 4.296E-01 | 7.758E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 9.528E-02 | 5.258E-02 | 1.117E-01 | FAIL ABUN |
| AC-227 | 6.571E-03 | 1.940E-01 | 3.572E-01 | NOT IDENT. |
| TH-227 | 6.571E-03 | 1.940E-01 | 3.572E-01 | NOT IDENT. |
| AC-228 | -2.911E-02 | 7.694E-02 | 1.505E-01 | FAIL ABUN |
| RA-228 | -2.911E-02 | 7.694E-02 | 1.505E-01 | FAIL ABUN |
| TH-228 | -3.868E-02 | 4.329E-02 | 7.459E-02 | NOT IDENT. |
| TH-229 | 1.562E-01 | 3.274E-01 | 6.429E-01 | NOT IDENT. |
| TH-230 | 9.527E-02 | 5.257E-02 | 1.117E-01 | FAIL ABUN |
| PA-231 | -1.161E+00 | 9.798E-01 | 1.530E+00 | NOT IDENT. |
| TH-231 | 1.836E-03 | 4.843E-01 | 8.864E-01 | NOT IDENT. |
| TH-232 | -2.911E-02 | 7.694E-02 | 1.505E-01 | NOT IDENT. |
| PA-233 | -1.605E-02 | 4.392E-02 | 7.744E-02 | NOT IDENT. |
| PA-234 | -2.862E-02 | 1.777E-01 | 3.526E-01 | FAIL ABUN |
| PA-234M | -1.953E+00 | 2.366E+00 | 4.366E+00 | NOT IDENT. |
| TH-234 | -6.822E-01 | 1.189E+00 | 2.056E+00 | NOT IDENT. |
| U-234 | 9.527E-02 | 5.257E-02 | 1.117E-01 | FAIL ABUN |
| U-235 | -1.244E-01 | 1.454E-01 | 2.455E-01 | FAIL ABUN |
| NP-237 | -1.605E-02 | 4.392E-02 | 7.744E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 9.167E+11 | 0.000E+00 | SHORT HLIF |
| U-238 | -6.822E-01 | 1.189E+00 | 2.056E+00 | NOT IDENT. |
| NP-239 | 3.905E-02 | 2.502E-01 | 4.564E-01 | FAIL ABUN |
| PU-239 | 8.135E+01 | 1.963E+02 | 3.905E+02 | NOT IDENT. |
| AM-243 | 3.837E-02 | 3.812E-02 | 7.532E-02 | NOT IDENT. |
| CM-243 | 6.163E-02 | 9.718E-02 | 1.385E-01 | FAIL ABUN |
| CM-247 | -2.096E-02 | 2.505E-02 | 4.057E-02 | NOT IDENT. |
| CF-249 | 7.016E-03 | 2.709E-02 | 5.194E-02 | NOT IDENT. |
| CF-251 | -3.412E-02 | 8.699E-02 | 1.561E-01 | NOT IDENT. |
| ANH-511 | -2.868E-02 | 3.829E-02 | 8.235E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:12:24.53

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 58.60 | 26 | 30 | 1.19 | 117.85 | 114 | 8 | 7.15E-03 | 41.9 | |
| 2 | 0 | 93.55 | 49 | 77 | 1.14 | 187.74 | 181 | 11 | 1.35E-02 | 38.5 | |
| 3 | 3 | 104.44 | 14 | 43 | 1.51 | 209.53 | 205 | 19 | 4.03E-03 | 80.5 | 2.05E+00 |
| 4 | 3 | 110.18 | 14 | 16 | 1.14 | 221.00 | 205 | 19 | 3.93E-03 | 48.7 | |
| 5 | 0 | 186.61 | 24 | 54 | 0.70 | 373.85 | 369 | 10 | 6.61E-03 | 61.7 | |
| 6 | 0 | 204.98 | 17 | 20 | 1.79 | 410.58 | 407 | 7 | 4.72E-03 | 50.5 | |
| 7 | 0 | 372.19 | 9 | 13 | 1.11 | 744.96 | 741 | 8 | 2.60E-03 | 72.4 | |
| 8 | 0 | 452.59 | 21 | 5 | 3.26 | 905.76 | 900 | 10 | 5.83E-03 | 29.5 | |
| 9 | 0 | 511.11 | 80 | 28 | 1.63 | 1022.78 | 1017 | 14 | 2.23E-02 | 18.9 | |
| 10 | 0 | 540.92 | 12 | 8 | 1.09 | 1082.39 | 1076 | 10 | 3.44E-03 | 50.2 | |
| 11 | 0 | 552.54 | 11 | 10 | 0.58 | 1105.64 | 1099 | 8 | 2.99E-03 | 59.5 | |
| 12 | 0 | 571.35 | 8 | 13 | 0.57 | 1143.25 | 1136 | 11 | 2.34E-03 | 91.0 | |
| 13 | 0 | 609.41 | 25 | 3 | 0.87 | 1219.36 | 1213 | 13 | 6.95E-03 | 24.8 | |
| 14 | 0 | 615.23 | 15 | 0 | 4.22 | 1231.00 | 1226 | 11 | 4.17E-03 | 25.8 | |
| 15 | 0 | 670.76 | 10 | 4 | 1.40 | 1342.05 | 1338 | 8 | 2.78E-03 | 46.9 | |
| 16 | 0 | 1460.29 | 19 | 0 | 2.42 | 2921.05 | 2916 | 10 | 5.28E-03 | 22.9 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:12:26.58

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 12 | 10.66* | 1.324E+00 | 4.512E-01 | 4.512E-01 | 72.97 |
| TE-125M | 109.28 | 14 | 0.27* | 5.983E+00 | 4.488E+00 | 1.360E+01 | 97.49 |
| AM-241 | 59.54 | 26 | 35.90* | 1.661E+00 | 2.211E-01 | 2.212E-01 | 83.71 |

Flag: "*" = Keyline

Sample ID : G341147015 Acquisition date : 7-FEB-2014 09:11:35

Total number of lines in spectrum 13
Number of unidentified lines 4
Number of lines tentatively identified by NID 9 69.23%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 4.512E-01 | 4.512E-01 | 3.292E-01 | 72.97 | |
| TE-125M | 57.40D | 3.03 | 4.488E+00 | 1.360E+01 | 1.326E+01 | 97.49 | |
| AM-241 | 432.60Y | 1.00 | 2.211E-01 | 2.212E-01 | 1.852E-01 | 83.71 | |
| | Total Activity : | | 5.161E+00 | 1.428E+01 | | | |
| | Grand Total Activity : | | 5.161E+00 | 1.428E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147015 Acquisition date : 7-FEB-2014 09:11:35

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 104.44 | 14 | 43 | 1.51 | 209.53 | 205 | 19 | 4.03E-03 | **** | 5.80E+00 | T |
| 0 | 204.98 | 17 | 20 | 1.79 | 410.58 | 407 | 7 | 4.72E-03 | **** | 5.43E+00 | T |
| 0 | 372.19 | 9 | 13 | 1.11 | 744.96 | 741 | 8 | 2.38E-03 | **** | 3.77E+00 | |
| 0 | 452.59 | 20 | 5 | 3.26 | 905.76 | 900 | 10 | 5.45E-03 | 67.1 | 3.32E+00 | T |
| 0 | 540.92 | 12 | 8 | 1.09 | 1082.39 | 1076 | 10 | 3.44E-03 | **** | 2.94E+00 | |
| 0 | 552.54 | 11 | 10 | 0.58 | 1105.64 | 1099 | 8 | 2.99E-03 | **** | 2.90E+00 | T |
| 0 | 571.35 | 6 | 13 | 0.57 | 1143.25 | 1136 | 11 | 1.65E-03 | **** | 2.83E+00 | |
| 0 | 609.41 | 23 | 3 | 0.87 | 1219.36 | 1213 | 13 | 6.35E-03 | 56.3 | 2.70E+00 | T |
| 0 | 615.23 | 13 | 0 | 4.22 | 1231.00 | 1226 | 11 | 3.56E-03 | 65.3 | 2.68E+00 | T |
| 0 | 670.76 | 6 | 4 | 1.40 | 1342.05 | 1338 | 8 | 1.63E-03 | **** | 2.52E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:12:39.05

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147015.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:35 Sensitivity     : 3.000            *
* Detector ID      : GAM28                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.19     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 13:42:00 Nuclide Library : SOLID            *
* Sample ID        : G341147015           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.4650E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4          *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 2.302E-01 |
| TE-125M | 1.335E+01 |
| AM-241 | 1.123E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 4.848E-01 | NOT IDENT. |
| NA-22 | 2.319E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.829E-02 | NOT IDENT. |
| SC-46 | 4.141E-02 | NOT IDENT. |
| V-48 | 9.673E-01 | NOT IDENT. |
| CR-51 | 1.500E+00 | NOT IDENT. |
| MN-54 | 2.032E-02 | NOT IDENT. |
| CO-56 | 5.154E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.013E-02 | NOT IDENT. |
| CO-58 | 5.060E-02 | NOT IDENT. |
| FE-59 | 1.272E-01 | NOT IDENT. |
| CO-60 | 2.471E-02 | NOT IDENT. |
| ZN-65 | 5.113E-02 | NOT IDENT. |
| GE-68 | 7.701E-01 | NOT IDENT. |
| AS-73 | 1.573E+00 | NOT IDENT. |
| AS-74 | 1.044E+00 | NOT IDENT. |
| SE-75 | 3.584E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.508E+00 | NOT IDENT. |
| RB-83 | 6.521E-02 | FAIL ABUN |
| KR-85 | 4.934E+00 | NOT IDENT. |
| SR-85 | 5.850E-02 | NOT IDENT. |
| RB-86 | 6.708E+00 | NOT IDENT. |
| Y-88 | 3.266E-02 | NOT IDENT. |
| Y-91 | 1.949E+01 | NOT IDENT. |
| NB-94 | 1.700E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95 | 5.027E-02 | NOT IDENT. |
| NB-95M | 1.570E-01 | NOT IDENT. |
| ZR-95 | 7.798E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.600E-02 | NOT IDENT. |
| RH-102 | 2.416E-02 | NOT IDENT. |
| RU-103 | 7.878E-02 | FAIL ABUN |
| RH-106 | 1.700E-01 | NOT IDENT. |
| RU-106 | 1.700E-01 | NOT IDENT. |
| AG-108M | 1.548E-02 | FAIL ABUN |
| CD-109 | 5.021E-01 | NOT IDENT. |
| AG-110M | 3.760E-02 | NOT IDENT. |
| SN-113 | 4.250E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.525E+00 | NOT IDENT. |
| TE-123M | 2.472E-02 | NOT IDENT. |
| SB-124 | 1.060E-01 | NOT IDENT. |
| SB-125 | 5.308E-02 | NOT IDENT. |
| I-126 | 6.722E+00 | NOT IDENT. |
| SB-126 | 4.556E+00 | NOT IDENT. |
| SN-126 | 4.104E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.230E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.658E-02 | NOT IDENT. |
| CS-135 | 8.876E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.192E+00 | NOT IDENT. |
| BA-137M | 2.405E-02 | NOT IDENT. |
| CS-137 | 2.541E-02 | NOT IDENT. |
| CE-139 | 2.473E-02 | NOT IDENT. |
| BA-140 | 2.198E+00 | NOT IDENT. |
| LA-140 | 2.198E+00 | NOT IDENT. |
| CE-141 | 1.762E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.212E-01 | NOT IDENT. |
| PM-144 | 1.799E-02 | NOT IDENT. |
| PR-144 | 1.398E+00 | NOT IDENT. |
| PM-146 | 2.802E-02 | FAIL ABUN |
| ND-147 | 3.540E+01 | NOT IDENT. |
| PM-147 | 4.589E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.452E-02 | NOT IDENT. |
| EU-152 | 5.461E-02 | NOT IDENT. |
| GD-153 | 6.365E-02 | FAIL ABUN |
| EU-154 | 6.186E-02 | NOT IDENT. |
| EU-155 | 6.247E-02 | FAIL ABUN |
| TB-160 | 1.497E-01 | NOT IDENT. |
| HO-166M | 3.070E-02 | NOT IDENT. |
| TM-171 | 1.916E+01 | NOT IDENT. |
| LU-176 | 1.427E-02 | NOT IDENT. |
| HF-181 | 8.231E-02 | FAIL ABUN |
| TA-182 | 1.187E-01 | NOT IDENT. |
| RE-183 | 3.821E-01 | FAIL ABUN |
| RE-184 | 2.492E-01 | NOT IDENT. |
| W-188 | 9.289E+00 | NOT IDENT. |
| IR-192 | 4.629E-02 | NOT IDENT. |
| HG-203 | 7.203E-02 | NOT IDENT. |
| BI-207 | 1.848E-02 | NOT IDENT. |
| TL-208 | 2.203E-02 | NOT IDENT. |
| PB-210 | 3.754E+00 | NOT IDENT. |
| BI-211 | 1.422E-01 | NOT IDENT. |
| PB-211 | 3.632E-01 | NOT IDENT. |
| BI-212 | 2.998E-01 | NOT IDENT. |
| PB-212 | 3.412E-02 | NOT IDENT. |
| BI-214 | 5.024E-02 | FAIL ABUN |
| PB-214 | 5.170E-02 | NOT IDENT. |
| RN-219 | 2.065E-01 | NOT IDENT. |
| RN-222 | 5.024E-02 | FAIL ABUN |
| RA-223 | 4.012E-01 | NOT IDENT. |
| RA-224 | 3.539E-01 | NOT IDENT. |
| RA-226 | 5.024E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.634E-01 | NOT IDENT. |
| TH-227 | 1.634E-01 | NOT IDENT. |
| AC-228 | 6.168E-02 | FAIL ABUN |
| RA-228 | 6.168E-02 | FAIL ABUN |
| TH-228 | 3.412E-02 | NOT IDENT. |
| TH-229 | 2.935E-01 | NOT IDENT. |
| TH-230 | 5.024E-02 | FAIL ABUN |
| PA-231 | 6.742E-01 | NOT IDENT. |
| TH-231 | 4.012E-01 | NOT IDENT. |
| TH-232 | 6.168E-02 | NOT IDENT. |
| PA-233 | 3.447E-02 | NOT IDENT. |
| PA-234 | 1.463E-01 | FAIL ABUN |
| PA-234M | 1.733E+00 | NOT IDENT. |
| TH-234 | 9.449E-01 | NOT IDENT. |
| U-234 | 5.024E-02 | FAIL ABUN |
| U-235 | 1.126E-01 | FAIL ABUN |
| NP-237 | 3.447E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 9.449E-01 | NOT IDENT. |
| NP-239 | 2.068E-01 | FAIL ABUN |
| PU-239 | 1.777E+02 | NOT IDENT. |
| AM-243 | 3.483E-02 | NOT IDENT. |
| CM-243 | 6.349E-02 | FAIL ABUN |
| CM-247 | 1.761E-02 | NOT IDENT. |
| CF-249 | 2.311E-02 | NOT IDENT. |
| CF-251 | 7.119E-02 | NOT IDENT. |
| ANH-511 | 3.893E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:12:44.11

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147015.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:35 Sensitivity     : 3.000          *
* Detector ID      : GAM28                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.19     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 13:42:00 Nuclide Library : SOLID          *
* Sample ID        : G341147015           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.4650E+02 GRAM*
*                                         Quantity Err(%) : 1.3652E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 4.512E-01 | 3.251E-01 | 3.251E-01 |
| TE-125M | 1.360E+01 | 1.306E+01 | 1.306E+01 |
| AM-241 | 2.212E-01 | 1.824E-01 | 1.824E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 1.985E-01 | 5.346E-01 | 5.420E-01 | NOT IDENT. |
| NA-22 | -3.040E-03 | 2.852E-02 | 2.855E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 5.909E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.901E-02 | 2.826E-02 | 2.953E-02 | NOT IDENT. |
| SC-46 | 2.291E-02 | 4.514E-02 | 4.630E-02 | NOT IDENT. |
| V-48 | 4.968E-02 | 1.123E+00 | 1.123E+00 | NOT IDENT. |
| CR-51 | 3.568E-01 | 1.760E+00 | 1.768E+00 | NOT IDENT. |
| MN-54 | 4.426E-04 | 2.455E-02 | 2.455E-02 | NOT IDENT. |
| CO-56 | 4.038E-02 | 5.490E-02 | 5.784E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.373E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.437E-02 | 2.222E-02 | 2.479E-02 | NOT IDENT. |
| CO-58 | 1.959E-02 | 5.740E-02 | 5.807E-02 | NOT IDENT. |
| FE-59 | 2.503E-03 | 1.498E-01 | 1.498E-01 | NOT IDENT. |
| CO-60 | 1.521E-02 | 2.566E-02 | 2.657E-02 | NOT IDENT. |
| ZN-65 | 7.541E-03 | 5.869E-02 | 5.879E-02 | NOT IDENT. |
| GE-68 | 3.253E-02 | 9.018E-01 | 9.019E-01 | NOT IDENT. |
| AS-73 | 1.362E+00 | 1.822E+00 | 1.923E+00 | NOT IDENT. |
| AS-74 | 3.250E-01 | 1.181E+00 | 1.190E+00 | NOT IDENT. |
| SE-75 | -1.423E-02 | 4.481E-02 | 4.526E-02 | NOT IDENT. |
| BR-77 | -2.340E+10 | 7.088E+10 | 7.166E+10 | SHORT HLIF |
| SR-82 | -2.787E-01 | 1.877E+00 | 1.881E+00 | NOT IDENT. |
| RB-83 | -1.997E-02 | 8.035E-02 | 8.085E-02 | FAIL ABUN |
| KR-85 | -1.908E+01 | 7.970E+00 | 1.173E+01 | NOT IDENT. |
| SR-85 | -2.267E-01 | 9.458E-02 | 1.393E-01 | NOT IDENT. |
| RB-86 | 8.460E-01 | 7.714E+00 | 7.723E+00 | NOT IDENT. |
| Y-88 | 6.862E-03 | 3.579E-02 | 3.592E-02 | NOT IDENT. |
| Y-91 | -7.458E+00 | 2.543E+01 | 2.565E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | -9.256E-03 | 2.219E-02 | 2.258E-02 | NOT IDENT. |
| NB-95 | -5.046E-02 | 6.843E-02 | 7.211E-02 | NOT IDENT. |
| NB-95M | 4.426E-03 | 1.859E-01 | 1.859E-01 | NOT IDENT. |
| ZR-95 | -6.054E-02 | 1.075E-01 | 1.109E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 8.612E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.721E+39 | 1.155E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 8.561E+08 | 1.776E+09 | 1.818E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 2.593E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -6.553E-03 | 1.925E-02 | 1.948E-02 | NOT IDENT. |
| RH-102 | -2.938E-03 | 2.945E-02 | 2.948E-02 | NOT IDENT. |
| RU-103 | -4.575E-02 | 1.002E-01 | 1.023E-01 | FAIL ABUN |
| RH-106 | 3.691E-02 | 2.120E-01 | 2.126E-01 | NOT IDENT. |
| RU-106 | 3.691E-02 | 2.120E-01 | 2.126E-01 | NOT IDENT. |
| AG-108M | 2.619E-03 | 1.757E-02 | 1.761E-02 | FAIL ABUN |
| CD-109 | 2.141E-01 | 5.892E-01 | 5.970E-01 | NOT IDENT. |
| AG-110M | 2.896E-02 | 3.964E-02 | 4.173E-02 | NOT IDENT. |
| SN-113 | 5.780E-03 | 5.103E-02 | 5.110E-02 | NOT IDENT. |
| CD-115 | -1.542E+10 | 1.511E+11 | 1.513E+11 | SHORT HLIF |
| SN-117M | -2.514E-01 | 1.802E+00 | 1.806E+00 | NOT IDENT. |
| TE-123M | -1.261E-02 | 3.010E-02 | 3.064E-02 | NOT IDENT. |
| SB-124 | 3.699E-03 | 1.234E-01 | 1.234E-01 | NOT IDENT. |
| SB-125 | -1.723E-02 | 6.420E-02 | 6.467E-02 | NOT IDENT. |
| I-126 | -8.601E+00 | 1.156E+01 | 1.220E+01 | NOT IDENT. |
| SB-126 | -2.995E+00 | 6.188E+00 | 6.333E+00 | NOT IDENT. |
| SN-126 | -2.916E-02 | 5.358E-02 | 5.517E-02 | NOT IDENT. |
| SB-127 | -2.077E+05 | 6.298E+05 | 6.368E+05 | SHORT HLIF |
| I-131 | 1.651E+01 | 6.098E+01 | 6.144E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.835E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.434E+06 | 8.164E+06 | 8.190E+06 | SHORT HLIF |
| BA-133 | -1.818E-02 | 2.998E-02 | 3.108E-02 | NOT IDENT. |
| I-133 | -4.676E+28 | 1.492E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.922E-02 | 2.840E-02 | 2.969E-02 | NOT IDENT. |
| CS-135 | 1.063E-01 | 9.218E-02 | 1.039E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 4.091E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.332E+00 | 3.555E+00 | 3.859E+00 | NOT IDENT. |
| BA-137M | -1.017E-02 | 2.747E-02 | 2.785E-02 | NOT IDENT. |
| CS-137 | -1.074E-02 | 2.902E-02 | 2.942E-02 | NOT IDENT. |
| CE-139 | -1.968E-02 | 3.114E-02 | 3.237E-02 | NOT IDENT. |
| BA-140 | -2.815E+00 | 3.632E+00 | 3.847E+00 | NOT IDENT. |
| LA-140 | -2.815E+00 | 3.632E+00 | 3.847E+00 | NOT IDENT. |
| CE-141 | -1.646E-01 | 2.260E-01 | 2.379E-01 | NOT IDENT. |
| CE-143 | -1.118E+18 | 5.735E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -4.263E-02 | 1.449E-01 | 1.462E-01 | NOT IDENT. |
| PM-144 | -1.196E-02 | 2.415E-02 | 2.474E-02 | NOT IDENT. |
| PR-144 | -9.392E-01 | 1.880E+00 | 1.927E+00 | NOT IDENT. |
| PM-146 | 4.814E-02 | 3.206E-02 | 3.872E-02 | FAIL ABUN |
| ND-147 | 8.237E+00 | 4.007E+01 | 4.024E+01 | NOT IDENT. |
| PM-147 | 1.348E+02 | 5.516E+02 | 5.550E+02 | NOT IDENT. |
| PM-149 | -1.713E+12 | 1.769E+12 | 1.930E+12 | SHORT HLIF |
| EU-150 | -4.448E-03 | 1.825E-02 | 1.836E-02 | NOT IDENT. |
| EU-152 | -3.897E-03 | 6.678E-02 | 6.681E-02 | NOT IDENT. |
| GD-153 | -9.121E-03 | 7.912E-02 | 7.922E-02 | FAIL ABUN |
| EU-154 | -2.156E-02 | 7.953E-02 | 8.012E-02 | NOT IDENT. |
| EU-155 | 6.295E-02 | 9.947E-02 | 1.034E-01 | FAIL ABUN |
| TB-160 | 3.013E-02 | 1.753E-01 | 1.758E-01 | NOT IDENT. |
| HO-166M | 2.008E-02 | 3.238E-02 | 3.362E-02 | NOT IDENT. |
| TM-171 | 1.282E+01 | 2.166E+01 | 2.242E+01 | NOT IDENT. |
| LU-176 | 9.276E-03 | 1.575E-02 | 1.630E-02 | NOT IDENT. |
| HF-181 | 3.082E-02 | 9.105E-02 | 9.210E-02 | FAIL ABUN |
| TA-182 | 5.677E-02 | 1.240E-01 | 1.266E-01 | NOT IDENT. |
| RE-183 | 5.747E-01 | 4.761E-01 | 5.420E-01 | FAIL ABUN |
| RE-184 | 1.030E-01 | 2.740E-01 | 2.780E-01 | NOT IDENT. |
| W-188 | -4.461E+00 | 1.172E+01 | 1.189E+01 | NOT IDENT. |
| IR-192 | 2.087E-02 | 5.315E-02 | 5.397E-02 | NOT IDENT. |
| HG-203 | 3.190E-02 | 8.226E-02 | 8.351E-02 | NOT IDENT. |
| BI-207 | 4.429E-03 | 2.027E-02 | 2.037E-02 | NOT IDENT. |
| TL-208 | 1.022E-02 | 2.334E-02 | 2.379E-02 | NOT IDENT. |
| PB-210 | -3.196E+00 | 4.747E+00 | 4.961E+00 | NOT IDENT. |
| BI-211 | 1.024E-01 | 1.574E-01 | 1.640E-01 | NOT IDENT. |
| PB-211 | 8.457E-03 | 4.430E-01 | 4.430E-01 | NOT IDENT. |
| BI-212 | 2.781E-01 | 3.077E-01 | 3.323E-01 | NOT IDENT. |
| PB-212 | -3.868E-02 | 4.342E-02 | 4.679E-02 | NOT IDENT. |
| BI-214 | 9.528E-02 | 5.316E-02 | 6.835E-02 | FAIL ABUN |
| PB-214 | 3.717E-02 | 5.723E-02 | 5.963E-02 | NOT IDENT. |
| RN-219 | -1.306E-01 | 2.731E-01 | 2.793E-01 | NOT IDENT. |
| RN-222 | 9.528E-02 | 5.316E-02 | 6.835E-02 | FAIL ABUN |
| RA-223 | 1.836E-03 | 4.843E-01 | 4.843E-01 | NOT IDENT. |
| RA-224 | -8.036E-02 | 4.297E-01 | 4.312E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 9.528E-02 | 5.316E-02 | 6.835E-02 | FAIL ABUN |
| AC-227 | 6.571E-03 | 1.940E-01 | 1.941E-01 | NOT IDENT. |
| TH-227 | 6.571E-03 | 1.940E-01 | 1.941E-01 | NOT IDENT. |
| AC-228 | -2.911E-02 | 7.705E-02 | 7.816E-02 | FAIL ABUN |
| RA-228 | -2.911E-02 | 7.705E-02 | 7.816E-02 | FAIL ABUN |
| TH-228 | -3.868E-02 | 4.342E-02 | 4.679E-02 | NOT IDENT. |
| TH-229 | 1.562E-01 | 3.277E-01 | 3.352E-01 | NOT IDENT. |
| TH-230 | 9.527E-02 | 5.316E-02 | 6.834E-02 | FAIL ABUN |
| PA-231 | -1.161E+00 | 9.839E-01 | 1.114E+00 | NOT IDENT. |
| TH-231 | 1.836E-03 | 4.843E-01 | 4.843E-01 | NOT IDENT. |
| TH-232 | -2.911E-02 | 7.705E-02 | 7.816E-02 | NOT IDENT. |
| PA-233 | -1.605E-02 | 4.394E-02 | 4.453E-02 | NOT IDENT. |
| PA-234 | -2.862E-02 | 1.807E-01 | 1.811E-01 | FAIL ABUN |
| PA-234M | -1.953E+00 | 2.385E+00 | 2.542E+00 | NOT IDENT. |
| TH-234 | -6.822E-01 | 1.199E+00 | 1.238E+00 | NOT IDENT. |
| U-234 | 9.527E-02 | 5.316E-02 | 6.834E-02 | FAIL ABUN |
| U-235 | -1.244E-01 | 1.458E-01 | 1.562E-01 | FAIL ABUN |
| NP-237 | -1.605E-02 | 4.394E-02 | 4.453E-02 | NOT IDENT. |
| NP-238 | 2.908E+11 | 9.177E+11 | 9.270E+11 | SHORT HLIF |
| U-238 | -6.822E-01 | 1.199E+00 | 1.238E+00 | NOT IDENT. |
| NP-239 | 3.905E-02 | 2.503E-01 | 2.509E-01 | FAIL ABUN |
| PU-239 | 8.135E+01 | 1.964E+02 | 1.998E+02 | NOT IDENT. |
| AM-243 | 3.837E-02 | 3.826E-02 | 4.199E-02 | NOT IDENT. |
| CM-243 | 6.163E-02 | 9.745E-02 | 1.013E-01 | FAIL ABUN |
| CM-247 | -2.096E-02 | 2.535E-02 | 2.705E-02 | NOT IDENT. |
| CF-249 | 7.016E-03 | 2.710E-02 | 2.728E-02 | NOT IDENT. |
| CF-251 | -3.412E-02 | 8.711E-02 | 8.846E-02 | NOT IDENT. |
| ANH-511 | -2.868E-02 | 3.837E-02 | 4.049E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 29.0945 | 94.67 | 95.8039 | 193.51 | 29.3376 |
| 45.60 | 38.3321 | 94.87 | 93.6066 | 197.03 | 30.3906 |
| 46.54 | 39.4363 | 97.43 | 44.7591 | 198.01 | 34.2230 |
| 49.72 | 0.0000 | 98.43 | 40.3477 | 201.83 | 45.8024 |
| 51.35 | 34.7938 | 98.44 | 40.3482 | 205.31 | 36.3831 |
| 52.39 | 29.7511 | 99.53 | 47.1543 | 210.85 | 25.0260 |
| 53.44 | 25.9169 | 100.11 | 42.1406 | 215.65 | 17.4043 |
| 57.36 | 0.0000 | 103.18 | 38.9550 | 222.11 | 25.2901 |
| 57.53 | 31.1449 | 103.37 | 38.9664 | 227.09 | 39.0839 |
| 57.98 | 31.1762 | 105.21 | 35.1120 | 227.38 | 39.0942 |
| 59.32 | 39.0862 | 105.31 | 35.1173 | 228.16 | 0.0000 |
| 59.54 | 35.9767 | 106.12 | 35.1605 | 228.18 | 34.2320 |
| 63.29 | 34.0610 | 109.28 | 35.3274 | 117.23 | 34.2320 |
| 63.58 | 37.8687 | 111.00 | 34.2747 | 235.69 | 36.4301 |
| 64.28 | 36.8710 | 111.76 | 0.0000 | 235.96 | 41.3627 |
| 66.73 | 39.1759 | 116.30 | 0.0000 | 238.63 | 40.4720 |
| 67.24 | 42.3964 | 117.23 | 28.8200 | 238.98 | 0.0000 |
| 67.75 | 42.4402 | 121.12 | 39.4095 | 240.99 | 39.5657 |
| 69.67 | 33.0184 | 121.22 | 35.9371 | 242.00 | 39.6002 |
| 70.83 | 38.4318 | 121.78 | 30.1642 | 244.70 | 36.7152 |
| 72.81 | 49.2973 | 122.06 | 30.1758 | 252.40 | 0.0000 |
| 72.87 | 46.0875 | 123.07 | 23.2444 | 252.80 | 31.9717 |
| 74.66 | 32.2647 | 127.23 | 34.1872 | 254.15 | 0.0000 |
| 74.82 | 35.5019 | 129.30 | 28.1285 | 256.23 | 38.0747 |
| 74.97 | 35.5120 | 131.20 | 31.7241 | 260.90 | 0.0000 |
| 77.11 | 55.1034 | 133.02 | 36.2166 | 264.66 | 28.2491 |
| 79.69 | 37.9964 | 133.52 | 36.2400 | 268.22 | 15.1767 |
| 80.12 | 49.9772 | 136.00 | 30.1490 | 269.46 | 21.2685 |
| 80.19 | 0.0000 | 136.47 | 36.3780 | 271.23 | 29.4120 |
| 80.57 | 52.1929 | 140.51 | 0.0000 | 273.65 | 28.4525 |
| 81.00 | 47.8806 | 143.76 | 43.8761 | 276.40 | 23.4222 |
| 81.07 | 52.2400 | 144.24 | 36.7346 | 277.37 | 34.6501 |
| 83.79 | 41.5579 | 145.44 | 38.5833 | 277.60 | 29.5598 |
| 85.43 | 49.3552 | 152.43 | 34.3856 | 278.00 | 32.6279 |
| 86.55 | 51.6491 | 153.25 | 37.1362 | 279.20 | 26.5352 |
| 86.79 | 53.8691 | 323.87 | 38.9917 | 279.54 | 27.5628 |
| 86.94 | 53.8831 | 156.02 | 33.6224 | 280.46 | 26.5610 |
| 87.09 | 49.4973 | 158.56 | 41.0130 | 283.69 | 35.8443 |
| 87.57 | 48.4374 | 159.00 | 45.5933 | 284.31 | 0.0000 |
| 88.03 | 37.4583 | 162.33 | 32.0370 | 285.41 | 39.9938 |
| 88.34 | 36.3759 | 163.33 | 43.9867 | 285.90 | 0.0000 |
| 88.47 | 36.3840 | 165.86 | 50.5449 | 287.50 | 22.5965 |
| 89.96 | 107.2171 | 176.31 | 42.7614 | 290.67 | 37.0651 |
| 91.11 | 48.7288 | 176.60 | 46.4943 | 293.27 | 0.0000 |
| 92.59 | 47.7386 | 177.52 | 42.8169 | 351.93 | 32.0265 |
| 93.35 | 44.4637 | 181.07 | 0.0000 | 295.96 | 34.1118 |
| 94.56 | 64.6004 | 184.41 | 43.1292 | 879.38 | 33.1426 |
| 94.65 | 95.8008 | 143.76 | 34.7380 | 299.98 | 23.8458 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 21.7742 | 487.02 | 13.9525 | 702.65 | 16.3891 |
| 300.13 | 21.7748 | 492.35 | 0.0000 | 706.68 | 6.1556 |
| 301.36 | 30.0970 | 497.08 | 18.6995 | 711.68 | 6.1676 |
| 302.85 | 27.0132 | 505.52 | 49.7651 | 720.70 | 12.3779 |
| 256.23 | 24.9653 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 15.6292 | 511.00 | 22.5971 | 722.78 | 11.3556 |
| 308.46 | 23.9939 | 514.00 | 77.3214 | 722.91 | 11.3561 |
| 311.90 | 27.1910 | 514.00 | 77.3219 | 723.31 | 9.2929 |
| 316.51 | 26.2314 | 520.40 | 15.1352 | 724.19 | 12.3946 |
| 319.41 | 32.5941 | 520.69 | 0.0000 | 727.33 | 7.2389 |
| 320.08 | 24.1939 | 522.65 | 0.0000 | 733.00 | 14.5089 |
| 321.04 | 30.5262 | 527.90 | 0.0000 | 735.93 | 9.3375 |
| 323.87 | 30.5868 | 529.59 | 14.2529 | 333.97 | 8.3047 |
| 325.23 | 27.4485 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 32.8074 | 531.02 | 10.4594 | 747.24 | 8.3352 |
| 333.37 | 21.2332 | 546.56 | 0.0000 | 748.06 | 8.3377 |
| 333.97 | 25.4905 | 552.55 | 17.6123 | 752.31 | 7.3071 |
| 334.37 | 29.7470 | 563.25 | 14.4818 | 753.82 | 7.3110 |
| 338.28 | 21.3043 | 569.33 | 11.2952 | 756.73 | 14.6378 |
| 338.32 | 21.3049 | 946.00 | 16.1377 | 756.80 | 14.6385 |
| 311.90 | 20.2693 | 569.70 | 16.1389 | 884.68 | 16.7734 |
| 340.48 | 20.2693 | 583.19 | 8.7686 | 765.81 | 17.8338 |
| 340.55 | 20.2701 | 584.27 | 10.7226 | 766.42 | 15.7394 |
| 344.28 | 23.5294 | 595.83 | 12.7378 | 766.84 | 15.7419 |
| 345.93 | 20.3432 | 427.87 | 10.8007 | 772.60 | 0.0000 |
| 351.06 | 21.4868 | 602.52 | 0.0000 | 776.52 | 13.6909 |
| 351.93 | 21.4990 | 602.73 | 19.6563 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 19.6733 | 778.90 | 13.7027 |
| 356.01 | 28.0237 | 609.32 | 4.9282 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 0.0000 | 785.37 | 8.4521 |
| 366.42 | 0.0000 | 614.28 | 0.0000 | 792.07 | 11.6494 |
| 375.05 | 24.4392 | 618.01 | 16.4897 | 794.95 | 8.4811 |
| 356.01 | 20.8436 | 620.36 | 3.3013 | 795.86 | 8.4838 |
| 388.16 | 18.6988 | 621.93 | 8.4946 | 810.29 | 10.6587 |
| 388.63 | 17.6040 | 630.19 | 0.0000 | 344.28 | 10.6592 |
| 391.69 | 22.0462 | 631.29 | 8.9552 | 810.76 | 10.6604 |
| 264.66 | 13.2993 | 633.25 | 9.9583 | 815.77 | 13.8826 |
| 401.81 | 19.9627 | 634.78 | 7.9719 | 1048.07 | 9.6203 |
| 402.40 | 22.1887 | 635.95 | 11.9637 | 832.01 | 6.4434 |
| 404.85 | 16.6658 | 636.99 | 0.0000 | 834.85 | 8.5996 |
| 410.95 | 18.9559 | 645.85 | 20.0225 | 835.71 | 7.5269 |
| 413.71 | 20.1033 | 657.76 | 21.1277 | 836.80 | 0.0000 |
| 414.70 | 14.5276 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 14.4064 | 661.66 | 13.1000 | 846.77 | 8.6346 |
| 427.87 | 21.6193 | 664.57 | 0.0000 | 856.80 | 9.7466 |
| 433.94 | 14.4625 | 666.33 | 21.8746 | 860.56 | 13.0119 |
| 439.40 | 16.3202 | 666.50 | 21.8761 | 871.09 | 9.7930 |
| 453.88 | 13.7093 | 667.71 | 0.0000 | 873.19 | 7.6221 |
| 463.37 | 11.0238 | 677.62 | 15.2135 | 875.33 | 0.0000 |
| 468.07 | 16.5773 | 685.70 | 0.0000 | 879.38 | 8.7287 |
| 473.00 | 0.0000 | 695.00 | 10.2126 | 880.51 | 7.6404 |
| 475.06 | 15.7144 | 696.49 | 14.3059 | 883.24 | 9.8321 |
| 476.78 | 13.8781 | 696.51 | 14.3062 | 884.68 | 6.5578 |
| 477.60 | 12.9585 | 697.00 | 14.3090 | 889.28 | 6.5678 |
| 482.18 | 12.0617 | 697.49 | 15.3340 | 894.76 | 9.8690 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 4.3909 | 1298.22 | 0.0000 | | |
| 903.28 | 4.3983 | 1312.11 | 6.1521 | | |
| 911.20 | 5.5118 | 1332.49 | 4.1213 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 3.6924 | 1365.19 | 7.2675 | | |
| 937.49 | 5.5577 | 1368.63 | 0.0000 | | |
| 944.13 | 9.2820 | 1384.29 | 5.2136 | | |
| 946.00 | 9.2873 | 1408.01 | 0.0000 | | |
| 949.00 | 5.5775 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 7.4247 | | |
| 962.31 | 9.3341 | 1489.16 | 4.2689 | | |
| 964.08 | 11.2068 | 1505.03 | 5.3542 | | |
| 966.17 | 14.9521 | 1596.21 | 6.5479 | | |
| 968.97 | 5.6118 | 1620.50 | 2.8199 | | |
| 983.53 | 7.5153 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.8594 | | |
| 1274.44 | 5.6580 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.6102 | 1764.49 | 4.8326 | | |
| 1004.73 | 6.6175 | 1063.66 | 4.8376 | | |
| 507.63 | 0.0000 | 1771.35 | 3.8710 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.9233 | | |
| 1037.84 | 7.6361 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.9586 | | |
| 631.29 | 8.6122 | | | | |
| 1048.07 | 11.4878 | | | | |
| 1049.04 | 10.5336 | | | | |
| 1050.41 | 9.5797 | | | | |
| 1063.66 | 2.8846 | | | | |
| 1077.00 | 6.7562 | | | | |
| 1077.34 | 7.7220 | | | | |
| 1085.87 | 7.7402 | | | | |
| 1099.45 | 5.8271 | | | | |
| 1112.07 | 6.8217 | | | | |
| 1112.84 | 5.8484 | | | | |
| 1115.54 | 6.8282 | | | | |
| 1120.29 | 14.6509 | | | | |
| 1120.55 | 14.6515 | | | | |
| 1221.41 | 11.7236 | | | | |
| 1129.67 | 11.7500 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.9336 | | | | |
| 1177.95 | 8.9257 | | | | |
| 1189.05 | 5.9675 | | | | |
| 1204.77 | 6.9903 | | | | |
| 1221.41 | 3.0085 | | | | |
| 1231.02 | 5.0262 | | | | |
| 1235.36 | 4.0254 | | | | |
| 1238.28 | 6.0425 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 5.0773 | | | | |
| 1274.44 | 9.1450 | | | | |
| 1274.54 | 8.1289 | | | | |
| 1291.59 | 4.0814 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:13:11.36

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147016.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;214
                                        Background date  : 2-FEB-2014 16:28:13.
Sample date      : 7-DEC-2013 13:44:00. Acquisition date : 7-FEB-2014 09:11:59.
Sample ID        : G341147016           Sample quantity  : 1.30630E+02 GRAM
Detector name    : GAM29                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.77  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.98* | 19 | 50 | 1.77 | 93.97 | 89 | 9 | 5.24E-03 | 75.4 | |
| 2 | 7 | 74.76* | 26 | 31 | 1.32 | 149.46 | 147 | 18 | 7.08E-03 | 37.6 | 7.96E-01 |
| 3 | 7 | 77.56 | 18 | 78 | 2.05 | 155.03 | 147 | 18 | 4.93E-03 | 106.9 | |
| 4 | 0 | 92.87* | 22 | 61 | 1.05 | 185.62 | 181 | 11 | 6.11E-03 | 82.5 | |
| 5 | 0 | 128.23 | 19 | 36 | 0.58 | 256.24 | 253 | 8 | 5.28E-03 | 59.3 | |
| 6 | 0 | 164.05 | 26 | 51 | 1.74 | 327.77 | 323 | 10 | 7.35E-03 | 53.7 | |
| 7 | 2 | 173.72 | 18 | 30 | 1.40 | 347.08 | 343 | 16 | 4.89E-03 | 55.7 | 2.82E+00 |
| 8 | 2 | 176.93 | 18 | 27 | 1.41 | 353.49 | 343 | 16 | 5.14E-03 | 53.8 | |
| 9 | 0 | 224.78 | 12 | 17 | 0.60 | 449.05 | 445 | 7 | 3.38E-03 | 63.4 | |
| 10 | 3 | 238.27* | 17 | 21 | 1.22 | 476.00 | 471 | 16 | 4.71E-03 | 59.7 | 2.66E+00 |
| 11 | 3 | 240.68 | 14 | 24 | 1.62 | 480.81 | 471 | 16 | 3.88E-03 | 84.3 | |
| 12 | 0 | 295.54* | 24 | 17 | 0.92 | 590.40 | 588 | 10 | 6.61E-03 | 43.7 | |
| 13 | 0 | 352.56* | 5 | 14 | 1.49 | 704.31 | 699 | 7 | 1.29E-03 | 156.1 | |
| 14 | 0 | 371.94 | 5 | 26 | 0.93 | 743.02 | 738 | 7 | 1.51E-03 | 158.1 | |
| 15 | 0 | 473.68 | 11 | 6 | 0.82 | 946.30 | 941 | 8 | 3.02E-03 | 49.5 | |
| 16 | 0 | 511.28* | 8 | 48 | 2.86 | 1021.43 | 1014 | 20 | 2.10E-03 | 278.1 | |
| 17 | 0 | 573.36 | 29 | 3 | 2.34 | 1145.48 | 1140 | 14 | 8.16E-03 | 22.7 | |
| 18 | 0 | 611.84 | 8 | 30 | 0.48 | 1222.38 | 1217 | 13 | 2.21E-03 | 166.6 | |
| 19 | 0 | 633.08 | 12 | 0 | 0.74 | 1264.83 | 1260 | 10 | 3.33E-03 | 28.9 | |
| 20 | 0 | 736.26 | 7 | 3 | 0.62 | 1471.07 | 1468 | 6 | 1.94E-03 | 54.4 | |
| 21 | 0 | 745.14 | 6 | 2 | 1.33 | 1488.83 | 1485 | 7 | 1.77E-03 | 52.2 | |
| 22 | 0 | 817.51 | 5 | 3 | 0.88 | 1633.50 | 1630 | 6 | 1.39E-03 | 70.7 | |
| 23 | 0 | 832.32 | 8 | 3 | 1.34 | 1663.11 | 1660 | 6 | 2.32E-03 | 47.1 | |
| 24 | 0 | 846.17 | 10 | 8 | 3.98 | 1690.82 | 1683 | 12 | 2.78E-03 | 67.1 | |
| 25 | 0 | 964.96 | 8 | 4 | 0.90 | 1928.33 | 1925 | 7 | 2.08E-03 | 55.2 | |
| 26 | 0 | 1009.63 | 6 | 2 | 1.32 | 2017.67 | 2014 | 7 | 1.74E-03 | 53.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:13:12

Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147016.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title     : RXF2
Sample date      : 7-DEC-2013 13:44:00  Acquisition date : 7-FEB-2014 09:11:59
Sample ID        : G341147016           Sample quantity  : 130.63 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA29              Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.77   0.0%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| PB-214 | 242.00 | RA-224 | 240.99 |
| PB-214 | 74.82 | AM-243 | 74.66 |
| PB-214 | 74.82 | TH-228 | 74.82 |
| PB-214 | 74.82 | PB-212 | 74.82 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| PB-210 | 46.54 | 4.25* | 8.153E-01 | 3.128E+00 | 3.144E+00 | 150.77 | OK |
| PB-212 | 74.82 | 10.28 | 4.372E+00 | 3.050E-01 | 3.050E-01 | 80.94 | OK |
| | 77.11 | 17.10 | 4.683E+00 | 1.274E-01 | 1.274E-01 | 213.80 | OK |
| | 238.63 | 43.60* | 5.457E+00 | 4.092E-02 | 4.092E-02 | 119.39 | OK |
| | 300.09 | 3.30 | 4.714E+00 | ----- Line Not Found | | ----- | Absent |
| PB-214 | 74.82 | 5.80 | 4.379E+00 | ----- Line Not Found | | ----- | <<INT Reject |
| | 77.11 | 9.70 | 4.683E+00 | 2.246E-01 | 2.246E-01 | 213.80 | OK |
| | 87.09 | 3.41 | 5.566E+00 | ----- Line Not Found | | ----- | Absent |
| | 242.00 | 7.25 | 5.406E+00 | ----- Line Not Found | | ----- | <<INT Reject |
| | 295.22 | 18.42 | 4.761E+00 | 1.559E-01 | 1.560E-01 | 87.30 | OK |
| | 351.93 | 35.60* | 4.235E+00 | 1.770E-02 | 1.771E-02 | 312.22 | OK |
| RA-224 | 240.99 | 4.10* | 5.424E+00 | 2.954E-01 | 2.954E-01 | 208.39 | OK |
| TH-228 | 74.82 | 10.28 | 4.372E+00 | 3.050E-01 | 3.050E-01 | 80.94 | OK |
| | 77.11 | 17.10 | 4.683E+00 | 1.274E-01 | 1.274E-01 | 213.80 | OK |
| | 238.63 | 43.60* | 5.457E+00 | 4.092E-02 | 4.092E-02 | 119.39 | OK |
| | 300.09 | 3.30 | 4.714E+00 | ----- Line Not Found | | ----- | Absent |
| AM-243 | 43.53 | 5.90 | 5.135E-01 | ----- Line Not Found | | ----- | Absent |
| | 74.66 | 67.20* | 4.372E+00 | 4.666E-02 | 4.666E-02 | 80.94 | OK |
| ANH-511 | 511.00 | 100.00* | 3.282E+00 | 1.327E-02 | 1.327E-02 | 556.19 | OK |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:13:13.70

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147016.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:59 Sensitivity     : 3.000            *
* Detector ID      : GAM29                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.77     Half life ratio : *****            *
* Sample date      :  7-DEC-2013 13:44:00 Nuclide Library : SOLID            *
* Sample ID        : G341147016           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.3063E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7          *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| PB-210 | 3.144E+00 | 4.646E+00 | 6.312E+00 |
| PB-212 | 4.092E-02 | 4.788E-02 | 7.097E-02 |
| PB-214 | 1.771E-02 | 5.417E-02 | 7.800E-02 |
| RA-224 | 2.954E-01 | 6.033E-01 | 7.598E-01 |
| TH-228 | 4.092E-02 | 4.788E-02 | 7.097E-02 |
| AM-243 | 4.666E-02 | 3.701E-02 | 7.752E-02 |
| ANH-511 | 1.327E-02 | 7.232E-02 | 4.555E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 1.065E-02 | 4.488E-01 | 7.683E-01 | NOT IDENT. |
| NA-22 | 7.130E-03 | 2.115E-02 | 4.934E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.459E+28 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.008E-02 | 3.165E-02 | 7.131E-02 | NOT IDENT. |
| K-40 | 7.534E-02 | 2.874E-01 | 7.009E-01 | NOT IDENT. |
| SC-46 | 2.267E-03 | 3.961E-02 | 8.015E-02 | NOT IDENT. |
| V-48 | -3.626E-01 | 3.532E-01 | 5.541E-01 | NOT IDENT. |
| CR-51 | 5.516E-01 | 8.850E-01 | 1.777E+00 | NOT IDENT. |
| MN-54 | -8.501E-03 | 2.832E-02 | 4.585E-02 | NOT IDENT. |
| CO-56 | 4.450E-02 | 5.851E-02 | 7.665E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.315E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 4.868E-03 | 2.319E-02 | 4.185E-02 | NOT IDENT. |
| CO-58 | -1.884E-02 | 3.643E-02 | 6.469E-02 | NOT IDENT. |
| FE-59 | 1.773E-02 | 1.324E-01 | 2.684E-01 | NOT IDENT. |
| CO-60 | 6.553E-03 | 2.859E-02 | 6.060E-02 | NOT IDENT. |
| ZN-65 | 7.681E-03 | 6.116E-02 | 1.261E-01 | NOT IDENT. |
| GE-68 | 2.969E-01 | 1.004E+00 | 2.098E+00 | NOT IDENT. |
| AS-73 | -6.279E-01 | 1.055E+00 | 1.808E+00 | NOT IDENT. |
| AS-74 | -2.067E-01 | 4.278E-01 | 7.398E-01 | NOT IDENT. |
| SE-75 | 1.344E-03 | 4.596E-02 | 8.617E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 6.133E+06 | 0.000E+00 | SHORT HLIF |
| SR-82 | -6.134E-01 | 7.702E-01 | 1.327E+00 | NOT IDENT. |
| RB-83 | -3.245E-02 | 8.899E-02 | 1.349E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | 5.676E+00 | 6.492E+00 | 1.301E+01 | NOT IDENT. |
| SR-85 | 4.900E-02 | 5.619E-02 | 1.126E-01 | NOT IDENT. |
| RB-86 | 5.999E-01 | 3.107E+00 | 6.414E+00 | NOT IDENT. |
| Y-88 | 1.253E-02 | 2.701E-02 | 7.511E-02 | NOT IDENT. |
| Y-91 | 5.317E+00 | 1.532E+01 | 3.594E+01 | NOT IDENT. |
| NB-94 | -7.783E-03 | 2.169E-02 | 3.843E-02 | NOT IDENT. |
| NB-95 | 1.229E-02 | 3.495E-02 | 7.715E-02 | NOT IDENT. |
| NB-95M | 1.398E-01 | 1.519E-01 | 2.824E-01 | NOT IDENT. |
| ZR-95 | 4.001E-02 | 7.118E-02 | 1.583E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.330E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.569E+26 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.195E+06 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.416E-02 | 2.808E-02 | 4.414E-02 | FAIL ABUN |
| RH-102 | -8.746E-03 | 3.796E-02 | 6.014E-02 | FAIL ABUN |
| RU-103 | 1.677E-02 | 6.506E-02 | 1.280E-01 | NOT IDENT. |
| RH-106 | -3.775E-02 | 2.458E-01 | 4.528E-01 | NOT IDENT. |
| RU-106 | -3.775E-02 | 2.458E-01 | 4.528E-01 | NOT IDENT. |
| AG-108M | 5.973E-03 | 1.976E-02 | 3.937E-02 | NOT IDENT. |
| CD-109 | 1.464E-01 | 6.938E-01 | 1.146E+00 | NOT IDENT. |
| AG-110M | 6.445E-03 | 3.598E-02 | 7.526E-02 | NOT IDENT. |
| SN-113 | -1.626E-02 | 4.259E-02 | 7.628E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.784E+07 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.839E-01 | 4.554E-01 | 8.018E-01 | NOT IDENT. |
| TE-123M | 1.571E-02 | 3.073E-02 | 5.166E-02 | NOT IDENT. |
| SB-124 | 4.163E-02 | 9.138E-02 | 2.338E-01 | NOT IDENT. |
| SB-125 | 3.491E-02 | 7.129E-02 | 1.423E-01 | FAIL ABUN |
| TE-125M | 1.255E+00 | 1.290E+01 | 2.323E+01 | NOT IDENT. |
| I-126 | 5.471E-02 | 1.773E+00 | 3.398E+00 | NOT IDENT. |
| SB-126 | 5.868E-01 | 1.405E+00 | 2.943E+00 | NOT IDENT. |
| SN-126 | 1.358E-02 | 5.991E-02 | 1.049E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 3.710E+03 | 0.000E+00 | SHORT HLIF |
| I-131 | -2.043E+00 | 4.839E+00 | 8.628E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 1.254E+04 | 0.000E+00 | SHORT HLIF |
| BA-133 | -7.704E-03 | 3.164E-02 | 5.045E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 7.440E+19 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.770E-03 | 2.587E-02 | 5.575E-02 | NOT IDENT. |
| CS-135 | 1.147E-02 | 1.218E-01 | 2.293E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.940E-01 | 7.923E-01 | 1.786E+00 | FAIL ABUN |
| BA-137M | -4.326E-03 | 2.464E-02 | 4.521E-02 | NOT IDENT. |
| CS-137 | -4.570E-03 | 2.603E-02 | 4.776E-02 | NOT IDENT. |
| CE-139 | 1.250E-02 | 3.101E-02 | 5.139E-02 | NOT IDENT. |
| BA-140 | -3.277E-01 | 7.735E-01 | 1.412E+00 | NOT IDENT. |
| LA-140 | -3.277E-01 | 7.735E-01 | 1.412E+00 | NOT IDENT. |
| CE-141 | -5.963E-02 | 1.336E-01 | 2.243E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.752E+12 | 0.000E+00 | SHORT HLIF |
| CE-144 | 9.549E-02 | 1.705E-01 | 3.070E-01 | NOT IDENT. |
| PM-144 | 3.461E-02 | 2.790E-02 | 6.194E-02 | NOT IDENT. |
| PR-144 | 2.655E+00 | 2.140E+00 | 4.750E+00 | NOT IDENT. |
| PM-146 | -5.294E-03 | 3.111E-02 | 5.733E-02 | FAIL ABUN |
| ND-147 | -7.909E-01 | 8.211E+00 | 1.521E+01 | NOT IDENT. |
| PM-147 | 3.828E+02 | 6.122E+02 | 1.149E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.568E+08 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.413E-02 | 2.003E-02 | 4.051E-02 | FAIL ABUN |
| EU-152 | 6.588E-02 | 6.109E-02 | 1.329E-01 | FAIL ABUN |
| GD-153 | 2.701E-02 | 8.231E-02 | 1.370E-01 | NOT IDENT. |
| EU-154 | 1.973E-02 | 5.852E-02 | 1.365E-01 | NOT IDENT. |
| EU-155 | 5.370E-02 | 7.607E-02 | 1.464E-01 | NOT IDENT. |
| TB-160 | 2.900E-02 | 1.189E-01 | 2.567E-01 | FAIL ABUN |
| HO-166M | 1.410E-03 | 4.081E-02 | 7.454E-02 | NOT IDENT. |
| TM-171 | -1.170E+01 | 1.648E+01 | 2.787E+01 | NOT IDENT. |
| LU-176 | -4.299E-03 | 1.972E-02 | 3.617E-02 | NOT IDENT. |
| HF-181 | -8.738E-03 | 6.168E-02 | 1.154E-01 | NOT IDENT. |
| TA-182 | 9.608E-02 | 1.342E-01 | 3.146E-01 | NOT IDENT. |
| RE-183 | -2.966E-02 | 2.514E-01 | 4.530E-01 | NOT IDENT. |
| RE-184 | 1.364E-01 | 2.290E-01 | 4.948E-01 | NOT IDENT. |
| W-188 | 3.515E+00 | 8.793E+00 | 1.669E+01 | NOT IDENT. |
| IR-192 | -1.526E-03 | 3.918E-02 | 7.352E-02 | FAIL ABUN |
| HG-203 | -5.533E-02 | 5.296E-02 | 8.770E-02 | NOT IDENT. |
| BI-207 | -1.603E-02 | 3.611E-02 | 6.579E-02 | FAIL ABUN |
| TL-208 | 1.527E-02 | 2.638E-02 | 5.577E-02 | NOT IDENT. |
| BI-211 | 8.242E-02 | 1.370E-01 | 2.727E-01 | NOT IDENT. |
| PB-211 | 1.471E-01 | 4.069E-01 | 8.339E-01 | FAIL ABUN |
| BI-212 | 1.432E-01 | 3.544E-01 | 7.413E-01 | NOT IDENT. |
| BI-214 | 8.059E-03 | 7.800E-02 | 1.338E-01 | NOT IDENT. |
| RN-219 | -1.432E-01 | 2.768E-01 | 4.864E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 8.059E-03 | 7.800E-02 | 1.338E-01 | NOT IDENT. |
| RA-223 | -3.265E-01 | 4.857E-01 | 8.395E-01 | NOT IDENT. |
| RA-226 | 8.059E-03 | 7.800E-02 | 1.338E-01 | NOT IDENT. |
| AC-227 | 3.584E-03 | 1.795E-01 | 3.392E-01 | NOT IDENT. |
| TH-227 | 3.584E-03 | 1.795E-01 | 3.392E-01 | NOT IDENT. |
| AC-228 | 5.940E-02 | 1.148E-01 | 2.459E-01 | NOT IDENT. |
| RA-228 | 5.940E-02 | 1.148E-01 | 2.459E-01 | NOT IDENT. |
| TH-229 | 2.279E-01 | 3.740E-01 | 7.411E-01 | NOT IDENT. |
| TH-230 | 8.059E-03 | 7.799E-02 | 1.338E-01 | NOT IDENT. |
| PA-231 | -1.665E-01 | 1.012E+00 | 1.877E+00 | NOT IDENT. |
| TH-231 | -3.265E-01 | 4.857E-01 | 8.395E-01 | NOT IDENT. |
| TH-232 | 5.940E-02 | 1.148E-01 | 2.459E-01 | NOT IDENT. |
| PA-233 | -2.191E-02 | 4.547E-02 | 8.095E-02 | NOT IDENT. |
| PA-234 | 6.712E-02 | 1.474E-01 | 3.440E-01 | NOT IDENT. |
| PA-234M | -3.131E-01 | 2.651E+00 | 5.504E+00 | NOT IDENT. |
| TH-234 | -8.808E-01 | 1.076E+00 | 1.932E+00 | FAIL ABUN |
| U-234 | 8.059E-03 | 7.799E-02 | 1.338E-01 | NOT IDENT. |
| U-235 | -1.804E-02 | 1.544E-01 | 2.720E-01 | FAIL ABUN |
| NP-237 | -2.191E-02 | 4.547E-02 | 8.095E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 5.985E+07 | 0.000E+00 | SHORT HLIF |
| U-238 | -8.808E-01 | 1.076E+00 | 1.932E+00 | FAIL ABUN |
| NP-239 | -2.212E-01 | 3.023E-01 | 4.960E-01 | NOT IDENT. |
| PU-239 | 2.513E+02 | 2.921E+02 | 4.580E+02 | FAIL ABUN |
| AM-241 | -8.743E-02 | 1.197E-01 | 2.013E-01 | NOT IDENT. |
| CM-243 | -3.270E-02 | 7.592E-02 | 1.299E-01 | NOT IDENT. |
| CM-247 | -4.916E-03 | 2.270E-02 | 4.220E-02 | NOT IDENT. |
| CF-249 | 1.056E-02 | 2.800E-02 | 5.559E-02 | NOT IDENT. |
| CF-251 | 9.609E-02 | 1.014E-01 | 1.721E-01 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:13:09.81

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.98 | 35 | 50 | 1.77 | 93.97 | 89 | 9 | 9.58E-03 | 40.5 | |
| 2 | 7 | 74.76 | 30 | 31 | 1.32 | 149.46 | 147 | 18 | 8.42E-03 | 29.9 | 7.96E-01 |
| 3 | 7 | 77.56 | 18 | 78 | 2.05 | 155.03 | 147 | 18 | 4.93E-03 | 106.9 | |
| 4 | 0 | 92.87 | 85 | 61 | 1.05 | 185.62 | 181 | 11 | 2.35E-02 | 20.9 | |
| 5 | 0 | 128.23 | 19 | 36 | 0.58 | 256.24 | 253 | 8 | 5.28E-03 | 59.3 | |
| 6 | 0 | 164.05 | 26 | 51 | 1.74 | 327.77 | 323 | 10 | 7.35E-03 | 53.7 | |
| 7 | 2 | 173.72 | 18 | 30 | 1.40 | 347.08 | 343 | 16 | 4.89E-03 | 55.7 | 2.82E+00 |
| 8 | 2 | 176.93 | 18 | 27 | 1.41 | 353.49 | 343 | 16 | 5.14E-03 | 53.8 | |
| 9 | 0 | 185.54 | 39 | 63 | 0.87 | 370.69 | 366 | 10 | 1.08E-02 | 41.4 | |
| 10 | 0 | 224.78 | 12 | 17 | 0.60 | 449.05 | 445 | 7 | 3.38E-03 | 63.4 | |
| 11 | 3 | 238.27 | 26 | 21 | 1.22 | 476.00 | 471 | 16 | 7.25E-03 | 37.1 | 2.66E+00 |
| 12 | 3 | 240.68 | 14 | 24 | 1.62 | 480.81 | 471 | 16 | 3.88E-03 | 84.3 | |
| 13 | 0 | 295.54 | 29 | 17 | 0.92 | 590.40 | 588 | 10 | 8.13E-03 | 34.6 | |
| 14 | 0 | 352.56 | 8 | 14 | 1.49 | 704.31 | 699 | 7 | 2.31E-03 | 82.0 | |
| 15 | 0 | 371.94 | 5 | 26 | 0.93 | 743.02 | 738 | 7 | 1.51E-03 | 158.1 | |
| 16 | 0 | 473.68 | 11 | 6 | 0.82 | 946.30 | 941 | 8 | 3.02E-03 | 49.5 | |
| 17 | 0 | 511.28 | 100 | 48 | 2.86 | 1021.43 | 1014 | 20 | 2.78E-02 | 20.6 | |
| 18 | 0 | 573.36 | 29 | 3 | 2.34 | 1145.48 | 1140 | 14 | 8.16E-03 | 22.7 | |
| 19 | 0 | 611.84 | 8 | 30 | 0.48 | 1222.38 | 1217 | 13 | 2.21E-03 | 166.6 | |
| 20 | 0 | 633.08 | 12 | 0 | 0.74 | 1264.83 | 1260 | 10 | 3.33E-03 | 28.9 | |
| 21 | 0 | 736.26 | 7 | 3 | 0.62 | 1471.07 | 1468 | 6 | 1.94E-03 | 54.4 | |
| 22 | 0 | 745.14 | 6 | 2 | 1.33 | 1488.83 | 1485 | 7 | 1.77E-03 | 52.2 | |
| 23 | 0 | 817.51 | 5 | 3 | 0.88 | 1633.50 | 1630 | 6 | 1.39E-03 | 70.7 | |
| 24 | 0 | 832.32 | 8 | 3 | 1.34 | 1663.11 | 1660 | 6 | 2.32E-03 | 47.1 | |
| 25 | 0 | 846.17 | 10 | 8 | 3.98 | 1690.82 | 1683 | 12 | 2.78E-03 | 67.1 | |
| 26 | 0 | 964.96 | 8 | 4 | 0.90 | 1928.33 | 1925 | 7 | 2.08E-03 | 55.2 | |
| 27 | 0 | 1009.63 | 6 | 2 | 1.32 | 2017.67 | 2014 | 7 | 1.74E-03 | 53.2 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:13:11.89

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PB-210 | 46.54 | 19 | 4.25* | 8.153E-01 | 3.128E+00 | 3.144E+00 | 150.77 |
| PB-212 | 74.82 | 26 | 10.28 | 4.372E+00 | 3.261E-01 | 3.261E-01 | 75.20 |
| | 77.11 | 18 | 17.10 | 4.683E+00 | 1.274E-01 | 1.274E-01 | 213.80 |
| | 238.63 | 17 | 43.60* | 5.457E+00 | 4.092E-02 | 4.092E-02 | 119.39 |
| | 300.09 | ------ | 3.30 | 4.714E+00 | ------ | Line Not Found | ------ |
| PB-214 | 74.82 | 26 | 5.80 | 4.372E+00 | 5.779E-01 | 5.780E-01 | 75.20 |
| | 77.11 | 18 | 9.70 | 4.683E+00 | 2.246E-01 | 2.246E-01 | 213.80 |
| | 87.09 | ------ | 3.41 | 5.566E+00 | ------ | Line Not Found | ------ |
| | 242.00 | 14 | 7.25 | 5.424E+00 | 2.043E-01 | 2.043E-01 | 168.52 |
| | 295.22 | 24 | 18.42 | 4.761E+00 | 1.559E-01 | 1.560E-01 | 87.30 |
| | 351.93 | 5 | 35.60* | 4.235E+00 | 1.770E-02 | 1.771E-02 | 312.22 |
| RA-224 | 240.99 | 14 | 4.10* | 5.424E+00 | 3.613E-01 | 3.613E-01 | 168.52 |
| TH-228 | 74.82 | 26 | 10.28 | 4.372E+00 | 3.261E-01 | 3.261E-01 | 75.20 |
| | 77.11 | 18 | 17.10 | 4.683E+00 | 1.274E-01 | 1.274E-01 | 213.80 |
| | 238.63 | 17 | 43.60* | 5.457E+00 | 4.092E-02 | 4.092E-02 | 119.39 |
| | 300.09 | ------ | 3.30 | 4.714E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 5.135E-01 | ------ | Line Not Found | ------ |
| | 74.66 | 26 | 67.20* | 4.372E+00 | 4.988E-02 | 4.988E-02 | 75.20 |
| ANH-511 | 511.00 | 8 | 100.00* | 3.282E+00 | 1.327E-02 | 1.327E-02 | 556.19 |

Flag: "*" = Keyline

Sample ID : G341147016 Acquisition date : 7-FEB-2014 09:11:59

Total number of lines in spectrum 26
Number of unidentified lines 7
Number of lines tentatively identified by NID 19 73.08%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| PB-210 | 22.20Y | 1.01 | 3.128E+00 | 3.144E+00 | 4.741E+00 | 150.77 | |
| PB-212 | 1.41E+10Y | 1.00 | 4.092E-02 | 4.092E-02 | 4.886E-02 | 119.39 | |
| PB-214 | 1600.00Y | 1.00 | 1.770E-02 | 1.771E-02 | 5.528E-02 | 312.22 | |
| RA-224 | 1.41E+10Y | 1.00 | 3.613E-01 | 3.613E-01 | 6.089E-01 | 168.52 | |
| TH-228 | 1.41E+10Y | 1.00 | 4.092E-02 | 4.092E-02 | 4.886E-02 | 119.39 | |
| AM-243 | 7370.00Y | 1.00 | 4.988E-02 | 4.988E-02 | 3.751E-02 | 75.20 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.327E-02 | 1.327E-02 | 7.379E-02 | 556.19 | |
| | Total Activity : | | 3.652E+00 | 3.668E+00 | | | |
| | Grand Total Activity : | | 3.652E+00 | 3.668E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147016 Acquisition date : 7-FEB-2014 09:11:59

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.87 | 22 | 61 | 1.05 | 185.62 | 181 | 11 | 6.11E-03 | **** | 5.97E+00 | T |
| 0 | 128.23 | 19 | 36 | 0.58 | 256.24 | 253 | 8 | 5.28E-03 | **** | 6.89E+00 | T |
| 0 | 164.05 | 26 | 51 | 1.74 | 327.77 | 323 | 10 | 7.35E-03 | **** | 6.59E+00 | T |
| 2 | 173.72 | 18 | 30 | 1.40 | 347.08 | 343 | 16 | 4.89E-03 | **** | 6.44E+00 | |
| 2 | 176.93 | 18 | 27 | 1.41 | 353.49 | 343 | 16 | 5.14E-03 | **** | 6.39E+00 | T |
| 0 | 224.78 | 12 | 17 | 0.60 | 449.05 | 445 | 7 | 3.38E-03 | **** | 5.65E+00 | |
| 0 | 371.94 | 5 | 26 | 0.93 | 743.02 | 738 | 7 | 1.51E-03 | **** | 4.09E+00 | |
| 0 | 473.68 | 11 | 6 | 0.82 | 946.30 | 941 | 8 | 3.02E-03 | 99.0 | 3.46E+00 | T |
| 0 | 573.36 | 29 | 3 | 2.34 | 1145.48 | 1140 | 14 | 8.16E-03 | 45.3 | 3.02E+00 | |
| 0 | 611.84 | 8 | 30 | 0.48 | 1222.38 | 1217 | 13 | 2.21E-03 | **** | 2.88E+00 | |
| 0 | 633.08 | 12 | 0 | 0.74 | 1264.83 | 1260 | 10 | 3.33E-03 | 57.7 | 2.81E+00 | T |
| 0 | 736.26 | 7 | 3 | 0.62 | 1471.07 | 1468 | 6 | 1.94E-03 | **** | 2.51E+00 | T |
| 0 | 745.14 | 6 | 2 | 1.33 | 1488.83 | 1485 | 7 | 1.77E-03 | **** | 2.49E+00 | |
| 0 | 817.51 | 5 | 3 | 0.88 | 1633.50 | 1630 | 6 | 1.39E-03 | **** | 2.31E+00 | T |
| 0 | 832.32 | 8 | 3 | 1.34 | 1663.11 | 1660 | 6 | 2.32E-03 | 94.1 | 2.28E+00 | T |
| 0 | 846.17 | 10 | 8 | 3.98 | 1690.82 | 1683 | 12 | 2.78E-03 | **** | 2.25E+00 | T |
| 0 | 964.96 | 8 | 4 | 0.90 | 1928.33 | 1925 | 7 | 2.08E-03 | **** | 2.02E+00 | T |
| 0 | 1009.63 | 6 | 2 | 1.32 | 2017.67 | 2014 | 7 | 1.74E-03 | **** | 1.95E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:13:24.24

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147016.CNF;1       *
* Acquisition date :  7-FEB-2014 09:11:59 Sensitivity     : 3.000                *
* Detector ID      : GAM29                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.77     Half life ratio : *****                *
* Sample date      :  7-DEC-2013 13:44:00 Nuclide Library : SOLID                *
* Sample ID        : G341147016           Analyst initials: RXF2                 *
* Batch Number     : 1359496              Sample Quantity : 1.3063E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| PB-210 | 2.920E+00 |
| PB-212 | 3.223E-02 |
| PB-214 | 3.386E-02 |
| RA-224 | 3.451E-01 |
| TH-228 | 3.223E-02 |
| AM-243 | 3.612E-02 |
| ANH-511 | 2.042E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 3.359E-01 | NOT IDENT. |
| NA-22 | 1.958E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.918E-02 | NOT IDENT. |
| K-40 | 2.993E-01 | NOT IDENT. |
| SC-46 | 3.409E-02 | NOT IDENT. |
| V-48 | 2.199E-01 | NOT IDENT. |
| CR-51 | 8.072E-01 | NOT IDENT. |
| MN-54 | 1.901E-02 | NOT IDENT. |
| CO-56 | 3.231E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.938E-02 | NOT IDENT. |
| CO-58 | 2.620E-02 | NOT IDENT. |
| FE-59 | 1.143E-01 | NOT IDENT. |
| CO-60 | 2.514E-02 | NOT IDENT. |
| ZN-65 | 5.283E-02 | NOT IDENT. |
| GE-68 | 8.961E-01 | NOT IDENT. |
| AS-73 | 8.213E-01 | NOT IDENT. |
| AS-74 | 3.200E-01 | NOT IDENT. |
| SE-75 | 3.941E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 5.474E-01 | NOT IDENT. |
| RB-83 | 5.871E-02 | NOT IDENT. |
| KR-85 | 5.952E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SR-85 | 5.151E-02 | NOT IDENT. |
| RB-86 | 2.722E+00 | NOT IDENT. |
| Y-88 | 2.770E-02 | NOT IDENT. |
| Y-91 | 1.427E+01 | NOT IDENT. |
| NB-94 | 1.622E-02 | NOT IDENT. |
| NB-95 | 3.234E-02 | NOT IDENT. |
| NB-95M | 1.301E-01 | NOT IDENT. |
| ZR-95 | 6.783E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.036E-02 | FAIL ABUN |
| RH-102 | 2.499E-02 | FAIL ABUN |
| RU-103 | 5.640E-02 | NOT IDENT. |
| RH-106 | 1.956E-01 | NOT IDENT. |
| RU-106 | 1.956E-01 | NOT IDENT. |
| AG-108M | 1.736E-02 | NOT IDENT. |
| CD-109 | 5.324E-01 | NOT IDENT. |
| AG-110M | 3.179E-02 | NOT IDENT. |
| SN-113 | 3.375E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.695E-01 | NOT IDENT. |
| TE-123M | 2.385E-02 | NOT IDENT. |
| SB-124 | 9.059E-02 | NOT IDENT. |
| SB-125 | 6.384E-02 | FAIL ABUN |
| TE-125M | 1.071E+01 | NOT IDENT. |
| I-126 | 1.459E+00 | NOT IDENT. |
| SB-126 | 1.290E+00 | NOT IDENT. |
| SN-126 | 4.870E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 3.836E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.222E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.381E-02 | NOT IDENT. |
| CS-135 | 1.051E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.593E-01 | FAIL ABUN |
| BA-137M | 1.942E-02 | NOT IDENT. |
| CS-137 | 2.052E-02 | NOT IDENT. |
| CE-139 | 2.368E-02 | NOT IDENT. |
| BA-140 | 5.287E-01 | NOT IDENT. |
| LA-140 | 5.287E-01 | NOT IDENT. |
| CE-141 | 1.034E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.417E-01 | NOT IDENT. |
| PM-144 | 2.762E-02 | NOT IDENT. |
| PR-144 | 2.119E+00 | NOT IDENT. |
| PM-146 | 2.525E-02 | FAIL ABUN |
| ND-147 | 6.687E+00 | NOT IDENT. |
| PM-147 | 5.333E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.841E-02 | FAIL ABUN |
| EU-152 | 5.964E-02 | FAIL ABUN |
| GD-153 | 6.340E-02 | NOT IDENT. |
| EU-154 | 5.418E-02 | NOT IDENT. |
| EU-155 | 6.748E-02 | NOT IDENT. |
| TB-160 | 1.070E-01 | FAIL ABUN |
| HO-166M | 3.170E-02 | NOT IDENT. |
| TM-171 | 1.270E+01 | NOT IDENT. |
| LU-176 | 1.631E-02 | NOT IDENT. |
| HF-181 | 4.996E-02 | NOT IDENT. |
| TA-182 | 1.321E-01 | NOT IDENT. |
| RE-183 | 2.072E-01 | NOT IDENT. |
| RE-184 | 2.154E-01 | NOT IDENT. |
| W-188 | 7.606E+00 | NOT IDENT. |
| IR-192 | 3.308E-02 | FAIL ABUN |
| HG-203 | 3.902E-02 | NOT IDENT. |
| BI-207 | 2.729E-02 | FAIL ABUN |
| TL-208 | 2.483E-02 | NOT IDENT. |
| BI-211 | 1.223E-01 | NOT IDENT. |
| PB-211 | 3.638E-01 | FAIL ABUN |
| BI-212 | 3.248E-01 | NOT IDENT. |
| BI-214 | 6.101E-02 | NOT IDENT. |
| RN-219 | 2.129E-01 | NOT IDENT. |
| RN-222 | 6.101E-02 | NOT IDENT. |

| | | |
|---|---|---|
| RA-223 | 3.765E-01 | NOT IDENT. |
| RA-226 | 6.101E-02 | NOT IDENT. |
| AC-227 | 1.540E-01 | NOT IDENT. |
| TH-227 | 1.540E-01 | NOT IDENT. |
| AC-228 | 1.088E-01 | NOT IDENT. |
| RA-228 | 1.088E-01 | NOT IDENT. |
| TH-229 | 3.419E-01 | NOT IDENT. |
| TH-230 | 6.101E-02 | NOT IDENT. |
| PA-231 | 8.453E-01 | NOT IDENT. |
| TH-231 | 3.765E-01 | NOT IDENT. |
| TH-232 | 1.088E-01 | NOT IDENT. |
| PA-233 | 3.610E-02 | NOT IDENT. |
| PA-234 | 1.405E-01 | NOT IDENT. |
| PA-234M | 2.281E+00 | NOT IDENT. |
| TH-234 | 8.937E-01 | FAIL ABUN |
| U-234 | 6.101E-02 | NOT IDENT. |
| U-235 | 1.256E-01 | FAIL ABUN |
| NP-237 | 3.610E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 8.937E-01 | FAIL ABUN |
| NP-239 | 2.264E-01 | NOT IDENT. |
| PU-239 | 2.112E+02 | FAIL ABUN |
| AM-241 | 9.154E-02 | NOT IDENT. |
| CM-243 | 5.921E-02 | NOT IDENT. |
| CM-247 | 1.832E-02 | NOT IDENT. |
| CF-249 | 2.484E-02 | NOT IDENT. |
| CF-251 | 7.904E-02 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:13:28.96

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147016.CNF;1    *
* Acquisition date :  7-FEB-2014 09:11:59 Sensitivity     : 3.000          *
* Detector ID      : GAM29                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.77     Half life ratio : *****          *
* Sample date      :  7-DEC-2013 13:44:00 Nuclide Library : SOLID          *
* Sample ID        : G341147016           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3063E+02 GRAM   *
*                                         Quantity Err(%) : 1.5310E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUN-2013 10:30:59 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_500MLMB.CNF;7       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| PB-210 | 3.144E+00 | 4.655E+00 | 4.655E+00 |
| PB-212 | 4.092E-02 | 4.799E-02 | 4.799E-02 |
| PB-214 | 1.771E-02 | 5.419E-02 | 5.419E-02 |
| RA-224 | 2.956E-01 | 6.038E-01 | 6.038E-01 |
| TH-228 | 4.092E-02 | 4.799E-02 | 4.799E-02 |
| AM-243 | 4.667E-02 | 3.722E-02 | 3.722E-02 |
| ANH-511 | 1.327E-02 | 7.233E-02 | 7.233E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 1.065E-02 | 4.488E-01 | 4.489E-01 | NOT IDENT. |
| NA-22 | 7.130E-03 | 2.116E-02 | 2.140E-02 | NOT IDENT. |
| NA-24 | 3.971E+27 | 1.460E+28 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.008E-02 | 3.166E-02 | 3.198E-02 | NOT IDENT. |
| K-40 | 7.534E-02 | 2.875E-01 | 2.895E-01 | NOT IDENT. |
| SC-46 | 2.267E-03 | 3.961E-02 | 3.962E-02 | NOT IDENT. |
| V-48 | -3.626E-01 | 3.578E-01 | 3.934E-01 | NOT IDENT. |
| CR-51 | 5.516E-01 | 8.861E-01 | 9.203E-01 | NOT IDENT. |
| MN-54 | -8.501E-03 | 2.834E-02 | 2.860E-02 | NOT IDENT. |
| CO-56 | 4.450E-02 | 5.880E-02 | 6.213E-02 | FAIL ABUN |
| MN-56 | 1.000E+41 | 1.321E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 4.868E-03 | 2.319E-02 | 2.330E-02 | NOT IDENT. |
| CO-58 | -1.884E-02 | 3.650E-02 | 3.748E-02 | NOT IDENT. |
| FE-59 | 1.773E-02 | 1.324E-01 | 1.327E-01 | NOT IDENT. |
| CO-60 | 6.553E-03 | 2.860E-02 | 2.875E-02 | NOT IDENT. |
| ZN-65 | 7.681E-03 | 6.117E-02 | 6.127E-02 | NOT IDENT. |
| GE-68 | 2.969E-01 | 1.005E+00 | 1.014E+00 | NOT IDENT. |
| AS-73 | -6.279E-01 | 1.063E+00 | 1.100E+00 | NOT IDENT. |
| AS-74 | -2.067E-01 | 4.284E-01 | 4.384E-01 | NOT IDENT. |
| SE-75 | 1.344E-03 | 4.596E-02 | 4.596E-02 | NOT IDENT. |
| BR-77 | 5.242E+06 | 1.119E+07 | 1.144E+07 | SHORT HLIF |
| SR-82 | -6.134E-01 | 7.731E-01 | 8.211E-01 | NOT IDENT. |
| RB-83 | -3.245E-02 | 8.913E-02 | 9.032E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | 5.676E+00 | 6.509E+00 | 6.994E+00 | NOT IDENT. |
| SR-85 | 4.900E-02 | 5.635E-02 | 6.052E-02 | NOT IDENT. |
| RB-86 | 5.999E-01 | 3.108E+00 | 3.120E+00 | NOT IDENT. |
| Y-88 | 1.253E-02 | 2.703E-02 | 2.762E-02 | NOT IDENT. |
| Y-91 | 5.317E+00 | 1.533E+01 | 1.551E+01 | NOT IDENT. |
| NB-94 | -7.783E-03 | 2.170E-02 | 2.198E-02 | NOT IDENT. |
| NB-95 | 1.229E-02 | 3.497E-02 | 3.541E-02 | NOT IDENT. |
| NB-95M | 1.398E-01 | 1.526E-01 | 1.651E-01 | NOT IDENT. |
| ZR-95 | 4.001E-02 | 7.131E-02 | 7.355E-02 | NOT IDENT. |
| NB-97 | 1.000E+41 | 1.333E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.615E+26 | 1.575E+26 | 0.000E+00 | SHORT HLIF |
| MO-99 | 5.582E+05 | 1.197E+06 | 1.223E+06 | SHORT HLIF |
| TC-99M | -1.000E+41 | 1.572E+43 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.416E-02 | 2.847E-02 | 3.048E-02 | FAIL ABUN |
| RH-102 | -8.746E-03 | 3.797E-02 | 3.818E-02 | FAIL ABUN |
| RU-103 | 1.677E-02 | 6.507E-02 | 6.551E-02 | NOT IDENT. |
| RH-106 | -3.775E-02 | 2.458E-01 | 2.464E-01 | NOT IDENT. |
| RU-106 | -3.775E-02 | 2.458E-01 | 2.464E-01 | NOT IDENT. |
| AG-108M | 5.973E-03 | 1.977E-02 | 1.995E-02 | NOT IDENT. |
| CD-109 | 1.464E-01 | 6.940E-01 | 6.971E-01 | NOT IDENT. |
| AG-110M | 6.445E-03 | 3.599E-02 | 3.611E-02 | NOT IDENT. |
| SN-113 | -1.626E-02 | 4.261E-02 | 4.324E-02 | NOT IDENT. |
| CD-115 | 4.751E+06 | 1.784E+07 | 1.797E+07 | SHORT HLIF |
| SN-117M | 1.839E-01 | 4.556E-01 | 4.631E-01 | NOT IDENT. |
| TE-123M | 1.571E-02 | 3.075E-02 | 3.156E-02 | NOT IDENT. |
| SB-124 | 4.163E-02 | 9.144E-02 | 9.335E-02 | NOT IDENT. |
| SB-125 | 3.491E-02 | 7.135E-02 | 7.307E-02 | FAIL ABUN |
| TE-125M | 1.255E+00 | 1.291E+01 | 1.292E+01 | NOT IDENT. |
| I-126 | 5.471E-02 | 1.773E+00 | 1.773E+00 | NOT IDENT. |
| SB-126 | 5.868E-01 | 1.407E+00 | 1.431E+00 | NOT IDENT. |
| SN-126 | 1.358E-02 | 5.993E-02 | 6.024E-02 | NOT IDENT. |
| SB-127 | 3.569E+02 | 3.711E+03 | 3.715E+03 | SHORT HLIF |
| I-131 | -2.043E+00 | 4.842E+00 | 4.929E+00 | NOT IDENT. |
| I-132 | 1.000E+41 | 1.593E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | -7.108E+02 | 1.254E+04 | 1.255E+04 | SHORT HLIF |
| BA-133 | -7.704E-03 | 3.164E-02 | 3.183E-02 | NOT IDENT. |
| I-133 | -7.576E+19 | 7.994E+19 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.770E-03 | 2.589E-02 | 2.626E-02 | NOT IDENT. |
| CS-135 | 1.147E-02 | 1.218E-01 | 1.219E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 3.638E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.940E-01 | 7.975E-01 | 8.280E-01 | FAIL ABUN |
| BA-137M | -4.326E-03 | 2.464E-02 | 2.472E-02 | NOT IDENT. |
| CS-137 | -4.570E-03 | 2.603E-02 | 2.611E-02 | NOT IDENT. |
| CE-139 | 1.250E-02 | 3.113E-02 | 3.163E-02 | NOT IDENT. |
| BA-140 | -3.277E-01 | 7.740E-01 | 7.880E-01 | NOT IDENT. |
| LA-140 | -3.277E-01 | 7.740E-01 | 7.880E-01 | NOT IDENT. |
| CE-141 | -5.963E-02 | 1.337E-01 | 1.364E-01 | NOT IDENT. |
| CE-143 | 1.236E+11 | 1.752E+12 | 1.752E+12 | SHORT HLIF |
| CE-144 | 9.549E-02 | 1.708E-01 | 1.761E-01 | NOT IDENT. |
| PM-144 | 3.461E-02 | 2.807E-02 | 3.212E-02 | NOT IDENT. |
| PR-144 | 2.655E+00 | 2.153E+00 | 2.463E+00 | NOT IDENT. |
| PM-146 | -5.294E-03 | 3.111E-02 | 3.121E-02 | FAIL ABUN |
| ND-147 | -7.909E-01 | 8.212E+00 | 8.219E+00 | NOT IDENT. |
| PM-147 | 3.828E+02 | 6.132E+02 | 6.370E+02 | NOT IDENT. |
| PM-149 | -1.336E+08 | 1.581E+08 | 1.692E+08 | SHORT HLIF |
| EU-150 | 1.413E-02 | 2.006E-02 | 2.105E-02 | FAIL ABUN |
| EU-152 | 6.588E-02 | 6.136E-02 | 6.817E-02 | FAIL ABUN |
| GD-153 | 2.701E-02 | 8.235E-02 | 8.324E-02 | NOT IDENT. |
| EU-154 | 1.973E-02 | 5.854E-02 | 5.921E-02 | NOT IDENT. |
| EU-155 | 5.370E-02 | 7.625E-02 | 8.000E-02 | NOT IDENT. |
| TB-160 | 2.900E-02 | 1.189E-01 | 1.197E-01 | FAIL ABUN |
| HO-166M | 1.410E-03 | 4.081E-02 | 4.082E-02 | NOT IDENT. |
| TM-171 | -1.170E+01 | 1.652E+01 | 1.734E+01 | NOT IDENT. |
| LU-176 | -4.299E-03 | 1.973E-02 | 1.982E-02 | NOT IDENT. |
| HF-181 | -8.738E-03 | 6.168E-02 | 6.181E-02 | NOT IDENT. |
| TA-182 | 9.608E-02 | 1.345E-01 | 1.413E-01 | NOT IDENT. |
| RE-183 | -2.966E-02 | 2.514E-01 | 2.517E-01 | NOT IDENT. |
| RE-184 | 1.364E-01 | 2.301E-01 | 2.382E-01 | NOT IDENT. |
| W-188 | 3.515E+00 | 8.804E+00 | 8.946E+00 | NOT IDENT. |
| IR-192 | -1.526E-03 | 3.918E-02 | 3.918E-02 | FAIL ABUN |
| HG-203 | -5.533E-02 | 5.312E-02 | 5.868E-02 | NOT IDENT. |
| BI-207 | -1.603E-02 | 3.621E-02 | 3.693E-02 | FAIL ABUN |
| TL-208 | 1.527E-02 | 2.641E-02 | 2.729E-02 | NOT IDENT. |
| BI-211 | 8.242E-02 | 1.372E-01 | 1.421E-01 | NOT IDENT. |
| PB-211 | 1.471E-01 | 4.071E-01 | 4.125E-01 | FAIL ABUN |
| BI-212 | 1.432E-01 | 3.547E-01 | 3.605E-01 | NOT IDENT. |
| BI-214 | 8.059E-03 | 7.800E-02 | 7.809E-02 | NOT IDENT. |
| RN-219 | -1.432E-01 | 2.776E-01 | 2.850E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 8.059E-03 | 7.800E-02 | 7.809E-02 | NOT IDENT. |
| RA-223 | -3.265E-01 | 4.866E-01 | 5.083E-01 | NOT IDENT. |
| RA-226 | 8.059E-03 | 7.800E-02 | 7.809E-02 | NOT IDENT. |
| AC-227 | 3.584E-03 | 1.795E-01 | 1.795E-01 | NOT IDENT. |
| TH-227 | 3.584E-03 | 1.795E-01 | 1.795E-01 | NOT IDENT. |
| AC-228 | 5.940E-02 | 1.151E-01 | 1.182E-01 | NOT IDENT. |
| RA-228 | 5.940E-02 | 1.151E-01 | 1.182E-01 | NOT IDENT. |
| TH-229 | 2.279E-01 | 3.744E-01 | 3.882E-01 | NOT IDENT. |
| TH-230 | 8.059E-03 | 7.800E-02 | 7.808E-02 | NOT IDENT. |
| PA-231 | -1.665E-01 | 1.012E+00 | 1.015E+00 | NOT IDENT. |
| TH-231 | -3.265E-01 | 4.866E-01 | 5.083E-01 | NOT IDENT. |
| TH-232 | 5.940E-02 | 1.151E-01 | 1.182E-01 | NOT IDENT. |
| PA-233 | -2.191E-02 | 4.551E-02 | 4.657E-02 | NOT IDENT. |
| PA-234 | 6.712E-02 | 1.665E-01 | 1.692E-01 | NOT IDENT. |
| PA-234M | -3.131E-01 | 2.651E+00 | 2.655E+00 | NOT IDENT. |
| TH-234 | -8.808E-01 | 1.095E+00 | 1.164E+00 | FAIL ABUN |
| U-234 | 8.059E-03 | 7.800E-02 | 7.808E-02 | NOT IDENT. |
| U-235 | -1.804E-02 | 1.544E-01 | 1.546E-01 | FAIL ABUN |
| NP-237 | -2.191E-02 | 4.551E-02 | 4.657E-02 | NOT IDENT. |
| NP-238 | -4.988E+07 | 6.038E+07 | 6.443E+07 | SHORT HLIF |
| U-238 | -8.808E-01 | 1.095E+00 | 1.164E+00 | FAIL ABUN |
| NP-239 | -2.212E-01 | 3.033E-01 | 3.192E-01 | NOT IDENT. |
| PU-239 | 2.513E+02 | 2.929E+02 | 3.140E+02 | FAIL ABUN |
| AM-241 | -8.743E-02 | 1.199E-01 | 1.263E-01 | NOT IDENT. |
| CM-243 | -3.270E-02 | 7.601E-02 | 7.743E-02 | NOT IDENT. |
| CM-247 | -4.916E-03 | 2.271E-02 | 2.282E-02 | NOT IDENT. |
| CF-249 | 1.056E-02 | 2.802E-02 | 2.842E-02 | NOT IDENT. |
| CF-251 | 9.609E-02 | 1.021E-01 | 1.109E-01 | FAIL ABUN |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 44.7002 | 94.67 | 49.8547 | 193.51 | 37.0861 |
| 45.60 | 34.4047 | 94.87 | 49.8667 | 197.03 | 45.1542 |
| 46.54 | 50.9480 | 97.43 | 40.3381 | 198.01 | 45.1880 |
| 49.72 | 0.0000 | 98.43 | 51.6938 | 201.83 | 54.2039 |
| 51.35 | 42.3205 | 98.44 | 52.9869 | 205.31 | 43.6533 |
| 52.39 | 48.4536 | 99.53 | 46.3690 | 210.85 | 41.1474 |
| 53.44 | 43.4844 | 100.11 | 39.9258 | 215.65 | 43.0854 |
| 57.36 | 0.0000 | 103.18 | 50.8966 | 222.11 | 34.6266 |
| 57.53 | 40.7270 | 103.37 | 43.3258 | 227.09 | 30.4036 |
| 57.98 | 40.7567 | 105.21 | 33.6477 | 227.38 | 33.3056 |
| 59.32 | 46.9715 | 105.31 | 33.6514 | 228.16 | 0.0000 |
| 59.54 | 46.9880 | 106.12 | 36.9418 | 228.18 | 28.9775 |
| 63.29 | 39.0450 | 109.28 | 44.7044 | 235.69 | 29.1265 |
| 63.58 | 44.2021 | 111.00 | 45.8815 | 235.96 | 29.1318 |
| 64.28 | 49.3948 | 111.76 | 0.0000 | 238.63 | 32.8321 |
| 66.73 | 38.2161 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 39.2787 | 117.23 | 50.5886 | 240.99 | 32.8837 |
| 67.75 | 36.2050 | 121.12 | 45.2738 | 242.00 | 26.3248 |
| 69.67 | 60.1662 | 121.22 | 43.0696 | 244.70 | 20.5114 |
| 70.83 | 38.9658 | 121.78 | 44.1996 | 252.40 | 0.0000 |
| 72.81 | 45.3282 | 122.06 | 48.6337 | 252.80 | 29.4570 |
| 72.87 | 43.7688 | 123.07 | 42.0453 | 254.15 | 0.0000 |
| 74.66 | 62.6843 | 127.23 | 38.3340 | 256.23 | 32.2895 |
| 74.82 | 62.6981 | 129.30 | 45.0940 | 260.90 | 0.0000 |
| 74.97 | 57.4853 | 131.20 | 38.4858 | 264.66 | 38.0271 |
| 77.11 | 57.6551 | 133.02 | 30.1731 | 268.22 | 39.0411 |
| 79.69 | 57.8568 | 133.52 | 37.5669 | 269.46 | 40.9318 |
| 80.12 | 57.8900 | 136.00 | 44.8303 | 271.23 | 37.2510 |
| 80.19 | 57.8954 | 136.47 | 49.3353 | 273.65 | 38.2392 |
| 80.57 | 57.9247 | 140.51 | 0.0000 | 276.40 | 26.1581 |
| 81.00 | 45.8393 | 143.76 | 42.9023 | 277.37 | 28.9778 |
| 81.07 | 45.8437 | 144.24 | 42.9212 | 277.60 | 31.7868 |
| 83.79 | 52.3536 | 145.44 | 55.4076 | 278.00 | 32.7297 |
| 85.43 | 50.8748 | 152.43 | 37.5530 | 279.20 | 37.4323 |
| 86.55 | 50.9475 | 153.25 | 47.8298 | 279.54 | 34.6322 |
| 86.79 | 47.7779 | 154.21 | 41.0321 | 280.46 | 24.3496 |
| 86.94 | 46.7252 | 156.02 | 41.0980 | 283.69 | 30.0269 |
| 87.09 | 46.7341 | 158.56 | 38.4436 | 284.31 | 30.0376 |
| 87.57 | 45.9123 | 159.00 | 37.7715 | 285.41 | 40.3899 |
| 88.03 | 46.2579 | 162.33 | 43.0462 | 285.90 | 0.0000 |
| 88.34 | 51.0632 | 163.33 | 36.7643 | 287.50 | 25.3924 |
| 88.47 | 47.8796 | 165.86 | 37.9951 | 290.67 | 29.0741 |
| 89.96 | 57.5626 | 176.31 | 38.3268 | 293.27 | 0.0000 |
| 91.11 | 44.8348 | 176.60 | 38.3358 | 295.22 | 27.2083 |
| 92.59 | 47.0553 | 177.52 | 38.3647 | 295.96 | 22.6831 |
| 93.35 | 47.0989 | 181.07 | 0.0000 | 298.58 | 16.6595 |
| 94.56 | 49.8481 | 184.41 | 43.8377 | 299.98 | 21.2201 |
| 94.65 | 49.8535 | 185.72 | 43.8831 | 300.09 | 21.2215 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 21.2222 | 497.08 | 15.6182 | 711.68 | 10.1151 |
| 301.36 | 24.2711 | 505.52 | 21.7312 | 720.70 | 12.6232 |
| 302.85 | 22.7736 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 23.7446 | 511.00 | 25.1298 | 722.78 | 15.3382 |
| 306.78 | 31.3836 | 514.00 | 25.1596 | 722.91 | 15.3390 |
| 308.46 | 19.0384 | 514.00 | 25.1596 | 723.31 | 16.2431 |
| 311.90 | 29.5667 | 520.40 | 20.1785 | 724.19 | 16.2479 |
| 316.51 | 27.7305 | 520.69 | 0.0000 | 727.33 | 12.6496 |
| 319.41 | 22.0282 | 522.65 | 0.0000 | 733.00 | 12.0680 |
| 320.08 | 23.9525 | 527.90 | 0.0000 | 735.93 | 14.4949 |
| 321.04 | 29.7172 | 529.59 | 22.1497 | 737.46 | 7.5529 |
| 323.87 | 35.5236 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 27.8636 | 531.02 | 18.9965 | 747.24 | 7.5755 |
| 328.76 | 24.0662 | 546.56 | 0.0000 | 748.06 | 7.5775 |
| 333.37 | 27.0212 | 552.55 | 20.2177 | 752.31 | 8.1943 |
| 333.97 | 23.1683 | 563.25 | 19.2305 | 753.82 | 11.8416 |
| 334.37 | 23.1735 | 569.33 | 13.7059 | 756.73 | 7.2934 |
| 338.28 | 24.1894 | 569.50 | 13.7066 | 756.80 | 5.4702 |
| 338.32 | 24.1898 | 569.70 | 11.9940 | 763.94 | 8.2228 |
| 340.48 | 26.1550 | 583.19 | 7.5334 | 765.81 | 6.3991 |
| 340.55 | 26.1558 | 584.27 | 15.0728 | 766.42 | 9.1433 |
| 344.28 | 12.6183 | 595.83 | 19.4601 | 766.84 | 10.9734 |
| 345.93 | 15.5435 | 600.60 | 12.9954 | 772.60 | 0.0000 |
| 351.06 | 13.6368 | 602.52 | 0.0000 | 776.52 | 14.6730 |
| 351.93 | 14.6175 | 602.73 | 27.0943 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 26.0288 | 778.90 | 7.3418 |
| 356.01 | 21.8747 | 609.32 | 24.3332 | 783.70 | 0.0000 |
| 364.49 | 27.4612 | 610.33 | 20.8646 | 785.37 | 4.5973 |
| 366.42 | 0.0000 | 614.28 | 17.4111 | 792.07 | 8.2914 |
| 375.05 | 22.0852 | 618.01 | 5.2301 | 794.95 | 6.4543 |
| 383.85 | 21.7845 | 620.36 | 9.8146 | 795.86 | 8.3006 |
| 388.16 | 18.8533 | 621.93 | 15.2753 | 801.95 | 8.3151 |
| 388.63 | 20.8427 | 630.19 | 0.0000 | 810.29 | 11.1135 |
| 391.69 | 24.8493 | 631.29 | 10.5085 | 810.45 | 10.1879 |
| 400.66 | 21.9607 | 633.25 | 5.2578 | 810.76 | 10.2916 |
| 401.81 | 22.9716 | 634.78 | 7.0141 | 815.77 | 9.2756 |
| 402.40 | 16.9837 | 635.95 | 7.0168 | 818.51 | 7.7358 |
| 404.85 | 12.0022 | 636.99 | 3.5097 | 832.01 | 8.3865 |
| 410.95 | 17.0516 | 645.85 | 15.4009 | 834.85 | 10.8802 |
| 413.71 | 21.0907 | 657.76 | 8.8357 | 835.71 | 9.3281 |
| 414.70 | 23.1098 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 19.1992 | 661.66 | 14.3766 | 846.75 | 0.0000 |
| 427.87 | 19.2058 | 664.57 | 0.0000 | 846.77 | 12.4759 |
| 433.94 | 15.2039 | 666.33 | 12.1837 | 856.80 | 7.5062 |
| 439.40 | 22.3531 | 666.50 | 12.1843 | 860.56 | 2.8178 |
| 453.88 | 20.4504 | 667.71 | 0.0000 | 871.09 | 8.4775 |
| 463.37 | 28.7477 | 677.62 | 8.8938 | 873.19 | 11.3098 |
| 468.07 | 23.0443 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 12.2978 | 879.38 | 6.6085 |
| 475.06 | 11.5562 | 696.49 | 8.9480 | 880.51 | 7.5549 |
| 476.78 | 14.8685 | 696.51 | 8.9480 | 883.24 | 9.4504 |
| 477.60 | 13.2211 | 697.00 | 13.4242 | 884.68 | 8.5087 |
| 482.18 | 15.5230 | 697.49 | 17.9019 | 889.28 | 10.4124 |
| 487.02 | 13.4802 | 702.65 | 13.4484 | 894.76 | 10.4277 |
| 492.35 | 0.0000 | 706.68 | 10.0992 | 898.04 | 12.3344 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 9.5012 | 1312.11 | 2.0864 | | |
| 911.20 | 9.5210 | 1332.49 | 6.2848 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 7.6473 | 1365.19 | 5.2710 | | |
| 937.49 | 4.7931 | 1368.63 | 0.0000 | | |
| 944.13 | 7.6820 | 1384.29 | 6.3483 | | |
| 946.00 | 3.8429 | 1408.01 | 0.0000 | | |
| 949.00 | 6.7302 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.1468 | | |
| 962.31 | 3.2157 | 1489.16 | 2.1579 | | |
| 964.08 | 6.7560 | 1505.03 | 0.0000 | | |
| 966.17 | 11.2659 | 1596.21 | 5.4976 | | |
| 968.97 | 4.8315 | 1620.50 | 1.8402 | | |
| 983.53 | 13.5775 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.8620 | | |
| 996.26 | 7.7832 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.8701 | 1764.49 | 0.9421 | | |
| 1004.73 | 9.7490 | 1770.23 | 7.5436 | | |
| 1021.30 | 0.0000 | 1771.35 | 4.7156 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 4.7434 | | |
| 1037.84 | 4.9136 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 0.9527 | | |
| 1046.59 | 5.9086 | | | | |
| 1048.07 | 5.9106 | | | | |
| 1049.04 | 5.9121 | | | | |
| 1050.41 | 5.9139 | | | | |
| 1063.66 | 11.8646 | | | | |
| 1077.00 | 8.9266 | | | | |
| 1077.34 | 8.9271 | | | | |
| 1085.87 | 6.9569 | | | | |
| 1099.45 | 9.9697 | | | | |
| 1112.07 | 9.9980 | | | | |
| 1112.84 | 9.0000 | | | | |
| 1115.54 | 8.0047 | | | | |
| 1120.29 | 6.0100 | | | | |
| 1120.55 | 5.0088 | | | | |
| 1121.30 | 7.0133 | | | | |
| 1129.67 | 2.0076 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.0809 | | | | |
| 1177.95 | 7.1015 | | | | |
| 1189.05 | 10.1694 | | | | |
| 1204.77 | 3.0612 | | | | |
| 1221.41 | 4.0959 | | | | |
| 1231.02 | 7.1825 | | | | |
| 1235.36 | 5.1350 | | | | |
| 1238.28 | 6.1658 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 9.3129 | | | | |
| 1274.44 | 3.1059 | | | | |
| 1274.54 | 3.1061 | | | | |
| 1291.59 | 7.2724 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:13:55.81

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147017.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM30.CNF;164
                                        Background date  : 2-FEB-2014 16:28:18.
Sample date      : 7-DEC-2013 13:50:00. Acquisition date : 7-FEB-2014 09:12:25.
Sample ID        : G341147017           Sample quantity  : 1.71780E+02 GRAM
Detector name    : GAM30                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.93  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.53* | 8 | 44 | 1.06 | 126.80 | 121 | 11 | 2.13E-03 | 181.4 | |
| 2 | 0 | 92.68* | 14 | 37 | 1.50 | 185.11 | 181 | 9 | 3.93E-03 | 94.1 | |
| 3 | 0 | 185.57* | 16 | 39 | 3.03 | 370.93 | 364 | 14 | 4.35E-03 | 95.3 | |
| 4 | 0 | 234.55 | 16 | 16 | 0.93 | 468.89 | 464 | 8 | 4.53E-03 | 49.0 | |
| 5 | 0 | 238.43* | 24 | 33 | 1.77 | 476.66 | 473 | 10 | 6.73E-03 | 51.2 | |
| 6 | 0 | 320.52 | 16 | 10 | 0.67 | 640.88 | 636 | 10 | 4.44E-03 | 44.6 | |
| 7 | 4 | 338.03* | 19 | 25 | 2.04 | 675.89 | 668 | 19 | 5.32E-03 | 56.2 | 2.97E+00 |
| 8 | 4 | 341.13 | 12 | 17 | 2.04 | 682.09 | 668 | 19 | 3.44E-03 | 71.3 | |
| 9 | 0 | 352.02* | 12 | 23 | 1.75 | 703.88 | 699 | 13 | 3.21E-03 | 97.1 | |
| 10 | 0 | 453.93 | 4 | 5 | 1.45 | 907.76 | 904 | 6 | 1.22E-03 | 90.4 | |
| 11 | 0 | 584.19 | 9 | 15 | 1.01 | 1168.35 | 1162 | 12 | 2.63E-03 | 87.6 | |
| 12 | 0 | 599.25* | 12 | 2 | 1.61 | 1198.47 | 1195 | 8 | 3.40E-03 | 40.6 | |
| 13 | 0 | 609.69* | 18 | 6 | 1.07 | 1219.37 | 1214 | 11 | 4.91E-03 | 39.5 | |
| 14 | 0 | 629.64 | 12 | 8 | 3.98 | 1259.27 | 1252 | 12 | 3.28E-03 | 58.0 | |
| 15 | 0 | 660.56* | 2 | 5 | 1.42 | 1321.13 | 1317 | 9 | 5.16E-04 | 279.5 | |
| 16 | 0 | 781.64 | 6 | 1 | 1.34 | 1563.38 | 1560 | 6 | 1.55E-03 | 54.6 | |
| 17 | 0 | 918.23 | 6 | 2 | 0.76 | 1836.67 | 1833 | 7 | 1.79E-03 | 51.7 | |
| 18 | 0 | 960.71 | 12 | 0 | 0.73 | 1921.67 | 1916 | 10 | 3.33E-03 | 28.9 | |
| 19 | 0 | 1459.79* | 15 | 0 | 0.73 | 2920.35 | 2915 | 11 | 4.05E-03 | 31.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:13:57

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147017.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-DEC-2013 13:50:00 | Acquisition date | : 7-FEB-2014 09:12:25 |
| Sample ID | : G341147017 | Sample quantity | : 171.78 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA30 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.93  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 15 | 10.66* | 1.331E+00 | 4.488E-01 | 4.488E-01 | 63.54 |
| CR-51 | 320.08 | 16 | 9.91* | 4.328E+00 | 1.630E-01 | 7.660E-01 | 89.27 |
| NB-95M | 235.69 | 16 | 24.80* | 5.309E+00 | 5.415E-02 | 1.058E-01 | 98.08 |
| BA-137M | 661.66 | 2 | 89.90* | 2.565E+00 | 3.520E-03 | 3.534E-03 | 559.08 |
| CS-137 | 661.66 | 2 | 85.10* | 2.565E+00 | 3.719E-03 | 3.733E-03 | 559.08 |
| TL-208 | 277.37 | ------ | 6.60 | 4.769E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 9 | 85.00* | 2.817E+00 | 1.730E-02 | 1.730E-02 | 175.26 |
| | 860.56 | ------ | 12.50 | 2.076E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 4.427E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 12 | 12.92* | 4.058E+00 | 9.630E-02 | 9.630E-02 | 194.25 |
| TH-234 | 63.29 | 8 | 3.70* | 3.265E+00 | 2.772E-01 | 2.772E-01 | 362.89 |
| | 92.59 | 14 | 4.23 | 6.039E+00 | 2.423E-01 | 2.423E-01 | 188.14 |
| U-238 | 63.29 | 8 | 3.70* | 3.265E+00 | 2.772E-01 | 2.772E-01 | 362.89 |
| | 92.59 | 14 | 4.23 | 6.039E+00 | 2.423E-01 | 2.423E-01 | 188.14 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:13:57.99

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147017.CNF;1    *
* Acquisition date :  7-FEB-2014 09:12:25 Sensitivity     : 3.000           *
* Detector ID      : GAM30                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.93     Half life ratio : *****           *
* Sample date      :  7-DEC-2013 13:50:00 Nuclide Library : SOLID           *
* Sample ID        : G341147017           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   :  6-JUN-2013 10:02:25 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_500MLMB.CNF;4       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 4.488E-01 | 2.795E-01 | 4.558E-01 |
| CR-51 | 7.660E-01 | 6.701E-01 | 1.034E+00 |
| NB-95M | 1.058E-01 | 1.017E-01 | 1.022E-01 |
| BA-137M | 3.534E-03 | 1.936E-02 | 2.762E-02 |
| CS-137 | 3.733E-03 | 2.046E-02 | 2.917E-02 |
| TL-208 | 1.730E-02 | 2.972E-02 | 3.562E-02 |
| BI-211 | 9.630E-02 | 1.833E-01 | 2.036E-01 |
| TH-234 | 2.772E-01 | 9.860E-01 | 9.682E-01 |
| U-238 | 2.772E-01 | 9.860E-01 | 9.682E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.898E-02 | 3.188E-01 | 6.093E-01 | NOT IDENT. |
| NA-22 | -2.098E-03 | 1.939E-02 | 4.024E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.220E+28 | 0.000E+00 | SHORT HLIF |
| AL-26 | -8.650E-03 | 2.212E-02 | 4.174E-02 | NOT IDENT. |
| SC-46 | 1.405E-02 | 1.732E-02 | 4.702E-02 | NOT IDENT. |
| V-48 | 2.178E-02 | 2.504E-01 | 5.171E-01 | NOT IDENT. |
| MN-54 | -2.602E-04 | 1.614E-02 | 3.322E-02 | NOT IDENT. |
| CO-56 | 2.856E-03 | 2.577E-02 | 5.410E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.127E-02 | 1.261E-02 | 2.641E-02 | NOT IDENT. |
| CO-58 | -1.485E-02 | 3.266E-02 | 5.888E-02 | NOT IDENT. |
| FE-59 | -1.913E-02 | 1.024E-01 | 1.925E-01 | NOT IDENT. |
| CO-60 | 6.260E-03 | 2.435E-02 | 5.537E-02 | NOT IDENT. |
| ZN-65 | -2.784E-02 | 5.197E-02 | 8.957E-02 | NOT IDENT. |
| GE-68 | 4.211E-01 | 6.689E-01 | 1.533E+00 | NOT IDENT. |
| AS-73 | -1.008E-01 | 5.852E-01 | 1.046E+00 | NOT IDENT. |
| AS-74 | -5.078E-02 | 3.222E-01 | 5.363E-01 | NOT IDENT. |
| SE-75 | 1.805E-02 | 3.058E-02 | 6.111E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 5.931E+06 | 0.000E+00 | SHORT HLIF |
| SR-82 | -9.524E-02 | 6.867E-01 | 1.140E+00 | NOT IDENT. |
| RB-83 | 1.154E-03 | 5.062E-02 | 1.013E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | -5.963E+00 | 6.332E+00 | 1.079E+01 | NOT IDENT. |
| SR-85 | -5.175E-02 | 5.481E-02 | 9.336E-02 | NOT IDENT. |
| RB-86 | 1.364E+00 | 2.128E+00 | 4.883E+00 | NOT IDENT. |
| Y-88 | 1.981E-03 | 1.822E-02 | 4.822E-02 | NOT IDENT. |
| Y-91 | 5.941E+00 | 1.812E+01 | 3.915E+01 | NOT IDENT. |
| NB-94 | 1.030E-02 | 1.824E-02 | 3.869E-02 | NOT IDENT. |
| NB-95 | 2.255E-02 | 3.281E-02 | 7.296E-02 | NOT IDENT. |
| ZR-95 | -6.775E-03 | 6.646E-02 | 1.279E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.213E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.287E+26 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 7.390E+05 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.125E-02 | 1.640E-02 | 3.290E-02 | NOT IDENT. |
| RH-102 | -9.141E-03 | 3.248E-02 | 5.211E-02 | NOT IDENT. |
| RU-103 | 3.667E-02 | 4.738E-02 | 1.035E-01 | FAIL ABUN |
| RH-106 | 6.699E-02 | 1.948E-01 | 3.753E-01 | NOT IDENT. |
| RU-106 | 6.699E-02 | 1.948E-01 | 3.753E-01 | NOT IDENT. |
| AG-108M | 3.822E-03 | 1.546E-02 | 3.022E-02 | NOT IDENT. |
| CD-109 | 2.985E-01 | 4.718E-01 | 8.150E-01 | NOT IDENT. |
| AG-110M | -2.042E-02 | 2.286E-02 | 3.517E-02 | NOT IDENT. |
| SN-113 | 1.456E-02 | 3.603E-02 | 6.983E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.181E+07 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.213E-01 | 2.884E-01 | 5.661E-01 | NOT IDENT. |
| TE-123M | 6.953E-03 | 1.861E-02 | 3.628E-02 | NOT IDENT. |
| SB-124 | -3.868E-02 | 8.719E-02 | 1.629E-01 | NOT IDENT. |
| SB-125 | -5.580E-03 | 4.706E-02 | 8.708E-02 | FAIL ABUN |
| TE-125M | 4.670E+00 | 9.218E+00 | 1.695E+01 | NOT IDENT. |
| I-126 | -1.129E+00 | 1.493E+00 | 2.190E+00 | NOT IDENT. |
| SB-126 | -9.711E-02 | 9.682E-01 | 1.892E+00 | NOT IDENT. |
| SN-126 | -3.213E-03 | 4.246E-02 | 7.101E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 3.014E+03 | 0.000E+00 | SHORT HLIF |
| I-131 | -8.962E-01 | 3.695E+00 | 6.636E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 9.692E+03 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.386E-02 | 2.791E-02 | 4.082E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 4.978E+19 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.219E-03 | 1.884E-02 | 3.952E-02 | NOT IDENT. |
| CS-135 | -3.231E-02 | 8.530E-02 | 1.512E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.276E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.250E-01 | 5.939E-01 | 1.136E+00 | FAIL ABUN |
| CE-139 | -2.309E-02 | 2.079E-02 | 3.452E-02 | NOT IDENT. |
| BA-140 | 3.291E-01 | 5.582E-01 | 1.409E+00 | NOT IDENT. |
| LA-140 | 3.291E-01 | 5.582E-01 | 1.409E+00 | NOT IDENT. |
| CE-141 | 1.124E-02 | 7.696E-02 | 1.482E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.063E+12 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.920E-02 | 1.130E-01 | 2.217E-01 | NOT IDENT. |
| PM-144 | -6.845E-03 | 2.201E-02 | 4.057E-02 | NOT IDENT. |
| PR-144 | -5.188E-01 | 1.689E+00 | 3.115E+00 | NOT IDENT. |
| PM-146 | 8.889E-03 | 1.575E-02 | 3.872E-02 | FAIL ABUN |
| ND-147 | 3.325E+00 | 5.401E+00 | 1.170E+01 | FAIL ABUN |
| PM-147 | 3.470E+02 | 3.496E+02 | 7.343E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.042E+08 | 0.000E+00 | SHORT HLIF |
| EU-150 | -4.703E-03 | 1.680E-02 | 2.589E-02 | FAIL ABUN |
| EU-152 | -3.306E-02 | 5.584E-02 | 7.984E-02 | NOT IDENT. |
| GD-153 | 3.398E-02 | 5.104E-02 | 8.982E-02 | NOT IDENT. |
| EU-154 | -5.804E-03 | 5.364E-02 | 1.113E-01 | NOT IDENT. |
| EU-155 | -2.957E-02 | 5.646E-02 | 9.367E-02 | NOT IDENT. |
| TB-160 | 1.264E-01 | 1.013E-01 | 2.501E-01 | NOT IDENT. |
| HO-166M | -1.633E-02 | 3.220E-02 | 5.767E-02 | FAIL ABUN |
| TM-171 | -3.169E-01 | 8.620E+00 | 1.569E+01 | NOT IDENT. |
| LU-176 | 5.398E-03 | 1.371E-02 | 2.701E-02 | NOT IDENT. |
| HF-181 | 1.895E-02 | 4.961E-02 | 9.919E-02 | NOT IDENT. |
| TA-182 | 4.753E-02 | 1.187E-01 | 2.616E-01 | NOT IDENT. |
| RE-183 | -1.982E-02 | 1.544E-01 | 2.462E-01 | NOT IDENT. |
| RE-184 | -2.845E-02 | 1.487E-01 | 2.869E-01 | NOT IDENT. |
| W-188 | -3.636E+00 | 5.573E+00 | 9.516E+00 | FAIL ABUN |
| IR-192 | 1.486E-02 | 2.883E-02 | 5.275E-02 | NOT IDENT. |
| HG-203 | -2.483E-02 | 3.760E-02 | 6.422E-02 | NOT IDENT. |
| BI-207 | -2.820E-03 | 2.750E-02 | 5.318E-02 | NOT IDENT. |
| PB-210 | -1.222E+00 | 1.732E+00 | 2.878E+00 | NOT IDENT. |
| PB-211 | -1.493E-02 | 3.675E-01 | 6.849E-01 | NOT IDENT. |
| BI-212 | -1.017E-01 | 2.279E-01 | 4.171E-01 | NOT IDENT. |
| PB-212 | 4.619E-02 | 4.635E-02 | 7.490E-02 | FAIL ABUN |
| BI-214 | 6.223E-02 | 4.820E-02 | 9.771E-02 | FAIL ABUN |
| PB-214 | 3.495E-02 | 6.653E-02 | 9.102E-02 | FAIL ABUN |
| RN-219 | -2.292E-02 | 2.067E-01 | 3.816E-01 | NOT IDENT. |
| RN-222 | 6.223E-02 | 4.820E-02 | 9.771E-02 | FAIL ABUN |
| RA-223 | -8.132E-02 | 3.675E-01 | 5.770E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 1.348E-01 | 3.912E-01 | 6.647E-01 | NOT IDENT. |
| RA-226 | 6.223E-02 | 4.820E-02 | 9.771E-02 | FAIL ABUN |
| AC-227 | 1.087E-02 | 1.374E-01 | 2.581E-01 | FAIL ABUN |
| TH-227 | 1.087E-02 | 1.374E-01 | 2.581E-01 | FAIL ABUN |
| AC-228 | -8.684E-02 | 6.075E-02 | 8.622E-02 | FAIL ABUN |
| RA-228 | -8.684E-02 | 6.075E-02 | 8.622E-02 | FAIL ABUN |
| TH-228 | 4.619E-02 | 4.635E-02 | 7.490E-02 | FAIL ABUN |
| TH-229 | -5.499E-03 | 2.775E-01 | 5.160E-01 | NOT IDENT. |
| TH-230 | 6.223E-02 | 4.820E-02 | 9.770E-02 | FAIL ABUN |
| PA-231 | 2.006E-01 | 6.975E-01 | 1.365E+00 | NOT IDENT. |
| TH-231 | -8.132E-02 | 3.675E-01 | 5.770E-01 | FAIL ABUN |
| TH-232 | -8.684E-02 | 6.075E-02 | 8.622E-02 | FAIL ABUN |
| PA-233 | -1.415E-02 | 3.443E-02 | 5.810E-02 | FAIL ABUN |
| PA-234 | -1.678E-02 | 1.504E-01 | 2.934E-01 | NOT IDENT. |
| PA-234M | 6.614E-01 | 2.706E+00 | 5.649E+00 | NOT IDENT. |
| U-234 | 6.223E-02 | 4.820E-02 | 9.770E-02 | FAIL ABUN |
| U-235 | -4.409E-02 | 9.992E-02 | 1.800E-01 | FAIL ABUN |
| NP-237 | -1.415E-02 | 3.443E-02 | 5.810E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 3.977E+07 | 0.000E+00 | SHORT HLIF |
| NP-239 | -2.202E-01 | 1.929E-01 | 3.230E-01 | NOT IDENT. |
| PU-239 | 5.233E+01 | 1.734E+02 | 3.359E+02 | NOT IDENT. |
| AM-241 | 1.345E-02 | 6.470E-02 | 1.110E-01 | NOT IDENT. |
| AM-243 | -2.746E-02 | 2.928E-02 | 4.748E-02 | NOT IDENT. |
| CM-243 | 4.662E-02 | 5.288E-02 | 1.040E-01 | NOT IDENT. |
| CM-247 | -1.934E-03 | 1.900E-02 | 3.512E-02 | NOT IDENT. |
| CF-249 | 2.812E-02 | 2.463E-02 | 5.161E-02 | NOT IDENT. |
| CF-251 | 1.237E-02 | 6.526E-02 | 1.247E-01 | NOT IDENT. |
| ANH-511 | -3.593E-02 | 3.117E-02 | 6.624E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:13:54.31

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.53 | 22 | 44 | 1.06 | 126.80 | 121 | 11 | 6.15E-03 | 61.8 | |
| 2 | 0 | 92.68 | 43 | 37 | 1.50 | 185.11 | 181 | 9 | 1.18E-02 | 30.2 | |
| 3 | 0 | 185.57 | 39 | 39 | 3.03 | 370.93 | 364 | 14 | 1.09E-02 | 37.1 | |
| 4 | 0 | 234.55 | 16 | 16 | 0.93 | 468.89 | 464 | 8 | 4.53E-03 | 49.0 | |
| 5 | 0 | 238.43 | 37 | 33 | 1.77 | 476.66 | 473 | 10 | 1.04E-02 | 32.3 | |
| 6 | 0 | 320.52 | 16 | 10 | 0.67 | 640.88 | 636 | 10 | 4.44E-03 | 44.6 | |
| 7 | 4 | 338.03 | 26 | 25 | 2.04 | 675.89 | 668 | 19 | 7.09E-03 | 40.9 | 2.97E+00 |
| 8 | 4 | 341.13 | 12 | 17 | 2.04 | 682.09 | 668 | 19 | 3.44E-03 | 71.3 | |
| 9 | 0 | 352.02 | 22 | 23 | 1.75 | 703.88 | 699 | 13 | 6.06E-03 | 50.0 | |
| 10 | 0 | 453.93 | 4 | 5 | 1.45 | 907.76 | 904 | 6 | 1.22E-03 | 90.4 | |
| 11 | 0 | 510.91 | 87 | 12 | 2.52 | 1021.74 | 1014 | 13 | 2.42E-02 | 13.7 | |
| 12 | 0 | 584.19 | 9 | 15 | 1.01 | 1168.35 | 1162 | 12 | 2.63E-03 | 87.6 | |
| 13 | 0 | 599.25 | 15 | 2 | 1.61 | 1198.47 | 1195 | 8 | 4.09E-03 | 31.1 | |
| 14 | 0 | 609.69 | 25 | 6 | 1.07 | 1219.37 | 1214 | 11 | 6.81E-03 | 27.4 | |
| 15 | 0 | 629.64 | 12 | 8 | 3.98 | 1259.27 | 1252 | 12 | 3.28E-03 | 58.0 | |
| 16 | 0 | 660.56 | 9 | 5 | 1.42 | 1321.13 | 1317 | 9 | 2.60E-03 | 52.5 | |
| 17 | 0 | 781.64 | 6 | 1 | 1.34 | 1563.38 | 1560 | 6 | 1.55E-03 | 54.6 | |
| 18 | 0 | 918.23 | 6 | 2 | 0.76 | 1836.67 | 1833 | 7 | 1.79E-03 | 51.7 | |
| 19 | 0 | 960.71 | 12 | 0 | 0.73 | 1921.67 | 1916 | 10 | 3.33E-03 | 28.9 | |
| 20 | 0 | 1459.79 | 20 | 0 | 0.73 | 2920.35 | 2915 | 11 | 5.56E-03 | 22.4 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:13:56.31

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 15 | 10.66* | 1.331E+00 | 4.488E-01 | 4.488E-01 | 63.54 |
| CR-51 | 320.08 | 16 | 9.91* | 4.328E+00 | 1.630E-01 | 7.660E-01 | 89.27 |
| NB-95M | 235.69 | 16 | 24.80* | 5.309E+00 | 5.415E-02 | 1.058E-01 | 98.08 |
| BA-137M | 661.66 | 2 | 89.90* | 2.565E+00 | 3.520E-03 | 3.534E-03 | 559.08 |
| CS-137 | 661.66 | 2 | 85.10* | 2.565E+00 | 3.719E-03 | 3.733E-03 | 559.08 |
| TL-208 | 277.37 | ------ | 6.60 | 4.769E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 9 | 85.00* | 2.817E+00 | 1.730E-02 | 1.730E-02 | 175.26 |
| | 860.56 | ------ | 12.50 | 2.076E+00 | ------ | Line Not Found | ------ |
| BI-211 | 72.87 | ------ | 1.23 | 4.427E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 12 | 12.92* | 4.058E+00 | 9.630E-02 | 9.630E-02 | 194.25 |
| TH-234 | 63.29 | 8 | 3.70* | 3.265E+00 | 2.772E-01 | 2.772E-01 | 362.89 |
| | 92.59 | 14 | 4.23 | 6.039E+00 | 2.423E-01 | 2.423E-01 | 188.14 |
| U-238 | 63.29 | 8 | 3.70* | 3.265E+00 | 2.772E-01 | 2.772E-01 | 362.89 |
| | 92.59 | 14 | 4.23 | 6.039E+00 | 2.423E-01 | 2.423E-01 | 188.14 |

Flag: "*" = Keyline

Sample ID : G341147017 Acquisition date : 7-FEB-2014 09:12:25

Total number of lines in spectrum 19
Number of unidentified lines 3
Number of lines tentatively identified by NID 16 84.21%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 4.488E-01 | 4.488E-01 | 2.852E-01 | 63.54 | |
| CR-51 | 27.70D | 4.70 | 1.630E-01 | 7.660E-01 | 6.837E-01 | 89.27 | |
| NB-95M | 64.03D | 1.95 | 5.415E-02 | 1.058E-01 | 1.037E-01 | 98.08 | |
| BA-137M | 30.08Y | 1.00 | 3.520E-03 | 3.534E-03 | 19.76E-03 | 559.08 | |
| CS-137 | 30.08Y | 1.00 | 3.719E-03 | 3.733E-03 | 20.87E-03 | 559.08 | |
| TL-208 | 1.41E+10Y | 1.00 | 1.730E-02 | 1.730E-02 | 3.032E-02 | 175.26 | |
| BI-211 | 7.04E+08Y | 1.00 | 9.630E-02 | 9.630E-02 | 18.70E-02 | 194.25 | |
| TH-234 | 4.47E+09Y | 1.00 | 2.772E-01 | 2.772E-01 | 10.06E-01 | 362.89 | |
| U-238 | 4.47E+09Y | 1.00 | 2.772E-01 | 2.772E-01 | 10.06E-01 | 362.89 | |
| | Total Activity : | | 1.341E+00 | 1.996E+00 | | | |

Grand Total Activity : 1.341E+00 1.996E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147017 Acquisition date : 7-FEB-2014 09:12:25

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 185.57 | 16 | 39 | 3.03 | 370.93 | 364 | 14 | 4.35E-03 | **** | 6.05E+00 | T |
| 0 | 238.43 | 24 | 33 | 1.77 | 476.66 | 473 | 10 | 6.73E-03 | **** | 5.26E+00 | T |
| 4 | 338.03 | 19 | 25 | 2.04 | 675.89 | 668 | 19 | 5.32E-03 | **** | 4.17E+00 | T |
| 4 | 341.13 | 12 | 17 | 2.04 | 682.09 | 668 | 19 | 3.44E-03 | **** | 4.15E+00 | T |
| 0 | 453.93 | 4 | 5 | 1.45 | 907.76 | 904 | 6 | 1.22E-03 | **** | 3.39E+00 | T |
| 0 | 599.25 | 12 | 2 | 1.61 | 1198.47 | 1195 | 8 | 3.40E-03 | 81.3 | 2.76E+00 | T |
| 0 | 609.69 | 18 | 6 | 1.07 | 1219.37 | 1214 | 11 | 4.91E-03 | 79.0 | 2.73E+00 | T |
| 0 | 629.64 | 12 | 8 | 3.98 | 1259.27 | 1252 | 12 | 3.28E-03 | **** | 2.66E+00 | T |
| 0 | 781.64 | 6 | 1 | 1.34 | 1563.38 | 1560 | 6 | 1.55E-03 | **** | 2.25E+00 | |
| 0 | 918.23 | 6 | 2 | 0.76 | 1836.67 | 1833 | 7 | 1.79E-03 | **** | 1.97E+00 | |
| 0 | 960.71 | 12 | 0 | 0.73 | 1921.67 | 1916 | 10 | 3.33E-03 | 57.7 | 1.89E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:14:08.25

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147017.CNF;1    *
* Acquisition date :  7-FEB-2014 09:12:25 Sensitivity     : 3.000          *
* Detector ID      : GAM30                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.93     Half life ratio : *****          *
* Sample date      :  7-DEC-2013 13:50:00 Nuclide Library : SOLID          *
* Sample ID        : G341147017           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-JUN-2013 10:02:25 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_500MLMB.CNF;4       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 1.862E-01 |
| CR-51 | 4.525E-01 |
| NB-95M | 4.233E-02 |
| BA-137M | 1.123E-02 |
| CS-137 | 1.187E-02 |
| TL-208 | 1.535E-02 |
| BI-211 | 9.056E-02 |
| TH-234 | 4.349E-01 |
| U-238 | 4.349E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 2.660E-01 | NOT IDENT. |
| NA-22 | 1.597E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.563E-02 | NOT IDENT. |
| SC-46 | 1.863E-02 | NOT IDENT. |
| V-48 | 2.120E-01 | NOT IDENT. |
| MN-54 | 1.343E-02 | NOT IDENT. |
| CO-56 | 2.216E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.201E-02 | NOT IDENT. |
| CO-58 | 2.446E-02 | NOT IDENT. |
| FE-59 | 8.005E-02 | NOT IDENT. |
| CO-60 | 2.348E-02 | NOT IDENT. |
| ZN-65 | 3.645E-02 | NOT IDENT. |
| GE-68 | 6.417E-01 | NOT IDENT. |
| AS-73 | 4.710E-01 | NOT IDENT. |
| AS-74 | 2.279E-01 | NOT IDENT. |
| SE-75 | 2.765E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 4.760E-01 | NOT IDENT. |
| RB-83 | 4.362E-02 | NOT IDENT. |
| KR-85 | 4.951E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SR-85 | 4.285E-02 | NOT IDENT. |
| RB-86 | 2.045E+00 | NOT IDENT. |
| Y-88 | 1.614E-02 | NOT IDENT. |
| Y-91 | 1.655E+01 | NOT IDENT. |
| NB-94 | 1.693E-02 | NOT IDENT. |
| NB-95 | 3.142E-02 | NOT IDENT. |
| ZR-95 | 5.473E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.512E-02 | NOT IDENT. |
| RH-102 | 2.196E-02 | NOT IDENT. |
| RU-103 | 4.567E-02 | FAIL ABUN |
| RH-106 | 1.629E-01 | NOT IDENT. |
| RU-106 | 1.629E-01 | NOT IDENT. |
| AG-108M | 1.325E-02 | NOT IDENT. |
| CD-109 | 3.773E-01 | NOT IDENT. |
| AG-110M | 1.283E-02 | NOT IDENT. |
| SN-113 | 3.142E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.584E-01 | NOT IDENT. |
| TE-123M | 1.659E-02 | NOT IDENT. |
| SB-124 | 6.011E-02 | NOT IDENT. |
| SB-125 | 3.770E-02 | FAIL ABUN |
| TE-125M | 7.780E+00 | NOT IDENT. |
| I-126 | 9.013E-01 | NOT IDENT. |
| SB-126 | 7.986E-01 | NOT IDENT. |
| SN-126 | 3.274E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 2.938E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 1.802E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.645E-02 | NOT IDENT. |
| CS-135 | 6.806E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.591E-01 | FAIL ABUN |
| CE-139 | 1.568E-02 | NOT IDENT. |
| BA-140 | 5.602E-01 | NOT IDENT. |
| LA-140 | 5.602E-01 | NOT IDENT. |
| CE-141 | 6.725E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.017E-01 | NOT IDENT. |
| PM-144 | 1.757E-02 | NOT IDENT. |
| PR-144 | 1.350E+00 | NOT IDENT. |
| PM-146 | 1.662E-02 | FAIL ABUN |
| ND-147 | 5.113E+00 | FAIL ABUN |
| PM-147 | 3.351E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.148E-02 | FAIL ABUN |
| EU-152 | 3.449E-02 | NOT IDENT. |
| GD-153 | 4.104E-02 | NOT IDENT. |
| EU-154 | 4.418E-02 | NOT IDENT. |
| EU-155 | 4.245E-02 | NOT IDENT. |
| TB-160 | 1.077E-01 | NOT IDENT. |
| HO-166M | 2.433E-02 | FAIL ABUN |
| TM-171 | 7.075E+00 | NOT IDENT. |
| LU-176 | 1.209E-02 | NOT IDENT. |
| HF-181 | 4.339E-02 | NOT IDENT. |
| TA-182 | 1.102E-01 | NOT IDENT. |
| RE-183 | 1.104E-01 | NOT IDENT. |
| RE-184 | 1.174E-01 | NOT IDENT. |
| W-188 | 4.172E+00 | FAIL ABUN |
| IR-192 | 2.346E-02 | NOT IDENT. |
| HG-203 | 2.829E-02 | NOT IDENT. |
| BI-207 | 2.202E-02 | NOT IDENT. |
| PB-210 | 1.301E+00 | NOT IDENT. |
| PB-211 | 3.000E-01 | NOT IDENT. |
| BI-212 | 1.713E-01 | NOT IDENT. |
| PB-212 | 3.488E-02 | FAIL ABUN |
| BI-214 | 4.411E-02 | FAIL ABUN |
| PB-214 | 4.144E-02 | FAIL ABUN |
| RN-219 | 1.667E-01 | NOT IDENT. |
| RN-222 | 4.411E-02 | FAIL ABUN |
| RA-223 | 2.541E-01 | FAIL ABUN |
| RA-224 | 3.049E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 4.411E-02 | FAIL ABUN |
| AC-227 | 1.167E-01 | FAIL ABUN |
| TH-227 | 1.167E-01 | FAIL ABUN |
| AC-228 | 3.154E-02 | FAIL ABUN |
| RA-228 | 3.154E-02 | FAIL ABUN |
| TH-228 | 3.488E-02 | FAIL ABUN |
| TH-229 | 2.355E-01 | NOT IDENT. |
| TH-230 | 4.411E-02 | FAIL ABUN |
| PA-231 | 6.088E-01 | NOT IDENT. |
| TH-231 | 2.541E-01 | FAIL ABUN |
| TH-232 | 3.154E-02 | FAIL ABUN |
| PA-233 | 2.557E-02 | FAIL ABUN |
| PA-234 | 1.211E-01 | NOT IDENT. |
| PA-234M | 2.441E+00 | NOT IDENT. |
| U-234 | 4.411E-02 | FAIL ABUN |
| U-235 | 8.192E-02 | FAIL ABUN |
| NP-237 | 2.557E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| NP-239 | 1.448E-01 | NOT IDENT. |
| PU-239 | 1.541E+02 | NOT IDENT. |
| AM-241 | 4.947E-02 | NOT IDENT. |
| AM-243 | 2.185E-02 | NOT IDENT. |
| CM-243 | 4.761E-02 | NOT IDENT. |
| CM-247 | 1.534E-02 | NOT IDENT. |
| CF-249 | 2.345E-02 | NOT IDENT. |
| CF-251 | 5.686E-02 | NOT IDENT. |
| ANH-511 | 3.123E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:14:13.04

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147017.CNF;1    *
* Acquisition date :  7-FEB-2014 09:12:25 Sensitivity     : 3.000           *
* Detector ID      : GAM30                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.93     Half life ratio : *****           *
* Sample date      :  7-DEC-2013 13:50:00 Nuclide Library : SOLID            *
* Sample ID        : G341147017           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM *
*                                         Quantity Err(%) : 1.1643E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   :  6-JUN-2013 10:02:25 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_500MLMB.CNF;4         *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 4.488E-01 | 2.824E-01 | 2.824E-01 |
| CR-51 | 7.660E-01 | 6.728E-01 | 6.728E-01 |
| NB-95M | 1.058E-01 | 1.022E-01 | 1.022E-01 |
| BA-137M | 3.534E-03 | 1.937E-02 | 1.937E-02 |
| CS-137 | 3.733E-03 | 2.046E-02 | 2.046E-02 |
| TL-208 | 1.730E-02 | 2.975E-02 | 2.975E-02 |
| BI-211 | 9.630E-02 | 1.835E-01 | 1.835E-01 |
| TH-234 | 2.772E-01 | 9.880E-01 | 9.880E-01 |
| U-238 | 2.772E-01 | 9.880E-01 | 9.880E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.898E-02 | 3.188E-01 | 3.193E-01 | NOT IDENT. |
| NA-22 | -2.098E-03 | 1.939E-02 | 1.941E-02 | NOT IDENT. |
| NA-24 | 2.885E+27 | 1.220E+28 | 0.000E+00 | SHORT HLIF |
| AL-26 | -8.650E-03 | 2.213E-02 | 2.247E-02 | NOT IDENT. |
| SC-46 | 1.405E-02 | 1.739E-02 | 1.851E-02 | NOT IDENT. |
| V-48 | 2.178E-02 | 2.504E-01 | 2.506E-01 | NOT IDENT. |
| MN-54 | -2.602E-04 | 1.614E-02 | 1.615E-02 | NOT IDENT. |
| CO-56 | 2.856E-03 | 2.577E-02 | 2.580E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 8.600E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.127E-02 | 1.265E-02 | 1.363E-02 | NOT IDENT. |
| CO-58 | -1.485E-02 | 3.269E-02 | 3.337E-02 | NOT IDENT. |
| FE-59 | -1.913E-02 | 1.024E-01 | 1.028E-01 | NOT IDENT. |
| CO-60 | 6.260E-03 | 2.436E-02 | 2.452E-02 | NOT IDENT. |
| ZN-65 | -2.784E-02 | 5.217E-02 | 5.366E-02 | NOT IDENT. |
| GE-68 | 4.211E-01 | 6.721E-01 | 6.984E-01 | NOT IDENT. |
| AS-73 | -1.008E-01 | 5.855E-01 | 5.873E-01 | NOT IDENT. |
| AS-74 | -5.078E-02 | 3.222E-01 | 3.230E-01 | NOT IDENT. |
| SE-75 | 1.805E-02 | 3.061E-02 | 3.167E-02 | NOT IDENT. |
| BR-77 | 5.910E+06 | 1.211E+07 | 1.240E+07 | SHORT HLIF |
| SR-82 | -9.524E-02 | 6.867E-01 | 6.881E-01 | NOT IDENT. |
| RB-83 | 1.154E-03 | 5.062E-02 | 5.063E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | -5.963E+00 | 6.351E+00 | 6.896E+00 | NOT IDENT. |
| SR-85 | -5.175E-02 | 5.498E-02 | 5.972E-02 | NOT IDENT. |
| RB-86 | 1.364E+00 | 2.138E+00 | 2.225E+00 | NOT IDENT. |
| Y-88 | 1.981E-03 | 1.822E-02 | 1.824E-02 | NOT IDENT. |
| Y-91 | 5.941E+00 | 1.813E+01 | 1.833E+01 | NOT IDENT. |
| NB-94 | 1.030E-02 | 1.827E-02 | 1.885E-02 | NOT IDENT. |
| NB-95 | 2.255E-02 | 3.287E-02 | 3.441E-02 | NOT IDENT. |
| ZR-95 | -6.775E-03 | 6.646E-02 | 6.653E-02 | NOT IDENT. |
| NB-97 | 1.000E+41 | 1.215E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -3.191E+26 | 1.313E+26 | 0.000E+00 | SHORT HLIF |
| MO-99 | -5.789E+04 | 7.390E+05 | 7.395E+05 | SHORT HLIF |
| TC-99M | -1.000E+41 | 2.035E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.125E-02 | 1.654E-02 | 1.730E-02 | NOT IDENT. |
| RH-102 | -9.141E-03 | 3.250E-02 | 3.276E-02 | NOT IDENT. |
| RU-103 | 3.667E-02 | 4.749E-02 | 5.028E-02 | FAIL ABUN |
| RH-106 | 6.699E-02 | 1.949E-01 | 1.972E-01 | NOT IDENT. |
| RU-106 | 6.699E-02 | 1.949E-01 | 1.972E-01 | NOT IDENT. |
| AG-108M | 3.822E-03 | 1.546E-02 | 1.556E-02 | NOT IDENT. |
| CD-109 | 2.985E-01 | 4.729E-01 | 4.917E-01 | NOT IDENT. |
| AG-110M | -2.042E-02 | 2.298E-02 | 2.476E-02 | NOT IDENT. |
| SN-113 | 1.456E-02 | 3.605E-02 | 3.664E-02 | NOT IDENT. |
| CD-115 | -1.100E+07 | 1.186E+07 | 1.286E+07 | SHORT HLIF |
| SN-117M | 1.213E-01 | 2.885E-01 | 2.937E-01 | NOT IDENT. |
| TE-123M | 6.953E-03 | 1.862E-02 | 1.889E-02 | NOT IDENT. |
| SB-124 | -3.868E-02 | 8.725E-02 | 8.898E-02 | NOT IDENT. |
| SB-125 | -5.580E-03 | 4.707E-02 | 4.713E-02 | FAIL ABUN |
| TE-125M | 4.670E+00 | 9.227E+00 | 9.464E+00 | NOT IDENT. |
| I-126 | -1.129E+00 | 1.497E+00 | 1.581E+00 | NOT IDENT. |
| SB-126 | -9.711E-02 | 9.683E-01 | 9.693E-01 | NOT IDENT. |
| SN-126 | -3.213E-03 | 4.246E-02 | 4.248E-02 | FAIL ABUN |
| SB-127 | 2.902E+03 | 3.134E+03 | 3.396E+03 | SHORT HLIF |
| I-131 | -8.962E-01 | 3.696E+00 | 3.718E+00 | NOT IDENT. |
| I-132 | -1.000E+41 | 4.916E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.913E+03 | 9.695E+03 | 9.734E+03 | SHORT HLIF |
| BA-133 | -1.386E-02 | 2.793E-02 | 2.862E-02 | NOT IDENT. |
| I-133 | 8.324E+18 | 4.988E+19 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.219E-03 | 1.885E-02 | 1.890E-02 | NOT IDENT. |
| CS-135 | -3.231E-02 | 8.535E-02 | 8.659E-02 | NOT IDENT. |
| I-135 | 1.000E+41 | 1.895E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.250E-01 | 5.943E-01 | 5.970E-01 | FAIL ABUN |
| CE-139 | -2.309E-02 | 2.135E-02 | 2.376E-02 | NOT IDENT. |
| BA-140 | 3.291E-01 | 5.588E-01 | 5.782E-01 | NOT IDENT. |
| LA-140 | 3.291E-01 | 5.588E-01 | 5.782E-01 | NOT IDENT. |
| CE-141 | 1.124E-02 | 7.697E-02 | 7.713E-02 | NOT IDENT. |
| CE-143 | -7.053E+11 | 1.065E+12 | 1.111E+12 | SHORT HLIF |
| CE-144 | 4.920E-02 | 1.131E-01 | 1.153E-01 | NOT IDENT. |
| PM-144 | -6.845E-03 | 2.202E-02 | 2.223E-02 | NOT IDENT. |
| PR-144 | -5.188E-01 | 1.690E+00 | 1.706E+00 | NOT IDENT. |
| PM-146 | 8.889E-03 | 1.578E-02 | 1.628E-02 | FAIL ABUN |
| ND-147 | 3.325E+00 | 5.408E+00 | 5.612E+00 | FAIL ABUN |
| PM-147 | 3.470E+02 | 3.508E+02 | 3.841E+02 | NOT IDENT. |
| PM-149 | 5.624E+07 | 1.046E+08 | 1.076E+08 | SHORT HLIF |
| EU-150 | -4.703E-03 | 1.681E-02 | 1.694E-02 | FAIL ABUN |
| EU-152 | -3.306E-02 | 5.591E-02 | 5.786E-02 | NOT IDENT. |
| GD-153 | 3.398E-02 | 5.113E-02 | 5.337E-02 | NOT IDENT. |
| EU-154 | -5.804E-03 | 5.364E-02 | 5.371E-02 | NOT IDENT. |
| EU-155 | -2.957E-02 | 5.654E-02 | 5.809E-02 | NOT IDENT. |
| TB-160 | 1.264E-01 | 1.024E-01 | 1.172E-01 | NOT IDENT. |
| HO-166M | -1.633E-02 | 3.224E-02 | 3.307E-02 | FAIL ABUN |
| TM-171 | -3.169E-01 | 8.620E+00 | 8.621E+00 | NOT IDENT. |
| LU-176 | 5.398E-03 | 1.372E-02 | 1.393E-02 | NOT IDENT. |
| HF-181 | 1.895E-02 | 4.964E-02 | 5.037E-02 | NOT IDENT. |
| TA-182 | 4.753E-02 | 1.188E-01 | 1.207E-01 | NOT IDENT. |
| RE-183 | -1.982E-02 | 1.544E-01 | 1.547E-01 | NOT IDENT. |
| RE-184 | -2.845E-02 | 1.488E-01 | 1.493E-01 | NOT IDENT. |
| W-188 | -3.636E+00 | 5.593E+00 | 5.828E+00 | FAIL ABUN |
| IR-192 | 1.486E-02 | 2.886E-02 | 2.962E-02 | NOT IDENT. |
| HG-203 | -2.483E-02 | 3.764E-02 | 3.927E-02 | NOT IDENT. |
| BI-207 | -2.820E-03 | 2.751E-02 | 2.754E-02 | NOT IDENT. |
| PB-210 | -1.222E+00 | 1.736E+00 | 1.821E+00 | NOT IDENT. |
| PB-211 | -1.493E-02 | 3.675E-01 | 3.675E-01 | NOT IDENT. |
| BI-212 | -1.017E-01 | 2.281E-01 | 2.327E-01 | NOT IDENT. |
| PB-212 | 4.619E-02 | 4.651E-02 | 5.096E-02 | FAIL ABUN |
| BI-214 | 6.223E-02 | 4.847E-02 | 5.600E-02 | FAIL ABUN |
| PB-214 | 3.495E-02 | 6.659E-02 | 6.843E-02 | FAIL ABUN |
| RN-219 | -2.292E-02 | 2.067E-01 | 2.070E-01 | NOT IDENT. |
| RN-222 | 6.223E-02 | 4.847E-02 | 5.600E-02 | FAIL ABUN |
| RA-223 | -8.132E-02 | 3.675E-01 | 3.694E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 1.348E-01 | 3.914E-01 | 3.961E-01 | NOT IDENT. |
| RA-226 | 6.223E-02 | 4.847E-02 | 5.600E-02 | FAIL ABUN |
| AC-227 | 1.087E-02 | 1.374E-01 | 1.375E-01 | FAIL ABUN |
| TH-227 | 1.087E-02 | 1.374E-01 | 1.375E-01 | FAIL ABUN |
| AC-228 | -8.684E-02 | 6.166E-02 | 7.304E-02 | FAIL ABUN |
| RA-228 | -8.684E-02 | 6.166E-02 | 7.304E-02 | FAIL ABUN |
| TH-228 | 4.619E-02 | 4.651E-02 | 5.096E-02 | FAIL ABUN |
| TH-229 | -5.499E-03 | 2.775E-01 | 2.775E-01 | NOT IDENT. |
| TH-230 | 6.223E-02 | 4.847E-02 | 5.600E-02 | FAIL ABUN |
| PA-231 | 2.006E-01 | 6.977E-01 | 7.035E-01 | NOT IDENT. |
| TH-231 | -8.132E-02 | 3.675E-01 | 3.694E-01 | FAIL ABUN |
| TH-232 | -8.684E-02 | 6.166E-02 | 7.304E-02 | FAIL ABUN |
| PA-233 | -1.415E-02 | 3.445E-02 | 3.503E-02 | FAIL ABUN |
| PA-234 | -1.678E-02 | 1.517E-01 | 1.518E-01 | NOT IDENT. |
| PA-234M | 6.614E-01 | 2.707E+00 | 2.724E+00 | NOT IDENT. |
| U-234 | 6.223E-02 | 4.847E-02 | 5.600E-02 | FAIL ABUN |
| U-235 | -4.409E-02 | 9.999E-02 | 1.019E-01 | FAIL ABUN |
| NP-237 | -1.415E-02 | 3.445E-02 | 3.503E-02 | FAIL ABUN |
| NP-238 | -6.303E+05 | 3.977E+07 | 3.977E+07 | SHORT HLIF |
| NP-239 | -2.202E-01 | 1.944E-01 | 2.182E-01 | NOT IDENT. |
| PU-239 | 5.233E+01 | 1.735E+02 | 1.751E+02 | NOT IDENT. |
| AM-241 | 1.345E-02 | 6.471E-02 | 6.499E-02 | NOT IDENT. |
| AM-243 | -2.746E-02 | 2.937E-02 | 3.187E-02 | NOT IDENT. |
| CM-243 | 4.662E-02 | 5.314E-02 | 5.715E-02 | NOT IDENT. |
| CM-247 | -1.934E-03 | 1.900E-02 | 1.902E-02 | NOT IDENT. |
| CF-249 | 2.812E-02 | 2.481E-02 | 2.786E-02 | NOT IDENT. |
| CF-251 | 1.237E-02 | 6.528E-02 | 6.552E-02 | NOT IDENT. |
| ANH-511 | -3.593E-02 | 3.131E-02 | 3.525E-02 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 26.2890 | 94.67 | 39.4086 | 193.51 | 36.9538 |
| 45.60 | 42.2421 | 94.87 | 39.4189 | 197.03 | 45.6127 |
| 46.54 | 37.0321 | 97.43 | 25.7930 | 198.01 | 44.6983 |
| 49.72 | 0.0000 | 98.43 | 22.9564 | 201.83 | 44.8360 |
| 51.35 | 33.1086 | 98.44 | 22.9567 | 205.31 | 29.6550 |
| 52.39 | 28.8930 | 99.53 | 28.7356 | 210.85 | 39.3919 |
| 53.44 | 30.0216 | 100.11 | 47.1608 | 215.65 | 34.7165 |
| 57.36 | 0.0000 | 103.18 | 25.4028 | 222.11 | 38.7637 |
| 57.53 | 25.9238 | 103.37 | 25.4087 | 227.09 | 30.1538 |
| 57.98 | 27.5658 | 105.21 | 40.5143 | 227.38 | 31.1331 |
| 59.32 | 16.2532 | 105.31 | 40.5193 | 228.16 | 0.0000 |
| 59.54 | 19.5113 | 106.12 | 39.4003 | 228.18 | 33.3767 |
| 63.29 | 26.1814 | 109.28 | 29.0811 | 117.23 | 33.3767 |
| 63.58 | 26.1940 | 111.00 | 43.1279 | 235.69 | 7.8307 |
| 64.28 | 37.6976 | 111.76 | 0.0000 | 235.96 | 7.8323 |
| 66.73 | 31.2664 | 116.30 | 0.0000 | 238.63 | 31.3894 |
| 67.24 | 49.4087 | 117.23 | 43.1470 | 238.98 | 0.0000 |
| 67.75 | 49.4490 | 121.12 | 25.6481 | 240.99 | 34.5866 |
| 69.67 | 46.2936 | 121.22 | 22.1129 | 242.00 | 33.0381 |
| 70.83 | 36.4395 | 121.78 | 21.2417 | 244.70 | 35.4658 |
| 72.81 | 53.1653 | 122.06 | 21.2483 | 252.40 | 0.0000 |
| 72.87 | 53.1702 | 123.07 | 37.2262 | 252.80 | 18.8240 |
| 74.66 | 57.7581 | 127.23 | 32.0534 | 254.15 | 0.0000 |
| 74.82 | 56.6609 | 129.30 | 36.5866 | 256.23 | 28.7991 |
| 74.97 | 56.6738 | 131.20 | 48.2853 | 260.90 | 0.0000 |
| 77.11 | 33.4442 | 133.02 | 40.3150 | 264.66 | 21.9725 |
| 79.69 | 52.5941 | 133.52 | 34.0618 | 268.22 | 33.0368 |
| 80.12 | 52.6269 | 136.00 | 37.7446 | 269.46 | 27.0523 |
| 80.19 | 52.6321 | 136.47 | 41.3594 | 271.23 | 27.0836 |
| 80.57 | 44.8179 | 140.51 | 0.0000 | 273.65 | 28.1316 |
| 81.00 | 40.3610 | 143.76 | 32.6091 | 276.40 | 17.1105 |
| 81.07 | 38.1226 | 144.24 | 27.1873 | 277.37 | 20.1425 |
| 83.79 | 48.4006 | 145.44 | 29.9417 | 277.60 | 20.1456 |
| 85.43 | 39.4861 | 152.43 | 22.8386 | 278.00 | 23.1734 |
| 86.55 | 51.9765 | 153.25 | 22.8567 | 279.20 | 27.2245 |
| 86.79 | 51.9936 | 323.87 | 25.6230 | 279.54 | 23.1965 |
| 86.94 | 52.0043 | 156.02 | 35.7508 | 280.46 | 24.2194 |
| 87.09 | 48.6228 | 158.56 | 30.3232 | 283.69 | 19.2134 |
| 87.57 | 43.4498 | 159.00 | 32.1743 | 284.31 | 21.2442 |
| 88.03 | 33.9665 | 162.33 | 35.9626 | 285.41 | 23.2836 |
| 88.34 | 32.2818 | 163.33 | 33.2268 | 285.90 | 0.0000 |
| 88.47 | 32.2875 | 165.86 | 52.7313 | 287.50 | 22.3008 |
| 89.96 | 51.0832 | 176.31 | 32.6827 | 290.67 | 25.3925 |
| 91.11 | 35.8134 | 176.60 | 32.6910 | 293.27 | 0.0000 |
| 92.59 | 45.5666 | 177.52 | 32.7172 | 351.93 | 21.3903 |
| 93.35 | 27.3674 | 181.07 | 0.0000 | 295.96 | 23.4383 |
| 94.56 | 30.8371 | 184.41 | 23.5085 | 879.38 | 39.8075 |
| 94.65 | 30.8408 | 143.76 | 23.5346 | 299.98 | 28.6046 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 28.6063 | 487.02 | 19.1206 | 702.65 | 10.7462 |
| 300.13 | 28.6071 | 492.35 | 0.0000 | 706.68 | 9.7825 |
| 301.36 | 19.4265 | 497.08 | 10.8448 | 711.68 | 14.6982 |
| 302.85 | 26.6078 | 505.52 | 29.0242 | 720.70 | 10.8109 |
| 256.23 | 27.6592 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 19.4908 | 511.00 | 21.8190 | 722.78 | 9.8350 |
| 308.46 | 19.5105 | 514.00 | 60.0780 | 722.91 | 9.8352 |
| 311.90 | 21.6088 | 514.00 | 60.0780 | 723.31 | 9.8367 |
| 316.51 | 14.8581 | 520.40 | 12.7781 | 724.19 | 12.7912 |
| 319.41 | 18.1911 | 520.69 | 0.0000 | 727.33 | 10.8346 |
| 320.08 | 16.5437 | 522.65 | 0.0000 | 733.00 | 9.8677 |
| 321.04 | 18.2085 | 527.90 | 0.0000 | 735.93 | 11.8526 |
| 323.87 | 21.5547 | 529.59 | 12.8270 | 333.97 | 5.9292 |
| 325.23 | 23.2309 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 19.7451 | 531.02 | 10.0842 | 747.24 | 12.8873 |
| 333.37 | 31.6761 | 546.56 | 0.0000 | 748.06 | 11.8989 |
| 333.97 | 25.0159 | 552.55 | 8.3230 | 752.31 | 11.9153 |
| 334.37 | 25.0217 | 563.25 | 8.3584 | 753.82 | 14.9011 |
| 338.28 | 18.8078 | 569.33 | 15.8259 | 756.73 | 12.9264 |
| 338.32 | 18.8083 | 946.00 | 15.8271 | 756.80 | 12.9267 |
| 311.90 | 18.8313 | 569.70 | 16.7594 | 884.68 | 8.9695 |
| 340.48 | 18.8313 | 583.19 | 13.1035 | 765.81 | 6.9803 |
| 340.55 | 18.8319 | 584.27 | 13.1086 | 766.42 | 5.9843 |
| 344.28 | 21.8071 | 595.83 | 12.5397 | 766.84 | 2.9925 |
| 345.93 | 19.5884 | 427.87 | 20.4135 | 772.60 | 0.0000 |
| 351.06 | 21.8893 | 602.52 | 0.0000 | 776.52 | 10.0054 |
| 351.93 | 17.8988 | 602.73 | 16.5011 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 9.4363 | 778.90 | 6.6753 |
| 356.01 | 27.0137 | 609.32 | 10.3976 | 783.70 | 0.0000 |
| 364.49 | 23.3216 | 610.33 | 4.7280 | 785.37 | 3.3443 |
| 366.42 | 0.0000 | 614.28 | 9.4700 | 792.07 | 10.0537 |
| 375.05 | 17.0566 | 618.01 | 9.4829 | 794.95 | 6.0375 |
| 356.01 | 28.9153 | 620.36 | 11.3895 | 795.86 | 7.0458 |
| 388.16 | 17.1733 | 621.93 | 10.8532 | 810.29 | 15.1644 |
| 388.63 | 22.5455 | 630.19 | 0.0000 | 344.28 | 15.1652 |
| 391.69 | 21.5054 | 631.29 | 12.7054 | 810.76 | 12.1333 |
| 264.66 | 15.1224 | 633.25 | 11.1252 | 815.77 | 7.0884 |
| 401.81 | 17.2925 | 634.78 | 7.9510 | 1048.07 | 10.1345 |
| 402.40 | 17.2976 | 635.95 | 5.9657 | 832.01 | 12.2106 |
| 404.85 | 17.3188 | 636.99 | 6.6842 | 834.85 | 6.1104 |
| 410.95 | 17.3713 | 645.85 | 9.5791 | 835.71 | 10.1865 |
| 413.71 | 19.5694 | 657.76 | 4.8099 | 836.80 | 0.0000 |
| 414.70 | 17.4036 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 16.4140 | 661.66 | 6.4220 | 846.77 | 6.1318 |
| 427.87 | 15.3255 | 664.57 | 0.0000 | 856.80 | 15.3743 |
| 433.94 | 14.2721 | 666.33 | 15.1622 | 860.56 | 7.1825 |
| 439.40 | 13.2083 | 666.50 | 15.1630 | 871.09 | 9.2626 |
| 453.88 | 7.7570 | 667.71 | 0.0000 | 873.19 | 7.2087 |
| 463.37 | 10.0166 | 677.62 | 9.6865 | 875.33 | 0.0000 |
| 468.07 | 7.8073 | 685.70 | 0.0000 | 879.38 | 3.0948 |
| 473.00 | 0.0000 | 695.00 | 14.6162 | 880.51 | 4.1278 |
| 475.06 | 13.4258 | 696.49 | 17.5482 | 883.24 | 8.2619 |
| 476.78 | 11.1967 | 696.51 | 17.5487 | 884.68 | 8.2654 |
| 477.60 | 14.5611 | 697.00 | 16.5762 | 889.28 | 1.0345 |
| 482.18 | 12.3458 | 697.49 | 15.6039 | 894.76 | 5.1805 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 3.1112 | 1298.22 | 0.0000 | | |
| 903.28 | 8.3086 | 1312.11 | 3.8192 | | |
| 911.20 | 6.9391 | 1332.49 | 4.7943 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 9.4072 | 1365.19 | 5.7920 | | |
| 937.49 | 5.2418 | 1368.63 | 0.0000 | | |
| 944.13 | 9.4522 | 1384.29 | 4.8452 | | |
| 946.00 | 8.4063 | 1408.01 | 6.8154 | | |
| 949.00 | 8.4131 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 6.7455 | | |
| 962.31 | 3.5179 | 1489.16 | 4.9455 | | |
| 964.08 | 3.5195 | 1505.03 | 6.9445 | | |
| 966.17 | 3.5215 | 1596.21 | 2.0177 | | |
| 968.97 | 11.6295 | 1620.50 | 4.0529 | | |
| 983.53 | 6.3677 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 5.1288 | | |
| 1274.44 | 9.5832 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.4628 | 1764.49 | 2.0771 | | |
| 1004.73 | 12.8054 | 1063.66 | 8.3164 | | |
| 507.63 | 0.0000 | 1771.35 | 3.1193 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 5.2305 | | |
| 1037.84 | 3.2284 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.0508 | | |
| 631.29 | 4.3139 | | | | |
| 1048.07 | 7.5520 | | | | |
| 1049.04 | 6.4749 | | | | |
| 1050.41 | 4.3180 | | | | |
| 1063.66 | 8.6645 | | | | |
| 1077.00 | 4.3463 | | | | |
| 1077.34 | 4.3467 | | | | |
| 1085.87 | 1.0889 | | | | |
| 1099.45 | 9.8323 | | | | |
| 1112.07 | 7.6706 | | | | |
| 1112.84 | 9.8640 | | | | |
| 1115.54 | 10.9673 | | | | |
| 1120.29 | 5.4897 | | | | |
| 1120.55 | 6.5880 | | | | |
| 1221.41 | 8.7855 | | | | |
| 1129.67 | 9.1699 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 6.4839 | | | | |
| 1177.95 | 8.3456 | | | | |
| 1189.05 | 8.3665 | | | | |
| 1204.77 | 7.4632 | | | | |
| 1221.41 | 6.5545 | | | | |
| 1231.02 | 6.5685 | | | | |
| 1235.36 | 5.6355 | | | | |
| 1238.28 | 9.3982 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 7.5736 | | | | |
| 1274.44 | 5.6833 | | | | |
| 1274.54 | 5.6833 | | | | |
| 1291.59 | 6.6548 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:17:29.79

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147018.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;247
                                        Background date  : 2-FEB-2014 16:26:12.
Sample date      : 7-NOV-2013 13:55:00. Acquisition date : 7-FEB-2014 09:17:04.
Sample ID        : G341147018           Sample quantity  : 1.41480E+02 GRAM
Detector name    : GAM04                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.37  0.0%
Energy tolerance : 2.00000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 119.08 | 10 | 23 | 1.33 | 237.95 | 232 | 8 | 2.84E-03 | 88.1 | |
| 2 | 0 | 186.89* | 10 | 39 | 2.32 | 373.54 | 368 | 11 | 2.75E-03 | 138.3 | |
| 3 | 0 | 194.66 | 12 | 14 | 1.05 | 389.09 | 383 | 8 | 3.44E-03 | 59.3 | |
| 4 | 0 | 216.11 | 7 | 15 | 0.97 | 431.97 | 427 | 7 | 1.83E-03 | 106.8 | |
| 5 | 0 | 296.20* | 7 | 7 | 0.79 | 592.13 | 588 | 7 | 2.06E-03 | 77.1 | |
| 6 | 0 | 473.07 | 12 | 3 | 3.43 | 945.85 | 940 | 11 | 3.45E-03 | 38.2 | |
| 7 | 0 | 480.20 | 4 | 6 | 0.64 | 960.10 | 955 | 7 | 1.08E-03 | 120.9 | |
| 8 | 0 | 645.77 | 8 | 3 | 0.72 | 1291.26 | 1284 | 11 | 2.25E-03 | 53.3 | |
| 9 | 0 | 759.91 | 9 | 0 | 1.48 | 1519.56 | 1515 | 8 | 2.50E-03 | 33.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:17:31

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147018.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:55:00 | Acquisition date | : 7-FEB-2014 09:17:04 |
| Sample ID | : G341147018 | Sample quantity | : 141.48 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA4 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.37  0.0% |
| Energy tolerance | : 2.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:17:31.93

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147018.CNF;1    *
* Acquisition date :  7-FEB-2014 09:17:04 Sensitivity     : 3.000            *
* Detector ID      : GAM04                Energy tolerance: 2.000            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.37     Half life ratio : 8.000            *
* Sample date      :  7-NOV-2013 13:55:00 Nuclide Library : SOLID            *
* Sample ID        : G341147018           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.4148E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  9-AUG-2013 10:37:36 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_500MLMB.CNF;5          *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.113E-02 | 1.088E+00 | 1.336E+00 | NOT IDENT. |
| NA-22 | 6.289E-03 | 2.621E-02 | 6.266E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.825E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.925E-02 | 2.867E-02 | 7.800E-02 | NOT IDENT. |
| K-40 | 3.986E-01 | 4.465E-01 | 1.042E+00 | NOT IDENT. |
| SC-46 | 7.706E-03 | 3.904E-02 | 9.069E-02 | NOT IDENT. |
| V-48 | -1.499E+00 | 1.377E+00 | 1.930E+00 | NOT IDENT. |
| CR-51 | -1.996E+00 | 1.339E+00 | 1.762E+00 | NOT IDENT. |
| MN-54 | 1.235E-02 | 3.265E-02 | 7.093E-02 | NOT IDENT. |
| CO-56 | -1.091E-02 | 6.059E-02 | 1.186E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.034E-02 | 2.195E-02 | 3.997E-02 | NOT IDENT. |
| CO-58 | 1.165E-02 | 6.063E-02 | 1.292E-01 | NOT IDENT. |
| FE-59 | -1.376E-01 | 1.830E-01 | 2.935E-01 | NOT IDENT. |
| CO-60 | 1.161E-03 | 3.159E-02 | 7.027E-02 | NOT IDENT. |
| ZN-65 | -1.534E-02 | 7.472E-02 | 1.456E-01 | NOT IDENT. |
| GE-68 | -1.535E+00 | 1.315E+00 | 1.839E+00 | NOT IDENT. |
| AS-73 | 1.281E+00 | 3.211E+00 | 6.196E+00 | NOT IDENT. |
| AS-74 | -9.334E-01 | 1.641E+00 | 2.774E+00 | NOT IDENT. |
| SE-75 | -7.591E-03 | 5.215E-02 | 9.894E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.100E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -6.137E-02 | 1.667E+00 | 3.496E+00 | NOT IDENT. |
| RB-83 | 2.514E-02 | 6.297E-02 | 1.465E-01 | NOT IDENT. |
| KR-85 | -3.942E+00 | 9.550E+00 | 1.645E+01 | NOT IDENT. |
| SR-85 | -4.732E-02 | 1.133E-01 | 1.950E-01 | NOT IDENT. |
| RB-86 | -1.631E+01 | 1.193E+01 | 1.511E+01 | NOT IDENT. |
| Y-88 | -7.909E-03 | 4.447E-02 | 9.885E-02 | NOT IDENT. |
| Y-91 | -1.071E+01 | 3.179E+01 | 6.001E+01 | NOT IDENT. |
| NB-94 | -9.787E-03 | 2.858E-02 | 5.553E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | 2.601E-02 | 5.350E-02 | 1.256E-01 | NOT IDENT. |
| NB-95M | -8.122E-02 | 2.180E-01 | 3.996E-01 | NOT IDENT. |
| ZR-95 | -7.737E-02 | 1.453E-01 | 2.158E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.056E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.306E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.197E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -3.432E-03 | 2.352E-02 | 4.264E-02 | NOT IDENT. |
| RH-102 | -1.448E-02 | 4.485E-02 | 8.574E-02 | FAIL ABUN |
| RU-103 | -9.587E-02 | 1.100E-01 | 1.748E-01 | NOT IDENT. |
| RH-106 | -1.121E-01 | 2.607E-01 | 4.595E-01 | NOT IDENT. |
| RU-106 | -1.121E-01 | 2.607E-01 | 4.595E-01 | NOT IDENT. |
| AG-108M | -4.230E-03 | 2.095E-02 | 3.951E-02 | NOT IDENT. |
| CD-109 | -3.626E-01 | 7.052E-01 | 1.234E+00 | NOT IDENT. |
| AG-110M | -2.465E-02 | 3.438E-02 | 5.795E-02 | NOT IDENT. |
| SN-113 | -2.904E-02 | 4.836E-02 | 8.451E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.725E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -4.637E-01 | 1.842E+00 | 3.269E+00 | NOT IDENT. |
| TE-123M | 7.991E-04 | 2.980E-02 | 5.502E-02 | NOT IDENT. |
| SB-124 | -1.143E-01 | 1.659E-01 | 2.757E-01 | FAIL ABUN |
| SB-125 | 2.196E-02 | 6.191E-02 | 1.308E-01 | NOT IDENT. |
| TE-125M | -5.287E+00 | 1.671E+01 | 2.997E+01 | NOT IDENT. |
| I-126 | -4.742E+00 | 7.770E+00 | 1.413E+01 | NOT IDENT. |
| SB-126 | -5.164E-01 | 6.495E+00 | 1.342E+01 | NOT IDENT. |
| SN-126 | -4.074E-02 | 6.282E-02 | 1.080E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 8.762E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.948E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 7.848E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -3.235E-02 | 3.238E-02 | 5.252E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.850E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -3.837E-03 | 3.392E-02 | 6.707E-02 | NOT IDENT. |
| CS-135 | -2.546E-02 | 1.152E-01 | 2.160E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.686E-01 | 4.348E+00 | 9.332E+00 | NOT IDENT. |
| BA-137M | -2.983E-03 | 2.052E-02 | 4.391E-02 | NOT IDENT. |
| CS-137 | -3.152E-03 | 2.168E-02 | 4.639E-02 | NOT IDENT. |
| CE-139 | -1.560E-02 | 3.159E-02 | 5.375E-02 | NOT IDENT. |
| BA-140 | 1.731E-02 | 4.379E+00 | 9.848E+00 | NOT IDENT. |
| LA-140 | 1.731E-02 | 4.379E+00 | 9.848E+00 | NOT IDENT. |
| CE-141 | 1.747E-01 | 2.311E-01 | 4.607E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 5.168E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.786E-02 | 1.543E-01 | 2.827E-01 | NOT IDENT. |
| PM-144 | 2.594E-02 | 3.154E-02 | 7.130E-02 | NOT IDENT. |
| PR-144 | 2.042E+00 | 2.462E+00 | 5.567E+00 | NOT IDENT. |
| PM-146 | 3.793E-03 | 3.057E-02 | 6.120E-02 | NOT IDENT. |
| ND-147 | 0.000E+00 | 5.434E+01 | 0.000E+00 | SHORT HLIF |
| PM-147 | -2.972E+02 | 6.108E+02 | 9.235E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.692E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.145E-02 | 1.920E-02 | 3.387E-02 | NOT IDENT. |
| EU-152 | -2.922E-02 | 6.275E-02 | 1.139E-01 | NOT IDENT. |
| GD-153 | 3.307E-02 | 6.645E-02 | 1.355E-01 | NOT IDENT. |
| EU-154 | 3.097E-03 | 7.562E-02 | 1.697E-01 | NOT IDENT. |
| EU-155 | 2.788E-02 | 7.567E-02 | 1.486E-01 | NOT IDENT. |
| TB-160 | 2.647E-02 | 1.438E-01 | 3.338E-01 | FAIL ABUN |
| HO-166M | -1.794E-02 | 4.066E-02 | 7.636E-02 | NOT IDENT. |
| TM-171 | 3.394E+01 | 3.814E+01 | 7.971E+01 | NOT IDENT. |
| LU-176 | -1.437E-02 | 2.074E-02 | 3.650E-02 | NOT IDENT. |
| HF-181 | 4.729E-02 | 1.121E-01 | 1.406E-01 | FAIL ABUN |
| TA-182 | -8.573E-02 | 1.968E-01 | 3.556E-01 | NOT IDENT. |
| RE-183 | -4.848E-02 | 4.795E-01 | 9.278E-01 | NOT IDENT. |
| RE-184 | 1.897E-01 | 4.351E-01 | 9.597E-01 | NOT IDENT. |
| W-188 | 1.076E+00 | 9.449E+00 | 1.795E+01 | NOT IDENT. |
| IR-192 | 6.969E-02 | 4.957E-02 | 1.150E-01 | FAIL ABUN |
| HG-203 | -3.933E-02 | 8.065E-02 | 1.465E-01 | NOT IDENT. |
| BI-207 | -4.098E-02 | 3.036E-02 | 1.514E-02 | NOT IDENT. |
| TL-208 | 1.908E-02 | 2.529E-02 | 5.901E-02 | NOT IDENT. |
| PB-210 | -1.767E+00 | 9.733E+00 | 1.792E+01 | NOT IDENT. |
| BI-211 | 1.009E-01 | 1.772E-01 | 3.554E-01 | NOT IDENT. |
| PB-211 | 2.544E-01 | 5.001E-01 | 1.056E+00 | NOT IDENT. |
| BI-212 | 8.742E-02 | 3.140E-01 | 6.933E-01 | NOT IDENT. |
| PB-212 | 2.216E-02 | 4.857E-02 | 9.777E-02 | NOT IDENT. |
| BI-214 | 7.557E-02 | 6.640E-02 | 1.433E-01 | NOT IDENT. |
| PB-214 | 1.100E-02 | 6.480E-02 | 1.239E-01 | FAIL ABUN |
| RN-219 | -8.701E-02 | 2.847E-01 | 5.266E-01 | NOT IDENT. |
| RN-222 | 7.557E-02 | 6.640E-02 | 1.433E-01 | NOT IDENT. |
| RA-223 | 8.908E-02 | 3.678E-01 | 7.668E-01 | NOT IDENT. |
| RA-224 | 4.386E-02 | 4.911E-01 | 9.448E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 7.557E-02 | 6.640E-02 | 1.433E-01 | NOT IDENT. |
| AC-227 | -4.998E-02 | 1.560E-01 | 2.938E-01 | NOT IDENT. |
| TH-227 | -4.998E-02 | 1.560E-01 | 2.938E-01 | NOT IDENT. |
| AC-228 | -1.947E-02 | 1.153E-01 | 2.330E-01 | NOT IDENT. |
| RA-228 | -1.947E-02 | 1.153E-01 | 2.330E-01 | NOT IDENT. |
| TH-228 | 2.216E-02 | 4.857E-02 | 9.777E-02 | NOT IDENT. |
| TH-229 | 3.309E-01 | 3.848E-01 | 6.818E-01 | FAIL ABUN |
| TH-230 | 7.556E-02 | 6.639E-02 | 1.433E-01 | NOT IDENT. |
| PA-231 | 8.145E-01 | 1.035E+00 | 2.210E+00 | NOT IDENT. |
| TH-231 | 8.908E-02 | 3.678E-01 | 7.668E-01 | NOT IDENT. |
| TH-232 | -1.947E-02 | 1.153E-01 | 2.330E-01 | NOT IDENT. |
| PA-233 | -8.962E-03 | 4.661E-02 | 8.812E-02 | NOT IDENT. |
| PA-234 | -2.588E-01 | 2.020E-01 | 2.886E-01 | NOT IDENT. |
| PA-234M | -5.400E-02 | 2.627E+00 | 5.609E+00 | NOT IDENT. |
| TH-234 | 3.627E-01 | 1.578E+00 | 3.062E+00 | NOT IDENT. |
| U-234 | 7.556E-02 | 6.639E-02 | 1.433E-01 | NOT IDENT. |
| U-235 | -3.533E-02 | 1.494E-01 | 2.646E-01 | FAIL ABUN |
| NP-237 | -8.962E-03 | 4.661E-02 | 8.812E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.072E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 3.627E-01 | 1.578E+00 | 3.062E+00 | NOT IDENT. |
| NP-239 | 2.091E-01 | 3.611E-01 | 5.342E-01 | FAIL ABUN |
| PU-239 | 1.645E+02 | 2.430E+02 | 4.841E+02 | NOT IDENT. |
| AM-241 | -7.063E-02 | 1.789E-01 | 3.276E-01 | NOT IDENT. |
| AM-243 | -3.496E-02 | 4.694E-02 | 8.036E-02 | NOT IDENT. |
| CM-243 | 1.268E-02 | 7.467E-02 | 1.434E-01 | NOT IDENT. |
| CM-247 | -2.616E-03 | 2.507E-02 | 4.835E-02 | NOT IDENT. |
| CF-249 | 1.137E-03 | 2.729E-02 | 5.391E-02 | NOT IDENT. |
| CF-251 | -3.196E-02 | 9.566E-02 | 1.659E-01 | NOT IDENT. |
| ANH-511 | -9.593E-03 | 4.540E-02 | 1.011E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:17:28.30

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 119.08 | 10 | 23 | 1.33 | 237.95 | 232 | 8 | 2.84E-03 | 88.1 | |
| 2 | 0 | 186.89 | 25 | 39 | 2.32 | 373.54 | 368 | 11 | 6.95E-03 | 53.2 | |
| 3 | 0 | 194.66 | 12 | 14 | 1.05 | 389.09 | 383 | 8 | 3.44E-03 | 59.3 | |
| 4 | 0 | 216.11 | 7 | 15 | 0.97 | 431.97 | 427 | 7 | 1.83E-03 | 106.8 | |
| 5 | 0 | 296.20 | 10 | 7 | 0.79 | 592.13 | 588 | 7 | 2.87E-03 | 52.4 | |
| 6 | 0 | 473.07 | 12 | 3 | 3.43 | 945.85 | 940 | 11 | 3.45E-03 | 38.2 | |
| 7 | 0 | 480.20 | 4 | 6 | 0.64 | 960.10 | 955 | 7 | 1.08E-03 | 120.9 | |
| 8 | 0 | 511.80 | 69 | 20 | 2.35 | 1023.32 | 1017 | 12 | 1.92E-02 | 17.9 | |
| 9 | 0 | 645.77 | 8 | 3 | 0.72 | 1291.26 | 1284 | 11 | 2.25E-03 | 53.3 | |
| 10 | 0 | 759.91 | 9 | 0 | 1.48 | 1519.56 | 1515 | 8 | 2.50E-03 | 33.3 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:17:30.28

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : G341147018 Acquisition date : 7-FEB-2014 09:17:04

| | | |
|---|---|---|
| Total number of lines in spectrum | 9 | |
| Number of unidentified lines | 1 | |
| Number of lines tentatively identified by NID | 8 | 88.89% |

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147018 Acquisition date : 7-FEB-2014 09:17:04

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 119.08 | 10 | 23 | 1.33 | 237.95 | 232 | 8 | 2.84E-03 | 88.1 | 4.93E+00 | T |
| 0 | 186.89 | 10 | 39 | 2.32 | 373.54 | 368 | 11 | 2.75E-03 | **** | 4.60E+00 | T |
| 0 | 194.66 | 12 | 14 | 1.05 | 389.09 | 383 | 8 | 3.44E-03 | 59.3 | 4.50E+00 | T |
| 0 | 216.11 | 7 | 15 | 0.97 | 431.97 | 427 | 7 | 1.83E-03 | **** | 4.24E+00 | T |
| 0 | 296.20 | 7 | 7 | 0.79 | 592.13 | 588 | 7 | 2.06E-03 | 77.1 | 3.43E+00 | T |
| 0 | 473.07 | 12 | 3 | 3.43 | 945.85 | 940 | 11 | 3.45E-03 | 38.2 | 2.47E+00 | T |
| 0 | 480.20 | 4 | 6 | 0.64 | 960.10 | 955 | 7 | 1.08E-03 | **** | 2.44E+00 | T |
| 0 | 645.77 | 8 | 3 | 0.72 | 1291.26 | 1284 | 11 | 2.25E-03 | 53.3 | 1.96E+00 | T |
| 0 | 759.91 | 9 | 0 | 1.48 | 1519.56 | 1515 | 8 | 2.50E-03 | 33.3 | 1.72E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:17:44.43

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147018.CNF;1       *
* Acquisition date :  7-FEB-2014 09:17:04 Sensitivity     : 3.000                *
* Detector ID      : GAM04                Energy tolerance: 2.000                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.37     Half life ratio : 8.000                *
* Sample date      :  7-NOV-2013 13:55:00 Nuclide Library : SOLID                 *
* Sample ID        : G341147018           Analyst initials: RXF2                 *
* Batch Number     : 1359496              Sample Quantity : 1.4148E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  9-AUG-2013 10:37:36 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_500MLMB.CNF;5              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.755E-01 | NOT IDENT. |
| NA-22 | 2.426E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.022E-02 | NOT IDENT. |
| K-40 | 4.513E-01 | NOT IDENT. |
| SC-46 | 3.513E-02 | NOT IDENT. |
| V-48 | 6.839E-01 | NOT IDENT. |
| CR-51 | 6.593E-01 | NOT IDENT. |
| MN-54 | 2.993E-02 | NOT IDENT. |
| CO-56 | 4.887E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.786E-02 | NOT IDENT. |
| CO-58 | 5.370E-02 | NOT IDENT. |
| FE-59 | 1.040E-01 | NOT IDENT. |
| CO-60 | 2.802E-02 | NOT IDENT. |
| ZN-65 | 5.777E-02 | NOT IDENT. |
| GE-68 | 6.966E-01 | NOT IDENT. |
| AS-73 | 2.802E+00 | NOT IDENT. |
| AS-74 | 1.177E+00 | NOT IDENT. |
| SE-75 | 4.390E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.400E+00 | NOT IDENT. |
| RB-83 | 5.877E-02 | NOT IDENT. |
| KR-85 | 7.504E+00 | NOT IDENT. |
| SR-85 | 8.895E-02 | NOT IDENT. |
| RB-86 | 5.560E+00 | NOT IDENT. |
| Y-88 | 3.322E-02 | NOT IDENT. |
| Y-91 | 2.283E+01 | NOT IDENT. |
| NB-94 | 2.384E-02 | NOT IDENT. |
| NB-95 | 5.143E-02 | NOT IDENT. |
| NB-95M | 1.804E-01 | NOT IDENT. |

| | | |
|---|---|---|
| ZR-95 | 8.720E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.911E-02 | NOT IDENT. |
| RH-102 | 3.614E-02 | FAIL ABUN |
| RU-103 | 7.064E-02 | NOT IDENT. |
| RH-106 | 1.872E-01 | NOT IDENT. |
| RU-106 | 1.872E-01 | NOT IDENT. |
| AG-108M | 1.674E-02 | NOT IDENT. |
| CD-109 | 5.555E-01 | NOT IDENT. |
| AG-110M | 2.053E-02 | NOT IDENT. |
| SN-113 | 3.545E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.453E+00 | NOT IDENT. |
| TE-123M | 2.456E-02 | NOT IDENT. |
| SB-124 | 8.714E-02 | FAIL ABUN |
| SB-125 | 5.574E-02 | NOT IDENT. |
| TE-125M | 1.328E+01 | NOT IDENT. |
| I-126 | 5.496E+00 | NOT IDENT. |
| SB-126 | 5.425E+00 | NOT IDENT. |
| SN-126 | 4.861E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.237E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.801E-02 | NOT IDENT. |
| CS-135 | 9.585E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.795E+00 | NOT IDENT. |
| BA-137M | 1.778E-02 | NOT IDENT. |
| CS-137 | 1.878E-02 | NOT IDENT. |
| CE-139 | 2.395E-02 | NOT IDENT. |
| BA-140 | 3.687E+00 | NOT IDENT. |
| LA-140 | 3.687E+00 | NOT IDENT. |
| CE-141 | 2.095E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.253E-01 | NOT IDENT. |
| PM-144 | 3.099E-02 | NOT IDENT. |
| PR-144 | 2.421E+00 | NOT IDENT. |
| PM-146 | 2.612E-02 | NOT IDENT. |
| ND-147 | 0.000E+00 | SHORT HLIF |
| PM-147 | 4.076E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.456E-02 | NOT IDENT. |
| EU-152 | 4.812E-02 | NOT IDENT. |
| GD-153 | 6.013E-02 | NOT IDENT. |
| EU-154 | 6.559E-02 | NOT IDENT. |
| EU-155 | 6.663E-02 | NOT IDENT. |
| TB-160 | 1.290E-01 | FAIL ABUN |
| HO-166M | 3.086E-02 | NOT IDENT. |
| TM-171 | 3.618E+01 | NOT IDENT. |
| LU-176 | 1.596E-02 | NOT IDENT. |
| HF-181 | 5.384E-02 | FAIL ABUN |
| TA-182 | 1.367E-01 | NOT IDENT. |
| RE-183 | 4.029E-01 | NOT IDENT. |
| RE-184 | 4.032E-01 | NOT IDENT. |
| W-188 | 7.700E+00 | NOT IDENT. |
| IR-192 | 5.127E-02 | FAIL ABUN |
| HG-203 | 6.363E-02 | NOT IDENT. |
| BI-207 | 0.000E+00 | NOT IDENT. |
| TL-208 | 2.552E-02 | NOT IDENT. |
| PB-210 | 8.026E+00 | NOT IDENT. |
| BI-211 | 1.595E-01 | NOT IDENT. |
| PB-211 | 4.594E-01 | NOT IDENT. |
| BI-212 | 2.862E-01 | NOT IDENT. |
| PB-212 | 4.477E-02 | NOT IDENT. |
| BI-214 | 6.398E-02 | NOT IDENT. |
| PB-214 | 5.533E-02 | FAIL ABUN |
| RN-219 | 2.241E-01 | NOT IDENT. |
| RN-222 | 6.398E-02 | NOT IDENT. |
| RA-223 | 3.277E-01 | NOT IDENT. |
| RA-224 | 4.283E-01 | NOT IDENT. |
| RA-226 | 6.398E-02 | NOT IDENT. |
| AC-227 | 1.270E-01 | NOT IDENT. |

| | | |
|---|---|---|
| TH-227 | 1.270E-01 | NOT IDENT. |
| AC-228 | 9.760E-02 | NOT IDENT. |
| RA-228 | 9.760E-02 | NOT IDENT. |
| TH-228 | 4.477E-02 | NOT IDENT. |
| TH-229 | 3.050E-01 | FAIL ABUN |
| TH-230 | 6.397E-02 | NOT IDENT. |
| PA-231 | 9.860E-01 | NOT IDENT. |
| TH-231 | 3.277E-01 | NOT IDENT. |
| TH-232 | 9.760E-02 | NOT IDENT. |
| PA-233 | 3.844E-02 | NOT IDENT. |
| PA-234 | 1.023E-01 | NOT IDENT. |
| PA-234M | 2.173E+00 | NOT IDENT. |
| TH-234 | 1.385E+00 | NOT IDENT. |
| U-234 | 6.397E-02 | NOT IDENT. |
| U-235 | 1.193E-01 | FAIL ABUN |
| NP-237 | 3.844E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.385E+00 | NOT IDENT. |
| NP-239 | 2.393E-01 | FAIL ABUN |
| PU-239 | 2.195E+02 | NOT IDENT. |
| AM-241 | 1.434E-01 | NOT IDENT. |
| AM-243 | 3.583E-02 | NOT IDENT. |
| CM-243 | 6.405E-02 | NOT IDENT. |
| CM-247 | 2.058E-02 | NOT IDENT. |
| CF-249 | 2.313E-02 | NOT IDENT. |
| CF-251 | 7.419E-02 | NOT IDENT. |
| ANH-511 | 4.748E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:17:49.08

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147018.CNF;1    *
* Acquisition date :  7-FEB-2014 09:17:04 Sensitivity     : 3.000            *
* Detector ID      : GAM04                Energy tolerance: 2.000            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.37     Half life ratio : 8.000            *
* Sample date      :  7-NOV-2013 13:55:00 Nuclide Library : SOLID            *
* Sample ID        : G341147018           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.4148E+02 GRAM  *
*                                         Quantity Err(%) : 1.4136E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  9-AUG-2013 10:37:36 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_500MLMB.CNF;5          *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.113E-02 | 1.088E+00 | 1.088E+00 | NOT IDENT. |
| NA-22 | 6.289E-03 | 2.621E-02 | 2.636E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.831E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.925E-02 | 2.871E-02 | 2.999E-02 | NOT IDENT. |
| K-40 | 3.986E-01 | 4.479E-01 | 4.826E-01 | NOT IDENT. |
| SC-46 | 7.706E-03 | 3.905E-02 | 3.921E-02 | NOT IDENT. |
| V-48 | -1.499E+00 | 1.391E+00 | 1.546E+00 | NOT IDENT. |
| CR-51 | -1.996E+00 | 1.349E+00 | 1.622E+00 | NOT IDENT. |
| MN-54 | 1.235E-02 | 3.267E-02 | 3.314E-02 | NOT IDENT. |
| CO-56 | -1.091E-02 | 6.060E-02 | 6.080E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 5.244E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.034E-02 | 2.197E-02 | 2.246E-02 | NOT IDENT. |
| CO-58 | 1.165E-02 | 6.065E-02 | 6.087E-02 | NOT IDENT. |
| FE-59 | -1.376E-01 | 1.843E-01 | 1.944E-01 | NOT IDENT. |
| CO-60 | 1.161E-03 | 3.159E-02 | 3.160E-02 | NOT IDENT. |
| ZN-65 | -1.534E-02 | 7.476E-02 | 7.508E-02 | NOT IDENT. |
| GE-68 | -1.535E+00 | 1.333E+00 | 1.502E+00 | NOT IDENT. |
| AS-73 | 1.281E+00 | 3.223E+00 | 3.274E+00 | NOT IDENT. |
| AS-74 | -9.334E-01 | 1.644E+00 | 1.697E+00 | NOT IDENT. |
| SE-75 | -7.591E-03 | 5.216E-02 | 5.227E-02 | NOT IDENT. |
| BR-77 | 3.836E+09 | 4.225E+10 | 4.228E+10 | SHORT HLIF |
| SR-82 | -6.137E-02 | 1.667E+00 | 1.667E+00 | NOT IDENT. |
| RB-83 | 2.514E-02 | 6.310E-02 | 6.411E-02 | NOT IDENT. |
| KR-85 | -3.942E+00 | 9.556E+00 | 9.720E+00 | NOT IDENT. |
| SR-85 | -4.732E-02 | 1.134E-01 | 1.153E-01 | NOT IDENT. |
| RB-86 | -1.631E+01 | 1.215E+01 | 1.421E+01 | NOT IDENT. |
| Y-88 | -7.909E-03 | 4.447E-02 | 4.462E-02 | NOT IDENT. |
| Y-91 | -1.071E+01 | 3.181E+01 | 3.217E+01 | NOT IDENT. |
| NB-94 | -9.787E-03 | 2.859E-02 | 2.893E-02 | NOT IDENT. |
| NB-95 | 2.601E-02 | 5.356E-02 | 5.483E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95M | -8.122E-02 | 2.182E-01 | 2.212E-01 | NOT IDENT. |
| ZR-95 | -7.737E-02 | 1.455E-01 | 1.496E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 1.059E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -3.183E+39 | 1.336E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -8.603E+08 | 2.199E+09 | 2.233E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 7.062E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -3.432E-03 | 2.353E-02 | 2.358E-02 | NOT IDENT. |
| RH-102 | -1.448E-02 | 4.488E-02 | 4.535E-02 | FAIL ABUN |
| RU-103 | -9.587E-02 | 1.104E-01 | 1.185E-01 | NOT IDENT. |
| RH-106 | -1.121E-01 | 2.609E-01 | 2.658E-01 | NOT IDENT. |
| RU-106 | -1.121E-01 | 2.609E-01 | 2.658E-01 | NOT IDENT. |
| AG-108M | -4.230E-03 | 2.095E-02 | 2.104E-02 | NOT IDENT. |
| CD-109 | -3.626E-01 | 7.064E-01 | 7.250E-01 | NOT IDENT. |
| AG-110M | -2.465E-02 | 3.450E-02 | 3.625E-02 | NOT IDENT. |
| SN-113 | -2.904E-02 | 4.843E-02 | 5.017E-02 | NOT IDENT. |
| CD-115 | 3.074E+11 | 1.758E+11 | 2.239E+11 | SHORT HLIF |
| SN-117M | -4.637E-01 | 1.843E+00 | 1.855E+00 | NOT IDENT. |
| TE-123M | 7.991E-04 | 2.980E-02 | 2.980E-02 | NOT IDENT. |
| SB-124 | -1.143E-01 | 1.661E-01 | 1.739E-01 | FAIL ABUN |
| SB-125 | 2.196E-02 | 6.194E-02 | 6.273E-02 | NOT IDENT. |
| TE-125M | -5.287E+00 | 1.671E+01 | 1.688E+01 | NOT IDENT. |
| I-126 | -4.742E+00 | 7.783E+00 | 8.072E+00 | NOT IDENT. |
| SB-126 | -5.164E-01 | 6.496E+00 | 6.500E+00 | NOT IDENT. |
| SN-126 | -4.074E-02 | 6.294E-02 | 6.557E-02 | NOT IDENT. |
| SB-127 | 8.805E+05 | 9.541E+05 | 1.033E+06 | SHORT HLIF |
| I-131 | -4.716E+00 | 6.948E+01 | 6.951E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 3.685E+42 | 0.000E+00 | SHORT HLIF |
| TE-132 | 5.976E+06 | 7.909E+06 | 8.355E+06 | SHORT HLIF |
| BA-133 | -3.235E-02 | 3.250E-02 | 3.562E-02 | NOT IDENT. |
| I-133 | -1.566E+28 | 1.850E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -3.837E-03 | 3.392E-02 | 3.397E-02 | NOT IDENT. |
| CS-135 | -2.546E-02 | 1.152E-01 | 1.158E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 3.002E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.686E-01 | 4.350E+00 | 4.364E+00 | NOT IDENT. |
| BA-137M | -2.983E-03 | 2.052E-02 | 2.057E-02 | NOT IDENT. |
| CS-137 | -3.152E-03 | 2.168E-02 | 2.173E-02 | NOT IDENT. |
| CE-139 | -1.560E-02 | 3.177E-02 | 3.254E-02 | NOT IDENT. |
| BA-140 | 1.731E-02 | 4.379E+00 | 4.379E+00 | NOT IDENT. |
| LA-140 | 1.731E-02 | 4.379E+00 | 4.379E+00 | NOT IDENT. |
| CE-141 | 1.747E-01 | 2.317E-01 | 2.447E-01 | NOT IDENT. |
| CE-143 | -6.171E+18 | 5.195E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.786E-02 | 1.543E-01 | 1.545E-01 | NOT IDENT. |
| PM-144 | 2.594E-02 | 3.162E-02 | 3.371E-02 | NOT IDENT. |
| PR-144 | 2.042E+00 | 2.468E+00 | 2.634E+00 | NOT IDENT. |
| PM-146 | 3.793E-03 | 3.057E-02 | 3.062E-02 | NOT IDENT. |
| ND-147 | -5.293E+01 | 5.455E+01 | 5.954E+01 | SHORT HLIF |
| PM-147 | -2.972E+02 | 6.114E+02 | 6.259E+02 | NOT IDENT. |
| PM-149 | -3.242E+11 | 1.693E+12 | 1.699E+12 | SHORT HLIF |
| EU-150 | -1.145E-02 | 1.922E-02 | 1.990E-02 | NOT IDENT. |
| EU-152 | -2.922E-02 | 6.281E-02 | 6.417E-02 | NOT IDENT. |
| GD-153 | 3.307E-02 | 6.652E-02 | 6.817E-02 | NOT IDENT. |
| EU-154 | 3.097E-03 | 7.562E-02 | 7.563E-02 | NOT IDENT. |
| EU-155 | 2.788E-02 | 7.572E-02 | 7.676E-02 | NOT IDENT. |
| TB-160 | 2.647E-02 | 1.438E-01 | 1.443E-01 | FAIL ABUN |
| HO-166M | -1.794E-02 | 4.069E-02 | 4.149E-02 | NOT IDENT. |
| TM-171 | 3.394E+01 | 3.834E+01 | 4.128E+01 | NOT IDENT. |
| LU-176 | -1.437E-02 | 2.077E-02 | 2.176E-02 | NOT IDENT. |
| HF-181 | 4.729E-02 | 1.122E-01 | 1.142E-01 | FAIL ABUN |
| TA-182 | -8.573E-02 | 1.969E-01 | 2.007E-01 | NOT IDENT. |
| RE-183 | -4.848E-02 | 4.795E-01 | 4.800E-01 | NOT IDENT. |
| RE-184 | 1.897E-01 | 4.360E-01 | 4.443E-01 | NOT IDENT. |
| W-188 | 1.076E+00 | 9.450E+00 | 9.463E+00 | NOT IDENT. |
| IR-192 | 6.969E-02 | 4.989E-02 | 5.896E-02 | FAIL ABUN |
| HG-203 | -3.933E-02 | 8.071E-02 | 8.263E-02 | NOT IDENT. |
| BI-207 | -4.098E-02 | 3.091E-02 | 3.601E-02 | NOT IDENT. |
| TL-208 | 1.908E-02 | 2.534E-02 | 2.676E-02 | NOT IDENT. |
| PB-210 | -1.767E+00 | 9.735E+00 | 9.768E+00 | NOT IDENT. |
| BI-211 | 1.009E-01 | 1.774E-01 | 1.832E-01 | NOT IDENT. |
| PB-211 | 2.544E-01 | 5.006E-01 | 5.136E-01 | NOT IDENT. |
| BI-212 | 8.742E-02 | 3.141E-01 | 3.166E-01 | NOT IDENT. |
| PB-212 | 2.216E-02 | 4.861E-02 | 4.962E-02 | NOT IDENT. |
| BI-214 | 7.557E-02 | 6.670E-02 | 7.490E-02 | NOT IDENT. |
| PB-214 | 1.100E-02 | 6.481E-02 | 6.499E-02 | FAIL ABUN |
| RN-219 | -8.701E-02 | 2.850E-01 | 2.877E-01 | NOT IDENT. |
| RN-222 | 7.557E-02 | 6.670E-02 | 7.490E-02 | NOT IDENT. |
| RA-223 | 8.908E-02 | 3.679E-01 | 3.701E-01 | NOT IDENT. |
| RA-224 | 4.386E-02 | 4.911E-01 | 4.915E-01 | NOT IDENT. |
| RA-226 | 7.557E-02 | 6.670E-02 | 7.490E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AC-227 | -4.998E-02 | 1.561E-01 | 1.577E-01 | NOT IDENT. |
| TH-227 | -4.998E-02 | 1.561E-01 | 1.577E-01 | NOT IDENT. |
| AC-228 | -1.947E-02 | 1.153E-01 | 1.157E-01 | NOT IDENT. |
| RA-228 | -1.947E-02 | 1.153E-01 | 1.157E-01 | NOT IDENT. |
| TH-228 | 2.216E-02 | 4.861E-02 | 4.962E-02 | NOT IDENT. |
| TH-229 | 3.309E-01 | 3.860E-01 | 4.138E-01 | FAIL ABUN |
| TH-230 | 7.556E-02 | 6.669E-02 | 7.489E-02 | NOT IDENT. |
| PA-231 | 8.145E-01 | 1.037E+00 | 1.100E+00 | NOT IDENT. |
| TH-231 | 8.908E-02 | 3.679E-01 | 3.701E-01 | NOT IDENT. |
| TH-232 | -1.947E-02 | 1.153E-01 | 1.157E-01 | NOT IDENT. |
| PA-233 | -8.962E-03 | 4.661E-02 | 4.679E-02 | NOT IDENT. |
| PA-234 | -2.588E-01 | 3.598E-01 | 3.782E-01 | NOT IDENT. |
| PA-234M | -5.400E-02 | 2.627E+00 | 2.627E+00 | NOT IDENT. |
| TH-234 | 3.627E-01 | 1.580E+00 | 1.588E+00 | NOT IDENT. |
| U-234 | 7.556E-02 | 6.669E-02 | 7.489E-02 | NOT IDENT. |
| U-235 | -3.533E-02 | 1.494E-01 | 1.503E-01 | FAIL ABUN |
| NP-237 | -8.962E-03 | 4.661E-02 | 4.679E-02 | NOT IDENT. |
| NP-238 | -9.994E+11 | 1.080E+12 | 1.170E+12 | SHORT HLIF |
| U-238 | 3.627E-01 | 1.580E+00 | 1.588E+00 | NOT IDENT. |
| NP-239 | 2.091E-01 | 3.619E-01 | 3.740E-01 | FAIL ABUN |
| PU-239 | 1.645E+02 | 2.435E+02 | 2.545E+02 | NOT IDENT. |
| AM-241 | -7.063E-02 | 1.790E-01 | 1.818E-01 | NOT IDENT. |
| AM-243 | -3.496E-02 | 4.705E-02 | 4.962E-02 | NOT IDENT. |
| CM-243 | 1.268E-02 | 7.469E-02 | 7.491E-02 | NOT IDENT. |
| CM-247 | -2.616E-03 | 2.507E-02 | 2.510E-02 | NOT IDENT. |
| CF-249 | 1.137E-03 | 2.729E-02 | 2.729E-02 | NOT IDENT. |
| CF-251 | -3.196E-02 | 9.576E-02 | 9.684E-02 | NOT IDENT. |
| ANH-511 | -9.593E-03 | 4.541E-02 | 4.561E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 19.6650 | 94.67 | 37.8690 | 193.51 | 26.0732 |
| 45.60 | 26.9685 | 94.87 | 31.9004 | 197.03 | 15.3596 |
| 46.54 | 23.4316 | 97.43 | 15.0175 | 198.01 | 29.0418 |
| 49.72 | 0.0000 | 98.43 | 24.0677 | 201.83 | 21.7231 |
| 51.35 | 31.0247 | 98.44 | 24.0681 | 205.31 | 25.2410 |
| 52.39 | 20.1269 | 99.53 | 29.1344 | 210.85 | 15.5738 |
| 53.44 | 22.0134 | 100.11 | 19.1061 | 215.65 | 26.0774 |
| 57.36 | 0.0000 | 103.18 | 20.2115 | 222.11 | 24.4893 |
| 57.53 | 12.9672 | 103.37 | 21.2286 | 227.09 | 20.2103 |
| 57.98 | 15.7624 | 105.21 | 20.2768 | 227.38 | 20.2157 |
| 59.32 | 21.3915 | 105.31 | 20.2799 | 228.16 | 0.0000 |
| 59.54 | 21.4023 | 106.12 | 17.2599 | 228.18 | 15.8327 |
| 63.29 | 21.5827 | 109.28 | 24.4867 | 235.69 | 34.5407 |
| 63.58 | 21.5965 | 111.00 | 20.4594 | 235.96 | 34.5490 |
| 64.28 | 25.3911 | 111.76 | 0.0000 | 238.63 | 23.9760 |
| 66.73 | 24.5797 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 21.7671 | 117.23 | 24.7806 | 240.99 | 30.2558 |
| 67.75 | 23.6852 | 121.12 | 26.4785 | 242.00 | 32.0644 |
| 69.67 | 21.8779 | 121.22 | 26.4822 | 244.70 | 21.4274 |
| 70.83 | 23.8369 | 121.78 | 17.1493 | 252.40 | 0.0000 |
| 72.81 | 32.5484 | 122.06 | 17.1561 | 252.80 | 21.5788 |
| 72.87 | 32.5524 | 123.07 | 18.7427 | 254.15 | 0.0000 |
| 74.66 | 33.6294 | 127.23 | 27.2312 | 256.23 | 17.1335 |
| 74.82 | 35.5622 | 129.30 | 22.0573 | 260.90 | 0.0000 |
| 74.97 | 29.8042 | 131.20 | 23.1678 | 264.66 | 22.7047 |
| 77.11 | 22.2053 | 133.02 | 24.2805 | 268.22 | 23.6823 |
| 79.69 | 31.0472 | 133.52 | 22.1841 | 269.46 | 24.6183 |
| 80.12 | 24.2753 | 136.00 | 25.4373 | 271.23 | 22.8279 |
| 80.19 | 0.0000 | 136.47 | 29.6953 | 273.65 | 16.4685 |
| 80.57 | 17.4931 | 140.51 | 0.0000 | 276.40 | 17.4223 |
| 81.00 | 18.4798 | 143.76 | 32.1194 | 277.37 | 19.2713 |
| 81.07 | 18.4822 | 144.24 | 28.9251 | 277.60 | 18.3569 |
| 83.79 | 28.3522 | 145.44 | 22.5317 | 278.00 | 15.6083 |
| 85.43 | 15.6893 | 152.43 | 22.7289 | 279.20 | 20.2185 |
| 86.55 | 26.5292 | 153.25 | 30.3356 | 279.54 | 17.4663 |
| 86.79 | 26.5405 | 154.21 | 20.6090 | 280.46 | 21.1589 |
| 86.94 | 35.3970 | 156.02 | 32.6120 | 283.69 | 13.8348 |
| 87.09 | 35.4064 | 158.56 | 25.0788 | 284.31 | 0.0000 |
| 87.57 | 37.4055 | 159.00 | 22.9100 | 285.41 | 17.5478 |
| 88.03 | 35.4657 | 162.33 | 18.6195 | 285.90 | 0.0000 |
| 88.34 | 31.5425 | 163.33 | 32.8964 | 287.50 | 21.2768 |
| 88.47 | 30.5637 | 165.86 | 29.6941 | 290.67 | 11.1286 |
| 89.96 | 38.5521 | 176.31 | 26.7090 | 293.27 | 0.0000 |
| 91.11 | 0.0000 | 176.60 | 25.6045 | 295.22 | 10.2371 |
| 92.59 | 28.7978 | 177.52 | 28.9736 | 295.96 | 7.4495 |
| 93.35 | 21.8750 | 181.07 | 0.0000 | 298.58 | 20.9002 |
| 94.56 | 37.8618 | 184.41 | 21.8939 | 299.98 | 23.9113 |
| 94.65 | 37.8676 | 185.72 | 26.9844 | 300.09 | 20.9241 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 20.9248 | 497.08 | 13.7330 | 711.68 | 9.3130 |
| 301.36 | 19.6353 | 505.52 | 13.7931 | 720.70 | 6.5423 |
| 302.85 | 15.9131 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 15.9331 | 511.00 | 10.6400 | 722.78 | 8.4184 |
| 306.78 | 21.5934 | 514.00 | 43.6904 | 722.91 | 8.4188 |
| 308.46 | 21.6204 | 514.00 | 43.6904 | 723.31 | 9.3557 |
| 311.90 | 17.9059 | 520.40 | 3.2073 | 724.19 | 6.5512 |
| 316.51 | 7.5649 | 520.69 | 0.0000 | 727.33 | 5.6222 |
| 319.41 | 0.0000 | 522.65 | 0.0000 | 733.00 | 6.5736 |
| 320.08 | 15.1692 | 527.90 | 0.0000 | 735.93 | 7.5213 |
| 321.04 | 15.1797 | 529.59 | 10.7401 | 737.46 | 5.6443 |
| 323.87 | 9.5067 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 9.5160 | 531.02 | 0.0000 | 747.24 | 10.3866 |
| 328.76 | 12.4019 | 546.56 | 0.0000 | 748.06 | 10.3898 |
| 333.37 | 19.1422 | 552.55 | 8.6892 | 752.31 | 5.6764 |
| 333.97 | 19.1504 | 563.25 | 12.0091 | 753.82 | 2.7046 |
| 334.37 | 24.9026 | 569.33 | 14.2330 | 756.73 | 11.0560 |
| 338.28 | 11.5248 | 569.50 | 14.2342 | 756.80 | 9.4768 |
| 338.32 | 9.6043 | 569.70 | 13.1407 | 763.94 | 11.4026 |
| 340.48 | 15.3901 | 583.19 | 3.3059 | 765.81 | 3.8035 |
| 340.55 | 15.3909 | 584.27 | 4.4100 | 766.42 | 5.7066 |
| 344.28 | 14.4660 | 595.83 | 16.6255 | 766.84 | 5.7075 |
| 345.93 | 14.4825 | 600.60 | 16.6612 | 772.60 | 0.0000 |
| 351.06 | 15.5020 | 602.52 | 0.0000 | 776.52 | 5.7281 |
| 351.93 | 18.4193 | 602.73 | 10.0063 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 16.6924 | 778.90 | 8.5997 |
| 356.01 | 22.3585 | 609.32 | 7.8058 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 3.3469 | 785.37 | 7.6623 |
| 366.42 | 0.0000 | 614.28 | 13.4110 | 792.07 | 9.6013 |
| 375.05 | 14.7654 | 618.01 | 4.4778 | 794.95 | 7.6893 |
| 383.85 | 11.8790 | 620.36 | 6.7236 | 795.86 | 9.6147 |
| 388.16 | 11.9112 | 621.93 | 10.0923 | 801.95 | 2.8907 |
| 388.63 | 12.9078 | 630.19 | 0.0000 | 810.29 | 8.6983 |
| 391.69 | 14.9220 | 631.29 | 12.6109 | 810.45 | 8.6988 |
| 400.66 | 14.0047 | 633.25 | 9.0154 | 810.76 | 6.7664 |
| 401.81 | 14.0147 | 634.78 | 9.9234 | 815.77 | 8.7152 |
| 402.40 | 12.0168 | 635.95 | 12.6362 | 818.51 | 9.6931 |
| 404.85 | 10.0291 | 636.99 | 0.0000 | 832.01 | 6.8175 |
| 410.95 | 13.0861 | 645.85 | 4.5322 | 834.85 | 6.8243 |
| 413.71 | 10.0830 | 657.76 | 10.9324 | 835.71 | 4.8760 |
| 414.70 | 10.0890 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 14.2284 | 661.66 | 4.5626 | 846.75 | 0.0000 |
| 427.87 | 8.1343 | 664.57 | 0.0000 | 846.77 | 8.8104 |
| 433.94 | 12.2444 | 666.33 | 8.2288 | 856.80 | 8.8409 |
| 439.40 | 10.2359 | 666.50 | 8.2292 | 860.56 | 7.8686 |
| 453.88 | 10.3201 | 667.71 | 0.0000 | 871.09 | 3.9484 |
| 463.37 | 8.2997 | 677.62 | 7.3486 | 873.19 | 4.9390 |
| 468.07 | 8.3210 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 11.1015 | 879.38 | 2.9696 |
| 475.06 | 0.0000 | 696.49 | 7.4053 | 880.51 | 2.9707 |
| 476.78 | 12.5407 | 696.51 | 7.4055 | 883.24 | 4.9557 |
| 477.60 | 12.5464 | 697.00 | 11.1103 | 884.68 | 5.9496 |
| 482.18 | 15.0926 | 697.49 | 12.0386 | 889.28 | 2.9794 |
| 487.02 | 8.4064 | 702.65 | 12.0634 | 894.76 | 3.9798 |
| 492.35 | 0.0000 | 706.68 | 13.0122 | 898.04 | 3.9841 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 5.9864 | 1312.11 | 1.8651 | | |
| 911.20 | 7.0022 | 1332.49 | 3.7485 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 8.0422 | 1365.19 | 6.6112 | | |
| 937.49 | 7.0617 | 1368.63 | 0.0000 | | |
| 944.13 | 5.0548 | 1384.29 | 5.6919 | | |
| 946.00 | 8.0924 | 1408.01 | 3.8154 | | |
| 949.00 | 3.0375 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 3.8612 | | |
| 962.31 | 7.1172 | 1489.16 | 3.8854 | | |
| 964.08 | 8.1385 | 1505.03 | 4.8735 | | |
| 966.17 | 5.0898 | 1596.21 | 2.9811 | | |
| 968.97 | 8.1508 | 1620.50 | 2.9960 | | |
| 983.53 | 9.2109 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 4.0514 | | |
| 996.26 | 1.0274 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.1156 | 1764.49 | 2.0547 | | |
| 1004.73 | 4.1202 | 1770.23 | 6.1709 | | |
| 1021.30 | 0.0000 | 1771.35 | 5.1434 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.0359 | | |
| 1037.84 | 4.1609 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.0824 | | |
| 1046.59 | 7.3004 | | | | |
| 1048.07 | 5.2168 | | | | |
| 1049.04 | 6.2619 | | | | |
| 1050.41 | 5.2202 | | | | |
| 1063.66 | 7.3363 | | | | |
| 1077.00 | 13.6773 | | | | |
| 1077.34 | 12.6264 | | | | |
| 1085.87 | 7.3832 | | | | |
| 1099.45 | 6.3527 | | | | |
| 1112.07 | 1.0625 | | | | |
| 1112.84 | 4.2510 | | | | |
| 1115.54 | 6.3812 | | | | |
| 1120.29 | 3.1948 | | | | |
| 1120.55 | 5.3250 | | | | |
| 1121.30 | 7.4566 | | | | |
| 1129.67 | 8.5414 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 1.0803 | | | | |
| 1177.95 | 8.6531 | | | | |
| 1189.05 | 5.4241 | | | | |
| 1204.77 | 5.4465 | | | | |
| 1221.41 | 6.5640 | | | | |
| 1231.02 | 1.0967 | | | | |
| 1235.36 | 3.2937 | | | | |
| 1238.28 | 1.0987 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 3.6935 | | | | |
| 1274.44 | 3.6958 | | | | |
| 1274.54 | 2.7720 | | | | |
| 1291.59 | 3.7116 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:18:16.72

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147019.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM40.CNF;31
                                        Background date  : 2-FEB-2014 16:28:49.
Sample date      : 7-NOV-2013 13:56:00. Acquisition date : 7-FEB-2014 09:17:32.
Sample ID        : G341147019           Sample quantity  : 1.35840E+02 GRAM
Detector name    : GAM40                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.34  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 45.40* | 11 | 37 | 3.94 | 90.78 | 85 | 13 | 3.18E-03 | 115.6 | |
| 2 | 0 | 138.76 | 21 | 24 | 1.55 | 277.52 | 274 | 8 | 5.83E-03 | 45.9 | |
| 3 | 0 | 175.43 | 29 | 39 | 1.05 | 350.86 | 345 | 11 | 7.92E-03 | 46.1 | |
| 4 | 0 | 186.03* | 30 | 36 | 2.00 | 372.06 | 366 | 13 | 8.35E-03 | 48.5 | |
| 5 | 0 | 238.52* | 15 | 42 | 1.25 | 477.06 | 470 | 13 | 4.04E-03 | 102.0 | |
| 6 | 0 | 348.57 | 15 | 7 | 1.27 | 697.20 | 694 | 7 | 4.17E-03 | 39.0 | |
| 7 | 0 | 352.18* | 7 | 9 | 1.54 | 704.41 | 701 | 7 | 1.92E-03 | 90.5 | |
| 8 | 0 | 366.14 | 5 | 11 | 0.46 | 732.33 | 727 | 7 | 1.25E-03 | 128.4 | |
| 9 | 0 | 371.54 | 7 | 8 | 0.51 | 743.14 | 737 | 8 | 1.94E-03 | 79.5 | |
| 10 | 0 | 381.51 | 17 | 6 | 3.38 | 763.09 | 758 | 9 | 4.61E-03 | 37.2 | |
| 11 | 0 | 460.24 | 9 | 8 | 0.80 | 920.57 | 916 | 9 | 2.36E-03 | 65.7 | |
| 12 | 0 | 489.11 | 6 | 2 | 0.64 | 978.32 | 975 | 7 | 1.67E-03 | 55.4 | |
| 13 | 0 | 511.03* | 23 | 3 | 3.06 | 1022.17 | 1017 | 12 | 6.29E-03 | 47.2 | |
| 14 | 0 | 523.11 | 13 | 4 | 0.73 | 1046.32 | 1043 | 7 | 3.47E-03 | 37.6 | |
| 15 | 0 | 525.96 | 7 | 2 | 1.00 | 1052.03 | 1049 | 6 | 1.82E-03 | 56.0 | |
| 16 | 0 | 663.79 | 6 | 3 | 1.12 | 1327.73 | 1324 | 6 | 1.70E-03 | 60.1 | |
| 17 | 0 | 685.55 | 12 | 0 | 0.56 | 1371.25 | 1366 | 10 | 3.33E-03 | 28.9 | |
| 18 | 0 | 971.56 | 8 | 2 | 1.43 | 1943.38 | 1938 | 9 | 2.15E-03 | 50.1 | |
| 19 | 0 | 1460.70* | 24 | 0 | 2.03 | 2921.85 | 2915 | 14 | 6.63E-03 | 22.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 10:18:18

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147019.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 13:56:00 | Acquisition date | : 7-FEB-2014 09:17:32 |
| Sample ID | : G341147019 | Sample quantity | : 135.84 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA40 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.34  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 24 | 10.66* | 1.017E+00 | 1.218E+00 | 1.218E+00 | 44.22 |
| PB-210 | 46.54 | 11 | 4.25* | 1.833E-01 | 8.122E+00 | 8.186E+00 | 231.20 |
| BI-211 | 72.87 | ------ | 1.23 | 2.469E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 7 | 12.92* | 3.153E+00 | 9.377E-02 | 9.377E-02 | 181.08 |
| ANH-511 | 511.00 | 23 | 100.00* | 2.434E+00 | 5.144E-02 | 5.144E-02 | 94.31 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:18:18.86

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147019.CNF;1  *
* Acquisition date :  7-FEB-2014 09:17:32 Sensitivity     : 3.000           *
* Detector ID      : GAM40                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:56:00 Nuclide Library : SOLID           *
* Sample ID        : G341147019           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3584E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 27-AUG-2013 12:36:50 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM40_500MLMB.CNF;1         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.218E+00 | 5.278E-01 | 5.362E-01 |
| PB-210 | 8.186E+00 | 1.855E+01 | 1.422E+01 |
| BI-211 | 9.377E-02 | 1.664E-01 | 2.111E-01 |
| ANH-511 | 5.144E-02 | 4.755E-02 | 4.201E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -2.794E-01 | 6.467E-01 | 1.160E+00 | NOT IDENT. |
| NA-22 | 3.508E-03 | 3.147E-02 | 6.769E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.917E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.123E-05 | 1.777E-02 | 4.708E-02 | NOT IDENT. |
| SC-46 | -1.966E-02 | 5.228E-02 | 9.924E-02 | NOT IDENT. |
| V-48 | -1.366E+00 | 1.633E+00 | 2.772E+00 | NOT IDENT. |
| CR-51 | -9.576E-01 | 1.790E+00 | 3.212E+00 | NOT IDENT. |
| MN-54 | -1.851E-03 | 3.034E-02 | 6.173E-02 | NOT IDENT. |
| CO-56 | 1.825E-02 | 5.915E-02 | 1.281E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 9.919E-03 | 2.843E-02 | 5.331E-02 | NOT IDENT. |
| CO-58 | 7.145E-03 | 6.195E-02 | 1.298E-01 | NOT IDENT. |
| FE-59 | 5.541E-02 | 1.741E-01 | 4.055E-01 | NOT IDENT. |
| CO-60 | 5.922E-04 | 3.215E-02 | 7.320E-02 | NOT IDENT. |
| ZN-65 | 3.469E-04 | 8.289E-02 | 1.677E-01 | NOT IDENT. |
| GE-68 | 4.197E-01 | 9.485E-01 | 2.244E+00 | NOT IDENT. |
| AS-73 | 1.499E-01 | 2.567E+00 | 4.945E+00 | NOT IDENT. |
| AS-74 | 1.805E+00 | 1.593E+00 | 3.579E+00 | NOT IDENT. |
| SE-75 | -3.111E-04 | 5.246E-02 | 1.014E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 7.271E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -1.873E+00 | 1.773E+00 | 2.728E+00 | NOT IDENT. |
| RB-83 | 9.810E-02 | 7.759E-02 | 1.929E-01 | NOT IDENT. |
| KR-85 | 0.000E+00 | 5.423E+00 | 1.431E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 6.429E-02 | 1.697E-01 | NOT IDENT. |
| RB-86 | 2.566E+00 | 9.084E+00 | 2.039E+01 | NOT IDENT. |
| Y-88 | -2.405E-02 | 5.699E-02 | 1.095E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | -1.807E+01 | 3.195E+01 | 5.583E+01 | NOT IDENT. |
| NB-94 | -2.128E-04 | 2.887E-02 | 5.731E-02 | NOT IDENT. |
| NB-95 | -1.743E-02 | 5.221E-02 | 1.038E-01 | NOT IDENT. |
| NB-95M | 1.884E-02 | 2.068E-01 | 3.610E-01 | NOT IDENT. |
| ZR-95 | 1.052E-03 | 1.131E-01 | 2.347E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 9.722E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.990E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.705E-04 | 2.623E-02 | 4.815E-02 | NOT IDENT. |
| RH-102 | -2.916E-02 | 4.324E-02 | 7.133E-02 | NOT IDENT. |
| RU-103 | 2.009E-02 | 1.161E-01 | 2.332E-01 | NOT IDENT. |
| RH-106 | -2.607E-01 | 2.712E-01 | 4.078E-01 | NOT IDENT. |
| RU-106 | -2.607E-01 | 2.712E-01 | 4.078E-01 | NOT IDENT. |
| AG-108M | 1.046E-03 | 2.091E-02 | 4.143E-02 | NOT IDENT. |
| CD-109 | 2.339E-01 | 7.306E-01 | 1.398E+00 | NOT IDENT. |
| AG-110M | -2.910E-02 | 4.603E-02 | 8.107E-02 | NOT IDENT. |
| SN-113 | -1.987E-02 | 5.863E-02 | 1.068E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.808E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.539E+00 | 1.934E+00 | 3.896E+00 | NOT IDENT. |
| TE-123M | 2.009E-03 | 3.316E-02 | 6.087E-02 | NOT IDENT. |
| SB-124 | -3.506E-02 | 1.601E-01 | 3.427E-01 | NOT IDENT. |
| SB-125 | 7.857E-02 | 7.574E-02 | 1.684E-01 | FAIL ABUN |
| TE-125M | -2.668E+00 | 1.935E+01 | 3.511E+01 | NOT IDENT. |
| I-126 | 4.327E+00 | 9.812E+00 | 1.935E+01 | NOT IDENT. |
| SB-126 | -7.837E-02 | 7.355E+00 | 1.514E+01 | NOT IDENT. |
| SN-126 | -2.044E-02 | 6.666E-02 | 1.191E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 7.890E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.029E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 8.752E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | 1.473E-02 | 2.583E-02 | 5.297E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.555E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.997E-03 | 2.779E-02 | 6.049E-02 | NOT IDENT. |
| CS-135 | 5.821E-02 | 1.165E-01 | 2.381E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.244E-02 | 4.747E+00 | 9.664E+00 | FAIL ABUN |
| BA-137M | 7.436E-03 | 3.159E-02 | 5.659E-02 | NOT IDENT. |
| CS-137 | 7.856E-03 | 3.337E-02 | 5.978E-02 | NOT IDENT. |
| CE-139 | -1.752E-02 | 3.628E-02 | 6.157E-02 | NOT IDENT. |
| BA-140 | 1.290E+00 | 4.040E+00 | 1.013E+01 | NOT IDENT. |
| LA-140 | 1.290E+00 | 4.040E+00 | 1.013E+01 | NOT IDENT. |
| CE-141 | 1.125E-01 | 2.262E-01 | 4.409E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 5.315E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -5.544E-02 | 1.698E-01 | 2.997E-01 | NOT IDENT. |
| PM-144 | 5.341E-03 | 3.298E-02 | 6.756E-02 | NOT IDENT. |
| PR-144 | 4.375E-01 | 2.574E+00 | 5.277E+00 | NOT IDENT. |
| PM-146 | -1.682E-02 | 2.916E-02 | 4.851E-02 | NOT IDENT. |
| ND-147 | -5.184E-01 | 4.593E+01 | 8.895E+01 | NOT IDENT. |
| PM-147 | 3.125E+02 | 7.011E+02 | 1.332E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.618E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.795E-03 | 2.205E-02 | 4.295E-02 | NOT IDENT. |
| EU-152 | -2.673E-03 | 7.555E-02 | 1.295E-01 | NOT IDENT. |
| GD-153 | -1.253E-02 | 9.413E-02 | 1.704E-01 | NOT IDENT. |
| EU-154 | 9.562E-03 | 8.576E-02 | 1.845E-01 | NOT IDENT. |
| EU-155 | -9.423E-03 | 1.007E-01 | 1.819E-01 | NOT IDENT. |
| TB-160 | 7.122E-02 | 2.038E-01 | 4.491E-01 | FAIL ABUN |
| HO-166M | -2.919E-02 | 4.161E-02 | 7.348E-02 | NOT IDENT. |
| TM-171 | -2.385E+00 | 3.097E+01 | 5.885E+01 | NOT IDENT. |
| LU-176 | -1.305E-02 | 2.137E-02 | 3.777E-02 | NOT IDENT. |
| HF-181 | 2.376E-02 | 1.242E-01 | 2.470E-01 | NOT IDENT. |
| TA-182 | 7.577E-02 | 1.549E-01 | 3.825E-01 | NOT IDENT. |
| RE-183 | 1.384E-01 | 5.721E-01 | 1.116E+00 | NOT IDENT. |
| RE-184 | 6.291E-02 | 3.616E-01 | 7.928E-01 | NOT IDENT. |
| W-188 | -5.579E+00 | 1.014E+01 | 1.828E+01 | NOT IDENT. |
| IR-192 | 2.539E-02 | 5.230E-02 | 1.085E-01 | NOT IDENT. |
| HG-203 | -1.361E-02 | 8.524E-02 | 1.622E-01 | NOT IDENT. |
| BI-207 | 5.010E-03 | 3.283E-02 | 7.243E-02 | NOT IDENT. |
| TL-208 | 1.754E-02 | 3.249E-02 | 6.860E-02 | NOT IDENT. |
| PB-211 | -1.986E-01 | 6.132E-01 | 1.115E+00 | NOT IDENT. |
| BI-212 | 1.400E-01 | 4.037E-01 | 8.607E-01 | NOT IDENT. |
| PB-212 | 4.506E-02 | 9.012E-02 | 1.127E-01 | FAIL ABUN |
| BI-214 | 2.371E-02 | 6.494E-02 | 1.287E-01 | NOT IDENT. |
| PB-214 | 3.404E-02 | 6.040E-02 | 1.187E-01 | FAIL ABUN |
| RN-219 | 2.294E-01 | 3.200E-01 | 6.800E-01 | NOT IDENT. |
| RN-222 | 2.371E-02 | 6.494E-02 | 1.287E-01 | NOT IDENT. |
| RA-223 | -3.781E-02 | 4.604E-01 | 8.855E-01 | NOT IDENT. |
| RA-224 | 5.866E-02 | 5.310E-01 | 9.150E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.371E-02 | 6.494E-02 | 1.287E-01 | NOT IDENT. |
| AC-227 | -1.523E-01 | 2.027E-01 | 3.461E-01 | NOT IDENT. |
| TH-227 | -1.523E-01 | 2.027E-01 | 3.461E-01 | NOT IDENT. |
| AC-228 | 1.159E-01 | 1.022E-01 | 2.541E-01 | NOT IDENT. |
| RA-228 | 1.159E-01 | 1.022E-01 | 2.541E-01 | NOT IDENT. |
| TH-228 | 4.506E-02 | 9.012E-02 | 1.127E-01 | FAIL ABUN |
| TH-229 | 1.008E-01 | 4.326E-01 | 7.796E-01 | NOT IDENT. |
| TH-230 | 2.371E-02 | 6.493E-02 | 1.287E-01 | NOT IDENT. |
| PA-231 | -2.978E-02 | 9.754E-01 | 1.905E+00 | NOT IDENT. |
| TH-231 | -3.781E-02 | 4.604E-01 | 8.855E-01 | NOT IDENT. |
| TH-232 | 1.159E-01 | 1.022E-01 | 2.541E-01 | NOT IDENT. |
| PA-233 | 4.993E-02 | 5.250E-02 | 1.124E-01 | NOT IDENT. |
| PA-234 | 1.245E-01 | 2.083E-01 | 4.883E-01 | NOT IDENT. |
| PA-234M | 3.231E+00 | 3.008E+00 | 7.702E+00 | NOT IDENT. |
| TH-234 | -1.053E+00 | 1.629E+00 | 2.909E+00 | NOT IDENT. |
| U-234 | 2.371E-02 | 6.493E-02 | 1.287E-01 | NOT IDENT. |
| U-235 | 1.102E-01 | 1.592E-01 | 2.982E-01 | FAIL ABUN |
| NP-237 | 4.993E-02 | 5.250E-02 | 1.124E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.145E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -1.053E+00 | 1.629E+00 | 2.909E+00 | NOT IDENT. |
| NP-239 | -9.381E-02 | 3.443E-01 | 6.096E-01 | NOT IDENT. |
| PU-239 | -3.536E+01 | 3.070E+02 | 4.769E+02 | NOT IDENT. |
| AM-241 | 2.033E-02 | 1.927E-01 | 3.699E-01 | NOT IDENT. |
| AM-243 | 2.384E-02 | 4.833E-02 | 9.480E-02 | NOT IDENT. |
| CM-243 | 1.718E-02 | 9.508E-02 | 1.776E-01 | NOT IDENT. |
| CM-247 | 1.240E-02 | 2.969E-02 | 6.061E-02 | NOT IDENT. |
| CF-249 | 2.585E-03 | 2.630E-02 | 5.290E-02 | NOT IDENT. |
| CF-251 | 1.263E-01 | 1.136E-01 | 2.141E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 10:18:15.21

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 45.40 | 16 | 37 | 3.94 | 90.78 | 85 | 13 | 4.42E-03 | 81.8 | |
| 2 | 0 | 92.95 | 34 | 42 | 0.72 | 185.88 | 184 | 7 | 9.44E-03 | 36.0 | |
| 3 | 0 | 138.76 | 21 | 24 | 1.55 | 277.52 | 274 | 8 | 5.83E-03 | 45.9 | |
| 4 | 0 | 175.43 | 29 | 39 | 1.05 | 350.86 | 345 | 11 | 7.92E-03 | 46.1 | |
| 5 | 0 | 186.03 | 54 | 36 | 2.00 | 372.06 | 366 | 13 | 1.49E-02 | 26.8 | |
| 6 | 0 | 238.52 | 30 | 42 | 1.25 | 477.06 | 470 | 13 | 8.31E-03 | 48.4 | |
| 7 | 0 | 348.57 | 15 | 7 | 1.27 | 697.20 | 694 | 7 | 4.17E-03 | 39.0 | |
| 8 | 0 | 352.18 | 11 | 9 | 1.54 | 704.41 | 701 | 7 | 3.04E-03 | 54.3 | |
| 9 | 0 | 366.14 | 5 | 11 | 0.46 | 732.33 | 727 | 7 | 1.25E-03 | 128.4 | |
| 10 | 0 | 371.54 | 7 | 8 | 0.51 | 743.14 | 737 | 8 | 1.94E-03 | 79.5 | |
| 11 | 0 | 381.51 | 17 | 6 | 3.38 | 763.09 | 758 | 9 | 4.61E-03 | 37.2 | |
| 12 | 0 | 460.24 | 9 | 8 | 0.80 | 920.57 | 916 | 9 | 2.36E-03 | 65.7 | |
| 13 | 0 | 489.11 | 6 | 2 | 0.64 | 978.32 | 975 | 7 | 1.67E-03 | 55.4 | |
| 14 | 0 | 511.03 | 89 | 3 | 3.06 | 1022.17 | 1017 | 12 | 2.48E-02 | 11.2 | |
| 15 | 0 | 523.11 | 13 | 4 | 0.73 | 1046.32 | 1043 | 7 | 3.47E-03 | 37.6 | |
| 16 | 0 | 525.96 | 7 | 2 | 1.00 | 1052.03 | 1049 | 6 | 1.82E-03 | 56.0 | |
| 17 | 0 | 663.79 | 6 | 3 | 1.12 | 1327.73 | 1324 | 6 | 1.70E-03 | 60.1 | |
| 18 | 0 | 685.55 | 12 | 0 | 0.56 | 1371.25 | 1366 | 10 | 3.33E-03 | 28.9 | |
| 19 | 0 | 971.56 | 8 | 2 | 1.43 | 1943.38 | 1938 | 9 | 2.15E-03 | 50.1 | |
| 20 | 0 | 1460.70 | 27 | 0 | 2.03 | 2921.85 | 2915 | 14 | 7.50E-03 | 19.2 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 10:18:17.24

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 24 | 10.66* | 1.017E+00 | 1.218E+00 | 1.218E+00 | 44.22 |
| PB-210 | 46.54 | 11 | 4.25* | 1.833E-01 | 8.122E+00 | 8.186E+00 | 231.20 |
| BI-211 | 72.87 | ------ | 1.23 | 2.469E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 7 | 12.92* | 3.153E+00 | 9.377E-02 | 9.377E-02 | 181.08 |
| ANH-511 | 511.00 | 23 | 100.00* | 2.434E+00 | 5.144E-02 | 5.144E-02 | 94.31 |

Flag: "*" = Keyline

Sample ID : G341147019 Acquisition date : 7-FEB-2014 09:17:32

Total number of lines in spectrum 19
Number of unidentified lines 8
Number of lines tentatively identified by NID 11 57.89%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.218E+00 | 1.218E+00 | 0.539E+00 | 44.22 | |
| PB-210 | 22.20Y | 1.01 | 8.122E+00 | 8.186E+00 | 18.93E+00 | 231.20 | |
| BI-211 | 7.04E+08Y | 1.00 | 9.377E-02 | 9.377E-02 | 16.98E-02 | 181.08 | |
| ANH-511 | 1.00E+09Y | 1.00 | 5.144E-02 | 5.144E-02 | 4.852E-02 | 94.31 | |
| Total Activity : | | | 9.486E+00 | 9.550E+00 | | | |

Grand Total Activity : 9.486E+00 9.550E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147019 Acquisition date : 7-FEB-2014 09:17:32

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 138.76 | 21 | 24 | 1.55 | 277.52 | 274 | 8 | 5.83E-03 | 91.8 | 5.19E+00 | |
| 0 | 175.43 | 29 | 39 | 1.05 | 350.86 | 345 | 11 | 7.92E-03 | 92.3 | 4.87E+00 | T |
| 0 | 186.03 | 30 | 36 | 2.00 | 372.06 | 366 | 13 | 8.35E-03 | 96.9 | 4.73E+00 | T |
| 0 | 238.52 | 15 | 42 | 1.25 | 477.06 | 470 | 13 | 4.04E-03 | **** | 4.10E+00 | T |
| 0 | 348.57 | 15 | 7 | 1.27 | 697.20 | 694 | 7 | 4.17E-03 | 78.0 | 3.18E+00 | |
| 0 | 366.14 | 5 | 11 | 0.46 | 732.33 | 727 | 7 | 1.25E-03 | **** | 3.07E+00 | T |
| 0 | 371.54 | 7 | 8 | 0.51 | 743.14 | 737 | 8 | 1.94E-03 | **** | 3.04E+00 | |
| 0 | 381.51 | 17 | 6 | 3.38 | 763.09 | 758 | 9 | 4.61E-03 | 74.4 | 2.98E+00 | |
| 0 | 460.24 | 9 | 8 | 0.80 | 920.57 | 916 | 9 | 2.36E-03 | **** | 2.62E+00 | |
| 0 | 489.11 | 6 | 2 | 0.64 | 978.32 | 975 | 7 | 1.67E-03 | **** | 2.51E+00 | |
| 0 | 523.11 | 13 | 4 | 0.73 | 1046.32 | 1043 | 7 | 3.47E-03 | 75.3 | 2.39E+00 | T |
| 0 | 525.96 | 7 | 2 | 1.00 | 1052.03 | 1049 | 6 | 1.82E-03 | **** | 2.38E+00 | |
| 0 | 663.79 | 6 | 3 | 1.12 | 1327.73 | 1324 | 6 | 1.70E-03 | **** | 2.01E+00 | T |
| 0 | 685.55 | 12 | 0 | 0.56 | 1371.25 | 1366 | 10 | 3.33E-03 | 57.7 | 1.96E+00 | T |
| 0 | 971.56 | 8 | 2 | 1.43 | 1943.38 | 1938 | 9 | 2.15E-03 | **** | 1.46E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:18:29.07

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147019.CNF;1    *
* Acquisition date :  7-FEB-2014 09:17:32 Sensitivity     : 3.000            *
* Detector ID      : GAM40                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 13:56:00 Nuclide Library : SOLID            *
* Sample ID        : G341147019           Analyst initials: RXF2             *
* Batch Number     : 1359496              Sample Quantity : 1.3584E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 27-AUG-2013 12:36:50 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM40_500MLMB.CNF;1          *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.991E-01 |
| PB-210 | 6.328E+00 |
| BI-211 | 8.727E-02 |
| ANH-511 | 1.794E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 4.872E-01 | NOT IDENT. |
| NA-22 | 2.686E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.488E-02 | NOT IDENT. |
| SC-46 | 3.950E-02 | NOT IDENT. |
| V-48 | 1.108E+00 | NOT IDENT. |
| CR-51 | 1.383E+00 | NOT IDENT. |
| MN-54 | 2.537E-02 | NOT IDENT. |
| CO-56 | 5.373E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.451E-02 | NOT IDENT. |
| CO-58 | 5.410E-02 | NOT IDENT. |
| FE-59 | 1.605E-01 | NOT IDENT. |
| CO-60 | 2.958E-02 | NOT IDENT. |
| ZN-65 | 6.899E-02 | NOT IDENT. |
| GE-68 | 9.015E-01 | NOT IDENT. |
| AS-73 | 2.211E+00 | NOT IDENT. |
| AS-74 | 1.581E+00 | NOT IDENT. |
| SE-75 | 4.510E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.019E+00 | NOT IDENT. |
| RB-83 | 8.199E-02 | NOT IDENT. |
| KR-85 | 6.436E+00 | NOT IDENT. |
| SR-85 | 7.630E-02 | NOT IDENT. |
| RB-86 | 8.223E+00 | NOT IDENT. |
| Y-88 | 3.880E-02 | NOT IDENT. |
| Y-91 | 2.083E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 2.476E-02 | NOT IDENT. |
| NB-95 | 4.059E-02 | NOT IDENT. |
| NB-95M | 1.608E-01 | NOT IDENT. |
| ZR-95 | 9.683E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.184E-02 | NOT IDENT. |
| RH-102 | 2.896E-02 | NOT IDENT. |
| RU-103 | 9.991E-02 | NOT IDENT. |
| RH-106 | 1.616E-01 | NOT IDENT. |
| RU-106 | 1.616E-01 | NOT IDENT. |
| AG-108M | 1.769E-02 | NOT IDENT. |
| CD-109 | 6.384E-01 | NOT IDENT. |
| AG-110M | 3.217E-02 | NOT IDENT. |
| SN-113 | 4.660E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.764E+00 | NOT IDENT. |
| TE-123M | 2.744E-02 | NOT IDENT. |
| SB-124 | 1.214E-01 | NOT IDENT. |
| SB-125 | 7.455E-02 | FAIL ABUN |
| TE-125M | 1.584E+01 | NOT IDENT. |
| I-126 | 8.116E+00 | NOT IDENT. |
| SB-126 | 6.290E+00 | NOT IDENT. |
| SN-126 | 5.422E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.258E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.476E-02 | NOT IDENT. |
| CS-135 | 1.068E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.970E+00 | FAIL ABUN |
| BA-137M | 2.414E-02 | NOT IDENT. |
| CS-137 | 2.550E-02 | NOT IDENT. |
| CE-139 | 2.781E-02 | NOT IDENT. |
| BA-140 | 3.846E+00 | NOT IDENT. |
| LA-140 | 3.846E+00 | NOT IDENT. |
| CE-141 | 1.993E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.337E-01 | NOT IDENT. |
| PM-144 | 2.915E-02 | NOT IDENT. |
| PR-144 | 2.278E+00 | NOT IDENT. |
| PM-146 | 1.977E-02 | NOT IDENT. |
| ND-147 | 3.655E+01 | NOT IDENT. |
| PM-147 | 6.115E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.909E-02 | NOT IDENT. |
| EU-152 | 5.587E-02 | NOT IDENT. |
| GD-153 | 7.763E-02 | NOT IDENT. |
| EU-154 | 7.321E-02 | NOT IDENT. |
| EU-155 | 8.326E-02 | NOT IDENT. |
| TB-160 | 1.870E-01 | FAIL ABUN |
| HO-166M | 2.947E-02 | NOT IDENT. |
| TM-171 | 2.620E+01 | NOT IDENT. |
| LU-176 | 1.659E-02 | NOT IDENT. |
| HF-181 | 1.071E-01 | NOT IDENT. |
| TA-182 | 1.507E-01 | NOT IDENT. |
| RE-183 | 5.027E-01 | NOT IDENT. |
| RE-184 | 3.204E-01 | NOT IDENT. |
| W-188 | 7.854E+00 | NOT IDENT. |
| IR-192 | 4.795E-02 | NOT IDENT. |
| HG-203 | 7.140E-02 | NOT IDENT. |
| BI-207 | 2.874E-02 | NOT IDENT. |
| TL-208 | 3.033E-02 | NOT IDENT. |
| PB-211 | 4.885E-01 | NOT IDENT. |
| BI-212 | 3.704E-01 | NOT IDENT. |
| PB-212 | 5.220E-02 | FAIL ABUN |
| BI-214 | 5.670E-02 | NOT IDENT. |
| PB-214 | 5.272E-02 | FAIL ABUN |
| RN-219 | 3.008E-01 | NOT IDENT. |
| RN-222 | 5.670E-02 | NOT IDENT. |
| RA-223 | 3.868E-01 | NOT IDENT. |
| RA-224 | 4.129E-01 | NOT IDENT. |
| RA-226 | 5.670E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.530E-01 | NOT IDENT. |
| TH-227 | 1.530E-01 | NOT IDENT. |
| AC-228 | 1.084E-01 | NOT IDENT. |
| RA-228 | 1.084E-01 | NOT IDENT. |
| TH-228 | 5.220E-02 | FAIL ABUN |
| TH-229 | 3.534E-01 | NOT IDENT. |
| TH-230 | 5.669E-02 | NOT IDENT. |
| PA-231 | 8.322E-01 | NOT IDENT. |
| TH-231 | 3.868E-01 | NOT IDENT. |
| TH-232 | 1.084E-01 | NOT IDENT. |
| PA-233 | 5.054E-02 | NOT IDENT. |
| PA-234 | 2.026E-01 | NOT IDENT. |
| PA-234M | 3.227E+00 | NOT IDENT. |
| TH-234 | 1.319E+00 | NOT IDENT. |
| U-234 | 5.669E-02 | NOT IDENT. |
| U-235 | 1.360E-01 | FAIL ABUN |
| NP-237 | 5.054E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.319E+00 | NOT IDENT. |
| NP-239 | 2.768E-01 | NOT IDENT. |
| PU-239 | 2.157E+02 | NOT IDENT. |
| AM-241 | 1.664E-01 | NOT IDENT. |
| AM-243 | 4.322E-02 | NOT IDENT. |
| CM-243 | 8.113E-02 | NOT IDENT. |
| CM-247 | 2.671E-02 | NOT IDENT. |
| CF-249 | 2.262E-02 | NOT IDENT. |
| CF-251 | 9.815E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 10:18:33.60

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147019.CNF;1    *
* Acquisition date :  7-FEB-2014 09:17:32 Sensitivity     : 3.000           *
* Detector ID      : GAM40                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 13:56:00 Nuclide Library : SOLID           *
* Sample ID        : G341147019           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3584E+02 GRAM *
*                                         Quantity Err(%) : 1.4723E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 27-AUG-2013 12:36:50 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM40_500MLMB.CNF;1       *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.218E+00 | 5.384E-01 | 5.384E-01 |
| PB-210 | 8.186E+00 | 1.857E+01 | 1.857E+01 |
| BI-211 | 9.377E-02 | 1.666E-01 | 1.666E-01 |
| ANH-511 | 5.144E-02 | 4.777E-02 | 4.777E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -2.794E-01 | 6.471E-01 | 6.593E-01 | NOT IDENT. |
| NA-22 | 3.508E-03 | 3.147E-02 | 3.151E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.923E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.123E-05 | 1.777E-02 | 1.777E-02 | NOT IDENT. |
| SC-46 | -1.966E-02 | 5.234E-02 | 5.308E-02 | NOT IDENT. |
| V-48 | -1.366E+00 | 1.643E+00 | 1.755E+00 | NOT IDENT. |
| CR-51 | -9.576E-01 | 1.792E+00 | 1.843E+00 | NOT IDENT. |
| MN-54 | -1.851E-03 | 3.034E-02 | 3.035E-02 | NOT IDENT. |
| CO-56 | 1.825E-02 | 5.918E-02 | 5.975E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 3.346E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 9.919E-03 | 2.844E-02 | 2.879E-02 | NOT IDENT. |
| CO-58 | 7.145E-03 | 6.195E-02 | 6.204E-02 | NOT IDENT. |
| FE-59 | 5.541E-02 | 1.743E-01 | 1.761E-01 | NOT IDENT. |
| CO-60 | 5.922E-04 | 3.215E-02 | 3.215E-02 | NOT IDENT. |
| ZN-65 | 3.469E-04 | 8.289E-02 | 8.289E-02 | NOT IDENT. |
| GE-68 | 4.197E-01 | 9.503E-01 | 9.690E-01 | NOT IDENT. |
| AS-73 | 1.499E-01 | 2.567E+00 | 2.568E+00 | NOT IDENT. |
| AS-74 | 1.805E+00 | 1.605E+00 | 1.800E+00 | NOT IDENT. |
| SE-75 | -3.111E-04 | 5.246E-02 | 5.246E-02 | NOT IDENT. |
| BR-77 | 3.636E+10 | 1.208E+11 | 1.219E+11 | SHORT HLIF |
| SR-82 | -1.873E+00 | 1.783E+00 | 1.973E+00 | NOT IDENT. |
| RB-83 | 9.810E-02 | 7.913E-02 | 9.065E-02 | NOT IDENT. |
| KR-85 | 1.433E+01 | 5.571E+00 | 8.532E+00 | NOT IDENT. |
| SR-85 | 1.697E-01 | 6.604E-02 | 1.011E-01 | NOT IDENT. |
| RB-86 | 2.566E+00 | 9.091E+00 | 9.164E+00 | NOT IDENT. |
| Y-88 | -2.405E-02 | 5.702E-02 | 5.805E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | -1.807E+01 | 3.199E+01 | 3.301E+01 | NOT IDENT. |
| NB-94 | -2.128E-04 | 2.887E-02 | 2.887E-02 | NOT IDENT. |
| NB-95 | -1.743E-02 | 5.224E-02 | 5.283E-02 | NOT IDENT. |
| NB-95M | 1.884E-02 | 2.069E-01 | 2.070E-01 | NOT IDENT. |
| ZR-95 | 1.052E-03 | 1.131E-01 | 1.131E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 7.195E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.133E+39 | 9.775E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | -4.291E+08 | 1.990E+09 | 1.999E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 5.252E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.705E-04 | 2.623E-02 | 2.624E-02 | NOT IDENT. |
| RH-102 | -2.916E-02 | 4.335E-02 | 4.530E-02 | NOT IDENT. |
| RU-103 | 2.009E-02 | 1.161E-01 | 1.164E-01 | NOT IDENT. |
| RH-106 | -2.607E-01 | 2.723E-01 | 2.966E-01 | NOT IDENT. |
| RU-106 | -2.607E-01 | 2.723E-01 | 2.966E-01 | NOT IDENT. |
| AG-108M | 1.046E-03 | 2.091E-02 | 2.091E-02 | NOT IDENT. |
| CD-109 | 2.339E-01 | 7.311E-01 | 7.387E-01 | NOT IDENT. |
| AG-110M | -2.910E-02 | 4.617E-02 | 4.800E-02 | NOT IDENT. |
| SN-113 | -1.987E-02 | 5.866E-02 | 5.934E-02 | NOT IDENT. |
| CD-115 | 9.527E+10 | 1.811E+11 | 1.861E+11 | SHORT HLIF |
| SN-117M | 1.539E+00 | 1.940E+00 | 2.060E+00 | NOT IDENT. |
| TE-123M | 2.009E-03 | 3.316E-02 | 3.317E-02 | NOT IDENT. |
| SB-124 | -3.506E-02 | 1.602E-01 | 1.609E-01 | NOT IDENT. |
| SB-125 | 7.857E-02 | 7.607E-02 | 8.391E-02 | FAIL ABUN |
| TE-125M | -2.668E+00 | 1.935E+01 | 1.938E+01 | NOT IDENT. |
| I-126 | 4.327E+00 | 9.821E+00 | 1.001E+01 | NOT IDENT. |
| SB-126 | -7.837E-02 | 7.355E+00 | 7.355E+00 | NOT IDENT. |
| SN-126 | -2.044E-02 | 6.669E-02 | 6.732E-02 | NOT IDENT. |
| SB-127 | 1.395E+06 | 9.901E+05 | 1.173E+06 | SHORT HLIF |
| I-131 | 2.612E+01 | 7.033E+01 | 7.131E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.660E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.979E+06 | 8.758E+06 | 8.803E+06 | SHORT HLIF |
| BA-133 | 1.473E-02 | 2.586E-02 | 2.670E-02 | NOT IDENT. |
| I-133 | 1.070E+30 | 1.668E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.997E-03 | 2.779E-02 | 2.788E-02 | NOT IDENT. |
| CS-135 | 5.821E-02 | 1.167E-01 | 1.196E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.183E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.244E-02 | 4.747E+00 | 4.747E+00 | FAIL ABUN |
| BA-137M | 7.436E-03 | 3.159E-02 | 3.177E-02 | NOT IDENT. |
| CS-137 | 7.856E-03 | 3.337E-02 | 3.356E-02 | NOT IDENT. |
| CE-139 | -1.752E-02 | 3.648E-02 | 3.732E-02 | NOT IDENT. |
| BA-140 | 1.290E+00 | 4.041E+00 | 4.083E+00 | NOT IDENT. |
| LA-140 | 1.290E+00 | 4.041E+00 | 4.083E+00 | NOT IDENT. |
| CE-141 | 1.125E-01 | 2.265E-01 | 2.321E-01 | NOT IDENT. |
| CE-143 | 2.305E+18 | 5.319E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -5.544E-02 | 1.699E-01 | 1.717E-01 | NOT IDENT. |
| PM-144 | 5.341E-03 | 3.298E-02 | 3.307E-02 | NOT IDENT. |
| PR-144 | 4.375E-01 | 2.574E+00 | 2.581E+00 | NOT IDENT. |
| PM-146 | -1.682E-02 | 2.921E-02 | 3.018E-02 | NOT IDENT. |
| ND-147 | -5.184E-01 | 4.593E+01 | 4.593E+01 | NOT IDENT. |
| PM-147 | 3.125E+02 | 7.017E+02 | 7.157E+02 | NOT IDENT. |
| PM-149 | 5.126E+10 | 1.618E+12 | 1.618E+12 | SHORT HLIF |
| EU-150 | 2.795E-03 | 2.205E-02 | 2.209E-02 | NOT IDENT. |
| EU-152 | -2.673E-03 | 7.555E-02 | 7.556E-02 | NOT IDENT. |
| GD-153 | -1.253E-02 | 9.414E-02 | 9.431E-02 | NOT IDENT. |
| EU-154 | 9.562E-03 | 8.576E-02 | 8.587E-02 | NOT IDENT. |
| EU-155 | -9.423E-03 | 1.007E-01 | 1.008E-01 | NOT IDENT. |
| TB-160 | 7.122E-02 | 2.040E-01 | 2.065E-01 | FAIL ABUN |
| HO-166M | -2.919E-02 | 4.170E-02 | 4.373E-02 | NOT IDENT. |
| TM-171 | -2.385E+00 | 3.097E+01 | 3.099E+01 | NOT IDENT. |
| LU-176 | -1.305E-02 | 2.140E-02 | 2.219E-02 | NOT IDENT. |
| HF-181 | 2.376E-02 | 1.242E-01 | 1.246E-01 | NOT IDENT. |
| TA-182 | 7.577E-02 | 1.550E-01 | 1.587E-01 | NOT IDENT. |
| RE-183 | 1.384E-01 | 5.723E-01 | 5.757E-01 | NOT IDENT. |
| RE-184 | 6.291E-02 | 3.617E-01 | 3.628E-01 | NOT IDENT. |
| W-188 | -5.579E+00 | 1.017E+01 | 1.048E+01 | NOT IDENT. |
| IR-192 | 2.539E-02 | 5.235E-02 | 5.358E-02 | NOT IDENT. |
| HG-203 | -1.361E-02 | 8.525E-02 | 8.547E-02 | NOT IDENT. |
| BI-207 | 5.010E-03 | 3.284E-02 | 3.291E-02 | NOT IDENT. |
| TL-208 | 1.754E-02 | 3.252E-02 | 3.347E-02 | NOT IDENT. |
| PB-211 | -1.986E-01 | 6.135E-01 | 6.200E-01 | NOT IDENT. |
| BI-212 | 1.400E-01 | 4.039E-01 | 4.088E-01 | NOT IDENT. |
| PB-212 | 4.506E-02 | 9.021E-02 | 9.246E-02 | FAIL ABUN |
| BI-214 | 2.371E-02 | 6.497E-02 | 6.584E-02 | NOT IDENT. |
| PB-214 | 3.404E-02 | 6.047E-02 | 6.239E-02 | FAIL ABUN |
| RN-219 | 2.294E-01 | 3.218E-01 | 3.380E-01 | NOT IDENT. |
| RN-222 | 2.371E-02 | 6.497E-02 | 6.584E-02 | NOT IDENT. |
| RA-223 | -3.781E-02 | 4.604E-01 | 4.607E-01 | NOT IDENT. |
| RA-224 | 5.866E-02 | 5.310E-01 | 5.316E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.371E-02 | 6.497E-02 | 6.584E-02 | NOT IDENT. |
| AC-227 | -1.523E-01 | 2.039E-01 | 2.152E-01 | NOT IDENT. |
| TH-227 | -1.523E-01 | 2.039E-01 | 2.152E-01 | NOT IDENT. |
| AC-228 | 1.159E-01 | 1.033E-01 | 1.158E-01 | NOT IDENT. |
| RA-228 | 1.159E-01 | 1.033E-01 | 1.158E-01 | NOT IDENT. |
| TH-228 | 4.506E-02 | 9.021E-02 | 9.246E-02 | FAIL ABUN |
| TH-229 | 1.008E-01 | 4.326E-01 | 4.350E-01 | NOT IDENT. |
| TH-230 | 2.371E-02 | 6.496E-02 | 6.583E-02 | NOT IDENT. |
| PA-231 | -2.978E-02 | 9.754E-01 | 9.755E-01 | NOT IDENT. |
| TH-231 | -3.781E-02 | 4.604E-01 | 4.607E-01 | NOT IDENT. |
| TH-232 | 1.159E-01 | 1.033E-01 | 1.158E-01 | NOT IDENT. |
| PA-233 | 4.993E-02 | 5.268E-02 | 5.729E-02 | NOT IDENT. |
| PA-234 | 1.245E-01 | 2.527E-01 | 2.589E-01 | NOT IDENT. |
| PA-234M | 3.231E+00 | 3.039E+00 | 3.370E+00 | NOT IDENT. |
| TH-234 | -1.053E+00 | 1.647E+00 | 1.714E+00 | NOT IDENT. |
| U-234 | 2.371E-02 | 6.496E-02 | 6.583E-02 | NOT IDENT. |
| U-235 | 1.102E-01 | 1.596E-01 | 1.671E-01 | FAIL ABUN |
| NP-237 | 4.993E-02 | 5.268E-02 | 5.729E-02 | NOT IDENT. |
| NP-238 | -2.757E+11 | 1.145E+12 | 1.152E+12 | SHORT HLIF |
| U-238 | -1.053E+00 | 1.647E+00 | 1.714E+00 | NOT IDENT. |
| NP-239 | -9.381E-02 | 3.445E-01 | 3.471E-01 | NOT IDENT. |
| PU-239 | -3.536E+01 | 3.071E+02 | 3.075E+02 | NOT IDENT. |
| AM-241 | 2.033E-02 | 1.927E-01 | 1.929E-01 | NOT IDENT. |
| AM-243 | 2.384E-02 | 4.839E-02 | 4.956E-02 | NOT IDENT. |
| CM-243 | 1.718E-02 | 9.510E-02 | 9.542E-02 | NOT IDENT. |
| CM-247 | 1.240E-02 | 2.978E-02 | 3.030E-02 | NOT IDENT. |
| CF-249 | 2.585E-03 | 2.631E-02 | 2.633E-02 | NOT IDENT. |
| CF-251 | 1.263E-01 | 1.149E-01 | 1.283E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 23.1350 | 94.67 | 53.1782 | 193.51 | 27.1597 |
| 45.60 | 21.8883 | 94.87 | 64.2354 | 197.03 | 29.5235 |
| 46.54 | 21.9393 | 97.43 | 37.2844 | 198.01 | 32.9610 |
| 49.72 | 0.0000 | 98.43 | 33.3047 | 201.83 | 33.0814 |
| 51.35 | 21.0829 | 98.44 | 33.3053 | 205.31 | 24.0339 |
| 52.39 | 23.1726 | 99.53 | 40.4372 | 210.85 | 18.4059 |
| 53.44 | 23.2279 | 100.11 | 38.4492 | 215.65 | 20.7973 |
| 57.36 | 0.0000 | 103.18 | 33.5442 | 222.11 | 20.9180 |
| 57.53 | 28.1264 | 103.37 | 34.5705 | 227.09 | 31.5146 |
| 57.98 | 24.3998 | 105.21 | 40.7819 | 227.38 | 31.5225 |
| 59.32 | 26.3518 | 105.31 | 40.7878 | 228.16 | 0.0000 |
| 59.54 | 25.4226 | 106.12 | 27.5644 | 228.18 | 23.6584 |
| 63.29 | 31.3143 | 109.28 | 30.7672 | 117.23 | 23.6584 |
| 63.58 | 32.2822 | 111.00 | 27.7583 | 235.69 | 21.1659 |
| 64.28 | 28.5246 | 111.76 | 0.0000 | 235.96 | 21.1707 |
| 66.73 | 26.7530 | 116.30 | 0.0000 | 238.63 | 23.8710 |
| 67.24 | 29.6490 | 117.23 | 37.3334 | 238.98 | 0.0000 |
| 67.75 | 34.4654 | 121.12 | 38.5727 | 240.99 | 26.9303 |
| 69.67 | 28.8280 | 121.22 | 34.4072 | 242.00 | 32.6273 |
| 70.83 | 27.9284 | 121.78 | 33.3895 | 244.70 | 29.4508 |
| 72.81 | 35.7655 | 122.06 | 37.5773 | 252.40 | 0.0000 |
| 72.87 | 37.7029 | 123.07 | 36.5824 | 252.80 | 25.0462 |
| 74.66 | 28.1283 | 127.23 | 31.5273 | 254.15 | 0.0000 |
| 74.82 | 32.9876 | 129.30 | 27.3966 | 256.23 | 26.0126 |
| 74.97 | 32.9966 | 131.20 | 27.4631 | 260.90 | 0.0000 |
| 77.11 | 28.2533 | 133.02 | 30.7025 | 264.66 | 21.6720 |
| 79.69 | 25.4468 | 133.52 | 27.5435 | 268.22 | 19.0155 |
| 80.12 | 28.4044 | 136.00 | 23.9095 | 269.46 | 22.6593 |
| 80.19 | 0.0000 | 136.47 | 27.1132 | 271.23 | 11.7989 |
| 80.57 | 30.3873 | 140.51 | 0.0000 | 273.65 | 26.3698 |
| 81.00 | 30.4100 | 143.76 | 21.8834 | 276.40 | 19.1354 |
| 81.07 | 30.4138 | 144.24 | 20.3931 | 277.37 | 16.4138 |
| 83.79 | 33.5132 | 145.44 | 22.5721 | 277.60 | 11.8564 |
| 85.43 | 34.5947 | 152.43 | 20.5893 | 278.00 | 12.7725 |
| 86.55 | 41.5913 | 153.25 | 18.4393 | 279.20 | 20.0892 |
| 86.79 | 43.5893 | 323.87 | 29.3178 | 279.54 | 21.0076 |
| 86.94 | 43.6003 | 156.02 | 28.2902 | 280.46 | 15.5383 |
| 87.09 | 43.6110 | 158.56 | 19.6414 | 283.69 | 16.4921 |
| 87.57 | 36.7021 | 159.00 | 27.2931 | 284.31 | 0.0000 |
| 88.03 | 28.7883 | 162.33 | 32.8726 | 285.41 | 14.6782 |
| 88.34 | 23.8370 | 163.33 | 32.9086 | 285.90 | 0.0000 |
| 88.47 | 23.8422 | 165.86 | 37.3995 | 287.50 | 14.7012 |
| 89.96 | 70.7046 | 176.31 | 40.0408 | 290.67 | 18.4192 |
| 91.11 | 38.9101 | 176.60 | 31.7085 | 293.27 | 0.0000 |
| 92.59 | 39.0026 | 177.52 | 21.7159 | 351.93 | 15.7085 |
| 93.35 | 30.0382 | 181.07 | 0.0000 | 295.96 | 22.1884 |
| 94.56 | 53.1690 | 184.41 | 28.5983 | 879.38 | 26.8618 |
| 94.65 | 53.1766 | 143.76 | 24.7055 | 299.98 | 22.2528 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 21.3272 | 487.02 | 9.9502 | 702.65 | 13.6637 |
| 300.13 | 21.3277 | 492.35 | 0.0000 | 706.68 | 10.0354 |
| 301.36 | 23.2029 | 497.08 | 10.4170 | 711.68 | 10.9685 |
| 302.85 | 23.2273 | 505.52 | 10.0419 | 720.70 | 8.2542 |
| 256.23 | 16.7434 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 25.1555 | 511.00 | 11.5372 | 722.78 | 10.0963 |
| 308.46 | 24.2524 | 514.00 | 0.0000 | 722.91 | 11.0147 |
| 311.90 | 14.9607 | 514.00 | 0.0000 | 723.31 | 11.9345 |
| 316.51 | 14.0705 | 520.40 | 1.6857 | 724.19 | 13.7750 |
| 319.41 | 17.8580 | 520.69 | 0.0000 | 727.33 | 8.2747 |
| 320.08 | 18.8068 | 522.65 | 0.0000 | 733.00 | 10.1347 |
| 321.04 | 21.6418 | 527.90 | 0.0000 | 735.93 | 7.3787 |
| 323.87 | 16.9698 | 529.59 | 3.3862 | 333.97 | 0.9229 |
| 325.23 | 14.1545 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 17.9717 | 531.02 | 7.2612 | 747.24 | 7.4092 |
| 333.37 | 18.0270 | 546.56 | 0.0000 | 748.06 | 8.3380 |
| 333.97 | 19.9326 | 552.55 | 12.8350 | 752.31 | 7.4229 |
| 334.37 | 19.9378 | 563.25 | 7.5234 | 753.82 | 7.4270 |
| 338.28 | 17.1337 | 569.33 | 8.6218 | 756.73 | 7.4348 |
| 338.32 | 17.1343 | 946.00 | 8.6223 | 756.80 | 7.4350 |
| 311.90 | 13.3455 | 569.70 | 9.7012 | 884.68 | 3.7270 |
| 340.48 | 13.3455 | 583.19 | 8.6748 | 765.81 | 5.5942 |
| 340.55 | 13.3461 | 584.27 | 11.9336 | 766.42 | 8.3931 |
| 344.28 | 13.7608 | 595.83 | 7.6325 | 766.84 | 10.2599 |
| 345.93 | 13.7755 | 427.87 | 12.0185 | 772.60 | 0.0000 |
| 351.06 | 7.6783 | 602.52 | 0.0000 | 776.52 | 10.2950 |
| 351.93 | 9.2191 | 602.73 | 8.7488 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 14.2291 | 778.90 | 11.2403 |
| 356.01 | 6.1621 | 609.32 | 14.2568 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 13.1656 | 785.37 | 7.5107 |
| 366.42 | 0.0000 | 614.28 | 13.1880 | 792.07 | 6.5873 |
| 375.05 | 23.3829 | 618.01 | 6.6042 | 794.95 | 5.6518 |
| 356.01 | 9.4031 | 620.36 | 13.2217 | 795.86 | 5.6536 |
| 388.16 | 10.8021 | 621.93 | 13.2305 | 810.29 | 6.6286 |
| 388.63 | 16.6988 | 630.19 | 0.0000 | 344.28 | 6.6290 |
| 391.69 | 19.6814 | 631.29 | 12.1753 | 810.76 | 7.5770 |
| 264.66 | 9.8926 | 633.25 | 8.8618 | 815.77 | 6.6411 |
| 401.81 | 11.8790 | 634.78 | 5.5421 | 1048.07 | 6.6473 |
| 402.40 | 13.8635 | 635.95 | 4.4358 | 832.01 | 6.6775 |
| 404.85 | 20.8247 | 636.99 | 0.0000 | 834.85 | 7.6387 |
| 410.95 | 18.9075 | 645.85 | 8.9077 | 835.71 | 4.7755 |
| 413.71 | 17.9407 | 657.76 | 10.2294 | 836.80 | 0.0000 |
| 414.70 | 16.9533 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 16.0674 | 661.66 | 8.9646 | 846.77 | 6.7103 |
| 427.87 | 9.0417 | 664.57 | 0.0000 | 856.80 | 6.7325 |
| 433.94 | 11.0880 | 666.33 | 5.3887 | 860.56 | 10.5926 |
| 439.40 | 14.1542 | 666.50 | 7.1855 | 871.09 | 9.6626 |
| 453.88 | 11.6445 | 667.71 | 0.0000 | 873.19 | 5.8015 |
| 463.37 | 11.4687 | 677.62 | 8.1193 | 875.33 | 0.0000 |
| 468.07 | 21.5566 | 685.70 | 0.0000 | 879.38 | 5.8131 |
| 473.00 | 0.0000 | 695.00 | 13.6238 | 880.51 | 9.6919 |
| 475.06 | 12.3624 | 696.49 | 11.8139 | 883.24 | 8.7304 |
| 476.78 | 13.4045 | 696.51 | 11.8139 | 884.68 | 9.7048 |
| 477.60 | 13.4100 | 697.00 | 10.9072 | 889.28 | 7.7752 |
| 482.18 | 12.4074 | 697.49 | 12.7275 | 894.76 | 3.8943 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 6.8223 | 1298.22 | 0.0000 | | |
| 903.28 | 4.8811 | 1312.11 | 4.3592 | | |
| 911.20 | 2.9359 | 1332.49 | 2.1898 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 4.9164 | 1365.19 | 5.5156 | | |
| 937.49 | 5.9196 | 1368.63 | 0.0000 | | |
| 944.13 | 3.9543 | 1384.29 | 3.6929 | | |
| 946.00 | 3.9565 | 1408.01 | 2.7843 | | |
| 949.00 | 7.9203 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 2.8164 | | |
| 962.31 | 6.9580 | 1489.16 | 3.7778 | | |
| 964.08 | 3.3151 | 1505.03 | 4.7380 | | |
| 966.17 | 1.6586 | 1596.21 | 1.9307 | | |
| 968.97 | 8.2998 | 1620.50 | 3.8800 | | |
| 983.53 | 10.0027 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.9500 | | |
| 1274.44 | 6.0240 | 1750.46 | 0.0000 | | |
| 1001.03 | 2.0107 | 1764.49 | 2.9906 | | |
| 1004.73 | 8.0518 | 1063.66 | 2.9938 | | |
| 507.63 | 0.0000 | 1771.35 | 0.9981 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.0049 | | |
| 1037.84 | 5.0801 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 4.0392 | | |
| 631.29 | 5.0925 | | | | |
| 1048.07 | 7.1323 | | | | |
| 1049.04 | 7.1343 | | | | |
| 1050.41 | 6.1175 | | | | |
| 1063.66 | 4.0934 | | | | |
| 1077.00 | 4.1084 | | | | |
| 1077.34 | 3.0816 | | | | |
| 1085.87 | 2.0591 | | | | |
| 1099.45 | 3.1000 | | | | |
| 1112.07 | 4.1473 | | | | |
| 1112.84 | 6.2224 | | | | |
| 1115.54 | 7.2646 | | | | |
| 1120.29 | 7.2738 | | | | |
| 1120.55 | 7.2741 | | | | |
| 1221.41 | 3.1182 | | | | |
| 1129.67 | 4.1668 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.3746 | | | | |
| 1177.95 | 4.2191 | | | | |
| 1189.05 | 9.5194 | | | | |
| 1204.77 | 6.3715 | | | | |
| 1221.41 | 2.1326 | | | | |
| 1231.02 | 2.1377 | | | | |
| 1235.36 | 5.3499 | | | | |
| 1238.28 | 5.3538 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.0795 | | | | |
| 1274.44 | 4.3205 | | | | |
| 1274.54 | 4.3207 | | | | |
| 1291.59 | 4.3381 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 11:01:02.25

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147020.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;271
                                        Background date  : 2-FEB-2014 16:25:56.
Sample date      : 7-NOV-2013 14:00:00. Acquisition date : 7-FEB-2014 10:00:39.
Sample ID        : G341147020           Sample quantity  : 1.30970E+02 GRAM
Detector name    : GAM01                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.20  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.29* | 2 | 20 | 1.40 | 126.56 | 123 | 7 | 5.68E-04 | 459.7 | |
| 2 | 0 | 138.96 | 24 | 29 | 1.69 | 277.84 | 272 | 10 | 6.55E-03 | 48.0 | |
| 3 | 1 | 186.17* | 13 | 18 | 1.25 | 372.23 | 365 | 15 | 3.48E-03 | 81.6 | 3.32E+00 |
| 4 | 1 | 187.67 | 16 | 18 | 1.25 | 375.23 | 365 | 15 | 4.45E-03 | 64.9 | |
| 5 | 0 | 198.81* | 10 | 26 | 1.33 | 397.51 | 393 | 8 | 2.69E-03 | 108.3 | |
| 6 | 0 | 214.06 | 29 | 11 | 3.85 | 428.00 | 423 | 12 | 8.15E-03 | 29.7 | |
| 7 | 0 | 236.27 | 9 | 20 | 1.11 | 472.41 | 468 | 8 | 2.45E-03 | 97.0 | |
| 8 | 0 | 238.99* | 5 | 12 | 1.09 | 477.84 | 475 | 6 | 1.38E-03 | 143.9 | |
| 9 | 0 | 339.13* | 15 | 17 | 4.08 | 678.08 | 670 | 12 | 4.12E-03 | 65.3 | |
| 10 | 0 | 352.69* | 9 | 10 | 1.23 | 705.19 | 701 | 7 | 2.58E-03 | 75.3 | |
| 11 | 0 | 426.77 | 9 | 8 | 1.59 | 853.31 | 846 | 11 | 2.43E-03 | 71.9 | |
| 12 | 0 | 511.45* | 22 | 9 | 2.19 | 1022.66 | 1014 | 17 | 5.99E-03 | 55.4 | |
| 13 | 0 | 518.48 | 9 | 2 | 1.15 | 1036.71 | 1034 | 6 | 2.40E-03 | 45.6 | |
| 14 | 0 | 521.27 | 7 | 0 | 0.50 | 1042.29 | 1040 | 6 | 1.94E-03 | 37.8 | |
| 15 | 0 | 610.13* | 7 | 8 | 1.59 | 1219.99 | 1212 | 11 | 1.96E-03 | 97.5 | |
| 16 | 0 | 664.98 | 10 | 0 | 0.66 | 1329.70 | 1325 | 9 | 2.78E-03 | 31.6 | |
| 17 | 0 | 746.35 | 8 | 2 | 1.38 | 1492.44 | 1489 | 6 | 2.08E-03 | 44.7 | |
| 18 | 0 | 979.61 | 8 | 0 | 0.58 | 1959.00 | 1953 | 10 | 2.22E-03 | 35.4 | |
| 19 | 0 | 1239.19 | 11 | 2 | 0.68 | 2478.30 | 2472 | 11 | 2.93E-03 | 43.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 11:01:03

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147020.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 14:00:00 | Acquisition date | : 7-FEB-2014 10:00:39 |
| Sample ID | : G341147020 | Sample quantity | : 130.97 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA1 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.20  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NB-95M | 235.69 | 9 | 24.80* | 3.964E+00 | 5.138E-02 | 1.389E-01 | 193.95 |
| ANH-511 | 511.00 | 22 | 100.00* | 2.302E+00 | 5.371E-02 | 5.371E-02 | 110.72 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:01:04.58

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147020.CNF;1  *
* Acquisition date :  7-FEB-2014 10:00:39 Sensitivity     : 3.000           *
* Detector ID      : GAM01                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.20     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 14:00:00 Nuclide Library : SOLID           *
* Sample ID        : G341147020           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3097E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 12-DEC-2013 13:25:43 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_500MLMB.CNF;3         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| NB-95M | 1.389E-01 | 2.640E-01 | 4.239E-01 |
| ANH-511 | 5.371E-02 | 5.828E-02 | 4.057E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.297E-01 | 7.913E-01 | 1.585E+00 | NOT IDENT. |
| NA-22 | 1.787E-02 | 2.878E-02 | 7.431E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.424E-04 | 1.997E-02 | 5.213E-02 | NOT IDENT. |
| K-40 | -1.184E-01 | 2.855E-01 | 7.350E-01 | NOT IDENT. |
| SC-46 | 3.296E-02 | 4.550E-02 | 1.159E-01 | NOT IDENT. |
| V-48 | -5.741E-01 | 2.011E+00 | 3.189E+00 | NOT IDENT. |
| CR-51 | -6.490E-01 | 1.925E+00 | 3.559E+00 | NOT IDENT. |
| MN-54 | -8.958E-03 | 2.971E-02 | 5.777E-02 | NOT IDENT. |
| CO-56 | 2.083E-03 | 6.135E-02 | 1.271E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.427E-02 | 2.283E-02 | 3.867E-02 | NOT IDENT. |
| CO-58 | 1.100E-03 | 4.790E-02 | 1.054E-01 | NOT IDENT. |
| FE-59 | 6.120E-02 | 2.396E-01 | 5.176E-01 | NOT IDENT. |
| CO-60 | 1.886E-02 | 2.033E-02 | 6.367E-02 | NOT IDENT. |
| ZN-65 | 2.023E-02 | 8.404E-02 | 1.809E-01 | NOT IDENT. |
| GE-68 | -1.272E-01 | 1.114E+00 | 2.259E+00 | NOT IDENT. |
| AS-73 | -8.486E-01 | 2.544E+00 | 4.616E+00 | NOT IDENT. |
| AS-74 | -3.377E-01 | 1.627E+00 | 2.990E+00 | NOT IDENT. |
| SE-75 | -2.555E-03 | 5.326E-02 | 1.029E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.795E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -2.103E+00 | 1.840E+00 | 2.632E+00 | NOT IDENT. |
| RB-83 | 8.218E-02 | 6.088E-02 | 2.320E-01 | FAIL ABUN |
| KR-85 | 0.000E+00 | 8.537E+00 | 1.815E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 1.013E-01 | 2.153E-01 | NOT IDENT. |
| RB-86 | -6.050E+00 | 1.059E+01 | 1.848E+01 | NOT IDENT. |
| Y-88 | -1.030E-03 | 5.226E-02 | 1.214E-01 | NOT IDENT. |
| Y-91 | -2.661E+00 | 3.314E+01 | 6.836E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | -2.057E-02 | 2.893E-02 | 5.077E-02 | NOT IDENT. |
| NB-95 | -7.900E-03 | 7.971E-02 | 1.573E-01 | NOT IDENT. |
| ZR-95 | -9.930E-02 | 1.242E-01 | 2.099E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 9.190E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.546E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.495E-02 | 2.581E-02 | 5.264E-02 | FAIL ABUN |
| RH-102 | 2.576E-02 | 5.192E-02 | 1.118E-01 | NOT IDENT. |
| RU-103 | -7.281E-02 | 1.336E-01 | 2.311E-01 | FAIL ABUN |
| RH-106 | 1.582E-01 | 2.599E-01 | 5.990E-01 | NOT IDENT. |
| RU-106 | 1.582E-01 | 2.599E-01 | 5.990E-01 | NOT IDENT. |
| AG-108M | -7.591E-03 | 2.240E-02 | 4.115E-02 | NOT IDENT. |
| CD-109 | 4.819E-01 | 7.332E-01 | 1.442E+00 | NOT IDENT. |
| AG-110M | -3.359E-02 | 4.393E-02 | 7.310E-02 | NOT IDENT. |
| SN-113 | -2.211E-02 | 5.068E-02 | 9.181E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.145E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | -2.703E-01 | 2.123E+00 | 3.802E+00 | NOT IDENT. |
| TE-123M | -2.599E-02 | 3.667E-02 | 6.030E-02 | NOT IDENT. |
| SB-124 | 8.057E-02 | 1.964E-01 | 4.894E-01 | NOT IDENT. |
| SB-125 | 6.852E-02 | 9.653E-02 | 1.332E-01 | FAIL ABUN |
| TE-125M | -3.944E+00 | 1.981E+01 | 3.563E+01 | NOT IDENT. |
| I-126 | 1.267E+01 | 7.852E+00 | 2.062E+01 | FAIL ABUN |
| SB-126 | 5.221E+00 | 8.133E+00 | 1.860E+01 | NOT IDENT. |
| SN-126 | 3.381E-02 | 6.605E-02 | 1.277E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 1.038E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 6.403E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.594E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 8.843E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.426E-03 | 3.101E-02 | 5.600E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.090E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -8.910E-03 | 3.592E-02 | 6.931E-02 | NOT IDENT. |
| CS-135 | -4.570E-02 | 1.265E-01 | 2.324E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 9.800E+40 | 0.000E+00 | SHORT HLIF |
| CS-136 | -5.428E-01 | 3.258E+00 | 6.901E+00 | FAIL ABUN |
| BA-137M | 1.256E-03 | 2.933E-02 | 5.356E-02 | NOT IDENT. |
| CS-137 | 1.327E-03 | 3.098E-02 | 5.658E-02 | NOT IDENT. |
| CE-139 | 1.039E-02 | 3.506E-02 | 6.597E-02 | NOT IDENT. |
| BA-140 | 2.985E+00 | 3.378E+00 | 1.071E+01 | NOT IDENT. |
| LA-140 | 2.985E+00 | 3.378E+00 | 1.071E+01 | NOT IDENT. |
| CE-141 | -5.791E-02 | 3.082E-01 | 5.438E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.876E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.214E-02 | 2.249E-01 | 3.778E-01 | NOT IDENT. |
| PM-144 | -6.908E-03 | 3.332E-02 | 6.432E-02 | NOT IDENT. |
| PR-144 | -5.382E-01 | 2.596E+00 | 5.011E+00 | NOT IDENT. |
| PM-146 | -1.400E-02 | 2.768E-02 | 4.930E-02 | FAIL ABUN |
| ND-147 | -1.782E+01 | 5.601E+01 | 1.023E+02 | NOT IDENT. |
| PM-147 | -2.925E+02 | 5.512E+02 | 9.493E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.204E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.310E-02 | 3.013E-02 | 4.619E-02 | NOT IDENT. |
| EU-152 | 2.383E-02 | 8.060E-02 | 1.536E-01 | NOT IDENT. |
| GD-153 | -3.286E-02 | 1.021E-01 | 1.786E-01 | NOT IDENT. |
| EU-154 | 4.870E-02 | 7.842E-02 | 2.025E-01 | NOT IDENT. |
| EU-155 | -1.924E-02 | 8.801E-02 | 1.583E-01 | NOT IDENT. |
| TB-160 | -2.922E-02 | 1.785E-01 | 3.664E-01 | NOT IDENT. |
| HO-166M | 4.292E-02 | 4.408E-02 | 1.071E-01 | NOT IDENT. |
| TM-171 | 1.377E+01 | 2.904E+01 | 5.781E+01 | NOT IDENT. |
| LU-176 | -1.811E-02 | 1.885E-02 | 3.102E-02 | NOT IDENT. |
| HF-181 | 3.395E-02 | 1.224E-01 | 2.507E-01 | NOT IDENT. |
| TA-182 | 1.585E-01 | 1.979E-01 | 4.946E-01 | NOT IDENT. |
| RE-183 | -1.081E-01 | 5.146E-01 | 9.501E-01 | NOT IDENT. |
| RE-184 | 2.111E-04 | 3.827E-01 | 8.096E-01 | NOT IDENT. |
| W-188 | 5.178E+00 | 1.435E+01 | 2.839E+01 | FAIL ABUN |
| IR-192 | 3.777E-03 | 5.654E-02 | 1.108E-01 | NOT IDENT. |
| HG-203 | 2.517E-02 | 9.532E-02 | 1.902E-01 | NOT IDENT. |
| BI-207 | 2.240E-02 | 4.167E-02 | 9.564E-02 | NOT IDENT. |
| TL-208 | 1.447E-02 | 3.184E-02 | 6.837E-02 | NOT IDENT. |
| PB-210 | 6.649E+00 | 6.815E+00 | 1.421E+01 | NOT IDENT. |
| BI-211 | 1.135E-01 | 2.156E-01 | 4.079E-01 | NOT IDENT. |
| PB-211 | -2.796E-01 | 5.926E-01 | 1.054E+00 | FAIL ABUN |
| BI-212 | -2.143E-01 | 3.989E-01 | 7.234E-01 | NOT IDENT. |
| PB-212 | 1.655E-02 | 4.666E-02 | 9.366E-02 | FAIL ABUN |
| BI-214 | 4.390E-02 | 8.387E-02 | 1.398E-01 | FAIL ABUN |
| PB-214 | 4.991E-02 | 7.363E-02 | 1.463E-01 | FAIL ABUN |
| RN-219 | -3.176E-02 | 3.483E-01 | 6.600E-01 | NOT IDENT. |
| RN-222 | 4.390E-02 | 8.387E-02 | 1.398E-01 | FAIL ABUN |
| RA-223 | 3.454E-01 | 5.424E-01 | 1.128E+00 | FAIL ABUN |
| RA-224 | -7.286E-03 | 5.701E-01 | 9.616E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 4.390E-02 | 8.387E-02 | 1.398E-01 | FAIL ABUN |
| AC-227 | -1.062E-02 | 2.053E-01 | 3.855E-01 | FAIL ABUN |
| TH-227 | -1.062E-02 | 2.053E-01 | 3.855E-01 | FAIL ABUN |
| AC-228 | 5.071E-03 | 9.598E-02 | 2.047E-01 | FAIL ABUN |
| RA-228 | 5.071E-03 | 9.598E-02 | 2.047E-01 | FAIL ABUN |
| TH-228 | 1.655E-02 | 4.666E-02 | 9.366E-02 | FAIL ABUN |
| TH-229 | 2.950E-02 | 5.148E-01 | 8.780E-01 | NOT IDENT. |
| TH-230 | 4.389E-02 | 8.386E-02 | 1.398E-01 | FAIL ABUN |
| PA-231 | -2.818E-01 | 1.224E+00 | 2.283E+00 | NOT IDENT. |
| TH-231 | 3.454E-01 | 5.424E-01 | 1.128E+00 | FAIL ABUN |
| TH-232 | 5.071E-03 | 9.598E-02 | 2.047E-01 | FAIL ABUN |
| PA-233 | -1.434E-02 | 4.899E-02 | 9.136E-02 | FAIL ABUN |
| PA-234 | -2.409E-01 | 2.412E-01 | 3.637E-01 | NOT IDENT. |
| PA-234M | 8.528E-01 | 3.857E+00 | 8.871E+00 | NOT IDENT. |
| TH-234 | 1.870E-01 | 1.685E+00 | 2.821E+00 | FAIL ABUN |
| U-234 | 4.389E-02 | 8.386E-02 | 1.398E-01 | FAIL ABUN |
| U-235 | 1.216E-01 | 1.931E-01 | 3.584E-01 | FAIL ABUN |
| NP-237 | -1.434E-02 | 4.899E-02 | 9.136E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 1.471E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.870E-01 | 1.685E+00 | 2.821E+00 | FAIL ABUN |
| NP-239 | 3.895E-02 | 2.942E-01 | 5.558E-01 | NOT IDENT. |
| PU-239 | -5.579E+01 | 2.784E+02 | 4.957E+02 | NOT IDENT. |
| AM-241 | -4.639E-02 | 1.972E-01 | 3.219E-01 | NOT IDENT. |
| AM-243 | 7.379E-03 | 5.049E-02 | 9.466E-02 | NOT IDENT. |
| CM-243 | -6.373E-02 | 9.482E-02 | 1.605E-01 | NOT IDENT. |
| CM-247 | 2.136E-04 | 3.042E-02 | 5.891E-02 | NOT IDENT. |
| CF-249 | 1.787E-02 | 2.960E-02 | 6.377E-02 | NOT IDENT. |
| CF-251 | -2.654E-02 | 1.054E-01 | 1.843E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 11:01:00.76

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.29 | 22 | 20 | 1.40 | 126.56 | 123 | 7 | 6.00E-03 | 41.9 | |
| 2 | 0 | 93.17 | 35 | 50 | 1.03 | 186.30 | 181 | 8 | 9.68E-03 | 39.0 | |
| 3 | 0 | 138.96 | 24 | 29 | 1.69 | 277.84 | 272 | 10 | 6.55E-03 | 48.0 | |
| 4 | 1 | 186.17 | 51 | 18 | 1.25 | 372.23 | 365 | 15 | 1.43E-02 | 18.8 | 3.32E+00 |
| 5 | 1 | 187.67 | 16 | 18 | 1.25 | 375.23 | 365 | 15 | 4.45E-03 | 64.9 | |
| 6 | 0 | 198.81 | 17 | 26 | 1.33 | 397.51 | 393 | 8 | 4.69E-03 | 60.2 | |
| 7 | 0 | 214.06 | 29 | 11 | 3.85 | 428.00 | 423 | 12 | 8.15E-03 | 29.7 | |
| 8 | 0 | 236.27 | 9 | 20 | 1.11 | 472.41 | 468 | 8 | 2.45E-03 | 97.0 | |
| 9 | 0 | 238.99 | 14 | 12 | 1.09 | 477.84 | 475 | 6 | 3.76E-03 | 49.0 | |
| 10 | 0 | 339.13 | 19 | 17 | 4.08 | 678.08 | 670 | 12 | 5.32E-03 | 49.5 | |
| 11 | 0 | 352.69 | 15 | 10 | 1.23 | 705.19 | 701 | 7 | 4.11E-03 | 46.1 | |
| 12 | 0 | 426.77 | 9 | 8 | 1.59 | 853.31 | 846 | 11 | 2.43E-03 | 71.9 | |
| 13 | 0 | 511.45 | 87 | 9 | 2.19 | 1022.66 | 1014 | 17 | 2.40E-02 | 13.2 | |
| 14 | 0 | 518.48 | 9 | 2 | 1.15 | 1036.71 | 1034 | 6 | 2.40E-03 | 45.6 | |
| 15 | 0 | 521.27 | 7 | 0 | 0.50 | 1042.29 | 1040 | 6 | 1.94E-03 | 37.8 | |
| 16 | 0 | 610.13 | 13 | 8 | 1.59 | 1219.99 | 1212 | 11 | 3.49E-03 | 52.6 | |
| 17 | 0 | 664.98 | 10 | 0 | 0.66 | 1329.70 | 1325 | 9 | 2.78E-03 | 31.6 | |
| 18 | 0 | 746.35 | 8 | 2 | 1.38 | 1492.44 | 1489 | 6 | 2.08E-03 | 44.7 | |
| 19 | 0 | 979.61 | 8 | 0 | 0.58 | 1959.00 | 1953 | 10 | 2.22E-03 | 35.4 | |
| 20 | 0 | 1239.19 | 11 | 2 | 0.68 | 2478.30 | 2472 | 11 | 2.93E-03 | 43.0 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 11:01:02.85

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| NB-95M | 235.69 | 9 | 24.80* | 3.964E+00 | 5.138E-02 | 1.389E-01 | 193.95 |
| ANH-511 | 511.00 | 22 | 100.00* | 2.302E+00 | 5.371E-02 | 5.371E-02 | 110.72 |

Flag: "*" = Keyline

Sample ID : G341147020 Acquisition date : 7-FEB-2014 10:00:39

Total number of lines in spectrum 19
Number of unidentified lines 5
Number of lines tentatively identified by NID 14 73.68%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| NB-95M | 64.03D | 2.70 | 5.138E-02 | 1.389E-01 | 2.693E-01 | 193.95 | |
| ANH-511 | 1.00E+09Y | 1.00 | 5.371E-02 | 5.371E-02 | 5.947E-02 | 110.72 | |
| Total Activity : | | | 1.051E-01 | 1.926E-01 | | | |
| Grand Total Activity : | | | 1.051E-01 | 1.926E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147020 Acquisition date : 7-FEB-2014 10:00:39

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.29 | 2 | 20 | 1.40 | 126.56 | 123 | 7 | 5.68E-04 | **** | 1.69E+00 | T |
| 0 | 138.96 | 24 | 29 | 1.69 | 277.84 | 272 | 10 | 6.55E-03 | 96.0 | 5.12E+00 | |
| 1 | 186.17 | 13 | 18 | 1.25 | 372.23 | 365 | 15 | 3.48E-03 | **** | 4.59E+00 | T |
| 1 | 187.67 | 16 | 18 | 1.25 | 375.23 | 365 | 15 | 4.45E-03 | **** | 4.57E+00 | |
| 0 | 198.81 | 10 | 26 | 1.33 | 397.51 | 393 | 8 | 2.69E-03 | **** | 4.42E+00 | T |
| 0 | 214.06 | 29 | 11 | 3.85 | 428.00 | 423 | 12 | 8.15E-03 | 59.5 | 4.23E+00 | |
| 0 | 238.99 | 5 | 12 | 1.09 | 477.84 | 475 | 6 | 1.38E-03 | **** | 3.93E+00 | T |
| 0 | 339.13 | 15 | 17 | 4.08 | 678.08 | 670 | 12 | 4.12E-03 | **** | 3.08E+00 | T |
| 0 | 352.69 | 9 | 10 | 1.23 | 705.19 | 701 | 7 | 2.58E-03 | **** | 3.00E+00 | T |
| 0 | 426.77 | 9 | 8 | 1.59 | 853.31 | 846 | 11 | 2.43E-03 | **** | 2.62E+00 | T |
| 0 | 518.48 | 9 | 2 | 1.15 | 1036.71 | 1034 | 6 | 2.40E-03 | 91.2 | 2.28E+00 | |
| 0 | 521.27 | 7 | 0 | 0.50 | 1042.29 | 1040 | 6 | 1.94E-03 | 75.6 | 2.27E+00 | T |
| 0 | 610.13 | 7 | 8 | 1.59 | 1219.99 | 1212 | 11 | 1.96E-03 | **** | 2.02E+00 | T |
| 0 | 664.98 | 10 | 0 | 0.66 | 1329.70 | 1325 | 9 | 2.78E-03 | 63.2 | 1.89E+00 | T |
| 0 | 746.35 | 8 | 2 | 1.38 | 1492.44 | 1489 | 6 | 2.08E-03 | 89.4 | 1.73E+00 | T |
| 0 | 979.61 | 8 | 0 | 0.58 | 1959.00 | 1953 | 10 | 2.22E-03 | 70.7 | 1.37E+00 | |
| 0 | 1239.19 | 11 | 2 | 0.68 | 2478.30 | 2472 | 11 | 2.93E-03 | 86.1 | 1.11E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:01:14.70

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147020.CNF;1    *
* Acquisition date :  7-FEB-2014 10:00:39 Sensitivity     : 3.000           *
* Detector ID      : GAM01                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.20     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 14:00:00 Nuclide Library : SOLID           *
* Sample ID        : G341147020           Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3097E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-DEC-2013 13:25:43 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_500MLMB.CNF;3         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| NB-95M | 1.907E-01 |
| ANH-511 | 1.692E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 6.914E-01 | NOT IDENT. |
| NA-22 | 2.949E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.648E-02 | NOT IDENT. |
| K-40 | 2.917E-01 | NOT IDENT. |
| SC-46 | 4.683E-02 | NOT IDENT. |
| V-48 | 1.289E+00 | NOT IDENT. |
| CR-51 | 1.537E+00 | NOT IDENT. |
| MN-54 | 2.285E-02 | NOT IDENT. |
| CO-56 | 5.219E-02 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.711E-02 | NOT IDENT. |
| CO-58 | 4.084E-02 | NOT IDENT. |
| FE-59 | 2.124E-01 | NOT IDENT. |
| CO-60 | 2.413E-02 | NOT IDENT. |
| ZN-65 | 7.417E-02 | NOT IDENT. |
| GE-68 | 8.876E-01 | NOT IDENT. |
| AS-73 | 2.088E+00 | NOT IDENT. |
| AS-74 | 1.265E+00 | NOT IDENT. |
| SE-75 | 4.535E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 9.367E-01 | NOT IDENT. |
| RB-83 | 1.002E-01 | FAIL ABUN |
| KR-85 | 8.288E+00 | NOT IDENT. |
| SR-85 | 9.830E-02 | NOT IDENT. |
| RB-86 | 7.072E+00 | NOT IDENT. |
| Y-88 | 4.300E-02 | NOT IDENT. |
| Y-91 | 2.640E+01 | NOT IDENT. |
| NB-94 | 2.110E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95 | 6.627E-02 | NOT IDENT. |
| ZR-95 | 8.236E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.399E-02 | FAIL ABUN |
| RH-102 | 4.853E-02 | NOT IDENT. |
| RU-103 | 9.722E-02 | FAIL ABUN |
| RH-106 | 2.531E-01 | NOT IDENT. |
| RU-106 | 2.531E-01 | NOT IDENT. |
| AG-108M | 1.727E-02 | NOT IDENT. |
| CD-109 | 6.611E-01 | NOT IDENT. |
| AG-110M | 2.736E-02 | NOT IDENT. |
| SN-113 | 3.846E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.706E+00 | NOT IDENT. |
| TE-123M | 2.697E-02 | NOT IDENT. |
| SB-124 | 1.896E-01 | NOT IDENT. |
| SB-125 | 5.604E-02 | FAIL ABUN |
| TE-125M | 1.606E+01 | NOT IDENT. |
| I-126 | 8.598E+00 | FAIL ABUN |
| SB-126 | 7.894E+00 | NOT IDENT. |
| SN-126 | 5.861E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.374E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.864E-02 | NOT IDENT. |
| CS-135 | 1.029E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.503E+00 | FAIL ABUN |
| BA-137M | 2.222E-02 | NOT IDENT. |
| CS-137 | 2.347E-02 | NOT IDENT. |
| CE-139 | 2.983E-02 | NOT IDENT. |
| BA-140 | 4.009E+00 | NOT IDENT. |
| LA-140 | 4.009E+00 | NOT IDENT. |
| CE-141 | 2.496E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.720E-01 | NOT IDENT. |
| PM-144 | 2.708E-02 | NOT IDENT. |
| PR-144 | 2.109E+00 | NOT IDENT. |
| PM-146 | 1.975E-02 | FAIL ABUN |
| ND-147 | 4.246E+01 | NOT IDENT. |
| PM-147 | 4.179E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.050E-02 | NOT IDENT. |
| EU-152 | 6.716E-02 | NOT IDENT. |
| GD-153 | 8.162E-02 | NOT IDENT. |
| EU-154 | 8.036E-02 | NOT IDENT. |
| EU-155 | 7.126E-02 | NOT IDENT. |
| TB-160 | 1.419E-01 | NOT IDENT. |
| HO-166M | 4.559E-02 | NOT IDENT. |
| TM-171 | 2.622E+01 | NOT IDENT. |
| LU-176 | 1.301E-02 | NOT IDENT. |
| HF-181 | 1.074E-01 | NOT IDENT. |
| TA-182 | 2.028E-01 | NOT IDENT. |
| RE-183 | 4.267E-01 | NOT IDENT. |
| RE-184 | 3.213E-01 | NOT IDENT. |
| W-188 | 1.280E+01 | FAIL ABUN |
| IR-192 | 4.855E-02 | NOT IDENT. |
| HG-203 | 8.460E-02 | NOT IDENT. |
| BI-207 | 3.962E-02 | NOT IDENT. |
| TL-208 | 2.983E-02 | NOT IDENT. |
| PB-210 | 6.495E+00 | NOT IDENT. |
| BI-211 | 1.841E-01 | NOT IDENT. |
| PB-211 | 4.516E-01 | FAIL ABUN |
| BI-212 | 2.958E-01 | NOT IDENT. |
| PB-212 | 4.233E-02 | FAIL ABUN |
| BI-214 | 6.149E-02 | FAIL ABUN |
| PB-214 | 6.593E-02 | FAIL ABUN |
| RN-219 | 2.871E-01 | NOT IDENT. |
| RN-222 | 6.149E-02 | FAIL ABUN |
| RA-223 | 5.030E-01 | FAIL ABUN |
| RA-224 | 4.326E-01 | NOT IDENT. |
| RA-226 | 6.149E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 1.710E-01 | FAIL ABUN |
| TH-227 | 1.710E-01 | FAIL ABUN |
| AC-228 | 8.180E-02 | FAIL ABUN |
| RA-228 | 8.180E-02 | FAIL ABUN |
| TH-228 | 4.233E-02 | FAIL ABUN |
| TH-229 | 4.000E-01 | NOT IDENT. |
| TH-230 | 6.148E-02 | FAIL ABUN |
| PA-231 | 1.011E+00 | NOT IDENT. |
| TH-231 | 5.030E-01 | FAIL ABUN |
| TH-232 | 8.180E-02 | FAIL ABUN |
| PA-233 | 3.953E-02 | FAIL ABUN |
| PA-234 | 1.362E-01 | NOT IDENT. |
| PA-234M | 3.750E+00 | NOT IDENT. |
| TH-234 | 1.287E+00 | FAIL ABUN |
| U-234 | 6.148E-02 | FAIL ABUN |
| U-235 | 1.654E-01 | FAIL ABUN |
| NP-237 | 3.953E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.287E+00 | FAIL ABUN |
| NP-239 | 2.489E-01 | NOT IDENT. |
| PU-239 | 2.241E+02 | NOT IDENT. |
| AM-241 | 1.445E-01 | NOT IDENT. |
| AM-243 | 4.334E-02 | NOT IDENT. |
| CM-243 | 7.246E-02 | NOT IDENT. |
| CM-247 | 2.552E-02 | NOT IDENT. |
| CF-249 | 2.770E-02 | NOT IDENT. |
| CF-251 | 8.266E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:01:19.22

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147020.CNF;1    *
* Acquisition date :  7-FEB-2014 10:00:39 Sensitivity     : 3.000          *
* Detector ID      : GAM01                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.20     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 14:00:00 Nuclide Library : SOLID          *
* Sample ID        : G341147020           Analyst initials: RXF2           *
* Batch Number     : 1359496              Sample Quantity : 1.3097E+02 GRAM   *
*                                         Quantity Err(%) : 1.5271E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-DEC-2013 13:25:43 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_500MLMB.CNF;3       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| NB-95M | 1.389E-01 | 2.646E-01 | 2.646E-01 |
| ANH-511 | 5.371E-02 | 5.851E-02 | 5.851E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.297E-01 | 7.916E-01 | 7.983E-01 | NOT IDENT. |
| NA-22 | 1.787E-02 | 2.882E-02 | 2.992E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 3.680E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -2.424E-04 | 1.997E-02 | 1.997E-02 | NOT IDENT. |
| K-40 | -1.184E-01 | 2.857E-01 | 2.906E-01 | NOT IDENT. |
| SC-46 | 3.296E-02 | 4.567E-02 | 4.802E-02 | NOT IDENT. |
| V-48 | -5.741E-01 | 2.012E+00 | 2.029E+00 | NOT IDENT. |
| CR-51 | -6.490E-01 | 1.926E+00 | 1.948E+00 | NOT IDENT. |
| MN-54 | -8.958E-03 | 2.972E-02 | 3.000E-02 | NOT IDENT. |
| CO-56 | 2.083E-03 | 6.135E-02 | 6.135E-02 | FAIL ABUN |
| MN-56 | 1.000E+41 | 2.539E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.427E-02 | 2.287E-02 | 2.375E-02 | NOT IDENT. |
| CO-58 | 1.100E-03 | 4.790E-02 | 4.790E-02 | NOT IDENT. |
| FE-59 | 6.120E-02 | 2.398E-01 | 2.414E-01 | NOT IDENT. |
| CO-60 | 1.886E-02 | 2.038E-02 | 2.208E-02 | NOT IDENT. |
| ZN-65 | 2.023E-02 | 8.408E-02 | 8.458E-02 | NOT IDENT. |
| GE-68 | -1.272E-01 | 1.114E+00 | 1.115E+00 | NOT IDENT. |
| AS-73 | -8.486E-01 | 2.550E+00 | 2.578E+00 | NOT IDENT. |
| AS-74 | -3.377E-01 | 1.627E+00 | 1.634E+00 | NOT IDENT. |
| SE-75 | -2.555E-03 | 5.326E-02 | 5.327E-02 | NOT IDENT. |
| BR-77 | 1.346E+10 | 5.211E+10 | 5.246E+10 | SHORT HLIF |
| SR-82 | -2.103E+00 | 1.851E+00 | 2.080E+00 | NOT IDENT. |
| RB-83 | 8.218E-02 | 6.232E-02 | 7.250E-02 | FAIL ABUN |
| KR-85 | 1.918E+01 | 8.735E+00 | 1.229E+01 | NOT IDENT. |
| SR-85 | 2.272E-01 | 1.036E-01 | 1.457E-01 | NOT IDENT. |
| RB-86 | -6.050E+00 | 1.062E+01 | 1.096E+01 | NOT IDENT. |
| Y-88 | -1.030E-03 | 5.226E-02 | 5.226E-02 | NOT IDENT. |
| Y-91 | -2.661E+00 | 3.314E+01 | 3.316E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | -2.057E-02 | 2.899E-02 | 3.043E-02 | NOT IDENT. |
| NB-95 | -7.900E-03 | 7.971E-02 | 7.979E-02 | NOT IDENT. |
| ZR-95 | -9.930E-02 | 1.246E-01 | 1.324E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 4.814E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.421E+38 | 9.191E+38 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.591E+08 | 2.546E+09 | 2.547E+09 | SHORT HLIF |
| TC-99M | -1.000E+41 | 4.782E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.495E-02 | 2.626E-02 | 2.857E-02 | FAIL ABUN |
| RH-102 | 2.576E-02 | 5.199E-02 | 5.327E-02 | NOT IDENT. |
| RU-103 | -7.281E-02 | 1.338E-01 | 1.378E-01 | FAIL ABUN |
| RH-106 | 1.582E-01 | 2.603E-01 | 2.699E-01 | NOT IDENT. |
| RU-106 | 1.582E-01 | 2.603E-01 | 2.699E-01 | NOT IDENT. |
| AG-108M | -7.591E-03 | 2.242E-02 | 2.268E-02 | NOT IDENT. |
| CD-109 | 4.819E-01 | 7.356E-01 | 7.670E-01 | NOT IDENT. |
| AG-110M | -3.359E-02 | 4.412E-02 | 4.664E-02 | NOT IDENT. |
| SN-113 | -2.211E-02 | 5.073E-02 | 5.170E-02 | NOT IDENT. |
| CD-115 | 6.914E+10 | 2.147E+11 | 2.169E+11 | SHORT HLIF |
| SN-117M | -2.703E-01 | 2.123E+00 | 2.127E+00 | NOT IDENT. |
| TE-123M | -2.599E-02 | 3.678E-02 | 3.860E-02 | NOT IDENT. |
| SB-124 | 8.057E-02 | 1.965E-01 | 1.998E-01 | NOT IDENT. |
| SB-125 | 6.852E-02 | 9.678E-02 | 1.016E-01 | FAIL ABUN |
| TE-125M | -3.944E+00 | 1.981E+01 | 1.989E+01 | NOT IDENT. |
| I-126 | 1.267E+01 | 7.948E+00 | 9.787E+00 | FAIL ABUN |
| SB-126 | 5.221E+00 | 8.162E+00 | 8.495E+00 | NOT IDENT. |
| SN-126 | 3.381E-02 | 6.616E-02 | 6.789E-02 | FAIL ABUN |
| SB-127 | -9.539E+04 | 1.039E+06 | 1.039E+06 | SHORT HLIF |
| I-131 | 1.711E+01 | 6.406E+01 | 6.452E+01 | SHORT HLIF |
| I-132 | -1.000E+41 | 5.882E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 3.118E+06 | 8.862E+06 | 8.972E+06 | SHORT HLIF |
| BA-133 | 3.426E-03 | 3.101E-02 | 3.105E-02 | NOT IDENT. |
| I-133 | -9.993E+29 | 2.165E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | -8.910E-03 | 3.593E-02 | 3.615E-02 | NOT IDENT. |
| CS-135 | -4.570E-02 | 1.267E-01 | 1.283E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 2.297E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -5.428E-01 | 3.259E+00 | 3.268E+00 | FAIL ABUN |
| BA-137M | 1.256E-03 | 2.933E-02 | 2.933E-02 | NOT IDENT. |
| CS-137 | 1.327E-03 | 3.098E-02 | 3.099E-02 | NOT IDENT. |
| CE-139 | 1.039E-02 | 3.514E-02 | 3.545E-02 | NOT IDENT. |
| BA-140 | 2.985E+00 | 3.386E+00 | 3.644E+00 | NOT IDENT. |
| LA-140 | 2.985E+00 | 3.386E+00 | 3.644E+00 | NOT IDENT. |
| CE-141 | -5.791E-02 | 3.082E-01 | 3.093E-01 | NOT IDENT. |
| CE-143 | 1.549E+18 | 6.878E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | 5.214E-02 | 2.250E-01 | 2.262E-01 | NOT IDENT. |
| PM-144 | -6.908E-03 | 3.332E-02 | 3.347E-02 | NOT IDENT. |
| PR-144 | -5.382E-01 | 2.596E+00 | 2.607E+00 | NOT IDENT. |
| PM-146 | -1.400E-02 | 2.773E-02 | 2.844E-02 | FAIL ABUN |
| ND-147 | -1.782E+01 | 5.603E+01 | 5.661E+01 | NOT IDENT. |
| PM-147 | -2.925E+02 | 5.518E+02 | 5.673E+02 | NOT IDENT. |
| PM-149 | 1.400E+12 | 2.219E+12 | 2.307E+12 | SHORT HLIF |
| EU-150 | -1.310E-02 | 3.016E-02 | 3.074E-02 | NOT IDENT. |
| EU-152 | 2.383E-02 | 8.065E-02 | 8.136E-02 | NOT IDENT. |
| GD-153 | -3.286E-02 | 1.021E-01 | 1.032E-01 | NOT IDENT. |
| EU-154 | 4.870E-02 | 7.853E-02 | 8.154E-02 | NOT IDENT. |
| EU-155 | -1.924E-02 | 8.803E-02 | 8.846E-02 | NOT IDENT. |
| TB-160 | -2.922E-02 | 1.786E-01 | 1.791E-01 | NOT IDENT. |
| HO-166M | 4.292E-02 | 4.426E-02 | 4.830E-02 | NOT IDENT. |
| TM-171 | 1.377E+01 | 2.908E+01 | 2.973E+01 | NOT IDENT. |
| LU-176 | -1.811E-02 | 1.897E-02 | 2.065E-02 | NOT IDENT. |
| HF-181 | 3.395E-02 | 1.224E-01 | 1.234E-01 | NOT IDENT. |
| TA-182 | 1.585E-01 | 1.984E-01 | 2.108E-01 | NOT IDENT. |
| RE-183 | -1.081E-01 | 5.148E-01 | 5.171E-01 | NOT IDENT. |
| RE-184 | 2.111E-04 | 3.827E-01 | 3.827E-01 | NOT IDENT. |
| W-188 | 5.178E+00 | 1.437E+01 | 1.456E+01 | FAIL ABUN |
| IR-192 | 3.777E-03 | 5.654E-02 | 5.656E-02 | NOT IDENT. |
| HG-203 | 2.517E-02 | 9.537E-02 | 9.604E-02 | NOT IDENT. |
| BI-207 | 2.240E-02 | 4.177E-02 | 4.297E-02 | NOT IDENT. |
| TL-208 | 1.447E-02 | 3.187E-02 | 3.253E-02 | NOT IDENT. |
| PB-210 | 6.649E+00 | 6.840E+00 | 7.468E+00 | NOT IDENT. |
| BI-211 | 1.135E-01 | 2.159E-01 | 2.219E-01 | NOT IDENT. |
| PB-211 | -2.796E-01 | 5.933E-01 | 6.066E-01 | FAIL ABUN |
| BI-212 | -2.143E-01 | 3.994E-01 | 4.109E-01 | NOT IDENT. |
| PB-212 | 1.655E-02 | 4.670E-02 | 4.730E-02 | FAIL ABUN |
| BI-214 | 4.390E-02 | 8.395E-02 | 8.625E-02 | FAIL ABUN |
| PB-214 | 4.991E-02 | 7.384E-02 | 7.719E-02 | FAIL ABUN |
| RN-219 | -3.176E-02 | 3.484E-01 | 3.487E-01 | NOT IDENT. |
| RN-222 | 4.390E-02 | 8.395E-02 | 8.625E-02 | FAIL ABUN |
| RA-223 | 3.454E-01 | 5.440E-01 | 5.659E-01 | FAIL ABUN |
| RA-224 | -7.286E-03 | 5.701E-01 | 5.701E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 4.390E-02 | 8.395E-02 | 8.625E-02 | FAIL ABUN |
| AC-227 | -1.062E-02 | 2.053E-01 | 2.053E-01 | FAIL ABUN |
| TH-227 | -1.062E-02 | 2.053E-01 | 2.053E-01 | FAIL ABUN |
| AC-228 | 5.071E-03 | 9.598E-02 | 9.601E-02 | FAIL ABUN |
| RA-228 | 5.071E-03 | 9.598E-02 | 9.601E-02 | FAIL ABUN |
| TH-228 | 1.655E-02 | 4.670E-02 | 4.730E-02 | FAIL ABUN |
| TH-229 | 2.950E-02 | 5.148E-01 | 5.150E-01 | NOT IDENT. |
| TH-230 | 4.389E-02 | 8.394E-02 | 8.624E-02 | FAIL ABUN |
| PA-231 | -2.818E-01 | 1.224E+00 | 1.231E+00 | NOT IDENT. |
| TH-231 | 3.454E-01 | 5.440E-01 | 5.659E-01 | FAIL ABUN |
| TH-232 | 5.071E-03 | 9.598E-02 | 9.601E-02 | FAIL ABUN |
| PA-233 | -1.434E-02 | 4.902E-02 | 4.944E-02 | FAIL ABUN |
| PA-234 | -2.409E-01 | 3.673E-01 | 3.830E-01 | NOT IDENT. |
| PA-234M | 8.528E-01 | 3.858E+00 | 3.877E+00 | NOT IDENT. |
| TH-234 | 1.870E-01 | 1.686E+00 | 1.688E+00 | FAIL ABUN |
| U-234 | 4.389E-02 | 8.394E-02 | 8.624E-02 | FAIL ABUN |
| U-235 | 1.216E-01 | 1.934E-01 | 2.011E-01 | FAIL ABUN |
| NP-237 | -1.434E-02 | 4.902E-02 | 4.944E-02 | FAIL ABUN |
| NP-238 | 5.047E+11 | 1.472E+12 | 1.489E+12 | SHORT HLIF |
| U-238 | 1.870E-01 | 1.686E+00 | 1.688E+00 | FAIL ABUN |
| NP-239 | 3.895E-02 | 2.942E-01 | 2.947E-01 | NOT IDENT. |
| PU-239 | -5.579E+01 | 2.784E+02 | 2.796E+02 | NOT IDENT. |
| AM-241 | -4.639E-02 | 1.972E-01 | 1.983E-01 | NOT IDENT. |
| AM-243 | 7.379E-03 | 5.050E-02 | 5.061E-02 | NOT IDENT. |
| CM-243 | -6.373E-02 | 9.513E-02 | 9.937E-02 | NOT IDENT. |
| CM-247 | 2.136E-04 | 3.042E-02 | 3.042E-02 | NOT IDENT. |
| CF-249 | 1.787E-02 | 2.968E-02 | 3.075E-02 | NOT IDENT. |
| CF-251 | -2.654E-02 | 1.055E-01 | 1.062E-01 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 42.6662 | 94.67 | 57.5111 | 193.51 | 34.3207 |
| 45.60 | 22.8200 | 94.87 | 76.7066 | 197.03 | 44.7756 |
| 46.54 | 18.3007 | 97.43 | 39.5271 | 198.01 | 39.6481 |
| 49.72 | 0.0000 | 98.43 | 41.6210 | 201.83 | 20.7645 |
| 51.35 | 21.3013 | 98.44 | 41.6217 | 205.31 | 23.1504 |
| 52.39 | 25.0689 | 99.53 | 29.4910 | 210.85 | 15.7103 |
| 53.44 | 35.3707 | 100.11 | 28.5004 | 215.65 | 21.0425 |
| 57.36 | 0.0000 | 103.18 | 29.6608 | 222.11 | 28.2261 |
| 57.53 | 26.3111 | 103.37 | 39.9006 | 227.09 | 17.7217 |
| 57.98 | 29.1597 | 105.21 | 29.7540 | 227.38 | 17.7264 |
| 59.32 | 32.5494 | 105.31 | 30.7848 | 228.16 | 0.0000 |
| 59.54 | 29.7335 | 106.12 | 33.9052 | 228.18 | 19.5132 |
| 63.29 | 26.6462 | 109.28 | 30.9705 | 235.69 | 27.1453 |
| 63.58 | 22.8538 | 111.00 | 28.9800 | 235.96 | 27.1518 |
| 64.28 | 25.7487 | 111.76 | 0.0000 | 238.63 | 30.0803 |
| 66.73 | 24.4428 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 26.4836 | 117.23 | 22.9772 | 240.99 | 27.2717 |
| 67.75 | 28.8165 | 121.12 | 26.2543 | 242.00 | 21.5491 |
| 69.67 | 35.6791 | 121.22 | 25.2076 | 244.70 | 22.4995 |
| 70.83 | 33.8285 | 121.78 | 31.5341 | 252.40 | 0.0000 |
| 72.81 | 37.8418 | 122.06 | 28.3918 | 252.80 | 17.2179 |
| 72.87 | 37.8461 | 123.07 | 20.0075 | 254.15 | 0.0000 |
| 74.66 | 37.0037 | 127.23 | 21.1805 | 256.23 | 19.9936 |
| 74.82 | 36.0410 | 129.30 | 32.9212 | 260.90 | 0.0000 |
| 74.97 | 36.0513 | 131.20 | 38.3280 | 264.66 | 19.2177 |
| 77.11 | 38.1546 | 133.02 | 30.7362 | 268.22 | 24.7798 |
| 79.69 | 31.4570 | 133.52 | 30.4358 | 269.46 | 30.3166 |
| 80.12 | 28.5304 | 136.00 | 30.5343 | 271.23 | 30.3599 |
| 80.19 | 0.0000 | 136.47 | 33.7690 | 273.65 | 16.5918 |
| 80.57 | 28.5540 | 140.51 | 0.0000 | 276.40 | 31.4086 |
| 81.00 | 33.5033 | 143.76 | 28.5640 | 277.37 | 25.8856 |
| 81.07 | 33.5075 | 144.24 | 35.7265 | 277.60 | 27.7396 |
| 83.79 | 36.6432 | 145.44 | 37.9480 | 278.00 | 25.8984 |
| 85.43 | 31.7835 | 152.43 | 34.9915 | 279.20 | 18.5162 |
| 86.55 | 42.7931 | 153.25 | 29.5529 | 279.54 | 19.4472 |
| 86.79 | 33.8504 | 154.21 | 32.8741 | 280.46 | 15.7544 |
| 86.94 | 33.8592 | 156.02 | 32.9446 | 283.69 | 23.2265 |
| 87.09 | 33.8682 | 158.56 | 27.5358 | 284.31 | 0.0000 |
| 87.57 | 32.8995 | 159.00 | 35.2637 | 285.41 | 17.6757 |
| 88.03 | 29.9324 | 162.33 | 21.0184 | 285.90 | 0.0000 |
| 88.34 | 31.9448 | 163.33 | 27.6873 | 287.50 | 25.1584 |
| 88.47 | 31.9520 | 165.86 | 25.5456 | 290.67 | 23.3513 |
| 89.96 | 80.0838 | 176.31 | 31.4604 | 293.27 | 0.0000 |
| 91.11 | 53.1590 | 176.60 | 29.2225 | 295.22 | 25.3063 |
| 92.59 | 38.2087 | 177.52 | 29.2516 | 295.96 | 34.6982 |
| 93.35 | 33.2234 | 181.07 | 0.0000 | 298.58 | 28.1891 |
| 94.56 | 57.5007 | 184.41 | 23.8000 | 299.98 | 24.4559 |
| 94.65 | 57.5091 | 185.72 | 23.8326 | 300.09 | 24.4579 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 24.4587 | 497.08 | 14.8560 | 711.68 | 3.7354 |
| 301.36 | 20.7146 | 505.52 | 5.1155 | 720.70 | 5.6227 |
| 302.85 | 24.5079 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 15.1001 | 511.00 | 8.5493 | 722.78 | 7.5029 |
| 306.78 | 18.9069 | 514.00 | 4.2810 | 722.91 | 7.5033 |
| 308.46 | 14.1975 | 514.00 | 4.2810 | 723.31 | 8.4426 |
| 311.90 | 17.0796 | 520.40 | 8.5894 | 724.19 | 6.5687 |
| 316.51 | 16.1842 | 520.69 | 0.0000 | 727.33 | 10.3345 |
| 319.41 | 17.1716 | 522.65 | 0.0000 | 733.00 | 4.7076 |
| 320.08 | 17.1799 | 527.90 | 0.0000 | 735.93 | 12.2535 |
| 321.04 | 21.0121 | 529.59 | 11.8637 | 737.46 | 9.4314 |
| 323.87 | 15.3120 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 12.4529 | 531.02 | 10.7928 | 747.24 | 9.4661 |
| 328.76 | 24.9673 | 546.56 | 0.0000 | 748.06 | 9.4690 |
| 333.37 | 23.1204 | 552.55 | 5.4524 | 752.31 | 2.8452 |
| 333.97 | 27.7559 | 563.25 | 9.8638 | 753.82 | 3.7957 |
| 334.37 | 32.3905 | 569.33 | 12.0897 | 756.73 | 10.4495 |
| 338.28 | 14.4990 | 569.50 | 12.0907 | 756.80 | 7.5998 |
| 338.32 | 14.4992 | 569.70 | 14.2902 | 763.94 | 8.5724 |
| 340.48 | 10.8420 | 583.19 | 6.6365 | 765.81 | 10.4846 |
| 340.55 | 10.8425 | 584.27 | 7.7462 | 766.42 | 9.5337 |
| 344.28 | 12.9403 | 595.83 | 12.2360 | 766.84 | 7.6281 |
| 345.93 | 12.6308 | 600.60 | 12.2622 | 772.60 | 0.0000 |
| 351.06 | 15.5989 | 602.52 | 0.0000 | 776.52 | 9.5688 |
| 351.93 | 11.7059 | 602.73 | 12.4968 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 21.4418 | 778.90 | 3.8309 |
| 356.01 | 9.3899 | 609.32 | 8.9521 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 7.1650 | 785.37 | 7.6797 |
| 366.42 | 0.0000 | 614.28 | 7.1773 | 792.07 | 7.6982 |
| 375.05 | 18.8136 | 618.01 | 10.1096 | 794.95 | 9.6326 |
| 383.85 | 10.9522 | 620.36 | 13.4930 | 795.86 | 9.6357 |
| 388.16 | 8.9848 | 621.93 | 5.4009 | 801.95 | 6.7595 |
| 388.63 | 10.9847 | 630.19 | 0.0000 | 810.29 | 3.8740 |
| 391.69 | 13.0061 | 631.29 | 9.9414 | 810.45 | 3.8742 |
| 400.66 | 15.0890 | 633.25 | 12.6632 | 810.76 | 3.8747 |
| 401.81 | 16.1062 | 634.78 | 16.2923 | 815.77 | 5.8222 |
| 402.40 | 14.0978 | 635.95 | 15.3946 | 818.51 | 4.8564 |
| 404.85 | 17.1440 | 636.99 | 0.0000 | 832.01 | 5.8551 |
| 410.95 | 19.2305 | 645.85 | 8.1842 | 834.85 | 6.8376 |
| 413.71 | 16.2205 | 657.76 | 6.0924 | 835.71 | 6.8397 |
| 414.70 | 16.2297 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 6.5388 | 661.66 | 7.6280 | 846.75 | 0.0000 |
| 427.87 | 8.1771 | 664.57 | 0.0000 | 846.77 | 6.8655 |
| 433.94 | 12.3082 | 666.33 | 10.6997 | 856.80 | 10.8254 |
| 439.40 | 12.3461 | 666.50 | 10.7002 | 860.56 | 5.9121 |
| 453.88 | 9.3343 | 667.71 | 0.0000 | 871.09 | 7.9107 |
| 463.37 | 13.5526 | 677.62 | 14.7410 | 873.19 | 4.9476 |
| 468.07 | 10.4515 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 12.0609 | 879.38 | 4.9578 |
| 475.06 | 14.6866 | 696.49 | 9.2830 | 880.51 | 4.9596 |
| 476.78 | 13.6500 | 696.51 | 9.2830 | 883.24 | 3.9712 |
| 477.60 | 12.6055 | 697.00 | 10.2134 | 884.68 | 7.9463 |
| 482.18 | 9.4769 | 697.49 | 9.2866 | 889.28 | 1.9896 |
| 487.02 | 7.3895 | 702.65 | 13.0279 | 894.76 | 7.9725 |
| 492.35 | 0.0000 | 706.68 | 12.1164 | 898.04 | 1.9952 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 4.9966 | 1312.11 | 2.7971 | | |
| 911.20 | 5.0093 | 1332.49 | 0.0000 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 8.0539 | 1365.19 | 2.8323 | | |
| 937.49 | 6.0614 | 1368.63 | 0.0000 | | |
| 944.13 | 7.0863 | 1384.29 | 1.8965 | | |
| 946.00 | 10.1292 | 1408.01 | 5.7202 | | |
| 949.00 | 4.0555 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 0.9646 | | |
| 962.31 | 4.0722 | 1489.16 | 4.8531 | | |
| 964.08 | 5.0929 | 1505.03 | 0.9739 | | |
| 966.17 | 3.0577 | 1596.21 | 0.0000 | | |
| 968.97 | 7.1408 | 1620.50 | 5.9851 | | |
| 983.53 | 8.5386 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.0230 | | |
| 996.26 | 9.2569 | 1750.46 | 0.0000 | | |
| 1001.03 | 4.1200 | 1764.49 | 3.0774 | | |
| 1004.73 | 8.2492 | 1770.23 | 4.1076 | | |
| 1021.30 | 0.0000 | 1771.35 | 3.0813 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.0342 | | |
| 1037.84 | 9.3705 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.0788 | | |
| 1046.59 | 4.1752 | | | | |
| 1048.07 | 3.1327 | | | | |
| 1049.04 | 3.1336 | | | | |
| 1050.41 | 1.0450 | | | | |
| 1063.66 | 4.1957 | | | | |
| 1077.00 | 7.3702 | | | | |
| 1077.34 | 5.2649 | | | | |
| 1085.87 | 5.2773 | | | | |
| 1099.45 | 5.2974 | | | | |
| 1112.07 | 9.5682 | | | | |
| 1112.84 | 8.5066 | | | | |
| 1115.54 | 5.3208 | | | | |
| 1120.29 | 9.5897 | | | | |
| 1120.55 | 9.5902 | | | | |
| 1121.30 | 8.5266 | | | | |
| 1129.67 | 4.2729 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 2.1613 | | | | |
| 1177.95 | 2.1640 | | | | |
| 1189.05 | 6.5106 | | | | |
| 1204.77 | 4.3582 | | | | |
| 1221.41 | 2.1883 | | | | |
| 1231.02 | 4.8748 | | | | |
| 1235.36 | 1.8300 | | | | |
| 1238.28 | 4.3953 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.8467 | | | | |
| 1274.44 | 1.8478 | | | | |
| 1274.54 | 1.8479 | | | | |
| 1291.59 | 2.7833 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 11:01:53.76

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017838.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;375
Background date : 2-FEB-2014 16:26:23.
Sample date : 17-JAN-2014 00:00:00 Acquisition date : 7-FEB-2014 10:01:24.
Sample ID : G1203017838 Sample quantity : 1.71780E+02 GRAM
Detector name : GAM06 Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.23 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : RXF2
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 1359496 Detector SN# :
Matrix Spike ID : LCS ID : 1605

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.38* | 3 | 20 | 1.49 | 126.36 | 123 | 6 | 8.72E-04 | 262.3 | |
| 2 | 1 | 185.62* | 23 | 28 | 1.32 | 370.76 | 366 | 13 | 6.28E-03 | 50.1 | 2.55E+00 |
| 3 | 1 | 188.32 | 15 | 19 | 1.33 | 376.17 | 366 | 13 | 4.17E-03 | 50.6 | |
| 4 | 0 | 218.54 | 7 | 27 | 1.29 | 436.60 | 433 | 7 | 1.98E-03 | 123.2 | |
| 5 | 0 | 339.86* | 17 | 25 | 2.23 | 679.20 | 669 | 17 | 4.64E-03 | 75.9 | |
| 6 | 0 | 373.67 | 18 | 13 | 1.90 | 746.81 | 742 | 10 | 5.05E-03 | 45.5 | |
| 7 | 0 | 447.63 | 6 | 1 | 0.71 | 894.71 | 891 | 6 | 1.59E-03 | 53.2 | |
| 8 | 0 | 451.24 | 6 | 3 | 1.23 | 901.94 | 899 | 6 | 1.57E-03 | 64.8 | |
| 9 | 0 | 467.41 | 8 | 11 | 1.29 | 934.28 | 929 | 9 | 2.25E-03 | 82.1 | |
| 10 | 0 | 510.96* | 2 | 12 | 1.65 | 1021.39 | 1014 | 16 | 4.84E-04 | 692.4 | |
| 11 | 0 | 525.09 | 16 | 3 | 0.65 | 1049.64 | 1044 | 10 | 4.56E-03 | 30.6 | |
| 12 | 0 | 644.55 | 12 | 0 | 1.09 | 1288.58 | 1284 | 8 | 3.33E-03 | 28.9 | |
| 13 | 0 | 713.16 | 6 | 5 | 3.25 | 1425.82 | 1419 | 9 | 1.53E-03 | 81.6 | |
| 14 | 0 | 760.09 | 10 | 2 | 1.55 | 1519.71 | 1513 | 11 | 2.69E-03 | 45.8 | |
| 15 | 0 | 880.55 | 13 | 0 | 2.46 | 1760.69 | 1756 | 9 | 3.61E-03 | 27.7 | |
| 16 | 0 | 1065.38 | 6 | 0 | 0.58 | 2130.50 | 2125 | 9 | 1.67E-03 | 40.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 11:01:55

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017838.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 17-JAN-2014 00:00:00 | Acquisition date | : 7-FEB-2014 10:01:24 |
| Sample ID | : G1203017838 | Sample quantity | : 171.78 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA6 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.23  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| ANH-511 | 511.00 | 2 | 100.00* | 2.348E+00 | 3.242E-03 | 3.242E-03 | 1384.83 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:01:56.10

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017838.CNF;1   *
* Acquisition date :  7-FEB-2014 10:01:24 Sensitivity     : 3.000           *
* Detector ID      : GAM06                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.23     Half life ratio : *****           *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203017838          Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| ANH-511 | 3.242E-03 | 4.399E-02 | 4.043E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 8.606E-02 | 2.404E-01 | 4.967E-01 | NOT IDENT. |
| NA-22 | 3.696E-03 | 2.458E-02 | 5.416E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 5.250E+08 | 0.000E+00 | SHORT HLIF |
| AL-26 | -5.257E-03 | 2.797E-02 | 5.831E-02 | NOT IDENT. |
| K-40 | -4.717E-02 | 2.701E-01 | 6.419E-01 | NOT IDENT. |
| SC-46 | 3.723E-04 | 2.760E-02 | 5.488E-02 | NOT IDENT. |
| V-48 | -3.395E-02 | 4.691E-02 | 8.102E-02 | NOT IDENT. |
| CR-51 | 1.902E-01 | 3.095E-01 | 6.223E-01 | NOT IDENT. |
| MN-54 | -1.087E-02 | 2.863E-02 | 5.113E-02 | NOT IDENT. |
| CO-56 | -1.315E-02 | 3.045E-02 | 5.403E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.248E-02 | 1.932E-02 | 3.201E-02 | NOT IDENT. |
| CO-58 | 4.217E-03 | 2.497E-02 | 5.218E-02 | NOT IDENT. |
| FE-59 | -3.626E-02 | 5.793E-02 | 1.022E-01 | NOT IDENT. |
| CO-60 | 1.876E-02 | 3.003E-02 | 6.960E-02 | NOT IDENT. |
| ZN-65 | -2.535E-02 | 4.750E-02 | 8.647E-02 | NOT IDENT. |
| GE-68 | -2.211E-01 | 6.928E-01 | 1.360E+00 | NOT IDENT. |
| AS-73 | 1.333E-01 | 7.582E-01 | 1.452E+00 | NOT IDENT. |
| AS-74 | 3.157E-02 | 9.163E-02 | 1.857E-01 | NOT IDENT. |
| SE-75 | 1.787E-03 | 3.186E-02 | 6.020E-02 | NOT IDENT. |
| BR-77 | -2.304E+01 | 4.586E+01 | 8.302E+01 | NOT IDENT. |
| SR-82 | -2.947E-02 | 2.612E-01 | 5.050E-01 | NOT IDENT. |
| RB-83 | -1.439E-02 | 5.931E-02 | 9.598E-02 | NOT IDENT. |
| KR-85 | 4.708E+00 | 6.019E+00 | 1.150E+01 | NOT IDENT. |
| SR-85 | 2.659E-02 | 3.408E-02 | 6.511E-02 | NOT IDENT. |
| RB-86 | -1.634E-01 | 5.453E-01 | 1.075E+00 | NOT IDENT. |
| Y-88 | -6.284E-03 | 2.768E-02 | 5.872E-02 | NOT IDENT. |
| Y-91 | -5.815E+00 | 9.984E+00 | 1.779E+01 | NOT IDENT. |
| NB-94 | 1.838E-02 | 2.208E-02 | 4.940E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | 2.730E-02 | 2.820E-02 | 6.309E-02 | NOT IDENT. |
| NB-95M | -6.354E-02 | 9.990E-02 | 1.733E-01 | NOT IDENT. |
| ZR-95 | -2.920E-03 | 4.984E-02 | 8.582E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 6.855E+08 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.728E+01 | 3.958E+01 | 6.194E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | 8.361E+23 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.854E-03 | 2.250E-02 | 4.068E-02 | NOT IDENT. |
| RH-102 | 2.623E-02 | 3.976E-02 | 8.553E-02 | NOT IDENT. |
| RU-103 | -1.049E-02 | 3.049E-02 | 5.697E-02 | NOT IDENT. |
| RH-106 | -1.291E-01 | 2.070E-01 | 3.619E-01 | NOT IDENT. |
| RU-106 | -1.291E-01 | 2.070E-01 | 3.619E-01 | NOT IDENT. |
| AG-108M | 1.780E-03 | 2.344E-02 | 4.370E-02 | NOT IDENT. |
| CD-109 | 2.020E-01 | 4.324E-01 | 8.409E-01 | NOT IDENT. |
| AG-110M | 6.375E-03 | 3.436E-02 | 6.382E-02 | NOT IDENT. |
| SN-113 | -9.463E-03 | 2.884E-02 | 5.162E-02 | NOT IDENT. |
| CD-115 | 9.648E+01 | 5.433E+01 | 1.308E+02 | NOT IDENT. |
| SN-117M | 1.010E-02 | 4.892E-02 | 8.931E-02 | NOT IDENT. |
| TE-123M | -1.073E-03 | 1.959E-02 | 3.457E-02 | NOT IDENT. |
| SB-124 | 2.859E-02 | 6.592E-02 | 1.666E-01 | FAIL ABUN |
| SB-125 | -1.664E-02 | 6.990E-02 | 1.247E-01 | NOT IDENT. |
| TE-125M | 5.101E+00 | 7.001E+00 | 1.349E+01 | NOT IDENT. |
| I-126 | -1.792E-02 | 2.072E-01 | 4.137E-01 | NOT IDENT. |
| SB-126 | -3.353E-02 | 1.127E-01 | 2.135E-01 | NOT IDENT. |
| SN-126 | 4.735E-03 | 4.475E-02 | 8.304E-02 | FAIL ABUN |
| SB-127 | 1.495E+00 | 2.306E+00 | 5.269E+00 | NOT IDENT. |
| I-131 | -1.699E-02 | 1.443E-01 | 2.648E-01 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.280E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 6.994E-02 | 1.936E+00 | 3.645E+00 | NOT IDENT. |
| BA-133 | -3.022E-02 | 3.259E-02 | 5.250E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 6.098E+05 | 0.000E+00 | SHORT HLIF |
| CS-134 | -2.277E-02 | 2.710E-02 | 4.331E-02 | NOT IDENT. |
| CS-135 | -1.091E-01 | 1.084E-01 | 1.775E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 3.040E+22 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.473E-02 | 9.370E-02 | 1.831E-01 | FAIL ABUN |
| BA-137M | -1.961E-02 | 2.138E-02 | 3.653E-02 | NOT IDENT. |
| CS-137 | -2.072E-02 | 2.259E-02 | 3.859E-02 | NOT IDENT. |
| CE-139 | -2.763E-03 | 2.128E-02 | 3.970E-02 | NOT IDENT. |
| BA-140 | 1.177E-01 | 1.068E-01 | 2.763E-01 | NOT IDENT. |
| LA-140 | 1.177E-01 | 1.068E-01 | 2.763E-01 | NOT IDENT. |
| CE-141 | 2.363E-02 | 4.861E-02 | 9.103E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.186E+03 | 0.000E+00 | SHORT HLIF |
| CE-144 | -2.420E-02 | 1.443E-01 | 2.519E-01 | NOT IDENT. |
| PM-144 | -4.295E-03 | 3.074E-02 | 5.005E-02 | NOT IDENT. |
| PR-144 | -3.225E-01 | 2.308E+00 | 3.758E+00 | NOT IDENT. |
| PM-146 | 1.058E-03 | 2.861E-02 | 4.821E-02 | NOT IDENT. |
| ND-147 | 1.956E-02 | 5.643E-01 | 1.069E+00 | NOT IDENT. |
| PM-147 | -2.013E+02 | 5.528E+02 | 9.476E+02 | NOT IDENT. |
| PM-149 | -3.126E+02 | 4.353E+02 | 7.398E+02 | NOT IDENT. |
| EU-150 | -8.619E-03 | 2.239E-02 | 3.380E-02 | NOT IDENT. |
| EU-152 | -4.584E-02 | 7.234E-02 | 1.024E-01 | NOT IDENT. |
| GD-153 | 1.854E-02 | 5.378E-02 | 1.021E-01 | NOT IDENT. |
| EU-154 | 1.044E-02 | 6.943E-02 | 1.530E-01 | NOT IDENT. |
| EU-155 | -1.662E-02 | 6.447E-02 | 1.140E-01 | NOT IDENT. |
| TB-160 | 1.541E-01 | 8.379E-02 | 2.469E-01 | FAIL ABUN |
| HO-166M | 2.464E-02 | 3.940E-02 | 8.182E-02 | FAIL ABUN |
| TM-171 | 4.470E+00 | 1.603E+01 | 3.096E+01 | NOT IDENT. |
| LU-176 | 4.159E-03 | 1.864E-02 | 3.588E-02 | NOT IDENT. |
| HF-181 | -1.325E-02 | 3.696E-02 | 6.842E-02 | NOT IDENT. |
| TA-182 | 1.311E-02 | 9.666E-02 | 2.135E-01 | NOT IDENT. |
| RE-183 | 7.649E-02 | 1.527E-01 | 3.045E-01 | NOT IDENT. |
| RE-184 | -3.939E-03 | 7.440E-02 | 1.577E-01 | NOT IDENT. |
| W-188 | 3.698E+00 | 5.374E+00 | 1.086E+01 | FAIL ABUN |
| IR-192 | -6.125E-03 | 2.537E-02 | 4.603E-02 | FAIL ABUN |
| HG-203 | 1.954E-03 | 2.985E-02 | 5.612E-02 | NOT IDENT. |
| BI-207 | -3.400E-03 | 3.450E-02 | 6.944E-02 | NOT IDENT. |
| TL-208 | -9.896E-03 | 2.647E-02 | 4.996E-02 | NOT IDENT. |
| PB-210 | 3.406E-01 | 3.801E+00 | 7.022E+00 | NOT IDENT. |
| BI-211 | -9.340E-03 | 1.636E-01 | 3.051E-01 | NOT IDENT. |
| PB-211 | 5.632E-02 | 4.840E-01 | 9.231E-01 | NOT IDENT. |
| BI-212 | 1.749E-01 | 3.513E-01 | 7.429E-01 | NOT IDENT. |
| PB-212 | -1.872E-02 | 4.675E-02 | 8.543E-02 | NOT IDENT. |
| BI-214 | 2.149E-02 | 5.792E-02 | 1.179E-01 | NOT IDENT. |
| PB-214 | 4.229E-02 | 5.765E-02 | 1.178E-01 | NOT IDENT. |
| RN-219 | 6.149E-03 | 2.524E-01 | 4.805E-01 | NOT IDENT. |
| RN-222 | 2.149E-02 | 5.792E-02 | 1.179E-01 | NOT IDENT. |
| RA-223 | -2.215E-01 | 5.085E-01 | 8.886E-01 | NOT IDENT. |
| RA-224 | -3.658E-01 | 4.437E-01 | 7.531E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.149E-02 | 5.792E-02 | 1.179E-01 | NOT IDENT. |
| AC-227 | -4.385E-02 | 1.778E-01 | 3.236E-01 | NOT IDENT. |
| TH-227 | -4.385E-02 | 1.778E-01 | 3.236E-01 | NOT IDENT. |
| AC-228 | -5.017E-02 | 9.636E-02 | 1.941E-01 | NOT IDENT. |
| RA-228 | -5.017E-02 | 9.636E-02 | 1.941E-01 | NOT IDENT. |
| TH-228 | -1.872E-02 | 4.675E-02 | 8.543E-02 | NOT IDENT. |
| TH-229 | 2.999E-02 | 3.830E-01 | 7.214E-01 | NOT IDENT. |
| TH-230 | 2.149E-02 | 5.792E-02 | 1.179E-01 | NOT IDENT. |
| PA-231 | 2.962E-01 | 9.904E-01 | 1.925E+00 | NOT IDENT. |
| TH-231 | -2.215E-01 | 5.085E-01 | 8.886E-01 | NOT IDENT. |
| TH-232 | -5.017E-02 | 9.636E-02 | 1.941E-01 | NOT IDENT. |
| PA-233 | -3.200E-02 | 4.390E-02 | 7.393E-02 | FAIL ABUN |
| PA-234 | -5.345E-02 | 1.641E-01 | 3.231E-01 | FAIL ABUN |
| PA-234M | -2.204E+00 | 3.126E+00 | 5.781E+00 | NOT IDENT. |
| TH-234 | 1.839E-01 | 9.456E-01 | 1.801E+00 | FAIL ABUN |
| U-234 | 2.149E-02 | 5.792E-02 | 1.179E-01 | NOT IDENT. |
| U-235 | -1.386E-02 | 1.398E-01 | 2.419E-01 | FAIL ABUN |
| NP-237 | -3.200E-02 | 4.390E-02 | 7.393E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | 7.410E+01 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.839E-01 | 9.456E-01 | 1.801E+00 | FAIL ABUN |
| NP-239 | 2.590E-01 | 2.871E-01 | 5.622E-01 | NOT IDENT. |
| PU-239 | -6.009E+01 | 2.404E+02 | 4.165E+02 | FAIL ABUN |
| AM-241 | -1.035E-02 | 1.183E-01 | 1.966E-01 | NOT IDENT. |
| AM-243 | -8.864E-03 | 3.497E-02 | 5.996E-02 | NOT IDENT. |
| CM-243 | 4.121E-02 | 6.288E-02 | 1.245E-01 | NOT IDENT. |
| CM-247 | -6.276E-03 | 2.537E-02 | 4.565E-02 | NOT IDENT. |
| CF-249 | -1.648E-02 | 2.597E-02 | 4.369E-02 | NOT IDENT. |
| CF-251 | -5.568E-02 | 7.942E-02 | 1.399E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 11:01:52.18

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.38 | 13 | 20 | 1.49 | 126.36 | 123 | 6 | 3.56E-03 | 61.6 | |
| 2 | 0 | 93.59 | 27 | 54 | 1.34 | 186.76 | 179 | 12 | 7.54E-03 | 57.4 | |
| 3 | 1 | 185.62 | 44 | 28 | 1.32 | 370.76 | 366 | 13 | 1.23E-02 | 24.5 | 2.55E+00 |
| 4 | 1 | 188.32 | 15 | 19 | 1.33 | 376.17 | 366 | 13 | 4.17E-03 | 50.6 | |
| 5 | 0 | 218.54 | 7 | 27 | 1.29 | 436.60 | 433 | 7 | 1.98E-03 | 123.2 | |
| 6 | 0 | 339.86 | 21 | 25 | 2.23 | 679.20 | 669 | 17 | 5.89E-03 | 58.6 | |
| 7 | 0 | 373.67 | 18 | 13 | 1.90 | 746.81 | 742 | 10 | 5.05E-03 | 45.5 | |
| 8 | 0 | 447.63 | 6 | 1 | 0.71 | 894.71 | 891 | 6 | 1.59E-03 | 53.2 | |
| 9 | 0 | 451.24 | 6 | 3 | 1.23 | 901.94 | 899 | 6 | 1.57E-03 | 64.8 | |
| 10 | 0 | 467.41 | 8 | 11 | 1.29 | 934.28 | 929 | 9 | 2.25E-03 | 82.1 | |
| 11 | 0 | 510.96 | 72 | 12 | 1.65 | 1021.39 | 1014 | 16 | 2.01E-02 | 15.9 | |
| 12 | 0 | 525.09 | 16 | 3 | 0.65 | 1049.64 | 1044 | 10 | 4.56E-03 | 30.6 | |
| 13 | 0 | 644.55 | 12 | 0 | 1.09 | 1288.58 | 1284 | 8 | 3.33E-03 | 28.9 | |
| 14 | 0 | 713.16 | 6 | 5 | 3.25 | 1425.82 | 1419 | 9 | 1.53E-03 | 81.6 | |
| 15 | 0 | 760.09 | 10 | 2 | 1.55 | 1519.71 | 1513 | 11 | 2.69E-03 | 45.8 | |
| 16 | 0 | 880.55 | 13 | 0 | 2.46 | 1760.69 | 1756 | 9 | 3.61E-03 | 27.7 | |
| 17 | 0 | 1065.38 | 6 | 0 | 0.58 | 2130.50 | 2125 | 9 | 1.67E-03 | 40.8 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 11:01:54.29

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| ANH-511 | 511.00 | 2 | 100.00* | 2.348E+00 | 3.242E-03 | 3.242E-03 | 1384.83 |

Flag: "*" = Keyline

Sample ID : G1203017838 Acquisition date : 7-FEB-2014 10:01:24

Total number of lines in spectrum 16
Number of unidentified lines 7
Number of lines tentatively identified by NID 9 56.25%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| ANH-511 | 1.00E+09Y | 1.00 | 3.242E-03 | 3.242E-03 | 44.89E-03 | 1384.83 | |
| | Total Activity : | | 3.242E-03 | 3.242E-03 | | | |
| | Grand Total Activity : | | 3.242E-03 | 3.242E-03 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203017838 Acquisition date : 7-FEB-2014 10:01:24

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.38 | 3 | 20 | 1.49 | 126.36 | 123 | 6 | 8.72E-04 | **** | 2.02E+00 | T |
| 1 | 185.62 | 23 | 28 | 1.32 | 370.76 | 366 | 13 | 6.28E-03 | **** | 4.67E+00 | T |
| 1 | 188.32 | 15 | 19 | 1.33 | 376.17 | 366 | 13 | 4.17E-03 | **** | 4.64E+00 | |
| 0 | 218.54 | 7 | 27 | 1.29 | 436.60 | 433 | 7 | 1.98E-03 | **** | 4.26E+00 | |
| 0 | 339.86 | 17 | 25 | 2.23 | 679.20 | 669 | 17 | 4.64E-03 | **** | 3.16E+00 | T |
| 0 | 373.67 | 18 | 13 | 1.90 | 746.81 | 742 | 10 | 5.05E-03 | 91.0 | 2.96E+00 | T |
| 0 | 447.63 | 6 | 1 | 0.71 | 894.71 | 891 | 6 | 1.59E-03 | **** | 2.59E+00 | |
| 0 | 451.24 | 6 | 3 | 1.23 | 901.94 | 899 | 6 | 1.57E-03 | **** | 2.58E+00 | |
| 0 | 467.41 | 8 | 11 | 1.29 | 934.28 | 929 | 9 | 2.25E-03 | **** | 2.51E+00 | T |
| 0 | 525.09 | 16 | 3 | 0.65 | 1049.64 | 1044 | 10 | 4.56E-03 | 61.2 | 2.30E+00 | |
| 0 | 644.55 | 12 | 0 | 1.09 | 1288.58 | 1284 | 8 | 3.33E-03 | 57.7 | 1.96E+00 | T |
| 0 | 713.16 | 6 | 5 | 3.25 | 1425.82 | 1419 | 9 | 1.53E-03 | **** | 1.80E+00 | T |
| 0 | 760.09 | 10 | 2 | 1.55 | 1519.71 | 1513 | 11 | 2.69E-03 | 91.5 | 1.71E+00 | |
| 0 | 880.55 | 13 | 0 | 2.46 | 1760.69 | 1756 | 9 | 3.61E-03 | 55.5 | 1.50E+00 | T |
| 0 | 1065.38 | 6 | 0 | 0.58 | 2130.50 | 2125 | 9 | 1.67E-03 | 81.6 | 1.27E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:02:08.64

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017838.CNF;1  *
* Acquisition date :  7-FEB-2014 10:01:24 Sensitivity     : 3.000           *
* Detector ID      : GAM06                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.23     Half life ratio : *****           *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203017838          Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8         *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| ANH-511 | 1.770E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 2.181E-01 | NOT IDENT. |
| NA-22 | 2.149E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.183E-02 | NOT IDENT. |
| K-40 | 2.628E-01 | NOT IDENT. |
| SC-46 | 2.271E-02 | NOT IDENT. |
| V-48 | 2.950E-02 | NOT IDENT. |
| CR-51 | 2.803E-01 | NOT IDENT. |
| MN-54 | 2.164E-02 | NOT IDENT. |
| CO-56 | 2.241E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.461E-02 | NOT IDENT. |
| CO-58 | 2.156E-02 | NOT IDENT. |
| FE-59 | 3.923E-02 | NOT IDENT. |
| CO-60 | 2.904E-02 | NOT IDENT. |
| ZN-65 | 3.301E-02 | NOT IDENT. |
| GE-68 | 5.251E-01 | NOT IDENT. |
| AS-73 | 6.571E-01 | NOT IDENT. |
| AS-74 | 8.181E-02 | NOT IDENT. |
| SE-75 | 2.709E-02 | NOT IDENT. |
| BR-77 | 3.822E+01 | NOT IDENT. |
| SR-82 | 2.106E-01 | NOT IDENT. |
| RB-83 | 4.126E-02 | NOT IDENT. |
| KR-85 | 5.168E+00 | NOT IDENT. |
| SR-85 | 2.925E-02 | NOT IDENT. |
| RB-86 | 4.166E-01 | NOT IDENT. |
| Y-88 | 2.081E-02 | NOT IDENT. |
| Y-91 | 6.301E+00 | NOT IDENT. |
| NB-94 | 2.146E-02 | NOT IDENT. |
| NB-95 | 2.715E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95M | 7.930E-02 | NOT IDENT. |
| ZR-95 | 3.492E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.475E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.866E-02 | NOT IDENT. |
| RH-102 | 3.742E-02 | NOT IDENT. |
| RU-103 | 2.453E-02 | NOT IDENT. |
| RH-106 | 1.502E-01 | NOT IDENT. |
| RU-106 | 1.502E-01 | NOT IDENT. |
| AG-108M | 1.939E-02 | NOT IDENT. |
| CD-109 | 3.813E-01 | NOT IDENT. |
| AG-110M | 2.616E-02 | NOT IDENT. |
| SN-113 | 2.219E-02 | NOT IDENT. |
| CD-115 | 5.802E+01 | NOT IDENT. |
| SN-117M | 4.060E-02 | NOT IDENT. |
| TE-123M | 1.570E-02 | NOT IDENT. |
| SB-124 | 6.454E-02 | FAIL ABUN |
| SB-125 | 5.484E-02 | NOT IDENT. |
| TE-125M | 6.185E+00 | NOT IDENT. |
| I-126 | 1.772E-01 | NOT IDENT. |
| SB-126 | 8.627E-02 | NOT IDENT. |
| SN-126 | 3.771E-02 | FAIL ABUN |
| SB-127 | 2.226E+00 | NOT IDENT. |
| I-131 | 1.171E-01 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.655E+00 | NOT IDENT. |
| BA-133 | 2.313E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.737E-02 | NOT IDENT. |
| CS-135 | 7.886E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.376E-02 | FAIL ABUN |
| BA-137M | 1.484E-02 | NOT IDENT. |
| CS-137 | 1.567E-02 | NOT IDENT. |
| CE-139 | 1.819E-02 | NOT IDENT. |
| BA-140 | 1.157E-01 | NOT IDENT. |
| LA-140 | 1.157E-01 | NOT IDENT. |
| CE-141 | 4.177E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.152E-01 | NOT IDENT. |
| PM-144 | 2.166E-02 | NOT IDENT. |
| PR-144 | 1.627E+00 | NOT IDENT. |
| PM-146 | 2.054E-02 | NOT IDENT. |
| ND-147 | 4.579E-01 | NOT IDENT. |
| PM-147 | 4.333E+02 | NOT IDENT. |
| PM-149 | 3.258E+02 | NOT IDENT. |
| EU-150 | 1.498E-02 | NOT IDENT. |
| EU-152 | 4.411E-02 | NOT IDENT. |
| GD-153 | 4.645E-02 | NOT IDENT. |
| EU-154 | 6.071E-02 | NOT IDENT. |
| EU-155 | 5.128E-02 | NOT IDENT. |
| TB-160 | 1.075E-01 | FAIL ABUN |
| HO-166M | 3.487E-02 | FAIL ABUN |
| TM-171 | 1.406E+01 | NOT IDENT. |
| LU-176 | 1.609E-02 | NOT IDENT. |
| HF-181 | 2.997E-02 | NOT IDENT. |
| TA-182 | 8.444E-02 | NOT IDENT. |
| RE-183 | 1.375E-01 | NOT IDENT. |
| RE-184 | 6.282E-02 | NOT IDENT. |
| W-188 | 4.915E+00 | FAIL ABUN |
| IR-192 | 2.039E-02 | FAIL ABUN |
| HG-203 | 2.532E-02 | NOT IDENT. |
| BI-207 | 2.847E-02 | NOT IDENT. |
| TL-208 | 2.171E-02 | NOT IDENT. |
| PB-210 | 3.204E+00 | NOT IDENT. |
| BI-211 | 1.378E-01 | NOT IDENT. |
| PB-211 | 4.056E-01 | NOT IDENT. |
| BI-212 | 3.216E-01 | NOT IDENT. |
| PB-212 | 3.937E-02 | NOT IDENT. |
| BI-214 | 5.261E-02 | NOT IDENT. |
| PB-214 | 5.353E-02 | NOT IDENT. |
| RN-219 | 2.084E-01 | NOT IDENT. |
| RN-222 | 5.261E-02 | NOT IDENT. |
| RA-223 | 3.992E-01 | NOT IDENT. |
| RA-224 | 3.407E-01 | NOT IDENT. |
| RA-226 | 5.261E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.457E-01 | NOT IDENT. |
| TH-227 | 1.457E-01 | NOT IDENT. |
| AC-228 | 8.137E-02 | NOT IDENT. |
| RA-228 | 8.137E-02 | NOT IDENT. |
| TH-228 | 3.937E-02 | NOT IDENT. |
| TH-229 | 3.315E-01 | NOT IDENT. |
| TH-230 | 5.261E-02 | NOT IDENT. |
| PA-231 | 8.662E-01 | NOT IDENT. |
| TH-231 | 3.992E-01 | NOT IDENT. |
| TH-232 | 8.137E-02 | NOT IDENT. |
| PA-233 | 3.241E-02 | FAIL ABUN |
| PA-234 | 1.267E-01 | FAIL ABUN |
| PA-234M | 2.366E+00 | NOT IDENT. |
| TH-234 | 8.209E-01 | FAIL ABUN |
| U-234 | 5.261E-02 | NOT IDENT. |
| U-235 | 1.105E-01 | FAIL ABUN |
| NP-237 | 3.241E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 8.209E-01 | FAIL ABUN |
| NP-239 | 2.594E-01 | NOT IDENT. |
| PU-239 | 1.903E+02 | FAIL ABUN |
| AM-241 | 8.807E-02 | NOT IDENT. |
| AM-243 | 2.721E-02 | NOT IDENT. |
| CM-243 | 5.646E-02 | NOT IDENT. |
| CM-247 | 1.990E-02 | NOT IDENT. |
| CF-249 | 1.874E-02 | NOT IDENT. |
| CF-251 | 6.280E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:02:13.47

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017838.CNF;1  *
* Acquisition date :  7-FEB-2014 10:01:24 Sensitivity     : 3.000       *
* Detector ID      : GAM06                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.23     Half life ratio : *****       *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203017838          Analyst initials: RXF2        *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM  *
*                                         Quantity Err(%) : 1.1643E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 28-MAY-2013 09:11:59 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_500MLMB.CNF;8     *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| ANH-511 | 3.242E-03 | 4.399E-02 | 4.399E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 8.606E-02 | 2.405E-01 | 2.436E-01 | NOT IDENT. |
| NA-22 | 3.696E-03 | 2.459E-02 | 2.464E-02 | NOT IDENT. |
| NA-24 | -2.070E+08 | 5.253E+08 | 5.335E+08 | SHORT HLIF |
| AL-26 | -5.257E-03 | 2.798E-02 | 2.808E-02 | NOT IDENT. |
| K-40 | -4.717E-02 | 2.701E-01 | 2.710E-01 | NOT IDENT. |
| SC-46 | 3.723E-04 | 2.760E-02 | 2.760E-02 | NOT IDENT. |
| V-48 | -3.395E-02 | 4.712E-02 | 4.955E-02 | NOT IDENT. |
| CR-51 | 1.902E-01 | 3.100E-01 | 3.216E-01 | NOT IDENT. |
| MN-54 | -1.087E-02 | 2.866E-02 | 2.907E-02 | NOT IDENT. |
| CO-56 | -1.315E-02 | 3.048E-02 | 3.105E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 2.314E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.248E-02 | 1.936E-02 | 2.016E-02 | NOT IDENT. |
| CO-58 | 4.217E-03 | 2.497E-02 | 2.505E-02 | NOT IDENT. |
| FE-59 | -3.626E-02 | 5.822E-02 | 6.047E-02 | NOT IDENT. |
| CO-60 | 1.876E-02 | 3.007E-02 | 3.124E-02 | NOT IDENT. |
| ZN-65 | -2.535E-02 | 4.765E-02 | 4.900E-02 | NOT IDENT. |
| GE-68 | -2.211E-01 | 6.936E-01 | 7.007E-01 | NOT IDENT. |
| AS-73 | 1.333E-01 | 7.588E-01 | 7.611E-01 | NOT IDENT. |
| AS-74 | 3.157E-02 | 9.169E-02 | 9.279E-02 | NOT IDENT. |
| SE-75 | 1.787E-03 | 3.186E-02 | 3.187E-02 | NOT IDENT. |
| BR-77 | -2.304E+01 | 4.807E+01 | 4.918E+01 | NOT IDENT. |
| SR-82 | -2.947E-02 | 2.612E-01 | 2.616E-01 | NOT IDENT. |
| RB-83 | -1.439E-02 | 5.935E-02 | 5.970E-02 | NOT IDENT. |
| KR-85 | 4.708E+00 | 6.031E+00 | 6.394E+00 | NOT IDENT. |
| SR-85 | 2.659E-02 | 3.415E-02 | 3.619E-02 | NOT IDENT. |
| RB-86 | -1.634E-01 | 5.458E-01 | 5.508E-01 | NOT IDENT. |
| Y-88 | -6.284E-03 | 2.768E-02 | 2.783E-02 | NOT IDENT. |
| Y-91 | -5.815E+00 | 9.996E+00 | 1.033E+01 | NOT IDENT. |
| NB-94 | 1.838E-02 | 2.214E-02 | 2.364E-02 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-95 | 2.730E-02 | 2.833E-02 | 3.089E-02 | NOT IDENT. |
| NB-95M | -6.354E-02 | 1.001E-01 | 1.041E-01 | NOT IDENT. |
| ZR-95 | -2.920E-03 | 4.985E-02 | 4.986E-02 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.522E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 7.881E+08 | 6.885E+08 | 7.747E+08 | SHORT HLIF |
| MO-99 | -3.728E+01 | 3.975E+01 | 4.316E+01 | NOT IDENT. |
| TC-99M | 2.045E+22 | 8.361E+23 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.854E-03 | 2.251E-02 | 2.255E-02 | NOT IDENT. |
| RH-102 | 2.623E-02 | 3.986E-02 | 4.158E-02 | NOT IDENT. |
| RU-103 | -1.049E-02 | 3.050E-02 | 3.087E-02 | NOT IDENT. |
| RH-106 | -1.291E-01 | 2.073E-01 | 2.153E-01 | NOT IDENT. |
| RU-106 | -1.291E-01 | 2.073E-01 | 2.153E-01 | NOT IDENT. |
| AG-108M | 1.780E-03 | 2.344E-02 | 2.345E-02 | NOT IDENT. |
| CD-109 | 2.020E-01 | 4.329E-01 | 4.424E-01 | NOT IDENT. |
| AG-110M | 6.375E-03 | 3.437E-02 | 3.449E-02 | NOT IDENT. |
| SN-113 | -9.463E-03 | 2.885E-02 | 2.917E-02 | NOT IDENT. |
| CD-115 | 9.648E+01 | 5.506E+01 | 7.017E+01 | NOT IDENT. |
| SN-117M | 1.010E-02 | 4.893E-02 | 4.914E-02 | NOT IDENT. |
| TE-123M | -1.073E-03 | 1.959E-02 | 1.960E-02 | NOT IDENT. |
| SB-124 | 2.859E-02 | 6.596E-02 | 6.721E-02 | FAIL ABUN |
| SB-125 | -1.664E-02 | 6.992E-02 | 7.032E-02 | NOT IDENT. |
| TE-125M | 5.101E+00 | 7.017E+00 | 7.384E+00 | NOT IDENT. |
| I-126 | -1.792E-02 | 2.072E-01 | 2.074E-01 | NOT IDENT. |
| SB-126 | -3.353E-02 | 1.128E-01 | 1.138E-01 | NOT IDENT. |
| SN-126 | 4.735E-03 | 4.475E-02 | 4.480E-02 | FAIL ABUN |
| SB-127 | 1.495E+00 | 2.314E+00 | 2.410E+00 | NOT IDENT. |
| I-131 | -1.699E-02 | 1.443E-01 | 1.445E-01 | NOT IDENT. |
| I-132 | -1.000E+41 | 1.841E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 6.994E-02 | 1.936E+00 | 1.936E+00 | NOT IDENT. |
| BA-133 | -3.022E-02 | 3.268E-02 | 3.541E-02 | NOT IDENT. |
| I-133 | 3.421E+05 | 6.123E+05 | 6.314E+05 | SHORT HLIF |
| CS-134 | -2.277E-02 | 2.720E-02 | 2.907E-02 | NOT IDENT. |
| CS-135 | -1.091E-01 | 1.090E-01 | 1.196E-01 | NOT IDENT. |
| I-135 | -5.476E+20 | 3.040E+22 | 0.000E+00 | SHORT HLIF |
| CS-136 | -2.473E-02 | 9.378E-02 | 9.444E-02 | FAIL ABUN |
| BA-137M | -1.961E-02 | 2.144E-02 | 2.319E-02 | NOT IDENT. |
| CS-137 | -2.072E-02 | 2.265E-02 | 2.450E-02 | NOT IDENT. |
| CE-139 | -2.763E-03 | 2.129E-02 | 2.132E-02 | NOT IDENT. |
| BA-140 | 1.177E-01 | 1.073E-01 | 1.197E-01 | NOT IDENT. |
| LA-140 | 1.177E-01 | 1.073E-01 | 1.197E-01 | NOT IDENT. |
| CE-141 | 2.363E-02 | 4.865E-02 | 4.980E-02 | NOT IDENT. |
| CE-143 | -6.342E+02 | 2.187E+03 | 2.206E+03 | SHORT HLIF |
| CE-144 | -2.420E-02 | 1.443E-01 | 1.447E-01 | NOT IDENT. |
| PM-144 | -4.295E-03 | 3.074E-02 | 3.080E-02 | NOT IDENT. |
| PR-144 | -3.225E-01 | 2.308E+00 | 2.313E+00 | NOT IDENT. |
| PM-146 | 1.058E-03 | 2.861E-02 | 2.861E-02 | NOT IDENT. |
| ND-147 | 1.956E-02 | 5.643E-01 | 5.644E-01 | NOT IDENT. |
| PM-147 | -2.013E+02 | 5.531E+02 | 5.605E+02 | NOT IDENT. |
| PM-149 | -3.126E+02 | 4.380E+02 | 4.601E+02 | NOT IDENT. |
| EU-150 | -8.619E-03 | 2.240E-02 | 2.274E-02 | NOT IDENT. |
| EU-152 | -4.584E-02 | 7.247E-02 | 7.535E-02 | NOT IDENT. |
| GD-153 | 1.854E-02 | 5.381E-02 | 5.445E-02 | NOT IDENT. |
| EU-154 | 1.044E-02 | 6.944E-02 | 6.959E-02 | NOT IDENT. |
| EU-155 | -1.662E-02 | 6.450E-02 | 6.493E-02 | NOT IDENT. |
| TB-160 | 1.541E-01 | 8.594E-02 | 1.105E-01 | FAIL ABUN |
| HO-166M | 2.464E-02 | 3.947E-02 | 4.100E-02 | FAIL ABUN |
| TM-171 | 4.470E+00 | 1.604E+01 | 1.617E+01 | NOT IDENT. |
| LU-176 | 4.159E-03 | 1.865E-02 | 1.874E-02 | NOT IDENT. |
| HF-181 | -1.325E-02 | 3.698E-02 | 3.746E-02 | NOT IDENT. |
| TA-182 | 1.311E-02 | 9.667E-02 | 9.685E-02 | NOT IDENT. |
| RE-183 | 7.649E-02 | 1.530E-01 | 1.568E-01 | NOT IDENT. |
| RE-184 | -3.939E-03 | 7.440E-02 | 7.442E-02 | NOT IDENT. |
| W-188 | 3.698E+00 | 5.397E+00 | 5.649E+00 | FAIL ABUN |
| IR-192 | -6.125E-03 | 2.537E-02 | 2.552E-02 | FAIL ABUN |
| HG-203 | 1.954E-03 | 2.985E-02 | 2.986E-02 | NOT IDENT. |
| BI-207 | -3.400E-03 | 3.450E-02 | 3.453E-02 | NOT IDENT. |
| TL-208 | -9.896E-03 | 2.648E-02 | 2.685E-02 | NOT IDENT. |
| PB-210 | 3.406E-01 | 3.801E+00 | 3.804E+00 | NOT IDENT. |
| BI-211 | -9.340E-03 | 1.636E-01 | 1.637E-01 | NOT IDENT. |
| PB-211 | 5.632E-02 | 4.840E-01 | 4.846E-01 | NOT IDENT. |
| BI-212 | 1.749E-01 | 3.517E-01 | 3.604E-01 | NOT IDENT. |
| PB-212 | -1.872E-02 | 4.678E-02 | 4.754E-02 | NOT IDENT. |
| BI-214 | 2.149E-02 | 5.795E-02 | 5.875E-02 | NOT IDENT. |
| PB-214 | 4.229E-02 | 5.776E-02 | 6.082E-02 | NOT IDENT. |
| RN-219 | 6.149E-03 | 2.524E-01 | 2.524E-01 | NOT IDENT. |
| RN-222 | 2.149E-02 | 5.795E-02 | 5.875E-02 | NOT IDENT. |
| RA-223 | -2.215E-01 | 5.090E-01 | 5.187E-01 | NOT IDENT. |
| RA-224 | -3.658E-01 | 4.449E-01 | 4.745E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 2.149E-02 | 5.795E-02 | 5.875E-02 | NOT IDENT. |
| AC-227 | -4.385E-02 | 1.780E-01 | 1.790E-01 | NOT IDENT. |
| TH-227 | -4.385E-02 | 1.780E-01 | 1.790E-01 | NOT IDENT. |
| AC-228 | -5.017E-02 | 9.657E-02 | 9.919E-02 | NOT IDENT. |
| RA-228 | -5.017E-02 | 9.657E-02 | 9.919E-02 | NOT IDENT. |
| TH-228 | -1.872E-02 | 4.678E-02 | 4.754E-02 | NOT IDENT. |
| TH-229 | 2.999E-02 | 3.830E-01 | 3.833E-01 | NOT IDENT. |
| TH-230 | 2.149E-02 | 5.794E-02 | 5.875E-02 | NOT IDENT. |
| PA-231 | 2.962E-01 | 9.908E-01 | 9.997E-01 | NOT IDENT. |
| TH-231 | -2.215E-01 | 5.090E-01 | 5.187E-01 | NOT IDENT. |
| TH-232 | -5.017E-02 | 9.657E-02 | 9.919E-02 | NOT IDENT. |
| PA-233 | -3.200E-02 | 4.399E-02 | 4.630E-02 | FAIL ABUN |
| PA-234 | -5.345E-02 | 1.752E-01 | 1.769E-01 | FAIL ABUN |
| PA-234M | -2.204E+00 | 3.140E+00 | 3.293E+00 | NOT IDENT. |
| TH-234 | 1.839E-01 | 9.465E-01 | 9.501E-01 | FAIL ABUN |
| U-234 | 2.149E-02 | 5.794E-02 | 5.875E-02 | NOT IDENT. |
| U-235 | -1.386E-02 | 1.398E-01 | 1.399E-01 | FAIL ABUN |
| NP-237 | -3.200E-02 | 4.399E-02 | 4.630E-02 | FAIL ABUN |
| NP-238 | -2.805E+01 | 7.419E+01 | 7.526E+01 | SHORT HLIF |
| U-238 | 1.839E-01 | 9.465E-01 | 9.501E-01 | FAIL ABUN |
| NP-239 | 2.590E-01 | 2.887E-01 | 3.114E-01 | NOT IDENT. |
| PU-239 | -6.009E+01 | 2.405E+02 | 2.420E+02 | FAIL ABUN |
| AM-241 | -1.035E-02 | 1.183E-01 | 1.184E-01 | NOT IDENT. |
| AM-243 | -8.864E-03 | 3.498E-02 | 3.520E-02 | NOT IDENT. |
| CM-243 | 4.121E-02 | 6.307E-02 | 6.575E-02 | NOT IDENT. |
| CM-247 | -6.276E-03 | 2.539E-02 | 2.555E-02 | NOT IDENT. |
| CF-249 | -1.648E-02 | 2.603E-02 | 2.707E-02 | NOT IDENT. |
| CF-251 | -5.568E-02 | 7.974E-02 | 8.360E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

## GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 32.5677 | 94.67 | 48.3593 | 193.51 | 41.8321 |
| 45.60 | 37.4594 | 94.87 | 48.3776 | 197.03 | 31.9561 |
| 46.54 | 30.9921 | 97.43 | 28.5315 | 198.01 | 36.5616 |
| 49.72 | 43.6078 | 98.43 | 26.4667 | 201.83 | 34.8819 |
| 51.35 | 29.5249 | 98.44 | 26.4673 | 205.31 | 35.0162 |
| 52.39 | 28.6560 | 99.53 | 31.8240 | 210.85 | 39.8624 |
| 53.44 | 27.7816 | 100.11 | 31.8576 | 215.65 | 35.7806 |
| 57.36 | 0.0000 | 103.18 | 22.4236 | 222.11 | 28.5181 |
| 57.53 | 25.1830 | 103.37 | 22.4312 | 227.09 | 30.1729 |
| 57.98 | 22.3034 | 105.21 | 31.0771 | 227.38 | 28.2955 |
| 59.32 | 20.4349 | 105.31 | 31.0826 | 228.16 | 32.0937 |
| 59.54 | 26.2882 | 106.12 | 28.9800 | 228.18 | 32.0942 |
| 63.29 | 25.5545 | 109.28 | 25.9009 | 235.69 | 50.4073 |
| 63.58 | 36.8838 | 111.00 | 33.5534 | 235.96 | 47.5666 |
| 64.28 | 42.8586 | 111.76 | 36.8477 | 238.63 | 36.2460 |
| 66.73 | 38.6527 | 116.30 | 46.9538 | 238.98 | 37.2126 |
| 67.24 | 44.0579 | 117.23 | 31.7148 | 240.99 | 43.9782 |
| 67.75 | 38.7461 | 121.12 | 42.9189 | 242.00 | 44.9783 |
| 69.67 | 36.9247 | 121.22 | 45.1269 | 244.70 | 31.6631 |
| 70.83 | 32.0200 | 121.78 | 44.0656 | 252.40 | 29.9631 |
| 72.81 | 43.2207 | 122.06 | 48.4936 | 252.80 | 31.9081 |
| 72.87 | 43.2266 | 123.07 | 38.6360 | 254.15 | 0.0000 |
| 74.66 | 35.3251 | 127.23 | 38.8866 | 256.23 | 31.0406 |
| 74.82 | 35.3375 | 129.30 | 42.3538 | 260.90 | 25.3299 |
| 74.97 | 34.3393 | 131.20 | 35.7692 | 264.66 | 26.3948 |
| 77.11 | 31.4560 | 133.02 | 36.9877 | 268.22 | 36.2869 |
| 79.69 | 31.6302 | 133.52 | 41.5019 | 269.46 | 30.4366 |
| 80.12 | 32.6802 | 136.00 | 37.1512 | 271.23 | 23.6012 |
| 80.19 | 32.6849 | 136.47 | 34.9239 | 273.65 | 29.5651 |
| 80.57 | 35.7778 | 140.51 | 32.8625 | 276.40 | 26.6733 |
| 81.00 | 30.6944 | 143.76 | 35.2919 | 277.37 | 24.7185 |
| 81.07 | 30.6989 | 144.24 | 33.0374 | 277.60 | 21.7566 |
| 83.79 | 23.6687 | 145.44 | 33.0932 | 278.00 | 25.7215 |
| 85.43 | 33.0404 | 152.43 | 46.0876 | 279.20 | 27.7291 |
| 86.55 | 30.0104 | 153.25 | 42.6781 | 279.54 | 32.6908 |
| 86.79 | 30.0245 | 154.21 | 33.4938 | 280.46 | 27.7599 |
| 86.94 | 28.9980 | 156.02 | 28.9441 | 283.69 | 22.8666 |
| 87.09 | 26.9348 | 158.56 | 30.2035 | 284.31 | 17.9052 |
| 87.57 | 31.1084 | 159.00 | 33.7080 | 285.41 | 25.8877 |
| 88.03 | 24.9094 | 162.33 | 38.5245 | 285.90 | 27.8906 |
| 88.34 | 24.9247 | 163.33 | 30.6840 | 287.50 | 26.9316 |
| 88.47 | 28.0475 | 165.86 | 42.2179 | 290.67 | 21.0032 |
| 89.96 | 55.2175 | 176.31 | 35.6436 | 293.27 | 0.0000 |
| 91.11 | 42.8109 | 176.60 | 35.6564 | 295.22 | 28.1119 |
| 92.59 | 32.4615 | 177.52 | 36.5888 | 295.96 | 24.1110 |
| 93.35 | 23.0706 | 181.07 | 30.1137 | 298.58 | 36.2455 |
| 94.56 | 48.3493 | 184.41 | 40.3119 | 299.98 | 29.2319 |
| 94.65 | 48.3575 | 185.72 | 41.4555 | 300.09 | 26.2103 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 26.2111 | 497.08 | 16.5872 | 711.68 | 6.1374 |
| 301.36 | 22.2011 | 505.52 | 18.5176 | 720.70 | 8.2145 |
| 302.85 | 26.2698 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 23.2702 | 511.00 | 16.7162 | 722.78 | 12.3325 |
| 306.78 | 22.3001 | 514.00 | 15.5036 | 722.91 | 12.3331 |
| 308.46 | 24.3604 | 514.00 | 15.5036 | 723.31 | 14.3910 |
| 311.90 | 26.4642 | 520.40 | 15.5579 | 724.19 | 11.3113 |
| 316.51 | 23.4969 | 520.69 | 15.5603 | 727.33 | 9.2670 |
| 319.41 | 21.5031 | 522.65 | 0.0000 | 733.00 | 11.3529 |
| 320.08 | 19.4655 | 527.90 | 3.1242 | 735.93 | 8.2666 |
| 321.04 | 26.6574 | 529.59 | 6.2541 | 737.46 | 10.3398 |
| 323.87 | 32.8818 | 529.87 | 0.0000 | 739.50 | 13.4532 |
| 325.23 | 24.6874 | 531.02 | 11.7355 | 747.24 | 11.4195 |
| 328.76 | 27.8495 | 546.56 | 0.0000 | 748.06 | 10.3848 |
| 333.37 | 19.8747 | 552.55 | 12.3440 | 752.31 | 9.1025 |
| 333.97 | 26.5117 | 563.25 | 14.3218 | 753.82 | 6.9395 |
| 334.37 | 26.5195 | 569.33 | 16.2816 | 756.73 | 6.9476 |
| 338.28 | 19.7410 | 569.50 | 14.3672 | 756.80 | 6.9478 |
| 338.32 | 19.7419 | 569.70 | 13.4107 | 763.94 | 12.1936 |
| 340.48 | 19.7741 | 583.19 | 12.5373 | 765.81 | 4.4826 |
| 340.55 | 19.7749 | 584.27 | 11.5790 | 766.42 | 7.8464 |
| 344.28 | 21.7090 | 595.83 | 14.5565 | 766.84 | 6.9759 |
| 345.93 | 21.7356 | 600.60 | 17.5083 | 772.60 | 0.0000 |
| 351.06 | 22.0283 | 602.52 | 0.0000 | 776.52 | 9.4537 |
| 351.93 | 14.6949 | 602.73 | 14.6056 | 777.92 | 10.5100 |
| 355.39 | 0.0000 | 604.72 | 22.4166 | 778.90 | 9.4625 |
| 356.01 | 31.5829 | 609.32 | 12.6982 | 783.70 | 14.7475 |
| 364.49 | 21.1847 | 610.33 | 12.7045 | 785.37 | 13.7030 |
| 366.42 | 24.3961 | 614.28 | 15.6656 | 792.07 | 13.7389 |
| 375.05 | 17.0750 | 618.01 | 10.7895 | 794.95 | 11.6381 |
| 383.85 | 15.0318 | 620.36 | 11.7832 | 795.86 | 12.7008 |
| 388.16 | 19.3837 | 621.93 | 13.7573 | 801.95 | 6.3653 |
| 388.63 | 19.3900 | 630.19 | 0.0000 | 810.29 | 9.5785 |
| 391.69 | 16.1920 | 631.29 | 9.8699 | 810.45 | 8.5148 |
| 400.66 | 11.9458 | 633.25 | 16.7941 | 810.76 | 6.3869 |
| 401.81 | 14.1285 | 634.78 | 16.8062 | 815.77 | 7.4655 |
| 402.40 | 18.4830 | 635.95 | 12.8588 | 818.51 | 7.4732 |
| 404.85 | 16.3351 | 636.99 | 6.9274 | 832.01 | 10.7305 |
| 410.95 | 18.5873 | 645.85 | 4.9683 | 834.85 | 13.9645 |
| 413.71 | 5.4767 | 657.76 | 7.9924 | 835.71 | 13.9690 |
| 414.70 | 5.4802 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 19.8858 | 661.66 | 11.0089 | 846.75 | 0.0000 |
| 427.87 | 21.0010 | 664.57 | 0.0000 | 846.77 | 11.8684 |
| 433.94 | 19.9718 | 666.33 | 10.0291 | 856.80 | 9.7462 |
| 439.40 | 13.3599 | 666.50 | 12.0357 | 860.56 | 8.6752 |
| 453.88 | 10.7830 | 667.71 | 0.0000 | 871.09 | 6.5313 |
| 463.37 | 18.0742 | 677.62 | 8.0637 | 873.19 | 6.0520 |
| 468.07 | 15.1040 | 685.70 | 5.0576 | 875.33 | 0.0000 |
| 473.00 | 22.7216 | 695.00 | 7.1094 | 879.38 | 2.1836 |
| 475.06 | 14.5594 | 696.49 | 8.1303 | 880.51 | 6.5534 |
| 476.78 | 13.6630 | 696.51 | 8.1303 | 883.24 | 9.1107 |
| 477.60 | 13.6696 | 697.00 | 11.1815 | 884.68 | 5.4692 |
| 482.18 | 21.0156 | 697.49 | 15.2509 | 889.28 | 7.6694 |
| 487.02 | 18.3252 | 702.65 | 7.1328 | 894.76 | 5.4888 |
| 492.35 | 17.4620 | 706.68 | 20.4146 | 898.04 | 8.7922 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 5.5052 | 1312.11 | 3.1094 | | |
| 911.20 | 5.5204 | 1332.49 | 4.1675 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 3.6998 | 1365.19 | 3.1514 | | |
| 937.49 | 6.4988 | 1368.63 | 0.0000 | | |
| 944.13 | 4.6525 | 1384.29 | 7.3879 | | |
| 946.00 | 6.5176 | 1408.01 | 2.1231 | | |
| 949.00 | 4.6601 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.1500 | | |
| 962.31 | 8.4256 | 1489.16 | 2.1642 | | |
| 964.08 | 7.4938 | 1505.03 | 2.7927 | | |
| 966.17 | 12.1859 | 1596.21 | 1.9001 | | |
| 968.97 | 3.7529 | 1620.50 | 5.7303 | | |
| 983.53 | 6.5991 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.9388 | | |
| 996.26 | 5.6798 | 1750.46 | 0.0000 | | |
| 1001.03 | 9.4808 | 1764.49 | 3.9360 | | |
| 1004.73 | 3.7969 | 1770.23 | 8.8660 | | |
| 1021.30 | 0.0000 | 1771.35 | 5.9119 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.9704 | | |
| 1037.84 | 4.7959 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.9937 | | |
| 1046.59 | 6.7328 | | | | |
| 1048.07 | 7.6979 | | | | |
| 1049.04 | 6.7380 | | | | |
| 1050.41 | 4.8149 | | | | |
| 1063.66 | 7.7350 | | | | |
| 1077.00 | 5.8250 | | | | |
| 1077.34 | 5.8254 | | | | |
| 1085.87 | 7.7874 | | | | |
| 1099.45 | 7.8190 | | | | |
| 1112.07 | 2.9431 | | | | |
| 1112.84 | 4.9062 | | | | |
| 1115.54 | 6.8744 | | | | |
| 1120.29 | 4.9170 | | | | |
| 1120.55 | 4.9174 | | | | |
| 1121.30 | 4.9184 | | | | |
| 1129.67 | 4.9304 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 8.9865 | | | | |
| 1177.95 | 3.9992 | | | | |
| 1189.05 | 6.0176 | | | | |
| 1204.77 | 5.0364 | | | | |
| 1221.41 | 4.0477 | | | | |
| 1231.02 | 2.0291 | | | | |
| 1235.36 | 8.1260 | | | | |
| 1238.28 | 5.0828 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 6.1541 | | | | |
| 1274.44 | 4.1055 | | | | |
| 1274.54 | 4.1056 | | | | |
| 1291.59 | 1.0310 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 11:02:42.12

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017839.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM07.CNF;363
                                        Background date  : 2-FEB-2014 16:26:28.
Sample date      : 7-NOV-2013 11:30:00. Acquisition date : 7-FEB-2014 10:01:53.
Sample ID        : G1203017839          Sample quantity  : 1.30470E+02 GRAM
Detector name    : GAM07                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.29  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 62.87* | 38 | 44 | 0.99 | 125.35 | 119 | 11 | 1.06E-02 | 39.6 | |
| 2 | 0 | 108.34 | 18 | 41 | 1.51 | 216.31 | 212 | 9 | 5.06E-03 | 67.2 | |
| 3 | 0 | 112.06 | 16 | 19 | 0.70 | 223.76 | 221 | 5 | 4.33E-03 | 49.7 | |
| 4 | 0 | 139.68 | 14 | 26 | 0.61 | 279.00 | 275 | 7 | 3.78E-03 | 68.0 | |
| 5 | 0 | 176.49 | 12 | 20 | 1.28 | 352.65 | 348 | 7 | 3.42E-03 | 67.3 | |
| 6 | 0 | 185.52* | 9 | 47 | 0.70 | 370.70 | 365 | 11 | 2.56E-03 | 160.8 | |
| 7 | 0 | 303.23 | 13 | 60 | 8.03 | 606.16 | 586 | 22 | 3.52E-03 | 159.1 | |
| 8 | 0 | 328.19 | 13 | 13 | 1.61 | 656.11 | 653 | 7 | 3.71E-03 | 51.5 | |
| 9 | 0 | 331.80 | 11 | 9 | 0.91 | 663.32 | 660 | 6 | 3.18E-03 | 50.5 | |
| 10 | 0 | 405.98 | 9 | 6 | 1.54 | 811.70 | 808 | 7 | 2.42E-03 | 60.0 | |
| 11 | 0 | 500.17 | 11 | 8 | 0.59 | 1000.12 | 995 | 9 | 2.93E-03 | 59.4 | |
| 12 | 0 | 510.76* | 5 | 12 | 1.55 | 1021.32 | 1015 | 15 | 1.28E-03 | 267.8 | |
| 13 | 0 | 541.34 | 6 | 9 | 0.84 | 1082.50 | 1076 | 9 | 1.77E-03 | 93.3 | |
| 14 | 0 | 546.01 | 10 | 4 | 1.60 | 1091.84 | 1087 | 8 | 2.80E-03 | 46.6 | |
| 15 | 0 | 577.10 | 5 | 2 | 0.80 | 1154.03 | 1151 | 6 | 1.51E-03 | 56.0 | |
| 16 | 0 | 653.17 | 12 | 2 | 1.48 | 1306.21 | 1303 | 7 | 3.19E-03 | 34.9 | |
| 17 | 0 | 1320.03 | 5 | 2 | 0.95 | 2640.36 | 2635 | 9 | 1.39E-03 | 69.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 11:02:43

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017839.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 11:30:00 | Acquisition date | : 7-FEB-2014 10:01:53 |
| Sample ID | : G1203017839 | Sample quantity | : 130.47 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA7 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.29  0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-125M | 109.28 | 18 | 0.27* | 6.336E+00 | 6.129E+00 | 1.861E+01 | 134.49 |
| ANH-511 | 511.00 | 5 | 100.00* | 2.741E+00 | 9.703E-03 | 9.703E-03 | 535.57 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:02:44.44

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017839.CNF;1  *
* Acquisition date :  7-FEB-2014 10:01:53 Sensitivity     : 3.000           *
* Detector ID      : GAM07                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.29     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:30:00 Nuclide Library : SOLID           *
* Sample ID        : G1203017839          Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3047E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 26-JUL-2013 13:45:01 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_500MLMB.CNF;10        *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| TE-125M | 1.861E+01 | 2.452E+01 | 3.024E+01 |
| ANH-511 | 9.703E-03 | 5.092E-02 | 3.768E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.142E-01 | 6.714E-01 | 1.399E+00 | NOT IDENT. |
| NA-22 | 5.318E-03 | 1.990E-02 | 5.025E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.106E-03 | 3.096E-02 | 6.980E-02 | NOT IDENT. |
| K-40 | -1.295E-01 | 4.698E-01 | 9.524E-01 | NOT IDENT. |
| SC-46 | 2.150E-02 | 5.492E-02 | 1.199E-01 | NOT IDENT. |
| V-48 | -9.424E-01 | 1.440E+00 | 2.495E+00 | NOT IDENT. |
| CR-51 | -2.056E-01 | 2.395E+00 | 4.306E+00 | NOT IDENT. |
| MN-54 | 3.555E-03 | 3.403E-02 | 6.934E-02 | NOT IDENT. |
| CO-56 | 3.080E-02 | 7.176E-02 | 1.504E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.785E-02 | 2.325E-02 | 4.474E-02 | NOT IDENT. |
| CO-58 | -4.824E-04 | 6.491E-02 | 1.307E-01 | NOT IDENT. |
| FE-59 | -2.997E-02 | 2.629E-01 | 5.040E-01 | NOT IDENT. |
| CO-60 | -2.161E-02 | 2.636E-02 | 4.349E-02 | NOT IDENT. |
| ZN-65 | -4.385E-02 | 7.508E-02 | 1.308E-01 | NOT IDENT. |
| GE-68 | 5.304E-01 | 1.311E+00 | 2.778E+00 | NOT IDENT. |
| AS-73 | -3.235E-02 | 8.225E-01 | 1.490E+00 | NOT IDENT. |
| AS-74 | -7.206E-01 | 1.386E+00 | 2.445E+00 | NOT IDENT. |
| SE-75 | -4.371E-03 | 4.963E-02 | 9.180E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.177E+10 | 0.000E+00 | SHORT HLIF |
| SR-82 | -9.478E-01 | 2.039E+00 | 3.781E+00 | NOT IDENT. |
| RB-83 | -6.908E-03 | 1.036E-01 | 1.994E-01 | NOT IDENT. |
| KR-85 | 1.353E+01 | 5.807E+00 | 1.406E+01 | NOT IDENT. |
| SR-85 | 1.604E-01 | 6.894E-02 | 1.669E-01 | NOT IDENT. |
| RB-86 | 3.860E+00 | 1.160E+01 | 2.437E+01 | NOT IDENT. |
| Y-88 | 2.121E-02 | 4.344E-02 | 1.175E-01 | NOT IDENT. |
| Y-91 | 6.586E+00 | 2.974E+01 | 6.543E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | -1.679E-04 | 2.484E-02 | 4.817E-02 | NOT IDENT. |
| NB-95 | -6.928E-02 | 7.841E-02 | 1.327E-01 | NOT IDENT. |
| NB-95M | -2.125E-01 | 2.168E-01 | 3.561E-01 | NOT IDENT. |
| ZR-95 | -6.662E-02 | 1.262E-01 | 2.174E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.092E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 2.801E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.334E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.476E-02 | 2.530E-02 | 4.750E-02 | NOT IDENT. |
| RH-102 | -4.417E-03 | 4.481E-02 | 8.546E-02 | NOT IDENT. |
| RU-103 | 7.986E-02 | 1.356E-01 | 2.587E-01 | NOT IDENT. |
| RH-106 | -3.758E-01 | 3.410E-01 | 5.276E-01 | NOT IDENT. |
| RU-106 | -3.758E-01 | 3.410E-01 | 5.276E-01 | NOT IDENT. |
| AG-108M | -5.640E-03 | 2.554E-02 | 4.774E-02 | NOT IDENT. |
| CD-109 | -1.125E-01 | 5.698E-01 | 1.001E+00 | NOT IDENT. |
| AG-110M | 1.705E-02 | 4.515E-02 | 9.849E-02 | NOT IDENT. |
| SN-113 | -1.797E-02 | 5.257E-02 | 9.799E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | 2.145E+11 | 0.000E+00 | SHORT HLIF |
| SN-117M | 1.992E+00 | 2.178E+00 | 4.382E+00 | NOT IDENT. |
| TE-123M | 3.614E-02 | 3.498E-02 | 7.110E-02 | NOT IDENT. |
| SB-124 | -2.740E-03 | 1.638E-01 | 3.623E-01 | NOT IDENT. |
| SB-125 | -1.682E-02 | 7.602E-02 | 1.432E-01 | FAIL ABUN |
| I-126 | 5.858E+00 | 9.640E+00 | 2.096E+01 | NOT IDENT. |
| SB-126 | -1.796E+00 | 6.961E+00 | 1.304E+01 | NOT IDENT. |
| SN-126 | -2.149E-02 | 4.984E-02 | 8.535E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | 9.267E+05 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 7.139E+01 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.232E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 9.144E+06 | 0.000E+00 | SHORT HLIF |
| BA-133 | -3.817E-02 | 4.037E-02 | 6.392E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | 1.978E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.173E-02 | 2.838E-02 | 6.683E-02 | NOT IDENT. |
| CS-135 | -4.818E-02 | 1.054E-01 | 1.851E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.302E-01 | 4.184E+00 | 8.822E+00 | FAIL ABUN |
| BA-137M | 6.455E-03 | 2.486E-02 | 5.134E-02 | NOT IDENT. |
| CS-137 | 6.819E-03 | 2.626E-02 | 5.424E-02 | NOT IDENT. |
| CE-139 | 3.414E-03 | 3.405E-02 | 6.417E-02 | NOT IDENT. |
| BA-140 | -6.955E+00 | 5.517E+00 | 7.063E+00 | FAIL ABUN |
| LA-140 | -6.955E+00 | 5.517E+00 | 7.063E+00 | FAIL ABUN |
| CE-141 | -2.607E-01 | 2.444E-01 | 4.128E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 7.748E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -8.721E-02 | 1.615E-01 | 2.673E-01 | NOT IDENT. |
| PM-144 | 8.708E-03 | 3.125E-02 | 6.312E-02 | NOT IDENT. |
| PR-144 | 6.884E-01 | 2.436E+00 | 4.924E+00 | NOT IDENT. |
| PM-146 | -4.111E-03 | 3.259E-02 | 6.253E-02 | NOT IDENT. |
| ND-147 | 7.835E+00 | 5.151E+01 | 1.042E+02 | NOT IDENT. |
| PM-147 | 3.333E+02 | 5.764E+02 | 1.092E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.014E+12 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.115E-02 | 2.766E-02 | 4.080E-02 | NOT IDENT. |
| EU-152 | 3.847E-02 | 8.217E-02 | 1.601E-01 | NOT IDENT. |
| GD-153 | 4.308E-02 | 6.578E-02 | 1.284E-01 | NOT IDENT. |
| EU-154 | 1.449E-02 | 5.423E-02 | 1.369E-01 | NOT IDENT. |
| EU-155 | -3.523E-02 | 8.568E-02 | 1.277E-01 | NOT IDENT. |
| TB-160 | -4.592E-03 | 1.946E-01 | 3.977E-01 | NOT IDENT. |
| HO-166M | -1.116E-02 | 4.652E-02 | 8.595E-02 | FAIL ABUN |
| TM-171 | 8.174E+00 | 9.254E+00 | 1.874E+01 | NOT IDENT. |
| LU-176 | 1.346E-02 | 2.476E-02 | 4.363E-02 | NOT IDENT. |
| HF-181 | -7.982E-02 | 1.252E-01 | 2.189E-01 | NOT IDENT. |
| TA-182 | 2.158E-01 | 1.698E-01 | 4.533E-01 | NOT IDENT. |
| RE-183 | 7.692E-02 | 1.990E-01 | 3.579E-01 | NOT IDENT. |
| RE-184 | 4.995E-02 | 3.862E-01 | 8.152E-01 | NOT IDENT. |
| W-188 | 7.408E+00 | 1.498E+01 | 2.593E+01 | FAIL ABUN |
| IR-192 | 6.442E-02 | 5.598E-02 | 1.188E-01 | NOT IDENT. |
| HG-203 | -2.110E-02 | 8.281E-02 | 1.496E-01 | NOT IDENT. |
| BI-207 | -4.841E-03 | 3.638E-02 | 7.215E-02 | NOT IDENT. |
| TL-208 | 6.896E-03 | 3.324E-02 | 6.345E-02 | NOT IDENT. |
| PB-210 | -7.376E-01 | 1.812E+00 | 3.292E+00 | NOT IDENT. |
| BI-211 | 1.657E-01 | 1.818E-01 | 3.754E-01 | NOT IDENT. |
| PB-211 | 4.057E-01 | 4.771E-01 | 1.090E+00 | FAIL ABUN |
| BI-212 | 3.072E-01 | 3.510E-01 | 8.018E-01 | NOT IDENT. |
| PB-212 | 3.153E-03 | 4.996E-02 | 9.644E-02 | NOT IDENT. |
| BI-214 | -1.964E-02 | 7.174E-02 | 1.329E-01 | NOT IDENT. |
| PB-214 | 5.874E-02 | 6.853E-02 | 1.397E-01 | NOT IDENT. |
| RN-219 | 1.749E-02 | 3.241E-01 | 5.625E-01 | NOT IDENT. |
| RN-222 | -1.964E-02 | 7.174E-02 | 1.329E-01 | NOT IDENT. |
| RA-223 | 6.091E-01 | 5.592E-01 | 1.080E+00 | NOT IDENT. |
| RA-224 | -5.231E-01 | 5.286E-01 | 8.676E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | -1.964E-02 | 7.174E-02 | 1.329E-01 | NOT IDENT. |
| AC-227 | -1.262E-01 | 2.235E-01 | 3.844E-01 | FAIL ABUN |
| TH-227 | -1.262E-01 | 2.235E-01 | 3.844E-01 | FAIL ABUN |
| AC-228 | -3.904E-03 | 1.331E-01 | 2.613E-01 | NOT IDENT. |
| RA-228 | -3.904E-03 | 1.331E-01 | 2.613E-01 | NOT IDENT. |
| TH-228 | 3.153E-03 | 4.996E-02 | 9.644E-02 | NOT IDENT. |
| TH-229 | 6.148E-02 | 4.283E-01 | 8.032E-01 | NOT IDENT. |
| TH-230 | -1.964E-02 | 7.174E-02 | 1.329E-01 | NOT IDENT. |
| PA-231 | 5.110E-02 | 1.048E+00 | 1.968E+00 | NOT IDENT. |
| TH-231 | 6.091E-01 | 5.592E-01 | 1.080E+00 | NOT IDENT. |
| TH-232 | -3.904E-03 | 1.331E-01 | 2.613E-01 | NOT IDENT. |
| PA-233 | -3.500E-02 | 4.609E-02 | 7.593E-02 | NOT IDENT. |
| PA-234 | 1.175E-01 | 2.470E-01 | 5.340E-01 | FAIL ABUN |
| PA-234M | 6.931E-01 | 3.690E+00 | 7.591E+00 | NOT IDENT. |
| TH-234 | 1.623E+00 | 1.259E+00 | 1.740E+00 | FAIL ABUN |
| U-234 | -1.964E-02 | 7.174E-02 | 1.329E-01 | NOT IDENT. |
| U-235 | -5.746E-02 | 1.661E-01 | 2.860E-01 | FAIL ABUN |
| NP-237 | -3.500E-02 | 4.609E-02 | 7.593E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.205E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.623E+00 | 1.259E+00 | 1.740E+00 | FAIL ABUN |
| NP-239 | 1.602E-02 | 2.830E-01 | 5.092E-01 | NOT IDENT. |
| PU-239 | 1.003E+02 | 2.382E+02 | 4.445E+02 | NOT IDENT. |
| AM-241 | 3.537E-02 | 7.539E-02 | 1.360E-01 | NOT IDENT. |
| AM-243 | 9.543E-04 | 3.501E-02 | 6.301E-02 | NOT IDENT. |
| CM-243 | 3.853E-02 | 7.516E-02 | 1.313E-01 | NOT IDENT. |
| CM-247 | 9.392E-03 | 2.800E-02 | 5.186E-02 | NOT IDENT. |
| CF-249 | 1.600E-02 | 3.359E-02 | 6.832E-02 | NOT IDENT. |
| CF-251 | 7.133E-02 | 9.415E-02 | 1.660E-01 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 11:02:40.58

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 62.87 | 52 | 44 | 0.99 | 125.35 | 119 | 11 | 1.45E-02 | 28.2 | |
| 2 | 0 | 92.70 | 35 | 39 | 0.89 | 185.04 | 182 | 8 | 9.69E-03 | 35.6 | |
| 3 | 0 | 108.34 | 18 | 41 | 1.51 | 216.31 | 212 | 9 | 5.06E-03 | 67.2 | |
| 4 | 0 | 112.06 | 16 | 19 | 0.70 | 223.76 | 221 | 5 | 4.33E-03 | 49.7 | |
| 5 | 0 | 139.68 | 14 | 26 | 0.61 | 279.00 | 275 | 7 | 3.78E-03 | 68.0 | |
| 6 | 0 | 176.49 | 12 | 20 | 1.28 | 352.65 | 348 | 7 | 3.42E-03 | 67.3 | |
| 7 | 0 | 185.52 | 30 | 47 | 0.70 | 370.70 | 365 | 11 | 8.32E-03 | 47.9 | |
| 8 | 0 | 239.61 | 14 | 41 | 1.01 | 478.91 | 473 | 11 | 3.99E-03 | 90.4 | |
| 9 | 0 | 303.23 | 13 | 60 | 8.03 | 606.16 | 586 | 22 | 3.52E-03 | 159.1 | |
| 10 | 0 | 328.19 | 13 | 13 | 1.61 | 656.11 | 653 | 7 | 3.71E-03 | 51.5 | |
| 11 | 0 | 331.80 | 11 | 9 | 0.91 | 663.32 | 660 | 6 | 3.18E-03 | 50.5 | |
| 12 | 0 | 405.98 | 9 | 6 | 1.54 | 811.70 | 808 | 7 | 2.42E-03 | 60.0 | |
| 13 | 0 | 500.17 | 11 | 8 | 0.59 | 1000.12 | 995 | 9 | 2.93E-03 | 59.4 | |
| 14 | 0 | 510.76 | 84 | 12 | 1.55 | 1021.32 | 1015 | 15 | 2.34E-02 | 14.0 | |
| 15 | 0 | 541.34 | 6 | 9 | 0.84 | 1082.50 | 1076 | 9 | 1.77E-03 | 93.3 | |
| 16 | 0 | 546.01 | 10 | 4 | 1.60 | 1091.84 | 1087 | 8 | 2.80E-03 | 46.6 | |
| 17 | 0 | 577.10 | 5 | 2 | 0.80 | 1154.03 | 1151 | 6 | 1.51E-03 | 56.0 | |
| 18 | 0 | 610.17 | 6 | 15 | 0.60 | 1220.18 | 1213 | 10 | 1.73E-03 | 122.6 | |
| 19 | 0 | 653.17 | 12 | 2 | 1.48 | 1306.21 | 1303 | 7 | 3.19E-03 | 34.9 | |
| 20 | 0 | 1320.03 | 5 | 2 | 0.95 | 2640.36 | 2635 | 9 | 1.39E-03 | 69.5 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 11:02:42.65

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-125M | 109.28 | 18 | 0.27* | 6.336E+00 | 6.129E+00 | 1.861E+01 | 134.49 |
| ANH-511 | 511.00 | 5 | 100.00* | 2.741E+00 | 9.703E-03 | 9.703E-03 | 535.57 |

Flag: "*" = Keyline

Sample ID : G1203017839 Acquisition date : 7-FEB-2014 10:01:53

Total number of lines in spectrum 17
Number of unidentified lines 6
Number of lines tentatively identified by NID 11 64.71%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TE-125M | 57.40D | 3.04 | 6.129E+00 | 1.861E+01 | 2.502E+01 | 134.49 | |
| ANH-511 | 1.00E+09Y | 1.00 | 9.703E-03 | 9.703E-03 | 51.96E-03 | 535.57 | |
| | Total Activity : | | 6.139E+00 | 1.862E+01 | | | |
| | Grand Total Activity : | | 6.139E+00 | 1.862E+01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203017839 Acquisition date : 7-FEB-2014 10:01:53

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 62.87 | 38 | 44 | 0.99 | 125.35 | 119 | 11 | 1.06E-02 | 79.1 | 3.65E+00 | T |
| 0 | 112.06 | 16 | 19 | 0.70 | 223.76 | 221 | 5 | 4.33E-03 | 99.3 | 6.37E+00 | T |
| 0 | 139.68 | 14 | 26 | 0.61 | 279.00 | 275 | 7 | 3.78E-03 | **** | 6.28E+00 | T |
| 0 | 176.49 | 12 | 20 | 1.28 | 352.65 | 348 | 7 | 3.42E-03 | **** | 5.74E+00 | T |
| 0 | 185.52 | 9 | 47 | 0.70 | 370.70 | 365 | 11 | 2.56E-03 | **** | 5.60E+00 | T |
| 0 | 303.23 | 13 | 60 | 8.03 | 606.16 | 586 | 22 | 3.52E-03 | **** | 4.06E+00 | T |
| 0 | 328.19 | 13 | 13 | 1.61 | 656.11 | 653 | 7 | 3.71E-03 | **** | 3.83E+00 | T |
| 0 | 331.80 | 11 | 9 | 0.91 | 663.32 | 660 | 6 | 3.18E-03 | **** | 3.80E+00 | |
| 0 | 405.98 | 9 | 6 | 1.54 | 811.70 | 808 | 7 | 2.42E-03 | **** | 3.26E+00 | T |
| 0 | 500.17 | 11 | 8 | 0.59 | 1000.12 | 995 | 9 | 2.93E-03 | **** | 2.79E+00 | |
| 0 | 541.34 | 6 | 9 | 0.84 | 1082.50 | 1076 | 9 | 1.77E-03 | **** | 2.62E+00 | |
| 0 | 546.01 | 10 | 4 | 1.60 | 1091.84 | 1087 | 8 | 2.80E-03 | 93.1 | 2.60E+00 | T |
| 0 | 577.10 | 5 | 2 | 0.80 | 1154.03 | 1151 | 6 | 1.51E-03 | **** | 2.50E+00 | |
| 0 | 653.17 | 12 | 2 | 1.48 | 1306.21 | 1303 | 7 | 3.19E-03 | 69.7 | 2.27E+00 | |
| 0 | 1320.03 | 5 | 2 | 0.95 | 2640.36 | 2635 | 9 | 1.39E-03 | **** | 1.28E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:02:54.95

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017839.CNF;1  *
* Acquisition date :  7-FEB-2014 10:01:53 Sensitivity     : 3.000           *
* Detector ID      : GAM07                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.29     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:30:00 Nuclide Library : SOLID           *
* Sample ID        : G1203017839          Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3047E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 26-JUL-2013 13:45:01 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_500MLMB.CNF;10        *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| TE-125M | 1.375E+01 |
| ANH-511 | 1.600E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 6.141E-01 | NOT IDENT. |
| NA-22 | 1.881E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.693E-02 | NOT IDENT. |
| K-40 | 4.142E-01 | NOT IDENT. |
| SC-46 | 5.060E-02 | NOT IDENT. |
| V-48 | 9.900E-01 | NOT IDENT. |
| CR-51 | 1.953E+00 | NOT IDENT. |
| MN-54 | 2.957E-02 | NOT IDENT. |
| CO-56 | 6.558E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.058E-02 | NOT IDENT. |
| CO-58 | 5.530E-02 | NOT IDENT. |
| FE-59 | 2.134E-01 | NOT IDENT. |
| CO-60 | 1.541E-02 | NOT IDENT. |
| ZN-65 | 5.185E-02 | NOT IDENT. |
| GE-68 | 1.188E+00 | NOT IDENT. |
| AS-73 | 6.764E-01 | NOT IDENT. |
| AS-74 | 1.027E+00 | NOT IDENT. |
| SE-75 | 4.089E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.569E+00 | NOT IDENT. |
| RB-83 | 8.633E-02 | NOT IDENT. |
| KR-85 | 6.364E+00 | NOT IDENT. |
| SR-85 | 7.554E-02 | NOT IDENT. |
| RB-86 | 1.038E+01 | NOT IDENT. |
| Y-88 | 4.400E-02 | NOT IDENT. |
| Y-91 | 2.629E+01 | NOT IDENT. |
| NB-94 | 2.045E-02 | NOT IDENT. |

| | | |
|---|---|---|
| NB-95 | 5.582E-02 | NOT IDENT. |
| NB-95M | 1.606E-01 | NOT IDENT. |
| ZR-95 | 8.954E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.187E-02 | NOT IDENT. |
| RH-102 | 3.649E-02 | NOT IDENT. |
| RU-103 | 1.139E-01 | NOT IDENT. |
| RH-106 | 2.244E-01 | NOT IDENT. |
| RU-106 | 2.244E-01 | NOT IDENT. |
| AG-108M | 2.111E-02 | NOT IDENT. |
| CD-109 | 4.589E-01 | NOT IDENT. |
| AG-110M | 4.151E-02 | NOT IDENT. |
| SN-113 | 4.279E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.029E+00 | NOT IDENT. |
| TE-123M | 3.293E-02 | NOT IDENT. |
| SB-124 | 1.356E-01 | NOT IDENT. |
| SB-125 | 6.274E-02 | FAIL ABUN |
| I-126 | 9.018E+00 | NOT IDENT. |
| SB-126 | 5.320E+00 | NOT IDENT. |
| SN-126 | 3.903E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.843E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.832E-02 | NOT IDENT. |
| CS-135 | 8.160E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.617E+00 | FAIL ABUN |
| BA-137M | 2.180E-02 | NOT IDENT. |
| CS-137 | 2.303E-02 | NOT IDENT. |
| CE-139 | 2.948E-02 | NOT IDENT. |
| BA-140 | 2.419E+00 | FAIL ABUN |
| LA-140 | 2.419E+00 | FAIL ABUN |
| CE-141 | 1.880E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.198E-01 | NOT IDENT. |
| PM-144 | 2.724E-02 | NOT IDENT. |
| PR-144 | 2.126E+00 | NOT IDENT. |
| PM-146 | 2.715E-02 | NOT IDENT. |
| ND-147 | 4.469E+01 | NOT IDENT. |
| PM-147 | 5.008E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 1.825E-02 | NOT IDENT. |
| EU-152 | 7.204E-02 | NOT IDENT. |
| GD-153 | 5.851E-02 | NOT IDENT. |
| EU-154 | 5.125E-02 | NOT IDENT. |
| EU-155 | 5.779E-02 | NOT IDENT. |
| TB-160 | 1.641E-01 | NOT IDENT. |
| HO-166M | 3.620E-02 | FAIL ABUN |
| TM-171 | 8.580E+00 | NOT IDENT. |
| LU-176 | 1.975E-02 | NOT IDENT. |
| HF-181 | 9.429E-02 | NOT IDENT. |
| TA-182 | 1.899E-01 | NOT IDENT. |
| RE-183 | 1.604E-01 | NOT IDENT. |
| RE-184 | 3.372E-01 | NOT IDENT. |
| W-188 | 1.182E+01 | FAIL ABUN |
| IR-192 | 5.375E-02 | NOT IDENT. |
| HG-203 | 6.613E-02 | NOT IDENT. |
| BI-207 | 2.925E-02 | NOT IDENT. |
| TL-208 | 2.804E-02 | NOT IDENT. |
| PB-210 | 1.525E+00 | NOT IDENT. |
| BI-211 | 1.712E-01 | NOT IDENT. |
| PB-211 | 4.824E-01 | FAIL ABUN |
| BI-212 | 3.450E-01 | NOT IDENT. |
| PB-212 | 4.452E-02 | NOT IDENT. |
| BI-214 | 5.932E-02 | NOT IDENT. |
| PB-214 | 6.385E-02 | NOT IDENT. |
| RN-219 | 2.455E-01 | NOT IDENT. |
| RN-222 | 5.932E-02 | NOT IDENT. |
| RA-223 | 4.896E-01 | NOT IDENT. |
| RA-224 | 3.942E-01 | NOT IDENT. |
| RA-226 | 5.932E-02 | NOT IDENT. |

| | | |
|---|---|---|
| AC-227 | 1.744E-01 | FAIL ABUN |
| TH-227 | 1.744E-01 | FAIL ABUN |
| AC-228 | 1.134E-01 | NOT IDENT. |
| RA-228 | 1.134E-01 | NOT IDENT. |
| TH-228 | 4.452E-02 | NOT IDENT. |
| TH-229 | 3.695E-01 | NOT IDENT. |
| TH-230 | 5.932E-02 | NOT IDENT. |
| PA-231 | 8.770E-01 | NOT IDENT. |
| TH-231 | 4.896E-01 | NOT IDENT. |
| TH-232 | 1.134E-01 | NOT IDENT. |
| PA-233 | 3.289E-02 | NOT IDENT. |
| PA-234 | 2.287E-01 | FAIL ABUN |
| PA-234M | 3.222E+00 | NOT IDENT. |
| TH-234 | 8.134E-01 | FAIL ABUN |
| U-234 | 5.932E-02 | NOT IDENT. |
| U-235 | 1.316E-01 | FAIL ABUN |
| NP-237 | 3.289E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 8.134E-01 | FAIL ABUN |
| NP-239 | 2.316E-01 | NOT IDENT. |
| PU-239 | 2.030E+02 | NOT IDENT. |
| AM-241 | 6.133E-02 | NOT IDENT. |
| AM-243 | 2.914E-02 | NOT IDENT. |
| CM-243 | 5.971E-02 | NOT IDENT. |
| CM-247 | 2.265E-02 | NOT IDENT. |
| CF-249 | 3.068E-02 | NOT IDENT. |
| CF-251 | 7.516E-02 | FAIL ABUN |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 11:02:59.82

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017839.CNF;1  *
* Acquisition date :  7-FEB-2014 10:01:53 Sensitivity     : 3.000           *
* Detector ID      : GAM07                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.29     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 11:30:00 Nuclide Library : SOLID           *
* Sample ID        : G1203017839          Analyst initials: RXF2            *
* Batch Number     : 1359496              Sample Quantity : 1.3047E+02 GRAM *
*                                         Quantity Err(%) : 1.5329E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 26-JUL-2013 13:45:01 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_500MLMB.CNF;10        *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| TE-125M | 1.861E+01 | 2.458E+01 | 2.458E+01 |
| ANH-511 | 9.703E-03 | 5.093E-02 | 5.093E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.142E-01 | 6.719E-01 | 6.867E-01 | NOT IDENT. |
| NA-22 | 5.318E-03 | 1.991E-02 | 2.005E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 5.768E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.106E-03 | 3.096E-02 | 3.101E-02 | NOT IDENT. |
| K-40 | -1.295E-01 | 4.699E-01 | 4.735E-01 | NOT IDENT. |
| SC-46 | 2.150E-02 | 5.497E-02 | 5.582E-02 | NOT IDENT. |
| V-48 | -9.424E-01 | 1.445E+00 | 1.506E+00 | NOT IDENT. |
| CR-51 | -2.056E-01 | 2.395E+00 | 2.397E+00 | NOT IDENT. |
| MN-54 | 3.555E-03 | 3.403E-02 | 3.407E-02 | NOT IDENT. |
| CO-56 | 3.080E-02 | 7.183E-02 | 7.316E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 2.352E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.785E-02 | 2.330E-02 | 2.465E-02 | NOT IDENT. |
| CO-58 | -4.824E-04 | 6.491E-02 | 6.491E-02 | NOT IDENT. |
| FE-59 | -2.997E-02 | 2.629E-01 | 2.633E-01 | NOT IDENT. |
| CO-60 | -2.161E-02 | 2.643E-02 | 2.817E-02 | NOT IDENT. |
| ZN-65 | -4.385E-02 | 7.539E-02 | 7.793E-02 | NOT IDENT. |
| GE-68 | 5.304E-01 | 1.313E+00 | 1.335E+00 | NOT IDENT. |
| AS-73 | -3.235E-02 | 8.226E-01 | 8.227E-01 | NOT IDENT. |
| AS-74 | -7.206E-01 | 1.388E+00 | 1.426E+00 | NOT IDENT. |
| SE-75 | -4.371E-03 | 4.963E-02 | 4.967E-02 | NOT IDENT. |
| BR-77 | 1.032E+09 | 4.186E+10 | 4.186E+10 | SHORT HLIF |
| SR-82 | -9.478E-01 | 2.041E+00 | 2.085E+00 | NOT IDENT. |
| RB-83 | -6.908E-03 | 1.036E-01 | 1.037E-01 | NOT IDENT. |
| KR-85 | 1.353E+01 | 5.923E+00 | 8.503E+00 | NOT IDENT. |
| SR-85 | 1.604E-01 | 7.031E-02 | 1.009E-01 | NOT IDENT. |
| RB-86 | 3.860E+00 | 1.161E+01 | 1.174E+01 | NOT IDENT. |
| Y-88 | 2.121E-02 | 4.347E-02 | 4.451E-02 | NOT IDENT. |
| Y-91 | 6.586E+00 | 2.975E+01 | 2.990E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| NB-94 | -1.679E-04 | 2.484E-02 | 2.484E-02 | NOT IDENT. |
| NB-95 | -6.928E-02 | 7.869E-02 | 8.466E-02 | NOT IDENT. |
| NB-95M | -2.125E-01 | 2.178E-01 | 2.380E-01 | NOT IDENT. |
| ZR-95 | -6.662E-02 | 1.263E-01 | 1.299E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 5.256E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.419E+39 | 1.098E+39 | 0.000E+00 | SHORT HLIF |
| MO-99 | -5.866E+07 | 2.801E+09 | 2.801E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 1.339E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.476E-02 | 2.545E-02 | 2.631E-02 | NOT IDENT. |
| RH-102 | -4.417E-03 | 4.481E-02 | 4.486E-02 | NOT IDENT. |
| RU-103 | 7.986E-02 | 1.358E-01 | 1.405E-01 | NOT IDENT. |
| RH-106 | -3.758E-01 | 3.428E-01 | 3.824E-01 | NOT IDENT. |
| RU-106 | -3.758E-01 | 3.428E-01 | 3.824E-01 | NOT IDENT. |
| AG-108M | -5.640E-03 | 2.554E-02 | 2.567E-02 | NOT IDENT. |
| CD-109 | -1.125E-01 | 5.700E-01 | 5.722E-01 | NOT IDENT. |
| AG-110M | 1.705E-02 | 4.519E-02 | 4.584E-02 | NOT IDENT. |
| SN-113 | -1.797E-02 | 5.259E-02 | 5.321E-02 | NOT IDENT. |
| CD-115 | -2.067E+11 | 2.157E+11 | 2.350E+11 | SHORT HLIF |
| SN-117M | 1.992E+00 | 2.184E+00 | 2.362E+00 | NOT IDENT. |
| TE-123M | 3.614E-02 | 3.510E-02 | 3.869E-02 | NOT IDENT. |
| SB-124 | -2.740E-03 | 1.638E-01 | 1.638E-01 | NOT IDENT. |
| SB-125 | -1.682E-02 | 7.603E-02 | 7.641E-02 | FAIL ABUN |
| I-126 | 5.858E+00 | 9.657E+00 | 1.001E+01 | NOT IDENT. |
| SB-126 | -1.796E+00 | 6.965E+00 | 7.012E+00 | NOT IDENT. |
| SN-126 | -2.149E-02 | 4.988E-02 | 5.081E-02 | FAIL ABUN |
| SB-127 | 6.150E+04 | 9.271E+05 | 9.275E+05 | SHORT HLIF |
| I-131 | -2.422E+01 | 7.142E+01 | 7.225E+01 | SHORT HLIF |
| I-132 | 1.000E+41 | 5.801E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.362E+06 | 9.171E+06 | 9.379E+06 | SHORT HLIF |
| BA-133 | -3.817E-02 | 4.049E-02 | 4.399E-02 | FAIL ABUN |
| I-133 | 2.391E+28 | 1.978E+30 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.173E-02 | 2.846E-02 | 3.010E-02 | NOT IDENT. |
| CS-135 | -4.818E-02 | 1.055E-01 | 1.077E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 1.201E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | 5.302E-01 | 4.185E+00 | 4.192E+00 | FAIL ABUN |
| BA-137M | 6.455E-03 | 2.486E-02 | 2.503E-02 | NOT IDENT. |
| CS-137 | 6.819E-03 | 2.626E-02 | 2.644E-02 | NOT IDENT. |
| CE-139 | 3.414E-03 | 3.405E-02 | 3.409E-02 | NOT IDENT. |
| BA-140 | -6.955E+00 | 5.548E+00 | 6.372E+00 | FAIL ABUN |
| LA-140 | -6.955E+00 | 5.548E+00 | 6.372E+00 | FAIL ABUN |
| CE-141 | -2.607E-01 | 2.453E-01 | 2.720E-01 | NOT IDENT. |
| CE-143 | -7.126E+18 | 7.772E+18 | 0.000E+00 | SHORT HLIF |
| CE-144 | -8.721E-02 | 1.617E-01 | 1.664E-01 | NOT IDENT. |
| PM-144 | 8.708E-03 | 3.126E-02 | 3.150E-02 | NOT IDENT. |
| PR-144 | 6.884E-01 | 2.437E+00 | 2.457E+00 | NOT IDENT. |
| PM-146 | -4.111E-03 | 3.260E-02 | 3.265E-02 | NOT IDENT. |
| ND-147 | 7.835E+00 | 5.151E+01 | 5.164E+01 | NOT IDENT. |
| PM-147 | 3.333E+02 | 5.771E+02 | 5.963E+02 | NOT IDENT. |
| PM-149 | -2.403E+10 | 2.014E+12 | 2.014E+12 | SHORT HLIF |
| EU-150 | -1.115E-02 | 2.768E-02 | 2.813E-02 | NOT IDENT. |
| EU-152 | 3.847E-02 | 8.225E-02 | 8.405E-02 | NOT IDENT. |
| GD-153 | 4.308E-02 | 6.589E-02 | 6.869E-02 | NOT IDENT. |
| EU-154 | 1.449E-02 | 5.424E-02 | 5.464E-02 | NOT IDENT. |
| EU-155 | -3.523E-02 | 8.575E-02 | 8.721E-02 | NOT IDENT. |
| TB-160 | -4.592E-03 | 1.946E-01 | 1.946E-01 | NOT IDENT. |
| HO-166M | -1.116E-02 | 4.653E-02 | 4.680E-02 | FAIL ABUN |
| TM-171 | 8.174E+00 | 9.281E+00 | 9.986E+00 | NOT IDENT. |
| LU-176 | 1.346E-02 | 2.478E-02 | 2.551E-02 | NOT IDENT. |
| HF-181 | -7.982E-02 | 1.254E-01 | 1.304E-01 | NOT IDENT. |
| TA-182 | 2.158E-01 | 1.712E-01 | 1.969E-01 | NOT IDENT. |
| RE-183 | 7.692E-02 | 1.992E-01 | 2.022E-01 | NOT IDENT. |
| RE-184 | 4.995E-02 | 3.863E-01 | 3.869E-01 | NOT IDENT. |
| W-188 | 7.408E+00 | 1.501E+01 | 1.538E+01 | FAIL ABUN |
| IR-192 | 6.442E-02 | 5.622E-02 | 6.328E-02 | NOT IDENT. |
| HG-203 | -2.110E-02 | 8.283E-02 | 8.337E-02 | NOT IDENT. |
| BI-207 | -4.841E-03 | 3.638E-02 | 3.645E-02 | NOT IDENT. |
| TL-208 | 6.896E-03 | 3.325E-02 | 3.339E-02 | NOT IDENT. |
| PB-210 | -7.376E-01 | 1.813E+00 | 1.843E+00 | NOT IDENT. |
| BI-211 | 1.657E-01 | 1.823E-01 | 1.970E-01 | NOT IDENT. |
| PB-211 | 4.057E-01 | 4.785E-01 | 5.123E-01 | FAIL ABUN |
| BI-212 | 3.072E-01 | 3.522E-01 | 3.784E-01 | NOT IDENT. |
| PB-212 | 3.153E-03 | 4.996E-02 | 4.998E-02 | NOT IDENT. |
| BI-214 | -1.964E-02 | 7.176E-02 | 7.231E-02 | NOT IDENT. |
| PB-214 | 5.874E-02 | 6.870E-02 | 7.362E-02 | NOT IDENT. |
| RN-219 | 1.749E-02 | 3.242E-01 | 3.242E-01 | NOT IDENT. |
| RN-222 | -1.964E-02 | 7.176E-02 | 7.231E-02 | NOT IDENT. |
| RA-223 | 6.091E-01 | 5.620E-01 | 6.255E-01 | NOT IDENT. |
| RA-224 | -5.231E-01 | 5.304E-01 | 5.805E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | -1.964E-02 | 7.176E-02 | 7.231E-02 | NOT IDENT. |
| AC-227 | -1.262E-01 | 2.243E-01 | 2.314E-01 | FAIL ABUN |
| TH-227 | -1.262E-01 | 2.243E-01 | 2.314E-01 | FAIL ABUN |
| AC-228 | -3.904E-03 | 1.331E-01 | 1.331E-01 | NOT IDENT. |
| RA-228 | -3.904E-03 | 1.331E-01 | 1.331E-01 | NOT IDENT. |
| TH-228 | 3.153E-03 | 4.996E-02 | 4.998E-02 | NOT IDENT. |
| TH-229 | 6.148E-02 | 4.283E-01 | 4.292E-01 | NOT IDENT. |
| TH-230 | -1.964E-02 | 7.175E-02 | 7.230E-02 | NOT IDENT. |
| PA-231 | 5.110E-02 | 1.048E+00 | 1.048E+00 | NOT IDENT. |
| TH-231 | 6.091E-01 | 5.620E-01 | 6.255E-01 | NOT IDENT. |
| TH-232 | -3.904E-03 | 1.331E-01 | 1.331E-01 | NOT IDENT. |
| PA-233 | -3.500E-02 | 4.618E-02 | 4.880E-02 | NOT IDENT. |
| PA-234 | 1.175E-01 | 2.815E-01 | 2.865E-01 | FAIL ABUN |
| PA-234M | 6.931E-01 | 3.691E+00 | 3.704E+00 | NOT IDENT. |
| TH-234 | 1.623E+00 | 1.310E+00 | 1.501E+00 | FAIL ABUN |
| U-234 | -1.964E-02 | 7.175E-02 | 7.230E-02 | NOT IDENT. |
| U-235 | -5.746E-02 | 1.662E-01 | 1.682E-01 | FAIL ABUN |
| NP-237 | -3.500E-02 | 4.618E-02 | 4.880E-02 | NOT IDENT. |
| NP-238 | -7.992E+11 | 1.210E+12 | 1.262E+12 | SHORT HLIF |
| U-238 | 1.623E+00 | 1.310E+00 | 1.501E+00 | FAIL ABUN |
| NP-239 | 1.602E-02 | 2.830E-01 | 2.831E-01 | NOT IDENT. |
| PU-239 | 1.003E+02 | 2.383E+02 | 2.426E+02 | NOT IDENT. |
| AM-241 | 3.537E-02 | 7.544E-02 | 7.711E-02 | NOT IDENT. |
| AM-243 | 9.543E-04 | 3.501E-02 | 3.501E-02 | NOT IDENT. |
| CM-243 | 3.853E-02 | 7.529E-02 | 7.727E-02 | NOT IDENT. |
| CM-247 | 9.392E-03 | 2.805E-02 | 2.837E-02 | NOT IDENT. |
| CF-249 | 1.600E-02 | 3.363E-02 | 3.440E-02 | NOT IDENT. |
| CF-251 | 7.133E-02 | 9.460E-02 | 9.991E-02 | FAIL ABUN |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 39.3524 | 94.67 | 58.8689 | 193.51 | 41.7176 |
| 45.60 | 41.5494 | 94.87 | 63.2543 | 197.03 | 40.9384 |
| 46.54 | 38.7660 | 97.43 | 25.2085 | 198.01 | 41.9385 |
| 49.72 | 0.0000 | 98.43 | 31.8458 | 201.83 | 41.1665 |
| 51.35 | 33.4376 | 98.44 | 31.8463 | 205.31 | 30.7573 |
| 52.39 | 25.6481 | 99.53 | 37.4146 | 210.85 | 29.0149 |
| 53.44 | 29.6841 | 100.11 | 36.3541 | 215.65 | 36.9470 |
| 57.36 | 0.0000 | 103.18 | 29.2504 | 222.11 | 36.2268 |
| 57.53 | 21.0189 | 103.37 | 24.9382 | 227.09 | 32.4816 |
| 57.98 | 19.5415 | 105.21 | 38.3678 | 227.38 | 32.4917 |
| 59.32 | 24.1384 | 105.31 | 38.3749 | 228.16 | 0.0000 |
| 59.54 | 21.1336 | 106.12 | 28.4058 | 228.18 | 27.5918 |
| 63.29 | 31.5059 | 109.28 | 33.6087 | 235.69 | 44.6903 |
| 63.58 | 35.0892 | 111.00 | 30.3400 | 235.96 | 40.7291 |
| 64.28 | 35.1521 | 111.76 | 0.0000 | 238.63 | 25.8984 |
| 66.73 | 38.4451 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 33.8743 | 117.23 | 32.9393 | 240.99 | 50.9222 |
| 67.75 | 34.5336 | 121.12 | 33.1544 | 242.00 | 52.9729 |
| 69.67 | 38.2067 | 121.22 | 30.8730 | 244.70 | 20.0438 |
| 70.83 | 43.4904 | 121.78 | 30.9015 | 252.40 | 0.0000 |
| 72.81 | 48.8964 | 122.06 | 30.9157 | 252.80 | 31.3165 |
| 72.87 | 48.9034 | 123.07 | 35.5547 | 254.15 | 0.0000 |
| 74.66 | 50.1521 | 127.23 | 34.6397 | 256.23 | 41.5560 |
| 74.82 | 50.1704 | 129.30 | 30.1199 | 260.90 | 0.0000 |
| 74.97 | 49.1422 | 131.20 | 36.0200 | 264.66 | 23.4994 |
| 77.11 | 46.2301 | 133.02 | 30.2958 | 268.22 | 24.6028 |
| 79.69 | 46.4969 | 133.52 | 33.8177 | 269.46 | 26.6836 |
| 80.12 | 45.4832 | 136.00 | 23.8797 | 271.23 | 20.5597 |
| 80.19 | 0.0000 | 136.47 | 25.3024 | 273.65 | 21.6354 |
| 80.57 | 31.7639 | 140.51 | 0.0000 | 276.40 | 21.6899 |
| 81.00 | 32.8535 | 143.76 | 42.6321 | 277.37 | 20.6754 |
| 81.07 | 34.9784 | 144.24 | 45.7094 | 277.60 | 16.5437 |
| 83.79 | 40.5151 | 145.44 | 49.8596 | 278.00 | 19.6526 |
| 85.43 | 40.6560 | 152.43 | 37.7703 | 279.20 | 22.7805 |
| 86.55 | 47.1860 | 153.25 | 34.2125 | 279.54 | 23.8233 |
| 86.79 | 47.2095 | 154.21 | 37.8645 | 280.46 | 23.8430 |
| 86.94 | 42.9313 | 156.02 | 56.0357 | 283.69 | 21.8328 |
| 87.09 | 42.9447 | 158.56 | 36.2787 | 284.31 | 0.0000 |
| 87.57 | 46.2115 | 159.00 | 34.4853 | 285.41 | 22.9074 |
| 88.03 | 44.1041 | 162.33 | 55.6080 | 285.90 | 0.0000 |
| 88.34 | 38.7502 | 163.33 | 42.9032 | 287.50 | 30.2518 |
| 88.47 | 38.7605 | 165.86 | 41.2159 | 290.67 | 26.7797 |
| 89.96 | 69.1178 | 176.31 | 40.1061 | 293.27 | 0.0000 |
| 91.11 | 43.2992 | 176.60 | 40.1206 | 295.22 | 27.3060 |
| 92.59 | 34.7422 | 177.52 | 41.6551 | 295.96 | 27.3235 |
| 93.35 | 33.7073 | 181.07 | 0.0000 | 298.58 | 27.3850 |
| 94.56 | 41.4174 | 184.41 | 33.7604 | 299.98 | 27.4179 |
| 94.65 | 58.8667 | 185.72 | 33.8145 | 300.09 | 27.4207 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 27.4215 | 497.08 | 11.2918 | 711.68 | 11.8502 |
| 301.36 | 27.4500 | 505.52 | 6.4838 | 720.70 | 8.6520 |
| 302.85 | 33.8276 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 23.7125 | 511.00 | 10.7317 | 722.78 | 10.8247 |
| 306.78 | 22.0610 | 514.00 | 3.2575 | 722.91 | 10.8252 |
| 308.46 | 19.1181 | 514.00 | 3.2575 | 723.31 | 11.9099 |
| 311.90 | 23.4337 | 520.40 | 14.7118 | 724.19 | 7.5819 |
| 316.51 | 14.9692 | 520.69 | 0.0000 | 727.33 | 5.4229 |
| 319.41 | 27.8658 | 522.65 | 0.0000 | 733.00 | 13.0462 |
| 320.08 | 33.2431 | 527.90 | 0.0000 | 735.93 | 9.7969 |
| 321.04 | 32.1959 | 529.59 | 13.8011 | 737.46 | 11.9818 |
| 323.87 | 15.4894 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 34.4585 | 531.02 | 10.8520 | 747.24 | 10.9373 |
| 328.76 | 19.0059 | 546.56 | 0.0000 | 748.06 | 6.5646 |
| 333.37 | 34.6826 | 552.55 | 13.9737 | 752.31 | 7.6723 |
| 333.97 | 31.2289 | 563.25 | 14.0526 | 753.82 | 9.8706 |
| 334.37 | 26.0325 | 569.33 | 12.0835 | 756.73 | 12.0785 |
| 338.28 | 23.9363 | 569.50 | 12.0844 | 756.80 | 12.0788 |
| 338.32 | 23.9370 | 569.70 | 12.0858 | 763.94 | 14.6842 |
| 340.48 | 33.7861 | 583.19 | 16.9027 | 765.81 | 18.3691 |
| 340.55 | 33.7880 | 584.27 | 13.1914 | 766.42 | 16.5366 |
| 344.28 | 20.7685 | 595.83 | 14.2892 | 766.84 | 14.7015 |
| 345.93 | 27.3617 | 600.60 | 17.3926 | 772.60 | 0.0000 |
| 351.06 | 16.4813 | 602.52 | 0.0000 | 776.52 | 11.9923 |
| 351.93 | 18.6910 | 602.73 | 12.2900 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 25.6299 | 778.90 | 9.2336 |
| 356.01 | 36.3944 | 609.32 | 20.5503 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 16.4484 | 785.37 | 12.0352 |
| 366.42 | 0.0000 | 614.28 | 30.9009 | 792.07 | 15.7805 |
| 375.05 | 33.5522 | 618.01 | 15.4786 | 794.95 | 6.5052 |
| 383.85 | 22.5092 | 620.36 | 19.6285 | 795.86 | 4.6482 |
| 388.16 | 19.8682 | 621.93 | 23.7788 | 801.95 | 9.3191 |
| 388.63 | 19.8749 | 630.19 | 0.0000 | 810.29 | 11.2195 |
| 391.69 | 19.9174 | 631.29 | 12.4626 | 810.45 | 11.2202 |
| 400.66 | 18.2192 | 633.25 | 14.5530 | 810.76 | 10.2863 |
| 401.81 | 15.1947 | 634.78 | 11.4428 | 815.77 | 10.3065 |
| 402.40 | 12.1606 | 635.95 | 12.4901 | 818.51 | 8.4415 |
| 404.85 | 19.1851 | 636.99 | 0.0000 | 832.01 | 11.3140 |
| 410.95 | 19.6574 | 645.85 | 12.5487 | 834.85 | 10.3825 |
| 413.71 | 22.0570 | 657.76 | 8.7630 | 835.71 | 14.1626 |
| 414.70 | 17.4732 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 20.3981 | 661.66 | 8.4275 | 846.75 | 0.0000 |
| 427.87 | 19.4809 | 664.57 | 0.0000 | 846.77 | 11.3777 |
| 433.94 | 22.3515 | 666.33 | 7.3900 | 856.80 | 8.5655 |
| 439.40 | 14.9531 | 666.50 | 7.3905 | 860.56 | 10.4835 |
| 453.88 | 16.0332 | 667.71 | 0.0000 | 871.09 | 11.4812 |
| 463.37 | 18.9731 | 677.62 | 7.4281 | 873.19 | 6.7026 |
| 468.07 | 14.2707 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 11.7638 | 879.38 | 7.6776 |
| 475.06 | 19.1079 | 696.49 | 10.7014 | 880.51 | 7.6807 |
| 476.78 | 13.3894 | 696.51 | 10.7014 | 883.24 | 7.6883 |
| 477.60 | 12.4390 | 697.00 | 10.7039 | 884.68 | 6.7308 |
| 482.18 | 20.1487 | 697.49 | 10.7061 | 889.28 | 6.7421 |
| 487.02 | 17.3197 | 702.65 | 10.7305 | 894.76 | 8.6856 |
| 492.35 | 0.0000 | 706.68 | 8.5996 | 898.04 | 5.7972 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 6.7761 | 1312.11 | 9.2097 | | |
| 911.20 | 7.7660 | 1332.49 | 6.6133 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 3.9041 | 1365.19 | 4.7635 | | |
| 937.49 | 4.8988 | 1368.63 | 0.0000 | | |
| 944.13 | 6.8740 | 1384.29 | 5.7437 | | |
| 946.00 | 7.8612 | 1408.01 | 2.8889 | | |
| 949.00 | 6.8855 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 10.7291 | | |
| 962.31 | 10.8695 | 1489.16 | 1.9639 | | |
| 964.08 | 12.8535 | 1505.03 | 4.9282 | | |
| 966.17 | 8.9048 | 1596.21 | 10.0628 | | |
| 968.97 | 8.9132 | 1620.50 | 1.0117 | | |
| 983.53 | 9.9520 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.0814 | | |
| 996.26 | 12.9923 | 1750.46 | 0.0000 | | |
| 1001.03 | 9.0090 | 1764.49 | 4.1716 | | |
| 1004.73 | 7.0154 | 1770.23 | 7.3088 | | |
| 1021.30 | 0.0000 | 1771.35 | 8.3549 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.1566 | | |
| 1037.84 | 6.0779 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 1.0579 | | |
| 1046.59 | 6.0947 | | | | |
| 1048.07 | 6.0977 | | | | |
| 1049.04 | 3.0498 | | | | |
| 1050.41 | 4.0682 | | | | |
| 1063.66 | 7.1490 | | | | |
| 1077.00 | 8.2041 | | | | |
| 1077.34 | 8.2051 | | | | |
| 1085.87 | 9.2549 | | | | |
| 1099.45 | 11.3585 | | | | |
| 1112.07 | 7.2558 | | | | |
| 1112.84 | 7.2575 | | | | |
| 1115.54 | 9.3387 | | | | |
| 1120.29 | 6.2346 | | | | |
| 1120.55 | 6.2351 | | | | |
| 1121.30 | 5.1971 | | | | |
| 1129.67 | 8.3363 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 9.4984 | | | | |
| 1177.95 | 4.2272 | | | | |
| 1189.05 | 3.1804 | | | | |
| 1204.77 | 4.2596 | | | | |
| 1221.41 | 1.0699 | | | | |
| 1231.02 | 1.0727 | | | | |
| 1235.36 | 5.3701 | | | | |
| 1238.28 | 4.2995 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 1.8595 | | | | |
| 1274.44 | 1.8608 | | | | |
| 1274.54 | 1.8608 | | | | |
| 1291.59 | 6.5427 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:01:41.77

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017840.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM14.CNF;396
                                        Background date  : 2-FEB-2014 16:27:01.
Sample date      : 17-JAN-2014 00:00:00 Acquisition date : 7-FEB-2014 08:45:04.
Sample ID        : G1203017840          Sample quantity  : 1.71780E+02 GRAM
Detector name    : GAM14                Detector geometry: 500MLMB
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:08.26  0.9%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1359496              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 35.63* | 1565 | 349 | 1.78 | 71.89 | 67 | 32 | 1.74E+00 | 6.3 | 1.44E+02 |
| 2 | 3 | 42.13 | 1419 | 1706 | 1.80 | 84.89 | 67 | 32 | 1.58E+00 | 7.8 | |
| 3 | 3 | 46.32* | 7676 | 3417 | 1.80 | 93.26 | 67 | 32 | 8.53E+00 | 1.7 | |
| 4 | 0 | 59.32 | 14539 | 6721 | 1.30 | 119.26 | 111 | 16 | 1.62E+01 | 1.5 | |
| 5 | 0 | 66.43 | 238 | 2981 | 1.03 | 133.49 | 129 | 9 | 2.64E-01 | 41.8 | |
| 6 | 0 | 88.19 | 18108 | 5098 | 1.31 | 176.99 | 170 | 15 | 2.01E+01 | 1.1 | |
| 7 | 0 | 122.17 | 5624 | 2742 | 1.30 | 244.95 | 238 | 13 | 6.25E+00 | 2.3 | |
| 8 | 0 | 136.41 | 897 | 2084 | 1.14 | 273.44 | 267 | 12 | 9.97E-01 | 10.7 | |
| 9 | 0 | 165.92 | 1474 | 1740 | 1.37 | 332.46 | 327 | 11 | 1.64E+00 | 6.1 | |
| 10 | 0 | 193.61 | 46 | 1336 | 1.39 | 387.83 | 387 | 8 | 5.14E-02 | 137.5 | |
| 11 | 0 | 225.55 | 65 | 1551 | 2.19 | 451.70 | 449 | 9 | 7.26E-02 | 109.3 | |
| 12 | 0 | 252.87 | 46 | 1203 | 0.66 | 506.32 | 504 | 8 | 5.15E-02 | 130.0 | |
| 13 | 0 | 319.60 | 98 | 1059 | 0.81 | 639.76 | 636 | 10 | 1.09E-01 | 63.3 | |
| 14 | 0 | 350.23* | 74 | 791 | 1.79 | 701.01 | 699 | 8 | 8.23E-02 | 66.8 | |
| 15 | 0 | 383.05 | 37 | 885 | 0.74 | 766.65 | 761 | 9 | 4.12E-02 | 146.6 | |
| 16 | 0 | 391.63 | 652 | 1226 | 1.59 | 783.79 | 778 | 12 | 7.24E-01 | 11.4 | |
| 17 | 0 | 510.89* | 316 | 1038 | 2.75 | 1022.24 | 1016 | 14 | 3.51E-01 | 22.4 | |
| 18 | 0 | 661.52 | 14723 | 884 | 1.64 | 1323.40 | 1317 | 14 | 1.64E+01 | 0.9 | |
| 19 | 0 | 687.78 | 31 | 457 | 1.22 | 1375.91 | 1370 | 9 | 3.41E-02 | 127.7 | |
| 20 | 0 | 737.44* | 36 | 408 | 2.30 | 1475.20 | 1474 | 8 | 4.04E-02 | 97.2 | |
| 21 | 0 | 898.04 | 549 | 996 | 2.07 | 1796.24 | 1791 | 13 | 6.10E-01 | 12.6 | |
| 22 | 0 | 1115.19 | 2738 | 799 | 1.91 | 2230.28 | 2222 | 18 | 3.04E+00 | 3.1 | |
| 23 | 0 | 1172.85 | 13276 | 526 | 1.94 | 2345.54 | 2338 | 19 | 1.48E+01 | 1.0 | |
| 24 | 0 | 1224.27 | 12 | 93 | 0.86 | 2448.29 | 2444 | 8 | 1.36E-02 | 140.4 | |
| 25 | 0 | 1239.00 | 9 | 83 | 0.74 | 2477.74 | 2472 | 9 | 1.02E-02 | 182.7 | |
| 26 | 0 | 1310.79 | 15 | 34 | 0.86 | 2621.22 | 2617 | 7 | 1.70E-02 | 67.6 | |
| 27 | 1 | 1313.15 | 35 | 17 | 1.79 | 2625.93 | 2623 | 13 | 3.91E-02 | 27.4 | 1.03E+00 |
| 28 | 1 | 1316.49 | 30 | 29 | 1.86 | 2632.60 | 2623 | 13 | 3.35E-02 | 32.6 | |
| 29 | 0 | 1332.05* | 12094 | 200 | 2.09 | 2663.71 | 2654 | 21 | 1.34E+01 | 1.0 | |
| 30 | 0 | 1487.66 | 19 | 35 | 0.64 | 2974.66 | 2968 | 12 | 2.10E-02 | 69.2 | |
| 31 | 0 | 1492.94 | 9 | 27 | 0.86 | 2985.22 | 2979 | 9 | 9.66E-03 | 113.1 | |
| 32 | 0 | 1661.17 | 28 | 125 | 13.85 | 3321.38 | 3287 | 45 | 3.09E-02 | 141.3 | |
| 33 | 0 | 1669.26 | 4 | 25 | 1.23 | 3337.55 | 3331 | 9 | 4.25E-03 | 240.4 | |
| 34 | 0 | 1805.52 | 20 | 8 | 3.33 | 3609.79 | 3603 | 11 | 2.18E-02 | 36.3 | |

Sample ID : G1203017840 Acquisition date : 7-FEB-2014 08:45:04

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 0 | 1835.67 | 338 | 28 | 2.14 | 3670.02 | 3660 | 22 | 3.76E-01 | 6.7 | |
| 36 | 0 | 1849.28 | 11 | 12 | 2.52 | 3697.21 | 3686 | 16 | 1.24E-02 | 75.6 | |
| 37 | 0 | 1863.82 | 24 | 4 | 2.27 | 3726.26 | 3722 | 9 | 2.67E-02 | 25.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated  7-FEB-2014 09:01:43

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017840.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 17-JAN-2014 00:00:00 | Acquisition date | : 7-FEB-2014 08:45:04 |
| Sample ID | : G1203017840 | Sample quantity | : 171.78 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA14 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 00:15:00.00 | Elapsed real time | : 0 00:15:08.26 0.9% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CR-51 | 320.08 | 98 | 9.91* | 3.775E+00 | 4.563E+00 | 7.790E+00 | 126.57 |
| CO-57 | 122.06 | 5624 | 85.60* | 6.014E+00 | 1.910E+01 | 2.017E+01 | 4.67 |
| | 136.47 | 897 | 10.68 | 5.986E+00 | 2.454E+01 | 2.592E+01 | 21.41 |
| CO-60 | 1173.23 | 13276 | 99.85 | 1.385E+00 | 1.678E+02 | 1.691E+02 | 1.93 |
| | 1332.49 | 12094 | 99.98* | 1.238E+00 | 1.708E+02 | 1.721E+02 | 1.91 |
| ZN-65 | 1115.54 | 2738 | 50.60* | 1.448E+00 | 6.532E+01 | 6.941E+01 | 6.18 |
| Y-88 | 898.04 | 549 | 93.70 | 1.746E+00 | 5.869E+00 | 6.744E+00 | 25.28 |
| | 1836.06 | 338 | 99.20* | 9.535E-01 | 6.248E+00 | 7.179E+00 | 13.46 |
| CD-109 | 88.03 | 18108 | 3.70* | 5.015E+00 | 1.706E+03 | 1.762E+03 | 2.29 |
| SN-113 | 391.69 | 652 | 64.94* | 3.275E+00 | 5.356E+00 | 6.092E+00 | 22.88 |
| SN-126 | 64.28 | ------ | 9.60 | 2.663E+00 | ------ Line Not Found | | ------ |
| | 86.94 | 18108 | 8.90 | 5.015E+00 | 7.092E+02 | 7.092E+02 | 2.29 |
| | 87.57 | 18108 | 37.00* | 5.015E+00 | 1.706E+02 | 1.706E+02 | 2.29 |
| BA-137M | 661.66 | 14723 | 89.90* | 2.234E+00 | 1.281E+02 | 1.283E+02 | 1.86 |
| CS-137 | 661.66 | 14723 | 85.10* | 2.234E+00 | 1.354E+02 | 1.356E+02 | 1.86 |
| CE-139 | 165.86 | 1474 | 80.00* | 5.643E+00 | 5.709E+00 | 6.357E+00 | 12.13 |
| PM-147 | 121.22 | 5624 | 0.00* | 6.014E+00 | 5.737E+05 | 5.826E+05 | 4.67 |
| RE-183 | 57.98 | 14539 | 34.30* | 2.040E+00 | 3.632E+02 | 4.488E+02 | 3.03 |
| | 59.32 | 14539 | 58.90 | 2.040E+00 | 2.115E+02 | 2.614E+02 | 3.03 |
| | 67.24 | 238 | 12.90 | 2.929E+00 | 1.100E+01 | 1.360E+01 | 83.55 |
| | 162.33 | ------ | 23.30 | 5.695E+00 | ------ Line Not Found | | ------ |
| PB-210 | 46.54 | 7676 | 4.25* | 6.216E-01 | 5.080E+03 | 5.089E+03 | 3.49 |
| BI-211 | 72.87 | ------ | 1.23 | 3.676E+00 | ------ Line Not Found | | ------ |
| | 351.06 | 74 | 12.92* | 3.542E+00 | 2.828E+00 | 2.828E+00 | 133.61 |
| AM-241 | 59.54 | 14539 | 35.90* | 2.040E+00 | 3.470E+02 | 3.471E+02 | 3.03 |
| ANH-511 | 511.00 | 316 | 100.00* | 2.709E+00 | 2.041E+00 | 2.041E+00 | 44.82 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:01:44.20

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017840.CNF;1 | | |
| Acquisition date | : 7-FEB-2014 08:45:04 | Sensitivity | : 3.000 |
| Detector ID | : GAM14 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 00:15:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 00:15:08.26 | Half life ratio | : ***** |
| Sample date | : 17-JAN-2014 00:00:00 | Nuclide Library | : SOLID |
| Sample ID | : G1203017840 | Analyst initials | : RXF2 |
| Batch Number | : 1359496 | Sample Quantity | : 1.7178E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | |
|---|---|
| Eff. Cal. date | : 14-NOV-2013 13:13:25 |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM14_500MLMB.CNF;8 |
| Eff. Geometry | : 500MLMB |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CR-51 | 7.790E+00 | 9.662E+00 | 1.257E+01 |
| CO-57 | 2.017E+01 | 9.237E-01 | 7.171E-01 |
| CO-60 | 1.721E+02 | 3.225E+00 | 6.509E-01 |
| ZN-65 | 6.941E+01 | 4.205E+00 | 2.847E+00 |
| Y-88 | 7.179E+00 | 9.466E-01 | 5.174E-01 |
| CD-109 | 1.762E+03 | 3.952E+01 | 2.440E+01 |
| SN-113 | 6.092E+00 | 1.366E+00 | 1.414E+00 |
| SN-126 | 1.706E+02 | 3.827E+00 | 2.377E+00 |
| BA-137M | 1.283E+02 | 2.336E+00 | 1.076E+00 |
| CS-137 | 1.356E+02 | 2.468E+00 | 1.136E+00 |
| CE-139 | 6.357E+00 | 7.560E-01 | 7.924E-01 |
| PM-147 | 5.826E+05 | 2.668E+04 | 2.072E+04 |
| RE-183 | 4.488E+02 | 1.332E+01 | 9.643E+00 |
| PB-210 | 5.089E+03 | 1.742E+02 | 1.336E+02 |
| BI-211 | 2.828E+00 | 3.703E+00 | 5.937E+00 |
| AM-241 | 3.471E+02 | 1.030E+01 | 6.761E+00 |
| ANH-511 | 2.041E+00 | 8.964E-01 | 8.649E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -6.220E+00 | 6.840E+00 | 1.144E+01 | NOT IDENT. |
| NA-22 | 3.658E-01 | 3.759E-01 | 7.116E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 5.966E+09 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.025E-02 | 3.334E-01 | 5.233E-01 | NOT IDENT. |
| K-40 | -7.250E-01 | 2.847E+00 | 5.060E+00 | NOT IDENT. |
| SC-46 | -4.827E-03 | 9.407E-01 | 1.641E+00 | NOT IDENT. |
| V-48 | -8.815E-01 | 1.971E+00 | 3.393E+00 | FAIL ABUN |
| MN-54 | -2.185E-01 | 7.518E-01 | 1.249E+00 | NOT IDENT. |
| CO-56 | -3.739E-01 | 9.004E-01 | 1.489E+00 | FAIL ABUN |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | -3.005E-01 | 8.500E-01 | 1.411E+00 | NOT IDENT. |
| FE-59 | 1.086E+00 | 2.027E+00 | 3.564E+00 | NOT IDENT. |
| GE-68 | -1.480E+00 | 2.594E+01 | 4.498E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-73 | 0.000E+00 | 3.154E+01 | 4.780E+01 | NOT IDENT. |
| AS-74 | 4.597E-01 | 1.996E+00 | 3.414E+00 | NOT IDENT. |
| SE-75 | -3.419E-01 | 7.810E-01 | 1.343E+00 | FAIL ABUN |
| BR-77 | 3.709E+02 | 8.872E+02 | 1.551E+03 | NOT IDENT. |
| SR-82 | 6.612E+00 | 7.699E+00 | 1.325E+01 | NOT IDENT. |
| RB-83 | -9.901E-01 | 1.353E+00 | 2.264E+00 | NOT IDENT. |
| KR-85 | 1.850E+02 | 1.366E+02 | 2.107E+02 | NOT IDENT. |
| SR-85 | 1.045E+00 | 7.728E-01 | 1.193E+00 | NOT IDENT. |
| RB-86 | 1.097E+00 | 2.040E+01 | 3.547E+01 | NOT IDENT. |
| Y-91 | 1.257E+02 | 2.384E+02 | 4.303E+02 | NOT IDENT. |
| NB-94 | 4.368E-01 | 5.590E-01 | 9.664E-01 | NOT IDENT. |
| NB-95 | 3.283E-01 | 7.966E-01 | 1.356E+00 | NOT IDENT. |
| NB-95M | -1.275E-01 | 2.033E+00 | 3.526E+00 | NOT IDENT. |
| ZR-95 | 5.286E-01 | 1.397E+00 | 2.379E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | 9.755E+39 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.531E+10 | 0.000E+00 | SHORT HLIF |
| MO-99 | 6.750E+02 | 1.064E+03 | 1.827E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | 1.907E+25 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.283E-01 | 5.665E-01 | 8.317E-01 | NOT IDENT. |
| RH-102 | -2.385E-01 | 9.650E-01 | 1.625E+00 | NOT IDENT. |
| RU-103 | -4.105E-02 | 8.029E-01 | 1.369E+00 | NOT IDENT. |
| RH-106 | 1.517E+00 | 5.585E+00 | 9.545E+00 | NOT IDENT. |
| RU-106 | 1.517E+00 | 5.585E+00 | 9.545E+00 | NOT IDENT. |
| AG-108M | 2.727E-01 | 5.745E-01 | 9.922E-01 | NOT IDENT. |
| AG-110M | 4.652E-02 | 1.120E+00 | 1.956E+00 | NOT IDENT. |
| CD-115 | -1.775E+03 | 1.398E+03 | 2.305E+03 | NOT IDENT. |
| SN-117M | -6.405E-01 | 1.181E+00 | 1.938E+00 | NOT IDENT. |
| TE-123M | -1.801E-01 | 4.759E-01 | 7.547E-01 | NOT IDENT. |
| SB-124 | -6.760E-01 | 7.874E-01 | 1.292E+00 | NOT IDENT. |
| SB-125 | -5.516E-01 | 1.722E+00 | 2.928E+00 | FAIL ABUN |
| TE-125M | 9.266E+01 | 1.786E+02 | 3.004E+02 | NOT IDENT. |
| I-126 | -2.096E+00 | 6.163E+00 | 8.877E+00 | NOT IDENT. |
| SB-126 | 1.415E+00 | 3.652E+00 | 6.228E+00 | NOT IDENT. |
| SB-127 | -7.833E+01 | 8.454E+01 | 1.186E+02 | FAIL ABUN |
| I-131 | 2.030E+00 | 3.512E+00 | 6.113E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 7.240E+00 | 5.362E+01 | 8.134E+01 | NOT IDENT. |
| BA-133 | 6.178E-02 | 8.127E-01 | 1.217E+00 | FAIL ABUN |
| I-133 | 0.000E+00 | 1.499E+07 | 0.000E+00 | SHORT HLIF |
| CS-134 | -3.500E-01 | 7.800E-01 | 1.293E+00 | NOT IDENT. |
| CS-135 | 1.754E+00 | 2.576E+00 | 4.515E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | 3.955E+23 | 0.000E+00 | SHORT HLIF |
| CS-136 | -7.481E-01 | 3.023E+00 | 5.220E+00 | NOT IDENT. |
| BA-140 | -1.857E-01 | 1.031E+00 | 1.833E+00 | NOT IDENT. |
| LA-140 | -1.857E-01 | 1.031E+00 | 1.833E+00 | NOT IDENT. |
| CE-141 | 4.976E-01 | 1.093E+00 | 1.830E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | 4.645E+04 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.033E+00 | 3.649E+00 | 5.333E+00 | NOT IDENT. |
| PM-144 | -3.557E-01 | 5.800E-01 | 9.629E-01 | NOT IDENT. |
| PR-144 | -2.714E+01 | 4.353E+01 | 7.226E+01 | NOT IDENT. |
| PM-146 | 9.335E-01 | 8.876E-01 | 1.545E+00 | NOT IDENT. |
| ND-147 | 3.626E+00 | 1.443E+01 | 2.477E+01 | FAIL ABUN |
| PM-149 | -7.126E+03 | 1.064E+04 | 1.818E+04 | NOT IDENT. |
| EU-150 | 2.466E-01 | 4.438E-01 | 7.741E-01 | FAIL ABUN |
| EU-152 | 4.988E-02 | 1.742E+00 | 2.923E+00 | FAIL ABUN |
| GD-153 | 2.672E-01 | 1.447E+00 | 2.428E+00 | NOT IDENT. |
| EU-154 | 9.251E-01 | 1.070E+00 | 2.012E+00 | FAIL ABUN |
| EU-155 | -1.191E+00 | 1.804E+00 | 2.980E+00 | NOT IDENT. |
| TB-160 | 8.354E-01 | 3.053E+00 | 5.366E+00 | FAIL ABUN |
| HO-166M | 3.457E-01 | 1.073E+00 | 1.829E+00 | NOT IDENT. |
| TM-171 | 7.529E+02 | 7.615E+02 | 9.635E+02 | FAIL ABUN |
| LU-176 | 1.487E-01 | 4.517E-01 | 7.851E-01 | FAIL ABUN |
| HF-181 | 4.257E-01 | 9.161E-01 | 1.580E+00 | NOT IDENT. |
| TA-182 | -1.366E+00 | 2.307E+00 | 3.339E+00 | FAIL ABUN |
| RE-184 | 1.545E-01 | 3.688E+00 | 5.555E+00 | NOT IDENT. |
| W-188 | 3.793E+01 | 1.282E+02 | 2.230E+02 | NOT IDENT. |
| IR-192 | 2.969E-01 | 7.148E-01 | 1.085E+00 | NOT IDENT. |
| HG-203 | 8.905E-02 | 6.940E-01 | 1.204E+00 | NOT IDENT. |
| BI-207 | -1.155E-01 | 1.041E+00 | 1.804E+00 | NOT IDENT. |
| TL-208 | 2.370E-01 | 5.949E-01 | 1.023E+00 | NOT IDENT. |
| PB-211 | 4.372E+00 | 1.291E+01 | 2.229E+01 | NOT IDENT. |
| BI-212 | -7.982E-01 | 8.888E+00 | 1.495E+01 | NOT IDENT. |
| PB-212 | -1.089E-02 | 9.282E-01 | 1.611E+00 | NOT IDENT. |
| BI-214 | -3.896E-01 | 1.136E+00 | 1.912E+00 | NOT IDENT. |
| PB-214 | 5.302E-01 | 1.415E+00 | 2.140E+00 | FAIL ABUN |
| RN-219 | 5.849E+00 | 7.333E+00 | 1.278E+01 | NOT IDENT. |
| RN-222 | -3.896E-01 | 1.136E+00 | 1.912E+00 | NOT IDENT. |
| RA-223 | 1.874E+00 | 1.194E+01 | 1.799E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 2.035E+00 | 9.909E+00 | 1.725E+01 | NOT IDENT. |
| RA-226 | -3.896E-01 | 1.136E+00 | 1.912E+00 | NOT IDENT. |
| AC-227 | 2.270E+00 | 4.870E+00 | 7.431E+00 | NOT IDENT. |
| TH-227 | 2.270E+00 | 4.870E+00 | 7.431E+00 | NOT IDENT. |
| AC-228 | -4.891E-01 | 3.151E+00 | 5.474E+00 | NOT IDENT. |
| RA-228 | -4.891E-01 | 3.151E+00 | 5.474E+00 | NOT IDENT. |
| TH-228 | -1.089E-02 | 9.282E-01 | 1.611E+00 | NOT IDENT. |
| TH-229 | 3.507E+00 | 9.451E+00 | 1.419E+01 | FAIL ABUN |
| TH-230 | -3.896E-01 | 1.136E+00 | 1.912E+00 | NOT IDENT. |
| PA-231 | -5.102E-01 | 2.394E+01 | 4.142E+01 | NOT IDENT. |
| TH-231 | 1.874E+00 | 1.194E+01 | 1.799E+01 | NOT IDENT. |
| TH-232 | -4.891E-01 | 3.151E+00 | 5.474E+00 | NOT IDENT. |
| PA-233 | -5.722E-02 | 1.095E+00 | 1.889E+00 | NOT IDENT. |
| PA-234 | -4.657E-01 | 7.382E+00 | 1.281E+01 | NOT IDENT. |
| PA-234M | 3.111E+01 | 9.333E+01 | 1.638E+02 | NOT IDENT. |
| TH-234 | 1.580E+01 | 4.043E+01 | 4.342E+01 | NOT IDENT. |
| U-234 | -3.896E-01 | 1.136E+00 | 1.912E+00 | NOT IDENT. |
| U-235 | -1.997E+00 | 3.075E+00 | 5.047E+00 | NOT IDENT. |
| NP-237 | -5.722E-02 | 1.095E+00 | 1.889E+00 | NOT IDENT. |
| NP-238 | 0.000E+00 | 3.382E+03 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.580E+01 | 4.043E+01 | 4.342E+01 | NOT IDENT. |
| NP-239 | 5.789E-01 | 7.868E+00 | 1.147E+01 | NOT IDENT. |
| PU-239 | 7.970E+02 | 5.726E+03 | 8.824E+03 | NOT IDENT. |
| AM-243 | -9.985E-02 | 1.091E+00 | 1.826E+00 | FAIL ABUN |
| CM-243 | 4.879E-01 | 1.818E+00 | 3.050E+00 | NOT IDENT. |
| CM-247 | 3.699E-01 | 6.716E-01 | 1.165E+00 | NOT IDENT. |
| CF-249 | 7.175E-01 | 1.013E+00 | 1.226E+00 | FAIL ABUN |
| CF-251 | -1.441E-01 | 1.955E+00 | 3.230E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 7-FEB-2014 09:01:40.21

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 35.63 | 1574 | 349 | 1.78 | 71.89 | 67 | 32 | 1.75E+00 | 6.3 | 1.44E+02 |
| 2 | 3 | 42.13 | 1419 | 1706 | 1.80 | 84.89 | 67 | 32 | 1.58E+00 | 7.8 | |
| 3 | 3 | 46.32 | 7684 | 3417 | 1.80 | 93.26 | 67 | 32 | 8.54E+00 | 1.7 | |
| 4 | 0 | 59.32 | 14539 | 6721 | 1.30 | 119.26 | 111 | 16 | 1.62E+01 | 1.5 | |
| 5 | 0 | 66.43 | 238 | 2981 | 1.03 | 133.49 | 129 | 9 | 2.64E-01 | 41.8 | |
| 6 | 0 | 88.19 | 18108 | 5098 | 1.31 | 176.99 | 170 | 15 | 2.01E+01 | 1.1 | |
| 7 | 0 | 122.17 | 5624 | 2742 | 1.30 | 244.95 | 238 | 13 | 6.25E+00 | 2.3 | |
| 8 | 0 | 136.41 | 897 | 2084 | 1.14 | 273.44 | 267 | 12 | 9.97E-01 | 10.7 | |
| 9 | 0 | 165.92 | 1474 | 1740 | 1.37 | 332.46 | 327 | 11 | 1.64E+00 | 6.1 | |
| 10 | 0 | 193.61 | 46 | 1336 | 1.39 | 387.83 | 387 | 8 | 5.14E-02 | 137.5 | |
| 11 | 0 | 225.55 | 65 | 1551 | 2.19 | 451.70 | 449 | 9 | 7.26E-02 | 109.3 | |
| 12 | 0 | 252.87 | 46 | 1203 | 0.66 | 506.32 | 504 | 8 | 5.15E-02 | 130.0 | |
| 13 | 0 | 319.60 | 98 | 1059 | 0.81 | 639.76 | 636 | 10 | 1.09E-01 | 63.3 | |
| 14 | 0 | 350.23 | 75 | 791 | 1.79 | 701.01 | 699 | 8 | 8.34E-02 | 65.9 | |
| 15 | 0 | 383.05 | 37 | 885 | 0.74 | 766.65 | 761 | 9 | 4.12E-02 | 146.6 | |
| 16 | 0 | 391.63 | 652 | 1226 | 1.59 | 783.79 | 778 | 12 | 7.24E-01 | 11.4 | |
| 17 | 0 | 510.89 | 335 | 1038 | 2.75 | 1022.24 | 1016 | 14 | 3.72E-01 | 21.2 | |
| 18 | 0 | 661.52 | 14723 | 884 | 1.64 | 1323.40 | 1317 | 14 | 1.64E+01 | 0.9 | |
| 19 | 0 | 687.78 | 31 | 457 | 1.22 | 1375.91 | 1370 | 9 | 3.41E-02 | 127.7 | |
| 20 | 0 | 737.44 | 37 | 408 | 2.30 | 1475.20 | 1474 | 8 | 4.12E-02 | 95.3 | |
| 21 | 0 | 898.04 | 549 | 996 | 2.07 | 1796.24 | 1791 | 13 | 6.10E-01 | 12.6 | |
| 22 | 0 | 1115.19 | 2738 | 799 | 1.91 | 2230.28 | 2222 | 18 | 3.04E+00 | 3.1 | |
| 23 | 0 | 1172.85 | 13276 | 526 | 1.94 | 2345.54 | 2338 | 19 | 1.48E+01 | 1.0 | |
| 24 | 0 | 1224.27 | 12 | 93 | 0.86 | 2448.29 | 2444 | 8 | 1.36E-02 | 140.4 | |
| 25 | 0 | 1239.00 | 9 | 83 | 0.74 | 2477.74 | 2472 | 9 | 1.02E-02 | 182.7 | |
| 26 | 0 | 1310.79 | 15 | 34 | 0.86 | 2621.22 | 2617 | 7 | 1.70E-02 | 67.6 | |
| 27 | 1 | 1313.15 | 35 | 17 | 1.79 | 2625.93 | 2623 | 13 | 3.91E-02 | 27.4 | 1.03E+00 |
| 28 | 1 | 1316.49 | 30 | 29 | 1.86 | 2632.60 | 2623 | 13 | 3.35E-02 | 32.6 | |
| 29 | 0 | 1332.05 | 12095 | 200 | 2.09 | 2663.71 | 2654 | 21 | 1.34E+01 | 1.0 | |
| 30 | 0 | 1487.66 | 19 | 35 | 0.64 | 2974.66 | 2968 | 12 | 2.10E-02 | 69.2 | |
| 31 | 0 | 1492.94 | 9 | 27 | 0.86 | 2985.22 | 2979 | 9 | 9.66E-03 | 113.1 | |
| 32 | 0 | 1661.17 | 28 | 125 | 13.85 | 3321.38 | 3287 | 45 | 3.09E-02 | 141.3 | |
| 33 | 0 | 1669.26 | 4 | 25 | 1.23 | 3337.55 | 3331 | 9 | 4.25E-03 | 240.4 | |
| 34 | 0 | 1805.52 | 20 | 8 | 3.33 | 3609.79 | 3603 | 11 | 2.18E-02 | 36.3 | |
| 35 | 0 | 1835.67 | 338 | 28 | 2.14 | 3670.02 | 3660 | 22 | 3.76E-01 | 6.7 | |
| 36 | 0 | 1849.28 | 11 | 12 | 2.52 | 3697.21 | 3686 | 16 | 1.24E-02 | 75.6 | |
| 37 | 0 | 1863.82 | 24 | 4 | 2.27 | 3726.26 | 3722 | 9 | 2.67E-02 | 25.7 | |

VAX/VMS Nuclide Identification Report Generated  7-FEB-2014 09:01:42.39

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CR-51 | 320.08 | 98 | 9.91* | 3.775E+00 | 4.563E+00 | 7.790E+00 | 126.57 |
| CO-57 | 122.06 | 5624 | 85.60* | 6.014E+00 | 1.910E+01 | 2.017E+01 | 4.67 |
| | 136.47 | 897 | 10.68 | 5.986E+00 | 2.454E+01 | 2.592E+01 | 21.41 |
| CO-60 | 1173.23 | 13276 | 99.85 | 1.385E+00 | 1.678E+02 | 1.691E+02 | 1.93 |
| | 1332.49 | 12094 | 99.98* | 1.238E+00 | 1.708E+02 | 1.721E+02 | 1.91 |
| ZN-65 | 1115.54 | 2738 | 50.60* | 1.448E+00 | 6.532E+01 | 6.941E+01 | 6.18 |
| Y-88 | 898.04 | 549 | 93.70 | 1.746E+00 | 5.869E+00 | 6.744E+00 | 25.28 |
| | 1836.06 | 338 | 99.20* | 9.535E-01 | 6.248E+00 | 7.179E+00 | 13.46 |
| CD-109 | 88.03 | 18108 | 3.70* | 5.015E+00 | 1.706E+03 | 1.762E+03 | 2.29 |
| SN-113 | 391.69 | 652 | 64.94* | 3.275E+00 | 5.356E+00 | 6.092E+00 | 22.88 |
| SN-126 | 64.28 | ------ | 9.60 | 2.663E+00 | ------ | Line Not Found | ------ |
| | 86.94 | 18108 | 8.90 | 5.015E+00 | 7.092E+02 | 7.092E+02 | 2.29 |
| | 87.57 | 18108 | 37.00* | 5.015E+00 | 1.706E+02 | 1.706E+02 | 2.29 |
| BA-137M | 661.66 | 14723 | 89.90* | 2.234E+00 | 1.281E+02 | 1.283E+02 | 1.86 |
| CS-137 | 661.66 | 14723 | 85.10* | 2.234E+00 | 1.354E+02 | 1.356E+02 | 1.86 |
| CE-139 | 165.86 | 1474 | 80.00* | 5.643E+00 | 5.709E+00 | 6.357E+00 | 12.13 |
| PM-147 | 121.22 | 5624 | 0.00* | 6.014E+00 | 5.737E+05 | 5.826E+05 | 4.67 |
| RE-183 | 57.98 | 14539 | 34.30* | 2.040E+00 | 3.632E+02 | 4.488E+02 | 3.03 |
| | 59.32 | 14539 | 58.90 | 2.040E+00 | 2.115E+02 | 2.614E+02 | 3.03 |
| | 67.24 | 238 | 12.90 | 2.929E+00 | 1.100E+01 | 1.360E+01 | 83.55 |
| | 162.33 | ------ | 23.30 | 5.695E+00 | ------ | Line Not Found | ------ |
| PB-210 | 46.54 | 7676 | 4.25* | 6.216E-01 | 5.080E+03 | 5.089E+03 | 3.49 |
| BI-211 | 72.87 | ------ | 1.23 | 3.676E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 74 | 12.92* | 3.542E+00 | 2.828E+00 | 2.828E+00 | 133.61 |
| AM-241 | 59.54 | 14539 | 35.90* | 2.040E+00 | 3.470E+02 | 3.471E+02 | 3.03 |
| ANH-511 | 511.00 | 316 | 100.00* | 2.709E+00 | 2.041E+00 | 2.041E+00 | 44.82 |

Flag: "*" = Keyline

Sample ID : G1203017840 Acquisition date : 7-FEB-2014 08:45:04

| | | |
|---|---|---|
| Total number of lines in spectrum | 37 | |
| Number of unidentified lines | 13 | |
| Number of lines tentatively identified by NID | 24 | 64.86% |

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CR-51 | 27.70D | 1.71 | 4.563E+00 | 7.790E+00 | 9.860E+00 | 126.57 | |
| CO-57 | 271.74D | 1.06 | 1.910E+01 | 2.017E+01 | 0.094E+01 | 4.67 | |
| CO-60 | 5.27Y | 1.01 | 1.708E+02 | 1.721E+02 | 0.033E+02 | 1.91 | |
| ZN-65 | 244.06D | 1.06 | 6.532E+01 | 6.941E+01 | 0.429E+01 | 6.18 | |
| Y-88 | 106.63D | 1.15 | 6.248E+00 | 7.179E+00 | 0.966E+00 | 13.46 | |
| CD-109 | 461.40D | 1.03 | 1.706E+03 | 1.762E+03 | 0.040E+03 | 2.29 | |
| SN-113 | 115.09D | 1.14 | 5.356E+00 | 6.092E+00 | 1.394E+00 | 22.88 | |
| SN-126 | 2.30E+05Y | 1.00 | 1.706E+02 | 1.706E+02 | 0.039E+02 | 2.29 | |
| BA-137M | 30.08Y | 1.00 | 1.281E+02 | 1.283E+02 | 0.024E+02 | 1.86 | |
| CS-137 | 30.08Y | 1.00 | 1.354E+02 | 1.356E+02 | 0.025E+02 | 1.86 | |
| CE-139 | 137.64D | 1.11 | 5.709E+00 | 6.357E+00 | 0.771E+00 | 12.13 | |
| PM-147 | 2.62Y | 1.02 | 5.737E+05 | 5.826E+05 | 0.272E+05 | 4.67 | |
| RE-183 | 70.00D | 1.24 | 3.632E+02 | 4.488E+02 | 0.136E+02 | 3.03 | |
| PB-210 | 22.20Y | 1.00 | 5.080E+03 | 5.089E+03 | 0.178E+03 | 3.49 | |
| BI-211 | 7.04E+08Y | 1.00 | 2.828E+00 | 2.828E+00 | 3.779E+00 | 133.61 | |
| AM-241 | 432.60Y | 1.00 | 3.470E+02 | 3.471E+02 | 0.105E+02 | 3.03 | |
| ANH-511 | 1.00E+09Y | 1.00 | 2.041E+00 | 2.041E+00 | 0.915E+00 | 44.82 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 5.819E+05 | 5.910E+05 | | | |

Grand Total Activity : 5.819E+05 5.910E+05

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203017840 Acquisition date : 7-FEB-2014 08:45:04

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 35.63 | 1565 | 349 | 1.78 | 71.89 | 67 | 32 | 1.74E+00 | 12.7 | 7.99E-02 | |
| 3 | 42.13 | 1419 | 1706 | 1.80 | 84.89 | 67 | 32 | 1.58E+00 | 15.5 | 3.30E-01 | T |
| 0 | 193.61 | 46 | 1336 | 1.39 | 387.83 | 387 | 8 | 5.14E-02 | **** | 5.23E+00 | T |
| 0 | 225.55 | 65 | 1551 | 2.19 | 451.70 | 449 | 9 | 7.26E-02 | **** | 4.77E+00 | |
| 0 | 252.87 | 46 | 1203 | 0.66 | 506.32 | 504 | 8 | 5.15E-02 | **** | 4.43E+00 | T |
| 0 | 383.05 | 37 | 885 | 0.74 | 766.65 | 761 | 9 | 4.12E-02 | **** | 3.33E+00 | T |
| 0 | 687.78 | 31 | 457 | 1.22 | 1375.91 | 1370 | 9 | 3.41E-02 | **** | 2.17E+00 | |
| 0 | 737.44 | 36 | 408 | 2.30 | 1475.20 | 1474 | 8 | 4.04E-02 | **** | 2.05E+00 | T |
| 0 | 1224.27 | 12 | 93 | 0.86 | 2448.29 | 2444 | 8 | 1.36E-02 | **** | 1.33E+00 | |
| 0 | 1239.00 | 9 | 83 | 0.74 | 2477.74 | 2472 | 9 | 1.02E-02 | **** | 1.32E+00 | T |
| 0 | 1310.79 | 15 | 34 | 0.86 | 2621.22 | 2617 | 7 | 1.70E-02 | **** | 1.26E+00 | |
| 1 | 1313.15 | 35 | 17 | 1.79 | 2625.93 | 2623 | 13 | 3.91E-02 | 54.8 | 1.25E+00 | T |
| 1 | 1316.49 | 30 | 29 | 1.86 | 2632.60 | 2623 | 13 | 3.35E-02 | 65.3 | 1.25E+00 | |
| 0 | 1487.66 | 19 | 35 | 0.64 | 2974.66 | 2968 | 12 | 2.10E-02 | **** | 1.13E+00 | |
| 0 | 1492.94 | 9 | 27 | 0.86 | 2985.22 | 2979 | 9 | 9.66E-03 | **** | 1.12E+00 | |
| 0 | 1661.17 | 28 | 125 | 13.85 | 3321.38 | 3287 | 45 | 3.09E-02 | **** | 1.03E+00 | |
| 0 | 1669.26 | 4 | 25 | 1.23 | 3337.55 | 3331 | 9 | 4.25E-03 | **** | 1.02E+00 | |
| 0 | 1805.52 | 20 | 8 | 3.33 | 3609.79 | 3603 | 11 | 2.18E-02 | 72.6 | 9.65E-01 | |
| 0 | 1849.28 | 11 | 12 | 2.52 | 3697.21 | 3686 | 16 | 1.24E-02 | **** | 9.49E-01 | |
| 0 | 1863.82 | 24 | 4 | 2.27 | 3726.26 | 3722 | 9 | 2.67E-02 | 51.3 | 9.43E-01 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:01:54.96

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017840.CNF;1  *
* Acquisition date :  7-FEB-2014 08:45:04 Sensitivity     : 3.000        *
* Detector ID      : GAM14                Energy tolerance: 1.500        *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:15:08.26     Half life ratio : *****        *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1203017840          Analyst initials: RXF2         *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 14-NOV-2013 13:13:25 Eff. Geometry   : 500MLMB      *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_500MLMB.CNF;8      *
**************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| CR-51 | 6.180E+00 |
| CO-57 | 3.539E-01 |
| CO-60 | 3.063E-01 |
| ZN-65 | 1.390E+00 |
| Y-88 | 2.301E-01 |
| CD-109 | 1.207E+01 |
| SN-113 | 6.947E-01 |
| SN-126 | 1.176E+00 |
| BA-137M | 5.264E-01 |
| CS-137 | 5.560E-01 |
| CE-139 | 3.906E-01 |
| PM-147 | 1.023E+04 |
| RE-183 | 4.779E+00 |
| PB-210 | 6.597E+01 |
| BI-211 | 2.918E+00 |
| AM-241 | 3.350E+00 |
| ANH-511 | 4.240E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 5.616E+00 | NOT IDENT. |
| NA-22 | 3.373E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.372E-01 | NOT IDENT. |
| K-40 | 2.337E+00 | NOT IDENT. |
| SC-46 | 8.049E-01 | NOT IDENT. |
| V-48 | 1.660E+00 | FAIL ABUN |
| MN-54 | 6.113E-01 | NOT IDENT. |
| CO-56 | 7.292E-01 | FAIL ABUN |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-58 | 6.907E-01 | NOT IDENT. |
| FE-59 | 1.743E+00 | NOT IDENT. |
| GE-68 | 2.198E+01 | NOT IDENT. |
| AS-73 | 2.371E+01 | NOT IDENT. |

| | | |
|---|---|---|
| AS-74 | 1.670E+00 | NOT IDENT. |
| SE-75 | 6.611E-01 | FAIL ABUN |
| BR-77 | 7.646E+02 | NOT IDENT. |
| SR-82 | 6.485E+00 | NOT IDENT. |
| RB-83 | 1.109E+00 | NOT IDENT. |
| KR-85 | 1.034E+02 | NOT IDENT. |
| SR-85 | 5.851E-01 | NOT IDENT. |
| RB-86 | 1.734E+01 | NOT IDENT. |
| Y-91 | 2.066E+02 | NOT IDENT. |
| NB-94 | 4.723E-01 | NOT IDENT. |
| NB-95 | 6.633E-01 | NOT IDENT. |
| NB-95M | 1.738E+00 | NOT IDENT. |
| ZR-95 | 1.163E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 8.932E+02 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.102E-01 | NOT IDENT. |
| RH-102 | 7.946E-01 | NOT IDENT. |
| RU-103 | 6.710E-01 | NOT IDENT. |
| RH-106 | 4.669E+00 | NOT IDENT. |
| RU-106 | 4.669E+00 | NOT IDENT. |
| AG-108M | 4.878E-01 | NOT IDENT. |
| AG-110M | 9.592E-01 | NOT IDENT. |
| CD-115 | 1.128E+03 | NOT IDENT. |
| SN-117M | 9.552E-01 | NOT IDENT. |
| TE-123M | 3.720E-01 | NOT IDENT. |
| SB-124 | 5.837E-01 | NOT IDENT. |
| SB-125 | 1.439E+00 | FAIL ABUN |
| TE-125M | 1.484E+02 | NOT IDENT. |
| I-126 | 4.339E+00 | NOT IDENT. |
| SB-126 | 3.046E+00 | NOT IDENT. |
| SB-127 | 5.794E+01 | FAIL ABUN |
| I-131 | 3.005E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.011E+01 | NOT IDENT. |
| BA-133 | 5.980E-01 | FAIL ABUN |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 6.323E-01 | NOT IDENT. |
| CS-135 | 2.224E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.552E+00 | NOT IDENT. |
| BA-140 | 8.422E-01 | NOT IDENT. |
| LA-140 | 8.422E-01 | NOT IDENT. |
| CE-141 | 9.025E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.631E+00 | NOT IDENT. |
| PM-144 | 4.702E-01 | NOT IDENT. |
| PR-144 | 3.528E+01 | NOT IDENT. |
| PM-146 | 7.605E-01 | NOT IDENT. |
| ND-147 | 1.213E+01 | FAIL ABUN |
| PM-149 | 8.942E+03 | NOT IDENT. |
| EU-150 | 3.805E-01 | FAIL ABUN |
| EU-152 | 1.437E+00 | FAIL ABUN |
| GD-153 | 1.199E+00 | NOT IDENT. |
| EU-154 | 9.535E-01 | FAIL ABUN |
| EU-155 | 1.471E+00 | NOT IDENT. |
| TB-160 | 2.630E+00 | FAIL ABUN |
| HO-166M | 8.943E-01 | NOT IDENT. |
| TM-171 | 4.778E+02 | FAIL ABUN |
| LU-176 | 3.863E-01 | FAIL ABUN |
| HF-181 | 7.755E-01 | NOT IDENT. |
| TA-182 | 1.596E+00 | FAIL ABUN |
| RE-184 | 2.725E+00 | NOT IDENT. |
| W-188 | 1.097E+02 | NOT IDENT. |
| IR-192 | 5.334E-01 | NOT IDENT. |
| HG-203 | 5.927E-01 | NOT IDENT. |
| BI-207 | 8.815E-01 | NOT IDENT. |
| TL-208 | 5.004E-01 | NOT IDENT. |
| PB-211 | 1.096E+01 | NOT IDENT. |
| BI-212 | 7.310E+00 | NOT IDENT. |
| PB-212 | 7.943E-01 | NOT IDENT. |
| BI-214 | 9.345E-01 | NOT IDENT. |
| PB-214 | 1.052E+00 | FAIL ABUN |
| RN-219 | 6.284E+00 | NOT IDENT. |
| RN-222 | 9.345E-01 | NOT IDENT. |
| RA-223 | 8.842E+00 | NOT IDENT. |
| RA-224 | 8.505E+00 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 9.345E-01 | NOT IDENT. |
| AC-227 | 3.661E+00 | NOT IDENT. |
| TH-227 | 3.661E+00 | NOT IDENT. |
| AC-228 | 2.686E+00 | NOT IDENT. |
| RA-228 | 2.686E+00 | NOT IDENT. |
| TH-228 | 7.943E-01 | NOT IDENT. |
| TH-229 | 6.997E+00 | FAIL ABUN |
| TH-230 | 9.345E-01 | NOT IDENT. |
| PA-231 | 2.038E+01 | NOT IDENT. |
| TH-231 | 8.842E+00 | NOT IDENT. |
| TH-232 | 2.686E+00 | NOT IDENT. |
| PA-233 | 9.291E-01 | NOT IDENT. |
| PA-234 | 6.292E+00 | NOT IDENT. |
| PA-234M | 8.016E+01 | NOT IDENT. |
| TH-234 | 2.147E+01 | NOT IDENT. |
| U-234 | 9.345E-01 | NOT IDENT. |
| U-235 | 2.489E+00 | NOT IDENT. |
| NP-237 | 9.291E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.147E+01 | NOT IDENT. |
| NP-239 | 5.661E+00 | NOT IDENT. |
| PU-239 | 4.352E+03 | NOT IDENT. |
| AM-243 | 9.046E-01 | FAIL ABUN |
| CM-243 | 1.506E+00 | NOT IDENT. |
| CM-247 | 5.726E-01 | NOT IDENT. |
| CF-249 | 6.027E-01 | FAIL ABUN |
| CF-251 | 1.591E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 07-FEB-2014 09:01:59.57

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203017840.CNF;1  *
* Acquisition date :  7-FEB-2014 08:45:04 Sensitivity     : 3.000       *
* Detector ID      : GAM14                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:15:08.26     Half life ratio : *****       *
* Sample date      : 17-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203017840          Analyst initials: RXF2        *
* Batch Number     : 1359496              Sample Quantity : 1.7178E+02 GRAM  *
*                                         Quantity Err(%) : 1.1643E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 14-NOV-2013 13:13:25 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM14_500MLMB.CNF;8     *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CR-51 | 7.790E+00 | 9.701E+00 | 9.701E+00 |
| CO-57 | 2.017E+01 | 1.925E+00 | 1.925E+00 |
| CO-60 | 1.721E+02 | 1.442E+01 | 1.442E+01 |
| ZN-65 | 6.941E+01 | 1.109E+01 | 1.109E+01 |
| Y-88 | 7.179E+00 | 1.104E+00 | 1.104E+00 |
| CD-109 | 1.762E+03 | 1.974E+02 | 1.974E+02 |
| SN-113 | 6.092E+00 | 1.488E+00 | 1.488E+00 |
| SN-126 | 1.706E+02 | 1.685E+01 | 1.685E+01 |
| BA-137M | 1.283E+02 | 1.068E+01 | 1.068E+01 |
| CS-137 | 1.356E+02 | 1.128E+01 | 1.128E+01 |
| CE-139 | 6.357E+00 | 1.590E+00 | 1.590E+00 |
| PM-147 | 5.826E+05 | 5.555E+04 | 5.555E+04 |
| RE-183 | 4.488E+02 | 4.893E+01 | 4.893E+01 |
| PB-210 | 5.089E+03 | 4.784E+02 | 4.784E+02 |
| BI-211 | 2.828E+00 | 3.716E+00 | 3.716E+00 |
| AM-241 | 3.471E+02 | 2.857E+01 | 2.857E+01 |
| ANH-511 | 2.041E+00 | 9.170E-01 | 9.170E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -6.220E+00 | 6.866E+00 | 7.417E+00 | NOT IDENT. |
| NA-22 | 3.658E-01 | 3.772E-01 | 4.117E-01 | NOT IDENT. |
| NA-24 | 3.712E+09 | 5.975E+09 | 6.205E+09 | SHORT HLIF |
| AL-26 | 1.025E-02 | 3.334E-01 | 3.334E-01 | NOT IDENT. |
| K-40 | -7.250E-01 | 2.848E+00 | 2.866E+00 | NOT IDENT. |
| SC-46 | -4.827E-03 | 9.407E-01 | 9.407E-01 | NOT IDENT. |
| V-48 | -8.815E-01 | 1.974E+00 | 2.014E+00 | FAIL ABUN |
| MN-54 | -2.185E-01 | 7.522E-01 | 7.586E-01 | NOT IDENT. |
| CO-56 | -3.739E-01 | 9.014E-01 | 9.170E-01 | FAIL ABUN |
| MN-56 | -1.000E+41 | 2.381E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | -3.005E-01 | 8.506E-01 | 8.613E-01 | NOT IDENT. |
| FE-59 | 1.086E+00 | 2.034E+00 | 2.092E+00 | NOT IDENT. |
| GE-68 | -1.480E+00 | 2.594E+01 | 2.595E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-73 | 6.042E+01 | 3.391E+01 | 4.350E+01 | NOT IDENT. |
| AS-74 | 4.597E-01 | 1.996E+00 | 2.007E+00 | NOT IDENT. |
| SE-75 | -3.419E-01 | 7.819E-01 | 7.970E-01 | FAIL ABUN |
| BR-77 | 3.709E+02 | 9.171E+02 | 9.322E+02 | NOT IDENT. |
| SR-82 | 6.612E+00 | 7.728E+00 | 8.283E+00 | NOT IDENT. |
| RB-83 | -9.901E-01 | 1.362E+00 | 1.434E+00 | NOT IDENT. |
| KR-85 | 1.850E+02 | 1.377E+02 | 1.610E+02 | NOT IDENT. |
| SR-85 | 1.045E+00 | 7.791E-01 | 9.104E-01 | NOT IDENT. |
| RB-86 | 1.097E+00 | 2.040E+01 | 2.040E+01 | NOT IDENT. |
| Y-91 | 1.257E+02 | 2.387E+02 | 2.453E+02 | NOT IDENT. |
| NB-94 | 4.368E-01 | 5.603E-01 | 5.939E-01 | NOT IDENT. |
| NB-95 | 3.283E-01 | 7.973E-01 | 8.109E-01 | NOT IDENT. |
| NB-95M | -1.275E-01 | 2.033E+00 | 2.033E+00 | NOT IDENT. |
| ZR-95 | 5.286E-01 | 1.398E+00 | 1.418E+00 | NOT IDENT. |
| NB-97 | 1.000E+41 | 1.272E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.025E+10 | 1.534E+10 | 1.602E+10 | SHORT HLIF |
| MO-99 | 6.750E+02 | 1.066E+03 | 1.109E+03 | NOT IDENT. |
| TC-99M | -1.568E+24 | 1.907E+25 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.283E-01 | 5.682E-01 | 5.775E-01 | NOT IDENT. |
| RH-102 | -2.385E-01 | 9.653E-01 | 9.713E-01 | NOT IDENT. |
| RU-103 | -4.105E-02 | 8.029E-01 | 8.031E-01 | NOT IDENT. |
| RH-106 | 1.517E+00 | 5.587E+00 | 5.628E+00 | NOT IDENT. |
| RU-106 | 1.517E+00 | 5.587E+00 | 5.628E+00 | NOT IDENT. |
| AG-108M | 2.727E-01 | 5.751E-01 | 5.881E-01 | NOT IDENT. |
| AG-110M | 4.652E-02 | 1.120E+00 | 1.120E+00 | NOT IDENT. |
| CD-115 | -1.775E+03 | 1.410E+03 | 1.621E+03 | NOT IDENT. |
| SN-117M | -6.405E-01 | 1.183E+00 | 1.217E+00 | NOT IDENT. |
| TE-123M | -1.801E-01 | 4.762E-01 | 4.831E-01 | NOT IDENT. |
| SB-124 | -6.760E-01 | 7.894E-01 | 8.462E-01 | NOT IDENT. |
| SB-125 | -5.516E-01 | 1.723E+00 | 1.741E+00 | FAIL ABUN |
| TE-125M | 9.266E+01 | 1.787E+02 | 1.836E+02 | NOT IDENT. |
| I-126 | -2.096E+00 | 6.166E+00 | 6.238E+00 | NOT IDENT. |
| SB-126 | 1.415E+00 | 3.656E+00 | 3.711E+00 | NOT IDENT. |
| SB-127 | -7.833E+01 | 8.515E+01 | 9.218E+01 | FAIL ABUN |
| I-131 | 2.030E+00 | 3.518E+00 | 3.635E+00 | NOT IDENT. |
| I-132 | -1.000E+41 | 3.025E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 7.240E+00 | 5.363E+01 | 5.373E+01 | NOT IDENT. |
| BA-133 | 6.178E-02 | 8.127E-01 | 8.132E-01 | FAIL ABUN |
| I-133 | -2.572E+06 | 1.500E+07 | 1.505E+07 | SHORT HLIF |
| CS-134 | -3.500E-01 | 7.809E-01 | 7.966E-01 | NOT IDENT. |
| CS-135 | 1.754E+00 | 2.585E+00 | 2.703E+00 | NOT IDENT. |
| I-135 | 5.832E+22 | 3.965E+23 | 0.000E+00 | SHORT HLIF |
| CS-136 | -7.481E-01 | 3.025E+00 | 3.044E+00 | NOT IDENT. |
| BA-140 | -1.857E-01 | 1.031E+00 | 1.035E+00 | NOT IDENT. |
| LA-140 | -1.857E-01 | 1.031E+00 | 1.035E+00 | NOT IDENT. |
| CE-141 | 4.976E-01 | 1.094E+00 | 1.117E+00 | NOT IDENT. |
| CE-143 | 1.051E+04 | 4.646E+04 | 4.670E+04 | SHORT HLIF |
| CE-144 | 1.033E+00 | 3.650E+00 | 3.680E+00 | NOT IDENT. |
| PM-144 | -3.557E-01 | 5.808E-01 | 6.025E-01 | NOT IDENT. |
| PR-144 | -2.714E+01 | 4.360E+01 | 4.528E+01 | NOT IDENT. |
| PM-146 | 9.335E-01 | 8.939E-01 | 9.880E-01 | NOT IDENT. |
| ND-147 | 3.626E+00 | 1.444E+01 | 1.453E+01 | FAIL ABUN |
| PM-149 | -7.126E+03 | 1.071E+04 | 1.118E+04 | NOT IDENT. |
| EU-150 | 2.466E-01 | 4.447E-01 | 4.583E-01 | FAIL ABUN |
| EU-152 | 4.988E-02 | 1.742E+00 | 1.742E+00 | FAIL ABUN |
| GD-153 | 2.672E-01 | 1.447E+00 | 1.452E+00 | NOT IDENT. |
| EU-154 | 9.251E-01 | 1.073E+00 | 1.151E+00 | FAIL ABUN |
| EU-155 | -1.191E+00 | 1.808E+00 | 1.886E+00 | NOT IDENT. |
| TB-160 | 8.354E-01 | 3.054E+00 | 3.078E+00 | FAIL ABUN |
| HO-166M | 3.457E-01 | 1.074E+00 | 1.085E+00 | NOT IDENT. |
| TM-171 | 7.529E+02 | 7.645E+02 | 8.365E+02 | FAIL ABUN |
| LU-176 | 1.487E-01 | 4.520E-01 | 4.569E-01 | FAIL ABUN |
| HF-181 | 4.257E-01 | 9.170E-01 | 9.368E-01 | NOT IDENT. |
| TA-182 | -1.366E+00 | 2.311E+00 | 2.391E+00 | FAIL ABUN |
| RE-184 | 1.545E-01 | 3.688E+00 | 3.688E+00 | NOT IDENT. |
| W-188 | 3.793E+01 | 1.284E+02 | 1.295E+02 | NOT IDENT. |
| IR-192 | 2.969E-01 | 7.156E-01 | 7.280E-01 | NOT IDENT. |
| HG-203 | 8.905E-02 | 6.941E-01 | 6.952E-01 | NOT IDENT. |
| BI-207 | -1.155E-01 | 1.041E+00 | 1.043E+00 | NOT IDENT. |
| TL-208 | 2.370E-01 | 5.952E-01 | 6.048E-01 | NOT IDENT. |
| PB-211 | 4.372E+00 | 1.292E+01 | 1.307E+01 | NOT IDENT. |
| BI-212 | -7.982E-01 | 8.889E+00 | 8.896E+00 | NOT IDENT. |
| PB-212 | -1.089E-02 | 9.282E-01 | 9.282E-01 | NOT IDENT. |
| BI-214 | -3.896E-01 | 1.137E+00 | 1.150E+00 | NOT IDENT. |
| PB-214 | 5.302E-01 | 1.416E+00 | 1.437E+00 | FAIL ABUN |
| RN-219 | 5.849E+00 | 7.388E+00 | 7.844E+00 | NOT IDENT. |
| RN-222 | -3.896E-01 | 1.137E+00 | 1.150E+00 | NOT IDENT. |
| RA-223 | 1.874E+00 | 1.195E+01 | 1.198E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 2.035E+00 | 9.912E+00 | 9.954E+00 | NOT IDENT. |
| RA-226 | -3.896E-01 | 1.137E+00 | 1.150E+00 | NOT IDENT. |
| AC-227 | 2.270E+00 | 4.885E+00 | 4.991E+00 | NOT IDENT. |
| TH-227 | 2.270E+00 | 4.885E+00 | 4.991E+00 | NOT IDENT. |
| AC-228 | -4.891E-01 | 3.152E+00 | 3.160E+00 | NOT IDENT. |
| RA-228 | -4.891E-01 | 3.152E+00 | 3.160E+00 | NOT IDENT. |
| TH-228 | -1.089E-02 | 9.282E-01 | 9.282E-01 | NOT IDENT. |
| TH-229 | 3.507E+00 | 9.458E+00 | 9.589E+00 | FAIL ABUN |
| TH-230 | -3.896E-01 | 1.137E+00 | 1.150E+00 | NOT IDENT. |
| PA-231 | -5.102E-01 | 2.394E+01 | 2.394E+01 | NOT IDENT. |
| TH-231 | 1.874E+00 | 1.195E+01 | 1.198E+01 | NOT IDENT. |
| TH-232 | -4.891E-01 | 3.152E+00 | 3.160E+00 | NOT IDENT. |
| PA-233 | -5.722E-02 | 1.095E+00 | 1.095E+00 | NOT IDENT. |
| PA-234 | -4.657E-01 | 7.401E+00 | 7.404E+00 | NOT IDENT. |
| PA-234M | 3.111E+01 | 9.343E+01 | 9.448E+01 | NOT IDENT. |
| TH-234 | 1.580E+01 | 4.059E+01 | 4.121E+01 | NOT IDENT. |
| U-234 | -3.896E-01 | 1.137E+00 | 1.150E+00 | NOT IDENT. |
| U-235 | -1.997E+00 | 3.081E+00 | 3.210E+00 | NOT IDENT. |
| NP-237 | -5.722E-02 | 1.095E+00 | 1.095E+00 | NOT IDENT. |
| NP-238 | -4.261E+03 | 3.430E+03 | 3.931E+03 | SHORT HLIF |
| U-238 | 1.580E+01 | 4.059E+01 | 4.121E+01 | NOT IDENT. |
| NP-239 | 5.789E-01 | 7.868E+00 | 7.873E+00 | NOT IDENT. |
| PU-239 | 7.970E+02 | 5.726E+03 | 5.737E+03 | NOT IDENT. |
| AM-243 | -9.985E-02 | 1.092E+00 | 1.092E+00 | FAIL ABUN |
| CM-243 | 4.879E-01 | 1.819E+00 | 1.832E+00 | NOT IDENT. |
| CM-247 | 3.699E-01 | 6.753E-01 | 6.956E-01 | NOT IDENT. |
| CF-249 | 7.175E-01 | 1.017E+00 | 1.067E+00 | FAIL ABUN |
| CF-251 | -1.441E-01 | 1.955E+00 | 1.956E+00 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 1932.4076 | 94.67 | 1933.8971 | 193.51 | 1482.2296 |
| 45.60 | 1937.1372 | 94.87 | 1920.5742 | 197.03 | 1495.4435 |
| 46.54 | 1939.2494 | 97.43 | 1938.4144 | 198.01 | 1437.2383 |
| 49.72 | 4200.4482 | 98.43 | 1943.0858 | 201.83 | 1541.7281 |
| 51.35 | 4175.6709 | 98.44 | 1943.0997 | 205.31 | 1452.4633 |
| 52.39 | 4055.4485 | 99.53 | 1993.8221 | 210.85 | 1573.1920 |
| 53.44 | 4017.3748 | 100.11 | 1985.0756 | 215.65 | 1624.3832 |
| 57.36 | 0.0000 | 103.18 | 1922.1422 | 222.11 | 1617.7269 |
| 57.53 | 3732.8442 | 103.37 | 1924.5511 | 227.09 | 1577.0275 |
| 57.98 | 3734.5520 | 105.21 | 1975.4014 | 227.38 | 1581.8352 |
| 59.32 | 3739.6274 | 105.31 | 1994.8469 | 228.16 | 1594.6793 |
| 59.54 | 3740.4573 | 106.12 | 1970.2695 | 228.18 | 1594.6899 |
| 63.29 | 2373.5596 | 109.28 | 1930.6398 | 235.69 | 1527.8446 |
| 63.58 | 2374.2285 | 111.00 | 1921.1497 | 235.96 | 1531.7296 |
| 64.28 | 2375.8328 | 111.76 | 1885.5438 | 238.63 | 1533.5674 |
| 66.73 | 3304.8438 | 116.30 | 2000.8812 | 238.98 | 1491.2769 |
| 67.24 | 3353.0029 | 117.23 | 1908.7139 | 240.99 | 1514.8245 |
| 67.75 | 3371.2424 | 121.12 | 1797.9292 | 242.00 | 1459.9618 |
| 69.67 | 3365.5955 | 121.22 | 1798.0493 | 244.70 | 1477.4659 |
| 70.83 | 3267.3767 | 121.78 | 1798.7261 | 252.40 | 1373.3253 |
| 72.81 | 3323.5930 | 122.06 | 1799.0613 | 252.80 | 1408.2953 |
| 72.87 | 3294.5125 | 123.07 | 1643.4786 | 254.15 | 0.0000 |
| 74.66 | 3354.1951 | 127.23 | 1611.3993 | 256.23 | 1355.4128 |
| 74.82 | 3354.6719 | 129.30 | 1633.9156 | 260.90 | 1363.7130 |
| 74.97 | 3417.9224 | 131.20 | 1655.7135 | 264.66 | 1364.9539 |
| 77.11 | 3510.3384 | 133.02 | 1680.3657 | 268.22 | 1319.2346 |
| 79.69 | 3464.5317 | 133.52 | 1633.6677 | 269.46 | 1378.0032 |
| 80.12 | 3543.6140 | 136.00 | 1595.2722 | 271.23 | 1359.3396 |
| 80.19 | 3543.8196 | 136.47 | 1595.7391 | 273.65 | 1300.6271 |
| 80.57 | 3592.1499 | 140.51 | 1612.6970 | 276.40 | 1305.8568 |
| 81.00 | 3552.5696 | 143.76 | 1651.3268 | 277.37 | 1296.0444 |
| 81.07 | 3540.1536 | 144.24 | 1612.1908 | 277.60 | 1296.1624 |
| 83.79 | 3738.0693 | 145.44 | 1559.4020 | 278.00 | 1300.1416 |
| 85.43 | 3699.1882 | 152.43 | 1563.6830 | 279.20 | 1271.6260 |
| 86.55 | 3719.4961 | 153.25 | 1526.8103 | 279.54 | 1222.8760 |
| 86.79 | 2831.6042 | 154.21 | 1509.9510 | 280.46 | 1209.2208 |
| 86.94 | 2831.9565 | 156.02 | 1583.5743 | 283.69 | 1221.1699 |
| 87.09 | 2832.2988 | 158.56 | 1601.4226 | 284.31 | 1246.9178 |
| 87.57 | 2833.4021 | 159.00 | 1561.7090 | 285.41 | 1251.2385 |
| 88.03 | 2834.4543 | 162.33 | 1517.8912 | 285.90 | 1239.2373 |
| 88.34 | 2835.1592 | 163.33 | 1547.2380 | 287.50 | 1233.4174 |
| 88.47 | 2835.4556 | 165.86 | 1516.6710 | 290.67 | 1221.7524 |
| 89.96 | 1936.9390 | 176.31 | 1408.8120 | 293.27 | 0.0000 |
| 91.11 | 1955.6859 | 176.60 | 1409.0231 | 295.22 | 1222.9998 |
| 92.59 | 2020.8501 | 177.52 | 1378.3212 | 295.96 | 1233.7782 |
| 93.35 | 2030.5507 | 181.07 | 1357.3319 | 298.58 | 1218.9371 |
| 94.56 | 1949.0508 | 184.41 | 1480.3826 | 299.98 | 1262.2728 |
| 94.65 | 1933.8624 | 185.72 | 1479.5939 | 300.09 | 1262.3217 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 1261.4056 | 497.08 | 813.6967 | 711.68 | 607.7853 |
| 301.36 | 1240.1821 | 505.52 | 792.9833 | 720.70 | 616.5140 |
| 302.85 | 1188.6816 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 1168.5300 | 511.00 | 797.5914 | 722.78 | 630.7161 |
| 306.78 | 1161.0082 | 514.00 | 755.8780 | 722.91 | 630.7304 |
| 308.46 | 1153.1902 | 514.00 | 755.8871 | 723.31 | 639.3555 |
| 311.90 | 1145.1720 | 520.40 | 821.0535 | 724.19 | 616.9922 |
| 316.51 | 1094.3723 | 520.69 | 786.4938 | 727.33 | 624.9174 |
| 319.41 | 1156.0729 | 522.65 | 0.0000 | 733.00 | 584.9170 |
| 320.08 | 1106.6731 | 527.90 | 777.8315 | 735.93 | 604.9919 |
| 321.04 | 1046.8398 | 529.59 | 718.9531 | 737.46 | 625.2380 |
| 323.87 | 1036.7706 | 529.87 | 0.0000 | 739.50 | 573.9327 |
| 325.23 | 1056.4498 | 531.02 | 694.7256 | 747.24 | 628.7410 |
| 328.76 | 1083.3903 | 546.56 | 0.0000 | 748.06 | 590.0767 |
| 333.37 | 1072.7400 | 552.55 | 649.4201 | 752.31 | 600.3253 |
| 333.97 | 1029.7585 | 563.25 | 618.2813 | 753.82 | 623.1563 |
| 334.37 | 1038.5491 | 569.33 | 641.9690 | 756.73 | 589.0295 |
| 323.87 | 1091.9803 | 569.50 | 653.3530 | 756.80 | 589.0428 |
| 338.32 | 1091.9941 | 569.70 | 637.9009 | 763.94 | 629.9275 |
| 340.48 | 1077.4336 | 583.19 | 631.8400 | 765.81 | 631.2646 |
| 340.55 | 1077.4609 | 584.27 | 652.7329 | 766.42 | 638.9033 |
| 344.28 | 1125.9391 | 595.83 | 631.7945 | 766.84 | 636.7988 |
| 345.93 | 1077.2998 | 600.60 | 677.2879 | 772.60 | 0.0000 |
| 351.06 | 1074.7523 | 602.52 | 0.0000 | 776.52 | 633.7881 |
| 351.93 | 1016.7480 | 602.73 | 668.2850 | 777.92 | 661.0667 |
| 355.39 | 0.0000 | 604.72 | 611.3342 | 778.90 | 682.8794 |
| 356.01 | 1005.3024 | 609.32 | 641.2306 | 783.70 | 617.3845 |
| 364.49 | 1023.4814 | 610.33 | 668.5117 | 785.37 | 659.9383 |
| 366.42 | 1047.4839 | 614.28 | 628.4551 | 792.07 | 604.3378 |
| 375.05 | 1108.8334 | 618.01 | 637.3875 | 794.95 | 675.3981 |
| 383.85 | 924.6711 | 620.36 | 653.4424 | 795.86 | 664.6564 |
| 388.16 | 949.4917 | 621.93 | 639.0439 | 801.95 | 684.0079 |
| 388.63 | 959.4358 | 630.19 | 0.0000 | 810.29 | 719.0115 |
| 391.69 | 1020.1851 | 631.29 | 645.7473 | 810.45 | 704.8592 |
| 400.66 | 1045.7904 | 633.25 | 594.6717 | 810.76 | 704.8907 |
| 401.81 | 1004.8835 | 634.78 | 620.0739 | 815.77 | 756.9537 |
| 402.40 | 1011.9672 | 635.95 | 659.0780 | 818.51 | 706.0262 |
| 404.85 | 1031.4716 | 636.99 | 663.4457 | 832.01 | 681.6640 |
| 410.95 | 1001.9357 | 645.85 | 659.6052 | 834.85 | 729.2108 |
| 413.71 | 1056.1287 | 657.76 | 694.5288 | 835.71 | 726.0342 |
| 414.70 | 1097.9235 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 1021.9385 | 661.66 | 673.7006 | 846.75 | 0.0000 |
| 427.87 | 1049.9380 | 664.57 | 0.0000 | 846.77 | 768.3198 |
| 433.94 | 1049.9421 | 666.33 | 643.0719 | 856.80 | 804.9337 |
| 439.40 | 1068.6248 | 666.50 | 636.0540 | 860.56 | 777.9676 |
| 453.88 | 1165.2740 | 667.71 | 0.0000 | 871.09 | 795.2344 |
| 463.37 | 1137.5216 | 677.62 | 634.8727 | 873.19 | 794.6475 |
| 468.07 | 1101.9674 | 685.70 | 667.2206 | 875.33 | 0.0000 |
| 473.00 | 1073.4104 | 695.00 | 584.2105 | 879.38 | 773.4702 |
| 475.06 | 1025.7898 | 696.49 | 603.5726 | 880.51 | 789.3166 |
| 476.78 | 1009.1953 | 696.51 | 603.5726 | 946.00 | 819.2754 |
| 477.60 | 1043.6584 | 697.00 | 619.6112 | 884.68 | 813.0322 |
| 482.18 | 895.8911 | 697.49 | 615.4232 | 889.28 | 852.5619 |
| 487.02 | 914.3057 | 702.65 | 557.5134 | 894.76 | 908.2825 |
| 492.35 | 827.7679 | 706.68 | 609.2386 | 898.04 | 874.3634 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 847.8405 | 1332.49 | 85.5696 | | |
| 911.20 | 874.7001 | 1362.66 | 0.0000 | | |
| 923.98 | 0.0000 | 1365.19 | 61.9823 | | |
| 926.50 | 896.7875 | 1368.63 | 0.0000 | | |
| 937.49 | 962.9522 | 884.68 | 66.1638 | | |
| 944.13 | 937.0830 | 1408.01 | 56.3281 | | |
| 946.00 | 967.2875 | 1457.56 | 0.0000 | | |
| 949.00 | 916.4343 | 1460.82 | 52.6919 | | |
| 954.55 | 0.0000 | 1489.16 | 12.2070 | | |
| 962.31 | 849.3899 | 1505.03 | 42.8152 | | |
| 964.08 | 863.7185 | 1596.21 | 46.4301 | | |
| 879.38 | 842.5015 | 1620.50 | 47.6097 | | |
| 968.97 | 784.7897 | 1678.03 | 0.0000 | | |
| 983.53 | 712.6144 | 1690.97 | 43.8594 | | |
| 984.45 | 0.0000 | 507.63 | 0.0000 | | |
| 996.26 | 702.9417 | 1764.49 | 31.6101 | | |
| 1001.03 | 669.5829 | 1770.23 | 31.6321 | | |
| 1004.73 | 686.0737 | 1771.35 | 30.5824 | | |
| 1021.30 | 0.0000 | 1260.41 | 0.0000 | | |
| 1025.87 | 0.0000 | 1808.65 | 30.8694 | | |
| 1028.54 | 0.0000 | 1810.72 | 0.0000 | | |
| 1037.84 | 649.2656 | 1836.06 | 21.6792 | | |
| 1038.76 | 0.0000 | | | | |
| 1046.59 | 630.3032 | | | | |
| 1048.07 | 637.1216 | | | | |
| 1049.04 | 606.7958 | | | | |
| 1050.41 | 605.9742 | | | | |
| 1063.66 | 601.6530 | | | | |
| 1077.00 | 613.5259 | | | | |
| 1077.34 | 608.7994 | | | | |
| 1085.87 | 593.4099 | | | | |
| 1099.45 | 611.0544 | | | | |
| 344.28 | 603.1494 | | | | |
| 1112.84 | 606.5223 | | | | |
| 1115.54 | 555.0009 | | | | |
| 1120.29 | 450.4995 | | | | |
| 1120.55 | 448.8683 | | | | |
| 1121.30 | 450.5757 | | | | |
| 1129.67 | 413.6038 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 301.9646 | | | | |
| 1177.95 | 274.8465 | | | | |
| 1189.05 | 252.1182 | | | | |
| 1204.77 | 172.7219 | | | | |
| 1221.41 | 179.4653 | | | | |
| 1235.36 | 163.0447 | | | | |
| 1238.28 | 115.7529 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 102.5443 | | | | |
| 1274.44 | 86.8040 | | | | |
| 1274.54 | 83.8448 | | | | |
| 1291.59 | 104.8311 | | | | |
| 1298.22 | 0.0000 | | | | |
| 1312.11 | 11.9038 | | | | |

Radiochemistry Batch Checklist

03-May-2010



Batch# 1361908 Product GAMMA Date: 2/14/14

| Criteria | Yes | No | Comments |
|---|---|---|---|
| Sample Solids are less than or equal to 100 mg for GAB. | NA | | |
| Samples have been blank corrected (if required).<br>Blank correction reported included (if required). | NA | | |
| If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity.<br>If greater than $10^x$ MDA/ MDC, error is 40% or less.<br>If below the MDA/ MDC, error is okay. | ✓ | | |
| Instrument source check is within limits.<br>Instrument bkg check is within limits. | ✓ | | |
| Method RDL/ LLD has been met. | ✓ | | |
| If duplicate activities are:<br>Less than $5^x$ MDA/ MDC, then RPD is 100% or less,<br>If greater $5^x$ MDA/ MDC, then RPD 20% or less,<br>If below the MDA/ MDC, the RPD is 0%,<br>Or meets the client's required RER acceptance criteria. | ✓ | | |
| Tracer yield is 15-125% . Carrier yield 25-125%.<br>(Or meets the client's contract acceptance criteria). | NA | | |
| Method blank is less than the RDL/ LLD.<br>(If rad samples, < 5% of lowest activity) | ✓ | | |
| Sample was run within hold time. | ✓ | | |
| Sample was correctly preserved if required. | NA | | |
| Smears Taken for Radioactive batches. | NA | | |
| Method Spike and LCS are within 75-125%<br>(or meets the client's contract acceptance criteria). | ✓ | | |
| No blank spaces on data forms.<br>All line outs initialed and dated.<br>No transcription errors are apparent. | ✓ | | |
| Aux data is correct. | NA | | |
| Client Special requirements page has been checked. | ✓ | | |
| Raw Data and/ or spectrum are included and properly statused. | ✓ | | |
| MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified | ✓ | | |
| Hit notification complete (if necessary) | NA | | |
| Batch entered into Case Narrative. | ✓ | | |
| Batch Data Exception Reports (DER) completed, if applicable. | NA | | |
| Batch Data Exception Reports (DER) second reviewed.<br>Disposition verified to be completed. | NA | | |
| Aliquot Correction completed if required. | NA | | |
| Review sample historical results if available<br>(If REMP, results above MDC have been verified by historical results, recount or re-analysis.) | NA | | |

Primary Review Performed By: ~~NA~~ 2/14/14

Secondary Review Performed By: 2/14/14

DCN: ITSI-0808-0004-0076, 8 May 2019

# Gamma Spec Queue Sheet I.G. = 2/12/14

01/22/2014

**Batch #:1361908** **Analyst: RXF2** **First Client DueDate:02/17/2014** **Internal Due Date: 02/06/2014**

**Gamma LCS Isotope: Mixed Gamma** **LCS Code:** 1605 **Expiration Date:** 9/6/39 **Vol:** 1.0

**Initials:** RF **Prep Date:** 1/22/14 **Library:** SOIL **Balance ID:** LL4

| Sample ID | Client Description / Container ID | Type | Hazard Code | Client | Matrix | Collect Date | Geometry | Wet/Dry Aliquot (1 (g) F) | Detector | Sealing Date/Time (if Applicable) |
|---|---|---|---|---|---|---|---|---|---|---|
| 341140021-1 | 04-PDV-RT1300-06-0021 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:35:00 | 500mmB | 102.375 g | 17 | 1/22/14 |
| 341140022-1 | 04-PDV-RT1300-06-0022 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:38:00 | | 113.572 g | 19 | |
| 341140023-1 | 04-PDV-RT1300-06-0023 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:41:00 | | 122.654 g | 24 | |
| 341140024-1 | 04-PDV-RT1300-06-0024 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:44:00 | | 129.155 g | 28 | |
| 341140025-1 | 04-PDV-RT1300-06-0025 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:47:00 | | 130.479 g | 32 | |
| 341140026-1 | 04-PDV-RT1300-06-0026 | SAMPLE | | CURL001 | SOLID | 06-NOV-13 14:49:00 | | 109.734 g | 7 | |
| 341146021-1 | 04-PDV-RT1300-08-0021 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:53:00 | Jar | 57.245 g | 14 | |
| 341146022-1 | 04-PDV-RT1300-08-0022 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:58:00 | | 46.646 g | 22 ~~27~~ | 2/12 |
| 341146023-1 | 04-PDV-RT1300-08-0023 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:02:00 | | 72.393 g | 18 | |
| 341146024-1 | 04-PDV-RT1300-08-0024 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:06:00 | | 56.35 g | 4 ~~10~~ | 2/12 |
| 341147021-1 | 04-PDV-RT1300-09-0021 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:00:00 | 500mmD | 123.737 g | 1 | |
| 341147022-1 | 04-PDV-RT1300-09-0022 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:55:00 | | 78.22 g | 3 | |
| 341147023-1 | 04-PDV-RT1300-09-0023 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:45:00 | Jar | 43.788 g | 5 | |
| 341147024-1 | 04-PDV-RT1300-09-0024 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 15:48:00 | | 61.108 g | 6 | |
| 341148019-1 | 04-PDV-RT1300-07-0021 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:35:00 | | 55.756 g | 7 | |
| 341148020-1 | 04-PDV-RT1300-07-0022 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:40:00 | 500mmC | 116.529 g | 9 | |
| 341148021-1 | 04-PDV-RT1300-07-0023 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:45:00 | Jar | 73.76 g | 11 | |
| 341148022-1 | 04-PDV-RT1300-07-0024 | SAMPLE | | CURL001 | SOLID | 07-NOV-13 14:50:00 | 500mmB | 116.437 g | 12 | |
| 1203023699-1 | MB | MB | | QC ACCOUNT | SOLID | 1/22/14 | | 130.479 | 27 ~~13~~ | 2/12/14 |
| 1203023700-1 | DUP 04-PDV-RT1300-06-0021(341140021) | DUP | | QC ACCOUNT | SOLID | 06-NOV-13 14:35:00 | | 102.375 | 28 | |
| 1203023701-1 | LCS | LCS | | QC ACCOUNT | SOLID | 1/22/14 | | 130.479 | 11 | |

*GEL Laboratories LLC, Radiochemistry Division*

**Data Reviewed By:** 2/14/14



M-9847

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:22.34

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM17.CNF;353
                                      Background date  : 9-FEB-2014 11:21:42.
Sample date      : 6-NOV-2013 14:35:00. Acquisition date : 12-FEB-2014 11:48:57
Sample ID        : G341140021           Sample quantity  : 1.02375E+02 GRAM
Detector name    : GAM17                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:04.15  0.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.50 | 30 | 23 | 0.96 | 106.84 | 104 | 8 | 8.29E-03 | 33.0 | |
| 2 | 0 | 77.11* | 24 | 41 | 2.73 | 154.07 | 150 | 8 | 6.53E-03 | 54.3 | |
| 3 | 0 | 93.05* | 4 | 49 | 1.23 | 185.96 | 182 | 9 | 1.16E-03 | 348.0 | |
| 4 | 0 | 140.81* | 9 | 29 | 1.81 | 281.49 | 275 | 9 | 2.50E-03 | 119.6 | |
| 5 | 1 | 185.65* | 4 | 23 | 1.14 | 371.21 | 367 | 12 | 9.81E-04 | 293.1 | 8.58E-01 |
| 6 | 1 | 187.45 | 15 | 18 | 1.14 | 374.79 | 367 | 12 | 4.10E-03 | 66.3 | |
| 7 | 0 | 238.90* | 3 | 29 | 1.08 | 477.72 | 474 | 8 | 9.02E-04 | 324.8 | |
| 8 | 0 | 251.12 | 9 | 11 | 1.39 | 502.17 | 499 | 7 | 2.49E-03 | 71.9 | |
| 9 | 0 | 278.87 | 8 | 23 | 1.13 | 557.69 | 553 | 8 | 2.18E-03 | 110.5 | |
| 10 | 1 | 292.41 | 14 | 15 | 1.28 | 584.77 | 582 | 18 | 3.86E-03 | 45.5 | 6.60E+00 |
| 11 | 1 | 295.14* | 8 | 15 | 1.28 | 590.23 | 582 | 18 | 2.25E-03 | 89.7 | |
| 12 | 1 | 297.90 | 14 | 10 | 1.28 | 595.77 | 582 | 18 | 4.00E-03 | 48.7 | |
| 13 | 0 | 305.66 | 9 | 22 | 2.29 | 611.29 | 604 | 14 | 2.56E-03 | 110.8 | |
| 14 | 0 | 323.96 | 7 | 13 | 0.60 | 647.89 | 646 | 7 | 2.04E-03 | 87.6 | |
| 15 | 0 | 361.82 | 8 | 9 | 1.37 | 723.64 | 720 | 6 | 2.08E-03 | 72.4 | |
| 16 | 0 | 440.43 | 10 | 3 | 0.52 | 880.92 | 877 | 7 | 2.74E-03 | 44.4 | |
| 17 | 0 | 482.94 | 7 | 9 | 0.69 | 965.97 | 960 | 8 | 1.82E-03 | 91.4 | |
| 18 | 0 | 599.41 | 6 | 4 | 1.29 | 1199.00 | 1195 | 8 | 1.67E-03 | 70.7 | |
| 19 | 0 | 609.07* | 8 | 6 | 1.05 | 1218.33 | 1214 | 10 | 2.20E-03 | 79.0 | |
| 20 | 0 | 673.30 | 10 | 2 | 1.11 | 1346.86 | 1342 | 8 | 2.74E-03 | 40.5 | |
| 21 | 0 | 835.68 | 7 | 3 | 0.96 | 1671.77 | 1668 | 7 | 1.97E-03 | 56.6 | |
| 22 | 0 | 1063.77* | 3 | 2 | 0.76 | 2128.23 | 2123 | 8 | 8.55E-04 | 117.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 12:49:23

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 6-NOV-2013 14:35:00 | Acquisition date | : 12-FEB-2014 11:48:57 |
| Sample ID | : G341140021 | Sample quantity | : 102.38 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA17 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:04.15 0.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| MN-54 | 834.85 | 7 | 99.98* | 1.387E+00 | 3.754E-02 | 4.666E-02 | 113.12 |
| AS-73 | 53.44 | 30 | 10.30* | 5.352E+00 | 3.969E-01 | 9.241E-01 | 66.01 |
| HG-203 | 70.83 | ------ | 3.69 | 6.312E+00 | ------ | Line Not Found | ------ |
| | 72.87 | ------ | 6.19 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 279.20 | 8 | 81.56* | 3.641E+00 | 1.936E-02 | 8.307E-02 | 220.96 |
| PB-212 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:24.78

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:48:57 Sensitivity     : 3.000            *
* Detector ID      : GAM17                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:04.15     Half life ratio : *****            *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID            *
* Sample ID        : G341140021           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8          *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| MN-54 | 4.666E-02 | 5.173E-02 | 1.020E-01 |
| AS-73 | 9.241E-01 | 5.978E-01 | 7.571E-01 |
| HG-203 | 8.307E-02 | 1.799E-01 | 3.107E-01 |
| PB-212 | 1.324E-02 | 8.431E-02 | 1.182E-01 |
| TH-228 | 1.324E-02 | 8.431E-02 | 1.182E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.243E-01 | 9.549E-01 | 1.864E+00 | NOT IDENT. |
| NA-22 | -3.788E-02 | 4.915E-02 | 7.659E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.760E-03 | 4.709E-02 | 1.139E-01 | NOT IDENT. |
| K-40 | 1.817E-01 | 5.868E-01 | 1.290E+00 | NOT IDENT. |
| SC-46 | -1.289E-03 | 1.019E-01 | 2.056E-01 | NOT IDENT. |
| V-48 | 4.129E+00 | 3.528E+00 | 8.514E+00 | NOT IDENT. |
| CR-51 | 2.598E-01 | 3.645E+00 | 6.346E+00 | NOT IDENT. |
| CO-56 | 8.882E-03 | 1.112E-01 | 2.267E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -2.009E-02 | 2.580E-02 | 4.425E-02 | NOT IDENT. |
| CO-58 | -4.123E-02 | 9.682E-02 | 1.826E-01 | NOT IDENT. |
| FE-59 | 1.499E-01 | 4.231E-01 | 9.124E-01 | NOT IDENT. |
| CO-60 | -4.825E-03 | 4.165E-02 | 9.056E-02 | NOT IDENT. |
| ZN-65 | 1.170E-02 | 1.382E-01 | 2.823E-01 | NOT IDENT. |
| GE-68 | -1.962E-02 | 1.496E+00 | 3.191E+00 | NOT IDENT. |
| AS-74 | 1.171E-01 | 2.874E+00 | 5.020E+00 | NOT IDENT. |
| SE-75 | -4.908E-02 | 7.341E-02 | 1.205E-01 | FAIL ABUN |
| BR-77 | 0.000E+00 | 4.004E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 6.855E-01 | 3.925E+00 | 8.248E+00 | NOT IDENT. |
| RB-83 | 8.582E-02 | 1.546E-01 | 3.328E-01 | NOT IDENT. |
| KR-85 | -2.219E+01 | 1.254E+01 | 1.777E+01 | NOT IDENT. |
| SR-85 | -2.811E-01 | 1.586E-01 | 2.245E-01 | NOT IDENT. |
| RB-86 | -3.448E+00 | 1.750E+01 | 3.504E+01 | NOT IDENT. |
| Y-88 | -3.352E-02 | 1.050E-01 | 2.062E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 1.584E+01 | 5.112E+01 | 1.174E+02 | NOT IDENT. |
| NB-94 | 1.930E-02 | 3.839E-02 | 8.236E-02 | NOT IDENT. |
| NB-95 | -5.609E-02 | 1.139E-01 | 2.061E-01 | NOT IDENT. |
| NB-95M | 1.421E-01 | 2.974E-01 | 5.322E-01 | NOT IDENT. |
| ZR-95 | -2.771E-02 | 1.941E-01 | 3.906E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 5.572E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.494E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.380E-02 | 2.650E-02 | 5.303E-02 | FAIL ABUN |
| RH-102 | -1.030E-01 | 6.905E-02 | 8.327E-02 | NOT IDENT. |
| RU-103 | -1.624E-01 | 1.921E-01 | 3.146E-01 | FAIL ABUN |
| RH-106 | 1.475E-01 | 4.419E-01 | 9.139E-01 | NOT IDENT. |
| RU-106 | 1.475E-01 | 4.419E-01 | 9.139E-01 | NOT IDENT. |
| AG-108M | 6.794E-03 | 3.076E-02 | 6.304E-02 | NOT IDENT. |
| CD-109 | -1.304E-01 | 5.852E-01 | 1.036E+00 | NOT IDENT. |
| AG-110M | 2.158E-02 | 6.728E-02 | 1.506E-01 | NOT IDENT. |
| SN-113 | -4.920E-02 | 8.046E-02 | 1.423E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.993E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 6.418E-01 | 3.361E+00 | 6.328E+00 | NOT IDENT. |
| TE-123M | -1.906E-02 | 4.397E-02 | 7.649E-02 | NOT IDENT. |
| SB-124 | 1.921E-01 | 2.827E-01 | 7.725E-01 | NOT IDENT. |
| SB-125 | -4.794E-02 | 1.043E-01 | 1.889E-01 | FAIL ABUN |
| TE-125M | -5.969E+00 | 1.967E+01 | 3.614E+01 | NOT IDENT. |
| I-126 | -2.069E+01 | 2.175E+01 | 3.279E+01 | NOT IDENT. |
| SB-126 | 4.046E+00 | 1.804E+01 | 3.805E+01 | NOT IDENT. |
| SN-126 | -1.748E-03 | 4.929E-02 | 9.313E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | 5.020E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.289E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 3.706E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.171E-02 | 4.462E-02 | 8.216E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 3.374E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.352E-03 | 4.777E-02 | 1.028E-01 | NOT IDENT. |
| CS-135 | 9.916E-03 | 1.635E-01 | 3.012E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.350E+00 | 1.037E+01 | 1.951E+01 | NOT IDENT. |
| BA-137M | 2.568E-02 | 4.381E-02 | 9.389E-02 | NOT IDENT. |
| CS-137 | 2.713E-02 | 4.628E-02 | 9.919E-02 | NOT IDENT. |
| CE-139 | 2.621E-02 | 4.209E-02 | 8.359E-02 | NOT IDENT. |
| BA-140 | -9.189E-01 | 1.080E+01 | 2.307E+01 | NOT IDENT. |
| LA-140 | -9.189E-01 | 1.080E+01 | 2.307E+01 | NOT IDENT. |
| CE-141 | -7.570E-02 | 3.154E-01 | 5.735E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.555E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.690E-02 | 1.982E-01 | 3.702E-01 | NOT IDENT. |
| PM-144 | 3.605E-03 | 5.535E-02 | 1.062E-01 | NOT IDENT. |
| PR-144 | 2.817E-01 | 4.326E+00 | 8.297E+00 | NOT IDENT. |
| PM-146 | 4.277E-02 | 4.333E-02 | 1.002E-01 | NOT IDENT. |
| ND-147 | -4.587E+01 | 1.075E+02 | 1.985E+02 | NOT IDENT. |
| PM-147 | -2.736E+02 | 6.327E+02 | 1.137E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.825E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | 6.558E-03 | 3.369E-02 | 6.602E-02 | FAIL ABUN |
| EU-152 | 8.146E-02 | 1.115E-01 | 2.354E-01 | NOT IDENT. |
| GD-153 | 1.406E-02 | 7.591E-02 | 1.352E-01 | NOT IDENT. |
| EU-154 | -1.275E-01 | 1.420E-01 | 2.081E-01 | NOT IDENT. |
| EU-155 | -1.623E-02 | 8.896E-02 | 1.646E-01 | NOT IDENT. |
| TB-160 | 6.135E-02 | 3.285E-01 | 7.098E-01 | FAIL ABUN |
| HO-166M | -3.233E-02 | 7.791E-02 | 1.460E-01 | FAIL ABUN |
| TM-171 | 9.582E+00 | 6.199E+00 | 9.599E+00 | FAIL ABUN |
| LU-176 | 2.143E-02 | 4.655E-02 | 4.687E-02 | FAIL ABUN |
| HF-181 | 1.312E-01 | 2.351E-01 | 4.255E-01 | FAIL ABUN |
| TA-182 | 5.043E-02 | 2.282E-01 | 5.451E-01 | NOT IDENT. |
| RE-183 | 8.428E-02 | 1.660E-01 | 2.914E-01 | NOT IDENT. |
| RE-184 | -2.045E-01 | 7.761E-01 | 1.496E+00 | NOT IDENT. |
| W-188 | 1.565E+01 | 1.798E+01 | 3.468E+01 | NOT IDENT. |
| IR-192 | 2.341E-02 | 7.724E-02 | 1.577E-01 | FAIL ABUN |
| BI-207 | 2.714E-02 | 6.253E-02 | 1.398E-01 | FAIL ABUN |
| TL-208 | -3.052E-02 | 5.728E-02 | 1.057E-01 | FAIL ABUN |
| PB-210 | -7.215E-01 | 8.024E-01 | 1.446E+00 | NOT IDENT. |
| BI-211 | -9.370E-02 | 2.362E-01 | 4.495E-01 | NOT IDENT. |
| PB-211 | -4.851E-01 | 7.193E-01 | 1.255E+00 | NOT IDENT. |
| BI-212 | 2.530E-01 | 5.786E-01 | 1.272E+00 | NOT IDENT. |
| BI-214 | 6.955E-02 | 1.077E-01 | 2.109E-01 | FAIL ABUN |
| PB-214 | -8.446E-02 | 8.375E-02 | 1.464E-01 | FAIL ABUN |
| RN-219 | -2.777E-01 | 4.781E-01 | 8.464E-01 | NOT IDENT. |
| RN-222 | 6.955E-02 | 1.077E-01 | 2.109E-01 | FAIL ABUN |
| RA-223 | 4.209E-01 | 7.225E-01 | 1.374E+00 | FAIL ABUN |
| RA-224 | 3.428E-02 | 6.760E-01 | 1.113E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 6.955E-02 | 1.077E-01 | 2.109E-01 | FAIL ABUN |
| AC-227 | 1.550E-01 | 2.558E-01 | 5.105E-01 | FAIL ABUN |
| TH-227 | 1.550E-01 | 2.558E-01 | 5.105E-01 | FAIL ABUN |
| AC-228 | -6.449E-02 | 1.885E-01 | 3.685E-01 | FAIL ABUN |
| RA-228 | -6.449E-02 | 1.885E-01 | 3.685E-01 | FAIL ABUN |
| TH-229 | 1.832E-01 | 4.798E-01 | 9.322E-01 | NOT IDENT. |
| TH-230 | 6.954E-02 | 1.076E-01 | 2.109E-01 | FAIL ABUN |
| PA-231 | -5.067E-01 | 1.711E+00 | 2.962E+00 | NOT IDENT. |
| TH-231 | 4.209E-01 | 7.225E-01 | 1.374E+00 | FAIL ABUN |
| TH-232 | -6.449E-02 | 1.885E-01 | 3.685E-01 | NOT IDENT. |
| PA-233 | -2.867E-02 | 7.014E-02 | 1.193E-01 | NOT IDENT. |
| PA-234 | -1.940E-01 | 2.708E-01 | 4.566E-01 | NOT IDENT. |
| PA-234M | 1.588E+00 | 5.479E+00 | 1.184E+01 | NOT IDENT. |
| TH-234 | -8.972E-02 | 7.160E-01 | 1.337E+00 | FAIL ABUN |
| U-234 | 6.954E-02 | 1.076E-01 | 2.109E-01 | FAIL ABUN |
| U-235 | -4.918E-02 | 1.916E-01 | 3.273E-01 | FAIL ABUN |
| NP-237 | -2.867E-02 | 7.014E-02 | 1.193E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.658E+13 | 0.000E+00 | SHORT HLIF |
| U-238 | -8.972E-02 | 7.160E-01 | 1.337E+00 | FAIL ABUN |
| NP-239 | -1.393E-01 | 3.433E-01 | 6.196E-01 | FAIL ABUN |
| PU-239 | -5.705E+01 | 2.596E+02 | 4.795E+02 | NOT IDENT. |
| AM-241 | -1.726E-02 | 6.197E-02 | 1.042E-01 | NOT IDENT. |
| AM-243 | -1.106E-02 | 3.309E-02 | 5.621E-02 | NOT IDENT. |
| CM-243 | 7.453E-03 | 7.967E-02 | 1.531E-01 | FAIL ABUN |
| CM-247 | 1.129E-03 | 3.983E-02 | 7.839E-02 | FAIL ABUN |
| CF-249 | 2.270E-02 | 4.688E-02 | 9.664E-02 | NOT IDENT. |
| CF-251 | 3.299E-02 | 1.240E-01 | 2.364E-01 | NOT IDENT. |
| ANH-511 | -3.810E-02 | 6.228E-02 | 1.346E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:20.82

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.50 | 30 | 23 | 0.96 | 106.84 | 104 | 8 | 8.29E-03 | 33.0 | |
| 2 | 0 | 64.60 | 28 | 74 | 0.94 | 129.05 | 124 | 11 | 7.86E-03 | 61.9 | |
| 3 | 0 | 77.11 | 33 | 41 | 2.73 | 154.07 | 150 | 8 | 9.20E-03 | 38.0 | |
| 4 | 0 | 93.05 | 50 | 49 | 1.23 | 185.96 | 182 | 9 | 1.40E-02 | 28.1 | |
| 5 | 0 | 140.81 | 16 | 29 | 1.81 | 281.49 | 275 | 9 | 4.44E-03 | 65.9 | |
| 6 | 1 | 185.65 | 34 | 23 | 1.14 | 371.21 | 367 | 12 | 9.52E-03 | 28.7 | 8.58E-01 |
| 7 | 1 | 187.45 | 15 | 18 | 1.14 | 374.79 | 367 | 12 | 4.10E-03 | 66.3 | |
| 8 | 0 | 238.90 | 19 | 29 | 1.08 | 477.72 | 474 | 8 | 5.27E-03 | 53.8 | |
| 9 | 0 | 251.12 | 9 | 11 | 1.39 | 502.17 | 499 | 7 | 2.49E-03 | 71.9 | |
| 10 | 0 | 278.87 | 8 | 23 | 1.13 | 557.69 | 553 | 8 | 2.18E-03 | 110.5 | |
| 11 | 1 | 292.41 | 14 | 15 | 1.28 | 584.77 | 582 | 18 | 3.86E-03 | 45.5 | 6.60E+00 |
| 12 | 1 | 295.14 | 10 | 15 | 1.28 | 590.23 | 582 | 18 | 2.88E-03 | 67.5 | |
| 13 | 1 | 297.90 | 14 | 10 | 1.28 | 595.77 | 582 | 18 | 4.00E-03 | 48.7 | |
| 14 | 0 | 305.66 | 9 | 22 | 2.29 | 611.29 | 604 | 14 | 2.56E-03 | 110.8 | |
| 15 | 0 | 323.96 | 7 | 13 | 0.60 | 647.89 | 646 | 7 | 2.04E-03 | 87.6 | |
| 16 | 0 | 361.82 | 8 | 9 | 1.37 | 723.64 | 720 | 6 | 2.08E-03 | 72.4 | |
| 17 | 0 | 440.43 | 10 | 3 | 0.52 | 880.92 | 877 | 7 | 2.74E-03 | 44.4 | |
| 18 | 0 | 482.94 | 7 | 9 | 0.69 | 965.97 | 960 | 8 | 1.82E-03 | 91.4 | |
| 19 | 0 | 510.80 | 56 | 22 | 1.64 | 1021.71 | 1014 | 17 | 1.56E-02 | 23.0 | |
| 20 | 0 | 599.41 | 6 | 4 | 1.29 | 1199.00 | 1195 | 8 | 1.67E-03 | 70.7 | |
| 21 | 0 | 609.07 | 15 | 6 | 1.05 | 1218.33 | 1214 | 10 | 4.30E-03 | 37.4 | |
| 22 | 0 | 673.30 | 10 | 2 | 1.11 | 1346.86 | 1342 | 8 | 2.74E-03 | 40.5 | |
| 23 | 0 | 835.68 | 7 | 3 | 0.96 | 1671.77 | 1668 | 7 | 1.97E-03 | 56.6 | |
| 24 | 0 | 1063.77 | 6 | 2 | 0.76 | 2128.23 | 2123 | 8 | 1.65E-03 | 58.3 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:22.83

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| MN-54 | 834.85 | 7 | 99.98* | 1.387E+00 | 3.754E-02 | 4.666E-02 | 113.12 |
| AS-73 | 53.44 | 30 | 10.30* | 5.352E+00 | 3.969E-01 | 9.241E-01 | 66.01 |
| HG-203 | 70.83 | ------ | 3.69 | 6.312E+00 | ------ | Line Not Found | ------ |
| | 72.87 | ------ | 6.19 | 6.368E+00 | ------ | Line Not Found | ------ |
| | 279.20 | 8 | 81.56* | 3.641E+00 | 1.936E-02 | 8.307E-02 | 220.96 |
| PB-212 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 6.414E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 24 | 17.10 | 6.458E+00 | 1.560E-01 | 1.560E-01 | 108.63 |
| | 238.63 | 3 | 43.60* | 4.123E+00 | 1.324E-02 | 1.324E-02 | 649.60 |
| | 300.09 | ------ | 3.30 | 3.425E+00 | ------ | Line Not Found | ------ |

Flag: "*" = Keyline

Sample ID : G341140021 Acquisition date : 12-FEB-2014 11:48:57

Total number of lines in spectrum 22
Number of unidentified lines 3
Number of lines tentatively identified by NID 19 86.36%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| MN-54 | 312.05D | 1.24 | 3.754E-02 | 4.666E-02 | 5.278E-02 | 113.12 | |
| AS-73 | 80.30D | 2.33 | 3.969E-01 | 9.241E-01 | 6.100E-01 | 66.01 | |
| HG-203 | 46.59D | 4.29 | 1.936E-02 | 8.307E-02 | 18.35E-02 | 220.96 | |
| PB-212 | 1.41E+10Y | 1.00 | 1.324E-02 | 1.324E-02 | 8.603E-02 | 649.60 | |
| TH-228 | 1.41E+10Y | 1.00 | 1.324E-02 | 1.324E-02 | 8.603E-02 | 649.60 | |
| | Total Activity : | | 4.803E-01 | 1.080E+00 | | | |
| | Grand Total Activity : | | 4.803E-01 | 1.080E+00 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341140021 Acquisition date : 12-FEB-2014 11:48:57

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 93.05 | 4 | 49 | 1.23 | 185.96 | 182 | 9 | 1.16E-03 | **** | 6.54E+00 | T |
| 0 | 140.81 | 9 | 29 | 1.81 | 281.49 | 275 | 9 | 2.50E-03 | **** | 5.81E+00 | T |
| 1 | 185.65 | 4 | 23 | 1.14 | 371.21 | 367 | 12 | 9.81E-04 | **** | 4.95E+00 | T |
| 1 | 187.45 | 15 | 18 | 1.14 | 374.79 | 367 | 12 | 4.10E-03 | **** | 4.92E+00 | |
| 0 | 251.12 | 9 | 11 | 1.39 | 502.17 | 499 | 7 | 2.49E-03 | **** | 3.96E+00 | T |
| 1 | 292.41 | 14 | 15 | 1.28 | 584.77 | 582 | 18 | 3.86E-03 | 91.0 | 3.50E+00 | T |
| 1 | 295.14 | 8 | 15 | 1.28 | 590.23 | 582 | 18 | 2.25E-03 | **** | 3.47E+00 | T |
| 1 | 297.90 | 14 | 10 | 1.28 | 595.77 | 582 | 18 | 4.00E-03 | 97.3 | 3.45E+00 | T |
| 0 | 305.66 | 9 | 22 | 2.29 | 611.29 | 604 | 14 | 2.56E-03 | **** | 3.37E+00 | T |
| 0 | 323.96 | 7 | 13 | 0.60 | 647.89 | 646 | 7 | 2.04E-03 | **** | 3.21E+00 | T |
| 0 | 361.82 | 8 | 9 | 1.37 | 723.64 | 720 | 6 | 2.08E-03 | **** | 2.92E+00 | |
| 0 | 440.43 | 10 | 3 | 0.52 | 880.92 | 877 | 7 | 2.74E-03 | 88.8 | 2.45E+00 | T |
| 0 | 482.94 | 7 | 9 | 0.69 | 965.97 | 960 | 8 | 1.82E-03 | **** | 2.26E+00 | T |
| 0 | 599.41 | 6 | 4 | 1.29 | 1199.00 | 1195 | 8 | 1.67E-03 | **** | 1.86E+00 | T |
| 0 | 609.07 | 8 | 6 | 1.05 | 1218.33 | 1214 | 10 | 2.20E-03 | **** | 1.84E+00 | T |
| 0 | 673.30 | 10 | 2 | 1.11 | 1346.86 | 1342 | 8 | 2.74E-03 | 81.0 | 1.68E+00 | |
| 0 | 1063.77 | 3 | 2 | 0.76 | 2128.23 | 2123 | 8 | 8.55E-04 | **** | 1.12E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:35.19

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:48:57 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.15     Half life ratio : *****          *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341140021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| MN-54 | 4.215E-02 |
| AS-73 | 3.368E-01 |
| HG-203 | 1.411E-01 |
| PB-212 | 5.358E-02 |
| TH-228 | 5.358E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 7.832E-01 | NOT IDENT. |
| NA-22 | 2.714E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.262E-02 | NOT IDENT. |
| K-40 | 5.353E-01 | NOT IDENT. |
| SC-46 | 8.586E-02 | NOT IDENT. |
| V-48 | 3.679E+00 | NOT IDENT. |
| CR-51 | 2.816E+00 | NOT IDENT. |
| CO-56 | 9.597E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.972E-02 | NOT IDENT. |
| CO-58 | 7.307E-02 | NOT IDENT. |
| FE-59 | 3.822E-01 | NOT IDENT. |
| CO-60 | 3.409E-02 | NOT IDENT. |
| ZN-65 | 1.171E-01 | NOT IDENT. |
| GE-68 | 1.239E+00 | NOT IDENT. |
| AS-74 | 2.102E+00 | NOT IDENT. |
| SE-75 | 5.243E-02 | FAIL ABUN |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 3.479E+00 | NOT IDENT. |
| RB-83 | 1.435E-01 | NOT IDENT. |
| KR-85 | 7.798E+00 | NOT IDENT. |
| SR-85 | 9.853E-02 | NOT IDENT. |
| RB-86 | 1.357E+01 | NOT IDENT. |
| Y-88 | 7.550E-02 | NOT IDENT. |
| Y-91 | 4.659E+01 | NOT IDENT. |

| | | |
|---|---|---|
| NB-94 | 3.505E-02 | NOT IDENT. |
| NB-95 | 8.394E-02 | NOT IDENT. |
| NB-95M | 2.385E-01 | NOT IDENT. |
| ZR-95 | 1.606E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.399E-02 | FAIL ABUN |
| RH-102 | 3.117E-02 | NOT IDENT. |
| RU-103 | 1.294E-01 | FAIL ABUN |
| RH-106 | 3.905E-01 | NOT IDENT. |
| RU-106 | 3.905E-01 | NOT IDENT. |
| AG-108M | 2.711E-02 | NOT IDENT. |
| CD-109 | 4.708E-01 | NOT IDENT. |
| AG-110M | 6.176E-02 | NOT IDENT. |
| SN-113 | 6.104E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.856E+00 | NOT IDENT. |
| TE-123M | 3.443E-02 | NOT IDENT. |
| SB-124 | 2.993E-01 | NOT IDENT. |
| SB-125 | 8.032E-02 | FAIL ABUN |
| TE-125M | 1.620E+01 | NOT IDENT. |
| I-126 | 1.301E+01 | NOT IDENT. |
| SB-126 | 1.619E+01 | NOT IDENT. |
| SN-126 | 4.249E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.559E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.265E-02 | NOT IDENT. |
| CS-135 | 1.342E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.864E+00 | NOT IDENT. |
| BA-137M | 4.045E-02 | NOT IDENT. |
| CS-137 | 4.273E-02 | NOT IDENT. |
| CE-139 | 3.799E-02 | NOT IDENT. |
| BA-140 | 8.804E+00 | NOT IDENT. |
| LA-140 | 8.804E+00 | NOT IDENT. |
| CE-141 | 2.579E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.661E-01 | NOT IDENT. |
| PM-144 | 4.572E-02 | NOT IDENT. |
| PR-144 | 3.573E+00 | NOT IDENT. |
| PM-146 | 4.352E-02 | NOT IDENT. |
| ND-147 | 8.163E+01 | NOT IDENT. |
| PM-147 | 5.085E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.970E-02 | FAIL ABUN |
| EU-152 | 1.053E-01 | NOT IDENT. |
| GD-153 | 6.066E-02 | NOT IDENT. |
| EU-154 | 7.372E-02 | NOT IDENT. |
| EU-155 | 7.474E-02 | NOT IDENT. |
| TB-160 | 2.914E-01 | FAIL ABUN |
| HO-166M | 6.155E-02 | FAIL ABUN |
| TM-171 | 4.359E+00 | FAIL ABUN |
| LU-176 | 2.029E-02 | FAIL ABUN |
| HF-181 | 1.858E-01 | FAIL ABUN |
| TA-182 | 2.056E-01 | NOT IDENT. |
| RE-183 | 1.324E-01 | NOT IDENT. |
| RE-184 | 6.116E-01 | NOT IDENT. |
| W-188 | 1.549E+01 | NOT IDENT. |
| IR-192 | 6.967E-02 | FAIL ABUN |
| BI-207 | 5.801E-02 | FAIL ABUN |
| TL-208 | 4.675E-02 | FAIL ABUN |
| PB-210 | 6.725E-01 | NOT IDENT. |
| BI-211 | 1.992E-01 | NOT IDENT. |
| PB-211 | 5.285E-01 | NOT IDENT. |
| BI-212 | 5.411E-01 | NOT IDENT. |
| BI-214 | 9.361E-02 | FAIL ABUN |
| PB-214 | 6.387E-02 | FAIL ABUN |
| RN-219 | 3.668E-01 | NOT IDENT. |
| RN-222 | 9.361E-02 | FAIL ABUN |
| RA-223 | 6.096E-01 | FAIL ABUN |
| RA-224 | 4.975E-01 | NOT IDENT. |
| RA-226 | 9.361E-02 | FAIL ABUN |

| | | |
|---|---|---|
| AC-227 | 2.286E-01 | FAIL ABUN |
| TH-227 | 2.286E-01 | FAIL ABUN |
| AC-228 | 1.544E-01 | FAIL ABUN |
| RA-228 | 1.544E-01 | FAIL ABUN |
| TH-229 | 4.196E-01 | NOT IDENT. |
| TH-230 | 9.360E-02 | FAIL ABUN |
| PA-231 | 1.319E+00 | NOT IDENT. |
| TH-231 | 6.096E-01 | FAIL ABUN |
| TH-232 | 1.544E-01 | NOT IDENT. |
| PA-233 | 5.191E-02 | NOT IDENT. |
| PA-234 | 1.618E-01 | NOT IDENT. |
| PA-234M | 4.922E+00 | NOT IDENT. |
| TH-234 | 6.242E-01 | FAIL ABUN |
| U-234 | 9.360E-02 | FAIL ABUN |
| U-235 | 1.480E-01 | FAIL ABUN |
| NP-237 | 5.191E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 6.242E-01 | FAIL ABUN |
| NP-239 | 2.798E-01 | FAIL ABUN |
| PU-239 | 2.138E+02 | NOT IDENT. |
| AM-241 | 4.734E-02 | NOT IDENT. |
| AM-243 | 2.582E-02 | NOT IDENT. |
| CM-243 | 6.918E-02 | FAIL ABUN |
| CM-247 | 3.402E-02 | FAIL ABUN |
| CF-249 | 4.285E-02 | NOT IDENT. |
| CF-251 | 1.070E-01 | NOT IDENT. |
| ANH-511 | 6.273E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 12:49:39.85

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341140021.CNF;1    *
* Acquisition date : 12-FEB-2014 11:48:57 Sensitivity     : 3.000          *
* Detector ID      : GAM17                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:04.15     Half life ratio : *****          *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID          *
* Sample ID        : G341140021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM*
*                                         Quantity Err(%) : 1.9536E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 18-JUL-2013 12:48:17 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM17_500MLMB.CNF;8       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| MN-54 | 4.666E-02 | 5.192E-02 | 5.192E-02 |
| AS-73 | 9.241E-01 | 6.275E-01 | 6.275E-01 |
| HG-203 | 8.307E-02 | 1.800E-01 | 1.800E-01 |
| PB-212 | 1.324E-02 | 8.431E-02 | 8.431E-02 |
| TH-228 | 1.324E-02 | 8.431E-02 | 8.431E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.243E-01 | 9.553E-01 | 9.665E-01 | NOT IDENT. |
| NA-22 | -3.788E-02 | 4.926E-02 | 5.214E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 3.333E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.760E-03 | 4.709E-02 | 4.730E-02 | NOT IDENT. |
| K-40 | 1.817E-01 | 5.870E-01 | 5.927E-01 | NOT IDENT. |
| SC-46 | -1.289E-03 | 1.019E-01 | 1.019E-01 | NOT IDENT. |
| V-48 | 4.129E+00 | 3.556E+00 | 4.014E+00 | NOT IDENT. |
| CR-51 | 2.598E-01 | 3.645E+00 | 3.647E+00 | NOT IDENT. |
| CO-56 | 8.882E-03 | 1.112E-01 | 1.113E-01 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.328E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | -2.009E-02 | 2.587E-02 | 2.741E-02 | NOT IDENT. |
| CO-58 | -4.123E-02 | 9.690E-02 | 9.866E-02 | NOT IDENT. |
| FE-59 | 1.499E-01 | 4.236E-01 | 4.289E-01 | NOT IDENT. |
| CO-60 | -4.825E-03 | 4.165E-02 | 4.171E-02 | NOT IDENT. |
| ZN-65 | 1.170E-02 | 1.383E-01 | 1.384E-01 | NOT IDENT. |
| GE-68 | -1.962E-02 | 1.496E+00 | 1.496E+00 | NOT IDENT. |
| AS-74 | 1.171E-01 | 2.874E+00 | 2.875E+00 | NOT IDENT. |
| SE-75 | -4.908E-02 | 7.352E-02 | 7.678E-02 | FAIL ABUN |
| BR-77 | 6.290E+10 | 4.381E+11 | 4.390E+11 | SHORT HLIF |
| SR-82 | 6.855E-01 | 3.925E+00 | 3.938E+00 | NOT IDENT. |
| RB-83 | 8.582E-02 | 1.551E-01 | 1.599E-01 | NOT IDENT. |
| KR-85 | -2.219E+01 | 1.268E+01 | 1.615E+01 | NOT IDENT. |
| SR-85 | -2.811E-01 | 1.604E-01 | 2.044E-01 | NOT IDENT. |
| RB-86 | -3.448E+00 | 1.751E+01 | 1.758E+01 | NOT IDENT. |
| Y-88 | -3.352E-02 | 1.050E-01 | 1.061E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-91 | 1.584E+01 | 5.114E+01 | 5.164E+01 | NOT IDENT. |
| NB-94 | 1.930E-02 | 3.843E-02 | 3.940E-02 | NOT IDENT. |
| NB-95 | -5.609E-02 | 1.140E-01 | 1.168E-01 | NOT IDENT. |
| NB-95M | 1.421E-01 | 2.977E-01 | 3.046E-01 | NOT IDENT. |
| ZR-95 | -2.771E-02 | 1.942E-01 | 1.946E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 5.671E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -1.000E+41 | 5.636E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 4.676E+09 | 1.494E+10 | 1.509E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.348E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.380E-02 | 2.663E-02 | 2.735E-02 | FAIL ABUN |
| RH-102 | -1.030E-01 | 6.999E-02 | 8.399E-02 | NOT IDENT. |
| RU-103 | -1.624E-01 | 1.927E-01 | 2.061E-01 | FAIL ABUN |
| RH-106 | 1.475E-01 | 4.422E-01 | 4.471E-01 | NOT IDENT. |
| RU-106 | 1.475E-01 | 4.422E-01 | 4.471E-01 | NOT IDENT. |
| AG-108M | 6.794E-03 | 3.076E-02 | 3.092E-02 | NOT IDENT. |
| CD-109 | -1.304E-01 | 5.854E-01 | 5.883E-01 | NOT IDENT. |
| AG-110M | 2.158E-02 | 6.732E-02 | 6.802E-02 | NOT IDENT. |
| SN-113 | -4.920E-02 | 8.055E-02 | 8.355E-02 | NOT IDENT. |
| CD-115 | 2.048E+11 | 1.993E+12 | 1.995E+12 | SHORT HLIF |
| SN-117M | 6.418E-01 | 3.361E+00 | 3.374E+00 | NOT IDENT. |
| TE-123M | -1.906E-02 | 4.399E-02 | 4.482E-02 | NOT IDENT. |
| SB-124 | 1.921E-01 | 2.831E-01 | 2.961E-01 | NOT IDENT. |
| SB-125 | -4.794E-02 | 1.043E-01 | 1.066E-01 | FAIL ABUN |
| TE-125M | -5.969E+00 | 1.968E+01 | 1.987E+01 | NOT IDENT. |
| I-126 | -2.069E+01 | 2.186E+01 | 2.376E+01 | NOT IDENT. |
| SB-126 | 4.046E+00 | 1.805E+01 | 1.814E+01 | NOT IDENT. |
| SN-126 | -1.748E-03 | 4.929E-02 | 4.930E-02 | NOT IDENT. |
| SB-127 | -8.362E+05 | 5.035E+06 | 5.049E+06 | SHORT HLIF |
| I-131 | 3.115E+01 | 1.289E+02 | 1.297E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 8.244E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.216E+07 | 3.711E+07 | 3.752E+07 | SHORT HLIF |
| BA-133 | -1.171E-02 | 4.463E-02 | 4.494E-02 | NOT IDENT. |
| I-133 | 3.111E+31 | 3.379E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 9.352E-03 | 4.778E-02 | 4.796E-02 | NOT IDENT. |
| CS-135 | 9.916E-03 | 1.635E-01 | 1.636E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 8.433E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -3.350E+00 | 1.038E+01 | 1.049E+01 | NOT IDENT. |
| BA-137M | 2.568E-02 | 4.387E-02 | 4.537E-02 | NOT IDENT. |
| CS-137 | 2.713E-02 | 4.634E-02 | 4.793E-02 | NOT IDENT. |
| CE-139 | 2.621E-02 | 4.245E-02 | 4.406E-02 | NOT IDENT. |
| BA-140 | -9.189E-01 | 1.080E+01 | 1.081E+01 | NOT IDENT. |
| LA-140 | -9.189E-01 | 1.080E+01 | 1.081E+01 | NOT IDENT. |
| CE-141 | -7.570E-02 | 3.155E-01 | 3.174E-01 | NOT IDENT. |
| CE-143 | 1.744E+20 | 1.562E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.690E-02 | 1.982E-01 | 1.984E-01 | NOT IDENT. |
| PM-144 | 3.605E-03 | 5.535E-02 | 5.538E-02 | NOT IDENT. |
| PR-144 | 2.817E-01 | 4.326E+00 | 4.328E+00 | NOT IDENT. |
| PM-146 | 4.277E-02 | 4.355E-02 | 4.762E-02 | NOT IDENT. |
| ND-147 | -4.587E+01 | 1.075E+02 | 1.095E+02 | NOT IDENT. |
| PM-147 | -2.736E+02 | 6.332E+02 | 6.451E+02 | NOT IDENT. |
| PM-149 | -8.057E+12 | 1.830E+13 | 1.866E+13 | SHORT HLIF |
| EU-150 | 6.558E-03 | 3.370E-02 | 3.383E-02 | FAIL ABUN |
| EU-152 | 8.146E-02 | 1.117E-01 | 1.176E-01 | NOT IDENT. |
| GD-153 | 1.406E-02 | 7.592E-02 | 7.619E-02 | NOT IDENT. |
| EU-154 | -1.275E-01 | 1.424E-01 | 1.536E-01 | NOT IDENT. |
| EU-155 | -1.623E-02 | 8.898E-02 | 8.928E-02 | NOT IDENT. |
| TB-160 | 6.135E-02 | 3.286E-01 | 3.297E-01 | FAIL ABUN |
| HO-166M | -3.233E-02 | 7.797E-02 | 7.932E-02 | FAIL ABUN |
| TM-171 | 9.582E+00 | 6.259E+00 | 7.605E+00 | FAIL ABUN |
| LU-176 | 2.143E-02 | 4.658E-02 | 4.757E-02 | FAIL ABUN |
| HF-181 | 1.312E-01 | 2.353E-01 | 2.426E-01 | FAIL ABUN |
| TA-182 | 5.043E-02 | 2.283E-01 | 2.294E-01 | NOT IDENT. |
| RE-183 | 8.428E-02 | 1.663E-01 | 1.706E-01 | NOT IDENT. |
| RE-184 | -2.045E-01 | 7.766E-01 | 7.821E-01 | NOT IDENT. |
| W-188 | 1.565E+01 | 1.809E+01 | 1.942E+01 | NOT IDENT. |
| IR-192 | 2.341E-02 | 7.726E-02 | 7.798E-02 | FAIL ABUN |
| BI-207 | 2.714E-02 | 6.262E-02 | 6.380E-02 | FAIL ABUN |
| TL-208 | -3.052E-02 | 5.735E-02 | 5.897E-02 | FAIL ABUN |
| PB-210 | -7.215E-01 | 8.049E-01 | 8.682E-01 | NOT IDENT. |
| BI-211 | -9.370E-02 | 2.363E-01 | 2.401E-01 | NOT IDENT. |
| PB-211 | -4.851E-01 | 7.204E-01 | 7.529E-01 | NOT IDENT. |
| BI-212 | 2.530E-01 | 5.790E-01 | 5.902E-01 | NOT IDENT. |
| BI-214 | 6.955E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| PB-214 | -8.446E-02 | 8.403E-02 | 9.225E-02 | FAIL ABUN |
| RN-219 | -2.777E-01 | 4.797E-01 | 4.958E-01 | NOT IDENT. |
| RN-222 | 6.955E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| RA-223 | 4.209E-01 | 7.235E-01 | 7.480E-01 | FAIL ABUN |
| RA-224 | 3.428E-02 | 6.760E-01 | 6.762E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-226 | 6.955E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| AC-227 | 1.550E-01 | 2.569E-01 | 2.662E-01 | FAIL ABUN |
| TH-227 | 1.550E-01 | 2.569E-01 | 2.662E-01 | FAIL ABUN |
| AC-228 | -6.449E-02 | 1.886E-01 | 1.908E-01 | FAIL ABUN |
| RA-228 | -6.449E-02 | 1.886E-01 | 1.908E-01 | FAIL ABUN |
| TH-229 | 1.832E-01 | 4.800E-01 | 4.871E-01 | NOT IDENT. |
| TH-230 | 6.954E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| PA-231 | -5.067E-01 | 1.711E+00 | 1.726E+00 | NOT IDENT. |
| TH-231 | 4.209E-01 | 7.235E-01 | 7.480E-01 | FAIL ABUN |
| TH-232 | -6.449E-02 | 1.886E-01 | 1.908E-01 | NOT IDENT. |
| PA-233 | -2.867E-02 | 7.018E-02 | 7.136E-02 | NOT IDENT. |
| PA-234 | -1.940E-01 | 3.507E-01 | 3.614E-01 | NOT IDENT. |
| PA-234M | 1.588E+00 | 5.482E+00 | 5.529E+00 | NOT IDENT. |
| TH-234 | -8.972E-02 | 7.163E-01 | 7.174E-01 | FAIL ABUN |
| U-234 | 6.954E-02 | 1.078E-01 | 1.123E-01 | FAIL ABUN |
| U-235 | -4.918E-02 | 1.917E-01 | 1.929E-01 | FAIL ABUN |
| NP-237 | -2.867E-02 | 7.018E-02 | 7.136E-02 | NOT IDENT. |
| NP-238 | 5.758E+12 | 1.659E+13 | 1.679E+13 | SHORT HLIF |
| U-238 | -8.972E-02 | 7.163E-01 | 7.174E-01 | FAIL ABUN |
| NP-239 | -1.393E-01 | 3.436E-01 | 3.493E-01 | FAIL ABUN |
| PU-239 | -5.705E+01 | 2.597E+02 | 2.610E+02 | NOT IDENT. |
| AM-241 | -1.726E-02 | 6.199E-02 | 6.247E-02 | NOT IDENT. |
| AM-243 | -1.106E-02 | 3.311E-02 | 3.348E-02 | NOT IDENT. |
| CM-243 | 7.453E-03 | 7.968E-02 | 7.975E-02 | FAIL ABUN |
| CM-247 | 1.129E-03 | 3.983E-02 | 3.983E-02 | FAIL ABUN |
| CF-249 | 2.270E-02 | 4.694E-02 | 4.804E-02 | NOT IDENT. |
| CF-251 | 3.299E-02 | 1.241E-01 | 1.250E-01 | NOT IDENT. |
| ANH-511 | -3.810E-02 | 6.236E-02 | 6.469E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 23.4591 | 94.67 | 25.5046 | 193.51 | 21.9583 |
| 45.60 | 35.4403 | 94.87 | 25.5152 | 197.03 | 38.8567 |
| 46.54 | 39.1078 | 97.43 | 22.9493 | 198.01 | 32.5944 |
| 49.72 | 0.0000 | 98.43 | 21.6431 | 201.83 | 42.2522 |
| 51.35 | 20.8638 | 98.44 | 21.6436 | 205.31 | 25.4568 |
| 52.39 | 14.4911 | 99.53 | 24.4023 | 210.85 | 30.9612 |
| 53.44 | 21.8068 | 100.11 | 27.1451 | 215.65 | 26.8387 |
| 57.36 | 0.0000 | 103.18 | 30.0407 | 222.11 | 19.4656 |
| 57.53 | 26.1621 | 103.37 | 28.2305 | 227.09 | 23.9231 |
| 57.98 | 24.5589 | 105.21 | 31.0729 | 227.38 | 23.9307 |
| 59.32 | 38.2129 | 105.31 | 31.0788 | 228.16 | 0.0000 |
| 59.54 | 38.2368 | 106.12 | 25.6342 | 228.18 | 15.2420 |
| 63.29 | 34.8988 | 109.28 | 29.4718 | 235.69 | 18.1105 |
| 63.58 | 31.1842 | 111.00 | 17.5551 | 235.96 | 19.7626 |
| 64.28 | 26.2445 | 111.76 | 0.0000 | 238.63 | 31.9303 |
| 66.73 | 32.7061 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 30.2305 | 117.23 | 31.7718 | 240.99 | 23.1796 |
| 67.75 | 29.4300 | 121.12 | 30.1084 | 242.00 | 19.8895 |
| 69.67 | 32.1114 | 121.22 | 30.1136 | 244.70 | 22.1617 |
| 70.83 | 38.1388 | 121.78 | 33.9108 | 252.40 | 0.0000 |
| 72.81 | 35.7731 | 122.06 | 33.9272 | 252.80 | 18.4361 |
| 72.87 | 35.7784 | 123.07 | 24.5457 | 254.15 | 0.0000 |
| 74.66 | 39.7866 | 127.23 | 22.8184 | 256.23 | 16.8182 |
| 74.82 | 39.8020 | 129.30 | 25.7596 | 260.90 | 0.0000 |
| 74.97 | 39.8167 | 131.20 | 27.7551 | 264.66 | 23.7433 |
| 77.11 | 39.5921 | 133.02 | 21.1182 | 268.22 | 21.5567 |
| 79.69 | 31.1741 | 133.52 | 26.8997 | 269.46 | 21.5826 |
| 80.12 | 28.6049 | 136.00 | 27.4899 | 271.23 | 27.3091 |
| 80.19 | 0.0000 | 136.47 | 26.0626 | 273.65 | 25.6618 |
| 80.57 | 37.7459 | 140.51 | 0.0000 | 276.40 | 18.8680 |
| 81.00 | 37.7833 | 143.76 | 23.4331 | 277.37 | 24.0356 |
| 81.07 | 40.3956 | 144.24 | 19.0535 | 277.60 | 20.6063 |
| 83.79 | 33.2168 | 145.44 | 30.3460 | 278.00 | 19.4691 |
| 85.43 | 38.6029 | 152.43 | 13.8492 | 279.20 | 32.6760 |
| 86.55 | 38.6987 | 153.25 | 14.8564 | 279.54 | 32.6864 |
| 86.79 | 32.5591 | 154.21 | 27.7710 | 280.46 | 27.5493 |
| 86.94 | 32.5700 | 156.02 | 25.8553 | 283.69 | 26.4814 |
| 87.09 | 36.1029 | 158.56 | 22.9562 | 284.31 | 0.0000 |
| 87.57 | 37.0224 | 159.00 | 30.9603 | 285.41 | 23.0640 |
| 88.03 | 37.0595 | 162.33 | 29.1003 | 285.90 | 0.0000 |
| 88.34 | 41.3228 | 163.33 | 28.1364 | 287.50 | 18.4867 |
| 88.47 | 41.3344 | 165.86 | 24.2021 | 290.67 | 12.1673 |
| 89.96 | 38.5435 | 176.31 | 31.7076 | 293.27 | 0.0000 |
| 91.11 | 34.6413 | 176.60 | 31.7199 | 295.22 | 16.2900 |
| 92.59 | 31.1858 | 177.52 | 26.6361 | 295.96 | 16.3009 |
| 93.35 | 31.2354 | 181.07 | 0.0000 | 298.58 | 11.6709 |
| 94.56 | 25.4988 | 184.41 | 20.1572 | 299.98 | 10.5170 |
| 94.65 | 25.5036 | 185.72 | 21.7443 | 300.09 | 10.5179 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 10.5183 | 497.08 | 15.1643 | 711.68 | 13.5535 |
| 301.36 | 10.5298 | 505.52 | 20.3210 | 720.70 | 9.0720 |
| 302.85 | 9.3722 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 10.5591 | 511.00 | 12.2320 | 722.78 | 15.4365 |
| 306.78 | 10.5804 | 514.00 | 44.9292 | 722.91 | 14.5293 |
| 308.46 | 18.3660 | 514.00 | 44.9292 | 723.31 | 14.5320 |
| 311.90 | 20.0741 | 520.40 | 8.1995 | 724.19 | 12.7203 |
| 316.51 | 16.0046 | 520.69 | 0.0000 | 727.33 | 5.4592 |
| 319.41 | 19.3549 | 522.65 | 0.0000 | 733.00 | 8.2092 |
| 320.08 | 19.9773 | 527.90 | 0.0000 | 735.93 | 6.3931 |
| 321.04 | 24.2781 | 529.59 | 8.2429 | 737.46 | 3.6557 |
| 323.87 | 21.4728 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 15.7647 | 531.02 | 8.2495 | 747.24 | 7.3424 |
| 328.76 | 21.5607 | 546.56 | 0.0000 | 748.06 | 6.4268 |
| 333.37 | 16.2323 | 552.55 | 9.3933 | 752.31 | 4.5990 |
| 333.97 | 24.3604 | 563.25 | 9.4485 | 753.82 | 5.5223 |
| 334.37 | 20.7581 | 569.33 | 11.5861 | 756.73 | 8.2938 |
| 338.28 | 15.3920 | 569.50 | 11.5871 | 756.80 | 10.1371 |
| 338.32 | 15.3925 | 569.70 | 9.4815 | 763.94 | 3.6975 |
| 340.48 | 27.2108 | 583.19 | 18.0386 | 765.81 | 9.2510 |
| 340.55 | 27.2122 | 584.27 | 18.0485 | 766.42 | 12.9548 |
| 344.28 | 15.4667 | 595.83 | 8.5449 | 766.84 | 14.8082 |
| 345.93 | 20.0422 | 600.60 | 13.7059 | 772.60 | 0.0000 |
| 351.06 | 17.3797 | 602.52 | 0.0000 | 776.52 | 8.3635 |
| 351.93 | 20.1376 | 602.73 | 8.5754 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 5.7228 | 778.90 | 9.3020 |
| 356.01 | 14.6924 | 609.32 | 18.2845 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 15.4960 | 785.37 | 9.3269 |
| 366.42 | 0.0000 | 614.28 | 5.1757 | 792.07 | 10.2881 |
| 375.05 | 20.4984 | 618.01 | 9.7226 | 794.95 | 7.4910 |
| 383.85 | 14.0678 | 620.36 | 7.5710 | 795.86 | 6.5570 |
| 388.16 | 15.0532 | 621.93 | 8.6594 | 801.95 | 8.4516 |
| 388.63 | 12.2349 | 630.19 | 0.0000 | 810.29 | 9.4224 |
| 391.69 | 18.8647 | 631.29 | 16.3124 | 810.45 | 8.4808 |
| 400.66 | 17.0879 | 633.25 | 9.7968 | 810.76 | 8.4817 |
| 401.81 | 20.9023 | 634.78 | 8.7148 | 815.77 | 4.7216 |
| 402.40 | 14.2575 | 635.95 | 4.3600 | 818.51 | 4.7268 |
| 404.85 | 16.1865 | 636.99 | 0.0000 | 832.01 | 9.5044 |
| 410.95 | 14.3436 | 645.85 | 5.4764 | 834.85 | 7.6119 |
| 413.71 | 13.4130 | 657.76 | 12.1172 | 835.71 | 8.5665 |
| 414.70 | 16.2983 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 16.4374 | 661.66 | 7.7255 | 846.75 | 0.0000 |
| 427.87 | 15.4785 | 664.57 | 0.0000 | 846.77 | 9.5596 |
| 433.94 | 10.6850 | 666.33 | 13.2729 | 856.80 | 4.7983 |
| 439.40 | 14.6235 | 666.50 | 11.3778 | 860.56 | 5.7664 |
| 453.88 | 5.9050 | 667.71 | 0.0000 | 871.09 | 6.7544 |
| 463.37 | 17.8226 | 677.62 | 7.1166 | 873.19 | 5.7942 |
| 468.07 | 10.9240 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 7.8466 | 879.38 | 5.8077 |
| 475.06 | 7.9796 | 696.49 | 12.3387 | 880.51 | 7.7469 |
| 476.78 | 9.5856 | 696.51 | 12.3387 | 883.24 | 6.7855 |
| 477.60 | 6.3938 | 697.00 | 12.3414 | 884.68 | 4.8494 |
| 482.18 | 7.0129 | 697.49 | 11.2222 | 889.28 | 8.7440 |
| 487.02 | 9.3783 | 702.65 | 6.7491 | 894.76 | 8.7618 |
| 492.35 | 0.0000 | 706.68 | 10.8182 | 898.04 | 4.8737 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.7895 | 1312.11 | 0.9250 | | |
| 911.20 | 7.8357 | 1332.49 | 3.7204 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 946.00 | 11.8189 | 1365.19 | 6.5668 | | |
| 937.49 | 3.9553 | 1368.63 | 0.0000 | | |
| 944.13 | 1.9823 | 1384.29 | 0.9427 | | |
| 946.00 | 5.9509 | 344.28 | 2.8455 | | |
| 949.00 | 3.9715 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 5.7664 | | |
| 962.31 | 4.9875 | 1489.16 | 3.8708 | | |
| 964.08 | 4.9907 | 884.68 | 0.9714 | | |
| 966.17 | 4.9944 | 1596.21 | 3.9691 | | |
| 968.97 | 6.9988 | 1620.50 | 0.0000 | | |
| 983.53 | 4.0195 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.0133 | | |
| 996.26 | 9.0833 | 1750.46 | 0.0000 | | |
| 1001.03 | 6.0653 | 1764.49 | 2.0586 | | |
| 1004.73 | 7.0851 | 1770.23 | 0.0000 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.0615 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 2.0774 | | |
| 1037.84 | 8.1867 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 4.1779 | | |
| 1046.59 | 6.1576 | | | | |
| 1048.07 | 8.2145 | | | | |
| 1049.04 | 8.2168 | | | | |
| 1050.41 | 5.1379 | | | | |
| 1063.66 | 3.0959 | | | | |
| 1077.00 | 5.1819 | | | | |
| 1077.34 | 4.1459 | | | | |
| 1085.87 | 5.1965 | | | | |
| 1099.45 | 6.2625 | | | | |
| 1112.07 | 5.2393 | | | | |
| 1112.84 | 1.0481 | | | | |
| 1115.54 | 7.3428 | | | | |
| 1120.29 | 4.2020 | | | | |
| 1120.55 | 3.1518 | | | | |
| 1121.30 | 3.1525 | | | | |
| 1129.67 | 2.1070 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 1.0674 | | | | |
| 879.38 | 5.3445 | | | | |
| 1189.05 | 7.5069 | | | | |
| 1204.77 | 3.2319 | | | | |
| 1221.41 | 2.1649 | | | | |
| 1231.02 | 6.5127 | | | | |
| 1235.36 | 3.2603 | | | | |
| 1238.28 | 4.3508 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 4.3918 | | | | |
| 1274.44 | 7.6911 | | | | |
| 1274.54 | 6.5924 | | | | |
| 1291.59 | 5.5195 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:01.62

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147021.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;272
                                    Background date  : 9-FEB-2014 11:20:40.
Sample date      : 7-NOV-2013 15:00:00. Acquisition date : 12-FEB-2014 14:29:36
Sample ID        : G341147021           Sample quantity  : 1.23737E+02 GRAM
Detector name    : GAM01                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.21  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 75.70* | 3 | 43 | 1.38 | 151.37 | 146 | 8 | 9.57E-04 | 344.2 | |
| 2 | 0 | 85.38* | 3 | 25 | 0.99 | 170.72 | 167 | 6 | 8.52E-04 | 291.6 | |
| 3 | 0 | 92.84* | 15 | 44 | 1.10 | 185.64 | 181 | 10 | 4.08E-03 | 106.4 | |
| 4 | 0 | 144.48* | 21 | 52 | 1.70 | 288.88 | 283 | 15 | 5.85E-03 | 81.8 | |
| 5 | 0 | 186.40* | 37 | 13 | 2.08 | 372.69 | 368 | 10 | 1.02E-02 | 31.3 | |
| 6 | 0 | 239.06* | 22 | 42 | 0.94 | 477.98 | 474 | 10 | 6.22E-03 | 60.3 | |
| 7 | 0 | 338.82 | 20 | 10 | 2.14 | 677.45 | 673 | 10 | 5.44E-03 | 37.9 | |
| 8 | 0 | 352.57* | 12 | 10 | 0.91 | 704.95 | 701 | 10 | 3.28E-03 | 64.2 | |
| 9 | 0 | 428.04 | 8 | 13 | 2.13 | 855.86 | 851 | 10 | 2.26E-03 | 88.8 | |
| 10 | 0 | 459.24 | 11 | 9 | 1.30 | 918.24 | 913 | 9 | 3.18E-03 | 55.4 | |
| 11 | 0 | 511.20* | 8 | 4 | 1.82 | 1022.16 | 1017 | 13 | 2.27E-03 | 127.2 | |
| 12 | 0 | 516.97 | 10 | 0 | 1.80 | 1033.70 | 1031 | 6 | 2.78E-03 | 31.6 | |
| 13 | 0 | 584.44* | 4 | 11 | 2.18 | 1168.63 | 1163 | 9 | 1.00E-03 | 195.3 | |
| 14 | 0 | 609.86* | 9 | 7 | 0.88 | 1219.46 | 1216 | 7 | 2.37E-03 | 68.9 | |
| 15 | 0 | 710.28 | 8 | 1 | 0.52 | 1420.30 | 1417 | 6 | 2.10E-03 | 44.4 | |
| 16 | 0 | 737.06 | 7 | 2 | 1.44 | 1473.86 | 1470 | 7 | 2.04E-03 | 47.4 | |
| 17 | 0 | 912.28* | 7 | 2 | 2.63 | 1824.32 | 1819 | 10 | 2.04E-03 | 63.7 | |
| 18 | 0 | 1461.40* | 24 | 0 | 0.80 | 2922.93 | 2917 | 12 | 6.56E-03 | 22.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:30:03

```
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147021.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title     : RXF2
Sample date      : 7-NOV-2013 15:00:00  Acquisition date : 12-FEB-2014 14:29:36
Sample ID        : G341147021           Sample quantity  : 123.74 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA1               Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.21   0.0%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00
```

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| U-235 | 143.76 | CE-141 | 145.44 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10.66* | 9.586E-01 | 1.402E+00 | 1.402E+00 | 45.59 | OK |
| CE-141 | 145.44 | 48.29* | 5.085E+00 | 3.253E-02 | 2.573E-01 | 264.24 | OK |
| TL-208 | 277.37 | 6.60 | 3.551E+00 | ----- | Line Not Found | ----- | Absent |
| | 583.19 | 85.00* | 2.087E+00 | 1.232E-02 | 1.232E-02 | 390.53 | OK |
| | 860.56 | 12.50 | 1.534E+00 | ----- | Line Not Found | ----- | Absent |
| PB-212 | 74.82 | 10.28 | 2.978E+00 | 6.829E-02 | 6.829E-02 | 688.44 | OK |
| | 77.11 | 17.10 | 2.978E+00 | 4.105E-02 | 4.105E-02 | 688.44 | OK |
| | 238.63 | 43.60* | 3.933E+00 | 7.923E-02 | 7.923E-02 | 120.51 | OK |
| | 300.09 | 3.30 | 3.360E+00 | ----- | Line Not Found | ----- | Absent |
| TH-228 | 74.82 | 10.28 | 2.978E+00 | 6.829E-02 | 6.829E-02 | 688.44 | OK |
| | 77.11 | 17.10 | 2.978E+00 | 4.105E-02 | 4.105E-02 | 688.44 | OK |
| | 238.63 | 43.60* | 3.933E+00 | 7.923E-02 | 7.923E-02 | 120.51 | OK |
| | 300.09 | 3.30 | 3.360E+00 | ----- | Line Not Found | ----- | Absent |
| U-235 | 89.96 | 3.47 | 4.122E+00 | ----- | Line Not Found | ----- | Absent |
| | 93.35 | 5.60 | 4.293E+00 | 3.703E-01 | 3.703E-01 | 212.81 | OK |
| | 143.76 | 10.96* | 5.091E+00 | ----- | Line Not Found | ----- | <<INT Reject |
| | 163.33 | 5.08 | 4.891E+00 | ----- | Line Not Found | ----- | Absent |
| | 185.72 | 57.20 | 4.589E+00 | 8.464E-02 | 8.464E-02 | 62.69 | OK |
| | 205.31 | 5.01 | 4.339E+00 | ----- | Line Not Found | ----- | Absent |
| AM-243 | 43.53 | 5.90 | 1.751E-01 | ----- | Line Not Found | ----- | Absent |
| | 74.66 | 67.20* | 2.978E+00 | 1.045E-02 | 1.045E-02 | 688.44 | OK |
| ANH-511 | 511.00 | 100.00* | 2.303E+00 | 2.153E-02 | 2.153E-02 | 254.34 | OK |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:04.05

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147021.CNF;1 | | |
| Acquisition date | : 12-FEB-2014 14:29:36 | Sensitivity | : 3.000 |
| Detector ID | : GAM01 | Energy tolerance | : 1.500 |
| Elapsed live time | : 0 01:00:00.00 | Abundance limit | : 75.000 |
| Elapsed real time | : 0 01:00:00.21 | Half life ratio | : ***** |
| Sample date | : 7-NOV-2013 15:00:00 | Nuclide Library | : SOLID |
| Sample ID | : G341147021 | Analyst initials | : RXF2 |
| Batch Number | : 1361908 | Sample Quantity | : 1.2374E+02 GRAM |
| Wet wt corr | : 1.00000 | Wet Weight | : 0.00000 |
| | | Dry Weight | : 0.00000 |

CALIBRATION INFORMATION

| | | | |
|---|---|---|---|
| Eff. Cal. date | : 12-DEC-2013 13:25:43 | Eff. Geometry | : 500MLMB |
| Eff. File | : DKA100:[CANBERRA.GAMMA]EFF_GAM01_500MLMB.CNF;3 | | |

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 1.402E+00 | 6.263E-01 | 5.442E-01 |
| CE-141 | 2.573E-01 | 6.663E-01 | 5.269E-01 |
| TL-208 | 1.232E-02 | 4.717E-02 | 6.709E-02 |
| PB-212 | 7.923E-02 | 9.357E-02 | 8.887E-02 |
| TH-228 | 7.923E-02 | 9.357E-02 | 8.887E-02 |
| U-235 | 2.293E-01 | 3.675E-01 | 3.778E-01 |
| AM-243 | 1.045E-02 | 7.048E-02 | 9.368E-02 |
| ANH-511 | 2.153E-02 | 5.367E-02 | 3.487E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -1.704E-01 | 9.490E-01 | 1.751E+00 | NOT IDENT. |
| NA-22 | 2.640E-02 | 4.002E-02 | 9.594E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 7.279E+40 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.474E-02 | 2.964E-02 | 8.069E-02 | NOT IDENT. |
| SC-46 | 1.070E-02 | 5.927E-02 | 1.293E-01 | NOT IDENT. |
| V-48 | -5.764E-01 | 2.082E+00 | 3.998E+00 | NOT IDENT. |
| CR-51 | -1.455E+00 | 2.674E+00 | 4.742E+00 | NOT IDENT. |
| MN-54 | -1.360E-04 | 3.187E-02 | 6.667E-02 | NOT IDENT. |
| CO-56 | 3.250E-02 | 6.639E-02 | 1.508E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.423E-02 | 2.901E-02 | 4.985E-02 | NOT IDENT. |
| CO-58 | -1.176E-04 | 6.420E-02 | 1.377E-01 | NOT IDENT. |
| FE-59 | 1.940E-01 | 2.613E-01 | 6.277E-01 | NOT IDENT. |
| CO-60 | 2.609E-02 | 4.336E-02 | 1.007E-01 | NOT IDENT. |
| ZN-65 | -5.902E-02 | 8.342E-02 | 1.374E-01 | NOT IDENT. |
| GE-68 | -6.362E-01 | 1.168E+00 | 2.064E+00 | NOT IDENT. |
| AS-73 | 1.022E+00 | 2.776E+00 | 5.428E+00 | NOT IDENT. |
| AS-74 | 5.634E-01 | 1.878E+00 | 3.884E+00 | NOT IDENT. |
| SE-75 | 1.532E-02 | 6.228E-02 | 1.237E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.412E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 7.860E-01 | 2.627E+00 | 5.689E+00 | NOT IDENT. |
| RB-83 | 4.946E-02 | 1.203E-01 | 2.318E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | 1.346E+01 | 5.663E+00 | 1.512E+01 | NOT IDENT. |
| SR-85 | 1.679E-01 | 7.079E-02 | 1.890E-01 | NOT IDENT. |
| RB-86 | -7.645E+00 | 1.225E+01 | 2.096E+01 | NOT IDENT. |
| Y-88 | -1.127E-03 | 5.719E-02 | 1.328E-01 | NOT IDENT. |
| Y-91 | -1.375E+01 | 4.712E+01 | 8.809E+01 | NOT IDENT. |
| NB-94 | -5.312E-03 | 3.312E-02 | 6.397E-02 | NOT IDENT. |
| NB-95 | 3.371E-02 | 7.656E-02 | 1.712E-01 | NOT IDENT. |
| NB-95M | 2.346E-02 | 2.522E-01 | 4.384E-01 | NOT IDENT. |
| ZR-95 | -9.589E-02 | 1.220E-01 | 2.036E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 1.495E+41 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 7.131E+09 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -2.593E-03 | 3.202E-02 | 5.740E-02 | NOT IDENT. |
| RH-102 | -1.228E-02 | 5.709E-02 | 1.100E-01 | NOT IDENT. |
| RU-103 | 8.278E-02 | 1.539E-01 | 3.240E-01 | FAIL ABUN |
| RH-106 | 8.802E-02 | 3.449E-01 | 7.205E-01 | NOT IDENT. |
| RU-106 | 8.802E-02 | 3.449E-01 | 7.205E-01 | NOT IDENT. |
| AG-108M | -6.571E-03 | 3.229E-02 | 5.726E-02 | NOT IDENT. |
| CD-109 | -6.220E-02 | 8.912E-01 | 1.185E+00 | NOT IDENT. |
| AG-110M | -2.143E-02 | 5.513E-02 | 1.028E-01 | NOT IDENT. |
| SN-113 | -4.018E-02 | 5.938E-02 | 1.018E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.196E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 5.525E-01 | 3.153E+00 | 5.820E+00 | NOT IDENT. |
| TE-123M | 1.798E-02 | 3.984E-02 | 7.605E-02 | NOT IDENT. |
| SB-124 | -5.270E-04 | 1.276E-01 | 3.368E-01 | NOT IDENT. |
| SB-125 | 6.776E-02 | 1.179E-01 | 1.920E-01 | FAIL ABUN |
| TE-125M | -9.695E+00 | 2.243E+01 | 3.914E+01 | NOT IDENT. |
| I-126 | -2.988E+00 | 1.383E+01 | 2.731E+01 | NOT IDENT. |
| SB-126 | 6.470E-01 | 1.044E+01 | 2.206E+01 | NOT IDENT. |
| SN-126 | -3.798E-02 | 7.680E-02 | 1.054E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 2.376E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.391E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 3.444E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | -1.655E-02 | 4.304E-02 | 6.681E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 1.339E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.888E-02 | 3.827E-02 | 8.845E-02 | NOT IDENT. |
| CS-135 | 9.488E-02 | 1.334E-01 | 2.782E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 9.800E+40 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.859E+00 | 4.738E+00 | 1.168E+01 | NOT IDENT. |
| BA-137M | 6.454E-03 | 2.939E-02 | 6.238E-02 | NOT IDENT. |
| CS-137 | 6.818E-03 | 3.104E-02 | 6.589E-02 | NOT IDENT. |
| CE-139 | 1.807E-02 | 3.895E-02 | 7.448E-02 | NOT IDENT. |
| BA-140 | -2.886E-01 | 6.534E+00 | 1.456E+01 | NOT IDENT. |
| LA-140 | -2.886E-01 | 6.534E+00 | 1.456E+01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 8.287E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.359E-01 | 1.945E-01 | 3.878E-01 | NOT IDENT. |
| PM-144 | 2.268E-02 | 3.677E-02 | 8.087E-02 | NOT IDENT. |
| PR-144 | 1.759E+00 | 2.870E+00 | 6.309E+00 | NOT IDENT. |
| PM-146 | 4.124E-02 | 4.016E-02 | 8.495E-02 | FAIL ABUN |
| ND-147 | -5.985E+01 | 8.836E+01 | 1.472E+02 | NOT IDENT. |
| PM-147 | -2.294E+02 | 7.225E+02 | 1.270E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.139E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.826E-02 | 2.687E-02 | 5.404E-02 | FAIL ABUN |
| EU-152 | 6.064E-03 | 8.974E-02 | 1.560E-01 | NOT IDENT. |
| GD-153 | -2.727E-02 | 1.090E-01 | 1.717E-01 | NOT IDENT. |
| EU-154 | 5.336E-02 | 1.118E-01 | 2.580E-01 | NOT IDENT. |
| EU-155 | 4.456E-02 | 1.013E-01 | 1.922E-01 | FAIL ABUN |
| TB-160 | -3.245E-02 | 2.561E-01 | 5.086E-01 | FAIL ABUN |
| HO-166M | 4.718E-02 | 4.105E-02 | 1.191E-01 | FAIL ABUN |
| TM-171 | 2.125E+01 | 3.410E+01 | 6.790E+01 | NOT IDENT. |
| LU-176 | -3.486E-03 | 2.388E-02 | 4.504E-02 | NOT IDENT. |
| HF-181 | 6.790E-02 | 1.595E-01 | 3.267E-01 | NOT IDENT. |
| TA-182 | -1.282E-01 | 2.250E-01 | 3.872E-01 | NOT IDENT. |
| RE-183 | 2.898E-01 | 6.520E-01 | 1.272E+00 | NOT IDENT. |
| RE-184 | -4.932E-01 | 4.734E-01 | 6.914E-01 | NOT IDENT. |
| W-188 | 4.716E+00 | 1.463E+01 | 2.919E+01 | NOT IDENT. |
| IR-192 | 6.897E-02 | 6.663E-02 | 1.453E-01 | NOT IDENT. |
| HG-203 | -7.631E-03 | 1.155E-01 | 2.198E-01 | NOT IDENT. |
| BI-207 | 1.796E-02 | 4.526E-02 | 9.970E-02 | FAIL ABUN |
| PB-210 | 5.295E-01 | 6.039E+00 | 1.178E+01 | NOT IDENT. |
| BI-211 | 9.040E-02 | 2.130E-01 | 4.085E-01 | NOT IDENT. |
| PB-211 | -1.392E-03 | 6.156E-01 | 1.190E+00 | FAIL ABUN |
| BI-212 | 3.068E-01 | 4.155E-01 | 9.565E-01 | NOT IDENT. |
| BI-214 | 5.626E-02 | 7.602E-02 | 1.640E-01 | FAIL ABUN |
| PB-214 | 6.715E-02 | 8.449E-02 | 1.468E-01 | FAIL ABUN |
| RN-219 | 1.754E-01 | 3.451E-01 | 7.219E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 5.626E-02 | 7.602E-02 | 1.640E-01 | FAIL ABUN |
| RA-223 | 1.973E-01 | 6.036E-01 | 1.201E+00 | FAIL ABUN |
| RA-224 | 4.321E-01 | 6.242E-01 | 1.156E+00 | NOT IDENT. |
| RA-226 | 5.626E-02 | 7.602E-02 | 1.640E-01 | FAIL ABUN |
| AC-227 | -3.396E-02 | 2.277E-01 | 4.295E-01 | NOT IDENT. |
| TH-227 | -3.396E-02 | 2.277E-01 | 4.295E-01 | NOT IDENT. |
| AC-228 | 1.184E-01 | 1.478E-01 | 3.207E-01 | FAIL ABUN |
| RA-228 | 1.184E-01 | 1.478E-01 | 3.207E-01 | FAIL ABUN |
| TH-229 | 3.673E-01 | 4.295E-01 | 8.666E-01 | FAIL ABUN |
| TH-230 | 5.626E-02 | 7.601E-02 | 1.640E-01 | FAIL ABUN |
| PA-231 | 5.543E-01 | 1.169E+00 | 2.416E+00 | NOT IDENT. |
| TH-231 | 1.973E-01 | 6.036E-01 | 1.201E+00 | FAIL ABUN |
| TH-232 | 1.184E-01 | 1.478E-01 | 3.207E-01 | FAIL ABUN |
| PA-233 | -9.127E-03 | 4.802E-02 | 9.178E-02 | NOT IDENT. |
| PA-234 | 4.476E-02 | 2.762E-01 | 5.773E-01 | NOT IDENT. |
| PA-234M | 1.048E-01 | 4.827E+00 | 9.739E+00 | NOT IDENT. |
| TH-234 | -1.056E-01 | 1.797E+00 | 3.490E+00 | FAIL ABUN |
| U-234 | 5.626E-02 | 7.601E-02 | 1.640E-01 | FAIL ABUN |
| NP-237 | -9.127E-03 | 4.802E-02 | 9.178E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 7.806E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -1.056E-01 | 1.797E+00 | 3.490E+00 | FAIL ABUN |
| NP-239 | -9.270E-02 | 3.804E-01 | 6.740E-01 | NOT IDENT. |
| PU-239 | -1.661E+01 | 3.142E+02 | 5.663E+02 | NOT IDENT. |
| AM-241 | -1.457E-02 | 2.205E-01 | 4.076E-01 | NOT IDENT. |
| CM-243 | 1.946E-02 | 9.401E-02 | 1.775E-01 | NOT IDENT. |
| CM-247 | 2.933E-03 | 3.380E-02 | 6.583E-02 | NOT IDENT. |
| CF-249 | -1.310E-02 | 3.013E-02 | 5.464E-02 | NOT IDENT. |
| CF-251 | 6.093E-03 | 1.244E-01 | 2.239E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:29:59.89

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 64.00 | 18 | 44 | 0.97 | 127.98 | 122 | 8 | 5.08E-03 | 67.0 | |
| 2 | 0 | 75.70 | 9 | 43 | 1.38 | 151.37 | 146 | 8 | 2.57E-03 | 126.1 | |
| 3 | 0 | 85.38 | 11 | 25 | 0.99 | 170.72 | 167 | 6 | 2.99E-03 | 80.2 | |
| 4 | 0 | 92.84 | 74 | 44 | 1.10 | 185.64 | 181 | 10 | 2.04E-02 | 20.6 | |
| 5 | 0 | 144.48 | 27 | 52 | 1.70 | 288.88 | 283 | 15 | 7.44E-03 | 63.6 | |
| 6 | 0 | 186.40 | 70 | 13 | 2.08 | 372.69 | 368 | 10 | 1.95E-02 | 15.6 | |
| 7 | 0 | 239.06 | 33 | 42 | 0.94 | 477.98 | 474 | 10 | 9.23E-03 | 39.8 | |
| 8 | 0 | 338.82 | 20 | 10 | 2.14 | 677.45 | 673 | 10 | 5.44E-03 | 37.9 | |
| 9 | 0 | 352.57 | 19 | 10 | 0.91 | 704.95 | 701 | 10 | 5.28E-03 | 38.7 | |
| 10 | 0 | 428.04 | 8 | 13 | 2.13 | 855.86 | 851 | 10 | 2.26E-03 | 88.8 | |
| 11 | 0 | 459.24 | 11 | 9 | 1.30 | 918.24 | 913 | 9 | 3.18E-03 | 55.4 | |
| 12 | 0 | 511.20 | 80 | 4 | 1.82 | 1022.16 | 1017 | 13 | 2.23E-02 | 12.1 | |
| 13 | 0 | 516.97 | 10 | 0 | 1.80 | 1033.70 | 1031 | 6 | 2.78E-03 | 31.6 | |
| 14 | 0 | 584.44 | 11 | 11 | 2.18 | 1168.63 | 1163 | 9 | 3.03E-03 | 63.1 | |
| 15 | 0 | 609.86 | 13 | 7 | 0.88 | 1219.46 | 1216 | 7 | 3.61E-03 | 43.7 | |
| 16 | 0 | 710.28 | 8 | 1 | 0.52 | 1420.30 | 1417 | 6 | 2.10E-03 | 44.4 | |
| 17 | 0 | 737.06 | 7 | 2 | 1.44 | 1473.86 | 1470 | 7 | 2.04E-03 | 47.4 | |
| 18 | 0 | 912.28 | 12 | 2 | 2.63 | 1824.32 | 1819 | 10 | 3.23E-03 | 38.7 | |
| 19 | 0 | 1461.40 | 28 | 0 | 0.80 | 2922.93 | 2917 | 12 | 7.78E-03 | 18.9 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:02.19

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 24 | 10.66* | 9.586E-01 | 1.402E+00 | 1.402E+00 | 45.59 |
| CE-141 | 145.44 | 21 | 48.29* | 5.085E+00 | 5.203E-02 | 4.116E-01 | 163.58 |
| TL-208 | 277.37 | ------ | 6.60 | 3.551E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 4 | 85.00* | 2.087E+00 | 1.232E-02 | 1.232E-02 | 390.53 |
| | 860.56 | ------ | 12.50 | 1.534E+00 | ------ | Line Not Found | ------ |
| PB-212 | 74.82 | 3 | 10.28 | 2.978E+00 | 6.829E-02 | 6.829E-02 | 688.44 |
| | 77.11 | 3 | 17.10 | 2.978E+00 | 4.105E-02 | 4.105E-02 | 688.44 |
| | 238.63 | 22 | 43.60* | 3.933E+00 | 7.923E-02 | 7.923E-02 | 120.51 |
| | 300.09 | ------ | 3.30 | 3.360E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | 3 | 10.28 | 2.978E+00 | 6.829E-02 | 6.829E-02 | 688.44 |
| | 77.11 | 3 | 17.10 | 2.978E+00 | 4.105E-02 | 4.105E-02 | 688.44 |
| | 238.63 | 22 | 43.60* | 3.933E+00 | 7.923E-02 | 7.923E-02 | 120.51 |
| | 300.09 | ------ | 3.30 | 3.360E+00 | ------ | Line Not Found | ------ |
| U-235 | 89.96 | ------ | 3.47 | 4.122E+00 | ------ | Line Not Found | ------ |
| | 93.35 | 15 | 5.60 | 4.293E+00 | 3.703E-01 | 3.703E-01 | 212.81 |
| | 143.76 | 21 | 10.96* | 5.085E+00 | 2.293E-01 | 2.293E-01 | 163.58 |
| | 163.33 | ------ | 5.08 | 4.891E+00 | ------ | Line Not Found | ------ |
| | 185.72 | 37 | 57.20 | 4.589E+00 | 8.464E-02 | 8.464E-02 | 62.69 |
| | 205.31 | ------ | 5.01 | 4.339E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.751E-01 | ------ | Line Not Found | ------ |
| | 74.66 | 3 | 67.20* | 2.978E+00 | 1.045E-02 | 1.045E-02 | 688.44 |
| ANH-511 | 511.00 | 8 | 100.00* | 2.303E+00 | 2.153E-02 | 2.153E-02 | 254.34 |

Flag: "*" = Keyline

Sample ID : G341147021 Acquisition date : 12-FEB-2014 14:29:36

Total number of lines in spectrum 18
Number of unidentified lines 2
Number of lines tentatively identified by NID 16 88.89%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 1.402E+00 | 1.402E+00 | 0.639E+00 | 45.59 | |
| CE-141 | 32.51D | 7.91 | 5.203E-02 | 4.116E-01 | 6.732E-01 | 163.58 | |
| TL-208 | 1.41E+10Y | 1.00 | 1.232E-02 | 1.232E-02 | 4.813E-02 | 390.53 | |
| PB-212 | 1.41E+10Y | 1.00 | 7.923E-02 | 7.923E-02 | 9.548E-02 | 120.51 | |
| TH-228 | 1.41E+10Y | 1.00 | 7.923E-02 | 7.923E-02 | 9.548E-02 | 120.51 | |
| U-235 | 7.04E+08Y | 1.00 | 2.293E-01 | 2.293E-01 | 3.750E-01 | 163.58 | |
| AM-243 | 7370.00Y | 1.00 | 1.045E-02 | 1.045E-02 | 7.192E-02 | 688.44 | |
| ANH-511 | 1.00E+09Y | 1.00 | 2.153E-02 | 2.153E-02 | 5.477E-02 | 254.34 | |
| | | | --------- | --------- | | | |
| | Total Activity : | | 1.886E+00 | 2.245E+00 | | | |

Grand Total Activity : 1.886E+00 2.245E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147021 Acquisition date : 12-FEB-2014 14:29:36

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 85.38 | 3 | 25 | 0.99 | 170.72 | 167 | 6 | 8.52E-04 | **** | 3.81E+00 | T |
| 0 | 338.82 | 20 | 10 | 2.14 | 677.45 | 673 | 10 | 5.44E-03 | 75.8 | 3.08E+00 | T |
| 0 | 352.57 | 12 | 10 | 0.91 | 704.95 | 701 | 10 | 3.28E-03 | **** | 3.00E+00 | T |
| 0 | 428.04 | 8 | 13 | 2.13 | 855.86 | 851 | 10 | 2.26E-03 | **** | 2.62E+00 | T |
| 0 | 459.24 | 11 | 9 | 1.30 | 918.24 | 913 | 9 | 3.18E-03 | **** | 2.49E+00 | |
| 0 | 516.97 | 10 | 0 | 1.80 | 1033.70 | 1031 | 6 | 2.78E-03 | 63.2 | 2.28E+00 | |
| 0 | 609.86 | 9 | 7 | 0.88 | 1219.46 | 1216 | 7 | 2.37E-03 | **** | 2.02E+00 | T |
| 0 | 710.28 | 8 | 1 | 0.52 | 1420.30 | 1417 | 6 | 2.10E-03 | 88.8 | 1.80E+00 | T |
| 0 | 737.06 | 7 | 2 | 1.44 | 1473.86 | 1470 | 7 | 2.04E-03 | 94.7 | 1.74E+00 | T |
| 0 | 912.28 | 7 | 2 | 2.63 | 1824.32 | 1819 | 10 | 2.04E-03 | **** | 1.46E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:14.34

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147021.CNF;1    *
* Acquisition date : 12-FEB-2014 14:29:36 Sensitivity     : 3.000            *
* Detector ID      : GAM01                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.21     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 15:00:00 Nuclide Library : SOLID            *
* Sample ID        : G341147021           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 1.2374E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 12-DEC-2013 13:25:43 Eff. Geometry   : 500MLMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_500MLMB.CNF;3          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 1.918E-01 |
| CE-141 | 2.371E-01 |
| TL-208 | 2.894E-02 |
| PB-212 | 3.967E-02 |
| TH-228 | 3.967E-02 |
| U-235 | 1.743E-01 |
| AM-243 | 4.261E-02 |
| ANH-511 | 1.388E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 7.607E-01 | NOT IDENT. |
| NA-22 | 3.983E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.021E-02 | NOT IDENT. |
| SC-46 | 5.238E-02 | NOT IDENT. |
| V-48 | 1.595E+00 | NOT IDENT. |
| CR-51 | 2.079E+00 | NOT IDENT. |
| MN-54 | 2.687E-02 | NOT IDENT. |
| CO-56 | 6.282E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.254E-02 | NOT IDENT. |
| CO-58 | 5.567E-02 | NOT IDENT. |
| FE-59 | 2.607E-01 | NOT IDENT. |
| CO-60 | 4.219E-02 | NOT IDENT. |
| ZN-65 | 5.117E-02 | NOT IDENT. |
| GE-68 | 7.727E-01 | NOT IDENT. |
| AS-73 | 2.470E+00 | NOT IDENT. |
| AS-74 | 1.645E+00 | NOT IDENT. |
| SE-75 | 5.521E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 2.383E+00 | NOT IDENT. |
| RB-83 | 9.842E-02 | NOT IDENT. |
| KR-85 | 6.722E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SR-85 | 8.402E-02 | NOT IDENT. |
| RB-86 | 7.702E+00 | NOT IDENT. |
| Y-88 | 4.707E-02 | NOT IDENT. |
| Y-91 | 3.530E+01 | NOT IDENT. |
| NB-94 | 2.746E-02 | NOT IDENT. |
| NB-95 | 7.171E-02 | NOT IDENT. |
| NB-95M | 1.955E-01 | NOT IDENT. |
| ZR-95 | 7.656E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.623E-02 | NOT IDENT. |
| RH-102 | 4.722E-02 | NOT IDENT. |
| RU-103 | 1.408E-01 | FAIL ABUN |
| RH-106 | 3.106E-01 | NOT IDENT. |
| RU-106 | 3.106E-01 | NOT IDENT. |
| AG-108M | 2.514E-02 | NOT IDENT. |
| CD-109 | 5.283E-01 | NOT IDENT. |
| AG-110M | 4.155E-02 | NOT IDENT. |
| SN-113 | 4.276E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.642E+00 | NOT IDENT. |
| TE-123M | 3.456E-02 | NOT IDENT. |
| SB-124 | 1.065E-01 | NOT IDENT. |
| SB-125 | 8.476E-02 | FAIL ABUN |
| TE-125M | 1.759E+01 | NOT IDENT. |
| I-126 | 1.126E+01 | NOT IDENT. |
| SB-126 | 9.046E+00 | NOT IDENT. |
| SN-126 | 4.711E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.889E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.783E-02 | NOT IDENT. |
| CS-135 | 1.250E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.524E+00 | NOT IDENT. |
| BA-137M | 2.636E-02 | NOT IDENT. |
| CS-137 | 2.785E-02 | NOT IDENT. |
| CE-139 | 3.381E-02 | NOT IDENT. |
| BA-140 | 5.394E+00 | NOT IDENT. |
| LA-140 | 5.394E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.757E-01 | NOT IDENT. |
| PM-144 | 3.501E-02 | NOT IDENT. |
| PR-144 | 2.731E+00 | NOT IDENT. |
| PM-146 | 3.728E-02 | FAIL ABUN |
| ND-147 | 6.086E+01 | NOT IDENT. |
| PM-147 | 5.747E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.427E-02 | FAIL ABUN |
| EU-152 | 6.779E-02 | NOT IDENT. |
| GD-153 | 7.759E-02 | NOT IDENT. |
| EU-154 | 1.069E-01 | NOT IDENT. |
| EU-155 | 8.778E-02 | FAIL ABUN |
| TB-160 | 2.084E-01 | FAIL ABUN |
| HO-166M | 5.110E-02 | FAIL ABUN |
| TM-171 | 3.110E+01 | NOT IDENT. |
| LU-176 | 1.988E-02 | NOT IDENT. |
| HF-181 | 1.427E-01 | NOT IDENT. |
| TA-182 | 1.449E-01 | NOT IDENT. |
| RE-183 | 5.822E-01 | NOT IDENT. |
| RE-184 | 2.479E-01 | NOT IDENT. |
| W-188 | 1.304E+01 | NOT IDENT. |
| IR-192 | 6.504E-02 | NOT IDENT. |
| HG-203 | 9.787E-02 | NOT IDENT. |
| BI-207 | 4.117E-02 | FAIL ABUN |
| PB-210 | 5.242E+00 | NOT IDENT. |
| BI-211 | 1.832E-01 | NOT IDENT. |
| PB-211 | 5.153E-01 | FAIL ABUN |
| BI-212 | 4.086E-01 | NOT IDENT. |
| BI-214 | 7.310E-02 | FAIL ABUN |
| PB-214 | 6.576E-02 | FAIL ABUN |
| RN-219 | 3.156E-01 | NOT IDENT. |
| RN-222 | 7.310E-02 | FAIL ABUN |

| | | |
|---|---|---|
| RA-223 | 5.359E-01 | FAIL ABUN |
| RA-224 | 5.268E-01 | NOT IDENT. |
| RA-226 | 7.310E-02 | FAIL ABUN |
| AC-227 | 1.918E-01 | NOT IDENT. |
| TH-227 | 1.918E-01 | NOT IDENT. |
| AC-228 | 1.386E-01 | FAIL ABUN |
| RA-228 | 1.386E-01 | FAIL ABUN |
| TH-229 | 3.921E-01 | FAIL ABUN |
| TH-230 | 7.309E-02 | FAIL ABUN |
| PA-231 | 1.070E+00 | NOT IDENT. |
| TH-231 | 5.359E-01 | FAIL ABUN |
| TH-232 | 1.386E-01 | FAIL ABUN |
| PA-233 | 3.938E-02 | NOT IDENT. |
| PA-234 | 2.403E-01 | NOT IDENT. |
| PA-234M | 4.144E+00 | NOT IDENT. |
| TH-234 | 1.615E+00 | FAIL ABUN |
| U-234 | 7.309E-02 | FAIL ABUN |
| NP-237 | 3.938E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.615E+00 | FAIL ABUN |
| NP-239 | 3.064E-01 | NOT IDENT. |
| PU-239 | 2.580E+02 | NOT IDENT. |
| AM-241 | 1.864E-01 | NOT IDENT. |
| CM-243 | 8.050E-02 | NOT IDENT. |
| CM-247 | 2.875E-02 | NOT IDENT. |
| CF-249 | 2.289E-02 | NOT IDENT. |
| CF-251 | 1.019E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:19.64

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147021.CNF;1    *
* Acquisition date : 12-FEB-2014 14:29:36 Sensitivity     : 3.000          *
* Detector ID      : GAM01                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.21     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:00:00 Nuclide Library : SOLID          *
* Sample ID        : G341147021           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.2374E+02 GRAM*
*                                         Quantity Err(%) : 1.6163E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-DEC-2013 13:25:43 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_500MLMB.CNF;3       *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 1.402E+00 | 6.381E-01 | 6.381E-01 |
| CE-141 | 2.572E-01 | 6.672E-01 | 6.672E-01 |
| TL-208 | 1.232E-02 | 4.718E-02 | 4.718E-02 |
| PB-212 | 7.923E-02 | 9.405E-02 | 9.405E-02 |
| TH-228 | 7.923E-02 | 9.405E-02 | 9.405E-02 |
| U-235 | 2.293E-01 | 3.682E-01 | 3.682E-01 |
| AM-243 | 1.045E-02 | 7.049E-02 | 7.049E-02 |
| ANH-511 | 2.153E-02 | 5.371E-02 | 5.371E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -1.704E-01 | 9.491E-01 | 9.522E-01 | NOT IDENT. |
| NA-22 | 2.640E-02 | 4.008E-02 | 4.181E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 7.456E+40 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.474E-02 | 2.966E-02 | 3.040E-02 | NOT IDENT. |
| SC-46 | 1.070E-02 | 5.929E-02 | 5.948E-02 | NOT IDENT. |
| V-48 | -5.764E-01 | 2.083E+00 | 2.099E+00 | NOT IDENT. |
| CR-51 | -1.455E+00 | 2.679E+00 | 2.758E+00 | NOT IDENT. |
| MN-54 | -1.360E-04 | 3.187E-02 | 3.187E-02 | NOT IDENT. |
| CO-56 | 3.250E-02 | 6.649E-02 | 6.808E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 2.088E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | -1.423E-02 | 2.904E-02 | 2.974E-02 | NOT IDENT. |
| CO-58 | -1.176E-04 | 6.420E-02 | 6.420E-02 | NOT IDENT. |
| FE-59 | 1.940E-01 | 2.628E-01 | 2.770E-01 | NOT IDENT. |
| CO-60 | 2.609E-02 | 4.340E-02 | 4.497E-02 | NOT IDENT. |
| ZN-65 | -5.902E-02 | 8.379E-02 | 8.791E-02 | NOT IDENT. |
| GE-68 | -6.362E-01 | 1.171E+00 | 1.205E+00 | NOT IDENT. |
| AS-73 | 1.022E+00 | 2.784E+00 | 2.822E+00 | NOT IDENT. |
| AS-74 | 5.634E-01 | 1.879E+00 | 1.897E+00 | NOT IDENT. |
| SE-75 | 1.532E-02 | 6.230E-02 | 6.269E-02 | NOT IDENT. |
| BR-77 | 2.889E+11 | 8.786E+11 | 8.882E+11 | SHORT HLIF |
| SR-82 | 7.860E-01 | 2.628E+00 | 2.652E+00 | NOT IDENT. |
| RB-83 | 4.946E-02 | 1.205E-01 | 1.226E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| KR-85 | 1.346E+01 | 5.811E+00 | 8.403E+00 | NOT IDENT. |
| SR-85 | 1.679E-01 | 7.262E-02 | 1.049E-01 | NOT IDENT. |
| RB-86 | -7.645E+00 | 1.229E+01 | 1.276E+01 | NOT IDENT. |
| Y-88 | -1.127E-03 | 5.719E-02 | 5.720E-02 | NOT IDENT. |
| Y-91 | -1.375E+01 | 4.714E+01 | 4.754E+01 | NOT IDENT. |
| NB-94 | -5.312E-03 | 3.312E-02 | 3.321E-02 | NOT IDENT. |
| NB-95 | 3.371E-02 | 7.663E-02 | 7.812E-02 | NOT IDENT. |
| NB-95M | 2.346E-02 | 2.522E-01 | 2.524E-01 | NOT IDENT. |
| ZR-95 | -9.589E-02 | 1.224E-01 | 1.298E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.096E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | -5.777E+38 | 1.495E+41 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.085E+10 | 7.212E+09 | 8.713E+09 | SHORT HLIF |
| TC-99M | 1.000E+41 | 3.324E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -2.593E-03 | 3.202E-02 | 3.204E-02 | NOT IDENT. |
| RH-102 | -1.228E-02 | 5.711E-02 | 5.738E-02 | NOT IDENT. |
| RU-103 | 8.278E-02 | 1.542E-01 | 1.586E-01 | FAIL ABUN |
| RH-106 | 8.802E-02 | 3.450E-01 | 3.473E-01 | NOT IDENT. |
| RU-106 | 8.802E-02 | 3.450E-01 | 3.473E-01 | NOT IDENT. |
| AG-108M | -6.571E-03 | 3.230E-02 | 3.244E-02 | NOT IDENT. |
| CD-109 | -6.220E-02 | 8.913E-01 | 8.917E-01 | NOT IDENT. |
| AG-110M | -2.143E-02 | 5.519E-02 | 5.603E-02 | NOT IDENT. |
| SN-113 | -4.018E-02 | 5.952E-02 | 6.221E-02 | NOT IDENT. |
| CD-115 | 4.158E+11 | 1.197E+12 | 1.211E+12 | SHORT HLIF |
| SN-117M | 5.525E-01 | 3.154E+00 | 3.164E+00 | NOT IDENT. |
| TE-123M | 1.798E-02 | 3.988E-02 | 4.070E-02 | NOT IDENT. |
| SB-124 | -5.270E-04 | 1.276E-01 | 1.276E-01 | NOT IDENT. |
| SB-125 | 6.776E-02 | 1.181E-01 | 1.220E-01 | FAIL ABUN |
| TE-125M | -9.695E+00 | 2.244E+01 | 2.287E+01 | NOT IDENT. |
| I-126 | -2.988E+00 | 1.383E+01 | 1.390E+01 | NOT IDENT. |
| SB-126 | 6.470E-01 | 1.044E+01 | 1.045E+01 | NOT IDENT. |
| SN-126 | -3.798E-02 | 7.691E-02 | 7.880E-02 | NOT IDENT. |
| SB-127 | -3.029E+06 | 2.743E+06 | 3.064E+06 | SHORT HLIF |
| I-131 | -4.397E+00 | 1.391E+02 | 1.391E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.677E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -4.111E+06 | 3.444E+07 | 3.449E+07 | SHORT HLIF |
| BA-133 | -1.655E-02 | 4.308E-02 | 4.372E-02 | NOT IDENT. |
| I-133 | 9.941E+31 | 1.464E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 2.888E-02 | 3.838E-02 | 4.053E-02 | NOT IDENT. |
| CS-135 | 9.488E-02 | 1.339E-01 | 1.406E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.403E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.859E+00 | 4.747E+00 | 4.820E+00 | NOT IDENT. |
| BA-137M | 6.454E-03 | 2.939E-02 | 2.953E-02 | NOT IDENT. |
| CS-137 | 6.818E-03 | 3.105E-02 | 3.120E-02 | NOT IDENT. |
| CE-139 | 1.807E-02 | 3.916E-02 | 4.000E-02 | NOT IDENT. |
| BA-140 | -2.886E-01 | 6.534E+00 | 6.535E+00 | NOT IDENT. |
| LA-140 | -2.886E-01 | 6.534E+00 | 6.535E+00 | NOT IDENT. |
| CE-143 | 3.314E+19 | 8.297E+19 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.359E-01 | 1.949E-01 | 2.043E-01 | NOT IDENT. |
| PM-144 | 2.268E-02 | 3.682E-02 | 3.821E-02 | NOT IDENT. |
| PR-144 | 1.759E+00 | 2.873E+00 | 2.981E+00 | NOT IDENT. |
| PM-146 | 4.124E-02 | 4.045E-02 | 4.452E-02 | FAIL ABUN |
| ND-147 | -5.985E+01 | 8.855E+01 | 9.257E+01 | NOT IDENT. |
| PM-147 | -2.294E+02 | 7.227E+02 | 7.301E+02 | NOT IDENT. |
| PM-149 | -7.581E+12 | 1.147E+13 | 1.197E+13 | SHORT HLIF |
| EU-150 | 2.826E-02 | 2.706E-02 | 2.990E-02 | FAIL ABUN |
| EU-152 | 6.064E-03 | 8.974E-02 | 8.978E-02 | NOT IDENT. |
| GD-153 | -2.727E-02 | 1.090E-01 | 1.097E-01 | NOT IDENT. |
| EU-154 | 5.336E-02 | 1.119E-01 | 1.145E-01 | NOT IDENT. |
| EU-155 | 4.456E-02 | 1.014E-01 | 1.034E-01 | FAIL ABUN |
| TB-160 | -3.245E-02 | 2.562E-01 | 2.566E-01 | FAIL ABUN |
| HO-166M | 4.718E-02 | 4.128E-02 | 4.644E-02 | FAIL ABUN |
| TM-171 | 2.125E+01 | 3.417E+01 | 3.549E+01 | NOT IDENT. |
| LU-176 | -3.486E-03 | 2.389E-02 | 2.394E-02 | NOT IDENT. |
| HF-181 | 6.790E-02 | 1.597E-01 | 1.626E-01 | NOT IDENT. |
| TA-182 | -1.282E-01 | 2.253E-01 | 2.326E-01 | NOT IDENT. |
| RE-183 | 2.898E-01 | 6.529E-01 | 6.658E-01 | NOT IDENT. |
| RE-184 | -4.932E-01 | 4.794E-01 | 5.285E-01 | NOT IDENT. |
| W-188 | 4.716E+00 | 1.465E+01 | 1.480E+01 | NOT IDENT. |
| IR-192 | 6.897E-02 | 6.711E-02 | 7.396E-02 | NOT IDENT. |
| HG-203 | -7.631E-03 | 1.155E-01 | 1.155E-01 | NOT IDENT. |
| BI-207 | 1.796E-02 | 4.532E-02 | 4.603E-02 | FAIL ABUN |
| PB-210 | 5.295E-01 | 6.039E+00 | 6.044E+00 | NOT IDENT. |
| BI-211 | 9.040E-02 | 2.132E-01 | 2.171E-01 | NOT IDENT. |
| PB-211 | -1.392E-03 | 6.156E-01 | 6.156E-01 | FAIL ABUN |
| BI-212 | 3.068E-01 | 4.165E-01 | 4.389E-01 | NOT IDENT. |
| BI-214 | 5.626E-02 | 7.618E-02 | 8.029E-02 | FAIL ABUN |
| PB-214 | 6.715E-02 | 8.481E-02 | 9.005E-02 | FAIL ABUN |
| RN-219 | 1.754E-01 | 3.462E-01 | 3.551E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 5.626E-02 | 7.618E-02 | 8.029E-02 | FAIL ABUN |
| RA-223 | 1.973E-01 | 6.041E-01 | 6.106E-01 | FAIL ABUN |
| RA-224 | 4.321E-01 | 6.263E-01 | 6.559E-01 | NOT IDENT. |
| RA-226 | 5.626E-02 | 7.618E-02 | 8.029E-02 | FAIL ABUN |
| AC-227 | -3.396E-02 | 2.278E-01 | 2.283E-01 | NOT IDENT. |
| TH-227 | -3.396E-02 | 2.278E-01 | 2.283E-01 | NOT IDENT. |
| AC-228 | 1.184E-01 | 1.486E-01 | 1.579E-01 | FAIL ABUN |
| RA-228 | 1.184E-01 | 1.486E-01 | 1.579E-01 | FAIL ABUN |
| TH-229 | 3.673E-01 | 4.316E-01 | 4.622E-01 | FAIL ABUN |
| TH-230 | 5.626E-02 | 7.617E-02 | 8.028E-02 | FAIL ABUN |
| PA-231 | 5.543E-01 | 1.171E+00 | 1.197E+00 | NOT IDENT. |
| TH-231 | 1.973E-01 | 6.041E-01 | 6.106E-01 | FAIL ABUN |
| TH-232 | 1.184E-01 | 1.486E-01 | 1.579E-01 | FAIL ABUN |
| PA-233 | -9.127E-03 | 4.803E-02 | 4.821E-02 | NOT IDENT. |
| PA-234 | 4.476E-02 | 2.810E-01 | 2.817E-01 | NOT IDENT. |
| PA-234M | 1.048E-01 | 4.827E+00 | 4.827E+00 | NOT IDENT. |
| TH-234 | -1.056E-01 | 1.797E+00 | 1.797E+00 | FAIL ABUN |
| U-234 | 5.626E-02 | 7.617E-02 | 8.028E-02 | FAIL ABUN |
| NP-237 | -9.127E-03 | 4.803E-02 | 4.821E-02 | NOT IDENT. |
| NP-238 | -4.425E+12 | 7.825E+12 | 8.076E+12 | SHORT HLIF |
| U-238 | -1.056E-01 | 1.797E+00 | 1.797E+00 | FAIL ABUN |
| NP-239 | -9.270E-02 | 3.805E-01 | 3.828E-01 | NOT IDENT. |
| PU-239 | -1.661E+01 | 3.142E+02 | 3.142E+02 | NOT IDENT. |
| AM-241 | -1.457E-02 | 2.205E-01 | 2.206E-01 | NOT IDENT. |
| CM-243 | 1.946E-02 | 9.403E-02 | 9.444E-02 | NOT IDENT. |
| CM-247 | 2.933E-03 | 3.381E-02 | 3.383E-02 | NOT IDENT. |
| CF-249 | -1.310E-02 | 3.018E-02 | 3.075E-02 | NOT IDENT. |
| CF-251 | 6.093E-03 | 1.244E-01 | 1.244E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

# GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 29.0493 | 94.67 | 21.1883 | 193.51 | 18.3044 |
| 45.60 | 20.0816 | 94.87 | 25.7371 | 197.03 | 36.7389 |
| 46.54 | 21.0458 | 97.43 | 30.4054 | 198.01 | 33.3274 |
| 49.72 | 0.0000 | 98.43 | 23.3484 | 201.83 | 31.1468 |
| 51.35 | 28.7105 | 98.44 | 23.3487 | 205.31 | 24.3080 |
| 52.39 | 29.7113 | 99.53 | 22.3725 | 210.85 | 25.6020 |
| 53.44 | 28.8551 | 100.11 | 27.4826 | 215.65 | 29.8102 |
| 57.36 | 0.0000 | 103.18 | 31.7064 | 222.11 | 38.8109 |
| 57.53 | 34.7682 | 103.37 | 28.6466 | 227.09 | 25.6965 |
| 57.98 | 31.9816 | 105.21 | 29.7540 | 227.38 | 25.7033 |
| 59.32 | 34.9081 | 105.31 | 26.6801 | 228.16 | 0.0000 |
| 59.54 | 39.6447 | 106.12 | 25.6858 | 228.18 | 32.8176 |
| 63.29 | 33.3078 | 109.28 | 33.0352 | 117.23 | 32.8176 |
| 63.58 | 34.2806 | 111.00 | 30.0150 | 235.69 | 21.4305 |
| 64.28 | 36.2389 | 111.76 | 0.0000 | 235.96 | 21.4356 |
| 66.73 | 35.4660 | 116.30 | 0.0000 | 238.63 | 23.2765 |
| 67.24 | 29.7460 | 117.23 | 37.5991 | 238.98 | 0.0000 |
| 67.75 | 26.8954 | 121.12 | 35.7058 | 240.99 | 24.4010 |
| 69.67 | 38.5720 | 121.22 | 35.7108 | 242.00 | 22.9857 |
| 70.83 | 39.1444 | 121.78 | 33.6364 | 244.70 | 22.7995 |
| 72.81 | 21.8318 | 122.06 | 37.8558 | 252.40 | 0.0000 |
| 72.87 | 21.8343 | 123.07 | 35.8028 | 252.80 | 23.5613 |
| 74.66 | 34.0823 | 127.23 | 39.1839 | 254.15 | 0.0000 |
| 74.82 | 34.0928 | 129.30 | 36.1071 | 256.23 | 25.4465 |
| 74.97 | 34.1026 | 131.20 | 28.7460 | 260.90 | 0.0000 |
| 77.11 | 36.6871 | 133.02 | 26.6808 | 264.66 | 20.1329 |
| 79.69 | 30.6706 | 133.52 | 21.3584 | 268.22 | 17.4376 |
| 80.12 | 31.4818 | 136.00 | 29.9987 | 269.46 | 22.9671 |
| 80.19 | 0.0000 | 136.47 | 30.0169 | 271.23 | 22.0800 |
| 80.57 | 28.3570 | 140.51 | 0.0000 | 273.65 | 21.2007 |
| 81.00 | 28.0837 | 143.76 | 27.0493 | 276.40 | 23.0946 |
| 81.07 | 28.0872 | 144.24 | 27.0655 | 277.37 | 14.7917 |
| 83.79 | 29.7107 | 145.44 | 27.1057 | 277.60 | 12.0205 |
| 85.43 | 26.8174 | 152.43 | 20.7762 | 278.00 | 12.9492 |
| 86.55 | 19.4062 | 153.25 | 36.1203 | 279.20 | 23.1453 |
| 86.79 | 25.3878 | 323.87 | 33.9699 | 279.54 | 26.8556 |
| 86.94 | 25.3944 | 156.02 | 29.6502 | 280.46 | 25.0216 |
| 87.09 | 25.4012 | 158.56 | 29.7386 | 283.69 | 14.8650 |
| 87.57 | 29.9086 | 159.00 | 26.4478 | 284.31 | 0.0000 |
| 88.03 | 20.9527 | 162.33 | 27.6558 | 285.41 | 23.2574 |
| 88.34 | 32.9431 | 163.33 | 33.2248 | 285.90 | 0.0000 |
| 88.47 | 32.9505 | 165.86 | 25.5456 | 287.50 | 18.6359 |
| 89.96 | 30.0314 | 176.31 | 32.5840 | 290.67 | 19.6151 |
| 91.11 | 19.5585 | 176.60 | 29.2225 | 293.27 | 0.0000 |
| 92.59 | 25.1373 | 177.52 | 33.7518 | 351.93 | 20.6200 |
| 93.35 | 25.1692 | 181.07 | 0.0000 | 295.96 | 19.6936 |
| 94.56 | 21.1845 | 184.41 | 30.5999 | 879.38 | 24.4305 |
| 94.65 | 21.1876 | 143.76 | 27.2373 | 299.98 | 21.6341 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 21.6358 | 487.02 | 6.3339 | 702.65 | 13.9585 |
| 300.13 | 21.6366 | 492.35 | 0.0000 | 706.68 | 7.7669 |
| 301.36 | 25.4225 | 497.08 | 9.5503 | 711.68 | 9.3384 |
| 302.85 | 22.6227 | 505.52 | 10.2309 | 720.70 | 6.5598 |
| 256.23 | 21.7064 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 20.7975 | 511.00 | 5.1296 | 722.78 | 7.5029 |
| 308.46 | 21.7696 | 514.00 | 0.0000 | 722.91 | 7.5033 |
| 311.90 | 14.2330 | 514.00 | 0.0000 | 723.31 | 7.5045 |
| 316.51 | 12.3761 | 520.40 | 6.8715 | 724.19 | 9.3838 |
| 319.41 | 26.7114 | 520.69 | 0.0000 | 727.33 | 5.6370 |
| 320.08 | 23.8609 | 522.65 | 0.0000 | 733.00 | 12.5537 |
| 321.04 | 20.0570 | 527.90 | 0.0000 | 735.93 | 7.5406 |
| 323.87 | 19.1400 | 529.59 | 3.2356 | 333.97 | 8.4883 |
| 325.23 | 18.2004 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 17.2851 | 531.02 | 14.0307 | 747.24 | 3.7864 |
| 333.37 | 10.2757 | 546.56 | 0.0000 | 748.06 | 4.7345 |
| 333.97 | 12.3359 | 552.55 | 14.1763 | 752.31 | 1.8968 |
| 334.37 | 9.2544 | 563.25 | 7.6718 | 753.82 | 3.7957 |
| 338.28 | 18.3654 | 569.33 | 10.9906 | 756.73 | 6.6497 |
| 338.32 | 18.3657 | 946.00 | 10.9915 | 756.80 | 7.5998 |
| 311.90 | 17.0374 | 569.70 | 9.8932 | 884.68 | 2.8575 |
| 340.48 | 17.0374 | 583.19 | 13.2729 | 765.81 | 5.7189 |
| 340.55 | 17.0382 | 584.27 | 10.6233 | 766.42 | 6.6736 |
| 344.28 | 13.9755 | 595.83 | 7.7866 | 766.84 | 8.5816 |
| 345.93 | 15.5457 | 427.87 | 13.3770 | 772.60 | 0.0000 |
| 351.06 | 12.4791 | 602.52 | 0.0000 | 776.52 | 6.6982 |
| 351.93 | 12.4863 | 602.73 | 11.1578 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 16.0813 | 778.90 | 5.7463 |
| 356.01 | 18.7799 | 609.32 | 15.6663 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 12.3149 | 785.37 | 7.6797 |
| 366.42 | 0.0000 | 614.28 | 10.7660 | 792.07 | 9.6228 |
| 375.05 | 11.8823 | 618.01 | 6.7397 | 794.95 | 3.8530 |
| 356.01 | 12.9435 | 620.36 | 12.3686 | 795.86 | 4.8179 |
| 388.16 | 12.9780 | 621.93 | 10.8018 | 810.29 | 5.8110 |
| 388.63 | 8.9875 | 630.19 | 0.0000 | 344.28 | 4.8428 |
| 391.69 | 16.0076 | 631.29 | 14.4602 | 810.76 | 4.8434 |
| 264.66 | 12.0712 | 633.25 | 9.9497 | 815.77 | 5.8222 |
| 401.81 | 11.0730 | 634.78 | 7.2410 | 1048.07 | 5.8277 |
| 402.40 | 15.1048 | 635.95 | 10.8668 | 832.01 | 5.8551 |
| 404.85 | 14.1186 | 636.99 | 0.0000 | 834.85 | 5.8608 |
| 410.95 | 11.1334 | 645.85 | 8.1842 | 835.71 | 5.8626 |
| 413.71 | 20.2756 | 657.76 | 6.3971 | 836.80 | 0.0000 |
| 414.70 | 16.2297 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 8.1735 | 661.66 | 8.2382 | 846.77 | 4.9039 |
| 427.87 | 10.2214 | 664.57 | 0.0000 | 856.80 | 7.8730 |
| 433.94 | 17.5831 | 666.33 | 9.1711 | 860.56 | 1.9707 |
| 439.40 | 12.3461 | 666.50 | 9.1716 | 871.09 | 10.8773 |
| 453.88 | 6.6377 | 667.71 | 0.0000 | 873.19 | 5.9372 |
| 463.37 | 11.6761 | 677.62 | 13.8197 | 875.33 | 0.0000 |
| 468.07 | 13.5870 | 685.70 | 0.0000 | 879.38 | 7.9324 |
| 473.00 | 0.0000 | 695.00 | 13.9164 | 880.51 | 6.9434 |
| 475.06 | 7.3433 | 696.49 | 8.3547 | 883.24 | 5.9568 |
| 476.78 | 14.7000 | 696.51 | 8.3547 | 884.68 | 8.9396 |
| 477.60 | 16.8074 | 697.00 | 12.0704 | 889.28 | 4.9739 |
| 482.18 | 11.5829 | 697.49 | 10.2153 | 894.76 | 4.9828 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 0.9976 | 1298.22 | 0.0000 | | |
| 903.28 | 8.9938 | 1312.11 | 1.8647 | | |
| 911.20 | 6.6790 | 1332.49 | 4.6844 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.0404 | 1365.19 | 1.8882 | | |
| 937.49 | 6.0614 | 1368.63 | 0.0000 | | |
| 944.13 | 7.0863 | 1384.29 | 5.6895 | | |
| 946.00 | 7.0904 | 1408.01 | 4.7668 | | |
| 949.00 | 10.1387 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 1.9293 | | |
| 962.31 | 6.1083 | 1489.16 | 3.8825 | | |
| 964.08 | 7.1301 | 1505.03 | 1.9478 | | |
| 966.17 | 9.1731 | 1596.21 | 2.9779 | | |
| 968.97 | 8.1609 | 1620.50 | 2.9926 | | |
| 983.53 | 7.1724 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 1.0115 | | |
| 1274.44 | 7.1998 | 1750.46 | 0.0000 | | |
| 1001.03 | 8.2400 | 1764.49 | 4.1032 | | |
| 1004.73 | 5.1558 | 1063.66 | 5.1345 | | |
| 507.63 | 0.0000 | 1771.35 | 7.1897 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 1.0342 | | |
| 1037.84 | 2.0823 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 2.0788 | | |
| 631.29 | 3.1314 | | | | |
| 1048.07 | 2.0885 | | | | |
| 1049.04 | 5.2227 | | | | |
| 1050.41 | 6.2698 | | | | |
| 1063.66 | 3.1468 | | | | |
| 1077.00 | 6.3173 | | | | |
| 1077.34 | 6.3179 | | | | |
| 1085.87 | 8.4438 | | | | |
| 1099.45 | 3.1784 | | | | |
| 1112.07 | 2.1263 | | | | |
| 1112.84 | 3.1900 | | | | |
| 1115.54 | 7.4491 | | | | |
| 1120.29 | 3.1966 | | | | |
| 1120.55 | 4.2623 | | | | |
| 1221.41 | 5.3291 | | | | |
| 1129.67 | 3.2046 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.4033 | | | | |
| 1177.95 | 8.6559 | | | | |
| 1189.05 | 5.4255 | | | | |
| 1204.77 | 7.6269 | | | | |
| 1221.41 | 6.5648 | | | | |
| 1231.02 | 5.4841 | | | | |
| 1235.36 | 8.7840 | | | | |
| 1238.28 | 5.4941 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 5.5400 | | | | |
| 1274.44 | 4.6195 | | | | |
| 1274.54 | 3.6958 | | | | |
| 1291.59 | 3.7111 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:46.78

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147022.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM03.CNF;137
                                        Background date  : 10-FEB-2014 14:49:34
Sample date      : 7-NOV-2013 15:55:00. Acquisition date : 12-FEB-2014 14:30:08
Sample ID        : G341147022           Sample quantity  : 7.82200E+01 GRAM
Detector name    : GAM03                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.34  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.36 | 23 | 27 | 1.85 | 92.55 | 89 | 7 | 6.38E-03 | 42.6 | |
| 2 | 0 | 63.63* | 2 | 37 | 1.07 | 127.06 | 123 | 8 | 4.26E-04 | 774.1 | |
| 3 | 0 | 66.75* | 15 | 27 | 1.34 | 133.31 | 130 | 6 | 4.03E-03 | 66.1 | |
| 4 | 0 | 109.89 | 32 | 57 | 6.01 | 219.55 | 213 | 16 | 8.90E-03 | 55.2 | |
| 5 | 0 | 144.02* | 39 | 24 | 1.44 | 287.78 | 283 | 10 | 1.10E-02 | 30.3 | |
| 6 | 0 | 167.74 | 8 | 20 | 0.64 | 335.21 | 331 | 7 | 2.30E-03 | 99.4 | |
| 7 | 0 | 185.92* | 18 | 15 | 1.35 | 371.57 | 367 | 11 | 4.98E-03 | 64.4 | |
| 8 | 0 | 239.13* | 7 | 14 | 0.54 | 477.95 | 474 | 8 | 1.81E-03 | 137.8 | |
| 9 | 0 | 242.51 | 12 | 12 | 1.40 | 484.72 | 481 | 7 | 3.32E-03 | 56.5 | |
| 10 | 0 | 352.50* | 5 | 12 | 1.47 | 704.65 | 700 | 9 | 1.46E-03 | 152.0 | |
| 11 | 0 | 430.75 | 9 | 7 | 1.03 | 861.11 | 858 | 7 | 2.50E-03 | 59.1 | |
| 12 | 0 | 439.57 | 8 | 9 | 1.12 | 878.75 | 873 | 10 | 2.19E-03 | 82.2 | |
| 13 | 0 | 491.57 | 6 | 4 | 1.38 | 982.73 | 979 | 7 | 1.78E-03 | 62.7 | |
| 14 | 0 | 511.35* | 9 | 34 | 3.24 | 1022.30 | 1015 | 18 | 2.58E-03 | 175.9 | |
| 15 | 0 | 597.69 | 15 | 2 | 0.97 | 1194.95 | 1191 | 8 | 4.21E-03 | 30.3 | |
| 16 | 0 | 610.19 | 14 | 20 | 1.58 | 1219.96 | 1214 | 13 | 3.75E-03 | 72.7 | |
| 17 | 0 | 699.34 | 7 | 1 | 1.30 | 1398.26 | 1395 | 6 | 1.82E-03 | 48.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:30:48

```
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147022.CNF;1
Analyses by      : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title     : RXF2
Sample date      : 7-NOV-2013 15:55:00  Acquisition date : 12-FEB-2014 14:30:08
Sample ID        : G341147022           Sample quantity  : 78.220 GRAM
Sample type      : SOLID                Sample geometry  :
Detector name    : GAMMA3               Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.34   0.0%
Energy tolerance :     1.50 keV         Half life ratio  :    10.00
Errors propagated: No                   Systematic Error :     0.00 %
Efficiency type  : Empirical            Efficiencies at  : Peak Energy
Abundance limit  :    75.00
```

Interference Report

| Interfering | | Interfered | |
|---|---|---|---|
| Nuclide | Line | Nuclide | Line |
| U-235 | 143.76 | CE-141 | 145.44 |

Nuclide Type:

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TE-125M | 109.28 | 0.27* | 5.092E+00 | 2.236E+01 | 7.212E+01 | 110.46 | OK |
| CE-141 | 145.44 | 48.29* | 5.374E+00 | 1.322E-01 | 1.045E+00 | 68.26 | OK |
| PB-210 | 46.54 | 4.25* | 2.551E-01 | 2.035E+01 | 2.052E+01 | 85.25 | OK |
| BI-211 | 72.87 | 1.23 | 2.619E+00 | ----- Line Not Found | | ----- | Absent |
| | 351.06 | 12.92* | 3.277E+00 | 1.189E-01 | 1.189E-01 | 304.09 | OK |
| U-235 | 89.96 | 3.47 | 4.138E+00 | ----- Line Not Found | | ----- | Absent |
| | 93.35 | 5.60 | 4.361E+00 | ----- Line Not Found | | ----- | Absent |
| | 143.76 | 10.96* | 5.375E+00 | ----- Line Not Found | | ----- | <<INT Reject |
| | 163.33 | 5.08 | 5.209E+00 | ----- Line Not Found | | ----- | Absent |
| | 185.72 | 57.20 | 4.930E+00 | 6.099E-02 | 6.099E-02 | 128.79 | OK |
| | 205.31 | 5.01 | 4.676E+00 | ----- Line Not Found | | ----- | Absent |
| ANH-511 | 511.00 | 100.00* | 2.525E+00 | 3.534E-02 | 3.534E-02 | 351.80 | OK |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:49.19

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147022.CNF;1    *
* Acquisition date : 12-FEB-2014 14:30:08 Sensitivity     : 3.000          *
* Detector ID      : GAM03                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:55:00 Nuclide Library : SOLID          *
* Sample ID        : G341147022           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 7.8220E+01 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  8-AUG-2013 12:06:15 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM03_500MLMB.CNF;13      *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| TE-125M | 7.212E+01 | 7.807E+01 | 6.255E+01 |
| CE-141 | 1.045E+00 | 6.988E-01 | 7.155E-01 |
| PB-210 | 2.052E+01 | 1.714E+01 | 2.441E+01 |
| BI-211 | 1.189E-01 | 3.544E-01 | 5.219E-01 |
| U-235 | 6.434E-01 | 3.819E-01 | 6.336E-01 |
| ANH-511 | 3.534E-02 | 1.218E-01 | 9.080E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -6.866E-01 | 1.318E+00 | 2.274E+00 | NOT IDENT. |
| NA-22 | -5.296E-03 | 5.402E-02 | 1.127E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.608E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.386E-02 | 4.830E-02 | 7.815E-02 | NOT IDENT. |
| K-40 | 6.531E-01 | 7.660E-01 | 1.837E+00 | NOT IDENT. |
| SC-46 | -1.644E-02 | 7.625E-02 | 1.533E-01 | NOT IDENT. |
| V-48 | -9.080E-02 | 2.710E+00 | 5.610E+00 | NOT IDENT. |
| CR-51 | -6.510E-01 | 3.717E+00 | 6.939E+00 | NOT IDENT. |
| MN-54 | 2.764E-02 | 5.027E-02 | 1.144E-01 | NOT IDENT. |
| CO-56 | 2.672E-02 | 1.048E-01 | 2.228E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.988E-02 | 3.723E-02 | 7.545E-02 | NOT IDENT. |
| CO-58 | -7.273E-04 | 9.410E-02 | 1.960E-01 | NOT IDENT. |
| FE-59 | 1.000E-01 | 3.211E-01 | 7.377E-01 | NOT IDENT. |
| CO-60 | 2.886E-02 | 6.426E-02 | 1.439E-01 | NOT IDENT. |
| ZN-65 | -3.097E-02 | 1.247E-01 | 2.389E-01 | NOT IDENT. |
| GE-68 | 1.781E+00 | 1.949E+00 | 4.717E+00 | NOT IDENT. |
| AS-73 | -3.178E-02 | 4.893E+00 | 9.123E+00 | NOT IDENT. |
| AS-74 | 2.989E+00 | 3.080E+00 | 6.648E+00 | NOT IDENT. |
| SE-75 | -7.502E-02 | 9.910E-02 | 1.706E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.281E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.080E-01 | 4.026E+00 | 8.166E+00 | NOT IDENT. |
| RB-83 | -1.825E-01 | 1.997E-01 | 2.926E-01 | NOT IDENT. |
| KR-85 | 2.669E+01 | 1.502E+01 | 3.202E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | 3.337E-01 | 1.881E-01 | 4.009E-01 | NOT IDENT. |
| RB-86 | 1.262E+01 | 2.087E+01 | 4.794E+01 | NOT IDENT. |
| Y-88 | -8.158E-02 | 1.186E-01 | 1.973E-01 | NOT IDENT. |
| Y-91 | -1.364E+01 | 7.295E+01 | 1.445E+02 | NOT IDENT. |
| NB-94 | 1.021E-03 | 4.298E-02 | 7.704E-02 | NOT IDENT. |
| NB-95 | -5.403E-02 | 1.272E-01 | 2.342E-01 | NOT IDENT. |
| NB-95M | 4.130E-03 | 3.965E-01 | 6.694E-01 | NOT IDENT. |
| ZR-95 | -4.342E-02 | 2.197E-01 | 4.272E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 8.605E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.242E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.050E-02 | 4.221E-02 | 8.122E-02 | NOT IDENT. |
| RH-102 | -2.140E-02 | 7.998E-02 | 1.525E-01 | NOT IDENT. |
| RU-103 | -3.161E-02 | 2.160E-01 | 3.910E-01 | FAIL ABUN |
| RH-106 | -1.139E-01 | 5.115E-01 | 9.831E-01 | NOT IDENT. |
| RU-106 | -1.139E-01 | 5.115E-01 | 9.831E-01 | NOT IDENT. |
| AG-108M | -8.992E-03 | 6.762E-02 | 7.616E-02 | NOT IDENT. |
| CD-109 | -1.051E-01 | 1.268E+00 | 2.292E+00 | NOT IDENT. |
| AG-110M | -9.335E-03 | 7.759E-02 | 1.475E-01 | NOT IDENT. |
| SN-113 | -5.181E-02 | 8.561E-02 | 1.478E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.834E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | -1.613E+00 | 4.586E+00 | 7.865E+00 | NOT IDENT. |
| TE-123M | -4.888E-03 | 6.009E-02 | 1.068E-01 | NOT IDENT. |
| SB-124 | -1.410E-01 | 4.469E-01 | 8.505E-01 | NOT IDENT. |
| SB-125 | -5.887E-02 | 1.647E-01 | 2.505E-01 | NOT IDENT. |
| I-126 | -1.296E+01 | 2.341E+01 | 4.224E+01 | NOT IDENT. |
| SB-126 | 2.016E+00 | 1.743E+01 | 3.604E+01 | NOT IDENT. |
| SN-126 | -8.958E-02 | 1.139E-01 | 1.893E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 4.183E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.826E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.319E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 4.285E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.421E-03 | 5.525E-02 | 9.526E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.046E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -5.258E-02 | 5.665E-02 | 9.409E-02 | NOT IDENT. |
| CS-135 | 1.549E-01 | 2.077E-01 | 4.280E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.909E+00 | 8.339E+00 | 1.958E+01 | NOT IDENT. |
| BA-137M | 6.904E-03 | 4.646E-02 | 9.551E-02 | NOT IDENT. |
| CS-137 | 7.293E-03 | 4.908E-02 | 1.009E-01 | NOT IDENT. |
| CE-139 | 9.264E-04 | 7.162E-02 | 1.135E-01 | NOT IDENT. |
| BA-140 | -1.878E+00 | 1.033E+01 | 2.144E+01 | NOT IDENT. |
| LA-140 | -1.878E+00 | 1.033E+01 | 2.144E+01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.338E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.085E-02 | 3.046E-01 | 5.557E-01 | NOT IDENT. |
| PM-144 | 1.000E-02 | 5.329E-02 | 9.915E-02 | NOT IDENT. |
| PR-144 | 7.635E-01 | 4.159E+00 | 7.731E+00 | NOT IDENT. |
| PM-146 | 7.109E-03 | 6.153E-02 | 1.189E-01 | NOT IDENT. |
| ND-147 | 3.946E+01 | 1.360E+02 | 2.725E+02 | NOT IDENT. |
| PM-147 | 3.523E+02 | 9.673E+02 | 1.855E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.645E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | 3.115E-03 | 3.769E-02 | 7.218E-02 | FAIL ABUN |
| EU-152 | -6.125E-02 | 1.258E-01 | 2.231E-01 | NOT IDENT. |
| GD-153 | -1.226E-01 | 1.578E-01 | 2.635E-01 | NOT IDENT. |
| EU-154 | -1.467E-02 | 1.467E-01 | 3.061E-01 | NOT IDENT. |
| EU-155 | 6.973E-03 | 1.625E-01 | 2.671E-01 | NOT IDENT. |
| TB-160 | -8.174E-03 | 3.823E-01 | 7.682E-01 | FAIL ABUN |
| HO-166M | 2.477E-02 | 7.784E-02 | 1.652E-01 | NOT IDENT. |
| TM-171 | 3.157E+01 | 5.630E+01 | 1.117E+02 | FAIL ABUN |
| LU-176 | -7.732E-03 | 3.323E-02 | 6.174E-02 | NOT IDENT. |
| HF-181 | -1.224E-01 | 2.384E-01 | 4.116E-01 | NOT IDENT. |
| TA-182 | -1.736E-01 | 3.582E-01 | 6.704E-01 | FAIL ABUN |
| RE-183 | 2.547E-01 | 1.100E+00 | 2.090E+00 | FAIL ABUN |
| RE-184 | -2.037E-01 | 7.722E-01 | 1.478E+00 | NOT IDENT. |
| W-188 | -1.428E+01 | 2.177E+01 | 3.781E+01 | FAIL ABUN |
| IR-192 | -3.682E-02 | 1.178E-01 | 2.109E-01 | NOT IDENT. |
| HG-203 | -2.161E-02 | 1.733E-01 | 3.243E-01 | NOT IDENT. |
| BI-207 | 3.000E-02 | 7.312E-02 | 1.577E-01 | NOT IDENT. |
| TL-208 | 1.336E-02 | 5.376E-02 | 1.077E-01 | NOT IDENT. |
| PB-211 | 6.831E-01 | 9.937E-01 | 2.068E+00 | NOT IDENT. |
| BI-212 | 1.152E-01 | 6.488E-01 | 1.348E+00 | NOT IDENT. |
| PB-212 | 3.369E-02 | 9.098E-02 | 1.593E-01 | FAIL ABUN |
| BI-214 | 1.284E-01 | 1.830E-01 | 2.600E-01 | FAIL ABUN |
| PB-214 | 4.317E-02 | 1.286E-01 | 2.209E-01 | FAIL ABUN |
| RN-219 | -4.087E-01 | 5.683E-01 | 9.544E-01 | NOT IDENT. |
| RN-222 | 1.284E-01 | 1.830E-01 | 2.600E-01 | FAIL ABUN |
| RA-223 | 1.592E-01 | 8.075E-01 | 1.591E+00 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 0.000E+00 | 5.869E-01 | 1.542E+00 | NOT IDENT. |
| RA-226 | 1.284E-01 | 1.830E-01 | 2.600E-01 | FAIL ABUN |
| AC-227 | 6.720E-02 | 3.101E-01 | 6.124E-01 | NOT IDENT. |
| TH-227 | 6.720E-02 | 3.101E-01 | 6.124E-01 | NOT IDENT. |
| AC-228 | -2.450E-02 | 1.776E-01 | 3.773E-01 | NOT IDENT. |
| RA-228 | -2.450E-02 | 1.776E-01 | 3.773E-01 | NOT IDENT. |
| TH-228 | 3.369E-02 | 9.098E-02 | 1.593E-01 | FAIL ABUN |
| TH-229 | 5.167E-01 | 6.636E-01 | 1.368E+00 | NOT IDENT. |
| TH-230 | 1.284E-01 | 1.829E-01 | 2.600E-01 | FAIL ABUN |
| PA-231 | -3.322E-01 | 1.856E+00 | 3.467E+00 | NOT IDENT. |
| TH-231 | 1.592E-01 | 8.075E-01 | 1.591E+00 | FAIL ABUN |
| TH-232 | -2.450E-02 | 1.776E-01 | 3.773E-01 | NOT IDENT. |
| PA-233 | -5.515E-02 | 8.690E-02 | 1.509E-01 | NOT IDENT. |
| PA-234 | -1.136E-01 | 3.544E-01 | 6.720E-01 | FAIL ABUN |
| PA-234M | -2.999E+00 | 6.483E+00 | 1.286E+01 | NOT IDENT. |
| TH-234 | 2.436E-01 | 3.696E+00 | 5.759E+00 | FAIL ABUN |
| U-234 | 1.284E-01 | 1.829E-01 | 2.600E-01 | FAIL ABUN |
| NP-237 | -5.515E-02 | 8.690E-02 | 1.509E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 8.965E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.436E-01 | 3.696E+00 | 5.759E+00 | FAIL ABUN |
| NP-239 | 1.068E-01 | 5.120E-01 | 9.233E-01 | NOT IDENT. |
| PU-239 | -2.252E+01 | 4.418E+02 | 7.952E+02 | NOT IDENT. |
| AM-241 | 2.432E-01 | 4.022E-01 | 7.205E-01 | NOT IDENT. |
| AM-243 | -1.879E-02 | 9.353E-02 | 1.669E-01 | NOT IDENT. |
| CM-243 | 9.242E-02 | 1.461E-01 | 2.778E-01 | NOT IDENT. |
| CM-247 | -3.687E-02 | 5.227E-02 | 8.800E-02 | NOT IDENT. |
| CF-249 | 1.150E-02 | 5.040E-02 | 1.004E-01 | NOT IDENT. |
| CF-251 | -5.547E-02 | 1.808E-01 | 3.093E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:45.28

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.36 | 23 | 27 | 1.85 | 92.55 | 89 | 7 | 6.38E-03 | 42.6 | |
| 2 | 0 | 63.63 | 20 | 37 | 1.07 | 127.06 | 123 | 8 | 5.53E-03 | 58.0 | |
| 3 | 0 | 66.75 | 20 | 27 | 1.34 | 133.31 | 130 | 6 | 5.46E-03 | 47.6 | |
| 4 | 0 | 93.09 | 72 | 63 | 1.17 | 185.97 | 181 | 12 | 1.99E-02 | 25.8 | |
| 5 | 0 | 109.89 | 32 | 57 | 6.01 | 219.55 | 213 | 16 | 8.90E-03 | 55.2 | |
| 6 | 0 | 144.02 | 50 | 24 | 1.44 | 287.78 | 283 | 10 | 1.38E-02 | 23.6 | |
| 7 | 0 | 167.74 | 8 | 20 | 0.64 | 335.21 | 331 | 7 | 2.30E-03 | 99.4 | |
| 8 | 0 | 185.92 | 67 | 15 | 1.35 | 371.57 | 367 | 11 | 1.87E-02 | 16.3 | |
| 9 | 0 | 239.13 | 22 | 14 | 0.54 | 477.95 | 474 | 8 | 6.00E-03 | 38.2 | |
| 10 | 0 | 242.51 | 12 | 12 | 1.40 | 484.72 | 481 | 7 | 3.32E-03 | 56.5 | |
| 11 | 0 | 352.50 | 15 | 12 | 1.47 | 704.65 | 700 | 9 | 4.30E-03 | 46.8 | |
| 12 | 0 | 430.75 | 9 | 7 | 1.03 | 861.11 | 858 | 7 | 2.50E-03 | 59.1 | |
| 13 | 0 | 439.57 | 8 | 9 | 1.12 | 878.75 | 873 | 10 | 2.19E-03 | 82.2 | |
| 14 | 0 | 491.57 | 6 | 4 | 1.38 | 982.73 | 979 | 7 | 1.78E-03 | 62.7 | |
| 15 | 0 | 511.35 | 81 | 34 | 3.24 | 1022.30 | 1015 | 18 | 2.26E-02 | 19.7 | |
| 16 | 0 | 597.69 | 15 | 2 | 0.97 | 1194.95 | 1191 | 8 | 4.21E-03 | 30.3 | |
| 17 | 0 | 610.19 | 14 | 20 | 1.58 | 1219.96 | 1214 | 13 | 3.75E-03 | 72.7 | |
| 18 | 0 | 699.34 | 7 | 1 | 1.30 | 1398.26 | 1395 | 6 | 1.82E-03 | 48.8 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:47.27

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| TE-125M | 109.28 | 32 | 0.27* | 5.092E+00 | 2.236E+01 | 7.212E+01 | 110.46 |
| CE-141 | 145.44 | 39 | 48.29* | 5.374E+00 | 1.460E-01 | 1.154E+00 | 60.57 |
| PB-210 | 46.54 | 23 | 4.25* | 2.551E-01 | 2.035E+01 | 2.052E+01 | 85.25 |
| BI-211 | 72.87 | ------ | 1.23 | 2.619E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 5 | 12.92* | 3.277E+00 | 1.189E-01 | 1.189E-01 | 304.09 |
| U-235 | 89.96 | ------ | 3.47 | 4.138E+00 | ------ | Line Not Found | ------ |
| | 93.35 | ------ | 5.60 | 4.361E+00 | ------ | Line Not Found | ------ |
| | 143.76 | 39 | 10.96* | 5.374E+00 | 6.434E-01 | 6.434E-01 | 60.57 |
| | 163.33 | ------ | 5.08 | 5.209E+00 | ------ | Line Not Found | ------ |
| | 185.72 | 18 | 57.20 | 4.930E+00 | 6.099E-02 | 6.099E-02 | 128.79 |
| | 205.31 | ------ | 5.01 | 4.676E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 9 | 100.00* | 2.525E+00 | 3.534E-02 | 3.534E-02 | 351.80 |

Flag: "*" = Keyline

Sample ID : G341147022 Acquisition date : 12-FEB-2014 14:30:08

Total number of lines in spectrum 17
Number of unidentified lines 4
Number of lines tentatively identified by NID 13 76.47%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TE-125M | 57.40D | 3.22 | 2.236E+01 | 7.212E+01 | 7.966E+01 | 110.46 | |
| CE-141 | 32.51D | 7.90 | 1.460E-01 | 1.154E+00 | 0.699E+00 | 60.57 | |
| PB-210 | 22.20Y | 1.01 | 2.035E+01 | 2.052E+01 | 1.749E+01 | 85.25 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.189E-01 | 1.189E-01 | 3.617E-01 | 304.09 | |
| U-235 | 7.04E+08Y | 1.00 | 6.434E-01 | 6.434E-01 | 3.897E-01 | 60.57 | |
| ANH-511 | 1.00E+09Y | 1.00 | 3.534E-02 | 3.534E-02 | 12.43E-02 | 351.80 | |
| | Total Activity : | | 4.365E+01 | 9.459E+01 | | | |

Grand Total Activity : 4.365E+01 9.459E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147022 Acquisition date : 12-FEB-2014 14:30:08

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.63 | 2 | 37 | 1.07 | 127.06 | 123 | 8 | 4.26E-04 | **** | 1.63E+00 | T |
| 0 | 66.75 | 15 | 27 | 1.34 | 133.31 | 130 | 6 | 4.03E-03 | **** | 1.97E+00 | T |
| 0 | 167.74 | 8 | 20 | 0.64 | 335.21 | 331 | 7 | 2.30E-03 | **** | 5.16E+00 | |
| 0 | 239.13 | 7 | 14 | 0.54 | 477.95 | 474 | 8 | 1.81E-03 | **** | 4.26E+00 | T |
| 0 | 242.51 | 12 | 12 | 1.40 | 484.72 | 481 | 7 | 3.32E-03 | **** | 4.22E+00 | T |
| 0 | 430.75 | 9 | 7 | 1.03 | 861.11 | 858 | 7 | 2.50E-03 | **** | 2.85E+00 | |
| 0 | 439.57 | 8 | 9 | 1.12 | 878.75 | 873 | 10 | 2.19E-03 | **** | 2.81E+00 | T |
| 0 | 491.57 | 6 | 4 | 1.38 | 982.73 | 979 | 7 | 1.78E-03 | **** | 2.60E+00 | T |
| 0 | 597.69 | 15 | 2 | 0.97 | 1194.95 | 1191 | 8 | 4.21E-03 | 60.5 | 2.25E+00 | |
| 0 | 610.19 | 14 | 20 | 1.58 | 1219.96 | 1214 | 13 | 3.75E-03 | **** | 2.22E+00 | T |
| 0 | 699.34 | 7 | 1 | 1.30 | 1398.26 | 1395 | 6 | 1.82E-03 | 97.6 | 2.00E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:30:59.71

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147022.CNF;1       *
* Acquisition date : 12-FEB-2014 14:30:08 Sensitivity     : 3.000                *
* Detector ID      : GAM03                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 15:55:00 Nuclide Library : SOLID                *
* Sample ID        : G341147022           Analyst initials: RXF2                 *
* Batch Number     : 1361908              Sample Quantity : 7.8220E+01 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  8-AUG-2013 12:06:15 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM03_500MLMB.CNF;13             *
*********************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| TE-125M | 2.823E+01 |
| CE-141 | 3.183E-01 |
| PB-210 | 1.104E+01 |
| BI-211 | 2.305E-01 |
| U-235 | 2.949E-01 |
| ANH-511 | 4.028E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 9.715E-01 | NOT IDENT. |
| NA-22 | 4.474E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.470E-02 | NOT IDENT. |
| K-40 | 8.045E-01 | NOT IDENT. |
| SC-46 | 5.905E-02 | NOT IDENT. |
| V-48 | 2.226E+00 | NOT IDENT. |
| CR-51 | 3.047E+00 | NOT IDENT. |
| MN-54 | 4.792E-02 | NOT IDENT. |
| CO-56 | 9.333E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 3.409E-02 | NOT IDENT. |
| CO-58 | 7.906E-02 | NOT IDENT. |
| FE-59 | 2.928E-01 | NOT IDENT. |
| CO-60 | 6.031E-02 | NOT IDENT. |
| ZN-65 | 9.445E-02 | NOT IDENT. |
| GE-68 | 1.988E+00 | NOT IDENT. |
| AS-73 | 4.137E+00 | NOT IDENT. |
| AS-74 | 2.897E+00 | NOT IDENT. |
| SE-75 | 7.562E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 3.421E+00 | NOT IDENT. |
| RB-83 | 1.211E-01 | NOT IDENT. |
| KR-85 | 1.481E+01 | NOT IDENT. |
| SR-85 | 1.854E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RB-86 | 2.000E+01 | NOT IDENT. |
| Y-88 | 7.123E-02 | NOT IDENT. |
| Y-91 | 5.977E+01 | NOT IDENT. |
| NB-94 | 3.200E-02 | NOT IDENT. |
| NB-95 | 9.714E-02 | NOT IDENT. |
| NB-95M | 3.000E-01 | NOT IDENT. |
| ZR-95 | 1.773E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.687E-02 | NOT IDENT. |
| RH-102 | 6.500E-02 | NOT IDENT. |
| RU-103 | 1.649E-01 | FAIL ABUN |
| RH-106 | 4.201E-01 | NOT IDENT. |
| RU-106 | 4.201E-01 | NOT IDENT. |
| AG-108M | 3.303E-02 | NOT IDENT. |
| CD-109 | 1.045E+00 | NOT IDENT. |
| AG-110M | 5.961E-02 | NOT IDENT. |
| SN-113 | 6.215E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.534E+00 | NOT IDENT. |
| TE-123M | 4.823E-02 | NOT IDENT. |
| SB-124 | 3.375E-01 | NOT IDENT. |
| SB-125 | 1.090E-01 | NOT IDENT. |
| I-126 | 1.768E+01 | NOT IDENT. |
| SB-126 | 1.517E+01 | NOT IDENT. |
| SN-126 | 8.583E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 4.110E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.785E-02 | NOT IDENT. |
| CS-135 | 1.936E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.915E+00 | NOT IDENT. |
| BA-137M | 4.081E-02 | NOT IDENT. |
| CS-137 | 4.311E-02 | NOT IDENT. |
| CE-139 | 5.166E-02 | NOT IDENT. |
| BA-140 | 8.050E+00 | NOT IDENT. |
| LA-140 | 8.050E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.505E-01 | NOT IDENT. |
| PM-144 | 4.176E-02 | NOT IDENT. |
| PR-144 | 3.255E+00 | NOT IDENT. |
| PM-146 | 5.193E-02 | NOT IDENT. |
| ND-147 | 1.179E+02 | NOT IDENT. |
| PM-147 | 8.362E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 3.211E-02 | FAIL ABUN |
| EU-152 | 9.674E-02 | NOT IDENT. |
| GD-153 | 1.189E-01 | NOT IDENT. |
| EU-154 | 1.215E-01 | NOT IDENT. |
| EU-155 | 1.207E-01 | NOT IDENT. |
| TB-160 | 3.184E-01 | FAIL ABUN |
| HO-166M | 7.043E-02 | NOT IDENT. |
| TM-171 | 5.083E+01 | FAIL ABUN |
| LU-176 | 2.703E-02 | NOT IDENT. |
| HF-181 | 1.759E-01 | NOT IDENT. |
| TA-182 | 2.658E-01 | FAIL ABUN |
| RE-183 | 9.531E-01 | FAIL ABUN |
| RE-184 | 5.990E-01 | NOT IDENT. |
| W-188 | 1.665E+01 | FAIL ABUN |
| IR-192 | 9.442E-02 | NOT IDENT. |
| HG-203 | 1.447E-01 | NOT IDENT. |
| BI-207 | 6.644E-02 | NOT IDENT. |
| TL-208 | 4.719E-02 | NOT IDENT. |
| PB-211 | 9.189E-01 | NOT IDENT. |
| BI-212 | 5.740E-01 | NOT IDENT. |
| PB-212 | 7.272E-02 | FAIL ABUN |
| BI-214 | 1.172E-01 | FAIL ABUN |
| PB-214 | 9.937E-02 | FAIL ABUN |
| RN-219 | 4.116E-01 | NOT IDENT. |
| RN-222 | 1.172E-01 | FAIL ABUN |
| RA-223 | 7.021E-01 | FAIL ABUN |
| RA-224 | 6.967E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 1.172E-01 | FAIL ABUN |
| AC-227 | 2.728E-01 | NOT IDENT. |
| TH-227 | 2.728E-01 | NOT IDENT. |
| AC-228 | 1.574E-01 | NOT IDENT. |
| RA-228 | 1.574E-01 | NOT IDENT. |
| TH-228 | 7.272E-02 | FAIL ABUN |
| TH-229 | 6.232E-01 | NOT IDENT. |
| TH-230 | 1.172E-01 | FAIL ABUN |
| PA-231 | 1.533E+00 | NOT IDENT. |
| TH-231 | 7.021E-01 | FAIL ABUN |
| TH-232 | 1.574E-01 | NOT IDENT. |
| PA-233 | 6.602E-02 | NOT IDENT. |
| PA-234 | 2.667E-01 | FAIL ABUN |
| PA-234M | 5.391E+00 | NOT IDENT. |
| TH-234 | 2.661E+00 | FAIL ABUN |
| U-234 | 1.172E-01 | FAIL ABUN |
| NP-237 | 6.602E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.661E+00 | FAIL ABUN |
| NP-239 | 4.149E-01 | NOT IDENT. |
| PU-239 | 3.596E+02 | NOT IDENT. |
| AM-241 | 3.307E-01 | NOT IDENT. |
| AM-243 | 7.661E-02 | NOT IDENT. |
| CM-243 | 1.261E-01 | NOT IDENT. |
| CM-247 | 3.798E-02 | NOT IDENT. |
| CF-249 | 4.379E-02 | NOT IDENT. |
| CF-251 | 1.398E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:31:04.59

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147022.CNF;1       *
* Acquisition date : 12-FEB-2014 14:30:08 Sensitivity     : 3.000                *
* Detector ID      : GAM03                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 15:55:00 Nuclide Library : SOLID                *
* Sample ID        : G341147022           Analyst initials: RXF2                 *
* Batch Number     : 1361908              Sample Quantity : 7.8220E+01 GRAM      *
*                                         Quantity Err(%) : 1.2784E-03 %         *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  8-AUG-2013 12:06:15 Eff. Geometry   : 500MLMB              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM03_500MLMB.CNF;13             *
*********************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| TE-125M | 7.212E+01 | 7.836E+01 | 7.836E+01 |
| CE-141 | 1.045E+00 | 7.054E-01 | 7.054E-01 |
| PB-210 | 2.052E+01 | 1.725E+01 | 1.725E+01 |
| BI-211 | 1.189E-01 | 3.546E-01 | 3.546E-01 |
| U-235 | 6.434E-01 | 3.866E-01 | 3.866E-01 |
| ANH-511 | 3.534E-02 | 1.219E-01 | 1.219E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -6.866E-01 | 1.320E+00 | 1.355E+00 | NOT IDENT. |
| NA-22 | -5.296E-03 | 5.402E-02 | 5.408E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.616E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -3.386E-02 | 4.838E-02 | 5.073E-02 | NOT IDENT. |
| K-40 | 6.531E-01 | 7.681E-01 | 8.226E-01 | NOT IDENT. |
| SC-46 | -1.644E-02 | 7.628E-02 | 7.664E-02 | NOT IDENT. |
| V-48 | -9.080E-02 | 2.710E+00 | 2.710E+00 | NOT IDENT. |
| CR-51 | -6.510E-01 | 3.717E+00 | 3.729E+00 | NOT IDENT. |
| MN-54 | 2.764E-02 | 5.037E-02 | 5.189E-02 | NOT IDENT. |
| CO-56 | 2.672E-02 | 1.049E-01 | 1.056E-01 | NOT IDENT. |
| MN-56 | 1.000E+41 | 3.925E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.988E-02 | 3.734E-02 | 3.970E-02 | NOT IDENT. |
| CO-58 | -7.273E-04 | 9.410E-02 | 9.410E-02 | NOT IDENT. |
| FE-59 | 1.000E-01 | 3.215E-01 | 3.247E-01 | NOT IDENT. |
| CO-60 | 2.886E-02 | 6.430E-02 | 6.560E-02 | NOT IDENT. |
| ZN-65 | -3.097E-02 | 1.248E-01 | 1.256E-01 | NOT IDENT. |
| GE-68 | 1.781E+00 | 1.966E+00 | 2.124E+00 | NOT IDENT. |
| AS-73 | -3.178E-02 | 4.893E+00 | 4.893E+00 | NOT IDENT. |
| AS-74 | 2.989E+00 | 3.096E+00 | 3.377E+00 | NOT IDENT. |
| SE-75 | -7.502E-02 | 9.928E-02 | 1.049E-01 | NOT IDENT. |
| BR-77 | 1.215E+11 | 4.727E+11 | 4.759E+11 | SHORT HLIF |
| SR-82 | 1.080E-01 | 4.026E+00 | 4.026E+00 | NOT IDENT. |
| RB-83 | -1.825E-01 | 2.017E-01 | 2.178E-01 | NOT IDENT. |
| KR-85 | 2.669E+01 | 1.519E+01 | 1.938E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | 3.337E-01 | 1.902E-01 | 2.425E-01 | NOT IDENT. |
| RB-86 | 1.262E+01 | 2.095E+01 | 2.171E+01 | NOT IDENT. |
| Y-88 | -8.158E-02 | 1.188E-01 | 1.244E-01 | NOT IDENT. |
| Y-91 | -1.364E+01 | 7.296E+01 | 7.322E+01 | NOT IDENT. |
| NB-94 | 1.021E-03 | 4.298E-02 | 4.298E-02 | NOT IDENT. |
| NB-95 | -5.403E-02 | 1.273E-01 | 1.296E-01 | NOT IDENT. |
| NB-95M | 4.130E-03 | 3.965E-01 | 3.965E-01 | NOT IDENT. |
| ZR-95 | -4.342E-02 | 2.198E-01 | 2.206E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 3.916E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 8.647E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.145E+09 | 1.243E+10 | 1.251E+10 | SHORT HLIF |
| TC-99M | -1.000E+41 | 3.967E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.050E-02 | 4.240E-02 | 4.340E-02 | NOT IDENT. |
| RH-102 | -2.140E-02 | 8.002E-02 | 8.060E-02 | NOT IDENT. |
| RU-103 | -3.161E-02 | 2.160E-01 | 2.165E-01 | FAIL ABUN |
| RH-106 | -1.139E-01 | 5.117E-01 | 5.142E-01 | NOT IDENT. |
| RU-106 | -1.139E-01 | 5.117E-01 | 5.142E-01 | NOT IDENT. |
| AG-108M | -8.992E-03 | 6.762E-02 | 6.774E-02 | NOT IDENT. |
| CD-109 | -1.051E-01 | 1.268E+00 | 1.269E+00 | NOT IDENT. |
| AG-110M | -9.335E-03 | 7.760E-02 | 7.772E-02 | NOT IDENT. |
| SN-113 | -5.181E-02 | 8.572E-02 | 8.885E-02 | NOT IDENT. |
| CD-115 | 3.042E+11 | 1.835E+12 | 1.840E+12 | SHORT HLIF |
| SN-117M | -1.613E+00 | 4.588E+00 | 4.646E+00 | NOT IDENT. |
| TE-123M | -4.888E-03 | 6.009E-02 | 6.013E-02 | NOT IDENT. |
| SB-124 | -1.410E-01 | 4.471E-01 | 4.516E-01 | NOT IDENT. |
| SB-125 | -5.887E-02 | 1.648E-01 | 1.669E-01 | NOT IDENT. |
| I-126 | -1.296E+01 | 2.345E+01 | 2.416E+01 | NOT IDENT. |
| SB-126 | 2.016E+00 | 1.743E+01 | 1.746E+01 | NOT IDENT. |
| SN-126 | -8.958E-02 | 1.142E-01 | 1.211E-01 | FAIL ABUN |
| SB-127 | -5.797E+05 | 4.191E+06 | 4.199E+06 | SHORT HLIF |
| I-131 | 9.676E+01 | 1.828E+02 | 1.879E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.121E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.915E+07 | 4.297E+07 | 4.383E+07 | SHORT HLIF |
| BA-133 | 2.421E-03 | 5.525E-02 | 5.526E-02 | NOT IDENT. |
| I-133 | 1.121E+32 | 2.152E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -5.258E-02 | 5.693E-02 | 6.167E-02 | NOT IDENT. |
| CS-135 | 1.549E-01 | 2.082E-01 | 2.196E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 4.412E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.909E+00 | 8.363E+00 | 8.546E+00 | NOT IDENT. |
| BA-137M | 6.904E-03 | 4.647E-02 | 4.657E-02 | NOT IDENT. |
| CS-137 | 7.293E-03 | 4.909E-02 | 4.920E-02 | NOT IDENT. |
| CE-139 | 9.264E-04 | 7.162E-02 | 7.162E-02 | NOT IDENT. |
| BA-140 | -1.878E+00 | 1.033E+01 | 1.036E+01 | NOT IDENT. |
| LA-140 | -1.878E+00 | 1.033E+01 | 1.036E+01 | NOT IDENT. |
| CE-143 | 1.393E+19 | 1.338E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.085E-02 | 3.046E-01 | 3.046E-01 | NOT IDENT. |
| PM-144 | 1.000E-02 | 5.330E-02 | 5.349E-02 | NOT IDENT. |
| PR-144 | 7.635E-01 | 4.160E+00 | 4.174E+00 | NOT IDENT. |
| PM-146 | 7.109E-03 | 6.153E-02 | 6.161E-02 | NOT IDENT. |
| ND-147 | 3.946E+01 | 1.360E+02 | 1.372E+02 | NOT IDENT. |
| PM-147 | 3.523E+02 | 9.678E+02 | 9.808E+02 | NOT IDENT. |
| PM-149 | 1.547E+12 | 1.645E+13 | 1.646E+13 | SHORT HLIF |
| EU-150 | 3.115E-03 | 3.769E-02 | 3.771E-02 | FAIL ABUN |
| EU-152 | -6.125E-02 | 1.259E-01 | 1.289E-01 | NOT IDENT. |
| GD-153 | -1.226E-01 | 1.582E-01 | 1.676E-01 | NOT IDENT. |
| EU-154 | -1.467E-02 | 1.467E-01 | 1.469E-01 | NOT IDENT. |
| EU-155 | 6.973E-03 | 1.625E-01 | 1.625E-01 | NOT IDENT. |
| TB-160 | -8.174E-03 | 3.823E-01 | 3.823E-01 | FAIL ABUN |
| HO-166M | 2.477E-02 | 7.788E-02 | 7.867E-02 | NOT IDENT. |
| TM-171 | 3.157E+01 | 5.640E+01 | 5.817E+01 | FAIL ABUN |
| LU-176 | -7.732E-03 | 3.324E-02 | 3.342E-02 | NOT IDENT. |
| HF-181 | -1.224E-01 | 2.386E-01 | 2.449E-01 | NOT IDENT. |
| TA-182 | -1.736E-01 | 3.585E-01 | 3.670E-01 | FAIL ABUN |
| RE-183 | 2.547E-01 | 1.100E+00 | 1.106E+00 | FAIL ABUN |
| RE-184 | -2.037E-01 | 7.729E-01 | 7.783E-01 | NOT IDENT. |
| W-188 | -1.428E+01 | 2.184E+01 | 2.277E+01 | FAIL ABUN |
| IR-192 | -3.682E-02 | 1.178E-01 | 1.190E-01 | NOT IDENT. |
| HG-203 | -2.161E-02 | 1.733E-01 | 1.736E-01 | NOT IDENT. |
| BI-207 | 3.000E-02 | 7.324E-02 | 7.448E-02 | NOT IDENT. |
| TL-208 | 1.336E-02 | 5.377E-02 | 5.411E-02 | NOT IDENT. |
| PB-211 | 6.831E-01 | 9.956E-01 | 1.042E+00 | NOT IDENT. |
| BI-212 | 1.152E-01 | 6.489E-01 | 6.510E-01 | NOT IDENT. |
| PB-212 | 3.369E-02 | 9.103E-02 | 9.228E-02 | FAIL ABUN |
| BI-214 | 1.284E-01 | 1.833E-01 | 1.922E-01 | FAIL ABUN |
| PB-214 | 4.317E-02 | 1.287E-01 | 1.302E-01 | FAIL ABUN |
| RN-219 | -4.087E-01 | 5.714E-01 | 6.004E-01 | NOT IDENT. |
| RN-222 | 1.284E-01 | 1.833E-01 | 1.922E-01 | FAIL ABUN |
| RA-223 | 1.592E-01 | 8.077E-01 | 8.108E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 1.624E+00 | 6.031E-01 | 9.485E-01 | NOT IDENT. |
| RA-226 | 1.284E-01 | 1.833E-01 | 1.922E-01 | FAIL ABUN |
| AC-227 | 6.720E-02 | 3.103E-01 | 3.118E-01 | NOT IDENT. |
| TH-227 | 6.720E-02 | 3.103E-01 | 3.118E-01 | NOT IDENT. |
| AC-228 | -2.450E-02 | 1.777E-01 | 1.780E-01 | NOT IDENT. |
| RA-228 | -2.450E-02 | 1.777E-01 | 1.780E-01 | NOT IDENT. |
| TH-228 | 3.369E-02 | 9.103E-02 | 9.228E-02 | FAIL ABUN |
| TH-229 | 5.167E-01 | 6.651E-01 | 7.048E-01 | NOT IDENT. |
| TH-230 | 1.284E-01 | 1.832E-01 | 1.922E-01 | FAIL ABUN |
| PA-231 | -3.322E-01 | 1.856E+00 | 1.862E+00 | NOT IDENT. |
| TH-231 | 1.592E-01 | 8.077E-01 | 8.108E-01 | FAIL ABUN |
| TH-232 | -2.450E-02 | 1.777E-01 | 1.780E-01 | NOT IDENT. |
| PA-233 | -5.515E-02 | 8.702E-02 | 9.050E-02 | NOT IDENT. |
| PA-234 | -1.136E-01 | 3.778E-01 | 3.812E-01 | FAIL ABUN |
| PA-234M | -2.999E+00 | 6.497E+00 | 6.636E+00 | NOT IDENT. |
| TH-234 | 2.436E-01 | 3.696E+00 | 3.698E+00 | FAIL ABUN |
| U-234 | 1.284E-01 | 1.832E-01 | 1.922E-01 | FAIL ABUN |
| NP-237 | -5.515E-02 | 8.702E-02 | 9.050E-02 | NOT IDENT. |
| NP-238 | -4.827E+12 | 8.990E+12 | 9.250E+12 | SHORT HLIF |
| U-238 | 2.436E-01 | 3.696E+00 | 3.698E+00 | FAIL ABUN |
| NP-239 | 1.068E-01 | 5.122E-01 | 5.144E-01 | NOT IDENT. |
| PU-239 | -2.252E+01 | 4.418E+02 | 4.420E+02 | NOT IDENT. |
| AM-241 | 2.432E-01 | 4.027E-01 | 4.173E-01 | NOT IDENT. |
| AM-243 | -1.879E-02 | 9.355E-02 | 9.393E-02 | NOT IDENT. |
| CM-243 | 9.242E-02 | 1.465E-01 | 1.523E-01 | NOT IDENT. |
| CM-247 | -3.687E-02 | 5.271E-02 | 5.527E-02 | NOT IDENT. |
| CF-249 | 1.150E-02 | 5.041E-02 | 5.068E-02 | NOT IDENT. |
| CF-251 | -5.547E-02 | 1.810E-01 | 1.827E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 26.9413 | 94.67 | 62.7295 | 193.51 | 23.8794 |
| 45.60 | 19.9556 | 94.87 | 67.9784 | 197.03 | 39.9350 |
| 46.54 | 30.0032 | 97.43 | 34.6499 | 198.01 | 28.4248 |
| 49.72 | 0.0000 | 98.43 | 28.3936 | 201.83 | 41.0098 |
| 51.35 | 31.7949 | 98.44 | 25.2391 | 205.31 | 35.7779 |
| 52.39 | 26.0763 | 99.53 | 24.2277 | 210.85 | 31.4667 |
| 53.44 | 31.9473 | 100.11 | 31.6293 | 215.65 | 19.8658 |
| 57.36 | 0.0000 | 103.18 | 24.3611 | 222.11 | 18.1647 |
| 57.53 | 27.3529 | 103.37 | 22.8847 | 227.09 | 20.0688 |
| 57.98 | 32.2684 | 105.21 | 28.6838 | 227.38 | 20.0738 |
| 59.32 | 35.3026 | 105.31 | 28.6879 | 228.16 | 0.0000 |
| 59.54 | 30.9042 | 106.12 | 28.7220 | 228.18 | 20.0879 |
| 63.29 | 41.5270 | 109.28 | 28.8535 | 235.69 | 24.9968 |
| 63.58 | 41.5514 | 111.00 | 28.9243 | 235.96 | 22.0611 |
| 64.28 | 17.8330 | 111.76 | 0.0000 | 238.63 | 26.5331 |
| 66.73 | 31.3603 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 40.3605 | 117.23 | 23.3409 | 240.99 | 0.0000 |
| 67.75 | 46.3860 | 121.12 | 22.8122 | 242.00 | 16.2606 |
| 69.67 | 31.5397 | 121.22 | 22.8153 | 244.70 | 25.1864 |
| 70.83 | 28.8999 | 121.78 | 20.6578 | 252.40 | 0.0000 |
| 72.81 | 52.3748 | 122.06 | 18.4902 | 252.80 | 18.6427 |
| 72.87 | 42.3074 | 123.07 | 31.5844 | 254.15 | 0.0000 |
| 74.66 | 45.4793 | 127.23 | 25.1864 | 256.23 | 19.6289 |
| 74.82 | 45.4928 | 129.30 | 30.7435 | 260.90 | 0.0000 |
| 74.97 | 33.3704 | 131.20 | 28.6168 | 264.66 | 31.0523 |
| 77.11 | 40.6061 | 133.02 | 33.0954 | 268.22 | 19.8154 |
| 79.69 | 37.7330 | 133.52 | 27.5968 | 269.46 | 28.3351 |
| 80.12 | 33.6791 | 136.00 | 31.0041 | 271.23 | 28.3736 |
| 80.19 | 0.0000 | 136.47 | 33.2382 | 273.65 | 20.8462 |
| 80.57 | 39.8339 | 140.51 | 0.0000 | 276.40 | 23.7385 |
| 81.00 | 42.9302 | 143.76 | 23.4735 | 277.37 | 19.0048 |
| 81.07 | 42.9355 | 144.24 | 23.4870 | 277.60 | 20.9090 |
| 83.79 | 26.7037 | 145.44 | 21.8405 | 278.00 | 19.0140 |
| 85.43 | 35.0172 | 152.43 | 31.6171 | 279.20 | 24.7404 |
| 86.55 | 40.2420 | 153.25 | 25.9955 | 279.54 | 22.8431 |
| 86.79 | 40.2580 | 154.21 | 22.6296 | 280.46 | 24.7638 |
| 86.94 | 41.3007 | 156.02 | 30.6129 | 283.69 | 21.9598 |
| 87.09 | 41.3110 | 158.56 | 31.8372 | 284.31 | 0.0000 |
| 87.57 | 45.4782 | 159.00 | 30.7153 | 285.41 | 21.9879 |
| 88.03 | 37.2378 | 162.33 | 28.7735 | 285.90 | 0.0000 |
| 88.34 | 37.2567 | 163.33 | 32.5771 | 287.50 | 19.1495 |
| 88.47 | 35.1944 | 165.86 | 34.3863 | 290.67 | 26.8716 |
| 89.96 | 95.4641 | 176.31 | 34.7699 | 293.27 | 0.0000 |
| 91.11 | 64.4544 | 176.60 | 34.7803 | 295.22 | 19.2578 |
| 92.59 | 42.7242 | 177.52 | 34.8135 | 295.96 | 23.1218 |
| 93.35 | 36.5160 | 181.07 | 0.0000 | 298.58 | 25.0963 |
| 94.56 | 62.7188 | 184.41 | 21.0355 | 299.98 | 21.2564 |
| 94.65 | 62.7277 | 185.72 | 23.6961 | 300.09 | 22.2244 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 22.2251 | 497.08 | 11.1657 | 711.68 | 8.5729 |
| 301.36 | 23.2119 | 505.52 | 10.4648 | 720.70 | 8.6021 |
| 302.85 | 22.2683 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 12.6013 | 511.00 | 20.7670 | 722.78 | 12.4347 |
| 306.78 | 19.4177 | 514.00 | 20.7971 | 722.91 | 13.3919 |
| 308.46 | 18.4686 | 514.00 | 20.7973 | 723.31 | 11.4806 |
| 311.90 | 24.3595 | 520.40 | 17.5674 | 724.19 | 7.6563 |
| 316.51 | 25.4148 | 520.69 | 0.0000 | 727.33 | 7.6652 |
| 319.41 | 18.6095 | 522.65 | 0.0000 | 733.00 | 5.7609 |
| 320.08 | 19.5981 | 527.90 | 0.0000 | 735.93 | 4.8060 |
| 321.04 | 19.6109 | 529.59 | 9.9250 | 737.46 | 4.8087 |
| 323.87 | 16.7014 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 12.7834 | 531.02 | 11.0352 | 747.24 | 7.7215 |
| 328.76 | 17.7424 | 546.56 | 0.0000 | 748.06 | 5.7929 |
| 333.37 | 12.8534 | 552.55 | 6.6877 | 752.31 | 7.7357 |
| 333.97 | 20.7715 | 563.25 | 7.8404 | 753.82 | 12.5772 |
| 334.37 | 20.7770 | 569.33 | 10.1080 | 756.73 | 9.6851 |
| 338.28 | 21.8224 | 569.50 | 10.1088 | 756.80 | 9.6853 |
| 338.32 | 21.8231 | 569.70 | 10.1096 | 763.94 | 9.7102 |
| 340.48 | 17.8805 | 583.19 | 11.7524 | 765.81 | 11.6599 |
| 340.55 | 17.8813 | 584.27 | 12.6625 | 766.42 | 7.7750 |
| 344.28 | 19.9167 | 595.83 | 6.0602 | 766.84 | 7.7762 |
| 345.93 | 10.9658 | 600.60 | 13.6633 | 772.60 | 0.0000 |
| 351.06 | 19.2035 | 602.52 | 0.0000 | 776.52 | 8.7783 |
| 351.93 | 17.0127 | 602.73 | 13.6761 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 15.2083 | 778.90 | 5.8570 |
| 356.01 | 12.8428 | 609.32 | 10.9717 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 10.9764 | 785.37 | 13.6975 |
| 366.42 | 0.0000 | 614.28 | 10.6894 | 792.07 | 11.7683 |
| 375.05 | 16.2449 | 618.01 | 8.1571 | 794.95 | 7.8533 |
| 383.85 | 18.3727 | 620.36 | 8.2672 | 795.86 | 10.8018 |
| 388.16 | 13.3035 | 621.93 | 13.7878 | 801.95 | 8.8565 |
| 388.63 | 12.2836 | 630.19 | 0.0000 | 810.29 | 6.9081 |
| 391.69 | 15.3822 | 631.29 | 13.8417 | 810.45 | 6.9084 |
| 400.66 | 13.4017 | 633.25 | 12.0056 | 810.76 | 5.9222 |
| 401.81 | 21.6633 | 634.78 | 12.0133 | 815.77 | 8.8985 |
| 402.40 | 21.6707 | 635.95 | 10.1699 | 818.51 | 3.9585 |
| 404.85 | 13.4342 | 636.99 | 0.0000 | 832.01 | 4.9707 |
| 410.95 | 17.6293 | 645.85 | 8.3547 | 834.85 | 4.9755 |
| 413.71 | 20.7730 | 657.76 | 10.2604 | 835.71 | 3.9814 |
| 414.70 | 14.5492 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 21.7667 | 661.66 | 10.2765 | 846.75 | 0.0000 |
| 427.87 | 20.1012 | 664.57 | 0.0000 | 846.77 | 6.9932 |
| 433.94 | 16.8071 | 666.33 | 14.0394 | 856.80 | 11.0255 |
| 439.40 | 13.4857 | 666.50 | 14.0405 | 860.56 | 12.0428 |
| 453.88 | 14.8652 | 667.71 | 0.0000 | 871.09 | 8.0561 |
| 463.37 | 12.8053 | 677.62 | 9.4014 | 873.19 | 6.0460 |
| 468.07 | 17.1155 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 3.1550 | 879.38 | 8.0775 |
| 475.06 | 17.1772 | 696.49 | 7.8920 | 880.51 | 3.0302 |
| 476.78 | 12.8943 | 696.51 | 7.8923 | 883.24 | 8.0875 |
| 477.60 | 17.1997 | 697.00 | 12.6299 | 884.68 | 5.0570 |
| 482.18 | 17.2397 | 697.49 | 14.2112 | 889.28 | 5.0645 |
| 487.02 | 5.1846 | 702.65 | 7.9108 | 894.76 | 8.1172 |
| 492.35 | 0.0000 | 706.68 | 10.4583 | 898.04 | 5.0785 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.1389 | 1312.11 | 3.7858 | | |
| 911.20 | 4.0796 | 1332.49 | 5.7056 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 5.1237 | 1365.19 | 5.7483 | | |
| 937.49 | 4.1128 | 1368.63 | 0.0000 | | |
| 944.13 | 7.2119 | 1384.29 | 2.8866 | | |
| 946.00 | 7.2160 | 1408.01 | 2.9017 | | |
| 949.00 | 9.2861 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 3.9136 | | |
| 962.31 | 6.2155 | 1489.16 | 1.9686 | | |
| 964.08 | 6.2188 | 1505.03 | 2.9628 | | |
| 966.17 | 7.2598 | 1596.21 | 4.0244 | | |
| 968.97 | 4.1519 | 1620.50 | 2.0219 | | |
| 983.53 | 5.2122 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 7.1735 | | |
| 996.26 | 4.1854 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.3344 | 1764.49 | 3.1168 | | |
| 1004.73 | 5.2445 | 1770.23 | 5.2002 | | |
| 1021.30 | 0.0000 | 1771.35 | 2.0805 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 4.1891 | | |
| 1037.84 | 7.4119 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 6.3147 | | |
| 1046.59 | 2.1229 | | | | |
| 1048.07 | 3.1856 | | | | |
| 1049.04 | 6.3729 | | | | |
| 1050.41 | 7.4378 | | | | |
| 1063.66 | 6.3990 | | | | |
| 1077.00 | 4.2816 | | | | |
| 1077.34 | 3.2115 | | | | |
| 1085.87 | 5.3650 | | | | |
| 1099.45 | 3.2307 | | | | |
| 1112.07 | 2.1611 | | | | |
| 1112.84 | 6.4849 | | | | |
| 1115.54 | 6.4893 | | | | |
| 1120.29 | 7.5804 | | | | |
| 1120.55 | 7.5811 | | | | |
| 1121.30 | 8.6656 | | | | |
| 1129.67 | 7.5992 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 5.4897 | | | | |
| 1177.95 | 3.2978 | | | | |
| 1189.05 | 9.1862 | | | | |
| 1204.77 | 9.2224 | | | | |
| 1221.41 | 8.3346 | | | | |
| 1231.02 | 5.5696 | | | | |
| 1235.36 | 9.2924 | | | | |
| 1238.28 | 6.5095 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 6.5625 | | | | |
| 1274.44 | 5.6284 | | | | |
| 1274.54 | 5.6287 | | | | |
| 1291.59 | 2.8257 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 14-FEB-2014 08:44:08.05

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147023.CNF;3
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM05.CNF;316
                                      Background date  : 9-FEB-2014 11:20:51.
Sample date      : 7-NOV-2013 15:45:00. Acquisition date : 12-FEB-2014 14:30:33
Sample ID        : G341147023           Sample quantity  : 4.37880E+01 GRAM
Detector name    : GAM05                Detector geometry: JAR
Elapsed live time: 0 04:00:00.00        Elapsed real time: 0 04:00:01.73  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 25.91 | 53 | 224 | 1.30 | 51.98 | 50 | 7 | 3.71E-03 | 48.2 | |
| 2 | 0 | 75.33* | 10 | 150 | 0.64 | 150.84 | 148 | 6 | 7.18E-04 | 228.3 | |
| 3 | 0 | 85.70* | 48 | 269 | 5.04 | 171.58 | 165 | 13 | 3.32E-03 | 78.6 | |
| 4 | 0 | 93.25* | 37 | 250 | 1.06 | 186.68 | 181 | 11 | 2.58E-03 | 100.0 | |
| 5 | 0 | 113.24 | 40 | 116 | 1.42 | 226.67 | 224 | 7 | 2.76E-03 | 48.0 | |
| 6 | 0 | 155.72 | 11 | 157 | 0.53 | 311.66 | 309 | 8 | 7.39E-04 | 205.9 | |
| 7 | 0 | 164.02 | 27 | 123 | 1.18 | 328.28 | 326 | 7 | 1.87E-03 | 71.3 | |
| 8 | 0 | 186.55* | 23 | 123 | 0.90 | 373.35 | 369 | 9 | 1.63E-03 | 116.3 | |
| 9 | 1 | 239.01* | 13 | 122 | 1.61 | 478.29 | 473 | 17 | 8.88E-04 | 201.3 | 2.17E+00 |
| 10 | 1 | 242.51 | 35 | 117 | 1.61 | 485.29 | 473 | 17 | 2.43E-03 | 61.4 | |
| 11 | 0 | 298.82 | 103 | 201 | 8.03 | 597.94 | 587 | 25 | 7.13E-03 | 38.4 | |
| 12 | 0 | 345.80 | 37 | 71 | 3.19 | 691.92 | 686 | 10 | 2.60E-03 | 45.0 | |
| 13 | 0 | 353.01* | 23 | 99 | 1.75 | 706.34 | 700 | 13 | 1.63E-03 | 105.9 | |
| 14 | 0 | 362.88 | 18 | 86 | 1.18 | 726.09 | 721 | 9 | 1.22E-03 | 98.2 | |
| 15 | 0 | 393.82 | 16 | 64 | 2.90 | 787.98 | 780 | 10 | 1.10E-03 | 98.7 | |
| 16 | 0 | 422.63 | 30 | 55 | 3.23 | 845.61 | 840 | 9 | 2.06E-03 | 49.5 | |
| 17 | 0 | 511.16* | 36 | 89 | 2.93 | 1022.71 | 1013 | 18 | 2.47E-03 | 92.6 | |
| 18 | 0 | 571.46* | 11 | 76 | 2.17 | 1143.32 | 1134 | 16 | 7.57E-04 | 197.7 | |
| 19 | 1 | 583.48* | 20 | 32 | 1.95 | 1167.35 | 1161 | 20 | 1.39E-03 | 77.1 | 5.11E-01 |
| 20 | 1 | 586.30 | 26 | 25 | 1.78 | 1173.00 | 1161 | 20 | 1.77E-03 | 47.1 | |
| 21 | 0 | 685.14 | 22 | 27 | 3.80 | 1370.72 | 1365 | 10 | 1.52E-03 | 49.5 | |
| 22 | 0 | 727.54 | 11 | 33 | 1.41 | 1455.52 | 1452 | 8 | 7.70E-04 | 93.7 | |
| 23 | 0 | 790.59 | 16 | 11 | 1.37 | 1581.62 | 1578 | 8 | 1.10E-03 | 47.0 | |
| 24 | 0 | 803.61* | 16 | 19 | 0.94 | 1607.67 | 1601 | 11 | 1.13E-03 | 71.9 | |
| 25 | 0 | 844.11 | 10 | 39 | 0.83 | 1688.68 | 1684 | 9 | 7.16E-04 | 112.8 | |
| 26 | 0 | 900.21 | 16 | 10 | 1.42 | 1800.88 | 1798 | 6 | 1.14E-03 | 39.2 | |
| 27 | 0 | 910.76* | 20 | 25 | 5.04 | 1821.98 | 1815 | 14 | 1.41E-03 | 63.3 | |
| 28 | 0 | 1008.26 | 44 | 46 | 14.86 | 2016.99 | 2001 | 32 | 3.04E-03 | 49.7 | |
| 29 | 0 | 1058.64 | 28 | 6 | 2.42 | 2117.76 | 2112 | 11 | 1.91E-03 | 25.2 | |
| 30 | 0 | 1103.11 | 14 | 15 | 1.54 | 2206.70 | 2199 | 12 | 9.77E-04 | 61.1 | |
| 31 | 0 | 1173.95 | 14 | 29 | 5.55 | 2348.38 | 2338 | 17 | 9.48E-04 | 95.4 | |
| 32 | 0 | 1196.51 | 8 | 21 | 0.72 | 2393.50 | 2384 | 14 | 5.56E-04 | 126.6 | |
| 33 | 0 | 1217.72 | 16 | 17 | 3.36 | 2435.92 | 2427 | 14 | 1.09E-03 | 62.0 | |
| 34 | 0 | 1377.29 | 14 | 3 | 1.49 | 2755.03 | 2751 | 9 | 1.00E-03 | 32.5 | |

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 0 | 1390.82 | 7 | 13 | 0.50 | 2782.08 | 2777 | 11 | 4.90E-04 | 107.9 | |
| 36 | 0 | 1452.40 | 23 | 3 | 4.37 | 2905.23 | 2899 | 13 | 1.57E-03 | 26.7 | |
| 37 | 0 | 1461.17* | 17 | 10 | 2.58 | 2922.77 | 2917 | 10 | 1.20E-03 | 59.2 | |
| 38 | 0 | 1466.26 | 10 | 2 | 0.86 | 2932.95 | 2929 | 8 | 7.09E-04 | 39.2 | |
| 39 | 0 | 1488.32 | 17 | 8 | 1.97 | 2977.06 | 2969 | 15 | 1.15E-03 | 43.8 | |
| 40 | 0 | 1517.44 | 26 | 5 | 6.92 | 3035.31 | 3025 | 20 | 1.82E-03 | 28.5 | |
| 41 | 0 | 1704.19 | 12 | 3 | 4.32 | 3408.74 | 3402 | 12 | 8.38E-04 | 40.6 | |
| 42 | 0 | 1803.49 | 8 | 4 | 0.61 | 3607.30 | 3602 | 9 | 5.61E-04 | 58.2 | |
| 43 | 0 | 1897.64 | 10 | 4 | 1.49 | 3795.56 | 3790 | 9 | 6.75E-04 | 50.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 14-FEB-2014 08:44:09

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147023.CNF;3 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 15:45:00 | Acquisition date | : 12-FEB-2014 14:30:33 |
| Sample ID | : G341147023 | Sample quantity | : 43.788 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA5 | Detector geometry | : JAR |
| Elapsed live time | : 0 04:00:00.00 | Elapsed real time | : 0 04:00:01.73 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 17 | 10.66* | 9.714E-01 | 7.171E-01 | 7.171E-01 | 118.42 |
| TL-208 | 277.37 | ------ | 6.60 | 3.716E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 20 | 85.00* | 2.120E+00 | 4.775E-02 | 4.775E-02 | 154.16 |
| | 860.56 | ------ | 12.50 | 1.525E+00 | ------ | Line Not Found | ------ |
| PB-212 | 74.82 | 10 | 10.28 | 6.419E+00 | 6.718E-02 | 6.718E-02 | 456.54 |
| | 77.11 | ------ | 17.10 | 6.395E+00 | ------ | Line Not Found | ------ |
| | 238.63 | 13 | 43.60* | 4.084E+00 | 3.079E-02 | 3.079E-02 | 402.66 |
| | 300.09 | 103 | 3.30 | 3.535E+00 | 3.771E+00 | 3.771E+00 | 76.82 |
| TH-228 | 74.82 | 10 | 10.28 | 6.419E+00 | 6.718E-02 | 6.718E-02 | 456.54 |
| | 77.11 | ------ | 17.10 | 6.395E+00 | ------ | Line Not Found | ------ |
| | 238.63 | 13 | 43.60* | 4.084E+00 | 3.079E-02 | 3.079E-02 | 402.66 |
| | 300.09 | 103 | 3.30 | 3.535E+00 | 3.771E+00 | 3.771E+00 | 76.82 |
| U-235 | 89.96 | ------ | 3.47 | 6.204E+00 | ------ | Line Not Found | ------ |
| | 93.35 | 37 | 5.60 | 6.152E+00 | 4.620E-01 | 4.620E-01 | 199.99 |
| | 143.76 | ------ | 10.96* | 5.320E+00 | ------ | Line Not Found | ------ |
| | 163.33 | 27 | 5.08 | 5.014E+00 | 4.541E-01 | 4.541E-01 | 142.65 |
| | 185.72 | 23 | 57.20 | 4.702E+00 | 3.737E-02 | 3.737E-02 | 232.67 |
| | 205.31 | ------ | 5.01 | 4.464E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 6.545E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 10 | 67.20* | 6.419E+00 | 1.028E-02 | 1.028E-02 | 456.54 |
| ANH-511 | 511.00 | 36 | 100.00* | 2.363E+00 | 6.443E-02 | 6.443E-02 | 185.25 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 14-FEB-2014 08:44:10.50

```
*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147023.CNF;3       *
* Acquisition date : 12-FEB-2014 14:30:33 Sensitivity     : 3.000                *
* Detector ID      : GAM05                Energy tolerance: 1.500                *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 04:00:01.73     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 15:45:00 Nuclide Library : SOLID                *
* Sample ID        : G341147023           Analyst initials: RXF2                 *
* Batch Number     : 1361908              Sample Quantity : 4.3788E+01 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 18-SEP-2013 10:39:19 Eff. Geometry   : JAR                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_JAR.CNF;8                  *
*********************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 7.171E-01 | 8.322E-01 | 9.840E-01 |
| TL-208 | 4.775E-02 | 7.213E-02 | 7.393E-02 |
| PB-212 | 3.079E-02 | 1.215E-01 | 1.348E-01 |
| TH-228 | 3.079E-02 | 1.215E-01 | 1.348E-01 |
| U-235 | -3.672E-01 | 3.102E-01 | 4.587E-01 |
| AM-243 | 1.028E-02 | 4.598E-02 | 7.283E-02 |
| ANH-511 | 6.443E-02 | 1.170E-01 | 7.343E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -6.924E-01 | 1.224E+00 | 2.092E+00 | NOT IDENT. |
| NA-22 | -5.714E-03 | 5.618E-02 | 1.059E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.137E-02 | 6.850E-02 | 1.065E-01 | NOT IDENT. |
| SC-46 | 2.005E-02 | 1.059E-01 | 1.994E-01 | NOT IDENT. |
| V-48 | -3.836E+00 | 3.391E+00 | 5.392E+00 | NOT IDENT. |
| CR-51 | -6.554E-01 | 3.848E+00 | 6.889E+00 | NOT IDENT. |
| MN-54 | -8.052E-03 | 6.174E-02 | 1.121E-01 | NOT IDENT. |
| CO-56 | -8.244E-03 | 1.596E-01 | 2.479E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.638E-02 | 3.881E-02 | 7.002E-02 | NOT IDENT. |
| CO-58 | 5.111E-02 | 1.271E-01 | 2.339E-01 | NOT IDENT. |
| FE-59 | -4.166E-01 | 6.294E-01 | 6.959E-01 | NOT IDENT. |
| CO-60 | -1.390E-02 | 5.563E-02 | 1.026E-01 | FAIL ABUN |
| ZN-65 | 1.291E-02 | 1.336E-01 | 2.490E-01 | NOT IDENT. |
| GE-68 | 2.834E-01 | 1.863E+00 | 3.528E+00 | NOT IDENT. |
| AS-73 | 2.815E-01 | 5.714E-01 | 9.289E-01 | NOT IDENT. |
| AS-74 | 3.638E+00 | 3.518E+00 | 6.732E+00 | NOT IDENT. |
| SE-75 | -2.115E-02 | 1.051E-01 | 1.779E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.472E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -8.893E-01 | 3.894E+00 | 7.090E+00 | NOT IDENT. |
| RB-83 | -7.218E-02 | 1.904E-01 | 3.293E-01 | NOT IDENT. |
| KR-85 | 0.000E+00 | 1.496E+01 | 3.130E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | 0.000E+00 | 1.874E-01 | 3.921E-01 | NOT IDENT. |
| RB-86 | 1.105E+00 | 2.014E+01 | 3.765E+01 | NOT IDENT. |
| Y-88 | 4.646E-03 | 9.658E-02 | 1.889E-01 | NOT IDENT. |
| Y-91 | 1.588E+01 | 7.624E+01 | 1.410E+02 | NOT IDENT. |
| NB-94 | -1.205E-02 | 5.635E-02 | 1.011E-01 | NOT IDENT. |
| NB-95 | 1.918E-01 | 1.405E-01 | 2.875E-01 | NOT IDENT. |
| NB-95M | 3.811E-01 | 4.273E-01 | 6.932E-01 | NOT IDENT. |
| ZR-95 | 9.057E-02 | 2.460E-01 | 4.688E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.849E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.627E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.478E-02 | 4.193E-02 | 7.251E-02 | NOT IDENT. |
| RH-102 | -2.610E-02 | 8.627E-02 | 1.484E-01 | NOT IDENT. |
| RU-103 | 2.859E-03 | 2.425E-01 | 4.340E-01 | NOT IDENT. |
| RH-106 | -2.702E-01 | 5.879E-01 | 9.950E-01 | NOT IDENT. |
| RU-106 | -2.702E-01 | 5.879E-01 | 9.950E-01 | NOT IDENT. |
| AG-108M | -4.456E-02 | 4.240E-02 | 6.981E-02 | NOT IDENT. |
| CD-109 | -2.169E-02 | 1.224E+00 | 1.405E+00 | NOT IDENT. |
| AG-110M | 4.318E-02 | 8.807E-02 | 1.701E-01 | NOT IDENT. |
| SN-113 | 3.612E-02 | 9.906E-02 | 1.830E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.876E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | -2.079E+00 | 5.867E+00 | 8.726E+00 | FAIL ABUN |
| TE-123M | -3.334E-02 | 8.163E-02 | 1.119E-01 | NOT IDENT. |
| SB-124 | 2.753E-01 | 3.617E-01 | 7.648E-01 | NOT IDENT. |
| SB-125 | 9.209E-03 | 1.469E-01 | 2.410E-01 | NOT IDENT. |
| TE-125M | 3.634E+00 | 3.555E+01 | 5.567E+01 | NOT IDENT. |
| I-126 | -1.886E+00 | 2.407E+01 | 4.432E+01 | NOT IDENT. |
| SB-126 | -6.914E+00 | 2.070E+01 | 3.528E+01 | NOT IDENT. |
| SN-126 | -6.449E-02 | 1.121E-01 | 1.200E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 5.163E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 2.126E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 4.836E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 2.364E-02 | 7.531E-02 | 1.074E-01 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.333E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.804E-02 | 7.652E-02 | 1.154E-01 | NOT IDENT. |
| CS-135 | 1.303E-02 | 2.130E-01 | 3.676E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.395E+01 | 1.065E+01 | 1.629E+01 | NOT IDENT. |
| BA-137M | 1.155E-02 | 5.074E-02 | 9.186E-02 | NOT IDENT. |
| CS-137 | 1.221E-02 | 5.360E-02 | 9.704E-02 | NOT IDENT. |
| CE-139 | 6.034E-02 | 6.555E-02 | 1.075E-01 | NOT IDENT. |
| BA-140 | 4.237E+00 | 9.422E+00 | 1.978E+01 | NOT IDENT. |
| LA-140 | 4.237E+00 | 9.422E+00 | 1.978E+01 | NOT IDENT. |
| CE-141 | -4.266E-01 | 5.432E-01 | 8.161E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.450E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 8.501E-02 | 3.260E-01 | 5.796E-01 | NOT IDENT. |
| PM-144 | 2.959E-02 | 6.850E-02 | 1.284E-01 | NOT IDENT. |
| PR-144 | 2.302E+00 | 5.350E+00 | 1.003E+01 | FAIL ABUN |
| PM-146 | -3.500E-02 | 5.941E-02 | 1.016E-01 | NOT IDENT. |
| ND-147 | -4.068E+01 | 1.434E+02 | 2.496E+02 | NOT IDENT. |
| PM-147 | 1.924E+02 | 9.731E+02 | 1.736E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.758E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.281E-02 | 3.605E-02 | 6.363E-02 | FAIL ABUN |
| EU-152 | -5.702E-02 | 1.638E-01 | 2.480E-01 | NOT IDENT. |
| GD-153 | 6.587E-02 | 1.256E-01 | 2.038E-01 | NOT IDENT. |
| EU-154 | -1.093E-02 | 1.533E-01 | 2.899E-01 | NOT IDENT. |
| EU-155 | 5.373E-02 | 1.233E-01 | 2.236E-01 | FAIL ABUN |
| TB-160 | 5.981E-02 | 4.041E-01 | 7.568E-01 | FAIL ABUN |
| HO-166M | -7.481E-02 | 8.668E-02 | 1.477E-01 | NOT IDENT. |
| TM-171 | 1.761E+00 | 4.939E+00 | 9.125E+00 | NOT IDENT. |
| LU-176 | 1.390E-02 | 3.976E-02 | 6.480E-02 | NOT IDENT. |
| HF-181 | 7.271E-02 | 2.156E-01 | 3.999E-01 | FAIL ABUN |
| TA-182 | 4.607E-02 | 4.889E-01 | 7.669E-01 | NOT IDENT. |
| RE-183 | -6.125E-02 | 1.627E-01 | 2.889E-01 | NOT IDENT. |
| RE-184 | 9.616E-01 | 1.370E+00 | 1.699E+00 | FAIL ABUN |
| W-188 | 1.311E+00 | 2.445E+01 | 3.882E+01 | NOT IDENT. |
| IR-192 | -1.716E-02 | 1.045E-01 | 1.869E-01 | NOT IDENT. |
| HG-203 | 9.492E-02 | 1.725E-01 | 3.225E-01 | NOT IDENT. |
| BI-207 | 2.484E-02 | 6.906E-02 | 1.182E-01 | FAIL ABUN |
| PB-210 | -4.511E-01 | 7.803E-01 | 1.352E+00 | NOT IDENT. |
| BI-211 | -3.922E-01 | 5.159E-01 | 5.905E-01 | NOT IDENT. |
| PB-211 | 5.534E-01 | 9.991E-01 | 1.862E+00 | NOT IDENT. |
| BI-212 | 4.048E-01 | 7.434E-01 | 1.424E+00 | FAIL ABUN |
| BI-214 | 7.586E-02 | 1.301E-01 | 2.127E-01 | NOT IDENT. |
| PB-214 | 8.966E-02 | 1.861E-01 | 2.199E-01 | FAIL ABUN |
| RN-219 | -5.959E-02 | 5.699E-01 | 1.016E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 7.586E-02 | 1.301E-01 | 2.127E-01 | NOT IDENT. |
| RA-223 | 2.930E-02 | 8.432E-01 | 1.530E+00 | FAIL ABUN |
| RA-224 | -4.335E-01 | 1.119E+00 | 1.762E+00 | NOT IDENT. |
| RA-226 | 7.586E-02 | 1.301E-01 | 2.127E-01 | NOT IDENT. |
| AC-227 | -2.580E-01 | 3.641E-01 | 5.965E-01 | FAIL ABUN |
| TH-227 | -2.580E-01 | 3.641E-01 | 5.965E-01 | FAIL ABUN |
| AC-228 | 2.321E-01 | 2.879E-01 | 4.316E-01 | FAIL ABUN |
| RA-228 | 2.321E-01 | 2.879E-01 | 4.316E-01 | FAIL ABUN |
| TH-229 | -2.080E-01 | 7.337E-01 | 1.251E+00 | FAIL ABUN |
| TH-230 | 7.585E-02 | 1.301E-01 | 2.127E-01 | NOT IDENT. |
| PA-231 | 2.466E-01 | 1.994E+00 | 3.637E+00 | NOT IDENT. |
| TH-231 | 2.930E-02 | 8.432E-01 | 1.530E+00 | NOT IDENT. |
| TH-232 | 2.321E-01 | 2.879E-01 | 4.316E-01 | FAIL ABUN |
| PA-233 | -1.557E-02 | 9.030E-02 | 1.615E-01 | FAIL ABUN |
| PA-234 | -7.435E-02 | 4.161E-01 | 7.510E-01 | FAIL ABUN |
| PA-234M | 6.785E+00 | 6.902E+00 | 1.257E+01 | NOT IDENT. |
| TH-234 | -2.601E-01 | 8.117E-01 | 1.476E+00 | FAIL ABUN |
| U-234 | 7.585E-02 | 1.301E-01 | 2.127E-01 | NOT IDENT. |
| NP-237 | -1.557E-02 | 9.030E-02 | 1.615E-01 | FAIL ABUN |
| NP-238 | 0.000E+00 | 1.418E+13 | 0.000E+00 | SHORT HLIF |
| U-238 | -2.601E-01 | 8.117E-01 | 1.476E+00 | FAIL ABUN |
| NP-239 | 5.089E-02 | 5.449E-01 | 8.529E-01 | NOT IDENT. |
| PU-239 | 2.574E+02 | 4.309E+02 | 7.814E+02 | NOT IDENT. |
| AM-241 | -1.124E-01 | 6.829E-02 | 1.068E-01 | NOT IDENT. |
| CM-243 | -6.983E-02 | 1.179E-01 | 2.030E-01 | NOT IDENT. |
| CM-247 | 8.249E-04 | 5.309E-02 | 9.535E-02 | NOT IDENT. |
| CF-249 | 4.762E-03 | 6.285E-02 | 9.897E-02 | NOT IDENT. |
| CF-251 | 6.714E-02 | 1.736E-01 | 3.088E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 14-FEB-2014 08:44:06.03

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 25.91 | 53 | 224 | 1.30 | 51.98 | 50 | 7 | 3.71E-03 | 48.2 | |
| 2 | 0 | 47.02 | 194 | 185 | 0.75 | 94.21 | 90 | 9 | 1.35E-02 | 14.6 | |
| 3 | 0 | 63.88 | 136 | 207 | 0.81 | 127.92 | 124 | 9 | 9.44E-03 | 21.0 | |
| 4 | 0 | 75.33 | 55 | 150 | 0.64 | 150.84 | 148 | 6 | 3.82E-03 | 37.7 | |
| 5 | 0 | 85.70 | 82 | 269 | 5.04 | 171.58 | 165 | 13 | 5.69E-03 | 42.8 | |
| 6 | 0 | 93.25 | 221 | 250 | 1.06 | 186.68 | 181 | 11 | 1.53E-02 | 15.5 | |
| 7 | 0 | 113.24 | 40 | 116 | 1.42 | 226.67 | 224 | 7 | 2.76E-03 | 48.0 | |
| 8 | 0 | 155.72 | 11 | 157 | 0.53 | 311.66 | 309 | 8 | 7.39E-04 | 205.9 | |
| 9 | 0 | 164.02 | 27 | 123 | 1.18 | 328.28 | 326 | 7 | 1.87E-03 | 71.3 | |
| 10 | 0 | 186.55 | 117 | 123 | 0.90 | 373.35 | 369 | 9 | 8.16E-03 | 19.6 | |
| 11 | 1 | 239.01 | 98 | 122 | 1.61 | 478.29 | 473 | 17 | 6.79E-03 | 23.2 | 2.17E+00 |
| 12 | 1 | 242.51 | 35 | 117 | 1.61 | 485.29 | 473 | 17 | 2.43E-03 | 61.4 | |
| 13 | 0 | 298.82 | 103 | 201 | 8.03 | 597.94 | 587 | 25 | 7.13E-03 | 38.4 | |
| 14 | 0 | 345.80 | 37 | 71 | 3.19 | 691.92 | 686 | 10 | 2.60E-03 | 45.0 | |
| 15 | 0 | 353.01 | 73 | 99 | 1.75 | 706.34 | 700 | 13 | 5.06E-03 | 30.7 | |
| 16 | 0 | 362.88 | 18 | 86 | 1.18 | 726.09 | 721 | 9 | 1.22E-03 | 98.2 | |
| 17 | 0 | 393.82 | 16 | 64 | 2.90 | 787.98 | 780 | 10 | 1.10E-03 | 98.7 | |
| 18 | 0 | 422.63 | 30 | 55 | 3.23 | 845.61 | 840 | 9 | 2.06E-03 | 49.5 | |
| 19 | 0 | 511.16 | 372 | 89 | 2.93 | 1022.71 | 1013 | 18 | 2.58E-02 | 7.9 | |
| 20 | 0 | 571.46 | 23 | 76 | 2.17 | 1143.32 | 1134 | 16 | 1.61E-03 | 86.5 | |
| 21 | 1 | 583.48 | 39 | 32 | 1.95 | 1167.35 | 1161 | 20 | 2.69E-03 | 34.4 | 5.11E-01 |
| 22 | 1 | 586.30 | 26 | 25 | 1.78 | 1173.00 | 1161 | 20 | 1.77E-03 | 47.1 | |
| 23 | 0 | 685.14 | 22 | 27 | 3.80 | 1370.72 | 1365 | 10 | 1.52E-03 | 49.5 | |
| 24 | 0 | 727.54 | 11 | 33 | 1.41 | 1455.52 | 1452 | 8 | 7.70E-04 | 93.7 | |
| 25 | 0 | 790.59 | 16 | 11 | 1.37 | 1581.62 | 1578 | 8 | 1.10E-03 | 47.0 | |
| 26 | 0 | 803.61 | 24 | 19 | 0.94 | 1607.67 | 1601 | 11 | 1.66E-03 | 41.1 | |
| 27 | 0 | 844.11 | 10 | 39 | 0.83 | 1688.68 | 1684 | 9 | 7.16E-04 | 112.8 | |
| 28 | 0 | 900.21 | 16 | 10 | 1.42 | 1800.88 | 1798 | 6 | 1.14E-03 | 39.2 | |
| 29 | 0 | 910.76 | 36 | 25 | 5.04 | 1821.98 | 1815 | 14 | 2.52E-03 | 33.4 | |
| 30 | 0 | 1008.26 | 44 | 46 | 14.86 | 2016.99 | 2001 | 32 | 3.04E-03 | 49.7 | |
| 31 | 0 | 1058.64 | 28 | 6 | 2.42 | 2117.76 | 2112 | 11 | 1.91E-03 | 25.2 | |
| 32 | 0 | 1103.11 | 14 | 15 | 1.54 | 2206.70 | 2199 | 12 | 9.77E-04 | 61.1 | |
| 33 | 0 | 1173.95 | 14 | 29 | 5.55 | 2348.38 | 2338 | 17 | 9.48E-04 | 95.4 | |
| 34 | 0 | 1196.51 | 8 | 21 | 0.72 | 2393.50 | 2384 | 14 | 5.56E-04 | 126.6 | |
| 35 | 0 | 1217.72 | 16 | 17 | 3.36 | 2435.92 | 2427 | 14 | 1.09E-03 | 62.0 | |
| 36 | 0 | 1377.29 | 14 | 3 | 1.49 | 2755.03 | 2751 | 9 | 1.00E-03 | 32.5 | |
| 37 | 0 | 1390.82 | 7 | 13 | 0.50 | 2782.08 | 2777 | 11 | 4.90E-04 | 107.9 | |
| 38 | 0 | 1452.40 | 23 | 3 | 4.37 | 2905.23 | 2899 | 13 | 1.57E-03 | 26.7 | |
| 39 | 0 | 1461.17 | 32 | 10 | 2.58 | 2922.77 | 2917 | 10 | 2.23E-03 | 25.5 | |
| 40 | 0 | 1466.26 | 10 | 2 | 0.86 | 2932.95 | 2929 | 8 | 7.09E-04 | 39.2 | |
| 41 | 0 | 1488.32 | 17 | 8 | 1.97 | 2977.06 | 2969 | 15 | 1.15E-03 | 43.8 | |
| 42 | 0 | 1517.44 | 26 | 5 | 6.92 | 3035.31 | 3025 | 20 | 1.82E-03 | 28.5 | |
| 43 | 0 | 1704.19 | 12 | 3 | 4.32 | 3408.74 | 3402 | 12 | 8.38E-04 | 40.6 | |
| 44 | 0 | 1803.49 | 8 | 4 | 0.61 | 3607.30 | 3602 | 9 | 5.61E-04 | 58.2 | |
| 45 | 0 | 1897.64 | 10 | 4 | 1.49 | 3795.56 | 3790 | 9 | 6.75E-04 | 50.6 | |

VAX/VMS Nuclide Identification Report Generated 14-FEB-2014 08:44:08.60

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 17 | 10.66* | 9.714E-01 | 7.171E-01 | 7.171E-01 | 118.42 |
| TL-208 | 277.37 | ------ | 6.60 | 3.716E+00 | ------ | Line Not Found | ------ |
| | 583.19 | 20 | 85.00* | 2.120E+00 | 4.775E-02 | 4.775E-02 | 154.16 |
| | 860.56 | ------ | 12.50 | 1.525E+00 | ------ | Line Not Found | ------ |
| PB-212 | 74.82 | 10 | 10.28 | 6.419E+00 | 6.718E-02 | 6.718E-02 | 456.54 |
| | 77.11 | ------ | 17.10 | 6.395E+00 | ------ | Line Not Found | ------ |
| | 238.63 | 13 | 43.60* | 4.084E+00 | 3.079E-02 | 3.079E-02 | 402.66 |
| | 300.09 | 103 | 3.30 | 3.535E+00 | 3.771E+00 | 3.771E+00 | 76.82 |
| TH-228 | 74.82 | 10 | 10.28 | 6.419E+00 | 6.718E-02 | 6.718E-02 | 456.54 |
| | 77.11 | ------ | 17.10 | 6.395E+00 | ------ | Line Not Found | ------ |
| | 238.63 | 13 | 43.60* | 4.084E+00 | 3.079E-02 | 3.079E-02 | 402.66 |
| | 300.09 | 103 | 3.30 | 3.535E+00 | 3.771E+00 | 3.771E+00 | 76.82 |
| U-235 | 89.96 | ------ | 3.47 | 6.204E+00 | ------ | Line Not Found | ------ |
| | 93.35 | 37 | 5.60 | 6.152E+00 | 4.620E-01 | 4.620E-01 | 199.99 |
| | 143.76 | ------ | 10.96* | 5.320E+00 | ------ | Line Not Found | ------ |
| | 163.33 | 27 | 5.08 | 5.014E+00 | 4.541E-01 | 4.541E-01 | 142.65 |
| | 185.72 | 23 | 57.20 | 4.702E+00 | 3.737E-02 | 3.737E-02 | 232.67 |
| | 205.31 | ------ | 5.01 | 4.464E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 6.545E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 10 | 67.20* | 6.419E+00 | 1.028E-02 | 1.028E-02 | 456.54 |
| ANH-511 | 511.00 | 36 | 100.00* | 2.363E+00 | 6.443E-02 | 6.443E-02 | 185.25 |

Flag: "*" = Keyline

Sample ID : G341147023 Acquisition date : 12-FEB-2014 14:30:33

Total number of lines in spectrum 43
Number of unidentified lines 22
Number of lines tentatively identified by NID 21 48.84%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 7.171E-01 | 7.171E-01 | 8.492E-01 | 118.42 | |
| TL-208 | 1.41E+10Y | 1.00 | 4.775E-02 | 4.775E-02 | 7.361E-02 | 154.16 | |
| PB-212 | 1.41E+10Y | 1.00 | 3.079E-02 | 3.079E-02 | 12.40E-02 | 402.66 | |
| TH-228 | 1.41E+10Y | 1.00 | 3.079E-02 | 3.079E-02 | 12.40E-02 | 402.66 | |
| U-235 | 7.04E+08Y | 1.00 | 3.737E-02 | 3.737E-02 | 8.695E-02 | 232.67 | K |
| AM-243 | 7370.00Y | 1.00 | 1.028E-02 | 1.028E-02 | 4.692E-02 | 456.54 | |
| ANH-511 | 1.00E+09Y | 1.00 | 6.443E-02 | 6.443E-02 | 11.94E-02 | 185.25 | |
| Total Activity : | | | 9.385E-01 | 9.385E-01 | | | |
| Grand Total Activity : | | | 9.385E-01 | 9.385E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147023 Acquisition date : 12-FEB-2014 14:30:33

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 25.91 | 53 | 224 | 1.30 | 51.98 | 50 | 7 | 3.71E-03 | 96.4 | 5.94E+00 | |
| 0 | 85.70 | 48 | 269 | 5.04 | 171.58 | 165 | 13 | 3.32E-03 | **** | 6.27E+00 | T |
| 0 | 113.24 | 40 | 116 | 1.42 | 226.67 | 224 | 7 | 2.76E-03 | 96.0 | 5.82E+00 | T |
| 0 | 155.72 | 11 | 157 | 0.53 | 311.66 | 309 | 8 | 7.39E-04 | **** | 5.14E+00 | T |
| 1 | 242.51 | 35 | 117 | 1.61 | 485.29 | 473 | 17 | 2.43E-03 | **** | 4.05E+00 | T |
| 0 | 345.80 | 37 | 71 | 3.19 | 691.92 | 686 | 10 | 2.60E-03 | 89.9 | 3.19E+00 | T |
| 0 | 353.01 | 23 | 99 | 1.75 | 706.34 | 700 | 13 | 1.63E-03 | **** | 3.14E+00 | T |
| 0 | 362.88 | 18 | 86 | 1.18 | 726.09 | 721 | 9 | 1.22E-03 | **** | 3.08E+00 | |
| 0 | 393.82 | 16 | 64 | 2.90 | 787.98 | 780 | 10 | 1.10E-03 | **** | 2.90E+00 | |
| 0 | 422.63 | 30 | 55 | 3.23 | 845.61 | 840 | 9 | 2.06E-03 | 99.1 | 2.75E+00 | |
| 0 | 571.46 | 11 | 76 | 2.17 | 1143.32 | 1134 | 16 | 7.57E-04 | **** | 2.16E+00 | |
| 1 | 586.30 | 26 | 25 | 1.78 | 1173.00 | 1161 | 20 | 1.77E-03 | 94.1 | 2.11E+00 | |
| 0 | 685.14 | 22 | 27 | 3.80 | 1370.72 | 1365 | 10 | 1.52E-03 | 99.0 | 1.85E+00 | T |
| 0 | 727.54 | 11 | 33 | 1.41 | 1455.52 | 1452 | 8 | 7.70E-04 | **** | 1.76E+00 | T |
| 0 | 790.59 | 16 | 11 | 1.37 | 1581.62 | 1578 | 8 | 1.10E-03 | 94.0 | 1.64E+00 | T |
| 0 | 803.61 | 16 | 19 | 0.94 | 1607.67 | 1601 | 11 | 1.13E-03 | **** | 1.62E+00 | |
| 0 | 844.11 | 10 | 39 | 0.83 | 1688.68 | 1684 | 9 | 7.16E-04 | **** | 1.55E+00 | |
| 0 | 900.21 | 16 | 10 | 1.42 | 1800.88 | 1798 | 6 | 1.14E-03 | 78.4 | 1.47E+00 | |
| 0 | 910.76 | 20 | 25 | 5.04 | 1821.98 | 1815 | 14 | 1.41E-03 | **** | 1.45E+00 | T |
| 0 | 1008.26 | 44 | 46 | 14.86 | 2016.99 | 2001 | 32 | 3.04E-03 | 99.4 | 1.33E+00 | |
| 0 | 1058.64 | 28 | 6 | 2.42 | 2117.76 | 2112 | 11 | 1.91E-03 | 50.5 | 1.28E+00 | |
| 0 | 1103.11 | 14 | 15 | 1.54 | 2206.70 | 2199 | 12 | 9.77E-04 | **** | 1.23E+00 | |
| 0 | 1173.95 | 14 | 29 | 5.55 | 2348.38 | 2338 | 17 | 9.48E-04 | **** | 1.17E+00 | T |
| 0 | 1196.51 | 8 | 21 | 0.72 | 2393.50 | 2384 | 14 | 5.56E-04 | **** | 1.15E+00 | |
| 0 | 1217.72 | 16 | 17 | 3.36 | 2435.92 | 2427 | 14 | 1.09E-03 | **** | 1.13E+00 | |
| 0 | 1377.29 | 14 | 3 | 1.49 | 2755.03 | 2751 | 9 | 1.00E-03 | 65.1 | 1.02E+00 | |
| 0 | 1390.82 | 7 | 13 | 0.50 | 2782.08 | 2777 | 11 | 4.90E-04 | **** | 1.01E+00 | |
| 0 | 1452.40 | 23 | 3 | 4.37 | 2905.23 | 2899 | 13 | 1.57E-03 | 53.4 | 9.76E-01 | |
| 0 | 1466.26 | 10 | 2 | 0.86 | 2932.95 | 2929 | 8 | 7.09E-04 | 78.4 | 9.69E-01 | |
| 0 | 1488.32 | 17 | 8 | 1.97 | 2977.06 | 2969 | 15 | 1.15E-03 | 87.5 | 9.57E-01 | T |
| 0 | 1517.44 | 26 | 5 | 6.92 | 3035.31 | 3025 | 20 | 1.82E-03 | 57.0 | 9.42E-01 | |
| 0 | 1704.19 | 12 | 3 | 4.32 | 3408.74 | 3402 | 12 | 8.38E-04 | 81.2 | 8.58E-01 | |
| 0 | 1803.49 | 8 | 4 | 0.61 | 3607.30 | 3602 | 9 | 5.61E-04 | **** | 8.20E-01 | |
| 0 | 1897.64 | 10 | 4 | 1.49 | 3795.56 | 3790 | 9 | 6.75E-04 | **** | 7.89E-01 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 14-FEB-2014 08:44:22.74

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147023.CNF;3    *
* Acquisition date : 12-FEB-2014 14:30:33 Sensitivity     : 3.000            *
* Detector ID      : GAM05                Energy tolerance: 1.500            *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 04:00:01.73     Half life ratio : *****            *
* Sample date      :  7-NOV-2013 15:45:00 Nuclide Library : SOLID            *
* Sample ID        : G341147023           Analyst initials: RXF2             *
* Batch Number     : 1361908              Sample Quantity : 4.3788E+01 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 18-SEP-2013 10:39:19 Eff. Geometry   : JAR              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_JAR.CNF;8              *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 4.362E-01 |
| TL-208 | 3.376E-02 |
| PB-212 | 6.417E-02 |
| TH-228 | 6.417E-02 |
| U-235 | 2.195E-01 |
| AM-243 | 3.509E-02 |
| ANH-511 | 3.428E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 9.678E-01 | NOT IDENT. |
| NA-22 | 4.723E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.615E-02 | NOT IDENT. |
| SC-46 | 9.103E-02 | NOT IDENT. |
| V-48 | 2.409E+00 | NOT IDENT. |
| CR-51 | 3.249E+00 | NOT IDENT. |
| MN-54 | 5.147E-02 | NOT IDENT. |
| CO-56 | 1.150E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 3.350E-02 | NOT IDENT. |
| CO-58 | 1.076E-01 | NOT IDENT. |
| FE-59 | 3.104E-01 | NOT IDENT. |
| CO-60 | 4.560E-02 | FAIL ABUN |
| ZN-65 | 1.121E-01 | NOT IDENT. |
| GE-68 | 1.581E+00 | NOT IDENT. |
| AS-73 | 4.449E-01 | NOT IDENT. |
| AS-74 | 3.160E+00 | NOT IDENT. |
| SE-75 | 8.449E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 3.219E+00 | NOT IDENT. |
| RB-83 | 1.527E-01 | NOT IDENT. |
| KR-85 | 1.508E+01 | NOT IDENT. |
| SR-85 | 1.889E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RB-86 | 1.686E+01 | NOT IDENT. |
| Y-88 | 8.089E-02 | NOT IDENT. |
| Y-91 | 6.438E+01 | NOT IDENT. |
| NB-94 | 4.737E-02 | NOT IDENT. |
| NB-95 | 1.339E-01 | NOT IDENT. |
| NB-95M | 3.305E-01 | NOT IDENT. |
| ZR-95 | 2.166E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.466E-02 | NOT IDENT. |
| RH-102 | 6.877E-02 | NOT IDENT. |
| RU-103 | 2.025E-01 | NOT IDENT. |
| RH-106 | 4.629E-01 | NOT IDENT. |
| RU-106 | 4.629E-01 | NOT IDENT. |
| AG-108M | 3.254E-02 | NOT IDENT. |
| CD-109 | 6.737E-01 | NOT IDENT. |
| AG-110M | 7.809E-02 | NOT IDENT. |
| SN-113 | 8.605E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 4.180E+00 | FAIL ABUN |
| TE-123M | 5.361E-02 | NOT IDENT. |
| SB-124 | 3.393E-01 | NOT IDENT. |
| SB-125 | 1.129E-01 | NOT IDENT. |
| TE-125M | 2.667E+01 | NOT IDENT. |
| I-126 | 2.048E+01 | NOT IDENT. |
| SB-126 | 1.624E+01 | NOT IDENT. |
| SN-126 | 5.752E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 5.068E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 5.320E-02 | NOT IDENT. |
| CS-135 | 1.743E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 7.215E+00 | NOT IDENT. |
| BA-137M | 4.255E-02 | NOT IDENT. |
| CS-137 | 4.495E-02 | NOT IDENT. |
| CE-139 | 5.143E-02 | NOT IDENT. |
| BA-140 | 8.577E+00 | NOT IDENT. |
| LA-140 | 8.577E+00 | NOT IDENT. |
| CE-141 | 3.903E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.779E-01 | NOT IDENT. |
| PM-144 | 6.040E-02 | NOT IDENT. |
| PR-144 | 4.717E+00 | FAIL ABUN |
| PM-146 | 4.725E-02 | NOT IDENT. |
| ND-147 | 1.160E+02 | NOT IDENT. |
| PM-147 | 8.303E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.998E-02 | FAIL ABUN |
| EU-152 | 1.172E-01 | NOT IDENT. |
| GD-153 | 9.759E-02 | NOT IDENT. |
| EU-154 | 1.295E-01 | NOT IDENT. |
| EU-155 | 1.070E-01 | FAIL ABUN |
| TB-160 | 3.459E-01 | FAIL ABUN |
| HO-166M | 6.792E-02 | NOT IDENT. |
| TM-171 | 4.359E+00 | NOT IDENT. |
| LU-176 | 3.063E-02 | NOT IDENT. |
| HF-181 | 1.858E-01 | FAIL ABUN |
| TA-182 | 3.494E-01 | NOT IDENT. |
| RE-183 | 1.378E-01 | NOT IDENT. |
| RE-184 | 7.805E-01 | FAIL ABUN |
| W-188 | 1.837E+01 | NOT IDENT. |
| IR-192 | 8.838E-02 | NOT IDENT. |
| HG-203 | 1.532E-01 | NOT IDENT. |
| BI-207 | 5.298E-02 | FAIL ABUN |
| PB-210 | 6.556E-01 | NOT IDENT. |
| BI-211 | 2.812E-01 | NOT IDENT. |
| PB-211 | 8.776E-01 | NOT IDENT. |
| BI-212 | 6.631E-01 | FAIL ABUN |
| BI-214 | 1.002E-01 | NOT IDENT. |
| PB-214 | 1.048E-01 | FAIL ABUN |
| RN-219 | 4.773E-01 | NOT IDENT. |
| RN-222 | 1.002E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-223 | 7.217E-01 | FAIL ABUN |
| RA-224 | 8.464E-01 | NOT IDENT. |
| RA-226 | 1.002E-01 | NOT IDENT. |
| AC-227 | 2.828E-01 | FAIL ABUN |
| TH-227 | 2.828E-01 | FAIL ABUN |
| AC-228 | 2.004E-01 | FAIL ABUN |
| RA-228 | 2.004E-01 | FAIL ABUN |
| TH-229 | 5.974E-01 | FAIL ABUN |
| TH-230 | 1.001E-01 | NOT IDENT. |
| PA-231 | 1.726E+00 | NOT IDENT. |
| TH-231 | 7.217E-01 | NOT IDENT. |
| TH-232 | 2.004E-01 | FAIL ABUN |
| PA-233 | 7.639E-02 | FAIL ABUN |
| PA-234 | 3.413E-01 | FAIL ABUN |
| PA-234M | 5.771E+00 | NOT IDENT. |
| TH-234 | 7.144E-01 | FAIL ABUN |
| U-234 | 1.001E-01 | NOT IDENT. |
| NP-237 | 7.639E-02 | FAIL ABUN |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 7.144E-01 | FAIL ABUN |
| NP-239 | 4.075E-01 | NOT IDENT. |
| PU-239 | 3.743E+02 | NOT IDENT. |
| AM-241 | 5.099E-02 | NOT IDENT. |
| CM-243 | 9.686E-02 | NOT IDENT. |
| CM-247 | 4.487E-02 | NOT IDENT. |
| CF-249 | 4.651E-02 | NOT IDENT. |
| CF-251 | 1.475E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 14-FEB-2014 08:44:29.03

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147023.CNF;3    *
* Acquisition date : 12-FEB-2014 14:30:33 Sensitivity     : 3.000          *
* Detector ID      : GAM05                Energy tolerance: 1.500          *
* Elapsed live time:    0 04:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 04:00:01.73     Half life ratio : *****          *
* Sample date      :  7-NOV-2013 15:45:00 Nuclide Library : SOLID          *
* Sample ID        : G341147023           Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 4.3788E+01 GRAM*
*                                         Quantity Err(%) : 1.1419E-03 %   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 18-SEP-2013 10:39:19 Eff. Geometry   : JAR          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_JAR.CNF;8          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 7.171E-01 | 8.346E-01 | 8.346E-01 |
| TL-208 | 4.775E-02 | 7.226E-02 | 7.226E-02 |
| PB-212 | 3.079E-02 | 1.216E-01 | 1.216E-01 |
| TH-228 | 3.079E-02 | 1.216E-01 | 1.216E-01 |
| U-235 | -3.672E-01 | 3.138E-01 | 3.138E-01 |
| AM-243 | 1.028E-02 | 4.600E-02 | 4.600E-02 |
| ANH-511 | 6.443E-02 | 1.171E-01 | 1.171E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -6.924E-01 | 1.225E+00 | 1.264E+00 | NOT IDENT. |
| NA-22 | -5.714E-03 | 5.618E-02 | 5.624E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 5.586E+42 | 0.000E+00 | SHORT HLIF |
| AL-26 | -1.137E-02 | 6.851E-02 | 6.870E-02 | NOT IDENT. |
| SC-46 | 2.005E-02 | 1.059E-01 | 1.063E-01 | NOT IDENT. |
| V-48 | -3.836E+00 | 3.453E+00 | 3.861E+00 | NOT IDENT. |
| CR-51 | -6.554E-01 | 3.849E+00 | 3.860E+00 | NOT IDENT. |
| MN-54 | -8.052E-03 | 6.175E-02 | 6.185E-02 | NOT IDENT. |
| CO-56 | -8.244E-03 | 1.596E-01 | 1.596E-01 | NOT IDENT. |
| MN-56 | -1.000E+41 | 2.502E+42 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.638E-02 | 3.888E-02 | 3.957E-02 | NOT IDENT. |
| CO-58 | 5.111E-02 | 1.273E-01 | 1.293E-01 | NOT IDENT. |
| FE-59 | -4.166E-01 | 6.349E-01 | 6.621E-01 | NOT IDENT. |
| CO-60 | -1.390E-02 | 5.564E-02 | 5.599E-02 | FAIL ABUN |
| ZN-65 | 1.291E-02 | 1.337E-01 | 1.338E-01 | NOT IDENT. |
| GE-68 | 2.834E-01 | 1.864E+00 | 1.868E+00 | NOT IDENT. |
| AS-73 | 2.815E-01 | 5.750E-01 | 5.889E-01 | NOT IDENT. |
| AS-74 | 3.638E+00 | 3.541E+00 | 3.902E+00 | NOT IDENT. |
| SE-75 | -2.115E-02 | 1.051E-01 | 1.055E-01 | NOT IDENT. |
| BR-77 | 1.133E+11 | 5.486E+11 | 5.510E+11 | SHORT HLIF |
| SR-82 | -8.893E-01 | 3.895E+00 | 3.915E+00 | NOT IDENT. |
| RB-83 | -7.218E-02 | 1.907E-01 | 1.935E-01 | NOT IDENT. |
| KR-85 | 7.630E+01 | 1.648E+01 | 3.814E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| SR-85 | 9.547E-01 | 2.064E-01 | 4.773E-01 | NOT IDENT. |
| RB-86 | 1.105E+00 | 2.015E+01 | 2.015E+01 | NOT IDENT. |
| Y-88 | 4.646E-03 | 9.658E-02 | 9.661E-02 | NOT IDENT. |
| Y-91 | 1.588E+01 | 7.625E+01 | 7.658E+01 | NOT IDENT. |
| NB-94 | -1.205E-02 | 5.636E-02 | 5.662E-02 | NOT IDENT. |
| NB-95 | 1.918E-01 | 1.421E-01 | 1.663E-01 | NOT IDENT. |
| NB-95M | 3.811E-01 | 4.308E-01 | 4.638E-01 | NOT IDENT. |
| ZR-95 | 9.057E-02 | 2.462E-01 | 2.495E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.317E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 3.954E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | -1.001E+10 | 1.631E+10 | 1.693E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.611E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.478E-02 | 4.206E-02 | 4.259E-02 | NOT IDENT. |
| RH-102 | -2.610E-02 | 8.632E-02 | 8.712E-02 | NOT IDENT. |
| RU-103 | 2.859E-03 | 2.425E-01 | 2.425E-01 | NOT IDENT. |
| RH-106 | -2.702E-01 | 5.884E-01 | 6.009E-01 | NOT IDENT. |
| RU-106 | -2.702E-01 | 5.884E-01 | 6.009E-01 | NOT IDENT. |
| AG-108M | -4.456E-02 | 4.259E-02 | 4.709E-02 | NOT IDENT. |
| CD-109 | -2.169E-02 | 1.224E+00 | 1.224E+00 | NOT IDENT. |
| AG-110M | 4.318E-02 | 8.831E-02 | 9.043E-02 | NOT IDENT. |
| SN-113 | 3.612E-02 | 9.911E-02 | 1.004E-01 | NOT IDENT. |
| CD-115 | 1.490E+12 | 1.884E+12 | 2.000E+12 | SHORT HLIF |
| SN-117M | -2.079E+00 | 5.872E+00 | 5.947E+00 | FAIL ABUN |
| TE-123M | -3.334E-02 | 8.172E-02 | 8.309E-02 | NOT IDENT. |
| SB-124 | 2.753E-01 | 3.625E-01 | 3.831E-01 | NOT IDENT. |
| SB-125 | 9.209E-03 | 1.469E-01 | 1.470E-01 | NOT IDENT. |
| TE-125M | 3.634E+00 | 3.555E+01 | 3.559E+01 | NOT IDENT. |
| I-126 | -1.886E+00 | 2.407E+01 | 2.408E+01 | NOT IDENT. |
| SB-126 | -6.914E+00 | 2.072E+01 | 2.096E+01 | NOT IDENT. |
| SN-126 | -6.449E-02 | 1.123E-01 | 1.160E-01 | FAIL ABUN |
| SB-127 | 5.324E+06 | 5.700E+06 | 6.185E+06 | SHORT HLIF |
| I-131 | 2.010E+02 | 2.137E+02 | 2.321E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 7.440E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -1.175E+07 | 4.841E+07 | 4.870E+07 | SHORT HLIF |
| BA-133 | 2.364E-02 | 7.536E-02 | 7.611E-02 | NOT IDENT. |
| I-133 | 4.366E+31 | 2.347E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.804E-02 | 7.709E-02 | 8.474E-02 | NOT IDENT. |
| CS-135 | 1.303E-02 | 2.130E-01 | 2.131E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 1.877E+42 | 0.000E+00 | SHORT HLIF |
| CS-136 | -1.395E+01 | 1.100E+01 | 1.267E+01 | NOT IDENT. |
| BA-137M | 1.155E-02 | 5.075E-02 | 5.102E-02 | NOT IDENT. |
| CS-137 | 1.221E-02 | 5.361E-02 | 5.389E-02 | NOT IDENT. |
| CE-139 | 6.034E-02 | 6.693E-02 | 7.224E-02 | NOT IDENT. |
| BA-140 | 4.237E+00 | 9.429E+00 | 9.620E+00 | NOT IDENT. |
| LA-140 | 4.237E+00 | 9.429E+00 | 9.620E+00 | NOT IDENT. |
| CE-141 | -4.266E-01 | 5.458E-01 | 5.787E-01 | NOT IDENT. |
| CE-143 | 5.268E+19 | 1.452E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 8.501E-02 | 3.262E-01 | 3.284E-01 | NOT IDENT. |
| PM-144 | 2.959E-02 | 6.856E-02 | 6.984E-02 | NOT IDENT. |
| PR-144 | 2.302E+00 | 5.355E+00 | 5.454E+00 | FAIL ABUN |
| PM-146 | -3.500E-02 | 5.953E-02 | 6.159E-02 | NOT IDENT. |
| ND-147 | -4.068E+01 | 1.435E+02 | 1.446E+02 | NOT IDENT. |
| PM-147 | 1.924E+02 | 9.734E+02 | 9.773E+02 | NOT IDENT. |
| PM-149 | 2.165E+12 | 1.758E+13 | 1.761E+13 | SHORT HLIF |
| EU-150 | -1.281E-02 | 3.608E-02 | 3.654E-02 | FAIL ABUN |
| EU-152 | -5.702E-02 | 1.640E-01 | 1.660E-01 | NOT IDENT. |
| GD-153 | 6.587E-02 | 1.258E-01 | 1.292E-01 | NOT IDENT. |
| EU-154 | -1.093E-02 | 1.533E-01 | 1.534E-01 | NOT IDENT. |
| EU-155 | 5.373E-02 | 1.236E-01 | 1.259E-01 | FAIL ABUN |
| TB-160 | 5.981E-02 | 4.042E-01 | 4.051E-01 | FAIL ABUN |
| HO-166M | -7.481E-02 | 8.702E-02 | 9.332E-02 | NOT IDENT. |
| TM-171 | 1.761E+00 | 4.944E+00 | 5.008E+00 | NOT IDENT. |
| LU-176 | 1.390E-02 | 3.981E-02 | 4.030E-02 | NOT IDENT. |
| HF-181 | 7.271E-02 | 2.157E-01 | 2.182E-01 | FAIL ABUN |
| TA-182 | 4.607E-02 | 4.889E-01 | 4.893E-01 | NOT IDENT. |
| RE-183 | -6.125E-02 | 1.629E-01 | 1.653E-01 | NOT IDENT. |
| RE-184 | 9.616E-01 | 1.381E+00 | 1.448E+00 | FAIL ABUN |
| W-188 | 1.311E+00 | 2.445E+01 | 2.445E+01 | NOT IDENT. |
| IR-192 | -1.716E-02 | 1.045E-01 | 1.048E-01 | NOT IDENT. |
| HG-203 | 9.492E-02 | 1.730E-01 | 1.782E-01 | NOT IDENT. |
| BI-207 | 2.484E-02 | 6.921E-02 | 7.011E-02 | FAIL ABUN |
| PB-210 | -4.511E-01 | 7.823E-01 | 8.083E-01 | NOT IDENT. |
| BI-211 | -3.922E-01 | 5.179E-01 | 5.472E-01 | NOT IDENT. |
| PB-211 | 5.534E-01 | 1.000E+00 | 1.031E+00 | NOT IDENT. |
| BI-212 | 4.048E-01 | 7.446E-01 | 7.666E-01 | FAIL ABUN |
| BI-214 | 7.586E-02 | 1.303E-01 | 1.347E-01 | NOT IDENT. |
| PB-214 | 8.966E-02 | 1.864E-01 | 1.908E-01 | FAIL ABUN |
| RN-219 | -5.959E-02 | 5.699E-01 | 5.706E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RN-222 | 7.586E-02 | 1.303E-01 | 1.347E-01 | NOT IDENT. |
| RA-223 | 2.930E-02 | 8.432E-01 | 8.433E-01 | FAIL ABUN |
| RA-224 | -4.335E-01 | 1.120E+00 | 1.137E+00 | NOT IDENT. |
| RA-226 | 7.586E-02 | 1.303E-01 | 1.347E-01 | NOT IDENT. |
| AC-227 | -2.580E-01 | 3.672E-01 | 3.852E-01 | FAIL ABUN |
| TH-227 | -2.580E-01 | 3.672E-01 | 3.852E-01 | FAIL ABUN |
| AC-228 | 2.321E-01 | 2.902E-01 | 3.085E-01 | FAIL ABUN |
| RA-228 | 2.321E-01 | 2.902E-01 | 3.085E-01 | FAIL ABUN |
| TH-229 | -2.080E-01 | 7.341E-01 | 7.401E-01 | FAIL ABUN |
| TH-230 | 7.585E-02 | 1.303E-01 | 1.347E-01 | NOT IDENT. |
| PA-231 | 2.466E-01 | 1.994E+00 | 1.997E+00 | NOT IDENT. |
| TH-231 | 2.930E-02 | 8.432E-01 | 8.433E-01 | NOT IDENT. |
| TH-232 | 2.321E-01 | 2.902E-01 | 3.085E-01 | FAIL ABUN |
| PA-233 | -1.557E-02 | 9.032E-02 | 9.060E-02 | FAIL ABUN |
| PA-234 | -7.435E-02 | 4.249E-01 | 4.262E-01 | FAIL ABUN |
| PA-234M | 6.785E+00 | 7.002E+00 | 7.641E+00 | NOT IDENT. |
| TH-234 | -2.601E-01 | 8.143E-01 | 8.227E-01 | FAIL ABUN |
| U-234 | 7.585E-02 | 1.303E-01 | 1.347E-01 | NOT IDENT. |
| NP-237 | -1.557E-02 | 9.032E-02 | 9.060E-02 | FAIL ABUN |
| NP-238 | -2.126E+13 | 1.463E+13 | 1.749E+13 | SHORT HLIF |
| U-238 | -2.601E-01 | 8.143E-01 | 8.227E-01 | FAIL ABUN |
| NP-239 | 5.089E-02 | 5.449E-01 | 5.454E-01 | NOT IDENT. |
| PU-239 | 2.574E+02 | 4.324E+02 | 4.477E+02 | NOT IDENT. |
| AM-241 | -1.124E-01 | 6.996E-02 | 8.637E-02 | NOT IDENT. |
| CM-243 | -6.983E-02 | 1.183E-01 | 1.224E-01 | NOT IDENT. |
| CM-247 | 8.249E-04 | 5.309E-02 | 5.310E-02 | NOT IDENT. |
| CF-249 | 4.762E-03 | 6.285E-02 | 6.289E-02 | NOT IDENT. |
| CF-251 | 6.714E-02 | 1.739E-01 | 1.765E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 310.0102 | 94.67 | 150.7861 | 193.51 | 158.2718 |
| 45.60 | 142.5409 | 94.87 | 173.4553 | 197.03 | 153.4884 |
| 46.54 | 145.1537 | 97.43 | 149.8801 | 198.01 | 155.7445 |
| 49.72 | 0.0000 | 98.43 | 128.8701 | 201.83 | 173.2895 |
| 51.35 | 165.3413 | 98.44 | 128.8717 | 205.31 | 157.8293 |
| 52.39 | 140.0366 | 99.53 | 141.0041 | 210.85 | 133.9493 |
| 53.44 | 131.5762 | 100.11 | 157.6748 | 215.65 | 147.4157 |
| 57.36 | 0.0000 | 103.18 | 176.4813 | 222.11 | 121.1738 |
| 57.53 | 167.1859 | 103.37 | 166.0316 | 227.09 | 115.1571 |
| 57.98 | 154.9408 | 105.21 | 140.6253 | 227.38 | 113.0113 |
| 59.32 | 155.3537 | 105.31 | 153.0823 | 228.16 | 0.0000 |
| 59.54 | 191.8341 | 106.12 | 162.8309 | 228.18 | 123.9595 |
| 63.29 | 161.0230 | 109.28 | 169.3002 | 117.23 | 123.9595 |
| 63.58 | 156.6359 | 111.00 | 146.5496 | 235.69 | 108.5265 |
| 64.28 | 157.7390 | 111.76 | 0.0000 | 235.96 | 106.7991 |
| 66.73 | 315.1140 | 116.30 | 0.0000 | 238.63 | 131.5906 |
| 67.24 | 312.7043 | 117.23 | 149.2998 | 238.98 | 0.0000 |
| 67.75 | 269.6981 | 121.12 | 155.3129 | 240.99 | 131.8369 |
| 69.67 | 156.5872 | 121.22 | 151.4245 | 242.00 | 131.9421 |
| 70.83 | 156.0023 | 121.78 | 147.6199 | 244.70 | 142.8001 |
| 72.81 | 208.2403 | 122.06 | 147.6718 | 252.40 | 0.0000 |
| 72.87 | 208.2621 | 123.07 | 138.0659 | 252.80 | 110.8772 |
| 74.66 | 231.0001 | 127.23 | 168.2978 | 254.15 | 0.0000 |
| 74.82 | 231.0638 | 129.30 | 151.9459 | 256.23 | 133.4010 |
| 74.97 | 224.7280 | 131.20 | 178.9935 | 260.90 | 0.0000 |
| 77.11 | 198.0365 | 133.02 | 168.4773 | 264.66 | 125.2959 |
| 79.69 | 243.0819 | 133.52 | 169.5688 | 268.22 | 111.0442 |
| 80.12 | 252.4673 | 136.00 | 179.0112 | 269.46 | 125.7402 |
| 80.19 | 0.0000 | 136.47 | 200.0063 | 271.23 | 116.9095 |
| 80.57 | 275.8889 | 140.51 | 0.0000 | 273.65 | 110.8081 |
| 81.00 | 276.0829 | 143.76 | 187.6277 | 276.40 | 123.6662 |
| 81.07 | 265.7780 | 144.24 | 190.7407 | 277.37 | 124.6548 |
| 83.79 | 203.1721 | 145.44 | 164.8596 | 277.60 | 124.6767 |
| 85.43 | 198.6011 | 152.43 | 155.5910 | 278.00 | 125.6158 |
| 86.55 | 198.9492 | 153.25 | 155.7281 | 279.20 | 104.0152 |
| 86.79 | 199.0226 | 323.87 | 151.0172 | 279.54 | 100.4217 |
| 86.94 | 171.3917 | 156.02 | 161.6809 | 280.46 | 107.7304 |
| 87.09 | 171.4317 | 158.56 | 187.6050 | 283.69 | 112.5143 |
| 87.57 | 179.0178 | 159.00 | 189.7307 | 284.31 | 0.0000 |
| 88.03 | 149.2877 | 162.33 | 193.2567 | 285.41 | 114.4674 |
| 88.34 | 179.2302 | 163.33 | 190.1766 | 285.90 | 0.0000 |
| 88.47 | 179.2661 | 165.86 | 124.9222 | 287.50 | 110.0861 |
| 89.96 | 179.6748 | 176.31 | 156.7521 | 290.67 | 101.8195 |
| 91.11 | 179.9875 | 176.60 | 150.5656 | 293.27 | 0.0000 |
| 92.59 | 164.2814 | 177.52 | 139.2681 | 351.93 | 109.7622 |
| 93.35 | 164.4669 | 181.07 | 0.0000 | 295.96 | 108.9027 |
| 94.56 | 150.7617 | 184.41 | 130.5681 | 879.38 | 109.0974 |
| 94.65 | 150.7819 | 143.76 | 140.7872 | 299.98 | 109.2005 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 109.2092 | 487.02 | 44.8841 | 702.65 | 79.0390 |
| 300.13 | 109.2121 | 492.35 | 0.0000 | 706.68 | 57.7365 |
| 301.36 | 109.3036 | 497.08 | 64.5735 | 711.68 | 60.6400 |
| 302.85 | 109.4126 | 505.52 | 60.0274 | 720.70 | 51.6646 |
| 256.23 | 108.9210 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 89.1134 | 511.00 | 66.0270 | 722.78 | 51.3817 |
| 308.46 | 110.7480 | 514.00 | 51.6550 | 722.91 | 46.5667 |
| 311.90 | 107.3014 | 514.00 | 51.6550 | 723.31 | 46.5738 |
| 316.51 | 104.8423 | 520.40 | 62.1680 | 724.19 | 41.7685 |
| 319.41 | 100.3931 | 520.69 | 0.0000 | 727.33 | 49.7231 |
| 320.08 | 96.7167 | 522.65 | 0.0000 | 733.00 | 49.9566 |
| 321.04 | 95.8471 | 527.90 | 0.0000 | 735.93 | 41.4049 |
| 323.87 | 92.2928 | 529.59 | 56.1845 | 333.97 | 49.9010 |
| 325.23 | 96.1048 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 92.5817 | 531.02 | 64.5505 | 747.24 | 53.8515 |
| 333.37 | 100.3556 | 546.56 | 0.0000 | 748.06 | 50.0865 |
| 333.97 | 97.5787 | 552.55 | 59.9126 | 752.31 | 49.2134 |
| 334.37 | 92.9104 | 563.25 | 58.0790 | 753.82 | 48.2929 |
| 338.28 | 85.8476 | 569.33 | 52.9370 | 756.73 | 42.6535 |
| 338.32 | 85.8487 | 946.00 | 52.9407 | 756.80 | 42.6553 |
| 311.90 | 106.7688 | 569.70 | 52.9456 | 884.68 | 43.7099 |
| 340.48 | 106.7688 | 583.19 | 37.2738 | 765.81 | 36.1314 |
| 340.55 | 106.7729 | 584.27 | 37.2909 | 766.42 | 43.7474 |
| 344.28 | 108.5944 | 595.83 | 54.5996 | 766.84 | 40.8995 |
| 345.93 | 97.6760 | 427.87 | 82.5964 | 772.60 | 0.0000 |
| 351.06 | 120.1076 | 602.52 | 0.0000 | 776.52 | 36.2628 |
| 351.93 | 106.7308 | 602.73 | 71.9334 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 81.6629 | 778.90 | 35.3371 |
| 356.01 | 83.2169 | 609.32 | 67.8204 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 58.1555 | 785.37 | 44.3016 |
| 366.42 | 0.0000 | 614.28 | 81.9802 | 792.07 | 34.5344 |
| 375.05 | 90.4096 | 618.01 | 59.4164 | 794.95 | 39.1764 |
| 356.01 | 80.2340 | 620.36 | 62.7168 | 795.86 | 23.0518 |
| 388.16 | 79.1375 | 621.93 | 70.3304 | 810.29 | 32.1689 |
| 388.63 | 87.2369 | 630.19 | 0.0000 | 344.28 | 34.7439 |
| 391.69 | 73.7929 | 631.29 | 59.7319 | 810.76 | 37.0641 |
| 264.66 | 89.7752 | 633.25 | 52.1695 | 815.77 | 37.7051 |
| 401.81 | 83.9739 | 634.78 | 52.2012 | 1048.07 | 37.7384 |
| 402.40 | 84.9779 | 635.95 | 42.4334 | 832.01 | 43.7347 |
| 404.85 | 75.3119 | 636.99 | 0.0000 | 834.85 | 44.7469 |
| 410.95 | 64.7681 | 645.85 | 46.9662 | 835.71 | 47.7666 |
| 413.71 | 72.7272 | 657.76 | 52.6688 | 836.80 | 0.0000 |
| 414.70 | 79.7586 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 70.9388 | 661.66 | 48.3517 | 846.77 | 56.9137 |
| 427.87 | 72.1465 | 664.57 | 0.0000 | 856.80 | 38.2026 |
| 433.94 | 88.4122 | 666.33 | 51.3743 | 860.56 | 47.0732 |
| 439.40 | 60.7692 | 666.50 | 51.3766 | 871.09 | 42.3080 |
| 453.88 | 73.2629 | 667.71 | 0.0000 | 873.19 | 40.3669 |
| 463.37 | 66.5535 | 677.62 | 44.2227 | 875.33 | 0.0000 |
| 468.07 | 75.8047 | 685.70 | 0.0000 | 879.38 | 35.5115 |
| 473.00 | 0.0000 | 695.00 | 66.7632 | 880.51 | 37.4975 |
| 475.06 | 60.8525 | 696.49 | 73.2942 | 883.24 | 40.4920 |
| 476.78 | 63.9482 | 696.51 | 73.2942 | 884.68 | 33.5933 |
| 477.60 | 62.9589 | 697.00 | 75.1646 | 889.28 | 33.6403 |
| 482.18 | 50.8856 | 697.49 | 74.2497 | 894.76 | 30.5815 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 32.3130 | 1298.22 | 0.0000 | | |
| 903.28 | 23.8472 | 1312.11 | 18.9342 | | |
| 911.20 | 32.4409 | 1332.49 | 24.7268 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 32.0169 | 1365.19 | 17.2423 | | |
| 937.49 | 40.1506 | 1368.63 | 0.0000 | | |
| 944.13 | 31.1772 | 1384.29 | 17.9551 | | |
| 946.00 | 36.2256 | 1408.01 | 16.4350 | | |
| 949.00 | 30.2142 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 20.5276 | | |
| 962.31 | 34.3742 | 1489.16 | 15.4852 | | |
| 964.08 | 39.4491 | 1505.03 | 20.7136 | | |
| 966.17 | 44.5335 | 1596.21 | 10.0419 | | |
| 968.97 | 41.5297 | 1620.50 | 16.1417 | | |
| 983.53 | 41.7015 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 12.2662 | | |
| 1274.44 | 38.4969 | 1750.46 | 0.0000 | | |
| 1001.03 | 24.5308 | 1764.49 | 18.6447 | | |
| 1004.73 | 38.8798 | 1063.66 | 19.7004 | | |
| 507.63 | 0.0000 | 1771.35 | 18.6673 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 16.4410 | | |
| 1037.84 | 37.1689 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 11.5371 | | |
| 631.29 | 35.1870 | | | | |
| 1048.07 | 40.3774 | | | | |
| 1049.04 | 33.1393 | | | | |
| 1050.41 | 29.0072 | | | | |
| 1063.66 | 19.6045 | | | | |
| 1077.00 | 23.9958 | | | | |
| 1077.34 | 22.9543 | | | | |
| 1085.87 | 18.8232 | | | | |
| 1099.45 | 25.1855 | | | | |
| 1112.07 | 30.5317 | | | | |
| 1112.84 | 30.5376 | | | | |
| 1115.54 | 26.3438 | | | | |
| 1120.29 | 21.1011 | | | | |
| 1120.55 | 22.1570 | | | | |
| 1221.41 | 25.3271 | | | | |
| 1129.67 | 17.9781 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 34.2109 | | | | |
| 1177.95 | 23.8527 | | | | |
| 1189.05 | 22.0781 | | | | |
| 1204.77 | 33.3966 | | | | |
| 1221.41 | 33.3746 | | | | |
| 1231.02 | 38.0972 | | | | |
| 1235.36 | 18.6028 | | | | |
| 1238.28 | 28.8549 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 18.7619 | | | | |
| 1274.44 | 24.4049 | | | | |
| 1274.54 | 24.4058 | | | | |
| 1291.59 | 20.7317 | | | | |

VAX/VMS Nuclide Identification Report Generated 13-FEB-2014 14:54:27.93

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147024.CNF;2
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;376
                                      Background date  : 9-FEB-2014 11:20:56.
Sample date      : 7-NOV-2013 15:48:00. Acquisition date : 12-FEB-2014 14:31:00
Sample ID        : G341147024           Sample quantity  : 6.11080E+01 GRAM
Detector name    : GAM06                Detector geometry: JAR
Elapsed live time: 0 03:00:00.00        Elapsed real time: 0 03:00:00.72  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.37 | 17 | 74 | 0.69 | 106.34 | 105 | 5 | 1.57E-03 | 79.9 | |
| 2 | 0 | 62.83* | 11 | 134 | 0.88 | 125.24 | 122 | 8 | 1.03E-03 | 205.4 | |
| 3 | 0 | 77.49* | 27 | 125 | 1.70 | 154.56 | 152 | 7 | 2.51E-03 | 76.9 | |
| 4 | 0 | 143.95* | 10 | 119 | 1.74 | 287.45 | 283 | 8 | 9.50E-04 | 212.7 | |
| 5 | 0 | 238.83* | 52 | 86 | 1.09 | 477.16 | 473 | 8 | 4.77E-03 | 40.6 | |
| 6 | 0 | 319.99 | 10 | 79 | 1.29 | 639.46 | 635 | 9 | 9.13E-04 | 165.4 | |
| 7 | 1 | 355.41 | 32 | 65 | 1.54 | 710.28 | 700 | 18 | 2.95E-03 | 48.4 | 2.32E+00 |
| 8 | 0 | 361.77 | 39 | 46 | 2.29 | 723.01 | 718 | 9 | 3.61E-03 | 35.5 | |
| 9 | 0 | 511.18* | 17 | 125 | 2.64 | 1021.81 | 1013 | 22 | 1.61E-03 | 197.3 | |
| 10 | 0 | 570.50 | 23 | 22 | 1.02 | 1140.48 | 1136 | 9 | 2.16E-03 | 42.0 | |
| 11 | 0 | 585.53 | 10 | 51 | 0.92 | 1170.53 | 1162 | 12 | 9.67E-04 | 140.1 | |
| 12 | 0 | 611.00 | 30 | 61 | 1.40 | 1221.47 | 1213 | 16 | 2.73E-03 | 63.1 | |
| 13 | 0 | 741.02 | 20 | 16 | 1.51 | 1481.56 | 1475 | 11 | 1.84E-03 | 45.3 | |
| 14 | 0 | 750.52 | 20 | 6 | 4.37 | 1500.56 | 1495 | 11 | 1.89E-03 | 31.5 | |
| 15 | 0 | 769.47 | 9 | 36 | 5.90 | 1538.47 | 1525 | 16 | 8.78E-04 | 145.1 | |
| 16 | 0 | 888.82 | 15 | 8 | 1.36 | 1777.24 | 1771 | 11 | 1.37E-03 | 45.6 | |
| 17 | 0 | 911.29* | 5 | 24 | 1.61 | 1822.20 | 1815 | 13 | 5.00E-04 | 208.4 | |
| 18 | 0 | 917.71 | 8 | 6 | 1.49 | 1835.05 | 1832 | 7 | 7.77E-04 | 57.4 | |
| 19 | 0 | 1120.70 | 12 | 10 | 0.94 | 2241.20 | 2237 | 8 | 1.09E-03 | 57.8 | |
| 20 | 0 | 1155.72 | 6 | 3 | 1.46 | 2311.26 | 2308 | 6 | 5.45E-04 | 62.4 | |
| 21 | 0 | 1161.43 | 15 | 10 | 1.49 | 2322.70 | 2315 | 14 | 1.37E-03 | 53.1 | |
| 22 | 0 | 1172.51 | 11 | 6 | 0.89 | 2344.87 | 2341 | 8 | 1.05E-03 | 47.6 | |
| 23 | 0 | 1322.26 | 7 | 6 | 3.04 | 2644.56 | 2638 | 10 | 6.27E-04 | 83.2 | |
| 24 | 0 | 1328.27 | 12 | 0 | 0.50 | 2656.58 | 2651 | 11 | 1.11E-03 | 28.9 | |
| 25 | 0 | 1366.20 | 14 | 0 | 1.00 | 2732.50 | 2726 | 13 | 1.30E-03 | 26.7 | |
| 26 | 0 | 1394.85 | 13 | 0 | 0.67 | 2789.85 | 2784 | 12 | 1.20E-03 | 27.7 | |
| 27 | 0 | 1420.04 | 12 | 0 | 0.73 | 2840.25 | 2836 | 9 | 1.11E-03 | 28.9 | |
| 28 | 0 | 1460.49* | 52 | 4 | 2.52 | 2921.23 | 2912 | 17 | 4.83E-03 | 19.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 13-FEB-2014 14:54:29

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147024.CNF;2 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 7-NOV-2013 15:48:00 | Acquisition date | : 12-FEB-2014 14:31:00 |
| Sample ID | : G341147024 | Sample quantity | : 61.108 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA6 | Detector geometry | : JAR |
| Elapsed live time | : 0 03:00:00.00 | Elapsed real time | : 0 03:00:00.72 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 52 | 10.66* | 7.455E-01 | 2.689E+00 | 2.689E+00 | 37.98 |
| SC-46 | 889.28 | 15 | 99.98* | 1.140E+00 | 5.327E-02 | 1.188E-01 | 91.18 |
| | 1120.55 | 12 | 99.99 | 9.362E-01 | 5.131E-02 | 1.145E-01 | 115.67 |
| CR-51 | 320.08 | 10 | 9.91* | 2.507E+00 | 1.626E-01 | 1.843E+00 | 330.76 |
| AS-73 | 53.44 | 17 | 10.30* | 9.144E-01 | 7.368E-01 | 1.702E+00 | 159.75 |
| CE-141 | 145.44 | 10 | 48.29* | 4.027E+00 | 2.161E-02 | 1.710E-01 | 425.33 |
| PB-212 | 74.82 | ------ | 10.28 | 2.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 27 | 17.10 | 2.818E+00 | 2.306E-01 | 2.306E-01 | 153.71 |
| | 238.63 | 52 | 43.60* | 3.094E+00 | 1.564E-01 | 1.564E-01 | 81.29 |
| | 300.09 | ------ | 3.30 | 2.628E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 2.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 27 | 17.10 | 2.818E+00 | 2.306E-01 | 2.306E-01 | 153.71 |
| | 238.63 | 52 | 43.60* | 3.094E+00 | 1.564E-01 | 1.564E-01 | 81.29 |
| | 300.09 | ------ | 3.30 | 2.628E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 17 | 100.00* | 1.765E+00 | 4.037E-02 | 4.037E-02 | 394.53 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 13-FEB-2014 14:54:30.28

```
*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147024.CNF;2       *
* Acquisition date : 12-FEB-2014 14:31:00 Sensitivity     : 3.000                *
* Detector ID      : GAM06                Energy tolerance: 1.500                *
* Elapsed live time:    0 03:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 03:00:00.72     Half life ratio : *****                *
* Sample date      :  7-NOV-2013 15:48:00 Nuclide Library : SOLID                *
* Sample ID        : G341147024           Analyst initials: RXF2                 *
* Batch Number     : 1361908              Sample Quantity : 6.1108E+01 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 18-MAR-2013 09:03:34 Eff. Geometry   : JAR                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_JAR.CNF;6                  *
*********************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 2.689E+00 | 1.001E+00 | 1.134E+00 |
| SC-46 | 1.188E-01 | 1.062E-01 | 1.889E-01 |
| CR-51 | 1.843E+00 | 5.973E+00 | 8.050E+00 |
| AS-73 | 1.702E+00 | 2.665E+00 | 5.061E+00 |
| CE-141 | 1.710E-01 | 7.128E-01 | 9.016E-01 |
| PB-212 | 1.564E-01 | 1.246E-01 | 1.566E-01 |
| TH-228 | 1.564E-01 | 1.246E-01 | 1.566E-01 |
| ANH-511 | 4.037E-02 | 1.561E-01 | 8.050E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 3.243E-01 | 1.317E+00 | 2.517E+00 | NOT IDENT. |
| NA-22 | -2.003E-02 | 7.605E-02 | 1.167E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.601E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -7.259E-02 | 7.176E-02 | 9.604E-02 | NOT IDENT. |
| V-48 | -2.779E+00 | 3.298E+00 | 5.596E+00 | NOT IDENT. |
| MN-54 | 2.748E-02 | 6.541E-02 | 1.251E-01 | NOT IDENT. |
| CO-56 | 2.979E-02 | 1.403E-01 | 2.592E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.210E-03 | 4.632E-02 | 8.000E-02 | NOT IDENT. |
| CO-58 | -6.559E-02 | 1.111E-01 | 1.887E-01 | NOT IDENT. |
| FE-59 | -1.511E-01 | 4.684E-01 | 6.889E-01 | NOT IDENT. |
| CO-60 | 2.002E-02 | 7.188E-02 | 1.233E-01 | FAIL ABUN |
| ZN-65 | 6.920E-02 | 1.445E-01 | 2.640E-01 | NOT IDENT. |
| GE-68 | -1.157E+00 | 1.848E+00 | 3.228E+00 | NOT IDENT. |
| AS-74 | -7.233E-01 | 3.335E+00 | 6.030E+00 | NOT IDENT. |
| SE-75 | -4.927E-02 | 1.026E-01 | 1.779E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 4.556E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -5.451E-01 | 4.935E+00 | 8.883E+00 | NOT IDENT. |
| RB-83 | -8.301E-02 | 2.487E-01 | 3.827E-01 | NOT IDENT. |
| KR-85 | 0.000E+00 | 1.391E+01 | 2.984E+01 | NOT IDENT. |
| SR-85 | 0.000E+00 | 1.742E-01 | 3.736E-01 | NOT IDENT. |
| RB-86 | -1.045E+01 | 1.954E+01 | 3.472E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | 4.281E-02 | 9.603E-02 | 2.120E-01 | NOT IDENT. |
| Y-91 | 5.047E+01 | 7.458E+01 | 1.520E+02 | NOT IDENT. |
| NB-94 | 1.060E-02 | 5.463E-02 | 1.011E-01 | NOT IDENT. |
| NB-95 | 1.555E-02 | 1.425E-01 | 2.643E-01 | NOT IDENT. |
| NB-95M | -4.089E-02 | 4.832E-01 | 7.573E-01 | NOT IDENT. |
| ZR-95 | 1.311E-01 | 2.175E-01 | 4.123E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 3.733E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.809E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -5.390E-03 | 4.773E-02 | 8.154E-02 | NOT IDENT. |
| RH-102 | -1.811E-03 | 8.972E-02 | 1.645E-01 | NOT IDENT. |
| RU-103 | 3.612E-02 | 2.433E-01 | 4.601E-01 | FAIL ABUN |
| RH-106 | -1.982E-01 | 5.331E-01 | 9.470E-01 | NOT IDENT. |
| RU-106 | -1.982E-01 | 5.331E-01 | 9.470E-01 | NOT IDENT. |
| AG-108M | -3.540E-03 | 4.474E-02 | 7.859E-02 | NOT IDENT. |
| CD-109 | 3.219E-01 | 1.132E+00 | 2.019E+00 | NOT IDENT. |
| AG-110M | -4.689E-02 | 1.094E-01 | 1.576E-01 | NOT IDENT. |
| SN-113 | 3.618E-02 | 1.164E-01 | 2.111E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.974E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | 3.947E+00 | 5.027E+00 | 9.041E+00 | NOT IDENT. |
| TE-123M | 5.874E-02 | 6.318E-02 | 1.150E-01 | NOT IDENT. |
| SB-124 | 1.155E-01 | 2.751E-01 | 6.229E-01 | NOT IDENT. |
| SB-125 | 6.527E-02 | 1.489E-01 | 2.741E-01 | FAIL ABUN |
| TE-125M | 2.515E+01 | 4.176E+01 | 6.832E+01 | NOT IDENT. |
| I-126 | 1.675E+01 | 2.732E+01 | 5.305E+01 | NOT IDENT. |
| SB-126 | -1.142E+01 | 2.044E+01 | 3.511E+01 | NOT IDENT. |
| SN-126 | 1.542E-02 | 9.894E-02 | 1.750E-01 | FAIL ABUN |
| SB-127 | 0.000E+00 | 4.532E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 2.517E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.505E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 5.342E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 9.227E-02 | 8.756E-02 | 1.285E-01 | FAIL ABUN |
| I-133 | 0.000E+00 | 2.270E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.798E-02 | 5.824E-02 | 1.032E-01 | FAIL ABUN |
| CS-135 | -1.261E-01 | 2.324E-01 | 4.002E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 6.279E+00 | 9.737E+00 | 2.045E+01 | NOT IDENT. |
| BA-137M | -2.736E-02 | 6.737E-02 | 1.017E-01 | NOT IDENT. |
| CS-137 | -2.890E-02 | 7.117E-02 | 1.074E-01 | NOT IDENT. |
| CE-139 | 2.489E-03 | 6.367E-02 | 1.163E-01 | NOT IDENT. |
| BA-140 | 1.208E-01 | 1.293E+01 | 2.528E+01 | NOT IDENT. |
| LA-140 | 1.208E-01 | 1.293E+01 | 2.528E+01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.569E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | -8.067E-02 | 3.583E-01 | 6.056E-01 | NOT IDENT. |
| PM-144 | 5.998E-02 | 6.798E-02 | 1.331E-01 | NOT IDENT. |
| PR-144 | 4.708E+00 | 5.313E+00 | 1.040E+01 | NOT IDENT. |
| PM-146 | -1.945E-02 | 6.968E-02 | 1.192E-01 | NOT IDENT. |
| ND-147 | 7.221E+01 | 1.405E+02 | 2.748E+02 | FAIL ABUN |
| PM-147 | 5.542E+02 | 1.143E+03 | 2.035E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 2.022E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.637E-02 | 4.221E-02 | 7.267E-02 | FAIL ABUN |
| EU-152 | 5.029E-02 | 1.500E-01 | 2.740E-01 | NOT IDENT. |
| GD-153 | 4.507E-02 | 1.407E-01 | 2.516E-01 | NOT IDENT. |
| EU-154 | -5.156E-02 | 2.071E-01 | 3.186E-01 | NOT IDENT. |
| EU-155 | -4.581E-02 | 1.447E-01 | 2.469E-01 | NOT IDENT. |
| TB-160 | 2.008E-01 | 4.159E-01 | 8.116E-01 | NOT IDENT. |
| HO-166M | 2.556E-02 | 9.660E-02 | 1.809E-01 | NOT IDENT. |
| TM-171 | 1.777E+01 | 2.782E+01 | 5.900E+01 | FAIL ABUN |
| LU-176 | -5.236E-03 | 4.062E-02 | 7.178E-02 | NOT IDENT. |
| HF-181 | -5.724E-02 | 2.408E-01 | 4.397E-01 | NOT IDENT. |
| TA-182 | -1.642E-01 | 3.561E-01 | 6.316E-01 | FAIL ABUN |
| RE-183 | 3.247E-01 | 6.956E-01 | 1.277E+00 | NOT IDENT. |
| RE-184 | 2.049E-01 | 1.012E+00 | 1.782E+00 | NOT IDENT. |
| W-188 | 1.035E+01 | 2.599E+01 | 4.755E+01 | FAIL ABUN |
| IR-192 | -4.040E-02 | 1.470E-01 | 2.219E-01 | NOT IDENT. |
| HG-203 | 1.708E-02 | 1.914E-01 | 3.449E-01 | NOT IDENT. |
| BI-207 | -1.932E-02 | 6.848E-02 | 1.260E-01 | FAIL ABUN |
| TL-208 | -3.005E-02 | 7.579E-02 | 1.088E-01 | NOT IDENT. |
| PB-210 | -4.031E+00 | 6.817E+00 | 1.103E+01 | NOT IDENT. |
| BI-211 | 1.087E-01 | 4.352E-01 | 6.518E-01 | NOT IDENT. |
| PB-211 | -9.813E-02 | 1.099E+00 | 1.928E+00 | NOT IDENT. |
| BI-212 | 5.249E-02 | 6.923E-01 | 1.288E+00 | NOT IDENT. |
| BI-214 | -6.777E-02 | 1.441E-01 | 2.339E-01 | FAIL ABUN |
| PB-214 | -4.769E-02 | 1.636E-01 | 2.320E-01 | FAIL ABUN |
| RN-219 | -4.707E-01 | 6.415E-01 | 1.056E+00 | NOT IDENT. |
| RN-222 | -6.777E-02 | 1.441E-01 | 2.339E-01 | FAIL ABUN |
| RA-223 | 6.987E-01 | 1.039E+00 | 1.751E+00 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 0.000E+00 | 9.591E-01 | 1.770E+00 | NOT IDENT. |
| RA-226 | -6.777E-02 | 1.441E-01 | 2.339E-01 | FAIL ABUN |
| AC-227 | -7.965E-02 | 3.848E-01 | 6.804E-01 | NOT IDENT. |
| TH-227 | -7.965E-02 | 3.848E-01 | 6.804E-01 | NOT IDENT. |
| AC-228 | 7.683E-02 | 3.139E-01 | 4.472E-01 | FAIL ABUN |
| RA-228 | 7.683E-02 | 3.139E-01 | 4.472E-01 | FAIL ABUN |
| TH-229 | 6.397E-02 | 7.465E-01 | 1.360E+00 | NOT IDENT. |
| TH-230 | -6.776E-02 | 1.441E-01 | 2.338E-01 | FAIL ABUN |
| PA-231 | -6.846E-02 | 2.207E+00 | 3.937E+00 | NOT IDENT. |
| TH-231 | 6.987E-01 | 1.039E+00 | 1.751E+00 | FAIL ABUN |
| TH-232 | 7.683E-02 | 3.139E-01 | 4.472E-01 | FAIL ABUN |
| PA-233 | 4.825E-04 | 1.013E-01 | 1.806E-01 | NOT IDENT. |
| PA-234 | 1.633E-02 | 3.447E-01 | 6.785E-01 | FAIL ABUN |
| PA-234M | 2.755E+00 | 6.315E+00 | 1.264E+01 | NOT IDENT. |
| TH-234 | 7.245E-01 | 2.917E+00 | 3.686E+00 | FAIL ABUN |
| U-234 | -6.776E-02 | 1.441E-01 | 2.338E-01 | FAIL ABUN |
| U-235 | 9.523E-02 | 3.969E-01 | 5.289E-01 | FAIL ABUN |
| NP-237 | 4.825E-04 | 1.013E-01 | 1.806E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.108E+13 | 0.000E+00 | SHORT HLIF |
| U-238 | 7.245E-01 | 2.917E+00 | 3.686E+00 | FAIL ABUN |
| NP-239 | 2.897E-01 | 5.464E-01 | 9.820E-01 | NOT IDENT. |
| PU-239 | -4.946E+02 | 4.954E+02 | 7.939E+02 | NOT IDENT. |
| AM-241 | 1.130E-01 | 2.502E-01 | 4.154E-01 | NOT IDENT. |
| AM-243 | 5.795E-02 | 8.111E-02 | 1.347E-01 | NOT IDENT. |
| CM-243 | -3.928E-02 | 1.580E-01 | 2.487E-01 | NOT IDENT. |
| CM-247 | -1.852E-03 | 5.768E-02 | 1.017E-01 | NOT IDENT. |
| CF-249 | 8.966E-03 | 6.238E-02 | 1.118E-01 | NOT IDENT. |
| CF-251 | -9.939E-03 | 1.846E-01 | 3.347E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 13-FEB-2014 14:54:26.35

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 53.37 | 17 | 74 | 0.69 | 106.34 | 105 | 5 | 1.57E-03 | 79.9 | |
| 2 | 0 | 62.83 | 44 | 134 | 0.88 | 125.24 | 122 | 8 | 4.10E-03 | 47.5 | |
| 3 | 0 | 77.49 | 43 | 125 | 1.70 | 154.56 | 152 | 7 | 3.95E-03 | 46.2 | |
| 4 | 0 | 92.85 | 88 | 217 | 1.76 | 185.27 | 180 | 13 | 8.11E-03 | 36.3 | |
| 5 | 0 | 110.02 | 15 | 129 | 0.88 | 219.60 | 216 | 8 | 1.37E-03 | 136.9 | |
| 6 | 0 | 143.95 | 32 | 119 | 1.74 | 287.45 | 283 | 8 | 2.94E-03 | 62.3 | |
| 7 | 0 | 185.77 | 60 | 120 | 0.73 | 371.07 | 368 | 8 | 5.56E-03 | 34.2 | |
| 8 | 0 | 238.83 | 97 | 86 | 1.09 | 477.16 | 473 | 8 | 8.96E-03 | 19.6 | |
| 9 | 0 | 319.99 | 10 | 79 | 1.29 | 639.46 | 635 | 9 | 9.13E-04 | 165.4 | |
| 10 | 1 | 352.12 | 30 | 56 | 1.54 | 703.72 | 700 | 18 | 2.76E-03 | 43.7 | 2.32E+00 |
| 11 | 1 | 355.41 | 32 | 65 | 1.54 | 710.28 | 700 | 18 | 2.95E-03 | 48.4 | |
| 12 | 0 | 361.77 | 39 | 46 | 2.29 | 723.01 | 718 | 9 | 3.61E-03 | 35.5 | |
| 13 | 0 | 511.18 | 238 | 125 | 2.64 | 1021.81 | 1013 | 22 | 2.21E-02 | 13.5 | |
| 14 | 0 | 570.50 | 23 | 22 | 1.02 | 1140.48 | 1136 | 9 | 2.16E-03 | 42.0 | |
| 15 | 0 | 585.53 | 10 | 51 | 0.92 | 1170.53 | 1162 | 12 | 9.67E-04 | 140.1 | |
| 16 | 0 | 611.00 | 30 | 61 | 1.40 | 1221.47 | 1213 | 16 | 2.73E-03 | 63.1 | |
| 17 | 0 | 741.02 | 20 | 16 | 1.51 | 1481.56 | 1475 | 11 | 1.84E-03 | 45.3 | |
| 18 | 0 | 750.52 | 20 | 6 | 4.37 | 1500.56 | 1495 | 11 | 1.89E-03 | 31.5 | |
| 19 | 0 | 769.47 | 9 | 36 | 5.90 | 1538.47 | 1525 | 16 | 8.78E-04 | 145.1 | |
| 20 | 0 | 888.82 | 15 | 8 | 1.36 | 1777.24 | 1771 | 11 | 1.37E-03 | 45.6 | |
| 21 | 0 | 911.29 | 18 | 24 | 1.61 | 1822.20 | 1815 | 13 | 1.66E-03 | 60.2 | |
| 22 | 0 | 917.71 | 8 | 6 | 1.49 | 1835.05 | 1832 | 7 | 7.77E-04 | 57.4 | |
| 23 | 0 | 1120.70 | 12 | 10 | 0.94 | 2241.20 | 2237 | 8 | 1.09E-03 | 57.8 | |
| 24 | 0 | 1155.72 | 6 | 3 | 1.46 | 2311.26 | 2308 | 6 | 5.45E-04 | 62.4 | |
| 25 | 0 | 1161.43 | 15 | 10 | 1.49 | 2322.70 | 2315 | 14 | 1.37E-03 | 53.1 | |
| 26 | 0 | 1172.51 | 11 | 6 | 0.89 | 2344.87 | 2341 | 8 | 1.05E-03 | 47.6 | |
| 27 | 0 | 1322.26 | 7 | 6 | 3.04 | 2644.56 | 2638 | 10 | 6.27E-04 | 83.2 | |
| 28 | 0 | 1328.27 | 12 | 0 | 0.50 | 2656.58 | 2651 | 11 | 1.11E-03 | 28.9 | |
| 29 | 0 | 1366.20 | 14 | 0 | 1.00 | 2732.50 | 2726 | 13 | 1.30E-03 | 26.7 | |
| 30 | 0 | 1394.85 | 13 | 0 | 0.67 | 2789.85 | 2784 | 12 | 1.20E-03 | 27.7 | |
| 31 | 0 | 1420.04 | 12 | 0 | 0.73 | 2840.25 | 2836 | 9 | 1.11E-03 | 28.9 | |
| 32 | 0 | 1460.49 | 64 | 4 | 2.52 | 2921.23 | 2912 | 17 | 5.89E-03 | 14.6 | |

VAX/VMS Nuclide Identification Report Generated 13-FEB-2014 14:54:28.44

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 52 | 10.66* | 7.455E-01 | 2.689E+00 | 2.689E+00 | 37.98 |
| SC-46 | 889.28 | 15 | 99.98* | 1.140E+00 | 5.327E-02 | 1.188E-01 | 91.18 |
| | 1120.55 | 12 | 99.99 | 9.362E-01 | 5.131E-02 | 1.145E-01 | 115.67 |
| CR-51 | 320.08 | 10 | 9.91* | 2.507E+00 | 1.626E-01 | 1.843E+00 | 330.76 |
| AS-73 | 53.44 | 17 | 10.30* | 9.144E-01 | 7.368E-01 | 1.702E+00 | 159.75 |
| CE-141 | 145.44 | 10 | 48.29* | 4.027E+00 | 2.161E-02 | 1.710E-01 | 425.33 |
| PB-212 | 74.82 | ------ | 10.28 | 2.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 27 | 17.10 | 2.818E+00 | 2.306E-01 | 2.306E-01 | 153.71 |
| | 238.63 | 52 | 43.60* | 3.094E+00 | 1.564E-01 | 1.564E-01 | 81.29 |
| | 300.09 | ------ | 3.30 | 2.628E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 2.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 27 | 17.10 | 2.818E+00 | 2.306E-01 | 2.306E-01 | 153.71 |
| | 238.63 | 52 | 43.60* | 3.094E+00 | 1.564E-01 | 1.564E-01 | 81.29 |
| | 300.09 | ------ | 3.30 | 2.628E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 17 | 100.00* | 1.765E+00 | 4.037E-02 | 4.037E-02 | 394.53 |

Flag: "*" = Keyline

Sample ID : G341147024 Acquisition date : 12-FEB-2014 14:31:00

Total number of lines in spectrum 28
Number of unidentified lines 11
Number of lines tentatively identified by NID 17 60.71%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 2.689E+00 | 2.689E+00 | 1.022E+00 | 37.98 | |
| SC-46 | 83.79D | 2.23 | 5.327E-02 | 1.188E-01 | 1.084E-01 | 91.18 | |
| CR-51 | 27.70D | 11.3 | 1.626E-01 | 1.843E+00 | 6.095E+00 | 330.76 | |
| AS-73 | 80.30D | 2.31 | 7.368E-01 | 1.702E+00 | 2.719E+00 | 159.75 | |
| CE-141 | 32.51D | 7.91 | 2.161E-02 | 1.710E-01 | 7.273E-01 | 425.33 | |
| PB-212 | 1.41E+10Y | 1.00 | 1.564E-01 | 1.564E-01 | 1.271E-01 | 81.29 | |
| TH-228 | 1.41E+10Y | 1.00 | 1.564E-01 | 1.564E-01 | 1.271E-01 | 81.29 | |
| ANH-511 | 1.00E+09Y | 1.00 | 4.037E-02 | 4.037E-02 | 15.93E-02 | 394.53 | |
| Total Activity : | | | 4.017E+00 | 6.877E+00 | | | |

Grand Total Activity : 4.017E+00 6.877E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G341147024 Acquisition date : 12-FEB-2014 14:31:00

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 62.83 | 11 | 134 | 0.88 | 125.24 | 122 | 8 | 1.03E-03 | **** | 1.69E+00 | T |
| 1 | 355.41 | 32 | 65 | 1.54 | 710.28 | 700 | 18 | 2.95E-03 | 96.8 | 2.32E+00 | T |
| 0 | 361.77 | 39 | 46 | 2.29 | 723.01 | 718 | 9 | 3.61E-03 | 71.0 | 2.29E+00 | |
| 0 | 570.50 | 23 | 22 | 1.02 | 1140.48 | 1136 | 9 | 2.16E-03 | 84.0 | 1.62E+00 | T |
| 0 | 585.53 | 10 | 51 | 0.92 | 1170.53 | 1162 | 12 | 9.67E-04 | **** | 1.59E+00 | T |
| 0 | 611.00 | 30 | 61 | 1.40 | 1221.47 | 1213 | 16 | 2.73E-03 | **** | 1.54E+00 | T |
| 0 | 741.02 | 20 | 16 | 1.51 | 1481.56 | 1475 | 11 | 1.84E-03 | 90.6 | 1.32E+00 | |
| 0 | 750.52 | 20 | 6 | 4.37 | 1500.56 | 1495 | 11 | 1.89E-03 | 62.9 | 1.31E+00 | |
| 0 | 769.47 | 9 | 36 | 5.90 | 1538.47 | 1525 | 16 | 8.78E-04 | **** | 1.28E+00 | |
| 0 | 911.29 | 5 | 24 | 1.61 | 1822.20 | 1815 | 13 | 5.00E-04 | **** | 1.12E+00 | T |
| 0 | 917.71 | 8 | 6 | 1.49 | 1835.05 | 1832 | 7 | 7.77E-04 | **** | 1.11E+00 | |
| 0 | 1155.72 | 6 | 3 | 1.46 | 2311.26 | 2308 | 6 | 5.45E-04 | **** | 9.12E-01 | |
| 0 | 1161.43 | 15 | 10 | 1.49 | 2322.70 | 2315 | 14 | 1.37E-03 | **** | 9.08E-01 | |
| 0 | 1172.51 | 11 | 6 | 0.89 | 2344.87 | 2341 | 8 | 1.05E-03 | 95.1 | 9.00E-01 | T |
| 0 | 1322.26 | 7 | 6 | 3.04 | 2644.56 | 2638 | 10 | 6.27E-04 | **** | 8.12E-01 | |
| 0 | 1328.27 | 12 | 0 | 0.50 | 2656.58 | 2651 | 11 | 1.11E-03 | 57.7 | 8.08E-01 | |
| 0 | 1366.20 | 14 | 0 | 1.00 | 2732.50 | 2726 | 13 | 1.30E-03 | 53.5 | 7.89E-01 | T |
| 0 | 1394.85 | 13 | 0 | 0.67 | 2789.85 | 2784 | 12 | 1.20E-03 | 55.5 | 7.75E-01 | |
| 0 | 1420.04 | 12 | 0 | 0.73 | 2840.25 | 2836 | 9 | 1.11E-03 | 57.7 | 7.63E-01 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 13-FEB-2014 14:54:42.74

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147024.CNF;2  *
* Acquisition date : 12-FEB-2014 14:31:00 Sensitivity     : 3.000           *
* Detector ID      : GAM06                Energy tolerance: 1.500           *
* Elapsed live time:    0 03:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 03:00:00.72     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 15:48:00 Nuclide Library : SOLID           *
* Sample ID        : G341147024           Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 6.1108E+01 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 18-MAR-2013 09:03:34 Eff. Geometry   : JAR             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_JAR.CNF;6             *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) |
|---|---|
| K-40 | 4.973E-01 |
| SC-46 | 8.361E-02 |
| CR-51 | 3.774E+00 |
| AS-73 | 2.396E+00 |
| CE-141 | 4.284E-01 |
| PB-212 | 7.426E-02 |
| TH-228 | 7.426E-02 |
| ANH-511 | 3.713E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM ) | |
|---|---|---|
| BE-7 | 1.158E+00 | NOT IDENT. |
| NA-22 | 5.125E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 3.919E-02 | NOT IDENT. |
| V-48 | 2.442E+00 | NOT IDENT. |
| MN-54 | 5.685E-02 | NOT IDENT. |
| CO-56 | 1.185E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 3.799E-02 | NOT IDENT. |
| CO-58 | 8.270E-02 | NOT IDENT. |
| FE-59 | 2.979E-01 | NOT IDENT. |
| CO-60 | 5.457E-02 | FAIL ABUN |
| ZN-65 | 1.167E-01 | NOT IDENT. |
| GE-68 | 1.387E+00 | NOT IDENT. |
| AS-74 | 2.753E+00 | NOT IDENT. |
| SE-75 | 8.327E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 4.034E+00 | NOT IDENT. |
| RB-83 | 1.760E-01 | NOT IDENT. |
| KR-85 | 1.419E+01 | NOT IDENT. |
| SR-85 | 1.776E-01 | NOT IDENT. |
| RB-86 | 1.492E+01 | NOT IDENT. |
| Y-88 | 8.915E-02 | NOT IDENT. |

| | | |
|---|---|---|
| Y-91 | 6.840E+01 | NOT IDENT. |
| NB-94 | 4.657E-02 | NOT IDENT. |
| NB-95 | 1.199E-01 | NOT IDENT. |
| NB-95M | 3.584E-01 | NOT IDENT. |
| ZR-95 | 1.839E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 3.868E-02 | NOT IDENT. |
| RH-102 | 7.538E-02 | NOT IDENT. |
| RU-103 | 2.115E-01 | FAIL ABUN |
| RH-106 | 4.297E-01 | NOT IDENT. |
| RU-106 | 4.297E-01 | NOT IDENT. |
| AG-108M | 3.625E-02 | NOT IDENT. |
| CD-109 | 9.591E-01 | NOT IDENT. |
| AG-110M | 7.012E-02 | NOT IDENT. |
| SN-113 | 9.851E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 4.292E+00 | NOT IDENT. |
| TE-123M | 5.455E-02 | NOT IDENT. |
| SB-124 | 2.577E-01 | NOT IDENT. |
| SB-125 | 1.272E-01 | FAIL ABUN |
| TE-125M | 3.251E+01 | NOT IDENT. |
| I-126 | 2.442E+01 | NOT IDENT. |
| SB-126 | 1.580E+01 | NOT IDENT. |
| SN-126 | 8.313E-02 | FAIL ABUN |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 6.035E-02 | FAIL ABUN |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 4.595E-02 | FAIL ABUN |
| CS-135 | 1.881E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 9.073E+00 | NOT IDENT. |
| BA-137M | 4.657E-02 | NOT IDENT. |
| CS-137 | 4.919E-02 | NOT IDENT. |
| CE-139 | 5.525E-02 | NOT IDENT. |
| BA-140 | 1.101E+01 | NOT IDENT. |
| LA-140 | 1.101E+01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.874E-01 | NOT IDENT. |
| PM-144 | 6.174E-02 | NOT IDENT. |
| PR-144 | 4.827E+00 | NOT IDENT. |
| PM-146 | 5.508E-02 | NOT IDENT. |
| ND-147 | 1.262E+02 | FAIL ABUN |
| PM-147 | 9.672E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 3.396E-02 | FAIL ABUN |
| EU-152 | 1.282E-01 | NOT IDENT. |
| GD-153 | 1.191E-01 | NOT IDENT. |
| EU-154 | 1.401E-01 | NOT IDENT. |
| EU-155 | 1.166E-01 | NOT IDENT. |
| TB-160 | 3.654E-01 | NOT IDENT. |
| HO-166M | 8.298E-02 | NOT IDENT. |
| TM-171 | 2.797E+01 | FAIL ABUN |
| LU-176 | 3.362E-02 | NOT IDENT. |
| HF-181 | 2.017E-01 | NOT IDENT. |
| TA-182 | 2.734E-01 | FAIL ABUN |
| RE-183 | 6.059E-01 | NOT IDENT. |
| RE-184 | 8.049E-01 | NOT IDENT. |
| W-188 | 2.244E+01 | FAIL ABUN |
| IR-192 | 1.044E-01 | NOT IDENT. |
| HG-203 | 1.621E-01 | NOT IDENT. |
| BI-207 | 5.540E-02 | FAIL ABUN |
| TL-208 | 5.034E-02 | NOT IDENT. |
| PB-210 | 5.225E+00 | NOT IDENT. |
| BI-211 | 3.077E-01 | NOT IDENT. |
| PB-211 | 8.949E-01 | NOT IDENT. |
| BI-212 | 5.824E-01 | NOT IDENT. |
| BI-214 | 1.091E-01 | FAIL ABUN |
| PB-214 | 1.094E-01 | FAIL ABUN |
| RN-219 | 4.888E-01 | NOT IDENT. |
| RN-222 | 1.091E-01 | FAIL ABUN |
| RA-223 | 8.201E-01 | FAIL ABUN |
| RA-224 | 8.413E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 1.091E-01 | FAIL ABUN |
| AC-227 | 3.206E-01 | NOT IDENT. |
| TH-227 | 3.206E-01 | NOT IDENT. |
| AC-228 | 2.045E-01 | FAIL ABUN |
| RA-228 | 2.045E-01 | FAIL ABUN |
| TH-229 | 6.446E-01 | NOT IDENT. |
| TH-230 | 1.091E-01 | FAIL ABUN |
| PA-231 | 1.851E+00 | NOT IDENT. |
| TH-231 | 8.201E-01 | FAIL ABUN |
| TH-232 | 2.045E-01 | FAIL ABUN |
| PA-233 | 8.470E-02 | NOT IDENT. |
| PA-234 | 2.967E-01 | FAIL ABUN |
| PA-234M | 5.681E+00 | NOT IDENT. |
| TH-234 | 1.758E+00 | FAIL ABUN |
| U-234 | 1.091E-01 | FAIL ABUN |
| U-235 | 2.520E-01 | FAIL ABUN |
| NP-237 | 8.470E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.758E+00 | FAIL ABUN |
| NP-239 | 4.654E-01 | NOT IDENT. |
| PU-239 | 3.757E+02 | NOT IDENT. |
| AM-241 | 1.969E-01 | NOT IDENT. |
| AM-243 | 6.423E-02 | NOT IDENT. |
| CM-243 | 1.176E-01 | NOT IDENT. |
| CM-247 | 4.724E-02 | NOT IDENT. |
| CF-249 | 5.207E-02 | NOT IDENT. |
| CF-251 | 1.588E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 13-FEB-2014 14:54:48.53

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*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G341147024.CNF;2  *
* Acquisition date : 12-FEB-2014 14:31:00 Sensitivity     : 3.000           *
* Detector ID      : GAM06                Energy tolerance: 1.500           *
* Elapsed live time:    0 03:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 03:00:00.72     Half life ratio : *****           *
* Sample date      :  7-NOV-2013 15:48:00 Nuclide Library : SOLID           *
* Sample ID        : G341147024           Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 6.1108E+01 GRAM *
*                                         Quantity Err(%) : 1.6364E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 18-MAR-2013 09:03:34 Eff. Geometry   : JAR             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_JAR.CNF;6             *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 2.689E+00 | 1.028E+00 | 1.028E+00 |
| SC-46 | 1.188E-01 | 1.072E-01 | 1.072E-01 |
| CR-51 | 1.843E+00 | 5.976E+00 | 5.976E+00 |
| AS-73 | 1.702E+00 | 2.688E+00 | 2.688E+00 |
| CE-141 | 1.710E-01 | 7.129E-01 | 7.129E-01 |
| PB-212 | 1.564E-01 | 1.254E-01 | 1.254E-01 |
| TH-228 | 1.564E-01 | 1.254E-01 | 1.254E-01 |
| ANH-511 | 4.037E-02 | 1.561E-01 | 1.561E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 3.243E-01 | 1.317E+00 | 1.325E+00 | NOT IDENT. |
| NA-22 | -2.003E-02 | 7.607E-02 | 7.660E-02 | NOT IDENT. |
| NA-24 | 1.000E+41 | 1.609E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | -7.259E-02 | 7.199E-02 | 7.908E-02 | NOT IDENT. |
| V-48 | -2.779E+00 | 3.320E+00 | 3.549E+00 | NOT IDENT. |
| MN-54 | 2.748E-02 | 6.549E-02 | 6.665E-02 | NOT IDENT. |
| CO-56 | 2.979E-02 | 1.404E-01 | 1.410E-01 | NOT IDENT. |
| MN-56 | 1.000E+41 | 2.412E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.210E-03 | 4.632E-02 | 4.633E-02 | NOT IDENT. |
| CO-58 | -6.559E-02 | 1.113E-01 | 1.152E-01 | NOT IDENT. |
| FE-59 | -1.511E-01 | 4.691E-01 | 4.740E-01 | NOT IDENT. |
| CO-60 | 2.002E-02 | 7.190E-02 | 7.247E-02 | FAIL ABUN |
| ZN-65 | 6.920E-02 | 1.449E-01 | 1.482E-01 | NOT IDENT. |
| GE-68 | -1.157E+00 | 1.856E+00 | 1.928E+00 | NOT IDENT. |
| AS-74 | -7.233E-01 | 3.336E+00 | 3.352E+00 | NOT IDENT. |
| SE-75 | -4.927E-02 | 1.027E-01 | 1.050E-01 | NOT IDENT. |
| BR-77 | 5.719E+11 | 1.665E+12 | 1.685E+12 | SHORT HLIF |
| SR-82 | -5.451E-01 | 4.935E+00 | 4.941E+00 | NOT IDENT. |
| RB-83 | -8.301E-02 | 2.491E-01 | 2.519E-01 | NOT IDENT. |
| KR-85 | 4.219E+01 | 1.435E+01 | 2.382E+01 | NOT IDENT. |
| SR-85 | 5.271E-01 | 1.796E-01 | 2.979E-01 | NOT IDENT. |
| RB-86 | -1.045E+01 | 1.961E+01 | 2.016E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | 4.281E-02 | 9.609E-02 | 9.801E-02 | NOT IDENT. |
| Y-91 | 5.047E+01 | 7.471E+01 | 7.809E+01 | NOT IDENT. |
| NB-94 | 1.060E-02 | 5.464E-02 | 5.485E-02 | NOT IDENT. |
| NB-95 | 1.555E-02 | 1.425E-01 | 1.427E-01 | NOT IDENT. |
| NB-95M | -4.089E-02 | 4.832E-01 | 4.836E-01 | NOT IDENT. |
| ZR-95 | 1.311E-01 | 2.179E-01 | 2.258E-01 | NOT IDENT. |
| NB-97 | 1.000E+41 | 4.413E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 3.825E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.751E+10 | 1.818E+10 | 1.982E+10 | SHORT HLIF |
| TC-99M | -1.000E+41 | 3.291E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | -5.390E-03 | 4.774E-02 | 4.780E-02 | NOT IDENT. |
| RH-102 | -1.811E-03 | 8.972E-02 | 8.973E-02 | NOT IDENT. |
| RU-103 | 3.612E-02 | 2.434E-01 | 2.439E-01 | FAIL ABUN |
| RH-106 | -1.982E-01 | 5.334E-01 | 5.408E-01 | NOT IDENT. |
| RU-106 | -1.982E-01 | 5.334E-01 | 5.408E-01 | NOT IDENT. |
| AG-108M | -3.540E-03 | 4.474E-02 | 4.477E-02 | NOT IDENT. |
| CD-109 | 3.219E-01 | 1.133E+00 | 1.142E+00 | NOT IDENT. |
| AG-110M | -4.689E-02 | 1.096E-01 | 1.116E-01 | NOT IDENT. |
| SN-113 | 3.618E-02 | 1.164E-01 | 1.175E-01 | NOT IDENT. |
| CD-115 | -1.405E+12 | 1.980E+12 | 2.079E+12 | SHORT HLIF |
| SN-117M | 3.947E+00 | 5.039E+00 | 5.344E+00 | NOT IDENT. |
| TE-123M | 5.874E-02 | 6.337E-02 | 6.868E-02 | NOT IDENT. |
| SB-124 | 1.155E-01 | 2.753E-01 | 2.802E-01 | NOT IDENT. |
| SB-125 | 6.527E-02 | 1.490E-01 | 1.519E-01 | FAIL ABUN |
| TE-125M | 2.515E+01 | 4.182E+01 | 4.332E+01 | NOT IDENT. |
| I-126 | 1.675E+01 | 2.737E+01 | 2.839E+01 | NOT IDENT. |
| SB-126 | -1.142E+01 | 2.050E+01 | 2.114E+01 | NOT IDENT. |
| SN-126 | 1.542E-02 | 9.895E-02 | 9.920E-02 | FAIL ABUN |
| SB-127 | -2.851E+06 | 4.712E+06 | 4.884E+06 | SHORT HLIF |
| I-131 | -2.294E+01 | 2.517E+02 | 2.520E+02 | SHORT HLIF |
| I-132 | 1.000E+41 | 6.166E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 5.597E+07 | 5.427E+07 | 5.985E+07 | SHORT HLIF |
| BA-133 | 9.227E-02 | 8.792E-02 | 9.726E-02 | FAIL ABUN |
| I-133 | 1.235E+32 | 2.385E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.798E-02 | 5.827E-02 | 5.883E-02 | FAIL ABUN |
| CS-135 | -1.261E-01 | 2.327E-01 | 2.396E-01 | NOT IDENT. |
| I-135 | 1.000E+41 | 3.190E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 6.279E+00 | 9.792E+00 | 1.019E+01 | NOT IDENT. |
| BA-137M | -2.736E-02 | 6.741E-02 | 6.853E-02 | NOT IDENT. |
| CS-137 | -2.890E-02 | 7.121E-02 | 7.239E-02 | NOT IDENT. |
| CE-139 | 2.489E-03 | 6.367E-02 | 6.368E-02 | NOT IDENT. |
| BA-140 | 1.208E-01 | 1.293E+01 | 1.293E+01 | NOT IDENT. |
| LA-140 | 1.208E-01 | 1.293E+01 | 1.293E+01 | NOT IDENT. |
| CE-143 | 6.662E+18 | 1.569E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | -8.067E-02 | 3.584E-01 | 3.603E-01 | NOT IDENT. |
| PM-144 | 5.998E-02 | 6.819E-02 | 7.336E-02 | NOT IDENT. |
| PR-144 | 4.708E+00 | 5.329E+00 | 5.736E+00 | NOT IDENT. |
| PM-146 | -1.945E-02 | 6.971E-02 | 7.026E-02 | NOT IDENT. |
| ND-147 | 7.221E+01 | 1.407E+02 | 1.444E+02 | FAIL ABUN |
| PM-147 | 5.542E+02 | 1.144E+03 | 1.171E+03 | NOT IDENT. |
| PM-149 | -1.249E+13 | 2.033E+13 | 2.109E+13 | SHORT HLIF |
| EU-150 | -1.637E-02 | 4.224E-02 | 4.288E-02 | FAIL ABUN |
| EU-152 | 5.029E-02 | 1.501E-01 | 1.518E-01 | NOT IDENT. |
| GD-153 | 4.507E-02 | 1.408E-01 | 1.422E-01 | NOT IDENT. |
| EU-154 | -5.156E-02 | 2.071E-01 | 2.084E-01 | NOT IDENT. |
| EU-155 | -4.581E-02 | 1.448E-01 | 1.463E-01 | NOT IDENT. |
| TB-160 | 2.008E-01 | 4.167E-01 | 4.264E-01 | NOT IDENT. |
| HO-166M | 2.556E-02 | 9.663E-02 | 9.731E-02 | NOT IDENT. |
| TM-171 | 1.777E+01 | 2.787E+01 | 2.900E+01 | FAIL ABUN |
| LU-176 | -5.236E-03 | 4.062E-02 | 4.069E-02 | NOT IDENT. |
| HF-181 | -5.724E-02 | 2.408E-01 | 2.422E-01 | NOT IDENT. |
| TA-182 | -1.642E-01 | 3.564E-01 | 3.640E-01 | FAIL ABUN |
| RE-183 | 3.247E-01 | 6.966E-01 | 7.118E-01 | NOT IDENT. |
| RE-184 | 2.049E-01 | 1.012E+00 | 1.017E+00 | NOT IDENT. |
| W-188 | 1.035E+01 | 2.603E+01 | 2.645E+01 | FAIL ABUN |
| IR-192 | -4.040E-02 | 1.471E-01 | 1.482E-01 | NOT IDENT. |
| HG-203 | 1.708E-02 | 1.914E-01 | 1.916E-01 | NOT IDENT. |
| BI-207 | -1.932E-02 | 6.854E-02 | 6.909E-02 | FAIL ABUN |
| TL-208 | -3.005E-02 | 7.584E-02 | 7.704E-02 | NOT IDENT. |
| PB-210 | -4.031E+00 | 6.827E+00 | 7.064E+00 | NOT IDENT. |
| BI-211 | 1.087E-01 | 4.353E-01 | 4.381E-01 | NOT IDENT. |
| PB-211 | -9.813E-02 | 1.099E+00 | 1.100E+00 | NOT IDENT. |
| BI-212 | 5.249E-02 | 6.923E-01 | 6.927E-01 | NOT IDENT. |
| BI-214 | -6.777E-02 | 1.442E-01 | 1.474E-01 | FAIL ABUN |
| PB-214 | -4.769E-02 | 1.637E-01 | 1.651E-01 | FAIL ABUN |
| RN-219 | -4.707E-01 | 6.450E-01 | 6.790E-01 | NOT IDENT. |
| RN-222 | -6.777E-02 | 1.442E-01 | 1.474E-01 | FAIL ABUN |
| RA-223 | 6.987E-01 | 1.042E+00 | 1.088E+00 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-224 | 1.838E+00 | 9.745E-01 | 1.279E+00 | NOT IDENT. |
| RA-226 | -6.777E-02 | 1.442E-01 | 1.474E-01 | FAIL ABUN |
| AC-227 | -7.965E-02 | 3.850E-01 | 3.866E-01 | NOT IDENT. |
| TH-227 | -7.965E-02 | 3.850E-01 | 3.866E-01 | NOT IDENT. |
| AC-228 | 7.683E-02 | 3.140E-01 | 3.159E-01 | FAIL ABUN |
| RA-228 | 7.683E-02 | 3.140E-01 | 3.159E-01 | FAIL ABUN |
| TH-229 | 6.397E-02 | 7.466E-01 | 7.471E-01 | NOT IDENT. |
| TH-230 | -6.776E-02 | 1.442E-01 | 1.474E-01 | FAIL ABUN |
| PA-231 | -6.846E-02 | 2.207E+00 | 2.207E+00 | NOT IDENT. |
| TH-231 | 6.987E-01 | 1.042E+00 | 1.088E+00 | FAIL ABUN |
| TH-232 | 7.683E-02 | 3.140E-01 | 3.159E-01 | FAIL ABUN |
| PA-233 | 4.825E-04 | 1.013E-01 | 1.013E-01 | NOT IDENT. |
| PA-234 | 1.633E-02 | 3.452E-01 | 3.453E-01 | FAIL ABUN |
| PA-234M | 2.755E+00 | 6.327E+00 | 6.448E+00 | NOT IDENT. |
| TH-234 | 7.245E-01 | 2.922E+00 | 2.940E+00 | FAIL ABUN |
| U-234 | -6.776E-02 | 1.442E-01 | 1.474E-01 | FAIL ABUN |
| U-235 | 9.523E-02 | 3.970E-01 | 3.993E-01 | FAIL ABUN |
| NP-237 | 4.825E-04 | 1.013E-01 | 1.013E-01 | NOT IDENT. |
| NP-238 | -9.563E+12 | 1.115E+13 | 1.196E+13 | SHORT HLIF |
| U-238 | 7.245E-01 | 2.922E+00 | 2.940E+00 | FAIL ABUN |
| NP-239 | 2.897E-01 | 5.473E-01 | 5.626E-01 | NOT IDENT. |
| PU-239 | -4.946E+02 | 4.971E+02 | 5.448E+02 | NOT IDENT. |
| AM-241 | 1.130E-01 | 2.504E-01 | 2.555E-01 | NOT IDENT. |
| AM-243 | 5.795E-02 | 8.126E-02 | 8.535E-02 | NOT IDENT. |
| CM-243 | -3.928E-02 | 1.580E-01 | 1.590E-01 | NOT IDENT. |
| CM-247 | -1.852E-03 | 5.768E-02 | 5.769E-02 | NOT IDENT. |
| CF-249 | 8.966E-03 | 6.239E-02 | 6.252E-02 | NOT IDENT. |
| CF-251 | -9.939E-03 | 1.846E-01 | 1.847E-01 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 120.9658 | 94.67 | 159.7961 | 193.51 | 109.1272 |
| 45.60 | 108.6323 | 94.87 | 159.8564 | 197.03 | 109.5639 |
| 46.54 | 110.8204 | 97.43 | 96.1617 | 198.01 | 114.2550 |
| 49.72 | 0.0000 | 98.43 | 101.6323 | 201.83 | 135.8560 |
| 51.35 | 115.7185 | 98.44 | 101.6343 | 205.31 | 115.1848 |
| 52.39 | 120.3552 | 99.53 | 86.9857 | 210.85 | 105.6817 |
| 53.44 | 106.3363 | 100.11 | 96.6347 | 215.65 | 108.0871 |
| 57.36 | 0.0000 | 103.18 | 90.7621 | 222.11 | 94.7476 |
| 57.53 | 99.9572 | 103.37 | 93.9973 | 227.09 | 106.5479 |
| 57.98 | 101.8200 | 105.21 | 103.9476 | 227.38 | 100.9207 |
| 59.32 | 100.7147 | 105.31 | 103.9659 | 228.16 | 0.0000 |
| 59.54 | 96.3902 | 106.12 | 107.3334 | 228.18 | 85.8992 |
| 63.29 | 112.0467 | 109.28 | 93.8907 | 117.23 | 85.8992 |
| 63.58 | 109.1760 | 111.00 | 109.3191 | 235.69 | 106.5210 |
| 64.28 | 99.0181 | 111.76 | 0.0000 | 235.96 | 108.0713 |
| 66.73 | 96.6317 | 116.30 | 0.0000 | 238.63 | 110.6457 |
| 67.24 | 108.6562 | 117.23 | 94.0507 | 238.98 | 0.0000 |
| 67.75 | 109.6813 | 121.12 | 113.3499 | 240.99 | 67.3057 |
| 69.67 | 107.7803 | 121.22 | 106.7637 | 242.00 | 82.6835 |
| 70.83 | 121.0757 | 121.78 | 120.0786 | 244.70 | 97.8678 |
| 72.81 | 126.6466 | 122.06 | 117.9276 | 252.40 | 0.0000 |
| 72.87 | 126.6639 | 123.07 | 121.4276 | 252.80 | 89.9228 |
| 74.66 | 116.5727 | 127.23 | 117.7709 | 254.15 | 0.0000 |
| 74.82 | 116.6138 | 129.30 | 134.8633 | 256.23 | 94.0920 |
| 74.97 | 116.6526 | 131.20 | 95.0120 | 260.90 | 0.0000 |
| 77.11 | 150.6844 | 133.02 | 112.0839 | 264.66 | 83.0947 |
| 79.69 | 113.2566 | 133.52 | 123.3841 | 268.22 | 95.1306 |
| 80.12 | 119.4869 | 136.00 | 128.3405 | 269.46 | 88.3644 |
| 80.19 | 0.0000 | 136.47 | 131.8095 | 271.23 | 85.5543 |
| 80.57 | 124.2000 | 140.51 | 0.0000 | 273.65 | 91.6519 |
| 81.00 | 113.5694 | 143.76 | 112.7064 | 276.40 | 95.8263 |
| 81.07 | 113.5858 | 144.24 | 119.6182 | 277.37 | 88.9865 |
| 83.79 | 101.8782 | 145.44 | 121.5318 | 277.60 | 96.9159 |
| 85.43 | 120.8038 | 152.43 | 106.0016 | 278.00 | 90.0252 |
| 86.55 | 107.6235 | 153.25 | 111.8859 | 279.20 | 80.2164 |
| 86.79 | 107.6742 | 323.87 | 124.7355 | 279.54 | 77.2692 |
| 86.94 | 109.7783 | 156.02 | 111.1455 | 280.46 | 76.3397 |
| 87.09 | 104.6314 | 158.56 | 94.0954 | 283.69 | 82.5187 |
| 87.57 | 114.0641 | 159.00 | 87.1758 | 284.31 | 0.0000 |
| 88.03 | 111.0545 | 162.33 | 124.3291 | 285.41 | 88.6157 |
| 88.34 | 111.1226 | 163.33 | 108.7091 | 285.90 | 0.0000 |
| 88.47 | 119.4618 | 165.86 | 117.8583 | 287.50 | 82.7898 |
| 89.96 | 193.7822 | 176.31 | 103.3665 | 290.67 | 84.0128 |
| 91.11 | 132.6095 | 176.60 | 103.4037 | 293.27 | 0.0000 |
| 92.59 | 107.8559 | 177.52 | 116.0133 | 351.93 | 80.3198 |
| 93.35 | 106.9639 | 181.07 | 0.0000 | 295.96 | 84.3884 |
| 94.56 | 159.7628 | 184.41 | 129.5739 | 879.38 | 109.7435 |
| 94.65 | 159.7899 | 143.76 | 120.7617 | 299.98 | 101.8076 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 87.7036 | 487.02 | 44.8967 | 702.65 | 41.7778 |
| 300.13 | 87.7062 | 492.35 | 0.0000 | 706.68 | 40.8291 |
| 301.36 | 73.6672 | 497.08 | 40.5464 | 711.68 | 36.8244 |
| 302.85 | 77.7990 | 505.52 | 38.5783 | 720.70 | 35.9382 |
| 256.23 | 85.9987 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 76.0231 | 511.00 | 47.3627 | 722.78 | 22.6096 |
| 308.46 | 66.9910 | 514.00 | 47.4411 | 722.91 | 22.6107 |
| 311.90 | 76.3390 | 514.00 | 47.4411 | 723.31 | 25.6982 |
| 316.51 | 93.1705 | 520.40 | 51.3409 | 724.19 | 30.8489 |
| 319.41 | 88.4698 | 520.69 | 0.0000 | 727.33 | 28.8306 |
| 320.08 | 75.4031 | 522.65 | 0.0000 | 733.00 | 30.9624 |
| 321.04 | 68.8991 | 527.90 | 0.0000 | 735.93 | 29.2775 |
| 323.87 | 55.8991 | 529.59 | 34.7101 | 333.97 | 31.0195 |
| 325.23 | 61.7184 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 328.76 | 67.0451 | 531.02 | 33.7983 | 747.24 | 18.1674 |
| 333.37 | 64.1787 | 546.56 | 0.0000 | 748.06 | 18.6926 |
| 333.97 | 77.6711 | 552.55 | 38.9310 | 752.31 | 22.5395 |
| 334.37 | 79.7658 | 563.25 | 36.0697 | 753.82 | 24.2881 |
| 338.28 | 64.4181 | 569.33 | 51.0794 | 756.73 | 14.8877 |
| 338.32 | 64.4209 | 946.00 | 49.4870 | 756.80 | 14.8880 |
| 311.90 | 79.0963 | 569.70 | 41.1901 | 884.68 | 20.9033 |
| 340.48 | 79.0963 | 583.19 | 40.1835 | 765.81 | 30.3325 |
| 340.55 | 79.0998 | 584.27 | 31.8423 | 766.42 | 30.3396 |
| 344.28 | 62.6221 | 595.83 | 40.7583 | 766.84 | 30.3452 |
| 345.93 | 77.6273 | 427.87 | 52.5248 | 772.60 | 0.0000 |
| 351.06 | 55.3854 | 602.52 | 0.0000 | 776.52 | 34.6637 |
| 351.93 | 68.8562 | 602.73 | 40.3392 | 739.50 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 43.8585 | 778.90 | 31.5417 |
| 356.01 | 67.3770 | 609.32 | 47.8623 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 47.8863 | 785.37 | 23.1897 |
| 366.42 | 0.0000 | 614.28 | 24.4775 | 792.07 | 26.4209 |
| 375.05 | 43.7546 | 618.01 | 30.8270 | 794.95 | 25.3922 |
| 356.01 | 60.1272 | 620.36 | 34.3677 | 795.86 | 26.4600 |
| 388.16 | 58.1512 | 621.93 | 38.3240 | 810.29 | 24.4785 |
| 388.63 | 62.4790 | 630.19 | 0.0000 | 344.28 | 25.5445 |
| 391.69 | 58.2913 | 631.29 | 40.4665 | 810.76 | 24.4830 |
| 264.66 | 54.2992 | 633.25 | 44.4551 | 815.77 | 22.3966 |
| 401.81 | 67.3820 | 634.78 | 28.6694 | 1048.07 | 23.4873 |
| 402.40 | 57.6234 | 635.95 | 23.7393 | 832.01 | 35.4105 |
| 404.85 | 57.7172 | 636.99 | 0.0000 | 834.85 | 26.8549 |
| 410.95 | 40.4546 | 645.85 | 24.8413 | 835.71 | 26.8634 |
| 413.71 | 54.7668 | 657.76 | 29.9714 | 836.80 | 0.0000 |
| 414.70 | 52.6099 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 64.0765 | 661.66 | 40.0322 | 846.77 | 34.5262 |
| 427.87 | 47.5286 | 664.57 | 0.0000 | 856.80 | 37.9019 |
| 433.94 | 48.8199 | 666.33 | 34.0988 | 860.56 | 24.9412 |
| 439.40 | 47.8731 | 666.50 | 32.0953 | 871.09 | 18.5053 |
| 453.88 | 55.0383 | 667.71 | 0.0000 | 873.19 | 25.0552 |
| 463.37 | 55.1264 | 677.62 | 31.2467 | 875.33 | 0.0000 |
| 468.07 | 45.3119 | 685.70 | 0.0000 | 879.38 | 20.7441 |
| 473.00 | 0.0000 | 695.00 | 34.5313 | 880.51 | 24.2719 |
| 475.06 | 39.1283 | 696.49 | 38.6188 | 883.24 | 18.2214 |
| 476.78 | 40.0780 | 696.51 | 38.6188 | 884.68 | 29.1693 |
| 477.60 | 40.0974 | 697.00 | 38.6271 | 889.28 | 20.0865 |
| 482.18 | 45.6860 | 697.49 | 41.6857 | 894.76 | 23.5233 |

| ENERGY | MDA COUNTS |
|---|---|
| 898.04 | 23.0795 |
| 903.28 | 26.1499 |
| 911.20 | 24.8417 |
| 923.98 | 0.0000 |
| 926.50 | 19.4239 |
| 937.49 | 19.4965 |
| 944.13 | 25.1235 |
| 946.00 | 15.8286 |
| 949.00 | 16.7765 |
| 667.71 | 0.0000 |
| 962.31 | 27.1492 |
| 964.08 | 32.7854 |
| 966.17 | 23.4344 |
| 968.97 | 23.4558 |
| 983.53 | 26.3964 |
| 984.45 | 0.0000 |
| 1274.44 | 24.6125 |
| 1001.03 | 20.8577 |
| 1004.73 | 21.8320 |
| 507.63 | 0.0000 |
| 1025.87 | 0.0000 |
| 1028.54 | 0.0000 |
| 1037.84 | 12.4694 |
| 1038.76 | 0.0000 |
| 631.29 | 18.2748 |
| 1048.07 | 13.4714 |
| 1049.04 | 15.4010 |
| 1050.41 | 19.2594 |
| 1063.66 | 21.2713 |
| 1077.00 | 18.4457 |
| 1077.34 | 19.4181 |
| 1085.87 | 20.4420 |
| 1099.45 | 13.6833 |
| 1112.07 | 18.6397 |
| 1112.84 | 16.0567 |
| 1115.54 | 13.4682 |
| 1120.29 | 21.6348 |
| 1120.55 | 20.6531 |
| 1221.41 | 21.6410 |
| 1129.67 | 25.6382 |
| 1131.51 | 0.0000 |
| 1147.95 | 0.0000 |
| 1173.23 | 17.9729 |
| 1177.95 | 15.4254 |
| 1189.05 | 16.0469 |
| 1204.77 | 18.1311 |
| 1221.41 | 19.2265 |
| 1231.02 | 19.2768 |
| 1235.36 | 20.3149 |
| 1238.28 | 16.2650 |
| 1260.41 | 0.0000 |
| 1271.87 | 13.3338 |
| 1274.44 | 16.4219 |
| 1274.54 | 16.4225 |
| 1291.59 | 15.4651 |
| 1298.22 | 0.0000 |
| 1312.11 | 7.2552 |
| 1332.49 | 16.0746 |
| 1362.66 | 0.0000 |
| 1365.19 | 7.2031 |
| 1368.63 | 0.0000 |
| 1384.29 | 9.4988 |
| 1408.01 | 8.4925 |
| 1457.56 | 0.0000 |
| 1460.82 | 17.1999 |
| 1489.16 | 15.1496 |
| 1505.03 | 12.1018 |
| 1596.21 | 15.2009 |
| 1620.50 | 14.3256 |
| 1678.03 | 0.0000 |
| 1690.97 | 4.8469 |
| 1750.46 | 0.0000 |
| 1764.49 | 11.8079 |
| 1063.66 | 18.7170 |
| 1771.35 | 14.7797 |
| 1791.20 | 0.0000 |
| 1808.65 | 12.9039 |
| 1810.72 | 0.0000 |
| 1836.06 | 5.9874 |
| ENERGY | MDA COUNTS |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:23.68

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM27.CNF;190
                                        Background date  : 9-FEB-2014 11:22:29.
Sample date      : 22-JAN-2014 00:00:00 Acquisition date : 12-FEB-2014 14:36:55
Sample ID        : G1203023699          Sample quantity  : 1.30479E+02 GRAM
Detector name    : GAM27                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.42  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 63.42* | 3 | 65 | 0.93 | 126.19 | 121 | 10 | 9.34E-04 | 502.4 | |
| 2 | 0 | 74.11* | 23 | 75 | 3.37 | 147.56 | 142 | 11 | 6.47E-03 | 76.2 | |
| 3 | 2 | 85.03* | 19 | 34 | 1.20 | 169.42 | 165 | 26 | 5.39E-03 | 60.9 | 6.45E-01 |
| 4 | 2 | 89.83 | 16 | 38 | 1.21 | 179.02 | 165 | 26 | 4.33E-03 | 72.5 | |
| 5 | 0 | 112.53* | 13 | 29 | 1.35 | 224.42 | 220 | 8 | 3.51E-03 | 83.5 | |
| 6 | 0 | 185.99* | 3 | 23 | 1.21 | 371.37 | 367 | 9 | 9.72E-04 | 328.6 | |
| 7 | 0 | 201.49 | 11 | 18 | 1.37 | 402.39 | 400 | 5 | 3.10E-03 | 64.9 | |
| 8 | 1 | 238.69* | 16 | 32 | 1.33 | 476.80 | 474 | 15 | 4.58E-03 | 60.2 | 5.50E+00 |
| 9 | 1 | 242.85 | 15 | 35 | 1.34 | 485.13 | 474 | 15 | 4.10E-03 | 72.3 | |
| 10 | 0 | 438.93 | 7 | 22 | 0.52 | 877.40 | 874 | 9 | 2.06E-03 | 116.2 | |
| 11 | 0 | 496.50 | 14 | 12 | 3.65 | 992.57 | 986 | 14 | 3.77E-03 | 63.8 | |
| 12 | 0 | 511.41* | 8 | 32 | 3.07 | 1022.40 | 1014 | 17 | 2.14E-03 | 226.8 | |
| 13 | 0 | 537.06 | 11 | 15 | 3.85 | 1073.72 | 1066 | 12 | 3.04E-03 | 76.9 | |
| 14 | 0 | 564.97 | 22 | 12 | 6.02 | 1129.57 | 1121 | 16 | 6.12E-03 | 41.1 | |
| 15 | 0 | 608.70* | 0 | 20 | 1.37 | 1217.05 | 1212 | 10 | 1.29E-05 | ***** | |
| 16 | 0 | 789.47 | 9 | 2 | 0.92 | 1578.74 | 1576 | 6 | 2.40E-03 | 45.6 | |
| 17 | 0 | 805.96 | 19 | 5 | 3.90 | 1611.74 | 1606 | 12 | 5.24E-03 | 34.3 | |
| 18 | 0 | 911.32* | 10 | 0 | 1.50 | 1822.54 | 1819 | 7 | 2.74E-03 | 41.0 | |
| 19 | 0 | 1460.31* | 10 | 0 | 2.16 | 2921.16 | 2917 | 9 | 2.87E-03 | 44.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:37:25

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 22-JAN-2014 00:00:00 | Acquisition date | : 12-FEB-2014 14:36:55 |
| Sample ID | : G1203023699 | Sample quantity | : 130.48 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA27 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.42 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.470E+00 | 3.794E-01 | 3.794E-01 | 89.84 |
| RU-103 | 497.08 | 14 | 91.00* | 3.458E+00 | 2.483E-02 | 3.637E-02 | 127.57 |
| | 610.33 | ------ | 5.76 | 2.980E+00 | ------ | Line Not Found | ------ |
| TH-229 | 85.43 | 19 | 14.70 | 6.630E+00 | 1.146E-01 | 1.146E-01 | 121.71 |
| | 88.47 | 16 | 24.00 | 6.884E+00 | 5.425E-02 | 5.425E-02 | 144.91 |
| | 193.51 | ------ | 4.41* | 6.334E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 6.045E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.434E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 23 | 67.20* | 5.777E+00 | 3.454E-02 | 3.454E-02 | 152.34 |
| ANH-511 | 511.00 | 8 | 100.00* | 3.386E+00 | 1.310E-02 | 1.310E-02 | 453.63 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:26.03

```
*****************************************************************************
*                          GEL Laboratories LLC                             *
*                            2040 Savage Road                               *
*                          Charleston, SC 29407                             *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1  *
* Acquisition date : 12-FEB-2014 14:36:55 Sensitivity     : 3.000           *
* Detector ID      : GAM27                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****           *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023699          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7         *
*****************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| K-40 | 3.794E-01 | 3.340E-01 | 4.835E-01 |
| RU-103 | 3.637E-02 | 4.547E-02 | 5.936E-02 |
| TH-229 | -2.548E-01 | 3.776E-01 | 6.136E-01 |
| AM-243 | 3.454E-02 | 5.157E-02 | 5.200E-02 |
| ANH-511 | 1.310E-02 | 5.822E-02 | 3.446E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | -2.252E-01 | 2.498E-01 | 3.976E-01 | NOT IDENT. |
| NA-22 | 7.698E-03 | 2.373E-02 | 5.321E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | 4.663E+08 | 0.000E+00 | SHORT HLIF |
| AL-26 | 9.673E-03 | 1.803E-02 | 5.034E-02 | NOT IDENT. |
| SC-46 | -1.173E-02 | 3.063E-02 | 5.526E-02 | NOT IDENT. |
| V-48 | -1.431E-02 | 5.554E-02 | 1.046E-01 | NOT IDENT. |
| CR-51 | -8.963E-02 | 3.430E-01 | 6.192E-01 | NOT IDENT. |
| MN-54 | -2.707E-03 | 2.837E-02 | 5.361E-02 | NOT IDENT. |
| CO-56 | -6.148E-03 | 2.679E-02 | 5.060E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 8.839E-04 | 1.783E-02 | 3.227E-02 | NOT IDENT. |
| CO-58 | -1.240E-02 | 3.285E-02 | 5.016E-02 | NOT IDENT. |
| FE-59 | -8.837E-03 | 6.074E-02 | 1.212E-01 | NOT IDENT. |
| CO-60 | 7.923E-03 | 2.840E-02 | 6.091E-02 | NOT IDENT. |
| ZN-65 | -1.064E-02 | 6.422E-02 | 1.242E-01 | NOT IDENT. |
| GE-68 | 2.590E-01 | 6.687E-01 | 1.490E+00 | NOT IDENT. |
| AS-73 | -2.642E-01 | 3.585E-01 | 6.219E-01 | NOT IDENT. |
| AS-74 | -2.893E-02 | 7.969E-02 | 1.483E-01 | NOT IDENT. |
| SE-75 | 1.544E-02 | 2.924E-02 | 5.889E-02 | NOT IDENT. |
| BR-77 | 4.012E+01 | 4.731E+01 | 8.734E+01 | FAIL ABUN |
| SR-82 | -8.283E-02 | 2.477E-01 | 4.607E-01 | NOT IDENT. |
| RB-83 | -2.511E-02 | 5.376E-02 | 9.252E-02 | NOT IDENT. |
| KR-85 | 1.184E+01 | 6.643E+00 | 1.349E+01 | NOT IDENT. |
| SR-85 | 6.708E-02 | 3.768E-02 | 7.653E-02 | NOT IDENT. |
| RB-86 | 2.042E-01 | 5.269E-01 | 1.174E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | -4.088E-03 | 2.739E-02 | 5.895E-02 | NOT IDENT. |
| Y-91 | 4.612E+00 | 1.357E+01 | 2.922E+01 | NOT IDENT. |
| NB-94 | 3.821E-04 | 2.394E-02 | 4.648E-02 | NOT IDENT. |
| NB-95 | -2.812E-03 | 2.973E-02 | 5.622E-02 | NOT IDENT. |
| NB-95M | 2.211E-03 | 8.578E-02 | 1.446E-01 | NOT IDENT. |
| ZR-95 | -5.954E-03 | 5.297E-02 | 1.016E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 8.782E+08 | 0.000E+00 | SHORT HLIF |
| MO-99 | -2.814E+01 | 3.449E+01 | 5.739E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | 1.472E+24 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.116E-02 | 2.043E-02 | 3.468E-02 | NOT IDENT. |
| RH-102 | -1.585E-02 | 4.051E-02 | 7.439E-02 | NOT IDENT. |
| RH-106 | -5.288E-02 | 2.056E-01 | 3.903E-01 | NOT IDENT. |
| RU-106 | -5.288E-02 | 2.056E-01 | 3.903E-01 | NOT IDENT. |
| AG-108M | -6.284E-03 | 2.433E-02 | 3.768E-02 | NOT IDENT. |
| CD-109 | 2.085E-01 | 3.997E-01 | 7.738E-01 | NOT IDENT. |
| AG-110M | 9.189E-03 | 3.397E-02 | 6.997E-02 | NOT IDENT. |
| SN-113 | 3.100E-02 | 3.282E-02 | 6.864E-02 | NOT IDENT. |
| CD-115 | -2.232E+01 | 5.312E+01 | 9.300E+01 | NOT IDENT. |
| SN-117M | 3.621E-02 | 5.003E-02 | 9.652E-02 | NOT IDENT. |
| TE-123M | 2.152E-02 | 1.785E-02 | 3.655E-02 | NOT IDENT. |
| SB-124 | 2.237E-02 | 5.846E-02 | 1.432E-01 | NOT IDENT. |
| SB-125 | 4.266E-02 | 6.544E-02 | 1.329E-01 | NOT IDENT. |
| TE-125M | 4.484E-01 | 6.257E+00 | 1.043E+01 | NOT IDENT. |
| I-126 | 8.612E-02 | 2.278E-01 | 4.640E-01 | NOT IDENT. |
| SB-126 | -1.190E-01 | 1.504E-01 | 2.546E-01 | NOT IDENT. |
| SN-126 | 1.591E-02 | 3.831E-02 | 7.356E-02 | FAIL ABUN |
| SB-127 | 1.320E+00 | 2.870E+00 | 6.017E+00 | NOT IDENT. |
| I-131 | 7.366E-02 | 1.439E-01 | 2.870E-01 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.757E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.031E-01 | 1.846E+00 | 3.530E+00 | FAIL ABUN |
| BA-133 | -1.719E-02 | 3.251E-02 | 5.657E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 6.544E+05 | 0.000E+00 | SHORT HLIF |
| CS-134 | -1.169E-02 | 2.653E-02 | 4.700E-02 | NOT IDENT. |
| CS-135 | 1.708E-03 | 9.434E-02 | 1.800E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 4.008E+22 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.560E-02 | 1.205E-01 | 2.063E-01 | NOT IDENT. |
| BA-137M | -3.083E-03 | 2.523E-02 | 4.823E-02 | NOT IDENT. |
| CS-137 | -3.257E-03 | 2.666E-02 | 5.095E-02 | NOT IDENT. |
| CE-139 | -7.678E-03 | 2.018E-02 | 3.445E-02 | NOT IDENT. |
| BA-140 | -5.876E-02 | 1.089E-01 | 1.918E-01 | NOT IDENT. |
| LA-140 | -5.876E-02 | 1.089E-01 | 1.918E-01 | NOT IDENT. |
| CE-141 | 4.855E-02 | 4.949E-02 | 9.682E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | 2.066E+03 | 0.000E+00 | SHORT HLIF |
| CE-144 | 4.970E-02 | 1.312E-01 | 2.459E-01 | NOT IDENT. |
| PM-144 | -1.089E-02 | 2.712E-02 | 4.911E-02 | NOT IDENT. |
| PR-144 | -7.974E-01 | 2.040E+00 | 3.699E+00 | NOT IDENT. |
| PM-146 | -1.642E-02 | 2.979E-02 | 5.102E-02 | NOT IDENT. |
| ND-147 | 2.970E-01 | 5.639E-01 | 1.068E+00 | FAIL ABUN |
| PM-147 | 2.662E+02 | 5.080E+02 | 9.633E+02 | NOT IDENT. |
| PM-149 | -8.050E+01 | 4.946E+02 | 9.123E+02 | NOT IDENT. |
| EU-150 | -3.699E-04 | 1.892E-02 | 3.586E-02 | FAIL ABUN |
| EU-152 | 2.739E-02 | 7.221E-02 | 1.404E-01 | NOT IDENT. |
| GD-153 | -4.462E-02 | 5.451E-02 | 7.772E-02 | NOT IDENT. |
| EU-154 | 2.174E-02 | 6.700E-02 | 1.503E-01 | NOT IDENT. |
| EU-155 | 5.192E-03 | 6.158E-02 | 1.138E-01 | NOT IDENT. |
| TB-160 | 3.489E-02 | 9.179E-02 | 1.938E-01 | NOT IDENT. |
| HO-166M | 4.408E-03 | 3.987E-02 | 7.968E-02 | NOT IDENT. |
| TM-171 | 5.810E-01 | 7.082E+00 | 1.343E+01 | NOT IDENT. |
| LU-176 | 3.660E-03 | 1.603E-02 | 3.151E-02 | FAIL ABUN |
| HF-181 | 3.193E-02 | 3.690E-02 | 7.649E-02 | NOT IDENT. |
| TA-182 | -7.550E-02 | 1.083E-01 | 1.884E-01 | NOT IDENT. |
| RE-183 | -9.252E-02 | 1.013E-01 | 1.613E-01 | NOT IDENT. |
| RE-184 | -6.770E-02 | 8.938E-02 | 1.477E-01 | NOT IDENT. |
| W-188 | -4.234E+00 | 5.449E+00 | 9.316E+00 | FAIL ABUN |
| IR-192 | 7.331E-03 | 2.788E-02 | 5.350E-02 | NOT IDENT. |
| HG-203 | -1.312E-02 | 2.866E-02 | 5.112E-02 | FAIL ABUN |
| BI-207 | 9.431E-03 | 3.372E-02 | 6.992E-02 | FAIL ABUN |
| TL-208 | -1.733E-02 | 2.487E-02 | 4.475E-02 | NOT IDENT. |
| PB-210 | -6.880E-01 | 1.403E+00 | 2.714E+00 | NOT IDENT. |
| BI-211 | -8.583E-03 | 1.708E-01 | 3.148E-01 | FAIL ABUN |
| PB-211 | -1.053E-01 | 4.300E-01 | 7.873E-01 | NOT IDENT. |
| BI-212 | -1.981E-01 | 3.435E-01 | 6.323E-01 | NOT IDENT. |
| PB-212 | 3.871E-02 | 4.565E-02 | 8.519E-02 | FAIL ABUN |
| BI-214 | 1.961E-04 | 7.779E-02 | 1.199E-01 | FAIL ABUN |
| PB-214 | 1.107E-02 | 6.120E-02 | 1.157E-01 | FAIL ABUN |
| RN-219 | -5.018E-02 | 2.539E-01 | 4.672E-01 | NOT IDENT. |
| RN-222 | 1.961E-04 | 7.779E-02 | 1.199E-01 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | -2.495E-01 | 5.211E-01 | 8.994E-01 | FAIL ABUN |
| RA-224 | -1.299E-01 | 4.004E-01 | 7.304E-01 | NOT IDENT. |
| RA-226 | 1.961E-04 | 7.779E-02 | 1.199E-01 | FAIL ABUN |
| AC-227 | -1.493E-02 | 1.795E-01 | 3.347E-01 | NOT IDENT. |
| TH-227 | -1.493E-02 | 1.795E-01 | 3.347E-01 | NOT IDENT. |
| AC-228 | 1.007E-01 | 8.091E-02 | 2.117E-01 | FAIL ABUN |
| RA-228 | 1.007E-01 | 8.091E-02 | 2.117E-01 | FAIL ABUN |
| TH-228 | 3.871E-02 | 4.565E-02 | 8.519E-02 | FAIL ABUN |
| TH-230 | 1.961E-04 | 7.778E-02 | 1.199E-01 | FAIL ABUN |
| PA-231 | 4.386E-02 | 9.829E-01 | 1.863E+00 | NOT IDENT. |
| TH-231 | -2.495E-01 | 5.211E-01 | 8.994E-01 | FAIL ABUN |
| TH-232 | 1.007E-01 | 8.091E-02 | 2.117E-01 | FAIL ABUN |
| PA-233 | -3.985E-02 | 3.938E-02 | 6.421E-02 | NOT IDENT. |
| PA-234 | 1.845E-01 | 2.038E-01 | 4.615E-01 | NOT IDENT. |
| PA-234M | 3.350E-01 | 3.190E+00 | 6.471E+00 | NOT IDENT. |
| TH-234 | 1.158E-01 | 1.140E+00 | 1.510E+00 | FAIL ABUN |
| U-234 | 1.961E-04 | 7.778E-02 | 1.199E-01 | FAIL ABUN |
| U-235 | -5.694E-02 | 1.513E-01 | 2.640E-01 | FAIL ABUN |
| NP-237 | -3.985E-02 | 3.938E-02 | 6.421E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | 1.027E+02 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.158E-01 | 1.140E+00 | 1.510E+00 | FAIL ABUN |
| NP-239 | 4.569E-02 | 2.522E-01 | 4.671E-01 | NOT IDENT. |
| PU-239 | -1.869E+02 | 2.200E+02 | 3.592E+02 | NOT IDENT. |
| AM-241 | 2.113E-02 | 7.523E-02 | 1.307E-01 | NOT IDENT. |
| CM-243 | 1.305E-02 | 6.364E-02 | 1.189E-01 | NOT IDENT. |
| CM-247 | -8.060E-03 | 2.342E-02 | 4.206E-02 | NOT IDENT. |
| CF-249 | -1.721E-02 | 2.618E-02 | 4.459E-02 | NOT IDENT. |
| CF-251 | -2.202E-02 | 8.577E-02 | 1.482E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:21.94

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.85 | 29 | 49 | 1.17 | 93.05 | 89 | 9 | 8.11E-03 | 47.1 | |
| 2 | 0 | 63.42 | 40 | 65 | 0.93 | 126.19 | 121 | 10 | 1.10E-02 | 41.7 | |
| 3 | 0 | 74.11 | 28 | 75 | 3.37 | 147.56 | 142 | 11 | 7.67E-03 | 63.5 | |
| 4 | 2 | 85.03 | 25 | 34 | 1.20 | 169.42 | 165 | 26 | 6.96E-03 | 45.6 | 6.45E-01 |
| 5 | 2 | 89.83 | 16 | 38 | 1.21 | 179.02 | 165 | 26 | 4.33E-03 | 72.5 | |
| 6 | 2 | 92.53 | 55 | 42 | 1.21 | 184.42 | 165 | 26 | 1.53E-02 | 23.1 | |
| 7 | 0 | 112.53 | 16 | 29 | 1.35 | 224.42 | 220 | 8 | 4.36E-03 | 65.3 | |
| 8 | 0 | 185.99 | 41 | 23 | 1.21 | 371.37 | 367 | 9 | 1.14E-02 | 26.6 | |
| 9 | 0 | 201.49 | 11 | 18 | 1.37 | 402.39 | 400 | 5 | 3.10E-03 | 64.9 | |
| 10 | 1 | 238.69 | 33 | 32 | 1.33 | 476.80 | 474 | 15 | 9.09E-03 | 28.8 | 5.50E+00 |
| 11 | 1 | 242.85 | 15 | 35 | 1.34 | 485.13 | 474 | 15 | 4.10E-03 | 72.3 | |
| 12 | 0 | 438.93 | 7 | 22 | 0.52 | 877.40 | 874 | 9 | 2.06E-03 | 116.2 | |
| 13 | 0 | 496.50 | 14 | 12 | 3.65 | 992.57 | 986 | 14 | 3.77E-03 | 63.8 | |
| 14 | 0 | 511.41 | 107 | 32 | 3.07 | 1022.40 | 1014 | 17 | 2.96E-02 | 15.8 | |
| 15 | 0 | 537.06 | 11 | 15 | 3.85 | 1073.72 | 1066 | 12 | 3.04E-03 | 76.9 | |
| 16 | 0 | 564.97 | 22 | 12 | 6.02 | 1129.57 | 1121 | 16 | 6.12E-03 | 41.1 | |
| 17 | 0 | 608.70 | 12 | 20 | 1.37 | 1217.05 | 1212 | 10 | 3.28E-03 | 76.7 | |
| 18 | 0 | 789.47 | 9 | 2 | 0.92 | 1578.74 | 1576 | 6 | 2.40E-03 | 45.6 | |
| 19 | 0 | 805.96 | 19 | 5 | 3.90 | 1611.74 | 1606 | 12 | 5.24E-03 | 34.3 | |
| 20 | 0 | 911.32 | 13 | 0 | 1.50 | 1822.54 | 1819 | 7 | 3.61E-03 | 27.7 | |
| 21 | 0 | 1460.31 | 19 | 0 | 2.16 | 2921.16 | 2917 | 9 | 5.28E-03 | 22.9 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:24.26

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| K-40 | 1460.82 | 10 | 10.66* | 1.470E+00 | 3.794E-01 | 3.794E-01 | 89.84 |
| RU-103 | 497.08 | 14 | 91.00* | 3.458E+00 | 2.483E-02 | 3.637E-02 | 127.57 |
| | 610.33 | ------ | 5.76 | 2.980E+00 | ------ | Line Not Found | ------ |
| TH-229 | 85.43 | 19 | 14.70 | 6.630E+00 | 1.146E-01 | 1.146E-01 | 121.71 |
| | 88.47 | 16 | 24.00 | 6.884E+00 | 5.425E-02 | 5.425E-02 | 144.91 |
| | 193.51 | ------ | 4.41* | 6.334E+00 | ------ | Line Not Found | ------ |
| | 210.85 | ------ | 2.80 | 6.045E+00 | ------ | Line Not Found | ------ |
| AM-243 | 43.53 | ------ | 5.90 | 1.434E+00 | ------ | Line Not Found | ------ |
| | 74.66 | 23 | 67.20* | 5.777E+00 | 3.454E-02 | 3.454E-02 | 152.34 |
| ANH-511 | 511.00 | 8 | 100.00* | 3.386E+00 | 1.310E-02 | 1.310E-02 | 453.63 |

Flag: "*" = Keyline

Sample ID : G1203023699 Acquisition date : 12-FEB-2014 14:36:55

Total number of lines in spectrum 19
Number of unidentified lines 4
Number of lines tentatively identified by NID 15 78.95%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| K-40 | 1.25E+09Y | 1.00 | 3.794E-01 | 3.794E-01 | 3.408E-01 | 89.84 | |
| RU-103 | 39.26D | 1.47 | 2.483E-02 | 3.637E-02 | 4.640E-02 | 127.57 | |
| TH-229 | 7340.00Y | 1.00 | 5.425E-02 | 5.425E-02 | 7.861E-02 | 144.91 | K |
| AM-243 | 7370.00Y | 1.00 | 3.454E-02 | 3.454E-02 | 5.262E-02 | 152.34 | |
| ANH-511 | 1.00E+09Y | 1.00 | 1.310E-02 | 1.310E-02 | 5.941E-02 | 453.63 | |
| | Total Activity : | | 5.061E-01 | 5.176E-01 | | | |
| | Grand Total Activity : | | 5.061E-01 | 5.176E-01 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203023699 Acquisition date : 12-FEB-2014 14:36:55

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63.42 | 3 | 65 | 0.93 | 126.19 | 121 | 10 | 9.34E-04 | **** | 4.52E+00 | T |
| 0 | 112.53 | 13 | 29 | 1.35 | 224.42 | 220 | 8 | 3.51E-03 | **** | 7.40E+00 | T |
| 0 | 185.99 | 3 | 23 | 1.21 | 371.37 | 367 | 9 | 9.72E-04 | **** | 6.46E+00 | T |
| 0 | 201.49 | 11 | 18 | 1.37 | 402.39 | 400 | 5 | 3.10E-03 | **** | 6.20E+00 | T |
| 1 | 238.69 | 16 | 32 | 1.33 | 476.80 | 474 | 15 | 4.58E-03 | **** | 5.62E+00 | T |
| 1 | 242.85 | 15 | 35 | 1.34 | 485.13 | 474 | 15 | 4.10E-03 | **** | 5.56E+00 | T |
| 0 | 438.93 | 7 | 22 | 0.52 | 877.40 | 874 | 9 | 2.06E-03 | **** | 3.77E+00 | T |
| 0 | 537.06 | 11 | 15 | 3.85 | 1073.72 | 1066 | 12 | 3.04E-03 | **** | 3.27E+00 | |
| 0 | 564.97 | 22 | 12 | 6.02 | 1129.57 | 1121 | 16 | 6.12E-03 | 82.3 | 3.15E+00 | |
| 0 | 789.47 | 9 | 2 | 0.92 | 1578.74 | 1576 | 6 | 2.40E-03 | 91.2 | 2.45E+00 | |
| 0 | 805.96 | 19 | 5 | 3.90 | 1611.74 | 1606 | 12 | 5.24E-03 | 68.7 | 2.41E+00 | |
| 0 | 911.32 | 10 | 0 | 1.50 | 1822.54 | 1819 | 7 | 2.74E-03 | 82.0 | 2.19E+00 | T |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:36.76

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1   *
* Acquisition date : 12-FEB-2014 14:36:55 Sensitivity     : 3.000          *
* Detector ID      : GAM27                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****          *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID          *
* Sample ID        : G1203023699          Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| K-40 | 1.921E-01 |
| RU-103 | 2.606E-02 |
| TH-229 | 2.790E-01 |
| AM-243 | 2.403E-02 |
| ANH-511 | 1.494E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 1.710E-01 | NOT IDENT. |
| NA-22 | 2.182E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 1.884E-02 | NOT IDENT. |
| SC-46 | 2.346E-02 | NOT IDENT. |
| V-48 | 4.262E-02 | NOT IDENT. |
| CR-51 | 2.808E-01 | NOT IDENT. |
| MN-54 | 2.333E-02 | NOT IDENT. |
| CO-56 | 2.123E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 1.484E-02 | NOT IDENT. |
| CO-58 | 2.106E-02 | NOT IDENT. |
| FE-59 | 5.032E-02 | NOT IDENT. |
| CO-60 | 2.552E-02 | NOT IDENT. |
| ZN-65 | 5.327E-02 | NOT IDENT. |
| GE-68 | 6.109E-01 | NOT IDENT. |
| AS-73 | 2.807E-01 | NOT IDENT. |
| AS-74 | 6.406E-02 | NOT IDENT. |
| SE-75 | 2.661E-02 | NOT IDENT. |
| BR-77 | 4.040E+01 | FAIL ABUN |
| SR-82 | 1.929E-01 | NOT IDENT. |
| RB-83 | 4.012E-02 | NOT IDENT. |
| KR-85 | 6.216E+00 | NOT IDENT. |
| SR-85 | 3.525E-02 | NOT IDENT. |
| RB-86 | 4.813E-01 | NOT IDENT. |
| Y-88 | 2.207E-02 | NOT IDENT. |

| | | |
|---|---|---|
| Y-91 | 1.238E+01 | NOT IDENT. |
| NB-94 | 2.034E-02 | NOT IDENT. |
| NB-95 | 2.419E-02 | NOT IDENT. |
| NB-95M | 6.533E-02 | NOT IDENT. |
| ZR-95 | 4.368E-02 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 2.287E+01 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.577E-02 | NOT IDENT. |
| RH-102 | 3.237E-02 | NOT IDENT. |
| RH-106 | 1.674E-01 | NOT IDENT. |
| RU-106 | 1.674E-01 | NOT IDENT. |
| AG-108M | 1.658E-02 | NOT IDENT. |
| CD-109 | 3.551E-01 | NOT IDENT. |
| AG-110M | 2.992E-02 | NOT IDENT. |
| SN-113 | 3.098E-02 | NOT IDENT. |
| CD-115 | 3.935E+01 | NOT IDENT. |
| SN-117M | 4.437E-02 | NOT IDENT. |
| TE-123M | 1.677E-02 | NOT IDENT. |
| SB-124 | 5.548E-02 | NOT IDENT. |
| SB-125 | 5.958E-02 | NOT IDENT. |
| TE-125M | 4.709E+00 | NOT IDENT. |
| I-126 | 2.051E-01 | NOT IDENT. |
| SB-126 | 1.088E-01 | NOT IDENT. |
| SN-126 | 3.369E-02 | FAIL ABUN |
| SB-127 | 2.629E+00 | NOT IDENT. |
| I-131 | 1.291E-01 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.600E+00 | FAIL ABUN |
| BA-133 | 2.540E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 1.969E-02 | NOT IDENT. |
| CS-135 | 8.072E-02 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 8.754E-02 | NOT IDENT. |
| BA-137M | 2.103E-02 | NOT IDENT. |
| CS-137 | 2.222E-02 | NOT IDENT. |
| CE-139 | 1.564E-02 | NOT IDENT. |
| BA-140 | 7.653E-02 | NOT IDENT. |
| LA-140 | 7.653E-02 | NOT IDENT. |
| CE-141 | 4.486E-02 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 1.129E-01 | NOT IDENT. |
| PM-144 | 2.154E-02 | NOT IDENT. |
| PR-144 | 1.623E+00 | NOT IDENT. |
| PM-146 | 2.224E-02 | NOT IDENT. |
| ND-147 | 4.636E-01 | FAIL ABUN |
| PM-147 | 4.444E+02 | NOT IDENT. |
| PM-149 | 4.124E+02 | NOT IDENT. |
| EU-150 | 1.615E-02 | FAIL ABUN |
| EU-152 | 6.363E-02 | NOT IDENT. |
| GD-153 | 3.489E-02 | NOT IDENT. |
| EU-154 | 6.161E-02 | NOT IDENT. |
| EU-155 | 5.185E-02 | NOT IDENT. |
| TB-160 | 8.276E-02 | NOT IDENT. |
| HO-166M | 3.444E-02 | NOT IDENT. |
| TM-171 | 6.121E+00 | NOT IDENT. |
| LU-176 | 1.403E-02 | FAIL ABUN |
| HF-181 | 3.436E-02 | NOT IDENT. |
| TA-182 | 7.501E-02 | NOT IDENT. |
| RE-183 | 7.310E-02 | NOT IDENT. |
| RE-184 | 5.971E-02 | NOT IDENT. |
| W-188 | 4.176E+00 | FAIL ABUN |
| IR-192 | 2.431E-02 | NOT IDENT. |
| HG-203 | 2.299E-02 | FAIL ABUN |
| BI-207 | 2.954E-02 | FAIL ABUN |
| TL-208 | 1.941E-02 | NOT IDENT. |
| PB-210 | 1.260E+00 | NOT IDENT. |
| BI-211 | 1.437E-01 | FAIL ABUN |
| PB-211 | 3.421E-01 | NOT IDENT. |
| BI-212 | 2.716E-01 | NOT IDENT. |
| PB-212 | 3.944E-02 | FAIL ABUN |
| BI-214 | 5.423E-02 | FAIL ABUN |
| PB-214 | 5.286E-02 | FAIL ABUN |
| RN-219 | 2.042E-01 | NOT IDENT. |
| RN-222 | 5.423E-02 | FAIL ABUN |
| RA-223 | 4.077E-01 | FAIL ABUN |

| | | |
|---|---|---|
| RA-224 | 3.314E-01 | NOT IDENT. |
| RA-226 | 5.423E-02 | FAIL ABUN |
| AC-227 | 1.522E-01 | NOT IDENT. |
| TH-227 | 1.522E-01 | NOT IDENT. |
| AC-228 | 9.207E-02 | FAIL ABUN |
| RA-228 | 9.207E-02 | FAIL ABUN |
| TH-228 | 3.944E-02 | FAIL ABUN |
| TH-230 | 5.423E-02 | FAIL ABUN |
| PA-231 | 8.409E-01 | NOT IDENT. |
| TH-231 | 4.077E-01 | FAIL ABUN |
| TH-232 | 9.207E-02 | FAIL ABUN |
| PA-233 | 2.785E-02 | NOT IDENT. |
| PA-234 | 2.002E-01 | NOT IDENT. |
| PA-234M | 2.778E+00 | NOT IDENT. |
| TH-234 | 7.086E-01 | FAIL ABUN |
| U-234 | 5.423E-02 | FAIL ABUN |
| U-235 | 1.222E-01 | FAIL ABUN |
| NP-237 | 2.785E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 7.086E-01 | FAIL ABUN |
| NP-239 | 2.137E-01 | NOT IDENT. |
| PU-239 | 1.629E+02 | NOT IDENT. |
| AM-241 | 5.987E-02 | NOT IDENT. |
| CM-243 | 5.435E-02 | NOT IDENT. |
| CM-247 | 1.834E-02 | NOT IDENT. |
| CF-249 | 1.943E-02 | NOT IDENT. |
| CF-251 | 6.733E-02 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:37:41.86

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023699.CNF;1  *
* Acquisition date : 12-FEB-2014 14:36:55 Sensitivity     : 3.000       *
* Detector ID      : GAM27                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****       *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203023699          Analyst initials: RXF2        *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM  *
*                                         Quantity Err(%) : 1.5328E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  7-SEP-2013 09:46:07 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_500MLMB.CNF;7     *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| K-40 | 3.794E-01 | 3.359E-01 | 3.359E-01 |
| RU-103 | 3.637E-02 | 4.560E-02 | 4.560E-02 |
| TH-229 | -2.548E-01 | 3.781E-01 | 3.781E-01 |
| AM-243 | 3.454E-02 | 5.165E-02 | 5.165E-02 |
| ANH-511 | 1.310E-02 | 5.823E-02 | 5.823E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | -2.252E-01 | 2.506E-01 | 2.704E-01 | NOT IDENT. |
| NA-22 | 7.698E-03 | 2.374E-02 | 2.399E-02 | NOT IDENT. |
| NA-24 | -1.792E+08 | 4.666E+08 | 4.736E+08 | SHORT HLIF |
| AL-26 | 9.673E-03 | 1.804E-02 | 1.856E-02 | NOT IDENT. |
| SC-46 | -1.173E-02 | 3.066E-02 | 3.112E-02 | NOT IDENT. |
| V-48 | -1.431E-02 | 5.558E-02 | 5.595E-02 | NOT IDENT. |
| CR-51 | -8.963E-02 | 3.431E-01 | 3.454E-01 | NOT IDENT. |
| MN-54 | -2.707E-03 | 2.838E-02 | 2.840E-02 | NOT IDENT. |
| CO-56 | -6.148E-03 | 2.680E-02 | 2.695E-02 | NOT IDENT. |
| MN-56 | -1.000E+41 | 4.271E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 8.839E-04 | 1.783E-02 | 1.784E-02 | NOT IDENT. |
| CO-58 | -1.240E-02 | 3.288E-02 | 3.335E-02 | NOT IDENT. |
| FE-59 | -8.837E-03 | 6.076E-02 | 6.089E-02 | NOT IDENT. |
| CO-60 | 7.923E-03 | 2.841E-02 | 2.863E-02 | NOT IDENT. |
| ZN-65 | -1.064E-02 | 6.425E-02 | 6.443E-02 | NOT IDENT. |
| GE-68 | 2.590E-01 | 6.700E-01 | 6.801E-01 | NOT IDENT. |
| AS-73 | -2.642E-01 | 3.625E-01 | 3.816E-01 | NOT IDENT. |
| AS-74 | -2.893E-02 | 7.975E-02 | 8.081E-02 | NOT IDENT. |
| SE-75 | 1.544E-02 | 2.927E-02 | 3.008E-02 | NOT IDENT. |
| BR-77 | 4.012E+01 | 5.363E+01 | 5.660E+01 | FAIL ABUN |
| SR-82 | -8.283E-02 | 2.478E-01 | 2.506E-01 | NOT IDENT. |
| RB-83 | -2.511E-02 | 5.391E-02 | 5.508E-02 | NOT IDENT. |
| KR-85 | 1.184E+01 | 6.730E+00 | 8.591E+00 | NOT IDENT. |
| SR-85 | 6.708E-02 | 3.818E-02 | 4.870E-02 | NOT IDENT. |
| RB-86 | 2.042E-01 | 5.279E-01 | 5.359E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| Y-88 | -4.088E-03 | 2.739E-02 | 2.745E-02 | NOT IDENT. |
| Y-91 | 4.612E+00 | 1.358E+01 | 1.373E+01 | NOT IDENT. |
| NB-94 | 3.821E-04 | 2.394E-02 | 2.395E-02 | NOT IDENT. |
| NB-95 | -2.812E-03 | 2.973E-02 | 2.976E-02 | NOT IDENT. |
| NB-95M | 2.211E-03 | 8.578E-02 | 8.579E-02 | NOT IDENT. |
| ZR-95 | -5.954E-03 | 5.297E-02 | 5.304E-02 | NOT IDENT. |
| NB-97 | 1.000E+41 | 6.077E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 8.431E+08 | 8.815E+08 | 9.600E+08 | SHORT HLIF |
| MO-99 | -2.814E+01 | 3.461E+01 | 3.686E+01 | NOT IDENT. |
| TC-99M | 1.562E+23 | 1.472E+24 | 0.000E+00 | SHORT HLIF |
| RH-101 | -1.116E-02 | 2.054E-02 | 2.115E-02 | NOT IDENT. |
| RH-102 | -1.585E-02 | 4.055E-02 | 4.118E-02 | NOT IDENT. |
| RH-106 | -5.288E-02 | 2.056E-01 | 2.070E-01 | NOT IDENT. |
| RU-106 | -5.288E-02 | 2.056E-01 | 2.070E-01 | NOT IDENT. |
| AG-108M | -6.284E-03 | 2.433E-02 | 2.450E-02 | NOT IDENT. |
| CD-109 | 2.085E-01 | 4.004E-01 | 4.113E-01 | NOT IDENT. |
| AG-110M | 9.189E-03 | 3.399E-02 | 3.424E-02 | NOT IDENT. |
| SN-113 | 3.100E-02 | 3.295E-02 | 3.579E-02 | NOT IDENT. |
| CD-115 | -2.232E+01 | 5.317E+01 | 5.411E+01 | NOT IDENT. |
| SN-117M | 3.621E-02 | 5.011E-02 | 5.270E-02 | NOT IDENT. |
| TE-123M | 2.152E-02 | 1.792E-02 | 2.038E-02 | NOT IDENT. |
| SB-124 | 2.237E-02 | 5.849E-02 | 5.935E-02 | NOT IDENT. |
| SB-125 | 4.266E-02 | 6.556E-02 | 6.832E-02 | NOT IDENT. |
| TE-125M | 4.484E-01 | 6.257E+00 | 6.260E+00 | NOT IDENT. |
| I-126 | 8.612E-02 | 2.279E-01 | 2.312E-01 | NOT IDENT. |
| SB-126 | -1.190E-01 | 1.512E-01 | 1.604E-01 | NOT IDENT. |
| SN-126 | 1.591E-02 | 3.834E-02 | 3.901E-02 | FAIL ABUN |
| SB-127 | 1.320E+00 | 2.875E+00 | 2.936E+00 | NOT IDENT. |
| I-131 | 7.366E-02 | 1.440E-01 | 1.478E-01 | NOT IDENT. |
| I-132 | 1.000E+41 | 2.207E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.031E-01 | 1.846E+00 | 1.846E+00 | FAIL ABUN |
| BA-133 | -1.719E-02 | 3.255E-02 | 3.346E-02 | NOT IDENT. |
| I-133 | 4.207E+05 | 6.582E+05 | 6.850E+05 | SHORT HLIF |
| CS-134 | -1.169E-02 | 2.656E-02 | 2.707E-02 | NOT IDENT. |
| CS-135 | 1.708E-03 | 9.434E-02 | 9.435E-02 | NOT IDENT. |
| I-135 | -1.788E+21 | 4.009E+22 | 0.000E+00 | SHORT HLIF |
| CS-136 | -6.560E-02 | 1.210E-01 | 1.246E-01 | NOT IDENT. |
| BA-137M | -3.083E-03 | 2.524E-02 | 2.527E-02 | NOT IDENT. |
| CS-137 | -3.257E-03 | 2.666E-02 | 2.670E-02 | NOT IDENT. |
| CE-139 | -7.678E-03 | 2.024E-02 | 2.054E-02 | NOT IDENT. |
| BA-140 | -5.876E-02 | 1.090E-01 | 1.122E-01 | NOT IDENT. |
| LA-140 | -5.876E-02 | 1.090E-01 | 1.122E-01 | NOT IDENT. |
| CE-141 | 4.855E-02 | 4.964E-02 | 5.425E-02 | NOT IDENT. |
| CE-143 | 2.608E+02 | 2.066E+03 | 2.070E+03 | SHORT HLIF |
| CE-144 | 4.970E-02 | 1.313E-01 | 1.332E-01 | NOT IDENT. |
| PM-144 | -1.089E-02 | 2.714E-02 | 2.758E-02 | NOT IDENT. |
| PR-144 | -7.974E-01 | 2.041E+00 | 2.072E+00 | NOT IDENT. |
| PM-146 | -1.642E-02 | 2.985E-02 | 3.075E-02 | NOT IDENT. |
| ND-147 | 2.970E-01 | 5.645E-01 | 5.802E-01 | FAIL ABUN |
| PM-147 | 2.662E+02 | 5.084E+02 | 5.224E+02 | NOT IDENT. |
| PM-149 | -8.050E+01 | 4.947E+02 | 4.961E+02 | NOT IDENT. |
| EU-150 | -3.699E-04 | 1.892E-02 | 1.892E-02 | FAIL ABUN |
| EU-152 | 2.739E-02 | 7.226E-02 | 7.331E-02 | NOT IDENT. |
| GD-153 | -4.462E-02 | 5.467E-02 | 5.825E-02 | NOT IDENT. |
| EU-154 | 2.174E-02 | 6.703E-02 | 6.775E-02 | NOT IDENT. |
| EU-155 | 5.192E-03 | 6.158E-02 | 6.162E-02 | NOT IDENT. |
| TB-160 | 3.489E-02 | 9.190E-02 | 9.324E-02 | NOT IDENT. |
| HO-166M | 4.408E-03 | 3.987E-02 | 3.992E-02 | NOT IDENT. |
| TM-171 | 5.810E-01 | 7.082E+00 | 7.087E+00 | NOT IDENT. |
| LU-176 | 3.660E-03 | 1.603E-02 | 1.612E-02 | FAIL ABUN |
| HF-181 | 3.193E-02 | 3.702E-02 | 3.972E-02 | NOT IDENT. |
| TA-182 | -7.550E-02 | 1.085E-01 | 1.137E-01 | NOT IDENT. |
| RE-183 | -9.252E-02 | 1.018E-01 | 1.100E-01 | NOT IDENT. |
| RE-184 | -6.770E-02 | 8.991E-02 | 9.495E-02 | NOT IDENT. |
| W-188 | -4.234E+00 | 5.478E+00 | 5.801E+00 | FAIL ABUN |
| IR-192 | 7.331E-03 | 2.788E-02 | 2.808E-02 | NOT IDENT. |
| HG-203 | -1.312E-02 | 2.868E-02 | 2.929E-02 | FAIL ABUN |
| BI-207 | 9.431E-03 | 3.375E-02 | 3.402E-02 | FAIL ABUN |
| TL-208 | -1.733E-02 | 2.492E-02 | 2.612E-02 | NOT IDENT. |
| PB-210 | -6.880E-01 | 1.405E+00 | 1.438E+00 | NOT IDENT. |
| BI-211 | -8.583E-03 | 1.708E-01 | 1.708E-01 | FAIL ABUN |
| PB-211 | -1.053E-01 | 4.301E-01 | 4.327E-01 | NOT IDENT. |
| BI-212 | -1.981E-01 | 3.440E-01 | 3.554E-01 | NOT IDENT. |
| PB-212 | 3.871E-02 | 4.577E-02 | 4.898E-02 | FAIL ABUN |
| BI-214 | 1.961E-04 | 7.779E-02 | 7.779E-02 | FAIL ABUN |
| PB-214 | 1.107E-02 | 6.121E-02 | 6.141E-02 | FAIL ABUN |
| RN-219 | -5.018E-02 | 2.540E-01 | 2.550E-01 | NOT IDENT. |
| RN-222 | 1.961E-04 | 7.779E-02 | 7.779E-02 | FAIL ABUN |

| | | | | |
|---|---|---|---|---|
| RA-223 | -2.495E-01 | 5.217E-01 | 5.337E-01 | FAIL ABUN |
| RA-224 | -1.299E-01 | 4.006E-01 | 4.048E-01 | NOT IDENT. |
| RA-226 | 1.961E-04 | 7.779E-02 | 7.779E-02 | FAIL ABUN |
| AC-227 | -1.493E-02 | 1.795E-01 | 1.796E-01 | NOT IDENT. |
| TH-227 | -1.493E-02 | 1.795E-01 | 1.796E-01 | NOT IDENT. |
| AC-228 | 1.007E-01 | 8.201E-02 | 9.374E-02 | FAIL ABUN |
| RA-228 | 1.007E-01 | 8.201E-02 | 9.374E-02 | FAIL ABUN |
| TH-228 | 3.871E-02 | 4.577E-02 | 4.898E-02 | FAIL ABUN |
| TH-230 | 1.961E-04 | 7.778E-02 | 7.778E-02 | FAIL ABUN |
| PA-231 | 4.386E-02 | 9.829E-01 | 9.831E-01 | NOT IDENT. |
| TH-231 | -2.495E-01 | 5.217E-01 | 5.337E-01 | FAIL ABUN |
| TH-232 | 1.007E-01 | 8.201E-02 | 9.374E-02 | FAIL ABUN |
| PA-233 | -3.985E-02 | 3.954E-02 | 4.343E-02 | NOT IDENT. |
| PA-234 | 1.845E-01 | 2.944E-01 | 3.059E-01 | NOT IDENT. |
| PA-234M | 3.350E-01 | 3.190E+00 | 3.194E+00 | NOT IDENT. |
| TH-234 | 1.158E-01 | 1.141E+00 | 1.142E+00 | FAIL ABUN |
| U-234 | 1.961E-04 | 7.778E-02 | 7.778E-02 | FAIL ABUN |
| U-235 | -5.694E-02 | 1.514E-01 | 1.536E-01 | FAIL ABUN |
| NP-237 | -3.985E-02 | 3.954E-02 | 4.343E-02 | NOT IDENT. |
| NP-238 | -5.100E+01 | 1.030E+02 | 1.055E+02 | SHORT HLIF |
| U-238 | 1.158E-01 | 1.141E+00 | 1.142E+00 | FAIL ABUN |
| NP-239 | 4.569E-02 | 2.523E-01 | 2.531E-01 | NOT IDENT. |
| PU-239 | -1.869E+02 | 2.205E+02 | 2.361E+02 | NOT IDENT. |
| AM-241 | 2.113E-02 | 7.524E-02 | 7.584E-02 | NOT IDENT. |
| CM-243 | 1.305E-02 | 6.366E-02 | 6.393E-02 | NOT IDENT. |
| CM-247 | -8.060E-03 | 2.347E-02 | 2.375E-02 | NOT IDENT. |
| CF-249 | -1.721E-02 | 2.626E-02 | 2.738E-02 | NOT IDENT. |
| CF-251 | -2.202E-02 | 8.582E-02 | 8.639E-02 | NOT IDENT. |

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 44.8607 | 94.67 | 28.7425 | 193.51 | 46.2830 |
| 45.60 | 35.2062 | 94.87 | 28.7530 | 197.03 | 30.6649 |
| 46.54 | 31.6815 | 97.43 | 38.0068 | 198.01 | 40.1163 |
| 49.72 | 47.4930 | 98.43 | 32.8960 | 201.83 | 41.1576 |
| 51.35 | 27.5220 | 98.44 | 32.8965 | 205.31 | 39.8455 |
| 52.39 | 34.0388 | 99.53 | 29.5009 | 210.85 | 40.6666 |
| 53.44 | 40.5915 | 100.11 | 28.5126 | 215.65 | 39.9799 |
| 57.36 | 0.0000 | 103.18 | 34.8062 | 222.11 | 37.5588 |
| 57.53 | 43.8178 | 103.37 | 34.8176 | 227.09 | 33.2515 |
| 57.98 | 48.1604 | 105.21 | 33.8992 | 227.38 | 29.6651 |
| 59.32 | 40.7356 | 105.31 | 33.9049 | 228.16 | 30.5875 |
| 59.54 | 35.1359 | 106.12 | 33.9510 | 228.18 | 30.5881 |
| 63.29 | 35.9275 | 109.28 | 27.9242 | 117.23 | 30.5881 |
| 63.58 | 35.9521 | 111.00 | 31.1143 | 235.69 | 28.9990 |
| 64.28 | 32.6944 | 111.76 | 28.0374 | 235.96 | 29.0066 |
| 66.73 | 44.3165 | 116.30 | 32.9482 | 238.63 | 34.8967 |
| 67.24 | 38.6430 | 117.23 | 35.6152 | 238.98 | 37.2717 |
| 67.75 | 42.9863 | 121.12 | 42.1535 | 240.99 | 37.3427 |
| 69.67 | 46.0498 | 121.22 | 37.9440 | 242.00 | 37.3780 |
| 70.83 | 50.4959 | 121.78 | 41.1411 | 244.70 | 33.6341 |
| 72.81 | 49.2649 | 122.06 | 43.2695 | 252.40 | 27.6144 |
| 72.87 | 49.2711 | 123.07 | 41.2219 | 252.80 | 29.4661 |
| 74.66 | 49.4599 | 127.23 | 43.6066 | 254.15 | 0.0000 |
| 74.82 | 49.4768 | 129.30 | 46.9401 | 256.23 | 35.0997 |
| 74.97 | 49.4926 | 131.20 | 34.2331 | 260.90 | 31.5367 |
| 77.11 | 39.4795 | 133.02 | 38.6136 | 264.66 | 22.3352 |
| 79.69 | 41.1592 | 133.52 | 35.4210 | 268.22 | 25.2058 |
| 80.12 | 36.7813 | 136.00 | 37.7006 | 269.46 | 26.1675 |
| 80.19 | 36.7865 | 136.47 | 43.1152 | 271.23 | 27.1437 |
| 80.57 | 33.8695 | 140.51 | 40.1070 | 273.65 | 27.2003 |
| 81.00 | 38.3204 | 143.76 | 46.8195 | 276.40 | 31.9653 |
| 81.07 | 33.9036 | 144.24 | 43.5811 | 277.37 | 33.8730 |
| 83.79 | 42.9796 | 145.44 | 34.9219 | 277.60 | 33.8802 |
| 85.43 | 32.7098 | 152.43 | 27.5370 | 278.00 | 28.2426 |
| 86.55 | 32.7806 | 153.25 | 35.2852 | 279.20 | 26.3867 |
| 86.79 | 32.7956 | 323.87 | 35.3291 | 279.54 | 29.2224 |
| 86.94 | 32.8051 | 156.02 | 42.0515 | 280.46 | 26.4149 |
| 87.09 | 32.8145 | 158.56 | 31.0861 | 283.69 | 28.3786 |
| 87.57 | 32.8446 | 159.00 | 22.2168 | 284.31 | 29.3397 |
| 88.03 | 32.8734 | 162.33 | 40.1580 | 285.41 | 29.3667 |
| 88.34 | 32.8927 | 163.33 | 22.3378 | 285.90 | 32.2216 |
| 88.47 | 32.9010 | 165.86 | 39.2141 | 287.50 | 30.3667 |
| 89.96 | 32.9935 | 176.31 | 37.4416 | 290.67 | 37.1064 |
| 91.11 | 33.0643 | 176.60 | 37.4543 | 293.27 | 0.0000 |
| 92.59 | 33.1548 | 177.52 | 37.4949 | 351.93 | 24.8297 |
| 93.35 | 33.2011 | 181.07 | 23.9593 | 295.96 | 28.6665 |
| 94.56 | 28.7369 | 184.41 | 25.7696 | 879.38 | 30.6426 |
| 94.65 | 28.7415 | 143.76 | 26.3815 | 299.98 | 26.8426 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.09 | 26.8447 | 487.02 | 19.5340 | 702.65 | 16.3679 |
| 300.13 | 24.9280 | 492.35 | 6.9659 | 706.68 | 11.5731 |
| 301.36 | 23.9929 | 497.08 | 17.4602 | 711.68 | 12.5636 |
| 302.85 | 23.0607 | 505.52 | 12.2784 | 720.70 | 20.3704 |
| 256.23 | 27.9017 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 306.78 | 19.2773 | 511.00 | 14.2938 | 722.78 | 9.7085 |
| 308.46 | 16.4073 | 514.00 | 15.8585 | 722.91 | 10.6799 |
| 311.90 | 27.0968 | 514.00 | 15.8585 | 723.31 | 10.6818 |
| 316.51 | 29.1362 | 520.40 | 19.8907 | 724.19 | 11.6569 |
| 319.41 | 31.1479 | 520.69 | 19.8935 | 727.33 | 13.6172 |
| 320.08 | 36.0334 | 522.65 | 0.0000 | 733.00 | 10.7237 |
| 321.04 | 30.2124 | 527.90 | 14.4223 | 735.93 | 6.8323 |
| 323.87 | 37.1140 | 529.59 | 8.8831 | 333.97 | 9.7664 |
| 325.23 | 33.2415 | 529.87 | 0.0000 | 739.50 | 11.7293 |
| 328.76 | 28.4287 | 531.02 | 8.8896 | 747.24 | 10.7852 |
| 333.37 | 25.5755 | 546.56 | 0.0000 | 748.06 | 7.8463 |
| 333.97 | 22.6347 | 552.55 | 15.7295 | 752.31 | 7.8596 |
| 334.37 | 24.6101 | 563.25 | 19.8806 | 753.82 | 11.7964 |
| 338.28 | 26.6556 | 569.33 | 7.5531 | 756.73 | 13.7782 |
| 338.32 | 26.6564 | 946.00 | 7.5537 | 756.80 | 13.7785 |
| 311.90 | 26.6984 | 569.70 | 7.5545 | 884.68 | 14.8041 |
| 340.48 | 26.6984 | 583.19 | 15.5129 | 765.81 | 11.8521 |
| 340.55 | 25.7112 | 584.27 | 13.6952 | 766.42 | 12.8426 |
| 344.28 | 25.7810 | 595.83 | 17.4437 | 766.84 | 12.8448 |
| 345.93 | 25.8116 | 427.87 | 19.3235 | 772.60 | 0.0000 |
| 351.06 | 31.8853 | 602.52 | 0.0000 | 776.52 | 11.9013 |
| 351.93 | 28.9142 | 602.73 | 21.4922 | 739.50 | 11.9077 |
| 355.39 | 0.0000 | 604.72 | 21.5121 | 778.90 | 13.8975 |
| 356.01 | 33.9974 | 609.32 | 13.8593 | 783.70 | 17.4039 |
| 364.49 | 20.1175 | 610.33 | 23.1097 | 785.37 | 13.2686 |
| 366.42 | 20.1443 | 614.28 | 15.8756 | 792.07 | 3.3257 |
| 375.05 | 23.3036 | 618.01 | 19.4814 | 794.95 | 9.9878 |
| 356.01 | 24.4611 | 620.36 | 11.1442 | 795.86 | 9.9912 |
| 388.16 | 23.5092 | 621.93 | 14.8699 | 810.29 | 13.3942 |
| 388.63 | 20.4492 | 630.19 | 0.0000 | 344.28 | 13.3949 |
| 391.69 | 16.3923 | 631.29 | 19.6003 | 810.76 | 13.3965 |
| 264.66 | 15.4580 | 633.25 | 18.6836 | 815.77 | 10.0662 |
| 401.81 | 18.5633 | 634.78 | 17.7615 | 1048.07 | 14.1066 |
| 402.40 | 19.6019 | 635.95 | 14.0299 | 832.01 | 19.2403 |
| 404.85 | 17.5663 | 636.99 | 13.1007 | 834.85 | 16.2191 |
| 410.95 | 21.7841 | 645.85 | 9.3948 | 835.71 | 15.2102 |
| 413.71 | 29.0959 | 657.76 | 15.1113 | 836.80 | 0.0000 |
| 414.70 | 20.7959 | 657.90 | 0.0000 | 846.75 | 0.0000 |
| 427.09 | 20.9567 | 661.66 | 17.0292 | 846.77 | 11.1987 |
| 427.87 | 16.7734 | 664.57 | 0.0000 | 856.80 | 13.2825 |
| 433.94 | 21.8867 | 666.33 | 15.1684 | 860.56 | 9.2079 |
| 439.40 | 17.9473 | 666.50 | 15.1691 | 871.09 | 11.2959 |
| 453.88 | 22.3618 | 667.71 | 0.0000 | 873.19 | 8.2215 |
| 463.37 | 29.9811 | 677.62 | 13.3373 | 875.33 | 0.0000 |
| 468.07 | 15.0312 | 685.70 | 11.4715 | 879.38 | 8.2393 |
| 473.00 | 18.3037 | 695.00 | 18.2346 | 880.51 | 12.3636 |
| 475.06 | 7.5456 | 696.49 | 22.0875 | 883.24 | 12.3756 |
| 476.78 | 20.5009 | 696.51 | 22.0875 | 884.68 | 9.2863 |
| 477.60 | 23.7490 | 697.00 | 21.1320 | 889.28 | 14.4683 |
| 482.18 | 15.1521 | 697.49 | 21.1363 | 894.76 | 11.3894 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 898.04 | 9.3292 | 1298.22 | 0.0000 | | |
| 903.28 | 12.4611 | 1312.11 | 3.8999 | | |
| 911.20 | 9.3711 | 1332.49 | 6.8596 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 6.2798 | 1365.19 | 2.9635 | | |
| 937.49 | 8.4037 | 1368.63 | 0.0000 | | |
| 944.13 | 10.5276 | 1384.29 | 5.9546 | | |
| 946.00 | 6.3205 | 1408.01 | 4.9902 | | |
| 949.00 | 10.5444 | 1457.56 | 0.0000 | | |
| 667.71 | 0.0000 | 1460.82 | 5.0523 | | |
| 962.31 | 8.4723 | 1489.16 | 6.1021 | | |
| 964.08 | 14.8350 | 1505.03 | 7.1444 | | |
| 966.17 | 13.7849 | 1596.21 | 9.3710 | | |
| 968.97 | 10.6133 | 1620.50 | 3.1398 | | |
| 983.53 | 8.5303 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 2.1239 | | |
| 1274.44 | 9.6354 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.5055 | 1764.49 | 7.5440 | | |
| 1004.73 | 8.5877 | 1063.66 | 4.3156 | | |
| 507.63 | 0.0000 | 1771.35 | 3.2374 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 0.9317 | | |
| 1037.84 | 8.6762 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 3.7464 | | |
| 631.29 | 11.9614 | | | | |
| 1048.07 | 16.3184 | | | | |
| 1049.04 | 15.2346 | | | | |
| 1050.41 | 13.0641 | | | | |
| 1063.66 | 7.6511 | | | | |
| 1077.00 | 4.3895 | | | | |
| 1077.34 | 4.3898 | | | | |
| 1085.87 | 9.1687 | | | | |
| 1099.45 | 9.2049 | | | | |
| 1112.07 | 10.1626 | | | | |
| 1112.84 | 9.2407 | | | | |
| 1115.54 | 13.8721 | | | | |
| 1120.29 | 12.0389 | | | | |
| 1120.55 | 13.8916 | | | | |
| 1221.41 | 12.0420 | | | | |
| 1129.67 | 10.2140 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 9.3994 | | | | |
| 1177.95 | 9.4116 | | | | |
| 1189.05 | 5.6643 | | | | |
| 1204.77 | 7.5846 | | | | |
| 1221.41 | 10.4754 | | | | |
| 1231.02 | 4.7738 | | | | |
| 1235.36 | 4.7793 | | | | |
| 1238.28 | 5.7395 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 6.7550 | | | | |
| 1274.44 | 4.8283 | | | | |
| 1274.54 | 4.8283 | | | | |
| 1291.59 | 6.7892 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:49.70

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM28.CNF;115
                                        Background date  : 9-FEB-2014 11:22:34.
Sample date      : 6-NOV-2013 14:35:00. Acquisition date : 12-FEB-2014 14:38:29
Sample ID        : G1203023700          Sample quantity  : 1.02375E+02 GRAM
Detector name    : GAM28                Detector geometry: 500MLMB
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.18  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 47.02* | 15 | 25 | 1.61 | 94.69 | 91 | 10 | 4.16E-03 | 76.6 | |
| 2 | 0 | 77.33 | 19 | 28 | 1.50 | 155.30 | 152 | 7 | 5.17E-03 | 53.5 | |
| 3 | 0 | 92.39* | 15 | 62 | 1.25 | 185.42 | 179 | 12 | 4.26E-03 | 121.2 | |
| 4 | 0 | 112.62* | 24 | 42 | 1.01 | 225.88 | 221 | 11 | 6.66E-03 | 58.1 | |
| 5 | 0 | 189.34 | 16 | 23 | 1.18 | 379.31 | 376 | 7 | 4.31E-03 | 56.9 | |
| 6 | 0 | 238.11* | 21 | 26 | 2.88 | 476.83 | 472 | 11 | 5.76E-03 | 57.7 | |
| 7 | 0 | 317.90 | 10 | 57 | 4.37 | 636.40 | 620 | 19 | 2.78E-03 | 183.8 | |
| 8 | 0 | 342.62 | 12 | 9 | 1.72 | 685.84 | 683 | 6 | 3.23E-03 | 50.6 | |
| 9 | 0 | 351.36* | 13 | 17 | 1.15 | 703.31 | 697 | 11 | 3.56E-03 | 71.1 | |
| 10 | 0 | 366.01 | 25 | 18 | 3.71 | 732.61 | 726 | 14 | 7.03E-03 | 40.3 | |
| 11 | 0 | 479.59 | 11 | 3 | 0.71 | 959.75 | 956 | 7 | 3.00E-03 | 41.6 | |
| 12 | 0 | 510.46* | 4 | 20 | 2.87 | 1021.49 | 1015 | 17 | 1.05E-03 | 382.2 | |
| 13 | 0 | 603.62 | 6 | 10 | 0.89 | 1207.79 | 1203 | 8 | 1.60E-03 | 104.3 | |
| 14 | 0 | 637.59 | 8 | 7 | 0.63 | 1275.72 | 1270 | 9 | 2.31E-03 | 66.2 | |
| 15 | 0 | 649.98 | 6 | 6 | 0.89 | 1300.50 | 1297 | 6 | 1.67E-03 | 76.4 | |
| 16 | 0 | 739.82 | 5 | 8 | 0.63 | 1480.16 | 1471 | 11 | 1.37E-03 | 121.3 | |
| 17 | 0 | 1000.75* | 0 | 2 | 1.42 | 2002.00 | 1998 | 8 | 3.81E-05 | ***** | |
| 18 | 0 | 1103.84 | 6 | 3 | 1.31 | 2208.17 | 2204 | 7 | 1.64E-03 | 66.0 | |
| 19 | 0 | 1487.35 | 6 | 0 | 1.37 | 2975.17 | 2968 | 11 | 1.67E-03 | 40.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 15:38:51

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 6-NOV-2013 14:35:00 | Acquisition date | : 12-FEB-2014 14:38:29 |
| Sample ID | : G1203023700 | Sample quantity | : 102.38 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA28 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 01:00:00.00 | Elapsed real time | : 0 01:00:00.18 0.0% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PB-210 | 46.54 | 15 | 4.25* | 5.075E-01 | 5.097E+00 | 5.140E+00 | 153.18 |
| BI-211 | 72.87 | ------ | 1.23 | 3.415E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 13 | 12.92* | 3.913E+00 | 1.859E-01 | 1.859E-01 | 142.28 |
| PB-212 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 4 | 100.00* | 3.059E+00 | 9.042E-03 | 9.042E-03 | 764.30 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:52.08

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1  *
* Acquisition date : 12-FEB-2014 14:38:29 Sensitivity     : 3.000           *
* Detector ID      : GAM28                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****           *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023700          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4         *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| PB-210 | 5.140E+00 | 7.717E+00 | 1.040E+01 |
| BI-211 | 1.859E-01 | 2.592E-01 | 3.887E-01 |
| PB-212 | 6.990E-02 | 7.899E-02 | 9.870E-02 |
| TH-228 | 6.990E-02 | 7.899E-02 | 9.870E-02 |
| ANH-511 | 9.042E-03 | 6.772E-02 | 5.369E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 2.463E-03 | 9.665E-01 | 1.652E+00 | NOT IDENT. |
| NA-22 | 3.496E-02 | 4.520E-02 | 1.069E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.028E-02 | 4.211E-02 | 9.816E-02 | NOT IDENT. |
| K-40 | 5.037E-02 | 3.655E-01 | 8.461E-01 | NOT IDENT. |
| SC-46 | -4.723E-03 | 5.806E-02 | 1.150E-01 | NOT IDENT. |
| V-48 | -6.230E-01 | 1.912E+00 | 3.719E+00 | NOT IDENT. |
| CR-51 | 4.217E-01 | 3.163E+00 | 5.269E+00 | NOT IDENT. |
| MN-54 | 1.689E-02 | 3.262E-02 | 7.241E-02 | NOT IDENT. |
| CO-56 | 4.136E-02 | 8.256E-02 | 1.723E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.104E-02 | 2.851E-02 | 5.533E-02 | NOT IDENT. |
| CO-58 | -6.819E-02 | 6.018E-02 | 8.004E-02 | NOT IDENT. |
| FE-59 | 2.005E-01 | 2.643E-01 | 5.890E-01 | NOT IDENT. |
| CO-60 | 3.177E-02 | 4.221E-02 | 9.679E-02 | NOT IDENT. |
| ZN-65 | 8.079E-02 | 9.182E-02 | 2.152E-01 | NOT IDENT. |
| GE-68 | -1.211E-01 | 1.182E+00 | 2.406E+00 | NOT IDENT. |
| AS-73 | 2.017E+00 | 2.233E+00 | 4.568E+00 | NOT IDENT. |
| AS-74 | 1.480E+00 | 2.013E+00 | 4.409E+00 | NOT IDENT. |
| SE-75 | -5.870E-02 | 6.387E-02 | 1.046E-01 | NOT IDENT. |
| BR-77 | 0.000E+00 | 3.883E+11 | 0.000E+00 | SHORT HLIF |
| SR-82 | -4.626E+00 | 2.897E+00 | 3.471E+00 | NOT IDENT. |
| RB-83 | 1.981E-02 | 9.938E-02 | 2.084E-01 | NOT IDENT. |
| KR-85 | 9.981E+00 | 7.829E+00 | 1.598E+01 | NOT IDENT. |
| SR-85 | 1.260E-01 | 9.910E-02 | 2.022E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -5.451E+00 | 1.394E+01 | 2.627E+01 | NOT IDENT. |
| Y-88 | -2.356E-02 | 7.688E-02 | 1.508E-01 | NOT IDENT. |
| Y-91 | 2.586E+01 | 4.858E+01 | 1.065E+02 | NOT IDENT. |
| NB-94 | -8.341E-03 | 3.580E-02 | 6.552E-02 | NOT IDENT. |
| NB-95 | 2.520E-02 | 7.212E-02 | 1.552E-01 | NOT IDENT. |
| NB-95M | 4.876E-02 | 3.201E-01 | 5.308E-01 | NOT IDENT. |
| ZR-95 | -2.664E-02 | 1.478E-01 | 2.807E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 5.933E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | 1.661E+10 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.064E-03 | 2.985E-02 | 5.827E-02 | NOT IDENT. |
| RH-102 | -3.803E-02 | 6.210E-02 | 8.822E-02 | NOT IDENT. |
| RU-103 | 7.252E-02 | 1.427E-01 | 3.048E-01 | NOT IDENT. |
| RH-106 | -1.342E-01 | 2.891E-01 | 5.241E-01 | NOT IDENT. |
| RU-106 | -1.342E-01 | 2.891E-01 | 5.241E-01 | NOT IDENT. |
| AG-108M | 1.224E-02 | 2.733E-02 | 5.651E-02 | NOT IDENT. |
| CD-109 | -2.926E-02 | 9.989E-01 | 1.576E+00 | NOT IDENT. |
| AG-110M | -4.457E-02 | 4.739E-02 | 7.018E-02 | NOT IDENT. |
| SN-113 | -5.328E-02 | 7.246E-02 | 1.185E-01 | NOT IDENT. |
| CD-115 | 0.000E+00 | 1.307E+12 | 0.000E+00 | SHORT HLIF |
| SN-117M | -9.872E-01 | 3.223E+00 | 5.898E+00 | NOT IDENT. |
| TE-123M | -1.746E-02 | 3.961E-02 | 7.140E-02 | NOT IDENT. |
| SB-124 | 7.579E-03 | 2.189E-01 | 4.854E-01 | FAIL ABUN |
| SB-125 | -2.895E-02 | 8.727E-02 | 1.631E-01 | NOT IDENT. |
| TE-125M | -9.608E+00 | 2.919E+01 | 4.372E+01 | NOT IDENT. |
| I-126 | -1.965E+01 | 1.837E+01 | 2.877E+01 | NOT IDENT. |
| SB-126 | 9.216E+00 | 1.439E+01 | 3.053E+01 | NOT IDENT. |
| SN-126 | -5.674E-02 | 9.146E-02 | 1.321E-01 | NOT IDENT. |
| SB-127 | 0.000E+00 | 3.452E+06 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | 1.636E+02 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | 1.244E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | 4.386E+07 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.171E-02 | 4.203E-02 | 7.907E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.876E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -5.134E-04 | 4.251E-02 | 8.159E-02 | FAIL ABUN |
| CS-135 | 1.305E-01 | 1.447E-01 | 2.962E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.838E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.552E-01 | 4.934E+00 | 1.092E+01 | NOT IDENT. |
| BA-137M | 1.674E-02 | 3.995E-02 | 8.586E-02 | NOT IDENT. |
| CS-137 | 1.769E-02 | 4.220E-02 | 9.071E-02 | NOT IDENT. |
| CE-139 | 9.717E-03 | 4.349E-02 | 8.298E-02 | NOT IDENT. |
| BA-140 | 1.536E+00 | 6.491E+00 | 1.545E+01 | NOT IDENT. |
| LA-140 | 1.536E+00 | 6.491E+00 | 1.545E+01 | NOT IDENT. |
| CE-141 | 1.228E-01 | 2.854E-01 | 5.700E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | 1.638E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.043E-01 | 2.409E-01 | 4.851E-01 | NOT IDENT. |
| PM-144 | -1.541E-04 | 3.954E-02 | 7.576E-02 | NOT IDENT. |
| PR-144 | -4.609E-02 | 3.085E+00 | 5.901E+00 | NOT IDENT. |
| PM-146 | -1.903E-02 | 4.469E-02 | 8.153E-02 | NOT IDENT. |
| ND-147 | -4.219E+01 | 8.646E+01 | 1.571E+02 | FAIL ABUN |
| PM-147 | -2.803E+01 | 7.429E+02 | 1.315E+03 | NOT IDENT. |
| PM-149 | 0.000E+00 | 1.921E+13 | 0.000E+00 | SHORT HLIF |
| EU-150 | -1.297E-03 | 2.846E-02 | 5.187E-02 | NOT IDENT. |
| EU-152 | 1.949E-02 | 1.210E-01 | 1.872E-01 | NOT IDENT. |
| GD-153 | 5.079E-02 | 1.213E-01 | 2.040E-01 | NOT IDENT. |
| EU-154 | 1.000E-01 | 1.239E-01 | 2.934E-01 | NOT IDENT. |
| EU-155 | 2.283E-02 | 1.060E-01 | 1.936E-01 | NOT IDENT. |
| TB-160 | 1.139E-01 | 1.947E-01 | 4.587E-01 | FAIL ABUN |
| HO-166M | -2.206E-02 | 5.763E-02 | 1.039E-01 | NOT IDENT. |
| TM-171 | 2.036E+01 | 2.737E+01 | 5.098E+01 | NOT IDENT. |
| LU-176 | 3.353E-03 | 2.779E-02 | 4.636E-02 | NOT IDENT. |
| HF-181 | 1.981E-02 | 1.865E-01 | 3.225E-01 | NOT IDENT. |
| TA-182 | 1.978E-01 | 2.519E-01 | 5.829E-01 | NOT IDENT. |
| RE-183 | -1.520E-01 | 5.269E-01 | 9.371E-01 | NOT IDENT. |
| RE-184 | -1.181E-01 | 5.260E-01 | 9.866E-01 | NOT IDENT. |
| W-188 | -1.219E+01 | 1.851E+01 | 3.132E+01 | NOT IDENT. |
| IR-192 | 5.334E-02 | 1.921E-01 | 1.408E-01 | FAIL ABUN |
| HG-203 | -5.385E-02 | 1.270E-01 | 2.229E-01 | NOT IDENT. |
| BI-207 | -8.475E-03 | 4.307E-02 | 8.575E-02 | NOT IDENT. |
| TL-208 | 1.724E-03 | 3.491E-02 | 7.043E-02 | NOT IDENT. |
| PB-211 | -1.735E-01 | 6.040E-01 | 1.081E+00 | NOT IDENT. |
| BI-212 | -3.329E-01 | 5.805E-01 | 1.011E+00 | NOT IDENT. |
| BI-214 | -4.980E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| PB-214 | 6.748E-02 | 9.409E-02 | 1.462E-01 | FAIL ABUN |
| RN-219 | -1.797E-01 | 3.864E-01 | 6.579E-01 | NOT IDENT. |
| RN-222 | -4.980E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| RA-223 | -2.668E-01 | 6.333E-01 | 1.104E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 8.574E-02 | 5.997E-01 | 1.006E+00 | NOT IDENT. |
| RA-226 | -4.980E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| AC-227 | 1.574E-01 | 2.282E-01 | 4.608E-01 | NOT IDENT. |
| TH-227 | 1.574E-01 | 2.282E-01 | 4.608E-01 | NOT IDENT. |
| AC-228 | 6.265E-02 | 1.276E-01 | 2.795E-01 | NOT IDENT. |
| RA-228 | 6.265E-02 | 1.276E-01 | 2.795E-01 | NOT IDENT. |
| TH-229 | -4.086E-01 | 5.500E-01 | 8.009E-01 | NOT IDENT. |
| TH-230 | -4.979E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| PA-231 | -5.275E-01 | 1.568E+00 | 2.767E+00 | NOT IDENT. |
| TH-231 | -2.668E-01 | 6.333E-01 | 1.104E+00 | NOT IDENT. |
| TH-232 | 6.265E-02 | 1.276E-01 | 2.795E-01 | NOT IDENT. |
| PA-233 | 7.610E-03 | 7.175E-02 | 1.328E-01 | NOT IDENT. |
| PA-234 | 1.706E-01 | 2.890E-01 | 6.341E-01 | NOT IDENT. |
| PA-234M | 6.541E-02 | 3.978E+00 | 8.843E+00 | FAIL ABUN |
| TH-234 | -1.547E+00 | 1.676E+00 | 2.851E+00 | FAIL ABUN |
| U-234 | -4.979E-02 | 7.520E-02 | 1.244E-01 | NOT IDENT. |
| U-235 | -4.869E-02 | 1.859E-01 | 3.359E-01 | FAIL ABUN |
| NP-237 | 7.610E-03 | 7.175E-02 | 1.328E-01 | NOT IDENT. |
| NP-238 | 0.000E+00 | 8.580E+12 | 0.000E+00 | SHORT HLIF |
| U-238 | -1.547E+00 | 1.676E+00 | 2.851E+00 | FAIL ABUN |
| NP-239 | 6.692E-02 | 3.949E-01 | 6.468E-01 | NOT IDENT. |
| PU-239 | -2.159E+02 | 3.150E+02 | 5.569E+02 | NOT IDENT. |
| AM-241 | -1.862E-02 | 1.955E-01 | 3.521E-01 | NOT IDENT. |
| AM-243 | -1.533E-02 | 6.163E-02 | 9.515E-02 | NOT IDENT. |
| CM-243 | -3.793E-02 | 1.061E-01 | 1.812E-01 | NOT IDENT. |
| CM-247 | 3.886E-03 | 3.232E-02 | 6.122E-02 | NOT IDENT. |
| CF-249 | 1.395E-02 | 3.829E-02 | 7.462E-02 | NOT IDENT. |
| CF-251 | 2.854E-02 | 1.152E-01 | 2.218E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:48.10

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 47.02 | 31 | 25 | 1.61 | 94.69 | 91 | 10 | 8.47E-03 | 36.6 | |
| 2 | 0 | 77.33 | 19 | 28 | 1.50 | 155.30 | 152 | 7 | 5.17E-03 | 53.5 | |
| 3 | 0 | 92.39 | 75 | 62 | 1.25 | 185.42 | 179 | 12 | 2.07E-02 | 24.2 | |
| 4 | 0 | 112.62 | 32 | 42 | 1.01 | 225.88 | 221 | 11 | 8.92E-03 | 42.6 | |
| 5 | 0 | 185.60 | 34 | 38 | 1.38 | 371.83 | 367 | 9 | 9.54E-03 | 36.6 | |
| 6 | 0 | 189.34 | 16 | 23 | 1.18 | 379.31 | 376 | 7 | 4.31E-03 | 56.9 | |
| 7 | 0 | 238.11 | 35 | 26 | 2.88 | 476.83 | 472 | 11 | 9.62E-03 | 33.8 | |
| 8 | 0 | 317.90 | 10 | 57 | 4.37 | 636.40 | 620 | 19 | 2.78E-03 | 183.8 | |
| 9 | 0 | 342.62 | 12 | 9 | 1.72 | 685.84 | 683 | 6 | 3.23E-03 | 50.6 | |
| 10 | 0 | 351.36 | 18 | 17 | 1.15 | 703.31 | 697 | 11 | 4.86E-03 | 50.9 | |
| 11 | 0 | 366.01 | 25 | 18 | 3.71 | 732.61 | 726 | 14 | 7.03E-03 | 40.3 | |
| 12 | 0 | 479.59 | 11 | 3 | 0.71 | 959.75 | 956 | 7 | 3.00E-03 | 41.6 | |
| 13 | 0 | 510.46 | 98 | 20 | 2.87 | 1021.49 | 1015 | 17 | 2.72E-02 | 14.1 | |
| 14 | 0 | 603.62 | 6 | 10 | 0.89 | 1207.79 | 1203 | 8 | 1.60E-03 | 104.3 | |
| 15 | 0 | 637.59 | 8 | 7 | 0.63 | 1275.72 | 1270 | 9 | 2.31E-03 | 66.2 | |
| 16 | 0 | 649.98 | 6 | 6 | 0.89 | 1300.50 | 1297 | 6 | 1.67E-03 | 76.4 | |
| 17 | 0 | 739.82 | 5 | 8 | 0.63 | 1480.16 | 1471 | 11 | 1.37E-03 | 121.3 | |
| 18 | 0 | 1000.75 | 9 | 2 | 1.42 | 2002.00 | 1998 | 8 | 2.56E-03 | 42.0 | |
| 19 | 0 | 1103.84 | 6 | 3 | 1.31 | 2208.17 | 2204 | 7 | 1.64E-03 | 66.0 | |
| 20 | 0 | 1487.35 | 6 | 0 | 1.37 | 2975.17 | 2968 | 11 | 1.67E-03 | 40.8 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:38:50.31

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| PB-210 | 46.54 | 15 | 4.25* | 5.075E-01 | 5.097E+00 | 5.140E+00 | 153.18 |
| BI-211 | 72.87 | ------ | 1.23 | 3.415E+00 | ------ | Line Not Found | ------ |
| | 351.06 | 13 | 12.92* | 3.913E+00 | 1.859E-01 | 1.859E-01 | 142.28 |
| PB-212 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| TH-228 | 74.82 | ------ | 10.28 | 3.637E+00 | ------ | Line Not Found | ------ |
| | 77.11 | 19 | 17.10 | 3.910E+00 | 2.041E-01 | 2.041E-01 | 106.98 |
| | 238.63 | 21 | 43.60* | 4.991E+00 | 6.990E-02 | 6.990E-02 | 115.30 |
| | 300.09 | ------ | 3.30 | 4.328E+00 | ------ | Line Not Found | ------ |
| ANH-511 | 511.00 | 4 | 100.00* | 3.059E+00 | 9.042E-03 | 9.042E-03 | 764.30 |

Flag: "*" = Keyline

Sample ID : G1203023700 Acquisition date : 12-FEB-2014 14:38:29

Total number of lines in spectrum 19
Number of unidentified lines 6
Number of lines tentatively identified by NID 13 68.42%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| PB-210 | 22.20Y | 1.01 | 5.097E+00 | 5.140E+00 | 7.874E+00 | 153.18 | |
| BI-211 | 7.04E+08Y | 1.00 | 1.859E-01 | 1.859E-01 | 2.645E-01 | 142.28 | |
| PB-212 | 1.41E+10Y | 1.00 | 6.990E-02 | 6.990E-02 | 8.060E-02 | 115.30 | |
| TH-228 | 1.41E+10Y | 1.00 | 6.990E-02 | 6.990E-02 | 8.060E-02 | 115.30 | |
| ANH-511 | 1.00E+09Y | 1.00 | 9.042E-03 | 9.042E-03 | 69.11E-03 | 764.30 | |
| | Total Activity : | | 5.432E+00 | 5.475E+00 | | | |

Grand Total Activity : 5.432E+00 5.475E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 92.39 | 15 | 62 | 1.25 | 185.42 | 179 | 12 | 4.26E-03 | **** | 5.20E+00 | T |
| 0 | 112.62 | 24 | 42 | 1.01 | 225.88 | 221 | 11 | 6.66E-03 | **** | 6.04E+00 | T |
| 0 | 189.34 | 16 | 23 | 1.18 | 379.31 | 376 | 7 | 4.31E-03 | **** | 5.65E+00 | |
| 0 | 317.90 | 10 | 57 | 4.37 | 636.40 | 620 | 19 | 2.78E-03 | **** | 4.17E+00 | T |
| 0 | 342.62 | 12 | 9 | 1.72 | 685.84 | 683 | 6 | 3.23E-03 | **** | 3.98E+00 | |
| 0 | 366.01 | 25 | 18 | 3.71 | 732.61 | 726 | 14 | 7.03E-03 | 80.7 | 3.81E+00 | T |
| 0 | 479.59 | 11 | 3 | 0.71 | 959.75 | 956 | 7 | 3.00E-03 | 83.2 | 3.19E+00 | |
| 0 | 603.62 | 6 | 10 | 0.89 | 1207.79 | 1203 | 8 | 1.60E-03 | **** | 2.72E+00 | T |
| 0 | 637.59 | 8 | 7 | 0.63 | 1275.72 | 1270 | 9 | 2.31E-03 | **** | 2.62E+00 | T |
| 0 | 649.98 | 6 | 6 | 0.89 | 1300.50 | 1297 | 6 | 1.67E-03 | **** | 2.58E+00 | |
| 0 | 739.82 | 5 | 8 | 0.63 | 1480.16 | 1471 | 11 | 1.37E-03 | **** | 2.34E+00 | T |
| 0 | 1103.84 | 6 | 3 | 1.31 | 2208.17 | 2204 | 7 | 1.64E-03 | **** | 1.68E+00 | |
| 0 | 1487.35 | 6 | 0 | 1.37 | 2975.17 | 2968 | 11 | 1.67E-03 | 81.6 | 1.30E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:39:02.85

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1   *
* Acquisition date : 12-FEB-2014 14:38:29 Sensitivity     : 3.000          *
* Detector ID      : GAM28                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****          *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID          *
* Sample ID        : G1203023700          Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM*
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| PB-210 | 4.705E+00 |
| BI-211 | 1.748E-01 |
| PB-212 | 4.480E-02 |
| TH-228 | 4.480E-02 |
| ANH-511 | 2.361E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 7.199E-01 | NOT IDENT. |
| NA-22 | 4.628E-02 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 4.024E-02 | NOT IDENT. |
| K-40 | 3.528E-01 | NOT IDENT. |
| SC-46 | 4.646E-02 | NOT IDENT. |
| V-48 | 1.484E+00 | NOT IDENT. |
| CR-51 | 2.356E+00 | NOT IDENT. |
| MN-54 | 3.042E-02 | NOT IDENT. |
| CO-56 | 7.479E-02 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.527E-02 | NOT IDENT. |
| CO-58 | 2.808E-02 | NOT IDENT. |
| FE-59 | 2.467E-01 | NOT IDENT. |
| CO-60 | 4.123E-02 | NOT IDENT. |
| ZN-65 | 9.214E-02 | NOT IDENT. |
| GE-68 | 9.732E-01 | NOT IDENT. |
| AS-73 | 2.077E+00 | NOT IDENT. |
| AS-74 | 1.925E+00 | NOT IDENT. |
| SE-75 | 4.596E-02 | NOT IDENT. |
| BR-77 | 0.000E+00 | SHORT HLIF |
| SR-82 | 1.310E+00 | NOT IDENT. |
| RB-83 | 8.814E-02 | NOT IDENT. |
| KR-85 | 7.227E+00 | NOT IDENT. |
| SR-85 | 9.144E-02 | NOT IDENT. |
| RB-86 | 1.058E+01 | NOT IDENT. |

| | | |
|---|---|---|
| Y-88 | 5.844E-02 | NOT IDENT. |
| Y-91 | 4.547E+01 | NOT IDENT. |
| NB-94 | 2.869E-02 | NOT IDENT. |
| NB-95 | 6.501E-02 | NOT IDENT. |
| NB-95M | 2.425E-01 | NOT IDENT. |
| ZR-95 | 1.175E-01 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 0.000E+00 | SHORT HLIF |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 2.667E-02 | NOT IDENT. |
| RH-102 | 3.706E-02 | NOT IDENT. |
| RU-103 | 1.327E-01 | NOT IDENT. |
| RH-106 | 2.171E-01 | NOT IDENT. |
| RU-106 | 2.171E-01 | NOT IDENT. |
| AG-108M | 2.505E-02 | NOT IDENT. |
| CD-109 | 7.248E-01 | NOT IDENT. |
| AG-110M | 2.627E-02 | NOT IDENT. |
| SN-113 | 5.171E-02 | NOT IDENT. |
| CD-115 | 0.000E+00 | SHORT HLIF |
| SN-117M | 2.670E+00 | NOT IDENT. |
| TE-123M | 3.227E-02 | NOT IDENT. |
| SB-124 | 1.881E-01 | FAIL ABUN |
| SB-125 | 7.125E-02 | NOT IDENT. |
| TE-125M | 1.986E+01 | NOT IDENT. |
| I-126 | 1.211E+01 | NOT IDENT. |
| SB-126 | 1.338E+01 | NOT IDENT. |
| SN-126 | 6.053E-02 | NOT IDENT. |
| SB-127 | 0.000E+00 | SHORT HLIF |
| I-131 | 0.000E+00 | SHORT HLIF |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 0.000E+00 | SHORT HLIF |
| BA-133 | 3.536E-02 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 3.506E-02 | FAIL ABUN |
| CS-135 | 1.348E-01 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 4.230E+00 | NOT IDENT. |
| BA-137M | 3.859E-02 | NOT IDENT. |
| CS-137 | 4.076E-02 | NOT IDENT. |
| CE-139 | 3.810E-02 | NOT IDENT. |
| BA-140 | 5.987E+00 | NOT IDENT. |
| LA-140 | 5.987E+00 | NOT IDENT. |
| CE-141 | 2.583E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.245E-01 | NOT IDENT. |
| PM-144 | 3.299E-02 | NOT IDENT. |
| PR-144 | 2.568E+00 | NOT IDENT. |
| PM-146 | 3.601E-02 | NOT IDENT. |
| ND-147 | 6.618E+01 | FAIL ABUN |
| PM-147 | 5.971E+02 | NOT IDENT. |
| PM-149 | 0.000E+00 | SHORT HLIF |
| EU-150 | 2.338E-02 | NOT IDENT. |
| EU-152 | 8.411E-02 | NOT IDENT. |
| GD-153 | 9.379E-02 | NOT IDENT. |
| EU-154 | 1.273E-01 | NOT IDENT. |
| EU-155 | 8.846E-02 | NOT IDENT. |
| TB-160 | 1.881E-01 | FAIL ABUN |
| HO-166M | 4.435E-02 | NOT IDENT. |
| TM-171 | 2.310E+01 | NOT IDENT. |
| LU-176 | 2.070E-02 | NOT IDENT. |
| HF-181 | 1.421E-01 | NOT IDENT. |
| TA-182 | 2.484E-01 | NOT IDENT. |
| RE-183 | 4.206E-01 | NOT IDENT. |
| RE-184 | 4.045E-01 | NOT IDENT. |
| W-188 | 1.418E+01 | NOT IDENT. |
| IR-192 | 6.323E-02 | FAIL ABUN |
| HG-203 | 9.993E-02 | NOT IDENT. |
| BI-207 | 3.519E-02 | NOT IDENT. |
| TL-208 | 3.104E-02 | NOT IDENT. |
| PB-211 | 4.673E-01 | NOT IDENT. |
| BI-212 | 4.428E-01 | NOT IDENT. |
| BI-214 | 5.417E-02 | NOT IDENT. |
| PB-214 | 6.598E-02 | FAIL ABUN |
| RN-219 | 2.871E-01 | NOT IDENT. |
| RN-222 | 5.417E-02 | NOT IDENT. |
| RA-223 | 4.919E-01 | NOT IDENT. |
| RA-224 | 4.544E-01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-226 | 5.417E-02 | NOT IDENT. |
| AC-227 | 2.086E-01 | NOT IDENT. |
| TH-227 | 2.086E-01 | NOT IDENT. |
| AC-228 | 1.204E-01 | NOT IDENT. |
| RA-228 | 1.204E-01 | NOT IDENT. |
| TH-229 | 3.604E-01 | NOT IDENT. |
| TH-230 | 5.416E-02 | NOT IDENT. |
| PA-231 | 1.254E+00 | NOT IDENT. |
| TH-231 | 4.919E-01 | NOT IDENT. |
| TH-232 | 1.204E-01 | NOT IDENT. |
| PA-233 | 6.034E-02 | NOT IDENT. |
| PA-234 | 2.741E-01 | NOT IDENT. |
| PA-234M | 3.778E+00 | FAIL ABUN |
| TH-234 | 1.306E+00 | FAIL ABUN |
| U-234 | 5.416E-02 | NOT IDENT. |
| U-235 | 1.534E-01 | FAIL ABUN |
| NP-237 | 6.034E-02 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 1.306E+00 | FAIL ABUN |
| NP-239 | 2.928E-01 | NOT IDENT. |
| PU-239 | 2.534E+02 | NOT IDENT. |
| AM-241 | 1.605E-01 | NOT IDENT. |
| AM-243 | 4.351E-02 | NOT IDENT. |
| CM-243 | 8.232E-02 | NOT IDENT. |
| CM-247 | 2.677E-02 | NOT IDENT. |
| CF-249 | 3.322E-02 | NOT IDENT. |
| CF-251 | 1.011E-01 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 15:39:07.65

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023700.CNF;1  *
* Acquisition date : 12-FEB-2014 14:38:29 Sensitivity     : 3.000       *
* Detector ID      : GAM28                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.18     Half life ratio : *****       *
* Sample date      :  6-NOV-2013 14:35:00 Nuclide Library : SOLID        *
* Sample ID        : G1203023700          Analyst initials: RXF2        *
* Batch Number     : 1361908              Sample Quantity : 1.0238E+02 GRAM  *
*                                         Quantity Err(%) : 1.9536E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2013 07:12:44 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_500MLMB.CNF;4     *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| PB-210 | 5.140E+00 | 7.730E+00 | 7.730E+00 |
| BI-211 | 1.859E-01 | 2.597E-01 | 2.597E-01 |
| PB-212 | 6.990E-02 | 7.922E-02 | 7.922E-02 |
| TH-228 | 6.990E-02 | 7.922E-02 | 7.922E-02 |
| ANH-511 | 9.042E-03 | 6.773E-02 | 6.773E-02 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 2.463E-03 | 9.665E-01 | 9.665E-01 | NOT IDENT. |
| NA-22 | 3.496E-02 | 4.530E-02 | 4.796E-02 | NOT IDENT. |
| NA-24 | -1.000E+41 | 5.030E+41 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.028E-02 | 4.214E-02 | 4.312E-02 | NOT IDENT. |
| K-40 | 5.037E-02 | 3.656E-01 | 3.663E-01 | NOT IDENT. |
| SC-46 | -4.723E-03 | 5.807E-02 | 5.811E-02 | NOT IDENT. |
| V-48 | -6.230E-01 | 1.915E+00 | 1.935E+00 | NOT IDENT. |
| CR-51 | 4.217E-01 | 3.163E+00 | 3.169E+00 | NOT IDENT. |
| MN-54 | 1.689E-02 | 3.268E-02 | 3.356E-02 | NOT IDENT. |
| CO-56 | 4.136E-02 | 8.271E-02 | 8.478E-02 | NOT IDENT. |
| MN-56 | 1.000E+41 | 1.985E+41 | 0.000E+00 | SHORT HLIF |
| CO-57 | 2.104E-02 | 2.858E-02 | 3.011E-02 | NOT IDENT. |
| CO-58 | -6.819E-02 | 6.066E-02 | 6.801E-02 | NOT IDENT. |
| FE-59 | 2.005E-01 | 2.667E-01 | 2.816E-01 | NOT IDENT. |
| CO-60 | 3.177E-02 | 4.229E-02 | 4.464E-02 | NOT IDENT. |
| ZN-65 | 8.079E-02 | 9.283E-02 | 9.972E-02 | NOT IDENT. |
| GE-68 | -1.211E-01 | 1.182E+00 | 1.184E+00 | NOT IDENT. |
| AS-73 | 2.017E+00 | 2.272E+00 | 2.447E+00 | NOT IDENT. |
| AS-74 | 1.480E+00 | 2.020E+00 | 2.127E+00 | NOT IDENT. |
| SE-75 | -5.870E-02 | 6.404E-02 | 6.929E-02 | NOT IDENT. |
| BR-77 | 3.436E+11 | 1.047E+12 | 1.059E+12 | SHORT HLIF |
| SR-82 | -4.626E+00 | 2.936E+00 | 3.602E+00 | NOT IDENT. |
| RB-83 | 1.981E-02 | 9.943E-02 | 9.983E-02 | NOT IDENT. |
| KR-85 | 9.981E+00 | 7.876E+00 | 9.071E+00 | NOT IDENT. |
| SR-85 | 1.260E-01 | 9.970E-02 | 1.147E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RB-86 | -5.451E+00 | 1.397E+01 | 1.419E+01 | NOT IDENT. |
| Y-88 | -2.356E-02 | 7.690E-02 | 7.763E-02 | NOT IDENT. |
| Y-91 | 2.586E+01 | 4.864E+01 | 5.002E+01 | NOT IDENT. |
| NB-94 | -8.341E-03 | 3.581E-02 | 3.601E-02 | NOT IDENT. |
| NB-95 | 2.520E-02 | 7.216E-02 | 7.305E-02 | NOT IDENT. |
| NB-95M | 4.876E-02 | 3.202E-01 | 3.209E-01 | NOT IDENT. |
| ZR-95 | -2.664E-02 | 1.478E-01 | 1.483E-01 | NOT IDENT. |
| NB-97 | -1.000E+41 | 4.949E+41 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 1.000E+41 | 5.996E+40 | 0.000E+00 | SHORT HLIF |
| MO-99 | 6.986E+09 | 1.663E+10 | 1.693E+10 | SHORT HLIF |
| TC-99M | 1.000E+41 | 2.057E+42 | 0.000E+00 | SHORT HLIF |
| RH-101 | 9.064E-03 | 2.991E-02 | 3.019E-02 | NOT IDENT. |
| RH-102 | -3.803E-02 | 6.223E-02 | 6.455E-02 | NOT IDENT. |
| RU-103 | 7.252E-02 | 1.429E-01 | 1.466E-01 | NOT IDENT. |
| RH-106 | -1.342E-01 | 2.894E-01 | 2.957E-01 | NOT IDENT. |
| RU-106 | -1.342E-01 | 2.894E-01 | 2.957E-01 | NOT IDENT. |
| AG-108M | 1.224E-02 | 2.735E-02 | 2.790E-02 | NOT IDENT. |
| CD-109 | -2.926E-02 | 9.989E-01 | 9.990E-01 | NOT IDENT. |
| AG-110M | -4.457E-02 | 4.777E-02 | 5.182E-02 | NOT IDENT. |
| SN-113 | -5.328E-02 | 7.261E-02 | 7.648E-02 | NOT IDENT. |
| CD-115 | 7.800E+11 | 1.310E+12 | 1.356E+12 | SHORT HLIF |
| SN-117M | -9.872E-01 | 3.225E+00 | 3.255E+00 | NOT IDENT. |
| TE-123M | -1.746E-02 | 3.964E-02 | 4.041E-02 | NOT IDENT. |
| SB-124 | 7.579E-03 | 2.189E-01 | 2.189E-01 | FAIL ABUN |
| SB-125 | -2.895E-02 | 8.730E-02 | 8.827E-02 | NOT IDENT. |
| TE-125M | -9.608E+00 | 2.921E+01 | 2.953E+01 | NOT IDENT. |
| I-126 | -1.965E+01 | 1.847E+01 | 2.049E+01 | NOT IDENT. |
| SB-126 | 9.216E+00 | 1.444E+01 | 1.503E+01 | NOT IDENT. |
| SN-126 | -5.674E-02 | 9.162E-02 | 9.512E-02 | NOT IDENT. |
| SB-127 | -3.066E+06 | 3.726E+06 | 3.974E+06 | SHORT HLIF |
| I-131 | 9.747E+01 | 1.638E+02 | 1.696E+02 | SHORT HLIF |
| I-132 | -1.000E+41 | 6.169E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | 1.173E+07 | 4.391E+07 | 4.422E+07 | SHORT HLIF |
| BA-133 | 3.171E-02 | 4.211E-02 | 4.447E-02 | NOT IDENT. |
| I-133 | 1.562E+32 | 3.024E+32 | 0.000E+00 | SHORT HLIF |
| CS-134 | -5.134E-04 | 4.251E-02 | 4.251E-02 | FAIL ABUN |
| CS-135 | 1.305E-01 | 1.452E-01 | 1.567E-01 | NOT IDENT. |
| I-135 | -1.000E+41 | 2.880E+41 | 0.000E+00 | SHORT HLIF |
| CS-136 | 1.552E-01 | 4.934E+00 | 4.934E+00 | NOT IDENT. |
| BA-137M | 1.674E-02 | 3.997E-02 | 4.068E-02 | NOT IDENT. |
| CS-137 | 1.769E-02 | 4.222E-02 | 4.297E-02 | NOT IDENT. |
| CE-139 | 9.717E-03 | 4.354E-02 | 4.376E-02 | NOT IDENT. |
| BA-140 | 1.536E+00 | 6.492E+00 | 6.529E+00 | NOT IDENT. |
| LA-140 | 1.536E+00 | 6.492E+00 | 6.529E+00 | NOT IDENT. |
| CE-141 | 1.228E-01 | 2.856E-01 | 2.909E-01 | NOT IDENT. |
| CE-143 | 1.027E+20 | 1.640E+20 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.043E-01 | 2.417E-01 | 2.587E-01 | NOT IDENT. |
| PM-144 | -1.541E-04 | 3.954E-02 | 3.954E-02 | NOT IDENT. |
| PR-144 | -4.609E-02 | 3.085E+00 | 3.085E+00 | NOT IDENT. |
| PM-146 | -1.903E-02 | 4.473E-02 | 4.555E-02 | NOT IDENT. |
| ND-147 | -4.219E+01 | 8.654E+01 | 8.860E+01 | FAIL ABUN |
| PM-147 | -2.803E+01 | 7.429E+02 | 7.431E+02 | NOT IDENT. |
| PM-149 | 9.849E+12 | 1.928E+13 | 1.978E+13 | SHORT HLIF |
| EU-150 | -1.297E-03 | 2.846E-02 | 2.847E-02 | NOT IDENT. |
| EU-152 | 1.949E-02 | 1.210E-01 | 1.213E-01 | NOT IDENT. |
| GD-153 | 5.079E-02 | 1.214E-01 | 1.236E-01 | NOT IDENT. |
| EU-154 | 1.000E-01 | 1.242E-01 | 1.322E-01 | NOT IDENT. |
| EU-155 | 2.283E-02 | 1.060E-01 | 1.065E-01 | NOT IDENT. |
| TB-160 | 1.139E-01 | 1.953E-01 | 2.020E-01 | FAIL ABUN |
| HO-166M | -2.206E-02 | 5.767E-02 | 5.852E-02 | NOT IDENT. |
| TM-171 | 2.036E+01 | 2.744E+01 | 2.894E+01 | NOT IDENT. |
| LU-176 | 3.353E-03 | 2.779E-02 | 2.783E-02 | NOT IDENT. |
| HF-181 | 1.981E-02 | 1.866E-01 | 1.868E-01 | NOT IDENT. |
| TA-182 | 1.978E-01 | 2.525E-01 | 2.678E-01 | NOT IDENT. |
| RE-183 | -1.520E-01 | 5.272E-01 | 5.316E-01 | NOT IDENT. |
| RE-184 | -1.181E-01 | 5.263E-01 | 5.290E-01 | NOT IDENT. |
| W-188 | -1.219E+01 | 1.857E+01 | 1.937E+01 | NOT IDENT. |
| IR-192 | 5.334E-02 | 1.922E-01 | 1.937E-01 | FAIL ABUN |
| HG-203 | -5.385E-02 | 1.270E-01 | 1.293E-01 | NOT IDENT. |
| BI-207 | -8.475E-03 | 4.309E-02 | 4.326E-02 | NOT IDENT. |
| TL-208 | 1.724E-03 | 3.491E-02 | 3.492E-02 | NOT IDENT. |
| PB-211 | -1.735E-01 | 6.042E-01 | 6.092E-01 | NOT IDENT. |
| BI-212 | -3.329E-01 | 5.814E-01 | 6.005E-01 | NOT IDENT. |
| BI-214 | -4.980E-02 | 7.532E-02 | 7.859E-02 | NOT IDENT. |
| PB-214 | 6.748E-02 | 9.425E-02 | 9.904E-02 | FAIL ABUN |
| RN-219 | -1.797E-01 | 3.873E-01 | 3.957E-01 | NOT IDENT. |
| RN-222 | -4.980E-02 | 7.532E-02 | 7.859E-02 | NOT IDENT. |
| RA-223 | -2.668E-01 | 6.338E-01 | 6.451E-01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-224 | 8.574E-02 | 5.997E-01 | 6.010E-01 | NOT IDENT. |
| RA-226 | -4.980E-02 | 7.532E-02 | 7.859E-02 | NOT IDENT. |
| AC-227 | 1.574E-01 | 2.293E-01 | 2.401E-01 | NOT IDENT. |
| TH-227 | 1.574E-01 | 2.293E-01 | 2.401E-01 | NOT IDENT. |
| AC-228 | 6.265E-02 | 1.279E-01 | 1.310E-01 | NOT IDENT. |
| RA-228 | 6.265E-02 | 1.279E-01 | 1.310E-01 | NOT IDENT. |
| TH-229 | -4.086E-01 | 5.511E-01 | 5.811E-01 | NOT IDENT. |
| TH-230 | -4.979E-02 | 7.531E-02 | 7.858E-02 | NOT IDENT. |
| PA-231 | -5.275E-01 | 1.569E+00 | 1.586E+00 | NOT IDENT. |
| TH-231 | -2.668E-01 | 6.338E-01 | 6.451E-01 | NOT IDENT. |
| TH-232 | 6.265E-02 | 1.279E-01 | 1.310E-01 | NOT IDENT. |
| PA-233 | 7.610E-03 | 7.176E-02 | 7.184E-02 | NOT IDENT. |
| PA-234 | 1.706E-01 | 3.495E-01 | 3.578E-01 | NOT IDENT. |
| PA-234M | 6.541E-02 | 3.978E+00 | 3.979E+00 | FAIL ABUN |
| TH-234 | -1.547E+00 | 1.713E+00 | 1.849E+00 | FAIL ABUN |
| U-234 | -4.979E-02 | 7.531E-02 | 7.858E-02 | NOT IDENT. |
| U-235 | -4.869E-02 | 1.860E-01 | 1.873E-01 | FAIL ABUN |
| NP-237 | 7.610E-03 | 7.176E-02 | 7.184E-02 | NOT IDENT. |
| NP-238 | -4.213E+12 | 8.603E+12 | 8.810E+12 | SHORT HLIF |
| U-238 | -1.547E+00 | 1.713E+00 | 1.849E+00 | FAIL ABUN |
| NP-239 | 6.692E-02 | 3.950E-01 | 3.961E-01 | NOT IDENT. |
| PU-239 | -2.159E+02 | 3.156E+02 | 3.302E+02 | NOT IDENT. |
| AM-241 | -1.862E-02 | 1.955E-01 | 1.957E-01 | NOT IDENT. |
| AM-243 | -1.533E-02 | 6.165E-02 | 6.203E-02 | NOT IDENT. |
| CM-243 | -3.793E-02 | 1.062E-01 | 1.075E-01 | NOT IDENT. |
| CM-247 | 3.886E-03 | 3.233E-02 | 3.238E-02 | NOT IDENT. |
| CF-249 | 1.395E-02 | 3.833E-02 | 3.884E-02 | NOT IDENT. |
| CF-251 | 2.854E-02 | 1.152E-01 | 1.159E-01 | NOT IDENT. |

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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 37.6222 | 94.67 | 46.7879 | 193.51 | 40.8833 |
| 45.60 | 34.8016 | 94.87 | 48.4749 | 197.03 | 30.3906 |
| 46.54 | 30.3356 | 97.43 | 35.2478 | 198.01 | 28.5191 |
| 49.72 | 0.0000 | 98.43 | 36.9854 | 201.83 | 34.3518 |
| 51.35 | 32.2354 | 98.44 | 36.9859 | 205.31 | 36.3831 |
| 52.39 | 20.0050 | 99.53 | 42.6634 | 210.85 | 29.8387 |
| 53.44 | 20.5690 | 100.11 | 40.4550 | 215.65 | 31.9078 |
| 57.36 | 0.0000 | 103.18 | 35.0030 | 222.11 | 31.1262 |
| 57.53 | 34.2594 | 103.37 | 39.5311 | 227.09 | 29.3129 |
| 57.98 | 30.1370 | 105.21 | 39.6426 | 227.38 | 29.3207 |
| 59.32 | 31.2690 | 105.31 | 33.9845 | 228.16 | 0.0000 |
| 59.54 | 37.5409 | 106.12 | 30.6237 | 228.18 | 32.2759 |
| 63.29 | 40.9993 | 109.28 | 39.3159 | 235.69 | 34.6578 |
| 63.58 | 38.9206 | 111.00 | 32.5610 | 235.96 | 29.9387 |
| 64.28 | 33.7106 | 111.76 | 0.0000 | 238.63 | 32.5750 |
| 66.73 | 35.9995 | 116.30 | 0.0000 | 238.98 | 0.0000 |
| 67.24 | 30.7374 | 117.23 | 27.6672 | 240.99 | 26.9047 |
| 67.75 | 29.7081 | 121.12 | 37.0913 | 242.00 | 28.5122 |
| 69.67 | 35.1486 | 121.22 | 33.6186 | 244.70 | 41.9602 |
| 70.83 | 38.4318 | 121.78 | 25.5236 | 252.40 | 0.0000 |
| 72.81 | 33.4364 | 122.06 | 25.5334 | 252.80 | 35.9681 |
| 72.87 | 30.5464 | 123.07 | 24.4066 | 254.15 | 0.0000 |
| 74.66 | 43.5574 | 127.23 | 34.1872 | 256.23 | 21.0413 |
| 74.82 | 43.5705 | 129.30 | 45.7088 | 260.90 | 0.0000 |
| 74.97 | 43.5829 | 131.20 | 42.2988 | 264.66 | 30.2669 |
| 77.11 | 36.7356 | 133.02 | 38.8666 | 268.22 | 21.2474 |
| 79.69 | 42.3389 | 133.52 | 36.2400 | 269.46 | 22.2813 |
| 80.12 | 34.2235 | 136.00 | 35.4694 | 271.23 | 29.4120 |
| 80.19 | 0.0000 | 136.47 | 39.0398 | 273.65 | 28.4525 |
| 80.57 | 22.8344 | 140.51 | 0.0000 | 276.40 | 23.4222 |
| 81.00 | 32.6459 | 143.76 | 34.0264 | 277.37 | 23.4397 |
| 81.07 | 40.8125 | 144.24 | 34.0467 | 277.60 | 23.4440 |
| 83.79 | 41.5579 | 145.44 | 25.1240 | 278.00 | 27.5298 |
| 85.43 | 36.1938 | 152.43 | 30.7661 | 279.20 | 31.6381 |
| 86.55 | 41.2094 | 153.25 | 31.7017 | 279.54 | 30.6253 |
| 86.79 | 46.1736 | 154.21 | 33.5510 | 280.46 | 26.5610 |
| 86.94 | 46.1855 | 156.02 | 37.2573 | 283.69 | 36.8685 |
| 87.09 | 54.4470 | 158.56 | 35.5446 | 284.31 | 0.0000 |
| 87.57 | 54.4921 | 159.00 | 36.4746 | 285.41 | 30.7645 |
| 88.03 | 44.6195 | 162.33 | 41.1905 | 285.90 | 0.0000 |
| 88.34 | 38.0294 | 163.33 | 37.5720 | 287.50 | 27.7321 |
| 88.47 | 38.0378 | 165.86 | 38.5979 | 290.67 | 42.2131 |
| 89.96 | 43.1079 | 176.31 | 32.5359 | 293.27 | 0.0000 |
| 91.11 | 40.9765 | 176.60 | 34.4058 | 295.22 | 33.0596 |
| 92.59 | 41.0774 | 177.52 | 31.6472 | 295.96 | 28.9434 |
| 93.35 | 40.0173 | 181.07 | 0.0000 | 298.58 | 23.8212 |
| 94.56 | 46.7796 | 184.41 | 32.5032 | 299.98 | 20.7355 |
| 94.65 | 46.7864 | 185.72 | 31.5459 | 300.09 | 20.7373 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 20.7379 | 497.08 | 10.2847 | 711.68 | 15.4189 |
| 301.36 | 21.7944 | 505.52 | 4.6948 | 720.70 | 10.3149 |
| 302.85 | 22.8574 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 22.8849 | 511.00 | 17.8894 | 722.78 | 14.4525 |
| 306.78 | 21.6725 | 514.00 | 12.5726 | 722.91 | 13.4208 |
| 308.46 | 28.3754 | 514.00 | 12.5727 | 723.31 | 15.4882 |
| 311.90 | 31.3742 | 520.40 | 8.5135 | 724.19 | 17.5591 |
| 316.51 | 31.4777 | 520.69 | 0.0000 | 727.33 | 19.6485 |
| 319.41 | 20.1873 | 522.65 | 0.0000 | 733.00 | 15.5453 |
| 320.08 | 21.8797 | 527.90 | 0.0000 | 735.93 | 24.2083 |
| 321.04 | 21.8947 | 529.59 | 7.6016 | 737.46 | 17.6475 |
| 323.87 | 28.4774 | 529.87 | 0.0000 | 739.50 | 0.0000 |
| 325.23 | 19.0028 | 531.02 | 14.2628 | 747.24 | 12.5027 |
| 328.76 | 27.5159 | 546.56 | 0.0000 | 748.06 | 13.5488 |
| 333.37 | 24.4182 | 552.55 | 14.4100 | 752.31 | 6.2632 |
| 333.97 | 28.6768 | 563.25 | 9.6545 | 753.82 | 6.2666 |
| 334.37 | 29.7470 | 569.33 | 14.5225 | 756.73 | 10.4556 |
| 338.28 | 27.2695 | 569.50 | 14.5239 | 756.80 | 10.4561 |
| 338.32 | 27.2703 | 569.70 | 13.5567 | 763.94 | 7.3384 |
| 340.48 | 22.1895 | 583.19 | 11.6915 | 765.81 | 6.2943 |
| 340.55 | 22.1905 | 584.27 | 11.6974 | 766.42 | 9.4436 |
| 344.28 | 23.5294 | 595.83 | 8.8185 | 766.84 | 10.4946 |
| 345.93 | 21.4139 | 600.60 | 14.7283 | 772.60 | 0.0000 |
| 351.06 | 26.8585 | 602.52 | 0.0000 | 776.52 | 17.9035 |
| 351.93 | 25.7988 | 602.73 | 11.7938 | 777.92 | 0.0000 |
| 355.39 | 0.0000 | 604.72 | 19.6733 | 778.90 | 7.3784 |
| 356.01 | 13.7963 | 609.32 | 18.4808 | 783.70 | 0.0000 |
| 364.49 | 0.0000 | 610.33 | 15.7773 | 785.37 | 14.7913 |
| 366.42 | 0.0000 | 614.28 | 12.8410 | 792.07 | 10.5903 |
| 375.05 | 28.3669 | 618.01 | 9.8938 | 794.95 | 11.6615 |
| 383.85 | 23.0376 | 620.36 | 9.9038 | 795.86 | 12.7257 |
| 388.16 | 17.5989 | 621.93 | 11.8925 | 801.95 | 11.6902 |
| 388.63 | 18.7043 | 630.19 | 0.0000 | 810.29 | 10.6587 |
| 391.69 | 25.3531 | 631.29 | 16.5837 | 810.45 | 9.5933 |
| 400.66 | 17.7324 | 633.25 | 14.9374 | 810.76 | 9.5944 |
| 401.81 | 18.8537 | 634.78 | 9.9648 | 815.77 | 4.2716 |
| 402.40 | 12.2038 | 635.95 | 9.9697 | 818.51 | 9.6203 |
| 404.85 | 14.4437 | 636.99 | 0.0000 | 832.01 | 11.8129 |
| 410.95 | 12.2656 | 645.85 | 6.6742 | 834.85 | 5.3748 |
| 413.71 | 15.6359 | 657.76 | 19.1155 | 835.71 | 5.3763 |
| 414.70 | 20.1151 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 15.3068 | 661.66 | 10.0769 | 846.75 | 0.0000 |
| 427.87 | 19.8177 | 664.57 | 0.0000 | 846.77 | 9.7139 |
| 433.94 | 15.3664 | 666.33 | 21.2015 | 856.80 | 6.4978 |
| 439.40 | 13.6002 | 666.50 | 21.2030 | 860.56 | 7.5903 |
| 453.88 | 24.6767 | 667.71 | 0.0000 | 871.09 | 9.7930 |
| 463.37 | 19.2917 | 677.62 | 14.1993 | 873.19 | 4.3555 |
| 468.07 | 11.0515 | 685.70 | 0.0000 | 875.33 | 0.0000 |
| 473.00 | 0.0000 | 695.00 | 11.2339 | 879.38 | 3.2733 |
| 475.06 | 12.3250 | 696.49 | 15.3278 | 880.51 | 3.2744 |
| 476.78 | 15.4201 | 696.51 | 15.3281 | 883.24 | 8.7396 |
| 477.60 | 15.4268 | 697.00 | 14.3090 | 884.68 | 9.8367 |
| 482.18 | 17.0100 | 697.49 | 16.3563 | 889.28 | 6.5678 |
| 487.02 | 20.4636 | 702.65 | 19.4620 | 894.76 | 4.3862 |
| 492.35 | 0.0000 | 706.68 | 18.4667 | 898.04 | 10.9773 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 8.7967 | 1312.11 | 5.1267 | | |
| 911.20 | 5.5118 | 1332.49 | 5.1516 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 3.6924 | 1365.19 | 1.0382 | | |
| 937.49 | 10.1892 | 1368.63 | 0.0000 | | |
| 944.13 | 12.0666 | 1384.29 | 7.2991 | | |
| 946.00 | 8.3586 | 1408.01 | 2.0967 | | |
| 949.00 | 12.0846 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 2.1213 | | |
| 962.31 | 4.6671 | 1489.16 | 0.0000 | | |
| 964.08 | 7.4712 | 1505.03 | 5.3542 | | |
| 966.17 | 13.0831 | 1596.21 | 2.8062 | | |
| 968.97 | 4.6765 | 1620.50 | 1.8800 | | |
| 983.53 | 7.5153 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 3.8125 | | |
| 996.26 | 9.6994 | 1750.46 | 0.0000 | | |
| 1001.03 | 7.5545 | 1764.49 | 4.8326 | | |
| 1004.73 | 3.2412 | 1770.23 | 8.7078 | | |
| 1021.30 | 0.0000 | 1771.35 | 6.7742 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 3.8977 | | |
| 1037.84 | 9.5451 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 5.8757 | | |
| 1046.59 | 7.6553 | | | | |
| 1048.07 | 3.8293 | | | | |
| 1049.04 | 3.8304 | | | | |
| 1050.41 | 9.5797 | | | | |
| 1063.66 | 6.7308 | | | | |
| 1077.00 | 8.6865 | | | | |
| 1077.34 | 6.7568 | | | | |
| 1085.87 | 8.7078 | | | | |
| 1099.45 | 3.3298 | | | | |
| 1112.07 | 9.7453 | | | | |
| 1112.84 | 8.7726 | | | | |
| 1115.54 | 4.8773 | | | | |
| 1120.29 | 10.7440 | | | | |
| 1120.55 | 10.7444 | | | | |
| 1121.30 | 10.7467 | | | | |
| 1129.67 | 7.8333 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 7.9242 | | | | |
| 1177.95 | 2.9752 | | | | |
| 1189.05 | 2.9838 | | | | |
| 1204.77 | 6.9903 | | | | |
| 1221.41 | 5.0142 | | | | |
| 1231.02 | 5.0262 | | | | |
| 1235.36 | 6.0381 | | | | |
| 1238.28 | 6.0425 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 8.1237 | | | | |
| 1274.44 | 3.0483 | | | | |
| 1274.54 | 3.0483 | | | | |
| 1291.59 | 6.1221 | | | | |
| 1298.22 | 0.0000 | | | | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:26.42

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;376
                                          Background date  : 9-FEB-2014 11:21:17.
Sample date      : 22-JAN-2014 00:00:00 Acquisition date : 12-FEB-2014 16:15:51
Sample ID        : G1203023701          Sample quantity  : 1.30479E+02 GRAM
Detector name    : GAM11                Detector geometry: 500MLMB
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:10.25  1.1%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1361908              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1605
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.29* | 9214 | 6889 | 0.93 | 92.59 | 87 | 10 | 1.02E+01 | 2.0 | |
| 2 | 0 | 59.32* | 17971 | 6142 | 0.92 | 118.68 | 113 | 12 | 2.00E+01 | 1.2 | |
| 3 | 2 | 86.16 | 156 | 1610 | 0.82 | 172.38 | 171 | 12 | 1.73E-01 | 32.9 | 2.01E+01 |
| 4 | 2 | 87.86 | 19592 | 2019 | 0.91 | 175.79 | 171 | 12 | 2.18E+01 | 0.8 | |
| 5 | 0 | 121.89 | 6010 | 2291 | 0.88 | 243.89 | 239 | 10 | 6.68E+00 | 2.0 | |
| 6 | 0 | 136.35 | 787 | 1743 | 0.96 | 272.82 | 268 | 10 | 8.74E-01 | 10.6 | |
| 7 | 0 | 165.67 | 1485 | 1669 | 1.08 | 331.49 | 327 | 10 | 1.65E+00 | 5.8 | |
| 8 | 0 | 391.21 | 623 | 1244 | 1.16 | 782.78 | 776 | 12 | 6.92E-01 | 12.0 | |
| 9 | 0 | 491.85 | 89 | 655 | 0.80 | 984.14 | 981 | 8 | 9.84E-02 | 51.2 | |
| 10 | 0 | 501.63 | 103 | 568 | 2.57 | 1003.72 | 1000 | 8 | 1.14E-01 | 41.5 | |
| 11 | 0 | 511.06* | 539 | 1321 | 2.78 | 1022.59 | 1015 | 19 | 5.98E-01 | 16.8 | |
| 12 | 0 | 623.57 | 118 | 616 | 1.67 | 1247.67 | 1243 | 11 | 1.31E-01 | 41.6 | |
| 13 | 0 | 661.60* | 16143 | 1045 | 1.38 | 1323.76 | 1316 | 16 | 1.79E+01 | 0.9 | |
| 14 | 0 | 679.86 | 20 | 325 | 1.20 | 1360.29 | 1357 | 6 | 2.20E-02 | 145.9 | |
| 15 | 0 | 752.36 | 27 | 529 | 1.35 | 1505.34 | 1500 | 9 | 3.05E-02 | 152.8 | |
| 16 | 0 | 849.25 | 36 | 422 | 1.19 | 1699.16 | 1696 | 6 | 3.99E-02 | 91.8 | |
| 17 | 0 | 866.87 | 78 | 461 | 1.82 | 1734.40 | 1732 | 7 | 8.67E-02 | 47.1 | |
| 18 | 0 | 897.93 | 519 | 1090 | 1.32 | 1796.54 | 1790 | 13 | 5.76E-01 | 13.8 | |
| 19 | 0 | 1115.53 | 2970 | 645 | 1.66 | 2231.78 | 2225 | 14 | 3.30E+00 | 2.6 | |
| 20 | 0 | 1173.27 | 14826 | 615 | 1.76 | 2347.28 | 2337 | 20 | 1.65E+01 | 0.9 | |
| 21 | 0 | 1300.02 | 80 | 120 | 6.63 | 2600.77 | 2591 | 21 | 8.85E-02 | 36.2 | |
| 22 | 0 | 1332.59* | 13352 | 219 | 1.76 | 2665.91 | 2657 | 19 | 1.48E+01 | 0.9 | |
| 23 | 0 | 1522.34 | 37 | 33 | 2.71 | 3045.38 | 3037 | 15 | 4.09E-02 | 38.1 | |
| 24 | 0 | 1715.93 | 17 | 52 | 3.58 | 3432.50 | 3421 | 16 | 1.87E-02 | 99.1 | |
| 25 | 0 | 1836.20 | 323 | 34 | 2.03 | 3672.96 | 3665 | 19 | 3.59E-01 | 7.0 | |
| 26 | 0 | 1909.69 | 36 | 9 | 6.98 | 3819.92 | 3811 | 18 | 4.00E-02 | 25.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 12-FEB-2014 16:31:27

| | | | |
|---|---|---|---|
| Configuration | : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1 | | |
| Analyses by | : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4 | | |
| Sample title | : RXF2 | | |
| Sample date | : 22-JAN-2014 00:00:00 | Acquisition date | : 12-FEB-2014 16:15:51 |
| Sample ID | : G1203023701 | Sample quantity | : 130.48 GRAM |
| Sample type | : SOLID | Sample geometry | : |
| Detector name | : GAMMA11 | Detector geometry | : 500MLMB |
| Elapsed live time | : 0 00:15:00.00 | Elapsed real time | : 0 00:15:10.25 1.1% |
| Energy tolerance | : 1.50 keV | Half life ratio | : 10.00 |
| Errors propagated | : No | Systematic Error | : 0.00 % |
| Efficiency type | : Empirical | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Interference Report

No interference correction performed

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 6010 | 85.60* | 6.335E+00 | 2.551E+01 | 2.696E+01 | 3.95 |
| | 136.47 | 787 | 10.68 | 6.312E+00 | 2.686E+01 | 2.839E+01 | 21.15 |
| CO-60 | 1173.23 | 14826 | 99.85 | 1.498E+00 | 2.282E+02 | 2.300E+02 | 1.84 |
| | 1332.49 | 13352 | 99.98* | 1.344E+00 | 2.287E+02 | 2.305E+02 | 1.81 |
| ZN-65 | 1115.54 | 2970 | 50.60* | 1.563E+00 | 8.643E+01 | 9.192E+01 | 5.16 |
| Y-88 | 898.04 | 519 | 93.70 | 1.872E+00 | 6.806E+00 | 7.836E+00 | 27.66 |
| | 1836.06 | 323 | 99.20* | 1.036E+00 | 7.236E+00 | 8.331E+00 | 14.05 |
| CD-109 | 88.03 | 19592 | 3.70* | 5.342E+00 | 2.282E+03 | 2.357E+03 | 1.58 |
| SN-113 | 391.69 | 623 | 64.94* | 3.500E+00 | 6.305E+00 | 7.184E+00 | 24.04 |
| SN-126 | 64.28 | ------ | 9.60 | 3.047E+00 | ------ Line Not Found | | ------ |
| | 86.94 | 156 | 8.90 | 5.228E+00 | 7.708E+00 | 7.708E+00 | 65.71 |
| | 87.57 | 19592 | 37.00* | 5.342E+00 | 2.282E+02 | 2.282E+02 | 1.58 |
| BA-137M | 661.66 | 16143 | 89.90* | 2.382E+00 | 1.735E+02 | 1.738E+02 | 1.81 |
| CS-137 | 661.66 | 16143 | 85.10* | 2.382E+00 | 1.833E+02 | 1.836E+02 | 1.81 |
| CE-139 | 165.86 | 1485 | 80.00* | 5.980E+00 | 7.143E+00 | 7.967E+00 | 11.54 |
| PM-147 | 121.22 | 6010 | 0.00* | 6.335E+00 | 7.662E+05 | 7.783E+05 | 3.95 |
| PB-210 | 46.54 | 9214 | 4.25* | 8.491E-01 | 5.876E+03 | 5.887E+03 | 3.96 |
| TH-229 | 85.43 | 156 | 14.70 | 5.228E+00 | 4.667E+00 | 4.667E+00 | 65.71 |
| | 88.47 | 19592 | 24.00 | 5.342E+00 | 3.517E+02 | 3.517E+02 | 1.58 |
| | 193.51 | ------ | 4.41* | 5.558E+00 | ------ Line Not Found | | ------ |
| | 210.85 | ------ | 2.80 | 5.298E+00 | ------ Line Not Found | | ------ |
| AM-241 | 59.54 | 17971 | 35.90* | 2.409E+00 | 4.783E+02 | 4.783E+02 | 2.32 |
| ANH-511 | 511.00 | 539 | 100.00* | 2.887E+00 | 4.293E+00 | 4.293E+00 | 33.53 |

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:28.76

```
*****************************************************************************
*                           GEL Laboratories LLC                            *
*                             2040 Savage Road                              *
*                           Charleston, SC 29407                            *
*****************************************************************************
*                                                                           *
*                         DETECTOR AND SAMPLE DATA                          *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1  *
* Acquisition date : 12-FEB-2014 16:15:51 Sensitivity     : 3.000           *
* Detector ID      : GAM11                Energy tolerance: 1.500           *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 00:15:10.25     Half life ratio : *****           *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1203023701          Analyst initials: RXF2            *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                         CALIBRATION INFORMATION                           *
*                                                                           *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9         *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Cnt uncert (1.96-sigma) | MDA (pCi/GRAM ) |
|---|---|---|---|
| CO-57 | 2.696E+01 | 1.043E+00 | 7.995E-01 |
| CO-60 | 2.305E+02 | 4.092E+00 | 9.481E-01 |
| ZN-65 | 9.192E+01 | 4.647E+00 | 3.597E+00 |
| Y-88 | 8.331E+00 | 1.147E+00 | 6.671E-01 |
| CD-109 | 2.357E+03 | 3.640E+01 | 2.805E+01 |
| SN-113 | 7.184E+00 | 1.693E+00 | 1.661E+00 |
| SN-126 | 2.282E+02 | 3.524E+00 | 2.729E+00 |
| BA-137M | 1.738E+02 | 3.085E+00 | 1.221E+00 |
| CS-137 | 1.836E+02 | 3.259E+00 | 1.289E+00 |
| CE-139 | 7.967E+00 | 9.007E-01 | 8.742E-01 |
| PM-147 | 7.783E+05 | 3.011E+04 | 2.308E+04 |
| PB-210 | 5.887E+03 | 2.287E+02 | 1.817E+02 |
| TH-229 | 2.437E+00 | 8.834E+00 | 1.563E+01 |
| AM-241 | 4.783E+02 | 1.086E+01 | 6.863E+00 |
| ANH-511 | 4.293E+00 | 1.411E+00 | 9.772E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L. Cnt Uncert (1.96-sigma) | MDA (pCi/GRAM ) | |
|---|---|---|---|---|
| BE-7 | 6.188E+00 | 8.104E+00 | 1.384E+01 | NOT IDENT. |
| NA-22 | -2.478E-01 | 4.694E-01 | 8.135E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | 1.057E+10 | 0.000E+00 | SHORT HLIF |
| AL-26 | -4.145E-02 | 3.651E-01 | 6.526E-01 | NOT IDENT. |
| K-40 | -5.161E-01 | 3.432E+00 | 6.161E+00 | NOT IDENT. |
| SC-46 | -5.341E-02 | 1.154E+00 | 1.961E+00 | NOT IDENT. |
| V-48 | -4.356E-01 | 2.457E+00 | 4.134E+00 | NOT IDENT. |
| CR-51 | 1.300E+00 | 8.441E+00 | 1.456E+01 | NOT IDENT. |
| MN-54 | -3.799E-01 | 8.894E-01 | 1.505E+00 | NOT IDENT. |
| CO-56 | 2.000E-01 | 1.230E+00 | 1.830E+00 | NOT IDENT. |
| MN-56 | 0.000E+00 | 1.960E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | 3.755E-01 | 1.008E+00 | 1.746E+00 | NOT IDENT. |
| FE-59 | -6.801E-01 | 2.631E+00 | 4.378E+00 | NOT IDENT. |
| GE-68 | -5.474E+00 | 3.329E+01 | 5.565E+01 | NOT IDENT. |
| AS-73 | 2.170E+01 | 2.884E+01 | 4.776E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-74 | -2.061E-01 | 2.301E+00 | 4.029E+00 | NOT IDENT. |
| SE-75 | 2.324E-02 | 8.810E-01 | 1.529E+00 | FAIL ABUN |
| BR-77 | 2.494E+02 | 1.051E+03 | 1.842E+03 | NOT IDENT. |
| SR-82 | 2.718E+00 | 8.989E+00 | 1.561E+01 | NOT IDENT. |
| RB-83 | -1.229E+00 | 1.621E+00 | 2.552E+00 | NOT IDENT. |
| KR-85 | 2.054E+02 | 1.410E+02 | 2.450E+02 | NOT IDENT. |
| SR-85 | 1.164E+00 | 8.004E-01 | 1.391E+00 | NOT IDENT. |
| RB-86 | -1.355E+01 | 2.651E+01 | 4.386E+01 | NOT IDENT. |
| Y-91 | 1.733E+02 | 2.983E+02 | 5.432E+02 | NOT IDENT. |
| NB-94 | 1.119E-01 | 6.781E-01 | 1.182E+00 | NOT IDENT. |
| NB-95 | -5.936E-02 | 9.218E-01 | 1.587E+00 | NOT IDENT. |
| NB-95M | -1.632E-01 | 2.247E+00 | 3.914E+00 | NOT IDENT. |
| ZR-95 | 2.748E-01 | 1.883E+00 | 2.838E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | 2.818E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | 2.495E+10 | 0.000E+00 | SHORT HLIF |
| MO-99 | -3.009E+02 | 1.360E+03 | 2.338E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | 4.681E+25 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.898E-01 | 5.663E-01 | 9.091E-01 | NOT IDENT. |
| RH-102 | -7.002E-01 | 1.153E+00 | 1.929E+00 | NOT IDENT. |
| RU-103 | 3.760E-01 | 1.511E+00 | 1.609E+00 | NOT IDENT. |
| RH-106 | 4.764E+00 | 7.251E+00 | 1.132E+01 | NOT IDENT. |
| RU-106 | 4.764E+00 | 7.251E+00 | 1.132E+01 | NOT IDENT. |
| AG-108M | -1.812E-01 | 6.611E-01 | 1.109E+00 | NOT IDENT. |
| AG-110M | -3.704E-01 | 1.409E+00 | 2.382E+00 | NOT IDENT. |
| CD-115 | -5.479E+02 | 1.864E+03 | 3.088E+03 | FAIL ABUN |
| SN-117M | 1.327E-01 | 1.290E+00 | 2.141E+00 | NOT IDENT. |
| TE-123M | -3.392E-02 | 5.036E-01 | 8.328E-01 | NOT IDENT. |
| SB-124 | -5.478E-01 | 1.003E+00 | 1.709E+00 | NOT IDENT. |
| SB-125 | -1.644E-01 | 2.063E+00 | 3.478E+00 | NOT IDENT. |
| TE-125M | 1.398E+02 | 1.920E+02 | 3.275E+02 | NOT IDENT. |
| I-126 | -4.198E+00 | 7.090E+00 | 1.049E+01 | FAIL ABUN |
| SB-126 | 2.578E+00 | 4.264E+00 | 7.512E+00 | NOT IDENT. |
| SB-127 | 6.306E+01 | 8.858E+01 | 1.533E+02 | NOT IDENT. |
| I-131 | -4.422E+00 | 4.197E+00 | 6.989E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | 1.384E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.266E+01 | 5.556E+01 | 9.601E+01 | NOT IDENT. |
| BA-133 | -2.368E-02 | 8.236E-01 | 1.407E+00 | NOT IDENT. |
| I-133 | 0.000E+00 | 2.356E+07 | 0.000E+00 | SHORT HLIF |
| CS-134 | -3.882E-01 | 9.341E-01 | 1.588E+00 | NOT IDENT. |
| CS-135 | 5.833E-01 | 2.874E+00 | 5.003E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | 1.050E+24 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.341E+00 | 3.775E+00 | 6.474E+00 | NOT IDENT. |
| BA-140 | 8.682E-01 | 1.262E+00 | 2.434E+00 | NOT IDENT. |
| LA-140 | 8.682E-01 | 1.262E+00 | 2.434E+00 | NOT IDENT. |
| CE-141 | -1.666E-01 | 1.208E+00 | 2.004E+00 | NOT IDENT. |
| CE-143 | 0.000E+00 | 6.191E+04 | 0.000E+00 | SHORT HLIF |
| CE-144 | -1.655E+00 | 3.927E+00 | 5.772E+00 | NOT IDENT. |
| PM-144 | -4.458E-01 | 6.854E-01 | 1.170E+00 | NOT IDENT. |
| PR-144 | -3.332E+01 | 5.148E+01 | 8.785E+01 | NOT IDENT. |
| PM-146 | 1.307E-01 | 1.014E+00 | 1.710E+00 | NOT IDENT. |
| ND-147 | -5.019E+00 | 1.823E+01 | 3.020E+01 | NOT IDENT. |
| PM-149 | 6.366E+03 | 1.313E+04 | 2.294E+04 | NOT IDENT. |
| EU-150 | -1.466E-02 | 5.104E-01 | 8.750E-01 | NOT IDENT. |
| EU-152 | 1.817E-01 | 1.853E+00 | 3.181E+00 | FAIL ABUN |
| GD-153 | -1.018E+00 | 1.554E+00 | 2.596E+00 | NOT IDENT. |
| EU-154 | -2.907E-01 | 1.311E+00 | 2.319E+00 | FAIL ABUN |
| EU-155 | 3.728E-01 | 1.943E+00 | 3.286E+00 | FAIL ABUN |
| TB-160 | 2.804E+00 | 3.880E+00 | 6.722E+00 | FAIL ABUN |
| HO-166M | 2.937E-01 | 1.232E+00 | 2.152E+00 | FAIL ABUN |
| TM-171 | -2.430E+02 | 5.515E+02 | 9.441E+02 | NOT IDENT. |
| LU-176 | -1.671E-01 | 5.011E-01 | 8.572E-01 | FAIL ABUN |
| HF-181 | -8.905E-01 | 1.113E+00 | 1.829E+00 | NOT IDENT. |
| TA-182 | 3.221E-01 | 2.301E+00 | 4.127E+00 | NOT IDENT. |
| RE-183 | 0.000E+00 | 1.409E+01 | 2.008E+01 | FAIL ABUN |
| RE-184 | -7.326E-01 | 4.805E+00 | 7.010E+00 | NOT IDENT. |
| W-188 | -6.003E+01 | 1.474E+02 | 2.524E+02 | NOT IDENT. |
| IR-192 | 2.878E-01 | 7.223E-01 | 1.253E+00 | NOT IDENT. |
| HG-203 | 5.171E-01 | 7.692E-01 | 1.350E+00 | NOT IDENT. |
| BI-207 | 2.465E-01 | 1.327E+00 | 2.244E+00 | NOT IDENT. |
| TL-208 | -3.742E-01 | 6.731E-01 | 1.167E+00 | NOT IDENT. |
| BI-211 | -7.998E-01 | 3.939E+00 | 6.709E+00 | NOT IDENT. |
| PB-211 | -2.598E+00 | 1.486E+01 | 2.510E+01 | NOT IDENT. |
| BI-212 | -7.655E+00 | 1.003E+01 | 1.700E+01 | NOT IDENT. |
| PB-212 | 1.927E-01 | 1.003E+00 | 1.757E+00 | NOT IDENT. |
| BI-214 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| PB-214 | -3.766E-01 | 1.439E+00 | 2.446E+00 | FAIL ABUN |
| RN-219 | -6.418E+00 | 8.511E+00 | 1.418E+01 | NOT IDENT. |
| RN-222 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-223 | 3.233E+00 | 1.220E+01 | 2.109E+01 | NOT IDENT. |
| RA-224 | -2.346E+00 | 1.068E+01 | 1.853E+01 | NOT IDENT. |
| RA-226 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| AC-227 | 5.217E+00 | 4.736E+00 | 8.401E+00 | NOT IDENT. |
| TH-227 | 5.217E+00 | 4.736E+00 | 8.401E+00 | NOT IDENT. |
| AC-228 | -4.205E+00 | 3.963E+00 | 6.553E+00 | NOT IDENT. |
| RA-228 | -4.205E+00 | 3.963E+00 | 6.553E+00 | NOT IDENT. |
| TH-228 | 1.927E-01 | 1.003E+00 | 1.757E+00 | NOT IDENT. |
| TH-230 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| PA-231 | -1.274E+01 | 2.694E+01 | 4.615E+01 | NOT IDENT. |
| TH-231 | 3.233E+00 | 1.220E+01 | 2.109E+01 | NOT IDENT. |
| TH-232 | -4.205E+00 | 3.963E+00 | 6.553E+00 | NOT IDENT. |
| PA-233 | 3.450E-01 | 1.265E+00 | 2.189E+00 | NOT IDENT. |
| PA-234 | -2.143E+00 | 9.068E+00 | 1.524E+01 | NOT IDENT. |
| PA-234M | -4.447E+01 | 1.181E+02 | 1.973E+02 | NOT IDENT. |
| TH-234 | -5.259E+01 | 3.042E+01 | 4.521E+01 | NOT IDENT. |
| U-234 | -2.100E-01 | 1.330E+00 | 2.323E+00 | NOT IDENT. |
| U-235 | 8.707E-01 | 3.297E+00 | 5.518E+00 | NOT IDENT. |
| NP-237 | 3.450E-01 | 1.265E+00 | 2.189E+00 | NOT IDENT. |
| NP-238 | 0.000E+00 | 4.625E+03 | 0.000E+00 | SHORT HLIF |
| U-238 | -5.259E+01 | 3.042E+01 | 4.521E+01 | NOT IDENT. |
| NP-239 | 1.071E+00 | 8.646E+00 | 1.297E+01 | NOT IDENT. |
| PU-239 | 5.957E+02 | 5.764E+03 | 9.657E+03 | NOT IDENT. |
| AM-243 | -5.745E-01 | 1.167E+00 | 1.974E+00 | NOT IDENT. |
| CM-243 | 6.752E-01 | 1.973E+00 | 3.349E+00 | NOT IDENT. |
| CM-247 | -7.048E-01 | 7.790E-01 | 1.293E+00 | NOT IDENT. |
| CF-249 | 9.817E-01 | 9.234E-01 | 1.423E+00 | NOT IDENT. |
| CF-251 | -1.442E-02 | 2.176E+00 | 3.585E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:24.82

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 46.29 | 9218 | 6889 | 0.93 | 92.59 | 87 | 10 | 1.02E+01 | 2.0 | |
| 2 | 0 | 59.32 | 17972 | 6142 | 0.92 | 118.68 | 113 | 12 | 2.00E+01 | 1.2 | |
| 3 | 2 | 86.16 | 156 | 1610 | 0.82 | 172.38 | 171 | 12 | 1.73E-01 | 32.9 | 2.01E+01 |
| 4 | 2 | 87.86 | 19592 | 2019 | 0.91 | 175.79 | 171 | 12 | 2.18E+01 | 0.8 | |
| 5 | 0 | 121.89 | 6010 | 2291 | 0.88 | 243.89 | 239 | 10 | 6.68E+00 | 2.0 | |
| 6 | 0 | 136.35 | 787 | 1743 | 0.96 | 272.82 | 268 | 10 | 8.74E-01 | 10.6 | |
| 7 | 0 | 165.67 | 1485 | 1669 | 1.08 | 331.49 | 327 | 10 | 1.65E+00 | 5.8 | |
| 8 | 0 | 391.21 | 623 | 1244 | 1.16 | 782.78 | 776 | 12 | 6.92E-01 | 12.0 | |
| 9 | 0 | 491.85 | 89 | 655 | 0.80 | 984.14 | 981 | 8 | 9.84E-02 | 51.2 | |
| 10 | 0 | 501.63 | 103 | 568 | 2.57 | 1003.72 | 1000 | 8 | 1.14E-01 | 41.5 | |
| 11 | 0 | 511.06 | 559 | 1321 | 2.78 | 1022.59 | 1015 | 19 | 6.21E-01 | 16.2 | |
| 12 | 0 | 623.57 | 118 | 616 | 1.67 | 1247.67 | 1243 | 11 | 1.31E-01 | 41.6 | |
| 13 | 0 | 661.60 | 16146 | 1045 | 1.38 | 1323.76 | 1316 | 16 | 1.79E+01 | 0.9 | |
| 14 | 0 | 679.86 | 20 | 325 | 1.20 | 1360.29 | 1357 | 6 | 2.20E-02 | 145.9 | |
| 15 | 0 | 752.36 | 27 | 529 | 1.35 | 1505.34 | 1500 | 9 | 3.05E-02 | 152.8 | |
| 16 | 0 | 849.25 | 36 | 422 | 1.19 | 1699.16 | 1696 | 6 | 3.99E-02 | 91.8 | |
| 17 | 0 | 866.87 | 78 | 461 | 1.82 | 1734.40 | 1732 | 7 | 8.67E-02 | 47.1 | |
| 18 | 0 | 897.93 | 519 | 1090 | 1.32 | 1796.54 | 1790 | 13 | 5.76E-01 | 13.8 | |
| 19 | 0 | 1115.53 | 2970 | 645 | 1.66 | 2231.78 | 2225 | 14 | 3.30E+00 | 2.6 | |
| 20 | 0 | 1173.27 | 14826 | 615 | 1.76 | 2347.28 | 2337 | 20 | 1.65E+01 | 0.9 | |
| 21 | 0 | 1300.02 | 80 | 120 | 6.63 | 2600.77 | 2591 | 21 | 8.85E-02 | 36.2 | |
| 22 | 0 | 1332.59 | 13353 | 219 | 1.76 | 2665.91 | 2657 | 19 | 1.48E+01 | 0.9 | |
| 23 | 0 | 1522.34 | 37 | 33 | 2.71 | 3045.38 | 3037 | 15 | 4.09E-02 | 38.1 | |
| 24 | 0 | 1715.93 | 17 | 52 | 3.58 | 3432.50 | 3421 | 16 | 1.87E-02 | 99.1 | |
| 25 | 0 | 1836.20 | 323 | 34 | 2.03 | 3672.96 | 3665 | 19 | 3.59E-01 | 7.0 | |
| 26 | 0 | 1909.69 | 36 | 9 | 6.98 | 3819.92 | 3811 | 18 | 4.00E-02 | 25.7 | |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:27.02

Nuclide Line Activity Report

Nuclide Type:

| Nuclide | Energy | Area | %Abn | %Eff | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | 2-Sigma %Error |
|---|---|---|---|---|---|---|---|
| CO-57 | 122.06 | 6010 | 85.60* | 6.335E+00 | 2.551E+01 | 2.696E+01 | 3.95 |
| | 136.47 | 787 | 10.68 | 6.312E+00 | 2.686E+01 | 2.839E+01 | 21.15 |
| CO-60 | 1173.23 | 14826 | 99.85 | 1.498E+00 | 2.282E+02 | 2.300E+02 | 1.84 |
| | 1332.49 | 13352 | 99.98* | 1.344E+00 | 2.287E+02 | 2.305E+02 | 1.81 |
| ZN-65 | 1115.54 | 2970 | 50.60* | 1.563E+00 | 8.643E+01 | 9.192E+01 | 5.16 |
| Y-88 | 898.04 | 519 | 93.70 | 1.872E+00 | 6.806E+00 | 7.836E+00 | 27.66 |
| | 1836.06 | 323 | 99.20* | 1.036E+00 | 7.236E+00 | 8.331E+00 | 14.05 |
| CD-109 | 88.03 | 19592 | 3.70* | 5.342E+00 | 2.282E+03 | 2.357E+03 | 1.58 |
| SN-113 | 391.69 | 623 | 64.94* | 3.500E+00 | 6.305E+00 | 7.184E+00 | 24.04 |
| SN-126 | 64.28 | ------ | 9.60 | 3.047E+00 | ------ Line Not Found | | ------ |
| | 86.94 | 156 | 8.90 | 5.228E+00 | 7.708E+00 | 7.708E+00 | 65.71 |
| | 87.57 | 19592 | 37.00* | 5.342E+00 | 2.282E+02 | 2.282E+02 | 1.58 |
| BA-137M | 661.66 | 16143 | 89.90* | 2.382E+00 | 1.735E+02 | 1.738E+02 | 1.81 |
| CS-137 | 661.66 | 16143 | 85.10* | 2.382E+00 | 1.833E+02 | 1.836E+02 | 1.81 |
| CE-139 | 165.86 | 1485 | 80.00* | 5.980E+00 | 7.143E+00 | 7.967E+00 | 11.54 |
| PM-147 | 121.22 | 6010 | 0.00* | 6.335E+00 | 7.662E+05 | 7.783E+05 | 3.95 |
| PB-210 | 46.54 | 9214 | 4.25* | 8.491E-01 | 5.876E+03 | 5.887E+03 | 3.96 |
| TH-229 | 85.43 | 156 | 14.70 | 5.228E+00 | 4.667E+00 | 4.667E+00 | 65.71 |
| | 88.47 | 19592 | 24.00 | 5.342E+00 | 3.517E+02 | 3.517E+02 | 1.58 |
| | 193.51 | ------ | 4.41* | 5.558E+00 | ------ Line Not Found | | ------ |
| | 210.85 | ------ | 2.80 | 5.298E+00 | ------ Line Not Found | | ------ |
| AM-241 | 59.54 | 17971 | 35.90* | 2.409E+00 | 4.783E+02 | 4.783E+02 | 2.32 |
| ANH-511 | 511.00 | 539 | 100.00* | 2.887E+00 | 4.293E+00 | 4.293E+00 | 33.53 |

Flag: "*" = Keyline

Sample ID : G1203023701 Acquisition date : 12-FEB-2014 16:15:51

Total number of lines in spectrum 26
Number of unidentified lines 9
Number of lines tentatively identified by NID 17 65.38%

Nuclide Type :

| Nuclide | Hlife | Decay | Uncorrected pCi/GRAM | Decay Corr pCi/GRAM | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| CO-57 | 271.74D | 1.06 | 2.551E+01 | 2.696E+01 | 0.106E+01 | 3.95 | |
| CO-60 | 5.27Y | 1.01 | 2.287E+02 | 2.305E+02 | 0.042E+02 | 1.81 | |
| ZN-65 | 244.06D | 1.06 | 8.643E+01 | 9.192E+01 | 0.474E+01 | 5.16 | |
| Y-88 | 106.63D | 1.15 | 7.236E+00 | 8.331E+00 | 1.170E+00 | 14.05 | |
| CD-109 | 461.40D | 1.03 | 2.282E+03 | 2.357E+03 | 0.037E+03 | 1.58 | |
| SN-113 | 115.09D | 1.14 | 6.305E+00 | 7.184E+00 | 1.727E+00 | 24.04 | |
| SN-126 | 2.30E+05Y | 1.00 | 2.282E+02 | 2.282E+02 | 0.036E+02 | 1.58 | |
| BA-137M | 30.08Y | 1.00 | 1.735E+02 | 1.738E+02 | 0.031E+02 | 1.81 | |
| CS-137 | 30.08Y | 1.00 | 1.833E+02 | 1.836E+02 | 0.033E+02 | 1.81 | |
| CE-139 | 137.64D | 1.12 | 7.143E+00 | 7.967E+00 | 0.919E+00 | 11.54 | |
| PM-147 | 2.62Y | 1.02 | 7.662E+05 | 7.783E+05 | 0.307E+05 | 3.95 | |
| PB-210 | 22.20Y | 1.00 | 5.876E+03 | 5.887E+03 | 0.233E+03 | 3.96 | |
| TH-229 | 7340.00Y | 1.00 | 3.517E+02 | 3.517E+02 | 0.055E+02 | 1.58 | K |
| AM-241 | 432.60Y | 1.00 | 4.783E+02 | 4.783E+02 | 0.111E+02 | 2.32 | |
| ANH-511 | 1.00E+09Y | 1.00 | 4.293E+00 | 4.293E+00 | 1.440E+00 | 33.53 | |
| Total Activity : | | | 7.761E+05 | 7.883E+05 | | | |

Grand Total Activity : 7.761E+05 7.883E+05

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1203023701 Acquisition date : 12-FEB-2014 16:15:51

| It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | %Eff | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 491.85 | 89 | 655 | 0.80 | 984.14 | 981 | 8 | 9.84E-02 | **** | 2.97E+00 | T |
| 0 | 501.63 | 103 | 568 | 2.57 | 1003.72 | 1000 | 8 | 1.14E-01 | 83.0 | 2.93E+00 | |
| 0 | 623.57 | 118 | 616 | 1.67 | 1247.67 | 1243 | 11 | 1.31E-01 | 83.3 | 2.49E+00 | |
| 0 | 679.86 | 20 | 325 | 1.20 | 1360.29 | 1357 | 6 | 2.20E-02 | **** | 2.33E+00 | |
| 0 | 752.36 | 27 | 529 | 1.35 | 1505.34 | 1500 | 9 | 3.05E-02 | **** | 2.16E+00 | T |
| 0 | 849.25 | 36 | 422 | 1.19 | 1699.16 | 1696 | 6 | 3.99E-02 | **** | 1.96E+00 | |
| 0 | 866.87 | 78 | 461 | 1.82 | 1734.40 | 1732 | 7 | 8.67E-02 | 94.2 | 1.93E+00 | |
| 0 | 1300.02 | 80 | 120 | 6.63 | 2600.77 | 2591 | 21 | 8.85E-02 | 72.5 | 1.37E+00 | |
| 0 | 1522.34 | 37 | 33 | 2.71 | 3045.38 | 3037 | 15 | 4.09E-02 | 76.2 | 1.20E+00 | |
| 0 | 1715.93 | 17 | 52 | 3.58 | 3432.50 | 3421 | 16 | 1.87E-02 | **** | 1.09E+00 | |
| 0 | 1909.69 | 36 | 9 | 6.98 | 3819.92 | 3811 | 18 | 4.00E-02 | 51.4 | 1.01E+00 | |

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:39.11

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1   *
* Acquisition date : 12-FEB-2014 16:15:51 Sensitivity     : 3.000          *
* Detector ID      : GAM11                Energy tolerance: 1.500          *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:15:10.25     Half life ratio : *****          *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID          *
* Sample ID        : G1203023701          Analyst initials: RXF2           *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB       *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) |
|---|---|
| CO-57 | 3.939E-01 |
| CO-60 | 4.509E-01 |
| ZN-65 | 1.758E+00 |
| Y-88 | 2.988E-01 |
| CD-109 | 1.387E+01 |
| SN-113 | 8.155E-01 |
| SN-126 | 1.349E+00 |
| BA-137M | 5.961E-01 |
| CS-137 | 6.297E-01 |
| CE-139 | 4.301E-01 |
| PM-147 | 1.137E+04 |
| PB-210 | 9.007E+01 |
| TH-229 | 7.694E+00 |
| AM-241 | 3.398E+00 |
| ANH-511 | 4.781E-01 |

---- Non-Identified Nuclides ----

| Nuclide | Lc (pCi/GRAM) | |
|---|---|---|
| BE-7 | 6.795E+00 | NOT IDENT. |
| NA-22 | 3.843E-01 | NOT IDENT. |
| NA-24 | 0.000E+00 | SHORT HLIF |
| AL-26 | 2.967E-01 | NOT IDENT. |
| K-40 | 2.847E+00 | NOT IDENT. |
| SC-46 | 9.613E-01 | NOT IDENT. |
| V-48 | 2.022E+00 | NOT IDENT. |
| CR-51 | 7.149E+00 | NOT IDENT. |
| MN-54 | 7.365E-01 | NOT IDENT. |
| CO-56 | 8.963E-01 | NOT IDENT. |
| MN-56 | 0.000E+00 | SHORT HLIF |
| CO-58 | 8.546E-01 | NOT IDENT. |
| FE-59 | 2.141E+00 | NOT IDENT. |
| GE-68 | 2.721E+01 | NOT IDENT. |
| AS-73 | 2.367E+01 | NOT IDENT. |
| AS-74 | 1.968E+00 | NOT IDENT. |

| | | |
|---|---|---|
| SE-75 | 7.519E-01 | FAIL ABUN |
| BR-77 | 9.063E+02 | NOT IDENT. |
| SR-82 | 7.632E+00 | NOT IDENT. |
| RB-83 | 1.248E+00 | NOT IDENT. |
| KR-85 | 1.200E+02 | NOT IDENT. |
| SR-85 | 6.815E-01 | NOT IDENT. |
| RB-86 | 2.144E+01 | NOT IDENT. |
| Y-91 | 2.612E+02 | NOT IDENT. |
| NB-94 | 5.777E-01 | NOT IDENT. |
| NB-95 | 7.756E-01 | NOT IDENT. |
| NB-95M | 1.926E+00 | NOT IDENT. |
| ZR-95 | 1.386E+00 | NOT IDENT. |
| NB-97 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 0.000E+00 | SHORT HLIF |
| MO-99 | 1.142E+03 | NOT IDENT. |
| TC-99M | 0.000E+00 | SHORT HLIF |
| RH-101 | 4.475E-01 | NOT IDENT. |
| RH-102 | 9.423E-01 | NOT IDENT. |
| RU-103 | 7.877E-01 | NOT IDENT. |
| RH-106 | 5.534E+00 | NOT IDENT. |
| RU-106 | 5.534E+00 | NOT IDENT. |
| AG-108M | 5.440E-01 | NOT IDENT. |
| AG-110M | 1.168E+00 | NOT IDENT. |
| CD-115 | 1.511E+03 | FAIL ABUN |
| SN-117M | 1.053E+00 | NOT IDENT. |
| TE-123M | 4.097E-01 | NOT IDENT. |
| SB-124 | 7.786E-01 | NOT IDENT. |
| SB-125 | 1.707E+00 | NOT IDENT. |
| TE-125M | 1.614E+02 | NOT IDENT. |
| I-126 | 5.118E+00 | FAIL ABUN |
| SB-126 | 3.671E+00 | NOT IDENT. |
| SB-127 | 7.487E+01 | NOT IDENT. |
| I-131 | 3.429E+00 | NOT IDENT. |
| I-132 | 0.000E+00 | SHORT HLIF |
| TE-132 | 4.727E+01 | NOT IDENT. |
| BA-133 | 6.903E-01 | NOT IDENT. |
| I-133 | 0.000E+00 | SHORT HLIF |
| CS-134 | 7.762E-01 | NOT IDENT. |
| CS-135 | 2.460E+00 | NOT IDENT. |
| I-135 | 0.000E+00 | SHORT HLIF |
| CS-136 | 3.165E+00 | NOT IDENT. |
| BA-140 | 1.126E+00 | NOT IDENT. |
| LA-140 | 1.126E+00 | NOT IDENT. |
| CE-141 | 9.860E-01 | NOT IDENT. |
| CE-143 | 0.000E+00 | SHORT HLIF |
| CE-144 | 2.841E+00 | NOT IDENT. |
| PM-144 | 5.709E-01 | NOT IDENT. |
| PR-144 | 4.288E+01 | NOT IDENT. |
| PM-146 | 8.402E-01 | NOT IDENT. |
| ND-147 | 1.478E+01 | NOT IDENT. |
| PM-149 | 1.127E+04 | NOT IDENT. |
| EU-150 | 4.295E-01 | NOT IDENT. |
| EU-152 | 1.561E+00 | FAIL ABUN |
| GD-153 | 1.279E+00 | NOT IDENT. |
| EU-154 | 1.096E+00 | FAIL ABUN |
| EU-155 | 1.619E+00 | FAIL ABUN |
| TB-160 | 3.296E+00 | FAIL ABUN |
| HO-166M | 1.051E+00 | FAIL ABUN |
| TM-171 | 4.679E+02 | NOT IDENT. |
| LU-176 | 4.208E-01 | FAIL ABUN |
| HF-181 | 8.968E-01 | NOT IDENT. |
| TA-182 | 1.973E+00 | NOT IDENT. |
| RE-183 | 9.994E+00 | FAIL ABUN |
| RE-184 | 3.440E+00 | NOT IDENT. |
| W-188 | 1.240E+02 | NOT IDENT. |
| IR-192 | 6.153E-01 | NOT IDENT. |
| HG-203 | 6.634E-01 | NOT IDENT. |
| BI-207 | 1.097E+00 | NOT IDENT. |
| TL-208 | 5.697E-01 | NOT IDENT. |
| BI-211 | 3.293E+00 | NOT IDENT. |
| PB-211 | 1.231E+01 | NOT IDENT. |
| BI-212 | 8.292E+00 | NOT IDENT. |
| PB-212 | 8.643E-01 | NOT IDENT. |
| BI-214 | 1.135E+00 | NOT IDENT. |
| PB-214 | 1.201E+00 | FAIL ABUN |
| RN-219 | 6.958E+00 | NOT IDENT. |
| RN-222 | 1.135E+00 | NOT IDENT. |
| RA-223 | 1.035E+01 | NOT IDENT. |

| | | |
|---|---|---|
| RA-224 | 9.115E+00 | NOT IDENT. |
| RA-226 | 1.135E+00 | NOT IDENT. |
| AC-227 | 4.133E+00 | NOT IDENT. |
| TH-227 | 4.133E+00 | NOT IDENT. |
| AC-228 | 3.213E+00 | NOT IDENT. |
| RA-228 | 3.213E+00 | NOT IDENT. |
| TH-228 | 8.643E-01 | NOT IDENT. |
| TH-230 | 1.135E+00 | NOT IDENT. |
| PA-231 | 2.267E+01 | NOT IDENT. |
| TH-231 | 1.035E+01 | NOT IDENT. |
| TH-232 | 3.213E+00 | NOT IDENT. |
| PA-233 | 1.075E+00 | NOT IDENT. |
| PA-234 | 7.482E+00 | NOT IDENT. |
| PA-234M | 9.656E+01 | NOT IDENT. |
| TH-234 | 2.233E+01 | NOT IDENT. |
| U-234 | 1.135E+00 | NOT IDENT. |
| U-235 | 2.715E+00 | NOT IDENT. |
| NP-237 | 1.075E+00 | NOT IDENT. |
| NP-238 | 0.000E+00 | SHORT HLIF |
| U-238 | 2.233E+01 | NOT IDENT. |
| NP-239 | 6.393E+00 | NOT IDENT. |
| PU-239 | 4.753E+03 | NOT IDENT. |
| AM-243 | 9.765E-01 | NOT IDENT. |
| CM-243 | 1.651E+00 | NOT IDENT. |
| CM-247 | 6.344E-01 | NOT IDENT. |
| CF-249 | 6.986E-01 | NOT IDENT. |
| CF-251 | 1.763E+00 | NOT IDENT. |

VAX/VMS Nuclide Identification Report Generated 12-FEB-2014 16:31:43.72

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                         DETECTOR AND SAMPLE DATA                      *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203023701.CNF;1  *
* Acquisition date : 12-FEB-2014 16:15:51 Sensitivity     : 3.000       *
* Detector ID      : GAM11                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:15:10.25     Half life ratio : *****       *
* Sample date      : 22-JAN-2014 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1203023701          Analyst initials: RXF2        *
* Batch Number     : 1361908              Sample Quantity : 1.3048E+02 GRAM  *
*                                         Quantity Err(%) : 1.5328E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                         CALIBRATION INFORMATION                       *
*                                                                       *
* Eff. Cal. date   : 11-JUL-2013 12:10:44 Eff. Geometry   : 500MLMB     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_500MLMB.CNF;9     *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

| Nuclide | Activity (pCi/GRAM ) | Act Error (1.96-sigma) | TPU (1.96-sigma) |
|---|---|---|---|
| CO-57 | 2.696E+01 | 2.518E+00 | 2.518E+00 |
| CO-60 | 2.305E+02 | 1.931E+01 | 1.931E+01 |
| ZN-65 | 9.192E+01 | 1.641E+01 | 1.641E+01 |
| Y-88 | 8.331E+00 | 1.323E+00 | 1.323E+00 |
| CD-109 | 2.357E+03 | 2.541E+02 | 2.541E+02 |
| SN-113 | 7.184E+00 | 1.789E+00 | 1.789E+00 |
| SN-126 | 2.282E+02 | 2.143E+01 | 2.143E+01 |
| BA-137M | 1.738E+02 | 1.424E+01 | 1.424E+01 |
| CS-137 | 1.836E+02 | 1.503E+01 | 1.503E+01 |
| CE-139 | 7.967E+00 | 1.908E+00 | 1.908E+00 |
| PM-147 | 7.783E+05 | 7.264E+04 | 7.264E+04 |
| PB-210 | 5.887E+03 | 5.675E+02 | 5.675E+02 |
| TH-229 | 2.437E+00 | 8.836E+00 | 8.836E+00 |
| AM-241 | 4.783E+02 | 3.737E+01 | 3.737E+01 |
| ANH-511 | 4.293E+00 | 1.456E+00 | 1.456E+00 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/GRAM ) | K.L Act error (1.96-sigma) | TPU (1.96-sigma) | |
|---|---|---|---|---|
| BE-7 | 6.188E+00 | 8.120E+00 | 8.586E+00 | NOT IDENT. |
| NA-22 | -2.478E-01 | 4.699E-01 | 4.830E-01 | NOT IDENT. |
| NA-24 | 7.024E+09 | 1.058E+10 | 1.105E+10 | SHORT HLIF |
| AL-26 | -4.145E-02 | 3.651E-01 | 3.656E-01 | NOT IDENT. |
| K-40 | -5.161E-01 | 3.432E+00 | 3.440E+00 | NOT IDENT. |
| SC-46 | -5.341E-02 | 1.154E+00 | 1.155E+00 | NOT IDENT. |
| V-48 | -4.356E-01 | 2.458E+00 | 2.466E+00 | NOT IDENT. |
| CR-51 | 1.300E+00 | 8.442E+00 | 8.462E+00 | NOT IDENT. |
| MN-54 | -3.799E-01 | 8.904E-01 | 9.068E-01 | NOT IDENT. |
| CO-56 | 2.000E-01 | 1.231E+00 | 1.234E+00 | NOT IDENT. |
| MN-56 | 1.000E+41 | 6.446E+41 | 0.000E+00 | SHORT HLIF |
| CO-58 | 3.755E-01 | 1.009E+00 | 1.023E+00 | NOT IDENT. |
| FE-59 | -6.801E-01 | 2.634E+00 | 2.652E+00 | NOT IDENT. |
| GE-68 | -5.474E+00 | 3.330E+01 | 3.339E+01 | NOT IDENT. |
| AS-73 | 2.170E+01 | 2.918E+01 | 3.078E+01 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| AS-74 | -2.061E-01 | 2.301E+00 | 2.303E+00 | NOT IDENT. |
| SE-75 | 2.324E-02 | 8.810E-01 | 8.810E-01 | FAIL ABUN |
| BR-77 | 2.494E+02 | 1.063E+03 | 1.069E+03 | NOT IDENT. |
| SR-82 | 2.718E+00 | 8.993E+00 | 9.076E+00 | NOT IDENT. |
| RB-83 | -1.229E+00 | 1.632E+00 | 1.723E+00 | NOT IDENT. |
| KR-85 | 2.054E+02 | 1.420E+02 | 1.695E+02 | NOT IDENT. |
| SR-85 | 1.164E+00 | 8.063E-01 | 9.621E-01 | NOT IDENT. |
| RB-86 | -1.355E+01 | 2.660E+01 | 2.729E+01 | NOT IDENT. |
| Y-91 | 1.733E+02 | 2.989E+02 | 3.089E+02 | NOT IDENT. |
| NB-94 | 1.119E-01 | 6.782E-01 | 6.801E-01 | NOT IDENT. |
| NB-95 | -5.936E-02 | 9.219E-01 | 9.223E-01 | NOT IDENT. |
| NB-95M | -1.632E-01 | 2.247E+00 | 2.248E+00 | NOT IDENT. |
| ZR-95 | 2.748E-01 | 1.883E+00 | 1.887E+00 | NOT IDENT. |
| NB-97 | 1.000E+41 | 2.930E+40 | 0.000E+00 | SHORT HLIF |
| ZR-97 | 4.620E+10 | 2.525E+10 | 3.273E+10 | SHORT HLIF |
| MO-99 | -3.009E+02 | 1.360E+03 | 1.367E+03 | NOT IDENT. |
| TC-99M | 6.454E+24 | 4.682E+25 | 0.000E+00 | SHORT HLIF |
| RH-101 | 1.898E-01 | 5.675E-01 | 5.739E-01 | NOT IDENT. |
| RH-102 | -7.002E-01 | 1.155E+00 | 1.197E+00 | NOT IDENT. |
| RU-103 | 3.760E-01 | 1.511E+00 | 1.521E+00 | NOT IDENT. |
| RH-106 | 4.764E+00 | 7.265E+00 | 7.576E+00 | NOT IDENT. |
| RU-106 | 4.764E+00 | 7.265E+00 | 7.576E+00 | NOT IDENT. |
| AG-108M | -1.812E-01 | 6.613E-01 | 6.663E-01 | NOT IDENT. |
| AG-110M | -3.704E-01 | 1.410E+00 | 1.420E+00 | NOT IDENT. |
| CD-115 | -5.479E+02 | 1.865E+03 | 1.881E+03 | FAIL ABUN |
| SN-117M | 1.327E-01 | 1.290E+00 | 1.291E+00 | NOT IDENT. |
| TE-123M | -3.392E-02 | 5.036E-01 | 5.039E-01 | NOT IDENT. |
| SB-124 | -5.478E-01 | 1.004E+00 | 1.034E+00 | NOT IDENT. |
| SB-125 | -1.644E-01 | 2.063E+00 | 2.065E+00 | NOT IDENT. |
| TE-125M | 1.398E+02 | 1.924E+02 | 2.025E+02 | NOT IDENT. |
| I-126 | -4.198E+00 | 7.100E+00 | 7.348E+00 | FAIL ABUN |
| SB-126 | 2.578E+00 | 4.276E+00 | 4.431E+00 | NOT IDENT. |
| SB-127 | 6.306E+01 | 8.896E+01 | 9.339E+01 | NOT IDENT. |
| I-131 | -4.422E+00 | 4.213E+00 | 4.660E+00 | NOT IDENT. |
| I-132 | -1.000E+41 | 1.926E+41 | 0.000E+00 | SHORT HLIF |
| TE-132 | -3.266E+01 | 5.567E+01 | 5.758E+01 | NOT IDENT. |
| BA-133 | -2.368E-02 | 8.236E-01 | 8.236E-01 | NOT IDENT. |
| I-133 | -1.368E+07 | 2.366E+07 | 2.445E+07 | SHORT HLIF |
| CS-134 | -3.882E-01 | 9.350E-01 | 9.512E-01 | NOT IDENT. |
| CS-135 | 5.833E-01 | 2.875E+00 | 2.887E+00 | NOT IDENT. |
| I-135 | -1.007E+23 | 1.051E+24 | 0.000E+00 | SHORT HLIF |
| CS-136 | 2.341E+00 | 3.797E+00 | 3.941E+00 | NOT IDENT. |
| BA-140 | 8.682E-01 | 1.264E+00 | 1.323E+00 | NOT IDENT. |
| LA-140 | 8.682E-01 | 1.264E+00 | 1.323E+00 | NOT IDENT. |
| CE-141 | -1.666E-01 | 1.208E+00 | 1.211E+00 | NOT IDENT. |
| CE-143 | 2.908E+04 | 6.195E+04 | 6.332E+04 | SHORT HLIF |
| CE-144 | -1.655E+00 | 3.930E+00 | 4.000E+00 | NOT IDENT. |
| PM-144 | -4.458E-01 | 6.865E-01 | 7.153E-01 | NOT IDENT. |
| PR-144 | -3.332E+01 | 5.156E+01 | 5.370E+01 | NOT IDENT. |
| PM-146 | 1.307E-01 | 1.014E+00 | 1.016E+00 | NOT IDENT. |
| ND-147 | -5.019E+00 | 1.823E+01 | 1.837E+01 | NOT IDENT. |
| PM-149 | 6.366E+03 | 1.317E+04 | 1.348E+04 | NOT IDENT. |
| EU-150 | -1.466E-02 | 5.104E-01 | 5.104E-01 | NOT IDENT. |
| EU-152 | 1.817E-01 | 1.853E+00 | 1.855E+00 | FAIL ABUN |
| GD-153 | -1.018E+00 | 1.556E+00 | 1.623E+00 | NOT IDENT. |
| EU-154 | -2.907E-01 | 1.311E+00 | 1.318E+00 | FAIL ABUN |
| EU-155 | 3.728E-01 | 1.943E+00 | 1.950E+00 | FAIL ABUN |
| TB-160 | 2.804E+00 | 3.897E+00 | 4.097E+00 | FAIL ABUN |
| HO-166M | 2.937E-01 | 1.232E+00 | 1.240E+00 | FAIL ABUN |
| TM-171 | -2.430E+02 | 5.519E+02 | 5.627E+02 | NOT IDENT. |
| LU-176 | -1.671E-01 | 5.012E-01 | 5.069E-01 | FAIL ABUN |
| HF-181 | -8.905E-01 | 1.115E+00 | 1.185E+00 | NOT IDENT. |
| TA-182 | 3.221E-01 | 2.301E+00 | 2.306E+00 | NOT IDENT. |
| RE-183 | 6.205E+02 | 6.571E+01 | 2.873E+02 | FAIL ABUN |
| RE-184 | -7.326E-01 | 4.806E+00 | 4.817E+00 | NOT IDENT. |
| W-188 | -6.003E+01 | 1.476E+02 | 1.501E+02 | NOT IDENT. |
| IR-192 | 2.878E-01 | 7.227E-01 | 7.342E-01 | NOT IDENT. |
| HG-203 | 5.171E-01 | 7.702E-01 | 8.047E-01 | NOT IDENT. |
| BI-207 | 2.465E-01 | 1.328E+00 | 1.332E+00 | NOT IDENT. |
| TL-208 | -3.742E-01 | 6.738E-01 | 6.946E-01 | NOT IDENT. |
| BI-211 | -7.998E-01 | 3.939E+00 | 3.956E+00 | NOT IDENT. |
| PB-211 | -2.598E+00 | 1.486E+01 | 1.491E+01 | NOT IDENT. |
| BI-212 | -7.655E+00 | 1.005E+01 | 1.063E+01 | NOT IDENT. |
| PB-212 | 1.927E-01 | 1.003E+00 | 1.007E+00 | NOT IDENT. |
| BI-214 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| PB-214 | -3.766E-01 | 1.439E+00 | 1.449E+00 | FAIL ABUN |
| RN-219 | -6.418E+00 | 8.561E+00 | 9.037E+00 | NOT IDENT. |
| RN-222 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |

| | | | | |
|---|---|---|---|---|
| RA-223 | 3.233E+00 | 1.221E+01 | 1.229E+01 | NOT IDENT. |
| RA-224 | -2.346E+00 | 1.068E+01 | 1.073E+01 | NOT IDENT. |
| RA-226 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| AC-227 | 5.217E+00 | 4.796E+00 | 5.342E+00 | NOT IDENT. |
| TH-227 | 5.217E+00 | 4.796E+00 | 5.342E+00 | NOT IDENT. |
| AC-228 | -4.205E+00 | 4.001E+00 | 4.428E+00 | NOT IDENT. |
| RA-228 | -4.205E+00 | 4.001E+00 | 4.428E+00 | NOT IDENT. |
| TH-228 | 1.927E-01 | 1.003E+00 | 1.007E+00 | NOT IDENT. |
| TH-230 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| PA-231 | -1.274E+01 | 2.696E+01 | 2.756E+01 | NOT IDENT. |
| TH-231 | 3.233E+00 | 1.221E+01 | 1.229E+01 | NOT IDENT. |
| TH-232 | -4.205E+00 | 4.001E+00 | 4.428E+00 | NOT IDENT. |
| PA-233 | 3.450E-01 | 1.265E+00 | 1.274E+00 | NOT IDENT. |
| PA-234 | -2.143E+00 | 9.398E+00 | 9.447E+00 | NOT IDENT. |
| PA-234M | -4.447E+01 | 1.183E+02 | 1.200E+02 | NOT IDENT. |
| TH-234 | -5.259E+01 | 3.263E+01 | 4.034E+01 | NOT IDENT. |
| U-234 | -2.100E-01 | 1.330E+00 | 1.334E+00 | NOT IDENT. |
| U-235 | 8.707E-01 | 3.297E+00 | 3.321E+00 | NOT IDENT. |
| NP-237 | 3.450E-01 | 1.265E+00 | 1.274E+00 | NOT IDENT. |
| NP-238 | -3.432E+03 | 4.651E+03 | 4.902E+03 | SHORT HLIF |
| U-238 | -5.259E+01 | 3.263E+01 | 4.034E+01 | NOT IDENT. |
| NP-239 | 1.071E+00 | 8.647E+00 | 8.660E+00 | NOT IDENT. |
| PU-239 | 5.957E+02 | 5.764E+03 | 5.770E+03 | NOT IDENT. |
| AM-243 | -5.745E-01 | 1.168E+00 | 1.196E+00 | NOT IDENT. |
| CM-243 | 6.752E-01 | 1.975E+00 | 1.998E+00 | NOT IDENT. |
| CM-247 | -7.048E-01 | 7.895E-01 | 8.511E-01 | NOT IDENT. |
| CF-249 | 9.817E-01 | 9.294E-01 | 1.029E+00 | NOT IDENT. |
| CF-251 | -1.442E-02 | 2.176E+00 | 2.176E+00 | NOT IDENT. |

GEL Laboratories LLC
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GAMMA SPECTROSCOPY BACKGROUND REPORT

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 43.53 | 4206.4053 | 94.67 | 1506.2098 | 193.51 | 1214.8918 |
| 45.60 | 3879.0022 | 94.87 | 1507.7502 | 197.03 | 1216.7462 |
| 46.54 | 3888.9736 | 97.43 | 1515.3601 | 198.01 | 1247.0031 |
| 49.72 | 3543.4861 | 98.43 | 1472.5660 | 201.83 | 1213.0787 |
| 51.35 | 3650.1563 | 98.44 | 1472.5879 | 205.31 | 1240.4130 |
| 52.39 | 3833.4343 | 99.53 | 1492.8203 | 210.85 | 1266.9136 |
| 53.44 | 3769.7456 | 100.11 | 1502.5214 | 215.65 | 1313.1951 |
| 57.36 | 0.0000 | 103.18 | 1481.0214 | 222.11 | 1359.2535 |
| 57.53 | 4066.3281 | 103.37 | 1478.3616 | 227.09 | 1308.6724 |
| 57.98 | 3070.5886 | 105.21 | 1478.5797 | 227.38 | 1322.6045 |
| 59.32 | 3080.2480 | 105.31 | 1470.4807 | 228.16 | 1339.8811 |
| 59.54 | 3081.8318 | 106.12 | 1496.3831 | 228.18 | 1339.9149 |
| 63.29 | 2271.2366 | 109.28 | 1427.3027 | 235.69 | 1226.1108 |
| 63.58 | 2272.7058 | 111.00 | 1498.4142 | 235.96 | 1218.2058 |
| 64.28 | 2376.1492 | 111.76 | 1521.2231 | 238.63 | 1172.6937 |
| 66.73 | 2486.4331 | 116.30 | 1565.8734 | 238.98 | 1157.5148 |
| 67.24 | 2536.7766 | 117.23 | 1552.4482 | 240.99 | 1180.7028 |
| 67.75 | 2580.3894 | 121.12 | 1423.1129 | 242.00 | 1182.6913 |
| 69.67 | 2677.8459 | 121.22 | 1423.3163 | 244.70 | 1154.2817 |
| 70.83 | 2746.0061 | 121.78 | 1424.4756 | 252.40 | 1153.8181 |
| 72.81 | 2726.7480 | 122.06 | 1425.0519 | 252.80 | 1169.9747 |
| 72.87 | 2727.0867 | 123.07 | 1238.1693 | 254.15 | 0.0000 |
| 74.66 | 2774.4700 | 127.23 | 1232.9274 | 256.23 | 1081.4769 |
| 74.82 | 2675.6731 | 129.30 | 1251.8459 | 260.90 | 1124.9940 |
| 74.97 | 2676.4866 | 131.20 | 1307.6705 | 264.66 | 1119.2244 |
| 77.11 | 2753.2991 | 133.02 | 1271.8660 | 268.22 | 1100.0555 |
| 79.69 | 2852.8503 | 133.52 | 1295.5507 | 269.46 | 1103.0613 |
| 80.12 | 2847.2312 | 136.00 | 1206.7048 | 271.23 | 1077.4034 |
| 80.19 | 2847.6086 | 136.47 | 1207.4706 | 273.65 | 1047.4958 |
| 80.57 | 2878.6311 | 140.51 | 1144.8805 | 276.40 | 1052.7042 |
| 81.00 | 2987.8813 | 143.76 | 1180.5916 | 277.37 | 1055.4286 |
| 81.07 | 2988.2769 | 144.24 | 1224.2993 | 277.60 | 1039.5356 |
| 83.79 | 3017.1685 | 145.44 | 1233.9238 | 278.00 | 996.3460 |
| 85.43 | 3201.6023 | 152.43 | 1146.8998 | 279.20 | 991.6433 |
| 86.55 | 3350.4819 | 153.25 | 1192.6477 | 279.54 | 983.3884 |
| 86.79 | 2459.8015 | 154.21 | 1191.8417 | 280.46 | 1029.6254 |
| 86.94 | 2460.4829 | 156.02 | 1174.3607 | 283.69 | 1035.1615 |
| 87.09 | 2461.1521 | 158.56 | 1161.1743 | 284.31 | 1020.4601 |
| 87.57 | 2463.2954 | 159.00 | 1190.9807 | 285.41 | 1005.1787 |
| 88.03 | 2465.3398 | 162.33 | 1228.9978 | 285.90 | 970.3326 |
| 88.34 | 2466.7151 | 163.33 | 1218.6145 | 287.50 | 1034.5049 |
| 88.47 | 2467.2976 | 165.86 | 1186.0361 | 290.67 | 1082.9679 |
| 89.96 | 1533.9863 | 176.31 | 1088.1261 | 293.27 | 0.0000 |
| 91.11 | 1567.6339 | 176.60 | 1072.4333 | 295.22 | 1030.2443 |
| 92.59 | 1534.9790 | 177.52 | 1093.0455 | 295.96 | 1035.6332 |
| 93.35 | 1481.8402 | 181.07 | 1143.4288 | 298.58 | 1011.7731 |
| 94.56 | 1505.9255 | 184.41 | 1197.3165 | 299.98 | 977.2411 |
| 94.65 | 1506.1575 | 185.72 | 1197.8663 | 300.09 | 973.4824 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 300.13 | 973.4979 | 497.08 | 693.5773 | 711.68 | 556.2827 |
| 301.36 | 965.7491 | 505.52 | 578.3540 | 720.70 | 553.4430 |
| 302.85 | 983.2535 | 507.63 | 0.0000 | 721.93 | 0.0000 |
| 304.50 | 965.1746 | 511.00 | 664.5806 | 722.78 | 543.2712 |
| 306.78 | 961.0445 | 514.00 | 665.6145 | 722.91 | 545.2321 |
| 308.46 | 992.2969 | 514.00 | 665.6145 | 723.31 | 550.1491 |
| 311.90 | 983.2009 | 520.40 | 687.5037 | 724.19 | 560.9829 |
| 316.51 | 958.3110 | 520.69 | 687.6177 | 727.33 | 572.3292 |
| 319.41 | 978.9285 | 522.65 | 0.0000 | 733.00 | 530.8945 |
| 320.08 | 948.1241 | 527.90 | 681.4211 | 735.93 | 563.5742 |
| 321.04 | 941.9579 | 529.59 | 696.4192 | 737.46 | 570.7056 |
| 323.87 | 929.1951 | 529.87 | 0.0000 | 739.50 | 580.8944 |
| 325.23 | 942.8757 | 531.02 | 686.9298 | 747.24 | 601.8221 |
| 328.76 | 937.4114 | 546.56 | 0.0000 | 748.06 | 585.7471 |
| 333.37 | 919.7840 | 552.55 | 586.6034 | 752.31 | 603.3224 |
| 333.97 | 908.3344 | 563.25 | 620.5438 | 753.82 | 559.3150 |
| 334.37 | 891.7979 | 569.33 | 568.0671 | 756.73 | 559.9431 |
| 338.28 | 876.4520 | 569.50 | 568.1131 | 756.80 | 559.9570 |
| 338.32 | 876.4655 | 569.70 | 568.1744 | 763.94 | 576.5383 |
| 340.48 | 905.5746 | 583.19 | 595.4658 | 765.81 | 595.6140 |
| 340.55 | 905.6165 | 584.27 | 582.1047 | 766.42 | 611.4916 |
| 344.28 | 868.2045 | 595.83 | 581.5614 | 766.84 | 610.5994 |
| 345.93 | 898.0637 | 600.60 | 565.3936 | 772.60 | 0.0000 |
| 351.06 | 916.2444 | 602.52 | 0.0000 | 776.52 | 603.9466 |
| 351.93 | 926.7878 | 602.73 | 588.9188 | 777.92 | 625.9821 |
| 355.39 | 0.0000 | 604.72 | 607.8424 | 778.90 | 578.7894 |
| 356.01 | 891.2654 | 609.32 | 606.3367 | 783.70 | 643.1604 |
| 364.49 | 961.9044 | 610.33 | 612.1412 | 785.37 | 606.9239 |
| 366.42 | 858.1451 | 614.28 | 574.4389 | 792.07 | 620.3308 |
| 375.05 | 923.9550 | 618.01 | 615.1899 | 794.95 | 632.9099 |
| 383.85 | 913.7685 | 620.36 | 524.7616 | 795.86 | 656.9817 |
| 388.16 | 819.1528 | 621.93 | 556.0254 | 801.95 | 629.5467 |
| 388.63 | 837.4362 | 630.19 | 0.0000 | 810.29 | 638.4540 |
| 391.69 | 921.1576 | 631.29 | 620.3613 | 810.45 | 654.4723 |
| 400.66 | 894.7684 | 633.25 | 597.9252 | 810.76 | 654.5522 |
| 401.81 | 930.5173 | 634.78 | 561.9854 | 815.77 | 665.7468 |
| 402.40 | 931.8942 | 635.95 | 605.1577 | 818.51 | 689.4446 |
| 404.85 | 896.0621 | 636.99 | 606.3599 | 832.01 | 695.7911 |
| 410.95 | 897.3413 | 645.85 | 597.4708 | 834.85 | 708.5781 |
| 413.71 | 923.8121 | 657.76 | 611.8188 | 835.71 | 694.6856 |
| 414.70 | 952.4734 | 657.90 | 0.0000 | 836.80 | 0.0000 |
| 427.09 | 962.7122 | 661.66 | 566.6362 | 846.75 | 0.0000 |
| 427.87 | 951.6193 | 664.57 | 0.0000 | 846.77 | 716.9454 |
| 433.94 | 916.0648 | 666.33 | 587.2747 | 856.80 | 721.1458 |
| 439.40 | 952.7733 | 666.50 | 587.3202 | 860.56 | 757.0942 |
| 453.88 | 1003.3185 | 667.71 | 0.0000 | 871.09 | 731.4864 |
| 463.37 | 988.3350 | 677.62 | 578.9788 | 873.19 | 746.9069 |
| 468.07 | 1012.3840 | 685.70 | 531.1826 | 875.33 | 0.0000 |
| 473.00 | 930.0894 | 695.00 | 565.9266 | 879.38 | 764.5989 |
| 475.06 | 953.7760 | 696.49 | 585.4043 | 880.51 | 768.9866 |
| 476.78 | 895.3377 | 696.51 | 585.4043 | 883.24 | 795.3242 |
| 477.60 | 853.6418 | 697.00 | 579.7834 | 884.68 | 821.3379 |
| 482.18 | 877.4036 | 697.49 | 575.1171 | 889.28 | 805.1504 |
| 487.02 | 813.9601 | 702.65 | 588.7864 | 894.76 | 826.5155 |
| 492.35 | 741.8790 | 706.68 | 570.5358 | 898.04 | 839.4341 |

| ENERGY | MDA COUNTS | ENERGY | MDA COUNTS | ENERGY | MDA COUNTS |
|---|---|---|---|---|---|
| 903.28 | 904.5333 | 1312.11 | 112.9486 | | |
| 911.20 | 906.1981 | 1332.49 | 126.1226 | | |
| 923.98 | 0.0000 | 1362.66 | 0.0000 | | |
| 926.50 | 884.7408 | 1365.19 | 57.6892 | | |
| 937.49 | 912.9395 | 1368.63 | 0.0000 | | |
| 944.13 | 924.2936 | 1384.29 | 82.5063 | | |
| 946.00 | 924.8548 | 1408.01 | 59.2578 | | |
| 949.00 | 910.0314 | 1457.56 | 0.0000 | | |
| 954.55 | 0.0000 | 1460.82 | 51.9767 | | |
| 962.31 | 788.7268 | 1489.16 | 57.3363 | | |
| 964.08 | 789.1663 | 1505.03 | 38.3572 | | |
| 966.17 | 818.1074 | 1596.21 | 38.0810 | | |
| 968.97 | 722.9294 | 1620.50 | 48.6160 | | |
| 983.53 | 667.9880 | 1678.03 | 0.0000 | | |
| 984.45 | 0.0000 | 1690.97 | 45.1171 | | |
| 996.26 | 659.9792 | 1750.46 | 0.0000 | | |
| 1001.03 | 699.2495 | 1764.49 | 37.2516 | | |
| 1004.73 | 692.5928 | 1770.23 | 29.8343 | | |
| 1021.30 | 0.0000 | 1771.35 | 29.8411 | | |
| 1025.87 | 0.0000 | 1791.20 | 0.0000 | | |
| 1028.54 | 0.0000 | 1808.65 | 35.4183 | | |
| 1037.84 | 609.1133 | 1810.72 | 0.0000 | | |
| 1038.76 | 0.0000 | 1836.06 | 24.8118 | | |
| 1046.59 | 586.9516 | | | | |
| 1048.07 | 575.3173 | | | | |
| 1049.04 | 621.9281 | | | | |
| 1050.41 | 618.9127 | | | | |
| 1063.66 | 603.9697 | | | | |
| 1077.00 | 655.2923 | | | | |
| 1077.34 | 632.4900 | | | | |
| 1085.87 | 628.5938 | | | | |
| 1099.45 | 669.3553 | | | | |
| 1112.07 | 613.8395 | | | | |
| 1112.84 | 650.6311 | | | | |
| 1115.54 | 596.0978 | | | | |
| 1120.29 | 480.1367 | | | | |
| 1120.55 | 480.1580 | | | | |
| 1121.30 | 458.2195 | | | | |
| 1129.67 | 423.5010 | | | | |
| 1131.51 | 0.0000 | | | | |
| 1147.95 | 0.0000 | | | | |
| 1173.23 | 341.9121 | | | | |
| 1177.95 | 305.4321 | | | | |
| 1189.05 | 265.7068 | | | | |
| 1204.77 | 184.1408 | | | | |
| 1221.41 | 154.7443 | | | | |
| 1231.02 | 142.8344 | | | | |
| 1235.36 | 144.8881 | | | | |
| 1238.28 | 131.7265 | | | | |
| 1260.41 | 0.0000 | | | | |
| 1271.87 | 95.5811 | | | | |
| 1274.44 | 105.2063 | | | | |
| 1274.54 | 111.9060 | | | | |
| 1291.59 | 97.1508 | | | | |
| 1298.22 | 0.0000 | | | | |

# Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
7-FEB-2014 13:10:14.14

| Run Date | Detector | Parameter | | Flag |
|---|---|---|---|---|
| 7-FEB-2014 | GAM01 | Cal Check | NLACTVTY-59 | Investigate ok |
| 5-FEB-2014 | GAM02 | Cal Check may not have run since 7-FEB-2014 | | |
| 2-FEB-2014 | GAM02 | Bkg Check may not have run since 7-FEB-2014 | | |
| 7-FEB-2014 | GAM03 | Cal Check | PSENERGY-662 | missing |
| 7-FEB-2014 | GAM03 | Cal Check | PSENERGY-1332 | missing |
| 7-FEB-2014 | GAM03 | Cal Check | PSFWHM-662 | missing |
| 7-FEB-2014 | GAM03 | Cal Check | PSFWHM-1332 | missing |
| 7-FEB-2014 | GAM03 | Cal Check | NLACTVTY-1332 | missing |
| 7-FEB-2014 | GAM04 | All Parameters Passed | | |
| 7-FEB-2014 | GAM05 | Cal Check | NLACTVTY-59 | Investigate ok |
| 7-FEB-2014 | GAM06 | All Parameters Passed | | |
| 7-FEB-2014 | GAM07 | Bkg Check | BACKRATE | Investigate ok |
| 7-FEB-2014 | GAM08 | All Parameters Passed | | |
| 7-FEB-2014 | GAM09 | All Parameters Passed | | |
| 7-FEB-2014 | GAM10 | All Parameters Passed | | |
| 7-FEB-2014 | GAM11 | All Parameters Passed | | |
| 7-FEB-2014 | GAM12 | Cal Check | PSFWHM-1332 | Action Below, ok |
| 7-FEB-2014 | GAM12 | Cal Check | NLACTVTY-59 | Investigate ok |
| 7-FEB-2014 | GAM12 | Bkg Check | BACKRATE | Investigate ok |
| 7-FEB-2014 | GAM13 | Cal Check | PSFWHM-59 | Investigate ok |
| 7-FEB-2014 | GAM14 | Cal Check | PSFWHM-662 | Investigate ok |
| 7-FEB-2014 | GAM15 | All Parameters Passed | | |
| 31-JAN-2014 | GAM16 | Cal Check may not have run since 7-FEB-2014 | | |
| 28-JAN-2014 | GAM16 | Bkg Check may not have run since 7-FEB-2014 | | |
| 7-FEB-2014 | GAM17 | All Parameters Passed | | |
| 7-FEB-2014 | GAM18 | All Parameters Passed | | |
| 7-FEB-2014 | GAM19 | Cal Check | PSFWHM-662 | Investigate ok |
| 7-FEB-2014 | GAM20 | All Parameters Passed | | |
| 7-FEB-2014 | GAM21 | Cal Check | PSFWHM-662 | Investigate ok |
| 7-FEB-2014 | GAM21 | Bkg Check | BACKRATE | Investigate ok |

Locked Out

Locked Out

| | | | | |
|---|---|---|---|---|
| 7-FEB-2014 | GAM22 | Cal Check | PSFWHM-662 | Investigate OK |
| 7-FEB-2014 | GAM23 | Cal Check | PSFWHM-1332 | Investigate OK |
| 7-FEB-2014 | GAM24 | All Parameters Passed | | |
| 7-FEB-2014 | GAM25 | Cal Check | NLACTVTY-662 | Investigate OK |
| 7-FEB-2014 | GAM26 | All Parameters Passed | | |
| 7-FEB-2014 | GAM27 | All Parameters Passed | | |
| 7-FEB-2014 | GAM28 | Bkg Check | BACKRATE | Investigate OK |
| 7-FEB-2014 | GAM29 | Cal Check | PSFWHM-1332 | Investigate OK |
| 7-FEB-2014 | GAM30 | All Parameters Passed | | |
| 7-FEB-2014 | GAM31 | Cal Check | PSFWHM-662 | Investigate OK |
| 7-FEB-2014 | GAM32 | All Parameters Passed | | |
| 7-FEB-2014 | GAM33 | All Parameters Passed | | |
| 7-FEB-2014 | GAM36 | All Parameters Passed | | |
| 7-FEB-2014 | GAM40 | Cal Check | PSFWHM-662 | Investigate OK |
| 7-FEB-2014 | GAM40 | Cal Check | PSFWHM-1332 | Investigate OK |
| ---------- | GAM43 | Cal Check may not have run since 7-FEB-2014 | | ] Locked out |
| 5-FEB-2014 | GAM43 | Bkg Check may not have run since 7-FEB-2014 | | ] Locked out |
| 7-FEB-2014 | WELL | All Parameters Passed | | |
| 7-FEB-2014 | XRAY1 | Cal Check | NLACTVTY-109 | Investigate OK |
| 7-FEB-2014 | XRAY1 | Bkg Check | BACKRATE | Investigate OK |
| 7-FEB-2014 | XRAY2 | All Parameters Passed | | |
| 7-FEB-2014 | XRAY3 | All Parameters Passed | | |
| 7-FEB-2014 | XRAY5 | Cal Check | NLACTVTY-210 | Investigate OK |
| 7-FEB-2014 | XRAY6 | Cal Check | PSFWHM-59 | Investigate OK |
| 7-FEB-2014 | XRAY6 | Bkg Check | BACKRATE | Investigate OK |

APPROVAL DATE: 7/7/14 APPROVAL TIME: RF 13:28

APPROVED BY: 13:28 RF PROCEDURE # GL-RAD-I-001

Report completed at 7-FEB-2014 13:14:31.16

* = OUT OF SERVICE

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
12-FEB-2014 11:21:45.44

| Run Date | Detector | Parameter | | Flag |
|---|---|---|---|---|
| 12-FEB-2014 | GAM01 | All Parameters Passed | | |
| 11-FEB-2014 | GAM02 | Cal Check may not have run since 12-FEB-2014 | | * |
| 12-FEB-2014 | GAM03 | All Parameters Passed | | |
| 12-FEB-2014 | GAM04 | Cal Check | NLACTVTY-662 | Investigate |
| 12-FEB-2014 | GAM04 | Cal Check | NLACTVTY-1332 | Investigate OK |
| 12-FEB-2014 | GAM05 | All Parameters Passed | | |
| 12-FEB-2014 | GAM06 | Cal Check | NLACTVTY-59 | Investigate |
| 12-FEB-2014 | GAM06 | Cal Check | PSFWHM-59 | Investigate OK |
| 12-FEB-2014 | GAM07 | All Parameters Passed | | |
| 12-FEB-2014 | GAM08 | All Parameters Passed | | |
| 12-FEB-2014 | GAM09 | All Parameters Passed | | |
| 12-FEB-2014 | GAM10 | All Parameters Passed | | |
| 12-FEB-2014 | GAM11 | All Parameters Passed | | |
| 12-FEB-2014 | GAM12 | All Parameters Passed | | |
| 12-FEB-2014 | GAM13 | Cal Check | PSFWHM-1332 | Investigate OK |
| 12-FEB-2014 | GAM14 | Cal Check | PSFWHM-662 | Investigate OK |
| 12-FEB-2014 | GAM15 | All Parameters Passed | | |
| 31-JAN-2014 | GAM16 | Cal Check may not have run since 12-FEB-2014 | | * |
| 12-FEB-2014 | GAM16 | Bkg Check | BACKRATE | Action |
| 12-FEB-2014 | GAM17 | All Parameters Passed | | |
| 12-FEB-2014 | GAM18 | All Parameters Passed | | |
| 12-FEB-2014 | GAM19 | Cal Check | NLACTVTY-1332 | Investigate OK |
| 12-FEB-2014 | GAM20 | All Parameters Passed | | |
| 12-FEB-2014 | GAM21 | All Parameters Passed | | |
| 12-FEB-2014 | GAM22 | All Parameters Passed | | |
| 12-FEB-2014 | GAM23 | All Parameters Passed | | |
| 12-FEB-2014 | GAM24 | All Parameters Passed | | |

| | | | | | |
|---|---|---|---|---|---|
| 12-FEB-2014 | GAM25 | Cal Check | NLACTVTY-662 | Investigate | OK |
| 12-FEB-2014 | GAM26 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM27 | Cal Check | NLACTVTY-59 | Investigate | OK |
| 12-FEB-2014 | GAM28 | Cal Check | PSFWHM-59 | Investigate | OK |
| 12-FEB-2014 | GAM29 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM30 | Cal Check | NLACTVTY-1332 | Investigate | OK |
| 12-FEB-2014 | GAM31 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM32 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM33 | Cal Check | NLACTVTY-59 | Investigate | OK |
| 12-FEB-2014 | GAM36 | All Parameters Passed | | | |
| 12-FEB-2014 | GAM40 | Cal Check | NLACTVTY-59 | Investigate | OK |
| ---------- | GAM43 | Cal Check may not have run since 12-FEB-2014 | | | |
| 9-FEB-2014 | GAM43 | Bkg Check may not have run since 12-FEB-2014 | | | |
| 12-FEB-2014 | WELL | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY1 | Bkg Check | BACKRATE | Investigate | OK |
| 12-FEB-2014 | XRAY2 | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY3 | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY5 | All Parameters Passed | | | |
| 12-FEB-2014 | XRAY6 | All Parameters Passed | | | |

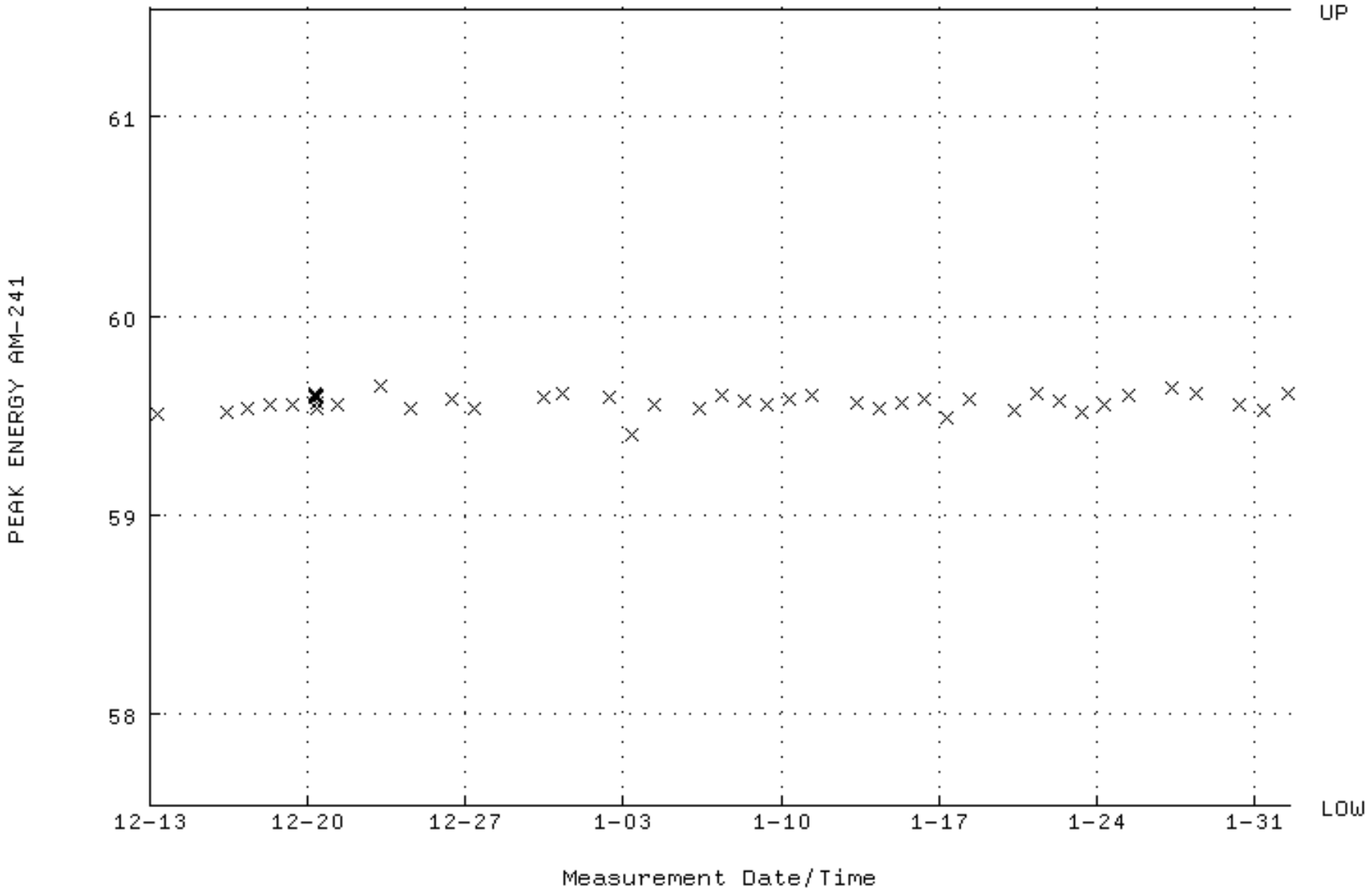
APPROVAL DATE: 2/12/14 APPROVAL TIME: 14:35

APPROVED BY: [signature] PROCEDURE # GL-RAD-I-001

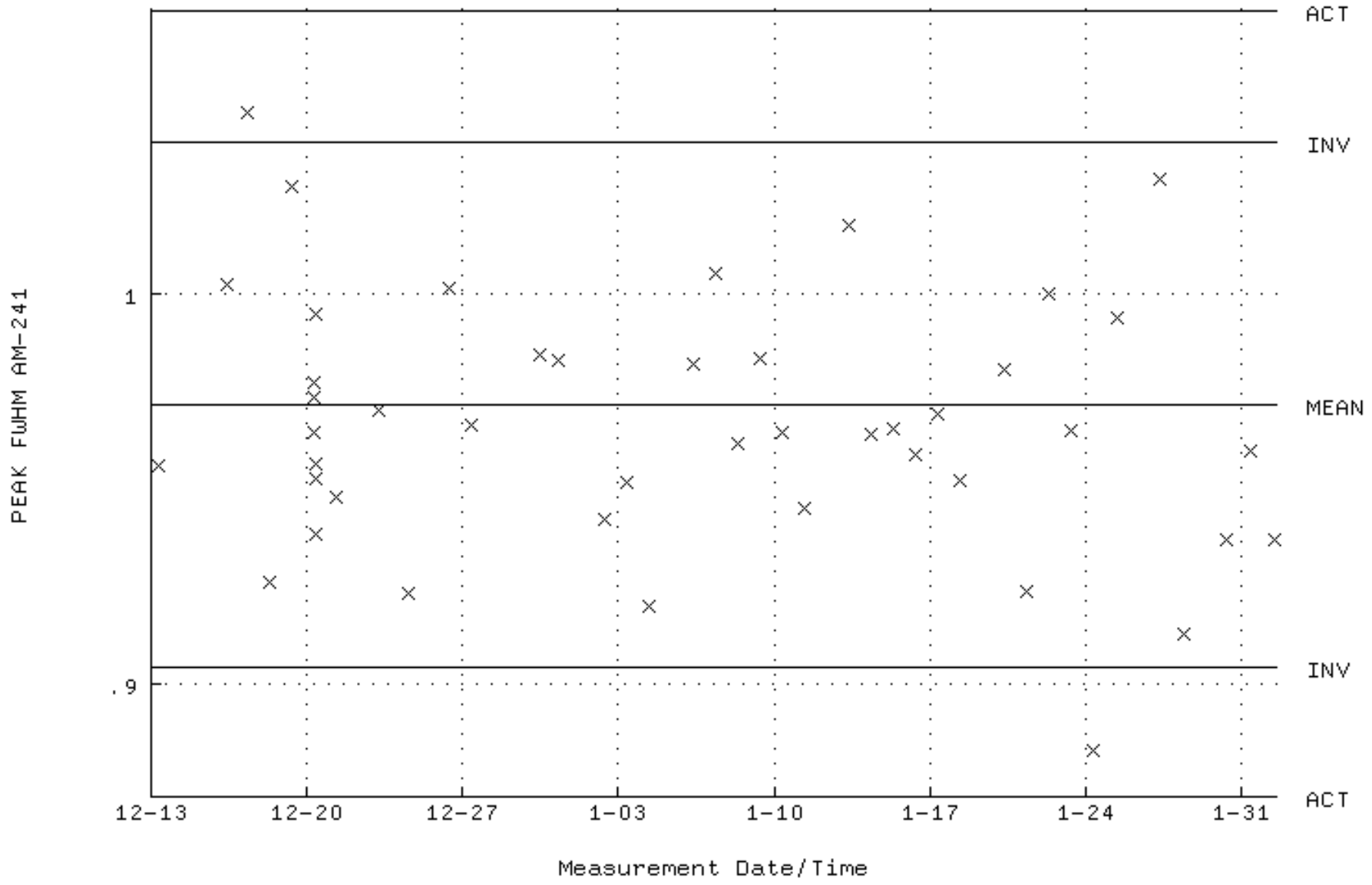
Report completed at 12-FEB-2014 11:25:58.59

# Background and Efficiency Data

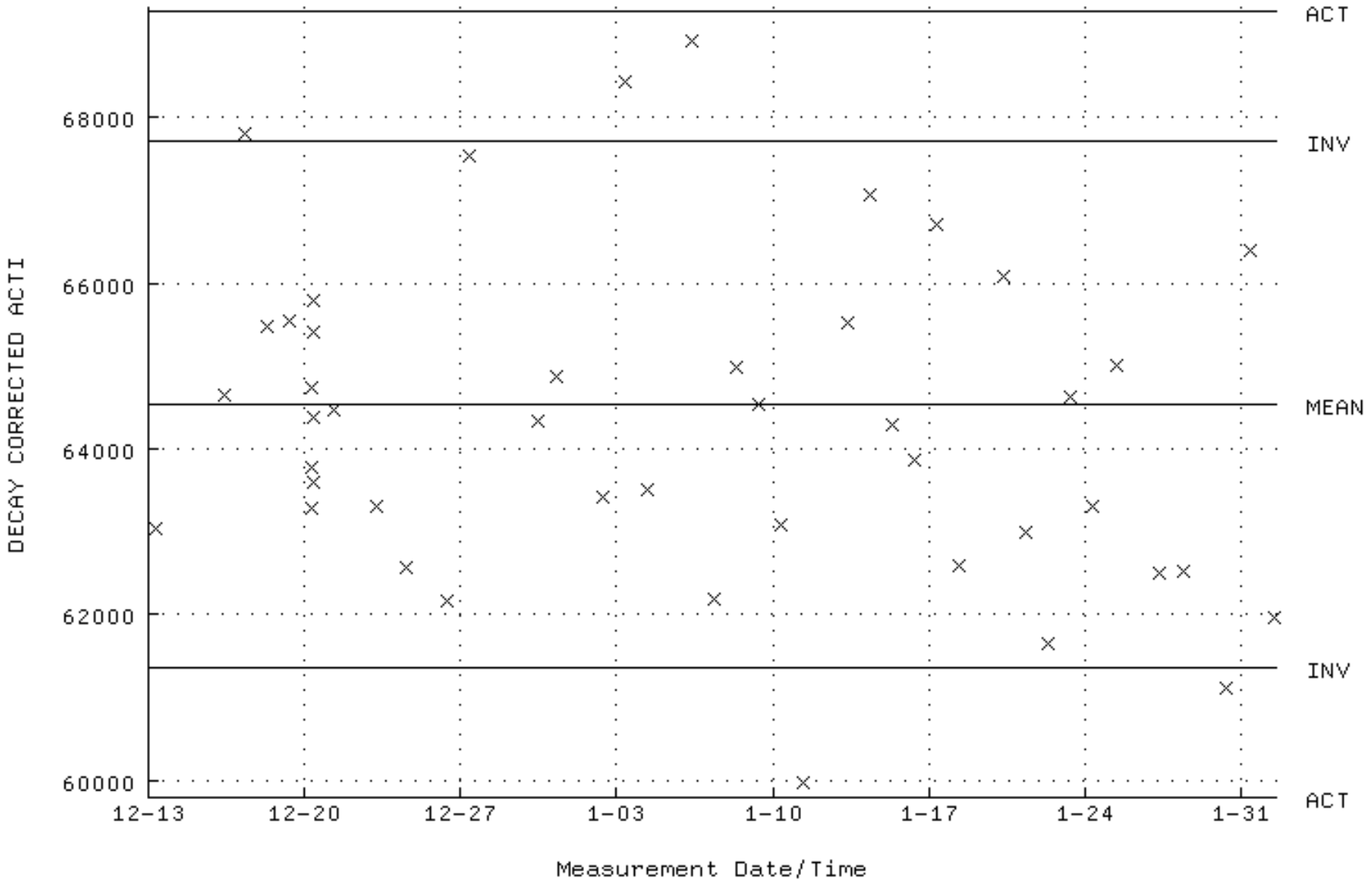
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 13-DEC-2013 07:59:51 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



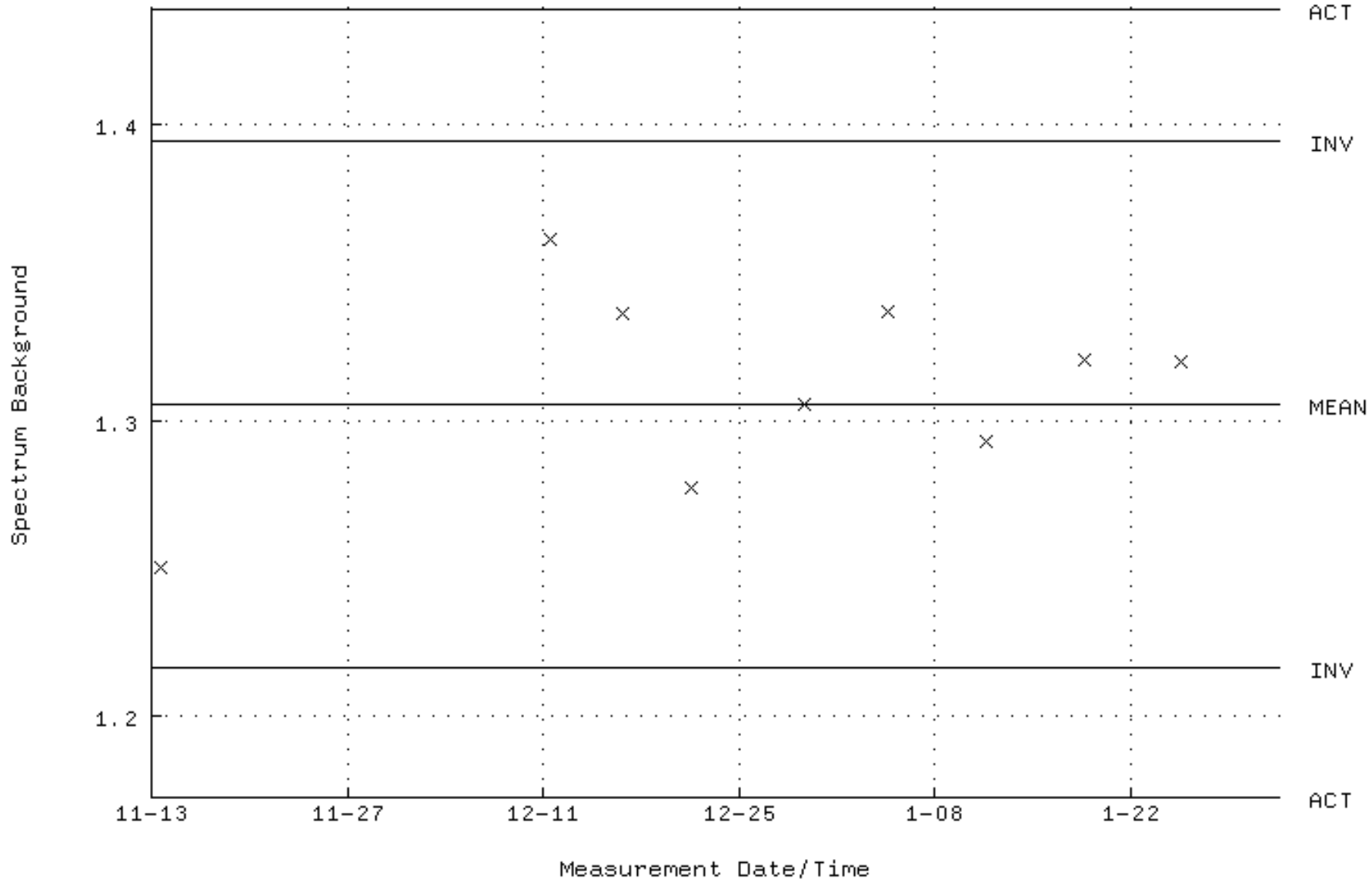
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 13-DEC-2013 07:59:51 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.971946 +- 3.361765E-02 (3.46 %)



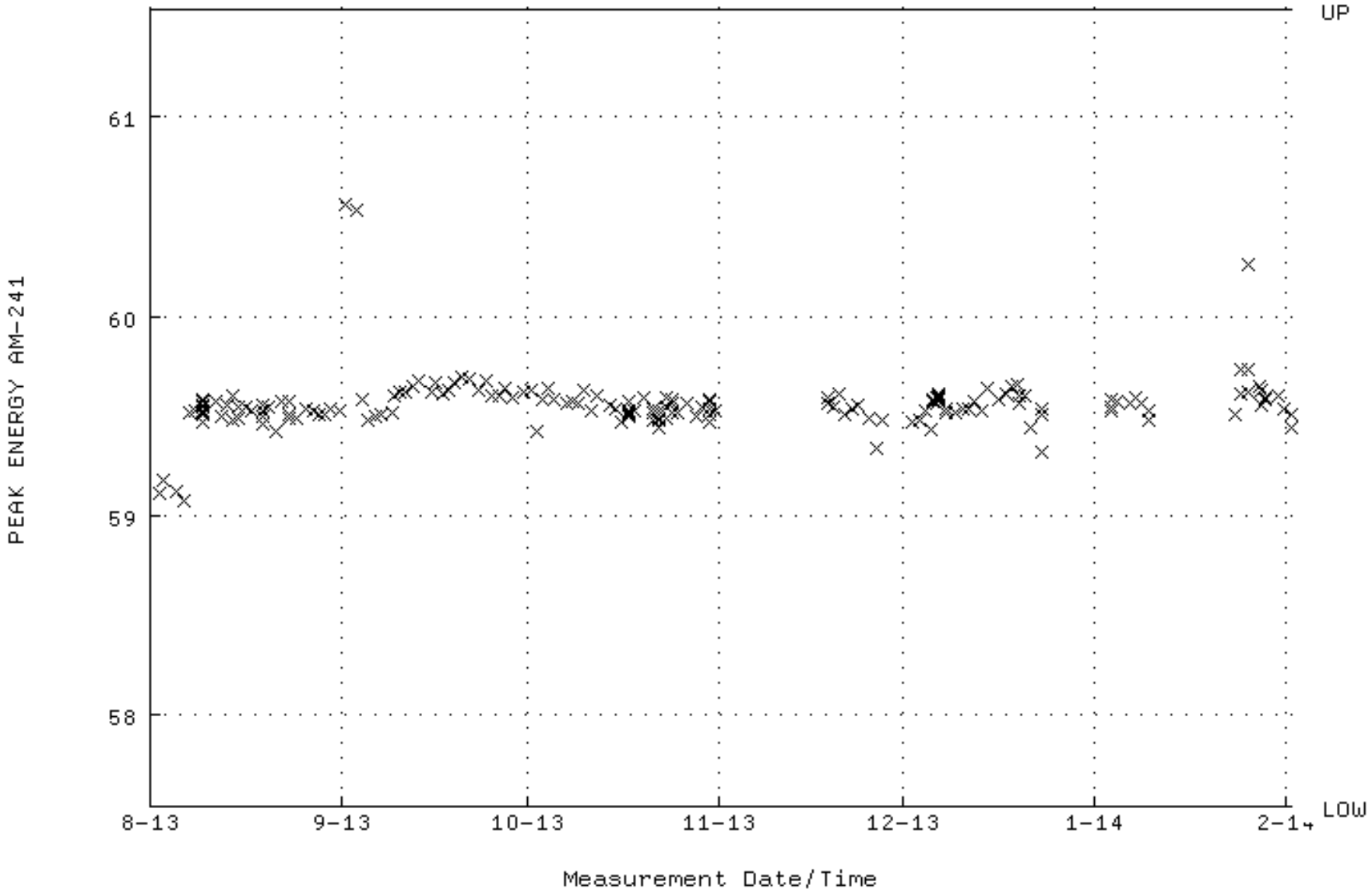
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 13-DEC-2013 07:59:51 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 64549.2 +- 1584.95 (2.46 %)



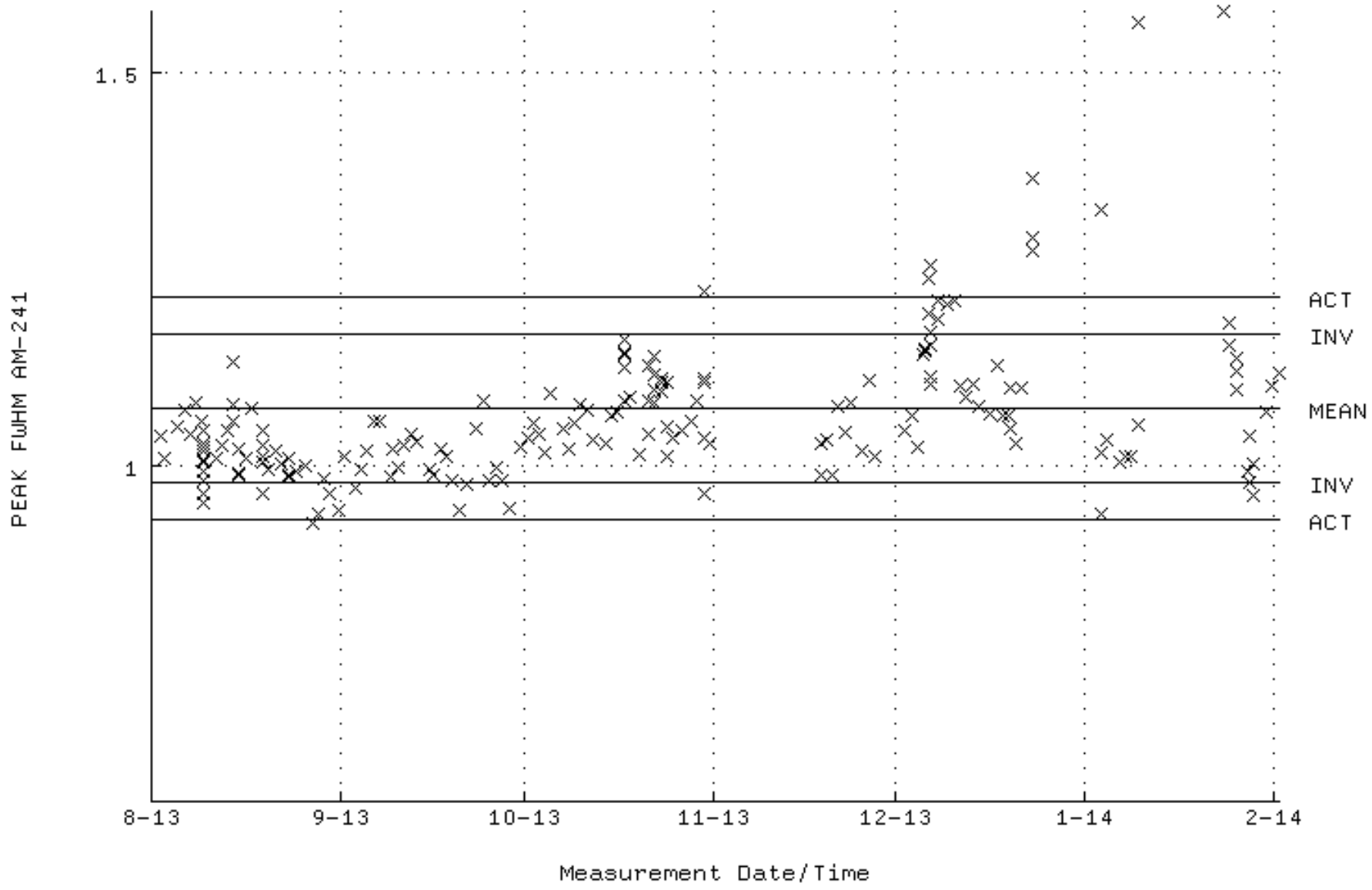
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM01.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 13-NOV-2013 15:06:05 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.30573 +- 4.439831E-02 (3.40 %)



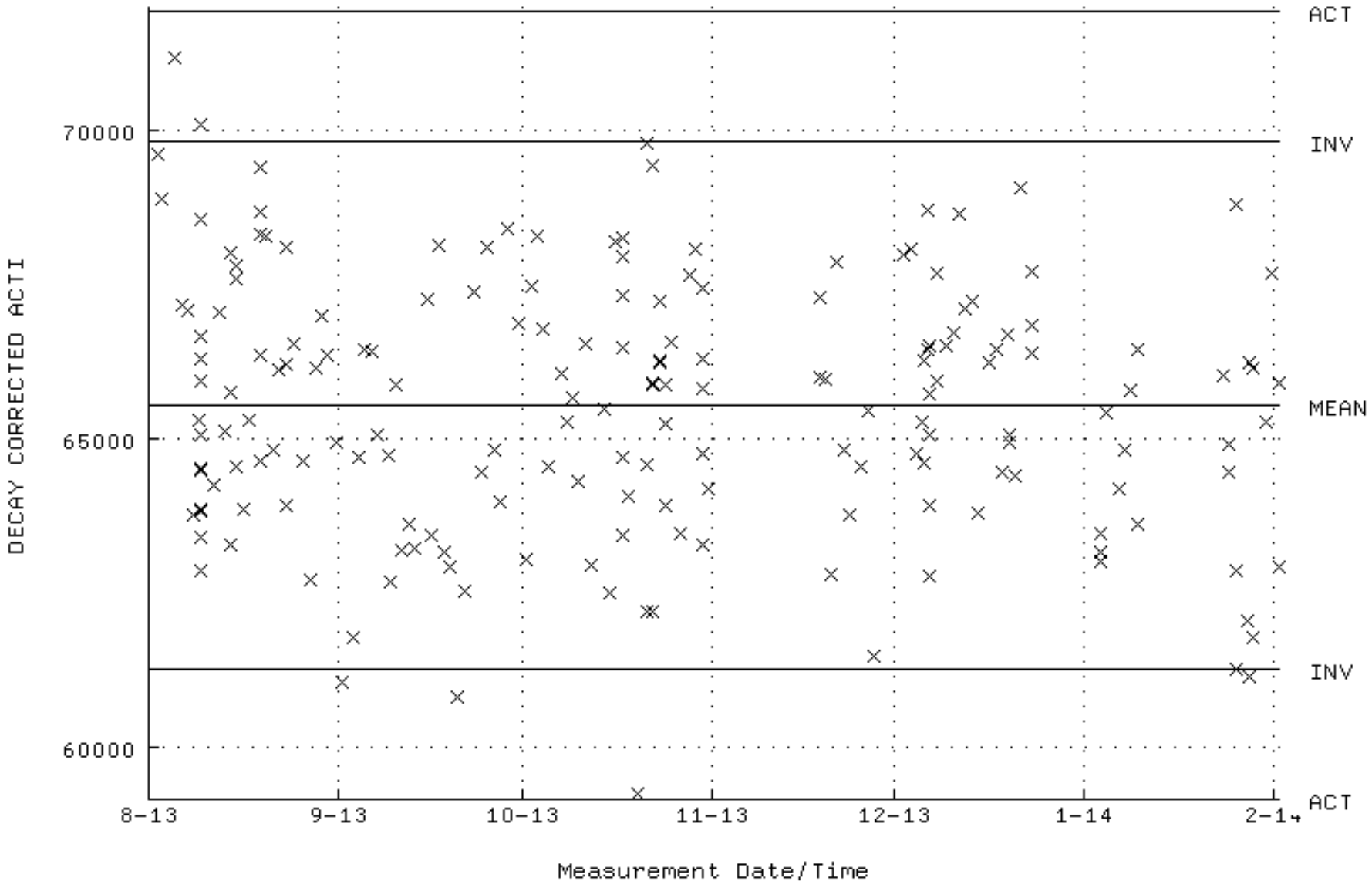
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM03_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:25 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



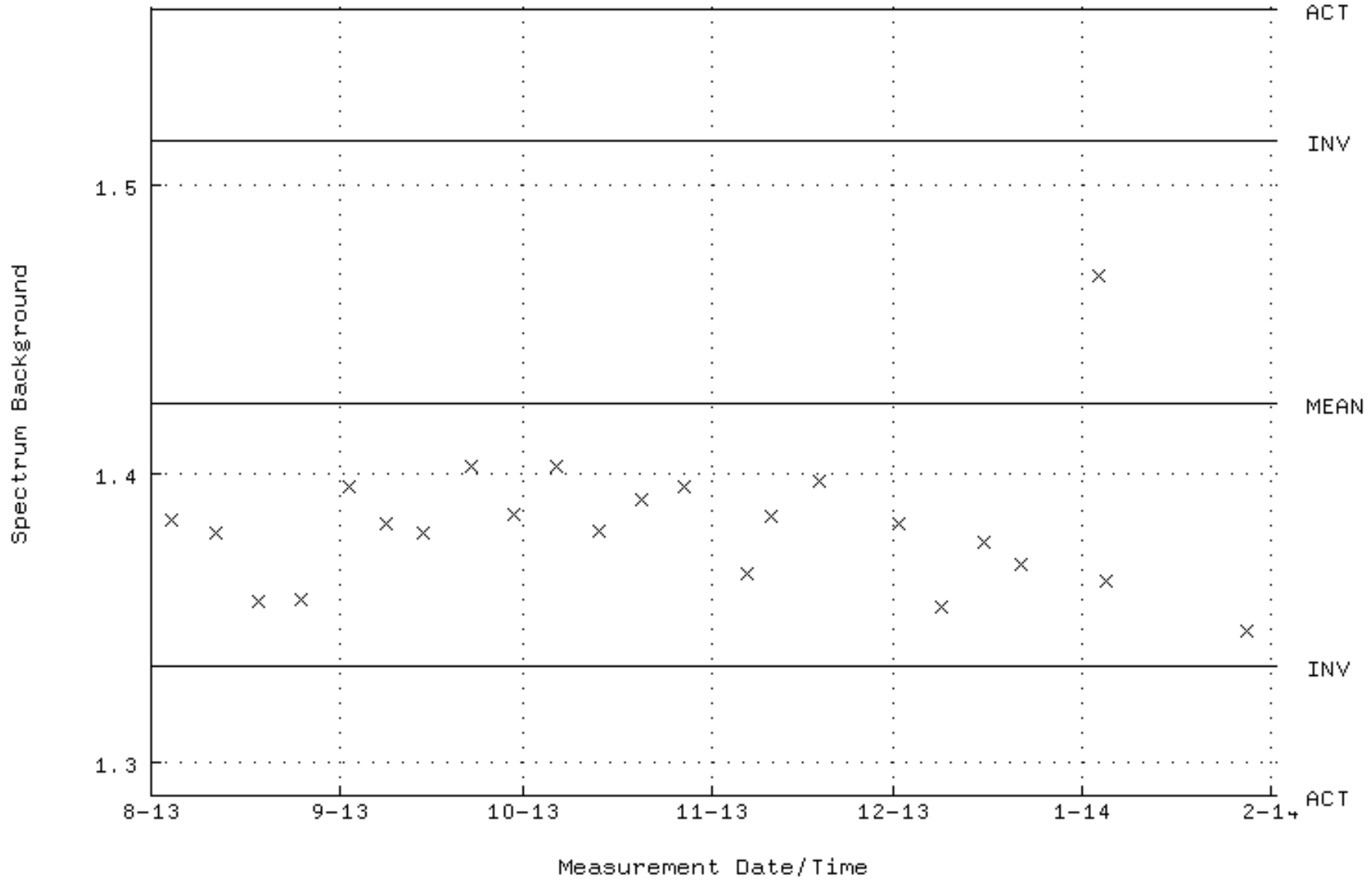
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM03_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.07472 +- 4.733376E-02 (4.40 %)



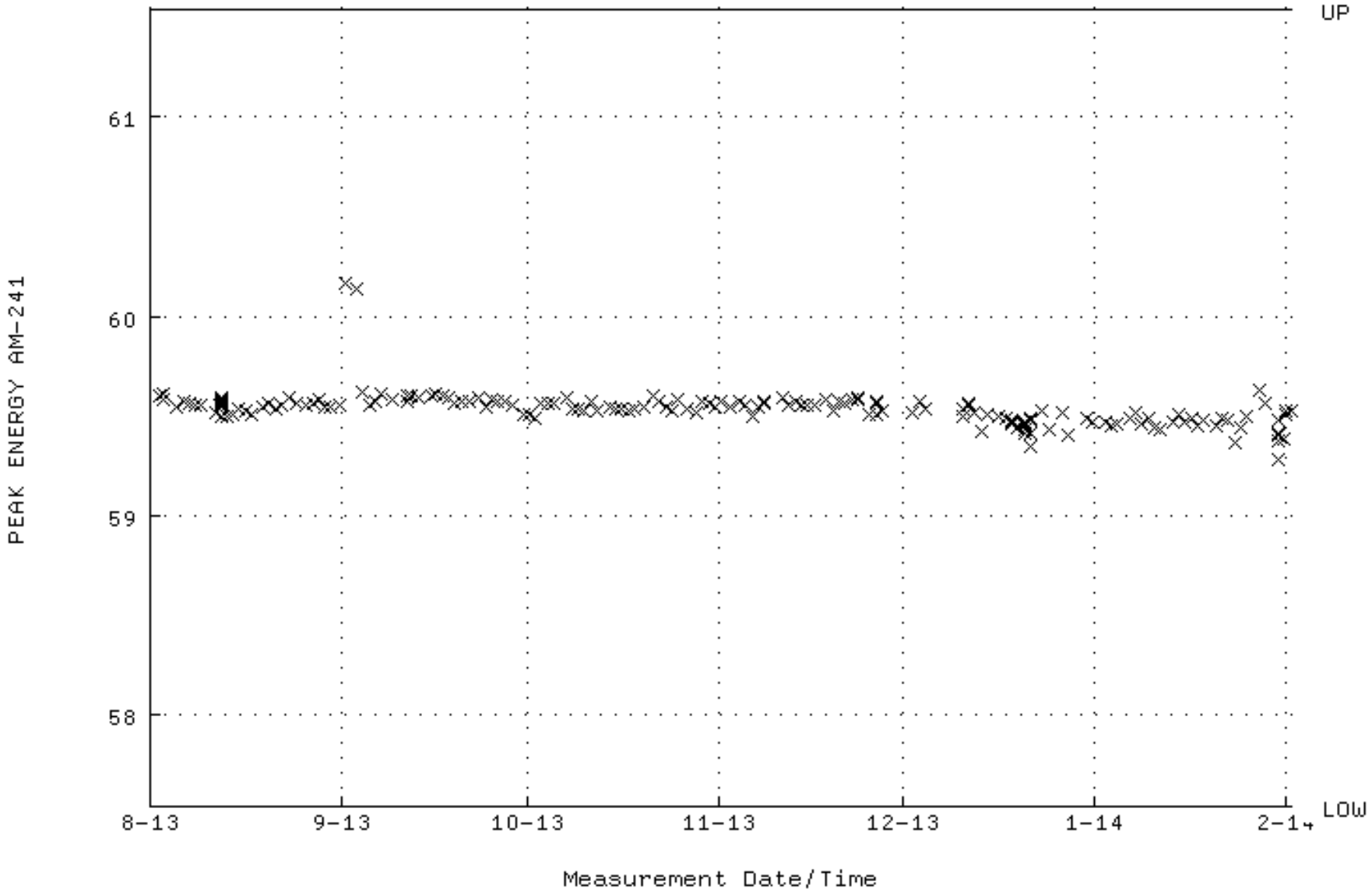
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM03_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 65545.9 +- 2132.62 (3.25 %)



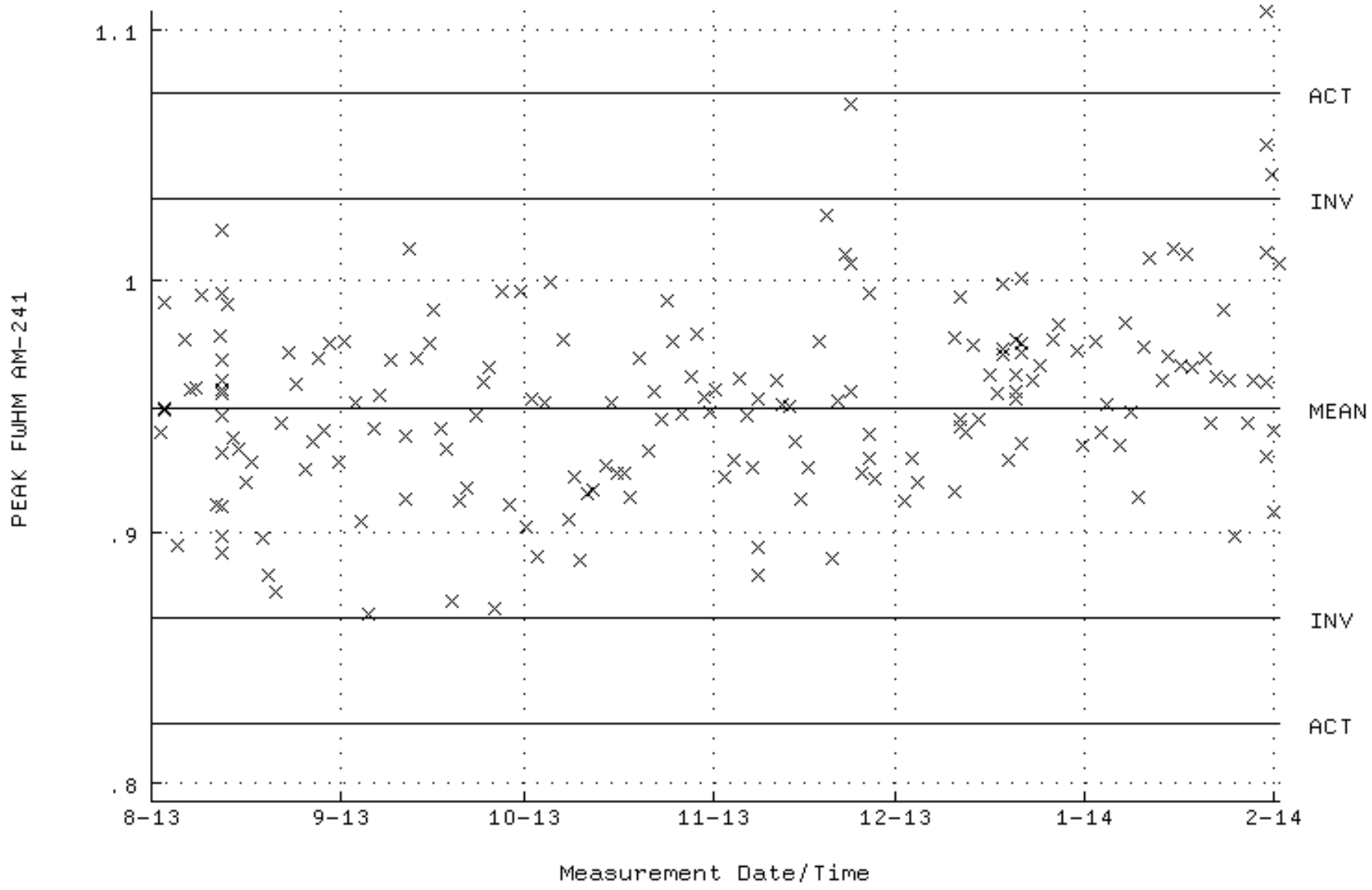
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM03.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:05:03 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.42465 +- 4.537193E-02 (3.18 %)



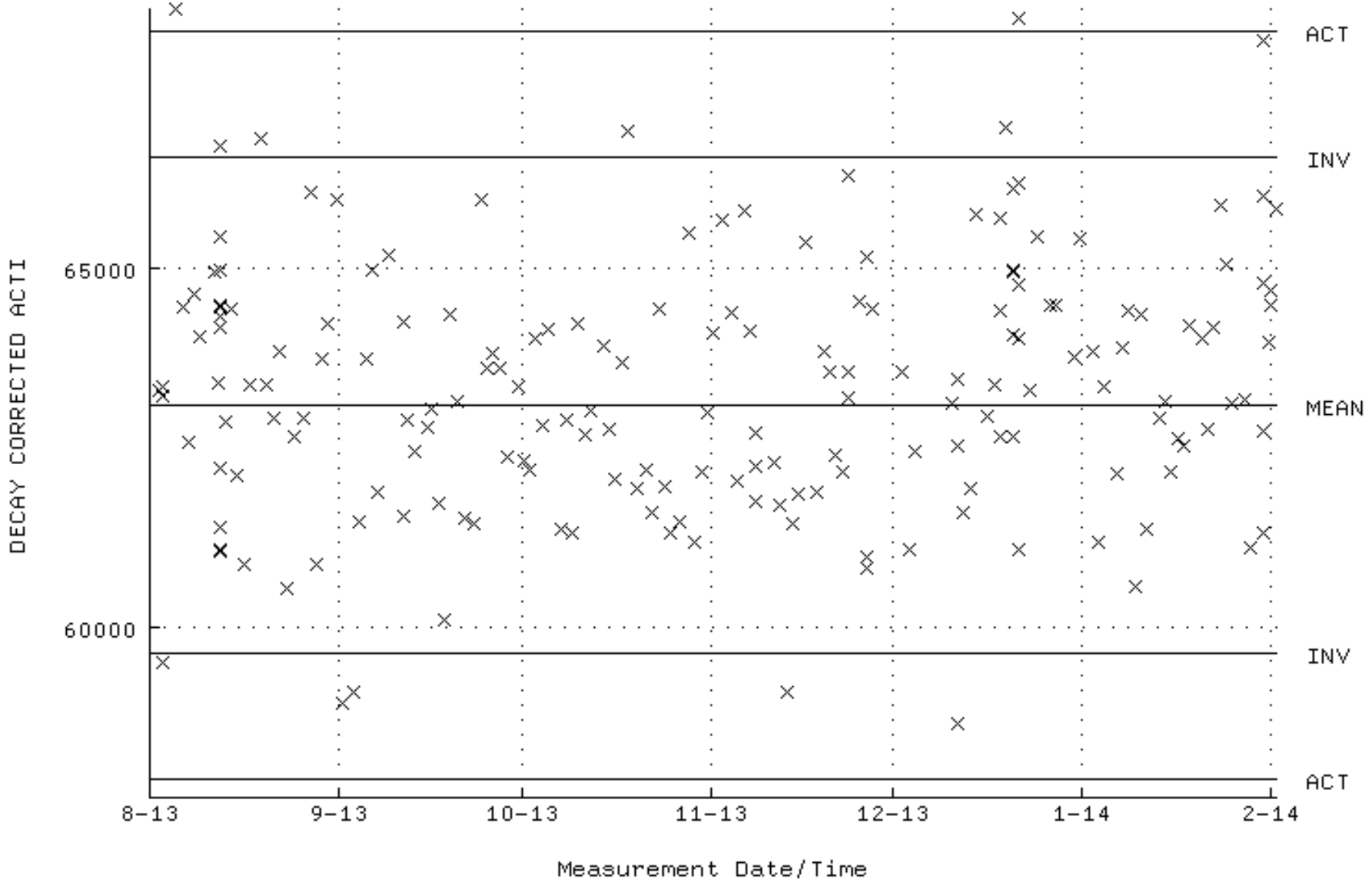
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:30 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



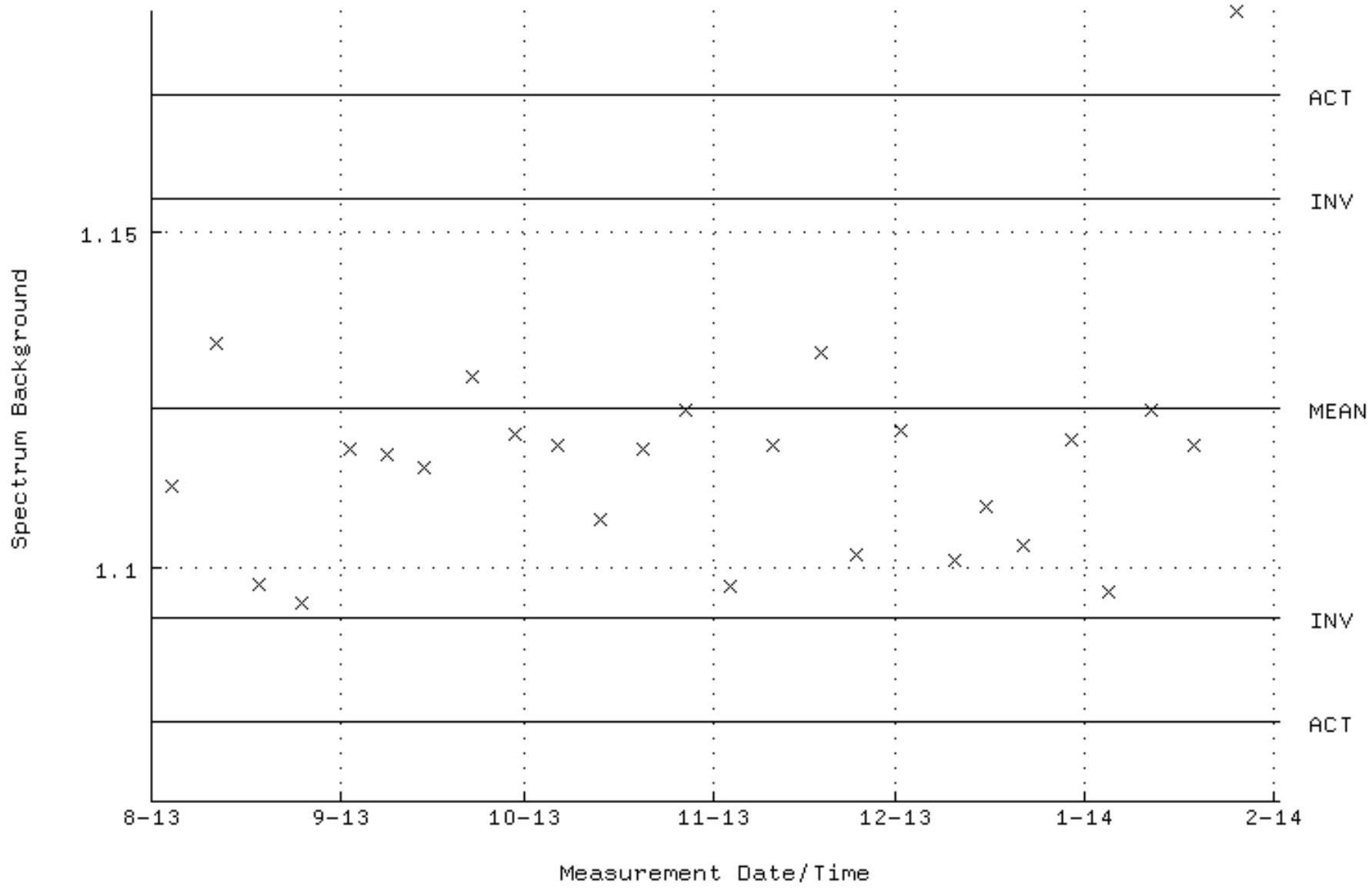
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:30 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.949746 +- 4.190384E-02 (4.41 %)



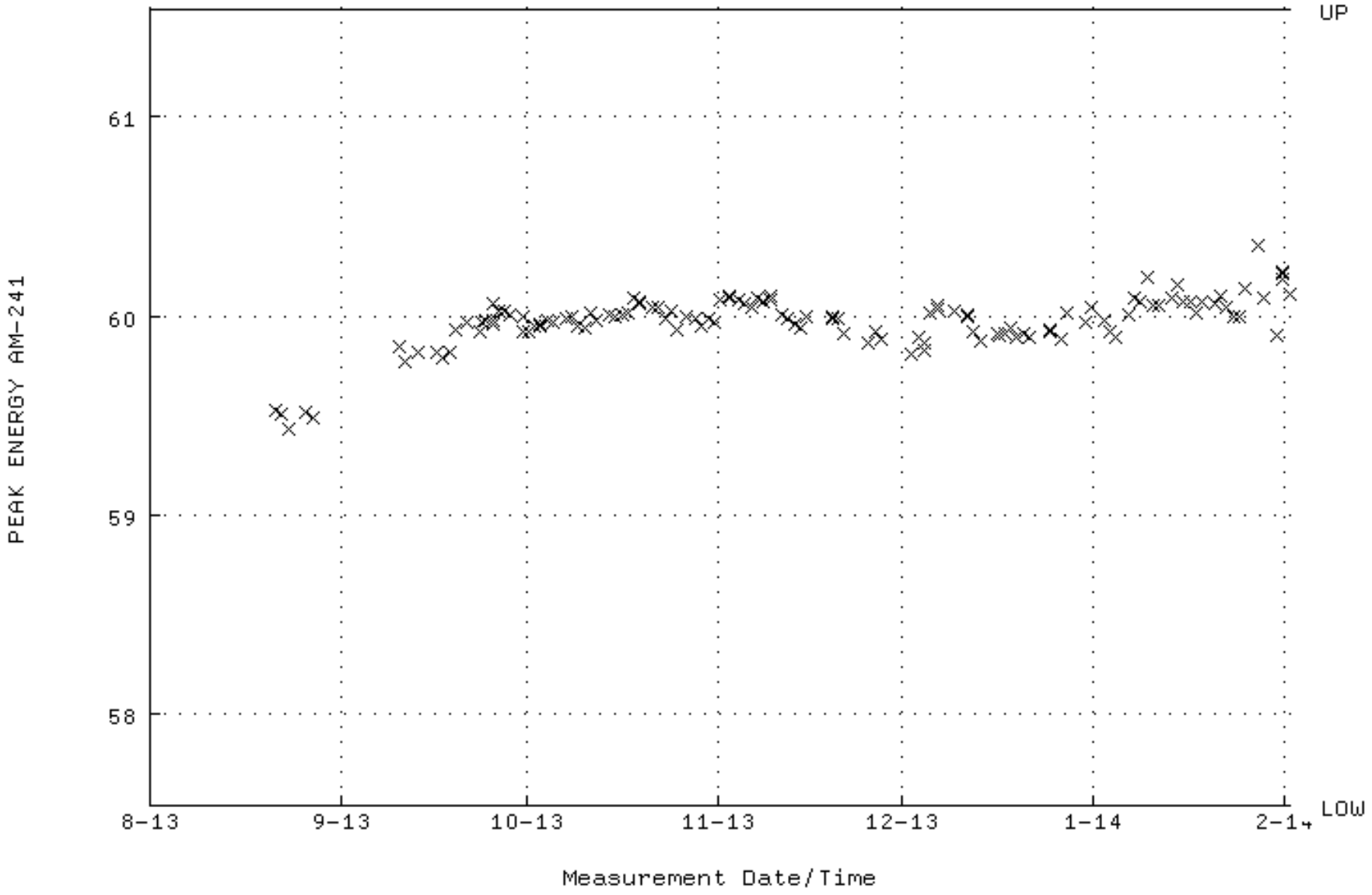
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:30 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63115.5 +- 1732.27 (2.74 %)



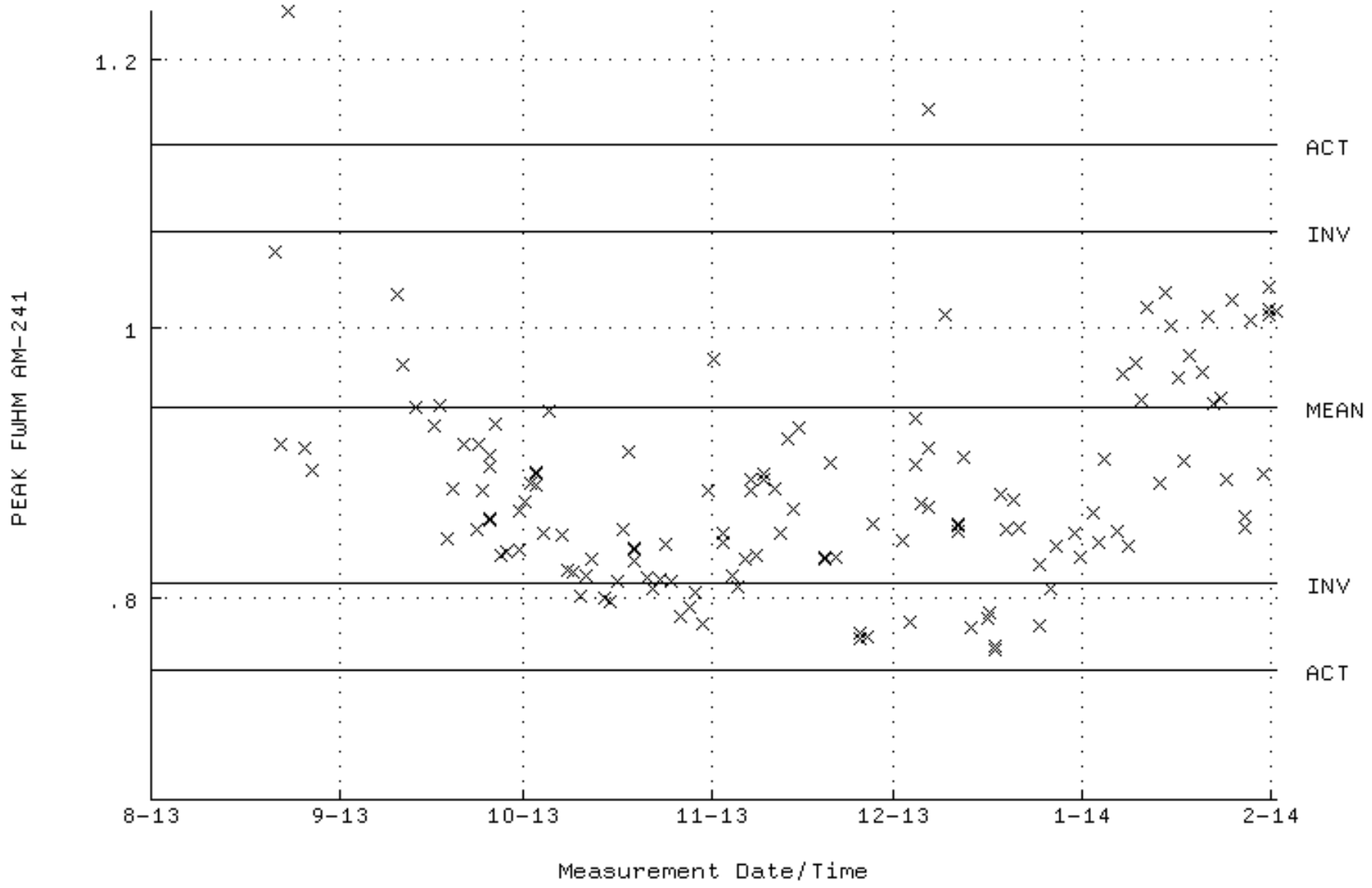
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM04.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:05:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.12388 +- 1.550973E-02 (1.38 %)



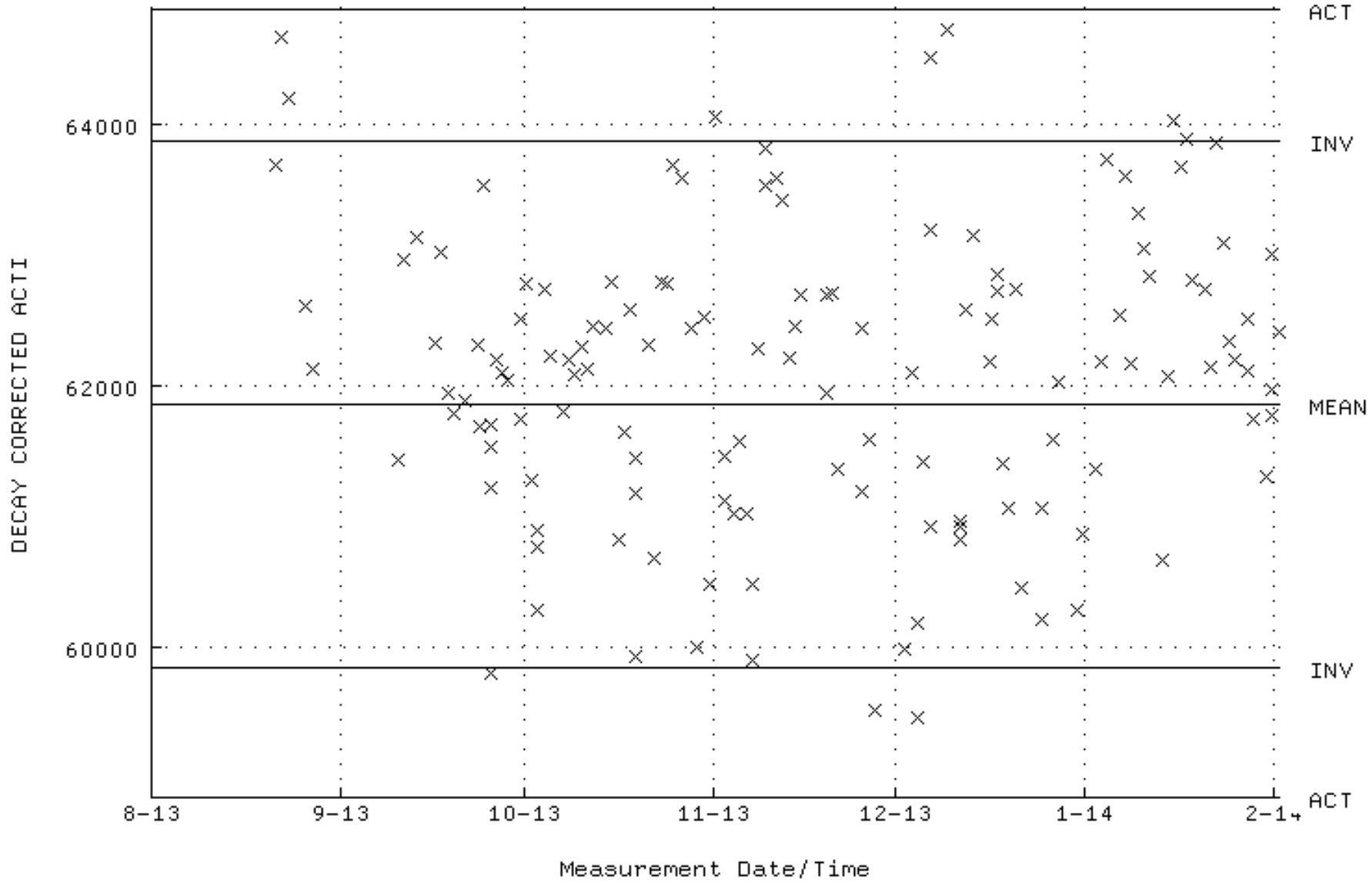
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM05_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 21-AUG-2013 08:11:31 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



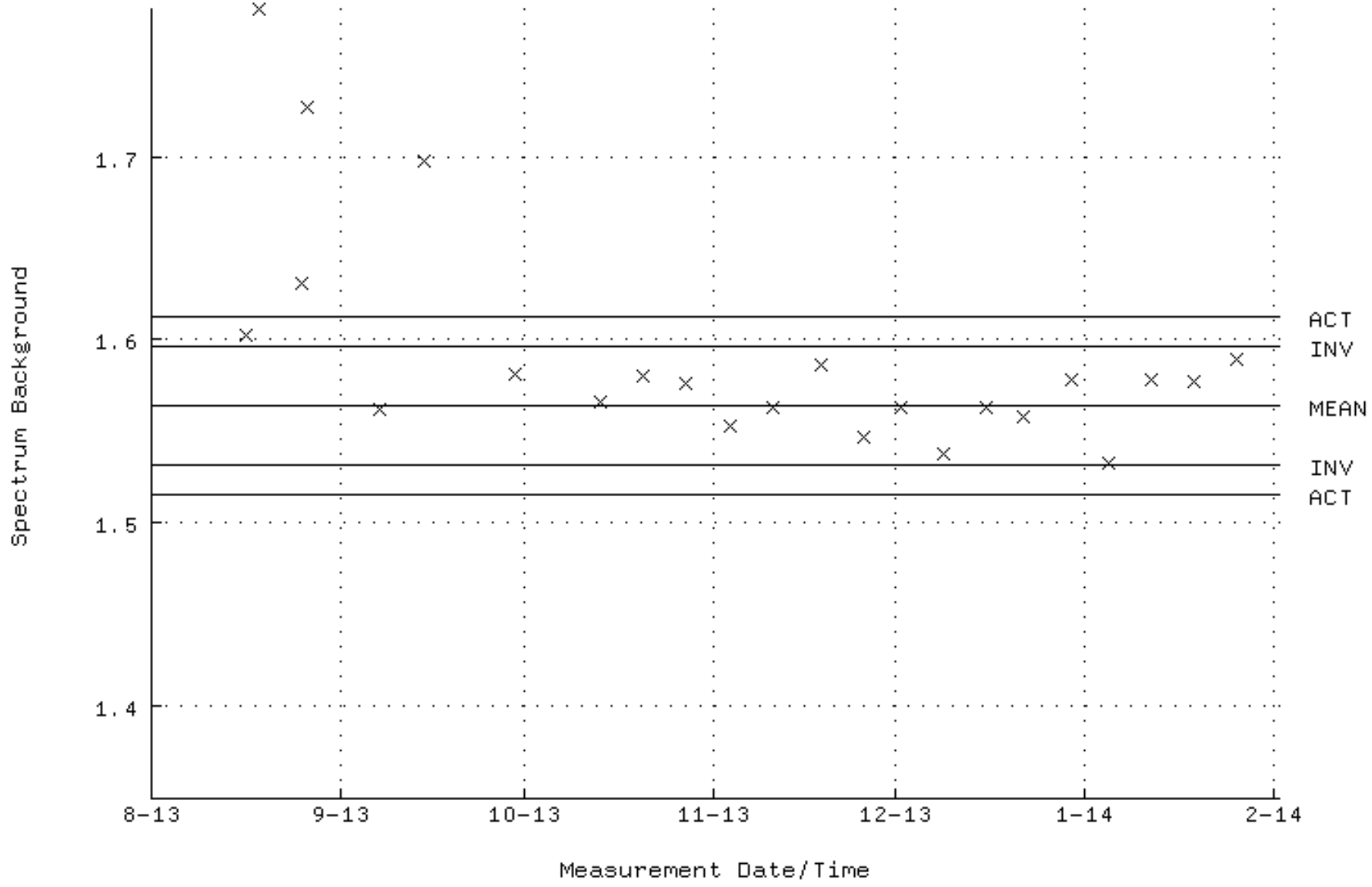
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM05_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 21-AUG-2013 08:11:31 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.942318 +- 6.517946E-02 (6.92 %)



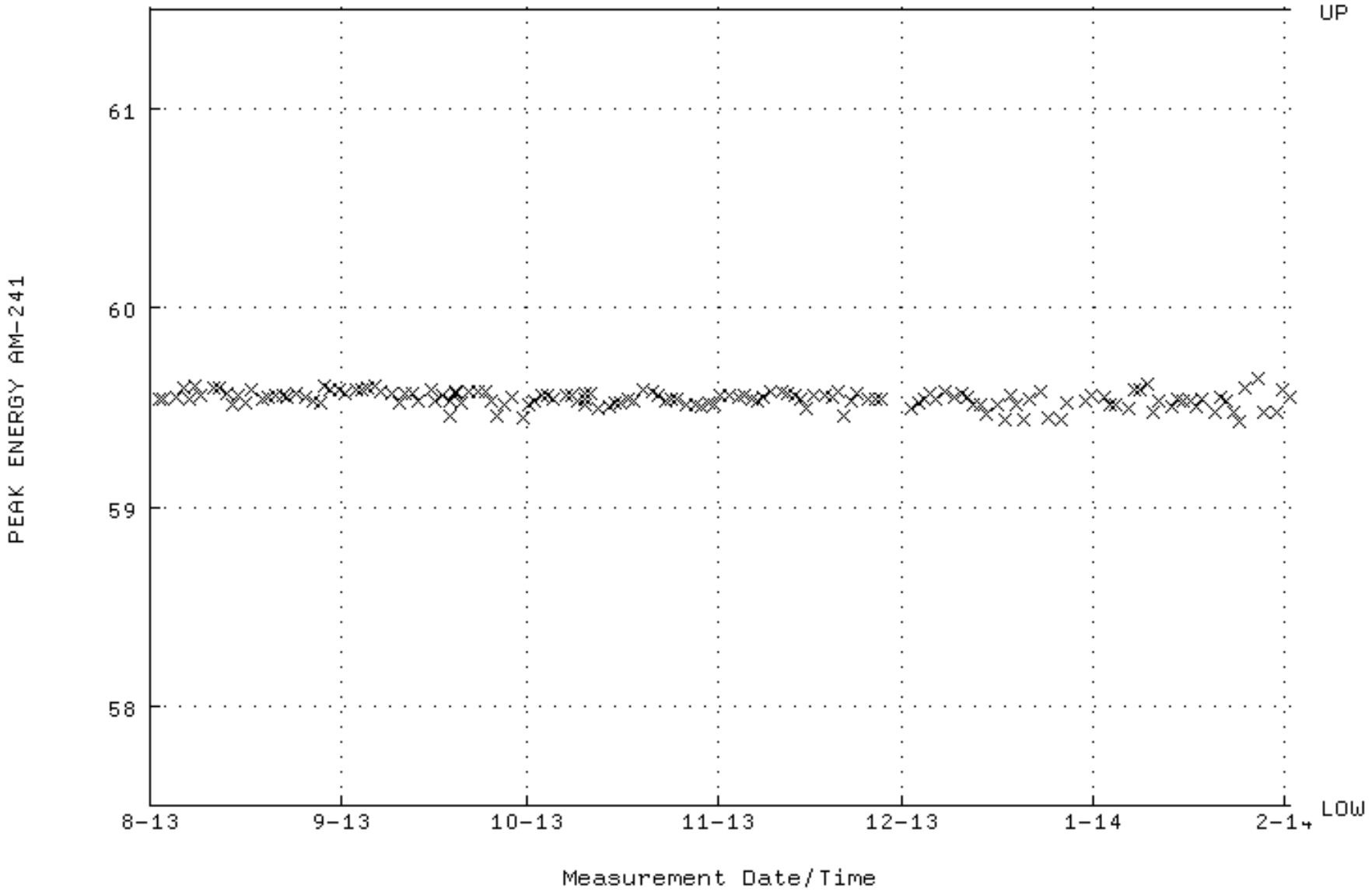
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM05_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 21-AUG-2013 08:11:31 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 61862.8 +- 1003.79 (1.62 %)



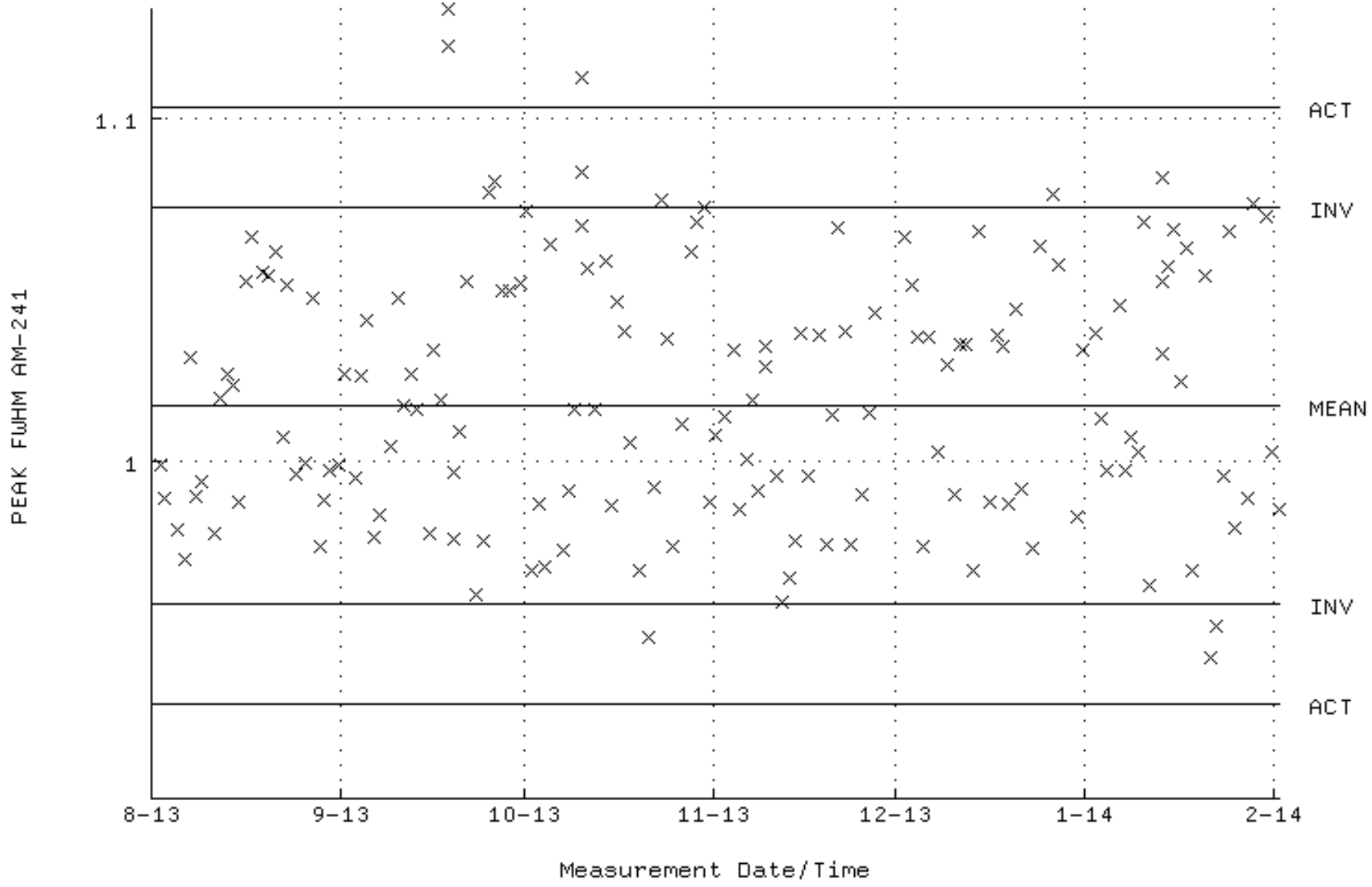
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM05.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 16-AUG-2013 14:59:12 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.56447 +- 1.619384E-02 (1.04 %)



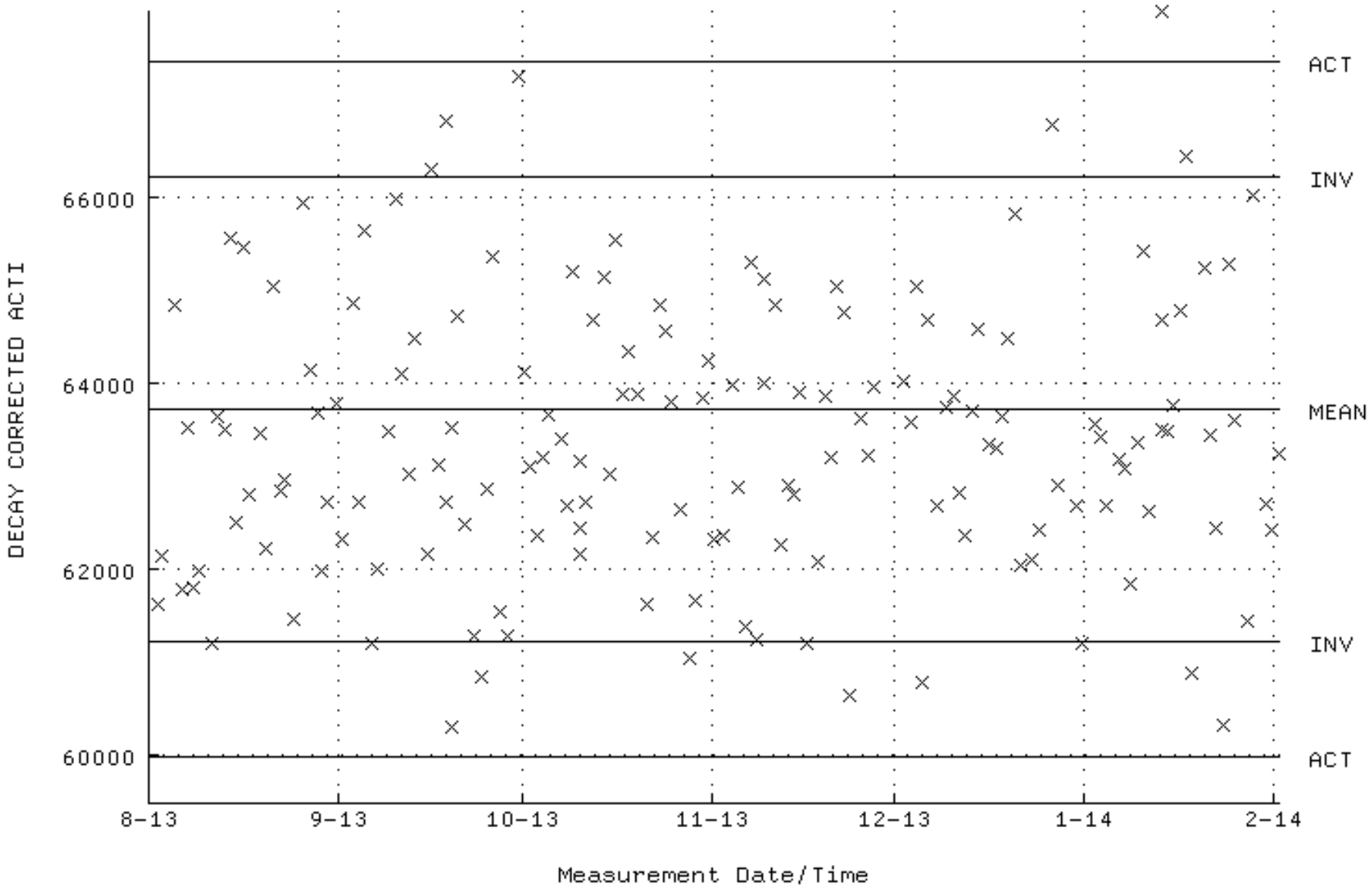
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:35:56 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



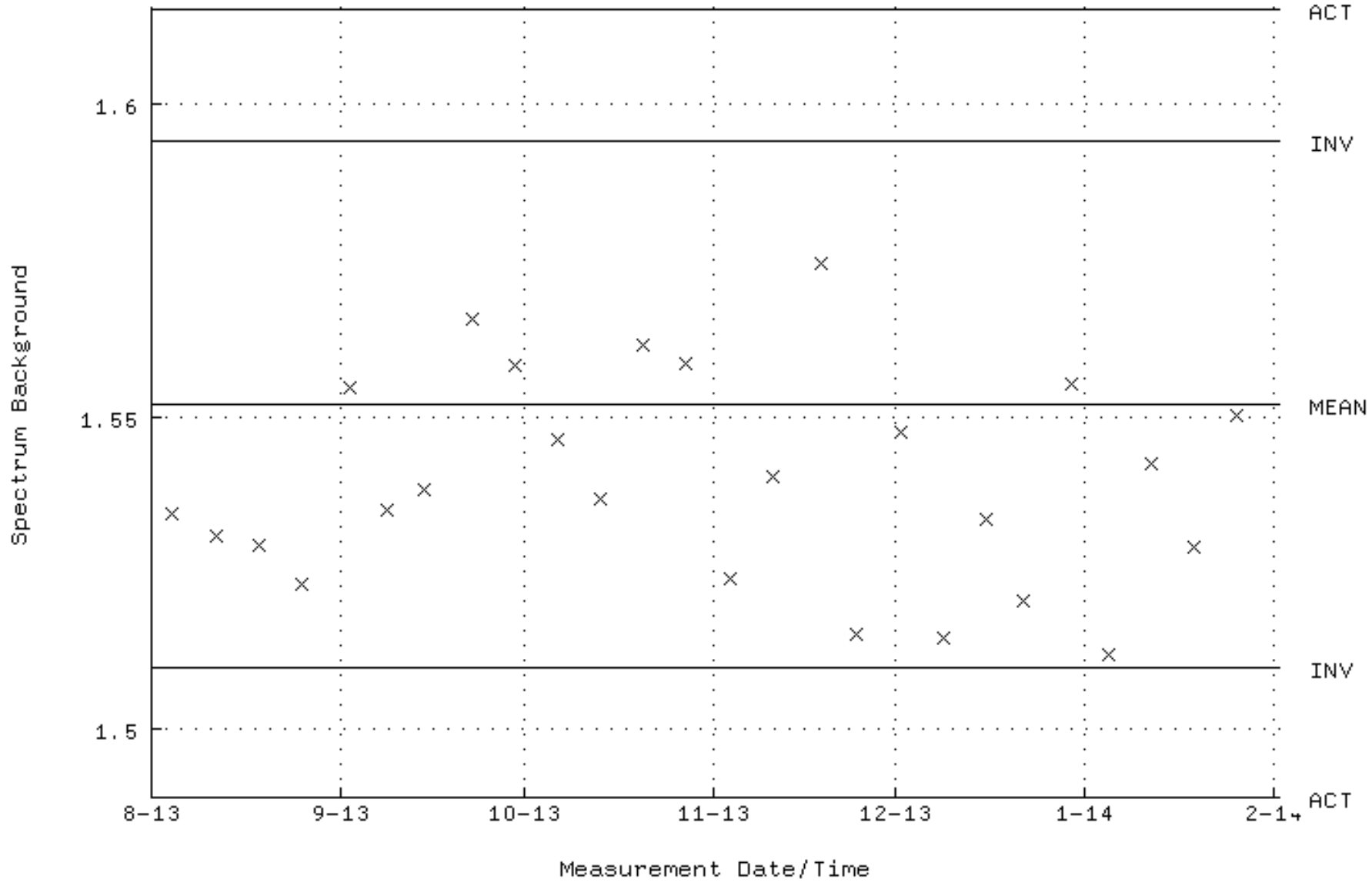
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:35:56 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.01657 +- 2.892673E-02 (2.85 %)



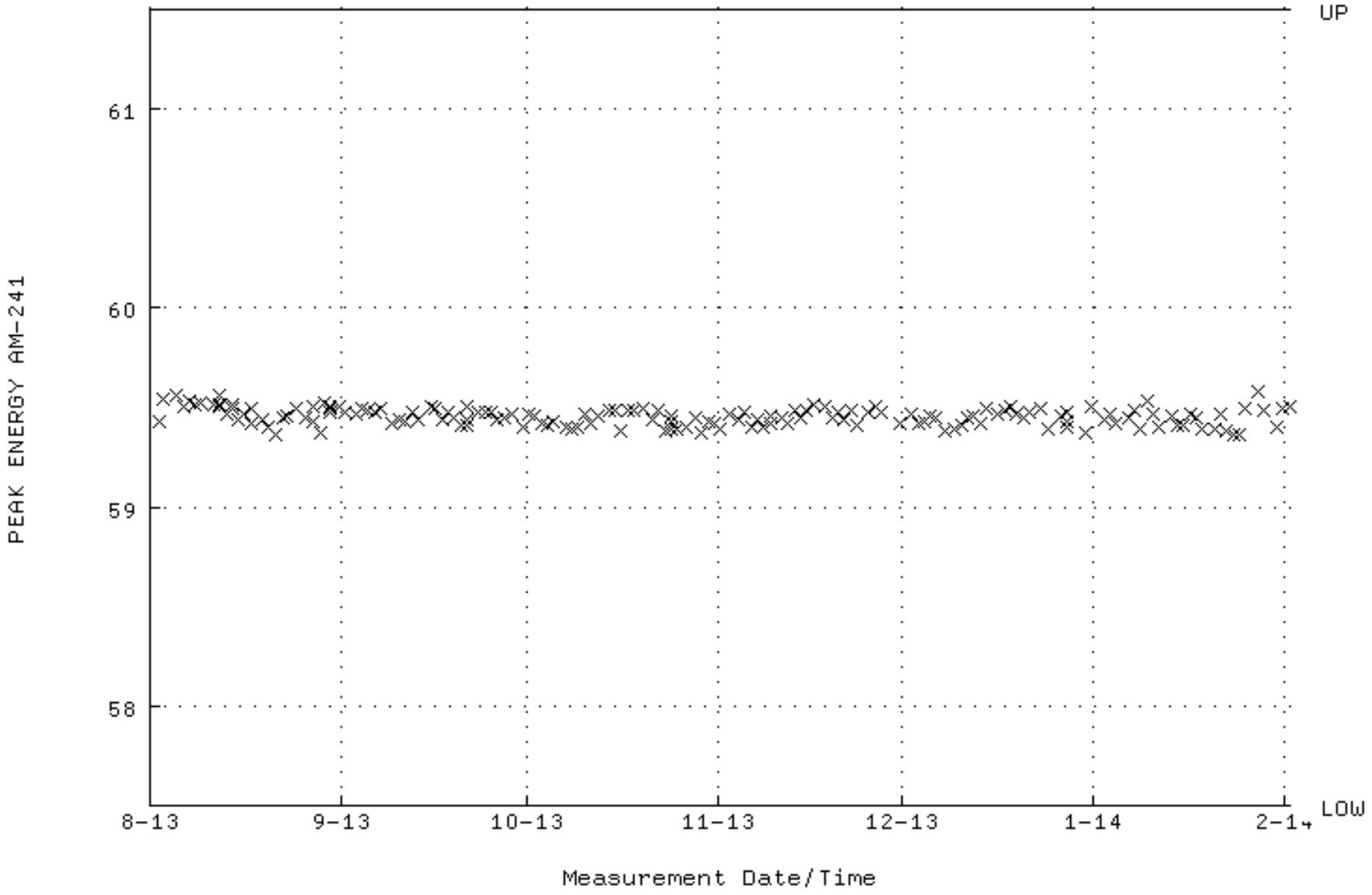
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:35:56 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63732.0 +- 1251.92 (1.96 %)



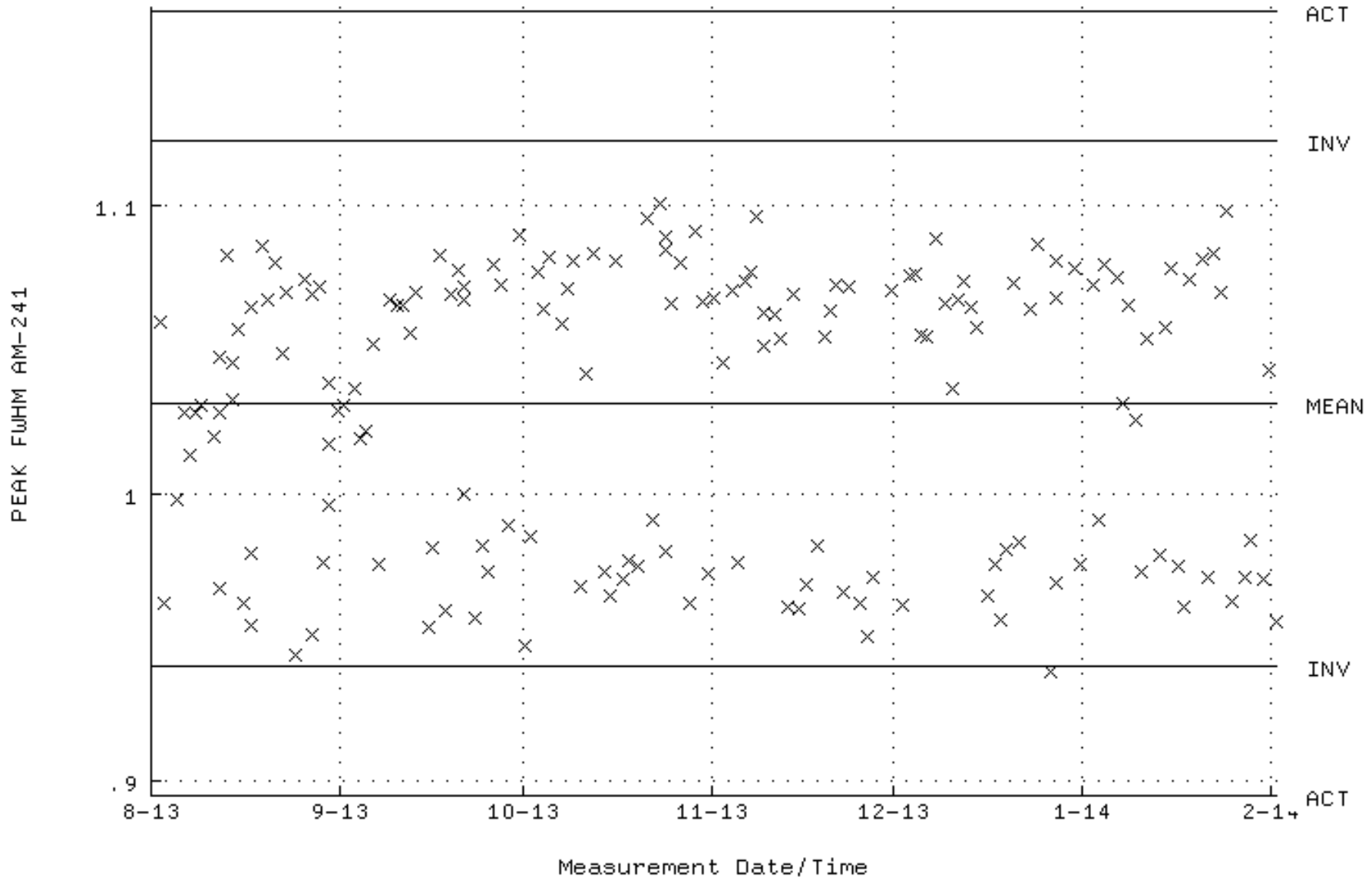
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM06.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:06:12 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.55214 +- 2.098598E-02 (1.35 %)



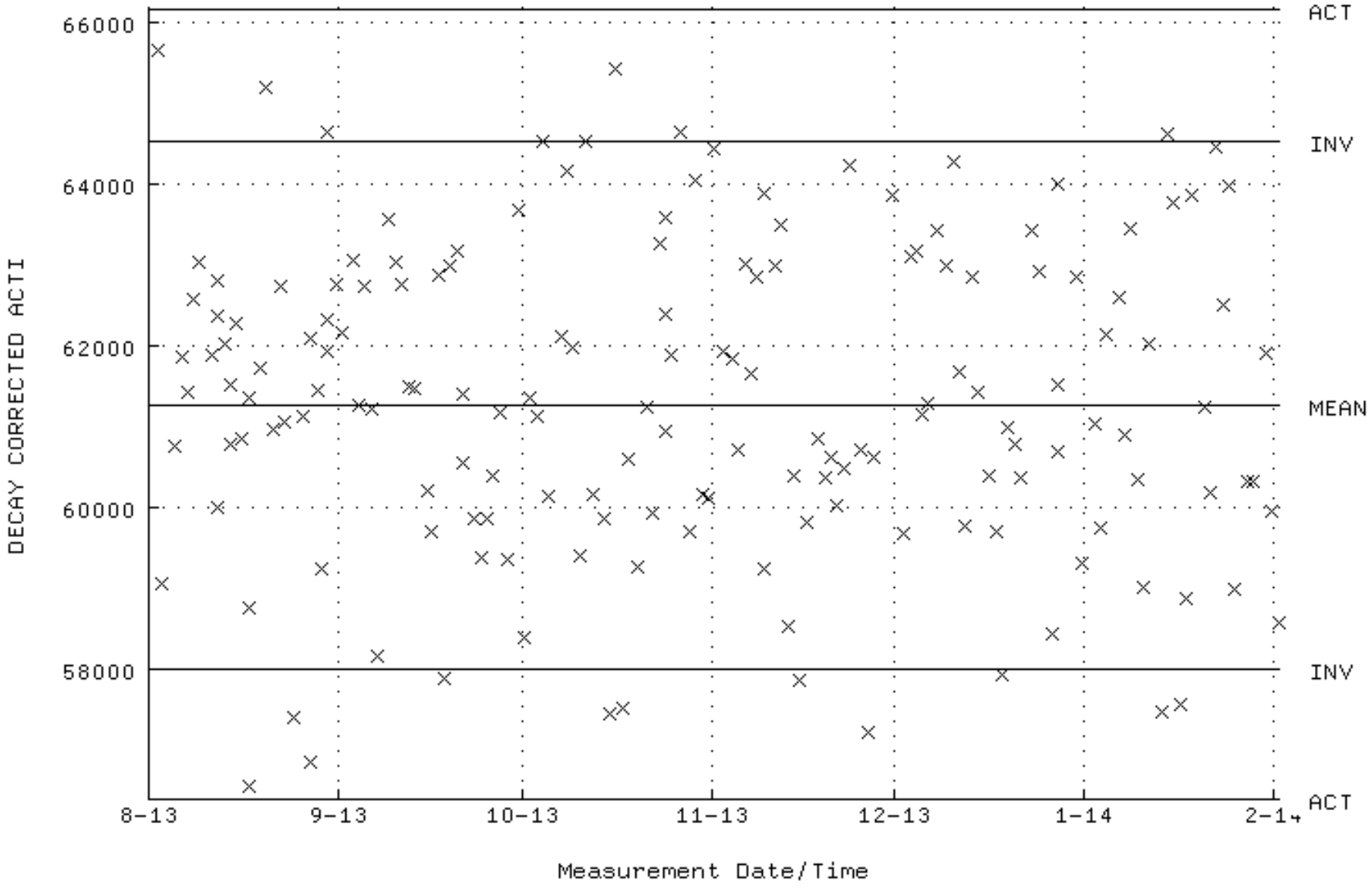
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:36 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



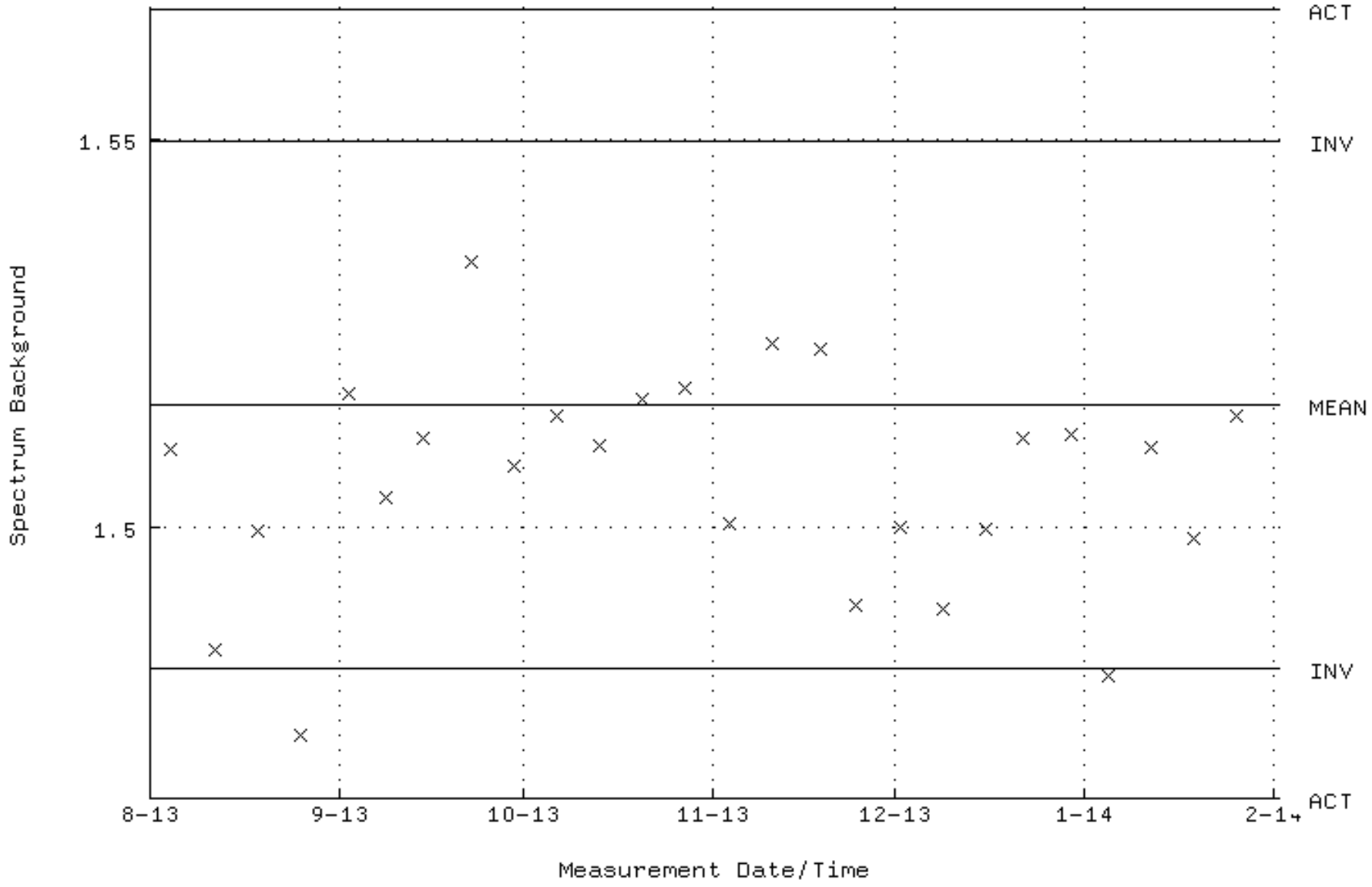
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:36 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.03160 +- 4.561273E-02 (4.42 %)



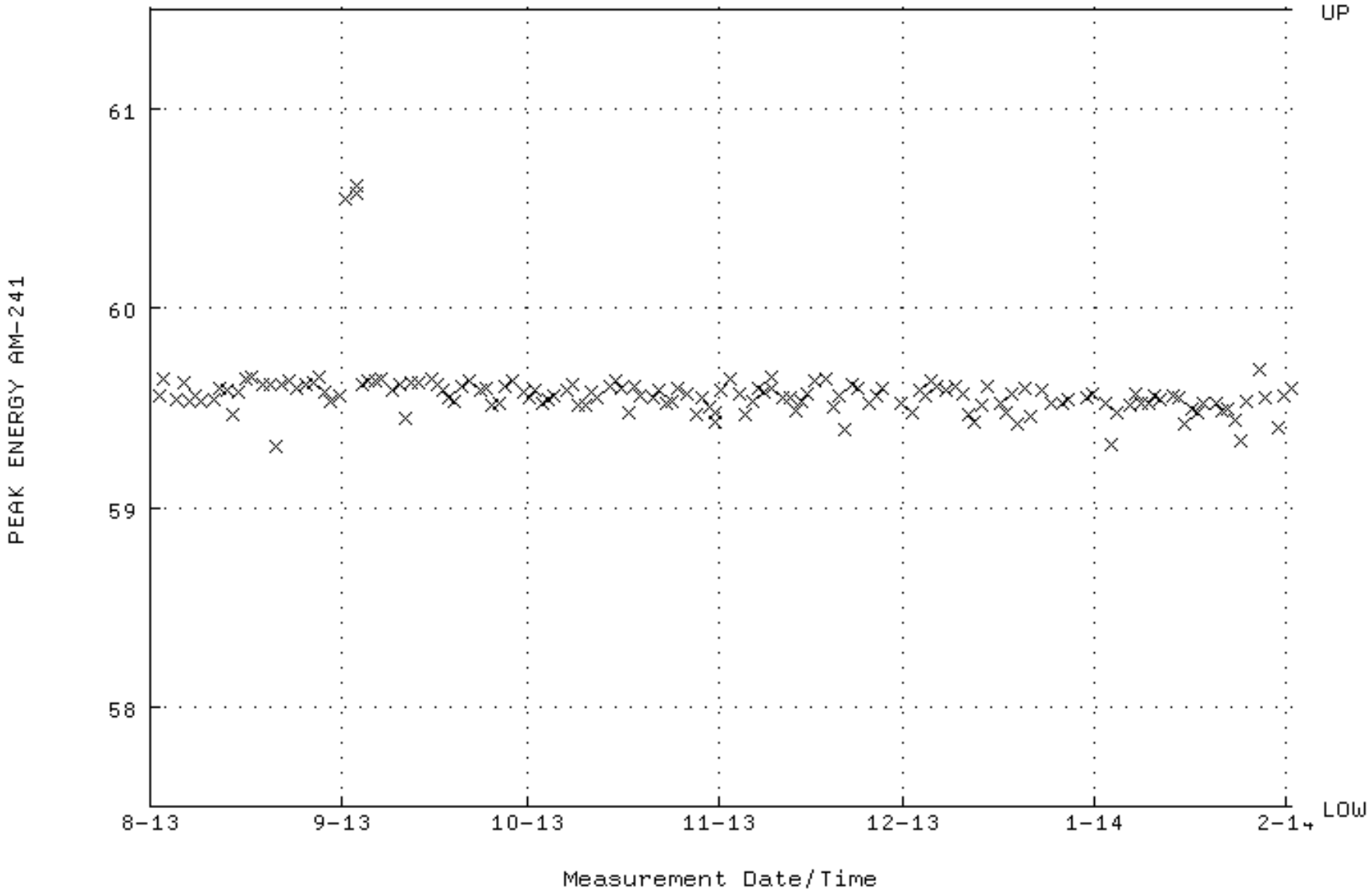
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:36 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 61278.6 +- 1628.45 (2.66 %)



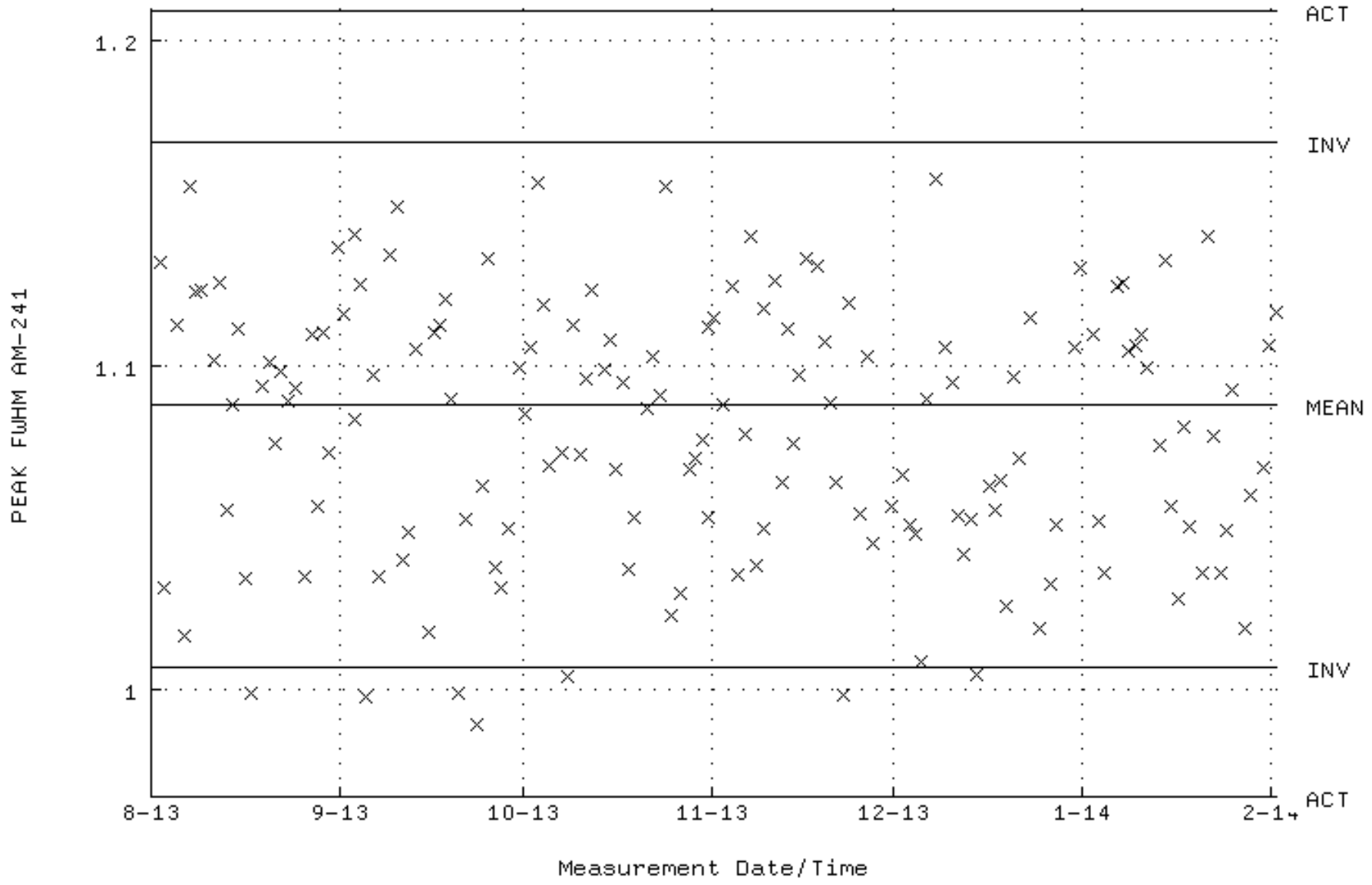
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM07.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:06:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.51582 +- 1.694994E-02 (1.12 %)



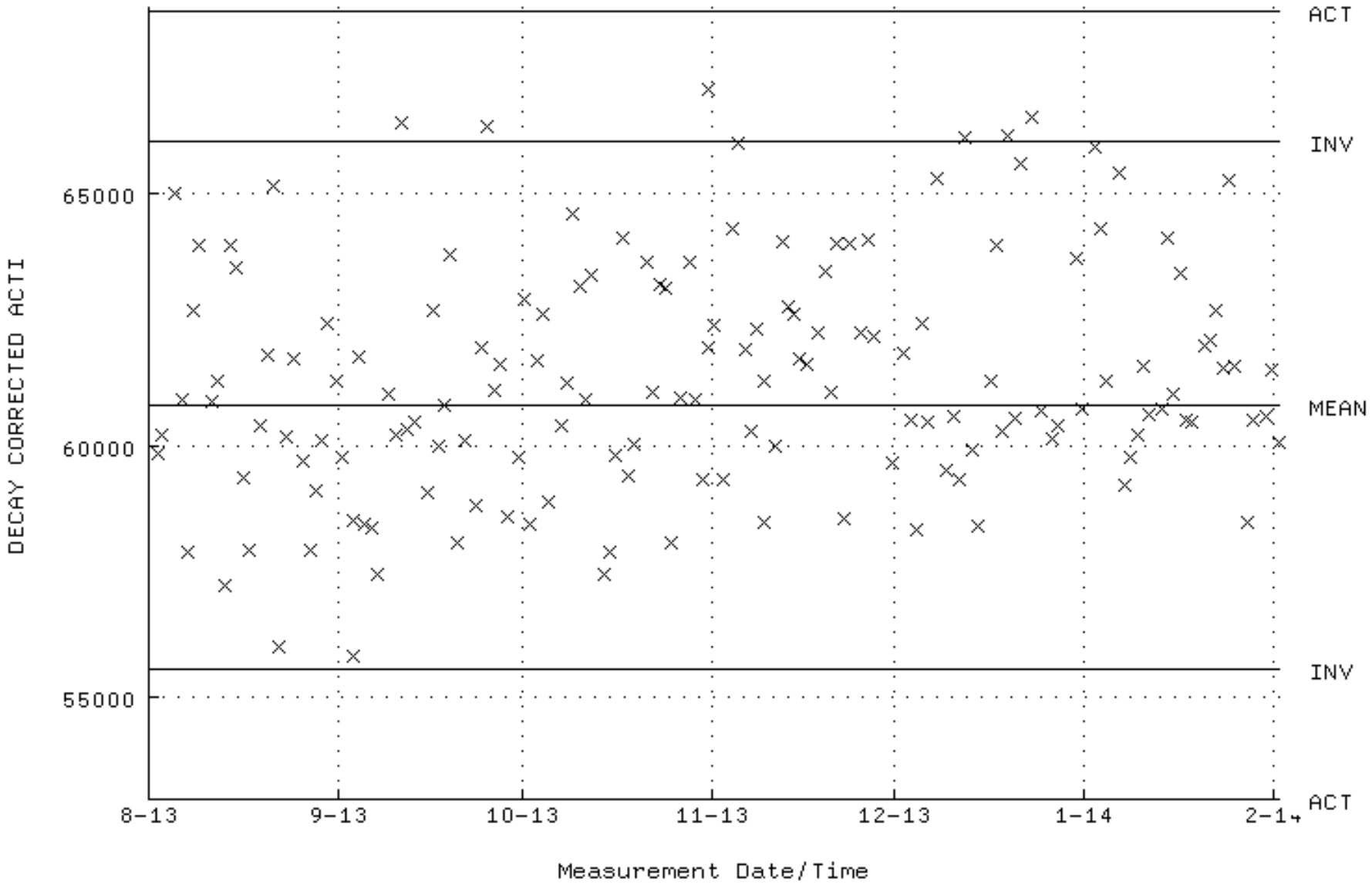
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:51:40 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



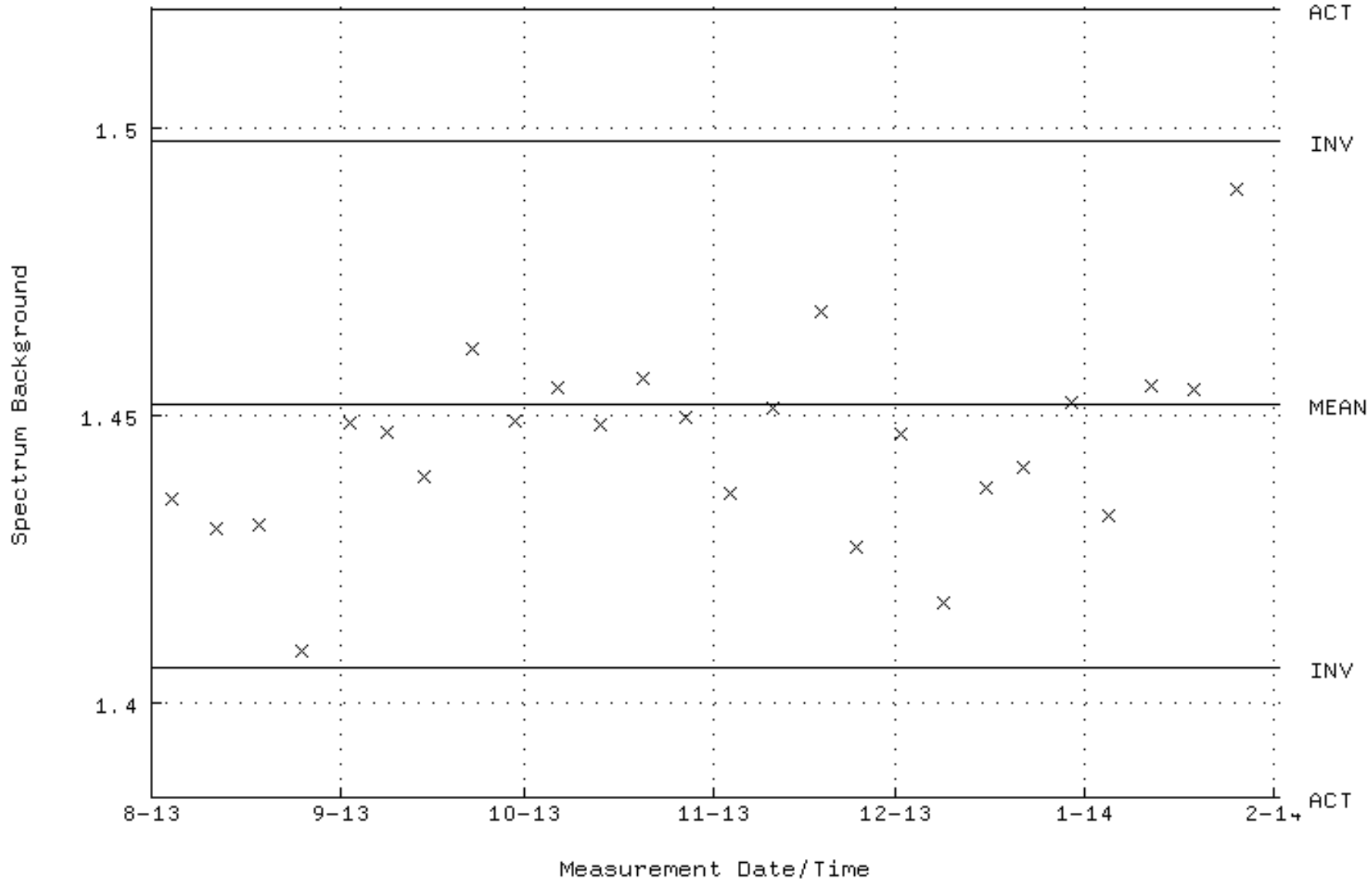
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:51:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.08808 +- 4.041690E-02 (3.71 %)



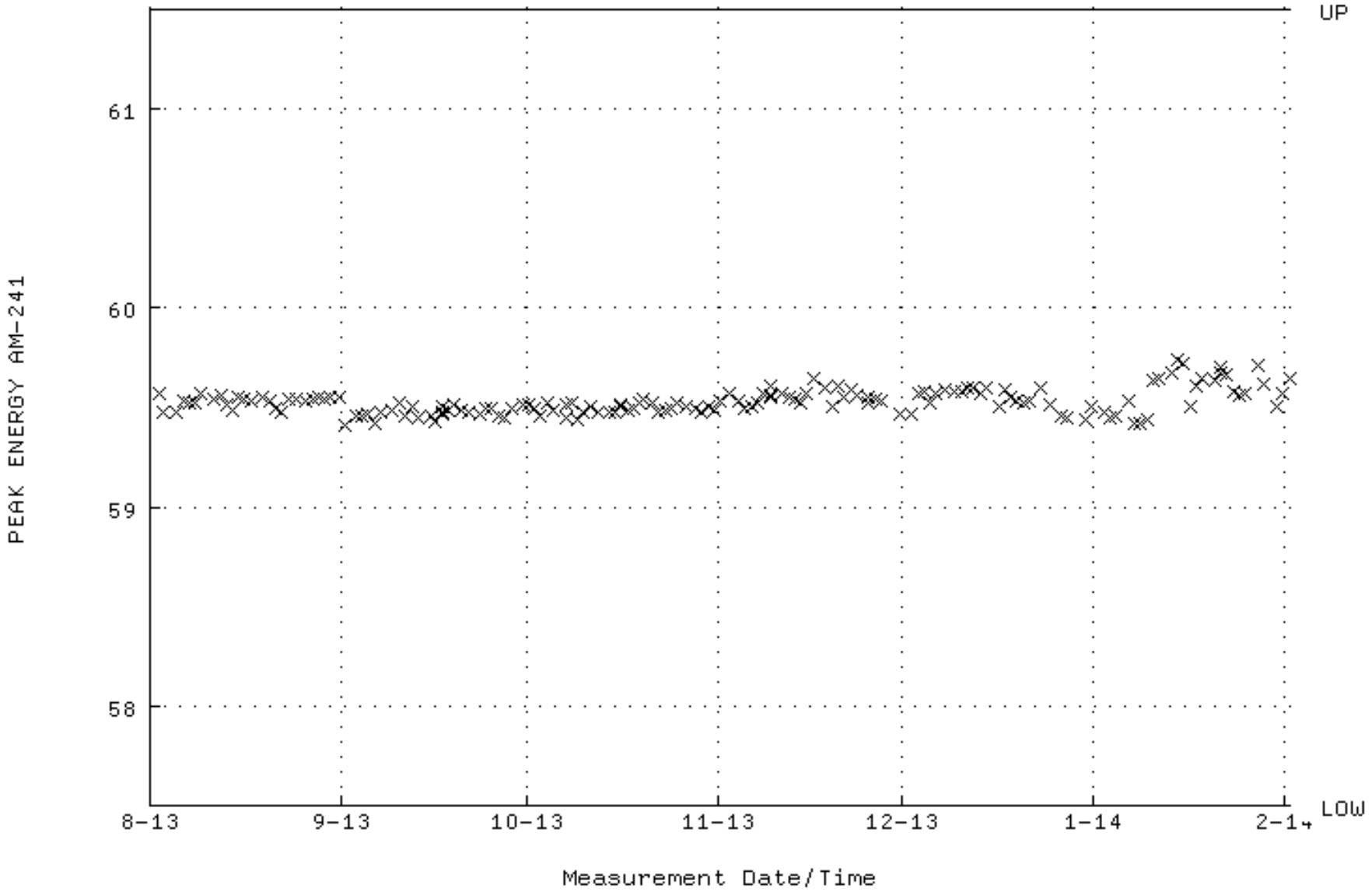
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:51:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60815.3 +- 2613.83 (4.30 %)



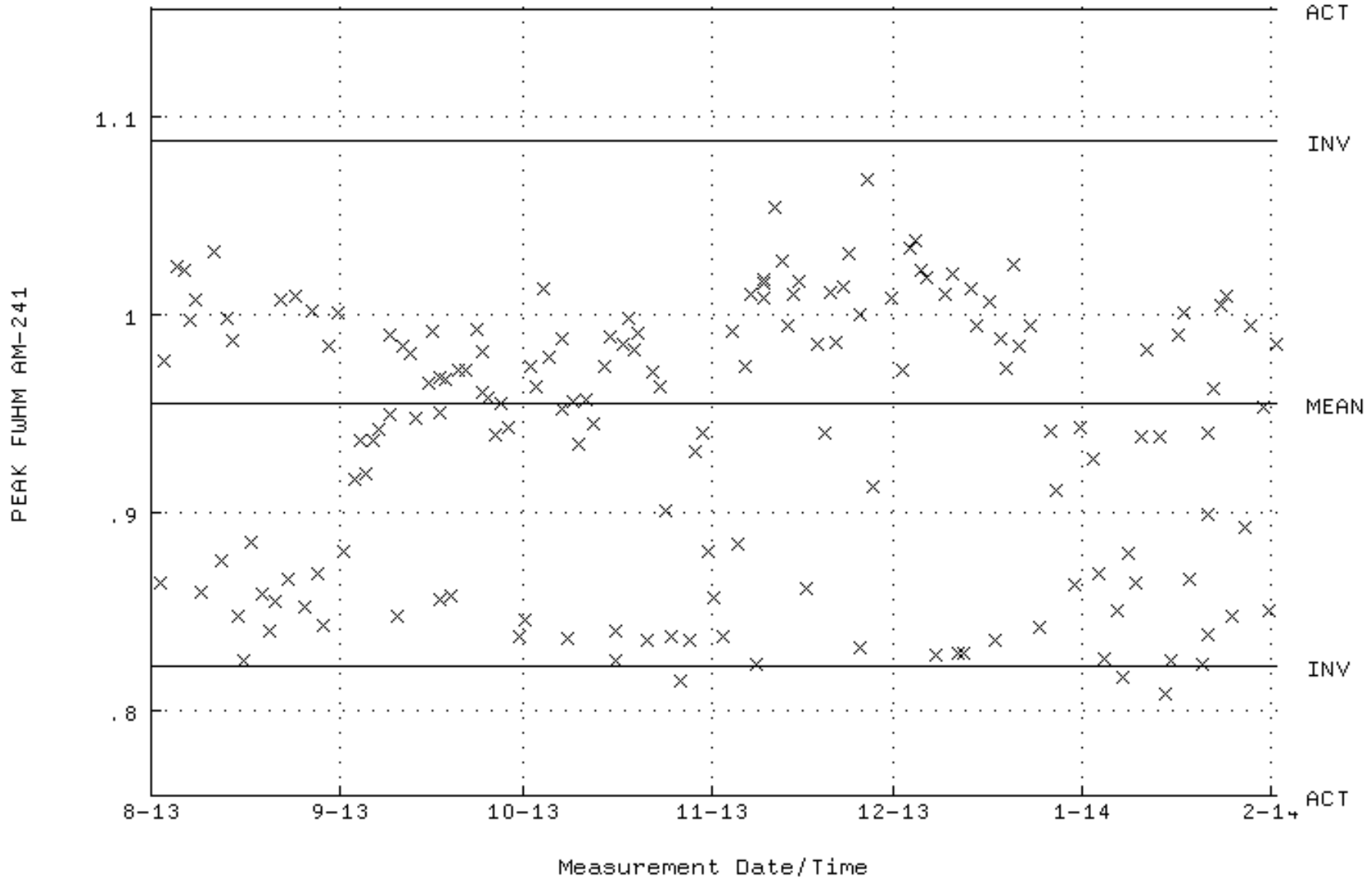
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM08.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:06:51 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.45204 +- 2.285979E-02 (1.57 %)



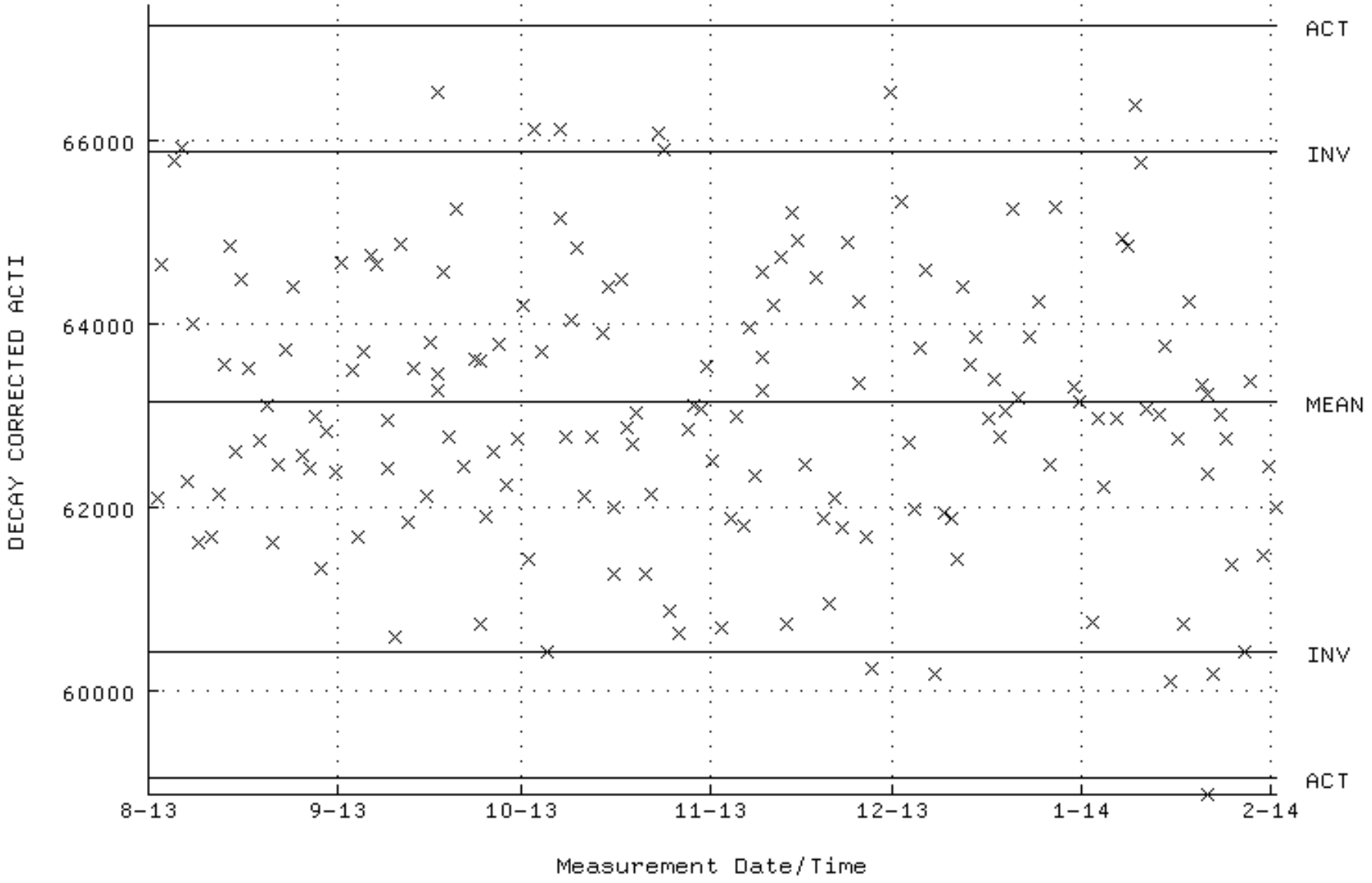
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:41:41 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



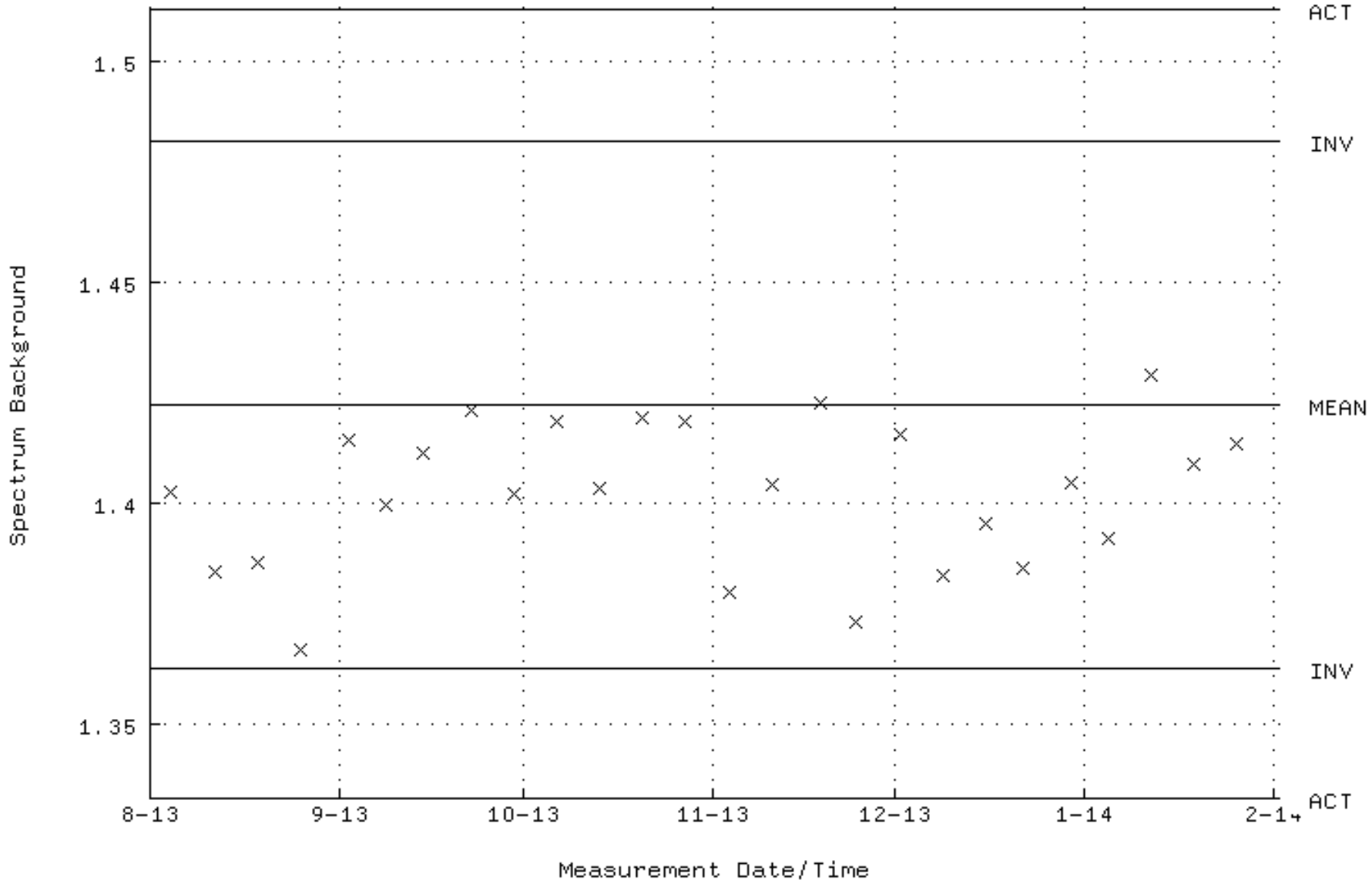
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:41:41 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.955734 +- 6.625439E-02 (6.93 %)



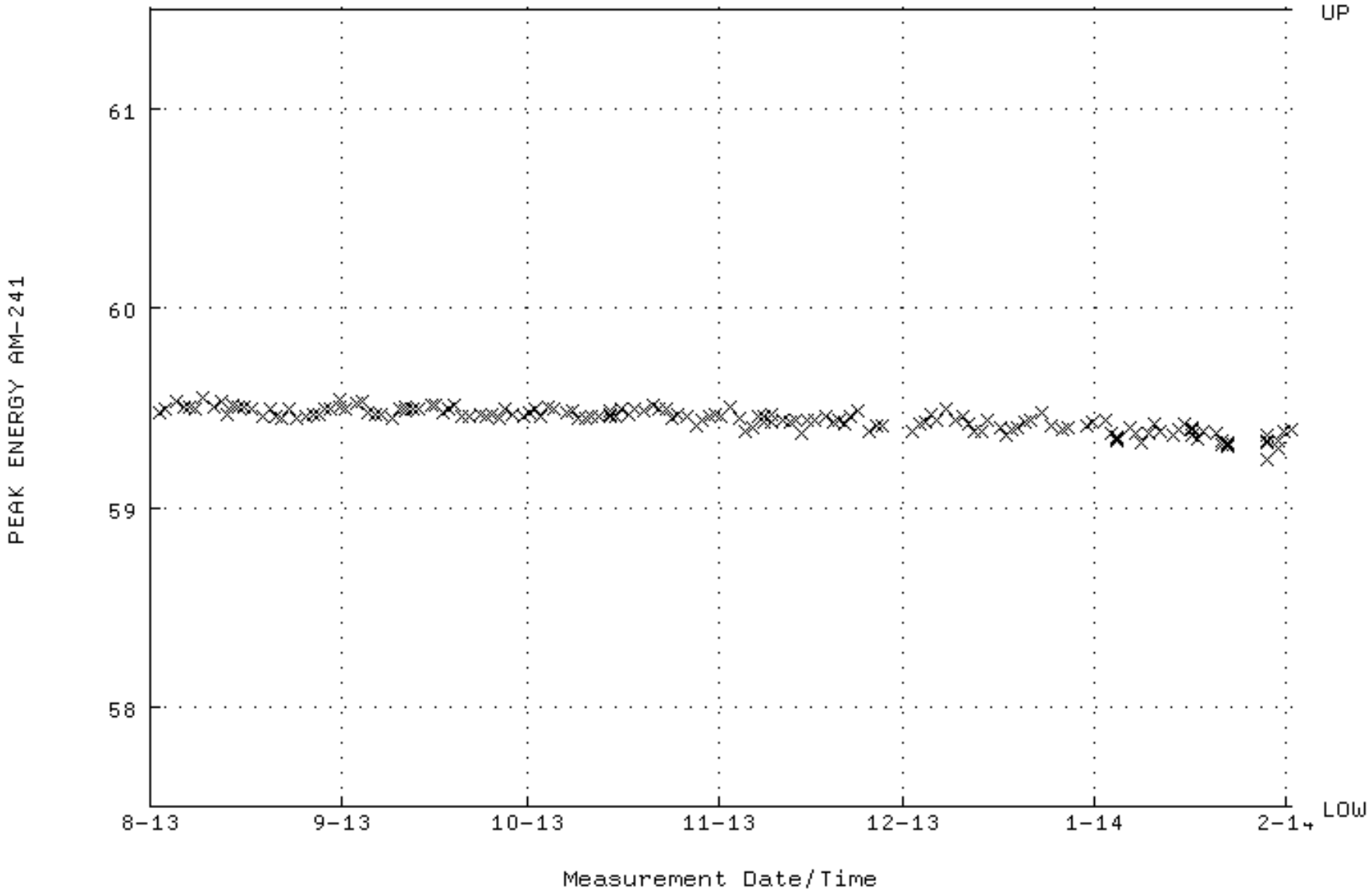
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:41:41 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63155.8 +- 1368.16 (2.17 %)



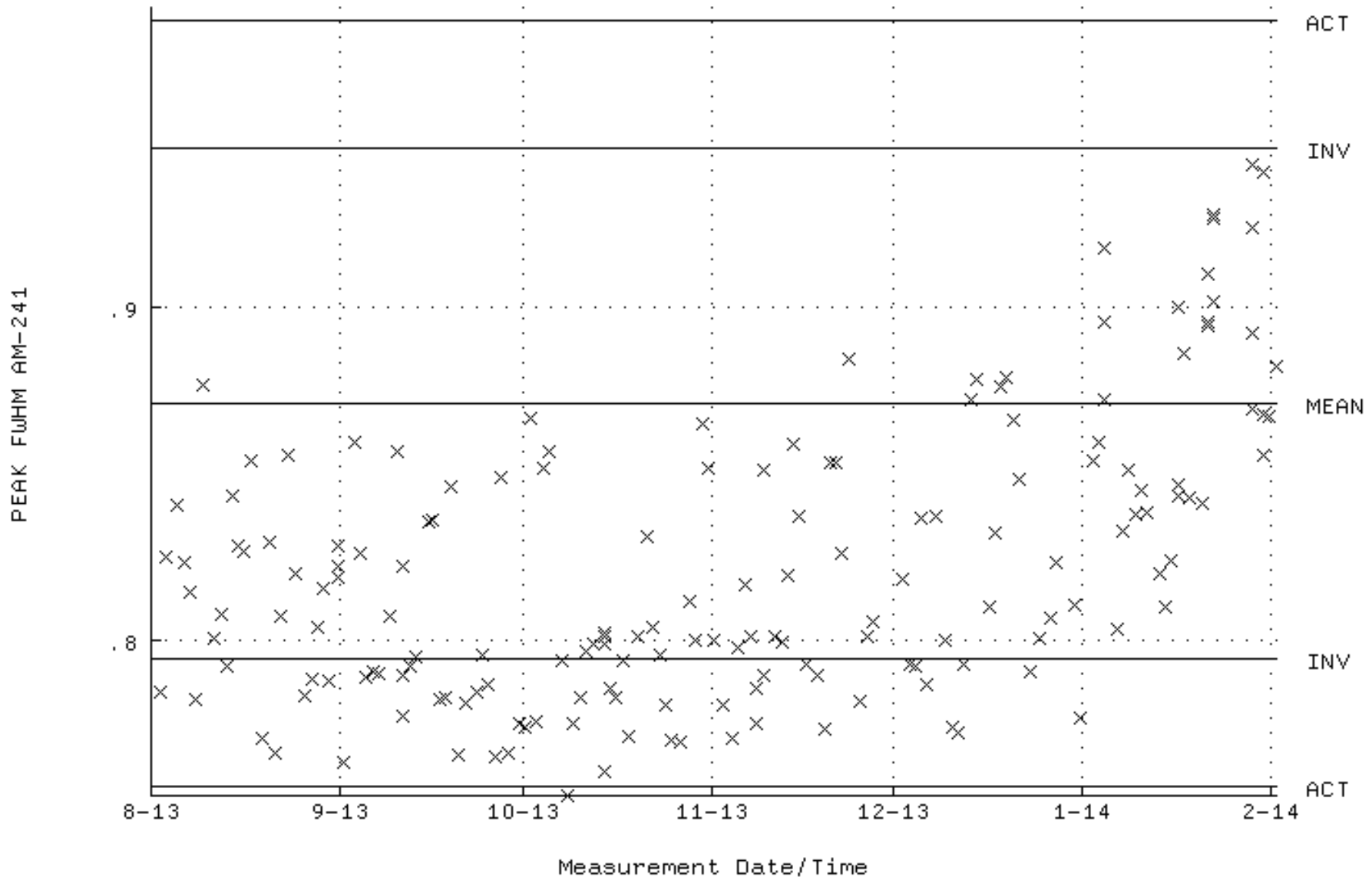
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM09.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:07:07 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.42250 +- 2.975852E-02 (2.09 %)



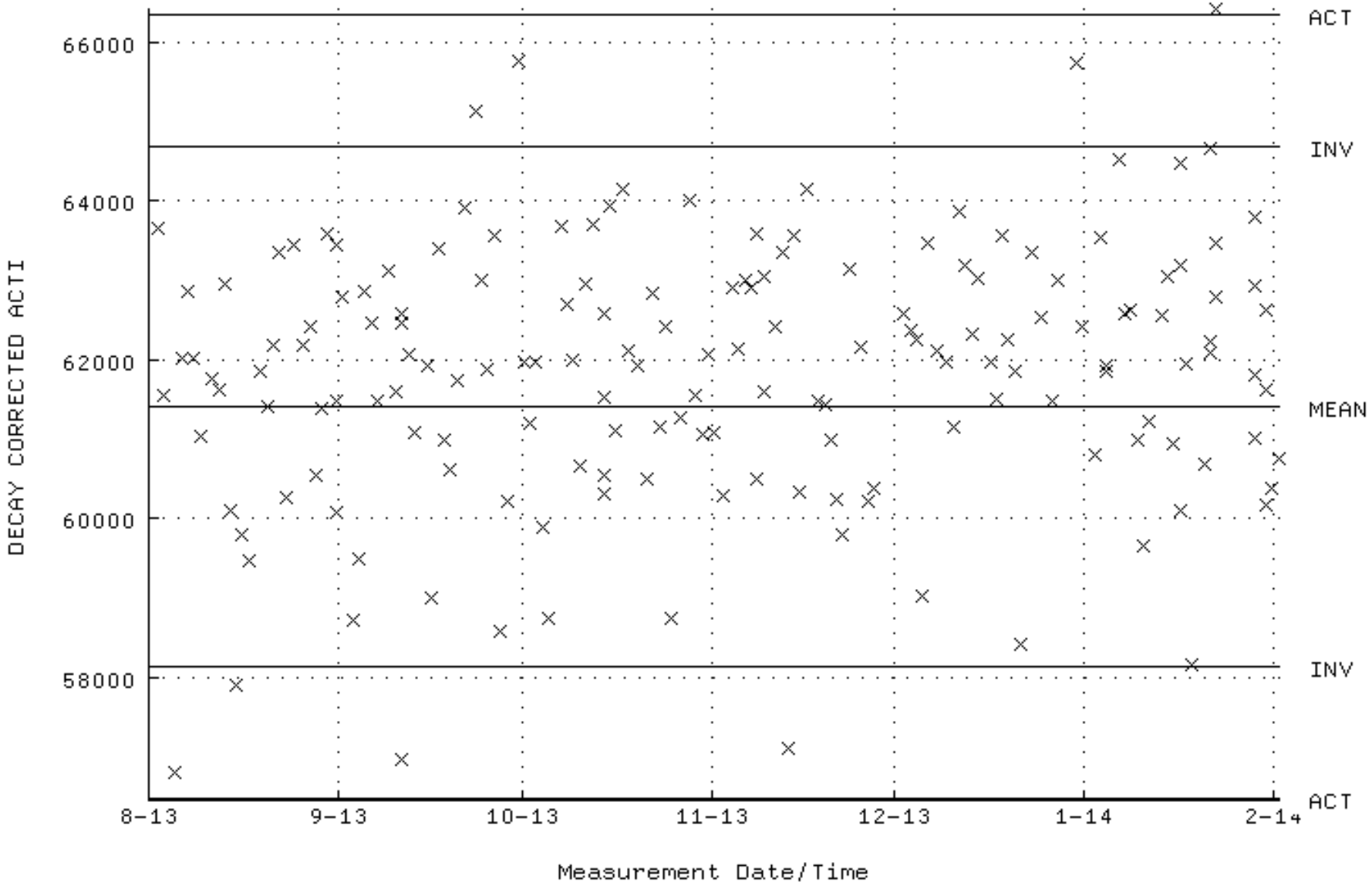
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:00 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



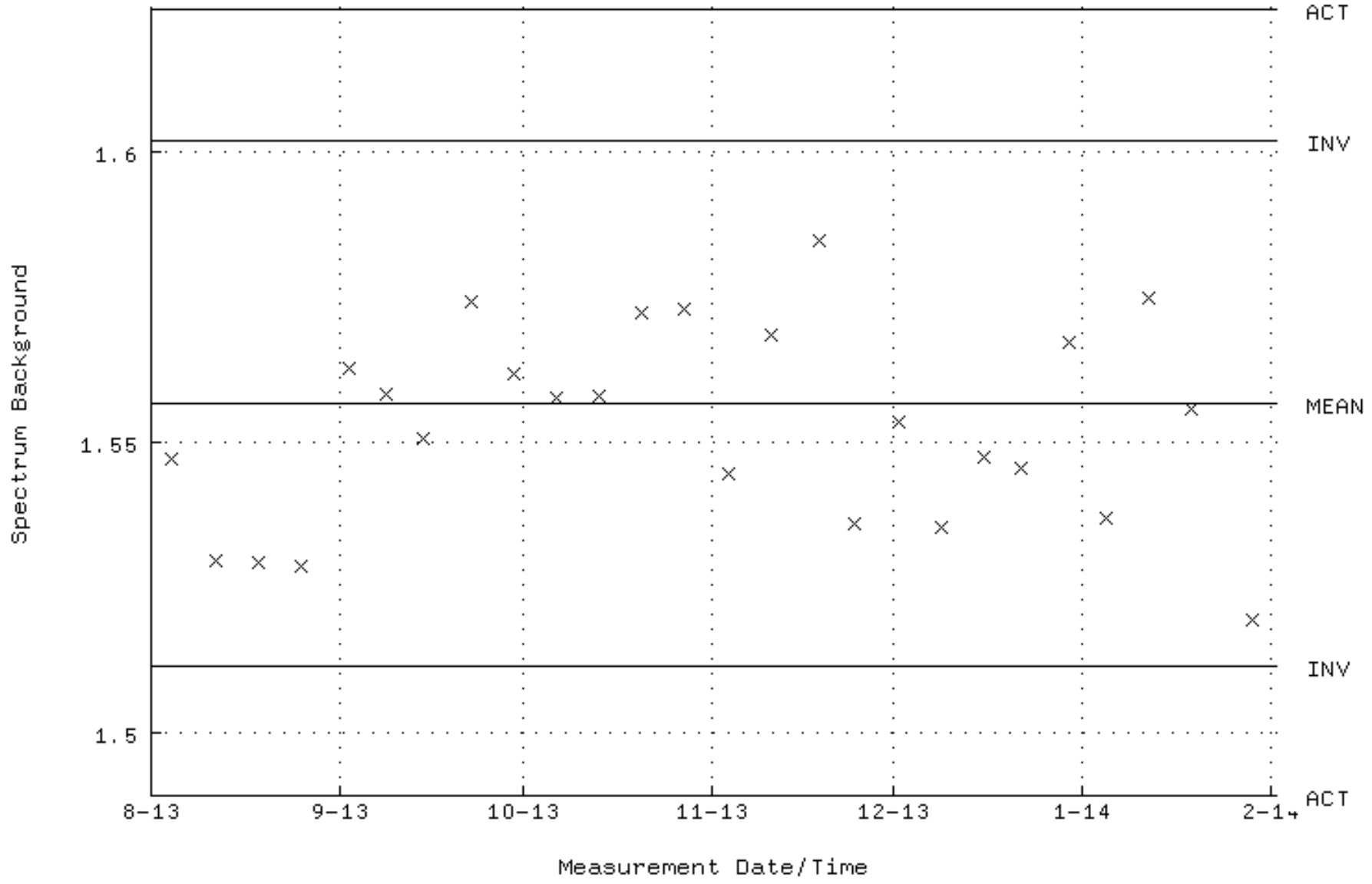
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:00 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.871600 +- 3.830351E-02 (4.39 %)



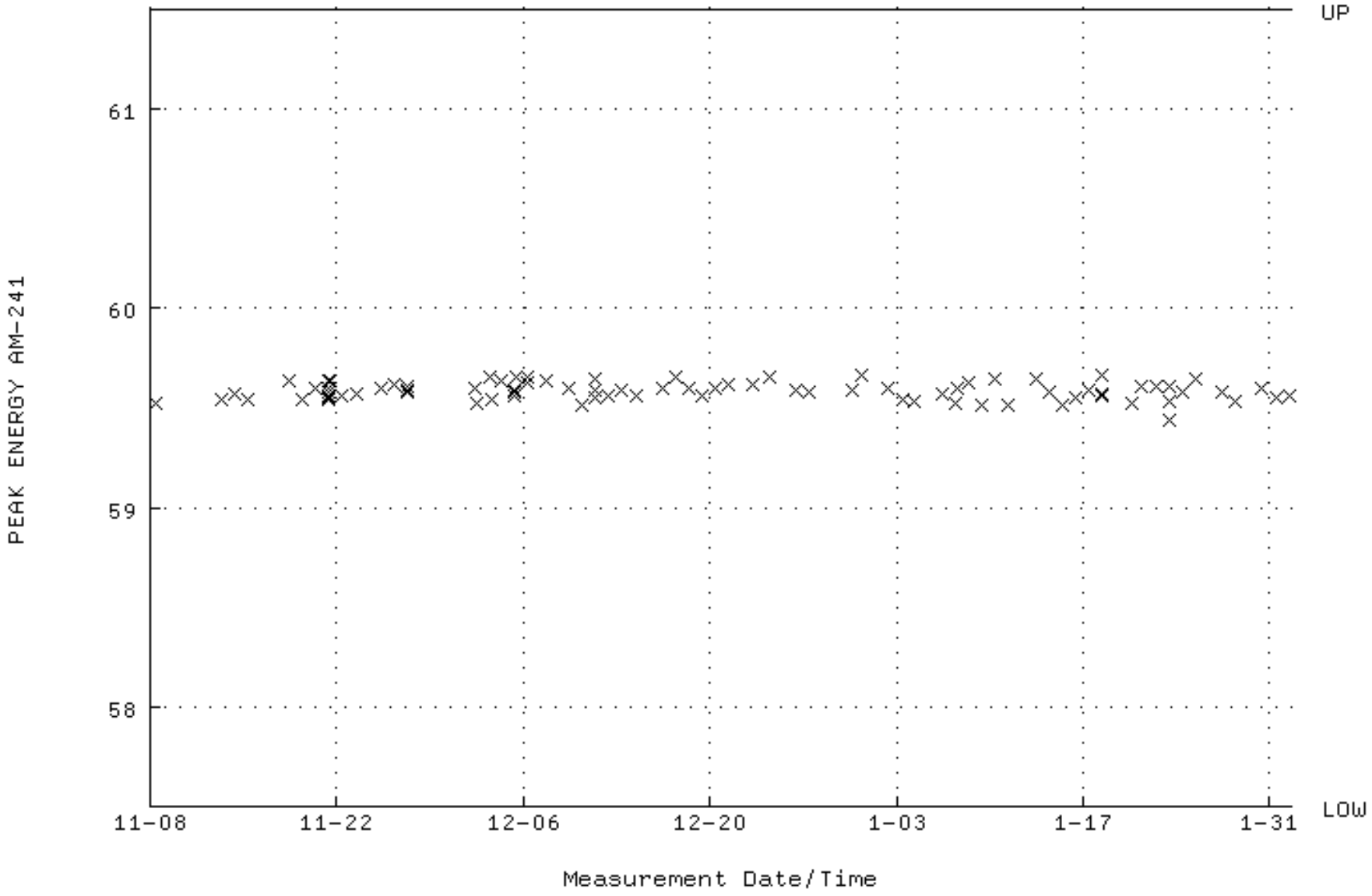
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:00 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 61421.1 +- 1640.81 (2.67 %)



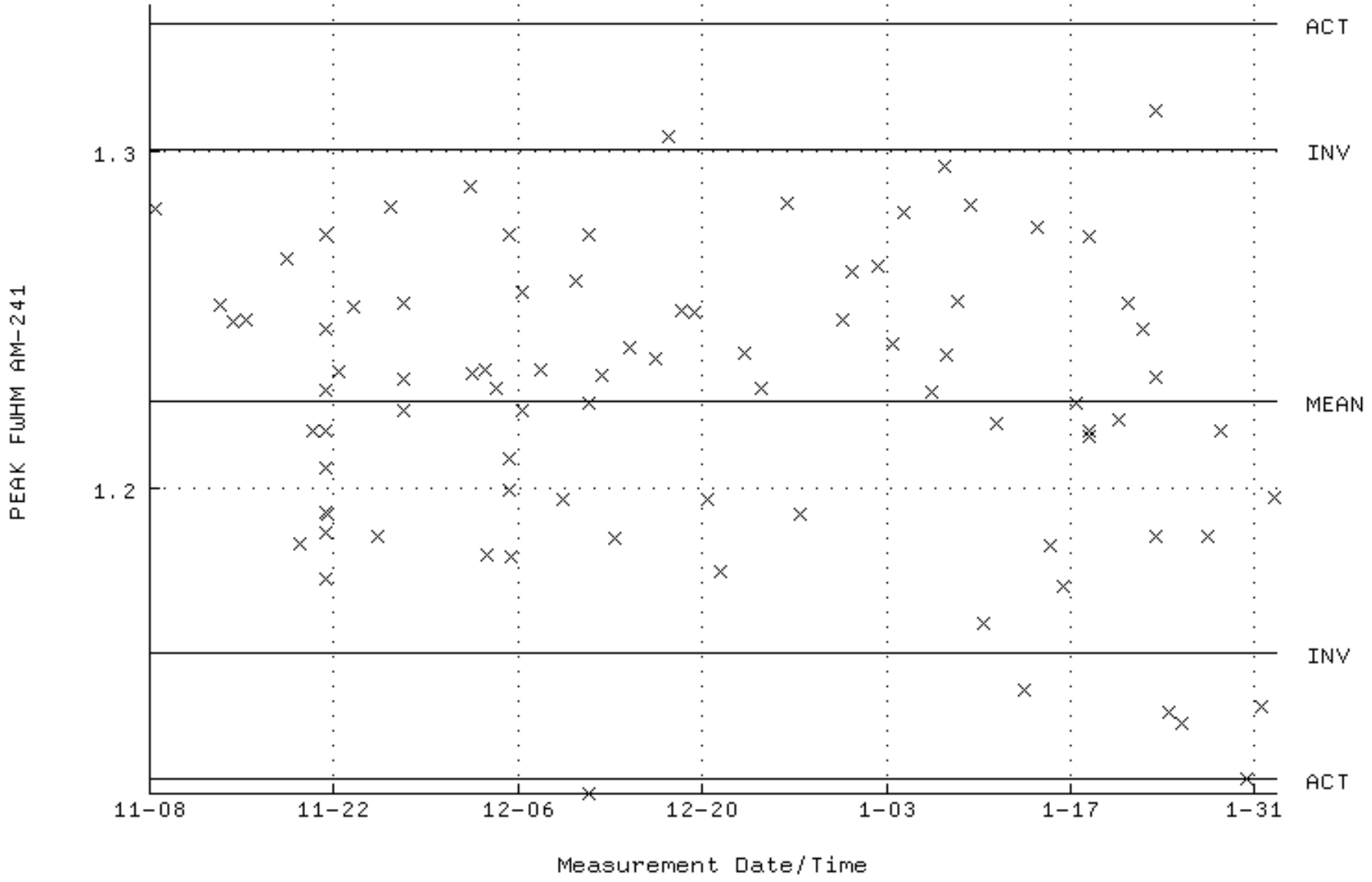
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM11.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:07:23 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.55675 +- 2.257414E-02 (1.45 %)



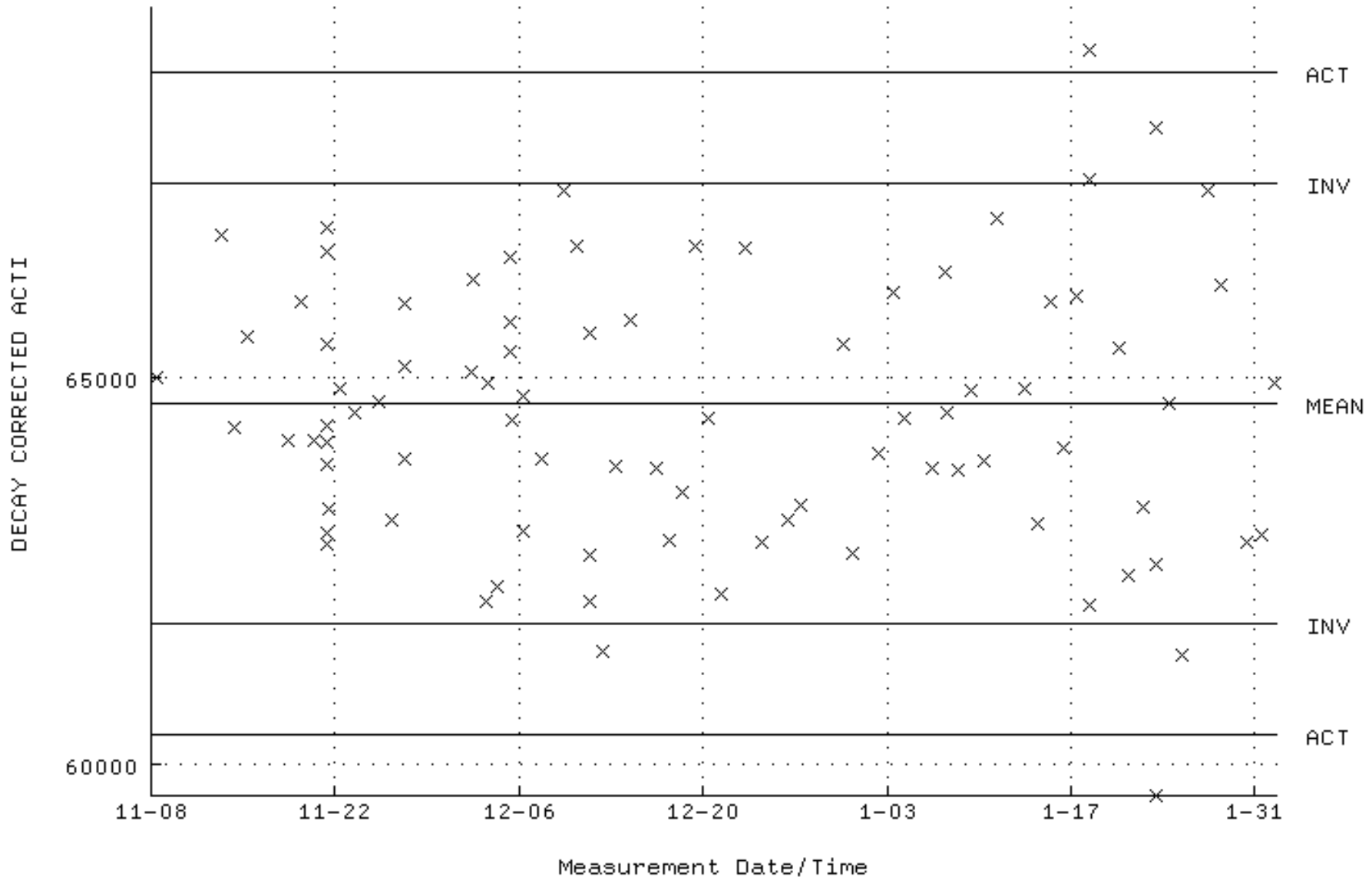
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM12_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 8-NOV-2013 08:39:38 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



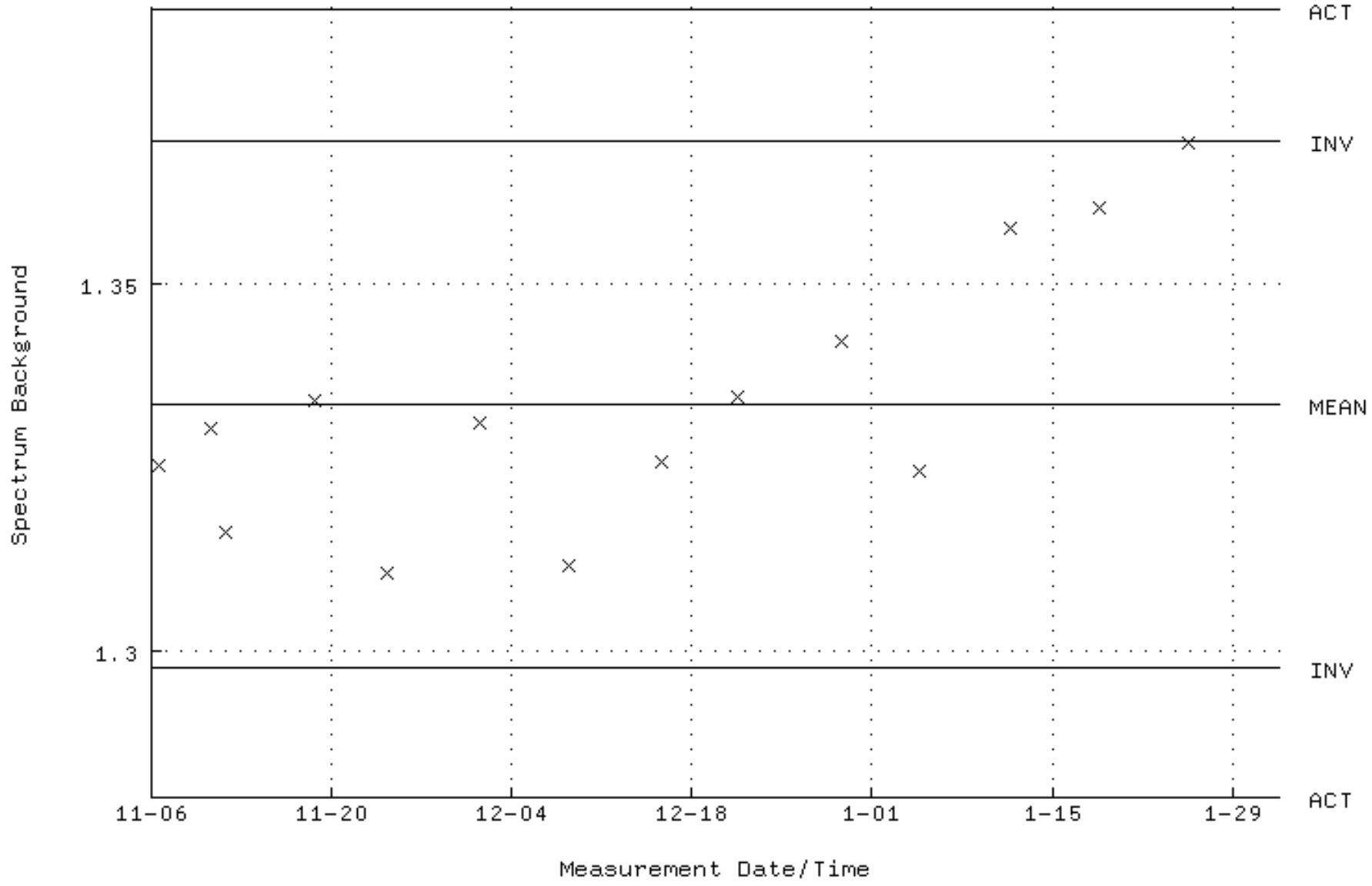
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM12_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 8-NOV-2013 08:39:38 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.22624 +- 3.731357E-02 (3.04 %)



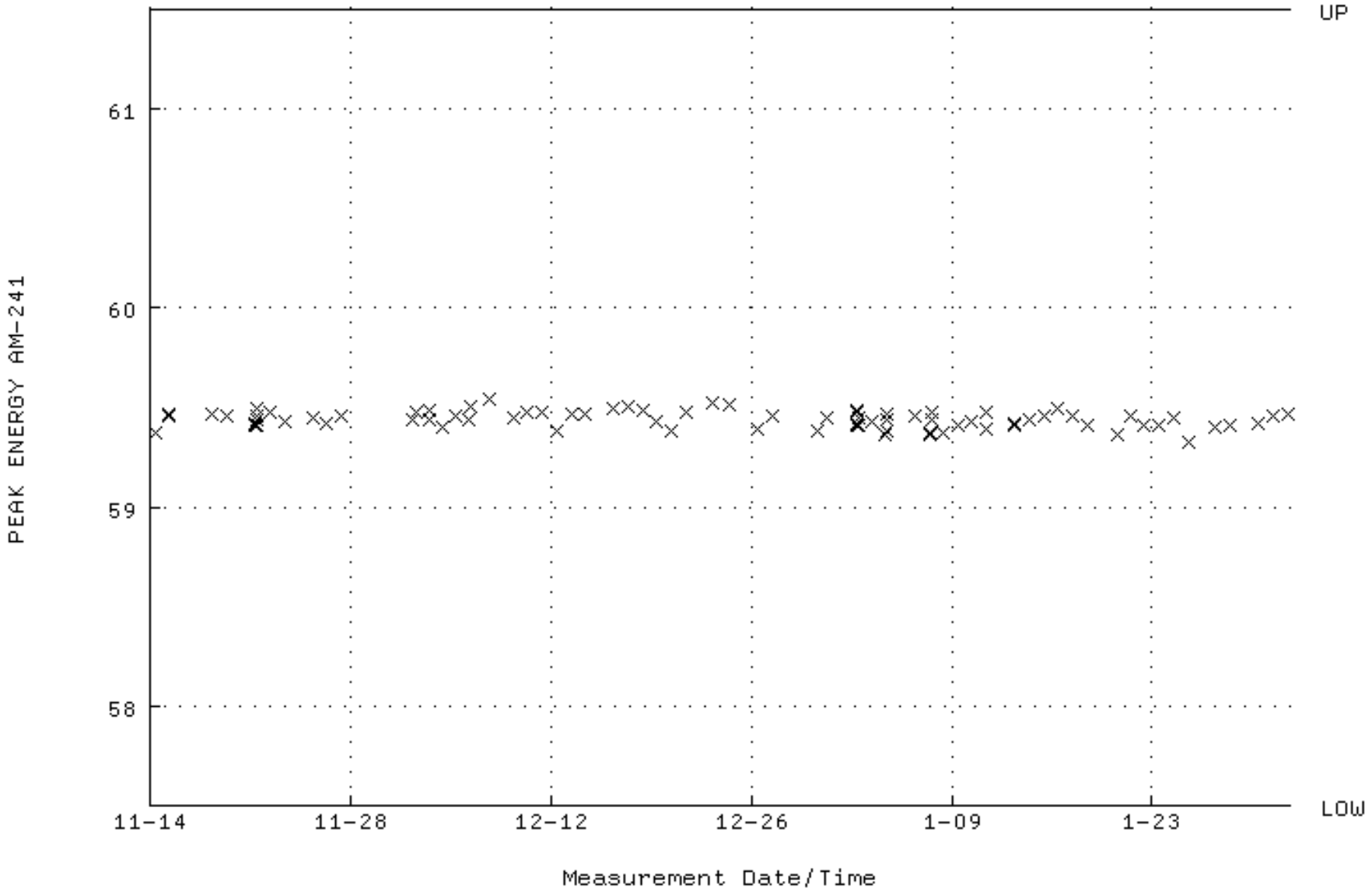
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM12_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 8-NOV-2013 08:39:38 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 64670.8 +- 1424.58 (2.20 %)



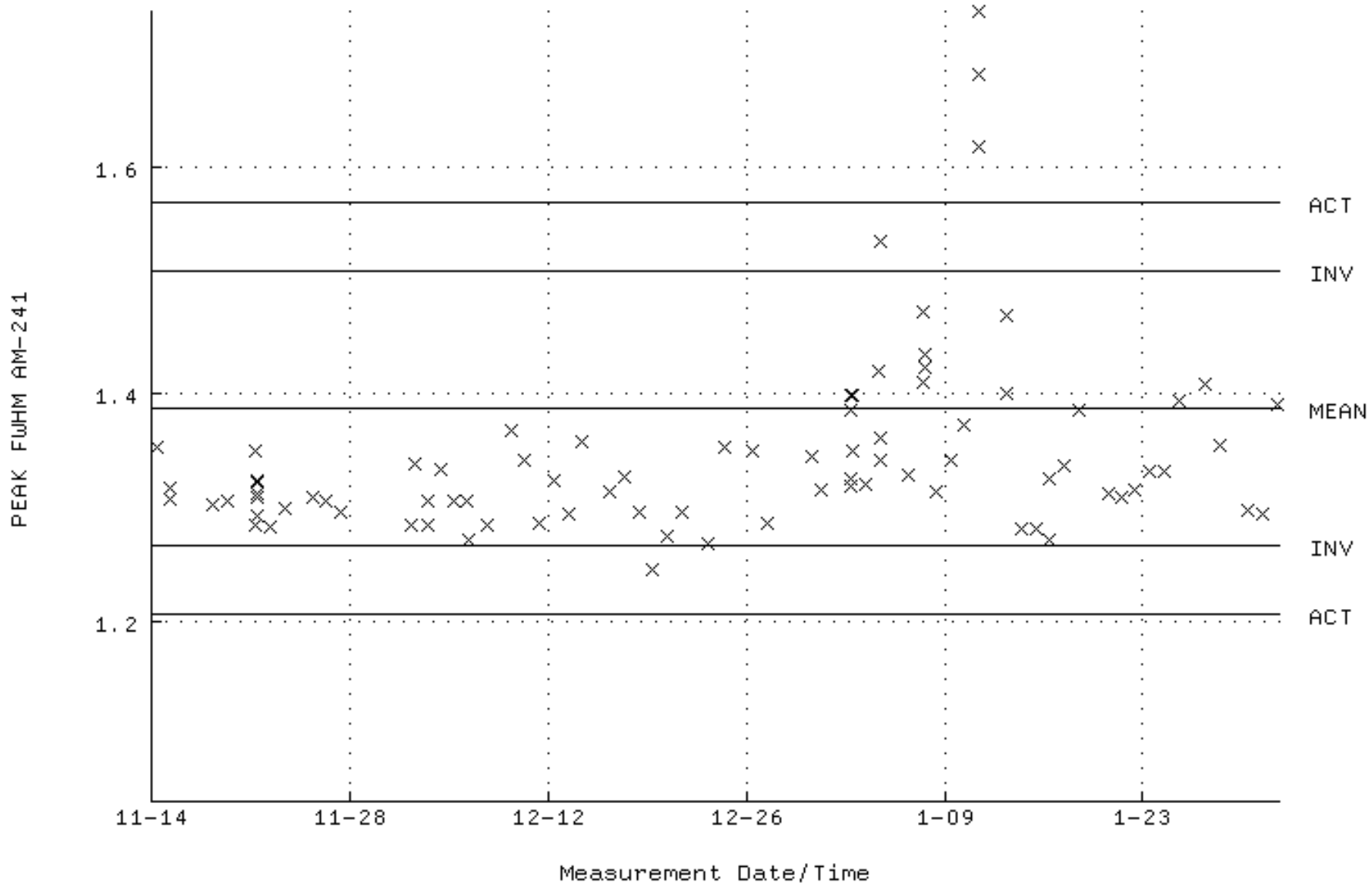
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM12.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-NOV-2013 13:11:34 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.33366 +- 1.783853E-02 (1.34 %)



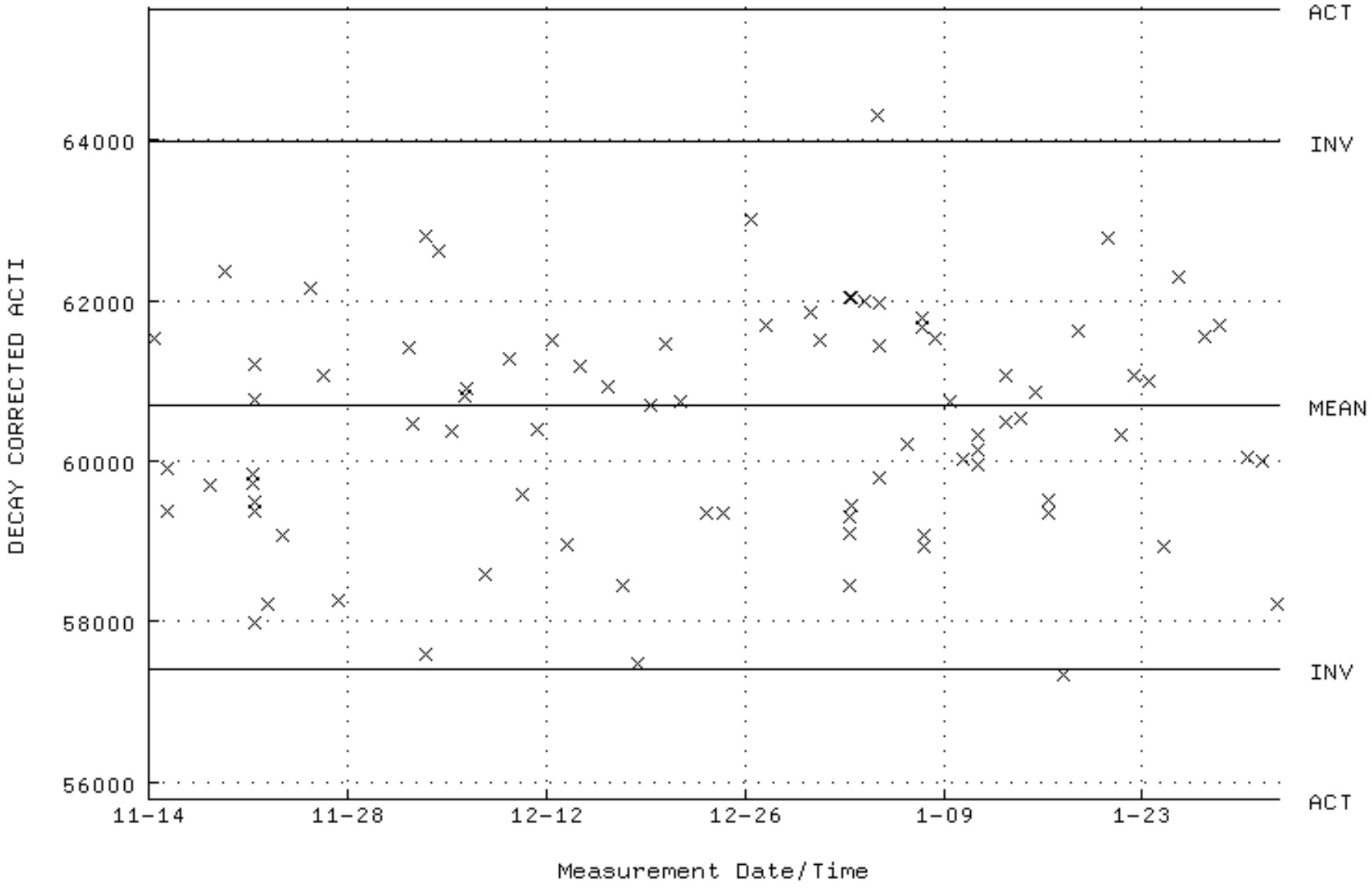
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM14_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 14-NOV-2013 08:09:11 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



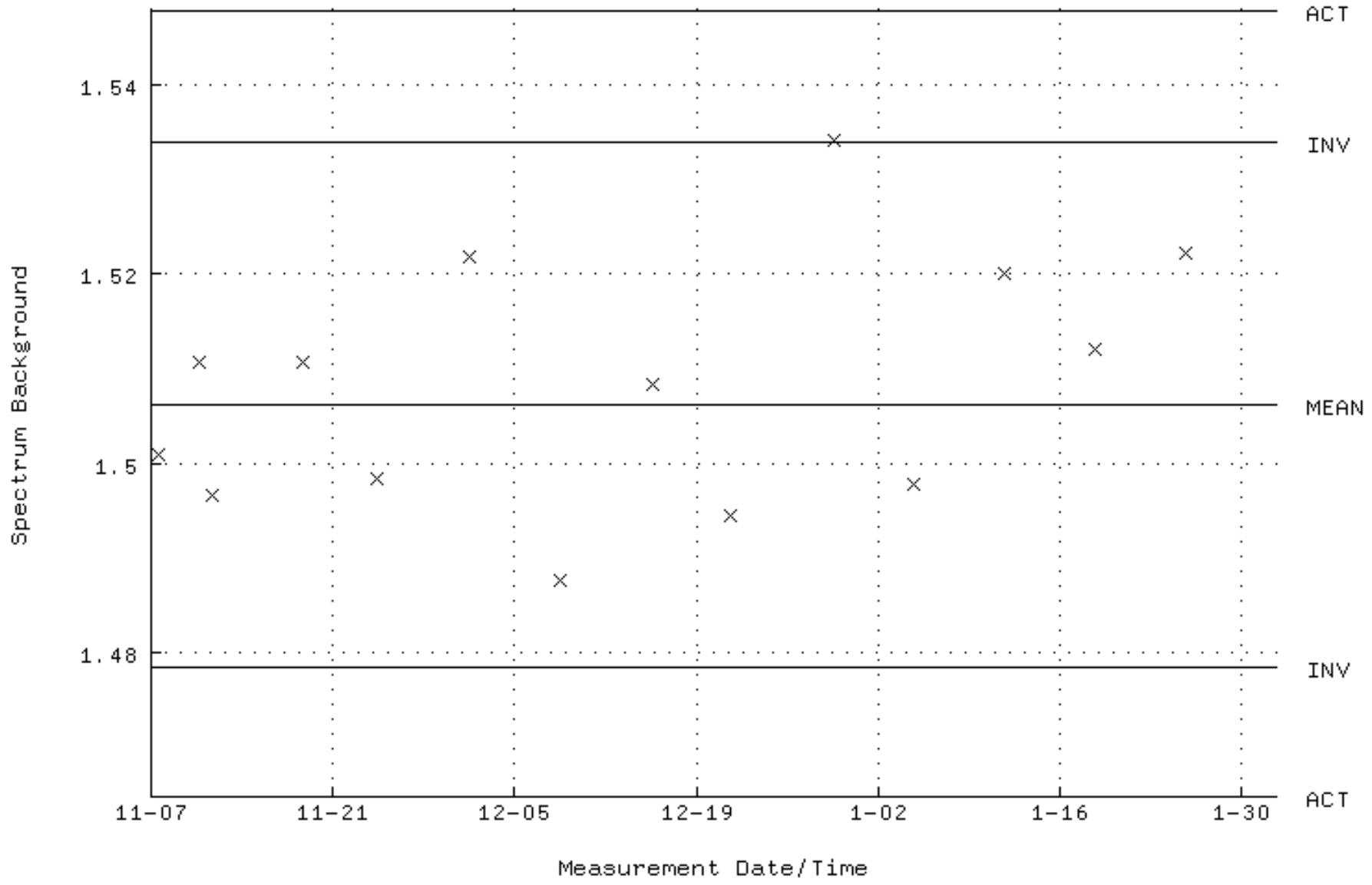
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM14_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 14-NOV-2013 08:09:11 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.38807 +- 6.018067E-02 (4.34 %)



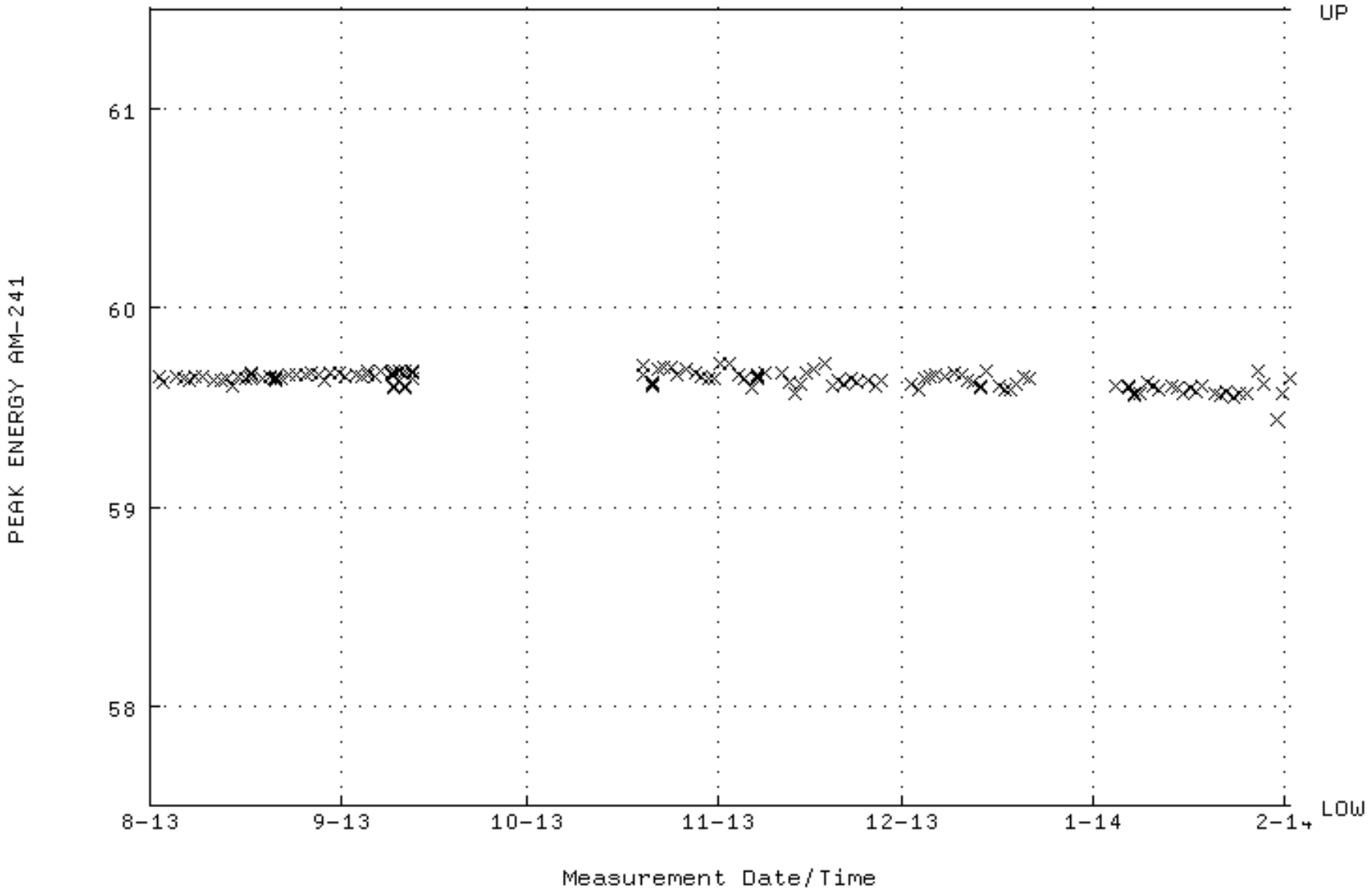
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM14_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 14-NOV-2013 08:09:11 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60704.0 +- 1639.60 (2.70 %)



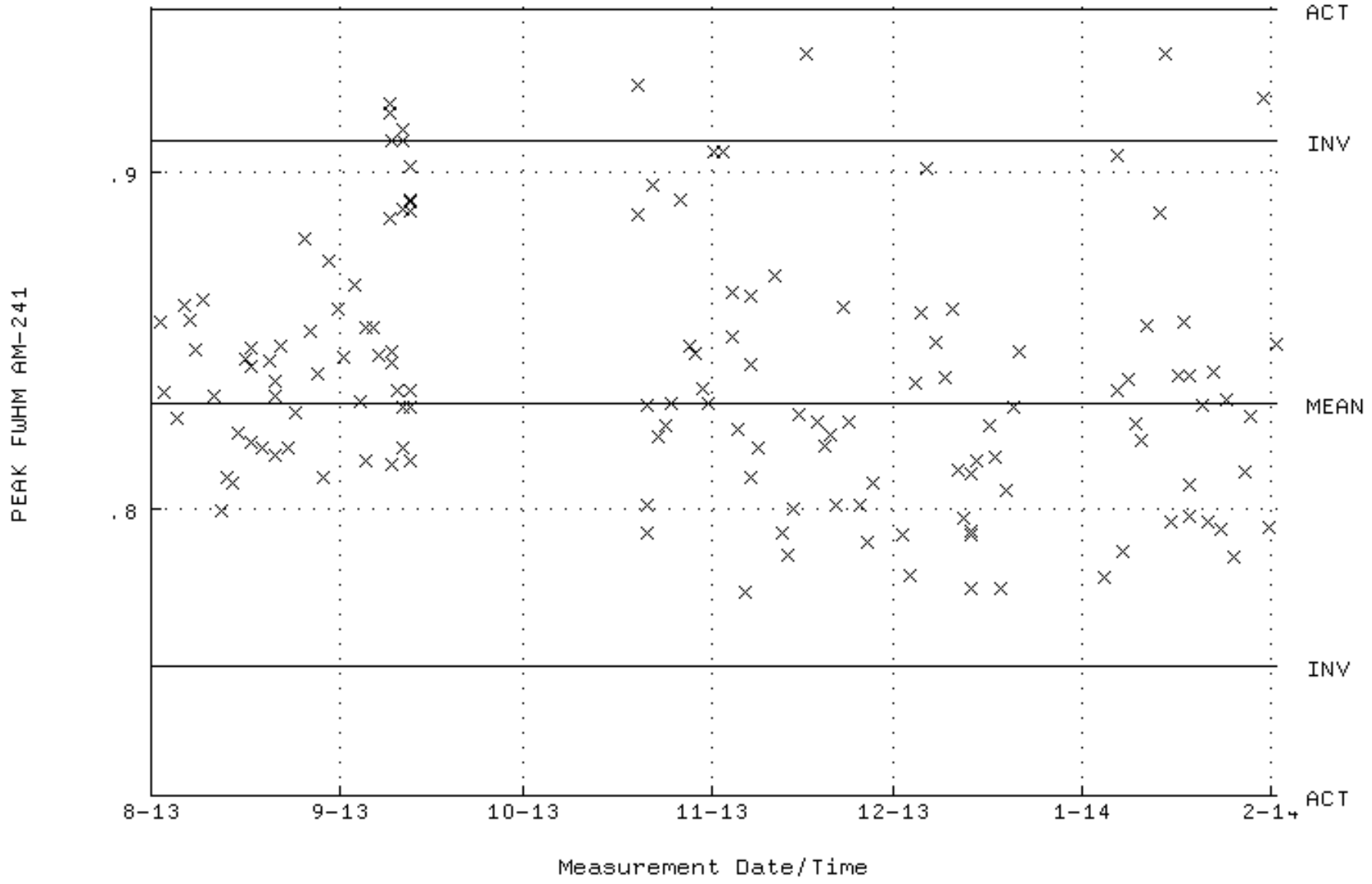
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM14.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 7-NOV-2013 15:11:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.50626 +- 1.383443E-02 (0.92 %)



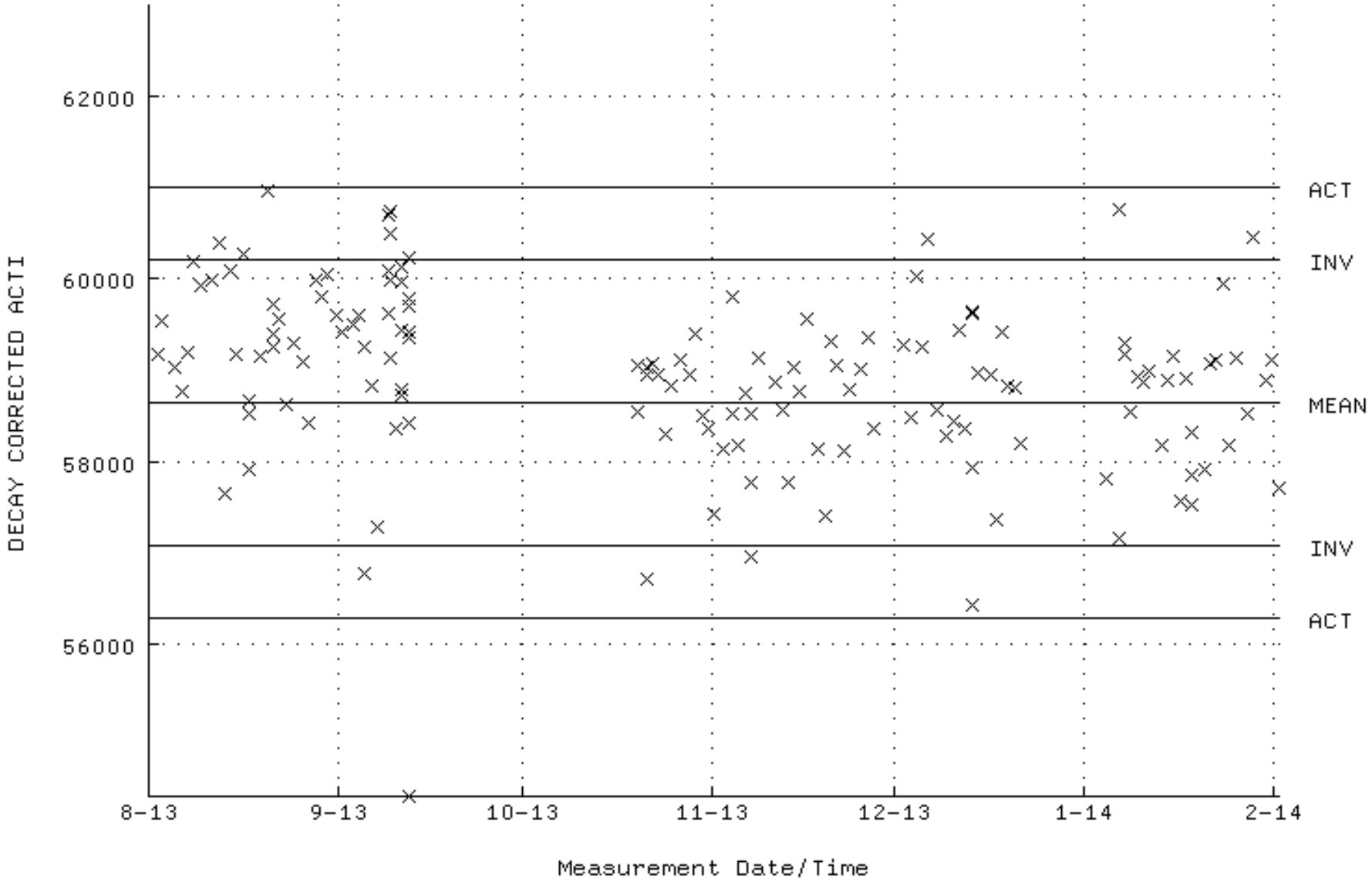
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM17_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:10 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



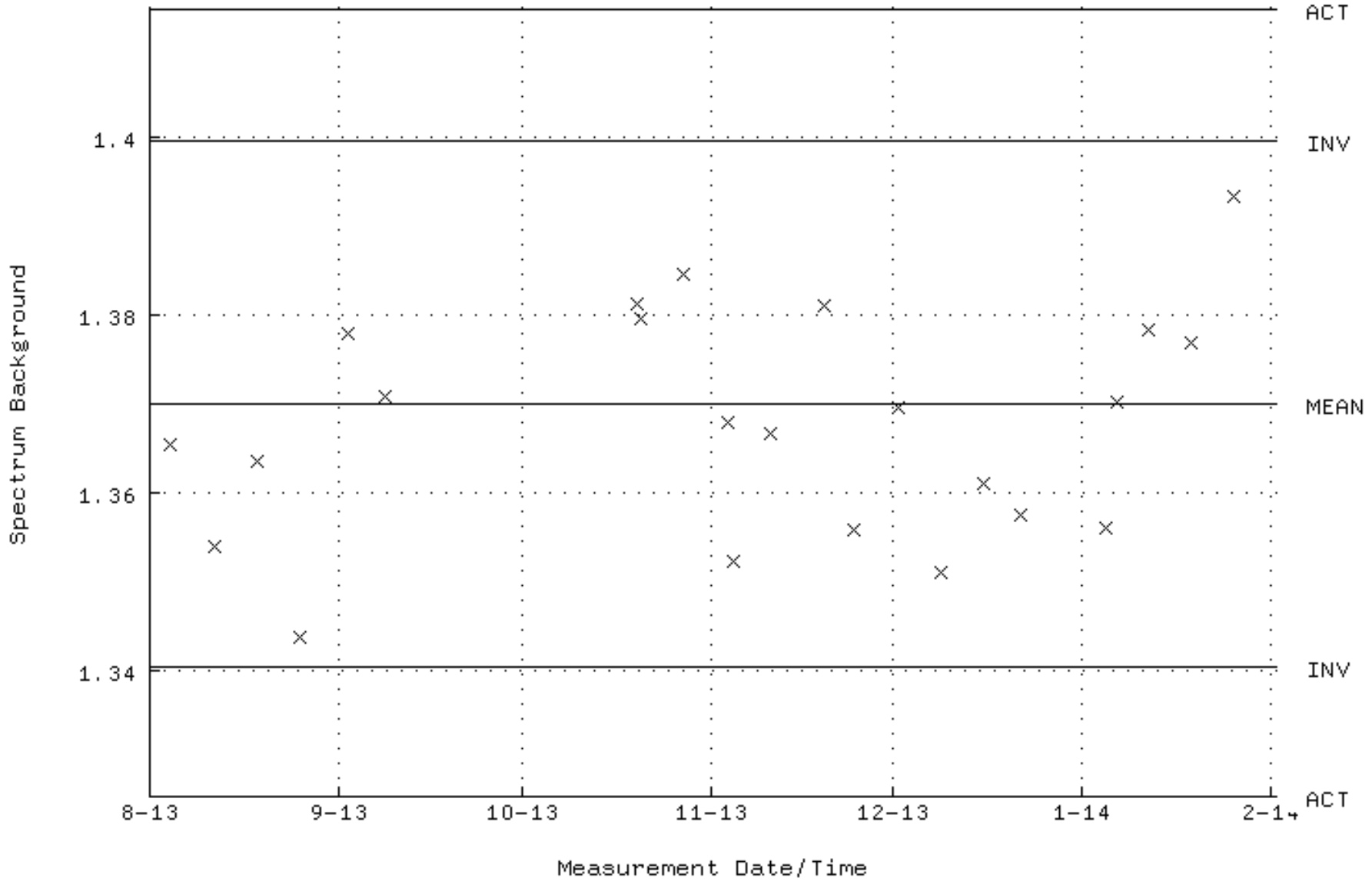
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM17_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:10 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.831575 +- 3.892219E-02 (4.68 %)



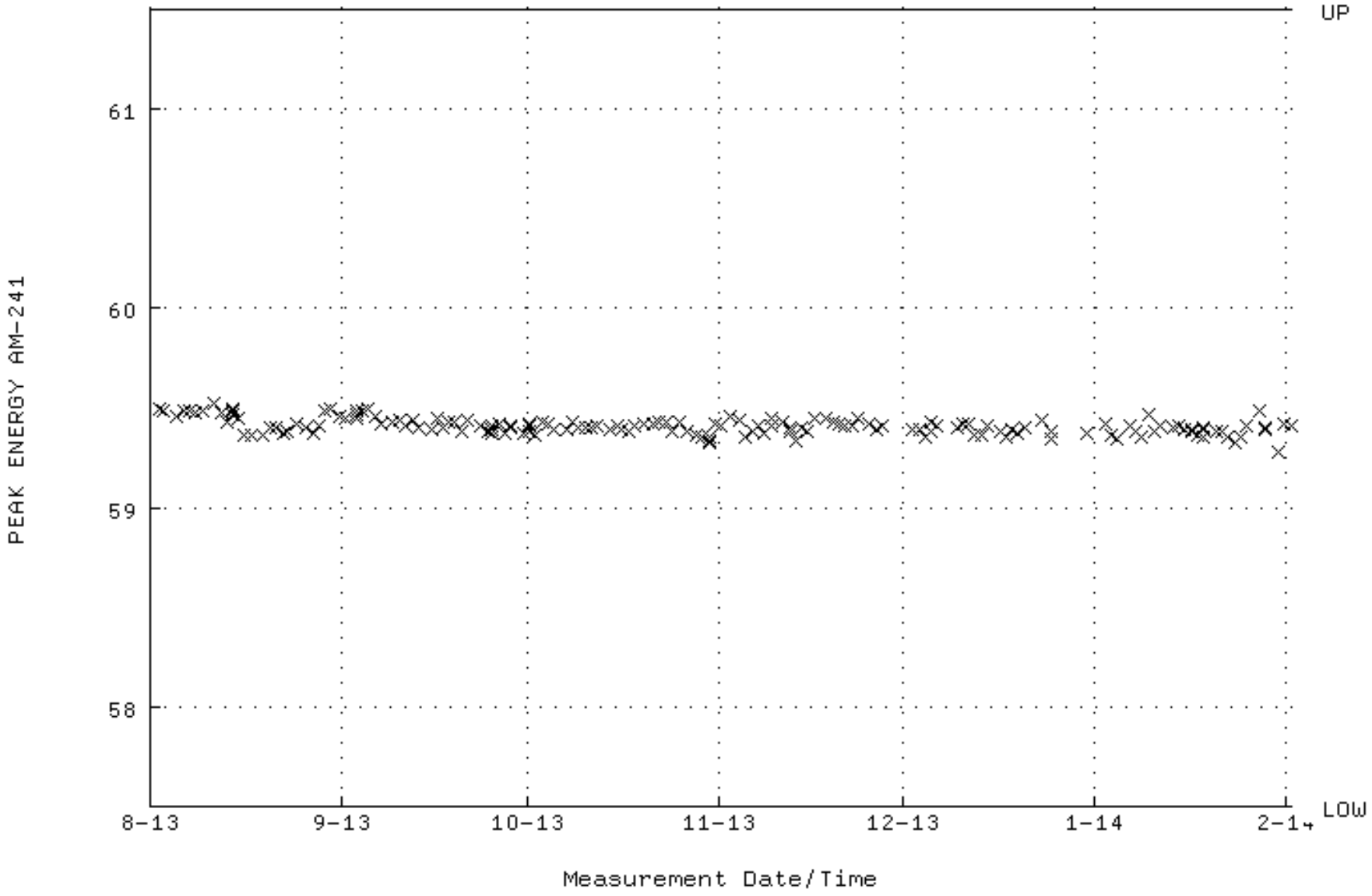
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM17_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:10 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 58655.2 +- 782.187 (1.33 %)



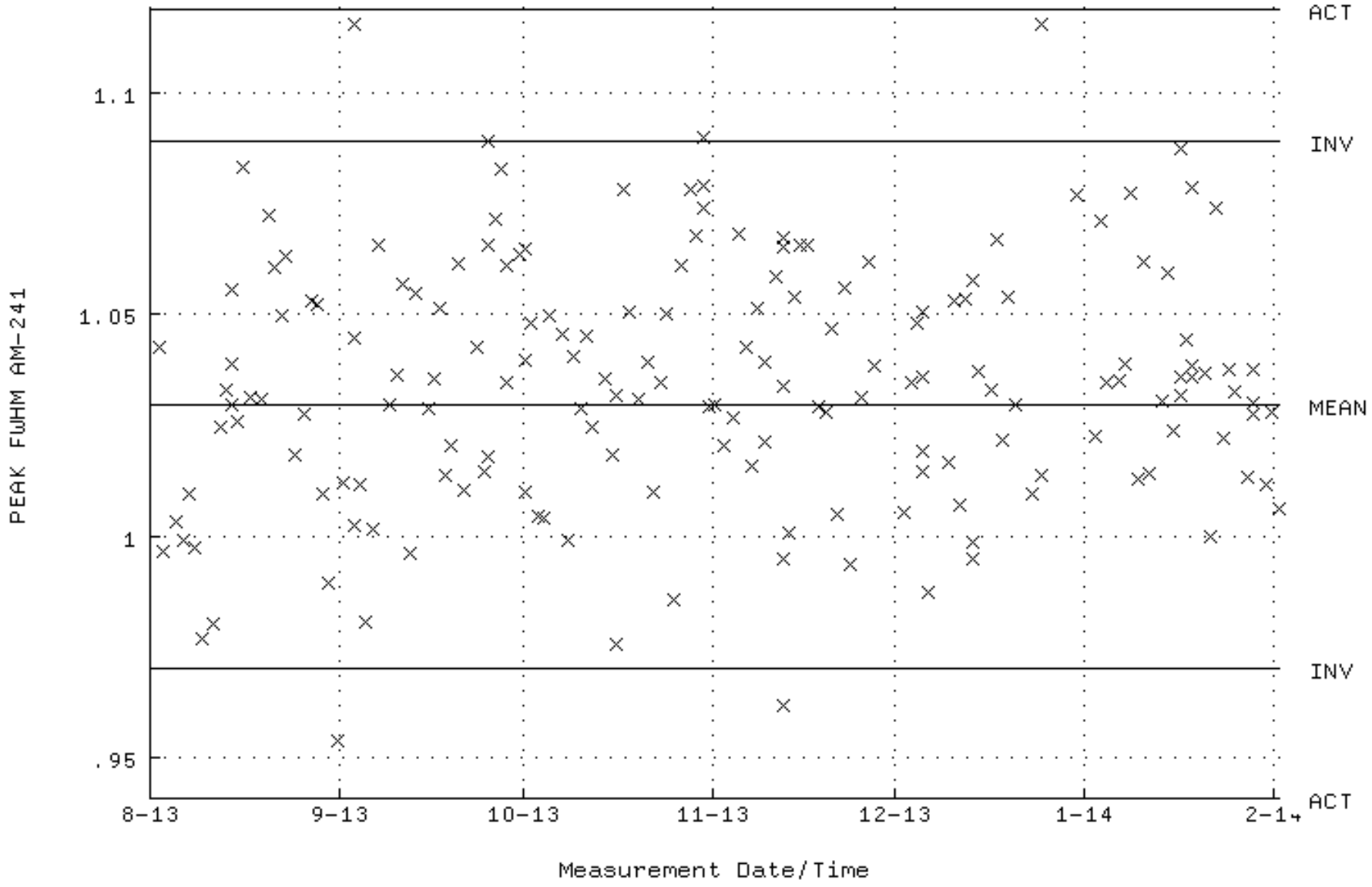
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM17.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:08:48 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.37021 +- 1.475731E-02 (1.08 %)



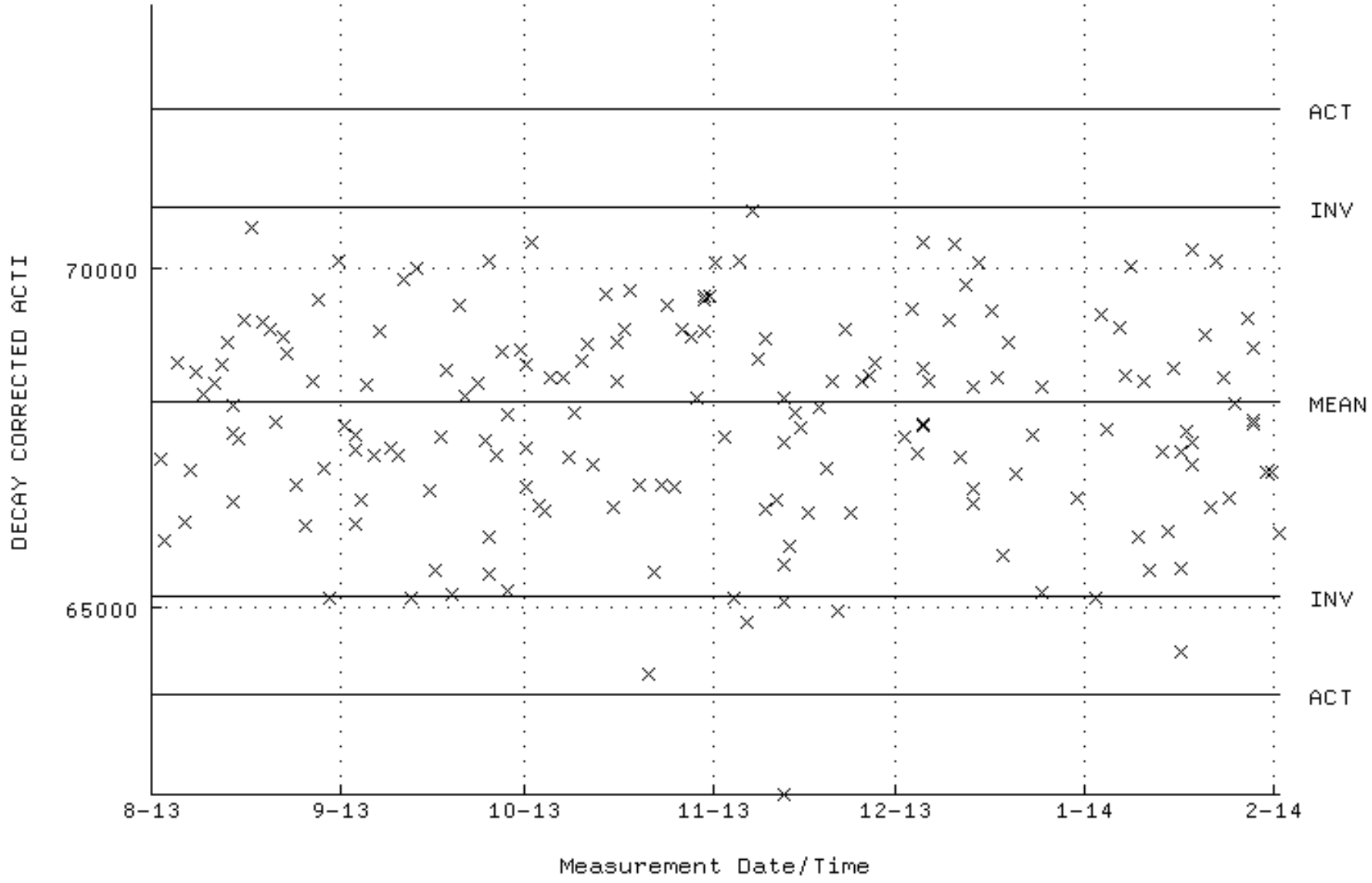
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 11:00:21 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



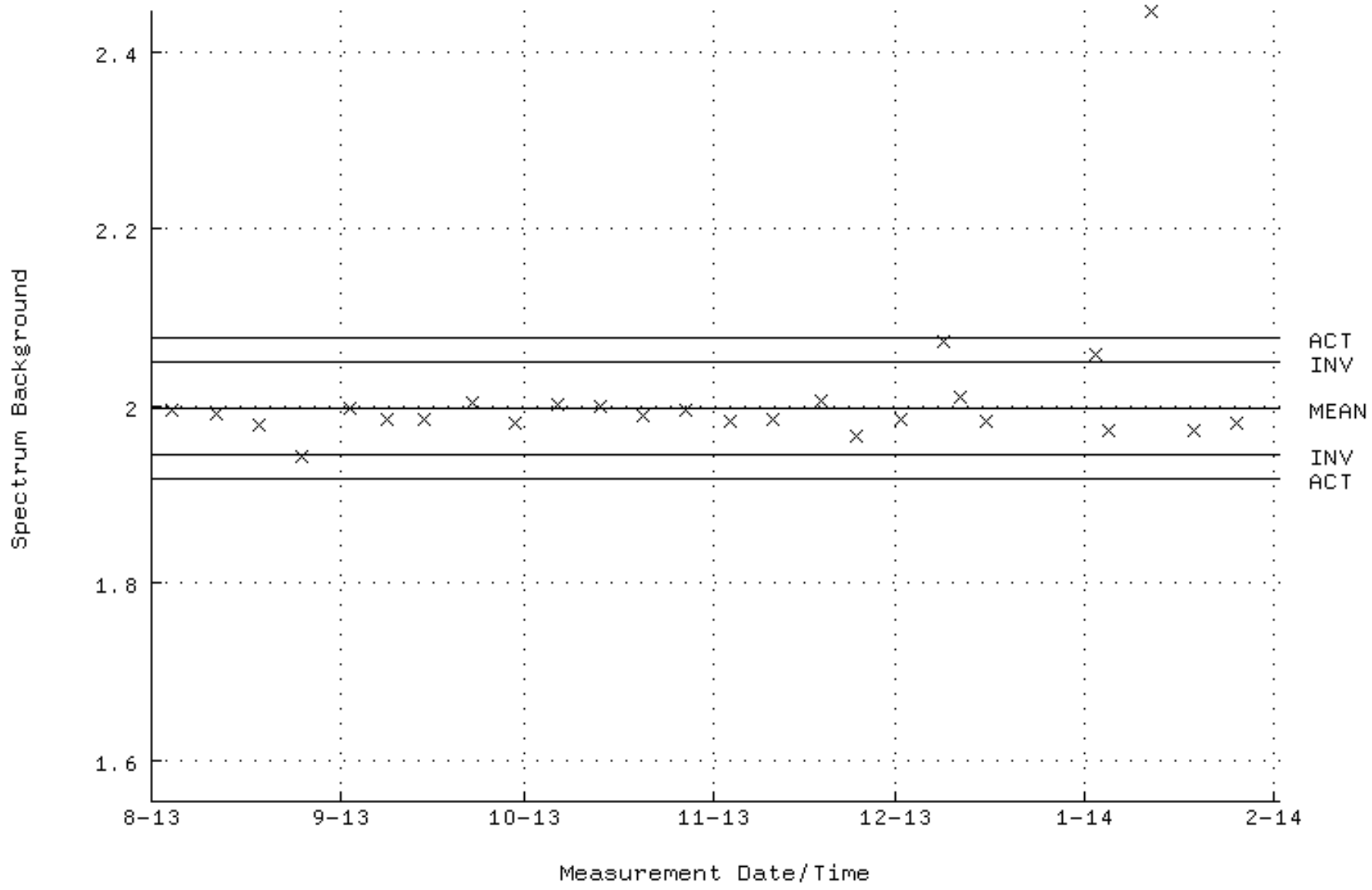
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 11:00:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.02979 +- 2.966322E-02 (2.88 %)



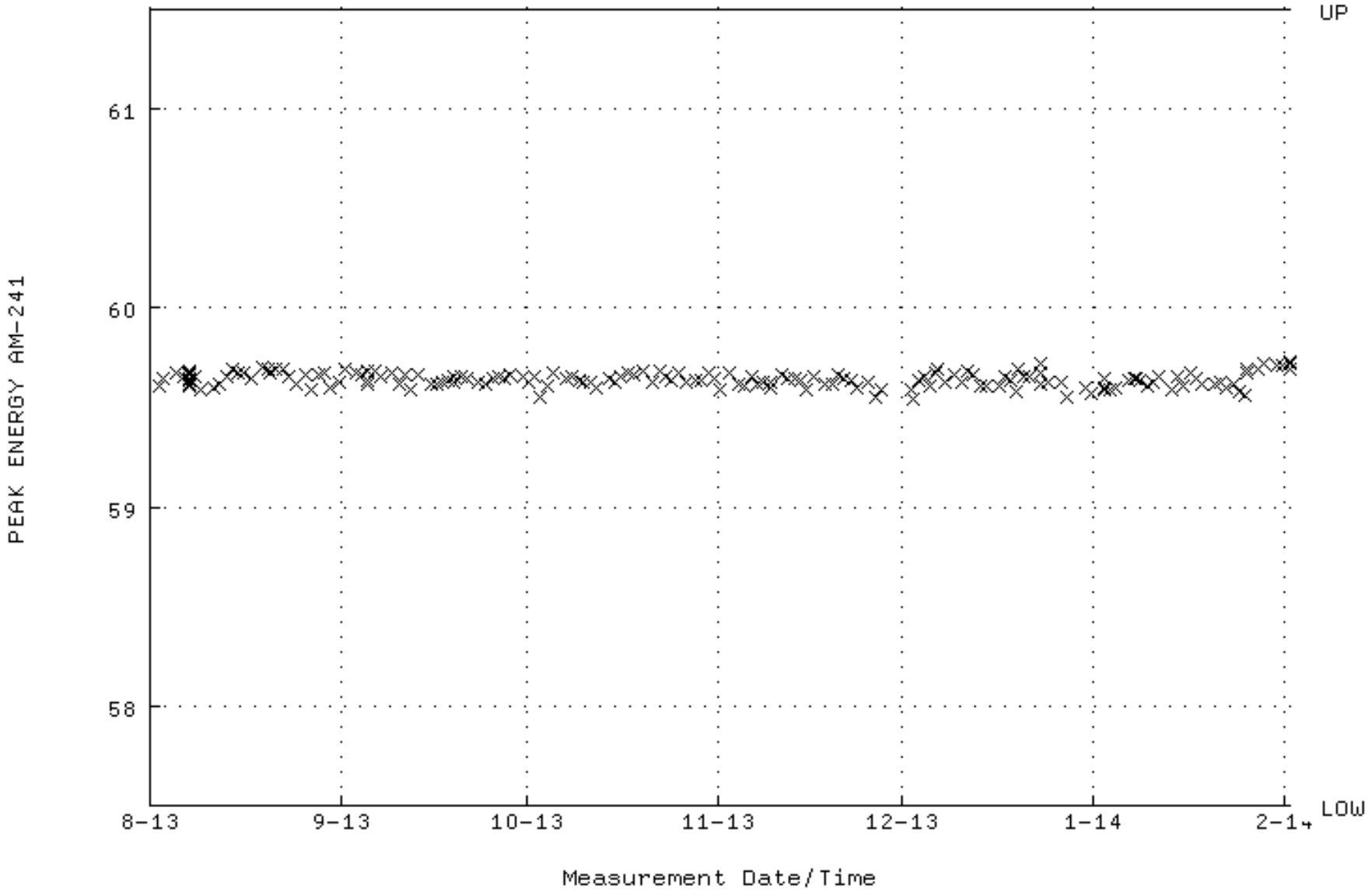
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 11:00:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 68053.7 +- 1438.48 (2.11 %)



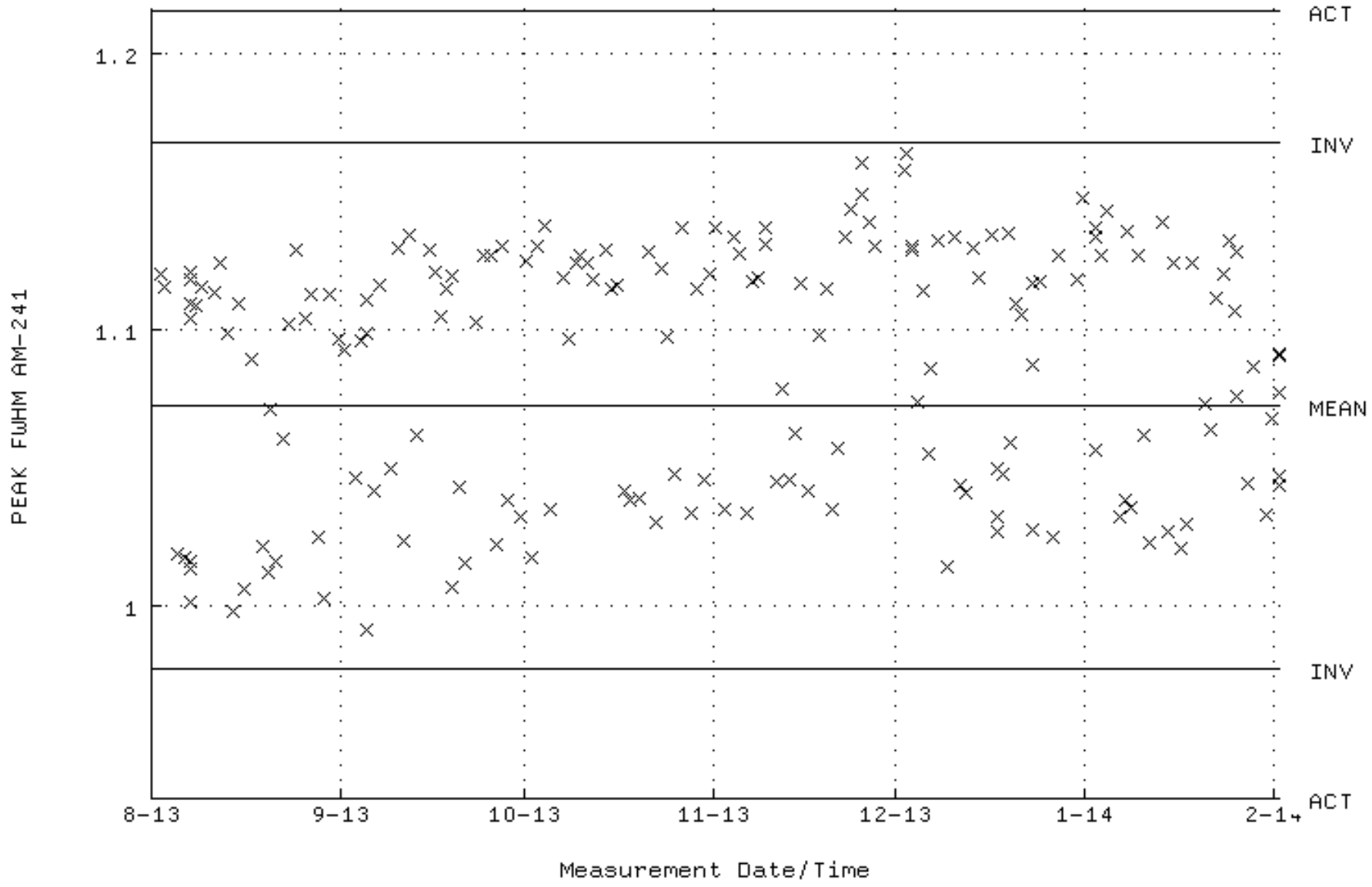
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM19.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:09:20 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.99831 +- 2.653599E-02 (1.33 %)



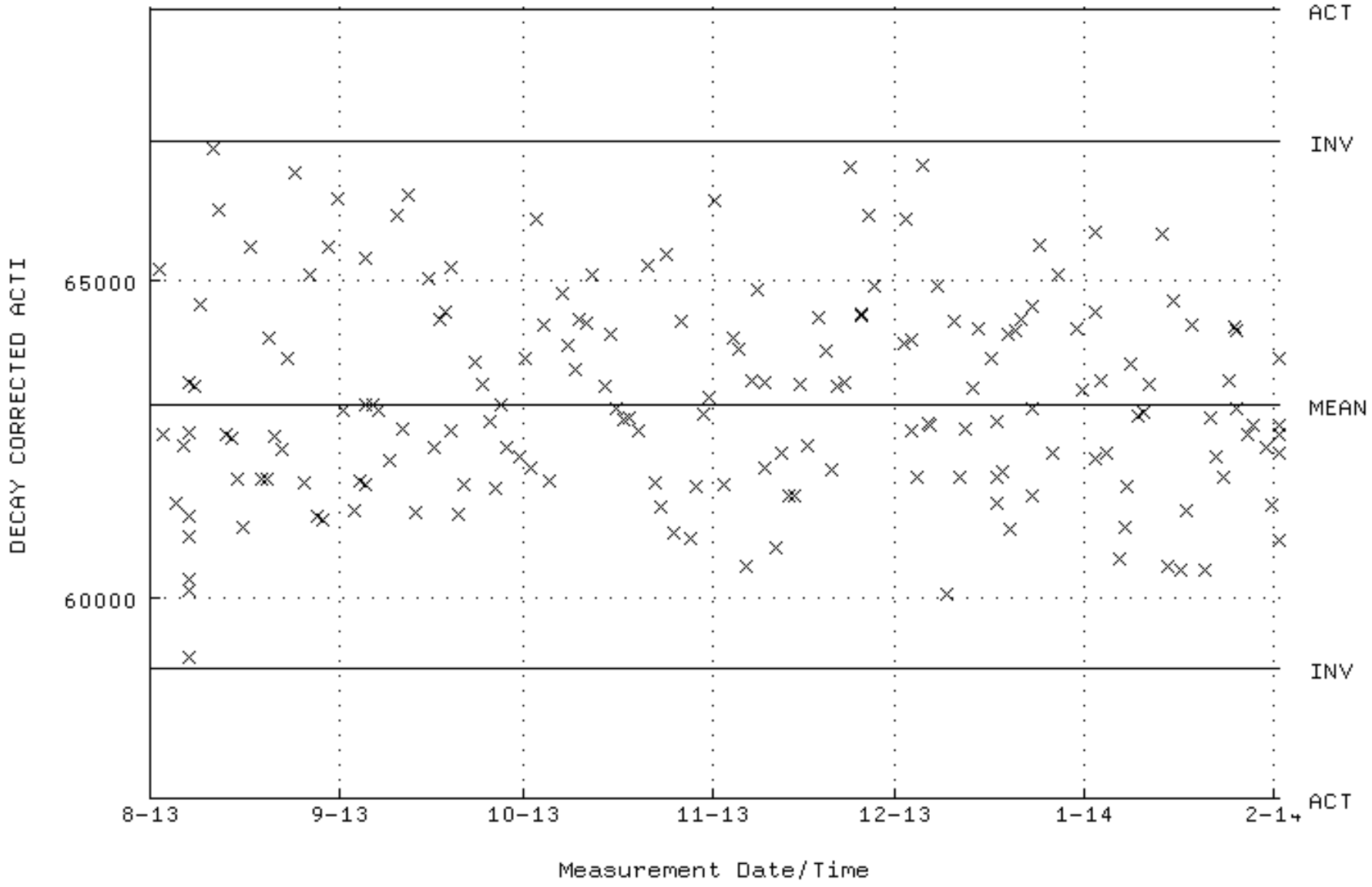
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM20_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 11:00:27 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



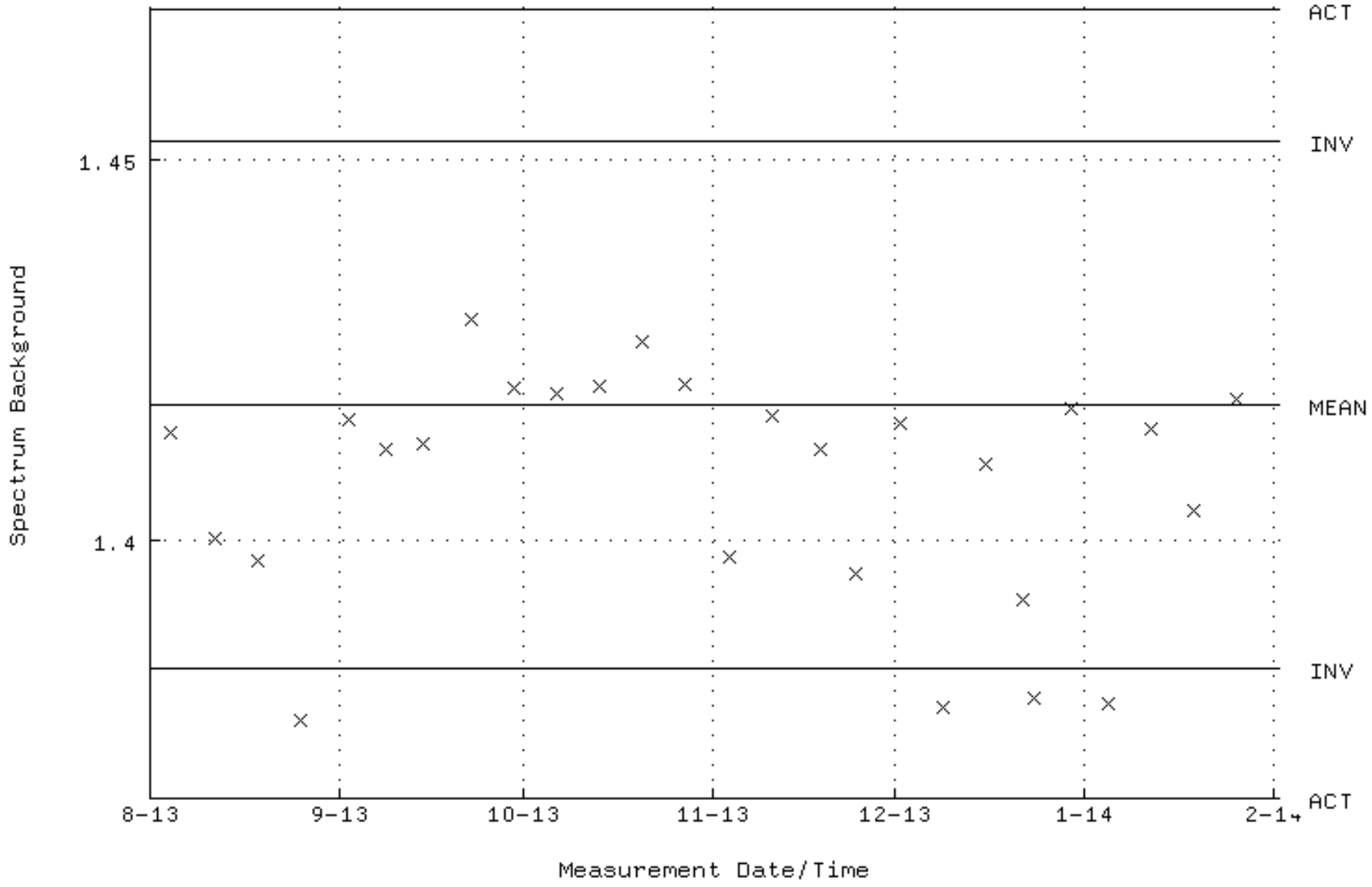
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM20_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 11:00:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.07278 +- 4.754534E-02 (4.43 %)



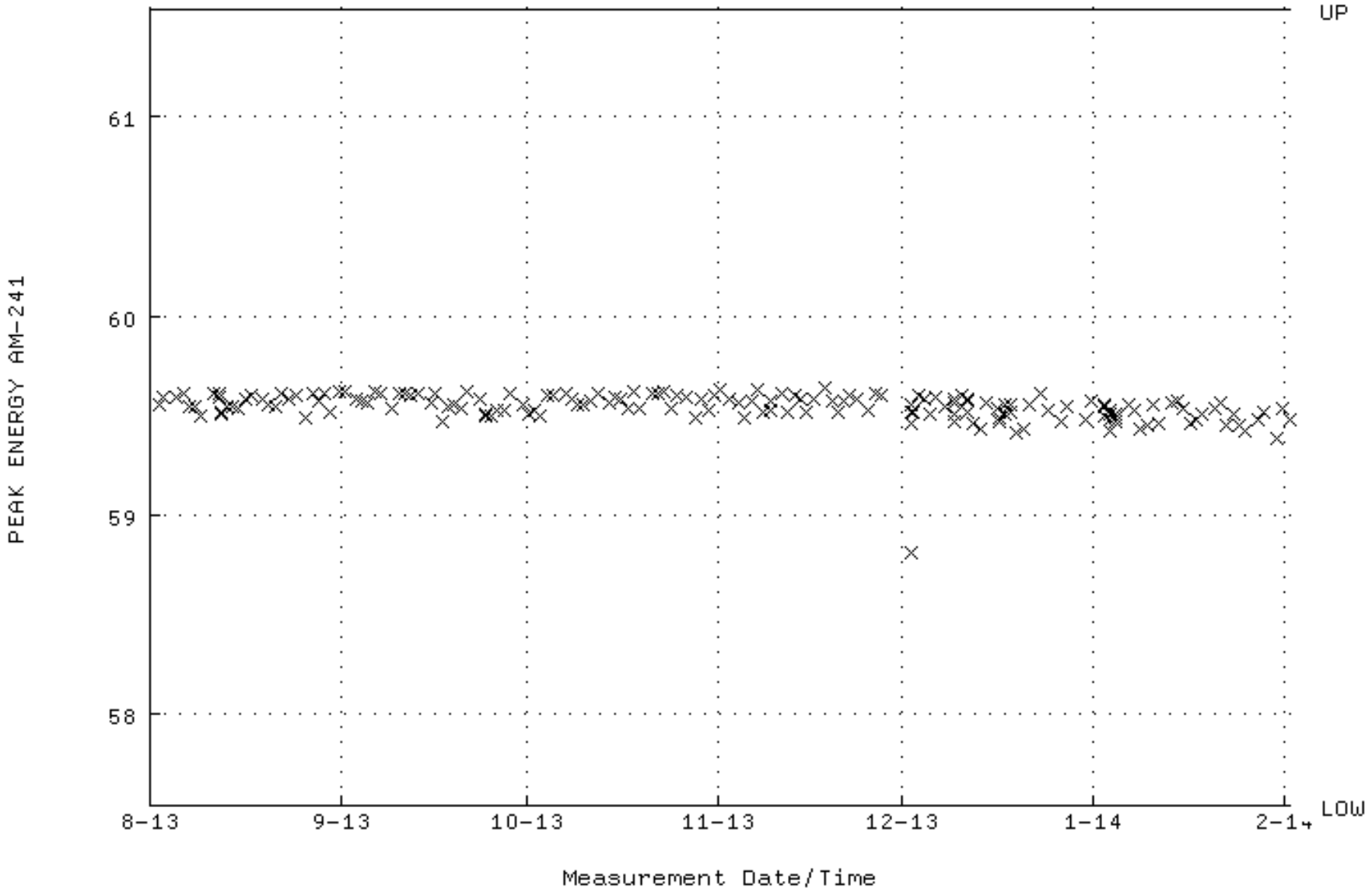
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM20_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 11:00:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63059.3 +- 2072.63 (3.29 %)



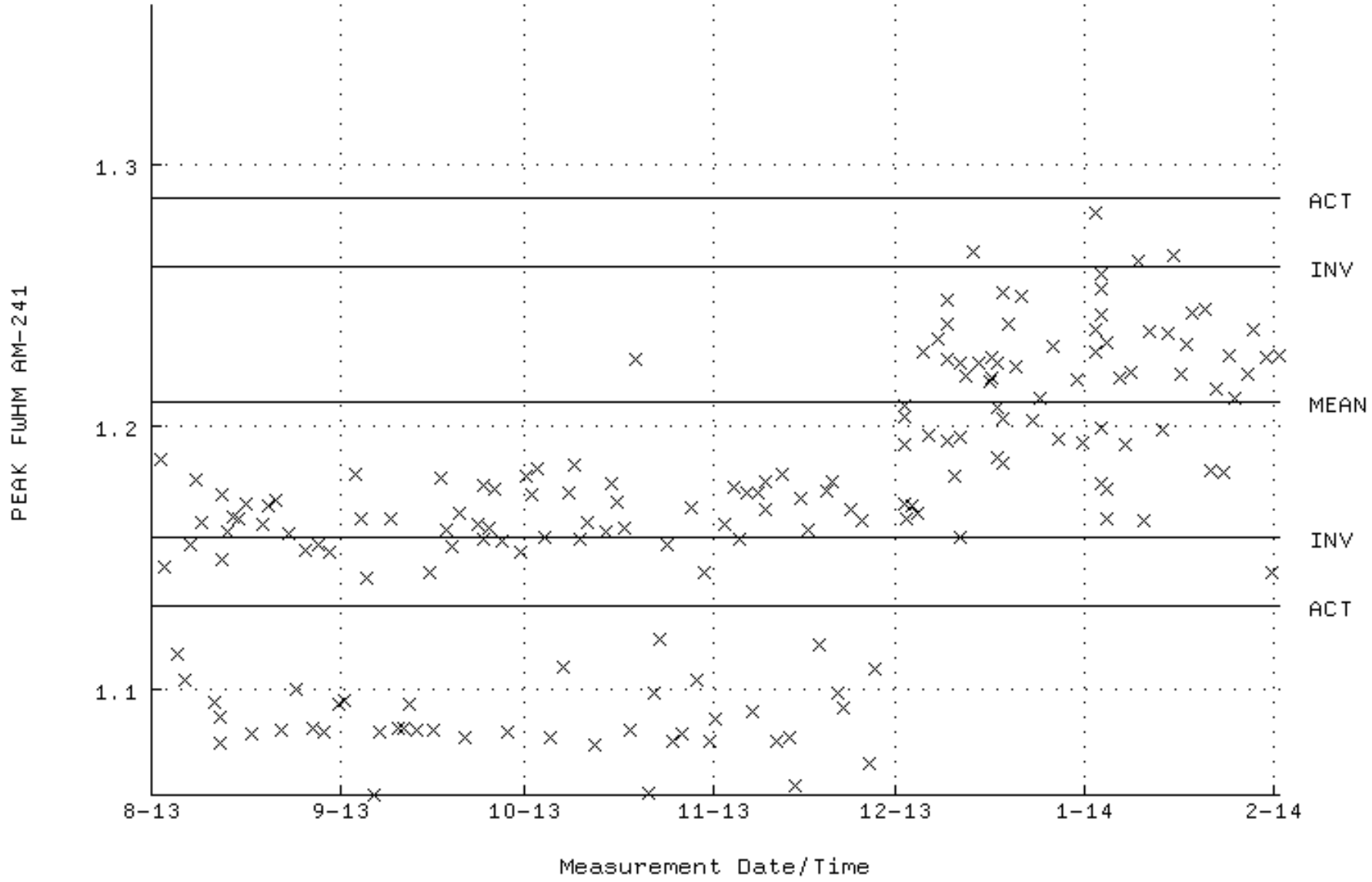
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM20.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:09:36 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.41799 +- 1.730532E-02 (1.22 %)



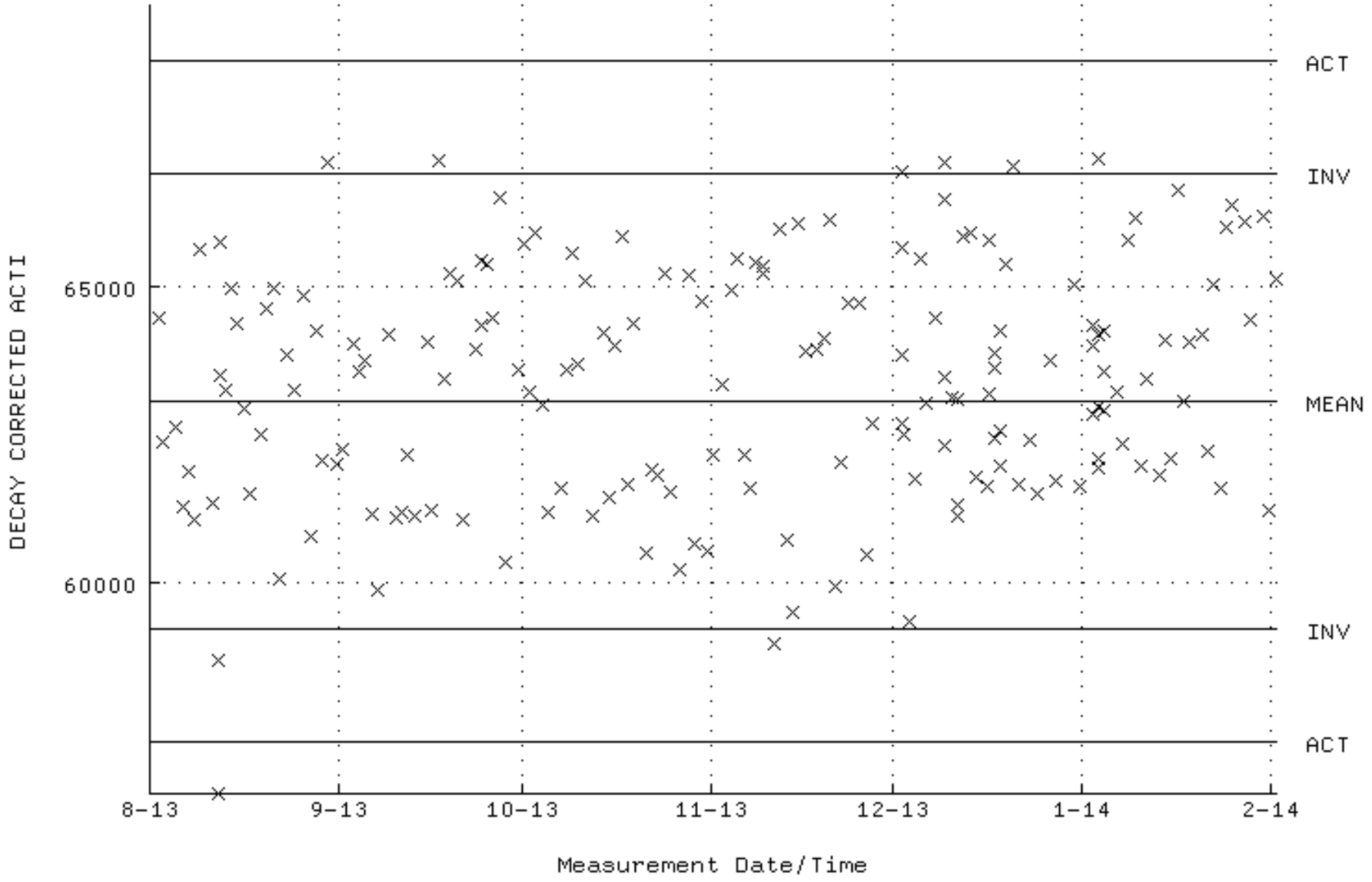
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:16 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



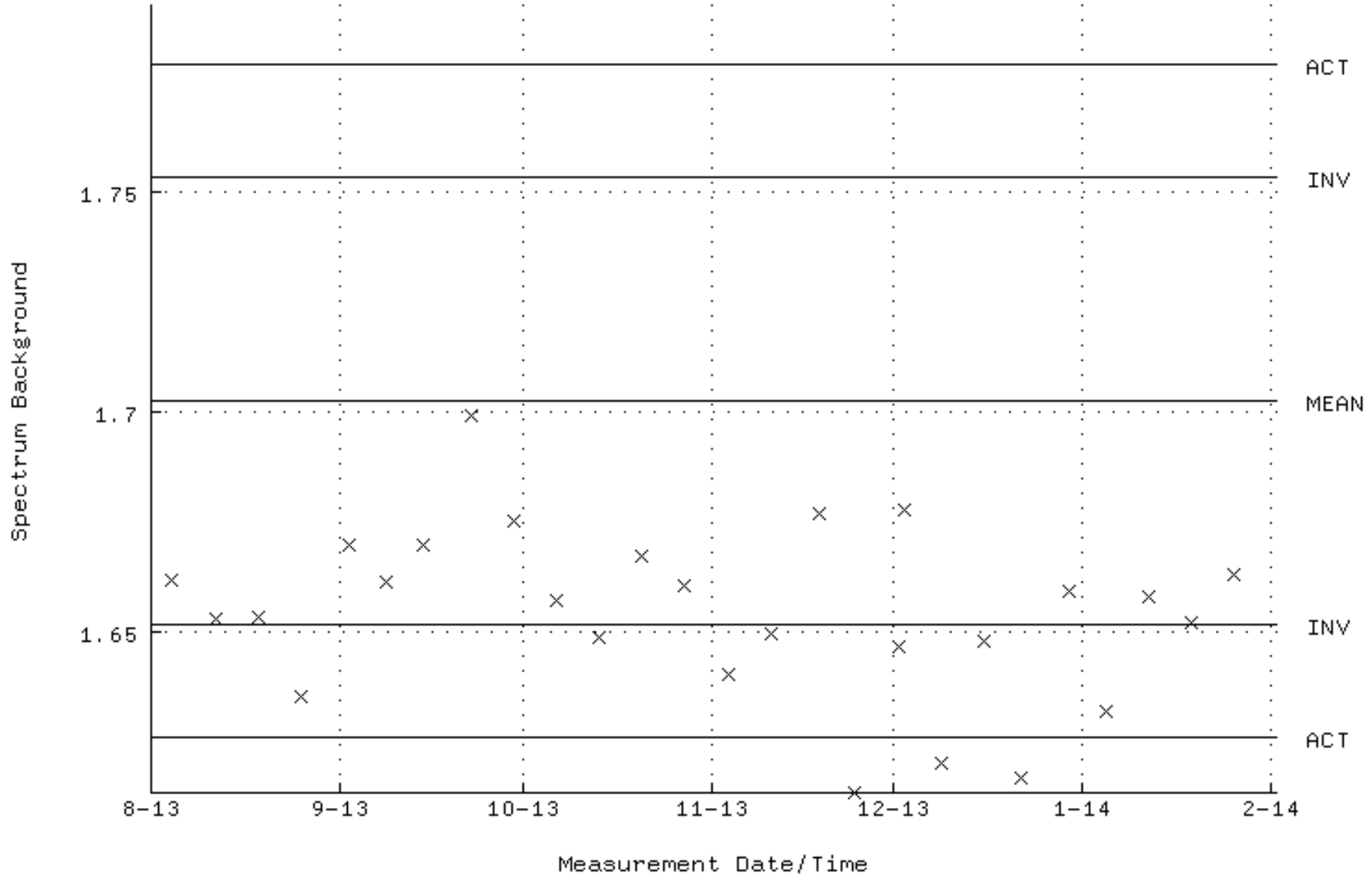
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:16 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.20983 +- 2.585393E-02 (2.14 %)



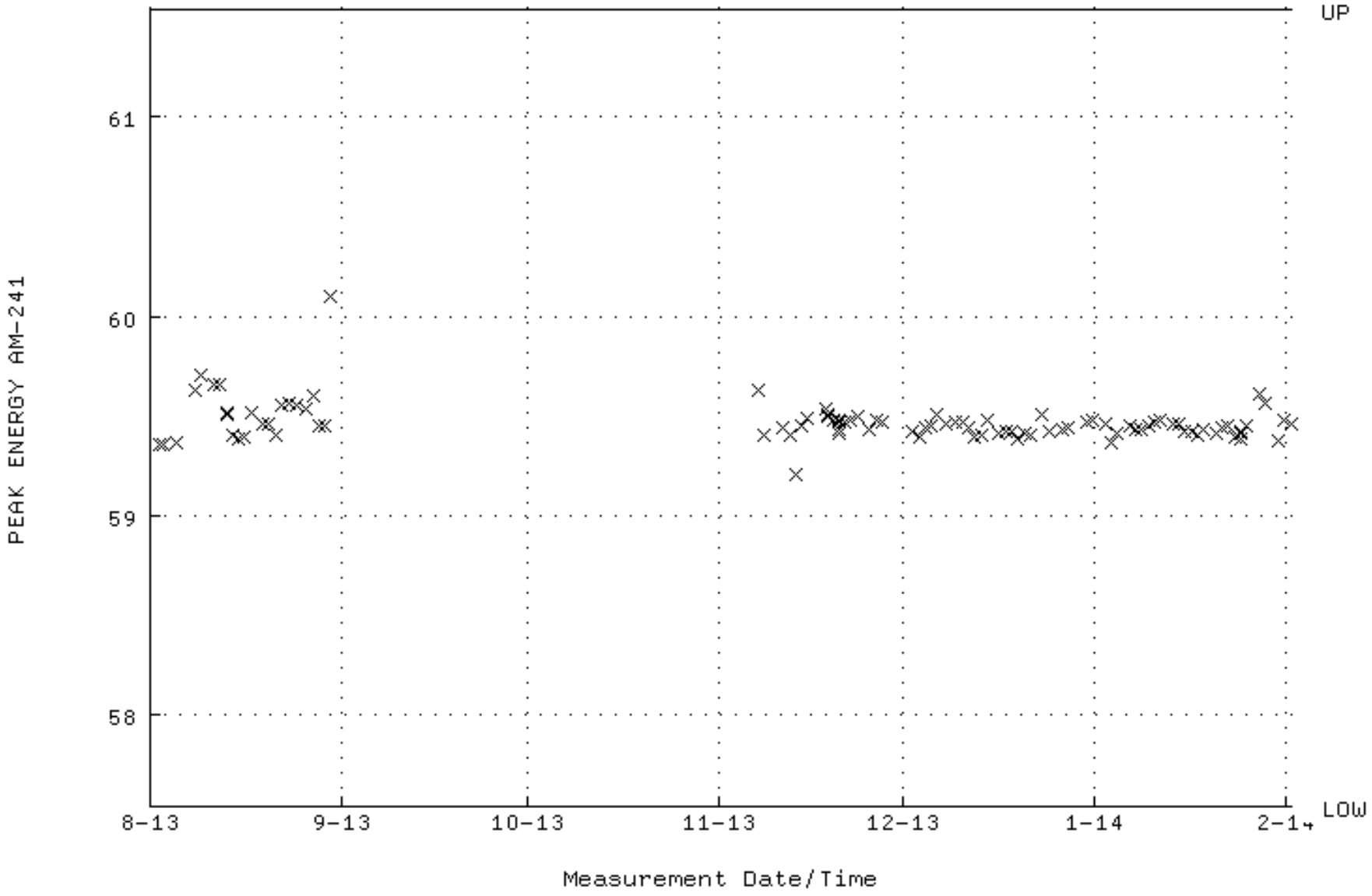
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:16 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63078.0 +- 1908.92 (3.03 %)



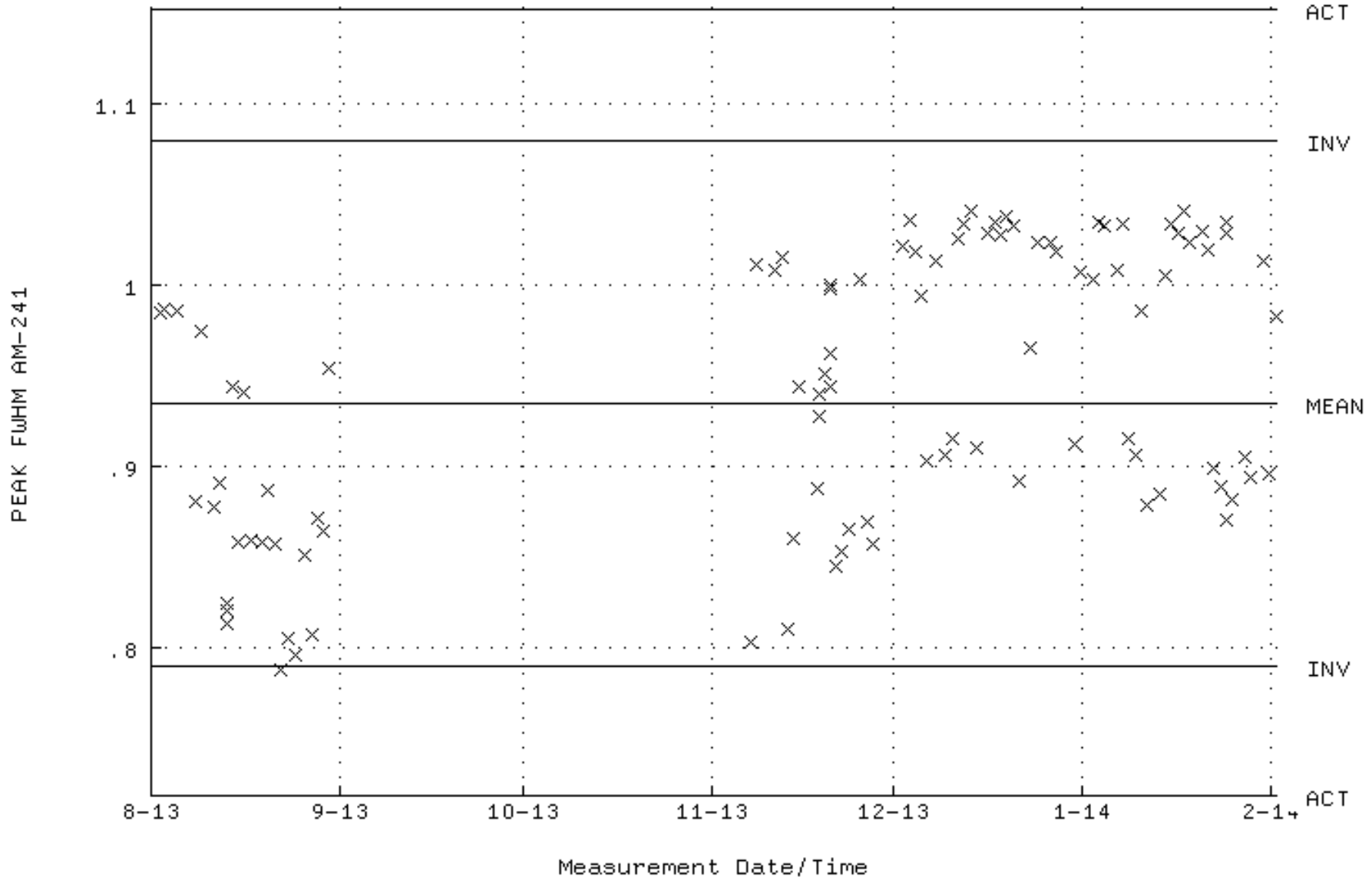
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM24.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:10:50 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.70273 +- 2.559708E-02 (1.50 %)



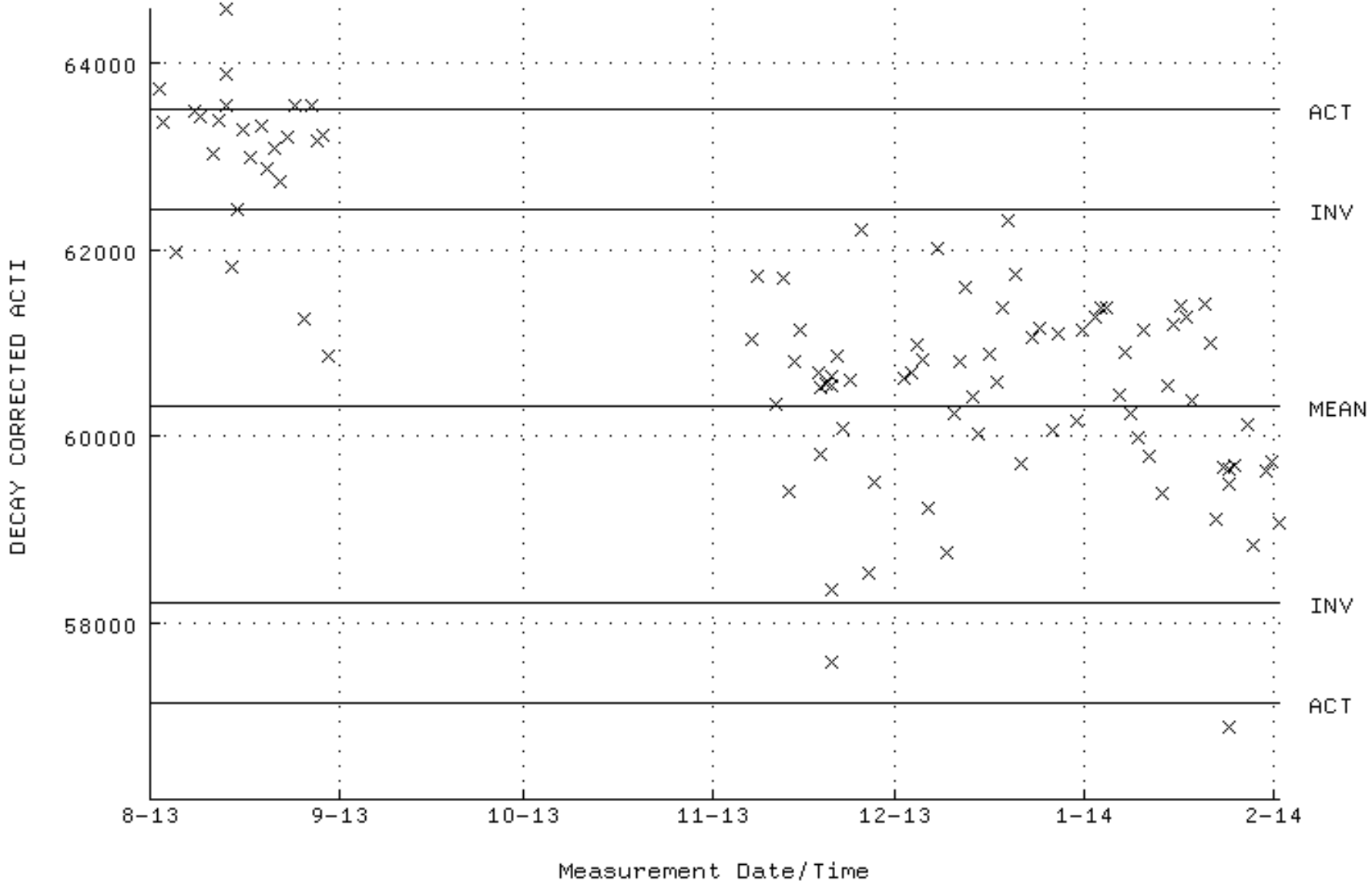
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 10:11:53 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



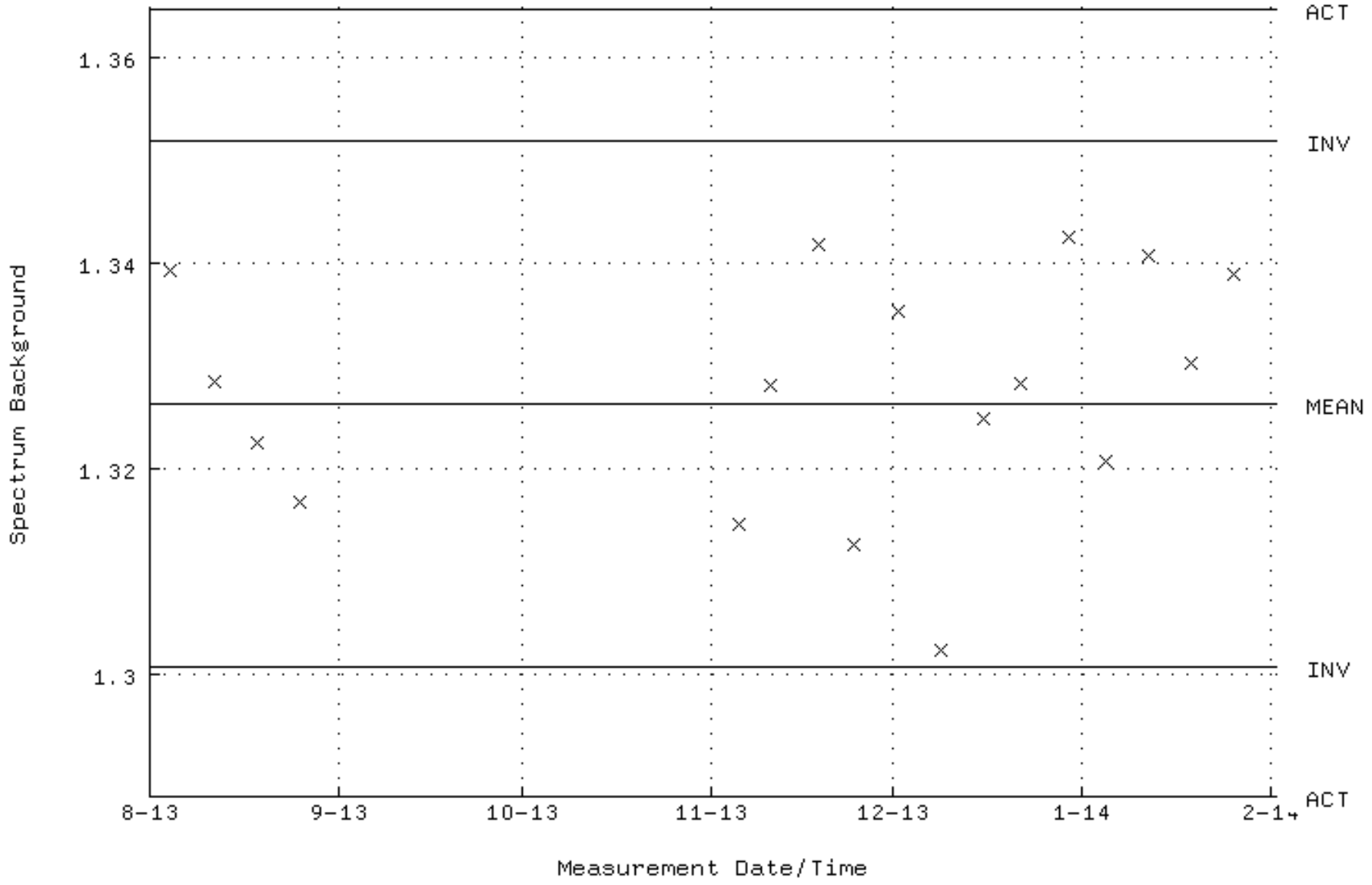
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 10:11:53 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.935052 +- 7.244962E-02 (7.75 %)



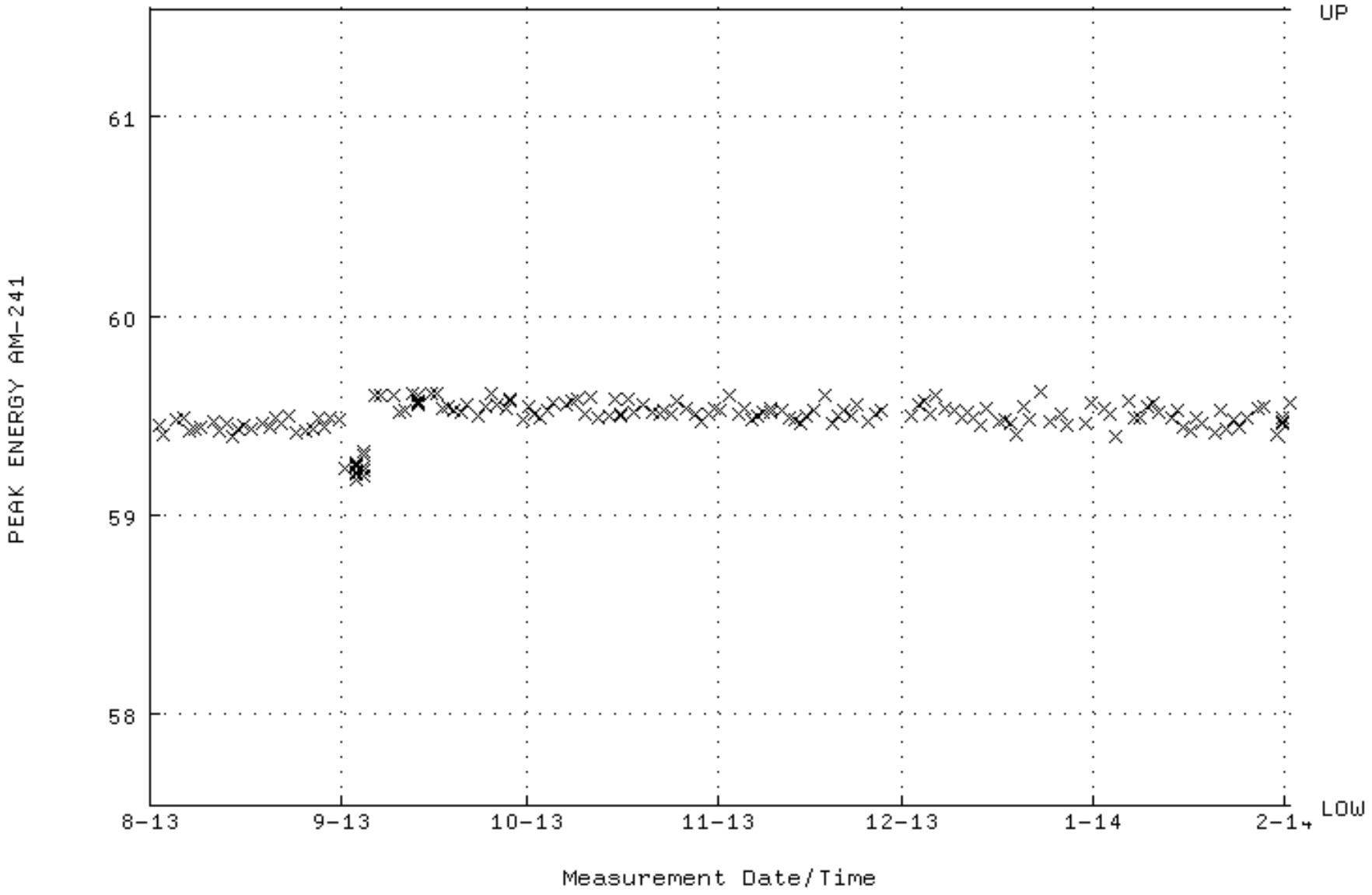
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 10:11:53 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60336.3 +- 1059.04 (1.76 %)



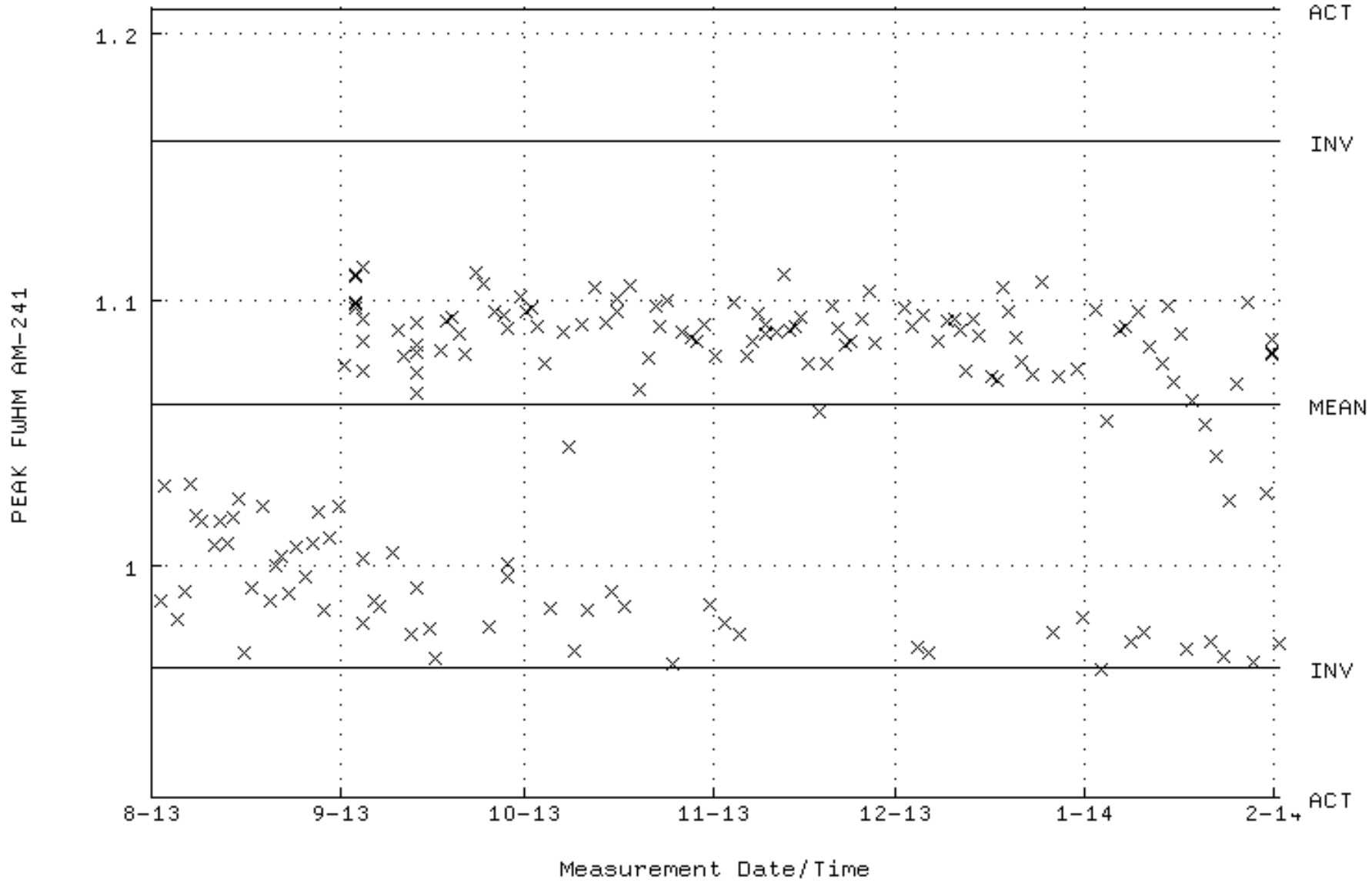
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM25.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:06 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.32636 +- 1.278824E-02 (0.96 %)



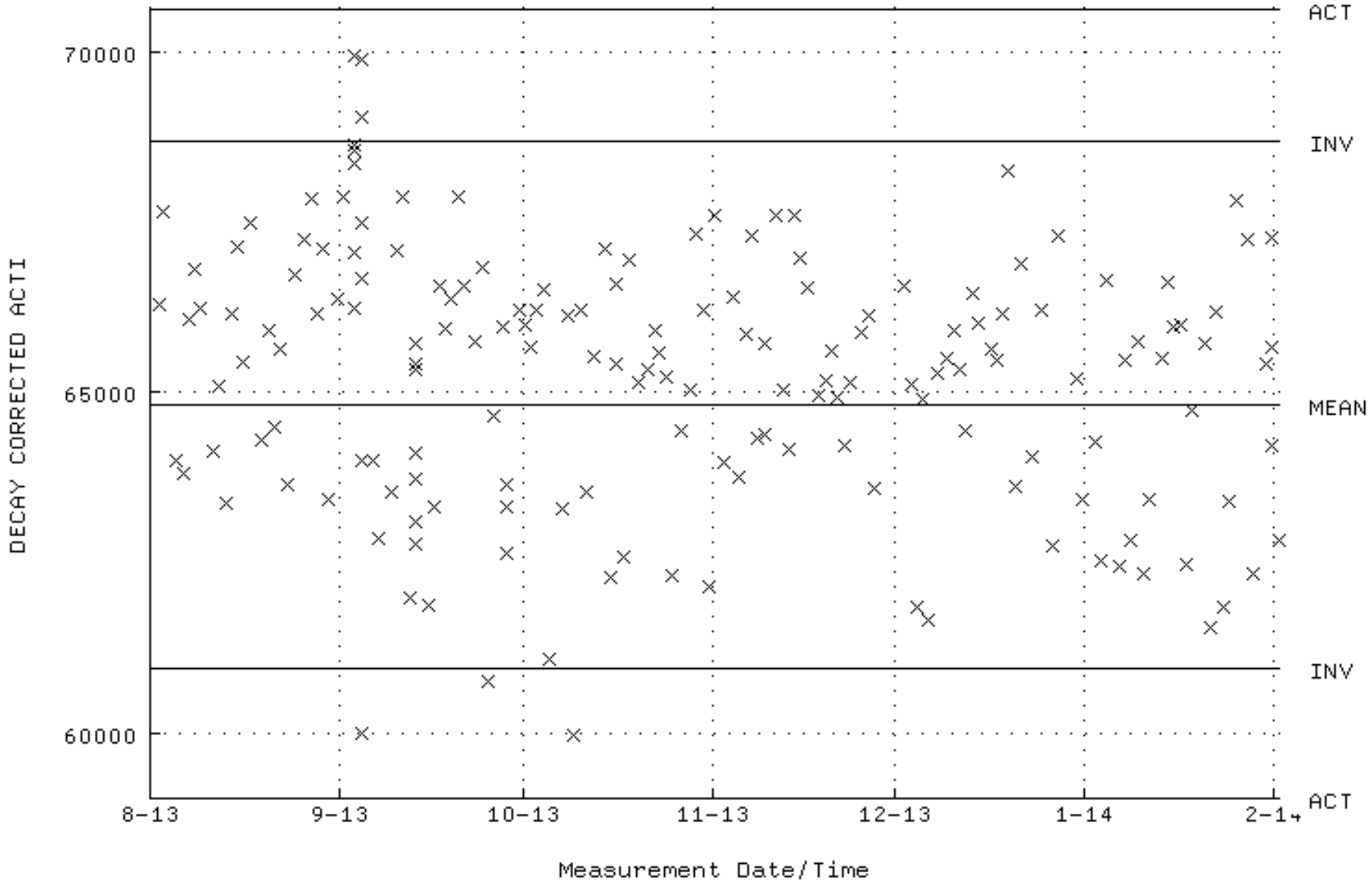
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:47:19 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



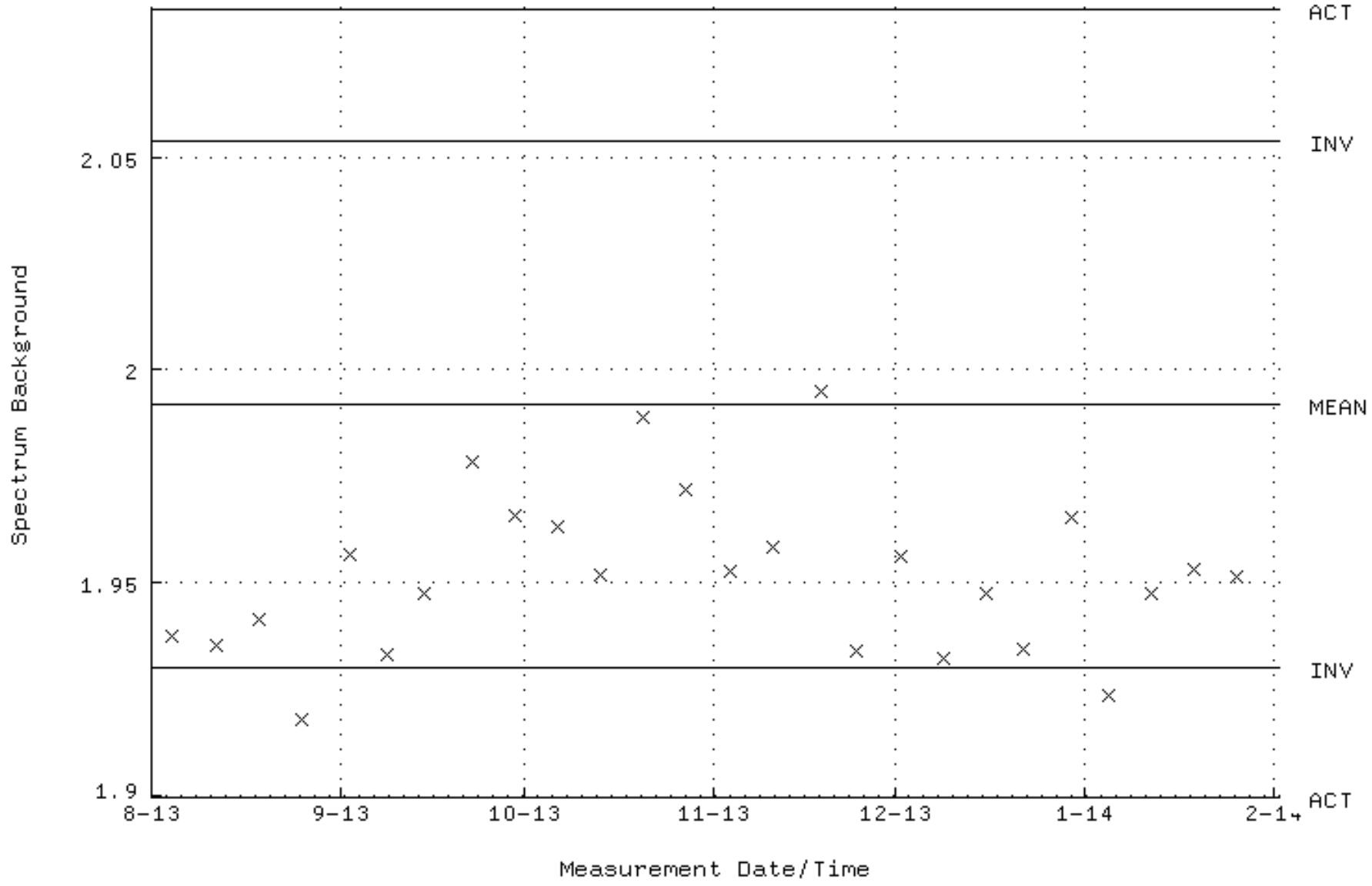
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:47:19 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.06116 +- 4.927532E-02 (4.64 %)



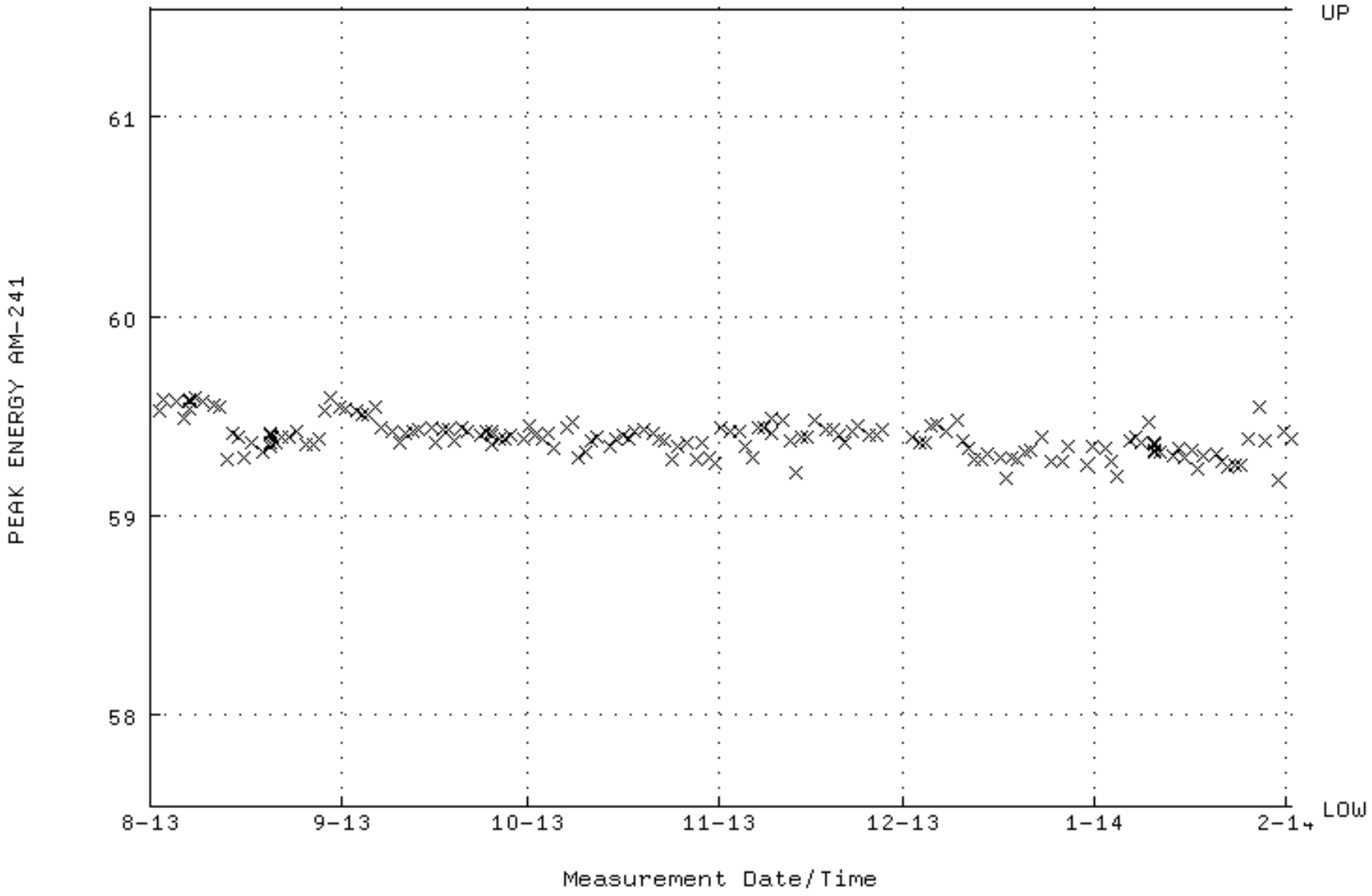
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:47:19 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 64826.7 +- 1930.90 (2.98 %)



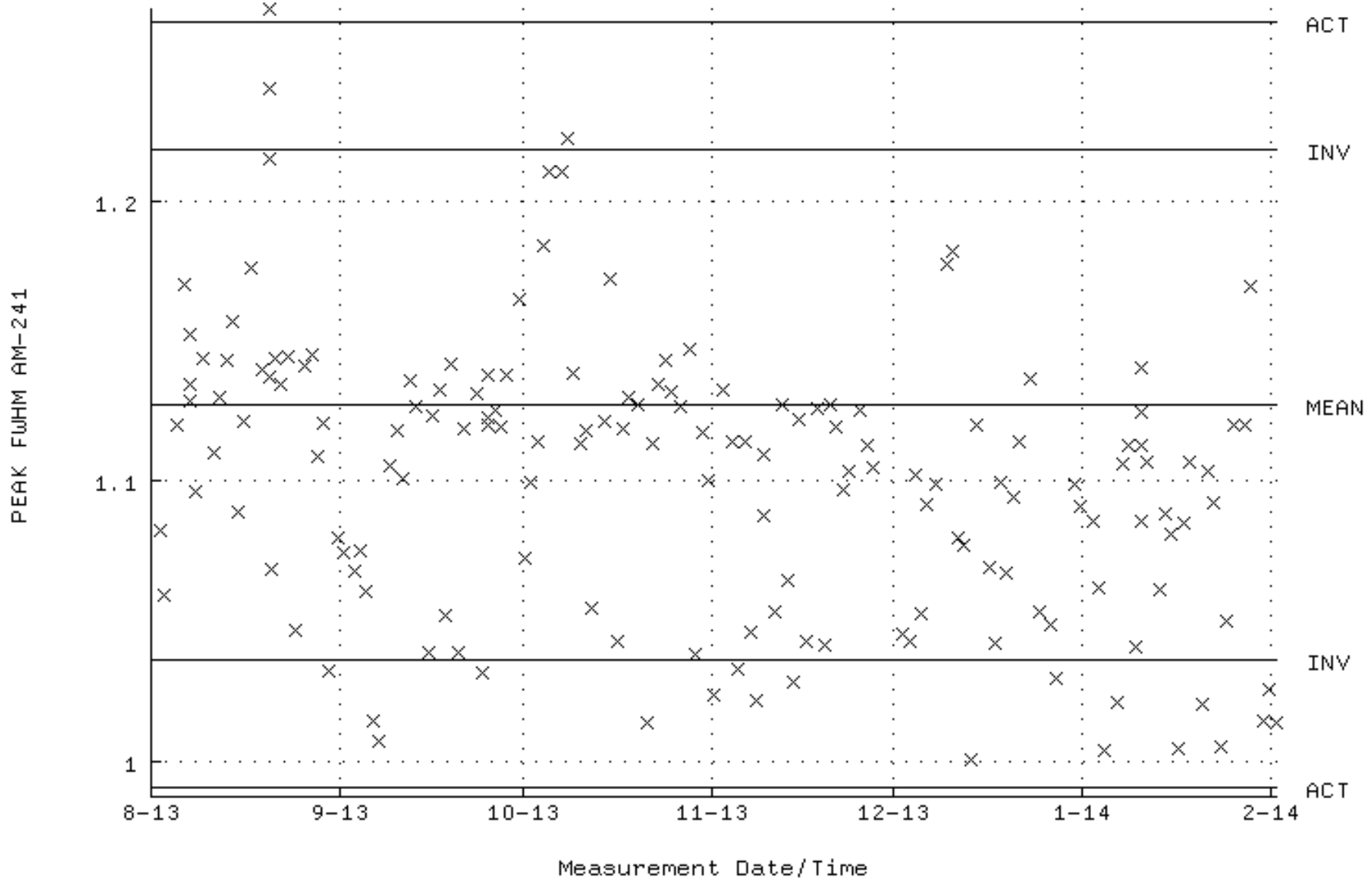
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM27.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:22 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.99202 +- 3.088858E-02 (1.55 %)



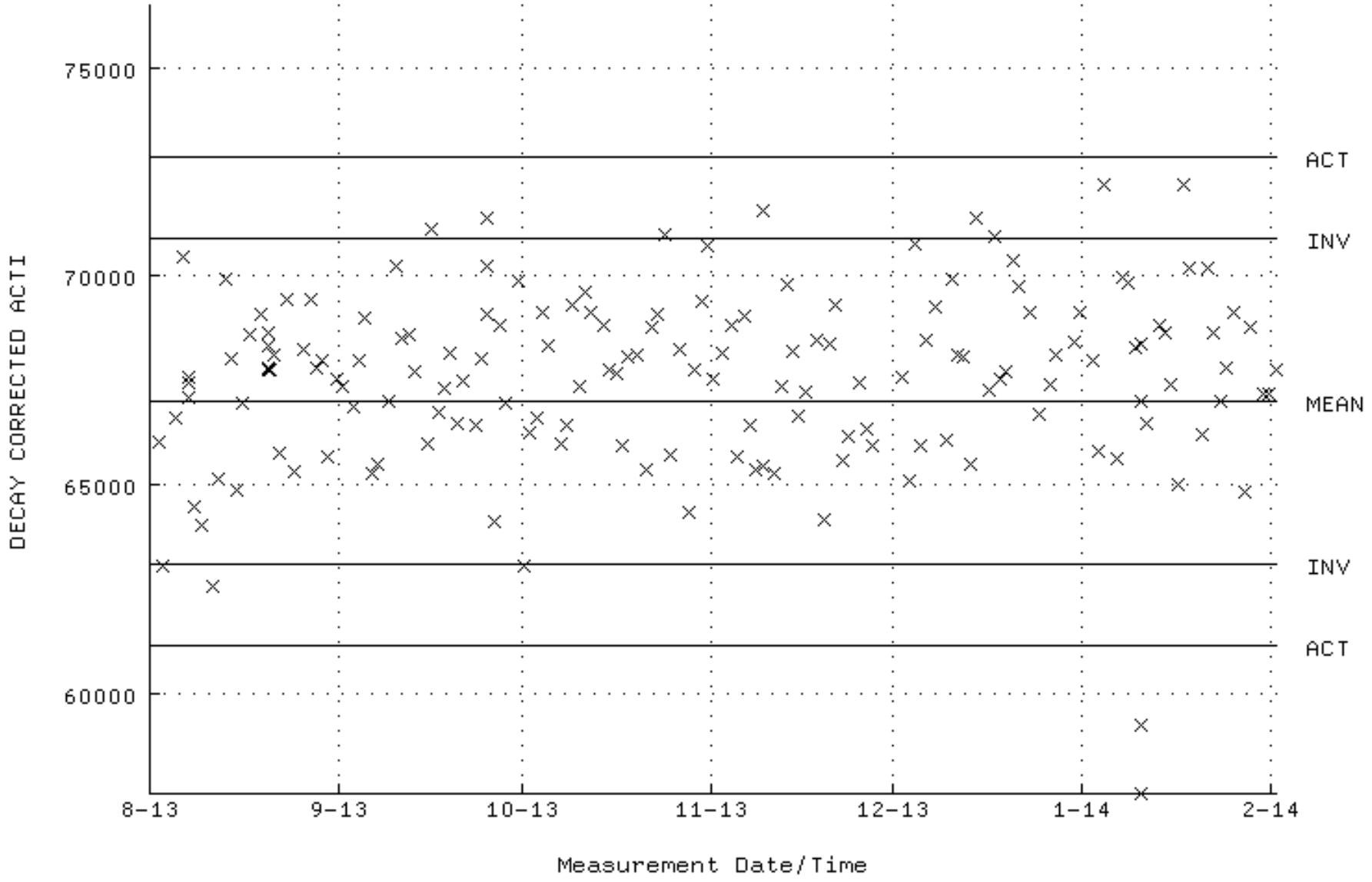
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 08:56:40 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



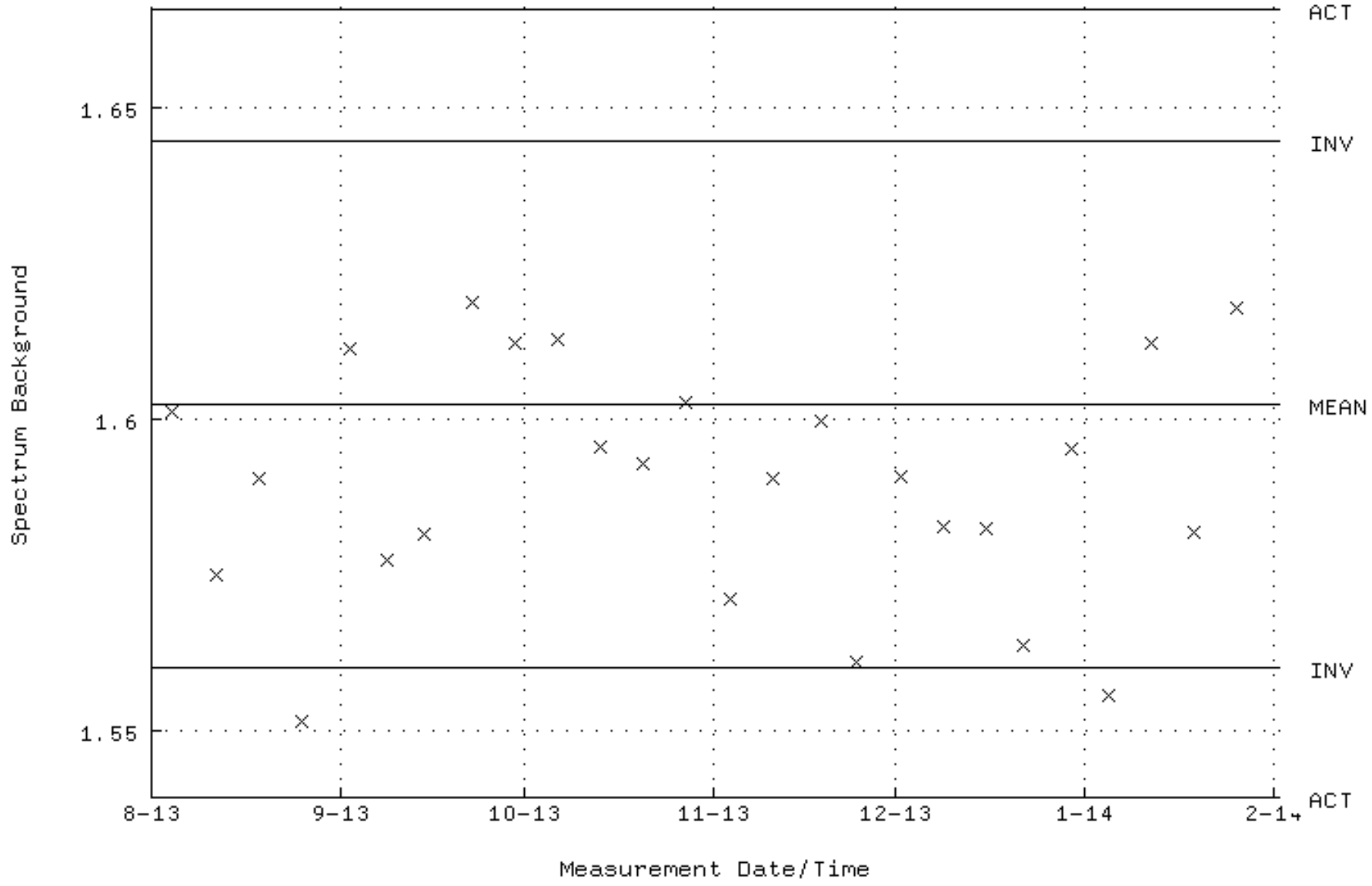
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 08:56:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.12745 +- 4.561869E-02 (4.05 %)



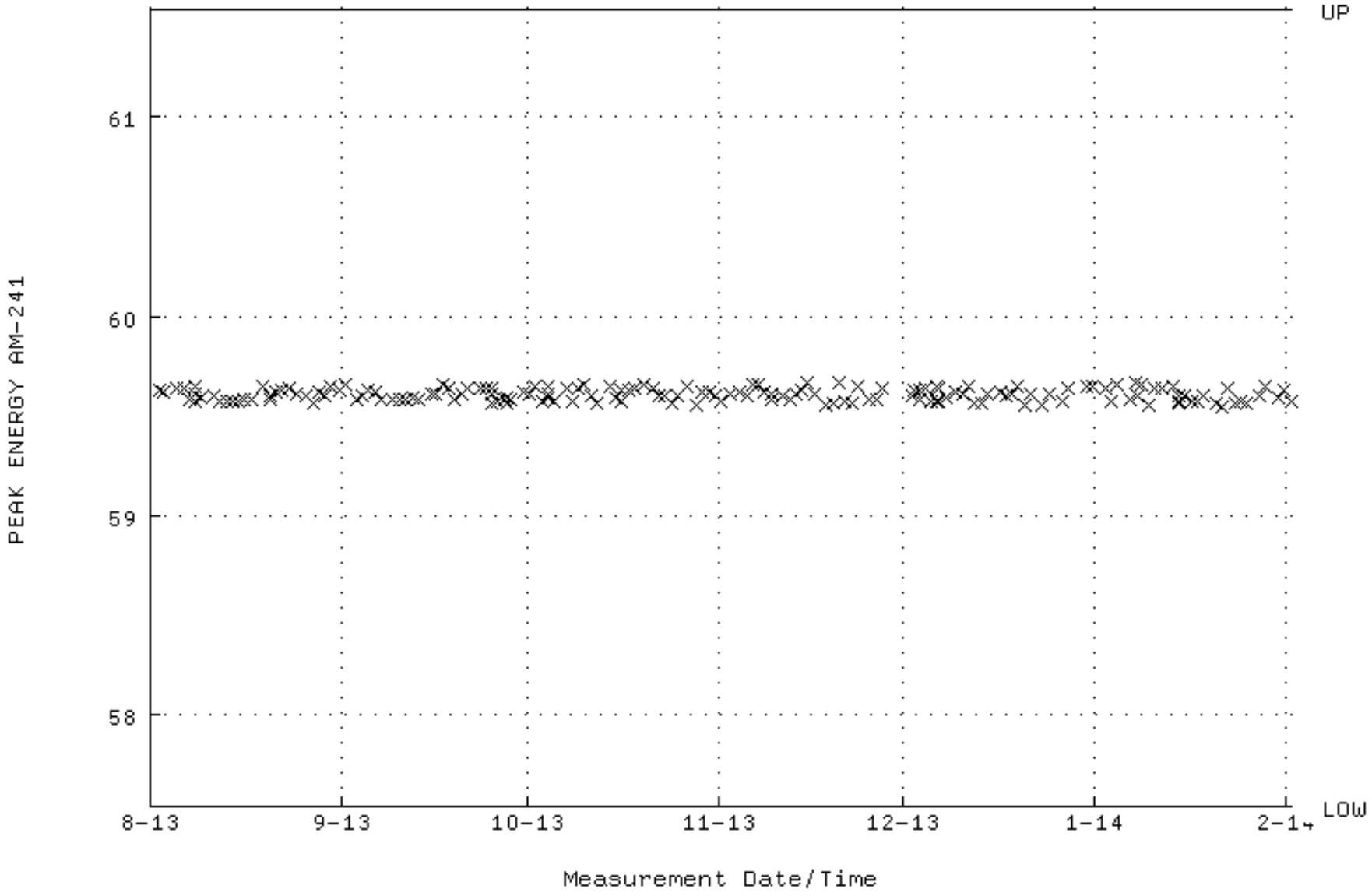
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 08:56:40 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 67020.3 +- 1955.01 (2.92 %)



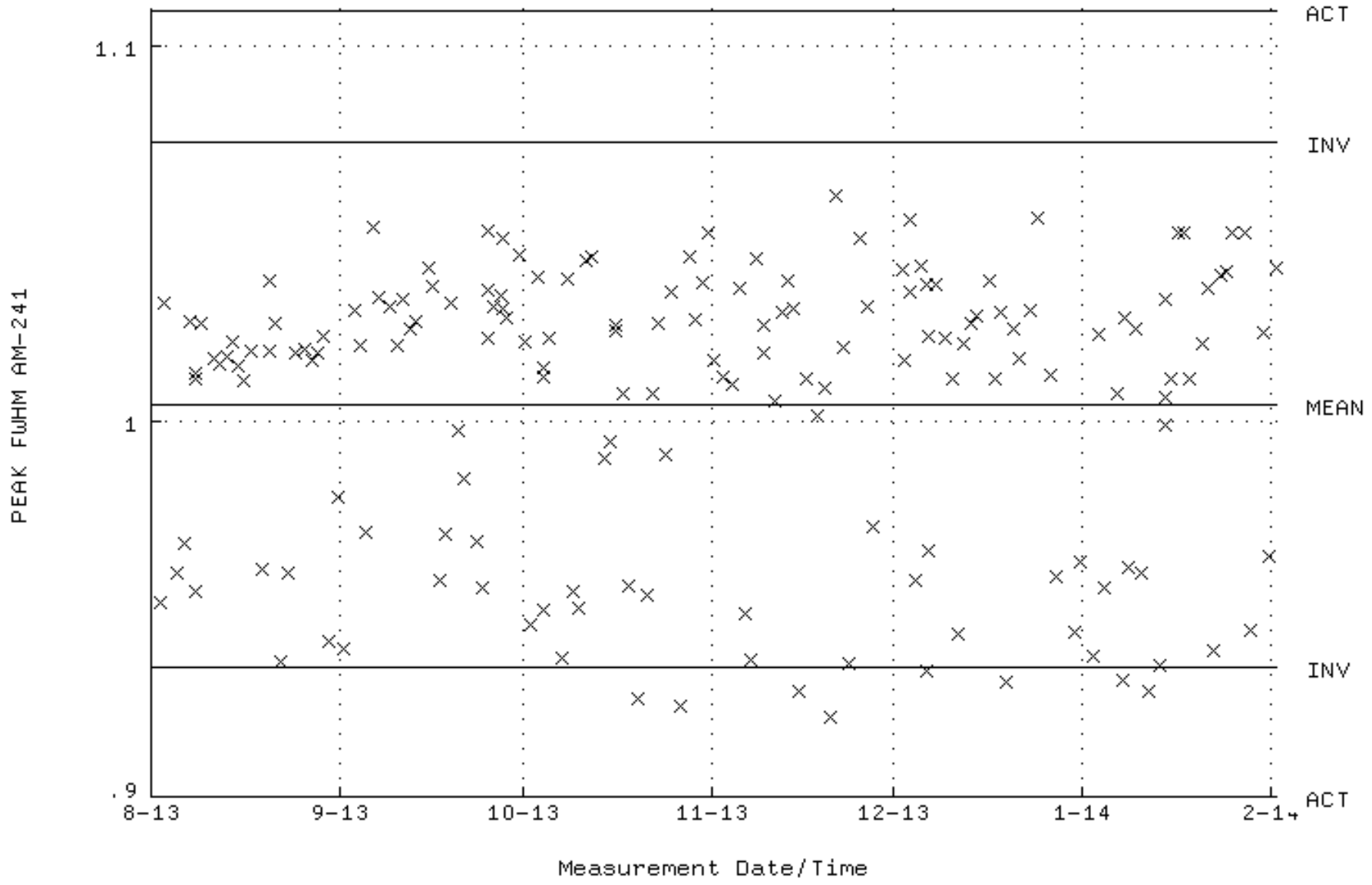
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM28.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:38 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.60249 +- 2.107004E-02 (1.31 %)



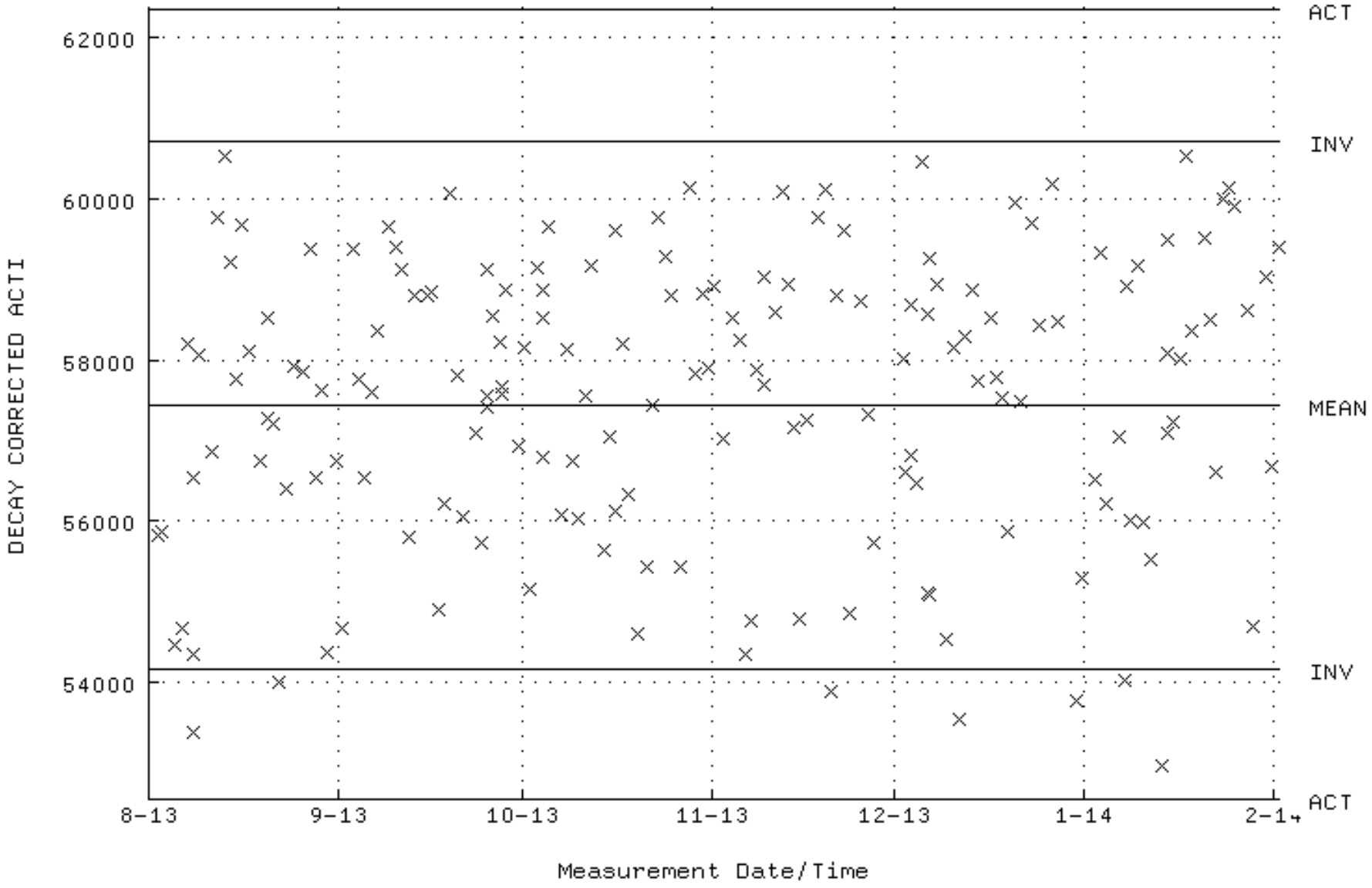
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:21 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



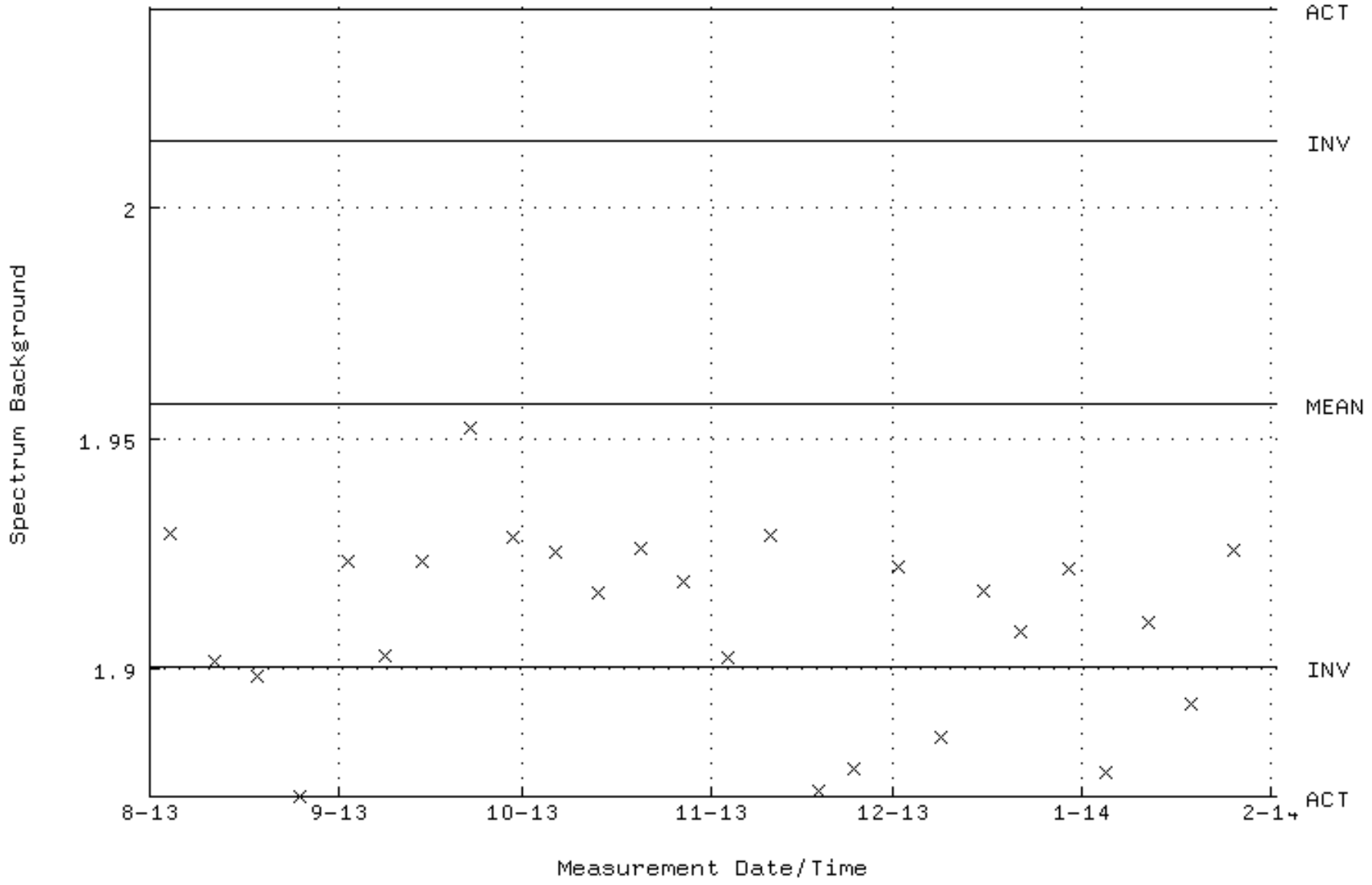
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.00467 +- 3.489131E-02 (3.47 %)



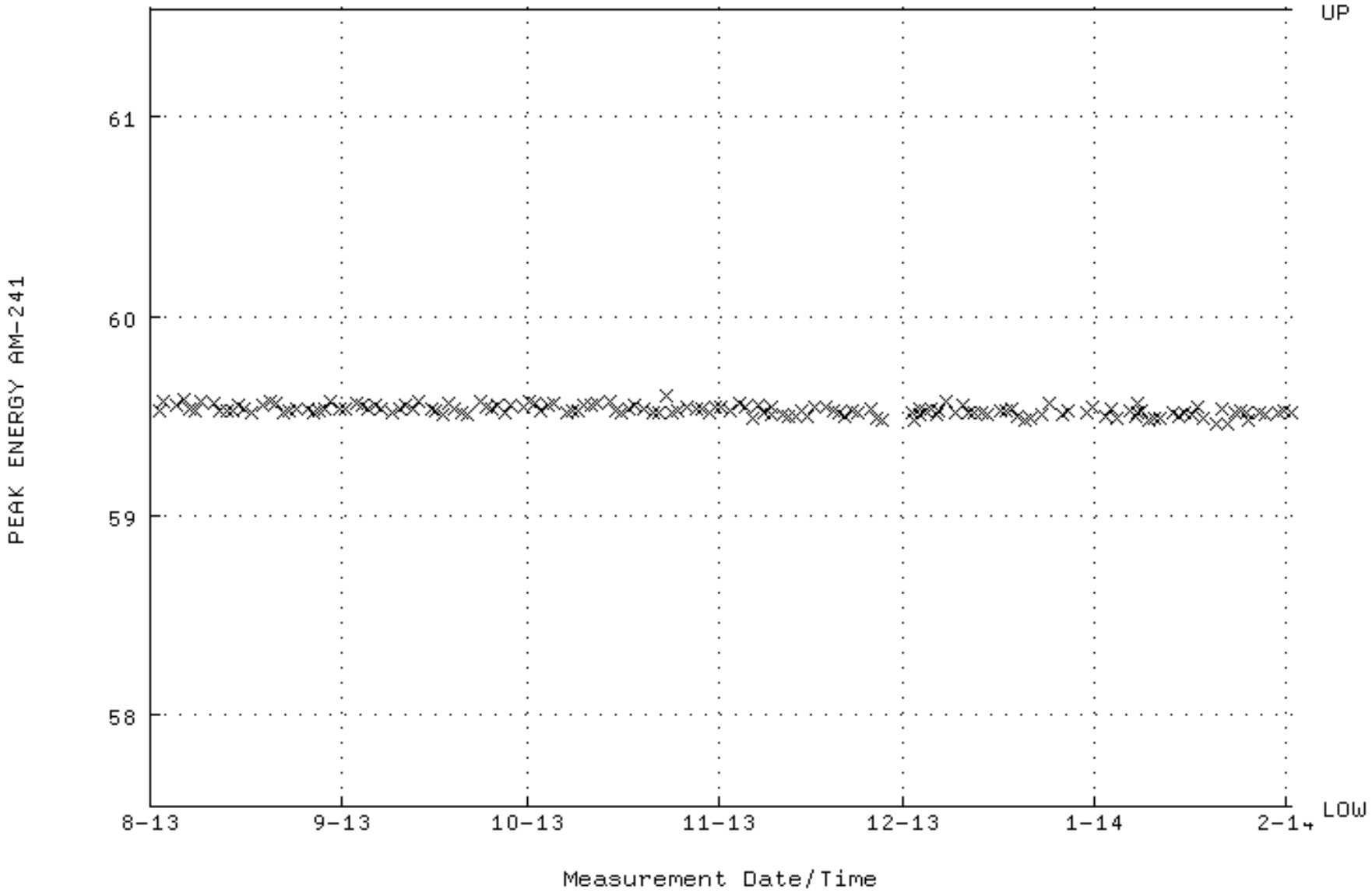
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 57448.1 +- 1629.14 (2.84 %)



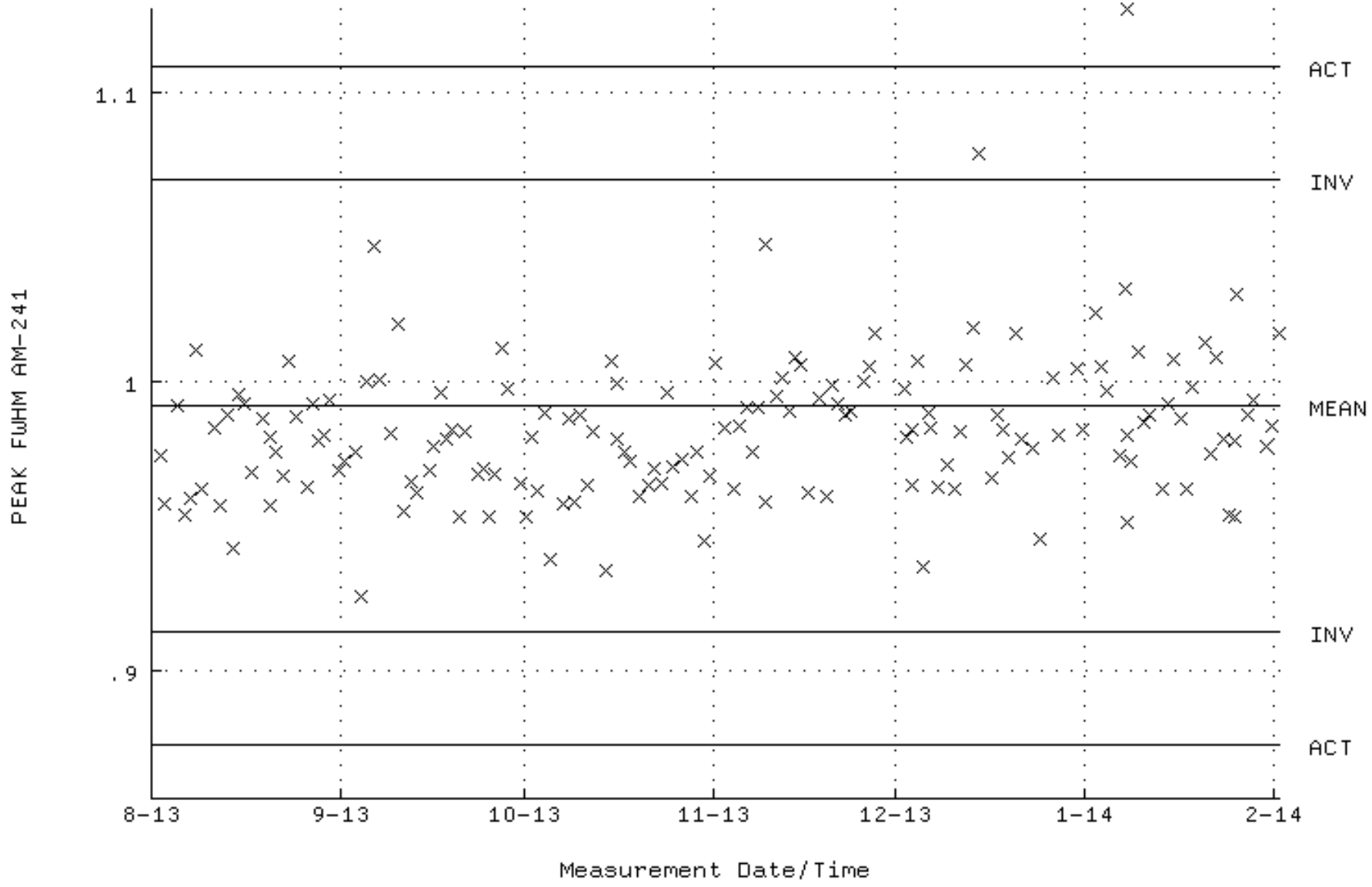
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM29.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:11:53 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.95762 +- 2.839290E-02 (1.45 %)



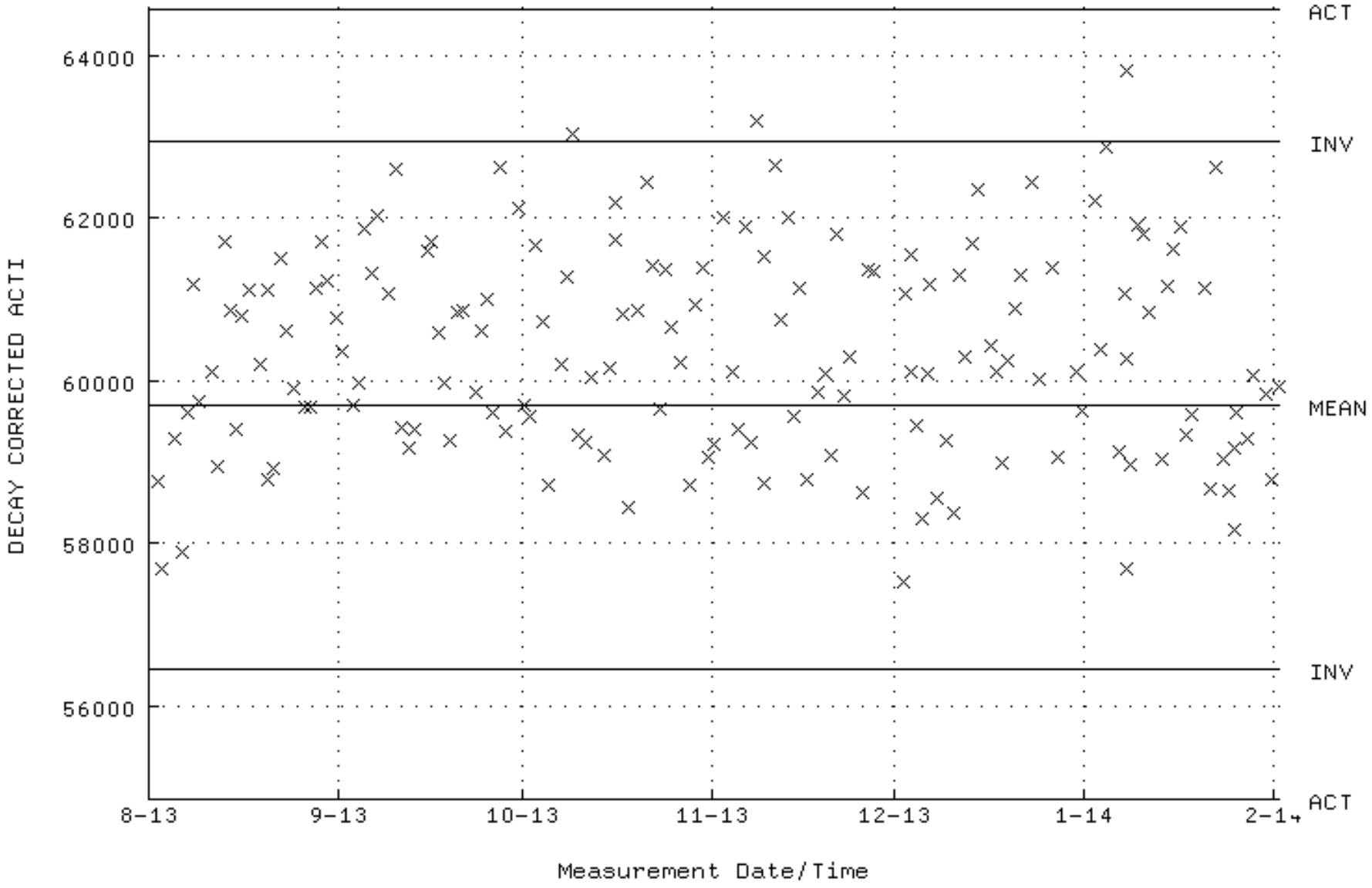
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:27 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



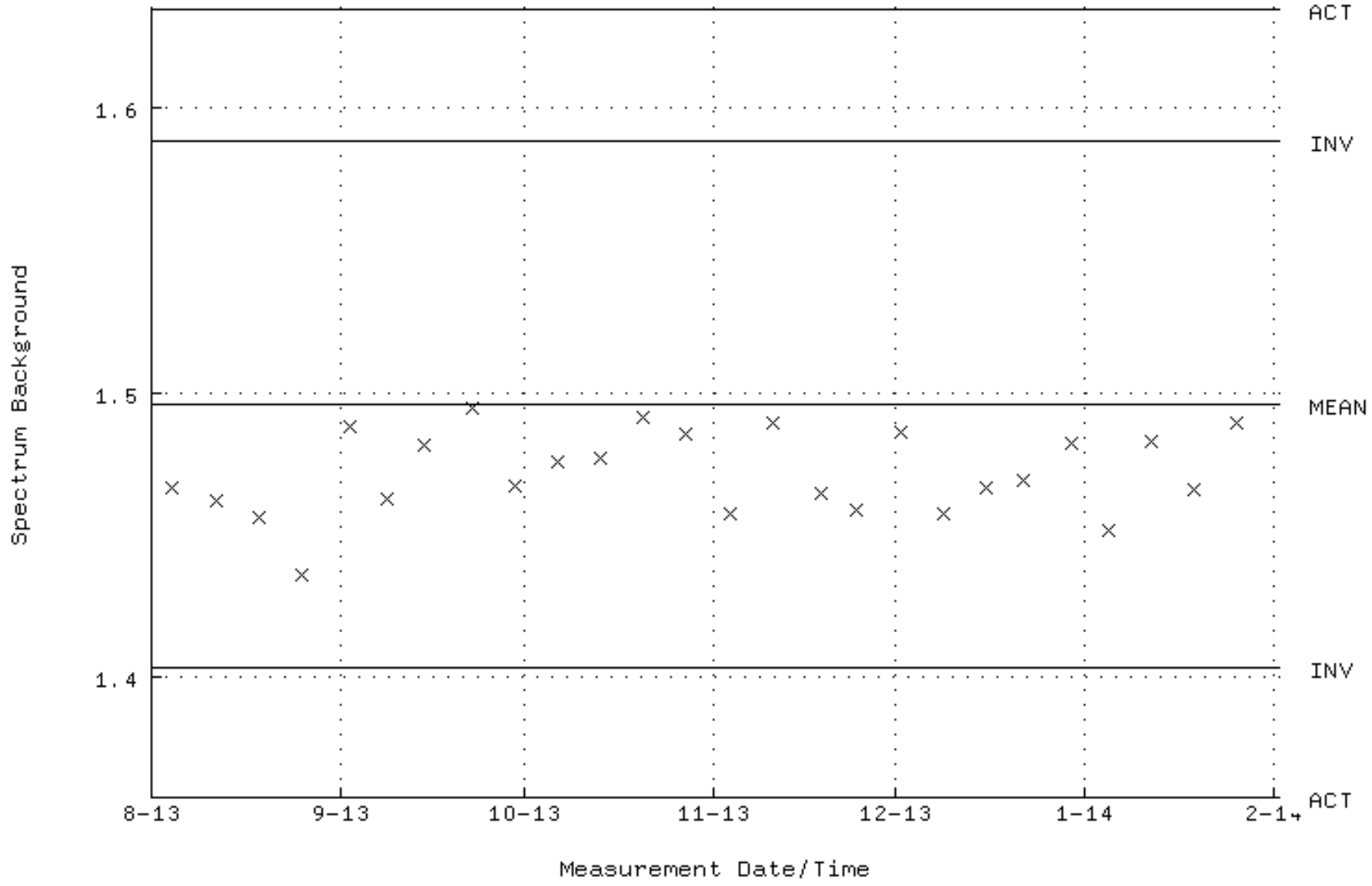
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.991793 +- 3.914304E-02 (3.95 %)



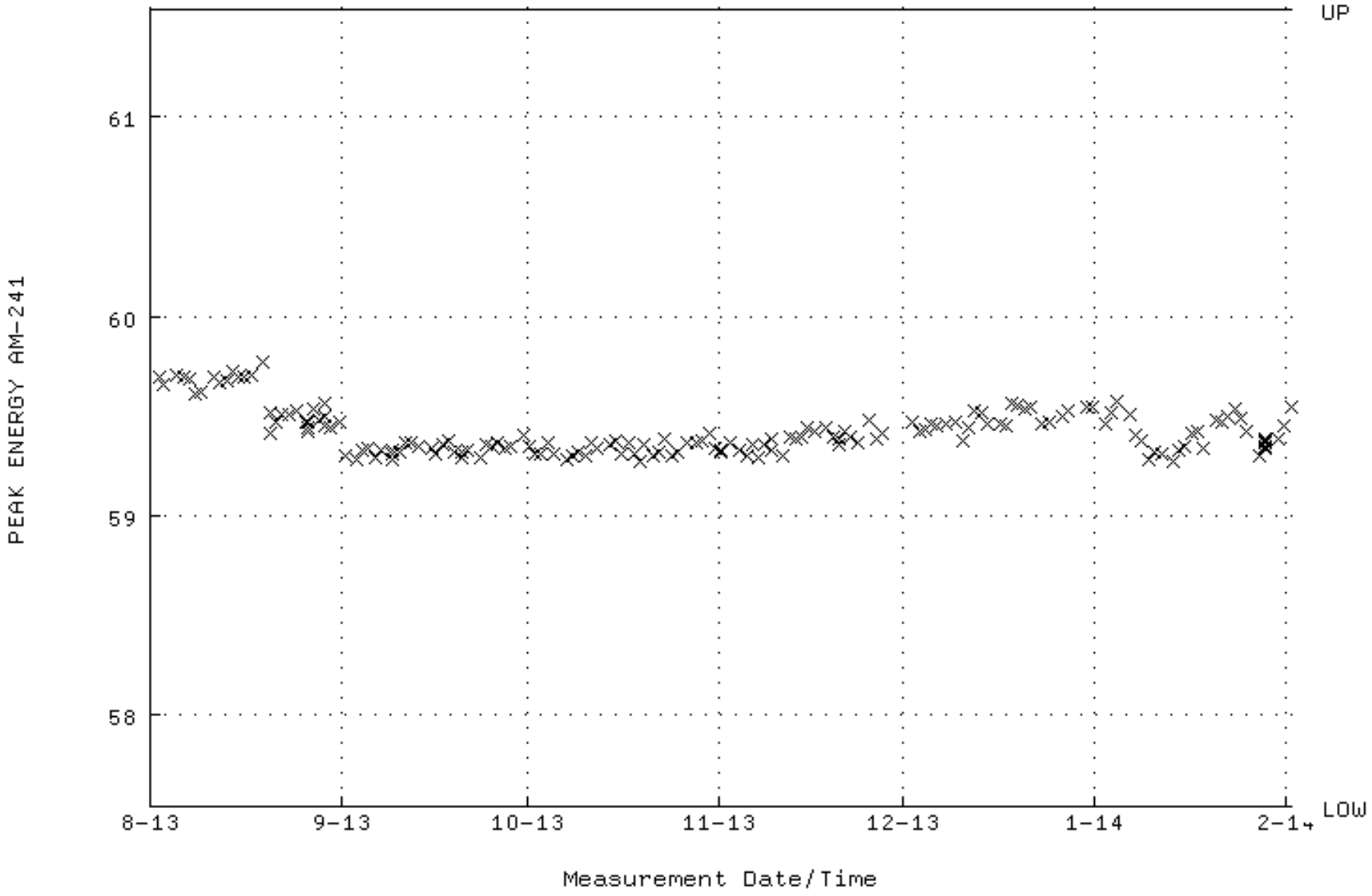
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:27 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 59710.0 +- 1618.68 (2.71 %)



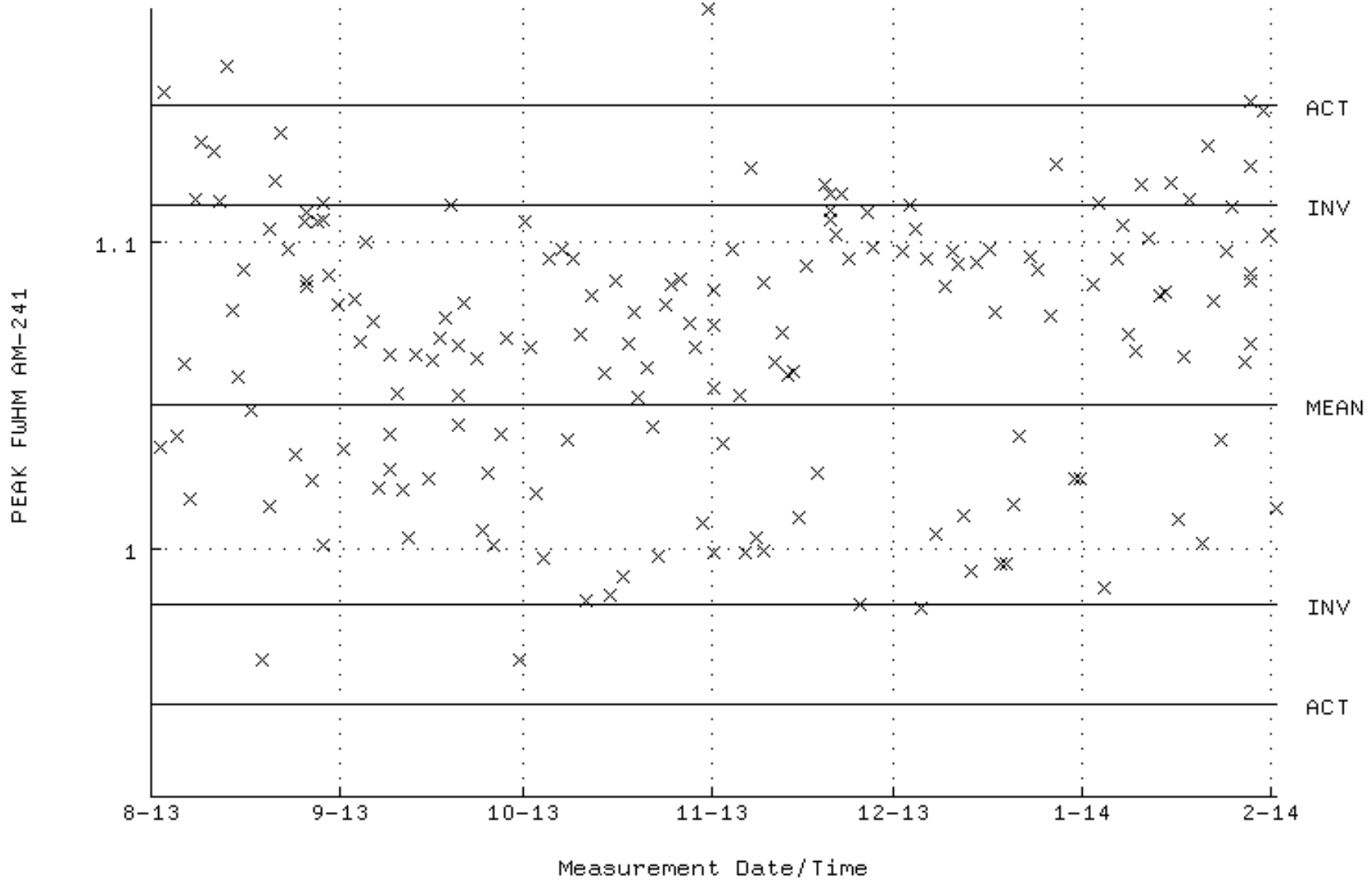
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM30.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:12:10 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.49629 +- 4.613569E-02 (3.08 %)



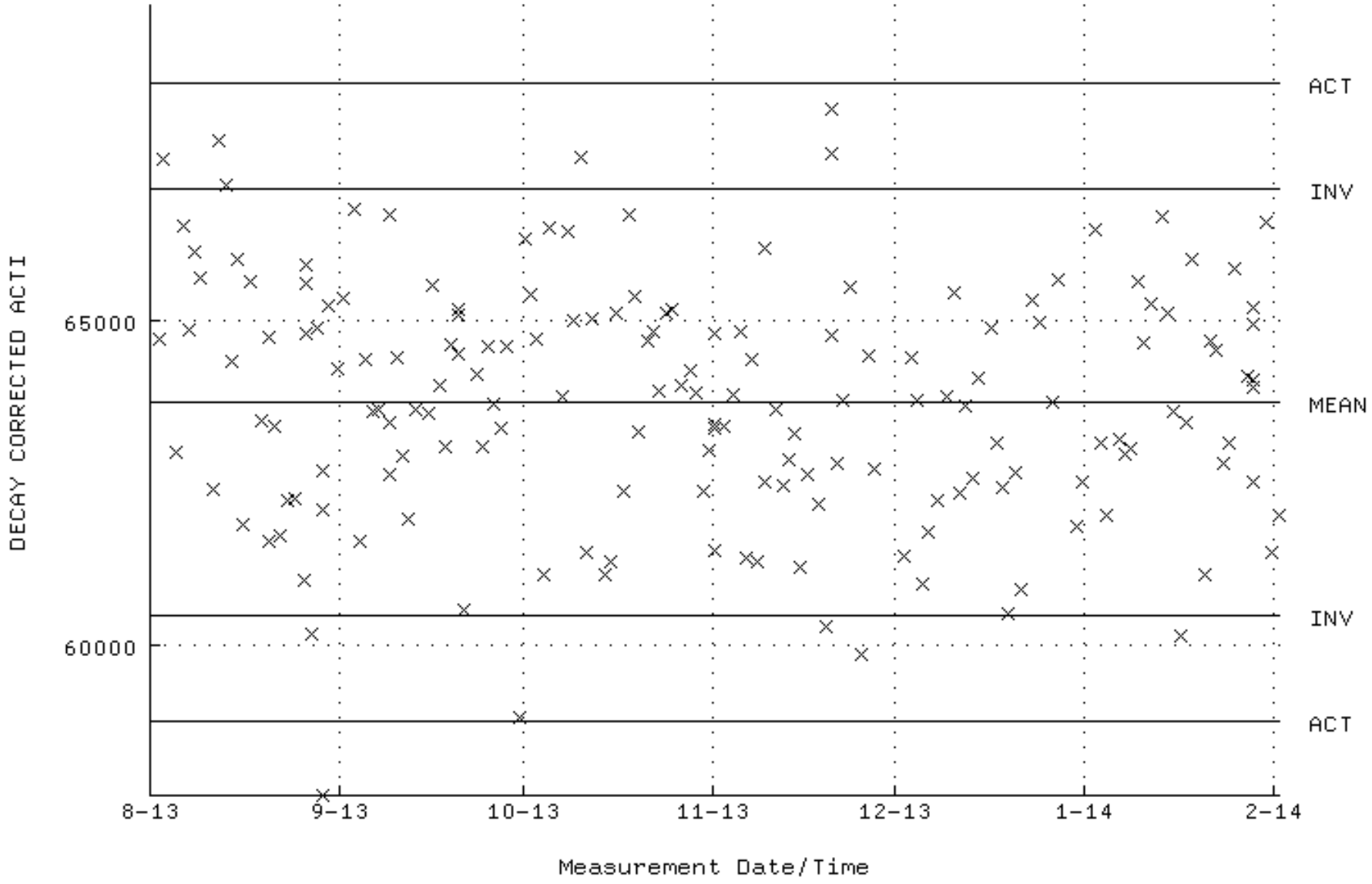
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:36:32 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



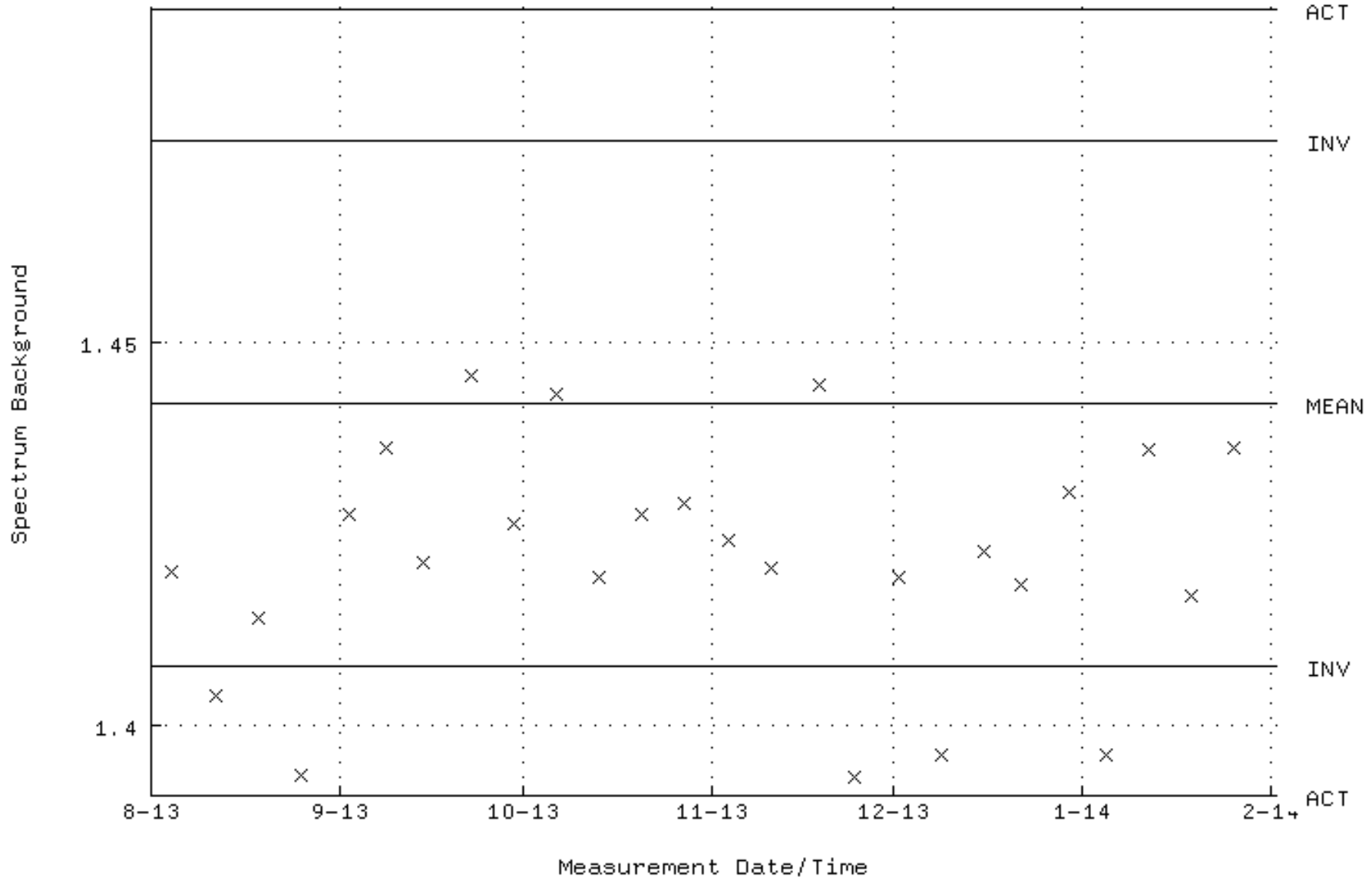
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:36:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.04735 +- 3.258776E-02 (3.11 %)



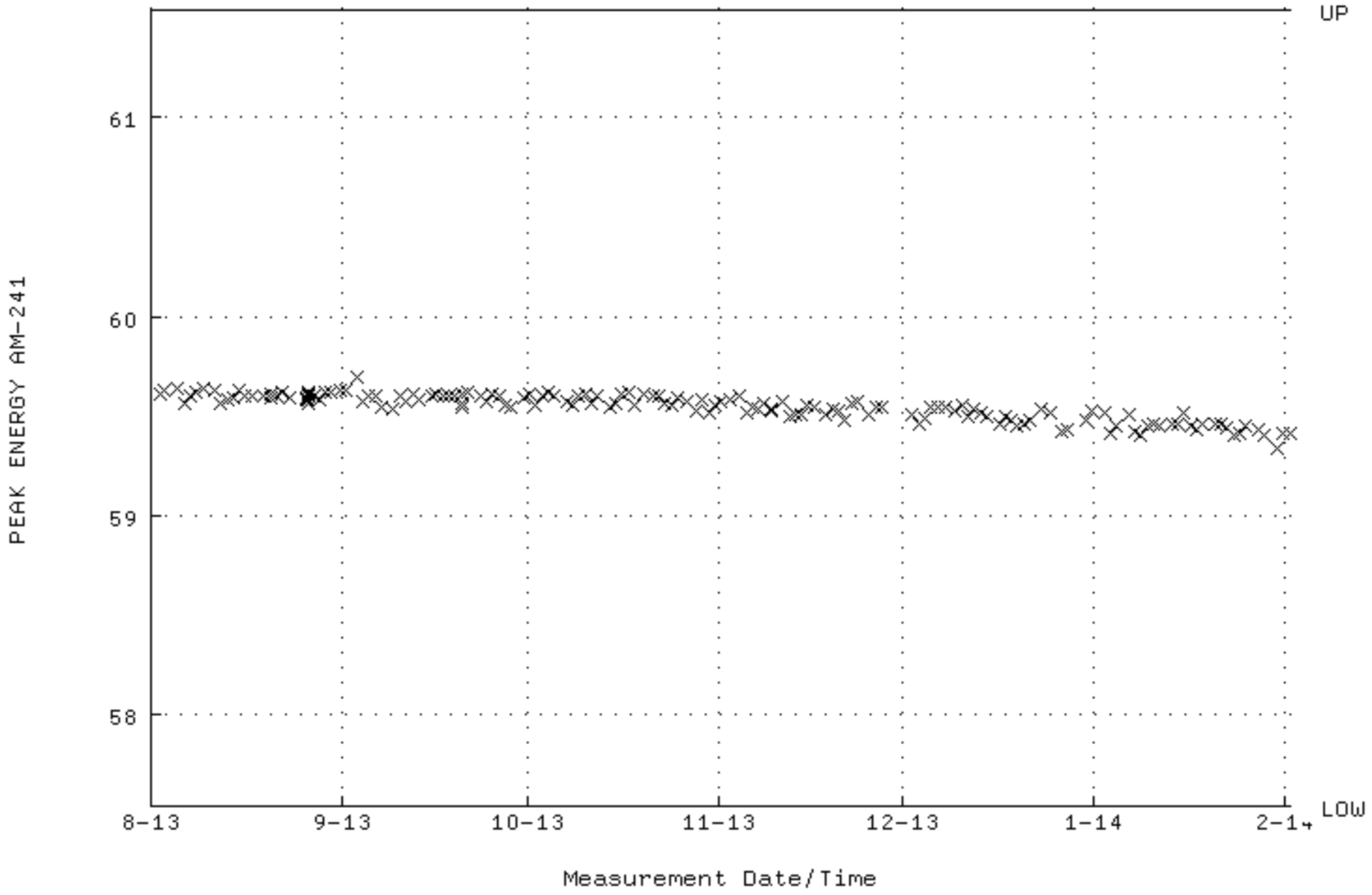
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:36:32 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 63751.2 +- 1640.77 (2.57 %)



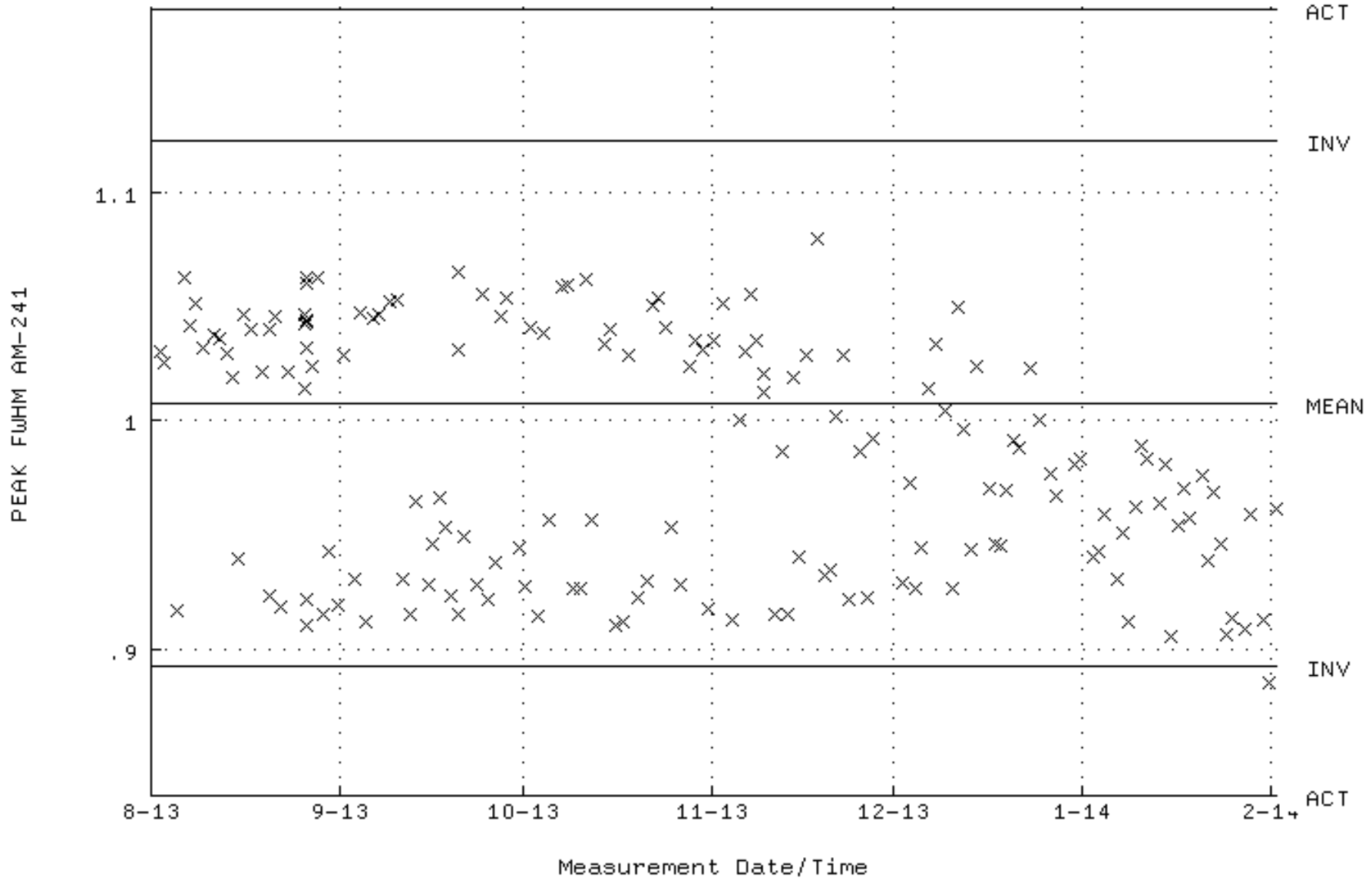
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM32.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:12:43 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.44220 +- 1.717079E-02 (1.19 %)



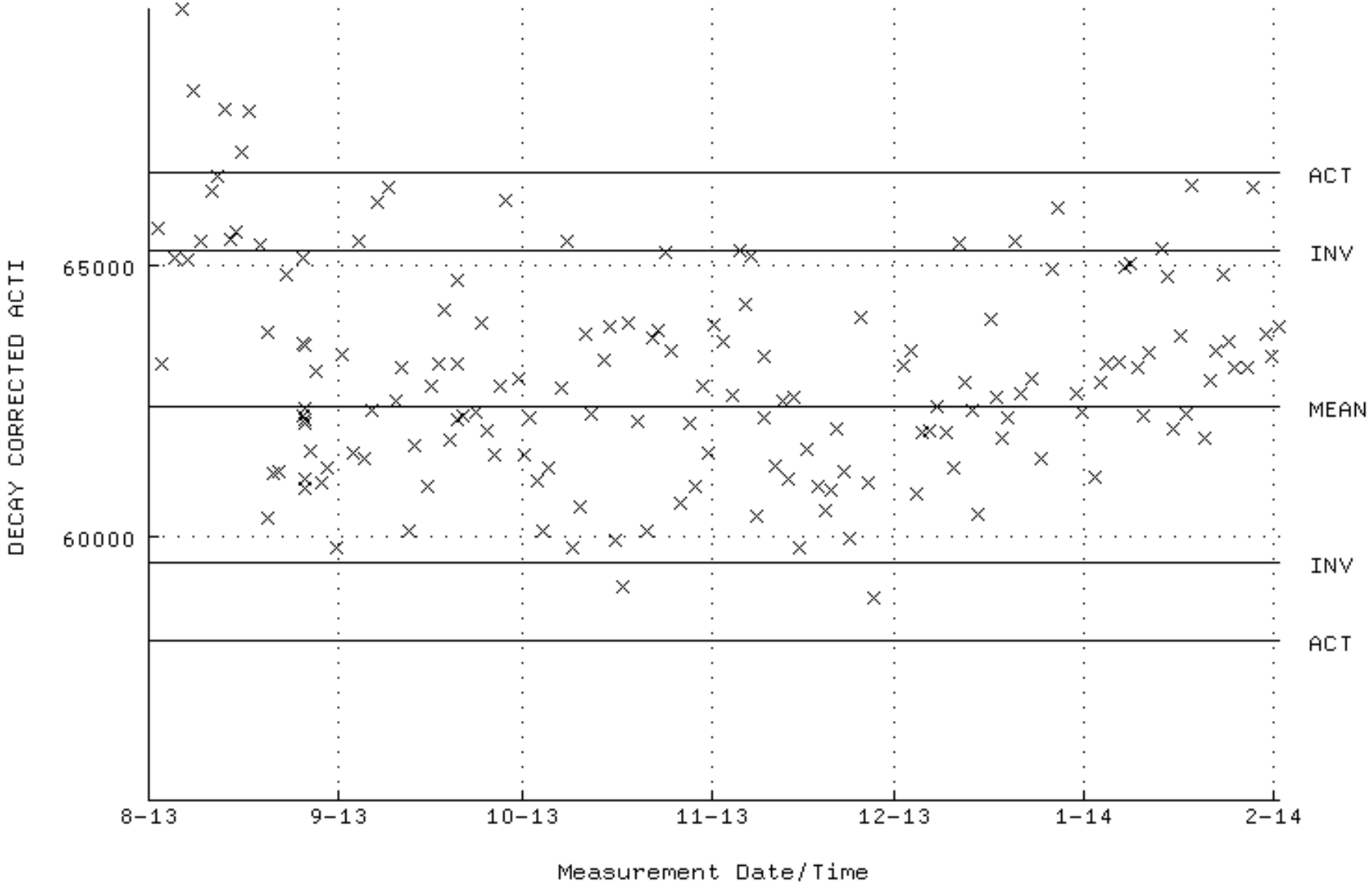
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 09:47:25 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



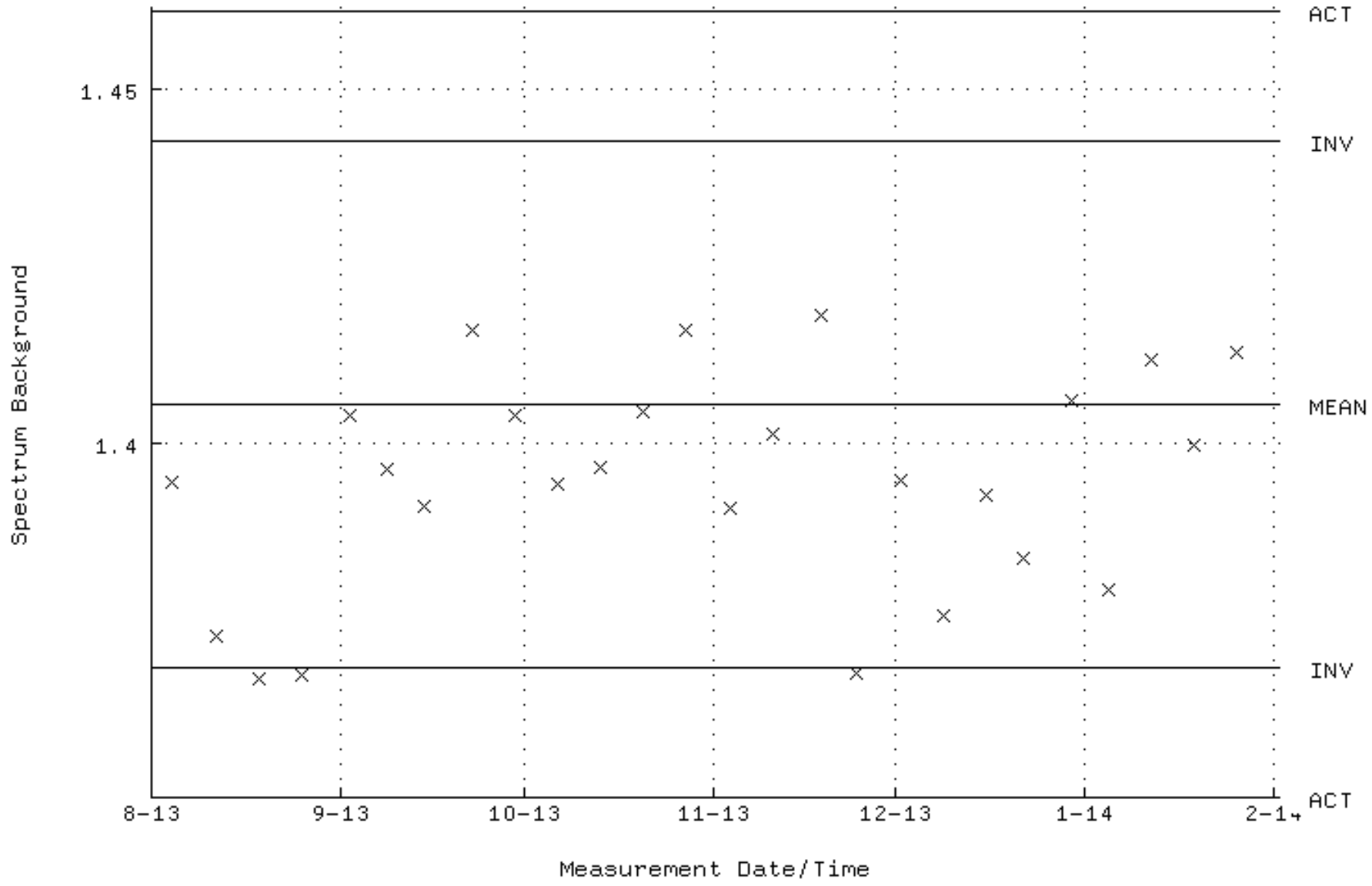
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 09:47:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.00788 +- 5.730930E-02 (5.69 %)



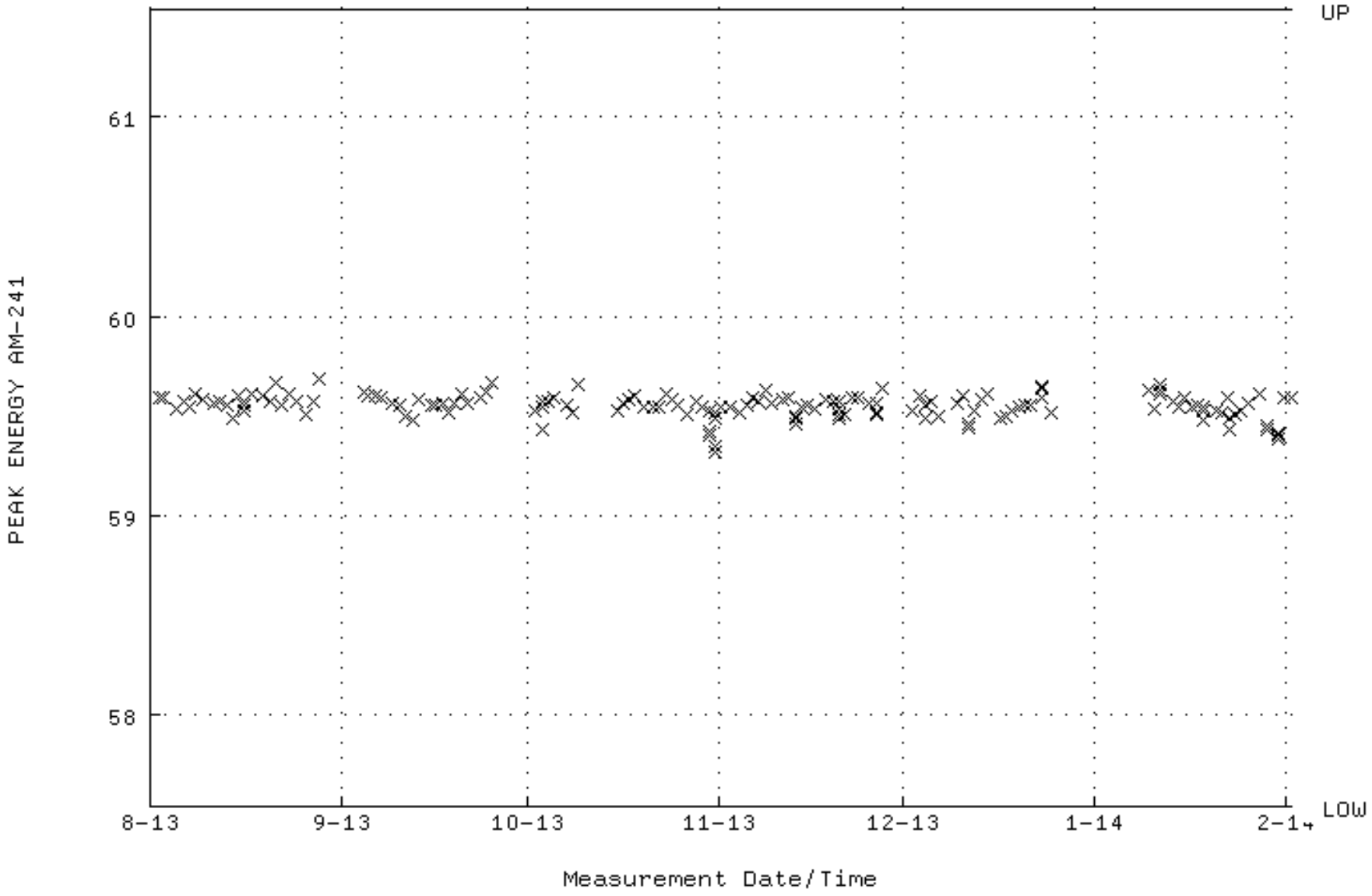
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 09:47:25 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 62415.9 +- 1434.02 (2.30 %)



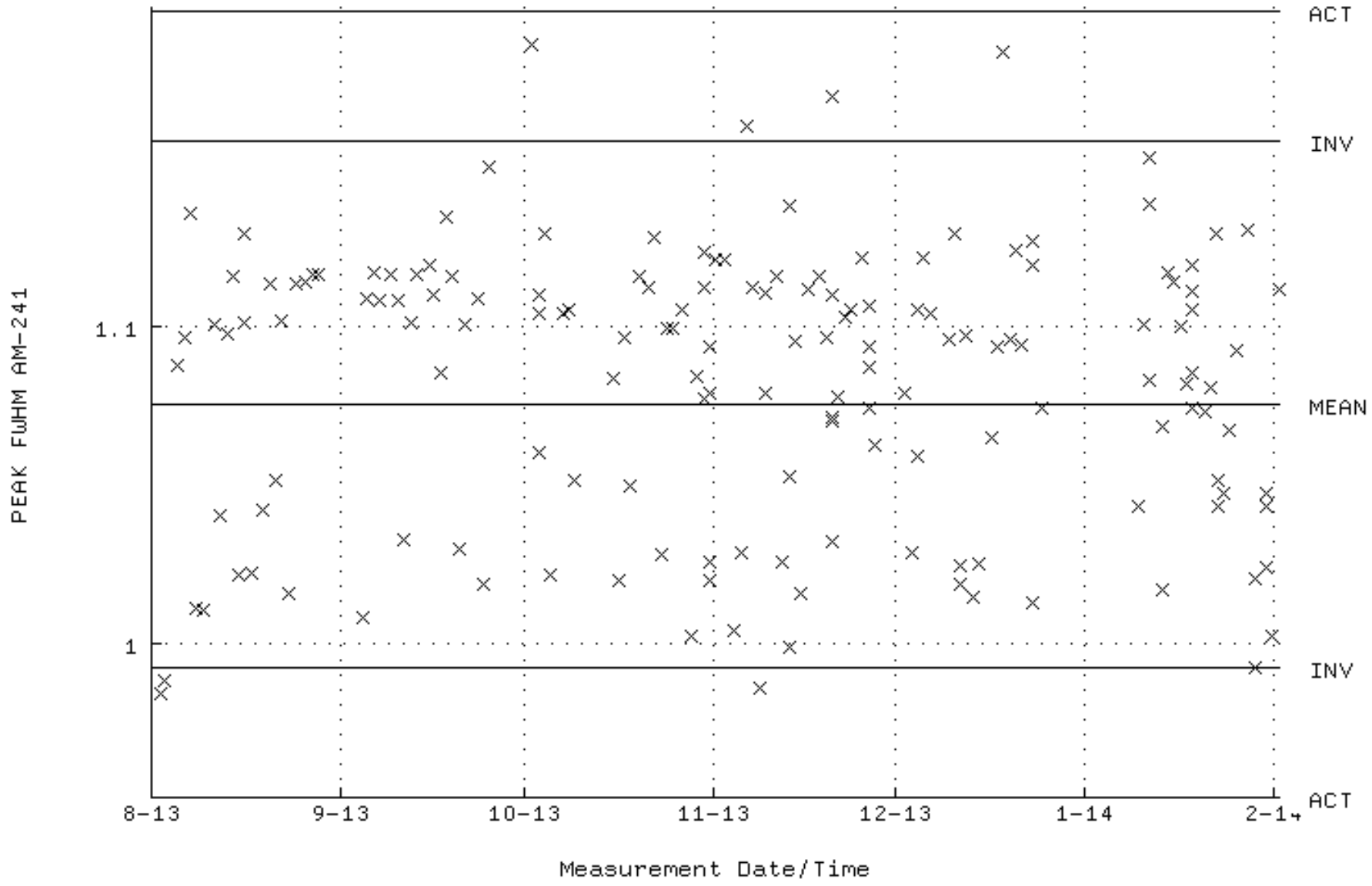
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM33.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:14:02 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.40566 +- 1.848232E-02 (1.31 %)



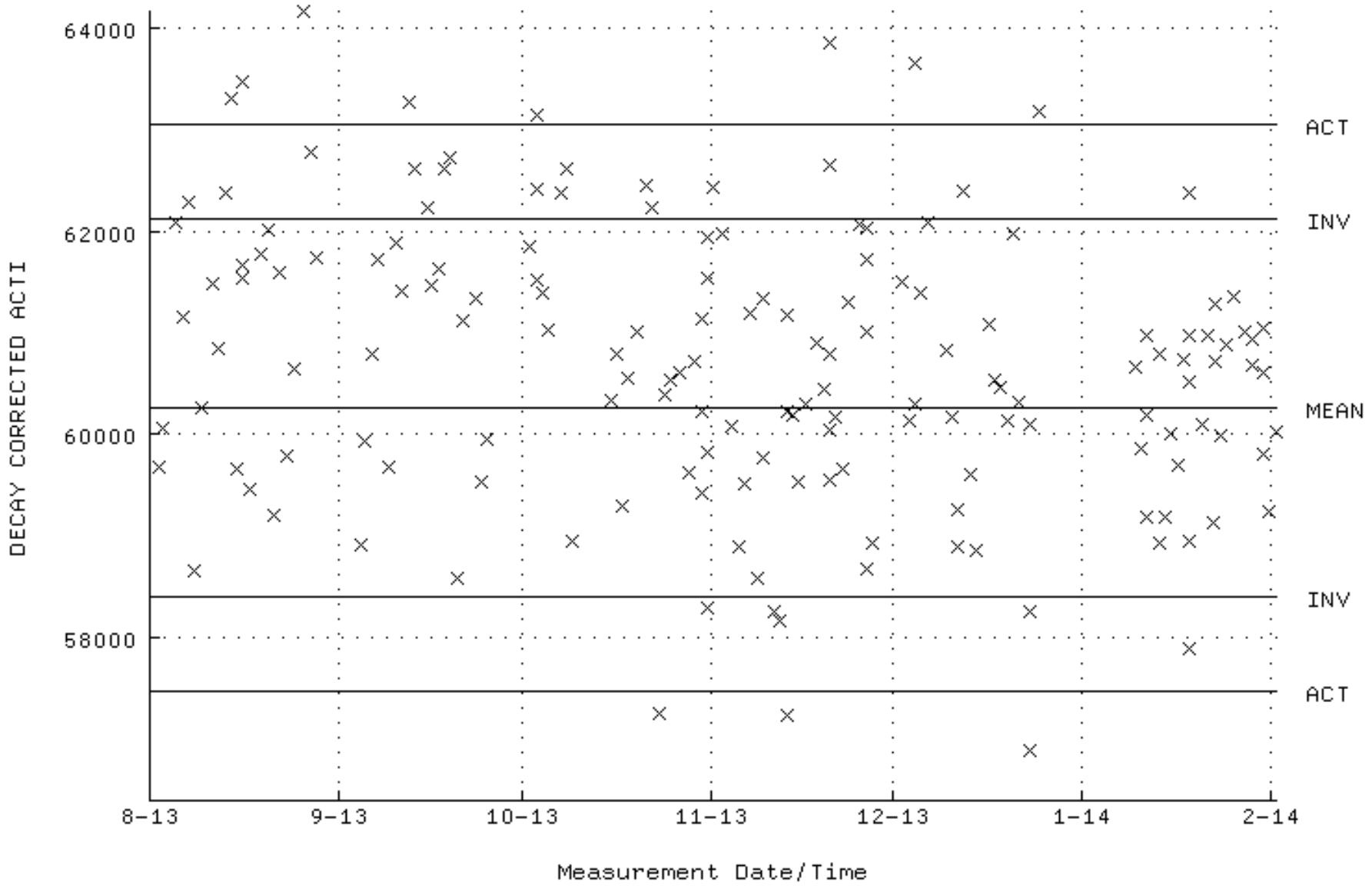
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM36_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-AUG-2013 08:56:45 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



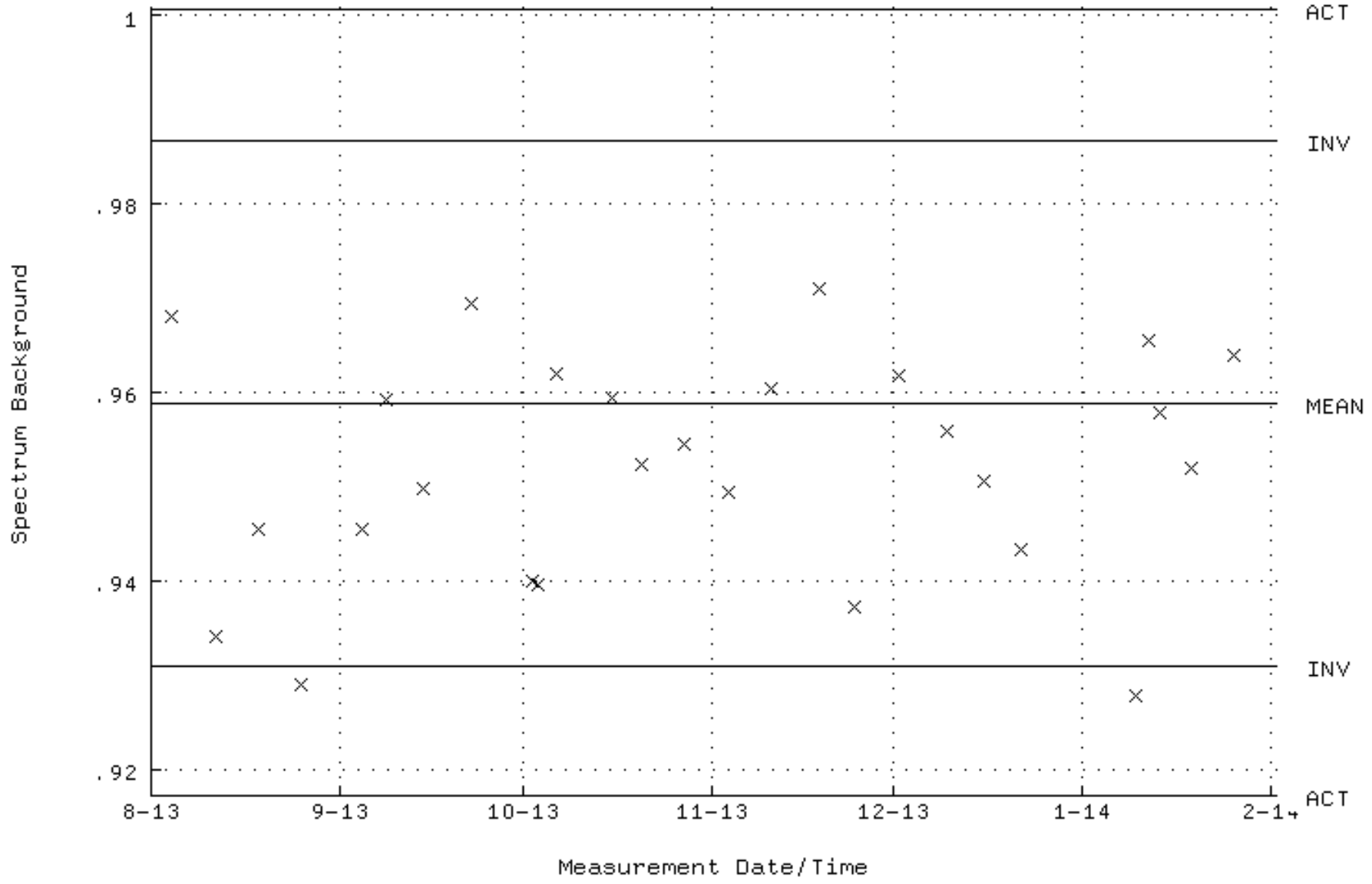
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM36_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-AUG-2013 08:56:45 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.07550 +- 4.143921E-02 (3.85 %)



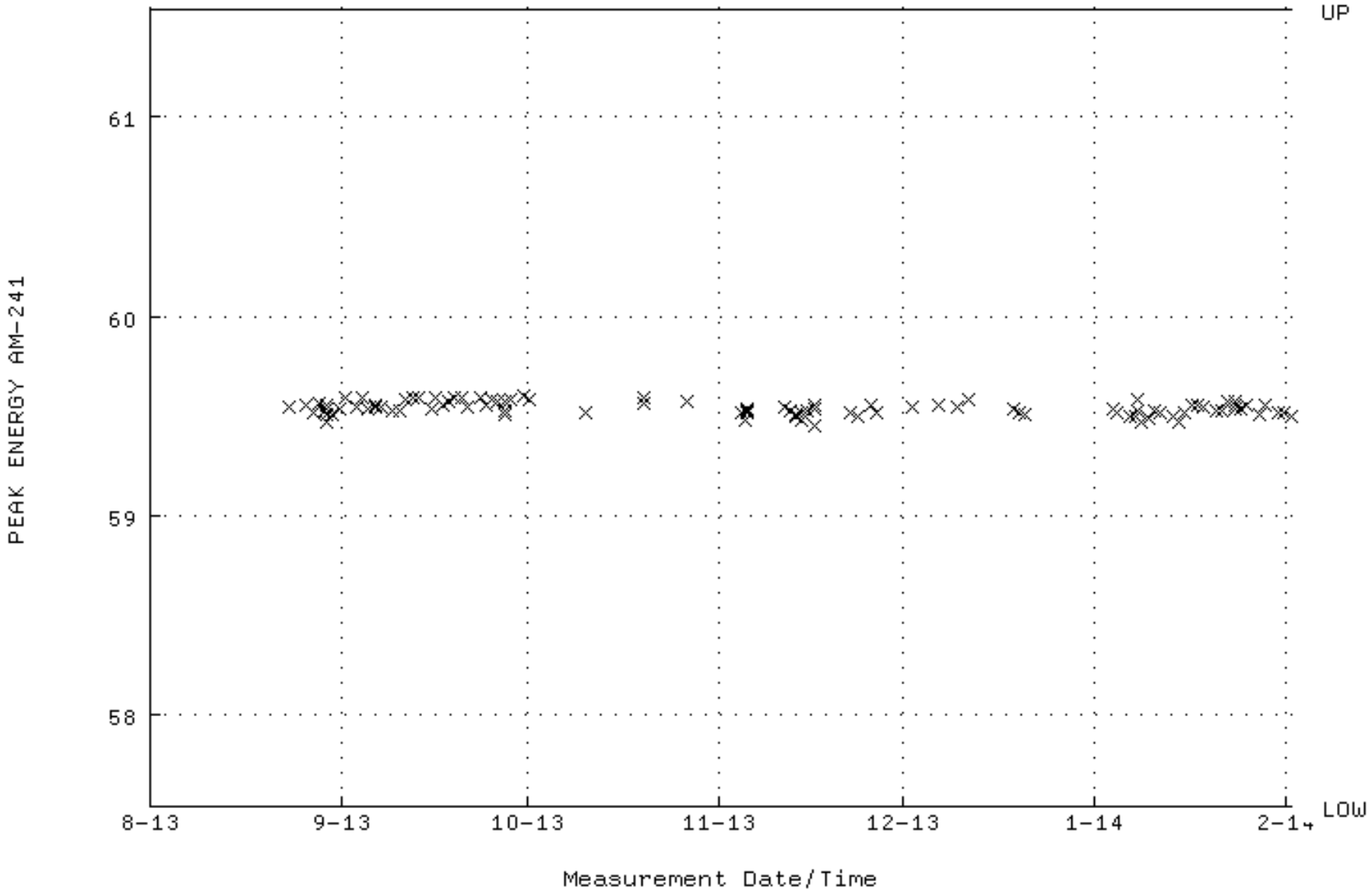
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM36_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-AUG-2013 08:56:45 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 60270.6 +- 928.610 (1.54 %)



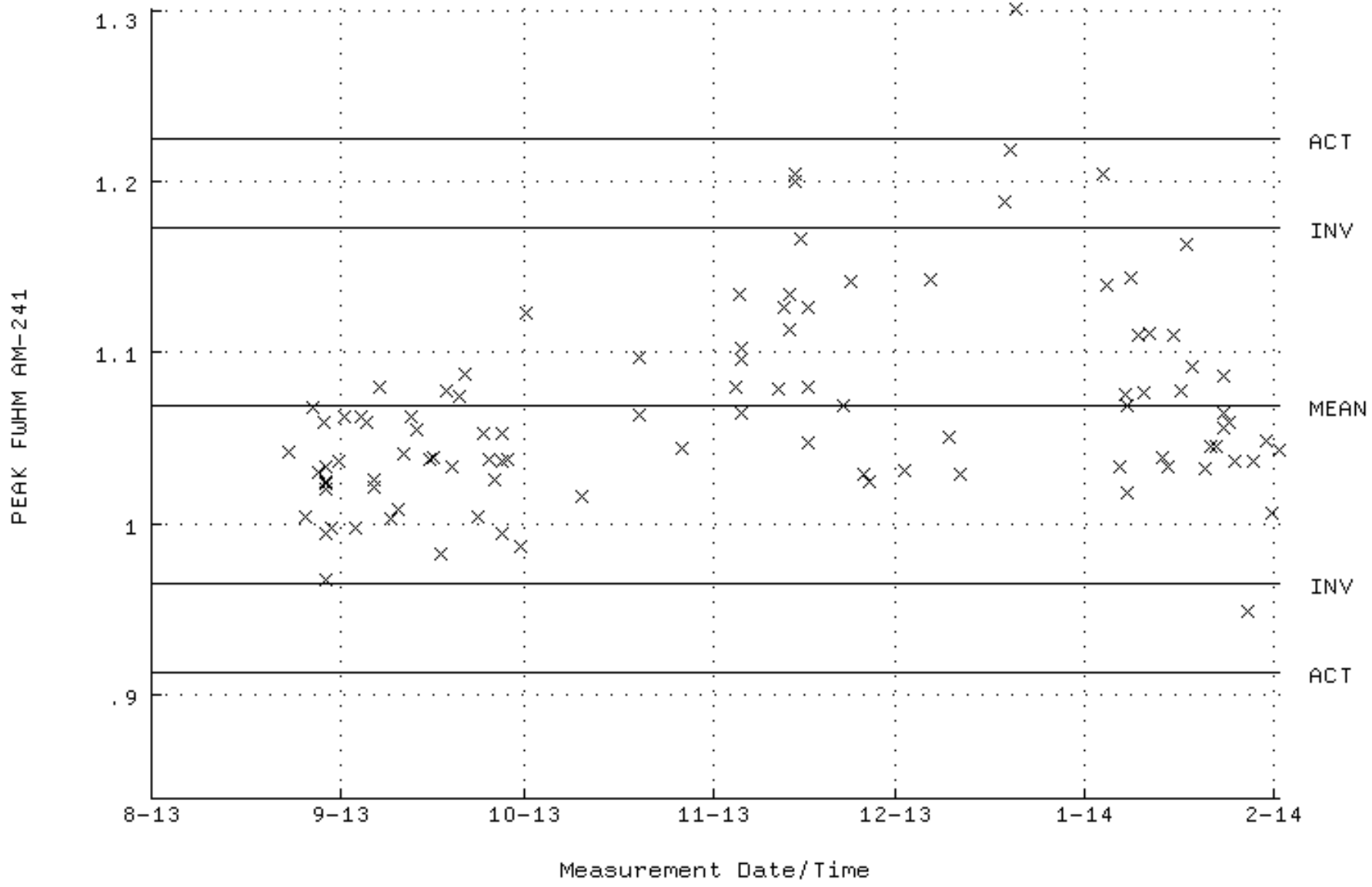
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM36.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 4-AUG-2013 09:14:21 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 0.958899 +- 1.389593E-02 (1.45 %)



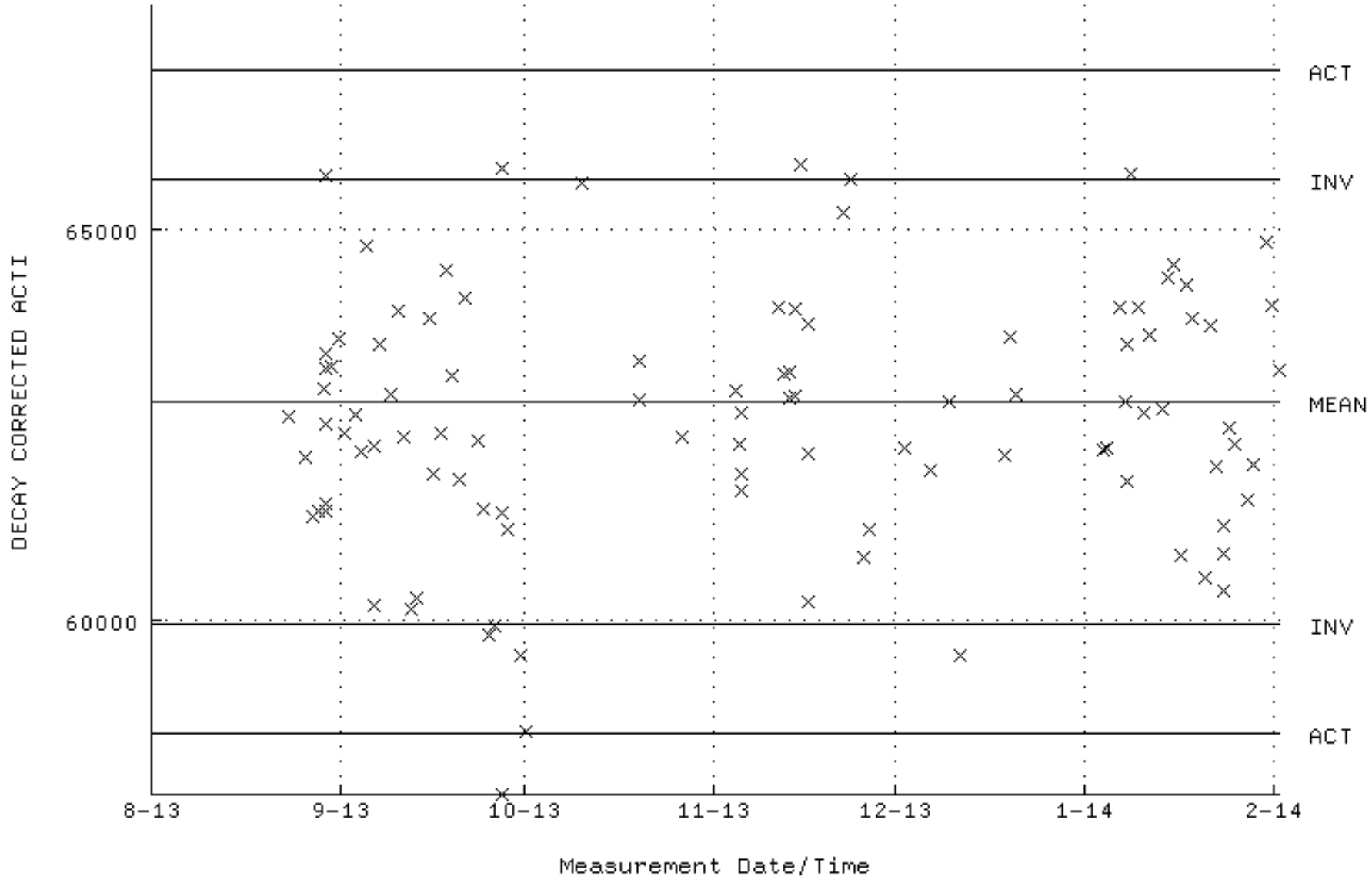
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM40_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 23-AUG-2013 10:52:57 through 1-FEB-2014 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



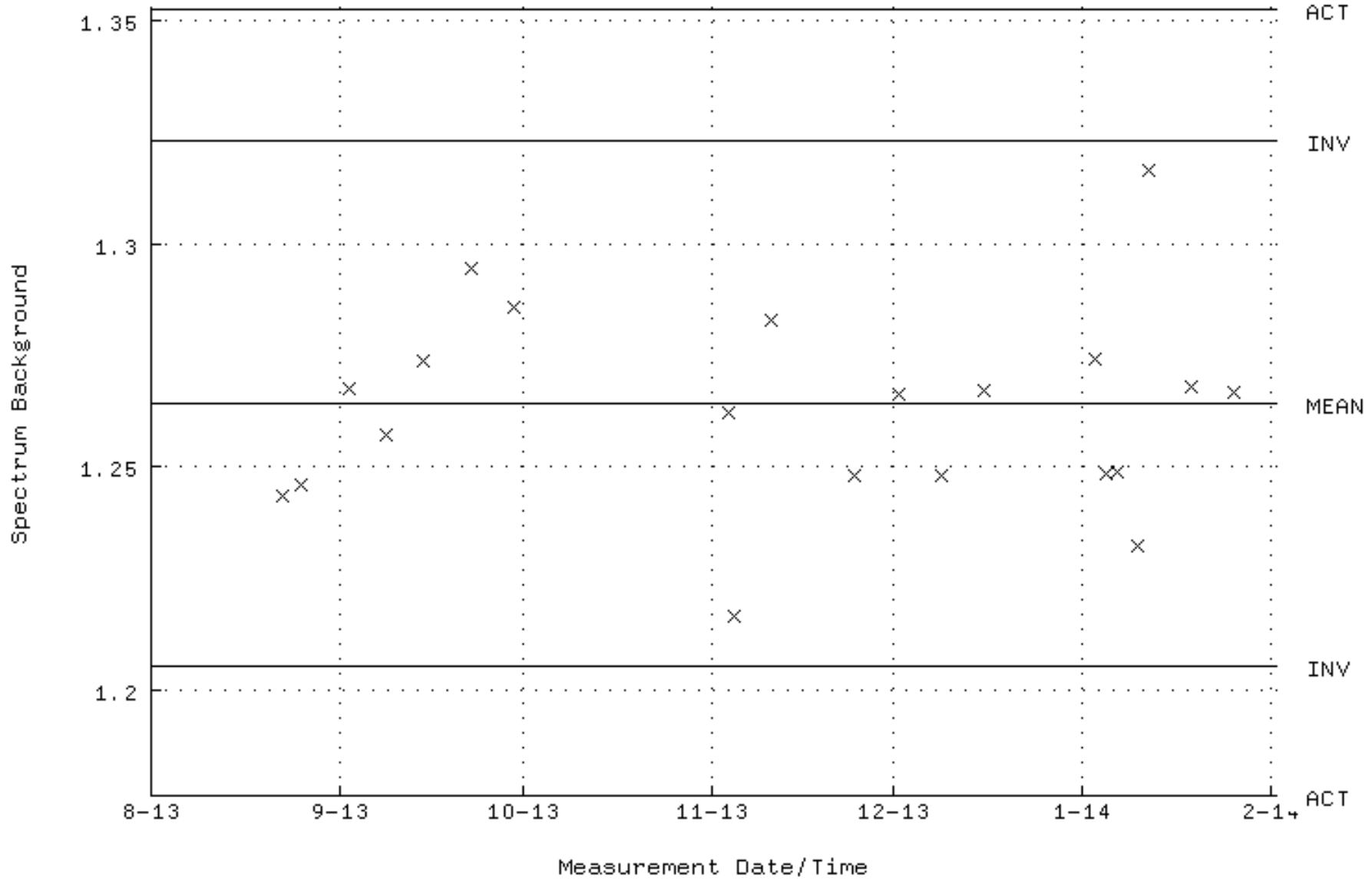
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM40_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 23-AUG-2013 10:52:57 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.06953 +- 5.224210E-02 (4.88 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM40_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 23-AUG-2013 10:52:57 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 62814.7 +- 1417.38 (2.26 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM40.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 22-AUG-2013 11:47:13 through 1-FEB-2014 12:00:00
Mean +- Std Dev : 1.26434 +- 2.937377E-02 (2.32 %)



# RAD Standards Traceability

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

1605

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

## 90617

### 500 mL Solid in 500 mL Marinelli Beaker

**Customer:** GEL Laboratories, LLC
**P.O. No.:** 188182RD, Item 2
**Reference Date:** 01-Apr-2012 12:00 PM EST **Grams of Master Source:** 0.0066953

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.
Density of solid matrix 1.15 g/cc.

| Nuclide | Gamma-Ray Energy (keV) | Half-Life, Days | Master Source* γps/gram | This Source γps | Uncertainty* , % Type $u_A$ | $u_B$ | U | Calibration Method* |
|---|---|---|---|---|---|---|---|---|
| Pb-210 | 46.5 | 8.109E+03 | ——— | 1.177E+03 | 0.1 | 2.1 | 4.1 | 4π LS |
| Am-241 | 59.5 | 1.580E+05 | ——— | 7.363E+02 | 0.1 | 1.7 | 3.5 | 4π LS |
| Cd-109 | 88.0 | 4.626E+02 | 1.664E+05 | 1.114E+03 | 0.5 | 2.3 | 4.7 | HPGe |
| Co-57 | 122.1 | 2.718E+02 | 8.863E+04 | 5.934E+02 | 0.4 | 2.0 | 4.1 | HPGe |
| Ce-139 | 165.9 | 1.376E+02 | 1.239E+05 | 8.293E+02 | 0.4 | 1.9 | 3.9 | HPGe |
| Hg-203 | 279.2 | 4.661E+01 | 2.641E+05 | 1.768E+03 | 0.3 | 1.9 | 3.8 | HPGe |
| Sn-113 | 391.7 | 1.151E+02 | 1.742E+05 | 1.166E+03 | 0.4 | 1.9 | 3.9 | HPGe |
| Cs-137 | 661.7 | 1.098E+04 | 1.114E+05 | 7.459E+02 | 0.7 | 1.9 | 4.0 | HPGe |
| Y-88 | 898.0 | 1.066E+02 | 4.157E+05 | 2.783E+03 | 0.5 | 1.9 | 3.9 | HPGe |
| Zn-65 | 1115.6 | 2.441E+02 | ——— | 1.357E+03 | 0.1 | 1.7 | 3.5 | IC |
| Co-60 | 1173.2 | 1.925E+03 | 2.084E+05 | 1.395E+03 | 0.6 | 1.9 | 4.0 | HPGe |
| Co-60 | 1332.5 | 1.925E+03 | 2.084E+05 | 1.396E+03 | 0.7 | 1.9 | 4.0 | HPGe |
| Y-88 | 1836.1 | 1.066E+02 | 4.401E+05 | 2.946E+03 | 0.7 | 1.9 | 4.0 | HPGe |

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



**Corporate Office**
24937 Avenue Tibbitts Valencia, California 91355

**Laboratory**
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Source Prepared by: _____
K. Eardley, Radiochemist

QA Approved: _____ Date: 26 APR 12
J.D. McCorvey, Counting Room Manager

# Standard Logbook

**Serial ID:** 1605 **Open/Reference Date:** 01-APR-12
**Name:** Mixed Gamma- 500MLMB L **Received:** 01-APR-12
**Type:** Source Material **Expires:** 10-SEP-39
**Employee:** Maggie Stamps **Verified:** 10-SEP-13
**Supplier:** Eckert & Zeigler Analytics
**Description:** 500MLMB Calibration Standard 90617
**Comments:** None

| Analyte | Concentration | Analyte | Concentration |
|---|---|---|---|
| Americium-241 | 123058.5 dpm/mL | Cesium-137 | 52589.89 dpm/mL |
| Cobalt-60 | 83776.76 dpm/mL | | |

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1
Maggie Stamps
9/10/2013

| Isotope | Result |
|---|---|
| **Am-241** | **pCi/L** |
| Mixed Gamma N1 | 58470 |
| Mixed Gamma N2 | 60540 |
| Mixed Gamma N3 | 62880 |

Isotopic Abundance: 0.359
Certificate Value (dps): 736.3

| | | | | | |
|---|---|---|---|---|---|
| **Mean Value (Counting) =** | 60630.00 | pCi/L | **109.3777** | **Fail** | *Exception taken due to the high uncertainty of the certified value |
| **Stdev =** | 2206.377 | pCi/L | | **Rule B (Pass/Fail)** | |
| **Certificate Value =** | 55431.8 | pCi/L | | | |
| **Two sigma =** | 4412.754242 | | | | |
| **10 % of Mean =** | 6063 | | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | | |

M Stamps 9/11/13
RF. wtd 9/4/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1
Maggie Stamps
9/10/2013

| | Isotope | Result | | | |
|---|---|---|---|---|---|
| | **Cs-137** | **pCi/L** | | | |
| | Mixed Gamma N1 | 23670 | | Isotopic Abundance: | 0.851 |
| | Mixed Gamma N2 | 23850 | | Certificate Value (dps): | 745.9 |
| | Mixed Gamma N3 | 23680 | | | |
| **Mean Value (Counting) =** | 23733.33 | pCi/L | **100.1865** | **Pass** | |
| **Stdev =** | 101.160 | pCi/L | | **Rule B (Pass/Fail)** | |
| **Certificate Value =** | 23689.1 | pCi/L | | | |
| **Two sigma =** | 202.3198787 | | | | |
| **10 % of Mean =** | 2373.333333 | | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | | |

M Stamps 9/11/13
R. Fuetel 9/11/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1

Maggie Stamps
9/10/2013

| Isotope | Result | | | |
|---|---|---|---|---|
| **Co-60 (1173)** | **pCi/L** | | | |
| Mixed Gamma N1 | 37100 | | Isotopic Abundance: | 0.9985 |
| Mixed Gamma N2 | 36890 | | Certificate Value (dps): | 1395 |
| Mixed Gamma N3 | 37230 | | | |
| **Mean Value (Counting) =** | 37073.33 | pCi/L | **98.18321** | **Pass** |
| **Stdev =** | 171.561 | pCi/L | | **Rule B (Pass/Fail)** |
| **Certificate Value =** | 37759.3 | pCi/L | | |
| **Two sigma =** | 343.1229129 | | | |
| **10 % of Mean =** | 3707.333333 | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | |

MStamps 9/4/13

R. Fuller 9/11/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Verification for Mixed Gamma Standard 1605 500MLMB

v1.1.1

Maggie Stamps
9/10/2013

| | Isotope | Result | | | |
|---|---|---|---|---|---|
| | **Co-60 (1332.50)** | **pCi/L** | | | |
| | Mixed Gamma N1 | 37690 | | Isotopic Abundance: | 0.9998 |
| | Mixed Gamma N2 | 37460 | | Certificate Value (dps): | 1396 |
| | Mixed Gamma N3 | 38010 | | | |
| **Mean Value (Counting) =** | 37720.00 | pCi/L | **99.95422** | **Pass** | |
| **Stdev =** | 276.225 | pCi/L | | **Rule B (Pass/Fail)** | |
| **Certificate Value =** | 37737.3 | pCi/L | | | |
| **Two sigma =** | 552.4490927 | | | | |
| **10 % of Mean =** | 3772 | | | | |
| **Rule A (Pass/Fail)** | **Pass** | | | | |

M. Stamps 9/11/13

R. Futch 9/11/13

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
**Rule B = The determined mean value shall be within 5% of the certificate value.**

# Runlogs

# Instrument Run Log

**Instrument Type: GAMMA SPECTROMETER** **Batch ID: 1359496**

| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 341147001 | SAMPLE | RXF2 | GAM06 | FEB-07-14 08:42:23 | DONE | 500MLMB | 28-MAY-13 00:00 |
| 341147002 | SAMPLE | RXF2 | GAM19 | FEB-07-14 08:42:45 | DONE | 500MLMB | 12-JUN-13 00:00 |
| 341147003 | SAMPLE | RXF2 | GAM24 | FEB-07-14 08:43:08 | DONE | 500MLMB | 06-JUN-13 00:00 |
| 341147004 | SAMPLE | RXF2 | GAM25 | FEB-07-14 08:43:28 | DONE | 500MLMB | 08-NOV-13 00:00 |
| 341147005 | SAMPLE | RXF2 | GAM32 | FEB-07-14 08:43:54 | DONE | 500MLMB | 23-AUG-13 00:00 |
| 341147006 | SAMPLE | RXF2 | GAM36 | FEB-07-14 08:44:15 | DONE | 500MLMB | 03-AUG-13 00:00 |
| 1203017840 | LCS | RXF2 | GAM14 | FEB-07-14 08:45:04 | DONE | 500MLMB | 14-NOV-13 00:00 |
| 341147007 | SAMPLE | RXF2 | GAM08 | FEB-07-14 08:59:23 | DONE | 500MLMB | 08-JUL-13 00:00 |
| 341147008 | SAMPLE | RXF2 | GAM09 | FEB-07-14 09:00:35 | DONE | 500MLMB | 05-JUN-13 00:00 |
| 341147009 | SAMPLE | RXF2 | GAM12 | FEB-07-14 09:00:58 | DONE | 500MLMB | 14-NOV-13 00:00 |
| 341147010 | SAMPLE | RXF2 | GAM20 | FEB-07-14 09:05:27 | DONE | 500MLMB | 11-JUN-13 00:00 |
| 341147011 | SAMPLE | RXF2 | GAM27 | FEB-07-14 09:05:45 | DONE | 500MLMB | 07-SEP-13 00:00 |
| 341147012 | SAMPLE | RXF2 | GAM33 | FEB-07-14 09:06:12 | DONE | 500MLMB | 23-AUG-13 00:00 |
| 341147013 | SAMPLE | RXF2 | GAM11 | FEB-07-14 09:10:24 | DONE | 500MLMB | 11-JUL-13 00:00 |
| 341147014 | SAMPLE | RXF2 | GAM17 | FEB-07-14 09:11:07 | DONE | 500MLMB | 18-JUL-13 00:00 |
| 341147015 | SAMPLE | RXF2 | GAM28 | FEB-07-14 09:11:35 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 341147016 | SAMPLE | RXF2 | GAM29 | FEB-07-14 09:11:59 | DONE | 500MLMB | 11-JUN-13 00:00 |
| 341147017 | SAMPLE | RXF2 | GAM30 | FEB-07-14 09:12:25 | DONE | 500MLMB | 06-JUN-13 00:00 |
| 341147018 | SAMPLE | RXF2 | GAM04 | FEB-07-14 09:17:04 | DONE | 500MLMB | 09-AUG-13 00:00 |
| 341147019 | SAMPLE | RXF2 | GAM40 | FEB-07-14 09:17:32 | DONE | 500MLMB | 27-AUG-13 00:00 |
| 341147020 | SAMPLE | RXF2 | GAM01 | FEB-07-14 10:00:39 | DONE | 500MLMB | 12-DEC-13 00:00 |
| 1203017838 | MB | RXF2 | GAM06 | FEB-07-14 10:01:24 | DONE | 500MLMB | 28-MAY-13 00:00 |
| 1203017839 | DUP | RXF2 | GAM07 | FEB-07-14 10:01:53 | DONE | 500MLMB | 26-JUL-13 00:00 |

# Instrument Run Log

**Instrument Type: GAMMA SPECTROMETER** **Batch ID: 1361908**

| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 341140023 | SAMPLE | RXF2 | GAM24 | FEB-12-14 11:43:07 | DONE | 500MLMB | 06-JUN-13 00:00 |
| 341140024 | SAMPLE | RXF2 | GAM28 | FEB-12-14 11:44:02 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 341140025 | SAMPLE | RXF2 | GAM32 | FEB-12-14 11:44:43 | DONE | 500MLMB | 23-AUG-13 00:00 |
| 341140026 | SAMPLE | RXF2 | GAM07 | FEB-12-14 11:45:24 | DONE | 500MLMB | 26-JUL-13 00:00 |
| 341146021 | SAMPLE | RXF2 | GAM14 | FEB-12-14 11:46:00 | DONE | JAR | 21-NOV-13 00:00 |
| 341140021 | SAMPLE | RXF2 | GAM17 | FEB-12-14 11:48:57 | DONE | 500MLMB | 18-JUL-13 00:00 |
| 341140022 | SAMPLE | RXF2 | GAM19 | FEB-12-14 11:49:54 | DONE | 500MLMB | 12-JUN-13 00:00 |
| 341146022 | SAMPLE | RXF2 | GAM22 | FEB-12-14 11:52:15 | DONE | JAR | 07-OCT-13 00:00 |
| 341146023 | SAMPLE | RXF2 | GAM18 | FEB-12-14 11:52:51 | DONE | JAR | 07-MAR-13 00:00 |
| 341146024 | SAMPLE | RXF2 | GAM04 | FEB-12-14 11:53:30 | DONE | JAR | 12-MAR-13 00:00 |
| 341147021 | SAMPLE | RXF2 | GAM01 | FEB-12-14 14:29:36 | DONE | 500MLMB | 12-DEC-13 00:00 |
| 341147022 | SAMPLE | RXF2 | GAM03 | FEB-12-14 14:30:08 | DONE | 500MLMB | 08-AUG-13 00:00 |
| 341147023 | SAMPLE | RXF2 | GAM05 | FEB-12-14 14:30:33 | DONE | JAR | 18-SEP-13 00:00 |
| 341147024 | SAMPLE | RXF2 | GAM06 | FEB-12-14 14:31:00 | DONE | JAR | 18-MAR-13 00:00 |
| 341148019 | SAMPLE | RXF2 | GAM07 | FEB-12-14 14:31:25 | DONE | JAR | 21-MAR-13 00:00 |
| 341148020 | SAMPLE | RXF2 | GAM09 | FEB-12-14 14:31:50 | DONE | 500MLMB | 05-JUN-13 00:00 |
| 341148021 | SAMPLE | RXF2 | GAM11 | FEB-12-14 14:32:19 | DONE | JAR | 25-MAR-13 00:00 |
| 341148022 | SAMPLE | RXF2 | GAM12 | FEB-12-14 14:32:52 | DONE | 500MLMB | 14-NOV-13 00:00 |
| 1203023699 | MB | RXF2 | GAM27 | FEB-12-14 14:36:55 | DONE | 500MLMB | 07-SEP-13 00:00 |
| 1203023700 | DUP | RXF2 | GAM28 | FEB-12-14 14:38:29 | DONE | 500MLMB | 01-AUG-13 00:00 |
| 1203023701 | LCS | RXF2 | GAM11 | FEB-12-14 16:15:51 | DONE | 500MLMB | 11-JUL-13 00:00 |

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GEL Laboratories LLC
a member of The GEL Group INC

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2040 Savage Road Charleston, SC 29407
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www.gel.com

# Packing Slip:

**ITSI Gilbane Company**
**Hunter's Point Rad Analysis - Total Sr**
**SDG: 345764**
**Attn:Kristen Carlyon**

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# DODQSM Cover Sheet

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
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www.gel.com

# DOD-QSM Cover Sheet

## Hunter's Point Rad Analysis - Total Sr

April 14, 2014

**GEL Laboratories, LLC**
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Project Manager:** Heather Shaffer
**Phone Extension:** 4505
**Email:** Heather.Shaffer@gel.com

**Contract Purchase Order:** 9259-07204.0004 9259-07204.0004

**Work Order:** 345764 **SDG:** 345764

**Client Contact:**
Kriston Carlyon
ITSI Gilbane Company
2730 Shadelands Drive
Walnut Creek, California 94598

**Project Identification:** Hunter's Point Rad Analysis - Total Sr

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 11, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,

Heather Shaffer

Heather Shaffer
Project Manager


problem solved

# Case Narrative

**DODQSM Case Narrative**
**for**
**ITSI Gilbane Company**
**SDG: 345764**

**April 14, 2014**

**Laboratory Identification:**

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on December 11, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. All samples under this SDG were relogged per client request.

**Sample Identification** The laboratory received the following samples:

| Laboratory ID | Client ID |
|---|---|
| 345764001 | 04-PDV-RT1300-09-0006 |
| 345764002 | 04-PDV-RT1300-09-0015 |
| 345764003 | 04-PDV-RT1300-09-0023 |

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

Heather Shaffer

Heather Shaffer
Project Manager

# Chain of Custody and Supporting Documentation

DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

Relog 345764

~~Relog 341147~~

~~339225~~

COC # HPSD1-0035

Gilbane

| | |
|---|---|
| Project Name: HPSD1 | Laboratory: Curtis & Tompkins, Berkeley, CA |
| Project Number: 07204.0004 | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| WBS Code: 0058000 | Ship to: 2323 5th St., Berkley, CA 94710 |

Comments:

Equipment:

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250 640 @ 11-08-13 BIN 11

Analytical Test Method: E901.1 - Solid Ra-226 and CS-137; GS186 - Ra-226 and CS-137 Screening

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-09-0001 | SN | 11/7/2013 | 1130 | JL | X | | RT1300-09-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-09-0002 | SN | 11/7/2013 | 1140 | JL | X | | RT1300-09-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-09-0003 | SN | 11/7/2013 | 1143 | JL | X | | RT1300-09-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-09-0004 | SN | 11/7/2013 | 1145 | JL | X | | RT1300-09-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-09-0005 | SN | 11/7/2013 | 1150 | JL | X | | RT1300-09-0005 | N1 | 0.00 | 0.00 |
| * 6 | 04-PDV-RT1300-09-0006 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-09-0007 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-09-0008 | SN | 11/7/2013 | 1311 | JL | X | | RT1300-09-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-09-0009 | SN | 11/7/2013 | 1315 | JL | X | | RT1300-09-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-09-0010 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0010 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) | Date | Time |
|---|---|---|---|---|---|
| James Lou | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| R. Hutz | 12/10/13 | 0955 | [signature] | 12-10-13 | 0955 |
| | | | [signature] | 121113 | 1030 |
| | | | | | |

Shipping Date / Carrier / Airbill Number

Shipping Date: 11/8/2013

Recevied by Laboratory: (Signature, Date, Time) & condition

[signature] 11-08-13 1102 OK

Page 1 of 3

DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

COC # HPSD1-0035

Gilbane

| | |
|---|---|
| Project Name: HPSD1 | Laboratory: Curtis & Tompkins, Berkeley, CA |
| Project Number: 07204.0004 | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| WBS Code: 0058000 | Ship to: 2323 5th St., Berkley, CA 94710 |

Comments:

Equipment:

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250640 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-09-0011 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-09-0012 | SN | 11/7/2013 | 1325 | JL | X | | RT1300-09-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-09-0013 | SN | 11/7/2013 | 1330 | JL | X | | RT1300-09-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-09-0014 | SN | 11/7/2013 | 1335 | JL | X | | RT1300-09-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-09-0015 | SN | 11/7/2013 | 1342 | JL | X | | RT1300-09-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-09-0016 | SN | 11/7/2013 | 1344 | JL | X | | RT1300-09-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-09-0017 | SN | 11/7/2013 | 1350 | JL | X | | RT1300-09-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-09-0018 | SN | 11/7/2013 | 1355 | JL | X | | RT1300-09-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-09-0019 | SN | 11/7/2013 | 1356 | JL | X | | RT1300-09-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-09-0020 | SN | 11/7/2013 | 1400 | | X | | RT1300-09-0020 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [illegible] | 11-8-13 | 1000 |
| [illegible] | 12/10/13 | 0955 | [illegible] | 12-10-13 | 0955 |
| | | | [illegible] | 121113 | 1030 |
| | | | | | |

Shipping Date / Carrier / Airbill Number

Shipping Date: 11/8/2013

Recevied by Laboratory: (Signature, Date, Time) & condition

[illegible] 11/8/13 1102 OK

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag. |

250640 11-0873 BIN 11

**Event: Railroad Tie Survey**

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PDV-RT1300-09-0021 | SN | 11/7/2013 | 1500 | JL | X | X | RT1300-09-0021 | N1 | 0.00 | 0.00 |
| 22 | 04-PDV-RT1300-09-0022 | SN | 11/7/2013 | 1555 | JL | X | X | RT1300-09-0022 | N1 | 0.00 | 0.00 |
| 23 | 04-PDV-RT1300-09-0023 | SN | 11/7/2013 | 1545 | JL | X | X | RT1300-09-0023 | N1 | 0.00 | 0.00 |
| 24 | 04-PDV-RT1300-09-0024 | SN | 11/7/2013 | 1548 | JL | X | X | RT1300-09-0024 | N1 | 0.00 | 0.00 |

**Cooler # 3** — **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | Susan Tuscano | 11-8-13 | 1000 |
| Rob Stutz | 12/10/13 | 0955 | Susan Tuscano | 12-10-13 | 0955 |
| | | | [illegible] | 121113 | 1630 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible]



M-10126

**Subject:** Total Stronium Request for Wood Chip Samples - SDGs 341140 through 341148
**From:** "Carlyon, Peyton Kristen" <KCarlyon@GilbaneCo.com>
**Date:** 4/2/2014 4:55 PM
**To:** Heather Shaffer <Heather.Shaffer@gel.com>
**CC:** "Palser, Ed" <EPalser@GilbaneCo.com>, "Hess, Jeffrey (ITSI)" <J.Hess@gilbaneco.com>, "Hess, Rachel" <RHess@GilbaneCo.com>

Hi Heather,

We would like to request Total Strontium/Sr-90 if necessary for the following samples:

| FLDSAMPID | SDG | LABCODE |
|---|---|---|
| 04-PDV-RT1300-01-0002 | 341141 | GELC |
| 04-PDV-RT1300-01-0015 | 341141 | GELC |
| 04-PDV-RT1300-01-0016 | 341141 | GELC |
| 04-PDV-RT1300-02-0004 | 341142 | GELC |
| 04-PDV-RT1300-02-0015 | 341142 | GELC |
| 04-PDV-RT1300-02-0017 | 341142 | GELC |
| 04-PDV-RT1300-03-0002 | 341143 | GELC |
| 04-PDV-RT1300-03-0006 | 341143 | GELC |
| 04-PDV-RT1300-03-0022 | 341143 | GELC |
| 04-PDV-RT1300-04-0014 | 341144 | GELC |
| 04-PDV-RT1300-04-0019 | 341144 | GELC |
| 04-PDV-RT1300-04-0024 | 341144 | GELC |
| 04-PDV-RT1300-05-0009 | 341145 | GELC |
| 04-PDV-RT1300-05-0020 | 341145 | GELC |
| 04-PDV-RT1300-05-0021 | 341145 | GELC |
| 04-PDV-RT1300-06-0008 | 341140 | GELC |
| 04-PDV-RT1300-06-0018 | 341140 | GELC |
| 04-PDV-RT1300-06-0021 | 341140 | GELC |
| 04-PDV-RT1300-07-0010 | 341148 | GELC |

| | | |
|---|---|---|
| 04-PDV-RT1300-07-0013 | 341148 | GELC |
| 04-PDV-RT1300-07-0023 | 341148 | GELC |
| 04-PDV-RT1300-08-0007 | 341146 | GELC |
| 04-PDV-RT1300-08-0008 | 341146 | GELC |
| 04-PDV-RT1300-08-0020 | 341146 | GELC |
| 04-PDV-RT1300-09-0006 | 341147 | GELC |
| 04-PDV-RT1300-09-0015 | 341147 | GELC |
| 04-PDV-RT1300-09-0023 | 341147 | GELC |

Please bill to our PO with you (9259-07204.0004). Please let me know if you need additional information.

Thanks,
Kristen

**Please note my new email address: kcarlyon@gilbaneco.com**

Kristen Carlyon | Senior Chemist | **Gilbane**
2730 Shadelands Drive | Walnut Creek, CA, 94598
ph: 925.946.3180 | cell: 925.525.9050 | www.gilbaneco.com

CONFIDENTIALITY NOTICE:
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# Laboratory Certifications

**List of current GEL Certifications as of 14 April 2014**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−14−9 |
| Utah NELAP | SC000122013−11 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780−12 |
| Wisconsin | 999887790 |

# Radiological Analysis

**Radiochemistry Case Narrative**
**ITSI Gilbane Company (ITSI)**
**SDG 345764**

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **GFPC, Total Sr, Solid** |
| Analytical Method: | EPA 905.0 Modified |
| Analytical Batch Number: | 1377649 |

| Sample ID | Client ID |
|---|---|
| 345764001 | 04-PDV-RT1300-09-0006 |
| 345764002 | 04-PDV-RT1300-09-0015 |
| 1203062517 | Method Blank (MB) |
| 1203062518 | 345763001(04-PDV-RT1300-08-0007) Sample Duplicate (DUP) |
| 1203062519 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 345763001 (04-PDV-RT1300-08-0007).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Chemical Recoveries**
All chemical recoveries meet the required acceptance limits for this sample set.

**Recounts**
Sample 1203062519 (LCS) was recounted due to a detector lock out condition. The recount is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **GFPC, Total Sr, Solid** |
| Analytical Method: | EPA 905.0 Modified |
| Analytical Batch Number: | 1379182 |

| Sample ID | Client ID |
|---|---|
| 345764003 | 04-PDV-RT1300-09-0023 |
| 1203065849 | Method Blank (MB) |
| 1203065850 | 345746003(04-PDV-RT1300-03-0022) Sample Duplicate (DUP) |
| 1203065851 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 345746003 (04-PDV-RT1300-03-0022).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Chemical Recoveries**
All chemical recoveries meet the required acceptance limits for this sample set.

**Recounts**
None of the samples in this batch were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Qualifier Definition Report
## for

ITSI003 ITSI Gilbane Company

Client SDG: 345764 GEL Work Order: 345764

**The Qualifiers in this report are defined as follows:**

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:** **Name: Kate Gellatly**

**Date: 15 APR 2014** **Title: Analyst I**

# Sample Data Summary

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive
Walnut Creek, California 94598
Report Date: April 15, 2014
Contact: Ms. Kristen Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-09-0006
Sample ID: 345764001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.0781 | +/-0.0823 | 0.137 | +/-0.0846 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1305 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 68.3 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 15, 2014

Contact: Ms. Kristen Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-09-0015
Sample ID: 345764002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.102 | +/-0.0876 | 0.144 | +/-0.0913 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1305 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 63.4 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 15, 2014

Contact: Ms. Kristen Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-09-0023
Sample ID: 345764003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | -0.0235 | +/-0.0482 | 0.102 | +/-0.0482 | 0.166 | pCi/g | | KSD1 | 04/11/14 | 1504 | 1379182 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1379182 | 72.0 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# Quality Control Data

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## QC Summary

**Client :** **ITSI Gilbane Company**
**2730 Shadelands Drive**
**Walnut Creek, California**
**Contact:** **Ms. Kristen Carlyon**
**Workorder:** **345764**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow** | | | | | | | | | | |
| Batch 1377649 | | | | | | | | | | |
| QC1203062518 345763001 DUP | | | | | | | | | | |
| Total Strontium | U | 0.131 | U | 0.00903 | pCi/g | 0 | | N/A | KSD1 | 04/12/1413:05 |
| | Uncert: | +/-0.102 | | +/-0.0698 | | | | | | |
| | TPU: | +/-0.107 | | +/-0.0698 | | | | | | |
| QC1203062519 LCS | | | | | | | | | | |
| Total Strontium | 3.88 | | | 4.03 | pCi/g | | 104 | (75%-125%) | KSD1 | 04/14/1410:58 |
| | Uncert: | | | +/-0.202 | | | | | | |
| | TPU: | | | +/-1.05 | | | | | | |
| QC1203062517 MB | | | | | | | | | | |
| Total Strontium | | | U | 0.0386 | pCi/g | | | | KSD1 | 04/12/1413:05 |
| | Uncert: | | | +/-0.0554 | | | | | | |
| | TPU: | | | +/-0.0563 | | | | | | |
| Batch 1379182 | | | | | | | | | | |
| QC1203065850 345746003 DUP | | | | | | | | | | |
| Total Strontium | U | -0.0556 | U | -0.0647 | pCi/g | 0 | | N/A | KSD1 | 04/11/1415:04 |
| | Uncert: | +/-0.0636 | | +/-0.0626 | | | | | | |
| | TPU: | +/-0.0636 | | +/-0.0626 | | | | | | |
| QC1203065851 LCS | | | | | | | | | | |
| Total Strontium | 4.30 | | | 4.31 | pCi/g | | 100 | (75%-125%) | KSD1 | 04/11/1415:04 |
| | Uncert: | | | +/-0.247 | | | | | | |
| | TPU: | | | +/-1.12 | | | | | | |
| QC1203065849 MB | | | | | | | | | | |
| Total Strontium | | | U | -0.0487 | pCi/g | | | | KSD1 | 04/11/1415:04 |
| | Uncert: | | | +/-0.0553 | | | | | | |
| | TPU: | | | +/-0.0553 | | | | | | |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

| | |
|---|---|
| ** | Analyte is a Tracer compound |
| < | Result is less than value reported |
| > | Result is greater than value reported |
| BD | Results are either below the MDC or tracer recovery is low |
| FA | Failed analysis. |
| H | Analytical holding time was exceeded |
| J | Value is estimated |
| K | Analyte present. Reported value may be biased high. Actual value is expected to be lower. |
| L | Analyte present. Reported value may be biased low. Actual value is expected to be higher. |
| M | M if above MDC and less than LLD |

## QC Summary

**Workorder:** **345764**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---|---|
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Y | Other specific qualifiers were required to properly define the results. Consult case narrative. |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. |
| h | Preparation or preservation holding time was exceeded |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Gas Flow Raw Data

Radiochemistry Batch Checklist

12-Mar-2014



Batch# 1377649 Product: ~~Sr 90~~ Tot I S. TM 4/14/2014 Date: 4/14/14

| Criteria: | Yes | No | Comments |
|---|---|---|---|
| Sample Solids are less than or equal to 100 mg for GAB. | | | NB |
| Samples have been blank corrected (if required). Blank correction reported included (if required). | | | NB |
| If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay. | / | | |
| Instrument source check is within limits. Instrument bkg check is within limits. | / | | |
| Method RDL/ LLD has been met. | / | | |
| If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria. | / | | |
| Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria). | / | | |
| Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity) | / | | |
| Sample was run within hold time. | / | | |
| Sample was correctly preserved if required. | / | | |
| Smears Taken for Radioactive batches. | / | | |
| Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria). | / | | |
| No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent. | / | | |
| Aux data is correct. | | | NA |
| Client Special requirements page has been checked. | / | | |
| Raw Data and/ or spectrum are included and properly statused. | / | | |
| MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified | / | | |
| Hit notification complete (if necessary) | | | NA |
| Batch entered into Case Narrative. | / | | |
| Batch Data Exception Reports (DER) completed, if applicable. | | | NA |
| Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed. | | | NA |
| Aliquot Correction completed if required. | | | NA |
| Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.) | / | | |

Primary Review Performed By: [signature] 4/14/14 HSI

Secondary Review Performed By: [signature] 4/14/14

Tot Sr

# Strontium 90 Queue Sheet

04/09/14

Batch #: 1377649 Analyst: KSD1 First Client Due Date: 04/14/2014 Internal Due Date: 04/04/2014 Comments

Sr-90 Spike Code: — Expiration Date: — Vol: — Sr Sep. Date/time: 4-12-14 / 1050

Sr-90 LCS Code: 12431 Expiration Date: 12/4/14 Vol: 0.1

Sr Carrier Code: 10410414 Exp Date: 12/5/14 Vol: 0.0 Sdt Wt: 8.2 BF 4-12-14

Prep Date: 4/9/14 Initials: KSD Pipet ID: 17954/19 Balance #: ~~5110~~ ~~S10477~~ 50410272 Analytical Scale #: F305410 Witness: 4/9/14

| Sample ID | Client Description | Type | RDL | Collection Date | Matrix | Client | Rad | Pos. # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr wt (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 345760001-1 | 04-PDV-RT1300-05-0009 | SAMPLE | .166 pCi/g | NOV-05-13 02:20 PM | SOLID | ITSI003 | | 1 | 5.110 | 10D | 0.0240 | 0.0299 | 5.9 |
| 345760002-1 | 04-PDV-RT1300-05-0020 | SAMPLE | .166 pCi/g | NOV-05-13 03:25 PM | SOLID | ITSI003 | | 2 | 5.462 | 4C | 0.0232 | 0.0288 | 5.6 |
| 345760003-1 | 04-PDV-RT1300-05-0021 | SAMPLE | .166 pCi/g | NOV-06-13 02:52 PM | SOLID | ITSI003 | | 3 | 5.016 | 10B | 0.0238 | 0.0292 | 5.4 |
| 345761001-1 | 04-PDV-RT1300-06-0008 | SAMPLE | .166 pCi/g | NOV-06-13 08:52 AM | SOLID | ITSI003 | | 4 | 5.354 | 14A | 0.0238 | 0.0293 | 5.5 |
| 345761002-1 | 04-PDV-RT1300-06-0018 | SAMPLE | .166 pCi/g | NOV-06-13 10:20 AM | SOLID | ITSI003 | | 5 | 4.936 | 10C | 0.0230 | 0.0285 | 5.5 |
| 345761003-1 | 04-PDV-RT1300-06-0021 | SAMPLE | .166 pCi/g | NOV-06-13 02:35 PM | SOLID | ITSI003 | | 6 | 5.078 | 14C | 0.0240 | 0.0296 | 5.6 |
| 345762001-1 | 04-PDV-RT1300-07-0010 | SAMPLE | .166 pCi/g | NOV-06-13 12:00 PM | SOLID | ITSI003 | | 7 | 5.588 | 4B | 0.0232 | 0.0289 | 5.7 |
| 345762002-1 | 04-PDV-RT1300-07-0013 | SAMPLE | .166 pCi/g | NOV-06-13 01:27 PM | SOLID | ITSI003 | | 8 | 5.102 | 11D | 0.0248 | 0.0301 | 5.3 |
| ~~345762003-1~~ | ~~04-PDV-RT1300-07-0023~~ | ~~SAMPLE~~ | ~~.166 pCi/g~~ | ~~NOV-07-13 02:45 PM~~ | ~~SOLID~~ | ~~ITSI003~~ | | 9 | | | | | |
| 345763001-1 | 04-PDV-RT1300-08-0007 | SAMPLE | .166 pCi/g | NOV-07-13 10:04 AM | SOLID | ITSI003 | | 10 | 5.105 | 4D | 0.0240 | 0.0299 | 5.9 |
| 345763002-1 | 04-PDV-RT1300-08-0008 | SAMPLE | .166 pCi/g | NOV-07-13 10:09 AM | SOLID | ITSI003 | | 11 | 5.033 | A1 | 0.0232 | 0.0289 | 5.7 |
| 345763003-1 | 04-PDV-RT1300-08-0020 | SAMPLE | .166 pCi/g | NOV-07-13 11:20 AM | SOLID | ITSI003 | | 12 | 5.858 | A2 | 0.0240 | 0.0290 | 5.0 |
| 345764001-1 | 04-PDV-RT1300-09-0006 | SAMPLE | .166 pCi/g | NOV-07-13 11:55 AM | SOLID | ITSI003 | | 13 | 5.185 | F1 | 0.0240 | 0.0296 | 5.6 |
| 345764002-1 | 04-PDV-RT1300-09-0015 | SAMPLE | .166 pCi/g | NOV-07-13 01:42 PM | SOLID | ITSI003 | | 14 | 5.440 | F2 | 0.0232 | 0.0284 | 5.2 |
| ~~345764003-1~~ | ~~04-PDV-RT1300-09-0023~~ | ~~SAMPLE~~ | ~~.166 pCi/g~~ | ~~NOV-07-13 03:45 PM~~ | ~~SOLID~~ | ~~ITSI003~~ | | 15 | | | | | |
| 1203062517-1 | MB for batch 1377649 | MB | .166 pCi/g | | SOLID | QC ACCOUNT | | 16 | 5.858 | F3 | 0.0232 | 0.0295 | 6.3 |
| 1203062518-1 | 04-PDV-RT1300-08-0007(345763001DUP) | DUP | .166 pCi/g | NOV-07-13 10:04 AM | SOLID | QC ACCOUNT | | 17 | 5.003 | F4 | 0.0248 | 0.0302 | 5.4 |
| 1203062519-1 | LCS for batch 1377649 | LCS | .166 pCi/g | | SOLID | QC ACCOUNT | | 18 | 5.358 | C3 | 0.0246 | 0.0314 | 6.8 |

38 A ML 4/14/14 WTO

Solid Sample Dissolution by: LEACH or DIGESTION (Circle One) Data Reviewed By:

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M-10146

# Total Strontium Solid

Filename : SR90.XLS
File type : Excel
Version # : 1.3.10

**Carrier S/N :** 2046474
**Carrier Exp Date :** 12/5/2014
**Carrier Volume Added:** 0.50
**Carrier Weight (mg/ml):** 16.40
**Carrier Weight StDev.:** 0.16

**Batch :** 1377649
**Analyst :** KSD1
**Prep Date :** 4/9/2014
**Method Uncertainty :** 0.1281

**Geometry:** Tuffryn Filter

| | | |
|---|---|---|
| **Procedure Code :** | GFCTOSRS | |
| **Parmname :** | Total Strontium | |
| **Required MDA :** | 0.166 | pCi/G |
| **Sr-90 Abundance :** | 1.00 | |
| **Halflife of Sr-90 :** | 28.90 | years |
| **Halflife of Y-90 :** | 64.053 | hours |

| Sample Characteristics | | | | | Carrier Calculations | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pos. | Sample ID | Sample Aliquot G | Sample Aliquot StDev. G | Sample Date/Time | Carrier Weight (mg) (Standard) | Net Weight (mg) (Sample) | Net Weight StDev. (mg) | Carrier Aliquot (mL) | Carrier Aliquot StDev. (mL) |
| 1 | 345760001.1 | 5.1100 | 3.7467E-03 | 11/5/2013 14:20 | 16.40 | 5.90 | 0.032688 | 0.5 | 0.001000 |
| 2 | 345760002.1 | 5.4620 | 3.7826E-03 | 11/5/2013 15:25 | 16.40 | 5.60 | 0.031399 | 0.5 | 0.001000 |
| 3 | 345760003.1 | 5.0160 | 3.7371E-03 | 11/6/2013 14:52 | 16.40 | 5.40 | 0.030539 | 0.5 | 0.001000 |
| 4 | 345761001.1 | 5.3560 | 3.7718E-03 | 11/6/2013 8:52 | 16.40 | 5.50 | 0.030969 | 0.5 | 0.001000 |
| 5 | 345761002.1 | 4.9360 | 3.7290E-03 | 11/6/2013 10:20 | 16.40 | 5.50 | 0.030969 | 0.5 | 0.001000 |
| 6 | 345761003.1 | 5.0780 | 3.7434E-03 | 11/6/2013 14:35 | 16.40 | 5.60 | 0.031399 | 0.5 | 0.001000 |
| 7 | 345762001.1 | 5.5880 | 3.7954E-03 | 11/6/2013 12:00 | 16.40 | 5.70 | 0.031829 | 0.5 | 0.001000 |
| 8 | 345762002.1 | 5.2020 | 3.7561E-03 | 11/6/2013 13:27 | 16.40 | 5.30 | 0.030109 | 0.5 | 0.001000 |
| 9 | 345763001.1 | 5.2650 | 3.7625E-03 | 11/7/2013 10:04 | 16.40 | 5.90 | 0.032688 | 0.5 | 0.001000 |
| 10 | 345763002.1 | 5.0330 | 3.7388E-03 | 11/7/2013 10:09 | 16.40 | 5.70 | 0.031829 | 0.5 | 0.001000 |
| 11 | 345763003.1 | 5.8580 | 3.8228E-03 | 11/7/2013 11:20 | 16.40 | 5.00 | 0.028820 | 0.5 | 0.001000 |
| 12 | 345764001.1 | 5.2850 | 3.7645E-03 | 11/7/2013 11:55 | 16.40 | 5.60 | 0.031399 | 0.5 | 0.001000 |
| 13 | 345764002.1 | 5.4400 | 3.7803E-03 | 11/7/2013 13:42 | 16.40 | 5.20 | 0.029680 | 0.5 | 0.001000 |
| 14 | 1203062517.1 | 5.8580 | 3.8228E-03 | 4/9/2014 0:00 | 16.40 | 6.30 | 0.034407 | 0.5 | 0.001000 |
| 15 | 1203062518.1 | 5.0030 | 3.7358E-03 | 11/7/2013 10:04 | 16.40 | 5.40 | 0.030539 | 0.5 | 0.001000 |
| 16 | 1203062519.1 | 5.8580 | 3.8228E-03 | 4/9/2014 0:00 | 16.40 | 6.80 | 0.036556 | 0.5 | 0.001000 |

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| | | |
|---|---|---|
| **Pipet, 0.1 ml Stdev : +/-** | 0.000200 | ml |
| **Pipet, 0.5 ml Stdev : +/-** | 0.001000 | ml |
| **Pipet, 1 ml Stdev : +/-** | 0.002000 | ml |

**Analytical SOP:** GL-RAD-A-004
**Instrument SOP:** GL-RAD-I-016, GL-RAD-I-006

**Count Raw Data**

| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Strontium Separation Date/Time | Yttrium Ingrowth | Sr-90 Decay | Calculated Sample Recovery % | Sample Recovery Error % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10D | 60 | 13 | 129 | 2.131 | 4/12/2014 12:54 | 4/12/2014 10:50 | 0.028 | 0.990 | 72.0% | 1.27% |
| 2 | 4C | 60 | 6 | 30 | 0.494 | 4/12/2014 12:53 | 4/12/2014 10:50 | 0.027 | 0.990 | 68.3% | 1.27% |
| 3 | 10B | 60 | 5 | 37 | 0.611 | 4/12/2014 12:54 | 4/12/2014 10:50 | 0.028 | 0.990 | 65.9% | 1.28% |
| 4 | 14A | 60 | 5 | 43 | 0.693 | 4/12/2014 12:55 | 4/12/2014 10:50 | 0.028 | 0.990 | 67.1% | 1.28% |
| 5 | 10C | 60 | 2 | 29 | 0.481 | 4/12/2014 12:55 | 4/12/2014 10:50 | 0.028 | 0.990 | 67.1% | 1.28% |
| 6 | 14C | 60 | 4 | 29 | 0.458 | 4/12/2014 12:56 | 4/12/2014 10:50 | 0.028 | 0.990 | 68.3% | 1.27% |
| 7 | 4B | 80 | 18 | 144 | 1.756 | 4/12/2014 12:53 | 4/12/2014 10:50 | 0.029 | 0.990 | 69.5% | 1.27% |
| 8 | 11D | 60 | 4 | 23 | 0.377 | 4/12/2014 12:56 | 4/12/2014 10:50 | 0.028 | 0.990 | 64.6% | 1.28% |
| 9 | 4D | 70 | 6 | 142 | 2.026 | 4/12/2014 12:53 | 4/12/2014 10:50 | 0.028 | 0.990 | 72.0% | 1.27% |
| 10 | A1 | 80 | 10 | 111 | 1.382 | 4/12/2014 13:04 | 4/12/2014 10:50 | 0.031 | 0.990 | 69.5% | 1.27% |
| 11 | A2 | 80 | 3 | 76 | 0.949 | 4/12/2014 13:04 | 4/12/2014 10:50 | 0.031 | 0.990 | 61.0% | 1.29% |
| 12 | F1 | 80 | 9 | 142 | 1.773 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 0.990 | 68.3% | 1.27% |
| 13 | F2 | 80 | 4 | 139 | 1.736 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 0.990 | 63.4% | 1.28% |
| 14 | F3 | 80 | 15 | 103 | 1.282 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 1.000 | 76.8% | 1.26% |
| 15 | F4 | 80 | 7 | 86 | 1.071 | 4/12/2014 13:05 | 4/12/2014 10:50 | 0.031 | 0.990 | 65.9% | 1.28% |
| 16 | 3B | 60 | 25 | 1594 | 26.553 | 4/14/2014 10:58 | 4/12/2014 10:50 | 0.409 | 1.000 | 82.9% | 1.25% |

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**Calibration Data**

| Pos. | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency (cpm/dpm) Sr-90 | Y-90 | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PIC | 3/1/2013 | 2/28/2015 | 0.4008 | 0.5333 | 0.00557 | 0.08818 | 0.891 | 4/5/2014 14:33 | 1000 |
| 2 | PIC | 3/1/2013 | 2/28/2015 | 0.3970 | 0.5373 | 0.00889 | 0.05801 | 1.246 | 4/5/2014 15:35 | 1000 |
| 3 | PIC | 3/1/2013 | 2/28/2015 | 0.4016 | 0.5268 | 0.00652 | 0.06640 | 0.489 | 4/5/2014 14:33 | 1000 |
| 4 | PIC | 3/1/2013 | 2/28/2015 | 0.4045 | 0.4988 | 0.02119 | 0.28791 | 0.824 | 4/5/2014 14:25 | 1000 |
| 5 | PIC | 3/1/2013 | 2/28/2015 | 0.4017 | 0.5291 | 0.00638 | 0.07158 | 0.572 | 4/5/2014 14:33 | 1000 |
| 6 | PIC | 3/1/2013 | 2/28/2015 | 0.3962 | 0.5271 | 0.01828 | 0.38146 | 0.477 | 4/5/2014 14:25 | 1000 |
| 7 | PIC | 3/1/2013 | 2/28/2015 | 0.3974 | 0.5348 | 0.01519 | 0.19699 | 1.912 | 4/5/2014 15:35 | 1000 |
| 8 | PIC | 3/1/2013 | 2/28/2015 | 0.4127 | 0.5341 | 0.01068 | 0.09722 | 0.582 | 4/5/2014 14:29 | 1000 |
| 9 | PIC | 3/1/2013 | 2/28/2015 | 0.3900 | 0.5316 | 0.00773 | 0.03235 | 1.583 | 4/5/2014 15:35 | 1000 |
| 10 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4211 | 0.5888 | 0.02044 | 0.04021 | 1.282 | 4/5/2014 15:37 | 1000 |
| 11 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4175 | 0.5959 | 0.02268 | 0.02360 | 1.114 | 4/5/2014 15:37 | 1000 |
| 12 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4430 | 0.6110 | 0.00772 | 0.01472 | 1.487 | 4/5/2014 15:33 | 1000 |
| 13 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4299 | 0.6058 | 0.01365 | 0.03537 | 1.390 | 4/5/2014 15:33 | 1000 |
| 14 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4442 | 0.6155 | 0.00981 | 0.03038 | 1.103 | 4/5/2014 15:33 | 1000 |
| 15 | LB4100 | 3/1/2013 | 2/28/2015 | 0.4469 | 0.6121 | 0.00850 | 0.04040 | 1.041 | 4/5/2014 15:33 | 1000 |
| 16 | PIC | 3/1/2013 | 2/28/2015 | 0.3815 | 0.5306 | 0.01614 | 0.03189 | 0.538 | 4/12/2014 16:00 | 500 |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

* - RPD changed to 0% due to sample & dup activity below MDA

**Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 504.36
**LCS Volume Added:** 0.10

**Results**

| Pos. | Decision Level pCi/G | Critical Level pCi/G | Required MDA pCi/G | MDA pCi/G | Sample Act. Conc. pCi/G | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/G | 2 SIGMA Total Prop. Uncertainty pCi/G | Sample QC | Sample Type | RPD | RER | Nominal pCi/G | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0871 | 0.0615 | 0.166 | 0.1379 | **0.3694** | 15.45% | 1.2399 | 0.1908 | 0.1114 | 0.1454 | | SAMPLE | | | | |
| 2 | 0.1025 | 0.0723 | 0.166 | 0.1595 | **-0.2228** | 13.05% | -0.7518 | 0.0974 | 0.0566 | 0.0566 | | SAMPLE | | | | |
| 3 | 0.0717 | 0.0506 | 0.166 | 0.1178 | **0.0404** | 84.61% | 0.1221 | 0.1033 | 0.0670 | 0.0678 | | SAMPLE | | | | |
| 4 | 0.0851 | 0.0601 | 0.166 | 0.1354 | **-0.0398** | 84.72% | -0.1313 | 0.1112 | 0.0660 | 0.0660 | | SAMPLE | | | | |
| 5 | 0.0773 | 0.0546 | 0.166 | 0.1257 | **-0.0301** | 101.79% | -0.0911 | 0.0927 | 0.0600 | 0.0600 | | SAMPLE | | | | |
| 6 | 0.0683 | 0.0482 | 0.166 | 0.1125 | **-6.101E-03** | 471.53% | -0.0191 | 0.0900 | 0.0564 | 0.0564 | | SAMPLE | | | | |
| 7 | 0.1062 | 0.0750 | 0.166 | 0.1606 | **-0.0444** | 98.83% | -0.1563 | 0.1545 | 0.0859 | 0.0859 | | SAMPLE | | | | |
| 8 | 0.0748 | 0.0528 | 0.166 | 0.1215 | **-0.0650** | 40.42% | -0.2051 | 0.0828 | 0.0514 | 0.0514 | | SAMPLE | | | | |
| 9 | 0.1075 | 0.0759 | 0.166 | 0.1645 | **0.1313** | 39.48% | 0.4428 | 0.1747 | 0.1016 | 0.1069 | | SAMPLE | | | | |
| 10 | 0.0907 | 0.0641 | 0.166 | 0.1392 | **0.0297** | 135.62% | 0.1005 | 0.1362 | 0.0791 | 0.0794 | | SAMPLE | | | | |
| 11 | 0.0835 | 0.0590 | 0.166 | 0.1289 | **-0.0482** | 69.14% | -0.1649 | 0.1139 | 0.0653 | 0.0653 | | SAMPLE | | | | |
| 12 | 0.0901 | 0.0636 | 0.166 | 0.1375 | **0.0781** | 53.73% | 0.2863 | 0.1538 | 0.0823 | 0.0846 | | SAMPLE | | | | |
| 13 | 0.0938 | 0.0662 | 0.166 | 0.1435 | **0.1016** | 43.99% | 0.3457 | 0.1519 | 0.0876 | 0.0913 | | SAMPLE | | | | |
| 14 | 0.0614 | 0.0434 | 0.166 | 0.0949 | **0.0386** | 73.21% | 0.1788 | 0.1309 | 0.0554 | 0.0563 | | MB | | | | |
| 15 | 0.0819 | 0.0578 | 0.166 | 0.1267 | **9.031E-03** | 394.37% | 0.0305 | 0.1201 | 0.0698 | 0.0698 | 345763001.1 | DUP | * 0.0% | | | |
| 16 | 0.0362 | 0.0255 | 0.166 | 0.0588 | **4.0310** | 3.28% | 26.0154 | 0.6661 | 0.2023 | 1.0524 | | LCS | | | 3.8783 | 103.9% |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 345760001 | 10D | 60 | 13 | 129 | 4/12/2014 12:54 | 4/12/2014 13:54 | PIC | 1377649 |
| 345760002 | 4C | 60 | 6 | 30 | 4/12/2014 12:53 | 4/12/2014 13:53 | PIC | 1377649 |
| 345760003 | 10B | 60 | 5 | 37 | 4/12/2014 12:54 | 4/12/2014 13:54 | PIC | 1377649 |
| 345761001 | 14A | 60 | 5 | 43 | 4/12/2014 12:55 | 4/12/2014 13:55 | PIC | 1377649 |
| 345761002 | 10C | 60 | 2 | 29 | 4/12/2014 12:55 | 4/12/2014 13:55 | PIC | 1377649 |
| 345761003 | 14C | 60 | 4 | 29 | 4/12/2014 12:56 | 4/12/2014 13:56 | PIC | 1377649 |
| 345762001 | 4B | 80 | 18 | 144 | 4/12/2014 12:53 | 4/12/2014 14:13 | PIC | 1377649 |
| 345762002 | 11D | 60 | 4 | 23 | 4/12/2014 12:56 | 4/12/2014 13:56 | PIC | 1377649 |
| 345763001 | 4D | 70 | 6 | 142 | 4/12/2014 12:53 | 4/12/2014 14:03 | PIC | 1377649 |
| 345763002 | A1 | 80 | 10 | 111 | 4/12/2014 13:04 | 4/12/2014 14:24 | LB4100 | 1377649 |
| 345763003 | A2 | 80 | 3 | 76 | 4/12/2014 13:04 | 4/12/2014 14:24 | LB4100 | 1377649 |
| 345764001 | F1 | 80 | 9 | 142 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 345764002 | F2 | 80 | 4 | 139 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 1203062517 | F3 | 80 | 15 | 103 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 1203062518 | F4 | 80 | 7 | 86 | 4/12/2014 13:05 | 4/12/2014 14:25 | LB4100 | 1377649 |
| 1203062519 | 3B | 60 | 25 | 1594 | 4/14/2014 10:58 | 4/14/2014 11:58 | PIC | 1377649 |

M-10151

Radiochemistry Batch Checklist

12-Mar-2014



Batch# 137182 Product: ~~Sr-90~~ Total Sr TMA 4/14/14 Date: 4/14/14

| Criteria: | Yes | No | Comments |
|---|---|---|---|
| Sample Solids are less than or equal to 100 mg for GAB. | | | NA |
| Samples have been blank corrected (if required). Blank correction reported included (if required). | | | NA |
| If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay. | / | | |
| Instrument source check is within limits. Instrument bkg check is within limits. | / | | |
| Method RDL/ LLD has been met. | / | | |
| If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria. | / | | |
| Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria). | / | | |
| Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity) | / | | |
| Sample was run within hold time. | / | | |
| Sample was correctly preserved if required. | / | | |
| Smears Taken for Radioactive batches. | / | | |
| Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria). | / | | |
| No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent. | / | | |
| Aux data is correct. | | | NA |
| Client Special requirements page has been checked. | / | | |
| Raw Data and/ or spectrum are included and properly statused. | / | | |
| MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified | / | | |
| Hit notification complete (if necessary) | | | NA |
| Batch entered into Case Narrative. | / | | |
| Batch Data Exception Reports (DER) completed, if applicable. | | | NA |
| Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed. | | | NA |
| Aliquot Correction completed if required. | | | NA |
| Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.) | / | | |

Primary Review Performed By: [signature] 4/14 HSI

Secondary Review Performed By: [signature] 4/14/14

Total sr

# Strontium 90 Queue Sheet

04/10/14

Batch #: 1379182 Analyst: KSD1 First Client Due Date: 04/14/2014 Internal Due Date: 04/04/2014 Comments

Sr-90 Spike Code: — Expiration Date: — Vol: — Sr Sep. Date/time: 1330 4/11/14

Sr-90 LCS Code: 12432 Expiration Date: 4/4/14 Vol: 0.1

Sr Carrier Code: W46474 Exp Date: 12/5/14 Vol: 0.5 Sdt Wt: 8.2

Prep Date: 4/10/14 Initials: KSD Pipet ID: 1795419 Balance #: 50410277 Analytical Scale #: F30560 Witness: NA

| Sample ID | Client Description | Type | RDL | Collection Date | Matrix | Client | Rad | Pos. # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr wt (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 345746003-1 | 04-PDV-RT1300-03-0022 | SAMPLE | .166 pCi/g | NOV-02-13 03:00 PM | SOLID | ITSI003 | | 1 | 5.169 | ~~5A~~ 6C | 0.0240 | 0.0304 | 6.4 |
| 345762003-1 | 04-PDV-RT1300-07-0023 | SAMPLE | .166 pCi/g | NOV-07-13 02:45 PM | SOLID | ITSI003 | | 2 | 5.254 | 5B | 0.0232 | 0.0284 | 5.2 |
| 345764003-1 | 04-PDV-RT1300-09-0023 | SAMPLE | .166 pCi/g | NOV-07-13 03:45 PM | SOLID | ITSI003 | | 3 | 5.279 | 5C | 0.0248 | 0.0307 | 5.9 |
| 1203065849-1 | MB for batch 1379182 | MB | .166 pCi/g | | SOLID | QC ACCOUNT | | 4 | 5.276 | 6B | 0.0234 | 0.0310 | 7.6 |
| 1203065850-1 | 04-PDV-RT1300-03-0022(345746003DUP) | DUP | .166 pCi/g | NOV-02-13 03:00 PM | SOLID | QC ACCOUNT | | 5 | 5.267 | 6C | 0.0230 | 0.0294 | 6.4 |
| 1203065851-1 | LCS for batch 1379182 | LCS | .166 pCi/g | | SOLID | QC ACCOUNT | | 6 | 5.279 | 7A | 0.0230 | 0.0309 | 7.9 |

DNL 4/14/14 (w) ✓

Solid Sample Dissolution by: LEACH or DIGESTION Data Reviewed By: [signature]

Circle One

Page 1 of 1

DCN: ITSI-0808-0004-0076, 8 May 2019

M-10153

# Total Strontium Solid

Filename : SR90.XLS
File type : Excel
Version # : 1.3.10

**Carrier S/N :** 2046474
**Carrier Exp Date :** 12/5/2014
**Carrier Volume Added:** 0.50
**Carrier Weight (mg/ml):** 16.40
**Carrier Weight StDev.:** 0.16

**Batch :** 1379182
**Analyst :** KSD1
**Prep Date :** 4/10/2014
**Method Uncertainty :** 0.1281

**Geometry:** Tuffryn Filter

| | | |
|---|---|---|
| **Procedure Code :** | GFCTOSRS | |
| **Parmname :** | Total Strontium | |
| **Required MDA :** | 0.166 | pCi/G |
| **Sr-90 Abundance :** | 1.00 | |
| **Halflife of Sr-90 :** | 28.90 | years |
| **Halflife of Y-90 :** | 64.053 | hours |

| Sample Characteristics | | | | | Carrier Calculations | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pos. | Sample ID | Sample Aliquot G | Sample Aliquot StDev. G | Sample Date/Time | Carrier Weight (mg) (Standard) | Net Weight (mg) (Sample) | Net Weight StDev. (mg) | Carrier Aliquot (mL) | Carrier Aliquot StDev. (mL) |
| 1 | 345746003.1 | 5.1690 | 3.7527E-03 | 11/2/2013 15:00 | 16.40 | 6.40 | 0.034837 | 0.5 | 0.001000 |
| 2 | 345762003.1 | 5.2540 | 3.7614E-03 | 11/7/2013 14:45 | 16.40 | 5.20 | 0.029680 | 0.5 | 0.001000 |
| 3 | 345764003.1 | 5.2790 | 3.7639E-03 | 11/7/2013 15:45 | 16.40 | 5.90 | 0.032688 | 0.5 | 0.001000 |
| 4 | 1203065849.1 | 5.2760 | 3.7636E-03 | 4/10/2014 0:00 | 16.40 | 7.60 | 0.039995 | 0.5 | 0.001000 |
| 5 | 1203065850.1 | 5.2670 | 3.7627E-03 | 11/2/2013 15:00 | 16.40 | 6.40 | 0.034837 | 0.5 | 0.001000 |
| 6 | 1203065851.1 | 5.2790 | 3.7639E-03 | 4/10/2014 0:00 | 16.40 | 7.90 | 0.041284 | 0.5 | 0.001000 |

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DCN: ITSI-0808-0004-0076, 8 May 2019

| | | |
|---|---|---|
| **Pipet, 0.1 ml Stdev : +/-** | 0.000200 | ml |
| **Pipet, 0.5 ml Stdev : +/-** | 0.001000 | ml |
| **Pipet, 1 ml Stdev : +/-** | 0.002000 | ml |

**Analytical SOP:** GL-RAD-A-004
**Instrument SOP:** GL-RAD-I-016

**Count Raw Data**

| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Strontium Separation Date/Time | Yttrium Ingrowth | Sr-90 Decay | Calculated Sample Recovery % | Sample Recovery Error % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6C | 60 | 4 | 48 | 0.797 | 4/11/2014 16:50 | 4/11/2014 13:30 | 0.041 | 0.990 | 78.0% | 1.26% |
| 2 | 5B | 60 | 5 | 24 | 0.396 | 4/11/2014 15:04 | 4/11/2014 13:30 | 0.022 | 0.990 | 63.4% | 1.28% |
| 3 | 5C | 60 | 4 | 25 | 0.413 | 4/11/2014 15:04 | 4/11/2014 13:30 | 0.022 | 0.990 | 72.0% | 1.27% |
| 4 | 6B | 60 | 14 | 44 | 0.724 | 4/11/2014 15:04 | 4/11/2014 13:30 | 0.022 | 1.000 | 92.7% | 1.24% |
| 5 | 6C | 60 | 3 | 46 | 0.765 | 4/11/2014 15:04 | 4/11/2014 13:30 | 0.022 | 0.990 | 78.0% | 1.26% |
| 6 | 7A | 60 | 10 | 1233 | 20.539 | 4/11/2014 15:04 | 4/11/2014 13:30 | 0.022 | 1.000 | 96.3% | 1.24% |

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**Calibration Data**

| Pos. | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency (cpm/dpm) Sr-90 | Y-90 | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PIC | 3/1/2013 | 2/28/2015 | 0.3952 | 0.5101 | 0.01970 | 0.04192 | 1.002 | 4/5/2014 14:31 | 1000 |
| 2 | PIC | 3/1/2013 | 2/28/2015 | 0.4042 | 0.5379 | 0.00426 | 0.04605 | 0.612 | 4/5/2014 14:30 | 1000 |
| 3 | PIC | 3/1/2013 | 2/28/2015 | 0.4068 | 0.5391 | 0.00657 | 0.05525 | 0.495 | 4/5/2014 14:30 | 1000 |
| 4 | PIC | 3/1/2013 | 2/28/2015 | 0.3624 | 0.4489 | 0.00851 | 0.03967 | 0.921 | 4/8/2014 10:41 | 1000 |
| 5 | PIC | 3/1/2013 | 2/28/2015 | 0.3952 | 0.5101 | 0.01970 | 0.04192 | 1.002 | 4/5/2014 14:31 | 1000 |
| 6 | PIC | 3/1/2013 | 2/28/2015 | 0.3994 | 0.5374 | 0.00594 | 0.06863 | 0.530 | 4/5/2014 14:31 | 1000 |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

* - RPD changed to 0% due to sample & dup activity below MDA

**Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 504.33
**LCS Volume Added:** 0.10

**Results**

| Pos. | Decision Level pCi/G | Critical Level pCi/G | Required MDA pCi/G | MDA pCi/G | Sample Act. Conc. pCi/G | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/G | 2 SIGMA Total Prop. Uncertainty pCi/G | Sample QC | Sample Type | RPD | RER | Nominal pCi/G | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0841 | 0.0594 | 0.166 | 0.1323 | **-0.0556** | 58.42% | -0.2048 | 0.1195 | 0.0636 | 0.0636 | | SAMPLE | | | | |
| 2 | 0.0795 | 0.0561 | 0.166 | 0.1287 | **-0.0708** | 39.38% | -0.2158 | 0.0849 | 0.0546 | 0.0547 | | SAMPLE | | | | |
| 3 | 0.0623 | 0.0440 | 0.166 | 0.1023 | **-0.0235** | 104.74% | -0.0820 | 0.0859 | 0.0482 | 0.0482 | | SAMPLE | | | | |
| 4 | 0.0735 | 0.0519 | 0.166 | 0.1162 | **-0.0487** | 57.89% | -0.1969 | 0.1140 | 0.0553 | 0.0553 | | MB | | | | |
| 5 | 0.0844 | 0.0596 | 0.166 | 0.1329 | **-0.0647** | 49.43% | -0.2374 | 0.1172 | 0.0626 | 0.0626 | 345746003.1 | DUP | * 0.0% | | | |
| 6 | 0.0485 | 0.0343 | 0.166 | 0.0793 | **4.3082** | 3.23% | 20.0086 | 0.5855 | 0.2471 | 1.1168 | | LCS | | | 4.3033 | 100.1% |

DCN: ITSI-0808-0004-0076, 8 May 2019

| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 345746003 | 6C | 60 | 4 | 48 | 4/11/2014 16:50 | 4/11/2014 17:50 | PIC | 1379182 |
| 345762003 | 5B | 60 | 5 | 24 | 4/11/2014 15:04 | 4/11/2014 16:04 | PIC | 1379182 |
| 345764003 | 5C | 60 | 4 | 25 | 4/11/2014 15:04 | 4/11/2014 16:04 | PIC | 1379182 |
| 1203065849 | 6B | 60 | 14 | 44 | 4/11/2014 15:04 | 4/11/2014 16:04 | PIC | 1379182 |
| 1203065850 | 6C | 60 | 3 | 46 | 4/11/2014 15:04 | 4/11/2014 16:04 | PIC | 1379182 |
| 1203065851 | 7A | 60 | 10 | 1233 | 4/11/2014 15:04 | 4/11/2014 16:04 | PIC | 1379182 |

M-10158

# Method Calibration Data

# Gas Flow Proportional Counter Calibration Package

Method: Strontium 89/90

Instrument (circle one): LB4100 / Protean

| Part 1: Efficiency determination | Included/ Acceptable | Comments |
|---|---|---|
| 1 Efficiency spreadsheet (eff pts, graphs, trendline equation) | ✓ | |
| 2 Applicable portion of GFPC_Machines.XLS | ✓ | |
| 3 Raw Data for Calibration standards | ✓ | |
| 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%) | ✓ | |
| 5 Plateau graph and raw data | ✓ | |
| 6 Standardization of Carrier (if applicable) | ✓ | |

| Part 2. Documentation for Calibration Source | | |
|---|---|---|
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |

| Part 3. Documentation for Verification Source | | |
|---|---|---|
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |

| Part 4. Enter into LIMS | | |
|---|---|---|
| 1 Alpha LIMS instrument calibration updated | ✓ | |

Primary Review of Package Nathaniel Young III

Secondary Review of Package Amanda L. Fehr

Effective Date: 3/1/13

exp date ~~2/28/14~~ 2/28/15 *ass 2/28/14

*Calibration verified 2/14 and exp. date extended. 2/28/14

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

# Sr-89 Calibration - LB4100 - Feb 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-89 |
| | Standard ID number | 1633-A |
| | Half Life (days) | 50.53 |
| | Std. Act. (dpm/mL) | 123593.8614 |
| | Reference Date | 12/13/2012 |
| | Volume of spike (mL) | 1.0 |
| | Std. Nominal (dpm) | 52080.78 |
| | Decay Date | 2/14/2013 |

| Carrier Data | | Std ID<br>Std weight | 1858443<br>17.73 | mg/mL |
|---|---|---|---|---|
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 1.9 | 0.1 | 1.77 | 100.0% |
| 2 | 3.5 | 0.2 | 3.55 | 98.7% |
| 3 | 6.9 | 0.4 | 7.09 | 97.3% |
| 4 | 8.3 | 0.5 | 8.87 | 93.6% |
| 5 | 13.5 | 0.8 | 14.18 | 95.2% |
| 6 | 17.6 | 1 | 17.73 | 99.3% |
| 7 | 26.6 | 1.5 | 26.60 | 100.0% |
| 8 | 36.1 | 2.1 | 37.23 | 97.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

The following detectors were not calibrated:

A4

*Background is considered neglible.
**Decay corrected to mid-point of count

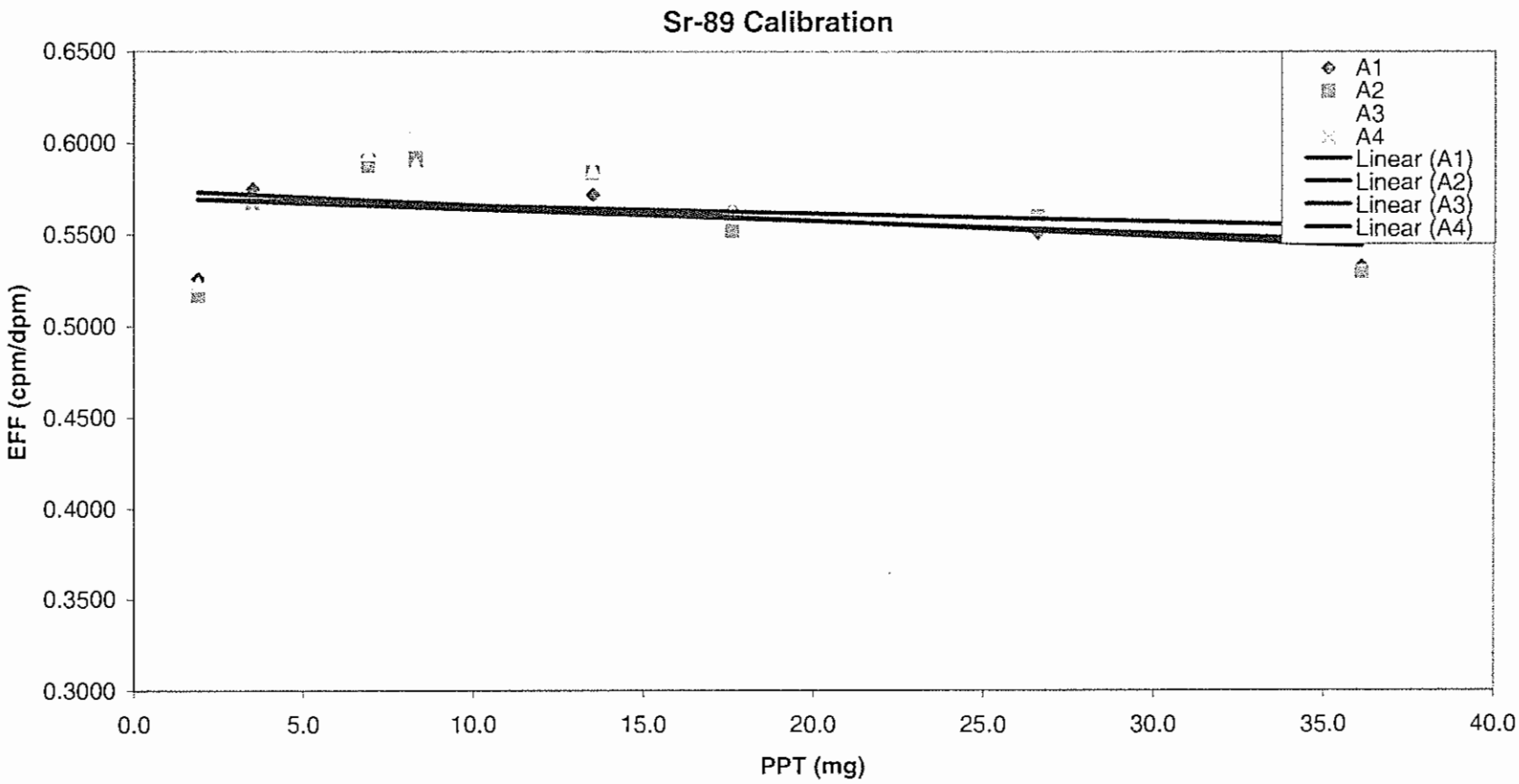
| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 2/14/2013 15:31 | 1 | 27150 | 27150.00 | 100.0% | 27150.00 | 51620.42 | 0.5260 | 0.5731 |
| A1 | 2 | 2/14/2013 15:44 | 1 | 29285 | 29285.00 | 98.7% | 29669.89 | 51613.92 | 0.5748 | 0.5717 |
| A1 | 3 | 2/14/2013 15:41 | 1 | 29776 | 29776.00 | 97.3% | 30604.55 | 51615.42 | 0.5929 | 0.5688 |
| A1 | 4 | 2/14/2013 15:38 | 1 | 28412 | 28412.00 | 93.6% | 30346.07 | 51616.82 | 0.5879 | 0.5677 |
| A1 | 5 | 2/14/2013 15:48 | 1 | 28092 | 28092.00 | 95.2% | 29515.33 | 51611.88 | 0.5719 | 0.5632 |
| A1 | 6 | 2/14/2013 15:57 | 1 | 28844 | 28844.00 | 99.3% | 29057.05 | 51607.85 | 0.5630 | 0.5598 |
| A1 | 7 | 2/14/2013 15:54 | 1 | 28434 | 28434.00 | 100.0% | 28434.00 | 51609.12 | 0.5509 | 0.5521 |
| A1 | 8 | 2/14/2013 15:51 | 1 | 26672 | 26672.00 | 97.0% | 27509.10 | 51610.64 | 0.5330 | 0.5441 |
| A2 | 1 | 2/14/2013 15:38 | 1 | 26680 | 26680.00 | 100.0% | 26680.00 | 51616.82 | 0.5169 | 0.5691 |
| A2 | 2 | 2/14/2013 15:31 | 1 | 28905 | 28905.00 | 98.7% | 29284.69 | 51620.41 | 0.5673 | 0.5681 |
| A2 | 3 | 2/14/2013 15:44 | 1 | 29511 | 29511.00 | 97.3% | 30332.16 | 51613.92 | 0.5877 | 0.5659 |
| A2 | 4 | 2/14/2013 15:41 | 1 | 28600 | 28600.00 | 93.6% | 30546.87 | 51615.41 | 0.5918 | 0.5650 |
| A2 | 5 | 2/14/2013 15:51 | 1 | 28678 | 28678.00 | 95.2% | 30131.02 | 51610.63 | 0.5838 | 0.5617 |
| A2 | 6 | 2/14/2013 15:48 | 1 | 28277 | 28277.00 | 99.3% | 28485.86 | 51611.88 | 0.5519 | 0.5591 |
| A2 | 7 | 2/14/2013 15:57 | 1 | 28907 | 28907.00 | 100.0% | 28907.00 | 51607.84 | 0.5601 | 0.5533 |
| A2 | 8 | 2/14/2013 15:54 | 1 | 26516 | 26516.00 | 97.0% | 27348.21 | 51609.11 | 0.5299 | 0.5472 |
| A3 | 1 | 2/14/2013 15:41 | 1 | 26987 | 26987.00 | 100.0% | 26987.00 | 51615.41 | 0.5228 | 0.5693 |
| A3 | 2 | 2/14/2013 15:36 | 1 | 28583 | 28583.00 | 98.7% | 28958.66 | 51617.77 | 0.5610 | 0.5686 |
| A3 | 3 | 2/14/2013 15:31 | 1 | 29853 | 29853.00 | 97.3% | 30683.69 | 51620.41 | 0.5944 | 0.5672 |
| A3 | 4 | 2/14/2013 15:44 | 1 | 28419 | 28419.00 | 93.6% | 30353.55 | 51613.92 | 0.5881 | 0.5666 |
| A3 | 5 | 2/14/2013 15:54 | 1 | 28725 | 28725.00 | 95.2% | 30180.40 | 51609.11 | 0.5848 | 0.5644 |
| A3 | 6 | 2/14/2013 15:51 | 1 | 28858 | 28858.00 | 99.3% | 29071.16 | 51610.63 | 0.5633 | 0.5627 |
| A3 | 7 | 2/14/2013 15:48 | 1 | 28676 | 28676.00 | 100.0% | 28676.00 | 51611.88 | 0.5556 | 0.5589 |
| A3 | 8 | 2/14/2013 15:57 | 1 | 27141 | 27141.00 | 97.0% | 27992.82 | 51607.84 | 0.5424 | 0.5549 |
| B1 | 1 | 2/14/2013 15:48 | 1 | 26722 | 26722.00 | 100.0% | 26722.00 | 51611.87 | 0.5177 | 0.5674 |
| B1 | 2 | 2/14/2013 15:57 | 1 | 28623 | 28623.00 | 98.7% | 28999.19 | 51607.84 | 0.5619 | 0.5662 |
| B1 | 3 | 2/14/2013 15:54 | 1 | 29424 | 29424.00 | 97.3% | 30242.75 | 51609.11 | 0.5860 | 0.5636 |
| B1 | 4 | 2/14/2013 15:51 | 1 | 28057 | 28057.00 | 93.6% | 29966.90 | 51610.62 | 0.5806 | 0.5626 |
| B1 | 5 | 2/14/2013 15:31 | 1 | 28929 | 28929.00 | 95.2% | 30394.74 | 51620.42 | 0.5888 | 0.5587 |
| B1 | 6 | 2/14/2013 15:44 | 1 | 28525 | 28525.00 | 99.3% | 28735.70 | 51613.92 | 0.5567 | 0.5556 |
| B1 | 7 | 2/14/2013 15:41 | 1 | 28211 | 28211.00 | 100.0% | 28211.00 | 51615.40 | 0.5466 | 0.5489 |
| B1 | 8 | 2/14/2013 15:36 | 1 | 26338 | 26338.00 | 97.0% | 27164.62 | 51617.77 | 0.5263 | 0.5418 |
| B2 | 1 | 2/14/2013 15:51 | 1 | 27329 | 27329.00 | 100.0% | 27329.00 | 51610.62 | 0.5295 | 0.5744 |
| B2 | 2 | 2/14/2013 15:48 | 1 | 29027 | 29027.00 | 98.7% | 29408.50 | 51611.87 | 0.5698 | 0.5732 |
| B2 | 3 | 2/14/2013 15:57 | 1 | 29390 | 29390.00 | 97.3% | 30207.81 | 51607.84 | 0.5853 | 0.5706 |
| B2 | 4 | 2/14/2013 15:54 | 1 | 28846 | 28846.00 | 93.6% | 30809.61 | 51609.11 | 0.5970 | 0.5695 |
| B2 | 5 | 2/14/2013 15:36 | 1 | 28795 | 28795.00 | 95.2% | 30253.95 | 51617.77 | 0.5861 | 0.5656 |
| B2 | 6 | 2/14/2013 15:31 | 1 | 28750 | 28750.00 | 99.3% | 28962.36 | 51620.41 | 0.5611 | 0.5624 |
| B2 | 7 | 2/14/2013 15:44 | 1 | 28726 | 28726.00 | 100.0% | 28726.00 | 51613.91 | 0.5566 | 0.5556 |
| B2 | 8 | 2/14/2013 15:41 | 1 | 26736 | 26736.00 | 97.0% | 27575.11 | 51615.40 | 0.5342 | 0.5484 |
| B3 | 1 | 2/14/2013 15:54 | 1 | 27326 | 27326.00 | 100.0% | 27326.00 | 51609.11 | 0.5295 | 0.5802 |
| B3 | 2 | 2/14/2013 15:51 | 1 | 29353 | 29353.00 | 98.7% | 29738.78 | 51610.61 | 0.5762 | 0.5789 |
| B3 | 3 | 2/14/2013 15:48 | 1 | 30111 | 30111.00 | 97.3% | 30948.87 | 51611.87 | 0.5996 | 0.5762 |
| B3 | 4 | 2/14/2013 15:57 | 1 | 29154 | 29154.00 | 93.6% | 31138.58 | 51607.83 | 0.6034 | 0.5751 |
| B3 | 5 | 2/14/2013 15:41 | 1 | 29120 | 29120.00 | 95.2% | 30595.41 | 51615.39 | 0.5928 | 0.5711 |
| B3 | 6 | 2/14/2013 15:36 | 1 | 28788 | 28788.00 | 99.3% | 29000.64 | 51617.76 | 0.5618 | 0.5679 |
| B3 | 7 | 2/14/2013 15:31 | 1 | 28809 | 28809.00 | 100.0% | 28809.00 | 51620.41 | 0.5581 | 0.5608 |
| B3 | 8 | 2/14/2013 15:44 | 1 | 27134 | 27134.00 | 97.0% | 27985.60 | 51613.90 | 0.5422 | 0.5534 |
| B4 | 1 | 2/14/2013 15:57 | 1 | 25575 | 25575.00 | 100.0% | 25575.00 | 51607.83 | 0.4956 | 0.5365 |
| B4 | 2 | 2/14/2013 15:54 | 1 | 26919 | 26919.00 | 98.7% | 27272.79 | 51609.10 | 0.5284 | 0.5361 |
| B4 | 3 | 2/14/2013 15:51 | 1 | 27774 | 27774.00 | 97.3% | 28546.84 | 51610.61 | 0.5531 | 0.5352 |
| B4 | 4 | 2/14/2013 15:48 | 1 | 27053 | 27053.00 | 93.6% | 28894.56 | 51611.86 | 0.5598 | 0.5348 |
| B4 | 5 | 2/14/2013 15:44 | 1 | 27278 | 27278.00 | 95.2% | 28660.09 | 51613.89 | 0.5553 | 0.5335 |
| B4 | 6 | 2/14/2013 15:41 | 1 | 27192 | 27192.00 | 99.3% | 27392.85 | 51615.39 | 0.5307 | 0.5324 |
| B4 | 7 | 2/14/2013 15:38 | 1 | 27195 | 27195.00 | 100.0% | 27195.00 | 51616.79 | 0.5269 | 0.5301 |
| B4 | 8 | 2/14/2013 15:31 | 1 | 25849 | 25849.00 | 97.0% | 26660.27 | 51620.41 | 0.5165 | 0.5277 |
| C1 | 1 | 2/14/2013 16:05 | 1 | 26526 | 26526.00 | 100.0% | 26526.00 | 51603.79 | 0.5140 | 0.5697 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 2 | 2/14/2013 16:16 | 1 | 28930 | 28930.00 | 98.7% | 29310.22 | 51598.21 | 0.5680 | 0.5682 |
| C1 | 3 | 2/14/2013 16:12 | 1 | 29354 | 29354.00 | 97.3% | 30170.81 | 51600.27 | 0.5847 | 0.5649 |
| C1 | 4 | 2/14/2013 16:09 | 1 | 28788 | 28788.00 | 93.6% | 30747.67 | 51601.76 | 0.5959 | 0.5635 |
| C1 | 5 | 2/14/2013 16:20 | 1 | 28560 | 28560.00 | 95.2% | 30007.04 | 51596.58 | 0.5816 | 0.5585 |
| C1 | 6 | 2/14/2013 16:31 | 1 | 28200 | 28200.00 | 99.3% | 28408.30 | 51590.92 | 0.5506 | 0.5545 |
| C1 | 7 | 2/14/2013 16:26 | 1 | 28046 | 28046.00 | 100.0% | 28046.00 | 51593.19 | 0.5436 | 0.5457 |
| C1 | 8 | 2/14/2013 16:23 | 1 | 26165 | 26165.00 | 97.0% | 26986.19 | 51594.87 | 0.5230 | 0.5365 |
| C2 | 1 | 2/14/2013 16:09 | 1 | 27178 | 27178.00 | 100.0% | 27178.00 | 51601.76 | 0.5267 | 0.5747 |
| C2 | 2 | 2/14/2013 16:05 | 1 | 28752 | 28752.00 | 98.7% | 29129.88 | 51603.79 | 0.5645 | 0.5735 |
| C2 | 3 | 2/14/2013 16:16 | 1 | 29850 | 29850.00 | 97.3% | 30680.61 | 51598.20 | 0.5946 | 0.5708 |
| C2 | 4 | 2/14/2013 16:12 | 1 | 28897 | 28897.00 | 93.6% | 30864.08 | 51600.26 | 0.5981 | 0.5698 |
| C2 | 5 | 2/14/2013 16:23 | 1 | 28700 | 28700.00 | 95.2% | 30154.13 | 51594.87 | 0.5844 | 0.5657 |
| C2 | 6 | 2/14/2013 16:20 | 1 | 28689 | 28689.00 | 99.3% | 28900.91 | 51596.58 | 0.5601 | 0.5626 |
| C2 | 7 | 2/14/2013 16:31 | 1 | 29075 | 29075.00 | 100.0% | 29075.00 | 51590.92 | 0.5636 | 0.5556 |
| C2 | 8 | 2/14/2013 16:26 | 1 | 26461 | 26461.00 | 97.0% | 27291.48 | 51593.19 | 0.5290 | 0.5483 |
| C3 | 1 | 2/14/2013 16:12 | 1 | 26597 | 26597.00 | 100.0% | 26597.00 | 51600.26 | 0.5154 | 0.5694 |
| C3 | 2 | 2/14/2013 16:09 | 1 | 28827 | 28827.00 | 98.7% | 29205.87 | 51601.76 | 0.5660 | 0.5683 |
| C3 | 3 | 2/14/2013 16:05 | 1 | 29624 | 29624.00 | 97.3% | 30448.32 | 51603.79 | 0.5900 | 0.5658 |
| C3 | 4 | 2/14/2013 16:16 | 1 | 28440 | 28440.00 | 93.6% | 30375.98 | 51598.20 | 0.5887 | 0.5647 |
| C3 | 5 | 2/14/2013 16:26 | 1 | 28677 | 28677.00 | 95.2% | 30129.97 | 51593.19 | 0.5840 | 0.5609 |
| C3 | 6 | 2/14/2013 16:23 | 1 | 28469 | 28469.00 | 99.3% | 28679.28 | 51594.87 | 0.5559 | 0.5579 |
| C3 | 7 | 2/14/2013 16:20 | 1 | 28776 | 28776.00 | 100.0% | 28776.00 | 51596.57 | 0.5577 | 0.5513 |
| C3 | 8 | 2/14/2013 16:31 | 1 | 26251 | 26251.00 | 97.0% | 27074.89 | 51590.92 | 0.5248 | 0.5443 |
| C4 | 1 | 2/14/2013 16:16 | 1 | 26622 | 26622.00 | 100.0% | 26622.00 | 51598.20 | 0.5159 | 0.5675 |
| C4 | 2 | 2/14/2013 16:12 | 1 | 28697 | 28697.00 | 98.7% | 29074.16 | 51600.26 | 0.5634 | 0.5664 |
| C4 | 3 | 2/14/2013 16:09 | 1 | 29635 | 29635.00 | 97.3% | 30459.63 | 51601.76 | 0.5903 | 0.5641 |
| C4 | 4 | 2/14/2013 16:05 | 1 | 28385 | 28385.00 | 93.6% | 30317.23 | 51603.77 | 0.5875 | 0.5631 |
| C4 | 5 | 2/14/2013 16:31 | 1 | 28434 | 28434.00 | 95.2% | 29874.66 | 51590.92 | 0.5791 | 0.5596 |
| C4 | 6 | 2/14/2013 16:26 | 1 | 28394 | 28394.00 | 99.3% | 28603.73 | 51593.18 | 0.5544 | 0.5569 |
| C4 | 7 | 2/14/2013 16:23 | 1 | 28540 | 28540.00 | 100.0% | 28540.00 | 51594.87 | 0.5532 | 0.5508 |
| C4 | 8 | 2/14/2013 16:20 | 1 | 26464 | 26464.00 | 97.0% | 27294.57 | 51596.57 | 0.5290 | 0.5444 |
| D1 | 1 | 2/14/2013 16:20 | 1 | 17106 | 17106.00 | 100.0% | 17106.00 | 51596.21 | 0.3315 | 0.4238 |
| D1 | 2 | 2/14/2013 16:32 | 1 | 21853 | 21853.00 | 98.7% | 22140.21 | 51590.62 | 0.4292 | 0.4260 |
| D1 | 3 | 2/14/2013 16:27 | 1 | 25612 | 25612.00 | 97.3% | 26324.68 | 51592.93 | 0.5102 | 0.4305 |
| D1 | 4 | 2/14/2013 16:24 | 1 | 16614 | 16614.00 | 93.6% | 17744.95 | 51594.46 | 0.3439 | 0.4324 |
| D1 | 5 | 2/14/2013 16:05 | 1 | 32889 | 32889.00 | 95.2% | 34555.38 | 51603.61 | 0.6696 | 0.4393 |
| D1 | 6 | 2/14/2013 16:17 | 1 | 17872 | 17872.00 | 99.3% | 18004.01 | 51597.85 | 0.3489 | 0.4448 |
| D1 | 7 | 2/14/2013 16:13 | 1 | 22231 | 22231.00 | 100.0% | 22231.00 | 51599.97 | 0.4308 | 0.4569 |
| D1 | 8 | 2/14/2013 16:09 | 1 | 22966 | 22966.00 | 97.0% | 23686.79 | 51601.54 | 0.4590 | 0.4696 |
| D2 | 1 | 2/14/2013 16:24 | 1 | 34220 | 34220.00 | 100.0% | 34220.00 | 51594.45 | 0.6632 | 0.6975 |
| D2 | 2 | 2/14/2013 16:20 | 1 | 36102 | 36102.00 | 98.7% | 36576.48 | 51596.21 | 0.7089 | 0.6952 |
| D2 | 3 | 2/14/2013 16:32 | 1 | 35700 | 35700.00 | 97.3% | 36693.39 | 51590.62 | 0.7112 | 0.6902 |
| D2 | 4 | 2/14/2013 16:27 | 1 | 33884 | 33884.00 | 93.6% | 36190.56 | 51592.93 | 0.7015 | 0.6881 |
| D2 | 5 | 2/14/2013 16:09 | 1 | 33596 | 33596.00 | 95.2% | 35298.20 | 51601.54 | 0.6841 | 0.6805 |
| D2 | 6 | 2/14/2013 16:05 | 1 | 33062 | 33062.00 | 99.3% | 33306.21 | 51603.61 | 0.6454 | 0.6745 |
| D2 | 7 | 2/14/2013 16:17 | 1 | 35188 | 35188.00 | 100.0% | 35188.00 | 51597.84 | 0.6820 | 0.6612 |
| D2 | 8 | 2/14/2013 16:13 | 1 | 31930 | 31930.00 | 97.0% | 32932.12 | 51599.97 | 0.6382 | 0.6473 |
| D3 | 1 | 2/14/2013 16:27 | 1 | 31213 | 31213.00 | 100.0% | 31213.00 | 51592.93 | 0.6050 | 0.6849 |
| D3 | 2 | 2/14/2013 16:24 | 1 | 36223 | 36223.00 | 98.7% | 36699.07 | 51594.45 | 0.7113 | 0.6826 |
| D3 | 3 | 2/14/2013 16:20 | 1 | 35945 | 35945.00 | 97.3% | 36945.21 | 51596.20 | 0.7160 | 0.6778 |
| D3 | 4 | 2/14/2013 16:32 | 1 | 33900 | 33900.00 | 93.6% | 36207.65 | 51590.62 | 0.7018 | 0.6757 |
| D3 | 5 | 2/14/2013 16:13 | 1 | 33729 | 33729.00 | 95.2% | 35437.94 | 51599.97 | 0.6868 | 0.6683 |
| D3 | 6 | 2/14/2013 16:09 | 1 | 33220 | 33220.00 | 99.3% | 33465.38 | 51601.54 | 0.6485 | 0.6624 |
| D3 | 7 | 2/14/2013 16:05 | 1 | 32405 | 32405.00 | 100.0% | 32405.00 | 51603.60 | 0.6280 | 0.6495 |
| D3 | 8 | 2/14/2013 16:17 | 1 | 32001 | 32001.00 | 97.0% | 33005.35 | 51597.84 | 0.6397 | 0.6358 |
| D4 | 1 | 2/14/2013 16:32 | 1 | 31768 | 31768.00 | 100.0% | 31768.00 | 51590.62 | 0.6158 | 0.6935 |
| D4 | 2 | 2/14/2013 16:27 | 1 | 33755 | 33755.00 | 98.7% | 34198.64 | 51592.93 | 0.6629 | 0.6903 |
| D4 | 3 | 2/14/2013 16:24 | 1 | 37049 | 37049.00 | 97.3% | 38079.93 | 51594.45 | 0.7381 | 0.6836 |
| D4 | 4 | 2/14/2013 16:20 | 1 | 35096 | 35096.00 | 93.6% | 37485.07 | 51596.20 | 0.7265 | 0.6808 |
| D4 | 5 | 2/14/2013 16:17 | 1 | 34910 | 34910.00 | 95.2% | 36678.77 | 51597.84 | 0.7109 | 0.6706 |
| D4 | 6 | 2/14/2013 16:13 | 1 | 33506 | 33506.00 | 99.3% | 33753.49 | 51599.97 | 0.6541 | 0.6625 |
| D4 | 7 | 2/14/2013 16:09 | 1 | 32930 | 32930.00 | 100.0% | 32930.00 | 51601.54 | 0.6382 | 0.6448 |
| D4 | 8 | 2/14/2013 16:05 | 1 | 30311 | 30311.00 | 97.0% | 31262.31 | 51603.60 | 0.6058 | 0.6261 |
| E1 | 1 | 2/14/2013 16:35 | 1 | 26763 | 26763.00 | 100.0% | 26763.00 | 51589.09 | 0.5188 | 0.5640 |
| E1 | 2 | 2/14/2013 16:44 | 1 | 28437 | 28437.00 | 98.7% | 28810.74 | 51584.59 | 0.5585 | 0.5627 |
| E1 | 3 | 2/14/2013 16:41 | 1 | 29015 | 29015.00 | 97.3% | 29822.37 | 51585.97 | 0.5781 | 0.5600 |
| E1 | 4 | 2/14/2013 16:39 | 1 | 28005 | 28005.00 | 93.6% | 29911.36 | 51587.07 | 0.5798 | 0.5589 |
| E1 | 5 | 2/14/2013 16:49 | 1 | 28319 | 28319.00 | 95.2% | 29753.83 | 51582.22 | 0.5768 | 0.5548 |
| E1 | 6 | 2/14/2013 16:56 | 1 | 28284 | 28284.00 | 99.3% | 28492.92 | 51578.54 | 0.5524 | 0.5516 |
| E1 | 7 | 2/14/2013 16:54 | 1 | 28411 | 28411.00 | 100.0% | 28411.00 | 51579.74 | 0.5508 | 0.5444 |
| E1 | 8 | 2/14/2013 16:51 | 1 | 25909 | 25909.00 | 97.0% | 26722.16 | 51580.94 | 0.5181 | 0.5369 |
| E2 | 1 | 2/14/2013 16:39 | 1 | 26781 | 26781.00 | 100.0% | 26781.00 | 51587.06 | 0.5191 | 0.5702 |
| E2 | 2 | 2/14/2013 16:35 | 1 | 28571 | 28571.00 | 98.7% | 28946.50 | 51589.08 | 0.5611 | 0.5691 |
| E2 | 3 | 2/14/2013 16:44 | 1 | 29563 | 29563.00 | 97.3% | 30385.62 | 51584.58 | 0.5890 | 0.5666 |
| E2 | 4 | 2/14/2013 16:41 | 1 | 28723 | 28723.00 | 93.6% | 30678.24 | 51585.96 | 0.5947 | 0.5655 |
| E2 | 5 | 2/14/2013 16:51 | 1 | 28719 | 28719.00 | 95.2% | 30174.10 | 51580.94 | 0.5850 | 0.5617 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| E2 | 6 | 2/14/2013 16:49 | 1 | 28554 | 28554.00 | 99.3% | 28764.91 | 51582.22 | 0.5577 | 0.5587 |
| E2 | 7 | 2/14/2013 16:56 | 1 | 28671 | 28671.00 | 100.0% | 28671.00 | 51578.53 | 0.5559 | 0.5521 |
| E2 | 8 | 2/14/2013 16:54 | 1 | 26339 | 26339.00 | 97.0% | 27165.65 | 51579.74 | 0.5267 | 0.5451 |
| E3 | 1 | 2/14/2013 16:41 | 1 | 26618 | 26618.00 | 100.0% | 26618.00 | 51585.96 | 0.5160 | 0.5690 |
| E3 | 2 | 2/14/2013 16:39 | 1 | 28693 | 28693.00 | 98.7% | 29070.11 | 51587.06 | 0.5635 | 0.5677 |
| E3 | 3 | 2/14/2013 16:35 | 1 | 29309 | 29309.00 | 97.3% | 30124.55 | 51589.08 | 0.5839 | 0.5648 |
| E3 | 4 | 2/14/2013 16:44 | 1 | 28454 | 28454.00 | 93.6% | 30390.93 | 51584.58 | 0.5891 | 0.5637 |
| E3 | 5 | 2/14/2013 16:54 | 1 | 28823 | 28823.00 | 95.2% | 30283.37 | 51579.74 | 0.5871 | 0.5594 |
| E3 | 6 | 2/14/2013 16:51 | 1 | 28468 | 28468.00 | 99.3% | 28678.28 | 51580.94 | 0.5560 | 0.5560 |
| E3 | 7 | 2/14/2013 16:49 | 1 | 28602 | 28602.00 | 100.0% | 28602.00 | 51582.22 | 0.5545 | 0.5486 |
| E3 | 8 | 2/14/2013 16:56 | 1 | 25989 | 25989.00 | 97.0% | 26804.67 | 51578.53 | 0.5197 | 0.5407 |
| E4 | 1 | 2/14/2013 16:44 | 1 | 26594 | 26594.00 | 100.0% | 26594.00 | 51584.57 | 0.5155 | 0.5688 |
| E4 | 2 | 2/14/2013 16:41 | 1 | 28704 | 28704.00 | 98.7% | 29081.25 | 51585.96 | 0.5637 | 0.5676 |
| E4 | 3 | 2/14/2013 16:39 | 1 | 29180 | 29180.00 | 97.3% | 29991.97 | 51587.05 | 0.5814 | 0.5652 |
| E4 | 4 | 2/14/2013 16:35 | 1 | 28925 | 28925.00 | 93.6% | 30893.99 | 51589.08 | 0.5988 | 0.5642 |
| E4 | 5 | 2/14/2013 16:56 | 1 | 28587 | 28587.00 | 95.2% | 30035.41 | 51578.52 | 0.5823 | 0.5604 |
| E4 | 6 | 2/14/2013 16:54 | 1 | 28404 | 28404.00 | 99.3% | 28613.80 | 51579.73 | 0.5547 | 0.5575 |
| E4 | 7 | 2/14/2013 16:51 | 1 | 28787 | 28787.00 | 100.0% | 28787.00 | 51580.93 | 0.5581 | 0.5510 |
| E4 | 8 | 2/14/2013 16:49 | 1 | 26216 | 26216.00 | 97.0% | 27038.79 | 51582.21 | 0.5242 | 0.5442 |
| F1 | 1 | 2/14/2013 16:49 | 1 | 27295 | 27295.00 | 100.0% | 27295.00 | 51582.20 | 0.5292 | 0.5830 |
| F1 | 2 | 2/14/2013 16:56 | 1 | 29644 | 29644.00 | 98.7% | 30033.61 | 51578.51 | 0.5823 | 0.5814 |
| F1 | 3 | 2/14/2013 16:54 | 1 | 30147 | 30147.00 | 97.3% | 30985.87 | 51579.73 | 0.6007 | 0.5781 |
| F1 | 4 | 2/14/2013 16:51 | 1 | 29146 | 29146.00 | 93.6% | 31130.03 | 51580.93 | 0.6035 | 0.5767 |
| F1 | 5 | 2/14/2013 16:35 | 1 | 29025 | 29025.00 | 95.2% | 30495.60 | 51589.08 | 0.5911 | 0.5716 |
| F1 | 6 | 2/14/2013 16:44 | 1 | 28823 | 28823.00 | 99.3% | 29035.90 | 51584.57 | 0.5629 | 0.5675 |
| F1 | 7 | 2/14/2013 16:41 | 1 | 29091 | 29091.00 | 100.0% | 29091.00 | 51585.96 | 0.5639 | 0.5586 |
| F1 | 8 | 2/14/2013 16:39 | 1 | 26635 | 26635.00 | 97.0% | 27470.94 | 51587.05 | 0.5325 | 0.5492 |
| F2 | 1 | 2/14/2013 16:51 | 1 | 27234 | 27234.00 | 100.0% | 27234.00 | 51580.92 | 0.5280 | 0.5784 |
| F2 | 2 | 2/14/2013 16:49 | 1 | 28779 | 28779.00 | 98.7% | 29157.24 | 51582.20 | 0.5653 | 0.5769 |
| F2 | 3 | 2/14/2013 16:56 | 1 | 30073 | 30073.00 | 97.3% | 30909.81 | 51578.51 | 0.5993 | 0.5736 |
| F2 | 4 | 2/14/2013 16:54 | 1 | 29103 | 29103.00 | 93.6% | 31084.11 | 51579.73 | 0.6026 | 0.5723 |
| F2 | 5 | 2/14/2013 16:39 | 1 | 28817 | 28817.00 | 95.2% | 30277.06 | 51587.05 | 0.5869 | 0.5673 |
| F2 | 6 | 2/14/2013 16:35 | 1 | 28793 | 28793.00 | 99.3% | 29005.68 | 51589.08 | 0.5622 | 0.5633 |
| F2 | 7 | 2/14/2013 16:44 | 1 | 29080 | 29080.00 | 100.0% | 29080.00 | 51584.56 | 0.5637 | 0.5547 |
| F2 | 8 | 2/14/2013 16:41 | 1 | 26207 | 26207.00 | 97.0% | 27029.51 | 51585.96 | 0.5240 | 0.5456 |
| F3 | 1 | 2/14/2013 16:54 | 1 | 27590 | 27590.00 | 100.0% | 27590.00 | 51579.72 | 0.5349 | 0.5865 |
| F3 | 2 | 2/14/2013 16:51 | 1 | 29748 | 29748.00 | 98.7% | 30138.97 | 51580.92 | 0.5843 | 0.5850 |
| F3 | 3 | 2/14/2013 16:49 | 1 | 30146 | 30146.00 | 97.3% | 30984.85 | 51582.20 | 0.6007 | 0.5818 |
| F3 | 4 | 2/14/2013 16:56 | 1 | 29369 | 29369.00 | 93.6% | 31368.22 | 51578.51 | 0.6082 | 0.5805 |
| F3 | 5 | 2/14/2013 16:41 | 1 | 29488 | 29488.00 | 95.2% | 30982.06 | 51585.95 | 0.6006 | 0.5757 |
| F3 | 6 | 2/14/2013 16:39 | 1 | 29095 | 29095.00 | 99.3% | 29309.91 | 51587.04 | 0.5682 | 0.5719 |
| F3 | 7 | 2/14/2013 16:35 | 1 | 28902 | 28902.00 | 100.0% | 28902.00 | 51589.07 | 0.5602 | 0.5635 |
| F3 | 8 | 2/14/2013 16:44 | 1 | 27124 | 27124.00 | 97.0% | 27975.29 | 51584.56 | 0.5423 | 0.5546 |
| F4 | 1 | 2/14/2013 16:56 | 1 | 27501 | 27501.00 | 100.0% | 27501.00 | 51578.50 | 0.5332 | 0.5848 |
| F4 | 2 | 2/14/2013 16:54 | 1 | 29663 | 29663.00 | 98.7% | 30052.86 | 51579.71 | 0.5826 | 0.5833 |
| F4 | 3 | 2/14/2013 16:51 | 1 | 30403 | 30403.00 | 97.3% | 31249.00 | 51580.92 | 0.6058 | 0.5800 |
| F4 | 4 | 2/14/2013 16:49 | 1 | 29060 | 29060.00 | 93.6% | 31038.18 | 51582.20 | 0.6017 | 0.5787 |
| F4 | 5 | 2/14/2013 16:44 | 1 | 29143 | 29143.00 | 95.2% | 30619.58 | 51584.55 | 0.5936 | 0.5737 |
| F4 | 6 | 2/14/2013 16:41 | 1 | 28837 | 28837.00 | 99.3% | 29050.00 | 51585.95 | 0.5631 | 0.5697 |
| F4 | 7 | 2/14/2013 16:39 | 1 | 29295 | 29295.00 | 100.0% | 29295.00 | 51587.04 | 0.5679 | 0.5611 |
| F4 | 8 | 2/14/2013 16:35 | 1 | 26770 | 26770.00 | 97.0% | 27610.18 | 51589.07 | 0.5352 | 0.5519 |
| G1 | 1 | 2/14/2013 17:00 | 1 | 26990 | 26990.00 | 100.0% | 26990.00 | 51576.86 | 0.5233 | 0.5806 |
| G1 | 2 | 2/14/2013 17:07 | 1 | 29405 | 29405.00 | 98.7% | 29791.47 | 51573.34 | 0.5777 | 0.5788 |
| G1 | 3 | 2/14/2013 17:05 | 1 | 29898 | 29898.00 | 97.3% | 30729.94 | 51574.47 | 0.5958 | 0.5750 |
| G1 | 4 | 2/14/2013 17:02 | 1 | 29244 | 29244.00 | 93.6% | 31234.71 | 51575.56 | 0.6056 | 0.5734 |
| G1 | 5 | 2/14/2013 17:11 | 1 | 29252 | 29252.00 | 95.2% | 30734.10 | 51571.20 | 0.5960 | 0.5676 |
| G1 | 6 | 2/14/2013 17:20 | 1 | 28210 | 28210.00 | 99.3% | 28418.37 | 51566.94 | 0.5511 | 0.5630 |
| G1 | 7 | 2/14/2013 17:17 | 1 | 28902 | 28902.00 | 100.0% | 28902.00 | 51568.21 | 0.5605 | 0.5530 |
| G1 | 8 | 2/14/2013 17:14 | 1 | 26193 | 26193.00 | 97.0% | 27015.07 | 51569.88 | 0.5239 | 0.5424 |
| G2 | 1 | 2/14/2013 17:02 | 1 | 27461 | 27461.00 | 100.0% | 27461.00 | 51575.56 | 0.5324 | 0.5756 |
| G2 | 2 | 2/14/2013 17:00 | 1 | 28555 | 28555.00 | 98.7% | 28930.29 | 51576.85 | 0.5609 | 0.5739 |
| G2 | 3 | 2/14/2013 17:07 | 1 | 29657 | 29657.00 | 97.3% | 30482.24 | 51573.34 | 0.5910 | 0.5704 |
| G2 | 4 | 2/14/2013 17:05 | 1 | 28546 | 28546.00 | 93.6% | 30489.19 | 51574.47 | 0.5912 | 0.5690 |
| G2 | 5 | 2/14/2013 17:14 | 1 | 28851 | 28851.00 | 95.2% | 30312.78 | 51569.87 | 0.5878 | 0.5636 |
| G2 | 6 | 2/14/2013 17:11 | 1 | 28993 | 28993.00 | 99.3% | 29207.15 | 51571.20 | 0.5663 | 0.5594 |
| G2 | 7 | 2/14/2013 17:20 | 1 | 28387 | 28387.00 | 100.0% | 28387.00 | 51566.93 | 0.5505 | 0.5501 |
| G2 | 8 | 2/14/2013 17:17 | 1 | 26098 | 26098.00 | 97.0% | 26917.09 | 51568.21 | 0.5220 | 0.5403 |
| G3 | 1 | 2/14/2013 17:05 | 1 | 27672 | 27672.00 | 100.0% | 27672.00 | 51574.47 | 0.5365 | 0.5688 |
| G3 | 2 | 2/14/2013 17:02 | 1 | 30013 | 30013.00 | 98.7% | 30407.46 | 51575.56 | 0.5896 | 0.5873 |
| G3 | 3 | 2/14/2013 17:00 | 1 | 30377 | 30377.00 | 97.3% | 31222.27 | 51576.85 | 0.6054 | 0.5840 |
| G3 | 4 | 2/14/2013 17:07 | 1 | 29285 | 29285.00 | 93.6% | 31278.50 | 51573.34 | 0.6065 | 0.5826 |
| G3 | 5 | 2/14/2013 17:17 | 1 | 29463 | 29463.00 | 95.2% | 30955.79 | 51568.20 | 0.6003 | 0.5776 |
| G3 | 6 | 2/14/2013 17:14 | 1 | 28921 | 28921.00 | 99.3% | 29134.62 | 51569.87 | 0.5650 | 0.5736 |
| G3 | 7 | 2/14/2013 17:11 | 1 | 29531 | 29531.00 | 100.0% | 29531.00 | 51571.19 | 0.5726 | 0.5649 |
| G3 | 8 | 2/14/2013 17:20 | 1 | 26930 | 26930.00 | 97.0% | 27775.20 | 51566.93 | 0.5386 | 0.5557 |
| G4 | 1 | 2/14/2013 17:07 | 1 | 27001 | 27001.00 | 100.0% | 27001.00 | 51573.34 | 0.5235 | 0.5767 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| G4 | 2 | 2/14/2013 17:05 | 1 | 28869 | 28869.00 | 98.7% | 29248.42 | 51574.47 | 0.5671 | 0.5754 |
| G4 | 3 | 2/14/2013 17:02 | 1 | 30051 | 30051.00 | 97.3% | 30887.20 | 51575.55 | 0.5989 | 0.5725 |
| G4 | 4 | 2/14/2013 17:00 | 1 | 28981 | 28981.00 | 93.6% | 30953.80 | 51576.85 | 0.6001 | 0.5713 |
| G4 | 5 | 2/14/2013 17:20 | 1 | 29338 | 29338.00 | 95.2% | 30824.46 | 51566.92 | 0.5978 | 0.5669 |
| G4 | 6 | 2/14/2013 17:17 | 1 | 28171 | 28171.00 | 99.3% | 28379.08 | 51568.20 | 0.5503 | 0.5635 |
| G4 | 7 | 2/14/2013 17:14 | 1 | 29023 | 29023.00 | 100.0% | 29023.00 | 51569.87 | 0.5628 | 0.5559 |
| G4 | 8 | 2/14/2013 17:11 | 1 | 26478 | 26478.00 | 97.0% | 27309.01 | 51571.19 | 0.5295 | 0.5478 |
| H1 | 1 | 2/14/2013 17:11 | 1 | 26604 | 26604.00 | 100.0% | 26604.00 | 51571.18 | 0.5159 | 0.5730 |
| H1 | 2 | 2/14/2013 17:20 | 1 | 28846 | 28846.00 | 98.7% | 29225.12 | 51566.92 | 0.5667 | 0.5718 |
| H1 | 3 | 2/14/2013 17:17 | 1 | 29666 | 29666.00 | 97.3% | 30491.49 | 51568.20 | 0.5913 | 0.5692 |
| H1 | 4 | 2/14/2013 17:14 | 1 | 28838 | 28838.00 | 93.6% | 30801.07 | 51569.86 | 0.5973 | 0.5682 |
| H1 | 5 | 2/14/2013 17:00 | 1 | 29238 | 29238.00 | 95.2% | 30719.39 | 51576.88 | 0.5956 | 0.5642 |
| H1 | 6 | 2/14/2013 17:07 | 1 | 28485 | 28485.00 | 99.3% | 28695.40 | 51573.33 | 0.5564 | 0.5611 |
| H1 | 7 | 2/14/2013 17:05 | 1 | 28838 | 28838.00 | 100.0% | 28838.00 | 51574.47 | 0.5592 | 0.5543 |
| H1 | 8 | 2/14/2013 17:02 | 1 | 26334 | 26334.00 | 97.0% | 27160.49 | 51575.55 | 0.5266 | 0.5471 |
| H2 | 1 | 2/14/2013 17:14 | 1 | 26712 | 26712.00 | 100.0% | 26712.00 | 51569.86 | 0.5180 | 0.5734 |
| H2 | 2 | 2/14/2013 17:11 | 1 | 29065 | 29065.00 | 98.7% | 29447.00 | 51571.18 | 0.5710 | 0.5726 |
| H2 | 3 | 2/14/2013 17:20 | 1 | 30048 | 30048.00 | 97.3% | 30884.12 | 51566.92 | 0.5989 | 0.5709 |
| H2 | 4 | 2/14/2013 17:17 | 1 | 28932 | 28932.00 | 93.6% | 30901.47 | 51568.19 | 0.5992 | 0.5702 |
| H2 | 5 | 2/14/2013 17:02 | 1 | 28551 | 28551.00 | 95.2% | 29997.58 | 51575.55 | 0.5816 | 0.5676 |
| H2 | 6 | 2/14/2013 17:00 | 1 | 28987 | 28987.00 | 99.3% | 29201.11 | 51576.88 | 0.5662 | 0.5655 |
| H2 | 7 | 2/14/2013 17:07 | 1 | 28907 | 28907.00 | 100.0% | 28907.00 | 51573.32 | 0.5605 | 0.5610 |
| H2 | 8 | 2/14/2013 17:05 | 1 | 27105 | 27105.00 | 97.0% | 27955.69 | 51574.46 | 0.5420 | 0.5562 |
| H3 | 1 | 2/14/2013 17:17 | 1 | 27270 | 27270.00 | 100.0% | 27270.00 | 51568.19 | 0.5288 | 0.5874 |
| H3 | 2 | 2/14/2013 17:14 | 1 | 29602 | 29602.00 | 98.7% | 29991.05 | 51569.86 | 0.5816 | 0.5859 |
| H3 | 3 | 2/14/2013 17:11 | 1 | 30365 | 30365.00 | 97.3% | 31209.94 | 51571.18 | 0.6052 | 0.5827 |
| H3 | 4 | 2/14/2013 17:20 | 1 | 29562 | 29562.00 | 93.6% | 31574.35 | 51566.92 | 0.6123 | 0.5814 |
| H3 | 5 | 2/14/2013 17:05 | 1 | 29489 | 29489.00 | 95.2% | 30983.11 | 51574.46 | 0.6007 | 0.5764 |
| H3 | 6 | 2/14/2013 17:02 | 1 | 29210 | 29210.00 | 99.3% | 29425.76 | 51575.55 | 0.5705 | 0.5725 |
| H3 | 7 | 2/14/2013 17:00 | 1 | 29736 | 29736.00 | 100.0% | 29736.00 | 51576.88 | 0.5765 | 0.5640 |
| H3 | 8 | 2/14/2013 17:07 | 1 | 26490 | 26490.00 | 97.0% | 27321.39 | 51573.32 | 0.5298 | 0.5550 |
| H4 | 1 | 2/14/2013 17:20 | 1 | 26626 | 26626.00 | 100.0% | 26626.00 | 51566.92 | 0.5163 | 0.5761 |
| H4 | 2 | 2/14/2013 17:17 | 1 | 28745 | 28745.00 | 98.7% | 29122.79 | 51568.19 | 0.5647 | 0.5747 |
| H4 | 3 | 2/14/2013 17:14 | 1 | 30627 | 30627.00 | 97.3% | 31479.23 | 51569.86 | 0.6104 | 0.5719 |
| H4 | 4 | 2/14/2013 17:11 | 1 | 28888 | 28888.00 | 93.6% | 30854.47 | 51571.17 | 0.5983 | 0.5707 |
| H4 | 5 | 2/14/2013 17:07 | 1 | 28747 | 28747.00 | 95.2% | 30203.51 | 51573.32 | 0.5856 | 0.5663 |
| H4 | 6 | 2/14/2013 17:05 | 1 | 28706 | 28706.00 | 99.3% | 28918.03 | 51574.46 | 0.5607 | 0.5629 |
| H4 | 7 | 2/14/2013 17:02 | 1 | 29087 | 29087.00 | 100.0% | 29087.00 | 51575.55 | 0.5640 | 0.5553 |
| H4 | 8 | 2/14/2013 17:00 | 1 | 26268 | 26268.00 | 97.0% | 27092.42 | 51576.87 | 0.5253 | 0.5474 |
| I1 | 1 | 2/14/2013 17:54 | 1 | 25458 | 25458.00 | 100.0% | 25458.00 | 51550.40 | 0.4938 | 0.5456 |
| I1 | 2 | 2/14/2013 18:14 | 1 | 27331 | 27331.00 | 98.7% | 27690.21 | 51540.57 | 0.5373 | 0.5439 |
| I1 | 3 | 2/14/2013 18:04 | 1 | 28374 | 28374.00 | 97.3% | 29163.54 | 51545.05 | 0.5658 | 0.5405 |
| I1 | 4 | 2/14/2013 17:56 | 1 | 27781 | 27781.00 | 93.6% | 29672.12 | 51549.16 | 0.5756 | 0.5391 |
| I1 | 5 | 2/14/2013 18:16 | 1 | 27505 | 27505.00 | 95.2% | 28898.59 | 51539.19 | 0.5607 | 0.5338 |
| I1 | 6 | 2/14/2013 18:25 | 1 | 25547 | 25547.00 | 99.3% | 25735.70 | 51535.12 | 0.4994 | 0.5297 |
| I1 | 7 | 2/14/2013 18:22 | 1 | 27827 | 27827.00 | 100.0% | 27827.00 | 51536.36 | 0.5399 | 0.5205 |
| I1 | 8 | 2/14/2013 18:19 | 1 | 24558 | 24558.00 | 97.0% | 25328.75 | 51537.81 | 0.4915 | 0.5109 |
| I2 | 1 | 2/14/2013 17:56 | 1 | 26014 | 26014.00 | 100.0% | 26014.00 | 51549.16 | 0.5046 | 0.5525 |
| I2 | 2 | 2/14/2013 17:54 | 1 | 27924 | 27924.00 | 98.7% | 28291.00 | 51550.40 | 0.5488 | 0.5508 |
| I2 | 3 | 2/14/2013 18:14 | 1 | 28671 | 28671.00 | 97.3% | 29468.80 | 51540.56 | 0.5718 | 0.5470 |
| I2 | 4 | 2/14/2013 18:04 | 1 | 27748 | 27748.00 | 93.6% | 29636.87 | 51545.05 | 0.5750 | 0.5455 |
| I2 | 5 | 2/14/2013 18:19 | 1 | 27973 | 27973.00 | 95.2% | 29390.30 | 51537.80 | 0.5703 | 0.5398 |
| I2 | 6 | 2/14/2013 18:16 | 1 | 25466 | 25466.00 | 99.3% | 25654.10 | 51539.18 | 0.4978 | 0.5353 |
| I2 | 7 | 2/14/2013 18:25 | 1 | 27985 | 27985.00 | 100.0% | 27985.00 | 51535.12 | 0.5430 | 0.5255 |
| I2 | 8 | 2/14/2013 18:22 | 1 | 24995 | 24995.00 | 97.0% | 25779.47 | 51536.36 | 0.5002 | 0.5150 |
| I3 | 1 | 2/14/2013 18:04 | 1 | 25605 | 25605.00 | 100.0% | 25605.00 | 51545.05 | 0.4967 | 0.5511 |
| I3 | 2 | 2/14/2013 17:56 | 1 | 27849 | 27849.00 | 98.7% | 28215.02 | 51549.16 | 0.5473 | 0.5494 |
| I3 | 3 | 2/14/2013 17:54 | 1 | 28684 | 28684.00 | 97.3% | 29482.16 | 51550.39 | 0.5719 | 0.5456 |
| I3 | 4 | 2/14/2013 18:14 | 1 | 27958 | 27958.00 | 93.6% | 29861.17 | 51540.56 | 0.5794 | 0.5441 |
| I3 | 5 | 2/14/2013 18:22 | 1 | 27726 | 27726.00 | 95.2% | 29130.78 | 51536.35 | 0.5652 | 0.5384 |
| I3 | 6 | 2/14/2013 18:19 | 1 | 25767 | 25767.00 | 99.3% | 25957.32 | 51537.80 | 0.5037 | 0.5339 |
| I3 | 7 | 2/14/2013 18:16 | 1 | 27712 | 27712.00 | 100.0% | 27712.00 | 51539.18 | 0.5377 | 0.5239 |
| I3 | 8 | 2/14/2013 18:25 | 1 | 24882 | 24882.00 | 97.0% | 25662.92 | 51535.12 | 0.4980 | 0.5135 |
| I4 | 1 | 2/14/2013 18:14 | 1 | 25975 | 25975.00 | 100.0% | 25975.00 | 51540.55 | 0.5040 | 0.5534 |
| I4 | 2 | 2/14/2013 18:04 | 1 | 28187 | 28187.00 | 98.7% | 28557.46 | 51545.05 | 0.5540 | 0.5520 |
| I4 | 3 | 2/14/2013 17:56 | 1 | 28724 | 28724.00 | 97.3% | 29523.28 | 51549.15 | 0.5727 | 0.5489 |
| I4 | 4 | 2/14/2013 17:54 | 1 | 27771 | 27771.00 | 93.6% | 29661.44 | 51550.39 | 0.5754 | 0.5476 |
| I4 | 5 | 2/14/2013 18:25 | 1 | 27999 | 27999.00 | 95.2% | 29417.62 | 51535.11 | 0.5708 | 0.5430 |
| I4 | 6 | 2/14/2013 18:22 | 1 | 26038 | 26038.00 | 99.3% | 26230.33 | 51536.35 | 0.5090 | 0.5393 |
| I4 | 7 | 2/14/2013 18:19 | 1 | 27846 | 27846.00 | 100.0% | 27846.00 | 51537.80 | 0.5403 | 0.5312 |
| I4 | 8 | 2/14/2013 18:16 | 1 | 25574 | 25574.00 | 97.0% | 26376.64 | 51539.17 | 0.5118 | 0.5227 |
| J1 | 1 | 2/14/2013 18:16 | 1 | 25319 | 25319.00 | 100.0% | 25319.00 | 51539.17 | 0.4913 | 0.5469 |
| J1 | 2 | 2/14/2013 18:25 | 1 | 27719 | 27719.00 | 98.7% | 28083.31 | 51535.11 | 0.5449 | 0.5457 |
| J1 | 3 | 2/14/2013 18:22 | 1 | 28831 | 28831.00 | 97.3% | 29633.25 | 51536.35 | 0.5750 | 0.5432 |
| J1 | 4 | 2/14/2013 18:19 | 1 | 27812 | 27812.00 | 93.6% | 29705.23 | 51537.80 | 0.5764 | 0.5421 |
| J1 | 5 | 2/14/2013 17:54 | 1 | 27562 | 27562.00 | 95.2% | 28958.47 | 51550.39 | 0.5618 | 0.5382 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| J1 | 6 | 2/14/2013 18:14 | 1 | 25600 | 25600.00 | 99.3% | 25789.09 | 51540.55 | 0.5004 | 0.5352 |
| J1 | 7 | 2/14/2013 18:04 | 1 | 28107 | 28107.00 | 100.0% | 28107.00 | 51545.05 | 0.5453 | 0.5285 |
| J1 | 8 | 2/14/2013 17:56 | 1 | 25299 | 25299.00 | 97.0% | 26093.01 | 51549.15 | 0.5062 | 0.5214 |
| J2 | 1 | 2/14/2013 18:19 | 1 | 25566 | 25566.00 | 100.0% | 25566.00 | 51537.80 | 0.4961 | 0.5447 |
| J2 | 2 | 2/14/2013 18:16 | 1 | 27613 | 27613.00 | 98.7% | 27975.91 | 51539.17 | 0.5428 | 0.5435 |
| J2 | 3 | 2/14/2013 18:25 | 1 | 28413 | 28413.00 | 97.3% | 29203.62 | 51535.10 | 0.5667 | 0.5409 |
| J2 | 4 | 2/14/2013 18:22 | 1 | 27447 | 27447.00 | 93.6% | 29315.38 | 51536.35 | 0.5688 | 0.5398 |
| J2 | 5 | 2/14/2013 17:56 | 1 | 27753 | 27753.00 | 95.2% | 29159.15 | 51549.15 | 0.5657 | 0.5359 |
| J2 | 6 | 2/14/2013 17:54 | 1 | 25406 | 25406.00 | 99.3% | 25593.66 | 51550.38 | 0.4965 | 0.5328 |
| J2 | 7 | 2/14/2013 18:14 | 1 | 27790 | 27790.00 | 100.0% | 27790.00 | 51540.55 | 0.5392 | 0.5259 |
| J2 | 8 | 2/14/2013 18:04 | 1 | 25316 | 25316.00 | 97.0% | 26110.54 | 51545.04 | 0.5066 | 0.5187 |
| J3 | 1 | 2/14/2013 18:22 | 1 | 25361 | 25361.00 | 100.0% | 25361.00 | 51536.34 | 0.4921 | 0.5490 |
| J3 | 2 | 2/14/2013 18:19 | 1 | 27836 | 27836.00 | 98.7% | 28201.84 | 51537.79 | 0.5472 | 0.5474 |
| J3 | 3 | 2/14/2013 18:16 | 1 | 28331 | 28331.00 | 97.3% | 29119.34 | 51539.16 | 0.5650 | 0.5441 |
| J3 | 4 | 2/14/2013 18:25 | 1 | 27891 | 27891.00 | 93.6% | 29789.60 | 51535.10 | 0.5780 | 0.5427 |
| J3 | 5 | 2/14/2013 18:04 | 1 | 28372 | 28372.00 | 95.2% | 29809.51 | 51545.03 | 0.5783 | 0.5376 |
| J3 | 6 | 2/14/2013 17:56 | 1 | 25570 | 25570.00 | 99.3% | 25758.87 | 51549.15 | 0.4997 | 0.5335 |
| J3 | 7 | 2/14/2013 17:54 | 1 | 27403 | 27403.00 | 100.0% | 27403.00 | 51550.37 | 0.5316 | 0.5246 |
| J3 | 8 | 2/14/2013 18:14 | 1 | 25098 | 25098.00 | 97.0% | 25885.70 | 51540.54 | 0.5022 | 0.5152 |
| J4 | 1 | 2/14/2013 18:25 | 1 | 26133 | 26133.00 | 100.0% | 26133.00 | 51535.09 | 0.5071 | 0.5534 |
| J4 | 2 | 2/14/2013 18:22 | 1 | 27899 | 27899.00 | 98.7% | 28265.67 | 51536.34 | 0.5485 | 0.5520 |
| J4 | 3 | 2/14/2013 18:19 | 1 | 28651 | 28651.00 | 97.3% | 29448.25 | 51537.79 | 0.5714 | 0.5491 |
| J4 | 4 | 2/14/2013 18:16 | 1 | 28007 | 28007.00 | 93.6% | 29913.50 | 51539.15 | 0.5804 | 0.5479 |
| J4 | 5 | 2/14/2013 18:14 | 1 | 27986 | 27986.00 | 95.2% | 29403.96 | 51540.54 | 0.5705 | 0.5435 |
| J4 | 6 | 2/14/2013 18:04 | 1 | 25877 | 25877.00 | 99.3% | 26068.14 | 51545.03 | 0.5057 | 0.5400 |
| J4 | 7 | 2/14/2013 17:56 | 1 | 28348 | 28348.00 | 100.0% | 28348.00 | 51549.14 | 0.5499 | 0.5323 |
| J4 | 8 | 2/14/2013 17:54 | 1 | 25430 | 25430.00 | 97.0% | 26228.12 | 51550.37 | 0.5088 | 0.5242 |

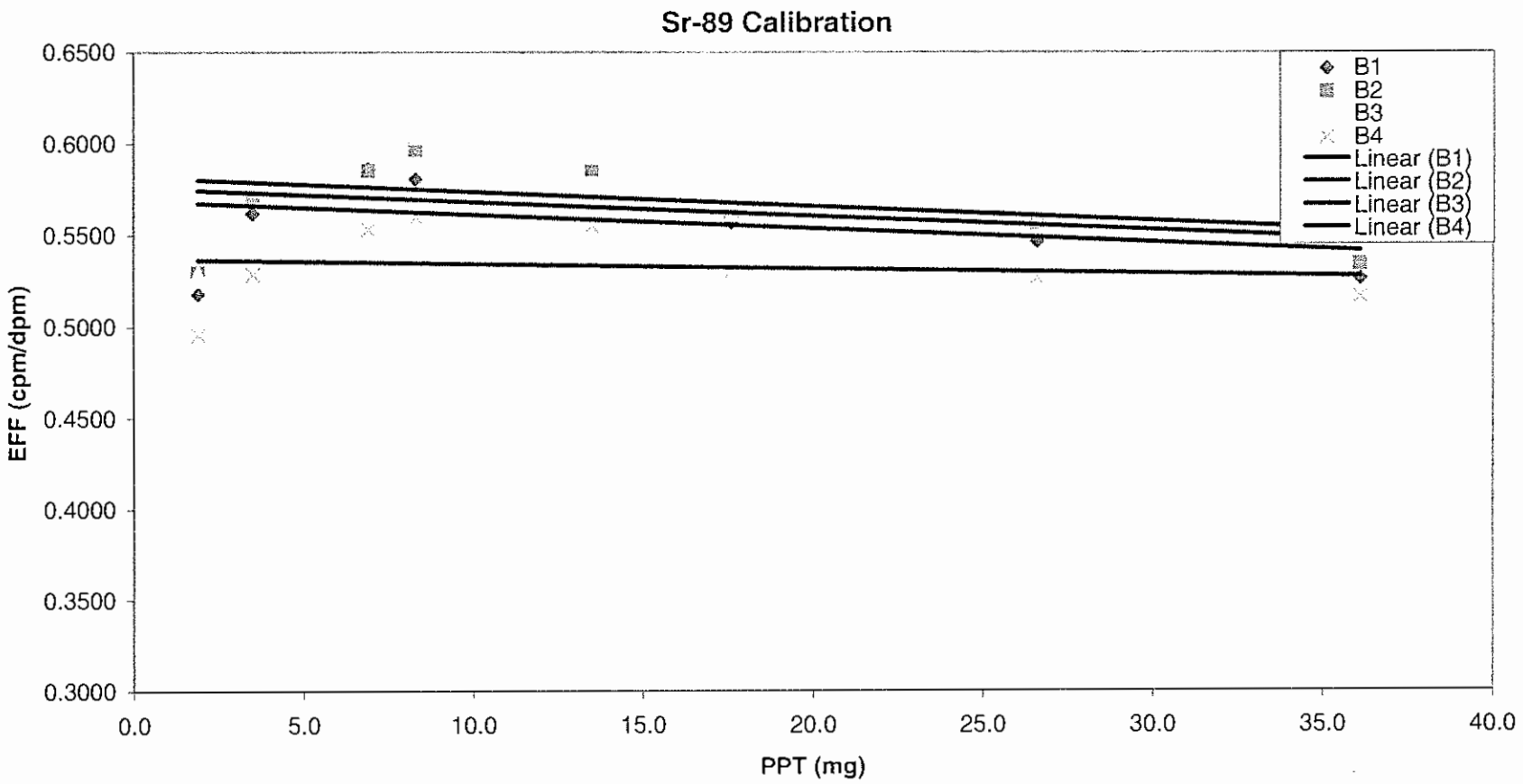



A1 y = -8.491165E-04x + 5.747061E-01

A2 y = -6.406264E-04x + 5.703443E-01

A3 y = -4.202331E-04x + 5.700664E-01

A4

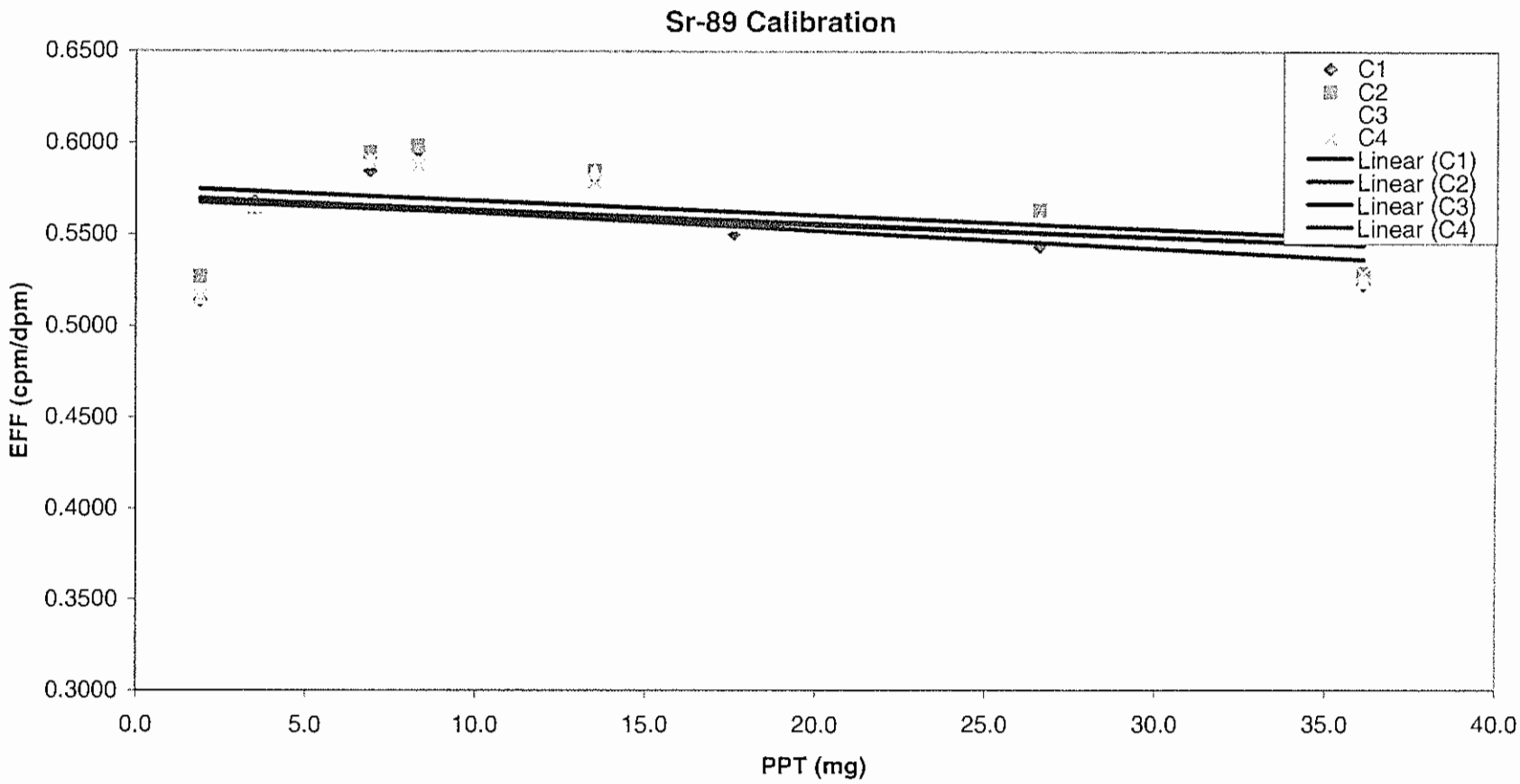



B1 y = -7.480430E-04x + 5.687816E-01

B2 y = -7.591522E-04x + 5.758076E-01

B3 y = -7.822953E-04x + 5.816376E-01

B4 y = -2.580587E-04x + 5.369774E-01

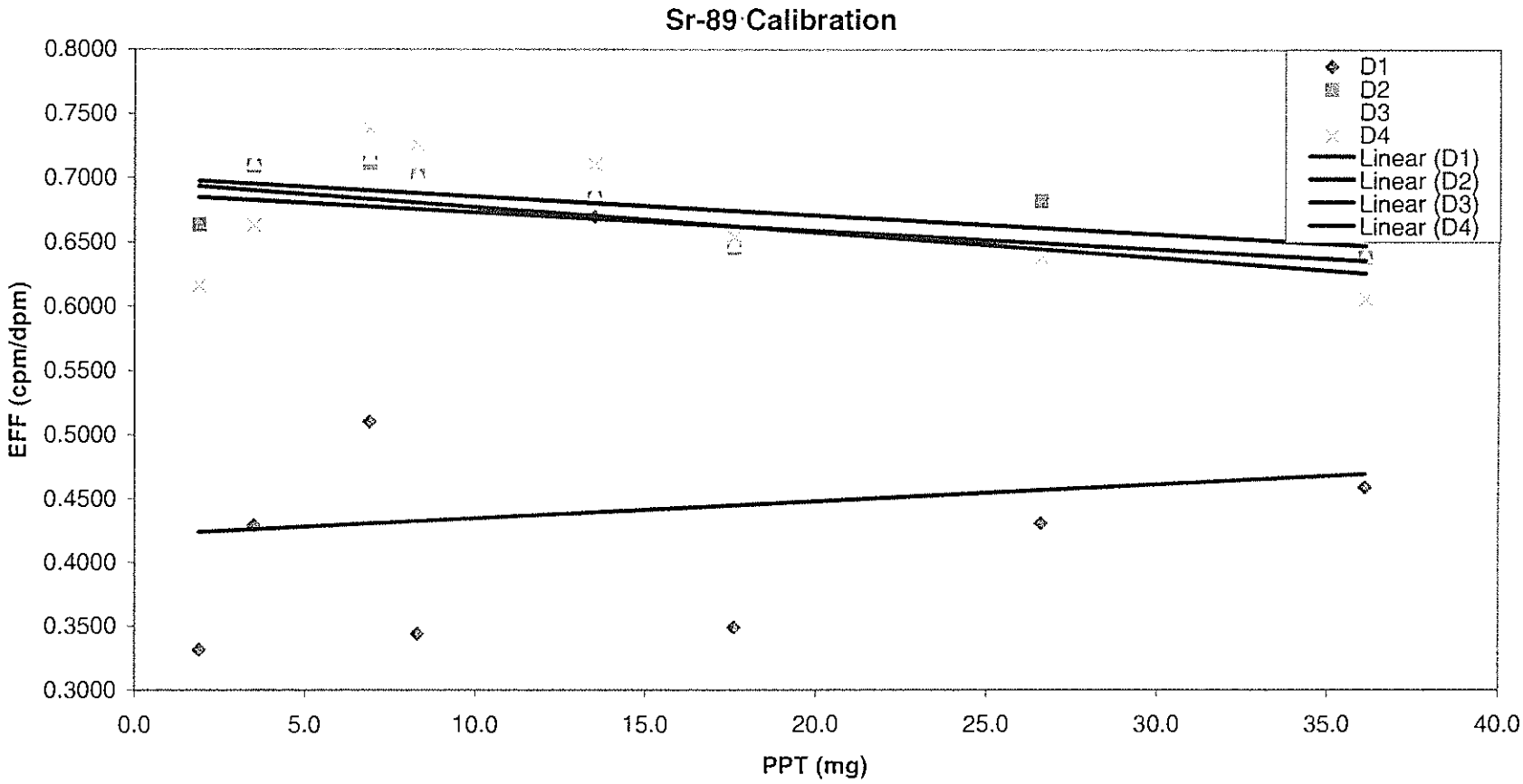



C1 y = -9.712360E-04x + 5.715763E-01

C2 y = -7.725299E-04x + 5.761770E-01

C3 y = -7.356185E-04x + 5.708355E-01

C4 y = -6.743296E-04x + 5.687446E-01

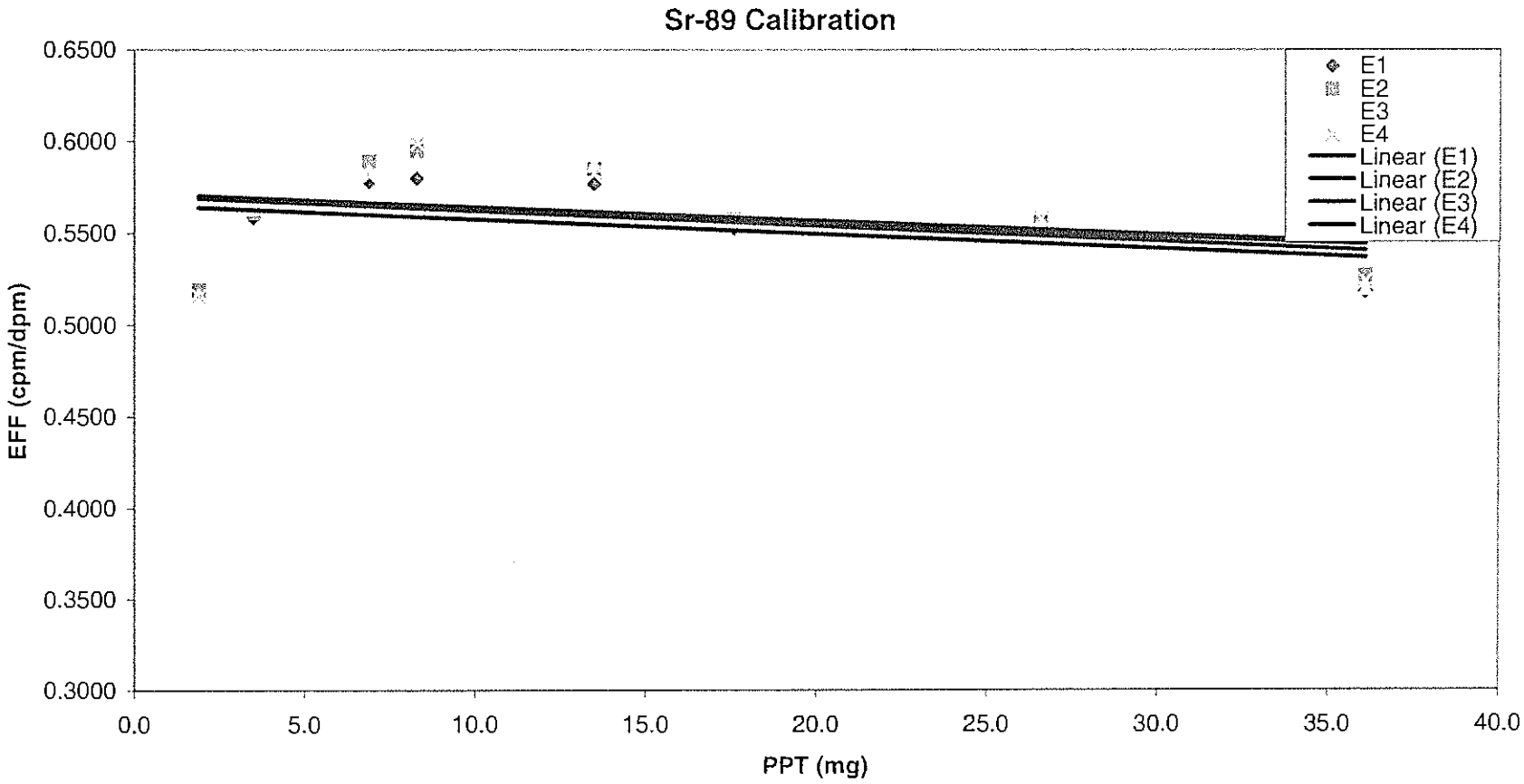



D1 y = 1.337734E-03x + 4.212809E-01

D2 y = -1.469478E-03x + 7.003281E-01

D3 y = -1.435312E-03x + 6.876622E-01

D4 y = -1.970516E-03x + 6.971995E-01

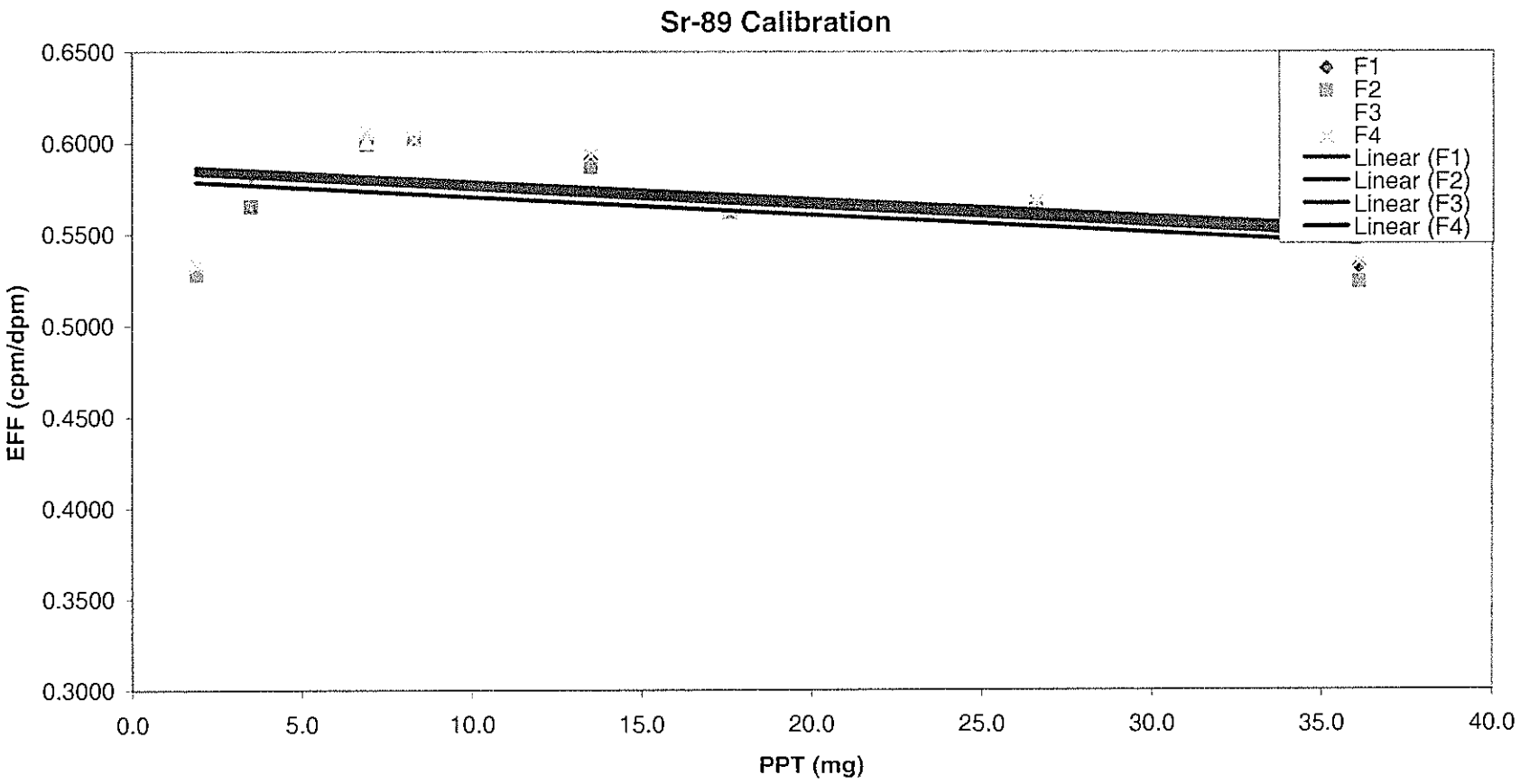



E1 y = -7.919716E-04x + 5.654928E-01

E2 y = -7.339795E-04x + 5.716417E-01

E3 y = -8.264190E-04x + 5.705518E-01

E4 y = -7.203757E-04x + 5.701605E-01

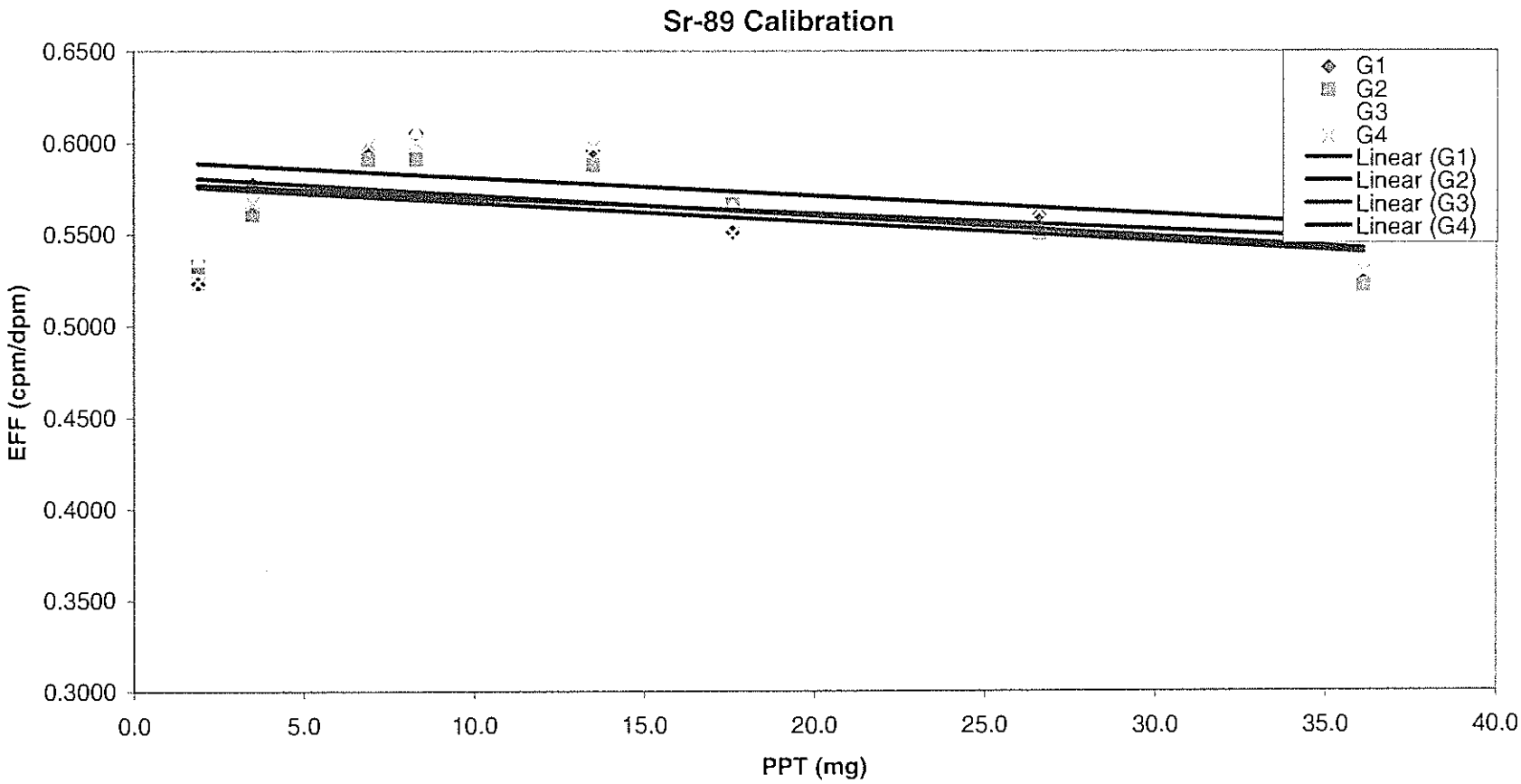



F1 y = -9.877608E-04x + 5.848942E-01

F2 y = -9.606949E-04x + 5.802409E-01

F3 y = -9.301478E-04x + 5.882220E-01

F4 y = -9.627272E-04x + 5.866634E-01

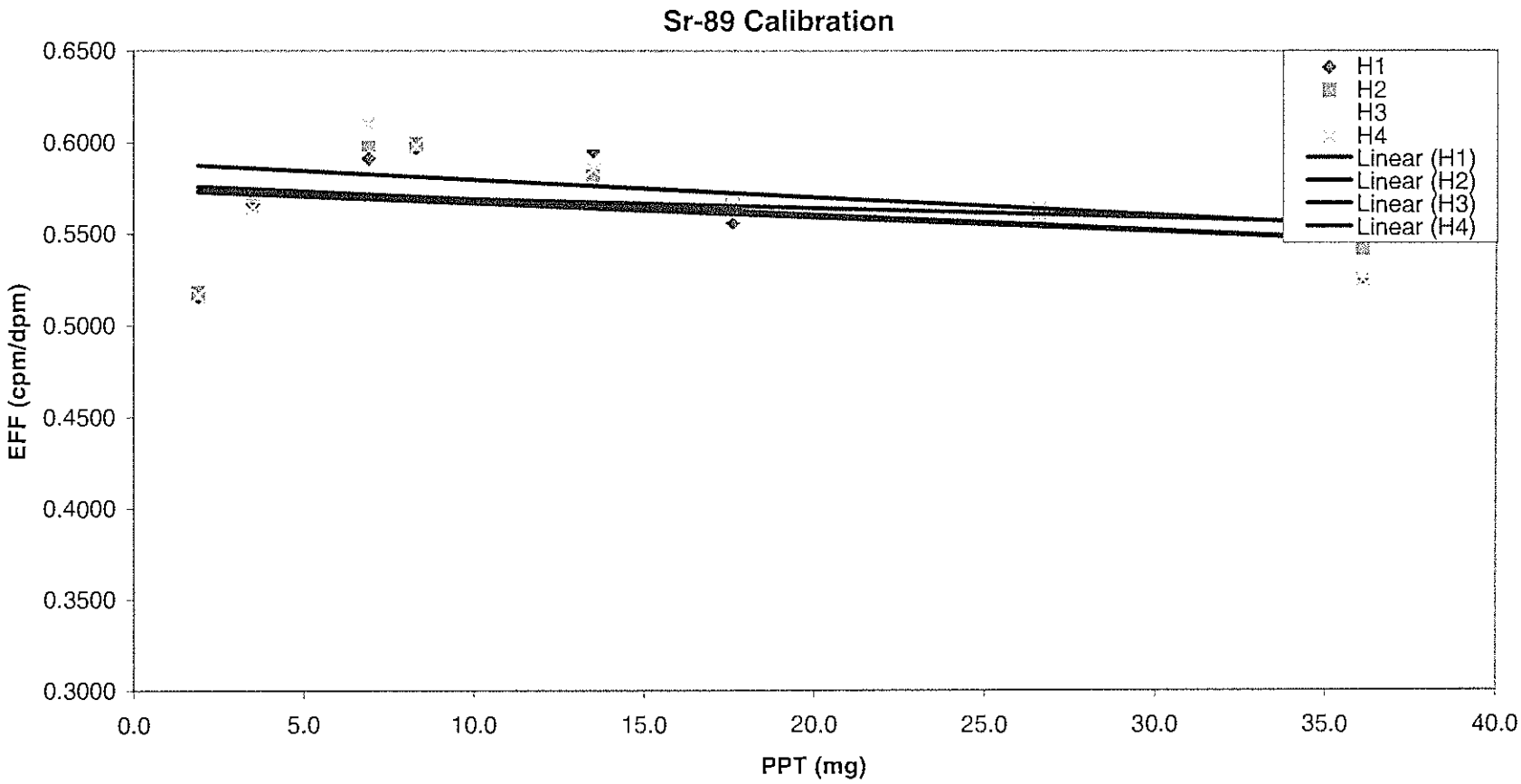



G1 y = -1.115706E-03x + 5.826749E-01

G2 y = -1.033069E-03x + 5.775452E-01

G3 y = -9.703879E-04x + 5.906826E-01

G4 y = -8.458304E-04x + 5.783561E-01

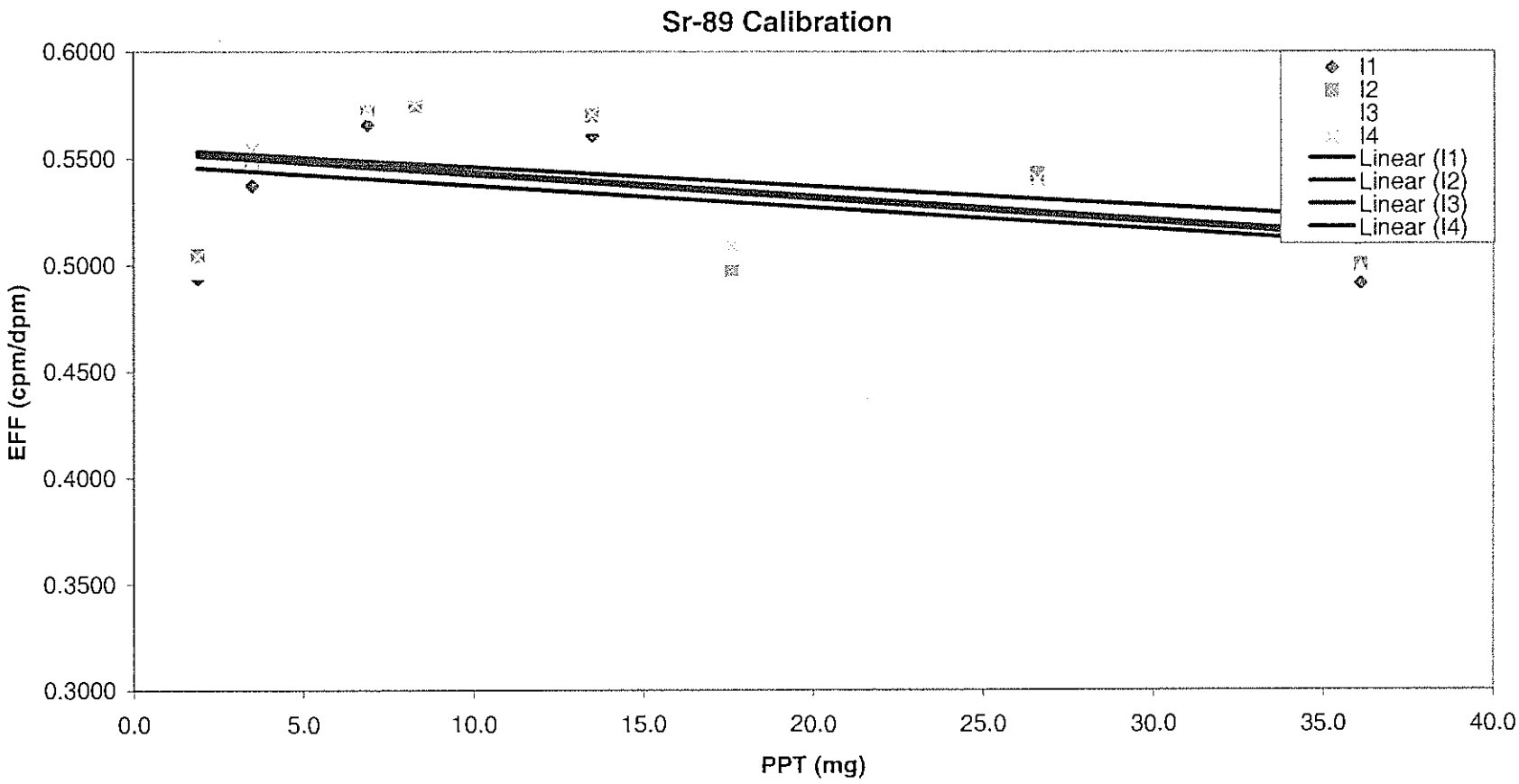



H1 y = -7.598651E-04x + 5.744832E-01

H2 y = -5.036199E-04x + 5.743844E-01

H3 y = -9.487267E-04x + 5.892461E-01

H4 y = -8.395378E-04x + 5.776789E-01

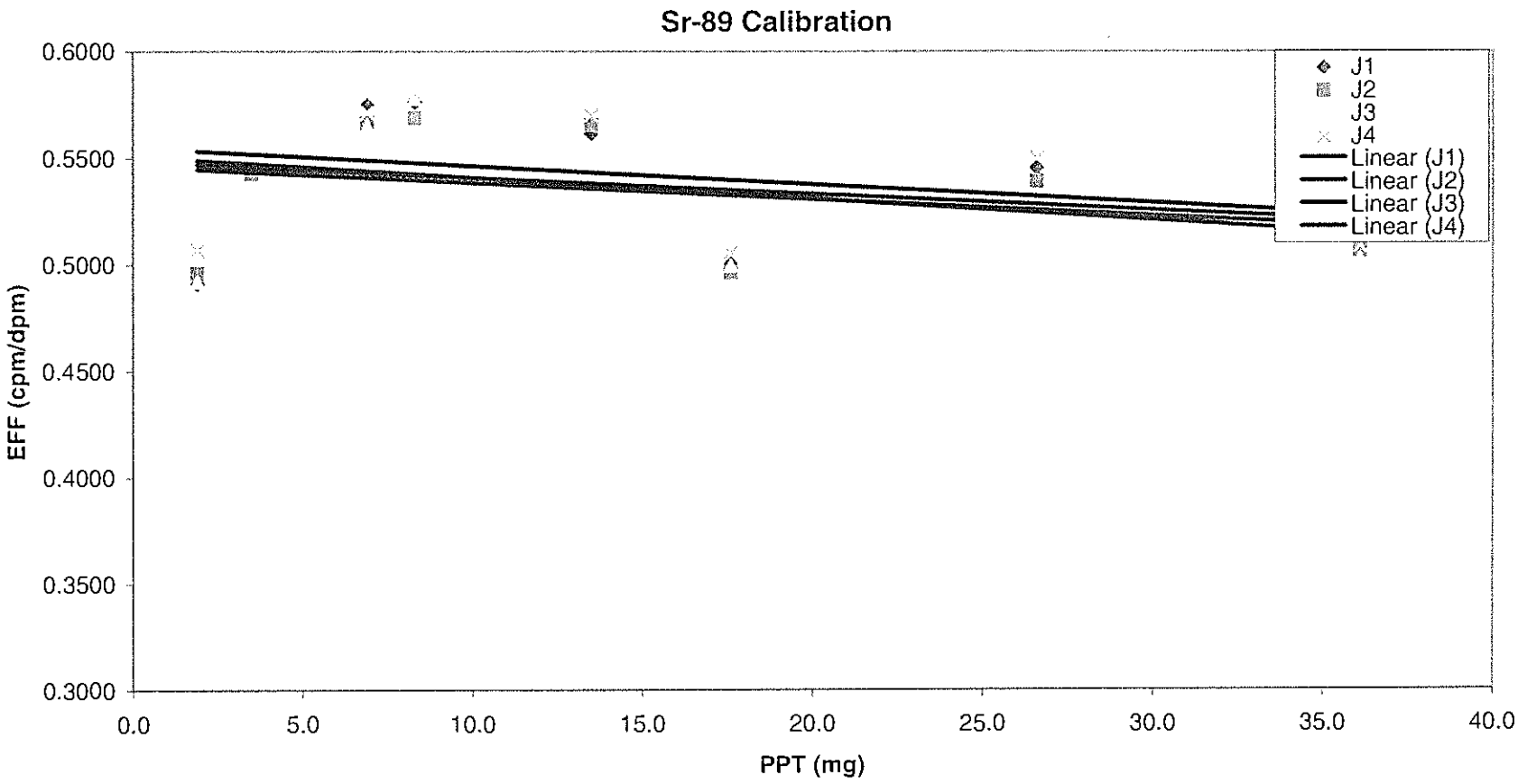



I1 y = -1.012691E-03x + 5.474808E-01

I2 y = -1.095949E-03x + 5.546033E-01

I3 y = -1.101048E-03x + 5.532368E-01

I4 y = -8.985042E-04x + 5.550967E-01




J1 y = -7.471830E-04x + 5.483286E-01

J2 y = -7.596602E-04x + 5.461452E-01

J3 y = -9.883080E-04x + 5.509050E-01

J4 y = -8.545895E-04x + 5.550071E-01

Current Calibration - LB4100

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-89 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **LB4100** | A0 | A1 | A2 | A3 | A4 |
| **A1** | 5.747061E-01 | -8.491165E-04 | | | |
| **A2** | 5.703443E-01 | -6.406264E-04 | | | |
| **A3** | 5.700664E-01 | -4.202331E-04 | | | |
| **A4** | #N/A | #N/A | | | |
| **B1** | 5.687816E-01 | -7.480430E-04 | | | |
| **B2** | 5.758076E-01 | -7.591522E-04 | | | |
| **B3** | 5.816376E-01 | -7.822953E-04 | | | |
| **B4** | 5.369774E-01 | -2.580587E-04 | | | |
| **C1** | 5.715763E-01 | -9.712360E-04 | | | |
| **C2** | 5.761770E-01 | -7.725299E-04 | | | |
| **C3** | 5.708355E-01 | -7.356185E-04 | | | |
| **C4** | 5.687446E-01 | -6.743296E-04 | | | |
| **D1** | 4.212809E-01 | 1.337734E-03 | | | |
| **D2** | 7.003281E-01 | -1.469478E-03 | | | |
| **D3** | 6.876622E-01 | -1.435312E-03 | | | |
| **D4** | 6.971995E-01 | -1.970516E-03 | | | |
| **E1** | 5.654928E-01 | -7.919716E-04 | | | |
| **E2** | 5.716417E-01 | -7.339795E-04 | | | |
| **E3** | 5.705518E-01 | -8.264190E-04 | | | |
| **E4** | 5.701605E-01 | -7.203757E-04 | | | |
| **F1** | 5.848942E-01 | -9.877608E-04 | | | |
| **F2** | 5.802409E-01 | -9.606949E-04 | | | |
| **F3** | 5.882220E-01 | -9.301478E-04 | | | |
| **F4** | 5.866634E-01 | -9.627272E-04 | | | |
| **G1** | 5.826749E-01 | -1.115706E-03 | | | |
| **G2** | 5.775452E-01 | -1.033069E-03 | | | |
| **G3** | 5.906826E-01 | -9.703879E-04 | | | |
| **G4** | 5.783561E-01 | -8.458304E-04 | | | |
| **H1** | 5.744832E-01 | -7.598651E-04 | | | |
| **H2** | 5.743844E-01 | -5.036199E-04 | | | |
| **H3** | 5.892461E-01 | -9.487267E-04 | | | |
| **H4** | 5.776789E-01 | -8.395378E-04 | | | |
| **I1** | 5.474808E-01 | -1.012691E-03 | | | |
| **I2** | 5.546033E-01 | -1.095949E-03 | | | |
| **I3** | 5.532368E-01 | -1.101048E-03 | | | |
| **I4** | 5.550967E-01 | -8.985042E-04 | | | |
| **J1** | 5.483286E-01 | -7.471830E-04 | | | |
| **J2** | 5.461452E-01 | -7.596602E-04 | | | |
| **J3** | 5.509050E-01 | -9.883080E-04 | | | |
| **J4** | 5.550071E-01 | -8.545895E-04 | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| C1 | A1 | 1 | 0 | 27150 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C2 | A1 | 1 | 0 | 29285 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C3 | A1 | 1 | 1 | 29776 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C4 | A1 | 1 | 0 | 28412 | 2/14/2013 15:38 | 2/14/2013 15:39 | LB4100 | SR89C13 |
| C5 | A1 | 1 | 0 | 28092 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C6 | A1 | 1 | 0 | 28844 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C7 | A1 | 1 | 1 | 28434 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C8 | A1 | 1 | 0 | 26672 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C1 | A2 | 1 | 0 | 26680 | 2/14/2013 15:38 | 2/14/2013 15:39 | LB4100 | SR89C13 |
| C2 | A2 | 1 | 0 | 28905 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C3 | A2 | 1 | 0 | 29511 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C4 | A2 | 1 | 0 | 28600 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C5 | A2 | 1 | 0 | 28678 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C6 | A2 | 1 | 0 | 28277 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C7 | A2 | 1 | 0 | 28907 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C8 | A2 | 1 | 0 | 26516 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C1 | A3 | 1 | 0 | 26987 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C2 | A3 | 1 | 0 | 28583 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C3 | A3 | 1 | 0 | 29853 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C4 | A3 | 1 | 0 | 28419 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C5 | A3 | 1 | 0 | 28725 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C6 | A3 | 1 | 0 | 28858 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C7 | A3 | 1 | 0 | 28676 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C8 | A3 | 1 | 0 | 27141 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C1 | B1 | 1 | 0 | 26722 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C2 | B1 | 1 | 0 | 28623 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C3 | B1 | 1 | 1 | 29424 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C4 | B1 | 1 | 0 | 28057 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C5 | B1 | 1 | 0 | 28929 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C6 | B1 | 1 | 1 | 28525 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C7 | B1 | 1 | 0 | 28211 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C8 | B1 | 1 | 0 | 26338 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C1 | B2 | 1 | 0 | 27329 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C2 | B2 | 1 | 0 | 29027 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C3 | B2 | 1 | 0 | 29390 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C4 | B2 | 1 | 0 | 28846 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C5 | B2 | 1 | 0 | 28795 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C6 | B2 | 1 | 0 | 28750 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C7 | B2 | 1 | 0 | 28726 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C8 | B2 | 1 | 0 | 26736 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C1 | B3 | 1 | 0 | 27326 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C2 | B3 | 1 | 0 | 29353 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C3 | B3 | 1 | 1 | 30111 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C4 | B3 | 1 | 0 | 29154 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C5 | B3 | 1 | 0 | 29120 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C6 | B3 | 1 | 0 | 28788 | 2/14/2013 15:36 | 2/14/2013 15:37 | LB4100 | SR89C13 |
| C7 | B3 | 1 | 0 | 28809 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C8 | B3 | 1 | 0 | 27134 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C1 | B4 | 1 | 0 | 25575 | 2/14/2013 15:57 | 2/14/2013 15:58 | LB4100 | SR89C13 |
| C2 | B4 | 1 | 0 | 26919 | 2/14/2013 15:54 | 2/14/2013 15:55 | LB4100 | SR89C13 |
| C3 | B4 | 1 | 2 | 27774 | 2/14/2013 15:51 | 2/14/2013 15:52 | LB4100 | SR89C13 |
| C4 | B4 | 1 | 0 | 27053 | 2/14/2013 15:48 | 2/14/2013 15:49 | LB4100 | SR89C13 |
| C5 | B4 | 1 | 0 | 27278 | 2/14/2013 15:44 | 2/14/2013 15:45 | LB4100 | SR89C13 |
| C6 | B4 | 1 | 0 | 27192 | 2/14/2013 15:41 | 2/14/2013 15:42 | LB4100 | SR89C13 |
| C7 | B4 | 1 | 0 | 27195 | 2/14/2013 15:38 | 2/14/2013 15:39 | LB4100 | SR89C13 |
| C8 | B4 | 1 | 0 | 25849 | 2/14/2013 15:31 | 2/14/2013 15:32 | LB4100 | SR89C13 |
| C1 | C1 | 1 | 0 | 26526 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C2 | C1 | 1 | 0 | 28930 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C3 | C1 | 1 | 0 | 29354 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |
| C4 | C1 | 1 | 0 | 28788 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C5 | C1 | 1 | 0 | 28560 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C6 | C1 | 1 | 0 | 28200 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C7 | C1 | 1 | 0 | 28046 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C8 | C1 | 1 | 0 | 26165 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C1 | C2 | 1 | 0 | 27178 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C2 | C2 | 1 | 0 | 28752 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C3 | C2 | 1 | 1 | 29850 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C4 | C2 | 1 | 0 | 28897 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |
| C5 | C2 | 1 | 0 | 28700 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C6 | C2 | 1 | 0 | 28689 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C7 | C2 | 1 | 0 | 29075 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C8 | C2 | 1 | 0 | 26461 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C1 | C3 | 1 | 0 | 26597 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C2 | C3 | 1 | 0 | 28827 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C3 | C3 | 1 | 0 | 29624 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C4 | C3 | 1 | 0 | 28440 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C5 | C3 | 1 | 0 | 28677 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C6 | C3 | 1 | 0 | 28469 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C7 | C3 | 1 | 0 | 28776 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C8 | C3 | 1 | 0 | 26251 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C1 | C4 | 1 | 0 | 26622 | 2/14/2013 16:16 | 2/14/2013 16:17 | LB4100 | SR89C13 |
| C2 | C4 | 1 | 0 | 28697 | 2/14/2013 16:12 | 2/14/2013 16:13 | LB4100 | SR89C13 |
| C3 | C4 | 1 | 0 | 29635 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C4 | C4 | 1 | 0 | 28385 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C5 | C4 | 1 | 0 | 28434 | 2/14/2013 16:31 | 2/14/2013 16:32 | LB4100 | SR89C13 |
| C6 | C4 | 1 | 0 | 28394 | 2/14/2013 16:26 | 2/14/2013 16:27 | LB4100 | SR89C13 |
| C7 | C4 | 1 | 0 | 28540 | 2/14/2013 16:23 | 2/14/2013 16:24 | LB4100 | SR89C13 |
| C8 | C4 | 1 | 0 | 26464 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C1 | D1 | 1 | 0 | 17106 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C2 | D1 | 1 | 0 | 21853 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C3 | D1 | 1 | 0 | 25612 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C4 | D1 | 1 | 0 | 16614 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C5 | D1 | 1 | 0 | 32889 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C6 | D1 | 1 | 0 | 17872 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C7 | D1 | 1 | 0 | 22231 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C8 | D1 | 1 | 0 | 22966 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C1 | D2 | 1 | 0 | 34220 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C2 | D2 | 1 | 0 | 36102 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C3 | D2 | 1 | 0 | 35700 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C4 | D2 | 1 | 0 | 33884 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C5 | D2 | 1 | 0 | 33596 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C6 | D2 | 1 | 1 | 33062 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C7 | D2 | 1 | 0 | 35188 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C8 | D2 | 1 | 0 | 31930 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C1 | D3 | 1 | 0 | 31213 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C2 | D3 | 1 | 0 | 36223 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C3 | D3 | 1 | 3 | 35945 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C4 | D3 | 1 | 0 | 33900 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C5 | D3 | 1 | 0 | 33729 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C6 | D3 | 1 | 0 | 33220 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C7 | D3 | 1 | 0 | 32405 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C8 | D3 | 1 | 0 | 32001 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C1 | D4 | 1 | 0 | 31768 | 2/14/2013 16:32 | 2/14/2013 16:33 | LB4100 | SR89C13 |
| C2 | D4 | 1 | 1 | 33755 | 2/14/2013 16:27 | 2/14/2013 16:28 | LB4100 | SR89C13 |
| C3 | D4 | 1 | 0 | 37049 | 2/14/2013 16:24 | 2/14/2013 16:25 | LB4100 | SR89C13 |
| C4 | D4 | 1 | 0 | 35096 | 2/14/2013 16:20 | 2/14/2013 16:21 | LB4100 | SR89C13 |
| C5 | D4 | 1 | 0 | 34910 | 2/14/2013 16:17 | 2/14/2013 16:18 | LB4100 | SR89C13 |
| C6 | D4 | 1 | 0 | 33506 | 2/14/2013 16:13 | 2/14/2013 16:14 | LB4100 | SR89C13 |
| C7 | D4 | 1 | 0 | 32930 | 2/14/2013 16:09 | 2/14/2013 16:10 | LB4100 | SR89C13 |
| C8 | D4 | 1 | 0 | 30311 | 2/14/2013 16:05 | 2/14/2013 16:06 | LB4100 | SR89C13 |
| C1 | E1 | 1 | 0 | 26763 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C2 | E1 | 1 | 0 | 28437 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C3 | E1 | 1 | 2 | 29015 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C4 | E1 | 1 | 0 | 28005 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C5 | E1 | 1 | 0 | 28319 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C6 | E1 | 1 | 0 | 28284 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C7 | E1 | 1 | 0 | 28411 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C8 | E1 | 1 | 0 | 25909 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C1 | E2 | 1 | 0 | 26781 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C2 | E2 | 1 | 0 | 28571 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C3 | E2 | 1 | 0 | 29563 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C4 | E2 | 1 | 0 | 28723 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C5 | E2 | 1 | 0 | 28719 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C6 | E2 | 1 | 0 | 28554 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C7 | E2 | 1 | 0 | 28671 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C8 | E2 | 1 | 0 | 26339 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C1 | E3 | 1 | 0 | 26618 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C2 | E3 | 1 | 0 | 28693 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C3 | E3 | 1 | 0 | 29309 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C4 | E3 | 1 | 0 | 28454 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C5 | E3 | 1 | 0 | 28823 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C6 | E3 | 1 | 0 | 28468 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C7 | E3 | 1 | 0 | 28602 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C8 | E3 | 1 | 0 | 25989 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C1 | E4 | 1 | 0 | 26594 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C2 | E4 | 1 | 0 | 28704 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C3 | E4 | 1 | 0 | 29180 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C4 | E4 | 1 | 0 | 28925 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C5 | E4 | 1 | 0 | 28587 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C6 | E4 | 1 | 0 | 28404 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C7 | E4 | 1 | 0 | 28787 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C8 | E4 | 1 | 0 | 26216 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C1 | F1 | 1 | 1 | 27295 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C2 | F1 | 1 | 0 | 29644 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C3 | F1 | 1 | 1 | 30147 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C4 | F1 | 1 | 0 | 29146 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C5 | F1 | 1 | 0 | 29025 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C6 | F1 | 1 | 0 | 28823 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C7 | F1 | 1 | 0 | 29091 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C8 | F1 | 1 | 0 | 26635 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C1 | F2 | 1 | 0 | 27234 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C2 | F2 | 1 | 0 | 28779 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C3 | F2 | 1 | 0 | 30073 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C4 | F2 | 1 | 0 | 29103 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C5 | F2 | 1 | 0 | 28817 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C6 | F2 | 1 | 0 | 28793 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C7 | F2 | 1 | 0 | 29080 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C8 | F2 | 1 | 0 | 26207 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C1 | F3 | 1 | 0 | 27590 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C2 | F3 | 1 | 0 | 29748 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C3 | F3 | 1 | 1 | 30146 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C4 | F3 | 1 | 1 | 29369 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C5 | F3 | 1 | 0 | 29488 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C6 | F3 | 1 | 0 | 29095 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C7 | F3 | 1 | 0 | 28902 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |
| C8 | F3 | 1 | 0 | 27124 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C1 | F4 | 1 | 0 | 27501 | 2/14/2013 16:56 | 2/14/2013 16:57 | LB4100 | SR89C13 |
| C2 | F4 | 1 | 0 | 29663 | 2/14/2013 16:54 | 2/14/2013 16:55 | LB4100 | SR89C13 |
| C3 | F4 | 1 | 0 | 30403 | 2/14/2013 16:51 | 2/14/2013 16:52 | LB4100 | SR89C13 |
| C4 | F4 | 1 | 0 | 29060 | 2/14/2013 16:49 | 2/14/2013 16:50 | LB4100 | SR89C13 |
| C5 | F4 | 1 | 0 | 29143 | 2/14/2013 16:44 | 2/14/2013 16:45 | LB4100 | SR89C13 |
| C6 | F4 | 1 | 0 | 28837 | 2/14/2013 16:41 | 2/14/2013 16:42 | LB4100 | SR89C13 |
| C7 | F4 | 1 | 0 | 29295 | 2/14/2013 16:39 | 2/14/2013 16:40 | LB4100 | SR89C13 |
| C8 | F4 | 1 | 0 | 26770 | 2/14/2013 16:35 | 2/14/2013 16:36 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C1 | G1 | 1 | 0 | 26990 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C2 | G1 | 1 | 0 | 29405 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C3 | G1 | 1 | 2 | 29898 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C4 | G1 | 1 | 0 | 29244 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C5 | G1 | 1 | 0 | 29252 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C6 | G1 | 1 | 0 | 28210 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C7 | G1 | 1 | 0 | 28902 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C8 | G1 | 1 | 0 | 26193 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C1 | G2 | 1 | 0 | 27461 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C2 | G2 | 1 | 0 | 28555 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C3 | G2 | 1 | 2 | 29657 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C4 | G2 | 1 | 0 | 28546 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C5 | G2 | 1 | 0 | 28851 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C6 | G2 | 1 | 0 | 28993 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C7 | G2 | 1 | 0 | 28387 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C8 | G2 | 1 | 0 | 26098 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C1 | G3 | 1 | 0 | 27672 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C2 | G3 | 1 | 0 | 30013 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C3 | G3 | 1 | 0 | 30377 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C4 | G3 | 1 | 1 | 29285 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C5 | G3 | 1 | 0 | 29463 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C6 | G3 | 1 | 0 | 28921 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C7 | G3 | 1 | 0 | 29531 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C8 | G3 | 1 | 0 | 26930 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C1 | G4 | 1 | 0 | 27001 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C2 | G4 | 1 | 0 | 28869 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C3 | G4 | 1 | 0 | 30051 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C4 | G4 | 1 | 0 | 28981 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C5 | G4 | 1 | 0 | 29338 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C6 | G4 | 1 | 0 | 28171 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C7 | G4 | 1 | 0 | 29023 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C8 | G4 | 1 | 0 | 26478 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C1 | H1 | 1 | 0 | 26604 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C2 | H1 | 1 | 0 | 28846 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C3 | H1 | 1 | 0 | 29666 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C4 | H1 | 1 | 0 | 28838 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C5 | H1 | 1 | 0 | 29238 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C6 | H1 | 1 | 0 | 28485 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C7 | H1 | 1 | 0 | 28838 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C8 | H1 | 1 | 0 | 26334 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C1 | H2 | 1 | 1 | 26712 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C2 | H2 | 1 | 0 | 29065 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C3 | H2 | 1 | 0 | 30048 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C4 | H2 | 1 | 0 | 28932 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C5 | H2 | 1 | 0 | 28551 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C6 | H2 | 1 | 0 | 28987 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C7 | H2 | 1 | 0 | 28907 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C8 | H2 | 1 | 0 | 27105 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C1 | H3 | 1 | 0 | 27270 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C2 | H3 | 1 | 0 | 29602 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C3 | H3 | 1 | 1 | 30365 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C4 | H3 | 1 | 0 | 29562 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C5 | H3 | 1 | 0 | 29489 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C6 | H3 | 1 | 0 | 29210 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C7 | H3 | 1 | 0 | 29736 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C8 | H3 | 1 | 0 | 26490 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C1 | H4 | 1 | 0 | 26626 | 2/14/2013 17:20 | 2/14/2013 17:21 | LB4100 | SR89C13 |
| C2 | H4 | 1 | 0 | 28745 | 2/14/2013 17:17 | 2/14/2013 17:18 | LB4100 | SR89C13 |
| C3 | H4 | 1 | 0 | 30627 | 2/14/2013 17:14 | 2/14/2013 17:15 | LB4100 | SR89C13 |
| C4 | H4 | 1 | 0 | 28888 | 2/14/2013 17:11 | 2/14/2013 17:12 | LB4100 | SR89C13 |
| C5 | H4 | 1 | 0 | 28747 | 2/14/2013 17:07 | 2/14/2013 17:08 | LB4100 | SR89C13 |
| C6 | H4 | 1 | 1 | 28706 | 2/14/2013 17:05 | 2/14/2013 17:06 | LB4100 | SR89C13 |
| C7 | H4 | 1 | 0 | 29087 | 2/14/2013 17:02 | 2/14/2013 17:03 | LB4100 | SR89C13 |
| C8 | H4 | 1 | 0 | 26268 | 2/14/2013 17:00 | 2/14/2013 17:01 | LB4100 | SR89C13 |
| C1 | I1 | 1 | 0 | 25458 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C2 | I1 | 1 | 0 | 27331 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C3 | I1 | 1 | 1 | 28374 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C4 | I1 | 1 | 0 | 27781 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C5 | I1 | 1 | 0 | 27505 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C6 | I1 | 1 | 0 | 25547 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C7 | I1 | 1 | 1 | 27827 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C8 | I1 | 1 | 0 | 24558 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C1 | I2 | 1 | 0 | 26014 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C2 | I2 | 1 | 0 | 27924 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C3 | I2 | 1 | 1 | 28671 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C4 | I2 | 1 | 0 | 27748 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C5 | I2 | 1 | 0 | 27973 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C6 | I2 | 1 | 0 | 25466 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C7 | I2 | 1 | 0 | 27985 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C8 | I2 | 1 | 0 | 24995 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C1 | I3 | 1 | 0 | 25605 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C2 | I3 | 1 | 0 | 27849 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C3 | I3 | 1 | 0 | 28684 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C4 | I3 | 1 | 0 | 27958 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C5 | I3 | 1 | 0 | 27726 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C6 | I3 | 1 | 0 | 25767 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C7 | I3 | 1 | 0 | 27712 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C8 | I3 | 1 | 0 | 24882 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C1 | I4 | 1 | 0 | 25975 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C2 | I4 | 1 | 0 | 28187 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C3 | I4 | 1 | 2 | 28724 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C4 | I4 | 1 | 0 | 27771 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C5 | I4 | 1 | 0 | 27999 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C6 | I4 | 1 | 0 | 26038 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C7 | I4 | 1 | 1 | 27846 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C8 | I4 | 1 | 0 | 25574 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C1 | J1 | 1 | 0 | 25319 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C2 | J1 | 1 | 0 | 27719 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C3 | J1 | 1 | 0 | 28831 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C4 | J1 | 1 | 0 | 27812 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C5 | J1 | 1 | 0 | 27562 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C6 | J1 | 1 | 0 | 25600 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C7 | J1 | 1 | 0 | 28107 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C8 | J1 | 1 | 0 | 25299 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C1 | J2 | 1 | 1 | 25566 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C2 | J2 | 1 | 0 | 27613 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C3 | J2 | 1 | 0 | 28413 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C4 | J2 | 1 | 0 | 27447 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C5 | J2 | 1 | 0 | 27753 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C6 | J2 | 1 | 0 | 25406 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C7 | J2 | 1 | 0 | 27790 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C8 | J2 | 1 | 0 | 25316 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C1 | J3 | 1 | 0 | 25361 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C2 | J3 | 1 | 0 | 27836 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C3 | J3 | 1 | 0 | 28331 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C4 | J3 | 1 | 0 | 27891 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C5 | J3 | 1 | 1 | 28372 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C6 | J3 | 1 | 0 | 25570 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C7 | J3 | 1 | 0 | 27403 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |
| C8 | J3 | 1 | 0 | 25098 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C1 | J4 | 1 | 0 | 26133 | 2/14/2013 18:25 | 2/14/2013 18:26 | LB4100 | SR89C13 |
| C2 | J4 | 1 | 0 | 27899 | 2/14/2013 18:22 | 2/14/2013 18:23 | LB4100 | SR89C13 |
| C3 | J4 | 1 | 0 | 28651 | 2/14/2013 18:19 | 2/14/2013 18:20 | LB4100 | SR89C13 |
| C4 | J4 | 1 | 0 | 28007 | 2/14/2013 18:16 | 2/14/2013 18:17 | LB4100 | SR89C13 |
| C5 | J4 | 1 | 0 | 27986 | 2/14/2013 18:14 | 2/14/2013 18:15 | LB4100 | SR89C13 |
| C6 | J4 | 1 | 0 | 25877 | 2/14/2013 18:04 | 2/14/2013 18:05 | LB4100 | SR89C13 |
| C7 | J4 | 1 | 0 | 28348 | 2/14/2013 17:56 | 2/14/2013 17:57 | LB4100 | SR89C13 |
| C8 | J4 | 1 | 0 | 25430 | 2/14/2013 17:54 | 2/14/2013 17:55 | LB4100 | SR89C13 |

M-10185

## Sr-90 Calibration - LB4100 - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

Separation Date/Time 3/29/2013 14:10
Y-90 Half Life (days) 2.668875
The following detectors were not calibrated:
A4

| Carrier Data | | Std ID | 1858443 | |
|---|---|---|---|---|
| | | Std weight | 17.1 | mg/mL |
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 3.3 | 0.2 | 3.42 | 96.5% |
| 2 | 7.3 | 0.4 | 6.84 | 100.0% |
| 3 | 8.5 | 0.5 | 8.55 | 99.4% |
| 4 | 12.2 | 0.7 | 11.97 | 100.0% |
| 5 | 17.2 | 1 | 17.10 | 100.0% |
| 6 | 26.6 | 1.5 | 25.65 | 100.0% |
| 7 | 31.0 | 1.8 | 30.78 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

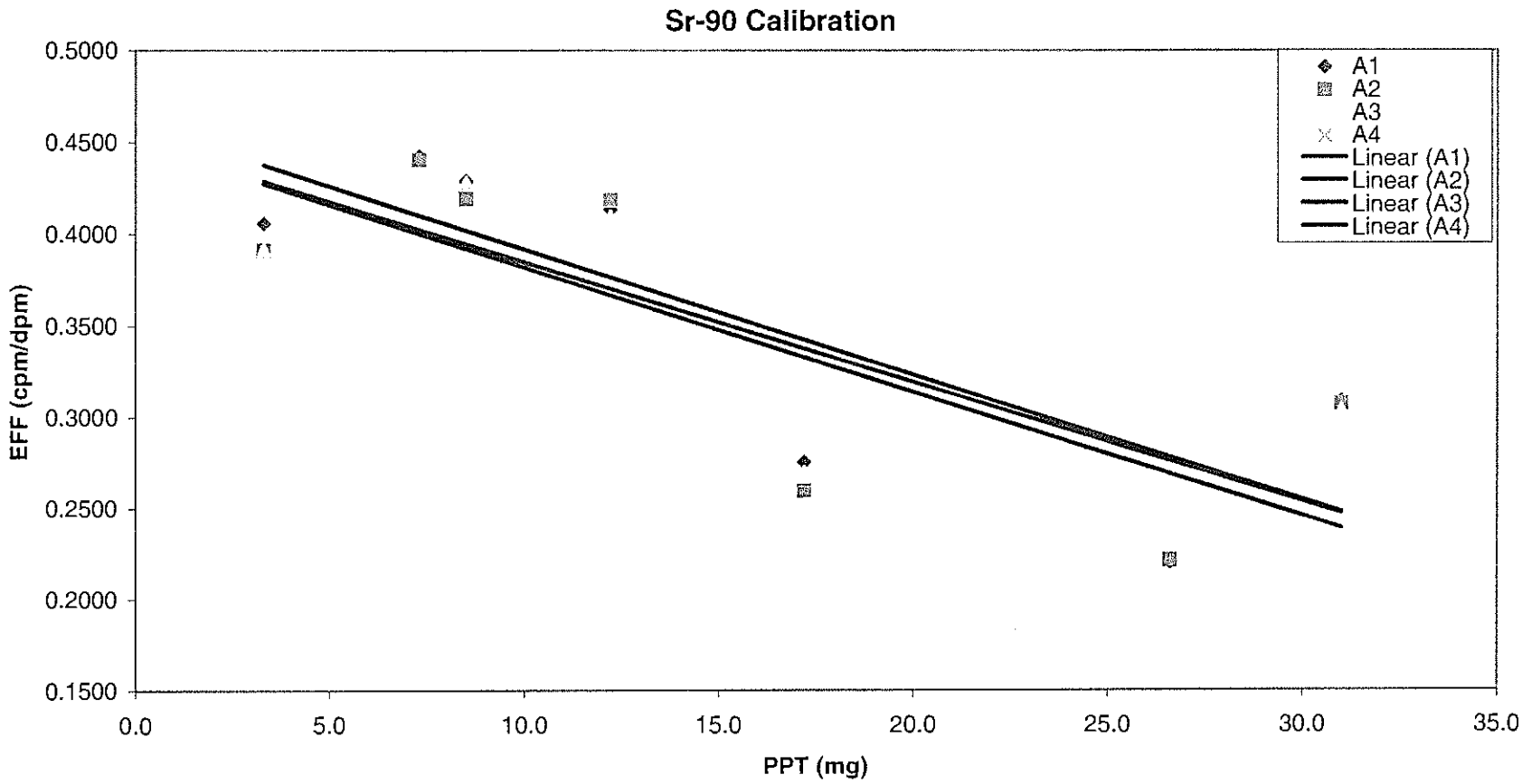
*Background is considered negligible.
**Decay corrected to mid-point of cou

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 3/30/2013 17:34 | 3 | 16161 | 5387.00 | 96.5% | 0.58883 | 0.25692 | 3885.49 | 9576.84 | 0.4057 | 0.4375 |
| A1 | 2 | 3/30/2013 18:04 | 3 | 17126 | 5708.67 | 100.0% | 0.58883 | 0.26093 | 4237.27 | 9576.83 | 0.4424 | 0.4102 |
| A1 | 3 | 3/30/2013 18:00 | 3 | 16749 | 5583.00 | 99.4% | 0.58883 | 0.26035 | 4106.22 | 9576.83 | 0.4288 | 0.4020 |
| A1 | 4 | 3/30/2013 17:56 | 3 | 16276 | 5425.33 | 100.0% | 0.58883 | 0.25978 | 3960.40 | 9576.83 | 0.4135 | 0.3767 |
| A1 | 5 | 3/30/2013 17:52 | 3 | 12301 | 4100.33 | 100.0% | 0.58883 | 0.25922 | 2638.53 | 9576.83 | 0.2755 | 0.3425 |
| A1 | 6 | 3/30/2013 17:47 | 3 | 10705 | 3568.33 | 100.0% | 0.58883 | 0.25857 | 2110.25 | 9576.84 | 0.2203 | 0.2782 |
| A1 | 7 | 3/30/2013 17:43 | 3 | 13238 | 4412.67 | 100.0% | 0.58883 | 0.25801 | 2957.70 | 9576.84 | 0.3088 | 0.2481 |
| A2 | 1 | 3/30/2013 17:39 | 3 | 15811 | 5270.33 | 96.5% | 0.59585 | 0.25748 | 3747.52 | 9576.84 | 0.3913 | 0.4286 |
| A2 | 2 | 3/30/2013 17:35 | 3 | 17048 | 5682.67 | 100.0% | 0.59585 | 0.25693 | 4216.56 | 9576.84 | 0.4403 | 0.4024 |
| A2 | 3 | 3/30/2013 18:04 | 3 | 16536 | 5512.00 | 99.4% | 0.59585 | 0.26093 | 4014.30 | 9576.83 | 0.4192 | 0.3946 |
| A2 | 4 | 3/30/2013 18:00 | 3 | 16478 | 5492.67 | 100.0% | 0.59585 | 0.26035 | 4007.03 | 9576.83 | 0.4184 | 0.3704 |
| A2 | 5 | 3/30/2013 17:56 | 3 | 11902 | 3967.33 | 100.0% | 0.59585 | 0.25978 | 2484.94 | 9576.83 | 0.2595 | 0.3377 |
| A2 | 6 | 3/30/2013 17:52 | 3 | 10797 | 3599.00 | 100.0% | 0.59585 | 0.25923 | 2119.76 | 9576.83 | 0.2213 | 0.2762 |
| A2 | 7 | 3/30/2013 17:47 | 3 | 13258 | 4419.33 | 100.0% | 0.59585 | 0.25857 | 2943.87 | 9576.84 | 0.3074 | 0.2475 |
| A3 | 1 | 3/30/2013 17:43 | 3 | 15854 | 5284.67 | 96.5% | 0.59919 | 0.25802 | 3750.23 | 9576.84 | 0.3916 | 0.4273 |
| A3 | 2 | 3/30/2013 17:39 | 3 | 16572 | 5524.00 | 100.0% | 0.59919 | 0.25748 | 4046.49 | 9576.84 | 0.4225 | 0.4001 |
| A3 | 3 | 3/30/2013 17:35 | 3 | 16758 | 5586.00 | 99.4% | 0.59919 | 0.25693 | 4103.01 | 9576.84 | 0.4284 | 0.3920 |
| A3 | 4 | 3/30/2013 18:04 | 3 | 16259 | 5419.67 | 100.0% | 0.59919 | 0.26093 | 3922.39 | 9576.83 | 0.4096 | 0.3668 |
| A3 | 5 | 3/30/2013 18:00 | 3 | 12236 | 4078.67 | 100.0% | 0.59919 | 0.26035 | 2584.71 | 9576.83 | 0.2699 | 0.3329 |
| A3 | 6 | 3/30/2013 17:56 | 3 | 10256 | 3418.67 | 100.0% | 0.59919 | 0.25978 | 1927.98 | 9576.83 | 0.2013 | 0.2691 |
| A3 | 7 | 3/30/2013 17:52 | 3 | 13195 | 4398.33 | 100.0% | 0.59919 | 0.25923 | 2910.81 | 9576.83 | 0.3039 | 0.2392 |
| B1 | 1 | 3/30/2013 17:52 | 3 | 15694 | 5231.33 | 96.5% | 0.60441 | 0.25921 | 3676.36 | 9576.83 | 0.3839 | 0.4311 |
| B1 | 2 | 3/30/2013 17:47 | 3 | 16458 | 5486.00 | 100.0% | 0.60441 | 0.25855 | 3989.43 | 9576.84 | 0.4166 | 0.4060 |
| B1 | 3 | 3/30/2013 17:43 | 3 | 16119 | 5373.00 | 99.4% | 0.60441 | 0.25801 | 3870.78 | 9576.84 | 0.4042 | 0.3985 |
| B1 | 4 | 3/30/2013 17:39 | 3 | 16296 | 5432.00 | 100.0% | 0.60441 | 0.25747 | 3941.68 | 9576.84 | 0.4116 | 0.3753 |
| B1 | 5 | 3/30/2013 17:34 | 3 | 15592 | 5197.33 | 100.0% | 0.60441 | 0.25690 | 3710.33 | 9576.84 | 0.3874 | 0.3440 |
| B1 | 6 | 3/30/2013 18:04 | 3 | 10430 | 3476.67 | 100.0% | 0.60441 | 0.26091 | 1966.43 | 9576.83 | 0.2053 | 0.2851 |
| B1 | 7 | 3/30/2013 18:00 | 3 | 12809 | 4269.67 | 100.0% | 0.60441 | 0.26034 | 2762.77 | 9576.83 | 0.2885 | 0.2575 |
| B2 | 1 | 3/30/2013 17:56 | 3 | 15924 | 5308.00 | 96.5% | 0.60565 | 0.25977 | 3746.51 | 9576.83 | 0.3912 | 0.4442 |
| B2 | 2 | 3/30/2013 17:52 | 3 | 16897 | 5632.33 | 100.0% | 0.60565 | 0.25921 | 4128.83 | 9576.83 | 0.4311 | 0.4158 |
| B2 | 3 | 3/30/2013 17:47 | 3 | 16417 | 5472.33 | 99.4% | 0.60565 | 0.25855 | 3963.85 | 9576.84 | 0.4139 | 0.4073 |
| B2 | 4 | 3/30/2013 17:43 | 3 | 16651 | 5550.33 | 100.0% | 0.60565 | 0.25801 | 4053.81 | 9576.84 | 0.4233 | 0.3810 |
| B2 | 5 | 3/30/2013 17:39 | 3 | 15592 | 5197.33 | 100.0% | 0.60565 | 0.25747 | 3703.93 | 9576.84 | 0.3868 | 0.3455 |
| B2 | 6 | 3/30/2013 17:34 | 3 | 9824 | 3274.67 | 100.0% | 0.60565 | 0.25690 | 1784.60 | 9576.84 | 0.1863 | 0.2788 |
| B2 | 7 | 3/30/2013 18:04 | 3 | 12806 | 4268.67 | 100.0% | 0.60565 | 0.26091 | 2755.31 | 9576.83 | 0.2877 | 0.2476 |
| B3 | 1 | 3/30/2013 18:00 | 3 | 16050 | 5350.00 | 96.5% | 0.61133 | 0.26034 | 3770.42 | 9576.83 | 0.3937 | 0.4340 |
| B3 | 2 | 3/30/2013 17:56 | 3 | 17122 | 5707.33 | 100.0% | 0.61133 | 0.25977 | 4186.50 | 9576.83 | 0.4371 | 0.4090 |
| B3 | 3 | 3/30/2013 17:52 | 3 | 16567 | 5522.33 | 99.4% | 0.61133 | 0.25921 | 3995.82 | 9576.83 | 0.4172 | 0.4015 |
| B3 | 4 | 4/1/2013 11:09 | 3 | 19703 | 6567.67 | 100.0% | 0.61133 | 0.52619 | 3487.42 | 9575.75 | 0.3642 | 0.3783 |
| B3 | 5 | 3/30/2013 17:43 | 3 | 15955 | 5318.33 | 100.0% | 0.61133 | 0.25801 | 3807.79 | 9576.84 | 0.3976 | 0.3470 |
| B3 | 6 | 3/30/2013 17:39 | 3 | 10587 | 3529.00 | 100.0% | 0.61133 | 0.25747 | 2021.50 | 9576.84 | 0.2111 | 0.2882 |
| B3 | 7 | 3/30/2013 17:34 | 3 | 13066 | 4355.33 | 100.0% | 0.61133 | 0.25690 | 2851.30 | 9576.84 | 0.2977 | 0.2607 |
| B4 | 1 | 3/30/2013 18:04 | 3 | 14738 | 4912.67 | 96.5% | 0.57015 | 0.26092 | 3436.20 | 9576.83 | 0.3588 | 0.4071 |
| B4 | 2 | 3/30/2013 18:00 | 3 | 15486 | 5162.00 | 100.0% | 0.57015 | 0.26034 | 3740.49 | 9576.83 | 0.3906 | 0.3829 |
| B4 | 3 | 3/30/2013 17:56 | 3 | 15349 | 5116.33 | 99.4% | 0.57015 | 0.25977 | 3689.58 | 9576.83 | 0.3853 | 0.3756 |
| B4 | 4 | 3/30/2013 17:52 | 3 | 15422 | 5140.67 | 100.0% | 0.57015 | 0.25921 | 3725.30 | 9576.83 | 0.3890 | 0.3531 |
| B4 | 5 | 3/30/2013 17:47 | 3 | 14782 | 4927.33 | 100.0% | 0.57015 | 0.25855 | 3515.58 | 9576.84 | 0.3671 | 0.3228 |
| B4 | 6 | 3/30/2013 17:43 | 3 | 9596 | 3198.67 | 100.0% | 0.57015 | 0.25801 | 1789.87 | 9576.84 | 0.1869 | 0.2658 |
| B4 | 7 | 3/30/2013 17:39 | 3 | 11943 | 3981.00 | 100.0% | 0.57015 | 0.25747 | 2575.12 | 9576.84 | 0.2689 | 0.2392 |
| C1 | 1 | 3/30/2013 18:09 | 3 | 15726 | 5242.67 | 96.5% | 0.58269 | 0.26155 | 3730.05 | 9576.83 | 0.3895 | 0.4300 |
| C1 | 2 | 3/30/2013 18:44 | 3 | 16973 | 5657.67 | 100.0% | 0.58269 | 0.26613 | 4172.59 | 9576.81 | 0.4357 | 0.4054 |
| C1 | 3 | 3/30/2013 18:39 | 3 | 16728 | 5576.00 | 99.4% | 0.58269 | 0.26549 | 4085.76 | 9576.81 | 0.4266 | 0.3980 |
| C1 | 4 | 3/30/2013 18:34 | 3 | 16665 | 5555.00 | 100.0% | 0.58269 | 0.26487 | 4076.96 | 9576.82 | 0.4257 | 0.3753 |
| C1 | 5 | 3/30/2013 18:29 | 3 | 12265 | 4088.33 | 100.0% | 0.58269 | 0.26422 | 2613.90 | 9576.82 | 0.2729 | 0.3445 |
| C1 | 6 | 3/30/2013 18:24 | 3 | 11355 | 3785.00 | 100.0% | 0.58269 | 0.26356 | 2314.26 | 9576.82 | 0.2417 | 0.2857 |
| C1 | 7 | 3/30/2013 18:19 | 3 | 13236 | 4412.00 | 100.0% | 0.58269 | 0.25291 | 2944.89 | 9576.82 | 0.3075 | 0.2596 |
| C2 | 1 | 3/30/2013 18:14 | 3 | 16885 | 5628.33 | 96.5% | 0.59154 | 0.26224 | 4088.68 | 9576.82 | 0.4269 | 0.4603 |
| C2 | 2 | 3/30/2013 18:09 | 3 | 17728 | 5909.33 | 100.0% | 0.59154 | 0.26155 | 4427.62 | 9576.83 | 0.4623 | 0.4330 |
| C2 | 3 | 3/30/2013 18:44 | 3 | 17608 | 5869.33 | 99.4% | 0.59154 | 0.26613 | 4352.83 | 9576.81 | 0.4545 | 0.4249 |
| C2 | 4 | 3/30/2013 18:39 | 3 | 17198 | 5732.67 | 100.0% | 0.59154 | 0.26549 | 4226.65 | 9576.81 | 0.4416 | 0.3997 |
| C2 | 5 | 3/30/2013 18:34 | 3 | 12850 | 4283.33 | 100.0% | 0.59154 | 0.26487 | 2782.84 | 9576.82 | 0.2906 | 0.3657 |
| C2 | 6 | 3/30/2013 18:29 | 3 | 11926 | 3975.33 | 100.0% | 0.59154 | 0.26422 | 2478.51 | 9576.82 | 0.2588 | 0.3017 |
| C2 | 7 | 3/30/2013 18:24 | 3 | 13738 | 4579.33 | 100.0% | 0.59154 | 0.26356 | 3086.26 | 9576.82 | 0.3223 | 0.2718 |
| C3 | 1 | 3/30/2013 18:19 | 3 | 17291 | 5763.67 | 96.5% | 0.58516 | 0.26291 | 4236.77 | 9576.82 | 0.4424 | 0.4741 |
| C3 | 2 | 3/30/2013 18:14 | 3 | 18199 | 6066.33 | 100.0% | 0.58516 | 0.26224 | 4596.71 | 9576.82 | 0.4800 | 0.4467 |
| C3 | 3 | 3/30/2013 18:09 | 3 | 17785 | 5928.33 | 99.4% | 0.58516 | 0.26155 | 4453.95 | 9576.83 | 0.4651 | 0.4385 |
| C3 | 4 | 3/30/2013 18:44 | 3 | 17652 | 5884.00 | 100.0% | 0.58516 | 0.26613 | 4392.62 | 9576.81 | 0.4587 | 0.4131 |
| C3 | 5 | 3/30/2013 18:39 | 3 | 12971 | 4323.67 | 100.0% | 0.58516 | 0.26549 | 2835.87 | 9576.81 | 0.2961 | 0.3788 |
| C3 | 6 | 3/30/2013 18:34 | 3 | 12022 | 4007.33 | 100.0% | 0.58516 | 0.26487 | 2523.01 | 9576.82 | 0.2634 | 0.3144 |
| C3 | 7 | 3/30/2013 18:29 | 3 | 14327 | 4775.67 | 100.0% | 0.58516 | 0.26422 | 3294.99 | 9576.82 | 0.3441 | 0.2842 |
| C4 | 1 | 3/30/2013 18:24 | 3 | 17245 | 5748.33 | 96.5% | 0.58553 | 0.26356 | 4216.68 | 9576.82 | 0.4403 | 0.4719 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C4 | 2 | 3/30/2013 18:19 | 3 | 17812 | 5937.33 | 100.0% | 0.58553 | 0.26291 | 4463.06 | 9576.82 | 0.4660 | 0.4444 |
| C4 | 3 | 3/30/2013 18:14 | 3 | 17917 | 5972.33 | 99.4% | 0.58553 | 0.26224 | 4493.14 | 9576.82 | 0.4692 | 0.4361 |
| C4 | 4 | 3/30/2013 18:09 | 3 | 17597 | 5865.67 | 100.0% | 0.58553 | 0.26155 | 4398.99 | 9576.83 | 0.4593 | 0.4107 |
| C4 | 5 | 3/30/2013 18:44 | 3 | 13064 | 4354.67 | 100.0% | 0.58553 | 0.26613 | 2862.36 | 9576.81 | 0.2989 | 0.3763 |
| C4 | 6 | 3/30/2013 18:39 | 3 | 11923 | 3974.33 | 100.0% | 0.58553 | 0.26549 | 2485.59 | 9576.81 | 0.2595 | 0.3116 |
| C4 | 7 | 3/30/2013 18:34 | 3 | 14197 | 4732.33 | 100.0% | 0.58553 | 0.26487 | 3247.07 | 9576.82 | 0.3391 | 0.2814 |
| D1 | 1 | 3/30/2013 18:30 | 3 | 17998 | 5999.33 | 96.5% | 0.67247 | 0.26428 | 4235.47 | 9576.82 | 0.4423 | 0.4737 |
| D1 | 2 | 3/30/2013 18:25 | 3 | 18672 | 6224.00 | 100.0% | 0.67247 | 0.26362 | 4526.29 | 9576.82 | 0.4726 | 0.4452 |
| D1 | 3 | 3/30/2013 18:20 | 3 | 18274 | 6091.33 | 99.4% | 0.67247 | 0.26297 | 4387.83 | 9576.82 | 0.4582 | 0.4367 |
| D1 | 4 | 3/30/2013 18:15 | 3 | 18243 | 6081.00 | 100.0% | 0.67247 | 0.26231 | 4391.70 | 9576.82 | 0.4586 | 0.4104 |
| D1 | 5 | 3/30/2013 18:10 | 3 | 13824 | 4608.00 | 100.0% | 0.67247 | 0.26161 | 2923.17 | 9576.83 | 0.3052 | 0.3748 |
| D1 | 6 | 3/30/2013 18:44 | 3 | 12622 | 4207.33 | 100.0% | 0.67247 | 0.26619 | 2493.06 | 9576.81 | 0.2603 | 0.3080 |
| D1 | 7 | 3/30/2013 18:39 | 3 | 14560 | 4853.33 | 100.0% | 0.67247 | 0.26555 | 3143.19 | 9576.81 | 0.3282 | 0.2767 |
| D2 | 1 | 3/30/2013 18:35 | 3 | 18378 | 6126.00 | 96.5% | 0.67504 | 0.26493 | 4351.03 | 9576.82 | 0.4543 | 0.4903 |
| D2 | 2 | 3/30/2013 18:30 | 3 | 19314 | 6438.00 | 100.0% | 0.67504 | 0.26428 | 4729.52 | 9576.82 | 0.4939 | 0.4585 |
| D2 | 3 | 3/30/2013 18:25 | 3 | 18625 | 6208.33 | 99.4% | 0.67504 | 0.26362 | 4494.11 | 9576.82 | 0.4693 | 0.4489 |
| D2 | 4 | 3/30/2013 18:20 | 3 | 18750 | 6250.00 | 100.0% | 0.67504 | 0.26297 | 4549.98 | 9576.82 | 0.4751 | 0.4194 |
| D2 | 5 | 3/30/2013 18:15 | 3 | 13854 | 4618.00 | 100.0% | 0.67504 | 0.26231 | 2922.25 | 9576.82 | 0.3051 | 0.3796 |
| D2 | 6 | 3/30/2013 18:10 | 3 | 11743 | 3914.33 | 100.0% | 0.67504 | 0.26161 | 2223.07 | 9576.83 | 0.2321 | 0.3047 |
| D2 | 7 | 3/30/2013 18:44 | 3 | 14966 | 4988.67 | 100.0% | 0.67504 | 0.26619 | 3267.83 | 9576.81 | 0.3412 | 0.2696 |
| D3 | 1 | 3/30/2013 18:39 | 3 | 18779 | 6259.67 | 96.5% | 0.67813 | 0.26555 | 4472.39 | 9576.81 | 0.4670 | 0.5006 |
| D3 | 2 | 3/30/2013 18:35 | 3 | 19428 | 6476.00 | 100.0% | 0.67813 | 0.26493 | 4755.45 | 9576.82 | 0.4966 | 0.4666 |
| D3 | 3 | 3/30/2013 18:30 | 3 | 19167 | 6389.00 | 99.4% | 0.67813 | 0.26428 | 4662.59 | 9576.82 | 0.4869 | 0.4564 |
| D3 | 4 | 3/30/2013 18:25 | 3 | 18722 | 6240.67 | 100.0% | 0.67813 | 0.26362 | 4528.64 | 9576.82 | 0.4729 | 0.4251 |
| D3 | 5 | 3/30/2013 18:20 | 3 | 13946 | 4648.67 | 100.0% | 0.67813 | 0.26297 | 2940.85 | 9576.82 | 0.3071 | 0.3826 |
| D3 | 6 | 3/30/2013 18:15 | 3 | 11717 | 3905.67 | 100.0% | 0.67813 | 0.26231 | 2202.13 | 9576.82 | 0.2299 | 0.3029 |
| D3 | 7 | 3/30/2013 18:10 | 3 | 14849 | 4949.67 | 100.0% | 0.67813 | 0.26162 | 3250.64 | 9576.83 | 0.3394 | 0.2656 |
| D4 | 1 | 3/30/2013 18:44 | 3 | 18298 | 6099.33 | 96.5% | 0.67635 | 0.26619 | 4312.45 | 9576.81 | 0.4503 | 0.4901 |
| D4 | 2 | 3/30/2013 18:39 | 3 | 19342 | 6447.33 | 100.0% | 0.67635 | 0.26555 | 4727.31 | 9576.81 | 0.4936 | 0.4597 |
| D4 | 3 | 3/30/2013 18:35 | 3 | 18911 | 6303.67 | 99.4% | 0.67635 | 0.26493 | 4577.54 | 9576.82 | 0.4780 | 0.4505 |
| D4 | 4 | 3/30/2013 18:30 | 3 | 18797 | 6265.67 | 100.0% | 0.67635 | 0.26428 | 4553.86 | 9576.82 | 0.4755 | 0.4224 |
| D4 | 5 | 3/30/2013 18:25 | 3 | 13889 | 4629.67 | 100.0% | 0.67635 | 0.26362 | 2922.14 | 9576.82 | 0.3051 | 0.3844 |
| D4 | 6 | 3/30/2013 18:20 | 3 | 12639 | 4213.00 | 100.0% | 0.67635 | 0.26297 | 2509.66 | 9576.82 | 0.2621 | 0.3130 |
| D4 | 7 | 3/30/2013 18:15 | 3 | 14727 | 4909.00 | 100.0% | 0.67635 | 0.26231 | 3209.94 | 9576.82 | 0.3352 | 0.2795 |
| E1 | 1 | 3/30/2013 18:27 | 3 | 15390 | 5130.00 | 96.5% | 0.58862 | 0.24789 | 3681.81 | 9576.87 | 0.3844 | 0.4315 |
| E1 | 2 | 3/30/2013 16:57 | 3 | 16259 | 5419.67 | 100.0% | 0.58862 | 0.25187 | 3999.65 | 9576.86 | 0.4177 | 0.4075 |
| E1 | 3 | 3/30/2013 16:53 | 3 | 15987 | 5329.00 | 99.4% | 0.58862 | 0.25132 | 3903.93 | 9576.86 | 0.4076 | 0.4003 |
| E1 | 4 | 3/30/2013 16:49 | 3 | 16116 | 5372.00 | 100.0% | 0.58862 | 0.25077 | 3958.39 | 9576.86 | 0.4133 | 0.3781 |
| E1 | 5 | 3/30/2013 16:45 | 3 | 15325 | 5108.33 | 100.0% | 0.58862 | 0.25022 | 3697.78 | 9576.86 | 0.3861 | 0.3481 |
| E1 | 6 | 3/30/2013 16:41 | 3 | 10706 | 3568.67 | 100.0% | 0.58862 | 0.24967 | 2161.26 | 9576.86 | 0.2257 | 0.2917 |
| E1 | 7 | 3/30/2013 16:36 | 3 | 12474 | 4158.00 | 100.0% | 0.58862 | 0.24910 | 2753.77 | 9576.87 | 0.2875 | 0.2653 |
| E2 | 1 | 3/30/2013 16:32 | 3 | 15809 | 5269.67 | 96.5% | 0.60087 | 0.24850 | 3787.70 | 9576.87 | 0.3955 | 0.4454 |
| E2 | 2 | 3/30/2013 16:27 | 3 | 16432 | 5477.33 | 100.0% | 0.60087 | 0.24789 | 4050.86 | 9576.87 | 0.4230 | 0.4203 |
| E2 | 3 | 3/30/2013 16:57 | 3 | 16516 | 5505.33 | 99.4% | 0.60087 | 0.25187 | 4047.45 | 9576.86 | 0.4226 | 0.4128 |
| E2 | 4 | 3/30/2013 16:53 | 3 | 16816 | 5605.33 | 100.0% | 0.60087 | 0.25132 | 4159.12 | 9576.86 | 0.4343 | 0.3896 |
| E2 | 5 | 3/30/2013 16:49 | 3 | 15824 | 5274.67 | 100.0% | 0.60087 | 0.25077 | 3831.63 | 9576.86 | 0.4001 | 0.3582 |
| E2 | 6 | 3/30/2013 16:45 | 3 | 10813 | 3604.33 | 100.0% | 0.60087 | 0.25023 | 2164.42 | 9576.86 | 0.2260 | 0.2991 |
| E2 | 7 | 3/30/2013 16:41 | 3 | 12797 | 4265.67 | 100.0% | 0.60087 | 0.24967 | 2828.97 | 9576.86 | 0.2954 | 0.2715 |
| E3 | 1 | 3/30/2013 16:36 | 3 | 15240 | 5080.00 | 96.5% | 0.59431 | 0.24910 | 3610.63 | 9576.87 | 0.3770 | 0.4219 |
| E3 | 2 | 3/30/2013 16:32 | 3 | 15970 | 5323.33 | 100.0% | 0.59431 | 0.24850 | 3908.98 | 9576.87 | 0.4082 | 0.4005 |
| E3 | 3 | 3/30/2013 16:27 | 3 | 15685 | 5228.33 | 99.4% | 0.59431 | 0.24789 | 3809.14 | 9576.87 | 0.3977 | 0.3941 |
| E3 | 4 | 3/30/2013 16:57 | 3 | 16121 | 5373.67 | 100.0% | 0.59431 | 0.25187 | 3940.12 | 9576.86 | 0.4114 | 0.3743 |
| E3 | 5 | 3/30/2013 16:53 | 3 | 15491 | 5163.67 | 100.0% | 0.59431 | 0.25132 | 3733.25 | 9576.86 | 0.3898 | 0.3476 |
| E3 | 6 | 3/30/2013 16:49 | 3 | 10842 | 3614.00 | 100.0% | 0.59431 | 0.25077 | 2186.71 | 9576.86 | 0.2283 | 0.2973 |
| E3 | 7 | 3/30/2013 16:45 | 3 | 12801 | 4267.00 | 100.0% | 0.59431 | 0.25023 | 2842.81 | 9576.86 | 0.2968 | 0.2738 |
| E4 | 1 | 3/30/2013 16:41 | 3 | 15712 | 5237.33 | 96.5% | 0.59053 | 0.24967 | 3773.98 | 9576.86 | 0.3941 | 0.4441 |
| E4 | 2 | 3/30/2013 16:38 | 3 | 16576 | 5525.33 | 100.0% | 0.59053 | 0.24910 | 4116.53 | 9576.87 | 0.4298 | 0.4193 |
| E4 | 3 | 3/30/2013 16:32 | 3 | 16377 | 5459.00 | 99.4% | 0.59053 | 0.24850 | 4045.36 | 9576.87 | 0.4224 | 0.4119 |
| E4 | 4 | 3/30/2013 16:27 | 3 | 16478 | 5492.67 | 100.0% | 0.59053 | 0.24789 | 4090.73 | 9576.87 | 0.4271 | 0.3890 |
| E4 | 5 | 3/30/2013 16:57 | 3 | 15702 | 5234.00 | 100.0% | 0.59053 | 0.25187 | 3809.56 | 9576.86 | 0.3978 | 0.3580 |
| E4 | 6 | 3/30/2013 16:53 | 3 | 10478 | 3492.67 | 100.0% | 0.59053 | 0.25132 | 2071.32 | 9576.86 | 0.2163 | 0.2997 |
| E4 | 7 | 3/30/2013 16:49 | 3 | 13072 | 4357.33 | 100.0% | 0.59053 | 0.25077 | 2939.11 | 9576.86 | 0.3069 | 0.2725 |
| F1 | 1 | 3/30/2013 16:45 | 3 | 16331 | 5443.67 | 96.5% | 0.61096 | 0.25023 | 3926.32 | 9576.86 | 0.4100 | 0.4580 |
| F1 | 2 | 3/30/2013 16:41 | 3 | 17177 | 5725.67 | 100.0% | 0.61096 | 0.24967 | 4264.81 | 9576.86 | 0.4453 | 0.4320 |
| F1 | 3 | 3/30/2013 16:36 | 3 | 16803 | 5601.00 | 99.4% | 0.61096 | 0.24911 | 4134.87 | 9576.87 | 0.4318 | 0.4242 |
| F1 | 4 | 3/30/2013 16:32 | 3 | 16746 | 5582.00 | 100.0% | 0.61096 | 0.24850 | 4128.02 | 9576.87 | 0.4310 | 0.4001 |
| F1 | 5 | 3/30/2013 16:28 | 3 | 16084 | 5354.67 | 100.0% | 0.61096 | 0.24789 | 3904.23 | 9576.87 | 0.4077 | 0.3677 |
| F1 | 6 | 3/30/2013 16:57 | 3 | 11329 | 3776.33 | 100.0% | 0.61096 | 0.25187 | 2302.61 | 9576.86 | 0.2404 | 0.3066 |
| F1 | 7 | 3/30/2013 16:53 | 3 | 13040 | 4346.67 | 100.0% | 0.61096 | 0.25132 | 2876.15 | 9576.86 | 0.3003 | 0.2780 |
| F2 | 1 | 3/30/2013 16:49 | 3 | 15935 | 5311.67 | 96.5% | 0.60585 | 0.25077 | 3803.75 | 9576.86 | 0.3972 | 0.4412 |
| F2 | 2 | 3/30/2013 16:45 | 3 | 16617 | 5539.00 | 100.0% | 0.60585 | 0.25023 | 4087.14 | 9576.86 | 0.4268 | 0.4173 |
| F2 | 3 | 3/30/2013 16:41 | 3 | 16268 | 5422.67 | 99.4% | 0.60585 | 0.24967 | 3965.52 | 9576.86 | 0.4141 | 0.4102 |
| F2 | 4 | 3/30/2013 16:36 | 3 | 16500 | 5500.00 | 100.0% | 0.60585 | 0.24911 | 4054.63 | 9576.87 | 0.4234 | 0.3880 |
| F2 | 5 | 3/30/2013 16:32 | 3 | 15688 | 5229.33 | 100.0% | 0.60585 | 0.24850 | 3787.49 | 9576.87 | 0.3955 | 0.3581 |
| F2 | 6 | 3/30/2013 16:28 | 3 | 11219 | 3739.67 | 100.0% | 0.60585 | 0.24789 | 2301.36 | 9576.87 | 0.2403 | 0.3019 |
| F2 | 7 | 3/30/2013 16:57 | 3 | 12868 | 4289.33 | 100.0% | 0.60585 | 0.25187 | 2827.94 | 9576.86 | 0.2953 | 0.2755 |
| F3 | 1 | 3/30/2013 16:53 | 3 | 16431 | 5477.00 | 96.5% | 0.61555 | 0.25132 | 3941.56 | 9576.86 | 0.4116 | 0.4648 |
| F3 | 2 | 3/30/2013 16:49 | 3 | 17530 | 5843.33 | 100.0% | 0.61555 | 0.25077 | 4365.02 | 9576.86 | 0.4558 | 0.4373 |
| F3 | 3 | 3/30/2013 16:45 | 3 | 17043 | 5681.00 | 99.4% | 0.61555 | 0.25023 | 4197.21 | 9576.86 | 0.4383 | 0.4290 |
| F3 | 4 | 3/30/2013 16:41 | 3 | 16858 | 5619.33 | 100.0% | 0.61555 | 0.24967 | 4147.52 | 9576.86 | 0.4331 | 0.4035 |
| F3 | 5 | 3/30/2013 16:36 | 3 | 16156 | 5385.33 | 100.0% | 0.61555 | 0.24911 | 3916.83 | 9576.87 | 0.4090 | 0.3691 |
| F3 | 6 | 3/30/2013 16:32 | 3 | 11315 | 3771.67 | 100.0% | 0.61555 | 0.24850 | 2306.74 | 9576.87 | 0.2409 | 0.3043 |
| F3 | 7 | 4/1/2013 10:07 | 3 | 17640 | 5880.00 | 100.0% | 0.61555 | 0.52084 | 2810.01 | 9575.78 | 0.2934 | 0.2740 |
| F4 | 1 | 3/30/2013 16:57 | 3 | 16446 | 5482.67 | 96.5% | 0.61212 | 0.25187 | 3952.45 | 9576.86 | 0.4127 | 0.4607 |
| F4 | 2 | 3/30/2013 16:53 | 3 | 17260 | 5753.33 | 100.0% | 0.61212 | 0.25133 | 4280.01 | 9576.86 | 0.4469 | 0.4345 |
| F4 | 3 | 3/30/2013 16:49 | 3 | 16859 | 5619.67 | 99.4% | 0.61212 | 0.25078 | 4140.93 | 9576.86 | 0.4324 | 0.4267 |
| F4 | 4 | 3/30/2013 16:45 | 3 | 17073 | 5691.00 | 100.0% | 0.61212 | 0.25023 | 4224.10 | 9576.86 | 0.4411 | 0.4025 |
| F4 | 5 | 3/30/2013 16:41 | 3 | 16002 | 5334.00 | 100.0% | 0.61212 | 0.24967 | 3870.37 | 9576.86 | 0.4041 | 0.3700 |
| F4 | 6 | 3/30/2013 16:36 | 3 | 11367 | 3789.00 | 100.0% | 0.61212 | 0.24911 | 2328.67 | 9576.87 | 0.2432 | 0.3086 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F4 | 7 | 3/30/2013 16:32 | 3 | 13064 | 4354.67 | 100.0% | 0.61212 | 0.24850 | 2897.90 | 9576.87 | 0.3026 | 0.2799 |
| G1 | 1 | 3/30/2013 17:02 | 3 | 15385 | 5128.33 | 96.5% | 0.53730 | 0.25250 | 3781.80 | 9576.86 | 0.3949 | 0.4455 |
| G1 | 2 | 3/30/2013 17:30 | 3 | 16518 | 5506.00 | 100.0% | 0.53730 | 0.25632 | 4187.05 | 9576.84 | 0.4372 | 0.4210 |
| G1 | 3 | 3/30/2013 17:26 | 3 | 15987 | 5329.00 | 99.4% | 0.53730 | 0.25579 | 4005.07 | 9576.84 | 0.4182 | 0.4136 |
| G1 | 4 | 3/30/2013 17:22 | 3 | 16141 | 5380.33 | 100.0% | 0.53730 | 0.25524 | 4066.96 | 9576.85 | 0.4247 | 0.3908 |
| G1 | 5 | 3/30/2013 17:18 | 3 | 15413 | 5137.67 | 100.0% | 0.53730 | 0.25470 | 3827.05 | 9576.85 | 0.3996 | 0.3600 |
| G1 | 6 | 3/30/2013 17:14 | 3 | 10864 | 3621.33 | 100.0% | 0.53730 | 0.25417 | 2313.46 | 9576.85 | 0.2416 | 0.3021 |
| G1 | 7 | 3/30/2013 17:10 | 3 | 12302 | 4100.67 | 100.0% | 0.53730 | 0.25364 | 2795.52 | 9576.85 | 0.2919 | 0.2750 |
| G2 | 1 | 3/30/2013 17:06 | 3 | 16229 | 5409.67 | 96.5% | 0.59756 | 0.25306 | 3908.83 | 9576.85 | 0.4082 | 0.4596 |
| G2 | 2 | 3/30/2013 17:02 | 3 | 17029 | 5676.33 | 100.0% | 0.59756 | 0.25250 | 4231.33 | 9576.86 | 0.4418 | 0.4328 |
| G2 | 3 | 3/30/2013 17:30 | 3 | 16908 | 5636.00 | 99.4% | 0.59756 | 0.25633 | 4160.49 | 9576.84 | 0.4344 | 0.4247 |
| G2 | 4 | 3/30/2013 17:26 | 3 | 17104 | 5701.33 | 100.0% | 0.59756 | 0.25579 | 4237.52 | 9576.84 | 0.4425 | 0.4000 |
| G2 | 5 | 3/30/2013 17:22 | 3 | 16047 | 5349.00 | 100.0% | 0.59756 | 0.25524 | 3888.33 | 9576.85 | 0.4060 | 0.3655 |
| G2 | 6 | 3/30/2013 17:18 | 3 | 10784 | 3594.67 | 100.0% | 0.59756 | 0.25471 | 2137.06 | 9576.85 | 0.2231 | 0.3035 |
| G2 | 7 | 3/30/2013 17:14 | 3 | 13124 | 4374.67 | 100.0% | 0.59756 | 0.25417 | 2920.12 | 9576.85 | 0.3049 | 0.2740 |
| G3 | 1 | 3/30/2013 17:10 | 3 | 16936 | 5645.33 | 96.5% | 0.60776 | 0.25364 | 4115.34 | 9576.85 | 0.4297 | 0.4802 |
| G3 | 2 | 3/30/2013 17:06 | 3 | 17728 | 5909.33 | 100.0% | 0.60776 | 0.25306 | 4436.40 | 9576.85 | 0.4632 | 0.4533 |
| G3 | 3 | 3/30/2013 17:02 | 3 | 17443 | 5814.33 | 99.4% | 0.60776 | 0.25250 | 4336.00 | 9576.86 | 0.4528 | 0.4452 |
| G3 | 4 | 3/30/2013 17:30 | 3 | 17689 | 5896.33 | 100.0% | 0.60776 | 0.25633 | 4404.39 | 9576.84 | 0.4599 | 0.4203 |
| G3 | 5 | 3/30/2013 17:26 | 3 | 16907 | 5635.67 | 100.0% | 0.60776 | 0.25579 | 4146.85 | 9576.84 | 0.4330 | 0.3867 |
| G3 | 6 | 3/30/2013 17:22 | 3 | 11209 | 3736.33 | 100.0% | 0.60776 | 0.25524 | 2250.71 | 9576.85 | 0.2350 | 0.3234 |
| G3 | 7 | 3/30/2013 17:18 | 3 | 13910 | 4636.67 | 100.0% | 0.60776 | 0.25471 | 3154.16 | 9576.85 | 0.3294 | 0.2938 |
| G4 | 1 | 3/30/2013 17:14 | 3 | 16355 | 5451.67 | 96.5% | 0.60389 | 0.25417 | 3928.24 | 9576.85 | 0.4102 | 0.4700 |
| G4 | 2 | 3/30/2013 17:10 | 3 | 17548 | 5849.33 | 100.0% | 0.60389 | 0.25364 | 4382.43 | 9576.85 | 0.4576 | 0.4427 |
| G4 | 3 | 3/30/2013 17:06 | 3 | 17016 | 5672.67 | 99.4% | 0.60389 | 0.25306 | 4200.52 | 9576.85 | 0.4386 | 0.4345 |
| G4 | 4 | 3/30/2013 17:02 | 3 | 17695 | 5898.33 | 100.0% | 0.60389 | 0.25250 | 4438.02 | 9576.86 | 0.4634 | 0.4092 |
| G4 | 5 | 3/30/2013 17:30 | 3 | 16498 | 5499.33 | 100.0% | 0.60389 | 0.25633 | 4016.91 | 9576.84 | 0.4194 | 0.3750 |
| G4 | 6 | 3/30/2013 17:26 | 3 | 10596 | 3532.00 | 100.0% | 0.60389 | 0.25579 | 2052.68 | 9576.84 | 0.2143 | 0.3108 |
| G4 | 7 | 3/30/2013 17:22 | 3 | 13598 | 4532.67 | 100.0% | 0.60389 | 0.25524 | 3056.51 | 9576.85 | 0.3192 | 0.2807 |
| H1 | 1 | 3/30/2013 17:18 | 3 | 15975 | 5325.00 | 96.5% | 0.59583 | 0.25468 | 3818.93 | 9576.85 | 0.3988 | 0.4497 |
| H1 | 2 | 3/30/2013 17:14 | 3 | 16806 | 5602.00 | 100.0% | 0.59583 | 0.25414 | 4151.80 | 9576.85 | 0.4335 | 0.4231 |
| H1 | 3 | 3/30/2013 17:10 | 3 | 16419 | 5473.00 | 99.4% | 0.59583 | 0.25361 | 4017.33 | 9576.85 | 0.4195 | 0.4151 |
| H1 | 4 | 3/30/2013 17:06 | 3 | 16775 | 5591.67 | 100.0% | 0.59583 | 0.25303 | 4147.83 | 9576.85 | 0.4331 | 0.3905 |
| H1 | 5 | 3/30/2013 17:01 | 3 | 15992 | 5330.67 | 100.0% | 0.59583 | 0.25248 | 3889.98 | 9576.86 | 0.4062 | 0.3573 |
| H1 | 6 | 3/30/2013 17:30 | 3 | 10179 | 3393.00 | 100.0% | 0.59583 | 0.25630 | 1930.49 | 9576.84 | 0.2016 | 0.2948 |
| H1 | 7 | 3/30/2013 17:26 | 3 | 13094 | 4364.67 | 100.0% | 0.59583 | 0.25576 | 2905.25 | 9576.85 | 0.3034 | 0.2655 |
| H2 | 1 | 3/30/2013 17:22 | 3 | 16521 | 5507.00 | 96.5% | 0.59812 | 0.25521 | 3991.97 | 9576.85 | 0.4168 | 0.4638 |
| H2 | 2 | 3/30/2013 17:18 | 3 | 17287 | 5762.33 | 100.0% | 0.59812 | 0.25468 | 4303.52 | 9576.85 | 0.4494 | 0.4373 |
| H2 | 3 | 3/30/2013 17:14 | 3 | 17107 | 5702.33 | 99.4% | 0.59812 | 0.25414 | 4238.00 | 9576.85 | 0.4425 | 0.4294 |
| H2 | 4 | 3/30/2013 17:10 | 3 | 16752 | 5584.00 | 100.0% | 0.59812 | 0.25361 | 4131.29 | 9576.85 | 0.4314 | 0.4049 |
| H2 | 5 | 3/30/2013 17:06 | 3 | 16119 | 5373.00 | 100.0% | 0.59812 | 0.25303 | 3923.62 | 9576.85 | 0.4097 | 0.3718 |
| H2 | 6 | 3/30/2013 17:01 | 3 | 11258 | 3752.67 | 100.0% | 0.59812 | 0.25248 | 2306.45 | 9576.86 | 0.2408 | 0.3097 |
| H2 | 7 | 3/30/2013 17:30 | 3 | 13217 | 4405.67 | 100.0% | 0.59812 | 0.25630 | 2937.54 | 9576.84 | 0.3067 | 0.2806 |
| H3 | 1 | 3/30/2013 17:26 | 3 | 16866 | 5622.00 | 96.5% | 0.61253 | 0.25576 | 4067.13 | 9576.85 | 0.4247 | 0.4786 |
| H3 | 2 | 3/30/2013 17:22 | 3 | 17699 | 5899.67 | 100.0% | 0.61253 | 0.25521 | 4402.55 | 9576.85 | 0.4597 | 0.4505 |
| H3 | 3 | 3/30/2013 17:18 | 3 | 17697 | 5899.00 | 99.4% | 0.61253 | 0.25468 | 4396.25 | 9576.85 | 0.4591 | 0.4420 |
| H3 | 4 | 3/30/2013 17:14 | 3 | 17437 | 5812.33 | 100.0% | 0.61253 | 0.25414 | 4321.49 | 9576.85 | 0.4512 | 0.4160 |
| H3 | 5 | 3/30/2013 17:10 | 3 | 16538 | 5512.67 | 100.0% | 0.61253 | 0.25361 | 4024.94 | 9576.85 | 0.4203 | 0.3808 |
| H3 | 6 | 3/30/2013 17:06 | 3 | 11441 | 3813.67 | 100.0% | 0.61253 | 0.25303 | 2329.36 | 9576.85 | 0.2432 | 0.3147 |
| H3 | 7 | 3/30/2013 17:01 | 3 | 13301 | 4433.67 | 100.0% | 0.61253 | 0.25248 | 2952.60 | 9576.86 | 0.3083 | 0.2838 |
| H4 | 1 | 3/30/2013 17:30 | 3 | 16173 | 5391.00 | 96.5% | 0.59765 | 0.25630 | 3870.66 | 9576.84 | 0.4042 | 0.4566 |
| H4 | 2 | 3/30/2013 17:26 | 3 | 17139 | 5713.00 | 100.0% | 0.59765 | 0.25576 | 4249.10 | 9576.85 | 0.4437 | 0.4310 |
| H4 | 3 | 3/30/2013 17:22 | 3 | 16875 | 5625.00 | 99.4% | 0.59765 | 0.25521 | 4155.66 | 9576.85 | 0.4339 | 0.4234 |
| H4 | 4 | 3/30/2013 17:18 | 3 | 16818 | 5606.00 | 100.0% | 0.59765 | 0.25468 | 4148.32 | 9576.85 | 0.4332 | 0.3998 |
| H4 | 5 | 3/30/2013 17:14 | 3 | 16239 | 5413.00 | 100.0% | 0.59765 | 0.25414 | 3958.37 | 9576.85 | 0.4133 | 0.3679 |
| H4 | 6 | 3/30/2013 17:10 | 3 | 10966 | 3655.33 | 100.0% | 0.59765 | 0.25361 | 2203.75 | 9576.85 | 0.2301 | 0.3079 |
| H4 | 7 | 3/30/2013 17:06 | 3 | 13189 | 4396.33 | 100.0% | 0.59765 | 0.25303 | 2948.09 | 9576.85 | 0.3078 | 0.2798 |
| I1 | 1 | 3/30/2013 11:17 | 3 | 14017 | 4672.33 | 96.5% | 0.58071 | 0.20463 | 3492.93 | 9577.01 | 0.3647 | 0.3968 |
| I1 | 2 | 3/30/2013 11:31 | 3 | 14980 | 4993.33 | 100.0% | 0.58071 | 0.20662 | 3844.24 | 9577.00 | 0.4014 | 0.3852 |
| I1 | 3 | 3/30/2013 11:27 | 3 | 14513 | 4837.67 | 99.4% | 0.58071 | 0.20595 | 3685.56 | 9577.00 | 0.3848 | 0.3812 |
| I1 | 4 | 3/30/2013 11:22 | 3 | 14695 | 4898.33 | 100.0% | 0.58071 | 0.20528 | 3756.67 | 9577.00 | 0.3923 | 0.3686 |
| I1 | 5 | 3/30/2013 11:36 | 3 | 14034 | 4678.00 | 100.0% | 0.58071 | 0.20728 | 3525.24 | 9577.00 | 0.3681 | 0.3517 |
| I1 | 6 | 3/30/2013 12:02 | 3 | 11459 | 3819.67 | 100.0% | 0.58071 | 0.21096 | 2646.41 | 9576.99 | 0.2763 | 0.3198 |
| I1 | 7 | 3/30/2013 11:57 | 3 | 12779 | 4259.67 | 100.0% | 0.58071 | 0.21033 | 3089.92 | 9576.99 | 0.3226 | 0.3049 |
| I2 | 1 | 3/30/2013 11:22 | 3 | 14220 | 4740.00 | 96.5% | 0.59727 | 0.20528 | 3523.07 | 9577.00 | 0.3679 | 0.4068 |
| I2 | 2 | 3/30/2013 11:17 | 3 | 15645 | 5215.00 | 100.0% | 0.59727 | 0.20463 | 4044.53 | 9577.01 | 0.4223 | 0.3938 |
| I2 | 3 | 3/30/2013 11:31 | 3 | 14831 | 4943.67 | 99.4% | 0.59727 | 0.20662 | 3754.84 | 9577.00 | 0.3921 | 0.3893 |
| I2 | 4 | 3/30/2013 11:27 | 3 | 14874 | 4958.00 | 100.0% | 0.59727 | 0.20595 | 3779.97 | 9577.00 | 0.3947 | 0.3754 |
| I2 | 5 | 3/30/2013 11:52 | 3 | 14319 | 4773.00 | 100.0% | 0.59727 | 0.20954 | 3574.40 | 9576.99 | 0.3732 | 0.3566 |
| I2 | 6 | 3/30/2013 11:36 | 3 | 11488 | 3829.33 | 100.0% | 0.59727 | 0.20728 | 2643.70 | 9577.00 | 0.2760 | 0.3213 |
| I2 | 7 | 3/30/2013 12:02 | 3 | 12916 | 4305.33 | 100.0% | 0.59727 | 0.21097 | 3098.60 | 9576.99 | 0.3235 | 0.3047 |
| I3 | 1 | 3/30/2013 11:27 | 3 | 14044 | 4681.33 | 96.5% | 0.59590 | 0.20595 | 3463.24 | 9577.00 | 0.3615 | 0.4001 |
| I3 | 2 | 3/30/2013 11:22 | 3 | 15263 | 5087.67 | 100.0% | 0.59590 | 0.20528 | 3916.12 | 9577.00 | 0.4089 | 0.3863 |
| I3 | 3 | 3/30/2013 11:17 | 3 | 14712 | 4904.00 | 99.4% | 0.59590 | 0.20463 | 3729.33 | 9577.01 | 0.3894 | 0.3822 |
| I3 | 4 | 3/30/2013 11:31 | 3 | 14694 | 4898.00 | 100.0% | 0.59590 | 0.20662 | 3718.82 | 9577.00 | 0.3883 | 0.3694 |
| I3 | 5 | 3/30/2013 11:57 | 3 | 14163 | 4721.00 | 100.0% | 0.59590 | 0.21033 | 3520.63 | 9576.99 | 0.3676 | 0.3522 |
| I3 | 6 | 3/30/2013 11:52 | 3 | 11478 | 3826.00 | 100.0% | 0.59590 | 0.20954 | 2630.14 | 9576.99 | 0.2746 | 0.3198 |
| I3 | 7 | 3/30/2013 11:36 | 3 | 12865 | 4288.33 | 100.0% | 0.59590 | 0.20728 | 3105.40 | 9577.00 | 0.3243 | 0.3047 |
| I4 | 1 | 3/30/2013 11:31 | 3 | 14702 | 4900.67 | 96.5% | 0.60011 | 0.20662 | 3669.98 | 9577.00 | 0.3832 | 0.4152 |
| I4 | 2 | 3/30/2013 11:27 | 3 | 15485 | 5161.67 | 100.0% | 0.60011 | 0.20595 | 3978.03 | 9577.00 | 0.4154 | 0.4011 |
| I4 | 3 | 3/30/2013 11:22 | 3 | 15018 | 5006.00 | 99.4% | 0.60011 | 0.20528 | 3819.25 | 9577.00 | 0.3988 | 0.3966 |
| I4 | 4 | 3/30/2013 11:17 | 3 | 15237 | 5079.00 | 100.0% | 0.60011 | 0.20463 | 3902.95 | 9577.01 | 0.4075 | 0.3827 |
| I4 | 5 | 3/30/2013 12:02 | 3 | 14705 | 4901.67 | 100.0% | 0.60011 | 0.21097 | 3689.19 | 9576.99 | 0.3852 | 0.3640 |
| I4 | 6 | 3/30/2013 11:57 | 3 | 11552 | 3850.67 | 100.0% | 0.60011 | 0.21033 | 2641.83 | 9576.99 | 0.2759 | 0.3286 |
| I4 | 7 | 3/30/2013 11:52 | 3 | 13250 | 4416.67 | 100.0% | 0.60011 | 0.20955 | 3212.36 | 9576.99 | 0.3354 | 0.3121 |
| J1 | 1 | 3/30/2013 11:36 | 3 | 14098 | 4699.33 | 96.5% | 0.59388 | 0.20728 | 3477.53 | 9577.00 | 0.3631 | 0.4013 |
| J1 | 2 | 3/30/2013 12:02 | 3 | 15235 | 5078.33 | 100.0% | 0.59388 | 0.21097 | 3878.43 | 9576.99 | 0.4050 | 0.3881 |
| J1 | 3 | 3/30/2013 11:57 | 3 | 14926 | 4975.33 | 99.4% | 0.59388 | 0.21034 | 3771.98 | 9576.99 | 0.3939 | 0.3842 |
| J1 | 4 | 3/30/2013 11:52 | 3 | 14903 | 4967.67 | 100.0% | 0.59388 | 0.20955 | 3775.85 | 9576.99 | 0.3943 | 0.3720 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1 | 5 | 3/30/2013 11:17 | 3 | 14201 | 4733.67 | 100.0% | 0.59388 | 0.20463 | 3569.82 | 9577.01 | 0.3727 | 0.3555 |
| J1 | 6 | 3/30/2013 11:31 | 3 | 11434 | 3811.33 | 100.0% | 0.59388 | 0.20662 | 2636.14 | 9577.00 | 0.2753 | 0.3246 |
| J1 | 7 | 3/30/2013 11:27 | 3 | 13043 | 4347.67 | 100.0% | 0.59388 | 0.20595 | 3176.29 | 9577.00 | 0.3317 | 0.3102 |
| J2 | 1 | 3/30/2013 11:52 | 3 | 13996 | 4665.33 | 96.5% | 0.59026 | 0.20955 | 3437.72 | 9576.99 | 0.3590 | 0.3985 |
| J2 | 2 | 3/30/2013 11:36 | 3 | 15032 | 5010.67 | 100.0% | 0.59026 | 0.20728 | 3838.93 | 9577.00 | 0.4008 | 0.3853 |
| J2 | 3 | 3/30/2013 12:02 | 3 | 14838 | 4946.00 | 99.4% | 0.59026 | 0.21097 | 3746.41 | 9576.99 | 0.3912 | 0.3813 |
| J2 | 4 | 3/30/2013 11:57 | 3 | 14873 | 4957.67 | 100.0% | 0.59026 | 0.21034 | 3768.66 | 9576.99 | 0.3935 | 0.3691 |
| J2 | 5 | 3/30/2013 11:22 | 3 | 14122 | 4707.33 | 100.0% | 0.59026 | 0.20529 | 3546.86 | 9577.00 | 0.3704 | 0.3526 |
| J2 | 6 | 3/30/2013 11:17 | 3 | 11387 | 3795.67 | 100.0% | 0.59026 | 0.20463 | 2638.91 | 9577.01 | 0.2755 | 0.3215 |
| J2 | 7 | 3/30/2013 11:31 | 3 | 12835 | 4278.33 | 100.0% | 0.59026 | 0.20662 | 3110.32 | 9577.00 | 0.3248 | 0.3070 |
| J3 | 1 | 3/30/2013 11:57 | 3 | 14169 | 4723.00 | 96.5% | 0.59264 | 0.21034 | 3485.77 | 9576.99 | 0.3640 | 0.4024 |
| J3 | 2 | 3/30/2013 11:52 | 3 | 15436 | 5145.33 | 100.0% | 0.59264 | 0.20955 | 3955.99 | 9576.99 | 0.4131 | 0.3869 |
| J3 | 3 | 3/30/2013 11:36 | 3 | 14681 | 4893.67 | 99.4% | 0.59264 | 0.20728 | 3710.28 | 9577.00 | 0.3874 | 0.3849 |
| J3 | 4 | 3/30/2013 12:02 | 3 | 14942 | 4980.67 | 100.0% | 0.59264 | 0.21097 | 3783.27 | 9576.99 | 0.3950 | 0.3725 |
| J3 | 5 | 3/30/2013 11:27 | 3 | 14153 | 4717.67 | 100.0% | 0.59264 | 0.20595 | 3548.72 | 9577.00 | 0.3705 | 0.3556 |
| J3 | 6 | 3/30/2013 11:22 | 3 | 11535 | 3845.00 | 100.0% | 0.59264 | 0.20529 | 2679.84 | 9577.00 | 0.2798 | 0.3240 |
| J3 | 7 | 3/30/2013 11:17 | 3 | 12898 | 4299.33 | 100.0% | 0.59264 | 0.20463 | 3137.90 | 9577.01 | 0.3276 | 0.3092 |
| J4 | 1 | 3/30/2013 12:02 | 3 | 14607 | 4869.00 | 96.5% | 0.59452 | 0.21097 | 3624.10 | 9576.99 | 0.3784 | 0.4107 |
| J4 | 2 | 3/30/2013 11:57 | 3 | 15304 | 5101.33 | 100.0% | 0.59452 | 0.21034 | 3903.72 | 9576.99 | 0.4076 | 0.3971 |
| J4 | 3 | 3/30/2013 11:52 | 3 | 15038 | 5012.67 | 99.4% | 0.59452 | 0.20955 | 3812.53 | 9576.99 | 0.3981 | 0.3930 |
| J4 | 4 | 3/30/2013 11:36 | 3 | 15278 | 5092.67 | 100.0% | 0.59452 | 0.20728 | 3912.46 | 9577.00 | 0.4085 | 0.3804 |
| J4 | 5 | 3/30/2013 11:31 | 3 | 14435 | 4811.67 | 100.0% | 0.59452 | 0.20663 | 3635.19 | 9577.00 | 0.3796 | 0.3633 |
| J4 | 6 | 3/30/2013 11:27 | 3 | 11579 | 3859.67 | 100.0% | 0.59452 | 0.20595 | 2687.02 | 9577.00 | 0.2806 | 0.3312 |
| J4 | 7 | 3/30/2013 11:22 | 3 | 13248 | 4416.00 | 100.0% | 0.59452 | 0.20529 | 3247.13 | 9577.00 | 0.3391 | 0.3162 |

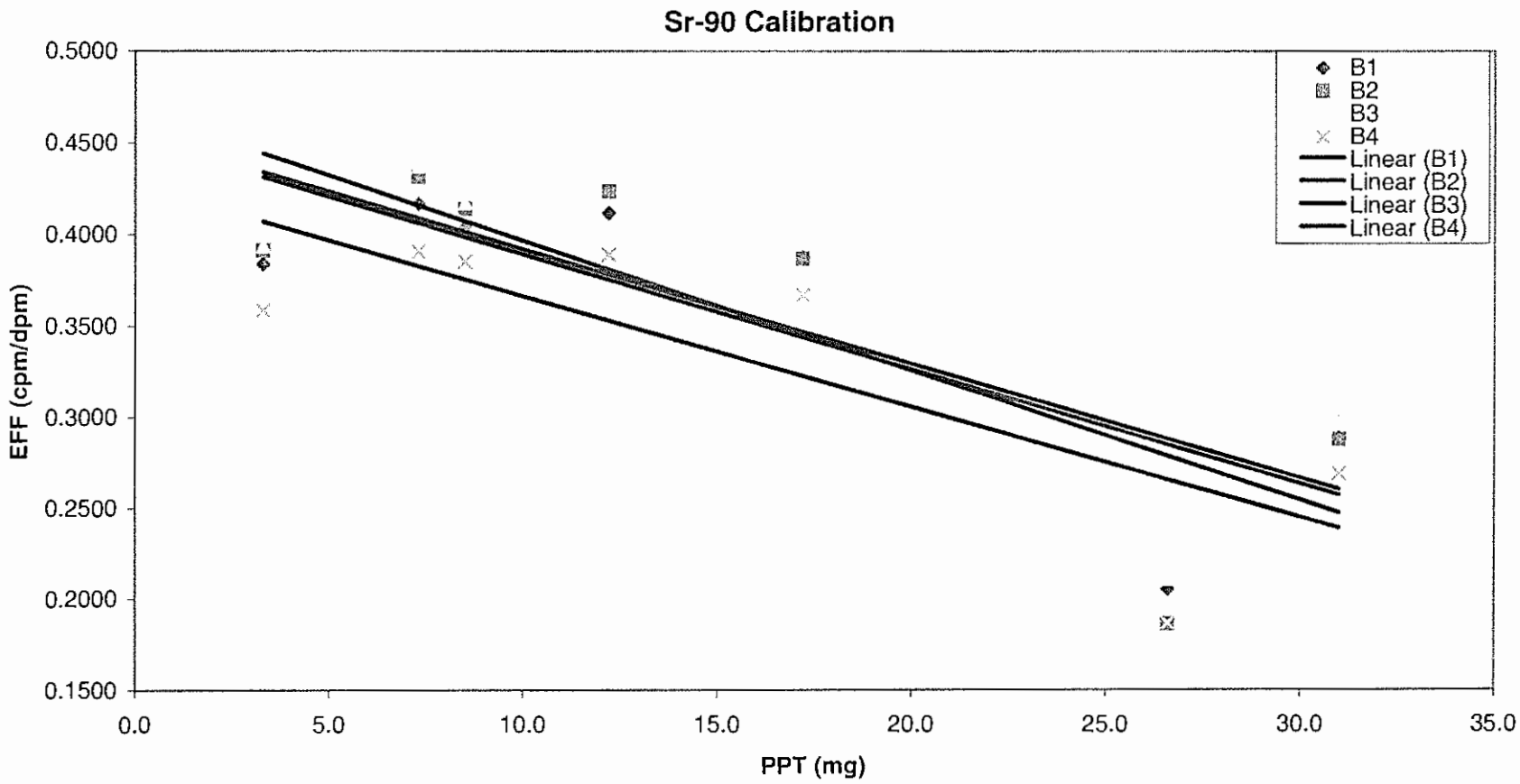



A1 y = -6.838931E-03x + 4.601118E-01

A2 y = -6.538213E-03x + 4.501572E-01

A3 y = -6.790414E-03x + 4.496771E-01

A4

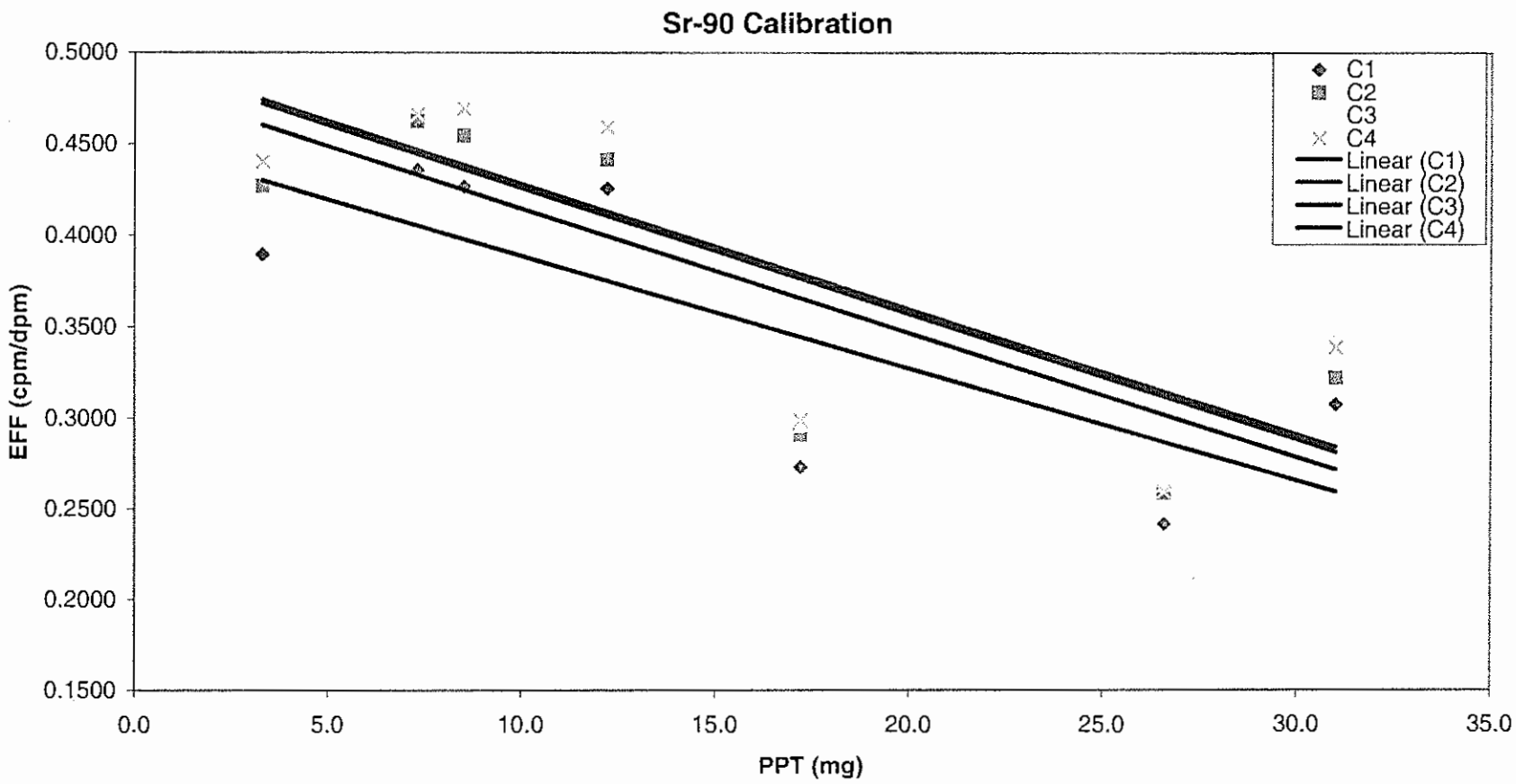



B1 y = -6.268380E-03x + 4.517913E-01

B2 y = -7.096876E-03x + 4.676161E-01

B3 y = -6.255501E-03x + 4.546309E-01

B4 y = -6.063498E-03x + 4.271211E-01

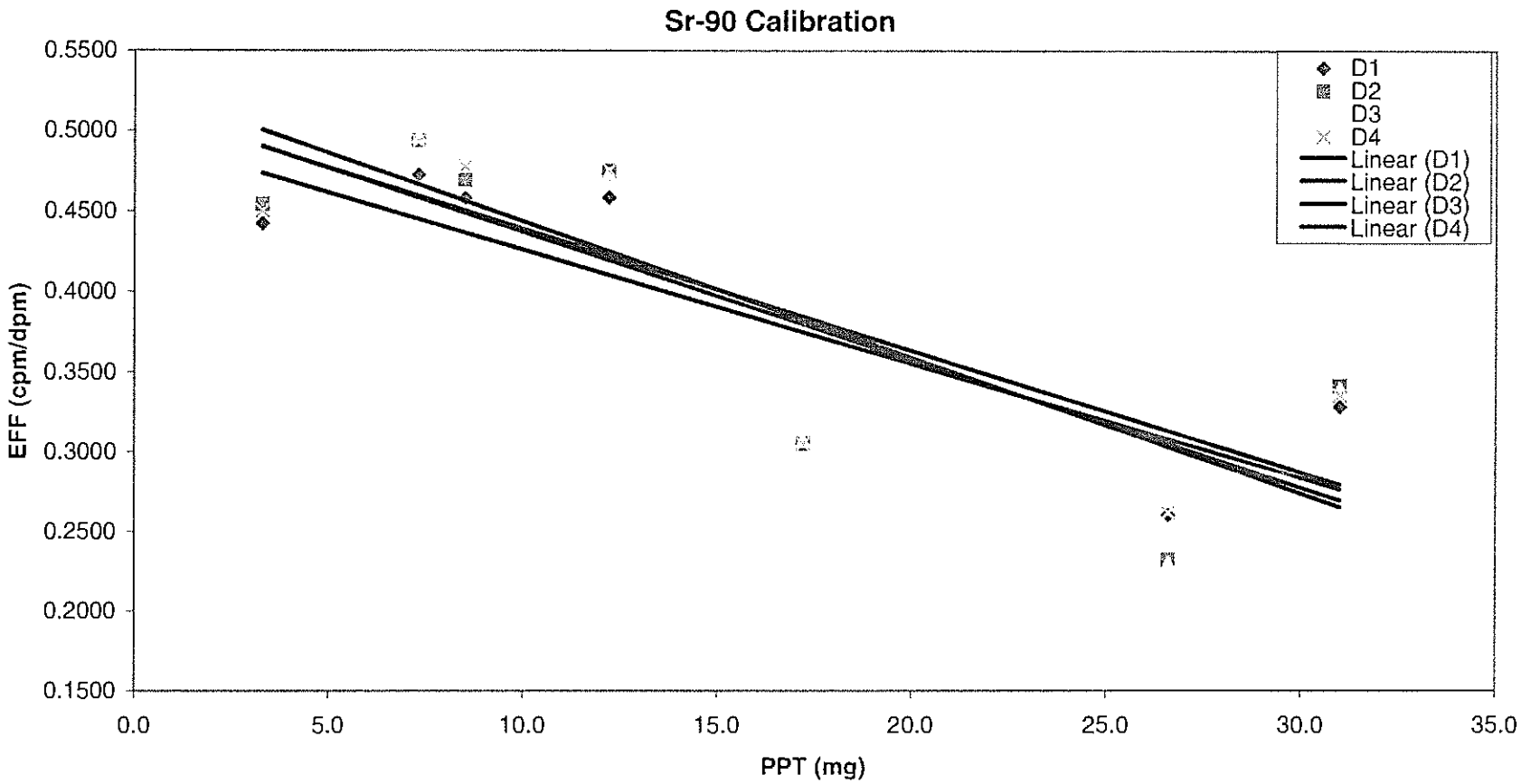



C1 y = -6.151357E-03x + 4.503257E-01

C2 y = -6.805446E-03x + 4.827195E-01

C3 y = -6.857230E-03x + 4.967583E-01

C4 y = -6.877521E-03x + 4.945746E-01

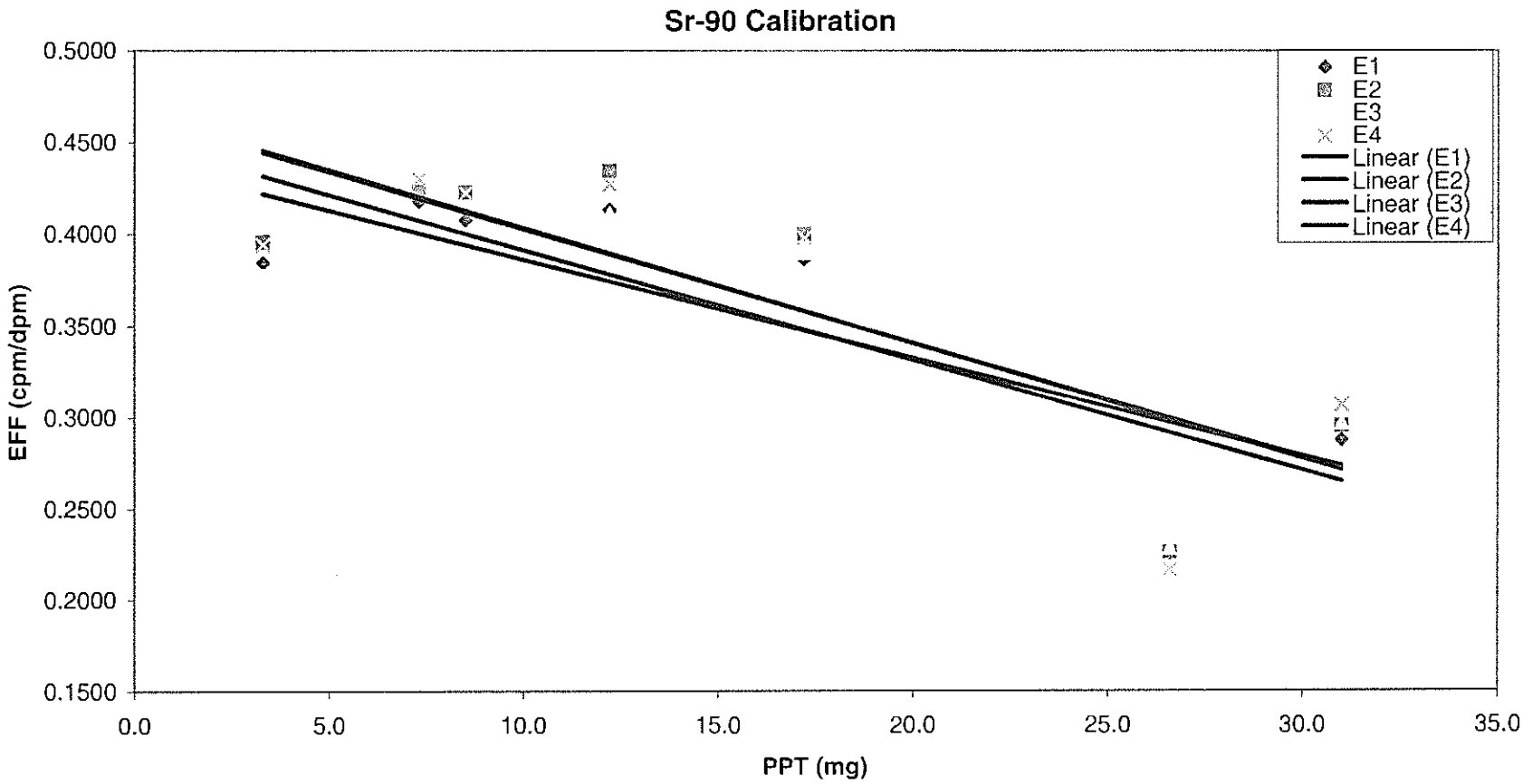



D1 y = -7.110776E-03x + 4.971226E-01

D2 y = -7.966863E-03x + 5.166183E-01

D3 y = -8.483742E-03x + 5.285535E-01

D4 y = -7.597376E-03x + 5.151222E-01

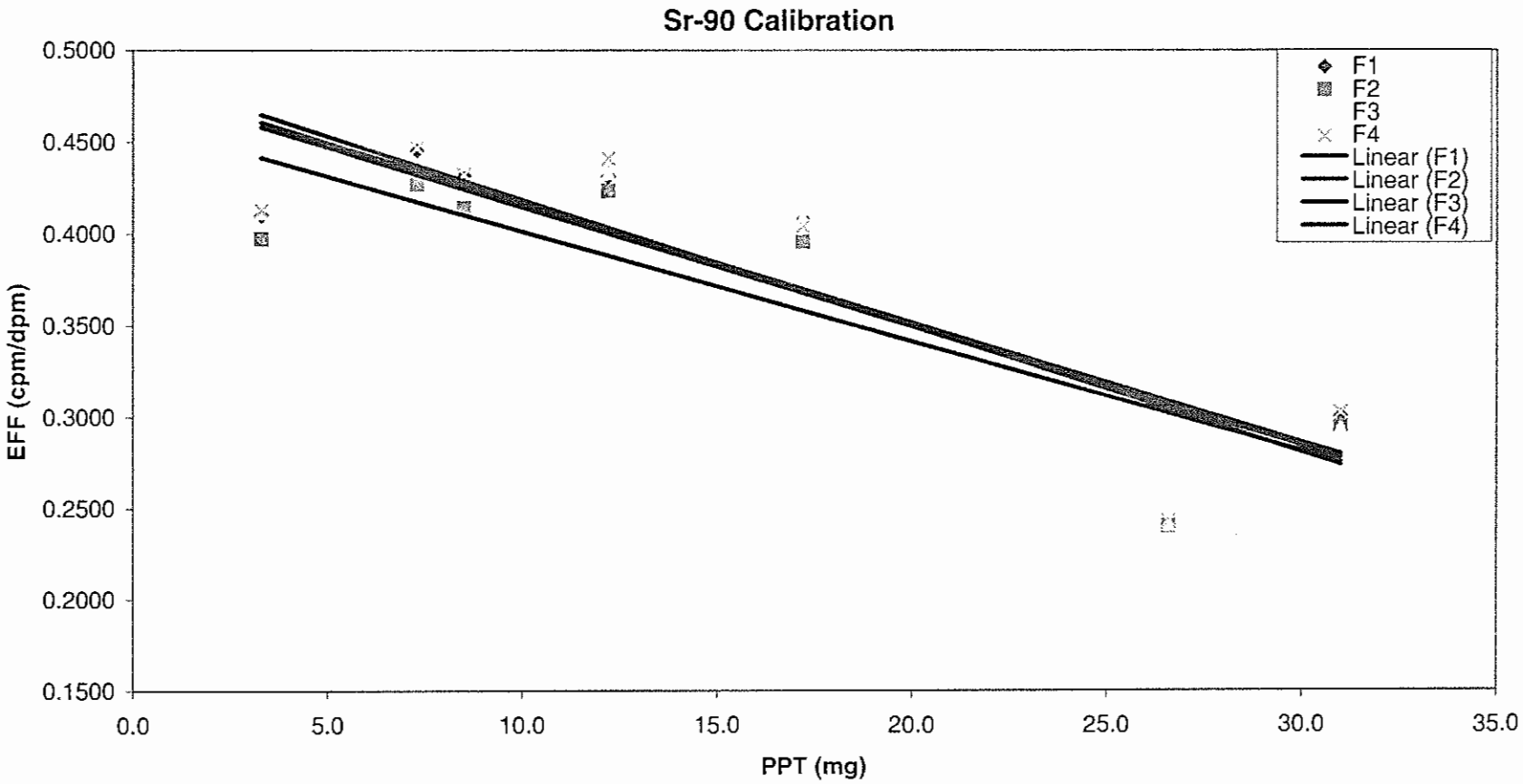



E1 y = -6.000645E-03x + 4.512971E-01

E2 y = -6.278061E-03x + 4.661429E-01

E3 y = -5.346722E-03x + 4.395187E-01

E4 y = -6.197105E-03x + 4.645646E-01

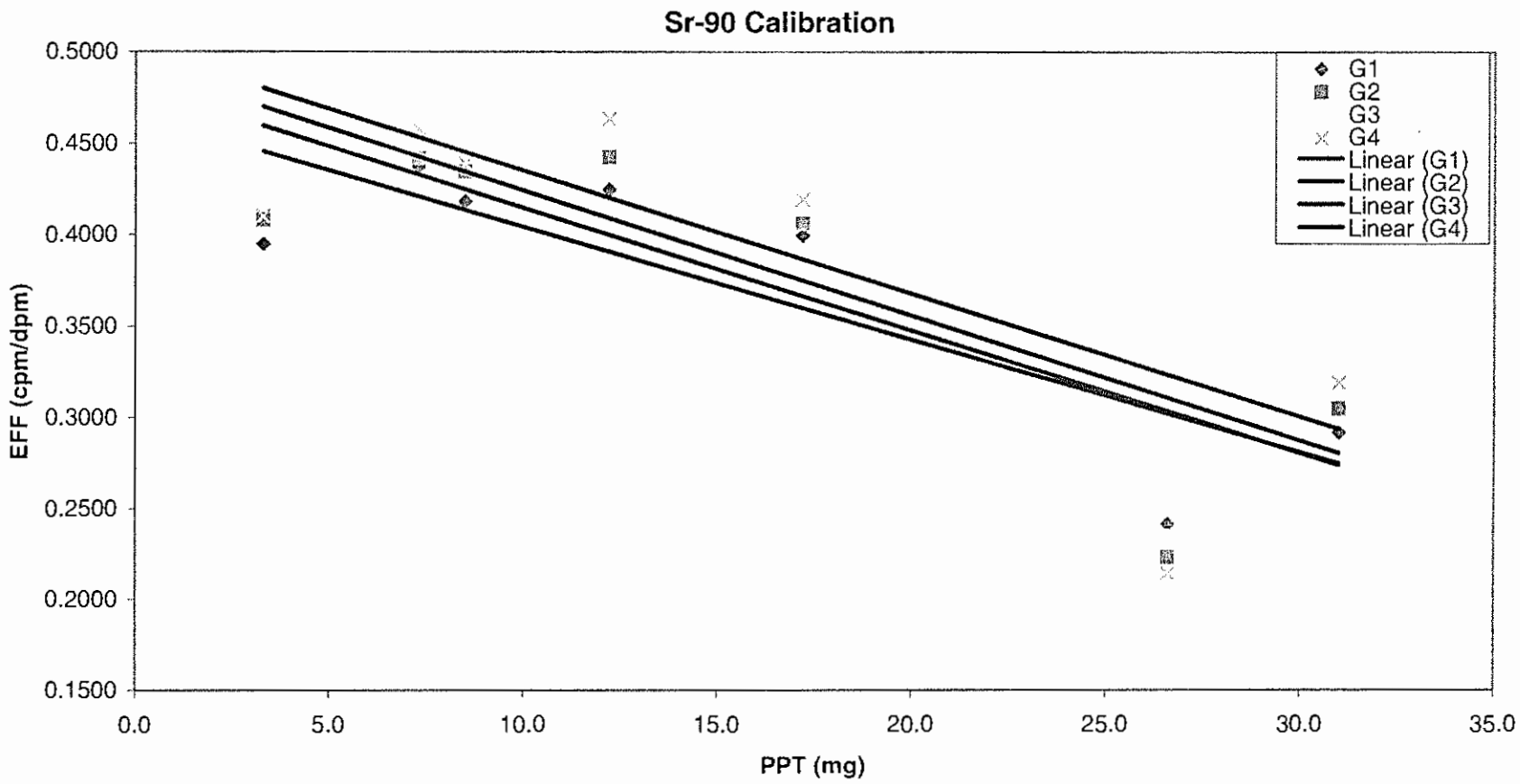



F1 y = -6.495779E-03x + 4.793904E-01

F2 y = -5.978627E-03x + 4.609735E-01

F3 y = -6.888160E-03x + 4.875487E-01

F4 y = -6.525092E-03x + 4.821831E-01

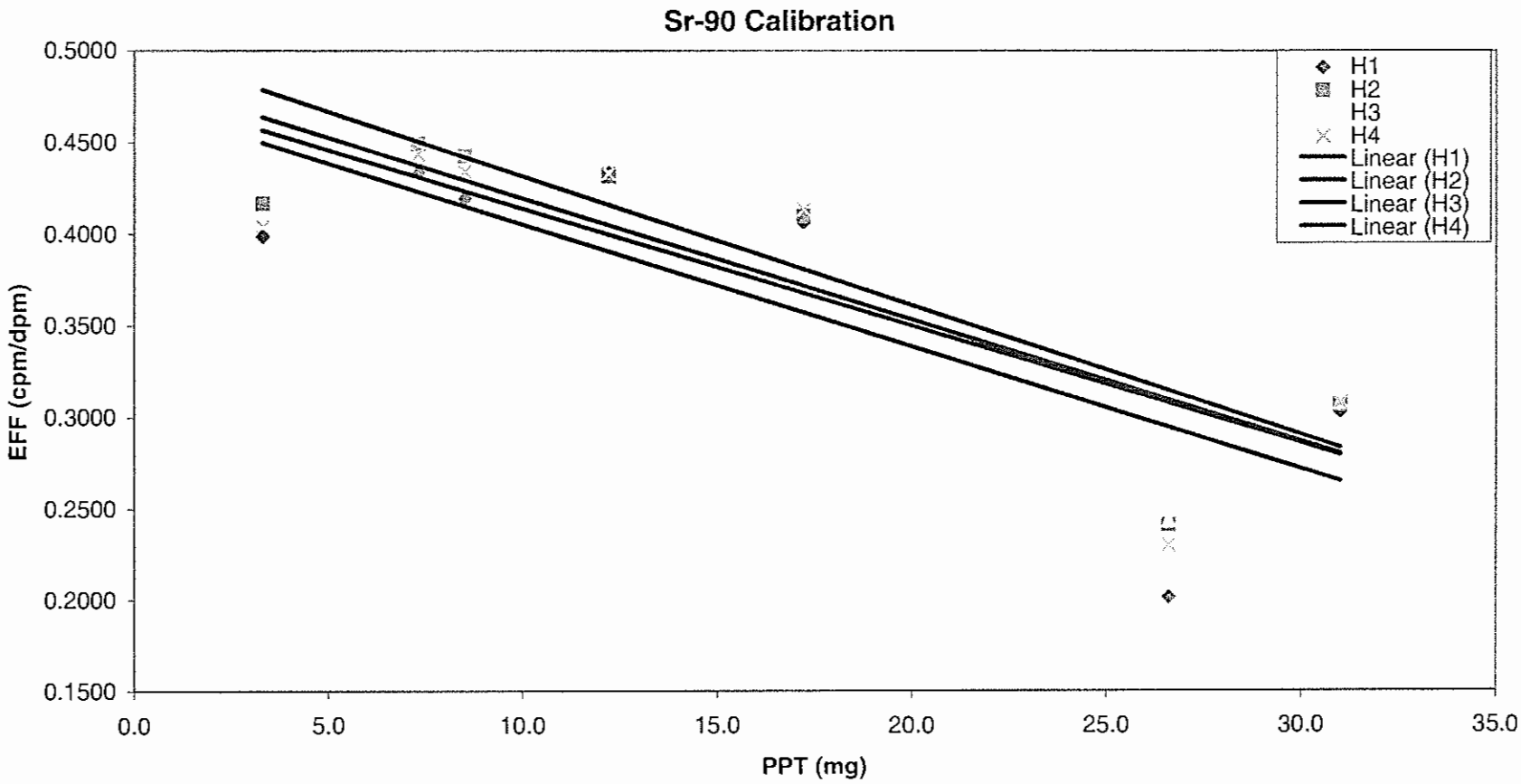



G1y = -6.160750E-03x + 4.659581E-01

G2y = -6.699940E-03x + 4.816901E-01

G3y = -6.730103E-03x + 5.024367E-01

G4y = -6.833214E-03x + 4.925353E-01

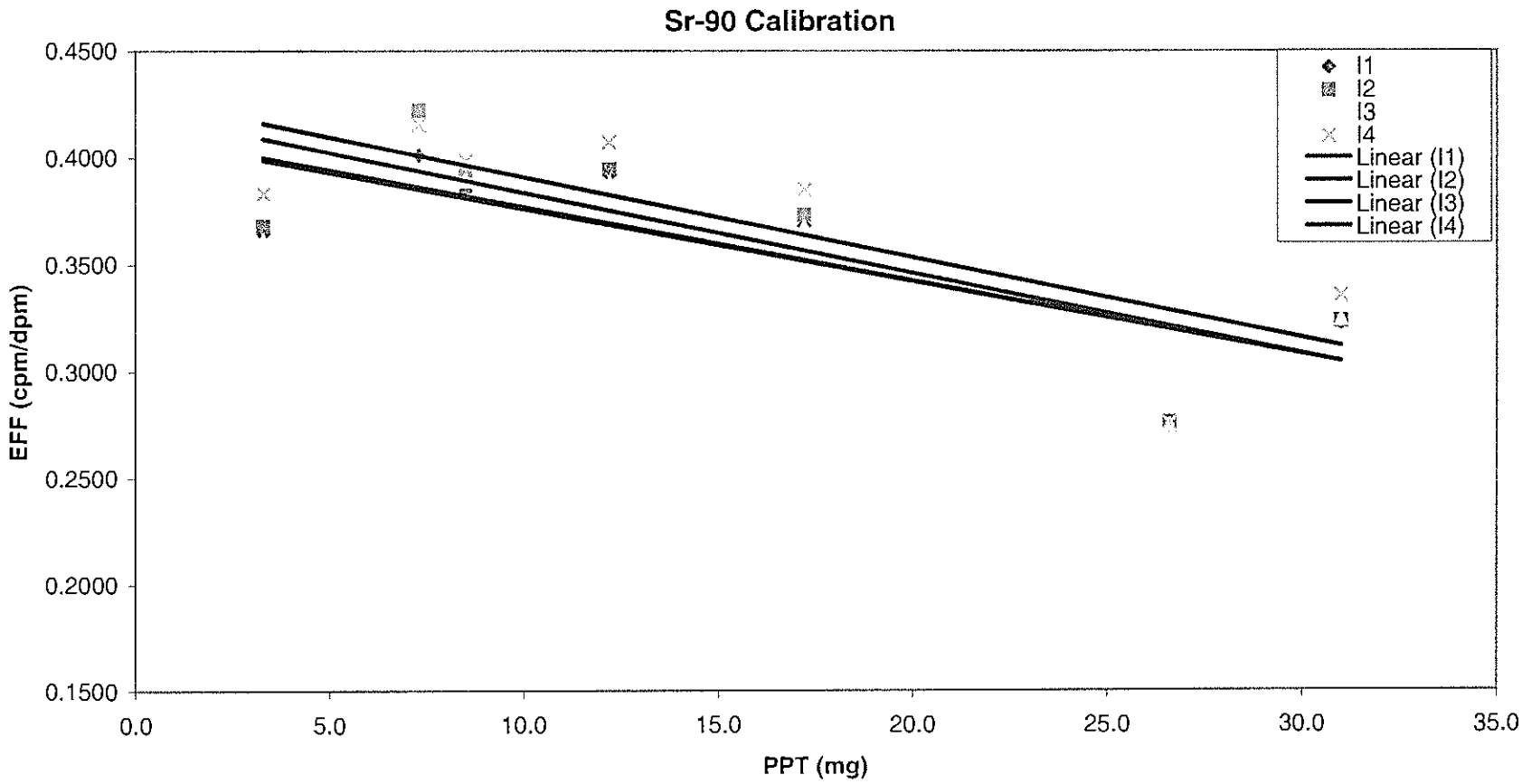



H1 y = -6.648954E-03x + 4.716380E-01

H2 y = -6.613426E-03x + 4.855805E-01

H3 y = -7.032967E-03x + 5.018137E-01

H4 y = -6.381233E-03x + 4.776094E-01

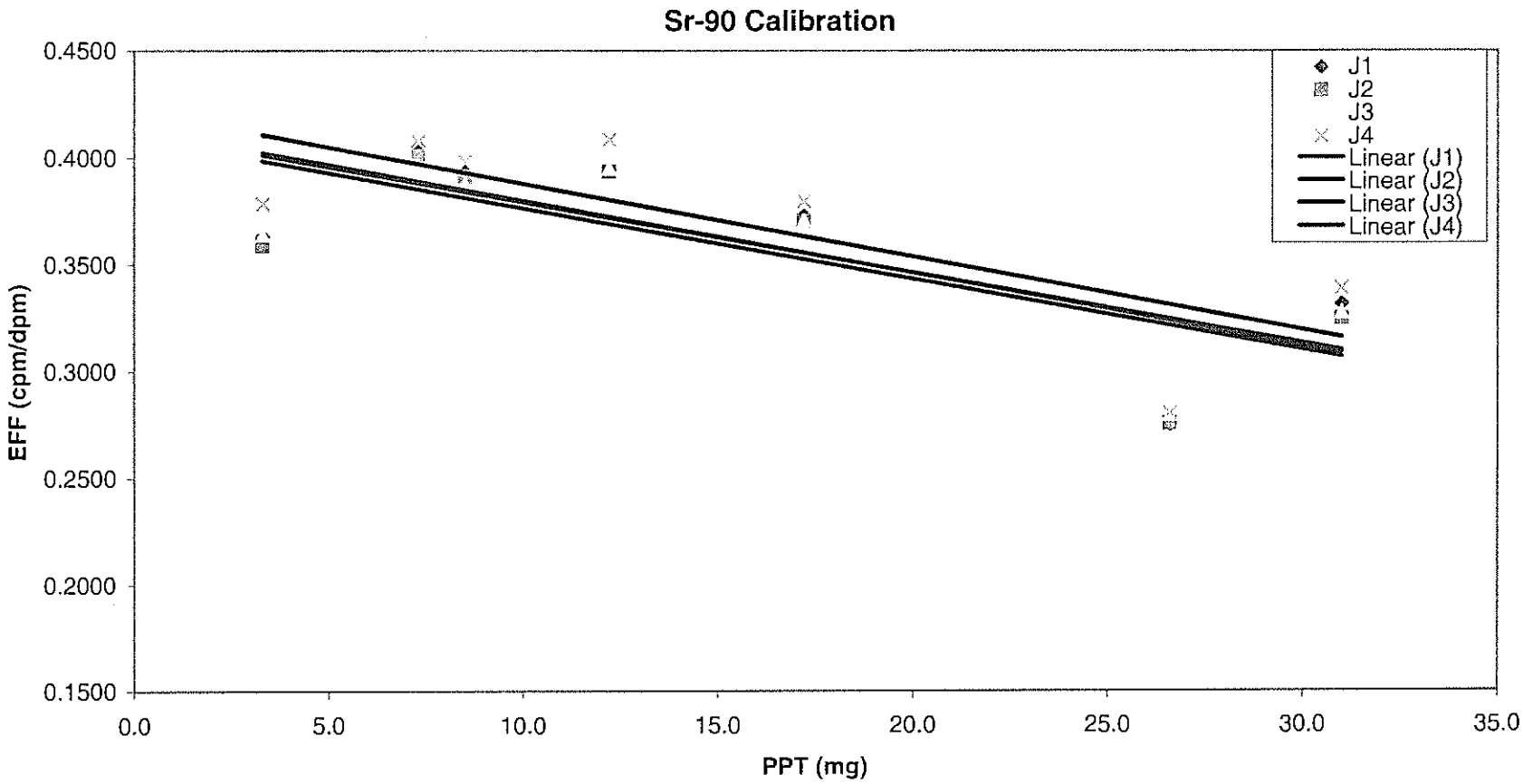



I1 y = -3.390175E-03x + 4.099971E-01

I2 y = -3.757063E-03x + 4.211986E-01

I3 y = -3.445925E-03x + 4.114795E-01

I4 y = -3.756514E-03x + 4.285664E-01




J1 y = -3.288666E-03x + 4.121145E-01

J2 y = -3.302749E-03x + 4.093705E-01

J3 y = -3.365113E-03x + 4.135077E-01

J4 y = -3.414406E-03x + 4.220172E-01

Current Calibration - LB4100

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **LB4100** | A0 | A1 | A2 | A3 | A4 |
| **A1** | 4.601118E-01 | -6.838931E-03 | | | |
| **A2** | 4.501572E-01 | -6.538213E-03 | | | |
| **A3** | 4.496771E-01 | -6.790414E-03 | | | |
| **A4** | #N/A | #N/A | | | |
| **B1** | 4.517913E-01 | -6.268380E-03 | | | |
| **B2** | 4.676161E-01 | -7.096876E-03 | | | |
| **B3** | 4.546309E-01 | -6.255501E-03 | | | |
| **B4** | 4.271211E-01 | -6.063498E-03 | | | |
| **C1** | 4.503257E-01 | -6.151357E-03 | | | |
| **C2** | 4.827195E-01 | -6.805446E-03 | | | |
| **C3** | 4.967583E-01 | -6.857230E-03 | | | |
| **C4** | 4.945746E-01 | -6.877521E-03 | | | |
| **D1** | 4.971226E-01 | -7.110776E-03 | | | |
| **D2** | 5.166183E-01 | -7.966863E-03 | | | |
| **D3** | 5.285535E-01 | -8.483742E-03 | | | |
| **D4** | 5.151222E-01 | -7.597376E-03 | | | |
| **E1** | 4.512971E-01 | -6.000645E-03 | | | |
| **E2** | 4.661429E-01 | -6.278061E-03 | | | |
| **E3** | 4.395187E-01 | -5.346722E-03 | | | |
| **E4** | 4.645646E-01 | -6.197105E-03 | | | |
| **F1** | 4.793904E-01 | -6.495779E-03 | | | |
| **F2** | 4.609735E-01 | -5.978627E-03 | | | |
| **F3** | 4.875487E-01 | -6.888160E-03 | | | |
| **F4** | 4.821831E-01 | -6.525092E-03 | | | |
| **G1** | 4.659581E-01 | -6.160750E-03 | | | |
| **G2** | 4.816901E-01 | -6.699940E-03 | | | |
| **G3** | 5.024367E-01 | -6.730103E-03 | | | |
| **G4** | 4.925353E-01 | -6.833214E-03 | | | |
| **H1** | 4.716380E-01 | -6.648954E-03 | | | |
| **H2** | 4.855805E-01 | -6.613426E-03 | | | |
| **H3** | 5.018137E-01 | -7.032967E-03 | | | |
| **H4** | 4.776094E-01 | -6.381233E-03 | | | |
| **I1** | 4.099971E-01 | -3.390175E-03 | | | |
| **I2** | 4.211986E-01 | -3.757063E-03 | | | |
| **I3** | 4.114795E-01 | -3.445925E-03 | | | |
| **I4** | 4.285664E-01 | -3.756514E-03 | | | |
| **J1** | 4.121145E-01 | -3.288666E-03 | | | |
| **J2** | 4.093705E-01 | -3.302749E-03 | | | |
| **J3** | 4.135077E-01 | -3.365113E-03 | | | |
| **J4** | 4.220172E-01 | -3.414406E-03 | | | |

DCN: ITSI-0808-0004-0076, 8 May 2019

| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| S1 | A1 | 3 | 0 | 16161 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S2 | A1 | 3 | 0 | 17126 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S3 | A1 | 3 | 0 | 16749 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S4 | A1 | 3 | 0 | 16276 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S5 | A1 | 3 | 0 | 12301 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S6 | A1 | 3 | 0 | 10705 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S7 | A1 | 3 | 2 | 13238 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S1 | A2 | 3 | 0 | 15811 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S2 | A2 | 3 | 0 | 17048 | 3/30/2013 17:35 | 3/30/2013 17:38 | LB4100 | Sr90S13 |
| S3 | A2 | 3 | 0 | 16536 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S4 | A2 | 3 | 0 | 16478 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S5 | A2 | 3 | 0 | 11902 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S6 | A2 | 3 | 0 | 10797 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S7 | A2 | 3 | 0 | 13258 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S1 | A3 | 3 | 1 | 15854 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S2 | A3 | 3 | 0 | 16572 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S3 | A3 | 3 | 0 | 16758 | 3/30/2013 17:35 | 3/30/2013 17:38 | LB4100 | Sr90S13 |
| S4 | A3 | 3 | 0 | 16259 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S5 | A3 | 3 | 1 | 12236 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S6 | A3 | 3 | 0 | 10256 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S7 | A3 | 3 | 0 | 13195 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S1 | B1 | 3 | 0 | 15694 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S2 | B1 | 3 | 1 | 16458 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S3 | B1 | 3 | 0 | 16119 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S4 | B1 | 3 | 0 | 16296 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S5 | B1 | 3 | 0 | 15592 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S6 | B1 | 3 | 0 | 10430 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S7 | B1 | 3 | 0 | 12809 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S1 | B2 | 3 | 1 | 15924 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S2 | B2 | 3 | 0 | 16897 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S3 | B2 | 3 | 0 | 16417 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S4 | B2 | 3 | 0 | 16651 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S5 | B2 | 3 | 0 | 15592 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S6 | B2 | 3 | 1 | 9824 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S7 | B2 | 3 | 0 | 12806 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S1 | B3 | 3 | 1 | 16050 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |

M-10201

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S2 | B3 | 3 | 0 | 17122 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S3 | B3 | 3 | 1 | 16567 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S4 | B3 | 3 | 0 | 19703 | 4/1/2013 11:09 | 4/1/2013 11:12 | LB4100 | SR90S13 |
| S5 | B3 | 3 | 0 | 15955 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S6 | B3 | 3 | 0 | 10587 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S7 | B3 | 3 | 0 | 13066 | 3/30/2013 17:34 | 3/30/2013 17:37 | LB4100 | Sr90S13 |
| S1 | B4 | 3 | 0 | 14738 | 3/30/2013 18:04 | 3/30/2013 18:07 | LB4100 | Sr90S13 |
| S2 | B4 | 3 | 0 | 15486 | 3/30/2013 18:00 | 3/30/2013 18:03 | LB4100 | Sr90S13 |
| S3 | B4 | 3 | 0 | 15349 | 3/30/2013 17:56 | 3/30/2013 17:59 | LB4100 | Sr90S13 |
| S4 | B4 | 3 | 0 | 15422 | 3/30/2013 17:52 | 3/30/2013 17:55 | LB4100 | Sr90S13 |
| S5 | B4 | 3 | 0 | 14782 | 3/30/2013 17:47 | 3/30/2013 17:50 | LB4100 | Sr90S13 |
| S6 | B4 | 3 | 0 | 9596 | 3/30/2013 17:43 | 3/30/2013 17:46 | LB4100 | Sr90S13 |
| S7 | B4 | 3 | 0 | 11943 | 3/30/2013 17:39 | 3/30/2013 17:42 | LB4100 | Sr90S13 |
| S1 | C1 | 3 | 1 | 15728 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S2 | C1 | 3 | 0 | 16973 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S3 | C1 | 3 | 0 | 16728 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S4 | C1 | 3 | 1 | 16665 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S5 | C1 | 3 | 0 | 12265 | 3/30/2013 18:29 | 3/30/2013 18:32 | LB4100 | Sr90S13 |
| S6 | C1 | 3 | 0 | 11355 | 3/30/2013 18:24 | 3/30/2013 18:27 | LB4100 | Sr90S13 |
| S7 | C1 | 3 | 0 | 13236 | 3/30/2013 18:19 | 3/30/2013 18:22 | LB4100 | Sr90S13 |
| S1 | C2 | 3 | 0 | 16885 | 3/30/2013 18:14 | 3/30/2013 18:17 | LB4100 | Sr90S13 |
| S2 | C2 | 3 | 0 | 17728 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S3 | C2 | 3 | 0 | 17608 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S4 | C2 | 3 | 0 | 17198 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S5 | C2 | 3 | 0 | 12850 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S6 | C2 | 3 | 0 | 11926 | 3/30/2013 18:29 | 3/30/2013 18:32 | LB4100 | Sr90S13 |
| S7 | C2 | 3 | 0 | 13738 | 3/30/2013 18:24 | 3/30/2013 18:27 | LB4100 | Sr90S13 |
| S1 | C3 | 3 | 0 | 17291 | 3/30/2013 18:19 | 3/30/2013 18:22 | LB4100 | Sr90S13 |
| S2 | C3 | 3 | 0 | 18199 | 3/30/2013 18:14 | 3/30/2013 18:17 | LB4100 | Sr90S13 |
| S3 | C3 | 3 | 0 | 17785 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S4 | C3 | 3 | 0 | 17652 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S5 | C3 | 3 | 0 | 12971 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S6 | C3 | 3 | 1 | 12022 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S7 | C3 | 3 | 0 | 14327 | 3/30/2013 18:29 | 3/30/2013 18:32 | LB4100 | Sr90S13 |
| S1 | C4 | 3 | 0 | 17245 | 3/30/2013 18:24 | 3/30/2013 18:27 | LB4100 | Sr90S13 |
| S2 | C4 | 3 | 0 | 17812 | 3/30/2013 18:19 | 3/30/2013 18:22 | LB4100 | Sr90S13 |
| S3 | C4 | 3 | 0 | 17917 | 3/30/2013 18:14 | 3/30/2013 18:17 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S4 | C4 | 3 | 0 | 17597 | 3/30/2013 18:09 | 3/30/2013 18:12 | LB4100 | Sr90S13 |
| S5 | C4 | 3 | 0 | 13064 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S6 | C4 | 3 | 0 | 11923 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S7 | C4 | 3 | 0 | 14197 | 3/30/2013 18:34 | 3/30/2013 18:37 | LB4100 | Sr90S13 |
| S1 | D1 | 3 | 0 | 17998 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S2 | D1 | 3 | 0 | 18672 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S3 | D1 | 3 | 0 | 18274 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S4 | D1 | 3 | 0 | 18243 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S5 | D1 | 3 | 0 | 13824 | 3/30/2013 18:10 | 3/30/2013 18:13 | LB4100 | Sr90S13 |
| S6 | D1 | 3 | 0 | 12622 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S7 | D1 | 3 | 0 | 14560 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S1 | D2 | 3 | 0 | 18378 | 3/30/2013 18:35 | 3/30/2013 18:38 | LB4100 | Sr90S13 |
| S2 | D2 | 3 | 1 | 19314 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S3 | D2 | 3 | 0 | 18625 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S4 | D2 | 3 | 0 | 18750 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S5 | D2 | 3 | 0 | 13854 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S6 | D2 | 3 | 0 | 11743 | 3/30/2013 18:10 | 3/30/2013 18:13 | LB4100 | Sr90S13 |
| S7 | D2 | 3 | 0 | 14966 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S1 | D3 | 3 | 0 | 18779 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S2 | D3 | 3 | 0 | 19428 | 3/30/2013 18:35 | 3/30/2013 18:38 | LB4100 | Sr90S13 |
| S3 | D3 | 3 | 0 | 19167 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S4 | D3 | 3 | 0 | 18722 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S5 | D3 | 3 | 0 | 13946 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S6 | D3 | 3 | 0 | 11717 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S7 | D3 | 3 | 0 | 14849 | 3/30/2013 18:10 | 3/30/2013 18:13 | LB4100 | Sr90S13 |
| S1 | D4 | 3 | 0 | 18298 | 3/30/2013 18:44 | 3/30/2013 18:47 | LB4100 | Sr90S13 |
| S2 | D4 | 3 | 0 | 19342 | 3/30/2013 18:39 | 3/30/2013 18:42 | LB4100 | Sr90S13 |
| S3 | D4 | 3 | 1 | 18911 | 3/30/2013 18:35 | 3/30/2013 18:38 | LB4100 | Sr90S13 |
| S4 | D4 | 3 | 0 | 18797 | 3/30/2013 18:30 | 3/30/2013 18:33 | LB4100 | Sr90S13 |
| S5 | D4 | 3 | 0 | 13889 | 3/30/2013 18:25 | 3/30/2013 18:28 | LB4100 | Sr90S13 |
| S6 | D4 | 3 | 0 | 12639 | 3/30/2013 18:20 | 3/30/2013 18:23 | LB4100 | Sr90S13 |
| S7 | D4 | 3 | 0 | 14727 | 3/30/2013 18:15 | 3/30/2013 18:18 | LB4100 | Sr90S13 |
| S1 | E1 | 3 | 1 | 15390 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S2 | E1 | 3 | 1 | 16259 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S3 | E1 | 3 | 0 | 15987 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S4 | E1 | 3 | 0 | 16116 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S5 | E1 | 3 | 0 | 15325 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S6 | E1 | 3 | 0 | 10706 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S7 | E1 | 3 | 0 | 12474 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S1 | E2 | 3 | 0 | 15809 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S2 | E2 | 3 | 0 | 16432 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S3 | E2 | 3 | 2 | 16516 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S4 | E2 | 3 | 0 | 16816 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S5 | E2 | 3 | 0 | 15824 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S6 | E2 | 3 | 0 | 10813 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S7 | E2 | 3 | 0 | 12797 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S1 | E3 | 3 | 1 | 15240 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S2 | E3 | 3 | 0 | 15970 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S3 | E3 | 3 | 0 | 15685 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S4 | E3 | 3 | 0 | 16121 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S5 | E3 | 3 | 0 | 15491 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S6 | E3 | 3 | 0 | 10842 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S7 | E3 | 3 | 0 | 12801 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S1 | E4 | 3 | 1 | 15712 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S2 | E4 | 3 | 0 | 16576 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S3 | E4 | 3 | 1 | 16377 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S4 | E4 | 3 | 0 | 16478 | 3/30/2013 16:27 | 3/30/2013 16:30 | LB4100 | Sr90S13 |
| S5 | E4 | 3 | 1 | 15702 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S6 | E4 | 3 | 0 | 10478 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S7 | E4 | 3 | 0 | 13072 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S1 | F1 | 3 | 1 | 16331 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S2 | F1 | 3 | 0 | 17177 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S3 | F1 | 3 | 0 | 16803 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S4 | F1 | 3 | 0 | 16746 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S5 | F1 | 3 | 0 | 16064 | 3/30/2013 16:28 | 3/30/2013 16:31 | LB4100 | Sr90S13 |
| S6 | F1 | 3 | 0 | 11329 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S7 | F1 | 3 | 0 | 13040 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S1 | F2 | 3 | 0 | 15935 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S2 | F2 | 3 | 0 | 16617 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S3 | F2 | 3 | 1 | 16268 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S4 | F2 | 3 | 0 | 16500 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S5 | F2 | 3 | 0 | 15688 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S6 | F2 | 3 | 0 | 11219 | 3/30/2013 16:28 | 3/30/2013 16:31 | LB4100 | Sr90S13 |
| S7 | F2 | 3 | 0 | 12868 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S1 | F3 | 3 | 1 | 16431 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S2 | F3 | 3 | 0 | 17530 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S3 | F3 | 3 | 0 | 17043 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S4 | F3 | 3 | 0 | 16858 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S5 | F3 | 3 | 0 | 16156 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S6 | F3 | 3 | 1 | 11315 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S7 | F3 | 3 | 0 | 17640 | 4/1/2013 10:07 | 4/1/2013 10:10 | LB4100 | SR90S13 |
| S1 | F4 | 3 | 0 | 16448 | 3/30/2013 16:57 | 3/30/2013 17:00 | LB4100 | Sr90S13 |
| S2 | F4 | 3 | 0 | 17260 | 3/30/2013 16:53 | 3/30/2013 16:56 | LB4100 | Sr90S13 |
| S3 | F4 | 3 | 0 | 16859 | 3/30/2013 16:49 | 3/30/2013 16:52 | LB4100 | Sr90S13 |
| S4 | F4 | 3 | 0 | 17073 | 3/30/2013 16:45 | 3/30/2013 16:48 | LB4100 | Sr90S13 |
| S5 | F4 | 3 | 0 | 16002 | 3/30/2013 16:41 | 3/30/2013 16:44 | LB4100 | Sr90S13 |
| S6 | F4 | 3 | 0 | 11367 | 3/30/2013 16:36 | 3/30/2013 16:39 | LB4100 | Sr90S13 |
| S7 | F4 | 3 | 0 | 13064 | 3/30/2013 16:32 | 3/30/2013 16:35 | LB4100 | Sr90S13 |
| S1 | G1 | 3 | 0 | 15385 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S2 | G1 | 3 | 0 | 16518 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S3 | G1 | 3 | 0 | 15987 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S4 | G1 | 3 | 0 | 16141 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S5 | G1 | 3 | 0 | 15413 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S6 | G1 | 3 | 0 | 10864 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S7 | G1 | 3 | 0 | 12302 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S1 | G2 | 3 | 0 | 16229 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S2 | G2 | 3 | 0 | 17029 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S3 | G2 | 3 | 0 | 16908 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S4 | G2 | 3 | 0 | 17104 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S5 | G2 | 3 | 0 | 16047 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S6 | G2 | 3 | 0 | 10784 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S7 | G2 | 3 | 0 | 13124 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S1 | G3 | 3 | 0 | 16936 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S2 | G3 | 3 | 0 | 17728 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S3 | G3 | 3 | 0 | 17443 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S4 | G3 | 3 | 0 | 17689 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S5 | G3 | 3 | 0 | 16907 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S6 | G3 | 3 | 1 | 11209 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S7 | G3 | 3 | 0 | 13910 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S1 | G4 | 3 | 0 | 16355 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S2 | G4 | 3 | 0 | 17548 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |

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| S3 | G4 | 3 | 0 | 17018 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S4 | G4 | 3 | 1 | 17695 | 3/30/2013 17:02 | 3/30/2013 17:05 | LB4100 | Sr90S13 |
| S5 | G4 | 3 | 0 | 16498 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S6 | G4 | 3 | 0 | 10596 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S7 | G4 | 3 | 0 | 13598 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S1 | H1 | 3 | 1 | 15975 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S2 | H1 | 3 | 0 | 16806 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S3 | H1 | 3 | 1 | 16419 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S4 | H1 | 3 | 1 | 16775 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S5 | H1 | 3 | 0 | 15992 | 3/30/2013 17:01 | 3/30/2013 17:04 | LB4100 | Sr90S13 |
| S6 | H1 | 3 | 0 | 10179 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S7 | H1 | 3 | 0 | 13094 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S1 | H2 | 3 | 0 | 16521 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S2 | H2 | 3 | 0 | 17287 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S3 | H2 | 3 | 0 | 17107 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S4 | H2 | 3 | 0 | 16752 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S5 | H2 | 3 | 0 | 16119 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S6 | H2 | 3 | 1 | 11258 | 3/30/2013 17:01 | 3/30/2013 17:04 | LB4100 | Sr90S13 |
| S7 | H2 | 3 | 0 | 13217 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S1 | H3 | 3 | 0 | 16866 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S2 | H3 | 3 | 0 | 17699 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S3 | H3 | 3 | 0 | 17697 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S4 | H3 | 3 | 0 | 17437 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S5 | H3 | 3 | 0 | 16538 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S6 | H3 | 3 | 0 | 11441 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S7 | H3 | 3 | 0 | 13301 | 3/30/2013 17:01 | 3/30/2013 17:04 | LB4100 | Sr90S13 |
| S1 | H4 | 3 | 1 | 16173 | 3/30/2013 17:30 | 3/30/2013 17:33 | LB4100 | Sr90S13 |
| S2 | H4 | 3 | 0 | 17139 | 3/30/2013 17:26 | 3/30/2013 17:29 | LB4100 | Sr90S13 |
| S3 | H4 | 3 | 0 | 16875 | 3/30/2013 17:22 | 3/30/2013 17:25 | LB4100 | Sr90S13 |
| S4 | H4 | 3 | 0 | 16818 | 3/30/2013 17:18 | 3/30/2013 17:21 | LB4100 | Sr90S13 |
| S5 | H4 | 3 | 0 | 16239 | 3/30/2013 17:14 | 3/30/2013 17:17 | LB4100 | Sr90S13 |
| S6 | H4 | 3 | 0 | 10966 | 3/30/2013 17:10 | 3/30/2013 17:13 | LB4100 | Sr90S13 |
| S7 | H4 | 3 | 1 | 13189 | 3/30/2013 17:06 | 3/30/2013 17:09 | LB4100 | Sr90S13 |
| S1 | I1 | 3 | 3 | 14017 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S2 | I1 | 3 | 2 | 14980 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S3 | I1 | 3 | 4 | 14513 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S4 | I1 | 3 | 0 | 14695 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |

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| S5 | I1 | 3 | 0 | 14034 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S6 | I1 | 3 | 1 | 11459 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S7 | I1 | 3 | 0 | 12779 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S1 | I2 | 3 | 1 | 14220 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S2 | I2 | 3 | 0 | 15645 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S3 | I2 | 3 | 1 | 14831 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S4 | I2 | 3 | 0 | 14874 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S5 | I2 | 3 | 1 | 14319 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S6 | I2 | 3 | 0 | 11488 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S7 | I2 | 3 | 0 | 12916 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S1 | I3 | 3 | 0 | 14044 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S2 | I3 | 3 | 0 | 15263 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S3 | I3 | 3 | 0 | 14712 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S4 | I3 | 3 | 1 | 14694 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S5 | I3 | 3 | 0 | 14163 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S6 | I3 | 3 | 1 | 11478 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S7 | I3 | 3 | 0 | 12865 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S1 | I4 | 3 | 2 | 14702 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S2 | I4 | 3 | 1 | 15485 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S3 | I4 | 3 | 2 | 15018 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S4 | I4 | 3 | 1 | 15237 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S5 | I4 | 3 | 1 | 14705 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S6 | I4 | 3 | 0 | 11552 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S7 | I4 | 3 | 1 | 13250 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S1 | J1 | 3 | 0 | 14098 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S2 | J1 | 3 | 0 | 15235 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S3 | J1 | 3 | 1 | 14926 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S4 | J1 | 3 | 0 | 14903 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S5 | J1 | 3 | 0 | 14201 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S6 | J1 | 3 | 0 | 11434 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S7 | J1 | 3 | 0 | 13043 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S1 | J2 | 3 | 0 | 13996 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S2 | J2 | 3 | 0 | 15032 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S3 | J2 | 3 | 0 | 14838 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S4 | J2 | 3 | 0 | 14873 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S5 | J2 | 3 | 0 | 14122 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S6 | J2 | 3 | 0 | 11387 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S7 | J2 | 3 | 0 | 12835 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S1 | J3 | 3 | 0 | 14169 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S2 | J3 | 3 | 0 | 15436 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S3 | J3 | 3 | 0 | 14681 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S4 | J3 | 3 | 1 | 14942 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S5 | J3 | 3 | 0 | 14153 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S6 | J3 | 3 | 0 | 11535 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |
| S7 | J3 | 3 | 1 | 12898 | 3/30/2013 11:17 | 3/30/2013 11:20 | LB4100 | SR90S13 |
| S1 | J4 | 3 | 1 | 14607 | 3/30/2013 12:02 | 3/30/2013 12:05 | LB4100 | SR90S13 |
| S2 | J4 | 3 | 0 | 15304 | 3/30/2013 11:57 | 3/30/2013 12:00 | LB4100 | SR90S13 |
| S3 | J4 | 3 | 0 | 15038 | 3/30/2013 11:52 | 3/30/2013 11:55 | LB4100 | SR90S13 |
| S4 | J4 | 3 | 1 | 15278 | 3/30/2013 11:36 | 3/30/2013 11:39 | LB4100 | SR90S13 |
| S5 | J4 | 3 | 1 | 14435 | 3/30/2013 11:31 | 3/30/2013 11:34 | LB4100 | SR90S13 |
| S6 | J4 | 3 | 0 | 11579 | 3/30/2013 11:27 | 3/30/2013 11:30 | LB4100 | SR90S13 |
| S7 | J4 | 3 | 0 | 13248 | 3/30/2013 11:22 | 3/30/2013 11:25 | LB4100 | SR90S13 |

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## Y-90 Calibration - LB4100 - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

Separation Date/Time 3/29/2013 13:05
Y-90 Half Life (days) 2.668875
The following detectors were not calibrated:
A4

| Carrier Data | | Std ID<br>Std weight | 1892786<br>31.85 | mg/mL |
|---|---|---|---|---|
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 15.9 | 0.5 | 15.93 | 99.8% |
| 2 | 16.1 | 0.5 | 15.93 | 100.0% |
| 3 | 16.0 | 0.5 | 15.93 | 100.0% |
| 4 | 16.1 | 0.5 | 15.93 | 100.0% |
| 5 | 16.0 | 0.5 | 15.93 | 100.0% |
| 6 | 16.2 | 0.5 | 15.93 | 100.0% |
| 7 | 15.9 | 0.5 | 15.93 | 99.8% |
| 8 | 16.4 | 0.5 | 15.93 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered negligible.
**Decay corrected to mid-point of cour

| Detector (#) | Source ID (#) | Raw Count Data<br>Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 3/30/2013 11:12 | 3 | 13609 | 4536.33 | 99.8% | 0.78692 | 5773.75 | 9577.01 | 0.6029 | |
| A1 | 2 | 3/30/2013 11:29 | 3 | 13067 | 4355.67 | 100.0% | 0.78451 | 5552.10 | 9577.00 | 0.5797 | |
| A1 | 3 | 3/30/2013 11:24 | 3 | 13370 | 4456.67 | 100.0% | 0.78516 | 5676.10 | 9577.00 | 0.5927 | |
| A1 | 4 | 3/30/2013 11:16 | 3 | 12879 | 4293.00 | 100.0% | 0.78627 | 5459.94 | 9577.01 | 0.5701 | |
| A1 | 5 | 3/30/2013 11:35 | 3 | 13230 | 4410.00 | 100.0% | 0.78366 | 5627.44 | 9577.00 | 0.5876 | |
| A1 | 6 | 3/30/2013 12:03 | 3 | 12870 | 4290.00 | 100.0% | 0.77964 | 5502.54 | 9576.99 | 0.5746 | |
| A1 | 7 | 3/30/2013 11:56 | 3 | 13380 | 4460.00 | 99.8% | 0.78058 | 5722.65 | 9576.99 | 0.5975 | |
| A1 | 8 | 3/30/2013 11:51 | 3 | 13594 | 4531.33 | 100.0% | 0.78135 | 5799.38 | 9576.99 | 0.6056 | 0.5888 |
| A2 | 1 | 3/30/2013 11:16 | 3 | 13095 | 4365.00 | 99.8% | 0.78627 | 5560.25 | 9577.01 | 0.5806 | |
| A2 | 2 | 3/30/2013 11:12 | 3 | 13922 | 4640.67 | 100.0% | 0.78691 | 5897.29 | 9577.01 | 0.6158 | |
| A2 | 3 | 3/30/2013 11:29 | 3 | 13018 | 4339.33 | 100.0% | 0.78451 | 5531.28 | 9577.00 | 0.5776 | |
| A2 | 4 | 3/30/2013 11:24 | 3 | 13740 | 4580.00 | 100.0% | 0.78516 | 5833.19 | 9577.00 | 0.6091 | |
| A2 | 5 | 3/30/2013 11:51 | 3 | 13262 | 4420.67 | 100.0% | 0.78135 | 5657.75 | 9576.99 | 0.5908 | |
| A2 | 6 | 3/30/2013 11:35 | 3 | 13159 | 4386.33 | 100.0% | 0.78366 | 5597.24 | 9577.00 | 0.5844 | |
| A2 | 7 | 3/30/2013 12:03 | 3 | 13590 | 4530.00 | 99.8% | 0.77964 | 5819.53 | 9576.99 | 0.6077 | |
| A2 | 8 | 3/30/2013 11:56 | 3 | 13477 | 4492.33 | 100.0% | 0.78058 | 5755.11 | 9576.99 | 0.6009 | 0.5959 |
| A3 | 1 | 3/30/2013 11:24 | 3 | 13615 | 4538.33 | 99.8% | 0.78516 | 5789.21 | 9577.00 | 0.6045 | |
| A3 | 2 | 3/30/2013 11:16 | 3 | 13338 | 4446.00 | 100.0% | 0.78627 | 5654.55 | 9577.01 | 0.5904 | |
| A3 | 3 | 3/30/2013 11:12 | 3 | 13773 | 4591.00 | 100.0% | 0.78691 | 5834.18 | 9577.01 | 0.6092 | |
| A3 | 4 | 3/30/2013 11:29 | 3 | 13485 | 4495.00 | 100.0% | 0.78451 | 5729.70 | 9577.00 | 0.5983 | |
| A3 | 5 | 3/30/2013 11:56 | 3 | 13089 | 4363.00 | 100.0% | 0.78058 | 5589.42 | 9576.99 | 0.5836 | |
| A3 | 6 | 3/30/2013 11:51 | 3 | 13309 | 4436.33 | 100.0% | 0.78135 | 5677.82 | 9576.99 | 0.5929 | |
| A3 | 7 | 3/30/2013 11:35 | 3 | 13758 | 4586.00 | 99.8% | 0.78366 | 5861.23 | 9577.00 | 0.6120 | |
| A3 | 8 | 3/30/2013 12:03 | 3 | 13498 | 4499.33 | 100.0% | 0.77963 | 5771.08 | 9576.99 | 0.6026 | 0.5992 |
| B1 | 1 | 3/30/2013 11:35 | 3 | 13650 | 4550.00 | 99.8% | 0.78367 | 5815.17 | 9577.00 | 0.6072 | |
| B1 | 2 | 3/30/2013 12:03 | 3 | 13728 | 4576.00 | 100.0% | 0.77966 | 5869.26 | 9576.99 | 0.6129 | |
| B1 | 3 | 3/30/2013 11:56 | 3 | 13629 | 4543.00 | 100.0% | 0.78059 | 5819.96 | 9576.99 | 0.6077 | |
| B1 | 4 | 3/30/2013 11:51 | 3 | 13494 | 4498.00 | 100.0% | 0.78135 | 5756.69 | 9576.99 | 0.6011 | |
| B1 | 5 | 3/30/2013 11:11 | 3 | 13423 | 4474.33 | 100.0% | 0.78695 | 5685.68 | 9577.01 | 0.5937 | |
| B1 | 6 | 3/30/2013 11:29 | 3 | 13398 | 4466.00 | 100.0% | 0.78452 | 5692.64 | 9577.00 | 0.5944 | |
| B1 | 7 | 3/30/2013 11:24 | 3 | 13865 | 4621.67 | 99.8% | 0.78518 | 5895.39 | 9577.00 | 0.6156 | |
| B1 | 8 | 3/30/2013 11:20 | 3 | 13608 | 4536.00 | 100.0% | 0.78579 | 5772.54 | 9577.00 | 0.6027 | 0.6044 |
| B2 | 1 | 3/30/2013 11:51 | 3 | 13621 | 4540.33 | 99.8% | 0.78135 | 5820.00 | 9576.99 | 0.6077 | |
| B2 | 2 | 3/30/2013 11:35 | 3 | 13593 | 4531.00 | 100.0% | 0.78367 | 5781.79 | 9577.00 | 0.6037 | |
| B2 | 3 | 3/30/2013 12:03 | 3 | 13435 | 4478.33 | 100.0% | 0.77965 | 5744.00 | 9576.99 | 0.5998 | |
| B2 | 4 | 3/30/2013 11:56 | 3 | 13710 | 4570.00 | 100.0% | 0.78059 | 5854.57 | 9576.99 | 0.6113 | |
| B2 | 5 | 3/30/2013 11:20 | 3 | 13771 | 4590.33 | 100.0% | 0.78579 | 5841.68 | 9577.00 | 0.6100 | |
| B2 | 6 | 3/30/2013 11:11 | 3 | 13752 | 4584.00 | 100.0% | 0.78695 | 5825.05 | 9577.01 | 0.6082 | |
| B2 | 7 | 3/30/2013 11:29 | 3 | 13556 | 4518.67 | 99.8% | 0.78452 | 5768.82 | 9577.00 | 0.6024 | |
| B2 | 8 | 3/30/2013 11:24 | 3 | 13584 | 4528.00 | 100.0% | 0.78518 | 5766.84 | 9577.00 | 0.6022 | 0.6057 |
| B3 | 1 | 3/30/2013 11:56 | 3 | 13691 | 4563.67 | 99.8% | 0.78059 | 5855.65 | 9576.99 | 0.6114 | |
| B3 | 2 | 3/30/2013 11:51 | 3 | 13798 | 4599.33 | 100.0% | 0.78135 | 5886.39 | 9576.99 | 0.6146 | |
| B3 | 3 | 3/30/2013 11:35 | 3 | 13908 | 4636.00 | 100.0% | 0.78366 | 5915.80 | 9577.00 | 0.6177 | |
| B3 | 4 | 3/30/2013 12:03 | 3 | 13648 | 4549.33 | 100.0% | 0.77965 | 5835.07 | 9576.99 | 0.6093 | |
| B3 | 5 | 3/30/2013 11:24 | 3 | 13507 | 4502.33 | 100.0% | 0.78518 | 5734.17 | 9577.00 | 0.5987 | |
| B3 | 6 | 3/30/2013 11:20 | 3 | 14073 | 4691.00 | 100.0% | 0.78579 | 5969.81 | 9577.00 | 0.6233 | |
| B3 | 7 | 3/30/2013 11:11 | 3 | 13982 | 4660.67 | 99.8% | 0.78695 | 5931.79 | 9577.01 | 0.6194 | |
| B3 | 8 | 3/30/2013 11:29 | 3 | 13436 | 4478.67 | 100.0% | 0.78452 | 5708.78 | 9577.00 | 0.5961 | 0.6113 |
| B4 | 1 | 3/30/2013 12:03 | 3 | 12732 | 4244.00 | 99.8% | 0.77965 | 5452.02 | 9576.99 | 0.5693 | |
| B4 | 2 | 3/30/2013 11:56 | 3 | 12808 | 4269.33 | 100.0% | 0.78058 | 5469.41 | 9576.99 | 0.5711 | |
| B4 | 3 | 3/30/2013 11:51 | 3 | 12570 | 4190.00 | 100.0% | 0.78135 | 5362.52 | 9576.99 | 0.5599 | |
| B4 | 5 | 3/30/2013 11:29 | 3 | 12723 | 4241.00 | 100.0% | 0.78452 | 5405.85 | 9577.00 | 0.5645 | |
| B4 | 6 | 3/30/2013 11:24 | 3 | 12765 | 4255.00 | 100.0% | 0.78518 | 5419.17 | 9577.00 | 0.5659 | |
| B4 | 7 | 3/30/2013 11:20 | 3 | 13416 | 4472.00 | 99.8% | 0.78579 | 5700.06 | 9577.00 | 0.5952 | |
| B4 | 8 | 3/30/2013 11:11 | 3 | 12780 | 4260.00 | 100.0% | 0.78694 | 5413.35 | 9577.01 | 0.5652 | 0.5702 |
| C1 | 1 | 3/30/2013 13:58 | 3 | 12969 | 4323.00 | 99.8% | 0.76365 | 5669.86 | 9576.94 | 0.5920 | |
| C1 | 2 | 3/30/2013 14:15 | 3 | 13130 | 4376.67 | 100.0% | 0.76135 | 5748.54 | 9576.93 | 0.6002 | |
| C1 | 3 | 3/30/2013 14:09 | 3 | 12220 | 4073.33 | 100.0% | 0.76212 | 5344.74 | 9576.93 | 0.5581 | |
| C1 | 4 | 3/30/2013 14:03 | 3 | 12937 | 4312.33 | 100.0% | 0.76296 | 5652.12 | 9576.93 | 0.5902 | |
| C1 | 5 | 3/30/2013 14:20 | 3 | 12776 | 4258.67 | 100.0% | 0.76062 | 5598.94 | 9576.93 | 0.5846 | |
| C1 | 6 | 3/30/2013 14:36 | 3 | 12163 | 4054.33 | 100.0% | 0.75839 | 5345.97 | 9576.92 | 0.5582 | |
| C1 | 7 | 3/30/2013 14:31 | 3 | 13000 | 4333.33 | 99.8% | 0.75909 | 5717.58 | 9576.92 | 0.5970 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 8 | 3/30/2013 14:26 | 3 | 12686 | 4228.67 | 100.0% | 0.75979 | 5565.58 | 9576.92 | 0.5811 | 0.5827 |
| C2 | 1 | 3/30/2013 14:03 | 3 | 13036 | 4345.33 | 99.8% | 0.76296 | 5704.33 | 9576.93 | 0.5956 | |
| C2 | 2 | 3/30/2013 13:58 | 3 | 13061 | 4353.67 | 100.0% | 0.76365 | 5701.13 | 9576.94 | 0.5953 | |
| C2 | 3 | 3/30/2013 14:15 | 3 | 12586 | 4195.33 | 100.0% | 0.76135 | 5510.39 | 9576.93 | 0.5754 | |
| C2 | 4 | 3/30/2013 14:09 | 3 | 13408 | 4469.33 | 100.0% | 0.76212 | 5864.36 | 9576.93 | 0.6123 | |
| C2 | 5 | 3/30/2013 14:26 | 3 | 12797 | 4265.67 | 100.0% | 0.75979 | 5614.28 | 9576.92 | 0.5862 | |
| C2 | 6 | 3/30/2013 14:20 | 3 | 12374 | 4124.67 | 100.0% | 0.76062 | 5422.78 | 9576.93 | 0.5662 | |
| C2 | 7 | 3/30/2013 14:36 | 3 | 13059 | 4353.00 | 99.8% | 0.75839 | 5748.83 | 9576.92 | 0.6003 | |
| C2 | 8 | 3/30/2013 14:31 | 3 | 13106 | 4368.67 | 100.0% | 0.75909 | 5755.17 | 9576.92 | 0.6009 | 0.5915 |
| C3 | 1 | 3/30/2013 14:09 | 3 | 13495 | 4498.33 | 99.8% | 0.76212 | 5911.70 | 9576.93 | 0.6173 | |
| C3 | 2 | 3/30/2013 14:03 | 3 | 12737 | 4245.67 | 100.0% | 0.76296 | 5564.76 | 9576.93 | 0.5811 | |
| C3 | 3 | 3/30/2013 13:58 | 3 | 12131 | 4043.67 | 100.0% | 0.76365 | 5295.19 | 9576.94 | 0.5529 | |
| C3 | 4 | 3/30/2013 14:15 | 3 | 13403 | 4467.67 | 100.0% | 0.76135 | 5868.08 | 9576.93 | 0.6127 | |
| C3 | 5 | 3/30/2013 14:31 | 3 | 12610 | 4203.33 | 100.0% | 0.75909 | 5537.36 | 9576.92 | 0.5782 | |
| C3 | 6 | 3/30/2013 14:26 | 3 | 12167 | 4055.67 | 100.0% | 0.75979 | 5337.89 | 9576.92 | 0.5574 | |
| C3 | 7 | 3/30/2013 14:20 | 3 | 12849 | 4283.00 | 99.8% | 0.76062 | 5639.80 | 9576.93 | 0.5889 | |
| C3 | 8 | 3/30/2013 14:36 | 3 | 12918 | 4306.00 | 100.0% | 0.75839 | 5677.83 | 9576.92 | 0.5929 | 0.5852 |
| C4 | 1 | 3/30/2013 14:15 | 3 | 13286 | 4428.67 | 99.8% | 0.76135 | 5826.02 | 9576.93 | 0.6083 | |
| C4 | 2 | 3/30/2013 14:09 | 3 | 13301 | 4433.67 | 100.0% | 0.76212 | 5817.58 | 9576.93 | 0.6075 | |
| C4 | 3 | 3/30/2013 14:03 | 3 | 12516 | 4172.00 | 100.0% | 0.76296 | 5468.20 | 9576.93 | 0.5710 | |
| C4 | 4 | 3/30/2013 13:58 | 3 | 12966 | 4322.00 | 100.0% | 0.76365 | 5659.68 | 9576.94 | 0.5910 | |
| C4 | 5 | 3/30/2013 14:36 | 3 | 12481 | 4160.33 | 100.0% | 0.75839 | 5485.78 | 9576.92 | 0.5728 | |
| C4 | 6 | 3/30/2013 14:31 | 3 | 12394 | 4131.33 | 100.0% | 0.75908 | 5442.53 | 9576.92 | 0.5683 | |
| C4 | 7 | 3/30/2013 14:26 | 3 | 12824 | 4274.67 | 99.8% | 0.75979 | 5634.99 | 9576.92 | 0.5884 | |
| C4 | 8 | 3/30/2013 14:20 | 3 | 12609 | 4203.00 | 100.0% | 0.76062 | 5525.78 | 9576.93 | 0.5770 | 0.5855 |
| D1 | 1 | 3/30/2013 14:21 | 3 | 14821 | 4940.33 | 99.8% | 0.76048 | 6506.52 | 9576.93 | 0.6794 | |
| D1 | 2 | 3/30/2013 14:37 | 3 | 15003 | 5001.00 | 100.0% | 0.75825 | 6595.42 | 9576.92 | 0.6887 | |
| D1 | 3 | 3/30/2013 14:32 | 3 | 13959 | 4653.00 | 100.0% | 0.75895 | 6130.83 | 9576.92 | 0.6402 | |
| D1 | 4 | 3/30/2013 14:27 | 3 | 14807 | 4935.67 | 100.0% | 0.75965 | 6497.26 | 9576.92 | 0.6784 | |
| D1 | 5 | 3/30/2013 13:59 | 3 | 14684 | 4894.67 | 100.0% | 0.76351 | 6410.71 | 9576.94 | 0.6694 | |
| D1 | 6 | 3/30/2013 14:16 | 3 | 14280 | 4760.00 | 100.0% | 0.76122 | 6253.16 | 9576.93 | 0.6529 | |
| D1 | 7 | 3/30/2013 14:10 | 3 | 15223 | 5074.33 | 99.8% | 0.76198 | 6669.86 | 9576.93 | 0.6965 | |
| D1 | 8 | 3/30/2013 14:04 | 3 | 14778 | 4926.00 | 100.0% | 0.76282 | 6457.61 | 9576.93 | 0.6743 | 0.6725 |
| D2 | 1 | 3/30/2013 14:27 | 3 | 15028 | 5009.33 | 99.8% | 0.75965 | 6604.62 | 9576.92 | 0.6896 | |
| D2 | 2 | 3/30/2013 14:21 | 3 | 14728 | 4909.33 | 100.0% | 0.76048 | 6455.56 | 9576.93 | 0.6741 | |
| D2 | 3 | 3/30/2013 14:37 | 3 | 13806 | 4602.00 | 100.0% | 0.75825 | 6069.23 | 9576.92 | 0.6337 | |
| D2 | 4 | 3/30/2013 14:32 | 3 | 14923 | 4974.33 | 100.0% | 0.75895 | 6554.24 | 9576.92 | 0.6844 | |
| D2 | 5 | 3/30/2013 14:04 | 3 | 14988 | 4996.00 | 100.0% | 0.76282 | 6549.37 | 9576.93 | 0.6839 | |
| D2 | 6 | 3/30/2013 13:59 | 3 | 14328 | 4776.00 | 100.0% | 0.76351 | 6255.31 | 9576.94 | 0.6532 | |
| D2 | 7 | 3/30/2013 14:16 | 3 | 15369 | 5123.00 | 99.8% | 0.76121 | 6740.63 | 9576.93 | 0.7038 | |
| D2 | 8 | 3/30/2013 14:10 | 3 | 14834 | 4944.67 | 100.0% | 0.76198 | 6489.24 | 9576.93 | 0.6776 | 0.6750 |
| D3 | 1 | 3/30/2013 14:32 | 3 | 15108 | 5036.00 | 99.8% | 0.75895 | 6645.93 | 9576.92 | 0.6940 | |
| D3 | 2 | 3/30/2013 14:27 | 3 | 14957 | 4985.67 | 100.0% | 0.75965 | 6563.10 | 9576.92 | 0.6853 | |
| D3 | 3 | 3/30/2013 14:21 | 3 | 13886 | 4628.67 | 100.0% | 0.76048 | 6086.50 | 9576.93 | 0.6355 | |
| D3 | 4 | 3/30/2013 14:37 | 3 | 15018 | 5006.00 | 100.0% | 0.75825 | 6602.04 | 9576.92 | 0.6894 | |
| D3 | 5 | 3/30/2013 14:10 | 3 | 14800 | 4933.33 | 100.0% | 0.76198 | 6474.36 | 9576.93 | 0.6760 | |
| D3 | 6 | 3/30/2013 14:04 | 3 | 14387 | 4795.67 | 100.0% | 0.76282 | 6286.75 | 9576.93 | 0.6564 | |
| D3 | 7 | 3/30/2013 13:59 | 3 | 15410 | 5136.67 | 99.8% | 0.76351 | 6738.27 | 9576.94 | 0.7036 | |
| D3 | 8 | 3/30/2013 14:16 | 3 | 14977 | 4992.33 | 100.0% | 0.76121 | 6558.39 | 9576.93 | 0.6848 | 0.6781 |
| D4 | 1 | 3/30/2013 14:37 | 3 | 14839 | 4946.33 | 99.8% | 0.75825 | 6533.62 | 9576.92 | 0.6822 | |
| D4 | 2 | 3/30/2013 14:32 | 3 | 15095 | 5031.67 | 100.0% | 0.75895 | 6629.80 | 9576.92 | 0.6923 | |
| D4 | 3 | 3/30/2013 14:27 | 3 | 13854 | 4618.00 | 100.0% | 0.75965 | 6079.12 | 9576.92 | 0.6348 | |
| D4 | 4 | 3/30/2013 14:21 | 3 | 14995 | 4998.33 | 100.0% | 0.76048 | 6572.61 | 9576.93 | 0.6863 | |
| D4 | 5 | 3/30/2013 14:16 | 3 | 14568 | 4856.00 | 100.0% | 0.76121 | 6379.31 | 9576.93 | 0.6661 | |
| D4 | 6 | 3/30/2013 14:10 | 3 | 14132 | 4710.67 | 100.0% | 0.76198 | 6182.16 | 9576.93 | 0.6455 | |
| D4 | 7 | 3/30/2013 14:04 | 3 | 15398 | 5132.67 | 99.8% | 0.76282 | 6739.13 | 9576.93 | 0.7037 | |
| D4 | 8 | 3/30/2013 13:59 | 3 | 15353 | 5117.67 | 100.0% | 0.76351 | 6702.82 | 9576.94 | 0.6999 | 0.6763 |
| E1 | 1 | 3/30/2013 12:38 | 3 | 13060 | 4353.33 | 99.8% | 0.77475 | 5627.85 | 9576.97 | 0.5876 | |
| E1 | 2 | 3/30/2013 12:51 | 3 | 12973 | 4324.33 | 100.0% | 0.77291 | 5594.84 | 9576.96 | 0.5842 | |
| E1 | 3 | 3/30/2013 12:47 | 3 | 13204 | 4401.33 | 100.0% | 0.77357 | 5689.67 | 9576.97 | 0.5941 | |
| E1 | 4 | 3/30/2013 12:42 | 3 | 13122 | 4374.00 | 100.0% | 0.77418 | 5649.82 | 9576.97 | 0.5899 | |
| E1 | 5 | 3/30/2013 12:16 | 3 | 13033 | 4344.33 | 100.0% | 0.77778 | 5585.58 | 9576.98 | 0.5832 | |
| E1 | 6 | 3/30/2013 12:34 | 3 | 12814 | 4271.33 | 100.0% | 0.77537 | 5508.74 | 9576.97 | 0.5752 | |
| E1 | 7 | 3/30/2013 12:29 | 3 | 13375 | 4458.33 | 99.8% | 0.77596 | 5754.59 | 9576.97 | 0.6009 | |
| E1 | 8 | 3/30/2013 12:25 | 3 | 13248 | 4416.00 | 100.0% | 0.77655 | 5686.69 | 9576.98 | 0.5938 | 0.5886 |
| E2 | 1 | 3/30/2013 12:42 | 3 | 13343 | 4447.67 | 99.8% | 0.77418 | 5754.02 | 9576.97 | 0.6008 | |
| E2 | 2 | 3/30/2013 12:38 | 3 | 13427 | 4475.67 | 100.0% | 0.77475 | 5776.92 | 9576.97 | 0.6032 | |
| E2 | 3 | 3/30/2013 12:51 | 3 | 13274 | 4424.67 | 100.0% | 0.77291 | 5724.67 | 9576.96 | 0.5978 | |
| E2 | 4 | 3/30/2013 12:47 | 3 | 13559 | 4519.67 | 100.0% | 0.77356 | 5842.66 | 9576.97 | 0.6101 | |
| E2 | 5 | 3/30/2013 12:25 | 3 | 13236 | 4412.00 | 100.0% | 0.77655 | 5681.54 | 9576.98 | 0.5933 | |
| E2 | 6 | 3/30/2013 12:16 | 3 | 13436 | 4478.67 | 100.0% | 0.77777 | 5758.31 | 9576.98 | 0.6013 | |
| E2 | 7 | 3/30/2013 12:34 | 3 | 13438 | 4479.33 | 99.8% | 0.77537 | 5786.08 | 9576.97 | 0.6042 | |
| E2 | 8 | 3/30/2013 12:29 | 3 | 13297 | 4432.33 | 100.0% | 0.77596 | 5712.05 | 9576.97 | 0.5964 | 0.6009 |
| E3 | 1 | 3/30/2013 12:47 | 3 | 13197 | 4399.00 | 99.8% | 0.77356 | 5695.61 | 9576.97 | 0.5947 | |
| E3 | 2 | 3/30/2013 12:42 | 3 | 13473 | 4491.00 | 100.0% | 0.77418 | 5800.96 | 9576.97 | 0.6057 | |
| E3 | 3 | 3/30/2013 12:38 | 3 | 13229 | 4409.67 | 100.0% | 0.77475 | 5691.73 | 9576.97 | 0.5943 | |
| E3 | 4 | 3/30/2013 12:51 | 3 | 13246 | 4415.33 | 100.0% | 0.77291 | 5712.59 | 9576.96 | 0.5965 | |
| E3 | 5 | 3/30/2013 12:29 | 3 | 13113 | 4371.00 | 100.0% | 0.77596 | 5633.01 | 9576.97 | 0.5882 | |
| E3 | 6 | 3/30/2013 12:25 | 3 | 12790 | 4263.33 | 100.0% | 0.77655 | 5490.10 | 9576.98 | 0.5733 | |
| E3 | 7 | 3/30/2013 12:16 | 3 | 13567 | 4522.33 | 99.8% | 0.77777 | 5823.60 | 9576.98 | 0.6081 | |
| E3 | 8 | 3/30/2013 12:34 | 3 | 13226 | 4408.67 | 100.0% | 0.77537 | 5685.86 | 9576.97 | 0.5937 | 0.5943 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E4 | 1 | 3/30/2013 12:51 | 3 | 12939 | 4313.00 | 99.8% | 0.77291 | 5588.99 | 9576.96 | 0.5836 | |
| E4 | 2 | 3/30/2013 12:47 | 3 | 13227 | 4409.00 | 100.0% | 0.77356 | 5699.62 | 9576.97 | 0.5951 | |
| E4 | 3 | 3/30/2013 12:42 | 3 | 13211 | 4403.67 | 100.0% | 0.77418 | 5688.17 | 9576.97 | 0.5939 | |
| E4 | 4 | 3/30/2013 12:38 | 3 | 13251 | 4417.00 | 100.0% | 0.77475 | 5701.21 | 9576.97 | 0.5953 | |
| E4 | 5 | 3/30/2013 12:34 | 3 | 12899 | 4299.67 | 100.0% | 0.77537 | 5545.30 | 9576.97 | 0.5790 | |
| E4 | 6 | 3/30/2013 12:29 | 3 | 12717 | 4239.00 | 100.0% | 0.77596 | 5462.91 | 9576.97 | 0.5704 | |
| E4 | 7 | 3/30/2013 12:25 | 3 | 13546 | 4515.33 | 99.8% | 0.77655 | 5823.75 | 9576.98 | 0.6081 | |
| E4 | 8 | 3/30/2013 12:16 | 3 | 13380 | 4460.00 | 100.0% | 0.77777 | 5734.31 | 9576.98 | 0.5988 | 0.5905 |
| F1 | 1 | 3/30/2013 12:16 | 3 | 13838 | 4612.67 | 99.8% | 0.77777 | 5939.94 | 9576.98 | 0.6202 | |
| F1 | 2 | 3/30/2013 12:34 | 3 | 13557 | 4519.00 | 100.0% | 0.77537 | 5828.17 | 9576.97 | 0.6086 | |
| F1 | 3 | 3/30/2013 12:29 | 3 | 13644 | 4548.00 | 100.0% | 0.77596 | 5861.13 | 9576.97 | 0.6120 | |
| F1 | 4 | 3/30/2013 12:25 | 3 | 13677 | 4559.00 | 100.0% | 0.77655 | 5870.86 | 9576.98 | 0.6130 | |
| F1 | 5 | 3/30/2013 12:38 | 3 | 13447 | 4482.33 | 100.0% | 0.77475 | 5785.54 | 9576.97 | 0.6041 | |
| F1 | 6 | 3/30/2013 12:51 | 3 | 13011 | 4337.00 | 100.0% | 0.77291 | 5611.26 | 9576.96 | 0.5859 | |
| F1 | 7 | 3/30/2013 12:47 | 3 | 13955 | 4651.67 | 99.8% | 0.77356 | 6022.77 | 9576.97 | 0.6289 | |
| F1 | 8 | 3/30/2013 12:42 | 3 | 13679 | 4559.67 | 100.0% | 0.77418 | 5889.68 | 9576.97 | 0.6150 | 0.6110 |
| F2 | 1 | 3/30/2013 12:25 | 3 | 13510 | 4503.33 | 99.8% | 0.77655 | 5808.31 | 9576.98 | 0.6065 | |
| F2 | 2 | 3/30/2013 12:16 | 3 | 13530 | 4510.00 | 100.0% | 0.77777 | 5798.62 | 9576.98 | 0.6055 | |
| F2 | 3 | 3/30/2013 12:34 | 3 | 13607 | 4535.67 | 100.0% | 0.77537 | 5849.68 | 9576.97 | 0.6108 | |
| F2 | 4 | 3/30/2013 12:29 | 3 | 13634 | 4544.67 | 100.0% | 0.77596 | 5856.85 | 9576.97 | 0.6116 | |
| F2 | 5 | 3/30/2013 12:42 | 3 | 13375 | 4458.33 | 100.0% | 0.77418 | 5758.80 | 9576.97 | 0.6013 | |
| F2 | 6 | 3/30/2013 12:38 | 3 | 13083 | 4361.00 | 100.0% | 0.77475 | 5628.95 | 9576.97 | 0.5878 | |
| F2 | 7 | 3/30/2013 12:51 | 3 | 13627 | 4542.33 | 99.8% | 0.77291 | 5886.17 | 9576.96 | 0.6146 | |
| F2 | 8 | 3/30/2013 12:47 | 3 | 13530 | 4510.00 | 100.0% | 0.77356 | 5830.20 | 9576.97 | 0.6088 | 0.6058 |
| F3 | 1 | 3/30/2013 12:29 | 3 | 13685 | 4561.67 | 99.8% | 0.77596 | 5888.01 | 9576.97 | 0.6148 | |
| F3 | 2 | 3/30/2013 12:25 | 3 | 13708 | 4569.33 | 100.0% | 0.77655 | 5884.18 | 9576.98 | 0.6144 | |
| F3 | 3 | 3/30/2013 12:16 | 3 | 13870 | 4623.33 | 100.0% | 0.77777 | 5944.35 | 9576.98 | 0.6207 | |
| F3 | 4 | 3/30/2013 12:34 | 3 | 13788 | 4596.00 | 100.0% | 0.77537 | 5927.50 | 9576.97 | 0.6189 | |
| F3 | 5 | 3/30/2013 12:47 | 3 | 13568 | 4522.67 | 100.0% | 0.77356 | 5846.58 | 9576.97 | 0.6105 | |
| F3 | 6 | 3/30/2013 12:42 | 3 | 13292 | 4430.67 | 100.0% | 0.77418 | 5723.07 | 9576.97 | 0.5976 | |
| F3 | 7 | 3/30/2013 12:38 | 3 | 14041 | 4680.33 | 99.8% | 0.77475 | 6050.63 | 9576.97 | 0.6318 | |
| F3 | 8 | 3/30/2013 12:51 | 3 | 13672 | 4557.33 | 100.0% | 0.77291 | 5896.35 | 9576.96 | 0.6157 | 0.6155 |
| F4 | 1 | 3/30/2013 12:34 | 3 | 13645 | 4548.33 | 99.8% | 0.77537 | 5875.26 | 9576.97 | 0.6135 | |
| F4 | 2 | 3/30/2013 12:29 | 3 | 13606 | 4535.33 | 100.0% | 0.77596 | 5844.84 | 9576.97 | 0.6103 | |
| F4 | 3 | 3/30/2013 12:25 | 3 | 13873 | 4624.33 | 100.0% | 0.77655 | 5955.01 | 9576.98 | 0.6218 | |
| F4 | 4 | 3/30/2013 12:16 | 3 | 13654 | 4551.33 | 100.0% | 0.77777 | 5851.78 | 9576.98 | 0.6110 | |
| F4 | 5 | 3/30/2013 12:51 | 3 | 13624 | 4541.33 | 100.0% | 0.77291 | 5875.67 | 9576.96 | 0.6135 | |
| F4 | 6 | 3/30/2013 12:47 | 3 | 13165 | 4388.33 | 100.0% | 0.77356 | 5672.92 | 9576.97 | 0.5924 | |
| F4 | 7 | 3/30/2013 12:42 | 3 | 13984 | 4661.33 | 99.8% | 0.77417 | 6030.50 | 9576.97 | 0.6297 | |
| F4 | 8 | 3/30/2013 12:38 | 3 | 13462 | 4487.33 | 100.0% | 0.77474 | 5792.03 | 9576.97 | 0.6048 | 0.6121 |
| G1 | 1 | 3/30/2013 12:57 | 3 | 12509 | 4169.67 | 99.8% | 0.77213 | 5408.71 | 9576.96 | 0.5648 | |
| G1 | 2 | 3/30/2013 13:26 | 3 | 13307 | 4435.67 | 100.0% | 0.76812 | 5774.72 | 9576.95 | 0.6030 | |
| G1 | 3 | 3/30/2013 13:20 | 3 | 3249 | 1083.00 | 100.0% | 0.76887 | 1408.57 | 9576.95 | 0.1471 | |
| G1 | 4 | 3/30/2013 13:03 | 3 | 12930 | 4310.00 | 100.0% | 0.77131 | 5587.92 | 9576.96 | 0.5835 | |
| G1 | 5 | 3/30/2013 13:40 | 3 | 12839 | 4279.67 | 100.0% | 0.76618 | 5585.70 | 9576.94 | 0.5832 | |
| G1 | 6 | 3/30/2013 13:52 | 3 | 13224 | 4408.00 | 100.0% | 0.76442 | 5766.47 | 9576.94 | 0.6021 | |
| G1 | 7 | 3/30/2013 13:48 | 3 | 13339 | 4446.33 | 99.8% | 0.76506 | 5820.85 | 9576.94 | 0.6078 | |
| G1 | 8 | 3/30/2013 13:44 | 3 | 13351 | 4450.33 | 100.0% | 0.76564 | 5812.57 | 9576.94 | 0.6069 | 0.5373 |
| G2 | 1 | 3/30/2013 13:03 | 3 | 13555 | 4518.33 | 99.8% | 0.77130 | 5867.26 | 9576.96 | 0.6126 | |
| G2 | 2 | 3/30/2013 12:57 | 3 | 13099 | 4366.33 | 100.0% | 0.77213 | 5654.92 | 9576.96 | 0.5905 | |
| G2 | 3 | 3/30/2013 13:26 | 3 | 12682 | 4227.33 | 100.0% | 0.76812 | 5503.51 | 9576.95 | 0.5747 | |
| G2 | 4 | 3/30/2013 13:20 | 3 | 13719 | 4573.00 | 100.0% | 0.76886 | 5947.74 | 9576.95 | 0.6210 | |
| G2 | 5 | 3/30/2013 13:44 | 3 | 12786 | 4262.67 | 100.0% | 0.76564 | 5567.46 | 9576.94 | 0.5813 | |
| G2 | 6 | 3/30/2013 13:40 | 3 | 13035 | 4345.00 | 100.0% | 0.76618 | 5670.99 | 9576.94 | 0.5921 | |
| G2 | 7 | 3/30/2013 13:53 | 3 | 13594 | 4531.33 | 99.8% | 0.76442 | 5937.16 | 9576.94 | 0.6199 | |
| G2 | 8 | 3/30/2013 13:48 | 3 | 12929 | 4309.67 | 100.0% | 0.76506 | 5633.09 | 9576.94 | 0.5882 | 0.5976 |
| G3 | 1 | 3/30/2013 13:20 | 3 | 13760 | 4586.67 | 99.8% | 0.76886 | 5974.89 | 9576.95 | 0.6239 | |
| G3 | 2 | 3/30/2013 13:03 | 3 | 13754 | 4584.67 | 100.0% | 0.77130 | 5944.05 | 9576.96 | 0.6207 | |
| G3 | 3 | 3/30/2013 12:57 | 3 | 12839 | 4279.67 | 100.0% | 0.77213 | 5542.70 | 9576.96 | 0.5788 | |
| G3 | 4 | 3/30/2013 13:26 | 3 | 13651 | 4550.33 | 100.0% | 0.76812 | 5924.02 | 9576.95 | 0.6186 | |
| G3 | 5 | 3/30/2013 13:48 | 3 | 12746 | 4248.67 | 100.0% | 0.76506 | 5553.36 | 9576.94 | 0.5799 | |
| G3 | 6 | 3/30/2013 13:44 | 3 | 12953 | 4317.67 | 100.0% | 0.76564 | 5639.31 | 9576.94 | 0.5888 | |
| G3 | 7 | 3/30/2013 13:40 | 3 | 14028 | 4676.00 | 99.8% | 0.76618 | 6112.59 | 9576.94 | 0.6383 | |
| G3 | 8 | 3/30/2013 13:53 | 3 | 13469 | 4489.67 | 100.0% | 0.76442 | 5873.33 | 9576.94 | 0.6133 | 0.6078 |
| G4 | 1 | 3/30/2013 13:26 | 3 | 13594 | 4531.33 | 99.8% | 0.76811 | 5908.58 | 9576.95 | 0.6170 | |
| G4 | 2 | 3/30/2013 13:20 | 3 | 13680 | 4560.00 | 100.0% | 0.76886 | 5930.83 | 9576.95 | 0.6193 | |
| G4 | 3 | 3/30/2013 13:03 | 3 | 13515 | 4505.00 | 100.0% | 0.77130 | 5840.78 | 9576.96 | 0.6099 | |
| G4 | 4 | 3/30/2013 12:57 | 3 | 13312 | 4437.33 | 100.0% | 0.77213 | 5746.89 | 9576.96 | 0.6001 | |
| G4 | 5 | 3/30/2013 13:53 | 3 | 12950 | 4316.67 | 100.0% | 0.76441 | 5647.03 | 9576.94 | 0.5896 | |
| G4 | 6 | 3/30/2013 13:48 | 3 | 12437 | 4145.67 | 100.0% | 0.76506 | 5418.75 | 9576.94 | 0.5658 | |
| G4 | 7 | 3/30/2013 13:44 | 3 | 13621 | 4540.33 | 99.8% | 0.76564 | 5939.46 | 9576.94 | 0.6202 | |
| G4 | 8 | 3/30/2013 13:40 | 3 | 13412 | 4470.67 | 100.0% | 0.76618 | 5835.02 | 9576.94 | 0.6093 | 0.6039 |
| H1 | 1 | 3/30/2013 13:40 | 3 | 13205 | 4401.67 | 99.8% | 0.76621 | 5753.77 | 9576.94 | 0.6008 | |
| H1 | 2 | 3/30/2013 13:53 | 3 | 13099 | 4366.33 | 100.0% | 0.76441 | 5712.00 | 9576.94 | 0.5964 | |
| H1 | 3 | 3/30/2013 13:48 | 3 | 12500 | 4166.67 | 100.0% | 0.76506 | 5446.20 | 9576.94 | 0.5687 | |
| H1 | 4 | 3/30/2013 13:44 | 3 | 13397 | 4465.67 | 100.0% | 0.76564 | 5832.63 | 9576.94 | 0.6090 | |
| H1 | 5 | 3/30/2013 12:57 | 3 | 13157 | 4385.67 | 100.0% | 0.77214 | 5679.91 | 9576.96 | 0.5931 | |
| H1 | 6 | 3/30/2013 13:26 | 3 | 12929 | 4309.67 | 100.0% | 0.76814 | 5610.50 | 9576.95 | 0.5858 | |
| H1 | 7 | 3/30/2013 13:20 | 3 | 13568 | 4522.67 | 99.8% | 0.76889 | 5891.29 | 9576.95 | 0.6152 | |
| H1 | 8 | 3/30/2013 13:03 | 3 | 13245 | 4415.00 | 100.0% | 0.77133 | 5723.85 | 9576.96 | 0.5977 | 0.5958 |
| H2 | 1 | 3/30/2013 13:44 | 3 | 13183 | 4394.33 | 99.8% | 0.76564 | 5748.49 | 9576.94 | 0.6002 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| H2 | 2 | 3/30/2013 13:40 | 3 | 13306 | 4435.33 | 100.0% | 0.76621 | 5788.68 | 9576.94 | 0.6044 | |
| H2 | 3 | 3/30/2013 13:53 | 3 | 12430 | 4143.33 | 100.0% | 0.76441 | 5420.27 | 9576.94 | 0.5660 | |
| H2 | 4 | 3/30/2013 13:48 | 3 | 13206 | 4402.00 | 100.0% | 0.76506 | 5753.80 | 9576.94 | 0.6008 | |
| H2 | 5 | 3/30/2013 13:03 | 3 | 13357 | 4452.33 | 100.0% | 0.77133 | 5772.27 | 9576.96 | 0.6027 | |
| H2 | 6 | 3/30/2013 12:57 | 3 | 12989 | 4329.67 | 100.0% | 0.77214 | 5607.38 | 9576.96 | 0.5855 | |
| H2 | 7 | 3/30/2013 13:26 | 3 | 13679 | 4559.67 | 99.8% | 0.76814 | 5945.29 | 9576.95 | 0.6208 | |
| H2 | 8 | 3/30/2013 13:20 | 3 | 13354 | 4451.33 | 100.0% | 0.76889 | 5789.27 | 9576.95 | 0.6045 | 0.5981 |
| H3 | 1 | 3/30/2013 13:48 | 3 | 13509 | 4503.00 | 99.8% | 0.76506 | 5895.07 | 9576.94 | 0.6155 | |
| H3 | 2 | 3/30/2013 13:44 | 3 | 13463 | 4487.67 | 100.0% | 0.76564 | 5861.37 | 9576.94 | 0.6120 | |
| H3 | 3 | 3/30/2013 13:40 | 3 | 13106 | 4368.67 | 100.0% | 0.76621 | 5701.69 | 9576.94 | 0.5954 | |
| H3 | 4 | 3/30/2013 13:53 | 3 | 13554 | 4518.00 | 100.0% | 0.76441 | 5910.43 | 9576.94 | 0.6172 | |
| H3 | 5 | 3/30/2013 13:20 | 3 | 13483 | 4494.33 | 100.0% | 0.76889 | 5845.21 | 9576.95 | 0.6103 | |
| H3 | 6 | 3/30/2013 13:03 | 3 | 13220 | 4406.67 | 100.0% | 0.77133 | 5713.06 | 9576.96 | 0.5965 | |
| H3 | 7 | 3/30/2013 12:57 | 3 | 13980 | 4660.00 | 99.8% | 0.77214 | 6044.69 | 9576.96 | 0.6312 | |
| H3 | 8 | 3/30/2013 13:26 | 3 | 13730 | 4576.67 | 100.0% | 0.76814 | 5958.09 | 9576.95 | 0.6221 | 0.6125 |
| H4 | 1 | 3/30/2013 13:53 | 3 | 13083 | 4361.00 | 99.8% | 0.76441 | 5714.03 | 9576.94 | 0.5966 | |
| H4 | 2 | 3/30/2013 13:48 | 3 | 13343 | 4447.67 | 100.0% | 0.76506 | 5813.51 | 9576.94 | 0.6070 | |
| H4 | 3 | 3/30/2013 13:44 | 3 | 12783 | 4261.00 | 100.0% | 0.76563 | 5565.33 | 9576.94 | 0.5811 | |
| H4 | 4 | 3/30/2013 13:40 | 3 | 13324 | 4441.33 | 100.0% | 0.76621 | 5796.53 | 9576.94 | 0.6053 | |
| H4 | 5 | 3/30/2013 13:26 | 3 | 12966 | 4322.00 | 100.0% | 0.76814 | 5626.57 | 9576.95 | 0.5875 | |
| H4 | 6 | 3/30/2013 13:20 | 3 | 12785 | 4261.67 | 100.0% | 0.76889 | 5542.61 | 9576.95 | 0.5787 | |
| H4 | 7 | 3/30/2013 13:03 | 3 | 13672 | 4557.33 | 99.8% | 0.77133 | 5917.71 | 9576.96 | 0.6179 | |
| H4 | 8 | 3/30/2013 12:57 | 3 | 13466 | 4488.67 | 100.0% | 0.77214 | 5813.31 | 9576.96 | 0.6070 | 0.5977 |
| I1 | 1 | 3/30/2013 10:30 | 3 | 13127 | 4375.67 | 99.8% | 0.79279 | 5528.03 | 9577.03 | 0.5772 | |
| I1 | 2 | 3/30/2013 10:45 | 3 | 13322 | 4440.67 | 100.0% | 0.79064 | 5616.55 | 9577.02 | 0.5865 | |
| I1 | 3 | 3/30/2013 10:40 | 3 | 13122 | 4374.00 | 100.0% | 0.79138 | 5527.03 | 9577.02 | 0.5771 | |
| I1 | 4 | 3/30/2013 10:36 | 3 | 13138 | 4379.33 | 100.0% | 0.79199 | 5529.54 | 9577.02 | 0.5774 | |
| I1 | 5 | 3/30/2013 10:50 | 3 | 12951 | 4317.00 | 100.0% | 0.78994 | 5464.96 | 9577.02 | 0.5706 | |
| I1 | 6 | 3/30/2013 11:05 | 3 | 13362 | 4454.00 | 100.0% | 0.78779 | 5653.77 | 9577.01 | 0.5903 | |
| I1 | 7 | 3/30/2013 11:01 | 3 | 13283 | 4427.67 | 99.8% | 0.78837 | 5625.09 | 9577.01 | 0.5874 | |
| I1 | 8 | 3/30/2013 10:57 | 3 | 13130 | 4376.67 | 100.0% | 0.78904 | 5546.81 | 9577.01 | 0.5792 | 0.5807 |
| I2 | 1 | 3/30/2013 10:36 | 3 | 13691 | 4563.67 | 99.8% | 0.79199 | 5771.37 | 9577.02 | 0.6026 | |
| I2 | 2 | 3/30/2013 10:30 | 3 | 13662 | 4554.00 | 100.0% | 0.79278 | 5744.31 | 9577.03 | 0.5998 | |
| I2 | 3 | 3/30/2013 10:45 | 3 | 13627 | 4542.33 | 100.0% | 0.79064 | 5745.14 | 9577.02 | 0.5999 | |
| I2 | 4 | 3/30/2013 10:40 | 3 | 13607 | 4535.67 | 100.0% | 0.79138 | 5731.33 | 9577.02 | 0.5984 | |
| I2 | 5 | 3/30/2013 10:57 | 3 | 13214 | 4404.67 | 100.0% | 0.78904 | 5582.31 | 9577.01 | 0.5829 | |
| I2 | 6 | 3/30/2013 10:50 | 3 | 13489 | 4496.33 | 100.0% | 0.78994 | 5691.98 | 9577.02 | 0.5943 | |
| I2 | 7 | 3/30/2013 11:06 | 3 | 13773 | 4591.00 | 99.8% | 0.78779 | 5836.85 | 9577.01 | 0.6095 | |
| I2 | 8 | 3/30/2013 11:01 | 3 | 13380 | 4460.00 | 100.0% | 0.78837 | 5657.27 | 9577.01 | 0.5907 | 0.5973 |
| I3 | 1 | 3/30/2013 10:40 | 3 | 13450 | 4483.33 | 99.8% | 0.79138 | 5674.11 | 9577.02 | 0.5925 | |
| I3 | 2 | 3/30/2013 10:36 | 3 | 13623 | 4541.00 | 100.0% | 0.79199 | 5733.69 | 9577.02 | 0.5987 | |
| I3 | 3 | 3/30/2013 10:30 | 3 | 13604 | 4534.67 | 100.0% | 0.79278 | 5719.93 | 9577.03 | 0.5973 | |
| I3 | 4 | 3/30/2013 10:45 | 3 | 13476 | 4492.00 | 100.0% | 0.79064 | 5681.48 | 9577.02 | 0.5932 | |
| I3 | 5 | 3/30/2013 11:01 | 3 | 13338 | 4446.00 | 100.0% | 0.78836 | 5639.53 | 9577.01 | 0.5889 | |
| I3 | 6 | 3/30/2013 10:57 | 3 | 13548 | 4516.00 | 100.0% | 0.78904 | 5723.41 | 9577.01 | 0.5976 | |
| I3 | 7 | 3/30/2013 10:50 | 3 | 13574 | 4524.67 | 99.8% | 0.78994 | 5736.88 | 9577.02 | 0.5990 | |
| I3 | 8 | 3/30/2013 11:06 | 3 | 13582 | 4527.33 | 100.0% | 0.78779 | 5746.87 | 9577.01 | 0.6001 | 0.5959 |
| I4 | 1 | 3/30/2013 10:46 | 3 | 13602 | 4534.00 | 99.8% | 0.79064 | 5743.63 | 9577.02 | 0.5997 | |
| I4 | 2 | 3/30/2013 10:40 | 3 | 13677 | 4559.00 | 100.0% | 0.79138 | 5760.83 | 9577.02 | 0.6015 | |
| I4 | 3 | 3/30/2013 10:36 | 3 | 13582 | 4527.33 | 100.0% | 0.79198 | 5716.45 | 9577.02 | 0.5969 | |
| I4 | 4 | 3/30/2013 10:30 | 3 | 13706 | 4568.67 | 100.0% | 0.79278 | 5762.83 | 9577.03 | 0.6017 | |
| I4 | 5 | 3/30/2013 11:06 | 3 | 13163 | 4387.67 | 100.0% | 0.78779 | 5569.60 | 9577.01 | 0.5816 | |
| I4 | 6 | 3/30/2013 11:01 | 3 | 13636 | 4545.33 | 100.0% | 0.78836 | 5765.53 | 9577.01 | 0.6020 | |
| I4 | 7 | 3/30/2013 10:57 | 3 | 13908 | 4636.00 | 99.8% | 0.78904 | 5884.75 | 9577.01 | 0.6145 | |
| I4 | 8 | 3/30/2013 10:50 | 3 | 13684 | 4561.33 | 100.0% | 0.78994 | 5774.29 | 9577.02 | 0.6029 | 0.6001 |
| J1 | 1 | 3/30/2013 10:50 | 3 | 13603 | 4534.33 | 99.8% | 0.78994 | 5749.15 | 9577.02 | 0.6003 | |
| J1 | 2 | 3/30/2013 11:06 | 3 | 13578 | 4526.00 | 100.0% | 0.78779 | 5745.20 | 9577.01 | 0.5999 | |
| J1 | 3 | 3/30/2013 11:01 | 3 | 13458 | 4486.00 | 100.0% | 0.78836 | 5690.28 | 9577.01 | 0.5942 | |
| J1 | 4 | 3/30/2013 10:57 | 3 | 13240 | 4413.33 | 100.0% | 0.78904 | 5593.32 | 9577.01 | 0.5840 | |
| J1 | 5 | 3/30/2013 10:30 | 3 | 13403 | 4467.67 | 100.0% | 0.79278 | 5635.43 | 9577.03 | 0.5884 | |
| J1 | 6 | 3/30/2013 10:46 | 3 | 13474 | 4491.33 | 100.0% | 0.79064 | 5680.65 | 9577.02 | 0.5932 | |
| J1 | 7 | 3/30/2013 10:40 | 3 | 13434 | 4478.00 | 99.8% | 0.79138 | 5667.39 | 9577.02 | 0.5918 | |
| J1 | 8 | 3/30/2013 10:36 | 3 | 13637 | 4545.67 | 100.0% | 0.79198 | 5739.60 | 9577.02 | 0.5993 | 0.5939 |
| J2 | 1 | 3/30/2013 10:57 | 3 | 13277 | 4425.67 | 99.8% | 0.78903 | 5617.78 | 9577.01 | 0.5866 | |
| J2 | 2 | 3/30/2013 10:50 | 3 | 13438 | 4479.33 | 100.0% | 0.78994 | 5670.50 | 9577.02 | 0.5921 | |
| J2 | 3 | 3/30/2013 11:06 | 3 | 13471 | 4490.33 | 100.0% | 0.78779 | 5699.93 | 9577.01 | 0.5952 | |
| J2 | 4 | 3/30/2013 11:01 | 3 | 13476 | 4492.00 | 100.0% | 0.78836 | 5697.89 | 9577.01 | 0.5950 | |
| J2 | 5 | 3/30/2013 10:36 | 3 | 13351 | 4450.33 | 100.0% | 0.79198 | 5619.22 | 9577.02 | 0.5867 | |
| J2 | 6 | 3/30/2013 10:30 | 3 | 13390 | 4463.33 | 100.0% | 0.79278 | 5629.97 | 9577.03 | 0.5879 | |
| J2 | 7 | 3/30/2013 10:46 | 3 | 13243 | 4414.33 | 99.8% | 0.79063 | 5592.06 | 9577.02 | 0.5839 | |
| J2 | 8 | 3/30/2013 10:40 | 3 | 13523 | 4507.67 | 100.0% | 0.79138 | 5695.98 | 9577.02 | 0.5948 | 0.5903 |
| J3 | 1 | 3/30/2013 11:01 | 3 | 13385 | 4461.67 | 99.8% | 0.78836 | 5668.32 | 9577.01 | 0.5919 | |
| J3 | 2 | 3/30/2013 10:57 | 3 | 13420 | 4473.33 | 100.0% | 0.78903 | 5669.37 | 9577.01 | 0.5920 | |
| J3 | 3 | 3/30/2013 10:50 | 3 | 13609 | 4536.33 | 100.0% | 0.78994 | 5742.66 | 9577.02 | 0.5996 | |
| J3 | 4 | 3/30/2013 11:06 | 3 | 13446 | 4482.00 | 100.0% | 0.78779 | 5689.36 | 9577.01 | 0.5941 | |
| J3 | 5 | 3/30/2013 10:40 | 3 | 13204 | 4401.33 | 100.0% | 0.79138 | 5561.62 | 9577.02 | 0.5807 | |
| J3 | 6 | 3/30/2013 10:36 | 3 | 13560 | 4520.00 | 100.0% | 0.79198 | 5707.21 | 9577.02 | 0.5959 | |
| J3 | 7 | 3/30/2013 10:31 | 3 | 13568 | 4522.67 | 99.8% | 0.79278 | 5713.80 | 9577.03 | 0.5966 | |
| J3 | 8 | 3/30/2013 10:46 | 3 | 13410 | 4470.00 | 100.0% | 0.79063 | 5653.68 | 9577.02 | 0.5903 | 0.5926 |
| J4 | 1 | 3/30/2013 11:06 | 3 | 13329 | 4443.00 | 99.8% | 0.78778 | 5648.74 | 9577.01 | 0.5898 | |
| J4 | 2 | 3/30/2013 11:02 | 3 | 13456 | 4485.33 | 100.0% | 0.78836 | 5689.47 | 9577.01 | 0.5941 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| J4 | 3 | 3/30/2013 10:57 | 3 | 13293 | 4431.00 | 100.0% | 0.78903 | 5615.72 | 9577.01 | 0.5864 | |
| J4 | 4 | 3/30/2013 10:50 | 3 | 13473 | 4491.00 | 100.0% | 0.78993 | 5685.28 | 9577.02 | 0.5936 | |
| J4 | 5 | 3/30/2013 10:46 | 3 | 13349 | 4449.67 | 100.0% | 0.79063 | 5627.98 | 9577.02 | 0.5877 | |
| J4 | 6 | 3/30/2013 10:40 | 3 | 13537 | 4512.33 | 100.0% | 0.79137 | 5701.89 | 9577.02 | 0.5954 | |
| J4 | 7 | 3/30/2013 10:36 | 3 | 13896 | 4632.00 | 99.8% | 0.79198 | 5857.84 | 9577.02 | 0.6117 | |
| J4 | 8 | 3/30/2013 10:31 | 3 | 13611 | 4537.00 | 100.0% | 0.79278 | 5722.91 | 9577.03 | 0.5976 | 0.5945 |

Current Calibration - LB4100

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Y-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **LB4100** | A0 | A1 | A2 | A3 | A4 |
| **A1** | 5.888316E-01 | | | | |
| **A2** | 5.958501E-01 | | | | |
| **A3** | 5.991856E-01 | | | | |
| **A4** | #N/A | | | | |
| **B1** | 6.044081E-01 | | | | |
| **B2** | 6.056540E-01 | | | | |
| **B3** | 6.113276E-01 | | | | |
| **B4** | 5.701514E-01 | | | | |
| **C1** | 5.826939E-01 | | | | |
| **C2** | 5.915425E-01 | | | | |
| **C3** | 5.851644E-01 | | | | |
| **C4** | 5.855293E-01 | | | | |
| **D1** | 6.724674E-01 | | | | |
| **D2** | 6.750365E-01 | | | | |
| **D3** | 6.781316E-01 | | | | |
| **D4** | 6.763468E-01 | | | | |
| **E1** | 5.886228E-01 | | | | |
| **E2** | 6.008718E-01 | | | | |
| **E3** | 5.943093E-01 | | | | |
| **E4** | 5.905346E-01 | | | | |
| **F1** | 6.109624E-01 | | | | |
| **F2** | 6.058489E-01 | | | | |
| **F3** | 6.155476E-01 | | | | |
| **F4** | 6.121195E-01 | | | | |
| **G1** | 5.372994E-01 | | | | |
| **G2** | 5.975562E-01 | | | | |
| **G3** | 6.077647E-01 | | | | |
| **G4** | 6.038893E-01 | | | | |
| **H1** | 5.958337E-01 | | | | |
| **H2** | 5.981218E-01 | | | | |
| **H3** | 6.125334E-01 | | | | |
| **H4** | 5.976537E-01 | | | | |
| **I1** | 5.807102E-01 | | | | |
| **I2** | 5.972705E-01 | | | | |
| **I3** | 5.959043E-01 | | | | |
| **I4** | 6.001073E-01 | | | | |
| **J1** | 5.938828E-01 | | | | |
| **J2** | 5.902584E-01 | | | | |
| **J3** | 5.926428E-01 | | | | |
| **J4** | 5.945201E-01 | | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| Y1 | A1 | 3 | 0 | 13609 | 3/30/2013 11:12 | 3/30/2013 11:15 | LB4100 | SR90Y13 |
| Y2 | A1 | 3 | 0 | 13067 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y3 | A1 | 3 | 0 | 13370 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y4 | A1 | 3 | 0 | 12879 | 3/30/2013 11:16 | 3/30/2013 11:19 | LB4100 | SR90Y13 |
| Y5 | A1 | 3 | 0 | 13230 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y6 | A1 | 3 | 0 | 12870 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y7 | A1 | 3 | 0 | 13380 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y8 | A1 | 3 | 0 | 13594 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y1 | A2 | 3 | 0 | 13095 | 3/30/2013 11:16 | 3/30/2013 11:19 | LB4100 | SR90Y13 |
| Y2 | A2 | 3 | 0 | 13922 | 3/30/2013 11:12 | 3/30/2013 11:15 | LB4100 | SR90Y13 |
| Y3 | A2 | 3 | 0 | 13018 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y4 | A2 | 3 | 0 | 13740 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y5 | A2 | 3 | 0 | 13262 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y6 | A2 | 3 | 0 | 13159 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y7 | A2 | 3 | 0 | 13590 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y8 | A2 | 3 | 0 | 13477 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y1 | A3 | 3 | 0 | 13615 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y2 | A3 | 3 | 0 | 13338 | 3/30/2013 11:16 | 3/30/2013 11:19 | LB4100 | SR90Y13 |
| Y3 | A3 | 3 | 0 | 13773 | 3/30/2013 11:12 | 3/30/2013 11:15 | LB4100 | SR90Y13 |
| Y4 | A3 | 3 | 0 | 13485 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y5 | A3 | 3 | 0 | 13089 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y6 | A3 | 3 | 0 | 13309 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y7 | A3 | 3 | 0 | 13758 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y8 | A3 | 3 | 0 | 13498 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y1 | B1 | 3 | 0 | 13650 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y2 | B1 | 3 | 0 | 13728 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y3 | B1 | 3 | 0 | 13629 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y4 | B1 | 3 | 0 | 13494 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y5 | B1 | 3 | 1 | 13423 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y6 | B1 | 3 | 0 | 13398 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y7 | B1 | 3 | 0 | 13865 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y8 | B1 | 3 | 1 | 13608 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y1 | B2 | 3 | 1 | 13621 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y2 | B2 | 3 | 0 | 13593 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y3 | B2 | 3 | 0 | 13435 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y4 | B2 | 3 | 0 | 13710 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y5 | B2 | 3 | 0 | 13771 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y6 | B2 | 3 | 1 | 13752 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y7 | B2 | 3 | 1 | 13556 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y8 | B2 | 3 | 0 | 13584 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y1 | B3 | 3 | 0 | 13691 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y2 | B3 | 3 | 0 | 13798 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y3 | B3 | 3 | 0 | 13908 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y4 | B3 | 3 | 1 | 13648 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y5 | B3 | 3 | 0 | 13507 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y6 | B3 | 3 | 0 | 14073 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y7 | B3 | 3 | 0 | 13982 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y8 | B3 | 3 | 0 | 13436 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y1 | B4 | 3 | 0 | 12732 | 3/30/2013 12:03 | 3/30/2013 12:06 | LB4100 | SR90Y13 |
| Y2 | B4 | 3 | 0 | 12808 | 3/30/2013 11:56 | 3/30/2013 11:59 | LB4100 | SR90Y13 |
| Y3 | B4 | 3 | 0 | 12570 | 3/30/2013 11:51 | 3/30/2013 11:54 | LB4100 | SR90Y13 |
| Y4. | B4 | 3 | 1 | 12846 | 3/30/2013 11:35 | 3/30/2013 11:38 | LB4100 | SR90Y13 |
| Y5 | B4 | 3 | 0 | 12723 | 3/30/2013 11:29 | 3/30/2013 11:32 | LB4100 | SR90Y13 |
| Y6 | B4 | 3 | 0 | 12765 | 3/30/2013 11:24 | 3/30/2013 11:27 | LB4100 | SR90Y13 |
| Y7 | B4 | 3 | 0 | 13416 | 3/30/2013 11:20 | 3/30/2013 11:23 | LB4100 | SR90Y13 |
| Y8 | B4 | 3 | 0 | 12780 | 3/30/2013 11:11 | 3/30/2013 11:14 | LB4100 | SR90Y13 |
| Y1 | C1 | 3 | 0 | 12969 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y2 | C1 | 3 | 0 | 13130 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y3 | C1 | 3 | 0 | 12220 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |
| Y4 | C1 | 3 | 0 | 12937 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y5 | C1 | 3 | 0 | 12776 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y6 | C1 | 3 | 0 | 12163 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y7 | C1 | 3 | 0 | 13000 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y8 | C1 | 3 | 1 | 12686 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y1 | C2 | 3 | 0 | 13036 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y2 | C2 | 3 | 0 | 13061 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y3 | C2 | 3 | 0 | 12586 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y4 | C2 | 3 | 0 | 13408 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |
| Y5 | C2 | 3 | 0 | 12797 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y6 | C2 | 3 | 0 | 12374 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y7 | C2 | 3 | 0 | 13059 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y8 | C2 | 3 | 0 | 13106 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y1 | C3 | 3 | 0 | 13495 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y2 | C3 | 3 | 0 | 12737 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y3 | C3 | 3 | 0 | 12131 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y4 | C3 | 3 | 0 | 13403 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y5 | C3 | 3 | 0 | 12610 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y6 | C3 | 3 | 0 | 12167 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y7 | C3 | 3 | 0 | 12849 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y8 | C3 | 3 | 0 | 12918 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y1 | C4 | 3 | 0 | 13286 | 3/30/2013 14:15 | 3/30/2013 14:18 | LB4100 | SR90Y13 |
| Y2 | C4 | 3 | 0 | 13301 | 3/30/2013 14:09 | 3/30/2013 14:12 | LB4100 | SR90Y13 |
| Y3 | C4 | 3 | 0 | 12516 | 3/30/2013 14:03 | 3/30/2013 14:06 | LB4100 | SR90Y13 |
| Y4 | C4 | 3 | 0 | 12966 | 3/30/2013 13:58 | 3/30/2013 14:01 | LB4100 | SR90Y13 |
| Y5 | C4 | 3 | 0 | 12481 | 3/30/2013 14:36 | 3/30/2013 14:39 | LB4100 | SR90Y13 |
| Y6 | C4 | 3 | 0 | 12394 | 3/30/2013 14:31 | 3/30/2013 14:34 | LB4100 | SR90Y13 |
| Y7 | C4 | 3 | 0 | 12824 | 3/30/2013 14:26 | 3/30/2013 14:29 | LB4100 | SR90Y13 |
| Y8 | C4 | 3 | 0 | 12609 | 3/30/2013 14:20 | 3/30/2013 14:23 | LB4100 | SR90Y13 |
| Y1 | D1 | 3 | 0 | 14821 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y2 | D1 | 3 | 0 | 15003 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y3 | D1 | 3 | 0 | 13959 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y4 | D1 | 3 | 0 | 14807 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y5 | D1 | 3 | 0 | 14684 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y6 | D1 | 3 | 0 | 14280 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y7 | D1 | 3 | 0 | 15223 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y8 | D1 | 3 | 0 | 14778 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |
| Y1 | D2 | 3 | 0 | 15028 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y2 | D2 | 3 | 0 | 14728 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y3 | D2 | 3 | 0 | 13806 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y4 | D2 | 3 | 0 | 14923 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y5 | D2 | 3 | 0 | 14988 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |
| Y6 | D2 | 3 | 0 | 14328 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y7 | D2 | 3 | 0 | 15369 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y8 | D2 | 3 | 0 | 14834 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y1 | D3 | 3 | 0 | 15108 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y2 | D3 | 3 | 0 | 14957 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y3 | D3 | 3 | 0 | 13886 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y4 | D3 | 3 | 0 | 15018 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y5 | D3 | 3 | 0 | 14800 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y6 | D3 | 3 | 0 | 14387 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y7 | D3 | 3 | 1 | 15410 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y8 | D3 | 3 | 0 | 14977 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y1 | D4 | 3 | 0 | 14839 | 3/30/2013 14:37 | 3/30/2013 14:40 | LB4100 | SR90Y13 |
| Y2 | D4 | 3 | 0 | 15095 | 3/30/2013 14:32 | 3/30/2013 14:35 | LB4100 | SR90Y13 |
| Y3 | D4 | 3 | 0 | 13854 | 3/30/2013 14:27 | 3/30/2013 14:30 | LB4100 | SR90Y13 |
| Y4 | D4 | 3 | 0 | 14995 | 3/30/2013 14:21 | 3/30/2013 14:24 | LB4100 | SR90Y13 |
| Y5 | D4 | 3 | 0 | 14568 | 3/30/2013 14:16 | 3/30/2013 14:19 | LB4100 | SR90Y13 |
| Y6 | D4 | 3 | 0 | 14132 | 3/30/2013 14:10 | 3/30/2013 14:13 | LB4100 | SR90Y13 |
| Y7 | D4 | 3 | 0 | 15398 | 3/30/2013 14:04 | 3/30/2013 14:07 | LB4100 | SR90Y13 |
| Y8 | D4 | 3 | 0 | 15353 | 3/30/2013 13:59 | 3/30/2013 14:02 | LB4100 | SR90Y13 |
| Y1 | E1 | 3 | 0 | 13060 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y2 | E1 | 3 | 0 | 12973 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y3 | E1 | 3 | 0 | 13204 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y4 | E1 | 3 | 0 | 13122 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y5 | E1 | 3 | 0 | 13033 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y6 | E1 | 3 | 0 | 12814 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y7 | E1 | 3 | 0 | 13375 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y8 | E1 | 3 | 0 | 13248 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y1 | E2 | 3 | 0 | 13343 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y2 | E2 | 3 | 0 | 13427 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y3 | E2 | 3 | 0 | 13274 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y4 | E2 | 3 | 0 | 13559 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y5 | E2 | 3 | 0 | 13236 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y6 | E2 | 3 | 0 | 13436 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y7 | E2 | 3 | 0 | 13438 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y8 | E2 | 3 | 0 | 13297 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y1 | E3 | 3 | 0 | 13197 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y2 | E3 | 3 | 0 | 13473 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y3 | E3 | 3 | 0 | 13229 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y4 | E3 | 3 | 0 | 13246 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y5 | E3 | 3 | 1 | 13113 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y6 | E3 | 3 | 0 | 12790 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y7 | E3 | 3 | 0 | 13567 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y8 | E3 | 3 | 0 | 13226 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y1 | E4 | 3 | 0 | 12939 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y2 | E4 | 3 | 0 | 13227 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y3 | E4 | 3 | 0 | 13211 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y4 | E4 | 3 | 0 | 13251 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y5 | E4 | 3 | 0 | 12899 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y6 | E4 | 3 | 0 | 12717 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y7 | E4 | 3 | 0 | 13546 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y8 | E4 | 3 | 0 | 13380 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y1 | F1 | 3 | 0 | 13838 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y2 | F1 | 3 | 0 | 13557 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y3 | F1 | 3 | 0 | 13644 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y4 | F1 | 3 | 0 | 13677 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y5 | F1 | 3 | 0 | 13447 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y6 | F1 | 3 | 1 | 13011 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y7 | F1 | 3 | 0 | 13955 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y8 | F1 | 3 | 0 | 13679 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y1 | F2 | 3 | 0 | 13510 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y2 | F2 | 3 | 0 | 13530 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y3 | F2 | 3 | 0 | 13607 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y4 | F2 | 3 | 0 | 13634 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y5 | F2 | 3 | 0 | 13375 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y6 | F2 | 3 | 0 | 13083 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y7 | F2 | 3 | 0 | 13627 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y8 | F2 | 3 | 0 | 13530 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y1 | F3 | 3 | 0 | 13685 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y2 | F3 | 3 | 0 | 13708 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y3 | F3 | 3 | 1 | 13870 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y4 | F3 | 3 | 1 | 13788 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y5 | F3 | 3 | 1 | 13568 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y6 | F3 | 3 | 0 | 13292 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y7 | F3 | 3 | 0 | 14041 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |
| Y8 | F3 | 3 | 0 | 13672 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y1 | F4 | 3 | 0 | 13645 | 3/30/2013 12:34 | 3/30/2013 12:37 | LB4100 | SR90Y13 |
| Y2 | F4 | 3 | 0 | 13606 | 3/30/2013 12:29 | 3/30/2013 12:32 | LB4100 | SR90Y13 |
| Y3 | F4 | 3 | 0 | 13873 | 3/30/2013 12:25 | 3/30/2013 12:28 | LB4100 | SR90Y13 |
| Y4 | F4 | 3 | 0 | 13654 | 3/30/2013 12:16 | 3/30/2013 12:19 | LB4100 | SR90Y13 |
| Y5 | F4 | 3 | 0 | 13624 | 3/30/2013 12:51 | 3/30/2013 12:54 | LB4100 | SR90Y13 |
| Y6 | F4 | 3 | 0 | 13165 | 3/30/2013 12:47 | 3/30/2013 12:50 | LB4100 | SR90Y13 |
| Y7 | F4 | 3 | 0 | 13984 | 3/30/2013 12:42 | 3/30/2013 12:45 | LB4100 | SR90Y13 |
| Y8 | F4 | 3 | 0 | 13462 | 3/30/2013 12:38 | 3/30/2013 12:41 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y1 | G1 | 3 | 0 | 12509 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y2 | G1 | 3 | 0 | 13307 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y3 | G1 | 3 | 0 | 3249 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y4 | G1 | 3 | 0 | 12930 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y5 | G1 | 3 | 0 | 12839 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y6 | G1 | 3 | 0 | 13224 | 3/30/2013 13:52 | 3/30/2013 13:55 | LB4100 | SR90Y13 |
| Y7 | G1 | 3 | 0 | 13339 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y8 | G1 | 3 | 0 | 13351 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y1 | G2 | 3 | 0 | 13555 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y2 | G2 | 3 | 0 | 13099 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y3 | G2 | 3 | 0 | 12682 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y4 | G2 | 3 | 0 | 13719 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y5 | G2 | 3 | 0 | 12788 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y6 | G2 | 3 | 0 | 13035 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y7 | G2 | 3 | 0 | 13594 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y8 | G2 | 3 | 0 | 12929 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y1 | G3 | 3 | 1 | 13760 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y2 | G3 | 3 | 0 | 13754 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y3 | G3 | 3 | 0 | 12839 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y4 | G3 | 3 | 0 | 13651 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y5 | G3 | 3 | 0 | 12746 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y6 | G3 | 3 | 0 | 12953 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y7 | G3 | 3 | 0 | 14028 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y8 | G3 | 3 | 0 | 13469 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y1 | G4 | 3 | 0 | 13594 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y2 | G4 | 3 | 0 | 13680 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y3 | G4 | 3 | 0 | 13515 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y4 | G4 | 3 | 0 | 13312 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y5 | G4 | 3 | 0 | 12950 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y6 | G4 | 3 | 1 | 12437 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y7 | G4 | 3 | 0 | 13621 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y8 | G4 | 3 | 0 | 13412 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y1 | H1 | 3 | 0 | 13205 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y2 | H1 | 3 | 0 | 13099 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y3 | H1 | 3 | 0 | 12500 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y4 | H1 | 3 | 0 | 13397 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y5 | H1 | 3 | 0 | 13157 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y6 | H1 | 3 | 0 | 12929 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y7 | H1 | 3 | 1 | 13568 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y8 | H1 | 3 | 0 | 13245 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y1 | H2 | 3 | 0 | 13183 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y2 | H2 | 3 | 0 | 13306 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y3 | H2 | 3 | 0 | 12430 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y4 | H2 | 3 | 0 | 13206 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y5 | H2 | 3 | 0 | 13357 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y6 | H2 | 3 | 0 | 12989 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y7 | H2 | 3 | 1 | 13679 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y8 | H2 | 3 | 0 | 13354 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y1 | H3 | 3 | 0 | 13509 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y2 | H3 | 3 | 0 | 13463 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y3 | H3 | 3 | 0 | 13106 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y4 | H3 | 3 | 0 | 13554 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y5 | H3 | 3 | 0 | 13483 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y6 | H3 | 3 | 0 | 13220 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y7 | H3 | 3 | 0 | 13980 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y8 | H3 | 3 | 1 | 13730 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y1 | H4 | 3 | 0 | 13083 | 3/30/2013 13:53 | 3/30/2013 13:56 | LB4100 | SR90Y13 |
| Y2 | H4 | 3 | 0 | 13343 | 3/30/2013 13:48 | 3/30/2013 13:51 | LB4100 | SR90Y13 |
| Y3 | H4 | 3 | 0 | 12783 | 3/30/2013 13:44 | 3/30/2013 13:47 | LB4100 | SR90Y13 |
| Y4 | H4 | 3 | 0 | 13324 | 3/30/2013 13:40 | 3/30/2013 13:43 | LB4100 | SR90Y13 |
| Y5 | H4 | 3 | 0 | 12966 | 3/30/2013 13:26 | 3/30/2013 13:29 | LB4100 | SR90Y13 |
| Y6 | H4 | 3 | 0 | 12785 | 3/30/2013 13:20 | 3/30/2013 13:23 | LB4100 | SR90Y13 |
| Y7 | H4 | 3 | 0 | 13672 | 3/30/2013 13:03 | 3/30/2013 13:06 | LB4100 | SR90Y13 |
| Y8 | H4 | 3 | 0 | 13466 | 3/30/2013 12:57 | 3/30/2013 13:00 | LB4100 | SR90Y13 |
| Y1 | I1 | 3 | 0 | 13127 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y2 | I1 | 3 | 0 | 13322 | 3/30/2013 10:45 | 3/30/2013 10:48 | LB4100 | SR90Y13 |
| Y3 | I1 | 3 | 0 | 13122 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y4 | I1 | 3 | 0 | 13138 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y5 | I1 | 3 | 2 | 12951 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y6 | I1 | 3 | 1 | 13362 | 3/30/2013 11:05 | 3/30/2013 11:08 | LB4100 | SR90Y13 |
| Y7 | I1 | 3 | 1 | 13283 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y8 | I1 | 3 | 0 | 13130 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y1 | I2 | 3 | 0 | 13691 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y2 | I2 | 3 | 0 | 13662 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y3 | I2 | 3 | 0 | 13627 | 3/30/2013 10:45 | 3/30/2013 10:48 | LB4100 | SR90Y13 |
| Y4 | I2 | 3 | 0 | 13607 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y5 | I2 | 3 | 0 | 13214 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y6 | I2 | 3 | 0 | 13489 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y7 | I2 | 3 | 0 | 13773 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y8 | I2 | 3 | 0 | 13380 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y1 | I3 | 3 | 0 | 13450 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y2 | I3 | 3 | 0 | 13623 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y3 | I3 | 3 | 0 | 13604 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y4 | I3 | 3 | 0 | 13476 | 3/30/2013 10:45 | 3/30/2013 10:48 | LB4100 | SR90Y13 |
| Y5 | I3 | 3 | 0 | 13338 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y6 | I3 | 3 | 0 | 13548 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y7 | I3 | 3 | 0 | 13574 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y8 | I3 | 3 | 0 | 13582 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y1 | I4 | 3 | 0 | 13602 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y2 | I4 | 3 | 2 | 13677 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y3 | I4 | 3 | 2 | 13582 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y4 | I4 | 3 | 0 | 13706 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y5 | I4 | 3 | 4 | 13163 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y6 | I4 | 3 | 0 | 13636 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y7 | I4 | 3 | 4 | 13908 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y8 | I4 | 3 | 1 | 13684 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y1 | J1 | 3 | 0 | 13603 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y2 | J1 | 3 | 0 | 13578 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y3 | J1 | 3 | 1 | 13458 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y4 | J1 | 3 | 0 | 13240 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y5 | J1 | 3 | 0 | 13403 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y6 | J1 | 3 | 0 | 13474 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y7 | J1 | 3 | 0 | 13434 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y8 | J1 | 3 | 0 | 13637 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y1 | J2 | 3 | 0 | 13277 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y2 | J2 | 3 | 0 | 13438 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y3 | J2 | 3 | 0 | 13471 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y4 | J2 | 3 | 0 | 13476 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y5 | J2 | 3 | 0 | 13351 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y6 | J2 | 3 | 0 | 13390 | 3/30/2013 10:30 | 3/30/2013 10:33 | LB4100 | SR90Y13 |
| Y7 | J2 | 3 | 0 | 13243 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y8 | J2 | 3 | 0 | 13523 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y1 | J3 | 3 | 1 | 13385 | 3/30/2013 11:01 | 3/30/2013 11:04 | LB4100 | SR90Y13 |
| Y2 | J3 | 3 | 0 | 13420 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y3 | J3 | 3 | 0 | 13609 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y4 | J3 | 3 | 0 | 13446 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y5 | J3 | 3 | 0 | 13204 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y6 | J3 | 3 | 0 | 13560 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y7 | J3 | 3 | 0 | 13568 | 3/30/2013 10:31 | 3/30/2013 10:34 | LB4100 | SR90Y13 |
| Y8 | J3 | 3 | 0 | 13410 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y1 | J4 | 3 | 0 | 13329 | 3/30/2013 11:06 | 3/30/2013 11:09 | LB4100 | SR90Y13 |
| Y2 | J4 | 3 | 0 | 13456 | 3/30/2013 11:02 | 3/30/2013 11:05 | LB4100 | SR90Y13 |
| Y3 | J4 | 3 | 0 | 13293 | 3/30/2013 10:57 | 3/30/2013 11:00 | LB4100 | SR90Y13 |
| Y4 | J4 | 3 | 0 | 13473 | 3/30/2013 10:50 | 3/30/2013 10:53 | LB4100 | SR90Y13 |
| Y5 | J4 | 3 | 0 | 13349 | 3/30/2013 10:46 | 3/30/2013 10:49 | LB4100 | SR90Y13 |
| Y6 | J4 | 3 | 0 | 13537 | 3/30/2013 10:40 | 3/30/2013 10:43 | LB4100 | SR90Y13 |
| Y7 | J4 | 3 | 0 | 13896 | 3/30/2013 10:36 | 3/30/2013 10:39 | LB4100 | SR90Y13 |
| Y8 | J4 | 3 | 0 | 13611 | 3/30/2013 10:31 | 3/30/2013 10:34 | LB4100 | SR90Y13 |

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# Strontium-89 & 90 Liquid

Filename : SR8990.XLS
File type : Excel
Version # : 1.3.9

Batch : 1082959
Analyst : AF1
Prep Date : 2/14/2014
Sr-89 Method Uncertainty : 0.0829
Sr-90 Method Uncertainty : 0.0821

Geometry: Tuffryn Filter

Sr Carrier S/N : 2046474
Carrier Exp Date : 12/5/2014
Carrier Volume Added: 2.00
Carrier Weight (mg/ml): 16.40
Carrier Weight StDev.: 0.16

Y Carrier S/N : 2073992
Carrier Exp Date : 5/14/2014
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 33.18
Carrier Weight StDev.: 0.29

Procedure Code : GFCGANBL
Parmname1 : Strontium-89
Parmname2 : Strontium-90
Required MDA Sr-89 : 1 pCi/L
Required MDA Sr-90 : 1 pCi/L
Sr-89 Abundance : 1.00
Sr-90 Abundance : 1.00
Halflife of Sr-89 : 50.53 days
Halflife of Sr-90 : 28.9 years
Halflife of Y-90 : 64.053 hours

| Sample Characteristics | | | | | Carrier Calculations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Net Weight (mg) | | Net Weight StDev. (mg) | | Carrier Aliquot (mL) | | Carrier Aliquot StDev. (mL) | |
| Pos. | Sample ID | Sample Aliquot L | Sample Aliquot StDev. L | Sample Date/Time | Sr | Y | Sr | Y | Sr | Y | Sr | Y |
| 1 | 1202347886.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 2 | 1202347887.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 3 | 1202347888.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 4 | ~~1202347889.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~6.9~~ | ~~17.6~~ | ~~0.036986~~ | ~~0.082975~~ | ~~0.5~~ | ~~0.5~~ | ~~0.001000~~ | ~~0.001000~~ |
| 5 | 1202347890.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 6 | 1202347891.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 7 | 1202347892.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 8 | 1202347893.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 9 | 1202347894.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 10 | 1202347895.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 11 | 1202347896.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 12 | 1202347897.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| ~~13~~ | ~~1202347898.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~8.6~~ | ~~17.0~~ | ~~0.044293~~ | ~~0.080396~~ | ~~0.8~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| 14 | 1202347899.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 15 | 1202347900.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 16 | 1202347901.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 17 | 1202347902.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 18 | 1202347903.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 19 | 1202347904.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 20 | 1202347905.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 21 | 1202347906.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 22 | 1202347907.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 23 | 1202347908.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 24 | 1202347909.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 25 | 1202347910.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 26 | 1202347911.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 27 | 1202347912.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 28 | 1202347913.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 29 | 1202347914.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 30 | 1202347915.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 31 | 1202347916.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 32 | 1202347917.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 33 | 1202347918.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 34 | 1202347919.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 35 | 1202347920.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 36 | 1202347921.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 37 | 1202347922.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 38 | 1202347923.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 39 | 1202347924.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 40 | 1202347925.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |



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**Pipet, 0.1 ml Stdev : +/-** 0.000200 ml
**Pipet, 0.5 ml Stdev : +/-** 0.001000 ml
**Pipet, 1 ml Stdev : +/-** 0.002000 ml
**Pipet, 5 ml Stdev : +/-** 0.010000 ml

**Analytical SOP:** GL-RAD-A-001
**Instrument SOP:** GL-RAD-I-006

| 1st Count Raw Data | | | | | | | 1st Count Calibration Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Counting | Gross Counts | | | Count | | | Calibration | Detector Efficiency (cpm/dpm) | | Detector Efficiency | | | Weekly Bkg Count | Weekly Bkg Count |
| Pos. | Detector ID | Time (min.) | Alpha | Beta | Gross Beta CPM | Start Date/Time | Counted on | Calibration Date | Due Date | Sr-89 | Sr-90 | Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Start Date/Time | Time (min.) |
| 1 | A1 | 15 | 2 | 5538 | 369.196 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5735 | 0.4505 | 0.02044 | 0.03298 | 1.222 | 2/8/2014 18:10 | 500 |
| 2 | A2 | 15 | 2 | 6110 | 407.330 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5680 | 0.4266 | 0.02268 | 0.02236 | 1.282 | 2/8/2014 18:10 | 500 |
| 3 | A3 | 15 | 2 | 6313 | 420.863 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5675 | 0.4076 | 0.01784 | 0.02575 | 1.080 | 2/8/2014 18:10 | 500 |
| 4 | A4 | 0.01 | 0 | 1489 | 148000.000 | 2/15/2014 13:38 | LB4100 | 3/1/2013 | 2/28/2014 | 0.0000 | 0.0000 | 0.00000 | 0.00000 | 0.000 | 12:00:00 AM | 0 |
| 5 | B1 | 15 | 4 | 4734 | 315.596 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5623 | 0.3979 | 0.01796 | 0.01463 | 1.076 | 2/8/2014 18:01 | 500 |
| 6 | B2 | 15 | 2 | 4242 | 282.797 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5687 | 0.4016 | 0.01415 | 0.02581 | 1.228 | 2/8/2014 18:01 | 500 |
| 7 | B3 | 15 | 0 | 2936 | 195.733 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5741 | 0.3946 | 0.01320 | 0.02600 | 4.120 | 2/8/2014 18:01 | 500 |
| 8 | B4 | 15 | 0 | 1995 | 133.000 | 2/15/2014 13:20 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5343 | 0.3635 | 0.00972 | 0.02500 | 1.136 | 2/8/2014 18:01 | 500 |
| 9 | C1 | 15 | 6 | 5997 | 399.795 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5702 | 0.4417 | 0.01816 | 0.01335 | 1.554 | 2/8/2014 20:04 | 500 |
| 10 | C2 | 15 | 4 | 6775 | 451.659 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5734 | 0.4582 | 0.02351 | 0.02904 | 1.252 | 2/8/2014 20:04 | 500 |
| 11 | C3 | 15 | 3 | 6845 | 456.326 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5663 | 0.4542 | 0.02588 | 0.03694 | 1.342 | 2/8/2014 20:04 | 500 |
| 12 | C4 | 15 | 1 | 6520 | 434.664 | 2/15/2014 13:44 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5641 | 0.4471 | 0.02683 | 0.03775 | 3.960 | 2/8/2014 20:04 | 500 |
| 13 | D1 | 15 | 2 | 4429 | 295.263 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.4328 | 0.4360 | 0.02033 | 0.02573 | 0.868 | 2/8/2014 20:28 | 500 |
| 14 | D2 | 15 | 3 | 4744 | 316.261 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6867 | 0.4425 | 0.01910 | 0.02995 | 1.134 | 2/8/2014 20:28 | 500 |
| 15 | D3 | 15 | 0 | 3235 | 215.667 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6739 | 0.4471 | 0.02505 | 0.02741 | 1.026 | 2/8/2014 20:28 | 500 |
| 16 | D4 | 15 | 1 | 2532 | 168.798 | 2/15/2014 13:45 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6765 | 0.4353 | 0.02356 | 0.02624 | 1.120 | 2/8/2014 20:28 | 500 |
| 17 | E1 | 15 | 1 | 5941 | 396.066 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5644 | 0.4429 | 0.02254 | 0.01370 | 1.962 | 2/15/2014 16:12 | 500 |
| 18 | E2 | 15 | 3 | 6650 | 443.327 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5690 | 0.4435 | 0.01894 | 0.03375 | 1.616 | 2/15/2014 16:12 | 500 |
| 19 | E3 | 15 | 3 | 6666 | 444.397 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5654 | 0.4064 | 0.01897 | 0.01648 | 1.672 | 2/15/2014 16:12 | 500 |
| 20 | E4 | 15 | 3 | 6497 | 433.129 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5652 | 0.4218 | 0.02127 | 0.02085 | 2.678 | 2/15/2014 16:12 | 500 |
| 21 | F1 | 15 | 2 | 5046 | 336.398 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5764 | 0.4235 | 0.00772 | 0.01640 | 1.508 | 2/15/2014 16:12 | 500 |
| 22 | F2 | 15 | 1 | 4355 | 290.331 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5713 | 0.4054 | 0.01365 | 0.03915 | 1.270 | 2/15/2014 16:12 | 500 |
| 23 | F3 | 15 | 1 | 3070 | 204.664 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5793 | 0.4214 | 0.00961 | 0.03381 | 1.072 | 2/15/2014 16:12 | 500 |
| 24 | F4 | 15 | 1 | 2459 | 163.930 | 2/16/2014 10:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5766 | 0.4137 | 0.00850 | 0.04642 | 1.036 | 2/15/2014 16:12 | 500 |
| 25 | G1 | 15 | 2 | 5748 | 383.198 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5811 | 0.4573 | 0.01543 | 0.01645 | 0.960 | 2/15/2014 16:18 | 500 |
| 26 | G2 | 15 | 5 | 6680 | 445.324 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5738 | 0.4576 | 0.01349 | 0.02788 | 0.954 | 2/15/2014 16:18 | 500 |
| 27 | G3 | 15 | 1 | 7001 | 466.730 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5847 | 0.4607 | 0.01089 | 0.04320 | 1.290 | 2/15/2014 16:18 | 500 |
| 28 | G4 | 15 | 2 | 6354 | 423.597 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5725 | 0.4454 | 0.00938 | 0.02199 | 0.924 | 2/15/2014 16:18 | 500 |
| 29 | H1 | 15 | 1 | 4874 | 324.932 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5679 | 0.4145 | 0.00965 | 0.02716 | 0.904 | 2/15/2014 16:12 | 500 |
| 30 | H2 | 15 | 0 | 4353 | 290.200 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5697 | 0.4241 | 0.00948 | 0.03714 | 0.944 | 2/15/2014 16:12 | 500 |
| 31 | H3 | 15 | 2 | 3025 | 201.664 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5801 | 0.4343 | 0.00824 | 0.02348 | 1.252 | 2/15/2014 16:12 | 500 |
| 32 | H4 | 15 | 1 | 2371 | 158.064 | 2/16/2014 11:05 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5689 | 0.4106 | 0.00628 | 0.04001 | 1.000 | 2/15/2014 16:12 | 500 |
| 33 | I1 | 15 | 0 | 5533 | 368.867 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5461 | 0.4053 | 0.01079 | 0.00864 | 1.062 | 2/15/2014 16:12 | 500 |
| 34 | I2 | 15 | 4 | 6369 | 424.598 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5507 | 0.4077 | 0.00589 | 0.00805 | 0.944 | 2/15/2014 16:12 | 500 |
| 35 | I3 | 15 | 2 | 6318 | 421.199 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5464 | 0.3901 | 0.01067 | 0.01119 | 1.010 | 2/15/2014 16:12 | 500 |
| 36 | I4 | 15 | 1 | 6220 | 414.666 | 2/16/2014 9:47 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5489 | 0.4026 | 0.01280 | 0.01109 | 0.870 | 2/15/2014 16:12 | 500 |
| 37 | J1 | 15 | 2 | 4739 | 315.932 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5419 | 0.3838 | 0.01589 | 0.01343 | 0.964 | 2/15/2014 16:12 | 500 |
| 38 | J2 | 15 | 1 | 4005 | 266.999 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5391 | 0.3787 | 0.01035 | 0.01166 | 0.886 | 2/15/2014 16:12 | 500 |
| 39 | J3 | 15 | 5 | 2909 | 193.930 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5414 | 0.3812 | 0.01579 | 0.01025 | 0.914 | 2/15/2014 16:12 | 500 |
| 40 | J4 | 15 | 3 | 2254 | 150.264 | 2/16/2014 9:48 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5460 | 0.3862 | 0.01072 | 0.01526 | 0.978 | 2/15/2014 16:12 | 500 |

M-10225

DCN: ITSI-0808 0004-0076, 8 May 2019

| 2nd Count Raw Data | | | | | | | 2nd Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency Y-90 (cpm/dpm) | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | A1 | 15 | 0 | 1421 | 94.733 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5888 | 0.02044 | 0.03298 | 1.120 | 2/22/2014 18:34 | 500 |
| 2 | A2 | 15 | 1 | 1572 | 104.799 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5959 | 0.02268 | 0.02236 | 1.146 | 2/22/2014 18:34 | 500 |
| 3 | A3 | 15 | 3 | 1657 | 110.462 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5992 | 0.01784 | 0.02575 | 1.146 | 2/22/2014 18:34 | 500 |
| 4 | A4 | 0.01 | 0 | 176 | 17600.000 | 2/27/2014 7:22 | LB4100 | 3/1/2013 | 2/28/2014 | 0.0000 | 0.00000 | 0.00000 | FAIL | 12:00:00 AM | 0 |
| 5 | B1 | 15 | 0 | 1227 | 81.800 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6044 | 0.01796 | 0.01463 | 0.940 | 2/22/2014 18:20 | 500 |
| 6 | B2 | 15 | 0 | 1005 | 67.000 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6057 | 0.01415 | 0.02581 | 1.274 | 2/22/2014 18:20 | 500 |
| 7 | B3 | 15 | 0 | 772 | 51.467 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6113 | 0.01320 | 0.02600 | 4.780 | 2/22/2014 18:20 | 500 |
| 8 | B4 | 15 | 1 | 527 | 35.132 | 2/27/2014 7:06 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5702 | 0.00972 | 0.02500 | 1.278 | 2/22/2014 18:20 | 500 |
| 9 | C1 | 15 | 2 | 1511 | 100.732 | 2/27/2014 7:27 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5827 | 0.01816 | 0.01335 | 1.440 | 2/22/2014 19:32 | 500 |
| 10 | C2 | 15 | 0 | 1670 | 111.333 | 2/27/2014 7:27 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5915 | 0.02351 | 0.02904 | 1.584 | 2/22/2014 19:33 | 500 |
| 11 | C3 | 15 | 1 | 1686 | 112.398 | 2/27/2014 7:28 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5852 | 0.02588 | 0.03694 | 1.196 | 2/22/2014 19:33 | 500 |
| 12 | C4 | 15 | 0 | 1820 | 121.333 | 2/27/2014 7:28 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5855 | 0.02683 | 0.03775 | 4.416 | 2/22/2014 19:33 | 500 |
| 13 | D1 | 15 | 0 | 1138 | 75.867 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6725 | 0.02033 | 0.02673 | 1.068 | 2/22/2014 21:30 | 500 |
| 14 | D2 | 15 | 1 | 1097 | 73.131 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6750 | 0.01910 | 0.02995 | 1.200 | 2/22/2014 21:30 | 500 |
| 15 | D3 | 15 | 1 | 851 | 56.732 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6781 | 0.02505 | 0.02741 | 1.054 | 2/22/2014 21:30 | 500 |
| 16 | D4 | 15 | 0 | 665 | 44.333 | 2/27/2014 7:29 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6763 | 0.02356 | 0.02624 | 1.114 | 2/22/2014 21:30 | 500 |
| 17 | E1 | 15 | 1 | 1381 | 92.066 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5886 | 0.02254 | 0.01370 | 1.188 | 2/22/2014 18:54 | 500 |
| 18 | E2 | 15 | 2 | 1531 | 102.062 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6009 | 0.01894 | 0.03375 | 1.232 | 2/22/2014 18:54 | 500 |
| 19 | E3 | 15 | 4 | 1589 | 105.929 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5943 | 0.01897 | 0.01648 | 1.040 | 2/22/2014 18:54 | 500 |
| 20 | E4 | 15 | 1 | 1588 | 105.865 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5905 | 0.02127 | 0.02085 | 1.174 | 2/22/2014 18:54 | 500 |
| 21 | F1 | 15 | 2 | 1252 | 83.464 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6110 | 0.00772 | 0.01640 | 1.558 | 2/22/2014 18:55 | 500 |
| 22 | F2 | 15 | 2 | 1024 | 68.261 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6058 | 0.01365 | 0.03915 | 1.264 | 2/22/2014 18:55 | 500 |
| 23 | F3 | 15 | 1 | 775 | 51.664 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6155 | 0.00981 | 0.03381 | 1.010 | 2/22/2014 18:55 | 500 |
| 24 | F4 | 15 | 0 | 596 | 39.733 | 2/27/2014 7:51 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6121 | 0.00850 | 0.04642 | 1.108 | 2/22/2014 18:55 | 500 |
| 25 | G1 | 15 | 1 | 1374 | 91.599 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5373 | 0.01543 | 0.01645 | 1.316 | 2/22/2014 18:54 | 500 |
| 26 | G2 | 15 | 2 | 1510 | 100.663 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5976 | 0.01349 | 0.02788 | 1.166 | 2/22/2014 18:54 | 500 |
| 27 | G3 | 15 | 1 | 1614 | 107.597 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6078 | 0.01089 | 0.04320 | 1.378 | 2/22/2014 18:54 | 500 |
| 28 | G4 | 15 | 0 | 1574 | 104.933 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6039 | 0.00938 | 0.02199 | 1.064 | 2/22/2014 18:54 | 500 |
| 29 | H1 | 15 | 0 | 1222 | 81.467 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5958 | 0.00965 | 0.02716 | 0.890 | 2/22/2014 18:54 | 500 |
| 30 | H2 | 15 | 2 | 999 | 66.595 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5981 | 0.00946 | 0.03714 | 0.874 | 2/22/2014 18:54 | 500 |
| 31 | H3 | 15 | 3 | 734 | 48.929 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6125 | 0.00824 | 0.02348 | 1.314 | 2/22/2014 18:54 | 500 |
| 32 | H4 | 15 | 3 | 611 | 40.725 | 2/27/2014 8:09 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5977 | 0.00628 | 0.04001 | 1.114 | 2/22/2014 18:54 | 500 |
| 33 | I1 | 15 | 0 | 1393 | 92.867 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5807 | 0.01079 | 0.00864 | 0.968 | 2/22/2014 19:02 | 500 |
| 34 | I2 | 15 | 3 | 1561 | 104.065 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5973 | 0.00589 | 0.00805 | 0.974 | 2/22/2014 19:02 | 500 |
| 35 | I3 | 15 | 2 | 1585 | 105.665 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5959 | 0.01067 | 0.01119 | 1.006 | 2/22/2014 19:02 | 500 |
| 36 | I4 | 15 | 1 | 1553 | 103.533 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.6001 | 0.01280 | 0.01109 | 0.986 | 2/22/2014 19:02 | 500 |
| 37 | J1 | 15 | 3 | 1161 | 77.397 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5939 | 0.01589 | 0.01343 | 1.052 | 2/22/2014 19:03 | 500 |
| 38 | J2 | 15 | 1 | 989 | 65.933 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5903 | 0.01035 | 0.01166 | 0.728 | 2/22/2014 19:03 | 500 |
| 39 | J3 | 15 | 0 | 785 | 52.333 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5926 | 0.01579 | 0.01025 | 0.774 | 2/22/2014 19:03 | 500 |
| 40 | J4 | 15 | 3 | 551 | 36.730 | 2/27/2014 8:31 | LB4100 | 3/1/2013 | 2/28/2014 | 0.5945 | 0.01072 | 0.01528 | 0.914 | 2/22/2014 19:03 | 500 |



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**Correction Factors**

| Pos. | Separation Date/Time Strontium | Separation Date/Time Yttrium | Yttrium Ingrowth (Sr-89 calc) | Yttrium Ingrowth (Sr-90 calc) | Yttrium Decay | Decay from Sample Date Sr-89 | Decay from Sample Date Sr-90 | Net Count Rate Y-90 | Net Count Rate Sr-90 | Gross CPM Sr-89 | Calculated Sample Recovery % Sr | Calculated Sample Recovery % Y | Sample Recovery % Error Sr | Sample Recovery % Error Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0211 | 0.9424 | 0.8062 | 0.9788 | 0.9999 | 3.0440 | 97.1442 | 269.007397 | 85.4% | 97.0% | 1.68% | 1.12% |
| 2 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0211 | 0.9424 | 0.8062 | 0.9788 | 0.9999 | 2.6214 | 97.6205 | 307.088396 | 110% | 100% | 1.33% | 1.12% |
| 3 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0211 | 0.9424 | 0.8062 | 0.9788 | 0.9999 | 3.2110 | 104.0811 | 313.571104 | 94.5% | 94.0% | 1.25% | 1.12% |
| 4 | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.0230~~ | ~~0.9424~~ | ~~0.8054~~ | ~~0.9787~~ | ~~0.9999~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~84.1%~~ | ~~106%~~ | ~~1.26%~~ | ~~1.12%~~ |
| 5 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.4156 | 68.3669 | 243.8134 | 65.5% | 102% | 1.22% | 1.12% |
| 6 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.2094 | 58.3810 | 221.20608 | 56.7% | 98.3% | 1.23% | 1.12% |
| 7 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.3127 | 41.3801 | 151.040507 | 39.0% | 95.8% | 1.21% | 1.12% |
| 8 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0210 | 0.9424 | 0.8063 | 0.9788 | 0.9999 | 3.0752 | 29.4498 | 100.475035 | 30.5% | 96.4% | 1.20% | 1.12% |
| 9 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 3.6882 | 102.4773 | 293.429136 | 85.4% | 97.0% | 1.68% | 1.12% |
| 10 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 3.3427 | 112.2594 | 336.056856 | 110% | 100% | 1.33% | 1.12% |
| 11 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 3.9336 | 121.2940 | 331.098342 | 94.5% | 94.0% | 1.25% | 1.12% |
| 12 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0253 | 0.9424 | 0.8031 | 0.9786 | 0.9999 | 4.6453 | 111.1949 | 318.823905 | 84.1% | 106% | 1.25% | 1.12% |
| ~~13~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.0254~~ | ~~0.9424~~ | ~~0.8029~~ | ~~0.9786~~ | ~~0.9999~~ | ~~3.6376~~ | ~~62.6476~~ | ~~228.878124~~ | ~~65.5%~~ | ~~102%~~ | ~~1.22%~~ | ~~1.12%~~ |
| 14 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0254 | 0.9424 | 0.8029 | 0.9786 | 0.9999 | 4.2658 | 63.4341 | 248.56078 | 56.7% | 98.3% | 1.23% | 1.12% |
| 15 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0254 | 0.9424 | 0.8029 | 0.9786 | 0.9999 | 4.7980 | 50.6248 | 160.243871 | 39.0% | 95.8% | 1.21% | 1.12% |
| 16 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0254 | 0.9424 | 0.8029 | 0.9786 | 0.9999 | 4.7678 | 38.1249 | 125.90552 | 30.5% | 96.4% | 1.20% | 1.12% |
| 17 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 31.6163 | 93.4900 | 270.959426 | 85.4% | 97.0% | 1.68% | 1.12% |
| 18 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 27.2838 | 98.6973 | 317.34548 | 110% | 100% | 1.33% | 1.12% |
| 19 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 32.9598 | 101.2006 | 310.236231 | 94.5% | 94.0% | 1.25% | 1.12% |
| 20 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 36.9508 | 93.5266 | 302.651727 | 84.1% | 106% | 1.25% | 1.12% |
| 21 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 37.1110 | 73.5203 | 225.766545 | 65.5% | 102% | 1.22% | 1.12% |
| 22 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 35.0891 | 60.5385 | 194.703073 | 56.7% | 98.3% | 1.23% | 1.12% |
| 23 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 38.5510 | 46.0119 | 118.101482 | 39.0% | 95.8% | 1.21% | 1.12% |
| 24 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2238 | 0.9424 | 0.7998 | 0.9669 | 0.9998 | 37.6275 | 35.9122 | 90.3904956 | 30.5% | 96.4% | 1.20% | 1.12% |
| 25 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 31.8633 | 105.4188 | 245.915768 | 85.4% | 97.0% | 1.68% | 1.12% |
| 26 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 27.3121 | 101.3688 | 316.643134 | 110% | 100% | 1.33% | 1.12% |
| 27 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 33.8602 | 113.9971 | 318.873169 | 94.5% | 94.0% | 1.25% | 1.12% |
| 28 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 37.1905 | 96.1344 | 290.272135 | 84.1% | 106% | 1.25% | 1.12% |
| 29 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 37.0330 | 72.6181 | 215.080353 | 65.5% | 102% | 1.22% | 1.12% |
| 30 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 34.9150 | 63.1388 | 192.146214 | 56.7% | 98.3% | 1.23% | 1.12% |
| 31 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 36.7579 | 46.8950 | 118.010649 | 39.0% | 95.8% | 1.21% | 1.12% |
| 32 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2263 | 0.9424 | 0.7971 | 0.9667 | 0.9998 | 39.1422 | 37.5667 | 81.3551149 | 30.5% | 96.4% | 1.20% | 1.12% |
| 33 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 31.0017 | 88.3293 | 249.535694 | 85.4% | 97.0% | 1.68% | 1.12% |
| 34 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 27.0495 | 93.9966 | 303.551779 | 110% | 100% | 1.33% | 1.12% |
| 35 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 31.8901 | 97.3928 | 291.915619 | 94.5% | 94.0% | 1.25% | 1.12% |
| 36 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 35.0961 | 86.6888 | 292.881037 | 84.1% | 106% | 1.25% | 1.12% |
| 37 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 33.5487 | 64.3626 | 218.020257 | 65.5% | 102% | 1.22% | 1.12% |
| 38 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 33.1210 | 56.9053 | 176.972955 | 56.7% | 98.3% | 1.23% | 1.12% |
| 39 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 38.0571 | 46.2524 | 109.62048 | 39.0% | 95.8% | 1.21% | 1.12% |
| 40 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2155 | 0.9424 | 0.7940 | 0.9674 | 0.9998 | 33.8396 | 32.2426 | 84.1814562 | 30.5% | 96.4% | 1.20% | 1.12% |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-89 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-89 LCS S/N :** 1680-A
**LCS Exp Date :** 3/24/2014
**LCS Activity (dpm/ml):** 2849.70
**LCS Volume Added:** 0.20
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-89 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.1721 | 2.2396 | 1 | 5.4191 | 1258.5608 | 3.08% | 267.7854 | 4.2351 | 39.0130 | 225.1004 | | LCS | | | 1283.6485 | 98.0% |
| 2 | 2.5514 | 1.8013 | 1 | 4.3408 | 1128.6481 | 3.02% | 305.8064 | 4.5249 | 32.7327 | 202.3998 | | LCS | | | 1283.6485 | 87.9% |
| 3 | 2.7223 | 1.9220 | 1 | 4.7020 | 1340.7009 | 2.62% | 312.4911 | 4.5724 | 38.4499 | 234.3604 | | LCS | | | 1283.6485 | 104.4% |
| 4 | #DIV/0! | #DIV/0! | 1 | #DIV/0! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | | LCS | | | 1283.6485 | #VALUE! |
| 5 | 3.9535 | 2.7912 | 1 | 6.8309 | 1515.2471 | 2.73% | 242.7374 | 4.0319 | 49.3304 | 266.2048 | | LCS | | | 1283.6485 | 118.0% |
| 6 | 4.8271 | 3.4080 | 1 | 8.2428 | 1569.4144 | 2.56% | 219.9781 | 3.8405 | 53.7036 | 272.0302 | | LCS | | | 1283.6485 | 122.3% |
| 7 | 12.7277 | 8.9859 | 1 | 20.0257 | 1508.8802 | 2.81% | 146.9205 | 3.1745 | 63.9009 | 264.4128 | | LCS | | | 1283.6485 | 117.5% |
| 8 | 9.1928 | 6.4902 | 1 | 15.8057 | 1403.3039 | 3.03% | 99.3390 | 2.5886 | 71.6712 | 247.8956 | | LCS | | | 1283.6485 | 109.3% |
| 9 | 3.5987 | 2.5407 | 1 | 6.0271 | 1380.0346 | 2.90% | 291.8751 | 4.4232 | 40.9911 | 243.7629 | | LCS | | | 1283.6485 | 107.5% |
| 10 | 2.4984 | 1.7639 | 1 | 4.2592 | 1224.4060 | 3.05% | 334.8049 | 4.7335 | 33.9293 | 220.2116 | | LCS | | | 1283.6485 | 95.4% |
| 11 | 3.0416 | 2.1474 | 1 | 5.1549 | 1418.0618 | 3.21% | 329.7563 | 4.6985 | 39.6020 | 258.3477 | | LCS | | | 1283.6485 | 110.5% |
| 12 | 5.8913 | 4.1593 | 1 | 9.2883 | 1526.7040 | 3.30% | 314.8639 | 4.6112 | 43.8227 | 280.1474 | | LCS | | | 1283.6485 | 118.9% |
| 13 | 4.6160 | 3.2582 | 1 | 8.1301 | 1849.8529 | 2.92% | 228.0101 | 3.9064 | 62.1184 | 329.0784 | | LCS | | | 1283.6485 | 144.1% |
| 14 | 3.8430 | 2.7132 | 1 | 6.6086 | 1462.4630 | 2.80% | 247.4268 | 4.0710 | 47.1623 | 258.0363 | | LCS | | | 1283.6485 | 113.9% |
| 15 | 5.4126 | 3.8213 | 1 | 9.3930 | 1393.4498 | 3.46% | 159.2179 | 3.2688 | 56.0715 | 256.8566 | | LCS | | | 1283.6485 | 108.6% |
| 16 | 7.2104 | 5.0906 | 1 | 12.4130 | 1392.4665 | 3.52% | 124.7855 | 2.8976 | 63.3740 | 256.8508 | | LCS | | | 1283.6485 | 108.5% |
| 17 | 4.1349 | 2.9192 | 1 | 6.8055 | 1300.5602 | 3.22% | 268.9974 | 4.2506 | 40.2802 | 235.0667 | | LCS | | | 1283.6485 | 101.3% |
| 18 | 2.8950 | 2.0439 | 1 | 4.8338 | 1177.6495 | 2.73% | 315.7295 | 4.6000 | 33.6287 | 207.0585 | | LCS | | | 1283.6485 | 91.7% |
| 19 | 3.4413 | 2.4296 | 1 | 5.7310 | 1344.9983 | 2.71% | 308.5642 | 4.5482 | 38.8569 | 236.3604 | | LCS | | | 1283.6485 | 104.8% |
| 20 | 4.8938 | 3.4551 | 1 | 7.8897 | 1469.2475 | 2.89% | 299.9737 | 4.4925 | 43.1272 | 261.3527 | | LCS | | | 1283.6485 | 114.5% |
| 21 | 4.6226 | 3.2636 | 1 | 7.7602 | 1382.6181 | 2.25% | 224.2585 | 3.8800 | 46.8853 | 235.4681 | | LCS | | | 1283.6485 | 107.7% |
| 22 | 4.9473 | 3.4928 | 1 | 8.4236 | 1390.7977 | 2.62% | 193.4331 | 3.6032 | 50.7776 | 241.7429 | | LCS | | | 1283.6485 | 108.3% |
| 23 | 6.5138 | 4.5988 | 1 | 11.2584 | 1205.8760 | 2.86% | 117.0295 | 2.8063 | 56.6767 | 211.9030 | | LCS | | | 1283.6485 | 93.9% |
| 24 | 8.2354 | 5.8142 | 1 | 14.2769 | 1184.1078 | 3.12% | 89.3545 | 2.4552 | 63.7707 | 210.7901 | | LCS | | | 1283.6485 | 92.2% |
| 25 | 2.8095 | 1.9835 | 1 | 4.9064 | 1150.4228 | 2.81% | 244.9558 | 4.0492 | 37.2734 | 201.7361 | | LCS | | | 1283.6485 | 89.6% |
| 26 | 2.2060 | 1.5575 | 1 | 3.8548 | 1167.7914 | 2.39% | 315.6891 | 4.5947 | 33.3135 | 200.7422 | | LCS | | | 1283.6485 | 91.0% |
| 27 | 2.9238 | 2.0642 | 1 | 4.9716 | 1338.9867 | 2.20% | 317.5832 | 4.6109 | 38.1035 | 227.9908 | | LCS | | | 1283.6485 | 104.3% |
| 28 | 2.8383 | 2.0038 | 1 | 4.9749 | 1399.2959 | 2.18% | 289.3481 | 4.3992 | 41.6987 | 237.8318 | | LCS | | | 1283.6485 | 109.0% |
| 29 | 3.6329 | 2.5649 | 1 | 6.3813 | 1340.3315 | 2.35% | 214.1764 | 3.7869 | 46.4493 | 229.5948 | | LCS | | | 1283.6485 | 104.4% |
| 30 | 4.2780 | 3.0203 | 1 | 7.4830 | 1378.8631 | 2.43% | 191.2022 | 3.5793 | 50.5926 | 236.7632 | | LCS | | | 1283.6485 | 107.4% |
| 31 | 7.0304 | 4.9635 | 1 | 11.9851 | 1201.5326 | 2.81% | 116.7586 | 2.8053 | 56.5831 | 210.2625 | | LCS | | | 1283.6485 | 93.6% |
| 32 | 8.2018 | 5.7905 | 1 | 14.2677 | 1079.4270 | 3.20% | 80.3551 | 2.3293 | 61.3285 | 193.4133 | | LCS | | | 1283.6485 | 84.1% |
| 33 | 3.1424 | 2.2186 | 1 | 5.4359 | 1240.9335 | 2.58% | 248.4737 | 4.0790 | 39.9275 | 214.2005 | | LCS | | | 1283.6485 | 96.7% |
| 34 | 2.2851 | 1.6133 | 1 | 3.9970 | 1165.6406 | 2.08% | 302.6078 | 4.4987 | 33.9650 | 196.7323 | | LCS | | | 1283.6485 | 90.8% |
| 35 | 2.7662 | 1.9529 | 1 | 4.8075 | 1311.4160 | 2.23% | 290.9056 | 4.4117 | 38.9807 | 223.6203 | | LCS | | | 1283.6485 | 102.2% |
| 36 | 2.8705 | 2.0266 | 1 | 5.0613 | 1471.8663 | 2.34% | 292.0110 | 4.4190 | 43.6561 | 252.6004 | | LCS | | | 1283.6485 | 114.7% |
| 37 | 3.9290 | 2.7739 | 1 | 6.8586 | 1422.5997 | 2.66% | 217.0563 | 3.8127 | 48.9777 | 248.5193 | | LCS | | | 1283.6485 | 110.8% |
| 38 | 4.3767 | 3.0900 | 1 | 7.7031 | 1341.0071 | 2.53% | 176.0870 | 3.4351 | 51.2744 | 231.5371 | | LCS | | | 1283.6485 | 104.5% |
| 39 | 6.4318 | 4.5409 | 1 | 11.2855 | 1197.7983 | 3.19% | 108.7065 | 2.7037 | 58.3900 | 215.5747 | | LCS | | | 1283.6485 | 93.3% |
| 40 | 8.4440 | 5.9615 | 1 | 14.7200 | 1163.5689 | 3.27% | 83.2035 | 2.3694 | 64.9449 | 209.1728 | | LCS | | | 1283.6485 | 90.6% |

M-10228

DCN: ITSI-0808 0004-0076, 8 May 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-90 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-90 LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 506.15
**LCS Volume Added:** 0.50
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-90 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.9266 | 2.7722 | 1 | 6.7598 | 568.8779 | 3.56% | 93.6133 | 2.5135 | 22.7481 | 99.7577 | | LCS | | | 569.9889 | 99.8% |
| 2 | 2.9609 | 2.0905 | 1 | 5.0869 | 469.5573 | 3.59% | 103.6525 | 2.6436 | 17.8358 | 82.4743 | | LCS | | | 569.9889 | 82.4% |
| 3 | 3.6386 | 2.5689 | 1 | 6.2511 | 608.5438 | 3.26% | 109.3155 | 2.7141 | 22.5018 | 105.3476 | | LCS | | | 569.9889 | 106.8% |
| ~~4~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#VALUE!~~ |
| 5 | 4.3222 | 3.0515 | 1 | 7.5633 | 590.3947 | 3.58% | 80.8600 | 2.3356 | 25.3996 | 103.6460 | | LCS | | | 569.9889 | 103.6% |
| 6 | 6.0536 | 4.2739 | 1 | 10.3047 | 577.3507 | 3.69% | 65.7260 | 2.1141 | 27.6585 | 101.8482 | | LCS | | | 569.9889 | 101.3% |
| 7 | 17.3057 | 12.2180 | 1 | 27.0288 | 605.2564 | 4.33% | 46.6867 | 1.8549 | 35.8161 | 110.1340 | | LCS | | | 569.9889 | 106.2% |
| 8 | 12.2043 | 8.6163 | 1 | 20.7689 | 598.5814 | 4.76% | 33.8537 | 1.5312 | 40.3244 | 111.3407 | | LCS | | | 569.9889 | 105.0% |
| 9 | 4.5167 | 3.1888 | 1 | 7.6105 | 612.0962 | 3.37% | 99.2916 | 2.5920 | 23.7052 | 106.4792 | | LCS | | | 569.9889 | 107.4% |
| 10 | 3.5200 | 2.4851 | 1 | 5.8664 | 502.7327 | 3.60% | 109.7493 | 2.7250 | 18.5183 | 88.3243 | | LCS | | | 569.9889 | 88.2% |
| 11 | 3.8209 | 2.6976 | 1 | 6.5396 | 636.3261 | 3.74% | 111.2015 | 2.7378 | 23.2421 | 112.5415 | | LCS | | | 569.9889 | 111.6% |
| 12 | 7.3048 | 5.1572 | 1 | 11.4531 | 665.6454 | 3.79% | 116.9173 | 2.8456 | 24.0353 | 117.9805 | | LCS | | | 569.9889 | 116.8% |
| ~~13~~ | ~~4.1584~~ | ~~2.9359~~ | ~~1~~ | ~~7.1898~~ | ~~492.9544~~ | ~~3.80%~~ | ~~74.7087~~ | ~~2.2494~~ | ~~21.8863~~ | ~~87.4019~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~86.5%~~ |
| 14 | 5.2937 | 3.7374 | 1 | 9.0578 | 569.3270 | 3.79% | 71.9313 | 2.2086 | 25.9253 | 100.8844 | | LCS | | | 569.9889 | 99.9% |
| 15 | 7.3570 | 5.1941 | 1 | 12.7355 | 653.4768 | 4.44% | 55.6775 | 1.9453 | 33.8614 | 119.5652 | | LCS | | | 569.9889 | 114.6% |
| 16 | 9.5462 | 6.8103 | 1 | 16.6143 | 646.9362 | 4.76% | 43.2193 | 1.7198 | 38.1797 | 120.3234 | | LCS | | | 569.9889 | 113.5% |
| 17 | 4.0783 | 2.8793 | 1 | 6.9842 | 556.9244 | 3.71% | 90.8778 | 2.4779 | 22.4352 | 98.3467 | | LCS | | | 569.9889 | 97.7% |
| 18 | 3.0690 | 2.1668 | 1 | 5.2393 | 456.6243 | 3.40% | 100.8302 | 2.6089 | 17.4557 | 79.5183 | | LCS | | | 569.9889 | 80.1% |
| 19 | 3.5230 | 2.4872 | 1 | 6.1061 | 593.4605 | 3.36% | 104.8889 | 2.6578 | 22.2172 | 103.1770 | | LCS | | | 569.9889 | 104.1% |
| 20 | 3.7502 | 2.6477 | 1 | 6.4292 | 593.4794 | 3.49% | 104.6913 | 2.6571 | 22.2536 | 103.7931 | | LCS | | | 569.9889 | 104.1% |
| 21 | 5.5497 | 3.9182 | 1 | 9.2928 | 596.4563 | 3.19% | 81.9065 | 2.3595 | 25.3856 | 102.9502 | | LCS | | | 569.9889 | 104.6% |
| 22 | 6.0771 | 4.2905 | 1 | 10.3517 | 593.1378 | 3.64% | 66.9974 | 2.1338 | 27.9101 | 104.4129 | | LCS | | | 569.9889 | 104.1% |
| 23 | 7.9650 | 5.6233 | 1 | 13.8428 | 657.5248 | 3.96% | 50.6544 | 1.8564 | 35.6018 | 117.4499 | | LCS | | | 569.9889 | 115.4% |
| 24 | 10.6710 | 7.5338 | 1 | 18.3884 | 641.3271 | 4.44% | 38.6253 | 1.6282 | 39.9412 | 117.3482 | | LCS | | | 569.9889 | 112.5% |
| 25 | 4.7181 | 3.3310 | 1 | 8.0093 | 608.1605 | 3.34% | 90.2829 | 2.4717 | 24.5164 | 105.6351 | | LCS | | | 569.9889 | 106.7% |
| 26 | 3.0123 | 2.1267 | 1 | 5.1673 | 454.6055 | 3.14% | 99.4969 | 2.5910 | 17.4317 | 78.3182 | | LCS | | | 569.9889 | 79.8% |
| 27 | 3.9787 | 2.8090 | 1 | 6.7283 | 589.6512 | 2.97% | 106.2191 | 2.6788 | 21.8968 | 100.8910 | | LCS | | | 569.9889 | 103.4% |
| 28 | 3.5030 | 2.4731 | 1 | 6.0587 | 577.7286 | 2.94% | 103.8693 | 2.6453 | 21.6652 | 98.7280 | | LCS | | | 569.9889 | 101.4% |
| 29 | 4.3155 | 3.0468 | 1 | 7.5919 | 603.6878 | 3.25% | 80.5767 | 2.3309 | 25.7138 | 104.4698 | | LCS | | | 569.9889 | 105.9% |
| 30 | 5.1358 | 3.6259 | 1 | 9.0514 | 591.3318 | 3.53% | 65.7210 | 2.1075 | 27.9212 | 103.5613 | | LCS | | | 569.9889 | 103.7% |
| 31 | 9.1602 | 6.4672 | 1 | 15.5521 | 623.1901 | 4.04% | 47.6146 | 1.8068 | 34.8207 | 111.7745 | | LCS | | | 569.9889 | 109.3% |
| 32 | 10.9956 | 7.7630 | 1 | 18.9386 | 675.8776 | 4.36% | 39.6113 | 1.6484 | 41.4151 | 123.1151 | | LCS | | | 569.9889 | 118.6% |
| 33 | 3.7590 | 2.6539 | 1 | 6.5593 | 575.0605 | 3.12% | 91.8987 | 2.4886 | 22.8387 | 99.0048 | | LCS | | | 569.9889 | 100.9% |
| 34 | 2.7655 | 1.9525 | 1 | 4.8229 | 473.1386 | 2.65% | 103.0911 | 2.6343 | 17.7316 | 80.5963 | | LCS | | | 569.9889 | 83.0% |
| 35 | 3.4811 | 2.4577 | 1 | 6.0522 | 594.9269 | 2.97% | 104.6592 | 2.6545 | 22.1300 | 101.8109 | | LCS | | | 569.9889 | 104.4% |
| 36 | 3.4070 | 2.4053 | 1 | 5.9346 | 576.2633 | 3.07% | 102.5466 | 2.6276 | 21.6554 | 99.0193 | | LCS | | | 569.9889 | 101.1% |
| 37 | 4.7261 | 3.3366 | 1 | 8.1826 | 576.1620 | 3.55% | 76.3453 | 2.2720 | 25.1466 | 101.0295 | | LCS | | | 569.9889 | 101.1% |
| 38 | 4.7687 | 3.3668 | 1 | 8.5643 | 596.8798 | 3.56% | 65.2046 | 2.0969 | 28.1511 | 104.6851 | | LCS | | | 569.9889 | 104.7% |
| 39 | 7.2954 | 5.1506 | 1 | 13.0176 | 700.2592 | 4.11% | 51.5593 | 1.8683 | 37.2136 | 126.0061 | | LCS | | | 569.9889 | 122.9% |
| 40 | 10.0524 | 7.0971 | 1 | 17.6384 | 616.8036 | 4.64% | 35.8163 | 1.5654 | 39.5370 | 113.9946 | | LCS | | | 569.9889 | 108.2% |

M-10229

| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 1st Count | | | | | | | | |
| V1 | A1 | 15 | 2 | 5538 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V2 | A2 | 15 | 2 | 6110 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V3 | A3 | 15 | 2 | 6313 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V4 | A4 | 0.01 | 0 | 1480 | 2/15/2014 13:38 | 2/15/2014 13:39 | LB4100 | SR89V14 |
| V5 | B1 | 15 | 4 | 4734 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V6 | B2 | 15 | 2 | 4242 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V7 | B3 | 15 | 0 | 2936 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V8 | B4 | 15 | 0 | 1995 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V1 | C1 | 15 | 6 | 5997 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V2 | C2 | 15 | 4 | 6775 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V3 | C3 | 15 | 3 | 6845 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V4 | C4 | 15 | 1 | 6520 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V5 | D1 | 15 | 2 | 4429 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V6 | D2 | 15 | 3 | 4744 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V7 | D3 | 15 | 0 | 3235 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V8 | D4 | 15 | 1 | 2532 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V1 | E1 | 15 | 1 | 5941 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V2 | E2 | 15 | 3 | 6650 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V3 | E3 | 15 | 3 | 6666 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V4 | E4 | 15 | 3 | 6497 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V5 | F1 | 15 | 2 | 5046 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V6 | F2 | 15 | 4 | 4355 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V7 | F3 | 15 | 1 | 3070 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V8 | F4 | 15 | 1 | 2459 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V1 | G1 | 15 | 2 | 5748 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V2 | G2 | 15 | 5 | 6680 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V3 | G3 | 15 | 1 | 7001 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V4 | G4 | 15 | 2 | 6354 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V5 | H1 | 15 | 1 | 4874 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V6 | H2 | 15 | 0 | 4353 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V7 | H3 | 15 | 2 | 3025 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V8 | H4 | 15 | 1 | 2371 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V1 | I1 | 15 | 0 | 5533 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V2 | I2 | 15 | 4 | 6369 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V3 | I3 | 15 | 2 | 6318 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V4 | I4 | 15 | 1 | 6220 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V5 | J1 | 15 | 2 | 4739 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V6 | J2 | 15 | 1 | 4005 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V7 | J3 | 15 | 5 | 2909 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V8 | J4 | 15 | 3 | 2254 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| 2nd Count | | | | | | | | |
| SV1 | A1 | 15 | 0 | 1421 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV2 | A2 | 15 | 1 | 1572 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV3 | A3 | 15 | 3 | 1657 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV4 | A4 | 0.01 | 0 | 176 | 2/27/2014 7:22 | 2/27/2014 7:22 | LB4100 | SR90V14 |
| SV5 | B1 | 15 | 0 | 1227 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV6 | B2 | 15 | 0 | 1005 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV7 | B3 | 15 | 0 | 772 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV8 | B4 | 15 | 1 | 527 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV1 | C1 | 15 | 2 | 1511 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV2 | C2 | 15 | 0 | 1670 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV3 | C3 | 15 | 1 | 1686 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV4 | C4 | 15 | 0 | 1820 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV5 | D1 | 15 | 0 | 1138 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV6 | D2 | 15 | 1 | 1097 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV7 | D3 | 15 | 1 | 851 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV8 | D4 | 15 | 0 | 665 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV1 | E1 | 15 | 1 | 1381 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV2 | E2 | 15 | 2 | 1531 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV3 | E3 | 15 | 4 | 1589 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV4 | E4 | 15 | 1 | 1588 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV5 | F1 | 15 | 2 | 1252 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV6 | F2 | 15 | 2 | 1024 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV7 | F3 | 15 | 1 | 775 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV8 | F4 | 15 | 0 | 596 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV1 | G1 | 15 | 1 | 1374 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV2 | G2 | 15 | 2 | 1510 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV3 | G3 | 15 | 1 | 1614 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV4 | G4 | 15 | 0 | 1574 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV5 | H1 | 15 | 0 | 1222 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV6 | H2 | 15 | 2 | 999 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV7 | H3 | 15 | 3 | 734 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV8 | H4 | 15 | 3 | 611 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV1 | I1 | 15 | 0 | 1393 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV2 | I2 | 15 | 3 | 1561 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV3 | I3 | 15 | 2 | 1585 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV4 | I4 | 15 | 1 | 1553 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV5 | J1 | 15 | 3 | 1161 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV6 | J2 | 15 | 1 | 989 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV7 | J3 | 15 | 0 | 785 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV8 | J4 | 15 | 3 | 551 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 1st Count | | | | | | | | |
| V1 | A1 | 15 | 2 | 5538 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V2 | A2 | 15 | 2 | 6110 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V3 | A3 | 15 | 2 | 6313 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V4 | A4 | 0.01 | 0 | 1480 | 2/15/2014 13:38 | 2/15/2014 13:39 | LB4100 | SR89V14 |
| V5 | B1 | 15 | 4 | 4734 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V6 | B2 | 15 | 2 | 4242 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V7 | B3 | 15 | 0 | 2936 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V8 | B4 | 15 | 0 | 1995 | 2/15/2014 13:20 | 2/15/2014 13:35 | LB4100 | SR89V14 |
| V1 | C1 | 15 | 6 | 5997 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V2 | C2 | 15 | 4 | 6775 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V3 | C3 | 15 | 3 | 6845 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V4 | C4 | 15 | 1 | 6520 | 2/15/2014 13:44 | 2/15/2014 13:59 | LB4100 | SR89V14 |
| V5 | D1 | 15 | 2 | 4429 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V6 | D2 | 15 | 3 | 4744 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V7 | D3 | 15 | 0 | 3235 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V8 | D4 | 15 | 1 | 2532 | 2/15/2014 13:45 | 2/15/2014 14:00 | LB4100 | SR89V14 |
| V1 | E1 | 15 | 1 | 5941 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V2 | E2 | 15 | 3 | 6650 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V3 | E3 | 15 | 3 | 6666 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V4 | E4 | 15 | 3 | 6497 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V5 | F1 | 15 | 2 | 5046 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V6 | F2 | 15 | 1 | 4355 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V7 | F3 | 15 | 1 | 3070 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V8 | F4 | 15 | 1 | 2459 | 2/16/2014 10:47 | 2/16/2014 11:02 | LB4100 | SR89V14 |
| V1 | G1 | 15 | 2 | 5748 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V2 | G2 | 15 | 5 | 6680 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V3 | G3 | 15 | 1 | 7001 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V4 | G4 | 15 | 2 | 6354 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V5 | H1 | 15 | 1 | 4874 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V6 | H2 | 15 | 0 | 4353 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V7 | H3 | 15 | 2 | 3025 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V8 | H4 | 15 | 1 | 2371 | 2/16/2014 11:05 | 2/16/2014 11:20 | LB4100 | SR89V14 |
| V1 | I1 | 15 | 0 | 5533 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V2 | I2 | 15 | 4 | 6369 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V3 | I3 | 15 | 2 | 6318 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V4 | I4 | 15 | 1 | 6220 | 2/16/2014 9:47 | 2/16/2014 10:02 | LB4100 | SR89V14 |
| V5 | J1 | 15 | 2 | 4739 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V6 | J2 | 15 | 1 | 4005 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V7 | J3 | 15 | 5 | 2909 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| V8 | J4 | 15 | 3 | 2254 | 2/16/2014 9:48 | 2/16/2014 10:03 | LB4100 | SR89V14 |
| 2nd Count | | | | | | | | |
| SV1 | A1 | 15 | 0 | 1421 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV2 | A2 | 15 | 1 | 1572 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV3 | A3 | 15 | 3 | 1657 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV4 | A4 | 0.01 | 0 | 176 | 2/27/2014 7:22 | 2/27/2014 7:22 | LB4100 | SR90V14 |
| SV5 | B1 | 15 | 0 | 1227 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV6 | B2 | 15 | 0 | 1005 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV7 | B3 | 15 | 0 | 772 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV8 | B4 | 15 | 1 | 527 | 2/27/2014 7:06 | 2/27/2014 7:21 | LB4100 | SR90V14 |
| SV1 | C1 | 15 | 2 | 1511 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV2 | C2 | 15 | 0 | 1670 | 2/27/2014 7:27 | 2/27/2014 7:42 | LB4100 | SR90V14 |
| SV3 | C3 | 15 | 1 | 1686 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV4 | C4 | 15 | 0 | 1820 | 2/27/2014 7:28 | 2/27/2014 7:43 | LB4100 | SR90V14 |
| SV5 | D1 | 15 | 0 | 1138 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV6 | D2 | 15 | 1 | 1097 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV7 | D3 | 15 | 1 | 851 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV8 | D4 | 15 | 0 | 665 | 2/27/2014 7:29 | 2/27/2014 7:44 | LB4100 | SR90V14 |
| SV1 | E1 | 15 | 1 | 1381 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV2 | E2 | 15 | 2 | 1531 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV3 | E3 | 15 | 4 | 1589 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV4 | E4 | 15 | 1 | 1588 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV5 | F1 | 15 | 2 | 1252 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV6 | F2 | 15 | 2 | 1024 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV7 | F3 | 15 | 1 | 775 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV8 | F4 | 15 | 0 | 596 | 2/27/2014 7:51 | 2/27/2014 8:06 | LB4100 | SR90V14 |
| SV1 | G1 | 15 | 1 | 1374 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV2 | G2 | 15 | 2 | 1510 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV3 | G3 | 15 | 1 | 1614 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV4 | G4 | 15 | 0 | 1574 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV5 | H1 | 15 | 0 | 1222 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV6 | H2 | 15 | 2 | 999 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV7 | H3 | 15 | 3 | 734 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV8 | H4 | 15 | 3 | 611 | 2/27/2014 8:09 | 2/27/2014 8:24 | LB4100 | SR90V14 |
| SV1 | I1 | 15 | 0 | 1393 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV2 | I2 | 15 | 3 | 1561 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV3 | I3 | 15 | 2 | 1585 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV4 | I4 | 15 | 1 | 1553 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV5 | J1 | 15 | 3 | 1161 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV6 | J2 | 15 | 1 | 989 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV7 | J3 | 15 | 0 | 785 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |
| SV8 | J4 | 15 | 3 | 551 | 2/27/2014 8:31 | 2/27/2014 8:46 | LB4100 | SR90V14 |

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| Detector # | Sample I.D. | Pgm time (min) | Total (counts) | Voltage | %slope/100V | Date/Time |
|---|---|---|---|---|---|---|
| A1 | Sr-90' | 0.11 | 1 | 750 | 1.2 | 7/1/2009 15:09 |
| A1 | Sr-90' | 0.12 | 1 | 780 | 2.2 | 7/1/2009 15:09 |
| A1 | Sr-90' | 0.5 | 71 | 810 | 3.6 | 7/1/2009 15:10 |
| A1 | Sr-90' | 0.5 | 197 | 840 | 6.3 | 7/1/2009 15:11 |
| A1 | Sr-90' | 0.5 | 436 | 870 | 9.1 | 7/1/2009 15:11 |
| A1 | Sr-90' | 0.5 | 768 | 900 | 11.7 | 7/1/2009 15:12 |
| A1 | Sr-90' | 0.5 | 1146 | 930 | 14.3 | 7/1/2009 15:12 |
| A1 | Sr-90' | 0.5 | 1601 | 960 | 17.2 | 7/1/2009 15:13 |
| A1 | Sr-90' | 0.5 | 2167 | 990 | 20.3 | 7/1/2009 15:14 |
| A1 | Sr-90' | 0.5 | 2839 | 1020 | 23.6 | 7/1/2009 15:14 |
| A1 | Sr-90' | 0.5 | 3575 | 1050 | 27.3 | 7/1/2009 15:15 |
| A1 | Sr-90' | 0.5 | 4430 | 1080 | 33.0 | 7/1/2009 15:16 |
| A1 | Sr-90' | 0.5 | 5461 | 1110 | 38.9 | 7/1/2009 15:16 |
| A1 | Sr-90' | 0.5 | 6850 | 1140 | 44.3 | 7/1/2009 15:17 |
| A1 | Sr-90' | 0.5 | 8198 | 1170 | 46.9 | 7/1/2009 15:18 |
| A1 | Sr-90' | 0.5 | 9713 | 1200 | 44.5 | 7/1/2009 15:18 |
| A1 | Sr-90' | 0.5 | 11070 | 1230 | 40.2 | 7/1/2009 15:19 |
| A1 | Sr-90' | 0.5 | 12096 | 1260 | 32.3 | 7/1/2009 15:20 |
| A1 | Sr-90' | 0.5 | 13036 | 1290 | 23.4 | 7/1/2009 15:20 |
| A1 | Sr-90' | 0.5 | 13569 | 1320 | 14.3 | 7/1/2009 15:21 |
| A1 | Sr-90' | 0.5 | 13839 | 1350 | 7.0 | 7/1/2009 15:21 |
| A1 | Sr-90' | 0.5 | 13834 | 1380 | 5.3 | 7/1/2009 15:22 |
| A1 | Sr-90' | 0.5 | 13947 | 1410 | 3.7 | 7/1/2009 15:23 |
| A1 | Sr-90' | 0.5 | 14310 | 1440 | 4.9 | 7/1/2009 15:23 |
| A1 | Sr-90' | 0.5 | 14159 | 1470 | 1.6 | 7/1/2009 15:24 |
| A1 | Sr-90' | 0.5 | 14463 | 1500 | -0.7 | 7/1/2009 15:25 |
| A1 | Sr-90' | 0.5 | 14107 | 1530 | 0.8 | 7/1/2009 15:25 |
| A1 | Sr-90' | 0.5 | 14237 | 1560 | -1.5 | 7/1/2009 15:53 |
| A1 | Sr-90' | 0.5 | 14392 | 1590 | 0.1 | 7/1/2009 15:53 |
| A1 | Sr-90' | 0.5 | 14095 | 1620 | 16.5 | 7/1/2009 15:54 |
| A1 | Sr-90' | 0.5 | 14197 | 1650 | 16.6 | 7/1/2009 15:55 |
| A2 | Sr-90' | 0.11 | 5 | 750 | 16.4 | 7/1/2009 15:09 |
| A2 | Sr-90' | 0.5 | 52 | 780 | 16.3 | 7/1/2009 15:09 |
| A2 | Sr-90' | 0.5 | 164 | 810 | 5.3 | 7/1/2009 15:10 |
| A2 | Sr-90' | 0.5 | 362 | 840 | 8.4 | 7/1/2009 15:11 |
| A2 | Sr-90' | 0.5 | 643 | 870 | 11.5 | 7/1/2009 15:11 |
| A2 | Sr-90' | 0.5 | 1065 | 900 | 15.3 | 7/1/2009 15:12 |
| A2 | Sr-90' | 0.5 | 1537 | 930 | 19.4 | 7/1/2009 15:12 |
| A2 | Sr-90' | 0.5 | 2206 | 960 | 23.9 | 7/1/2009 15:13 |
| A2 | Sr-90' | 0.5 | 2982 | 990 | 29.1 | 7/1/2009 15:14 |
| A2 | Sr-90' | 0.5 | 3922 | 1020 | 32.4 | 7/1/2009 15:14 |
| A2 | Sr-90' | 0.5 | 5045 | 1050 | 38.2 | 7/1/2009 15:15 |
| A2 | Sr-90' | 0.5 | 6034 | 1080 | 44.5 | 7/1/2009 15:16 |
| A2 | Sr-90' | 0.5 | 7649 | 1110 | 49.6 | 7/1/2009 15:16 |
| A2 | Sr-90' | 0.5 | 9297 | 1140 | 57.5 | 7/1/2009 15:17 |
| A2 | Sr-90' | 0.5 | 10846 | 1170 | 55.5 | 7/1/2009 15:18 |
| A2 | Sr-90' | 0.5 | 13066 | 1200 | 52.9 | 7/1/2009 15:18 |
| A2 | Sr-90' | 0.5 | 14085 | 1230 | 46.3 | 7/1/2009 15:19 |
| A2 | Sr-90' | 0.5 | 15618 | 1260 | 35.4 | 7/1/2009 15:20 |
| A2 | Sr-90' | 0.5 | 16518 | 1290 | 29.3 | 7/1/2009 15:20 |
| A2 | Sr-90' | 0.5 | 17153 | 1320 | 18.3 | 7/1/2009 15:21 |
| A2 | Sr-90' | 0.5 | 17712 | 1350 | 9.3 | 7/1/2009 15:21 |
| A2 | Sr-90' | 0.5 | 17772 | 1380 | 1.8 | 7/1/2009 15:22 |
| A2 | Sr-90' | 0.5 | 17602 | 1410 | -1.3 | 7/1/2009 15:23 |
| A2 | Sr-90' | 0.5 | 17483 | 1440 | -1.1 | 7/1/2009 15:23 |
| A2 | Sr-90' | 0.5 | 17666 | 1470 | 1.0 | 7/1/2009 15:24 |
| A2 | Sr-90' | 0.5 | 17571 | 1500 | 2.6 | 7/1/2009 15:25 |
| A2 | Sr-90' | 0.5 | 17710 | 1530 | 2.0 | 7/1/2009 15:25 |
| A2 | Sr-90' | 0.5 | 17851 | 1560 | 1.0 | 7/1/2009 15:53 |
| A2 | Sr-90' | 0.5 | 17830 | 1590 | -1.5 | 7/1/2009 15:53 |
| A2 | Sr-90' | 0.5 | 17655 | 1620 | 20.6 | 7/1/2009 15:54 |
| A2 | Sr-90' | 0.5 | 17586 | 1650 | 20.6 | 7/1/2009 15:55 |
| A3 | Sr-90' | 0.12 | 2 | 750 | 20.5 | 7/1/2009 15:09 |
| A3 | Sr-90' | 0.11 | 10 | 780 | 20.3 | 7/1/2009 15:09 |
| A3 | Sr-90' | 0.5 | 158 | 810 | 6.3 | 7/1/2009 15:10 |
| A3 | Sr-90' | 0.5 | 412 | 840 | 9.8 | 7/1/2009 15:11 |
| A3 | Sr-90' | 0.5 | 752 | 870 | 13.1 | 7/1/2009 15:11 |
| A3 | Sr-90' | 0.5 | 1186 | 900 | 16.1 | 7/1/2009 15:12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| A3 | Sr-90' | 0.5 | 1743 | 930 | 20.3 | 7/1/2009 15:12 |
| A3 | Sr-90' | 0.5 | 2332 | 960 | 24.4 | 7/1/2009 15:13 |
| A3 | Sr-90' | 0.5 | 3228 | 990 | 28.2 | 7/1/2009 15:14 |
| A3 | Sr-90' | 0.5 | 4102 | 1020 | 33.6 | 7/1/2009 15:14 |
| A3 | Sr-90' | 0.5 | 5082 | 1050 | 38.9 | 7/1/2009 15:15 |
| A3 | Sr-90' | 0.5 | 6439 | 1080 | 47.4 | 7/1/2009 15:16 |
| A3 | Sr-90' | 0.5 | 7892 | 1110 | 54.0 | 7/1/2009 15:16 |
| A3 | Sr-90' | 0.5 | 9804 | 1140 | 56.5 | 7/1/2009 15:17 |
| A3 | Sr-90' | 0.5 | 11495 | 1170 | 55.1 | 7/1/2009 15:18 |
| A3 | Sr-90' | 0.5 | 13109 | 1200 | 49.0 | 7/1/2009 15:18 |
| A3 | Sr-90' | 0.5 | 14504 | 1230 | 41.8 | 7/1/2009 15:19 |
| A3 | Sr-90' | 0.5 | 15649 | 1260 | 31.8 | 7/1/2009 15:20 |
| A3 | Sr-90' | 0.5 | 16497 | 1290 | 21.3 | 7/1/2009 15:20 |
| A3 | Sr-90' | 0.5 | 16882 | 1320 | 11.8 | 7/1/2009 15:21 |
| A3 | Sr-90' | 0.5 | 17082 | 1350 | 6.1 | 7/1/2009 15:21 |
| A3 | Sr-90' | 0.5 | 17120 | 1380 | 5.1 | 7/1/2009 15:22 |
| A3 | Sr-90' | 0.5 | 17292 | 1410 | 4.4 | 7/1/2009 15:23 |
| A3 | Sr-90' | 0.5 | 17541 | 1440 | 3.6 | 7/1/2009 15:23 |
| A3 | Sr-90' | 0.5 | 17524 | 1470 | 1.1 | 7/1/2009 15:24 |
| A3 | Sr-90' | 0.5 | 17542 | 1500 | -0.5 | 7/1/2009 15:25 |
| A3 | Sr-90' | 0.5 | 17462 | 1530 | -0.2 | 7/1/2009 15:25 |
| A3 | Sr-90' | 0.5 | 17501 | 1560 | -0.4 | 7/1/2009 15:53 |
| A3 | Sr-90' | 0.5 | 17517 | 1590 | 0.0 | 7/1/2009 15:53 |
| A3 | Sr-90' | 0.5 | 17449 | 1620 | -0.4 | 7/1/2009 15:54 |
| A3 | Sr-90' | 0.5 | 17488 | 1650 | -0.5 | 7/1/2009 15:55 |
| A4 | Sr-90' | 0.12 | 0 | | 1.3 | 7/1/2009 15:09 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:09 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:10 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:11 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:11 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:12 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:12 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:13 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:14 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:14 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:15 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:16 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:16 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:17 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:18 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:18 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:19 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:20 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:20 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:21 |
| A4 | Sr-90' | 0.11 | 0 | | #DIV/0! | 7/1/2009 15:21 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:22 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:23 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:23 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:24 |
| A4 | Sr-90' | 0.13 | 0 | | #DIV/0! | 7/1/2009 15:25 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:25 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:26 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:53 |
| A4 | Sr-90' | 0.12 | 0 | | #DIV/0! | 7/1/2009 15:54 |
| A4 | Sr-90' | 0.12 | 0 | | 0.1 | 7/1/2009 15:55 |
| B1 | Sr-90' | 0.11 | 2 | 750 | 1.2 | 7/1/2009 15:09 |
| B1 | Sr-90' | 0.12 | 5 | 780 | 2.8 | 7/1/2009 15:09 |
| B1 | Sr-90' | 0.5 | 74 | 810 | 4.9 | 7/1/2009 15:10 |
| B1 | Sr-90' | 0.5 | 259 | 840 | 8.8 | 7/1/2009 15:10 |
| B1 | Sr-90' | 0.5 | 604 | 870 | 12.3 | 7/1/2009 15:11 |
| B1 | Sr-90' | 0.5 | 1066 | 900 | 16.1 | 7/1/2009 15:12 |
| B1 | Sr-90' | 0.5 | 1521 | 930 | 20.5 | 7/1/2009 15:12 |
| B1 | Sr-90' | 0.5 | 2215 | 960 | 24.7 | 7/1/2009 15:13 |
| B1 | Sr-90' | 0.5 | 3106 | 990 | 29.4 | 7/1/2009 15:14 |
| B1 | Sr-90' | 0.5 | 3985 | 1020 | 34.3 | 7/1/2009 15:14 |
| B1 | Sr-90' | 0.5 | 5047 | 1050 | 39.2 | 7/1/2009 15:15 |
| B1 | Sr-90' | 0.5 | 6386 | 1080 | 46.0 | 7/1/2009 15:16 |
| B1 | Sr-90' | 0.5 | 7782 | 1110 | 53.3 | 7/1/2009 15:16 |
| B1 | Sr-90' | 0.5 | 9521 | 1140 | 58.8 | 7/1/2009 15:17 |

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|---|---|---|---|---|---|---|
| B1 | Sr-90' | 0.5 | 11467 | 1170 | 61.3 | 7/1/2009 15:18 |
| B1 | Sr-90' | 0.5 | 13368 | 1200 | 60.4 | 7/1/2009 15:18 |
| B1 | Sr-90' | 0.5 | 15059 | 1230 | 52.4 | 7/1/2009 15:19 |
| B1 | Sr-90' | 0.5 | 16782 | 1260 | 40.4 | 7/1/2009 15:20 |
| B1 | Sr-90' | 0.5 | 17615 | 1290 | 27.3 | 7/1/2009 15:20 |
| B1 | Sr-90' | 0.5 | 18143 | 1320 | 17.5 | 7/1/2009 15:21 |
| B1 | Sr-90' | 0.5 | 18471 | 1350 | 17.1 | 7/1/2009 15:22 |
| B1 | Sr-90' | 0.5 | 18973 | 1380 | 14.4 | 7/1/2009 15:22 |
| B1 | Sr-90' | 0.5 | 19758 | 1410 | 12.4 | 7/1/2009 15:23 |
| B1 | Sr-90' | 0.5 | 19657 | 1440 | 11.1 | 7/1/2009 15:24 |
| B1 | Sr-90' | 0.5 | 19984 | 1470 | 5.9 | 7/1/2009 15:25 |
| B1 | Sr-90' | 0.49 | 20518 | 1500 | 4.2 | 7/1/2009 15:26 |
| B1 | Sr-90' | 0.47 | 20211 | 1530 | 1.5 | 7/1/2009 15:54 |
| B1 | Sr-90' | 0.43 | 20172 | 1560 | 0.2 | 7/1/2009 15:55 |
| B1 | Sr-90' | 0.41 | 20383 | 1590 | 1.5 | 7/1/2009 15:57 |
| B1 | Sr-90' | 0.4 | 20465 | 1620 | | 7/1/2009 15:58 |
| B1 | Sr-90' | 0.39 | 20290 | 1650 | | 7/1/2009 16:00 |
| B2 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| B2 | Sr-90' | 0.11 | 9 | 780 | | 7/1/2009 15:09 |
| B2 | Sr-90' | 0.5 | 109 | 810 | 5.8 | 7/1/2009 15:10 |
| B2 | Sr-90' | 0.5 | 325 | 840 | 9.8 | 7/1/2009 15:10 |
| B2 | Sr-90' | 0.5 | 717 | 870 | 13.6 | 7/1/2009 15:11 |
| B2 | Sr-90' | 0.5 | 1181 | 900 | 17.1 | 7/1/2009 15:12 |
| B2 | Sr-90' | 0.5 | 1714 | 930 | 21.6 | 7/1/2009 15:12 |
| B2 | Sr-90' | 0.5 | 2393 | 960 | 26.7 | 7/1/2009 15:13 |
| B2 | Sr-90' | 0.5 | 3345 | 990 | 34.1 | 7/1/2009 15:14 |
| B2 | Sr-90' | 0.5 | 4370 | 1020 | 41.0 | 7/1/2009 15:14 |
| B2 | Sr-90' | 0.5 | 5845 | 1050 | 47.3 | 7/1/2009 15:15 |
| B2 | Sr-90' | 0.5 | 7288 | 1080 | 53.3 | 7/1/2009 15:16 |
| B2 | Sr-90' | 0.5 | 8981 | 1110 | 59.1 | 7/1/2009 15:16 |
| B2 | Sr-90' | 0.5 | 10794 | 1140 | 66.4 | 7/1/2009 15:17 |
| B2 | Sr-90' | 0.5 | 12959 | 1170 | 70.8 | 7/1/2009 15:18 |
| B2 | Sr-90' | 0.5 | 15256 | 1200 | 68.7 | 7/1/2009 15:18 |
| B2 | Sr-90' | 0.5 | 17372 | 1230 | 55.6 | 7/1/2009 15:19 |
| B2 | Sr-90' | 0.5 | 18895 | 1260 | 39.3 | 7/1/2009 15:20 |
| B2 | Sr-90' | 0.5 | 19482 | 1290 | 27.6 | 7/1/2009 15:20 |
| B2 | Sr-90' | 0.49 | 20099 | 1320 | 15.3 | 7/1/2009 15:21 |
| B2 | Sr-90' | 0.5 | 20913 | 1350 | 7.7 | 7/1/2009 15:22 |
| B2 | Sr-90' | 0.48 | 20468 | 1380 | 0.8 | 7/1/2009 15:22 |
| B2 | Sr-90' | 0.46 | 20449 | 1410 | -1.9 | 7/1/2009 15:23 |
| B2 | Sr-90' | 0.46 | 20458 | 1440 | 1.9 | 7/1/2009 15:24 |
| B2 | Sr-90' | 0.45 | 20631 | 1470 | -0.2 | 7/1/2009 15:25 |
| B2 | Sr-90' | 0.43 | 20659 | 1500 | -0.4 | 7/1/2009 15:26 |
| B2 | Sr-90' | 0.4 | 20326 | 1530 | -4.0 | 7/1/2009 15:54 |
| B2 | Sr-90' | 0.37 | 20546 | 1560 | -1.6 | 7/1/2009 15:55 |
| B2 | Sr-90' | 0.35 | 20090 | 1590 | 1.1 | 7/1/2009 15:57 |
| B2 | Sr-90' | 0.34 | 20530 | 1620 | | 7/1/2009 15:58 |
| B2 | Sr-90' | 0.33 | 20505 | 1650 | | 7/1/2009 16:00 |
| B3 | Sr-90' | 0.16 | 4 | 750 | | 7/1/2009 15:09 |
| B3 | Sr-90' | 0.11 | 7 | 780 | | 7/1/2009 15:09 |
| B3 | Sr-90' | 0.5 | 123 | 810 | 5.1 | 7/1/2009 15:10 |
| B3 | Sr-90' | 0.5 | 351 | 840 | 8.9 | 7/1/2009 15:10 |
| B3 | Sr-90' | 0.5 | 602 | 870 | 12.1 | 7/1/2009 15:11 |
| B3 | Sr-90' | 0.5 | 1104 | 900 | 16.3 | 7/1/2009 15:12 |
| B3 | Sr-90' | 0.5 | 1561 | 930 | 20.0 | 7/1/2009 15:12 |
| B3 | Sr-90' | 0.5 | 2320 | 960 | 23.4 | 7/1/2009 15:13 |
| B3 | Sr-90' | 0.5 | 3001 | 990 | 28.5 | 7/1/2009 15:14 |
| B3 | Sr-90' | 0.5 | 3889 | 1020 | 32.8 | 7/1/2009 15:14 |
| B3 | Sr-90' | 0.5 | 5051 | 1050 | 39.8 | 7/1/2009 15:15 |
| B3 | Sr-90' | 0.5 | 6217 | 1080 | 46.0 | 7/1/2009 15:16 |
| B3 | Sr-90' | 0.5 | 7803 | 1110 | 53.0 | 7/1/2009 15:16 |
| B3 | Sr-90' | 0.5 | 9410 | 1140 | 58.7 | 7/1/2009 15:17 |
| B3 | Sr-90' | 0.5 | 11403 | 1170 | 61.2 | 7/1/2009 15:18 |
| B3 | Sr-90' | 0.5 | 13228 | 1200 | 58.5 | 7/1/2009 15:18 |
| B3 | Sr-90' | 0.5 | 15074 | 1230 | 47.7 | 7/1/2009 15:19 |
| B3 | Sr-90' | 0.5 | 16346 | 1260 | 34.9 | 7/1/2009 15:20 |
| B3 | Sr-90' | 0.5 | 17002 | 1290 | 21.9 | 7/1/2009 15:20 |
| B3 | Sr-90' | 0.5 | 17498 | 1320 | 17.0 | 7/1/2009 15:21 |
| B3 | Sr-90' | 0.5 | 17784 | 1350 | 19.0 | 7/1/2009 15:22 |
| B3 | Sr-90' | 0.5 | 18505 | 1380 | 19.3 | 7/1/2009 15:22 |

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|---|---|---|---|---|---|---|
| B3 | Sr-90' | 0.5 | 19344 | 1410 | 19.5 | 7/1/2009 15:23 |
| B3 | Sr-90' | 0.5 | 19614 | 1440 | 14.7 | 7/1/2009 15:24 |
| B3 | Sr-90' | 0.5 | 20160 | 1470 | 8.1 | 7/1/2009 15:25 |
| B3 | Sr-90' | 0.49 | 20302 | 1500 | 4.3 | 7/1/2009 15:26 |
| B3 | Sr-90' | 0.46 | 20220 | 1530 | 0.7 | 7/1/2009 15:54 |
| B3 | Sr-90' | 0.42 | 20225 | 1560 | 1.2 | 7/1/2009 15:55 |
| B3 | Sr-90' | 0.4 | 20304 | 1590 | 1.4 | 7/1/2009 15:57 |
| B3 | Sr-90' | 0.39 | 20442 | 1620 | | 7/1/2009 15:58 |
| B3 | Sr-90' | 0.38 | 20327 | 1650 | | 7/1/2009 16:00 |
| B4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 15:09 |
| B4 | Sr-90' | 0.11 | 6 | 780 | | 7/1/2009 15:09 |
| B4 | Sr-90' | 0.5 | 96 | 810 | 5.1 | 7/1/2009 15:10 |
| B4 | Sr-90' | 0.5 | 302 | 840 | 8.3 | 7/1/2009 15:10 |
| B4 | Sr-90' | 0.5 | 616 | 870 | 11.7 | 7/1/2009 15:11 |
| B4 | Sr-90' | 0.5 | 992 | 900 | 15.1 | 7/1/2009 15:12 |
| B4 | Sr-90' | 0.5 | 1511 | 930 | 18.6 | 7/1/2009 15:12 |
| B4 | Sr-90' | 0.5 | 2118 | 960 | 22.1 | 7/1/2009 15:13 |
| B4 | Sr-90' | 0.5 | 2837 | 990 | 26.1 | 7/1/2009 15:14 |
| B4 | Sr-90' | 0.5 | 3650 | 1020 | 32.3 | 7/1/2009 15:14 |
| B4 | Sr-90' | 0.5 | 4667 | 1050 | 38.3 | 7/1/2009 15:15 |
| B4 | Sr-90' | 0.5 | 6052 | 1080 | 44.6 | 7/1/2009 15:16 |
| B4 | Sr-90' | 0.5 | 7378 | 1110 | 51.6 | 7/1/2009 15:16 |
| B4 | Sr-90' | 0.5 | 8977 | 1140 | 54.8 | 7/1/2009 15:17 |
| B4 | Sr-90' | 0.5 | 10948 | 1170 | 57.4 | 7/1/2009 15:18 |
| B4 | Sr-90' | 0.5 | 12490 | 1200 | 54.0 | 7/1/2009 15:18 |
| B4 | Sr-90' | 0.5 | 14225 | 1230 | 42.7 | 7/1/2009 15:19 |
| B4 | Sr-90' | 0.5 | 15436 | 1260 | 31.5 | 7/1/2009 15:20 |
| B4 | Sr-90' | 0.5 | 15887 | 1290 | 20.5 | 7/1/2009 15:20 |
| B4 | Sr-90' | 0.5 | 16380 | 1320 | 16.2 | 7/1/2009 15:21 |
| B4 | Sr-90' | 0.5 | 16833 | 1350 | 18.5 | 7/1/2009 15:22 |
| B4 | Sr-90' | 0.5 | 17391 | 1380 | 17.3 | 7/1/2009 15:22 |
| B4 | Sr-90' | 0.5 | 18163 | 1410 | 16.2 | 7/1/2009 15:23 |
| B4 | Sr-90' | 0.5 | 18306 | 1440 | 15.9 | 7/1/2009 15:24 |
| B4 | Sr-90' | 0.5 | 18799 | 1470 | 17.1 | 7/1/2009 15:25 |
| B4 | Sr-90' | 0.5 | 19464 | 1500 | 16.9 | 7/1/2009 15:53 |
| B4 | Sr-90' | 0.48 | 20148 | 1530 | 13.5 | 7/1/2009 15:54 |
| B4 | Sr-90' | 0.45 | 20170 | 1560 | 7.4 | 7/1/2009 15:55 |
| B4 | Sr-90' | 0.43 | 20474 | 1590 | 1.8 | 7/1/2009 15:57 |
| B4 | Sr-90' | 0.42 | 20404 | 1620 | 23.6 | 7/1/2009 15:58 |
| B4 | Sr-90' | 0.4 | 20306 | 1650 | 23.8 | 7/1/2009 16:00 |
| C1 | Sr-90' | 0.11 | 3 | 750 | 23.7 | 7/1/2009 15:09 |
| C1 | Sr-90' | 0.12 | 8 | 780 | 23.5 | 7/1/2009 15:09 |
| C1 | Sr-90' | 0.5 | 135 | 810 | 5.9 | 7/1/2009 15:10 |
| C1 | Sr-90' | 0.5 | 353 | 840 | 9.2 | 7/1/2009 15:10 |
| C1 | Sr-90' | 0.5 | 711 | 870 | 12.0 | 7/1/2009 15:11 |
| C1 | Sr-90' | 0.5 | 1103 | 900 | 14.8 | 7/1/2009 15:11 |
| C1 | Sr-90' | 0.5 | 1565 | 930 | 18.4 | 7/1/2009 15:12 |
| C1 | Sr-90' | 0.5 | 2153 | 960 | 22.0 | 7/1/2009 15:13 |
| C1 | Sr-90' | 0.5 | 2943 | 990 | 26.8 | 7/1/2009 15:13 |
| C1 | Sr-90' | 0.5 | 3707 | 1020 | 31.9 | 7/1/2009 15:14 |
| C1 | Sr-90' | 0.5 | 4809 | 1050 | 37.8 | 7/1/2009 15:15 |
| C1 | Sr-90' | 0.5 | 6002 | 1080 | 44.8 | 7/1/2009 15:15 |
| C1 | Sr-90' | 0.5 | 7464 | 1110 | 49.4 | 7/1/2009 15:16 |
| C1 | Sr-90' | 0.5 | 9096 | 1140 | 54.5 | 7/1/2009 15:16 |
| C1 | Sr-90' | 0.5 | 10669 | 1170 | 56.4 | 7/1/2009 15:17 |
| C1 | Sr-90' | 0.5 | 12567 | 1200 | 51.0 | 7/1/2009 15:18 |
| C1 | Sr-90' | 0.5 | 14181 | 1230 | 44.2 | 7/1/2009 15:18 |
| C1 | Sr-90' | 0.5 | 14993 | 1260 | 33.0 | 7/1/2009 15:19 |
| C1 | Sr-90' | 0.5 | 16093 | 1290 | 22.2 | 7/1/2009 15:20 |
| C1 | Sr-90' | 0.5 | 16566 | 1320 | 14.2 | 7/1/2009 15:20 |
| C1 | Sr-90' | 0.5 | 16722 | 1350 | 6.5 | 7/1/2009 15:21 |
| C1 | Sr-90' | 0.5 | 16806 | 1380 | 5.5 | 7/1/2009 15:22 |
| C1 | Sr-90' | 0.5 | 16948 | 1410 | 4.8 | 7/1/2009 15:22 |
| C1 | Sr-90' | 0.5 | 17275 | 1440 | 1.1 | 7/1/2009 15:23 |
| C1 | Sr-90' | 0.5 | 17203 | 1470 | -0.4 | 7/1/2009 15:23 |
| C1 | Sr-90' | 0.5 | 16846 | 1500 | -1.1 | 7/1/2009 15:24 |
| C1 | Sr-90' | 0.5 | 17103 | 1530 | -1.1 | 7/1/2009 15:25 |
| C1 | Sr-90' | 0.5 | 17160 | 1560 | 0.7 | 7/1/2009 15:25 |
| C1 | Sr-90' | 0.5 | 16887 | 1590 | -1.3 | 7/1/2009 15:26 |
| C1 | Sr-90' | | | | | |

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|---|---|---|---|---|---|---|
| C1 | Sr-90' | 0.5 | 16958 | 1650 | | 7/1/2009 15:27 |
| C2 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| C2 | Sr-90' | 0.12 | 1 | 780 | | 7/1/2009 15:09 |
| C2 | Sr-90' | 0.5 | 47 | 810 | 3.2 | 7/1/2009 15:10 |
| C2 | Sr-90' | 0.5 | 176 | 840 | 5.8 | 7/1/2009 15:10 |
| C2 | Sr-90' | 0.5 | 397 | 870 | 9.0 | 7/1/2009 15:11 |
| C2 | Sr-90' | 0.5 | 700 | 900 | 12.3 | 7/1/2009 15:11 |
| C2 | Sr-90' | 0.5 | 1129 | 930 | 15.6 | 7/1/2009 15:12 |
| C2 | Sr-90' | 0.5 | 1653 | 960 | 19.5 | 7/1/2009 15:13 |
| C2 | Sr-90' | 0.5 | 2258 | 990 | 24.3 | 7/1/2009 15:13 |
| C2 | Sr-90' | 0.5 | 3063 | 1020 | 28.9 | 7/1/2009 15:14 |
| C2 | Sr-90' | 0.5 | 4071 | 1050 | 33.8 | 7/1/2009 15:15 |
| C2 | Sr-90' | 0.5 | 5074 | 1080 | 39.0 | 7/1/2009 15:15 |
| C2 | Sr-90' | 0.5 | 6319 | 1110 | 46.0 | 7/1/2009 15:16 |
| C2 | Sr-90' | 0.5 | 7785 | 1140 | 53.8 | 7/1/2009 15:17 |
| C2 | Sr-90' | 0.5 | 9615 | 1170 | 56.3 | 7/1/2009 15:17 |
| C2 | Sr-90' | 0.5 | 11493 | 1200 | 55.4 | 7/1/2009 15:18 |
| C2 | Sr-90' | 0.5 | 12903 | 1230 | 51.4 | 7/1/2009 15:18 |
| C2 | Sr-90' | 0.5 | 14448 | 1260 | 43.4 | 7/1/2009 15:19 |
| C2 | Sr-90' | 0.5 | 15845 | 1290 | 36.3 | 7/1/2009 15:20 |
| C2 | Sr-90' | 0.5 | 16538 | 1320 | 26.0 | 7/1/2009 15:20 |
| C2 | Sr-90' | 0.5 | 17303 | 1350 | 16.2 | 7/1/2009 15:21 |
| C2 | Sr-90' | 0.5 | 17622 | 1380 | 8.3 | 7/1/2009 15:22 |
| C2 | Sr-90' | 0.5 | 17729 | 1410 | 1.2 | 7/1/2009 15:22 |
| C2 | Sr-90' | 0.5 | 17572 | 1440 | -0.5 | 7/1/2009 15:23 |
| C2 | Sr-90' | 0.5 | 17507 | 1470 | 0.5 | 7/1/2009 15:23 |
| C2 | Sr-90' | 0.5 | 17657 | 1500 | 2.7 | 7/1/2009 15:24 |
| C2 | Sr-90' | 0.5 | 17758 | 1530 | 1.4 | 7/1/2009 15:25 |
| C2 | Sr-90' | 0.5 | 17852 | 1560 | 1.7 | 7/1/2009 15:25 |
| C2 | Sr-90' | 0.5 | 17621 | 1590 | 0.7 | 7/1/2009 15:26 |
| C2 | Sr-90' | 0.5 | 17984 | 1620 | | 7/1/2009 15:27 |
| C2 | Sr-90' | 0.5 | 17797 | 1650 | | 7/1/2009 15:27 |
| C3 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| C3 | Sr-90' | 0.11 | 1 | 780 | | 7/1/2009 15:09 |
| C3 | Sr-90' | 0.11 | 5 | 810 | 3.3 | 7/1/2009 15:10 |
| C3 | Sr-90' | 0.5 | 146 | 840 | 6.5 | 7/1/2009 15:10 |
| C3 | Sr-90' | 0.5 | 419 | 870 | 10.9 | 7/1/2009 15:11 |
| C3 | Sr-90' | 0.5 | 776 | 900 | 14.3 | 7/1/2009 15:11 |
| C3 | Sr-90' | 0.5 | 1319 | 930 | 17.7 | 7/1/2009 15:12 |
| C3 | Sr-90' | 0.5 | 1837 | 960 | 21.7 | 7/1/2009 15:13 |
| C3 | Sr-90' | 0.5 | 2548 | 990 | 25.2 | 7/1/2009 15:13 |
| C3 | Sr-90' | 0.5 | 3420 | 1020 | 31.1 | 7/1/2009 15:14 |
| C3 | Sr-90' | 0.5 | 4313 | 1050 | 36.7 | 7/1/2009 15:15 |
| C3 | Sr-90' | 0.5 | 5621 | 1080 | 42.8 | 7/1/2009 15:15 |
| C3 | Sr-90' | 0.5 | 6946 | 1110 | 51.9 | 7/1/2009 15:16 |
| C3 | Sr-90' | 0.5 | 8517 | 1140 | 58.5 | 7/1/2009 15:17 |
| C3 | Sr-90' | 0.5 | 10649 | 1170 | 64.5 | 7/1/2009 15:17 |
| C3 | Sr-90' | 0.5 | 12537 | 1200 | 67.2 | 7/1/2009 15:18 |
| C3 | Sr-90' | 0.5 | 14612 | 1230 | 64.4 | 7/1/2009 15:18 |
| C3 | Sr-90' | 0.5 | 16617 | 1260 | 56.7 | 7/1/2009 15:19 |
| C3 | Sr-90' | 0.5 | 18266 | 1290 | 44.5 | 7/1/2009 15:20 |
| C3 | Sr-90' | 0.5 | 19218 | 1320 | 30.5 | 7/1/2009 15:20 |
| C3 | Sr-90' | 0.5 | 19990 | 1350 | 17.2 | 7/1/2009 15:21 |
| C3 | Sr-90' | 0.5 | 20330 | 1380 | 9.3 | 7/1/2009 15:22 |
| C3 | Sr-90' | 0.5 | 20293 | 1410 | 3.9 | 7/1/2009 15:22 |
| C3 | Sr-90' | 0.5 | 20457 | 1440 | 1.2 | 7/1/2009 15:23 |
| C3 | Sr-90' | 0.49 | 20504 | 1470 | 2.9 | 7/1/2009 15:23 |
| C3 | Sr-90' | 0.49 | 20402 | 1500 | -0.1 | 7/1/2009 15:24 |
| C3 | Sr-90' | 0.5 | 20751 | 1530 | -0.7 | 7/1/2009 15:25 |
| C3 | Sr-90' | 0.49 | 20326 | 1560 | 1.1 | 7/1/2009 15:25 |
| C3 | Sr-90' | 0.49 | 20435 | 1590 | 1.3 | 7/1/2009 15:26 |
| C3 | Sr-90' | 0.5 | 20730 | 1620 | | 7/1/2009 15:27 |
| C3 | Sr-90' | 0.5 | 20748 | 1650 | | 7/1/2009 15:27 |
| C4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 15:09 |
| C4 | Sr-90' | 0.11 | 0 | 780 | | 7/1/2009 15:09 |
| C4 | Sr-90' | 0.11 | 2 | 810 | 2.1 | 7/1/2009 15:10 |
| C4 | Sr-90' | 0.5 | 103 | 840 | 4.3 | 7/1/2009 15:10 |
| C4 | Sr-90' | 0.5 | 259 | 870 | 6.9 | 7/1/2009 15:11 |
| C4 | Sr-90' | 0.5 | 521 | 900 | 9.3 | 7/1/2009 15:11 |
| C4 | Sr-90' | 0.5 | 831 | 930 | 11.9 | 7/1/2009 15:12 |

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|---|---|---|---|---|---|---|
| C4 | Sr-90' | 0.5 | 1216 | 960 | 14.4 | 7/1/2009 15:13 |
| C4 | Sr-90' | 0.5 | 1699 | 990 | 17.6 | 7/1/2009 15:13 |
| C4 | Sr-90' | 0.5 | 2244 | 1020 | 21.6 | 7/1/2009 15:14 |
| C4 | Sr-90' | 0.5 | 2955 | 1050 | 25.8 | 7/1/2009 15:15 |
| C4 | Sr-90' | 0.5 | 3821 | 1080 | 31.0 | 7/1/2009 15:15 |
| C4 | Sr-90' | 0.5 | 4783 | 1110 | 35.5 | 7/1/2009 15:16 |
| C4 | Sr-90' | 0.5 | 5977 | 1140 | 38.8 | 7/1/2009 15:17 |
| C4 | Sr-90' | 0.5 | 7204 | 1170 | 43.3 | 7/1/2009 15:17 |
| C4 | Sr-90' | 0.5 | 8425 | 1200 | 44.9 | 7/1/2009 15:18 |
| C4 | Sr-90' | 0.5 | 10053 | 1230 | 42.6 | 7/1/2009 15:18 |
| C4 | Sr-90' | 0.5 | 11280 | 1260 | 36.6 | 7/1/2009 15:19 |
| C4 | Sr-90' | 0.5 | 12165 | 1290 | 28.3 | 7/1/2009 15:20 |
| C4 | Sr-90' | 0.5 | 12855 | 1320 | 20.1 | 7/1/2009 15:20 |
| C4 | Sr-90' | 0.5 | 13515 | 1350 | 13.9 | 7/1/2009 15:21 |
| C4 | Sr-90' | 0.5 | 13616 | 1380 | 8.4 | 7/1/2009 15:22 |
| C4 | Sr-90' | 0.5 | 13872 | 1410 | 4.0 | 7/1/2009 15:22 |
| C4 | Sr-90' | 0.5 | 13942 | 1440 | 3.0 | 7/1/2009 15:23 |
| C4 | Sr-90' | 0.5 | 13948 | 1470 | 1.3 | 7/1/2009 15:23 |
| C4 | Sr-90' | 0.5 | 14027 | 1500 | 3.1 | 7/1/2009 15:24 |
| C4 | Sr-90' | 0.5 | 14021 | 1530 | 2.0 | 7/1/2009 15:25 |
| C4 | Sr-90' | 0.5 | 14373 | 1560 | 0.9 | 7/1/2009 15:25 |
| C4 | Sr-90' | 0.5 | 14078 | 1590 | 0.1 | 7/1/2009 15:26 |
| C4 | Sr-90' | 0.5 | 14134 | 1620 | | 7/1/2009 15:27 |
| C4 | Sr-90' | 0.5 | 14161 | 1650 | | 7/1/2009 15:27 |
| D1 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| D1 | Sr-90' | 0.11 | 1 | 780 | | 7/1/2009 15:09 |
| D1 | Sr-90' | 0.5 | 72 | 810 | 5.0 | 7/1/2009 15:10 |
| D1 | Sr-90' | 0.5 | 270 | 840 | 8.8 | 7/1/2009 15:11 |
| D1 | Sr-90' | 0.5 | 615 | 870 | 13.4 | 7/1/2009 15:11 |
| D1 | Sr-90' | 0.5 | 1053 | 900 | 17.1 | 7/1/2009 15:12 |
| D1 | Sr-90' | 0.5 | 1693 | 930 | 20.6 | 7/1/2009 15:13 |
| D1 | Sr-90' | 0.5 | 2291 | 960 | 23.8 | 7/1/2009 15:14 |
| D1 | Sr-90' | 0.5 | 3080 | 990 | 28.2 | 7/1/2009 15:15 |
| D1 | Sr-90' | 0.5 | 3936 | 1020 | 34.8 | 7/1/2009 15:15 |
| D1 | Sr-90' | 0.5 | 5093 | 1050 | 40.1 | 7/1/2009 15:16 |
| D1 | Sr-90' | 0.5 | 6502 | 1080 | 48.6 | 7/1/2009 15:17 |
| D1 | Sr-90' | 0.5 | 7816 | 1110 | 56.3 | 7/1/2009 15:18 |
| D1 | Sr-90' | 0.5 | 9861 | 1140 | 62.6 | 7/1/2009 15:19 |
| D1 | Sr-90' | 0.5 | 11853 | 1170 | 66.5 | 7/1/2009 15:19 |
| D1 | Sr-90' | 0.5 | 13871 | 1200 | 63.1 | 7/1/2009 15:20 |
| D1 | Sr-90' | 0.5 | 15783 | 1230 | 56.3 | 7/1/2009 15:21 |
| D1 | Sr-90' | 0.5 | 17367 | 1260 | 45.6 | 7/1/2009 15:22 |
| D1 | Sr-90' | 0.5 | 18552 | 1290 | 32.7 | 7/1/2009 15:22 |
| D1 | Sr-90' | 0.5 | 19322 | 1320 | 19.4 | 7/1/2009 15:23 |
| D1 | Sr-90' | 0.5 | 19713 | 1350 | 10.4 | 7/1/2009 15:24 |
| D1 | Sr-90' | 0.5 | 19695 | 1380 | 5.3 | 7/1/2009 15:25 |
| D1 | Sr-90' | 0.5 | 19923 | 1410 | 2.4 | 7/1/2009 15:26 |
| D1 | Sr-90' | 0.5 | 20015 | 1440 | -0.9 | 7/1/2009 15:26 |
| D1 | Sr-90' | 0.5 | 19909 | 1470 | -2.8 | 7/1/2009 15:27 |
| D1 | Sr-90' | 0.5 | 19560 | 1500 | -3.0 | 7/1/2009 15:28 |
| D1 | Sr-90' | 0.5 | 19731 | 1530 | -0.4 | 7/1/2009 15:29 |
| D1 | Sr-90' | 0.5 | 19656 | 1560 | 1.3 | 7/1/2009 15:30 |
| D1 | Sr-90' | 0.5 | 19805 | 1590 | 0.8 | 7/1/2009 15:30 |
| D1 | Sr-90' | 0.5 | 19711 | 1620 | | 7/1/2009 15:31 |
| D1 | Sr-90' | 0.5 | 19827 | 1650 | | 7/1/2009 15:32 |
| D2 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 15:09 |
| D2 | Sr-90' | 0.11 | 0 | 780 | | 7/1/2009 15:09 |
| D2 | Sr-90' | 0.12 | 8 | 810 | 3.7 | 7/1/2009 15:10 |
| D2 | Sr-90' | 0.5 | 183 | 840 | 7.3 | 7/1/2009 15:11 |
| D2 | Sr-90' | 0.5 | 461 | 870 | 11.1 | 7/1/2009 15:11 |
| D2 | Sr-90' | 0.5 | 873 | 900 | 14.3 | 7/1/2009 15:12 |
| D2 | Sr-90' | 0.5 | 1331 | 930 | 17.1 | 7/1/2009 15:13 |
| D2 | Sr-90' | 0.5 | 1899 | 960 | 20.1 | 7/1/2009 15:14 |
| D2 | Sr-90' | 0.5 | 2520 | 990 | 24.9 | 7/1/2009 15:15 |
| D2 | Sr-90' | 0.5 | 3298 | 1020 | 30.4 | 7/1/2009 15:15 |
| D2 | Sr-90' | 0.5 | 4359 | 1050 | 36.7 | 7/1/2009 15:16 |
| D2 | Sr-90' | 0.5 | 5534 | 1080 | 42.9 | 7/1/2009 15:17 |
| D2 | Sr-90' | 0.5 | 6912 | 1110 | 48.8 | 7/1/2009 15:18 |
| D2 | Sr-90' | 0.5 | 8458 | 1140 | 55.7 | 7/1/2009 15:19 |
| D2 | Sr-90' | 0.5 | 10221 | 1170 | 60.7 | 7/1/2009 15:19 |

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|---|---|---|---|---|---|---|
| D2 | Sr-90' | 0.5 | 12229 | 1200 | 59.3 | 7/1/2009 15:20 |
| D2 | Sr-90' | 0.5 | 14132 | 1230 | 54.2 | 7/1/2009 15:21 |
| D2 | Sr-90' | 0.5 | 15397 | 1260 | 44.8 | 7/1/2009 15:22 |
| D2 | Sr-90' | 0.5 | 16761 | 1290 | 32.3 | 7/1/2009 15:22 |
| D2 | Sr-90' | 0.5 | 17632 | 1320 | 23.4 | 7/1/2009 15:23 |
| D2 | Sr-90' | 0.5 | 17862 | 1350 | 14.5 | 7/1/2009 15:24 |
| D2 | Sr-90' | 0.5 | 18357 | 1380 | 8.4 | 7/1/2009 15:25 |
| D2 | Sr-90' | 0.5 | 18569 | 1410 | 4.9 | 7/1/2009 15:26 |
| D2 | Sr-90' | 0.5 | 18543 | 1440 | -2.0 | 7/1/2009 15:26 |
| D2 | Sr-90' | 0.5 | 18507 | 1470 | -1.9 | 7/1/2009 15:27 |
| D2 | Sr-90' | 0.5 | 18087 | 1500 | -0.4 | 7/1/2009 15:28 |
| D2 | Sr-90' | 0.5 | 18508 | 1530 | 1.2 | 7/1/2009 15:29 |
| D2 | Sr-90' | 0.5 | 18487 | 1560 | 2.0 | 7/1/2009 15:30 |
| D2 | Sr-90' | 0.5 | 18483 | 1590 | | 7/1/2009 15:30 |
| D2 | Sr-90' | 0.5 | 18406 | 1620 | | 7/1/2009 15:31 |
| D2 | Sr-90' | 0.5 | 18558 | 1650 | | 7/1/2009 15:32 |
| D3 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 15:09 |
| D3 | Sr-90' | 0.11 | 2 | 780 | | 7/1/2009 15:09 |
| D3 | Sr-90' | 0.11 | 13 | 810 | 3.5 | 7/1/2009 15:10 |
| D3 | Sr-90' | 0.5 | 180 | 840 | 7.3 | 7/1/2009 15:11 |
| D3 | Sr-90' | 0.5 | 443 | 870 | 11.9 | 7/1/2009 15:11 |
| D3 | Sr-90' | 0.5 | 889 | 900 | 16.7 | 7/1/2009 15:12 |
| D3 | Sr-90' | 0.5 | 1450 | 930 | 21.0 | 7/1/2009 15:13 |
| D3 | Sr-90' | 0.5 | 2177 | 960 | 24.5 | 7/1/2009 15:14 |
| D3 | Sr-90' | 0.5 | 2948 | 990 | 29.5 | 7/1/2009 15:15 |
| D3 | Sr-90' | 0.5 | 3811 | 1020 | 35.9 | 7/1/2009 15:15 |
| D3 | Sr-90' | 0.5 | 5065 | 1050 | 43.8 | 7/1/2009 15:16 |
| D3 | Sr-90' | 0.5 | 6499 | 1080 | 51.6 | 7/1/2009 15:17 |
| D3 | Sr-90' | 0.5 | 8172 | 1110 | 58.7 | 7/1/2009 15:18 |
| D3 | Sr-90' | 0.5 | 10000 | 1140 | 67.5 | 7/1/2009 15:19 |
| D3 | Sr-90' | 0.5 | 12119 | 1170 | 72.7 | 7/1/2009 15:19 |
| D3 | Sr-90' | 0.5 | 14648 | 1200 | 75.0 | 7/1/2009 15:20 |
| D3 | Sr-90' | 0.5 | 16756 | 1230 | 69.6 | 7/1/2009 15:21 |
| D3 | Sr-90' | 0.5 | 18932 | 1260 | 50.7 | 7/1/2009 15:22 |
| D3 | Sr-90' | 0.49 | 20419 | 1290 | 28.7 | 7/1/2009 15:22 |
| D3 | Sr-90' | 0.47 | 20417 | 1320 | 7.9 | 7/1/2009 15:23 |
| D3 | Sr-90' | 0.45 | 20316 | 1350 | 1.1 | 7/1/2009 15:24 |
| D3 | Sr-90' | 0.44 | 20172 | 1380 | -0.5 | 7/1/2009 15:25 |
| D3 | Sr-90' | 0.45 | 20699 | 1410 | 3.2 | 7/1/2009 15:26 |
| D3 | Sr-90' | 0.44 | 20157 | 1440 | 0.3 | 7/1/2009 15:26 |
| D3 | Sr-90' | 0.45 | 20796 | 1470 | -3.9 | 7/1/2009 15:27 |
| D3 | Sr-90' | 0.44 | 20171 | 1500 | -0.2 | 7/1/2009 15:28 |
| D3 | Sr-90' | 0.44 | 20106 | 1530 | 0.5 | 7/1/2009 15:29 |
| D3 | Sr-90' | 0.44 | 20476 | 1560 | 4.9 | 7/1/2009 15:30 |
| D3 | Sr-90' | 0.45 | 20713 | 1590 | 3.7 | 7/1/2009 15:30 |
| D3 | Sr-90' | 0.45 | 20599 | 1620 | | 7/1/2009 15:31 |
| D3 | Sr-90' | 0.45 | 20602 | 1650 | | 7/1/2009 15:32 |
| D4 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 15:09 |
| D4 | Sr-90' | 0.11 | 1 | 780 | | 7/1/2009 15:09 |
| D4 | Sr-90' | 0.11 | 7 | 810 | 3.2 | 7/1/2009 15:10 |
| D4 | Sr-90' | 0.5 | 147 | 840 | 7.0 | 7/1/2009 15:11 |
| D4 | Sr-90' | 0.5 | 404 | 870 | 11.2 | 7/1/2009 15:11 |
| D4 | Sr-90' | 0.5 | 853 | 900 | 15.0 | 7/1/2009 15:12 |
| D4 | Sr-90' | 0.5 | 1327 | 930 | 17.8 | 7/1/2009 15:13 |
| D4 | Sr-90' | 0.5 | 1936 | 960 | 20.5 | 7/1/2009 15:14 |
| D4 | Sr-90' | 0.5 | 2527 | 990 | 24.2 | 7/1/2009 15:15 |
| D4 | Sr-90' | 0.5 | 3323 | 1020 | 29.1 | 7/1/2009 15:15 |
| D4 | Sr-90' | 0.5 | 4264 | 1050 | 36.1 | 7/1/2009 15:16 |
| D4 | Sr-90' | 0.5 | 5435 | 1080 | 42.7 | 7/1/2009 15:17 |
| D4 | Sr-90' | 0.5 | 6888 | 1110 | 51.1 | 7/1/2009 15:18 |
| D4 | Sr-90' | 0.5 | 8412 | 1140 | 56.9 | 7/1/2009 15:19 |
| D4 | Sr-90' | 0.5 | 10433 | 1170 | 59.9 | 7/1/2009 15:19 |
| D4 | Sr-90' | 0.5 | 12204 | 1200 | 61.4 | 7/1/2009 15:20 |
| D4 | Sr-90' | 0.5 | 13978 | 1230 | 56.9 | 7/1/2009 15:21 |
| D4 | Sr-90' | 0.5 | 15844 | 1260 | 49.4 | 7/1/2009 15:22 |
| D4 | Sr-90' | 0.5 | 17152 | 1290 | 38.6 | 7/1/2009 15:22 |
| D4 | Sr-90' | 0.5 | 18022 | 1320 | 24.6 | 7/1/2009 15:23 |
| D4 | Sr-90' | 0.5 | 18681 | 1350 | 14.6 | 7/1/2009 15:24 |
| D4 | Sr-90' | 0.5 | 18775 | 1380 | 10.1 | 7/1/2009 15:25 |
| D4 | Sr-90' | 0.5 | 18959 | 1410 | 5.8 | 7/1/2009 15:26 |

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| D4 | Sr-90' | 0.5 | 19392 | 1440 | 2.8 | 7/1/2009 15:26 |
| D4 | Sr-90' | 0.5 | 19243 | 1470 | -2.5 | 7/1/2009 15:27 |
| D4 | Sr-90' | 0.5 | 19058 | 1500 | -4.4 | 7/1/2009 15:28 |
| D4 | Sr-90' | 0.5 | 18753 | 1530 | -2.5 | 7/1/2009 15:29 |
| D4 | Sr-90' | 0.5 | 18970 | 1560 | 2.3 | 7/1/2009 15:30 |
| D4 | Sr-90' | 0.5 | 18909 | 1590 | 2.7 | 7/1/2009 15:30 |
| D4 | Sr-90' | 0.5 | 19318 | 1620 | | 7/1/2009 15:31 |
| D4 | Sr-90' | 0.5 | 18979 | 1650 | | 7/1/2009 15:32 |
| E1 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 16:53 |
| E1 | Sr-90' | 0.11 | 5 | 780 | | 7/1/2009 16:54 |
| E1 | Sr-90' | 0.5 | 105 | 810 | 4.8 | 7/1/2009 16:54 |
| E1 | Sr-90' | 0.5 | 272 | 840 | 7.7 | 7/1/2009 16:55 |
| E1 | Sr-90' | 0.5 | 586 | 870 | 10.2 | 7/1/2009 16:55 |
| E1 | Sr-90' | 0.5 | 917 | 900 | 12.7 | 7/1/2009 16:56 |
| E1 | Sr-90' | 0.5 | 1310 | 930 | 15.1 | 7/1/2009 16:57 |
| E1 | Sr-90' | 0.5 | 1822 | 960 | 17.8 | 7/1/2009 16:57 |
| E1 | Sr-90' | 0.5 | 2394 | 990 | 21.9 | 7/1/2009 16:58 |
| E1 | Sr-90' | 0.5 | 3047 | 1020 | 26.4 | 7/1/2009 16:59 |
| E1 | Sr-90' | 0.5 | 3979 | 1050 | 30.7 | 7/1/2009 16:59 |
| E1 | Sr-90' | 0.5 | 4991 | 1080 | 36.2 | 7/1/2009 17:00 |
| E1 | Sr-90' | 0.5 | 6025 | 1110 | 40.8 | 7/1/2009 17:00 |
| E1 | Sr-90' | 0.5 | 7460 | 1140 | 44.7 | 7/1/2009 17:01 |
| E1 | Sr-90' | 0.5 | 8857 | 1170 | 46.7 | 7/1/2009 17:02 |
| E1 | Sr-90' | 0.5 | 10283 | 1200 | 42.6 | 7/1/2009 17:02 |
| E1 | Sr-90' | 0.5 | 11614 | 1230 | 36.4 | 7/1/2009 17:03 |
| E1 | Sr-90' | 0.5 | 12474 | 1260 | 28.4 | 7/1/2009 17:04 |
| E1 | Sr-90' | 0.5 | 13226 | 1290 | 20.6 | 7/1/2009 17:04 |
| E1 | Sr-90' | 0.5 | 13737 | 1320 | 14.1 | 7/1/2009 17:05 |
| E1 | Sr-90' | 0.5 | 14075 | 1350 | 7.7 | 7/1/2009 17:05 |
| E1 | Sr-90' | 0.5 | 14159 | 1380 | 3.5 | 7/1/2009 17:06 |
| E1 | Sr-90' | 0.5 | 14167 | 1410 | 2.0 | 7/1/2009 17:07 |
| E1 | Sr-90' | 0.5 | 14219 | 1440 | 3.8 | 7/1/2009 17:07 |
| E1 | Sr-90' | 0.5 | 14348 | 1470 | 3.2 | 7/1/2009 17:08 |
| E1 | Sr-90' | 0.5 | 14643 | 1500 | 0.4 | 7/1/2009 17:09 |
| E1 | Sr-90' | 0.5 | 14432 | 1530 | -0.1 | 7/1/2009 17:09 |
| E1 | Sr-90' | 0.5 | 14241 | 1560 | -0.1 | 7/1/2009 17:10 |
| E1 | Sr-90' | 0.5 | 14536 | 1590 | 2.5 | 7/1/2009 17:10 |
| E1 | Sr-90' | 0.5 | 14569 | 1620 | | 7/1/2009 17:11 |
| E1 | Sr-90' | 0.5 | 14650 | 1650 | | 7/1/2009 17:12 |
| E2 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 16:53 |
| E2 | Sr-90' | 0.11 | 3 | 780 | | 7/1/2009 16:54 |
| E2 | Sr-90' | 0.5 | 81 | 810 | 4.5 | 7/1/2009 16:54 |
| E2 | Sr-90' | 0.5 | 238 | 840 | 7.9 | 7/1/2009 16:55 |
| E2 | Sr-90' | 0.5 | 551 | 870 | 11.3 | 7/1/2009 16:55 |
| E2 | Sr-90' | 0.5 | 958 | 900 | 15.1 | 7/1/2009 16:56 |
| E2 | Sr-90' | 0.5 | 1416 | 930 | 18.1 | 7/1/2009 16:57 |
| E2 | Sr-90' | 0.5 | 2066 | 960 | 21.2 | 7/1/2009 16:57 |
| E2 | Sr-90' | 0.5 | 2713 | 990 | 25.8 | 7/1/2009 16:58 |
| E2 | Sr-90' | 0.5 | 3496 | 1020 | 30.6 | 7/1/2009 16:59 |
| E2 | Sr-90' | 0.5 | 4569 | 1050 | 37.2 | 7/1/2009 16:59 |
| E2 | Sr-90' | 0.5 | 5734 | 1080 | 44.5 | 7/1/2009 17:00 |
| E2 | Sr-90' | 0.5 | 7168 | 1110 | 50.7 | 7/1/2009 17:00 |
| E2 | Sr-90' | 0.5 | 8866 | 1140 | 56.4 | 7/1/2009 17:01 |
| E2 | Sr-90' | 0.5 | 10605 | 1170 | 58.5 | 7/1/2009 17:02 |
| E2 | Sr-90' | 0.5 | 12472 | 1200 | 55.9 | 7/1/2009 17:02 |
| E2 | Sr-90' | 0.5 | 14141 | 1230 | 48.8 | 7/1/2009 17:03 |
| E2 | Sr-90' | 0.5 | 15488 | 1260 | 37.9 | 7/1/2009 17:04 |
| E2 | Sr-90' | 0.5 | 16420 | 1290 | 27.4 | 7/1/2009 17:04 |
| E2 | Sr-90' | 0.5 | 17015 | 1320 | 19.0 | 7/1/2009 17:05 |
| E2 | Sr-90' | 0.5 | 17485 | 1350 | 12.1 | 7/1/2009 17:05 |
| E2 | Sr-90' | 0.5 | 17805 | 1380 | 6.0 | 7/1/2009 17:06 |
| E2 | Sr-90' | 0.5 | 17843 | 1410 | 2.5 | 7/1/2009 17:07 |
| E2 | Sr-90' | 0.5 | 17729 | 1440 | 0.6 | 7/1/2009 17:07 |
| E2 | Sr-90' | 0.5 | 17899 | 1470 | 0.2 | 7/1/2009 17:08 |
| E2 | Sr-90' | 0.5 | 17869 | 1500 | 1.8 | 7/1/2009 17:09 |
| E2 | Sr-90' | 0.5 | 17806 | 1530 | 0.0 | 7/1/2009 17:09 |
| E2 | Sr-90' | 0.5 | 18040 | 1560 | 2.2 | 7/1/2009 17:10 |
| E2 | Sr-90' | 0.5 | 17819 | 1590 | 1.9 | 7/1/2009 17:10 |
| E2 | Sr-90' | 0.5 | 18188 | 1620 | | 7/1/2009 17:11 |
| E2 | Sr-90' | 0.5 | 18023 | 1650 | | 7/1/2009 17:12 |

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|---|---|---|---|---|---|---|
| E3 | Sr-90' | 0.11 | 6 | 750 | | 7/1/2009 16:53 |
| E3 | Sr-90' | 0.5 | 100 | 780 | | 7/1/2009 16:54 |
| E3 | Sr-90' | 0.5 | 299 | 810 | 8.2 | 7/1/2009 16:54 |
| E3 | Sr-90' | 0.5 | 562 | 840 | 12.0 | 7/1/2009 16:55 |
| E3 | Sr-90' | 0.5 | 998 | 870 | 15.3 | 7/1/2009 16:55 |
| E3 | Sr-90' | 0.5 | 1557 | 900 | 18.2 | 7/1/2009 16:56 |
| E3 | Sr-90' | 0.5 | 2103 | 930 | 21.5 | 7/1/2009 16:57 |
| E3 | Sr-90' | 0.5 | 2734 | 960 | 25.7 | 7/1/2009 16:57 |
| E3 | Sr-90' | 0.5 | 3637 | 990 | 32.2 | 7/1/2009 16:58 |
| E3 | Sr-90' | 0.5 | 4648 | 1020 | 38.0 | 7/1/2009 16:59 |
| E3 | Sr-90' | 0.5 | 5981 | 1050 | 43.0 | 7/1/2009 16:59 |
| E3 | Sr-90' | 0.5 | 7264 | 1080 | 48.2 | 7/1/2009 17:00 |
| E3 | Sr-90' | 0.5 | 8773 | 1110 | 52.4 | 7/1/2009 17:00 |
| E3 | Sr-90' | 0.5 | 10478 | 1140 | 56.1 | 7/1/2009 17:01 |
| E3 | Sr-90' | 0.5 | 12239 | 1170 | 54.1 | 7/1/2009 17:02 |
| E3 | Sr-90' | 0.5 | 13953 | 1200 | 47.1 | 7/1/2009 17:02 |
| E3 | Sr-90' | 0.5 | 15145 | 1230 | 37.8 | 7/1/2009 17:03 |
| E3 | Sr-90' | 0.5 | 16088 | 1260 | 27.2 | 7/1/2009 17:04 |
| E3 | Sr-90' | 0.5 | 16835 | 1290 | 18.2 | 7/1/2009 17:04 |
| E3 | Sr-90' | 0.5 | 17187 | 1320 | 9.6 | 7/1/2009 17:05 |
| E3 | Sr-90' | 0.5 | 17323 | 1350 | 4.3 | 7/1/2009 17:05 |
| E3 | Sr-90' | 0.5 | 17281 | 1380 | 4.2 | 7/1/2009 17:06 |
| E3 | Sr-90' | 0.5 | 17438 | 1410 | 2.2 | 7/1/2009 17:07 |
| E3 | Sr-90' | 0.5 | 17763 | 1440 | 1.7 | 7/1/2009 17:07 |
| E3 | Sr-90' | 0.5 | 17411 | 1470 | -0.9 | 7/1/2009 17:08 |
| E3 | Sr-90' | 0.5 | 17545 | 1500 | -0.4 | 7/1/2009 17:09 |
| E3 | Sr-90' | 0.5 | 17408 | 1530 | 2.9 | 7/1/2009 17:09 |
| E3 | Sr-90' | 0.5 | 17704 | 1560 | 1.8 | 7/1/2009 17:10 |
| E3 | Sr-90' | 0.5 | 17768 | 1590 | 0.6 | 7/1/2009 17:10 |
| E3 | Sr-90' | 0.5 | 17641 | 1620 | | 7/1/2009 17:11 |
| E3 | Sr-90' | 0.5 | 17535 | 1650 | | 7/1/2009 17:12 |
| E4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 16:53 |
| E4 | Sr-90' | 0.12 | 1 | 780 | | 7/1/2009 16:54 |
| E4 | Sr-90' | 0.5 | 62 | 810 | 3.5 | 7/1/2009 16:54 |
| E4 | Sr-90' | 0.5 | 205 | 840 | 6.0 | 7/1/2009 16:55 |
| E4 | Sr-90' | 0.5 | 428 | 870 | 8.7 | 7/1/2009 16:55 |
| E4 | Sr-90' | 0.5 | 712 | 900 | 12.1 | 7/1/2009 16:56 |
| E4 | Sr-90' | 0.5 | 1114 | 930 | 15.5 | 7/1/2009 16:57 |
| E4 | Sr-90' | 0.5 | 1670 | 960 | 17.6 | 7/1/2009 16:57 |
| E4 | Sr-90' | 0.5 | 2269 | 990 | 21.0 | 7/1/2009 16:58 |
| E4 | Sr-90' | 0.5 | 2774 | 1020 | 25.3 | 7/1/2009 16:59 |
| E4 | Sr-90' | 0.5 | 3713 | 1050 | 30.9 | 7/1/2009 16:59 |
| E4 | Sr-90' | 0.5 | 4742 | 1080 | 38.0 | 7/1/2009 17:00 |
| E4 | Sr-90' | 0.5 | 5922 | 1110 | 41.9 | 7/1/2009 17:00 |
| E4 | Sr-90' | 0.5 | 7364 | 1140 | 46.6 | 7/1/2009 17:01 |
| E4 | Sr-90' | 0.5 | 8687 | 1170 | 48.0 | 7/1/2009 17:02 |
| E4 | Sr-90' | 0.5 | 10345 | 1200 | 46.5 | 7/1/2009 17:02 |
| E4 | Sr-90' | 0.5 | 11633 | 1230 | 42.6 | 7/1/2009 17:03 |
| E4 | Sr-90' | 0.5 | 12867 | 1260 | 35.1 | 7/1/2009 17:04 |
| E4 | Sr-90' | 0.5 | 13814 | 1290 | 27.5 | 7/1/2009 17:04 |
| E4 | Sr-90' | 0.5 | 14521 | 1320 | 17.8 | 7/1/2009 17:05 |
| E4 | Sr-90' | 0.5 | 14937 | 1350 | 11.4 | 7/1/2009 17:05 |
| E4 | Sr-90' | 0.5 | 14976 | 1380 | 6.8 | 7/1/2009 17:06 |
| E4 | Sr-90' | 0.5 | 15298 | 1410 | 4.0 | 7/1/2009 17:07 |
| E4 | Sr-90' | 0.5 | 15356 | 1440 | 3.4 | 7/1/2009 17:07 |
| E4 | Sr-90' | 0.5 | 15348 | 1470 | 2.5 | 7/1/2009 17:08 |
| E4 | Sr-90' | 0.5 | 15467 | 1500 | 1.5 | 7/1/2009 17:09 |
| E4 | Sr-90' | 0.5 | 15614 | 1530 | -0.3 | 7/1/2009 17:09 |
| E4 | Sr-90' | 0.5 | 15441 | 1560 | -2.2 | 7/1/2009 17:10 |
| E4 | Sr-90' | 0.5 | 15310 | 1590 | -0.7 | 7/1/2009 17:10 |
| E4 | Sr-90' | 0.5 | 15285 | 1620 | | 7/1/2009 17:11 |
| E4 | Sr-90' | 0.5 | 15594 | 1650 | | 7/1/2009 17:12 |
| F1 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 16:53 |
| F1 | Sr-90' | 0.5 | 41 | 780 | | 7/1/2009 16:54 |
| F1 | Sr-90' | 0.5 | 140 | 810 | 5.8 | 7/1/2009 16:54 |
| F1 | Sr-90' | 0.5 | 386 | 840 | 9.6 | 7/1/2009 16:55 |
| F1 | Sr-90' | 0.5 | 692 | 870 | 13.4 | 7/1/2009 16:55 |
| F1 | Sr-90' | 0.5 | 1203 | 900 | 17.5 | 7/1/2009 16:56 |
| F1 | Sr-90' | 0.5 | 1739 | 930 | 22.0 | 7/1/2009 16:57 |
| F1 | Sr-90' | 0.5 | 2486 | 960 | 24.4 | 7/1/2009 16:57 |

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|---|---|---|---|---|---|---|
| F1 | Sr-90' | 0.5 | 3345 | 990 | 28.5 | 7/1/2009 16:58 |
| F1 | Sr-90' | 0.5 | 4063 | 1020 | 33.4 | 7/1/2009 16:59 |
| F1 | Sr-90' | 0.5 | 5218 | 1050 | 39.9 | 7/1/2009 16:59 |
| F1 | Sr-90' | 0.5 | 6559 | 1080 | 49.9 | 7/1/2009 17:00 |
| F1 | Sr-90' | 0.5 | 8089 | 1110 | 56.9 | 7/1/2009 17:00 |
| F1 | Sr-90' | 0.5 | 10105 | 1140 | 63.2 | 7/1/2009 17:01 |
| F1 | Sr-90' | 0.5 | 11973 | 1170 | 63.6 | 7/1/2009 17:02 |
| F1 | Sr-90' | 0.5 | 14100 | 1200 | 60.5 | 7/1/2009 17:02 |
| F1 | Sr-90' | 0.5 | 15625 | 1230 | 51.4 | 7/1/2009 17:03 |
| F1 | Sr-90' | 0.5 | 17349 | 1260 | 40.8 | 7/1/2009 17:04 |
| F1 | Sr-90' | 0.5 | 18058 | 1290 | 29.0 | 7/1/2009 17:04 |
| F1 | Sr-90' | 0.5 | 19007 | 1320 | 16.9 | 7/1/2009 17:05 |
| F1 | Sr-90' | 0.5 | 19153 | 1350 | 11.1 | 7/1/2009 17:05 |
| F1 | Sr-90' | 0.5 | 19337 | 1380 | 4.5 | 7/1/2009 17:06 |
| F1 | Sr-90' | 0.5 | 19560 | 1410 | 4.6 | 7/1/2009 17:07 |
| F1 | Sr-90' | 0.5 | 19474 | 1440 | 2.9 | 7/1/2009 17:07 |
| F1 | Sr-90' | 0.5 | 19777 | 1470 | 2.2 | 7/1/2009 17:08 |
| F1 | Sr-90' | 0.5 | 19660 | 1500 | 2.0 | 7/1/2009 17:09 |
| F1 | Sr-90' | 0.5 | 19795 | 1530 | 1.4 | 7/1/2009 17:09 |
| F1 | Sr-90' | 0.5 | 19765 | 1560 | 1.5 | 7/1/2009 17:10 |
| F1 | Sr-90' | 0.5 | 19927 | 1590 | -0.9 | 7/1/2009 17:10 |
| F1 | Sr-90' | 0.5 | 19825 | 1620 | | 7/1/2009 17:11 |
| F1 | Sr-90' | 0.5 | 19634 | 1650 | | 7/1/2009 17:12 |
| F2 | Sr-90' | 0.11 | 3 | 750 | | 7/1/2009 16:53 |
| F2 | Sr-90' | 0.5 | 75 | 780 | | 7/1/2009 16:54 |
| F2 | Sr-90' | 0.5 | 255 | 810 | 8.6 | 7/1/2009 16:54 |
| F2 | Sr-90' | 0.5 | 549 | 840 | 12.8 | 7/1/2009 16:55 |
| F2 | Sr-90' | 0.5 | 1053 | 870 | 16.1 | 7/1/2009 16:56 |
| F2 | Sr-90' | 0.5 | 1600 | 900 | 20.7 | 7/1/2009 16:56 |
| F2 | Sr-90' | 0.5 | 2150 | 930 | 24.4 | 7/1/2009 16:57 |
| F2 | Sr-90' | 0.5 | 3108 | 960 | 30.2 | 7/1/2009 16:57 |
| F2 | Sr-90' | 0.5 | 3956 | 990 | 37.2 | 7/1/2009 16:58 |
| F2 | Sr-90' | 0.5 | 5225 | 1020 | 43.1 | 7/1/2009 16:59 |
| F2 | Sr-90' | 0.5 | 6673 | 1050 | 52.0 | 7/1/2009 16:59 |
| F2 | Sr-90' | 0.5 | 8221 | 1080 | 57.9 | 7/1/2009 17:00 |
| F2 | Sr-90' | 0.5 | 10263 | 1110 | 65.3 | 7/1/2009 17:00 |
| F2 | Sr-90' | 0.5 | 12122 | 1140 | 70.5 | 7/1/2009 17:01 |
| F2 | Sr-90' | 0.5 | 14514 | 1170 | 70.5 | 7/1/2009 17:02 |
| F2 | Sr-90' | 0.5 | 16669 | 1200 | 64.7 | 7/1/2009 17:02 |
| F2 | Sr-90' | 0.5 | 18558 | 1230 | 50.8 | 7/1/2009 17:03 |
| F2 | Sr-90' | 0.5 | 19798 | 1260 | 30.8 | 7/1/2009 17:04 |
| F2 | Sr-90' | 0.5 | 20571 | 1290 | 14.2 | 7/1/2009 17:04 |
| F2 | Sr-90' | 0.48 | 20276 | 1320 | 4.2 | 7/1/2009 17:05 |
| F2 | Sr-90' | 0.48 | 20444 | 1350 | -2.3 | 7/1/2009 17:05 |
| F2 | Sr-90' | 0.48 | 20498 | 1380 | -0.7 | 7/1/2009 17:06 |
| F2 | Sr-90' | 0.47 | 20110 | 1410 | 0.6 | 7/1/2009 17:07 |
| F2 | Sr-90' | 0.47 | 20341 | 1440 | 0.6 | 7/1/2009 17:07 |
| F2 | Sr-90' | 0.48 | 20608 | 1470 | 2.6 | 7/1/2009 17:08 |
| F2 | Sr-90' | 0.47 | 20343 | 1500 | 1.8 | 7/1/2009 17:09 |
| F2 | Sr-90' | 0.48 | 20506 | 1530 | -0.2 | 7/1/2009 17:09 |
| F2 | Sr-90' | 0.48 | 20655 | 1560 | 1.8 | 7/1/2009 17:10 |
| F2 | Sr-90' | 0.47 | 20420 | 1590 | -0.3 | 7/1/2009 17:10 |
| F2 | Sr-90' | 0.48 | 20663 | 1620 | | 7/1/2009 17:11 |
| F2 | Sr-90' | 0.47 | 20459 | 1650 | | 7/1/2009 17:12 |
| F3 | Sr-90' | 0.11 | 4 | 750 | | 7/1/2009 16:53 |
| F3 | Sr-90' | 0.5 | 50 | 780 | | 7/1/2009 16:54 |
| F3 | Sr-90' | 0.5 | 177 | 810 | 6.3 | 7/1/2009 16:54 |
| F3 | Sr-90' | 0.5 | 380 | 840 | 10.6 | 7/1/2009 16:55 |
| F3 | Sr-90' | 0.5 | 779 | 870 | 14.1 | 7/1/2009 16:56 |
| F3 | Sr-90' | 0.5 | 1332 | 900 | 17.5 | 7/1/2009 16:56 |
| F3 | Sr-90' | 0.5 | 1821 | 930 | 21.0 | 7/1/2009 16:57 |
| F3 | Sr-90' | 0.5 | 2490 | 960 | 24.7 | 7/1/2009 16:57 |
| F3 | Sr-90' | 0.5 | 3348 | 990 | 30.7 | 7/1/2009 16:58 |
| F3 | Sr-90' | 0.5 | 4268 | 1020 | 37.1 | 7/1/2009 16:59 |
| F3 | Sr-90' | 0.5 | 5535 | 1050 | 43.6 | 7/1/2009 16:59 |
| F3 | Sr-90' | 0.5 | 6954 | 1080 | 49.9 | 7/1/2009 17:00 |
| F3 | Sr-90' | 0.5 | 8548 | 1110 | 54.8 | 7/1/2009 17:00 |
| F3 | Sr-90' | 0.5 | 10239 | 1140 | 59.6 | 7/1/2009 17:01 |
| F3 | Sr-90' | 0.5 | 12114 | 1170 | 60.8 | 7/1/2009 17:02 |
| F3 | Sr-90' | 0.5 | 14106 | 1200 | 57.4 | 7/1/2009 17:02 |

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|---|---|---|---|---|---|---|
| F3 | Sr-90' | 0.5 | 15735 | 1230 | 48.0 | 7/1/2009 17:03 |
| F3 | Sr-90' | 0.5 | 17035 | 1260 | 35.4 | 7/1/2009 17:04 |
| F3 | Sr-90' | 0.5 | 17852 | 1290 | 25.4 | 7/1/2009 17:04 |
| F3 | Sr-90' | 0.5 | 18355 | 1320 | 15.1 | 7/1/2009 17:05 |
| F3 | Sr-90' | 0.5 | 18889 | 1350 | 7.9 | 7/1/2009 17:05 |
| F3 | Sr-90' | 0.5 | 18778 | 1380 | 4.9 | 7/1/2009 17:06 |
| F3 | Sr-90' | 0.5 | 18827 | 1410 | 2.1 | 7/1/2009 17:07 |
| F3 | Sr-90' | 0.5 | 19124 | 1440 | 2.7 | 7/1/2009 17:07 |
| F3 | Sr-90' | 0.5 | 19026 | 1470 | 1.2 | 7/1/2009 17:08 |
| F3 | Sr-90' | 0.5 | 19090 | 1500 | -0.3 | 7/1/2009 17:09 |
| F3 | Sr-90' | 0.5 | 19021 | 1530 | 0.7 | 7/1/2009 17:09 |
| F3 | Sr-90' | 0.5 | 19089 | 1560 | 1.2 | 7/1/2009 17:10 |
| F3 | Sr-90' | 0.5 | 19128 | 1590 | 2.1 | 7/1/2009 17:10 |
| F3 | Sr-90' | 0.5 | 19221 | 1620 | | 7/1/2009 17:11 |
| F3 | Sr-90' | 0.5 | 19274 | 1650 | | 7/1/2009 17:12 |
| F4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 16:53 |
| F4 | Sr-90' | 0.11 | 0 | 780 | | 7/1/2009 16:54 |
| F4 | Sr-90' | 0.5 | 125 | 810 | 5.6 | 7/1/2009 16:54 |
| F4 | Sr-90' | 0.5 | 346 | 840 | 9.4 | 7/1/2009 16:55 |
| F4 | Sr-90' | 0.5 | 671 | 870 | 13.3 | 7/1/2009 16:56 |
| F4 | Sr-90' | 0.5 | 1133 | 900 | 16.8 | 7/1/2009 16:56 |
| F4 | Sr-90' | 0.5 | 1726 | 930 | 20.4 | 7/1/2009 16:57 |
| F4 | Sr-90' | 0.5 | 2343 | 960 | 24.5 | 7/1/2009 16:57 |
| F4 | Sr-90' | 0.5 | 3123 | 990 | 28.7 | 7/1/2009 16:58 |
| F4 | Sr-90' | 0.5 | 4105 | 1020 | 34.6 | 7/1/2009 16:59 |
| F4 | Sr-90' | 0.5 | 5144 | 1050 | 40.7 | 7/1/2009 16:59 |
| F4 | Sr-90' | 0.5 | 6524 | 1080 | 46.8 | 7/1/2009 17:00 |
| F4 | Sr-90' | 0.5 | 8020 | 1110 | 53.6 | 7/1/2009 17:00 |
| F4 | Sr-90' | 0.5 | 9687 | 1140 | 59.4 | 7/1/2009 17:01 |
| F4 | Sr-90' | 0.5 | 11603 | 1170 | 59.9 | 7/1/2009 17:02 |
| F4 | Sr-90' | 0.5 | 13644 | 1200 | 58.2 | 7/1/2009 17:02 |
| F4 | Sr-90' | 0.5 | 15027 | 1230 | 50.3 | 7/1/2009 17:03 |
| F4 | Sr-90' | 0.5 | 16711 | 1260 | 38.9 | 7/1/2009 17:04 |
| F4 | Sr-90' | 0.5 | 17608 | 1290 | 27.3 | 7/1/2009 17:04 |
| F4 | Sr-90' | 0.5 | 18185 | 1320 | 15.4 | 7/1/2009 17:05 |
| F4 | Sr-90' | 0.5 | 18391 | 1350 | 9.8 | 7/1/2009 17:05 |
| F4 | Sr-90' | 0.5 | 18626 | 1380 | 5.6 | 7/1/2009 17:06 |
| F4 | Sr-90' | 0.5 | 18863 | 1410 | 3.4 | 7/1/2009 17:07 |
| F4 | Sr-90' | 0.5 | 18792 | 1440 | 2.1 | 7/1/2009 17:07 |
| F4 | Sr-90' | 0.5 | 18816 | 1470 | -0.5 | 7/1/2009 17:08 |
| F4 | Sr-90' | 0.5 | 18962 | 1500 | 1.5 | 7/1/2009 17:09 |
| F4 | Sr-90' | 0.5 | 18700 | 1530 | 1.6 | 7/1/2009 17:09 |
| F4 | Sr-90' | 0.5 | 19073 | 1560 | 0.5 | 7/1/2009 17:10 |
| F4 | Sr-90' | 0.5 | 18996 | 1590 | 1.6 | 7/1/2009 17:10 |
| F4 | Sr-90' | 0.5 | 18893 | 1620 | | 7/1/2009 17:11 |
| F4 | Sr-90' | 0.5 | 19035 | 1650 | | 7/1/2009 17:12 |
| G1 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 16:53 |
| G1 | Sr-90' | 0.11 | 8 | 780 | | 7/1/2009 16:54 |
| G1 | Sr-90' | 0.5 | 142 | 810 | 5.3 | 7/1/2009 16:54 |
| G1 | Sr-90' | 0.5 | 309 | 840 | 8.5 | 7/1/2009 16:54 |
| G1 | Sr-90' | 0.5 | 643 | 870 | 11.6 | 7/1/2009 16:55 |
| G1 | Sr-90' | 0.5 | 1029 | 900 | 14.5 | 7/1/2009 16:56 |
| G1 | Sr-90' | 0.5 | 1529 | 930 | 17.1 | 7/1/2009 16:56 |
| G1 | Sr-90' | 0.5 | 2045 | 960 | 20.8 | 7/1/2009 16:57 |
| G1 | Sr-90' | 0.5 | 2698 | 990 | 24.9 | 7/1/2009 16:58 |
| G1 | Sr-90' | 0.5 | 3567 | 1020 | 30.5 | 7/1/2009 16:58 |
| G1 | Sr-90' | 0.5 | 4501 | 1050 | 34.9 | 7/1/2009 16:59 |
| G1 | Sr-90' | 0.5 | 5717 | 1080 | 42.1 | 7/1/2009 16:59 |
| G1 | Sr-90' | 0.5 | 6865 | 1110 | 49.7 | 7/1/2009 17:00 |
| G1 | Sr-90' | 0.5 | 8707 | 1140 | 54.5 | 7/1/2009 17:01 |
| G1 | Sr-90' | 0.5 | 10467 | 1170 | 57.3 | 7/1/2009 17:01 |
| G1 | Sr-90' | 0.5 | 12095 | 1200 | 52.8 | 7/1/2009 17:02 |
| G1 | Sr-90' | 0.5 | 13759 | 1230 | 47.4 | 7/1/2009 17:03 |
| G1 | Sr-90' | 0.5 | 14976 | 1260 | 37.0 | 7/1/2009 17:03 |
| G1 | Sr-90' | 0.5 | 16137 | 1290 | 25.1 | 7/1/2009 17:04 |
| G1 | Sr-90' | 0.5 | 16455 | 1320 | 16.0 | 7/1/2009 17:04 |
| G1 | Sr-90' | 0.5 | 16791 | 1350 | 8.1 | 7/1/2009 17:05 |
| G1 | Sr-90' | 0.5 | 17045 | 1380 | 5.8 | 7/1/2009 17:06 |
| G1 | Sr-90' | 0.5 | 17060 | 1410 | 2.2 | 7/1/2009 17:06 |
| G1 | Sr-90' | 0.5 | 17183 | 1440 | 0.5 | 7/1/2009 17:07 |

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|---|---|---|---|---|---|---|
| G1 | Sr-90' | 0.5 | 17051 | 1470 | -0.1 | 7/1/2009 17:08 |
| G1 | Sr-90' | 0.5 | 17124 | 1500 | 0.2 | 7/1/2009 17:08 |
| G1 | Sr-90' | 0.5 | 17071 | 1530 | 1.3 | 7/1/2009 17:09 |
| G1 | Sr-90' | 0.5 | 17202 | 1560 | 0.7 | 7/1/2009 17:09 |
| G1 | Sr-90' | 0.5 | 17214 | 1590 | 1.5 | 7/1/2009 17:10 |
| G1 | Sr-90' | 0.5 | 17159 | 1620 | | 7/1/2009 17:11 |
| G1 | Sr-90' | 0.5 | 17321 | 1650 | | 7/1/2009 17:11 |
| G2 | Sr-90' | 0.11 | 2 | 750 | | 7/1/2009 16:53 |
| G2 | Sr-90' | 0.11 | 8 | 780 | | 7/1/2009 16:54 |
| G2 | Sr-90' | 0.5 | 148 | 810 | 5.7 | 7/1/2009 16:54 |
| G2 | Sr-90' | 0.5 | 324 | 840 | 9.1 | 7/1/2009 16:54 |
| G2 | Sr-90' | 0.5 | 700 | 870 | 12.3 | 7/1/2009 16:55 |
| G2 | Sr-90' | 0.5 | 1101 | 900 | 15.5 | 7/1/2009 16:56 |
| G2 | Sr-90' | 0.5 | 1601 | 930 | 18.8 | 7/1/2009 16:56 |
| G2 | Sr-90' | 0.5 | 2197 | 960 | 23.0 | 7/1/2009 16:57 |
| G2 | Sr-90' | 0.5 | 2979 | 990 | 28.0 | 7/1/2009 16:58 |
| G2 | Sr-90' | 0.5 | 3866 | 1020 | 33.2 | 7/1/2009 16:58 |
| G2 | Sr-90' | 0.5 | 4971 | 1050 | 38.4 | 7/1/2009 16:59 |
| G2 | Sr-90' | 0.5 | 6177 | 1080 | 44.0 | 7/1/2009 16:59 |
| G2 | Sr-90' | 0.5 | 7579 | 1110 | 50.4 | 7/1/2009 17:00 |
| G2 | Sr-90' | 0.5 | 9156 | 1140 | 56.2 | 7/1/2009 17:01 |
| G2 | Sr-90' | 0.5 | 11042 | 1170 | 59.0 | 7/1/2009 17:01 |
| G2 | Sr-90' | 0.5 | 12872 | 1200 | 58.2 | 7/1/2009 17:02 |
| G2 | Sr-90' | 0.5 | 14577 | 1230 | 50.9 | 7/1/2009 17:03 |
| G2 | Sr-90' | 0.5 | 16124 | 1260 | 38.8 | 7/1/2009 17:03 |
| G2 | Sr-90' | 0.5 | 17054 | 1290 | 26.4 | 7/1/2009 17:04 |
| G2 | Sr-90' | 0.5 | 17456 | 1320 | 16.4 | 7/1/2009 17:04 |
| G2 | Sr-90' | 0.5 | 17867 | 1350 | 9.5 | 7/1/2009 17:05 |
| G2 | Sr-90' | 0.5 | 18172 | 1380 | 5.6 | 7/1/2009 17:06 |
| G2 | Sr-90' | 0.5 | 18119 | 1410 | 3.2 | 7/1/2009 17:06 |
| G2 | Sr-90' | 0.5 | 18174 | 1440 | 2.4 | 7/1/2009 17:07 |
| G2 | Sr-90' | 0.5 | 18347 | 1470 | 2.6 | 7/1/2009 17:08 |
| G2 | Sr-90' | 0.5 | 18411 | 1500 | 2.6 | 7/1/2009 17:08 |
| G2 | Sr-90' | 0.5 | 18383 | 1530 | 0.5 | 7/1/2009 17:09 |
| G2 | Sr-90' | 0.5 | 18551 | 1560 | 0.4 | 7/1/2009 17:09 |
| G2 | Sr-90' | 0.5 | 18352 | 1590 | -1.0 | 7/1/2009 17:10 |
| G2 | Sr-90' | 0.5 | 18482 | 1620 | | 7/1/2009 17:11 |
| G2 | Sr-90' | 0.5 | 18274 | 1650 | | 7/1/2009 17:11 |
| G3 | Sr-90' | 0.11 | 1 | 750 | | 7/1/2009 16:53 |
| G3 | Sr-90' | 0.12 | 0 | 780 | | 7/1/2009 16:54 |
| G3 | Sr-90' | 0.5 | 43 | 810 | 2.8 | 7/1/2009 16:54 |
| G3 | Sr-90' | 0.5 | 140 | 840 | 6.1 | 7/1/2009 16:54 |
| G3 | Sr-90' | 0.5 | 346 | 870 | 10.0 | 7/1/2009 16:55 |
| G3 | Sr-90' | 0.5 | 770 | 900 | 13.8 | 7/1/2009 16:56 |
| G3 | Sr-90' | 0.5 | 1233 | 930 | 17.3 | 7/1/2009 16:56 |
| G3 | Sr-90' | 0.5 | 1759 | 960 | 21.4 | 7/1/2009 16:57 |
| G3 | Sr-90' | 0.5 | 2451 | 990 | 25.6 | 7/1/2009 16:58 |
| G3 | Sr-90' | 0.5 | 3366 | 1020 | 31.4 | 7/1/2009 16:58 |
| G3 | Sr-90' | 0.5 | 4276 | 1050 | 35.9 | 7/1/2009 16:59 |
| G3 | Sr-90' | 0.5 | 5558 | 1080 | 42.3 | 7/1/2009 16:59 |
| G3 | Sr-90' | 0.5 | 6744 | 1110 | 49.0 | 7/1/2009 17:00 |
| G3 | Sr-90' | 0.5 | 8480 | 1140 | 55.9 | 7/1/2009 17:01 |
| G3 | Sr-90' | 0.5 | 10165 | 1170 | 63.6 | 7/1/2009 17:01 |
| G3 | Sr-90' | 0.5 | 12235 | 1200 | 67.0 | 7/1/2009 17:02 |
| G3 | Sr-90' | 0.5 | 14404 | 1230 | 67.4 | 7/1/2009 17:03 |
| G3 | Sr-90' | 0.5 | 16407 | 1260 | 59.3 | 7/1/2009 17:03 |
| G3 | Sr-90' | 0.5 | 18185 | 1290 | 47.6 | 7/1/2009 17:04 |
| G3 | Sr-90' | 0.5 | 19233 | 1320 | 33.5 | 7/1/2009 17:04 |
| G3 | Sr-90' | 0.5 | 20131 | 1350 | 19.1 | 7/1/2009 17:05 |
| G3 | Sr-90' | 0.5 | 20459 | 1380 | 9.5 | 7/1/2009 17:06 |
| G3 | Sr-90' | 0.49 | 20432 | 1410 | 3.7 | 7/1/2009 17:06 |
| G3 | Sr-90' | 0.49 | 20500 | 1440 | 1.6 | 7/1/2009 17:07 |
| G3 | Sr-90' | 0.49 | 20665 | 1470 | -0.3 | 7/1/2009 17:08 |
| G3 | Sr-90' | 0.49 | 20578 | 1500 | -1.6 | 7/1/2009 17:08 |
| G3 | Sr-90' | 0.48 | 20348 | 1530 | -1.6 | 7/1/2009 17:09 |
| G3 | Sr-90' | 0.48 | 20420 | 1560 | 1.5 | 7/1/2009 17:09 |
| G3 | Sr-90' | 0.48 | 20503 | 1590 | 3.3 | 7/1/2009 17:10 |
| G3 | Sr-90' | 0.48 | 20725 | 1620 | | 7/1/2009 17:11 |
| G3 | Sr-90' | 0.48 | 20692 | 1650 | | 7/1/2009 17:11 |
| G4 | Sr-90' | 0.12 | 0 | 750 | | 7/1/2009 16:53 |

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| G4 | Sr-90' | 0.12 | 2 | 780 | | 7/1/2009 16:54 |
| G4 | Sr-90' | 0.12 | 10 | 810 | 2.1 | 7/1/2009 16:54 |
| G4 | Sr-90' | 0.5 | 96 | 840 | 4.3 | 7/1/2009 16:54 |
| G4 | Sr-90' | 0.5 | 266 | 870 | 7.1 | 7/1/2009 16:55 |
| G4 | Sr-90' | 0.5 | 522 | 900 | 9.6 | 7/1/2009 16:56 |
| G4 | Sr-90' | 0.5 | 858 | 930 | 11.1 | 7/1/2009 16:56 |
| G4 | Sr-90' | 0.5 | 1238 | 960 | 13.8 | 7/1/2009 16:57 |
| G4 | Sr-90' | 0.5 | 1580 | 990 | 16.0 | 7/1/2009 16:58 |
| G4 | Sr-90' | 0.5 | 2232 | 1020 | 19.4 | 7/1/2009 16:58 |
| G4 | Sr-90' | 0.5 | 2756 | 1050 | 24.6 | 7/1/2009 16:59 |
| G4 | Sr-90' | 0.5 | 3567 | 1080 | 28.0 | 7/1/2009 16:59 |
| G4 | Sr-90' | 0.5 | 4603 | 1110 | 33.4 | 7/1/2009 17:00 |
| G4 | Sr-90' | 0.5 | 5501 | 1140 | 38.6 | 7/1/2009 17:01 |
| G4 | Sr-90' | 0.5 | 6802 | 1170 | 41.7 | 7/1/2009 17:01 |
| G4 | Sr-90' | 0.5 | 8262 | 1200 | 44.3 | 7/1/2009 17:02 |
| G4 | Sr-90' | 0.5 | 9472 | 1230 | 42.5 | 7/1/2009 17:03 |
| G4 | Sr-90' | 0.5 | 10818 | 1260 | 38.5 | 7/1/2009 17:03 |
| G4 | Sr-90' | 0.5 | 11904 | 1290 | 32.4 | 7/1/2009 17:04 |
| G4 | Sr-90' | 0.5 | 12821 | 1320 | 23.7 | 7/1/2009 17:04 |
| G4 | Sr-90' | 0.5 | 13335 | 1350 | 16.3 | 7/1/2009 17:05 |
| G4 | Sr-90' | 0.5 | 13662 | 1380 | 8.9 | 7/1/2009 17:06 |
| G4 | Sr-90' | 0.5 | 13925 | 1410 | 5.9 | 7/1/2009 17:06 |
| G4 | Sr-90' | 0.5 | 13865 | 1440 | 2.8 | 7/1/2009 17:07 |
| G4 | Sr-90' | 0.5 | 14125 | 1470 | 0.9 | 7/1/2009 17:08 |
| G4 | Sr-90' | 0.5 | 13975 | 1500 | 2.0 | 7/1/2009 17:08 |
| G4 | Sr-90' | 0.5 | 14009 | 1530 | 2.4 | 7/1/2009 17:09 |
| G4 | Sr-90' | 0.5 | 14226 | 1560 | 3.7 | 7/1/2009 17:09 |
| G4 | Sr-90' | 0.5 | 14366 | 1590 | 2.1 | 7/1/2009 17:10 |
| G4 | Sr-90' | 0.5 | 14354 | 1620 | | 7/1/2009 17:11 |
| G4 | Sr-90' | 0.5 | 14254 | 1650 | | 7/1/2009 17:11 |
| H1 | Sr-90' | 0.11 | 3 | 750 | | 7/1/2009 16:53 |
| H1 | Sr-90' | 0.12 | 4 | 780 | | 7/1/2009 16:54 |
| H1 | Sr-90' | 0.5 | 120 | 810 | 5.0 | 7/1/2009 16:54 |
| H1 | Sr-90' | 0.5 | 277 | 840 | 8.3 | 7/1/2009 16:55 |
| H1 | Sr-90' | 0.5 | 613 | 870 | 11.3 | 7/1/2009 16:55 |
| H1 | Sr-90' | 0.5 | 1000 | 900 | 15.1 | 7/1/2009 16:56 |
| H1 | Sr-90' | 0.5 | 1459 | 930 | 18.3 | 7/1/2009 16:56 |
| H1 | Sr-90' | 0.5 | 2112 | 960 | 22.4 | 7/1/2009 16:57 |
| H1 | Sr-90' | 0.5 | 2797 | 990 | 26.1 | 7/1/2009 16:58 |
| H1 | Sr-90' | 0.5 | 3684 | 1020 | 31.3 | 7/1/2009 16:58 |
| H1 | Sr-90' | 0.5 | 4585 | 1050 | 36.5 | 7/1/2009 16:59 |
| H1 | Sr-90' | 0.5 | 5908 | 1080 | 43.0 | 7/1/2009 17:00 |
| H1 | Sr-90' | 0.5 | 7164 | 1110 | 49.9 | 7/1/2009 17:00 |
| H1 | Sr-90' | 0.5 | 8847 | 1140 | 54.0 | 7/1/2009 17:01 |
| H1 | Sr-90' | 0.5 | 10607 | 1170 | 56.0 | 7/1/2009 17:01 |
| H1 | Sr-90' | 0.5 | 12293 | 1200 | 52.8 | 7/1/2009 17:02 |
| H1 | Sr-90' | 0.5 | 13845 | 1230 | 45.0 | 7/1/2009 17:03 |
| H1 | Sr-90' | 0.5 | 15147 | 1260 | 35.9 | 7/1/2009 17:03 |
| H1 | Sr-90' | 0.5 | 15927 | 1290 | 24.6 | 7/1/2009 17:04 |
| H1 | Sr-90' | 0.5 | 16632 | 1320 | 15.7 | 7/1/2009 17:05 |
| H1 | Sr-90' | 0.5 | 16799 | 1350 | 10.3 | 7/1/2009 17:05 |
| H1 | Sr-90' | 0.5 | 17067 | 1380 | 6.6 | 7/1/2009 17:06 |
| H1 | Sr-90' | 0.5 | 17254 | 1410 | 5.4 | 7/1/2009 17:06 |
| H1 | Sr-90' | 0.5 | 17390 | 1440 | 2.6 | 7/1/2009 17:07 |
| H1 | Sr-90' | 0.5 | 17444 | 1470 | -1.0 | 7/1/2009 17:08 |
| H1 | Sr-90' | 0.5 | 17357 | 1500 | -0.5 | 7/1/2009 17:08 |
| H1 | Sr-90' | 0.5 | 17121 | 1530 | 1.8 | 7/1/2009 17:09 |
| H1 | Sr-90' | 0.5 | 17478 | 1560 | 3.5 | 7/1/2009 17:10 |
| H1 | Sr-90' | 0.5 | 17655 | 1590 | 2.8 | 7/1/2009 17:10 |
| H1 | Sr-90' | 0.5 | 17621 | 1620 | 20.4 | 7/1/2009 17:11 |
| H1 | Sr-90' | 0.5 | 17476 | 1650 | | 7/1/2009 17:11 |
| H2 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 16:53 |
| H2 | Sr-90' | 0.11 | 2 | 780 | | 7/1/2009 16:54 |
| H2 | Sr-90' | 0.11 | 9 | 810 | 3.0 | 7/1/2009 16:54 |
| H2 | Sr-90' | 0.5 | 130 | 840 | 5.7 | 7/1/2009 16:55 |
| H2 | Sr-90' | 0.5 | 386 | 870 | 8.8 | 7/1/2009 16:55 |
| H2 | Sr-90' | 0.5 | 671 | 900 | 11.9 | 7/1/2009 16:56 |
| H2 | Sr-90' | 0.5 | 1065 | 930 | 14.0 | 7/1/2009 16:56 |
| H2 | Sr-90' | 0.5 | 1570 | 960 | 18.0 | 7/1/2009 16:57 |
| H2 | Sr-90' | 0.5 | 2032 | 990 | 22.2 | 7/1/2009 16:58 |

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| H2 | Sr-90' | 0.5 | 2889 | 1020 | 26.1 | 7/1/2009 16:58 |
| H2 | Sr-90' | 0.5 | 3732 | 1050 | 31.4 | 7/1/2009 16:59 |
| H2 | Sr-90' | 0.5 | 4634 | 1080 | 34.9 | 7/1/2009 17:00 |
| H2 | Sr-90' | 0.5 | 5875 | 1110 | 40.7 | 7/1/2009 17:00 |
| H2 | Sr-90' | 0.5 | 7057 | 1140 | 46.8 | 7/1/2009 17:01 |
| H2 | Sr-90' | 0.5 | 8628 | 1170 | 52.3 | 7/1/2009 17:01 |
| H2 | Sr-90' | 0.5 | 10272 | 1200 | 54.8 | 7/1/2009 17:02 |
| H2 | Sr-90' | 0.5 | 12110 | 1230 | 50.3 | 7/1/2009 17:03 |
| H2 | Sr-90' | 0.5 | 13536 | 1260 | 42.6 | 7/1/2009 17:03 |
| H2 | Sr-90' | 0.5 | 14535 | 1290 | 31.4 | 7/1/2009 17:04 |
| H2 | Sr-90' | 0.5 | 15451 | 1320 | 21.6 | 7/1/2009 17:05 |
| H2 | Sr-90' | 0.5 | 15866 | 1350 | 13.4 | 7/1/2009 17:05 |
| H2 | Sr-90' | 0.5 | 16110 | 1380 | 7.8 | 7/1/2009 17:06 |
| H2 | Sr-90' | 0.5 | 16214 | 1410 | 5.3 | 7/1/2009 17:06 |
| H2 | Sr-90' | 0.5 | 16443 | 1440 | 2.9 | 7/1/2009 17:07 |
| H2 | Sr-90' | 0.5 | 16489 | 1470 | 1.2 | 7/1/2009 17:08 |
| H2 | Sr-90' | 0.5 | 16408 | 1500 | 0.0 | 7/1/2009 17:08 |
| H2 | Sr-90' | 0.5 | 16413 | 1530 | 1.6 | 7/1/2009 17:09 |
| H2 | Sr-90' | 0.5 | 16476 | 1560 | 0.9 | 7/1/2009 17:10 |
| H2 | Sr-90' | 0.5 | 16689 | 1590 | 0.2 | 7/1/2009 17:10 |
| H2 | Sr-90' | 0.5 | 16407 | 1620 | | 7/1/2009 17:11 |
| H2 | Sr-90' | 0.5 | 16470 | 1650 | | 7/1/2009 17:11 |
| H3 | Sr-90' | 0.11 | 0 | 750 | | 7/1/2009 16:53 |
| H3 | Sr-90' | 0.11 | 2 | 780 | | 7/1/2009 16:54 |
| H3 | Sr-90' | 0.11 | 10 | 810 | 2.2 | 7/1/2009 16:54 |
| H3 | Sr-90' | 0.5 | 107 | 840 | 5.0 | 7/1/2009 16:55 |
| H3 | Sr-90' | 0.5 | 281 | 870 | 8.6 | 7/1/2009 16:55 |
| H3 | Sr-90' | 0.5 | 620 | 900 | 12.4 | 7/1/2009 16:56 |
| H3 | Sr-90' | 0.5 | 1041 | 930 | 16.8 | 7/1/2009 16:56 |
| H3 | Sr-90' | 0.5 | 1590 | 960 | 20.0 | 7/1/2009 16:57 |
| H3 | Sr-90' | 0.5 | 2316 | 990 | 24.3 | 7/1/2009 16:58 |
| H3 | Sr-90' | 0.5 | 2989 | 1020 | 29.6 | 7/1/2009 16:58 |
| H3 | Sr-90' | 0.5 | 3989 | 1050 | 35.8 | 7/1/2009 16:59 |
| H3 | Sr-90' | 0.5 | 5187 | 1080 | 42.4 | 7/1/2009 17:00 |
| H3 | Sr-90' | 0.5 | 6593 | 1110 | 48.1 | 7/1/2009 17:00 |
| H3 | Sr-90' | 0.5 | 8042 | 1140 | 56.1 | 7/1/2009 17:01 |
| H3 | Sr-90' | 0.5 | 9778 | 1170 | 62.8 | 7/1/2009 17:01 |
| H3 | Sr-90' | 0.5 | 12005 | 1200 | 68.0 | 7/1/2009 17:02 |
| H3 | Sr-90' | 0.5 | 14024 | 1230 | 67.5 | 7/1/2009 17:03 |
| H3 | Sr-90' | 0.5 | 16121 | 1260 | 59.0 | 7/1/2009 17:03 |
| H3 | Sr-90' | 0.5 | 17840 | 1290 | 49.1 | 7/1/2009 17:04 |
| H3 | Sr-90' | 0.5 | 18952 | 1320 | 33.9 | 7/1/2009 17:05 |
| H3 | Sr-90' | 0.5 | 19970 | 1350 | 20.2 | 7/1/2009 17:05 |
| H3 | Sr-90' | 0.5 | 20148 | 1380 | 11.3 | 7/1/2009 17:06 |
| H3 | Sr-90' | 0.5 | 20279 | 1410 | 3.1 | 7/1/2009 17:06 |
| H3 | Sr-90' | 0.5 | 20488 | 1440 | 1.9 | 7/1/2009 17:07 |
| H3 | Sr-90' | 0.49 | 20260 | 1470 | 1.2 | 7/1/2009 17:08 |
| H3 | Sr-90' | 0.5 | 20448 | 1500 | 0.3 | 7/1/2009 17:08 |
| H3 | Sr-90' | 0.49 | 20478 | 1530 | 0.5 | 7/1/2009 17:09 |
| H3 | Sr-90' | 0.49 | 20420 | 1560 | -1.7 | 7/1/2009 17:10 |
| H3 | Sr-90' | 0.49 | 20351 | 1590 | -1.3 | 7/1/2009 17:10 |
| H3 | Sr-90' | 0.49 | 20252 | 1620 | | 7/1/2009 17:11 |
| H3 | Sr-90' | 0.49 | 20370 | 1650 | | 7/1/2009 17:11 |
| H4 | Sr-90' | 0.12 | 1 | 750 | | 7/1/2009 16:53 |
| H4 | Sr-90' | 0.11 | 3 | 780 | | 7/1/2009 16:54 |
| H4 | Sr-90' | 0.11 | 6 | 810 | 2.6 | 7/1/2009 16:54 |
| H4 | Sr-90' | 0.5 | 150 | 840 | 5.2 | 7/1/2009 16:55 |
| H4 | Sr-90' | 0.5 | 313 | 870 | 8.6 | 7/1/2009 16:55 |
| H4 | Sr-90' | 0.5 | 632 | 900 | 11.7 | 7/1/2009 16:56 |
| H4 | Sr-90' | 0.5 | 1050 | 930 | 16.1 | 7/1/2009 16:56 |
| H4 | Sr-90' | 0.5 | 1541 | 960 | 19.0 | 7/1/2009 16:57 |
| H4 | Sr-90' | 0.5 | 2266 | 990 | 21.7 | 7/1/2009 16:58 |
| H4 | Sr-90' | 0.5 | 2881 | 1020 | 26.3 | 7/1/2009 16:58 |
| H4 | Sr-90' | 0.5 | 3633 | 1050 | 31.4 | 7/1/2009 16:59 |
| H4 | Sr-90' | 0.5 | 4798 | 1080 | 36.1 | 7/1/2009 17:00 |
| H4 | Sr-90' | 0.5 | 6014 | 1110 | 42.2 | 7/1/2009 17:00 |
| H4 | Sr-90' | 0.5 | 7109 | 1140 | 46.2 | 7/1/2009 17:01 |
| H4 | Sr-90' | 0.5 | 8810 | 1170 | 50.5 | 7/1/2009 17:01 |
| H4 | Sr-90' | 0.5 | 10328 | 1200 | 53.0 | 7/1/2009 17:02 |
| H4 | Sr-90' | 0.5 | 11973 | 1230 | 48.7 | 7/1/2009 17:03 |

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| H4 | Sr-90' | 0.5 | 13484 | 1260 | 43.5 | 7/1/2009 17:03 |
| H4 | Sr-90' | 0.5 | 14544 | 1290 | 33.5 | 7/1/2009 17:04 |
| H4 | Sr-90' | 0.5 | 15574 | 1320 | 21.0 | 7/1/2009 17:05 |
| H4 | Sr-90' | 0.5 | 15946 | 1350 | 13.2 | 7/1/2009 17:05 |
| H4 | Sr-90' | 0.5 | 15928 | 1380 | 8.1 | 7/1/2009 17:06 |
| H4 | Sr-90' | 0.5 | 16344 | 1410 | 7.2 | 7/1/2009 17:06 |
| H4 | Sr-90' | 0.5 | 16589 | 1440 | 5.8 | 7/1/2009 17:07 |
| H4 | Sr-90' | 0.5 | 16693 | 1470 | 1.0 | 7/1/2009 17:08 |
| H4 | Sr-90' | 0.5 | 16624 | 1500 | 0.0 | 7/1/2009 17:08 |
| H4 | Sr-90' | 0.5 | 16474 | 1530 | -1.0 | 7/1/2009 17:09 |
| H4 | Sr-90' | 0.5 | 16692 | 1560 | -0.1 | 7/1/2009 17:10 |
| H4 | Sr-90' | 0.5 | 16507 | 1590 | -0.7 | 7/1/2009 17:10 |
| H4 | Sr-90' | 0.5 | 16597 | 1620 | | 7/1/2009 17:11 |
| H4 | Sr-90' | 0.5 | 16414 | 1650 | | 7/1/2009 17:11 |
| I1 | Sr-90 | 0.5 | 123 | 750 | 18.9 | 1/27/2011 10:01 |
| I1 | Sr-90 | 0.5 | 268 | 780 | 18.6 | 1/27/2011 10:01 |
| I1 | Sr-90 | 0.5 | 584 | 810 | 9.6 | 1/27/2011 10:02 |
| I1 | Sr-90 | 0.5 | 867 | 840 | 12.4 | 1/27/2011 10:03 |
| I1 | Sr-90 | 0.5 | 1256 | 870 | 15.1 | 1/27/2011 10:03 |
| I1 | Sr-90 | 0.5 | 1797 | 900 | 17.5 | 1/27/2011 10:04 |
| I1 | Sr-90 | 0.5 | 2382 | 930 | 20.8 | 1/27/2011 10:05 |
| I1 | Sr-90 | 0.5 | 2927 | 960 | 24.5 | 1/27/2011 10:05 |
| I1 | Sr-90 | 0.5 | 3808 | 990 | 29.9 | 1/27/2011 10:06 |
| I1 | Sr-90 | 0.5 | 4757 | 1020 | 34.4 | 1/27/2011 10:07 |
| I1 | Sr-90 | 0.5 | 5949 | 1050 | 39.8 | 1/27/2011 10:07 |
| I1 | Sr-90 | 0.5 | 7017 | 1080 | 42.7 | 1/27/2011 10:08 |
| I1 | Sr-90 | 0.5 | 8641 | 1110 | 43.8 | 1/27/2011 10:08 |
| I1 | Sr-90 | 0.5 | 9823 | 1140 | 43.7 | 1/27/2011 10:09 |
| I1 | Sr-90 | 0.5 | 11116 | 1170 | 36.7 | 1/27/2011 10:10 |
| I1 | Sr-90 | 0.5 | 12334 | 1200 | 28.5 | 1/27/2011 10:10 |
| I1 | Sr-90 | 0.5 | 12896 | 1230 | 18.7 | 1/27/2011 10:11 |
| I1 | Sr-90 | 0.5 | 13215 | 1260 | 9.7 | 1/27/2011 10:12 |
| I1 | Sr-90 | 0.5 | 13483 | 1290 | 6.5 | 1/27/2011 10:12 |
| I1 | Sr-90 | 0.5 | 13490 | 1320 | 4.5 | 1/27/2011 10:13 |
| I1 | Sr-90 | 0.5 | 13739 | 1350 | 2.2 | 1/27/2011 10:13 |
| I1 | Sr-90 | 0.5 | 13768 | 1380 | 1.8 | 1/27/2011 10:14 |
| I1 | Sr-90 | 0.5 | 13669 | 1410 | 0.0 | 1/27/2011 10:15 |
| I1 | Sr-90 | 0.5 | 13797 | 1440 | 0.7 | 1/27/2011 10:15 |
| I1 | Sr-90 | 0.5 | 13731 | 1470 | 0.1 | 1/27/2011 10:16 |
| I1 | Sr-90 | 0.5 | 13846 | 1500 | -0.1 | 1/27/2011 10:17 |
| I1 | Sr-90 | 0.5 | 13654 | 1530 | 1.1 | 1/27/2011 10:17 |
| I1 | Sr-90 | 0.5 | 13826 | 1560 | 1.5 | 1/27/2011 10:18 |
| I1 | Sr-90 | 0.5 | 13901 | 1590 | 3.2 | 1/27/2011 10:18 |
| I1 | Sr-90 | 0.5 | 13942 | 1620 | 16.1 | 1/27/2011 10:19 |
| I1 | Sr-90 | 0.5 | 14075 | 1650 | 16.2 | 1/27/2011 10:20 |
| I2 | Sr-90 | 0.5 | 59 | 750 | 16.1 | 1/27/2011 10:01 |
| I2 | Sr-90 | 0.5 | 171 | 780 | 16.0 | 1/27/2011 10:01 |
| I2 | Sr-90 | 0.5 | 413 | 810 | 10.2 | 1/27/2011 10:02 |
| I2 | Sr-90 | 0.5 | 765 | 840 | 14.7 | 1/27/2011 10:03 |
| I2 | Sr-90 | 0.5 | 1299 | 870 | 18.6 | 1/27/2011 10:03 |
| I2 | Sr-90 | 0.5 | 1931 | 900 | 22.6 | 1/27/2011 10:04 |
| I2 | Sr-90 | 0.5 | 2626 | 930 | 26.9 | 1/27/2011 10:05 |
| I2 | Sr-90 | 0.5 | 3495 | 960 | 32.0 | 1/27/2011 10:05 |
| I2 | Sr-90 | 0.5 | 4556 | 990 | 36.2 | 1/27/2011 10:06 |
| I2 | Sr-90 | 0.5 | 5768 | 1020 | 42.1 | 1/27/2011 10:07 |
| I2 | Sr-90 | 0.5 | 6917 | 1050 | 50.6 | 1/27/2011 10:07 |
| I2 | Sr-90 | 0.5 | 8632 | 1080 | 59.4 | 1/27/2011 10:08 |
| I2 | Sr-90 | 0.5 | 10708 | 1110 | 64.5 | 1/27/2011 10:08 |
| I2 | Sr-90 | 0.5 | 12783 | 1140 | 63.6 | 1/27/2011 10:09 |
| I2 | Sr-90 | 0.5 | 14516 | 1170 | 56.5 | 1/27/2011 10:10 |
| I2 | Sr-90 | 0.5 | 16266 | 1200 | 43.1 | 1/27/2011 10:10 |
| I2 | Sr-90 | 0.5 | 17438 | 1230 | 28.9 | 1/27/2011 10:11 |
| I2 | Sr-90 | 0.5 | 17789 | 1260 | 16.6 | 1/27/2011 10:12 |
| I2 | Sr-90 | 0.5 | 18087 | 1290 | 10.0 | 1/27/2011 10:12 |
| I2 | Sr-90 | 0.5 | 18433 | 1320 | 5.9 | 1/27/2011 10:13 |
| I2 | Sr-90 | 0.5 | 18610 | 1350 | 2.4 | 1/27/2011 10:13 |
| I2 | Sr-90 | 0.5 | 18415 | 1380 | 0.5 | 1/27/2011 10:14 |
| I2 | Sr-90 | 0.5 | 18457 | 1410 | -1.2 | 1/27/2011 10:15 |
| I2 | Sr-90 | 0.5 | 18578 | 1440 | -2.3 | 1/27/2011 10:15 |
| I2 | Sr-90 | 0.5 | 18346 | 1470 | -1.8 | 1/27/2011 10:16 |

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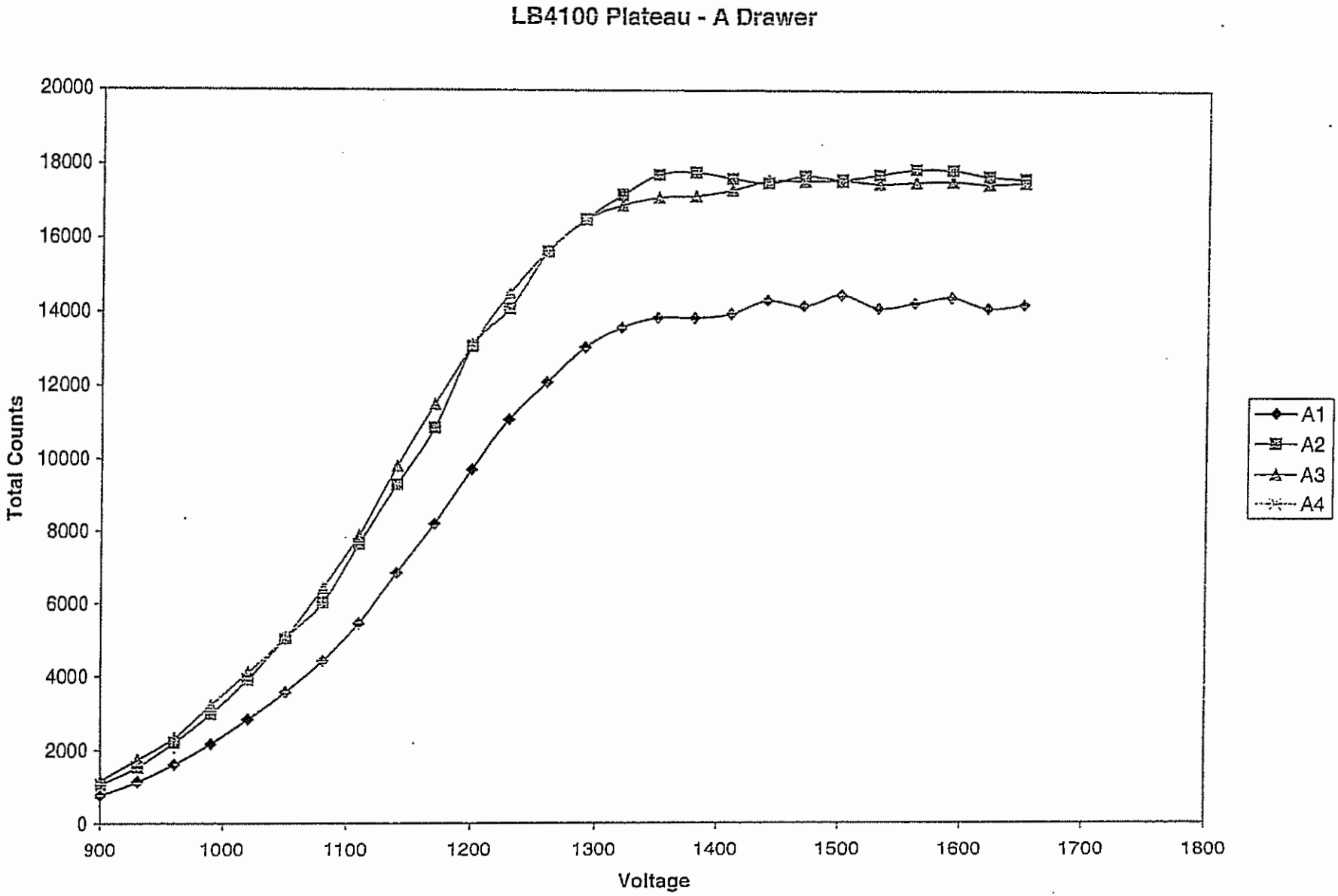
| I2 | Sr-90 | 0.5 | 18133 | 1500 | -0.7 | 1/27/2011 10:17 |
| I2 | Sr-90 | 0.5 | 18411 | 1530 | 1.6 | 1/27/2011 10:17 |
| I2 | Sr-90 | 0.5 | 18435 | 1560 | 3.5 | 1/27/2011 10:18 |
| I2 | Sr-90 | 0.5 | 18432 | 1590 | -0.2 | 1/27/2011 10:18 |
| I2 | Sr-90 | 0.5 | 18646 | 1620 | 21.2 | 1/27/2011 10:19 |
| I2 | Sr-90 | 0.5 | 18270 | 1650 | 21.2 | 1/27/2011 10:20 |
| I3 | Sr-90 | 0.5 | 154 | 750 | 21.1 | 1/27/2011 10:01 |
| I3 | Sr-90 | 0.5 | 362 | 780 | 20.6 | 1/27/2011 10:01 |
| I3 | Sr-90 | 0.5 | 717 | 810 | 14.2 | 1/27/2011 10:02 |
| I3 | Sr-90 | 0.5 | 1227 | 840 | 18.8 | 1/27/2011 10:03 |
| I3 | Sr-90 | 0.5 | 1845 | 870 | 22.1 | 1/27/2011 10:03 |
| I3 | Sr-90 | 0.5 | 2619 | 900 | 26.4 | 1/27/2011 10:04 |
| I3 | Sr-90 | 0.5 | 3329 | 930 | 31.0 | 1/27/2011 10:05 |
| I3 | Sr-90 | 0.5 | 4448 | 960 | 38.6 | 1/27/2011 10:05 |
| I3 | Sr-90 | 0.5 | 5579 | 990 | 45.8 | 1/27/2011 10:06 |
| I3 | Sr-90 | 0.5 | 7283 | 1020 | 53.0 | 1/27/2011 10:07 |
| I3 | Sr-90 | 0.5 | 8786 | 1050 | 61.6 | 1/27/2011 10:07 |
| I3 | Sr-90 | 0.5 | 10788 | 1080 | 66.6 | 1/27/2011 10:08 |
| I3 | Sr-90 | 0.5 | 13064 | 1110 | 66.9 | 1/27/2011 10:08 |
| I3 | Sr-90 | 0.5 | 15140 | 1140 | 60.2 | 1/27/2011 10:09 |
| I3 | Sr-90 | 0.5 | 16644 | 1170 | 46.6 | 1/27/2011 10:10 |
| I3 | Sr-90 | 0.5 | 18029 | 1200 | 34.2 | 1/27/2011 10:10 |
| I3 | Sr-90 | 0.5 | 18614 | 1230 | 23.1 | 1/27/2011 10:11 |
| I3 | Sr-90 | 0.5 | 19281 | 1260 | 10.6 | 1/27/2011 10:12 |
| I3 | Sr-90 | 0.5 | 19484 | 1290 | 6.5 | 1/27/2011 10:12 |
| I3 | Sr-90 | 0.5 | 19183 | 1320 | 0.8 | 1/27/2011 10:13 |
| I3 | Sr-90 | 0.5 | 19645 | 1350 | 1.1 | 1/27/2011 10:13 |
| I3 | Sr-90 | 0.5 | 19325 | 1380 | 2.4 | 1/27/2011 10:14 |
| I3 | Sr-90 | 0.5 | 19574 | 1410 | -1.1 | 1/27/2011 10:15 |
| I3 | Sr-90 | 0.5 | 19575 | 1440 | -1.2 | 1/27/2011 10:15 |
| I3 | Sr-90 | 0.5 | 19349 | 1470 | -2.3 | 1/27/2011 10:16 |
| I3 | Sr-90 | 0.5 | 19263 | 1500 | -0.8 | 1/27/2011 10:17 |
| I3 | Sr-90 | 0.5 | 19381 | 1530 | 0.7 | 1/27/2011 10:17 |
| I3 | Sr-90 | 0.5 | 19438 | 1560 | 2.1 | 1/27/2011 10:18 |
| I3 | Sr-90 | 0.5 | 19369 | 1590 | 0.5 | 1/27/2011 10:18 |
| I3 | Sr-90 | 0.5 | 19577 | 1620 | 22.6 | 1/27/2011 10:19 |
| I3 | Sr-90 | 0.5 | 19380 | 1650 | 22.6 | 1/27/2011 10:20 |
| I4 | Sr-90 | 0.11 | 7 | 750 | 22.5 | 1/27/2011 10:00 |
| I4 | Sr-90 | 0.5 | 130 | 780 | 22.2 | 1/27/2011 10:01 |
| I4 | Sr-90 | 0.5 | 348 | 810 | 8.9 | 1/27/2011 10:02 |
| I4 | Sr-90 | 0.5 | 686 | 840 | 11.9 | 1/27/2011 10:03 |
| I4 | Sr-90 | 0.5 | 1062 | 870 | 15.7 | 1/27/2011 10:03 |
| I4 | Sr-90 | 0.5 | 1562 | 900 | 19.2 | 1/27/2011 10:04 |
| I4 | Sr-90 | 0.5 | 2268 | 930 | 23.3 | 1/27/2011 10:05 |
| I4 | Sr-90 | 0.5 | 2966 | 960 | 28.2 | 1/27/2011 10:05 |
| I4 | Sr-90 | 0.5 | 3857 | 990 | 32.2 | 1/27/2011 10:06 |
| I4 | Sr-90 | 0.5 | 4995 | 1020 | 38.9 | 1/27/2011 10:07 |
| I4 | Sr-90 | 0.5 | 6078 | 1050 | 45.5 | 1/27/2011 10:07 |
| I4 | Sr-90 | 0.5 | 7697 | 1080 | 52.2 | 1/27/2011 10:08 |
| I4 | Sr-90 | 0.5 | 9336 | 1110 | 56.5 | 1/27/2011 10:08 |
| I4 | Sr-90 | 0.5 | 11190 | 1140 | 54.7 | 1/27/2011 10:09 |
| I4 | Sr-90 | 0.5 | 12811 | 1170 | 48.6 | 1/27/2011 10:10 |
| I4 | Sr-90 | 0.5 | 14166 | 1200 | 37.6 | 1/27/2011 10:10 |
| I4 | Sr-90 | 0.5 | 15132 | 1230 | 24.1 | 1/27/2011 10:11 |
| I4 | Sr-90 | 0.5 | 15674 | 1260 | 13.8 | 1/27/2011 10:12 |
| I4 | Sr-90 | 0.5 | 15676 | 1290 | 6.6 | 1/27/2011 10:12 |
| I4 | Sr-90 | 0.5 | 15961 | 1320 | 3.5 | 1/27/2011 10:13 |
| I4 | Sr-90 | 0.5 | 15975 | 1350 | 4.1 | 1/27/2011 10:13 |
| I4 | Sr-90 | 0.5 | 16050 | 1380 | 1.2 | 1/27/2011 10:14 |
| I4 | Sr-90 | 0.5 | 16239 | 1410 | 2.5 | 1/27/2011 10:15 |
| I4 | Sr-90 | 0.5 | 16010 | 1440 | 1.1 | 1/27/2011 10:15 |
| I4 | Sr-90 | 0.5 | 16371 | 1470 | 0.1 | 1/27/2011 10:16 |
| I4 | Sr-90 | 0.5 | 16155 | 1500 | 0.4 | 1/27/2011 10:17 |
| I4 | Sr-90 | 0.5 | 16176 | 1530 | 0.2 | 1/27/2011 10:17 |
| I4 | Sr-90 | 0.5 | 16160 | 1560 | 0.4 | 1/27/2011 10:18 |
| I4 | Sr-90 | 0.5 | 16393 | 1590 | -0.8 | 1/27/2011 10:18 |
| I4 | Sr-90 | 0.5 | 16100 | 1620 | 18.8 | 1/27/2011 10:19 |
| I4 | Sr-90 | 0.5 | 16079 | 1650 | 18.8 | 1/27/2011 10:20 |
| J1 | Sr-90 | 0.11 | 10 | 750 | 18.6 | 1/27/2011 10:00 |
| J1 | Sr-90 | 0.5 | 119 | 780 | 18.4 | 1/27/2011 10:01 |

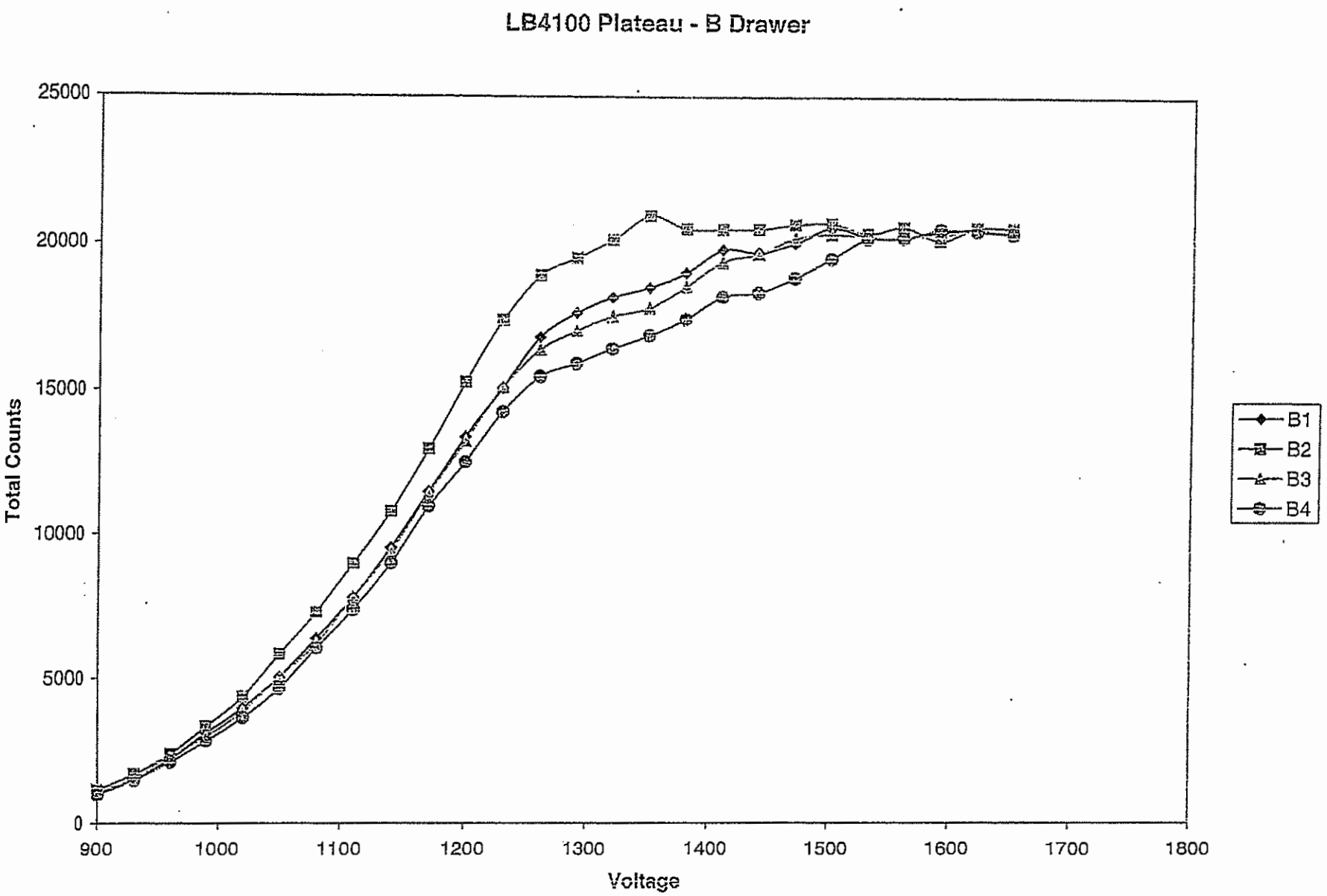
| | | | | | | |
|---|---|---|---|---|---|---|
| J1 | Sr-90 | 0.5 | 316 | 810 | 9.1 | 1/27/2011 10:01 |
| J1 | Sr-90 | 0.5 | 660 | 840 | 12.9 | 1/27/2011 10:02 |
| J1 | Sr-90 | 0.5 | 1111 | 870 | 15.9 | 1/27/2011 10:03 |
| J1 | Sr-90 | 0.5 | 1652 | 900 | 19.2 | 1/27/2011 10:03 |
| J1 | Sr-90 | 0.5 | 2205 | 930 | 22.2 | 1/27/2011 10:04 |
| J1 | Sr-90 | 0.5 | 2986 | 960 | 26.6 | 1/27/2011 10:05 |
| J1 | Sr-90 | 0.5 | 3780 | 990 | 32.8 | 1/27/2011 10:05 |
| J1 | Sr-90 | 0.5 | 4856 | 1020 | 39.1 | 1/27/2011 10:06 |
| J1 | Sr-90 | 0.5 | 6195 | 1050 | 47.2 | 1/27/2011 10:06 |
| J1 | Sr-90 | 0.5 | 7645 | 1080 | 54.9 | 1/27/2011 10:07 |
| J1 | Sr-90 | 0.5 | 9463 | 1110 | 58.6 | 1/27/2011 10:08 |
| J1 | Sr-90 | 0.5 | 11453 | 1140 | 61.1 | 1/27/2011 10:08 |
| J1 | Sr-90 | 0.5 | 13083 | 1170 | 58.1 | 1/27/2011 10:09 |
| J1 | Sr-90 | 0.5 | 15007 | 1200 | 48.1 | 1/27/2011 10:10 |
| J1 | Sr-90 | 0.5 | 16406 | 1230 | 38.0 | 1/27/2011 10:10 |
| J1 | Sr-90 | 0.5 | 17006 | 1260 | 27.4 | 1/27/2011 10:11 |
| J1 | Sr-90 | 0.5 | 17784 | 1290 | 17.1 | 1/27/2011 10:11 |
| J1 | Sr-90 | 0.5 | 18433 | 1320 | 10.7 | 1/27/2011 10:12 |
| J1 | Sr-90 | 0.5 | 18263 | 1350 | 4.1 | 1/27/2011 10:13 |
| J1 | Sr-90 | 0.5 | 18375 | 1380 | 1.6 | 1/27/2011 10:13 |
| J1 | Sr-90 | 0.5 | 18431 | 1410 | 2.0 | 1/27/2011 10:14 |
| J1 | Sr-90 | 0.5 | 18585 | 1440 | 2.8 | 1/27/2011 10:15 |
| J1 | Sr-90 | 0.5 | 18462 | 1470 | 3.2 | 1/27/2011 10:15 |
| J1 | Sr-90 | 0.5 | 18776 | 1500 | 1.2 | 1/27/2011 10:16 |
| J1 | Sr-90 | 0.5 | 18813 | 1530 | 0.4 | 1/27/2011 10:16 |
| J1 | Sr-90 | 0.5 | 18590 | 1560 | -1.2 | 1/27/2011 10:17 |
| J1 | Sr-90 | 0.5 | 18619 | 1590 | -0.3 | 1/27/2011 10:18 |
| J1 | Sr-90 | 0.5 | 18698 | 1620 | | 1/27/2011 10:18 |
| J1 | Sr-90 | 0.5 | 18719 | 1650 | | 1/27/2011 10:19 |
| J2 | Sr-90 | 0.11 | 7 | 750 | | 1/27/2011 10:00 |
| J2 | Sr-90 | 0.5 | 151 | 780 | | 1/27/2011 10:01 |
| J2 | Sr-90 | 0.5 | 376 | 810 | 10.4 | 1/27/2011 10:01 |
| J2 | Sr-90 | 0.5 | 774 | 840 | 14.1 | 1/27/2011 10:02 |
| J2 | Sr-90 | 0.5 | 1253 | 870 | 18.2 | 1/27/2011 10:03 |
| J2 | Sr-90 | 0.5 | 1832 | 900 | 21.4 | 1/27/2011 10:03 |
| J2 | Sr-90 | 0.5 | 2579 | 930 | 25.4 | 1/27/2011 10:04 |
| J2 | Sr-90 | 0.5 | 3318 | 960 | 31.3 | 1/27/2011 10:05 |
| J2 | Sr-90 | 0.5 | 4327 | 990 | 36.3 | 1/27/2011 10:05 |
| J2 | Sr-90 | 0.5 | 5659 | 1020 | 44.2 | 1/27/2011 10:06 |
| J2 | Sr-90 | 0.5 | 6856 | 1050 | 52.5 | 1/27/2011 10:06 |
| J2 | Sr-90 | 0.5 | 8683 | 1080 | 60.2 | 1/27/2011 10:07 |
| J2 | Sr-90 | 0.5 | 10687 | 1110 | 66.9 | 1/27/2011 10:08 |
| J2 | Sr-90 | 0.5 | 12771 | 1140 | 66.8 | 1/27/2011 10:08 |
| J2 | Sr-90 | 0.5 | 14852 | 1170 | 62.4 | 1/27/2011 10:09 |
| J2 | Sr-90 | 0.5 | 16623 | 1200 | 52.8 | 1/27/2011 10:10 |
| J2 | Sr-90 | 0.5 | 18114 | 1230 | 40.3 | 1/27/2011 10:10 |
| J2 | Sr-90 | 0.5 | 19058 | 1260 | 29.0 | 1/27/2011 10:11 |
| J2 | Sr-90 | 0.5 | 19679 | 1290 | 15.5 | 1/27/2011 10:11 |
| J2 | Sr-90 | 0.5 | 20190 | 1320 | 8.0 | 1/27/2011 10:12 |
| J2 | Sr-90 | 0.5 | 19875 | 1350 | 5.8 | 1/27/2011 10:13 |
| J2 | Sr-90 | 0.5 | 20157 | 1380 | 5.4 | 1/27/2011 10:13 |
| J2 | Sr-90 | 0.5 | 20567 | 1410 | 5.1 | 1/27/2011 10:14 |
| J2 | Sr-90 | 0.5 | 20653 | 1440 | 1.2 | 1/27/2011 10:15 |
| J2 | Sr-90 | 0.5 | 20388 | 1470 | -3.0 | 1/27/2011 10:15 |
| J2 | Sr-90 | 0.5 | 20423 | 1500 | -0.6 | 1/27/2011 10:16 |
| J2 | Sr-90 | 0.5 | 20233 | 1530 | 2.6 | 1/27/2011 10:16 |
| J2 | Sr-90 | 0.5 | 20634 | 1560 | 2.0 | 1/27/2011 10:17 |
| J2 | Sr-90 | 0.5 | 20666 | 1590 | -0.5 | 1/27/2011 10:18 |
| J2 | Sr-90 | 0.5 | 20509 | 1620 | | 1/27/2011 10:18 |
| J2 | Sr-90 | 0.49 | 20221 | 1650 | | 1/27/2011 10:19 |
| J3 | Sr-90 | 0.12 | 4 | 750 | | 1/27/2011 10:00 |
| J3 | Sr-90 | 0.5 | 71 | 780 | | 1/27/2011 10:01 |
| J3 | Sr-90 | 0.5 | 221 | 810 | 7.7 | 1/27/2011 10:01 |
| J3 | Sr-90 | 0.5 | 519 | 840 | 11.8 | 1/27/2011 10:02 |
| J3 | Sr-90 | 0.5 | 931 | 870 | 14.8 | 1/27/2011 10:03 |
| J3 | Sr-90 | 0.5 | 1493 | 900 | 18.2 | 1/27/2011 10:03 |
| J3 | Sr-90 | 0.5 | 1958 | 930 | 21.6 | 1/27/2011 10:04 |
| J3 | Sr-90 | 0.5 | 2731 | 960 | 26.1 | 1/27/2011 10:05 |
| J3 | Sr-90 | 0.5 | 3550 | 990 | 31.0 | 1/27/2011 10:05 |
| J3 | Sr-90 | 0.5 | 4617 | 1020 | 37.8 | 1/27/2011 10:06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| J3 | Sr-90 | 0.5 | 5670 | 1050 | 46.7 | 1/27/2011 10:06 |
| J3 | Sr-90 | 0.5 | 7343 | 1080 | 51.9 | 1/27/2011 10:07 |
| J3 | Sr-90 | 0.5 | 9190 | 1110 | 57.7 | 1/27/2011 10:08 |
| J3 | Sr-90 | 0.5 | 10644 | 1140 | 60.1 | 1/27/2011 10:08 |
| J3 | Sr-90 | 0.5 | 12673 | 1170 | 58.4 | 1/27/2011 10:09 |
| J3 | Sr-90 | 0.5 | 14621 | 1200 | 51.6 | 1/27/2011 10:10 |
| J3 | Sr-90 | 0.5 | 15968 | 1230 | 39.6 | 1/27/2011 10:10 |
| J3 | Sr-90 | 0.5 | 16732 | 1260 | 27.0 | 1/27/2011 10:11 |
| J3 | Sr-90 | 0.5 | 17556 | 1290 | 18.2 | 1/27/2011 10:11 |
| J3 | Sr-90 | 0.5 | 17875 | 1320 | 12.6 | 1/27/2011 10:12 |
| J3 | Sr-90 | 0.5 | 18126 | 1350 | 6.3 | 1/27/2011 10:13 |
| J3 | Sr-90 | 0.5 | 18337 | 1380 | 4.4 | 1/27/2011 10:13 |
| J3 | Sr-90 | 0.5 | 18271 | 1410 | 1.5 | 1/27/2011 10:14 |
| J3 | Sr-90 | 0.5 | 18460 | 1440 | 0.5 | 1/27/2011 10:15 |
| J3 | Sr-90 | 0.5 | 18291 | 1470 | -0.4 | 1/27/2011 10:15 |
| J3 | Sr-90 | 0.5 | 18399 | 1500 | -0.1 | 1/27/2011 10:16 |
| J3 | Sr-90 | 0.5 | 18247 | 1530 | 0.5 | 1/27/2011 10:16 |
| J3 | Sr-90 | 0.5 | 18472 | 1560 | 1.1 | 1/27/2011 10:17 |
| J3 | Sr-90 | 0.5 | 18335 | 1590 | 1.3 | 1/27/2011 10:18 |
| J3 | Sr-90 | 0.5 | 18525 | 1620 | | 1/27/2011 10:18 |
| J3 | Sr-90 | 0.5 | 18422 | 1650 | | 1/27/2011 10:19 |
| J4 | Sr-90 | 0.11 | 1 | 750 | | 1/27/2011 10:00 |
| J4 | Sr-90 | 0.5 | 49 | 780 | | 1/27/2011 10:01 |
| J4 | Sr-90 | 0.5 | 166 | 810 | 6.8 | 1/27/2011 10:01 |
| J4 | Sr-90 | 0.5 | 433 | 840 | 10.9 | 1/27/2011 10:02 |
| J4 | Sr-90 | 0.5 | 836 | 870 | 14.1 | 1/27/2011 10:03 |
| J4 | Sr-90 | 0.5 | 1347 | 900 | 17.4 | 1/27/2011 10:03 |
| J4 | Sr-90 | 0.5 | 1829 | 930 | 20.3 | 1/27/2011 10:04 |
| J4 | Sr-90 | 0.5 | 2543 | 960 | 23.8 | 1/27/2011 10:05 |
| J4 | Sr-90 | 0.5 | 3284 | 990 | 29.9 | 1/27/2011 10:05 |
| J4 | Sr-90 | 0.5 | 4184 | 1020 | 36.4 | 1/27/2011 10:06 |
| J4 | Sr-90 | 0.5 | 5494 | 1050 | 42.5 | 1/27/2011 10:06 |
| J4 | Sr-90 | 0.5 | 6895 | 1080 | 48.2 | 1/27/2011 10:07 |
| J4 | Sr-90 | 0.5 | 8310 | 1110 | 54.0 | 1/27/2011 10:08 |
| J4 | Sr-90 | 0.5 | 10001 | 1140 | 58.7 | 1/27/2011 10:08 |
| J4 | Sr-90 | 0.5 | 12034 | 1170 | 59.7 | 1/27/2011 10:09 |
| J4 | Sr-90 | 0.5 | 13840 | 1200 | 53.3 | 1/27/2011 10:10 |
| J4 | Sr-90 | 0.5 | 15343 | 1230 | 44.8 | 1/27/2011 10:10 |
| J4 | Sr-90 | 0.5 | 16337 | 1260 | 31.9 | 1/27/2011 10:11 |
| J4 | Sr-90 | 0.5 | 17505 | 1290 | 20.0 | 1/27/2011 10:11 |
| J4 | Sr-90 | 0.5 | 17549 | 1320 | 9.7 | 1/27/2011 10:12 |
| J4 | Sr-90 | 0.5 | 17735 | 1350 | 1.4 | 1/27/2011 10:13 |
| J4 | Sr-90 | 0.5 | 17679 | 1380 | 2.4 | 1/27/2011 10:13 |
| J4 | Sr-90 | 0.5 | 17657 | 1410 | 1.5 | 1/27/2011 10:14 |
| J4 | Sr-90 | 0.5 | 17945 | 1440 | 2.6 | 1/27/2011 10:15 |
| J4 | Sr-90 | 0.5 | 17829 | 1470 | 2.9 | 1/27/2011 10:15 |
| J4 | Sr-90 | 0.5 | 17979 | 1500 | -0.3 | 1/27/2011 10:16 |
| J4 | Sr-90 | 0.5 | 18069 | 1530 | 1.1 | 1/27/2011 10:17 |
| J4 | Sr-90 | 0.5 | 17773 | 1560 | 2.5 | 1/27/2011 10:17 |
| J4 | Sr-90 | 0.5 | 18094 | 1590 | 2.2 | 1/27/2011 10:18 |
| J4 | Sr-90 | 0.5 | 18340 | 1620 | 4.2 | 1/27/2011 10:18 |
| J4 | Sr-90 | 0.5 | 18112 | 1650 | 0.3 | 1/27/2011 10:19 |

DCN: ITSI-0808 0004-0076, 8 May 2019




M-10254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Total Counts
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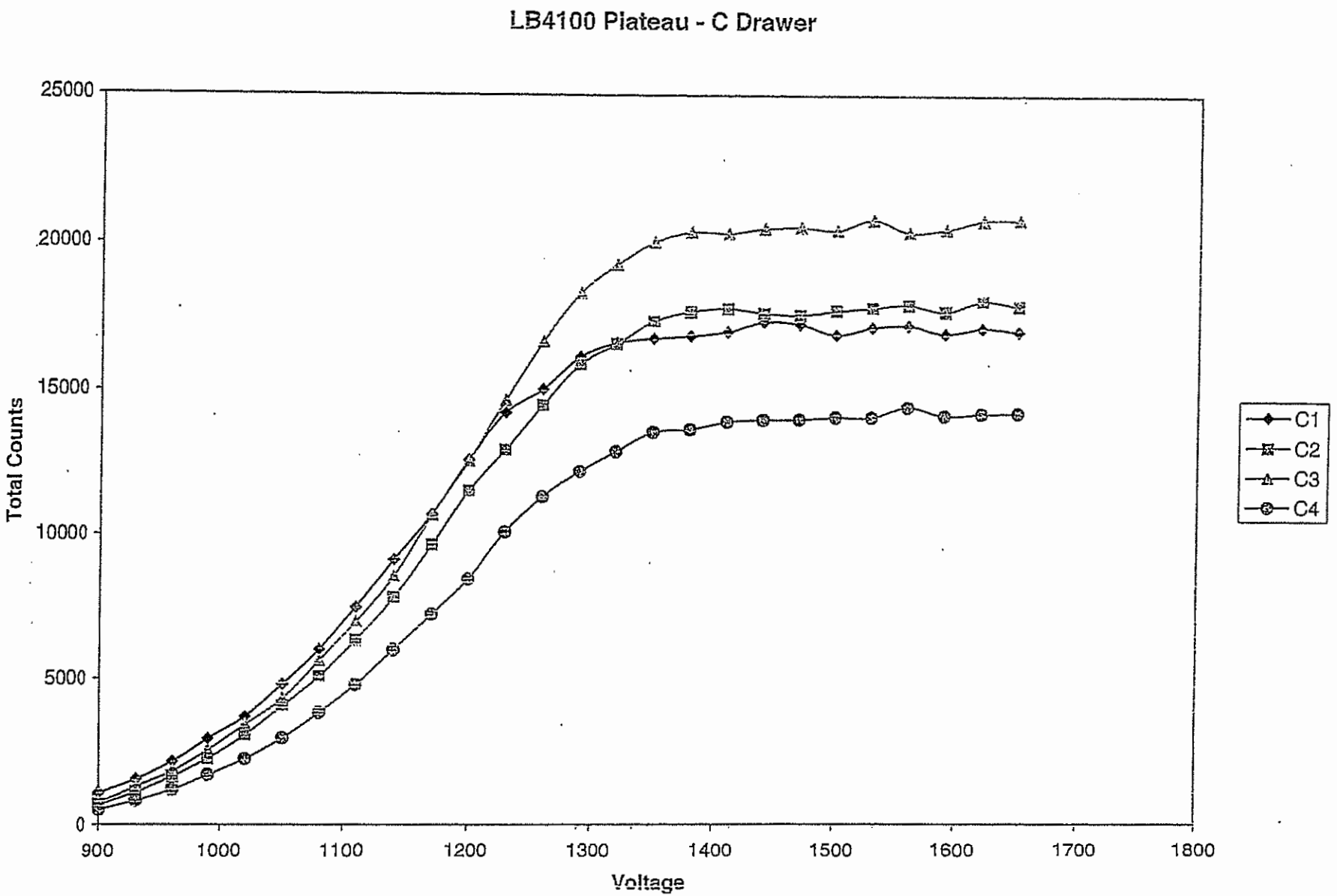
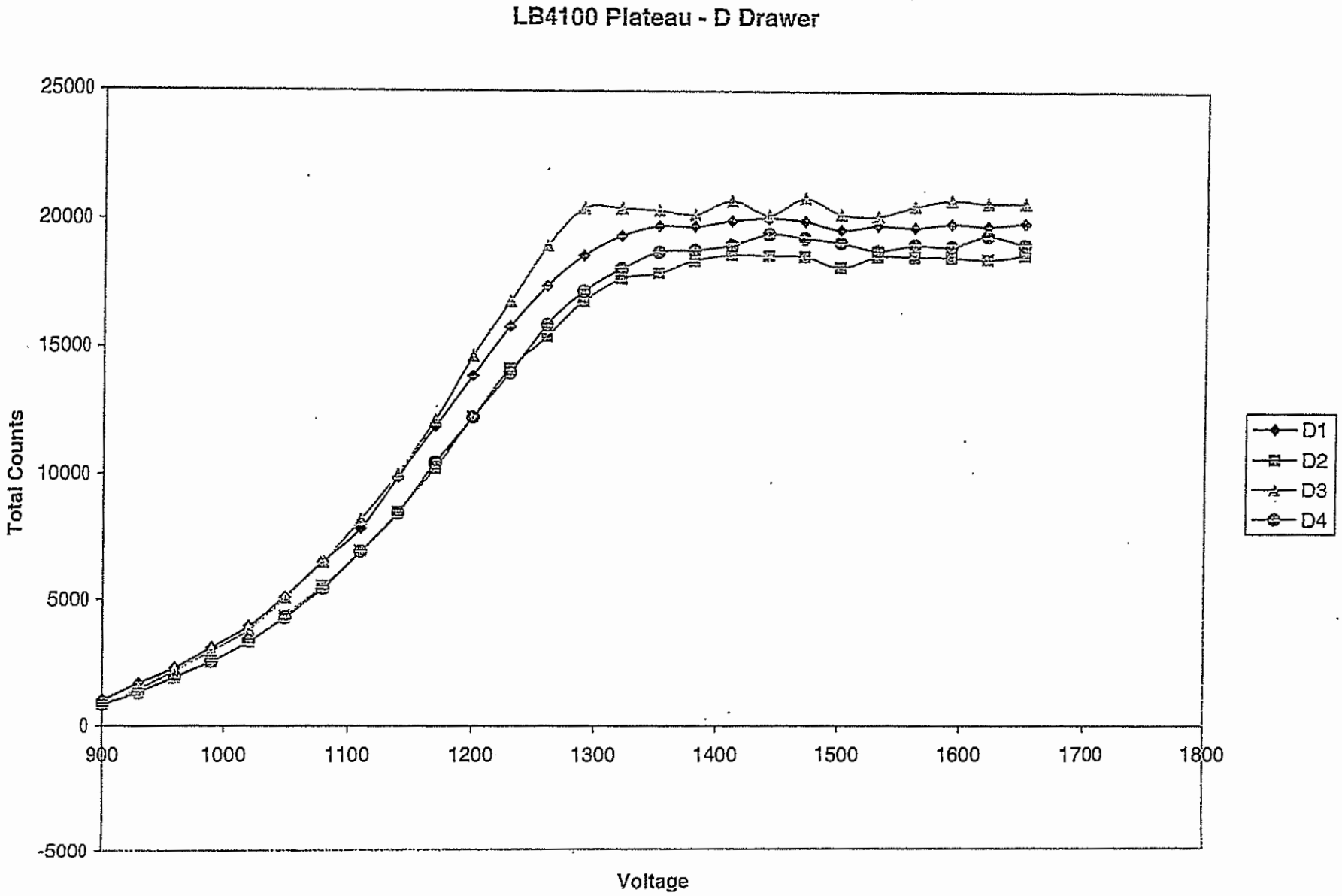
20000
15000
10000
5000
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Voltage
B1
B2
B3
B4

DCN: ITSI-0808 0004-0076, 8 May 2019

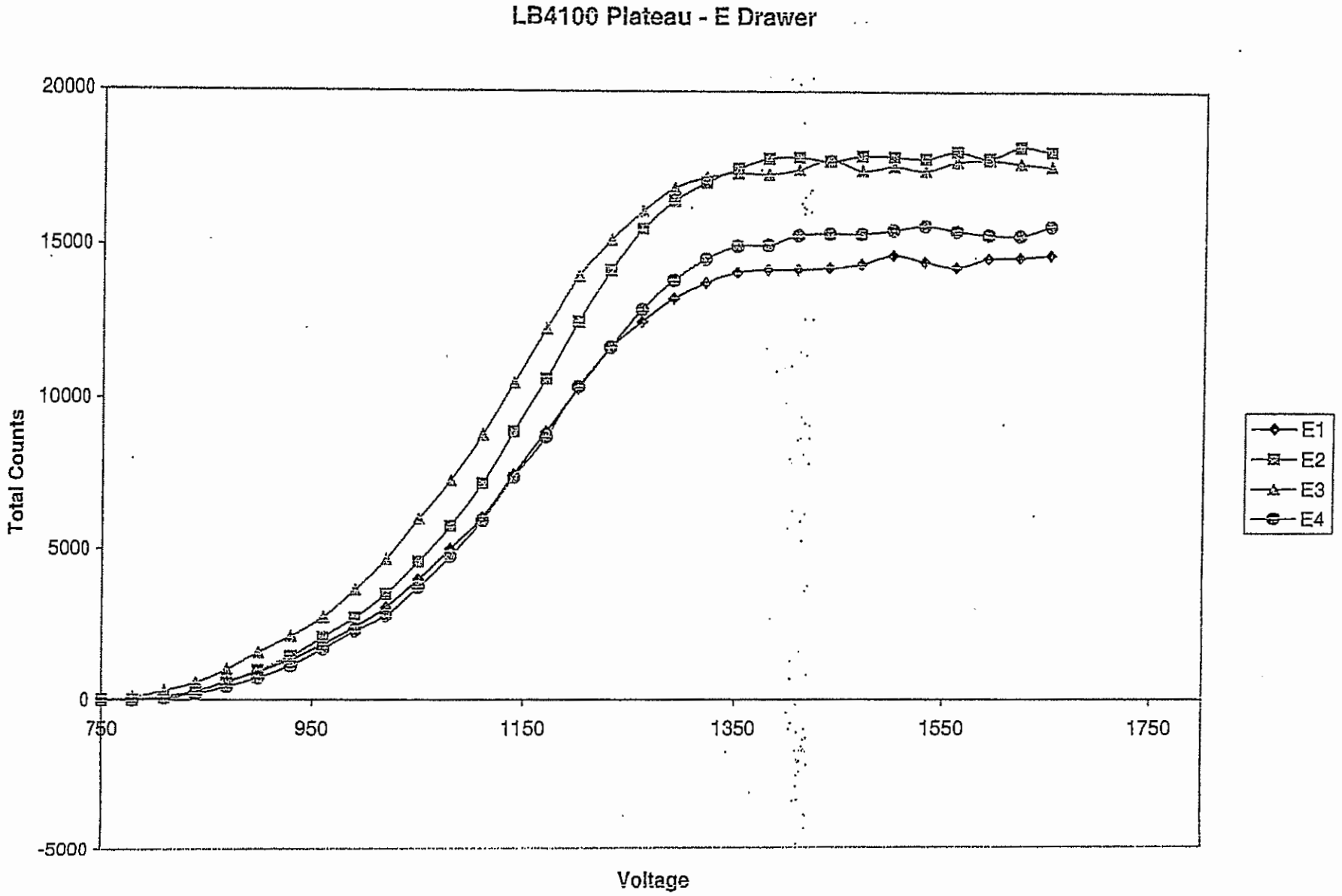


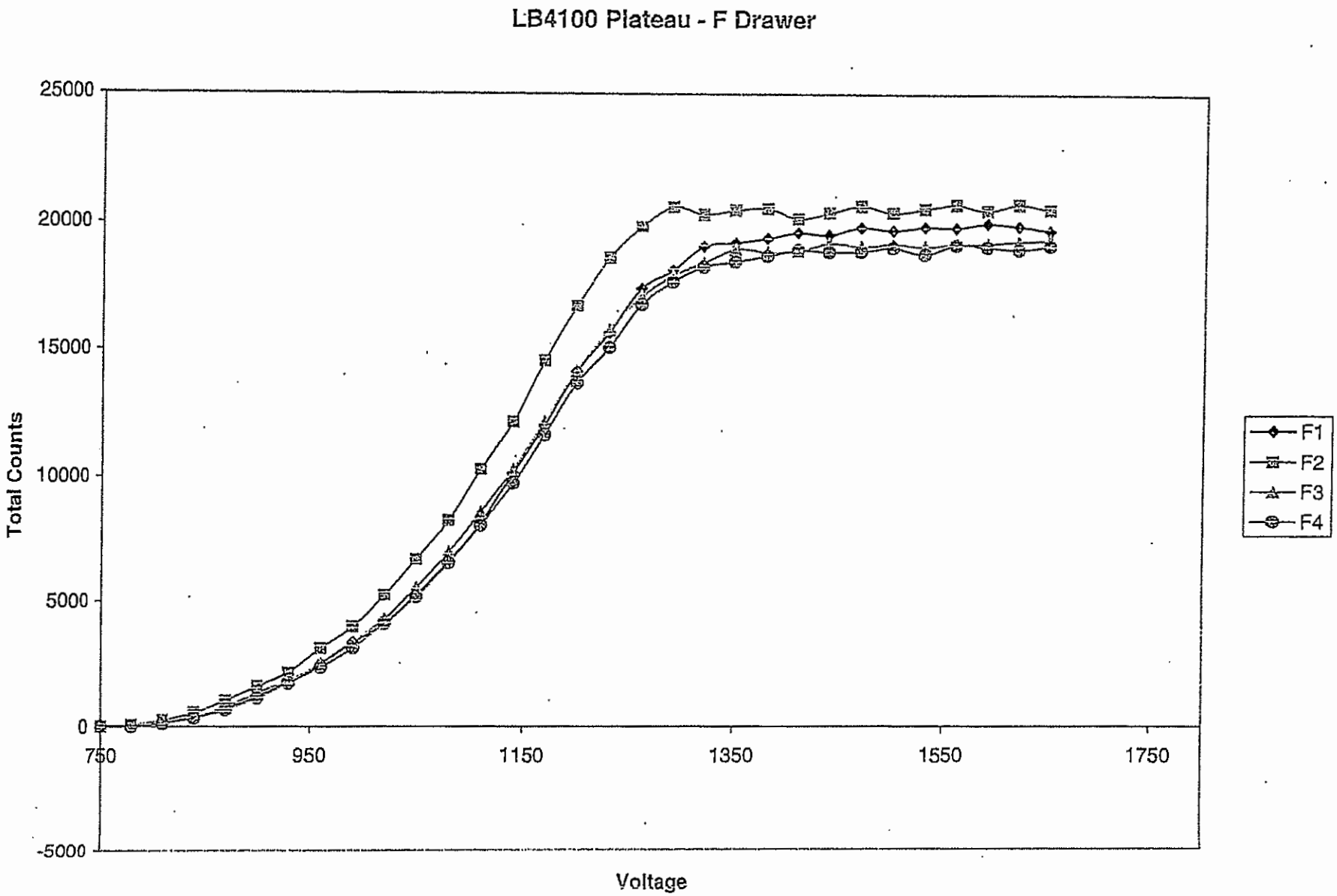

M-10256

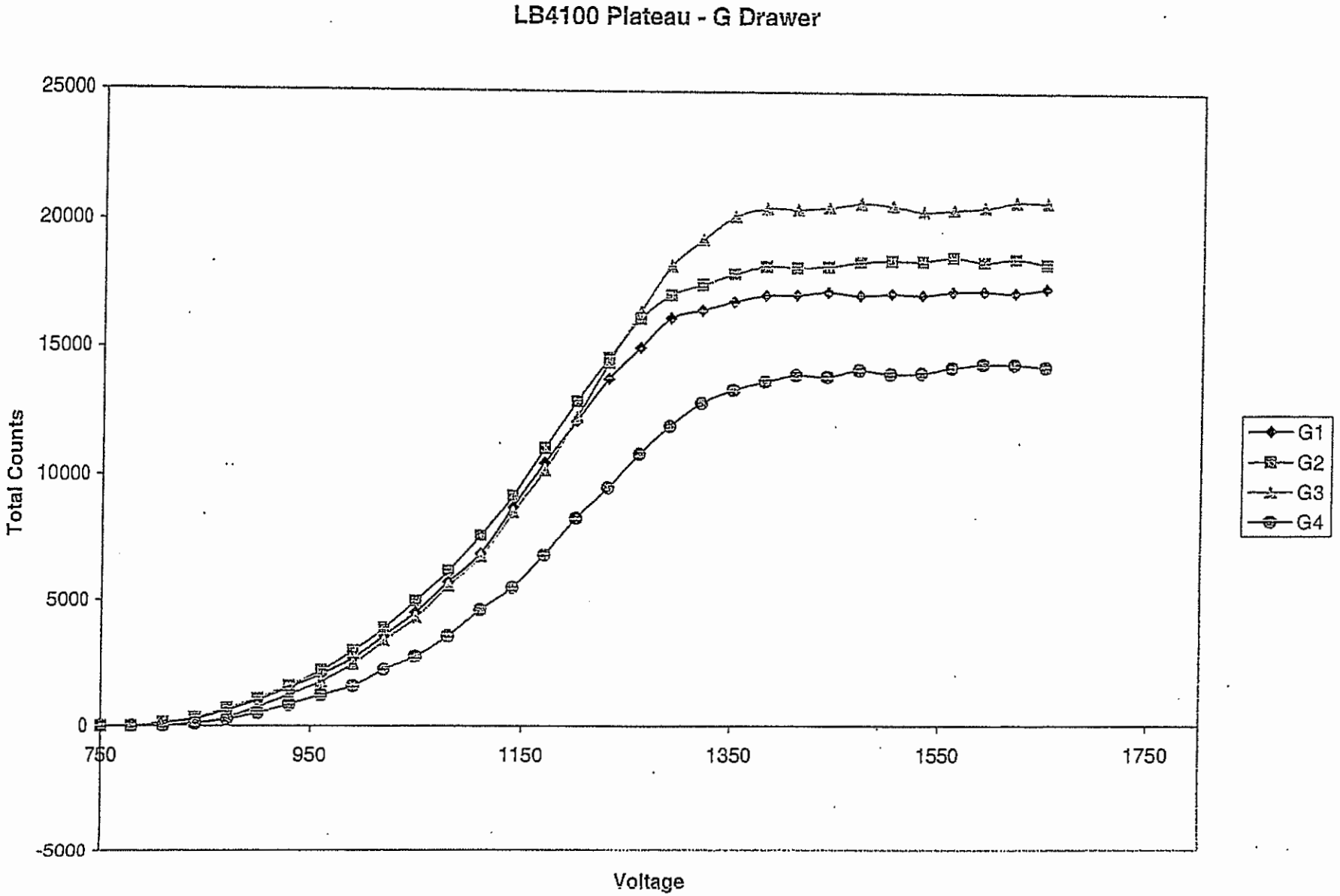
DCN: ITSI-0808 0004-0076, 8 May 2019



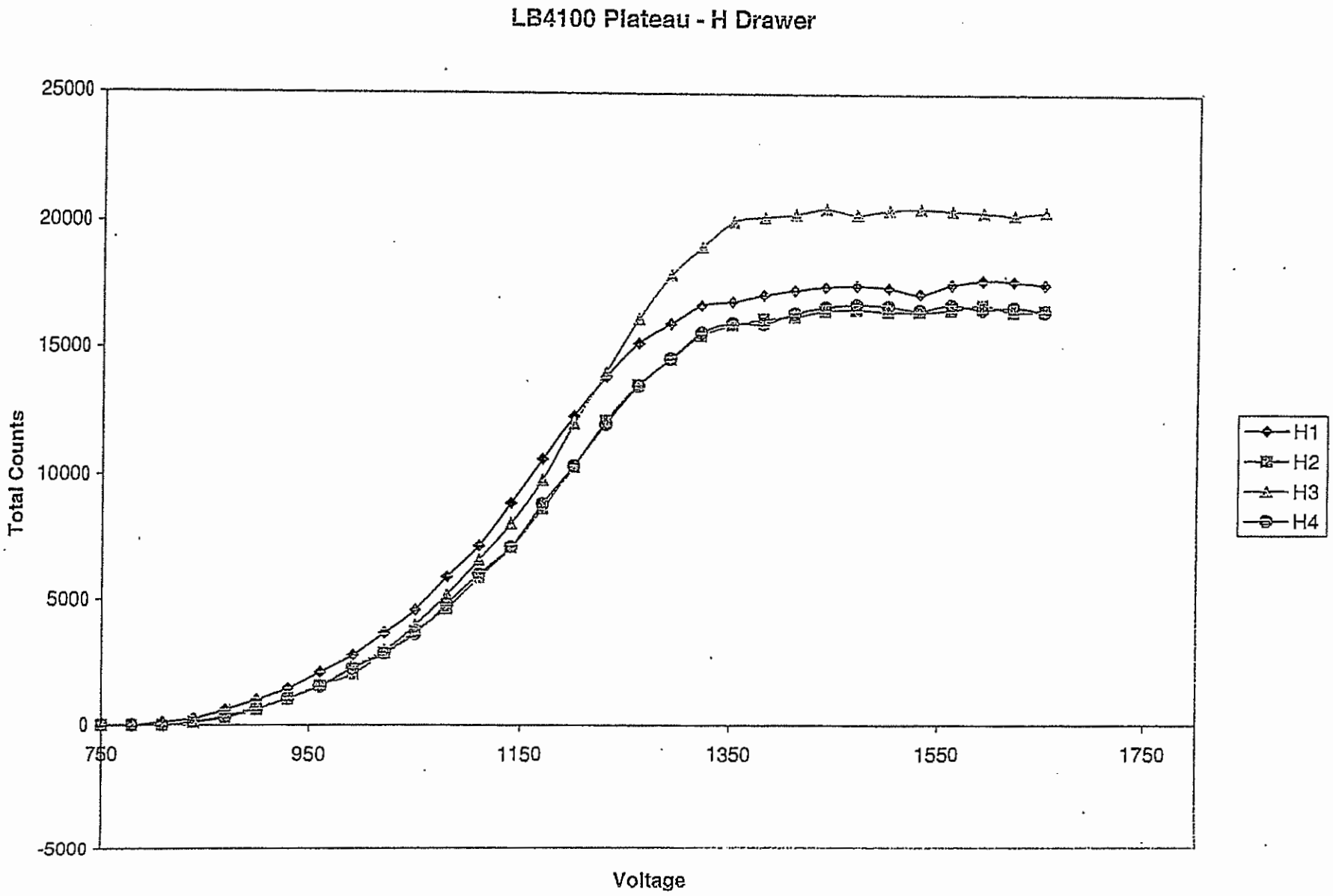

M-10257


LB4100 Plateau - E Drawer
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
E1
E2
E3
E4

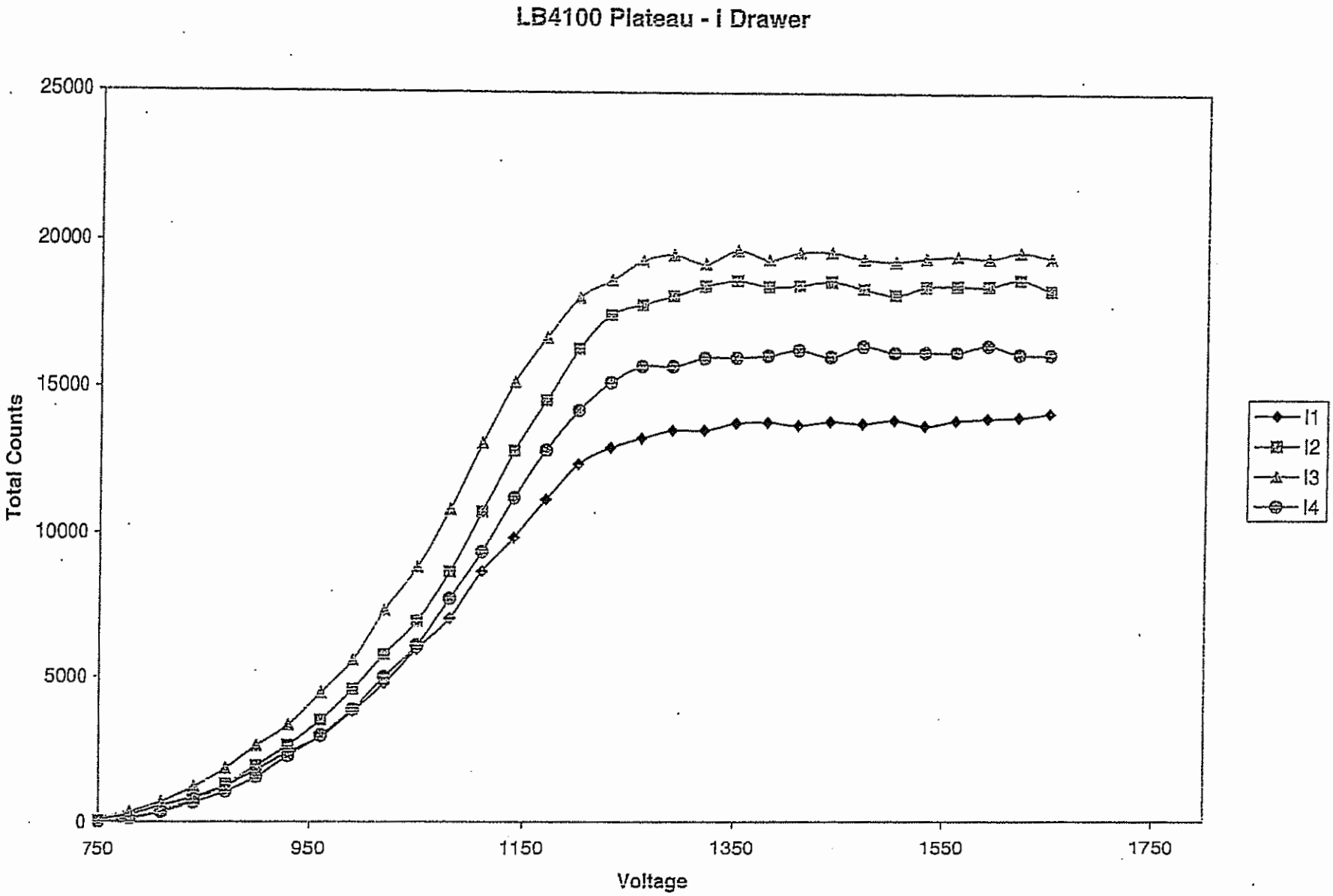

LB4100 Plateau - F Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
F1
F2
F3
F4

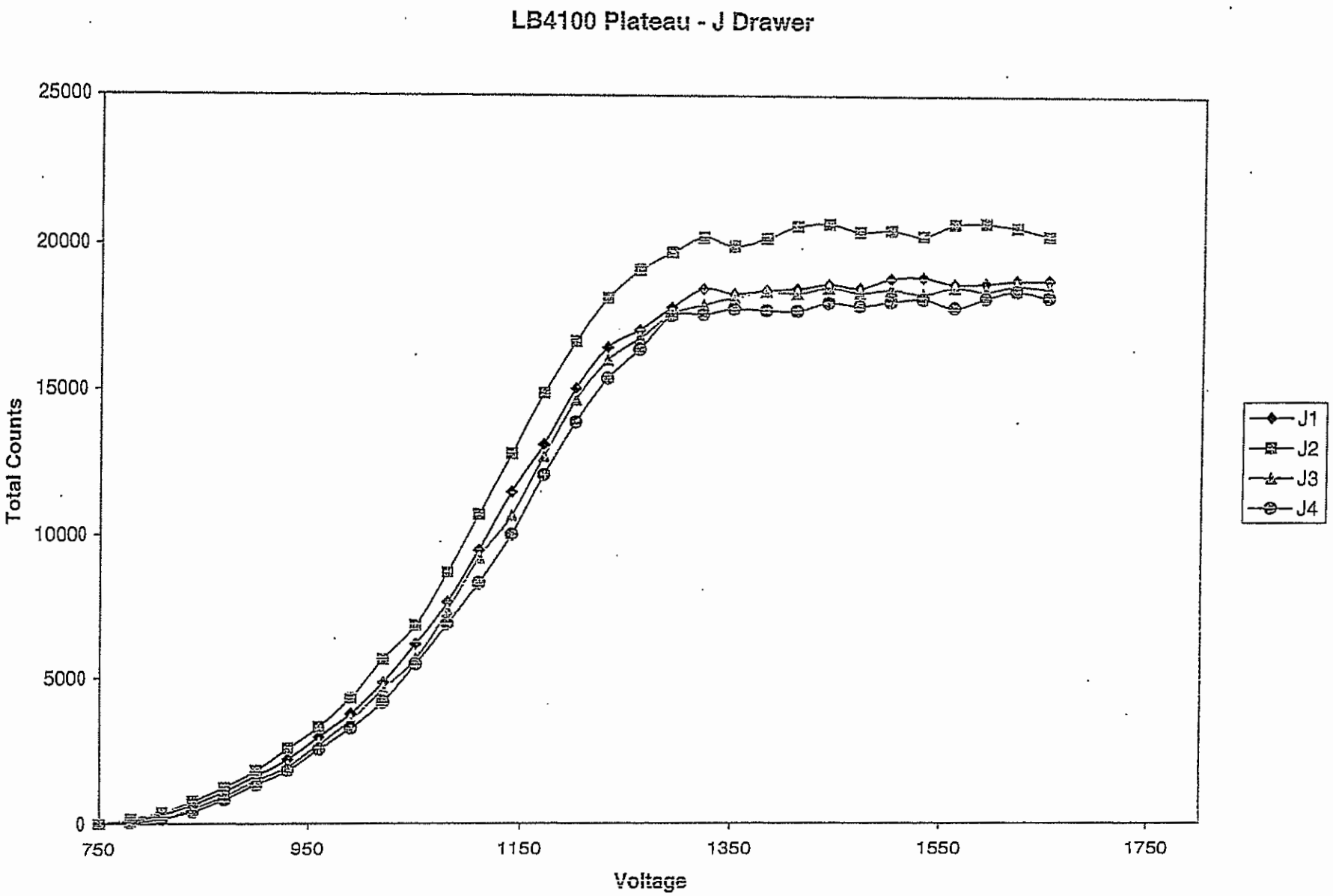

LB4100 Plateau - G Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
G1
G2
G3
G4

DCN: ITSI-0808-0004-0076, 8 May 2019




M-10261


LB4100 Plateau - i Drawer
Total Counts
25000
20000
15000
10000
5000
0
750
950
1150
1350
1550
1750
Voltage
I1
I2
I3
I4


LB4100 Plateau - J Drawer
Total Counts
25000
20000
15000
10000
5000
0
750
950
1150
1350
1550
1750
Voltage
J1
J2
J3
J4

showfile.cgi

DCN: ITSI-0808-0004-0076, 8 May 2019

# Standardization of Strontium Carrier 1858443

v1.2

| Analyst | VXC2 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Strontium |
| Serial Number | 1858443 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 12/11/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 1747929 |
| Parent Exp. Date | 3/5/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Strontium/mL | mg Strontium/g |
|---|---|---|---|---|---|---|
| 1 | 1.0326 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.24 |
| 2 | 1.0306 | 0.0248 | 0.0423 | 0.0175 | 17.50 | 16.98 |
| 3 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |
| 4 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |

Mean Value (mg/mL) = 17.73
Stdev (mg/mL) = ± 0.15
1.0% of Mean Value = 0.177250
Pass
Expiration Date 12/11/2013

Mean Value (mg/1.0mL) = 17.73

**Standardization Rule**

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

V. Chapp
12/11/12

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

5/8/2019 10:32 AM

# Standardization of Yttrium Carrier 1840837

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1840837 |
| Amount of Std. (mL) | 0.5 |
| Standard Prepared | 10/25/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 17318701 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium/mL | mg Yttrium/g |
|---|---|---|---|---|---|---|
| 1 | 0.5000 | 0.0241 | 0.0399 | 0.0158 | 31.60 | 31.60 |
| 2 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |
| 3 | 0.5000 | 0.0244 | 0.0400 | 0.0156 | 31.20 | 31.20 |
| 4 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |

Mean Value (mg/mL) = 31.20
Stdev (mg/mL) = ± 0.28
1.0% of Mean Value = 0.312000
Pass
Expiration Date 10/25/2013

Mean Value (mg/0.5mL) = 15.60

Jennifer L. Robb

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

# Standardization of Yttrium Carrier 1892786

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1892786 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 3/15/2013 |

| Parent Information | |
|---|---|
| Parent Serial # | 1731870.1 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium /mL | mg Yttrium /g |
|---|---|---|---|---|---|---|
| 1 | 1.0100 | 0.0242 | 0.0560 | 0.0318 | 31.80 | 31.49 |
| 2 | 1.0200 | 0.0242 | 0.0562 | 0.0320 | 32.00 | 31.37 |
| 3 | 1.0100 | 0.0242 | 0.0559 | 0.0317 | 31.70 | 31.39 |
| 4 | 1.0100 | 0.0242 | 0.0561 | 0.0319 | 31.90 | 31.58 |

Mean Value (mg/mL) = 31.85
Stdev (mg/mL) = ± 0.13
1.0% of Mean Value = 0.318500
Pass
Expiration Date 1/26/2014

Mean Value (mg/1.0mL) = 31.85

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

Jennifer L. Robb

Eckert & Ziegler
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www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

92552
Sr-89 5 mL Liquid in Flame Sealed Vial

1633

**Customer:** General Engineering Labs
**P.O. No.:** GEL1202747, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty* , % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 2.121E+05 | 0.1 | 0.9 | 1.8 | 12/13/2012 |

*Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.07181 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: K. Eardley
K. Eardley, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 11 DEC 12

RECEIVED 12/14/12 MW

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

RC-S-065-062

Single Isotope Certificate Rev 3, 23 August 2012

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1633 |
| Prepared By: | Ashley Drochter |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 12/13/2012 |
| Ampoule Mass (g): | 5.07181 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-062 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Bethany Fiem |
| Prep Date: | 01/08/2013 |
| Verification Date: | 01/09/2013 |
| Expiration Date: | 08/22/2013 |
| Primary Code: | 1633-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.9257 g |
| Density(g/mL): | 0.9986 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / (5.07181 g * 100 mL ) = 123593.8614 dpm/mL |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / ( 0.9986 g/mL)/ (5.07181 g * 100 mL) = 123767.0118 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1633-A

v1.0.2

| | |
|---|---|
| Instrument | Silver |
| Analyst | BF1 |
| Verification Prep Date | 1/8/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1633-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 12/13/2012 |
| Ref. Act. (DPM/mL) | 123593.8614 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 1/8/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 1/9/2013 | 89.20 | 8539.17 | 44.60 |
| 2 | 1/9/2013 | 88.90 | 8565.00 | 44.60 |
| 3 | 1/9/2013 | 88.90 | 8571.67 | 44.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 8494.57 | 1.011371 | 83990.64 | 8399.06 |
| 2 | 8520.40 | 1.011371 | 84246.04 | 8424.60 |
| 3 | 8527.07 | 1.011371 | 84311.99 | 8431.20 |

| | dpm/mL |
|---|---|
| Mean Value = | 84182.89 |
| Stdev = | 169.7251269 |
| Certificate Value* = | 85338.6 |
| Two sigma = | 339.450 |
| 10 % of Mean = | 8418.289 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.65% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 8/22/2013 |

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-89 source 1633-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Sr-89 source 1618-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

1-11-13

Amanda L [illegible]
1/11/13

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-004 | Isotope: Sr-89

Date Standards Prepared: 2-14-13

Standard ID: 1633-A | Matrix of Planchett/Filter: Sr Carbonate ppt on 25mm 0.45um filter

Amount Used (g or (ml)): 1.0

Standard Activity (DPM/g or mL): 123593.861 * | Residue/Carrier Agent: Sr Carrier 1858443 exp 12-11-

Reference Date: 12-13-12 | Pipette ID Used: 4043264

Expiration Date: 8-22-13 | Balance ID Used: 1113021018

*Not decay corrected

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | $C_1$ | 0.1 | 0.0246 | 0.0265 | 1.9 |
| | $C_2$ | 0.2 | 0.0241 | 0.0276 | 3.5 |
| | $C_3$ | 0.4 | 0.0246 | 0.0315 | 6.9 |
| | $C_4$ | 0.5 | 0.0242 | 0.0325 | 8.3 |
| | $C_5$ | 0.8 | 0.0236 | 0.0371 | 13.5 |
| | $C_6$ | 1.0 | 0.0236 | 0.0412 | 17.6 |
| | $C_7$ | 1.5 | 0.0236 | 0.0502 | 26.6 |
| | $C_8$ | 2.1 | 0.0238 | 0.0599 | 36.1 |
| | | | | | |
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| | | | | | |

wl ✓ WL 2/25/13

Prepared By: _____ Date: 2-14-13

Reviewed By: _____ Date: 2/25/13

Eckert & Ziegler
Analytics

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www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1244

78351-278

Sr-90 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 2

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.691 E4 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
5.01862 grams 0.1M HCl solution with 30 µg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED 10/7/08
RC-S-048-125

End of Certificate

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1244 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 5.01862 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-125 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 02/12/2013 |
| Verification Date: | 02/12/2013 |
| Expiration Date: | 02/12/2014 |
| Primary Code: | 1244-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.8346 g |
| Density(g/mL): | 0.9984 |
| Balance ID: | 38080204 |

## Calculations Converting parent activity to dpm/mL|dpm/g

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / (5.01862 g * 100 mL ) = 21333.9626 dpm/mL |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / ( 0.9984 g/mL)/ (5.01862 g * 100 mL) = 21367.7236 dpm/g |

## Secondary Standards

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1244-A

v1.0.2

| | |
|---|---|
| Instrument | GOLD |
| Analyst | BF |
| Verification Prep Date | 2/12/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1244-A |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 21333.9626 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 2/12/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 2/12/2013 | 57.70 | 3807.92 | 38.20 |
| 2 | 2/12/2013 | 55.70 | 3846.92 | 38.20 |
| 3 | 2/12/2013 | 56.20 | 3861.54 | 38.20 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 3769.72 | 2.046222 | 18422.83 | 1842.28 |
| 2 | 3808.72 | 2.046222 | 18613.42 | 1861.34 |
| 3 | 3823.34 | 2.046222 | 18684.87 | 1868.49 |

| | dpm/mL |
|---|---|
| Mean Value = | 18573.71 |
| Stdev = | 135.4612019 |
| Certificate Value* = | 19212.6 |
| Two sigma = | 270.922 |
| 10 % of Mean = | 1857.371 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 96.67% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 2/12/2014 |

**Verification Rules**

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 1244-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

Amanda Lehn 2/14/13

2-13-13

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet
Sr-90 (Sr portion)

Applicable SOP Number: GL-RAD-A-004

Isotope: Sr-90

Date Standards Prepared: 3/29/13

Standard ID: 1244-A

Matrix of Planchett/Filter: Sr carbonate ppt on 25 mm 0.45 µm filter

Amount Used (g or ml): 0.5

Standard Activity (DPM/g or mL): ~~21333.9629~~ 21333.9626 (AP 3/29/13)

Residue/Carrier Agent: Sr carrier 1858443

Reference Date: 10/1/08

Pipette ID Used: 1795419 / 2154115 / 4043264 / 11518634

Expiration Date: 2/12/14

Balance ID Used: 1113021018

Std carrier wt. 17.1 mg/mL

Sep Date/Time: 3-29-13 / 1410

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) | |
|---|---|---|---|---|---|---|
| | S1 | 0.2 | 0.0239 | 0.0272 | 3.3 | |
| | S2 | 0.4 | 0.0241 | 0.0314 | 7.3 | |
| | S3 | 0.5 | * ~~0.0243~~ 3/29/13 | 0.0328 | 8.5 | 0.0243 |
| | S4 | 0.7 | 0.0243 | 0.0365 | 12.2 | |
| | S5 | 1.0 | 0.0245 | 0.0417 | 17.2 | |
| | S6 | 1.5 | 0.0246 | 0.0512 | 26.6 | |
| | S7 | 1.8 | 0.0246 | 0.0556 | 31.0 | |
| | ~~S8~~ | ~~2.1~~ | ~~0.0247~~ | ~~0.0608~~ | ~~36.1~~ | (AP) 3/29/13 |
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(AP) 3/29/13

*NL 4/1/13

Prepared By: [signature] Date: 3-29-13

Reviewed By: [signature] AP Date: 4/1/13

**General Engineering Laboratories**
**GFC Calibration Source Preparation Sheet**
Sr-90 Yttrium Portion

Applicable SOP Number: GL-RAD-A-004
Isotope: Sr-90 (Y-90)
Date Standards Prepared: 3/29/13
Standard ID: 1244-A
Matrix of Planchett/Filter: Yttrium oxalate ppt on 25 mm 0.45µm filter
Amount Used (g or ml): 0.5
Standard Activity (DPM/g or mL): 21333.9626
Residue/Carrier Agent: Y carrier 1892786
Reference Date: 10/1/08
Pipette ID Used: 2154115
Expiration Date: 2/12/14
Balance ID Used: ~~35~~ 111302 1018 3-29-13

Std carrier (Y) 31.86 mg/mL
Sep date/time: 3/29/13 1305

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | Y1 | 0.5 | 0.0239 | 0.0398 | 15.9 |
| | Y2 | 0.5 | 0.0240 | 0.0401 | 16.1 |
| | Y3 | 0.5 | 0.0242 | 0.0402 | 16.0 |
| | Y4 | 0.5 | 0.0242 | 0.0403 | 16.1 |
| | Y5 | 0.5 | 0.0244 | 0.0404 | 16.0 |
| | Y6 | 0.5 | 0.0245 | 0.0407 | 16.2 |
| | Y7 | 0.5 | 0.0245 | 0.0404 | 15.9 |
| | Y8 | 0.5 | 0.0249 | 0.0413 | 16.4 |
| | | | | | |
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wt ✓

(AP) 3/29/13

Prepared By: [signature] Date: 3-29-13
Reviewed By: [signature] Date: 4/1/13

Eckert & Ziegler
Analytics

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www.analyticsinc.com

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

1680

94136

Sr-89 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs, LLC
**P.O. No.:** GEL1304373, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty* , % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 1.878E+05 | 0.1 | 0.9 | 1.8 | 07/15/2013 |

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.02926 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: R. Ormsby
R. Ormsby, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 15 Jul 13

RECEIVED 7/17/13

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-109

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1680 |
| Prepared By: | Gregory Ramsay |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 07/15/2013 |
| Ampoule Mass (g): | 5.02926 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-109 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 11/07/2013 |
| Verification Date: | 11/07/2013 |
| Expiration Date: | 03/24/2014 |
| Primary Code: | 1680-A |
| Dilution(mL): | 200 mL |
| Mass of Parent(g): | 4.7905 g |
| Density(g/mL): | 0.9979 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL) |
|---|
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g) |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / (5.02926 g * 200 mL ) = 53665.3046 dpm/mL |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / ( 0.9979 g/mL)/ (5.02926 g * 200 mL) = 53778.2389 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1680-A

v1.0.1

| | |
|---|---|
| Instrument | RED |
| Analyst | GXR1 |
| Verification Prep Date | 11/7/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1680-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 7/15/2013 |
| Ref. Act. (DPM/mL) | 53665.3046 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 11/7/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 11/8/2013 | 61.90 | 1139.80 | 39.60 |
| 2 | 11/8/2013 | 60.50 | 1139.20 | 39.60 |
| 3 | 11/8/2013 | 62.00 | 1128.40 | 39.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 1100.20 | 1.021162 | 10774.00 | 1077.40 |
| 2 | 1099.60 | 1.021162 | 10768.12 | 1076.81 |
| 3 | 1088.80 | 1.021162 | 10662.36 | 1066.24 |

| | dpm/mL |
|---|---|
| Mean Value = | 10734.83 |
| Stdev = | 62.82650264 |
| Certificate Value* = | 10930.2 |
| Two sigma = | 125.653 |
| 10 % of Mean = | 1073.483 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.21% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 3/24/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-89 source 1680-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRED for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 11/7/2013 using Sr-89 source 1657-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

11/25/13

11/14/13

11/25/13

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.856 E5 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED

# Verification for Sr-90 Standard 1243-L

v1.0.1

| | |
|---|---|
| Instrument | GREEN |
| Analyst | GXR1 |
| Verification Prep Date | 12/4/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1243-L |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 575.747476 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 12/4/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 12/5/2013 | 63.60 | 146.60 | 48.40 |
| 2 | 12/5/2013 | 63.10 | 147.60 | 48.40 |
| 3 | 12/5/2013 | 62.70 | 140.00 | 48.40 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 98.20 | 1.961352 | 500.67 | 50.07 |
| 2 | 99.20 | 1.961352 | 505.77 | 50.58 |
| 3 | 91.60 | 1.961352 | 467.02 | 46.70 |

| | dpm/mL |
|---|---|
| Mean Value = | 491.16 |
| Stdev = | 21.05469752 |
| **Certificate Value* =** | **508.5** |
| Two sigma = | 42.109 |
| 10 % of Mean = | 49.116 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 96.59% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 12/4/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-L by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/4/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12/13/13

Amanda L. Fehn 12/13/13

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1243 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 10.41484 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-124 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Daniel Roy |
| Prep Date: | 12/19/2008 |
| Verification Date: | 12/04/2013 |
| Expiration Date: | 12/04/2014 |
| Primary Code: | 1243-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 10.2164 g |
| Density(g/mL): | 0.9991 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL) |
|---|
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g) |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL ) = 226951.7634 dpm/mL |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / ( 0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|
| 01/21/2010 | Bethany Fiem | 2.2467 | 1000 | 1243-B | 510.329369 dpm/mL | 01/21/2010 | 01/21/2011 |
| 08/03/2010 | Bethany Fiem | 2.5604 | 1000 | 1243-C | 581.5851 dpm/mL | 08/03/2010 | 08/03/2011 |
| 01/12/2011 | Bethany Fiem | 2.4946 | 1000 | 1243-D | 566.6389 dpm/mL | 01/12/2011 | 01/12/2012 |
| 08/12/2011 | Tim Chandler | 3.3115 | 100 | 1243-G | 18.7877 dpm/mL | 08/11/2011 | 08/11/2012 |
| 08/17/2011 | Tim Chandler | 2.5541 | 100 | 1243-H | 14.49064 dpm/mL | 08/18/2011 | 08/16/2012 |
| 06/21/2011 | Tim Chandler | .0235 | 100 | 1243-E | 53.37936 dpm/mL | 06/25/2012 | 06/20/2013 |
| 07/05/2011 | Bethany Fiem | 2.6072 | 1000 | 1243-F | 592.2156 dpm/mL | 07/05/2011 | 07/05/2012 |
| 01/31/2012 | Gregory Ramsay | 2.6792 | 1000 | 1243-I | 608.5701 dpm/ml | 01/31/2012 | 01/31/2013 |
| 08/29/2012 | Bethany Fiem | 2.6799 | 1000 | 1243-J | 608.729104 dpm/mL | 09/14/2012 | 09/11/2013 |
| 02/12/2013 | Gregory Ramsay | 2.6526 | 1000 | 1243-K | 602.528 dpm/ml | 01/15/2014 | 01/15/2015 |
| 12/04/2013 | Gregory Ramsay | 2.5347 | 1000 | 1243-L | 575.747476 dpm/ml | 12/04/2013 | 12/04/2014 |

GEL Laboratories LLC
Version 1.0 9/18/2000

# Strontium 89/90 Queue Sheet

02/27/14

DCN: ITSI-0808-0004-0076, 8 May 2019

**Batch #:** 1366732 **Analyst:** AF1 **First Client Due Date:** **Internal Due Date:** 03/13/2014 **Comments**

**Sr-89/90 Spike Code(s):** — / — **Expiration Date:** — / — **Vol(s):** — / — **Sr Sep. Date/time:** 2/15/14 11:30

**Sr-89/90 LCS Code(s):** 1680-A / 1243-L **Expiration Date:** 3/24/14 / 12/9/14 **Vol(s):** 0.2 / 0.5 **Y Sep. Date/time:** 2/26/14 11:20

**Sr Carrier Code:** 2696474 **Exp Date:** 12/5/14 **Vol:** * **Sdt Wt:** 8.2 **Y Carrier Code:** 2073992 **Exp Date:** 5/14/14 **Vol:** 0.5 **Sdt Wt:** 16.59

**Prep Date:** 2/14/14 **Initials:** AF1 **Pipet ID:** **Balance #:** — **Analytical Scale #:** 11132018 **Witness:** —

| Sample ID | Client Description | Type | RDL (Carrier Volume) | Date Collected | Matrix | Client | Rad | Pos # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr (mg) | wt | Initial Y wt (g) | Final Y wt (g) | Net Y (mg) | wt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1203036037-1 | LCS for batch 1366732 | LCS | 0.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V1 | 200 | | 0.0270 | 0.0284 | 1.4 | | 0.0259 | 0.0426 | 16.1 | |
| 1203036038-1 | LCS for batch 1366732 | LCS | 0.2 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V2 | 200 | | 0.0240 | 0.0276 | 3.6 | | 0.0278 | 0.0444 | 16.6 | |
| 1203036039-1 | LCS for batch 1366732 | LCS | 0.4 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V3 | 200 | | 0.0280 | 0.0342 | 6.2 | | 0.0271 | 0.0427 | 15.6 | |
| 1203036040-1 | LCS for batch 1366732 | LCS | 0.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V4 | 200 | | 0.0243 | 0.0312 | 6.9 | | 0.0281 | 0.0457 | 17.6 | |
| 1203036041-1 | LCS for batch 1366732 | LCS | 0.8 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V5 | 200 | | 0.0231 | 0.0325 | 8.6 | | 0.0271 | 0.0441 | 17.0 | |
| 1203036042-1 | LCS for batch 1366732 | LCS | 1.0 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V6 | 200 | | 0.0261 | 0.0354 | 9.3 | | 0.0282 | 0.0445 | 16.3 | |
| 1203036043-1 | LCS for batch 1366732 | LCS | 1.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V7 | 200 | | 0.0280 | 0.0376 | 9.6 | | 0.0275 | 0.0434 | 15.9 | |
| 1203036044-1 | LCS for batch 1366732 | LCS | 2.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V8 | 200 | | 0.0262 | 0.0367 | 10.5 | | 0.0266 | 0.0426 | 16.0 | |

WH✓ WH✓

M-10282

Solid Sample Dissolution by: **LEACH or DIGESTION** (Circle One)

**Data Reviewed By:**

# Gas Flow Proportional Counter Calibration Package

Method: Strontium 89/90

Instrument (circle one): LB4100 / (Protean)

| | Included/ Acceptable | Comments |
|---|---|---|
| **Part 1: Efficiency determination** | | |
| 1 Efficiency spreadsheet (eff pts, graphs, trendline equation) | ✓ | |
| 2 Applicable portion of GFPC_Machines.XLS | ✓ | |
| 3 Raw Data for Calibration standards | ✓ | |
| 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%) | ✓ | |
| 5 Plateau graph and raw data | ✓ | |
| 6 Standardization of Carrier (if applicable) | ✓ | |
| **Part 2. Documentation for Calibration Source** | | |
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |
| **Part 3. Documentation for Verification Source** | | |
| 1 Vendor Certificate | ✓ | |
| 2 Standard Traceability Log (from LIMS) | ✓ | |
| 3 Current Verification of Source | ✓ | |
| 4 Source preparation sheet | ✓ | |
| **Part 4. Enter into LIMS** | | |
| 1 Alpha LIMS instrument calibration updated | ✓ | |

Primary Review of Package [signature]

Secondary Review of Package Amanda L. Fehr

Effective Date: 3/1/13

exp date ~~2/28/14~~ ~~2/25/14~~ 2/28/15

*calibration verified 2/1 and exp date extended.

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

Rev 7 SSC 8/3/09

# Sr-89 Calibration - PIC - Feb 2013

| Standard Data | |
|---|---|
| Isotope | Sr-89 |
| Standard ID number | 1633-A |
| Half Life (days) | 50.53 |
| Std. Act. (dpm/mL) | 123593.8614 |
| Reference Date | 12/13/2012 |
| Volume of spike (mL) | 1.0 |
| Std. Nominal (dpm) | 51371.24 |
| Decay Date | 2/15/2013 |

| Carrier Data | | Std ID<br>Std weight | 1858443<br>17.73 | mg/mL |
|---|---|---|---|---|
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 1.9 | 0.1 | 1.77 | 100.0% |
| 2 | 3.5 | 0.2 | 3.55 | 98.7% |
| 3 | 6.9 | 0.4 | 7.09 | 97.3% |
| 4 | 8.3 | 0.5 | 8.87 | 93.6% |
| 5 | 13.5 | 0.8 | 14.18 | 95.2% |
| 6 | 17.6 | 1 | 17.73 | 99.3% |
| 7 | 26.6 | 1.5 | 26.60 | 100.0% |
| 8 | 36.1 | 2.1 | 37.23 | 97.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

The following detectors were not calibrated:

12A

*Background is considered neglible.
**Decay corrected to mid-point of count

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1A | 1 | 2/15/2013 16:21 | 1 | 22671 | 22671.00 | 100.0% | 22671.00 | 50892.77 | 0.4455 | 0.5143 |
| 1A | 2 | 2/15/2013 16:30 | 1 | 24304 | 24304.00 | 98.7% | 24623.42 | 50888.38 | 0.4839 | 0.5095 |
| 1A | 3 | 2/15/2013 16:28 | 1 | 25873 | 25873.00 | 97.3% | 26592.94 | 50889.58 | 0.5226 | 0.4993 |
| 1A | 4 | 2/15/2013 16:24 | 1 | 24881 | 24881.00 | 93.6% | 26574.71 | 50891.32 | 0.5222 | 0.4951 |
| 1A | 5 | 2/15/2013 16:33 | 1 | 25969 | 25969.00 | 95.2% | 27284.76 | 50887.10 | 0.5362 | 0.4794 |
| 1A | 6 | 2/15/2013 16:39 | 1 | 23419 | 23419.00 | 99.3% | 23591.96 | 50884.19 | 0.4636 | 0.4671 |
| 1A | 7 | 2/15/2013 16:37 | 1 | 25270 | 25270.00 | 100.0% | 25270.00 | 50885.14 | 0.4966 | 0.4401 |
| 1A | 8 | 2/15/2013 16:35 | 1 | 17057 | 17057.00 | 97.0% | 17592.33 | 50886.14 | 0.3457 | 0.4115 |
| 1B | 1 | 2/15/2013 16:24 | 1 | 22892 | 22892.00 | 100.0% | 22892.00 | 50891.24 | 0.4498 | 0.5191 |
| 1B | 2 | 2/15/2013 16:22 | 1 | 24815 | 24815.00 | 98.7% | 25141.14 | 50892.67 | 0.4940 | 0.5141 |
| 1B | 3 | 2/15/2013 16:30 | 1 | 25632 | 25632.00 | 97.3% | 26345.24 | 50888.35 | 0.5177 | 0.5037 |
| 1B | 4 | 2/15/2013 16:28 | 1 | 25351 | 25351.00 | 93.6% | 27076.70 | 50889.55 | 0.5321 | 0.4994 |
| 1B | 5 | 2/15/2013 16:35 | 1 | 26005 | 26005.00 | 95.2% | 27322.59 | 50886.07 | 0.5369 | 0.4833 |
| 1B | 6 | 2/15/2013 16:33 | 1 | 23585 | 23585.00 | 99.3% | 23759.21 | 50887.06 | 0.4669 | 0.4707 |
| 1B | 7 | 2/15/2013 16:39 | 1 | 25562 | 25562.00 | 100.0% | 25562.00 | 50884.16 | 0.5024 | 0.4430 |
| 1B | 8 | 2/15/2013 16:37 | 1 | 17129 | 17129.00 | 97.0% | 17666.59 | 50885.13 | 0.3472 | 0.4137 |
| 1C | 1 | 2/15/2013 16:28 | 1 | 23030 | 23030.00 | 100.0% | 23030.00 | 50889.54 | 0.4525 | 0.5246 |
| 1C | 2 | 2/15/2013 16:25 | 1 | 25093 | 25093.00 | 98.7% | 25422.79 | 50891.21 | 0.4996 | 0.5192 |
| 1C | 3 | 2/15/2013 16:22 | 1 | 26245 | 26245.00 | 97.3% | 26975.30 | 50892.57 | 0.5300 | 0.5077 |
| 1C | 4 | 2/15/2013 16:31 | 1 | 25504 | 25504.00 | 93.6% | 27240.12 | 50888.31 | 0.5353 | 0.5030 |
| 1C | 5 | 2/15/2013 16:37 | 1 | 25732 | 25732.00 | 95.2% | 27035.75 | 50885.07 | 0.5313 | 0.4855 |
| 1C | 6 | 2/15/2013 16:35 | 1 | 23516 | 23516.00 | 99.3% | 23689.70 | 50886.03 | 0.4655 | 0.4717 |
| 1C | 7 | 2/15/2013 16:33 | 1 | 25862 | 25862.00 | 100.0% | 25862.00 | 50887.03 | 0.5082 | 0.4414 |
| 1C | 8 | 2/15/2013 16:39 | 1 | 16780 | 16780.00 | 97.0% | 17306.64 | 50884.12 | 0.3401 | 0.4094 |
| 1D | 1 | 2/15/2013 16:31 | 1 | 23237 | 23237.00 | 100.0% | 23237.00 | 50888.28 | 0.4566 | 0.5225 |
| 1D | 2 | 2/15/2013 16:28 | 1 | 24810 | 24810.00 | 98.7% | 25136.07 | 50889.50 | 0.4939 | 0.5173 |
| 1D | 3 | 2/15/2013 16:25 | 1 | 26179 | 26179.00 | 97.3% | 26907.46 | 50891.17 | 0.5287 | 0.5062 |
| 1D | 4 | 2/15/2013 16:22 | 1 | 25241 | 25241.00 | 93.6% | 26959.21 | 50892.51 | 0.5297 | 0.5016 |
| 1D | 5 | 2/15/2013 16:39 | 1 | 26012 | 26012.00 | 95.2% | 27329.94 | 50884.08 | 0.5371 | 0.4846 |
| 1D | 6 | 2/15/2013 16:37 | 1 | 23271 | 23271.00 | 99.3% | 23442.89 | 50885.05 | 0.4607 | 0.4713 |
| 1D | 7 | 2/15/2013 16:35 | 1 | 25607 | 25607.00 | 100.0% | 25607.00 | 50886.00 | 0.5032 | 0.4419 |
| 1D | 8 | 2/15/2013 16:33 | 1 | 17078 | 17078.00 | 97.0% | 17613.99 | 50887.01 | 0.3461 | 0.4109 |
| 2A | 1 | 2/15/2013 16:33 | 1 | 22234 | 22234.00 | 100.0% | 22234.00 | 50886.97 | 0.4369 | 0.5053 |
| 2A | 2 | 2/15/2013 16:39 | 1 | 23993 | 23993.00 | 98.7% | 24308.34 | 50884.06 | 0.4777 | 0.5006 |
| 2A | 3 | 2/15/2013 16:37 | 1 | 25476 | 25476.00 | 97.3% | 26184.90 | 50885.01 | 0.5146 | 0.4907 |
| 2A | 4 | 2/15/2013 16:35 | 1 | 24595 | 24595.00 | 93.6% | 26269.24 | 50885.96 | 0.5162 | 0.4866 |
| 2A | 5 | 2/15/2013 16:22 | 1 | 25135 | 25135.00 | 95.2% | 26408.51 | 50892.44 | 0.5189 | 0.4713 |
| 2A | 6 | 2/15/2013 16:31 | 1 | 22948 | 22948.00 | 99.3% | 23117.50 | 50888.22 | 0.4543 | 0.4593 |
| 2A | 7 | 2/15/2013 16:28 | 1 | 25149 | 25149.00 | 100.0% | 25149.00 | 50889.46 | 0.4942 | 0.4330 |
| 2A | 8 | 2/15/2013 16:25 | 1 | 16736 | 16736.00 | 97.0% | 17261.26 | 50891.14 | 0.3392 | 0.4052 |
| 2B | 1 | 2/15/2013 16:35 | 1 | 21501 | 21501.00 | 100.0% | 21501.00 | 50885.93 | 0.4225 | 0.4850 |
| 2B | 2 | 2/15/2013 16:33 | 1 | 23103 | 23103.00 | 98.7% | 23406.64 | 50886.92 | 0.4600 | 0.4806 |
| 2B | 3 | 2/15/2013 16:39 | 1 | 24238 | 24238.00 | 97.3% | 24912.45 | 50884.02 | 0.4896 | 0.4714 |
| 2B | 4 | 2/15/2013 16:37 | 1 | 23758 | 23758.00 | 93.6% | 25375.26 | 50884.98 | 0.4987 | 0.4676 |
| 2B | 5 | 2/15/2013 16:25 | 1 | 23999 | 23999.00 | 95.2% | 25214.95 | 50891.10 | 0.4955 | 0.4534 |
| 2B | 6 | 2/15/2013 16:22 | 1 | 22186 | 22186.00 | 99.3% | 22349.87 | 50892.40 | 0.4392 | 0.4422 |
| 2B | 7 | 2/15/2013 16:31 | 1 | 24035 | 24035.00 | 100.0% | 24035.00 | 50888.20 | 0.4723 | 0.4177 |
| 2B | 8 | 2/15/2013 16:28 | 1 | 16377 | 16377.00 | 97.0% | 16890.99 | 50889.43 | 0.3319 | 0.3918 |
| 2C | 1 | 2/15/2013 16:37 | 1 | 22296 | 22296.00 | 100.0% | 22296.00 | 50884.96 | 0.4382 | 0.5061 |
| 2C | 2 | 2/15/2013 16:36 | 1 | 23951 | 23951.00 | 98.7% | 24265.78 | 50885.89 | 0.4769 | 0.5019 |
| 2C | 3 | 2/15/2013 16:33 | 1 | 25463 | 25463.00 | 97.3% | 26171.54 | 50886.87 | 0.5143 | 0.4931 |
| 2C | 4 | 2/15/2013 16:39 | 1 | 24962 | 24962.00 | 93.6% | 26661.22 | 50883.99 | 0.5240 | 0.4894 |
| 2C | 5 | 2/15/2013 16:28 | 1 | 25437 | 25437.00 | 95.2% | 26725.81 | 50889.38 | 0.5252 | 0.4758 |
| 2C | 6 | 2/15/2013 16:25 | 1 | 23144 | 23144.00 | 99.3% | 23314.95 | 50891.06 | 0.4581 | 0.4651 |
| 2C | 7 | 2/15/2013 16:22 | 1 | 25548 | 25548.00 | 100.0% | 25548.00 | 50892.31 | 0.5020 | 0.4416 |
| 2C | 8 | 2/15/2013 16:31 | 1 | 17333 | 17333.00 | 97.0% | 17877.00 | 50888.17 | 0.3513 | 0.4168 |
| 2D | 1 | 2/15/2013 16:39 | 1 | 22601 | 22601.00 | 100.0% | 22601.00 | 50883.96 | 0.4442 | 0.5098 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2D | 2 | 2/15/2013 16:38 | 1 | 24333 | 24333.00 | 98.7% | 24652.81 | 50884.92 | 0.4845 | 0.5053 |
| 2D | 3 | 2/15/2013 16:36 | 1 | 25432 | 25432.00 | 97.3% | 26139.67 | 50885.86 | 0.5137 | 0.4956 |
| 2D | 4 | 2/15/2013 16:34 | 1 | 24784 | 24784.00 | 93.6% | 26471.10 | 50886.85 | 0.5202 | 0.4916 |
| 2D | 5 | 2/15/2013 16:31 | 1 | 25497 | 25497.00 | 95.2% | 26788.85 | 50888.12 | 0.5264 | 0.4789 |
| 2D | 6 | 2/15/2013 16:28 | 1 | 23111 | 23111.00 | 99.3% | 23281.71 | 50889.36 | 0.4575 | 0.4652 |
| 2D | 7 | 2/15/2013 16:25 | 1 | 25715 | 25715.00 | 100.0% | 25715.00 | 50891.02 | 0.5053 | 0.4396 |
| 2D | 8 | 2/15/2013 16:22 | 1 | 17022 | 17022.00 | 97.0% | 17556.24 | 50892.25 | 0.3450 | 0.4127 |
| 3A | 1 | 2/15/2013 17:08 | 1 | 22713 | 22713.00 | 100.0% | 22713.00 | 50870.09 | 0.4465 | 0.5136 |
| 3A | 2 | 2/15/2013 17:16 | 1 | 24219 | 24219.00 | 98.7% | 24537.31 | 50866.48 | 0.4824 | 0.5082 |
| 3A | 3 | 2/15/2013 17:13 | 1 | 25568 | 25568.00 | 97.3% | 26279.46 | 50867.78 | 0.5166 | 0.4966 |
| 3A | 4 | 2/15/2013 17:11 | 1 | 24790 | 24790.00 | 93.6% | 26477.51 | 50868.84 | 0.5205 | 0.4919 |
| 3A | 5 | 2/15/2013 17:20 | 1 | 25636 | 25636.00 | 95.2% | 26934.89 | 50864.33 | 0.5295 | 0.4742 |
| 3A | 6 | 2/15/2013 17:28 | 1 | 22922 | 22922.00 | 99.3% | 23091.31 | 50860.34 | 0.4540 | 0.4603 |
| 3A | 7 | 2/15/2013 17:26 | 1 | 25188 | 25188.00 | 100.0% | 25188.00 | 50861.29 | 0.4952 | 0.4297 |
| 3A | 8 | 2/15/2013 17:23 | 1 | 16133 | 16133.00 | 97.0% | 16639.33 | 50862.81 | 0.3271 | 0.3974 |
| 3B | 1 | 2/15/2013 17:11 | 1 | 22710 | 22710.00 | 100.0% | 22710.00 | 50868.83 | 0.4464 | 0.5168 |
| 3B | 2 | 2/15/2013 17:08 | 1 | 24287 | 24287.00 | 98.7% | 24606.20 | 50870.03 | 0.4837 | 0.5111 |
| 3B | 3 | 2/15/2013 17:16 | 1 | 25785 | 25785.00 | 97.3% | 26502.50 | 50866.44 | 0.5210 | 0.4990 |
| 3B | 4 | 2/15/2013 17:13 | 1 | 25095 | 25095.00 | 93.6% | 26803.27 | 50867.74 | 0.5269 | 0.4941 |
| 3B | 5 | 2/15/2013 17:23 | 1 | 25479 | 25479.00 | 95.2% | 26769.94 | 50862.77 | 0.5263 | 0.4756 |
| 3B | 6 | 2/15/2013 17:20 | 1 | 23180 | 23180.00 | 99.3% | 23351.22 | 50864.25 | 0.4591 | 0.4611 |
| 3B | 7 | 2/15/2013 17:28 | 1 | 25229 | 25229.00 | 100.0% | 25229.00 | 50860.31 | 0.4960 | 0.4291 |
| 3B | 8 | 2/15/2013 17:26 | 1 | 15914 | 15914.00 | 97.0% | 16413.46 | 50861.27 | 0.3227 | 0.3954 |
| 3C | 1 | 2/15/2013 17:13 | 1 | 22789 | 22789.00 | 100.0% | 22789.00 | 50867.71 | 0.4480 | 0.5218 |
| 3C | 2 | 2/15/2013 17:11 | 1 | 24757 | 24757.00 | 98.7% | 25082.38 | 50868.78 | 0.4931 | 0.5163 |
| 3C | 3 | 2/15/2013 17:08 | 1 | 25765 | 25765.00 | 97.3% | 26481.94 | 50869.95 | 0.5206 | 0.5047 |
| 3C | 4 | 2/15/2013 17:16 | 1 | 25700 | 25700.00 | 93.6% | 27449.46 | 50866.42 | 0.5396 | 0.4999 |
| 3C | 5 | 2/15/2013 17:26 | 1 | 25884 | 25884.00 | 95.2% | 27195.46 | 50861.23 | 0.5347 | 0.4821 |
| 3C | 6 | 2/15/2013 17:23 | 1 | 23317 | 23317.00 | 99.3% | 23489.23 | 50862.74 | 0.4618 | 0.4680 |
| 3C | 7 | 2/15/2013 17:20 | 1 | 25638 | 25638.00 | 100.0% | 25638.00 | 50864.20 | 0.5040 | 0.4372 |
| 3C | 8 | 2/15/2013 17:28 | 1 | 16405 | 16405.00 | 97.0% | 16919.87 | 50860.27 | 0.3327 | 0.4047 |
| 3D | 1 | 2/15/2013 17:16 | 1 | 22440 | 22440.00 | 100.0% | 22440.00 | 50866.39 | 0.4412 | 0.5133 |
| 3D | 2 | 2/15/2013 17:13 | 1 | 24241 | 24241.00 | 98.7% | 24559.60 | 50867.67 | 0.4828 | 0.5079 |
| 3D | 3 | 2/15/2013 17:11 | 1 | 25787 | 25787.00 | 97.3% | 26504.55 | 50868.75 | 0.5210 | 0.4963 |
| 3D | 4 | 2/15/2013 17:09 | 1 | 24974 | 24974.00 | 93.6% | 26674.04 | 50869.88 | 0.5244 | 0.4915 |
| 3D | 5 | 2/15/2013 17:28 | 1 | 25471 | 25471.00 | 95.2% | 26761.53 | 50860.24 | 0.5262 | 0.4737 |
| 3D | 6 | 2/15/2013 17:26 | 1 | 22855 | 22855.00 | 99.3% | 23023.82 | 50861.19 | 0.4527 | 0.4597 |
| 3D | 7 | 2/15/2013 17:23 | 1 | 24979 | 24979.00 | 100.0% | 24979.00 | 50862.70 | 0.4911 | 0.4289 |
| 3D | 8 | 2/15/2013 17:20 | 1 | 16191 | 16191.00 | 97.0% | 16699.16 | 50864.17 | 0.3283 | 0.3964 |
| 4A | 1 | 2/15/2013 17:20 | 1 | 22414 | 22414.00 | 100.0% | 22414.00 | 50864.14 | 0.4407 | 0.5128 |
| 4A | 2 | 2/15/2013 17:28 | 1 | 24462 | 24462.00 | 98.7% | 24783.50 | 50860.22 | 0.4873 | 0.5079 |
| 4A | 3 | 2/15/2013 17:27 | 1 | 25519 | 25519.00 | 97.3% | 26229.09 | 50861.15 | 0.5157 | 0.4974 |
| 4A | 4 | 2/15/2013 17:23 | 1 | 25109 | 25109.00 | 93.6% | 26818.23 | 50862.66 | 0.5273 | 0.4931 |
| 4A | 5 | 2/15/2013 17:09 | 1 | 25709 | 25709.00 | 95.2% | 27011.59 | 50869.83 | 0.5310 | 0.4771 |
| 4A | 6 | 2/15/2013 17:15 | 1 | 23050 | 23050.00 | 99.3% | 23220.26 | 50866.35 | 0.4565 | 0.4645 |
| 4A | 7 | 2/15/2013 17:13 | 1 | 25348 | 25348.00 | 100.0% | 25348.00 | 50867.64 | 0.4983 | 0.4368 |
| 4A | 8 | 2/15/2013 17:11 | 1 | 16794 | 16794.00 | 97.0% | 17321.08 | 50868.71 | 0.3405 | 0.4076 |
| 4B | 1 | 2/15/2013 17:24 | 1 | 22758 | 22758.00 | 100.0% | 22758.00 | 50862.63 | 0.4474 | 0.5134 |
| 4B | 2 | 2/15/2013 17:20 | 1 | 24066 | 24066.00 | 98.7% | 24382.30 | 50864.09 | 0.4794 | 0.5086 |
| 4B | 3 | 2/15/2013 17:29 | 1 | 25905 | 25905.00 | 97.3% | 26625.83 | 50860.18 | 0.5235 | 0.4983 |
| 4B | 4 | 2/15/2013 17:27 | 1 | 25162 | 25162.00 | 93.6% | 26874.83 | 50861.12 | 0.5284 | 0.4940 |
| 4B | 5 | 2/15/2013 17:11 | 1 | 25354 | 25354.00 | 95.2% | 26638.60 | 50868.66 | 0.5237 | 0.4783 |
| 4B | 6 | 2/15/2013 17:09 | 1 | 23302 | 23302.00 | 99.3% | 23474.12 | 50869.77 | 0.4615 | 0.4658 |
| 4B | 7 | 2/15/2013 17:16 | 1 | 25359 | 25359.00 | 100.0% | 25359.00 | 50866.30 | 0.4985 | 0.4386 |
| 4B | 8 | 2/15/2013 17:13 | 1 | 16980 | 16980.00 | 97.0% | 17512.92 | 50867.60 | 0.3443 | 0.4098 |
| 4C | 1 | 2/15/2013 17:27 | 1 | 23173 | 23173.00 | 100.0% | 23173.00 | 50861.10 | 0.4556 | 0.5244 |
| 4C | 2 | 2/15/2013 17:24 | 1 | 25035 | 25035.00 | 98.7% | 25364.03 | 50862.60 | 0.4987 | 0.5189 |
| 4C | 3 | 2/15/2013 17:21 | 1 | 25859 | 25859.00 | 97.3% | 26578.55 | 50864.07 | 0.5225 | 0.5073 |
| 4C | 4 | 2/15/2013 17:29 | 1 | 25412 | 25412.00 | 93.6% | 27141.85 | 50860.14 | 0.5337 | 0.5025 |
| 4C | 5 | 2/15/2013 17:13 | 1 | 26023 | 26023.00 | 95.2% | 27341.50 | 50867.55 | 0.5375 | 0.4847 |
| 4C | 6 | 2/15/2013 17:11 | 1 | 23478 | 23478.00 | 99.3% | 23651.42 | 50868.63 | 0.4650 | 0.4707 |
| 4C | 7 | 2/15/2013 17:09 | 1 | 25643 | 25643.00 | 100.0% | 25643.00 | 50869.71 | 0.5041 | 0.4399 |
| 4C | 8 | 2/15/2013 17:16 | 1 | 16702 | 16702.00 | 97.0% | 17226.19 | 50866.26 | 0.3387 | 0.4074 |
| 4D | 1 | 2/15/2013 17:29 | 1 | 22653 | 22653.00 | 100.0% | 22653.00 | 50860.10 | 0.4454 | 0.5205 |
| 4D | 2 | 2/15/2013 17:27 | 1 | 24739 | 24739.00 | 98.7% | 25064.14 | 50861.06 | 0.4928 | 0.5149 |
| 4D | 3 | 2/15/2013 17:24 | 1 | 25941 | 25941.00 | 97.3% | 26662.84 | 50862.55 | 0.5242 | 0.5032 |
| 4D | 4 | 2/15/2013 17:21 | 1 | 25276 | 25276.00 | 93.6% | 26996.60 | 50864.03 | 0.5308 | 0.4984 |
| 4D | 5 | 2/15/2013 17:16 | 1 | 25947 | 25947.00 | 95.2% | 27261.65 | 50866.22 | 0.5359 | 0.4804 |
| 4D | 6 | 2/15/2013 17:13 | 1 | 23091 | 23091.00 | 99.3% | 23261.56 | 50867.51 | 0.4573 | 0.4663 |
| 4D | 7 | 2/15/2013 17:11 | 1 | 25813 | 25813.00 | 100.0% | 25813.00 | 50868.58 | 0.5074 | 0.4352 |
| 4D | 8 | 2/15/2013 17:09 | 1 | 16149 | 16149.00 | 97.0% | 16655.84 | 50869.66 | 0.3274 | 0.4024 |
| 5A | 1 | 2/15/2013 13:38 | 1 | 23403 | 23403.00 | 100.0% | 23403.00 | 50972.23 | 0.4591 | 0.5263 |
| 5A | 2 | 2/15/2013 14:12 | 1 | 25086 | 25086.00 | 98.7% | 25415.70 | 50955.57 | 0.4988 | 0.5219 |
| 5A | 3 | 2/15/2013 13:48 | 1 | 26469 | 26469.00 | 97.3% | 27205.53 | 50967.40 | 0.5338 | 0.5124 |
| 5A | 4 | 2/15/2013 13:45 | 1 | 25794 | 25794.00 | 93.6% | 27549.86 | 50968.82 | 0.5405 | 0.5085 |
| 5A | 5 | 2/15/2013 14:15 | 1 | 26347 | 26347.00 | 95.2% | 27681.91 | 50953.88 | 0.5433 | 0.4940 |

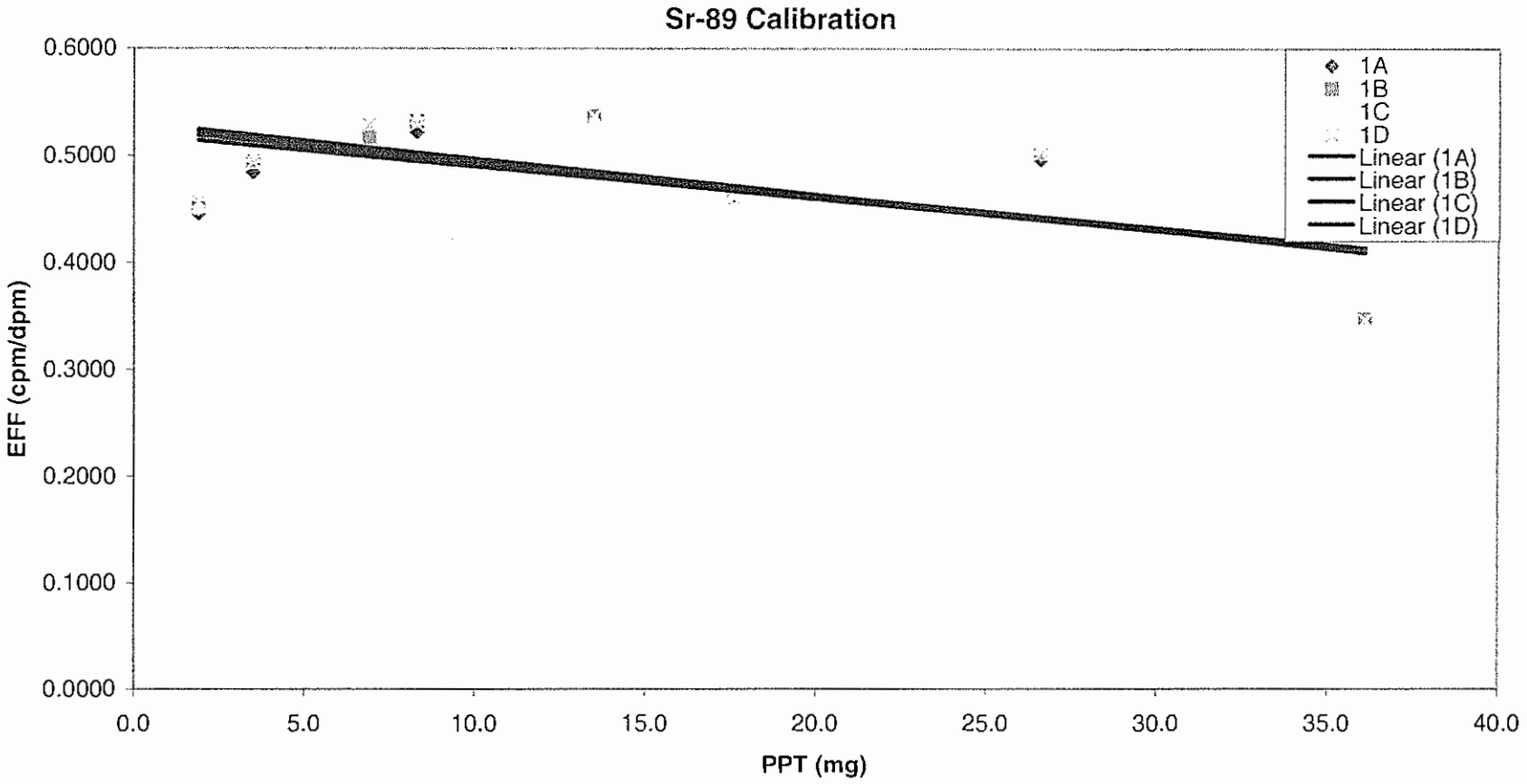
| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5A | 6 | 2/15/2013 14:30 | 1 | 24007 | 24007.00 | 99.3% | 24184.32 | 50946.54 | 0.4747 | 0.4826 |
| 5A | 7 | 2/15/2013 14:27 | 1 | 26340 | 26340.00 | 100.0% | 26340.00 | 50948.05 | 0.5170 | 0.4575 |
| 5A | 8 | 2/15/2013 14:25 | 1 | 18123 | 18123.00 | 97.0% | 18691.79 | 50949.39 | 0.3669 | 0.4310 |
| 5B | 1 | 2/15/2013 13:45 | 1 | 23574 | 23574.00 | 100.0% | 23574.00 | 50968.78 | 0.4625 | 0.5274 |
| 5B | 2 | 2/15/2013 13:38 | 1 | 25221 | 25221.00 | 98.7% | 25552.48 | 50972.23 | 0.5013 | 0.5227 |
| 5B | 3 | 2/15/2013 14:12 | 1 | 26417 | 26417.00 | 97.3% | 27152.08 | 50955.53 | 0.5329 | 0.5128 |
| 5B | 4 | 2/15/2013 13:48 | 1 | 25811 | 25811.00 | 93.6% | 27568.01 | 50967.35 | 0.5409 | 0.5088 |
| 5B | 5 | 2/15/2013 14:25 | 1 | 26405 | 26405.00 | 95.2% | 27742.85 | 50949.32 | 0.5445 | 0.4936 |
| 5B | 6 | 2/15/2013 14:15 | 1 | 23663 | 23663.00 | 99.3% | 23837.78 | 50953.83 | 0.4678 | 0.4817 |
| 5B | 7 | 2/15/2013 14:31 | 1 | 26124 | 26124.00 | 100.0% | 26124.00 | 50946.50 | 0.5128 | 0.4555 |
| 5B | 8 | 2/15/2013 14:27 | 1 | 18167 | 18167.00 | 97.0% | 18737.17 | 50947.99 | 0.3678 | 0.4279 |
| 5C | 1 | 2/15/2013 13:48 | 1 | 23369 | 23369.00 | 100.0% | 23369.00 | 50967.32 | 0.4585 | 0.5266 |
| 5C | 2 | 2/15/2013 13:45 | 1 | 25051 | 25051.00 | 98.7% | 25380.24 | 50968.73 | 0.4980 | 0.5217 |
| 5C | 3 | 2/15/2013 13:38 | 1 | 26297 | 26297.00 | 97.3% | 27028.74 | 50972.23 | 0.5303 | 0.5112 |
| 5C | 4 | 2/15/2013 14:12 | 1 | 26150 | 26150.00 | 93.6% | 27930.09 | 50955.49 | 0.5481 | 0.5069 |
| 5C | 5 | 2/15/2013 14:28 | 1 | 26199 | 26199.00 | 95.2% | 27526.42 | 50947.95 | 0.5403 | 0.4908 |
| 5C | 6 | 2/15/2013 14:25 | 1 | 23488 | 23488.00 | 99.3% | 23661.49 | 50949.26 | 0.4644 | 0.4782 |
| 5C | 7 | 2/15/2013 14:16 | 1 | 25842 | 25842.00 | 100.0% | 25842.00 | 50953.76 | 0.5072 | 0.4504 |
| 5C | 8 | 2/15/2013 14:31 | 1 | 17798 | 17798.00 | 97.0% | 18356.59 | 50946.45 | 0.3603 | 0.4211 |
| 5D | 1 | 2/15/2013 14:12 | 1 | 23109 | 23109.00 | 100.0% | 23109.00 | 50955.42 | 0.4535 | 0.5190 |
| 5D | 2 | 2/15/2013 13:48 | 1 | 24806 | 24806.00 | 98.7% | 25132.02 | 50967.28 | 0.4931 | 0.5147 |
| 5D | 3 | 2/15/2013 13:45 | 1 | 26008 | 26008.00 | 97.3% | 26731.70 | 50968.69 | 0.5245 | 0.5056 |
| 5D | 4 | 2/15/2013 13:38 | 1 | 25558 | 25558.00 | 93.6% | 27297.79 | 50972.23 | 0.5355 | 0.5018 |
| 5D | 5 | 2/15/2013 14:31 | 1 | 26045 | 26045.00 | 95.2% | 27364.61 | 50946.41 | 0.5371 | 0.4879 |
| 5D | 6 | 2/15/2013 14:28 | 1 | 23651 | 23651.00 | 99.3% | 23825.69 | 50947.63 | 0.4677 | 0.4768 |
| 5D | 7 | 2/15/2013 14:25 | 1 | 25829 | 25829.00 | 100.0% | 25829.00 | 50949.18 | 0.5070 | 0.4526 |
| 5D | 8 | 2/15/2013 14:16 | 1 | 18148 | 18148.00 | 97.0% | 18717.58 | 50953.71 | 0.3673 | 0.4271 |
| 6A | 1 | 2/15/2013 14:16 | 1 | 22130 | 22130.00 | 100.0% | 22130.00 | 50953.45 | 0.4343 | 0.4933 |
| 6A | 2 | 2/15/2013 14:31 | 1 | 24034 | 24034.00 | 98.7% | 24349.88 | 50946.16 | 0.4780 | 0.4901 |
| 6A | 3 | 2/15/2013 14:28 | 1 | 24798 | 24798.00 | 97.3% | 25488.03 | 50947.64 | 0.5003 | 0.4835 |
| 6A | 4 | 2/15/2013 14:26 | 1 | 24454 | 24454.00 | 93.6% | 26118.64 | 50948.80 | 0.5126 | 0.4807 |
| 6A | 5 | 2/15/2013 13:38 | 1 | 24903 | 24903.00 | 95.2% | 26164.75 | 50972.02 | 0.5133 | 0.4706 |
| 6A | 6 | 2/15/2013 14:13 | 1 | 22477 | 22477.00 | 99.3% | 22643.02 | 50954.98 | 0.4444 | 0.4625 |
| 6A | 7 | 2/15/2013 13:48 | 1 | 24857 | 24857.00 | 100.0% | 24857.00 | 50966.92 | 0.4877 | 0.4449 |
| 6A | 8 | 2/15/2013 13:45 | 1 | 18846 | 18846.00 | 97.0% | 19437.48 | 50968.41 | 0.3814 | 0.4263 |
| 6B | 1 | 2/15/2013 14:26 | 1 | 22530 | 22530.00 | 100.0% | 22530.00 | 50948.63 | 0.4422 | 0.5126 |
| 6B | 2 | 2/15/2013 14:16 | 1 | 25573 | 25573.00 | 98.7% | 25909.10 | 50953.38 | 0.5085 | 0.5090 |
| 6B | 3 | 2/15/2013 14:31 | 1 | 25565 | 25565.00 | 97.3% | 26276.37 | 50946.11 | 0.5158 | 0.5014 |
| 6B | 4 | 2/15/2013 14:28 | 1 | 25190 | 25190.00 | 93.6% | 26904.74 | 50947.58 | 0.5281 | 0.4982 |
| 6B | 5 | 2/15/2013 13:46 | 1 | 25651 | 25651.00 | 95.2% | 26950.65 | 50968.31 | 0.5288 | 0.4865 |
| 6B | 6 | 2/15/2013 13:41 | 1 | 23552 | 23552.00 | 99.3% | 23725.96 | 50970.56 | 0.4655 | 0.4773 |
| 6B | 7 | 2/15/2013 14:13 | 1 | 25638 | 25638.00 | 100.0% | 25638.00 | 50954.91 | 0.5032 | 0.4571 |
| 6B | 8 | 2/15/2013 13:49 | 1 | 19075 | 19075.00 | 97.0% | 19673.67 | 50966.85 | 0.3860 | 0.4358 |
| 6C | 1 | 2/15/2013 14:28 | 1 | 22479 | 22479.00 | 100.0% | 22479.00 | 50947.53 | 0.4412 | 0.5091 |
| 6C | 2 | 2/15/2013 14:26 | 1 | 24382 | 24382.00 | 98.7% | 24702.45 | 50948.63 | 0.4849 | 0.5050 |
| 6C | 3 | 2/15/2013 14:17 | 1 | 25764 | 25764.00 | 97.3% | 26480.91 | 50953.28 | 0.5197 | 0.4964 |
| 6C | 4 | 2/15/2013 14:31 | 1 | 25070 | 25070.00 | 93.6% | 26776.57 | 50946.05 | 0.5256 | 0.4928 |
| 6C | 5 | 2/15/2013 13:49 | 1 | 25538 | 25538.00 | 95.2% | 26831.93 | 50966.78 | 0.5265 | 0.4796 |
| 6C | 6 | 2/15/2013 13:46 | 1 | 23213 | 23213.00 | 99.3% | 23384.46 | 50968.22 | 0.4588 | 0.4692 |
| 6C | 7 | 2/15/2013 13:38 | 1 | 25525 | 25525.00 | 100.0% | 25525.00 | 50972.02 | 0.5008 | 0.4463 |
| 6C | 8 | 2/15/2013 14:13 | 1 | 17935 | 17935.00 | 97.0% | 18497.89 | 50954.86 | 0.3630 | 0.4221 |
| 6D | 1 | 2/15/2013 14:32 | 1 | 11648 | 11648.00 | 100.0% | 11648.00 | 50946.01 | 0.2286 | 0.3015 |
| 6D | 2 | 2/15/2013 14:29 | 1 | 13066 | 13066.00 | 98.7% | 13237.72 | 50947.40 | 0.2598 | 0.2955 |
| 6D | 3 | 2/15/2013 14:26 | 1 | 12930 | 12930.00 | 97.3% | 13289.79 | 50948.60 | 0.2608 | 0.2828 |
| 6D | 4 | 2/15/2013 14:17 | 1 | 15725 | 15725.00 | 93.6% | 16795.44 | 50953.26 | 0.3296 | 0.2776 |
| 6D | 5 | 2/15/2013 14:13 | 1 | 12091 | 12091.00 | 95.2% | 12703.61 | 50954.81 | 0.2493 | 0.2581 |
| 6D | 6 | 2/15/2013 13:50 | 1 | 17778 | 17778.00 | 99.3% | 17909.31 | 50966.02 | 0.3514 | 0.2428 |
| 6D | 7 | 2/15/2013 13:46 | 1 | 16245 | 16245.00 | 100.0% | 16245.00 | 50968.15 | 0.3187 | 0.2091 |
| 6D | 8 | 2/15/2013 13:38 | 1 | 2109 | 2109.00 | 97.0% | 2175.19 | 50972.03 | 0.0427 | 0.1736 |
| 7A | 1 | 2/15/2013 14:40 | 1 | 23154 | 23154.00 | 100.0% | 23154.00 | 50942.13 | 0.4545 | 0.5239 |
| 7A | 2 | 2/15/2013 14:57 | 1 | 24947 | 24947.00 | 98.7% | 25274.87 | 50933.78 | 0.4962 | 0.5194 |
| 7A | 3 | 2/15/2013 14:54 | 1 | 26400 | 26400.00 | 97.3% | 27134.61 | 50935.10 | 0.5327 | 0.5097 |
| 7A | 4 | 2/15/2013 14:51 | 1 | 25726 | 25726.00 | 93.6% | 27477.23 | 50936.44 | 0.5394 | 0.5058 |
| 7A | 5 | 2/15/2013 15:00 | 1 | 26121 | 26121.00 | 95.2% | 27444.46 | 50932.43 | 0.5388 | 0.4910 |
| 7A | 6 | 2/15/2013 15:13 | 1 | 23722 | 23722.00 | 99.3% | 23897.22 | 50925.78 | 0.4693 | 0.4794 |
| 7A | 7 | 2/15/2013 15:09 | 1 | 26485 | 26485.00 | 100.0% | 26485.00 | 50927.86 | 0.5200 | 0.4538 |
| 7A | 8 | 2/15/2013 15:05 | 1 | 17724 | 17724.00 | 97.0% | 18280.27 | 50929.64 | 0.3589 | 0.4269 |
| 7B | 1 | 2/15/2013 14:51 | 1 | 23235 | 23235.00 | 100.0% | 23235.00 | 50936.42 | 0.4562 | 0.5241 |
| 7B | 2 | 2/15/2013 14:40 | 1 | 25027 | 25027.00 | 98.7% | 25355.93 | 50941.89 | 0.4977 | 0.5193 |
| 7B | 3 | 2/15/2013 14:57 | 1 | 26374 | 26374.00 | 97.3% | 27107.89 | 50933.73 | 0.5322 | 0.5090 |
| 7B | 4 | 2/15/2013 14:54 | 1 | 25565 | 25565.00 | 93.6% | 27305.27 | 50935.08 | 0.5361 | 0.5048 |
| 7B | 5 | 2/15/2013 15:06 | 1 | 25913 | 25913.00 | 95.2% | 27225.93 | 50929.20 | 0.5346 | 0.4890 |
| 7B | 6 | 2/15/2013 15:00 | 1 | 23710 | 23710.00 | 99.3% | 23885.13 | 50932.39 | 0.4690 | 0.4766 |
| 7B | 7 | 2/15/2013 15:13 | 1 | 26047 | 26047.00 | 100.0% | 26047.00 | 50925.78 | 0.5115 | 0.4494 |
| 7B | 8 | 2/15/2013 15:09 | 1 | 17556 | 17556.00 | 97.0% | 18107.00 | 50927.83 | 0.3555 | 0.4206 |
| 7C | 1 | 2/15/2013 14:54 | 1 | 23070 | 23070.00 | 100.0% | 23070.00 | 50934.94 | 0.4529 | 0.5213 |

| Raw Count Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| 7C | 2 | 2/15/2013 14:52 | 1 | 24941 | 24941.00 | 98.7% | 25268.80 | 50936.26 | 0.4961 | 0.5165 |
| 7C | 3 | 2/15/2013 14:41 | 1 | 25992 | 25992.00 | 97.3% | 26715.26 | 50941.51 | 0.5244 | 0.5063 |
| 7C | 4 | 2/15/2013 14:57 | 1 | 25550 | 25550.00 | 93.6% | 27289.25 | 50933.71 | 0.5358 | 0.5020 |
| 7C | 5 | 2/15/2013 15:09 | 1 | 26073 | 26073.00 | 95.2% | 27394.03 | 50927.78 | 0.5379 | 0.4864 |
| 7C | 6 | 2/15/2013 15:06 | 1 | 23471 | 23471.00 | 99.3% | 23644.37 | 50929.17 | 0.4643 | 0.4741 |
| 7C | 7 | 2/15/2013 15:00 | 1 | 25731 | 25731.00 | 100.0% | 25731.00 | 50932.34 | 0.5052 | 0.4470 |
| 7C | 8 | 2/15/2013 15:13 | 1 | 17544 | 17544.00 | 97.0% | 18094.62 | 50925.73 | 0.3553 | 0.4184 |
| 7D | 1 | 2/15/2013 14:57 | 1 | 22969 | 22969.00 | 100.0% | 22969.00 | 50933.67 | 0.4510 | 0.5216 |
| 7D | 2 | 2/15/2013 14:54 | 1 | 25017 | 25017.00 | 98.7% | 25345.79 | 50934.88 | 0.4976 | 0.5168 |
| 7D | 3 | 2/15/2013 14:52 | 1 | 26248 | 26248.00 | 97.3% | 26978.38 | 50936.26 | 0.5296 | 0.5067 |
| 7D | 4 | 2/15/2013 14:41 | 1 | 25375 | 25375.00 | 93.6% | 27102.33 | 50941.33 | 0.5320 | 0.5025 |
| 7D | 5 | 2/15/2013 15:14 | 1 | 25995 | 25995.00 | 95.2% | 27312.08 | 50925.62 | 0.5363 | 0.4870 |
| 7D | 6 | 2/15/2013 15:09 | 1 | 23670 | 23670.00 | 99.3% | 23844.84 | 50927.74 | 0.4682 | 0.4748 |
| 7D | 7 | 2/15/2013 15:06 | 1 | 25810 | 25810.00 | 100.0% | 25810.00 | 50929.13 | 0.5068 | 0.4479 |
| 7D | 8 | 2/15/2013 15:00 | 1 | 17546 | 17546.00 | 97.0% | 18096.68 | 50932.31 | 0.3553 | 0.4195 |
| 8A | 1 | 2/15/2013 15:00 | 1 | 22652 | 22652.00 | 100.0% | 22652.00 | 50932.27 | 0.4447 | 0.5143 |
| 8A | 2 | 2/15/2013 15:14 | 1 | 24637 | 24637.00 | 98.7% | 24960.80 | 50925.54 | 0.4901 | 0.5098 |
| 8A | 3 | 2/15/2013 15:09 | 1 | 25565 | 25565.00 | 97.3% | 26276.37 | 50927.64 | 0.5160 | 0.5002 |
| 8A | 4 | 2/15/2013 15:07 | 1 | 25423 | 25423.00 | 93.6% | 27153.60 | 50929.02 | 0.5332 | 0.4962 |
| 8A | 5 | 2/15/2013 14:45 | 1 | 25896 | 25896.00 | 95.2% | 27208.06 | 50939.61 | 0.5341 | 0.4814 |
| 8A | 6 | 2/15/2013 14:57 | 1 | 23169 | 23169.00 | 99.3% | 23340.13 | 50933.62 | 0.4582 | 0.4698 |
| 8A | 7 | 2/15/2013 14:55 | 1 | 25611 | 25611.00 | 100.0% | 25611.00 | 50934.81 | 0.5028 | 0.4443 |
| 8A | 8 | 2/15/2013 14:52 | 1 | 17494 | 17494.00 | 97.0% | 18043.05 | 50936.23 | 0.3542 | 0.4174 |
| 8B | 1 | 2/15/2013 15:07 | 1 | 22319 | 22319.00 | 100.0% | 22319.00 | 50928.99 | 0.4382 | 0.5087 |
| 8B | 2 | 2/15/2013 15:00 | 1 | 24615 | 24615.00 | 98.7% | 24938.51 | 50932.22 | 0.4896 | 0.5037 |
| 8B | 3 | 2/15/2013 15:14 | 1 | 25451 | 25451.00 | 97.3% | 26159.20 | 50925.42 | 0.5137 | 0.4931 |
| 8B | 4 | 2/15/2013 15:09 | 1 | 24461 | 24461.00 | 93.6% | 26126.12 | 50927.61 | 0.5130 | 0.4888 |
| 8B | 5 | 2/15/2013 14:52 | 1 | 25258 | 25258.00 | 95.2% | 26537.74 | 50936.18 | 0.5210 | 0.4727 |
| 8B | 6 | 2/15/2013 14:45 | 1 | 22990 | 22990.00 | 99.3% | 23159.81 | 50939.55 | 0.4547 | 0.4600 |
| 8B | 7 | 2/15/2013 14:57 | 1 | 25222 | 25222.00 | 100.0% | 25222.00 | 50933.57 | 0.4952 | 0.4320 |
| 8B | 8 | 2/15/2013 14:55 | 1 | 16601 | 16601.00 | 97.0% | 17122.02 | 50934.75 | 0.3362 | 0.4026 |
| 8C | 1 | 2/15/2013 15:10 | 1 | 22927 | 22927.00 | 100.0% | 22927.00 | 50927.57 | 0.4502 | 0.5208 |
| 8C | 2 | 2/15/2013 15:07 | 1 | 25010 | 25010.00 | 98.7% | 25338.70 | 50928.95 | 0.4975 | 0.5164 |
| 8C | 3 | 2/15/2013 15:00 | 1 | 26237 | 26237.00 | 97.3% | 26967.07 | 50932.19 | 0.5295 | 0.5068 |
| 8C | 4 | 2/15/2013 15:14 | 1 | 25433 | 25433.00 | 93.6% | 27164.28 | 50925.42 | 0.5334 | 0.5029 |
| 8C | 5 | 2/15/2013 14:55 | 1 | 26120 | 26120.00 | 95.2% | 27443.41 | 50934.67 | 0.5388 | 0.4883 |
| 8C | 6 | 2/15/2013 14:52 | 1 | 23608 | 23608.00 | 99.3% | 23782.38 | 50936.11 | 0.4669 | 0.4768 |
| 8C | 7 | 2/15/2013 14:45 | 1 | 26024 | 26024.00 | 100.0% | 26024.00 | 50939.45 | 0.5109 | 0.4516 |
| 8C | 8 | 2/15/2013 14:57 | 1 | 17848 | 17848.00 | 97.0% | 18408.16 | 50933.53 | 0.3614 | 0.4249 |
| 8D | 1 | 2/15/2013 15:14 | 1 | 23697 | 23697.00 | 100.0% | 23697.00 | 50925.42 | 0.4653 | 0.5332 |
| 8D | 2 | 2/15/2013 15:10 | 1 | 25697 | 25697.00 | 98.7% | 26034.73 | 50927.53 | 0.5112 | 0.5284 |
| 8D | 3 | 2/15/2013 15:07 | 1 | 26831 | 26831.00 | 97.3% | 27577.60 | 50928.92 | 0.5415 | 0.5182 |
| 8D | 4 | 2/15/2013 15:00 | 1 | 26060 | 26060.00 | 93.6% | 27833.96 | 50932.14 | 0.5465 | 0.5139 |
| 8D | 5 | 2/15/2013 14:57 | 1 | 26234 | 26234.00 | 95.2% | 27563.19 | 50933.49 | 0.5412 | 0.4983 |
| 8D | 6 | 2/15/2013 14:55 | 1 | 23718 | 23718.00 | 99.3% | 23893.19 | 50934.64 | 0.4691 | 0.4859 |
| 8D | 7 | 2/15/2013 14:52 | 1 | 26787 | 26787.00 | 100.0% | 26787.00 | 50936.06 | 0.5259 | 0.4588 |
| 8D | 8 | 2/15/2013 14:45 | 1 | 18085 | 18085.00 | 97.0% | 18652.60 | 50939.40 | 0.3662 | 0.4302 |
| 9A | 1 | 2/15/2013 12:54 | 1 | 23046 | 23046.00 | 100.0% | 23046.00 | 50993.19 | 0.4519 | 0.5206 |
| 9A | 2 | 2/15/2013 13:04 | 1 | 25056 | 25056.00 | 98.7% | 25385.31 | 50988.47 | 0.4979 | 0.5173 |
| 9A | 3 | 2/15/2013 13:00 | 1 | 26656 | 26656.00 | 97.3% | 27397.73 | 50990.45 | 0.5373 | 0.5103 |
| 9A | 4 | 2/15/2013 12:57 | 1 | 25929 | 25929.00 | 93.6% | 27694.05 | 50991.87 | 0.5431 | 0.5074 |
| 9A | 5 | 2/15/2013 13:07 | 1 | 26267 | 26267.00 | 95.2% | 27597.86 | 50987.08 | 0.5413 | 0.4968 |
| 9A | 6 | 2/15/2013 13:17 | 1 | 23993 | 23993.00 | 99.3% | 24170.22 | 50982.11 | 0.4741 | 0.4883 |
| 9A | 7 | 2/15/2013 13:14 | 1 | 26420 | 26420.00 | 100.0% | 26420.00 | 50983.52 | 0.5182 | 0.4698 |
| 9A | 8 | 2/15/2013 13:10 | 1 | 19631 | 19631.00 | 97.0% | 20247.12 | 50985.51 | 0.3971 | 0.4503 |
| 9B | 1 | 2/15/2013 12:57 | 1 | 22752 | 22752.00 | 100.0% | 22752.00 | 50991.83 | 0.4462 | 0.5071 |
| 9B | 2 | 2/15/2013 12:54 | 1 | 24464 | 24464.00 | 98.7% | 24785.53 | 50993.19 | 0.4861 | 0.5039 |
| 9B | 3 | 2/15/2013 13:04 | 1 | 25548 | 25548.00 | 97.3% | 26258.90 | 50988.45 | 0.5150 | 0.4971 |
| 9B | 4 | 2/15/2013 13:00 | 1 | 25161 | 25161.00 | 93.6% | 26873.77 | 50990.41 | 0.5270 | 0.4943 |
| 9B | 5 | 2/15/2013 13:10 | 1 | 25785 | 25785.00 | 95.2% | 27091.44 | 50985.46 | 0.5314 | 0.4839 |
| 9B | 6 | 2/15/2013 13:07 | 1 | 23221 | 23221.00 | 99.3% | 23392.52 | 50987.03 | 0.4588 | 0.4757 |
| 9B | 7 | 2/15/2013 13:17 | 1 | 25852 | 25852.00 | 100.0% | 25852.00 | 50982.05 | 0.5071 | 0.4577 |
| 9B | 8 | 2/15/2013 13:14 | 1 | 19119 | 19119.00 | 97.0% | 19719.05 | 50983.48 | 0.3868 | 0.4387 |
| 9C | 1 | 2/15/2013 13:00 | 1 | 22898 | 22898.00 | 100.0% | 22898.00 | 50990.37 | 0.4491 | 0.5117 |
| 9C | 2 | 2/15/2013 12:57 | 1 | 24745 | 24745.00 | 98.7% | 25070.22 | 50991.71 | 0.4917 | 0.5084 |
| 9C | 3 | 2/15/2013 12:54 | 1 | 25810 | 25810.00 | 97.3% | 26528.19 | 50993.19 | 0.5202 | 0.5015 |
| 9C | 4 | 2/15/2013 13:04 | 1 | 25450 | 25450.00 | 93.6% | 27182.44 | 50988.39 | 0.5331 | 0.4986 |
| 9C | 5 | 2/15/2013 13:14 | 1 | 26012 | 26012.00 | 95.2% | 27329.94 | 50983.43 | 0.5361 | 0.4880 |
| 9C | 6 | 2/15/2013 13:10 | 1 | 23438 | 23438.00 | 99.3% | 23611.12 | 50985.41 | 0.4631 | 0.4797 |
| 9C | 7 | 2/15/2013 13:07 | 1 | 25678 | 25678.00 | 100.0% | 25678.00 | 50986.97 | 0.5036 | 0.4613 |
| 9C | 8 | 2/15/2013 13:17 | 1 | 19493 | 19493.00 | 97.0% | 20104.79 | 50982.00 | 0.3944 | 0.4420 |
| 9D | 1 | 2/15/2013 13:04 | 1 | 22005 | 22005.00 | 100.0% | 22005.00 | 50988.37 | 0.4316 | 0.4903 |
| 9D | 2 | 2/15/2013 13:00 | 1 | 23660 | 23660.00 | 98.7% | 23970.96 | 50990.33 | 0.4701 | 0.4874 |
| 9D | 3 | 2/15/2013 12:58 | 1 | 24728 | 24728.00 | 97.3% | 25416.08 | 50991.64 | 0.4984 | 0.4814 |
| 9D | 4 | 2/15/2013 12:54 | 1 | 24408 | 24408.00 | 93.6% | 26069.51 | 50993.19 | 0.5112 | 0.4789 |
| 9D | 5 | 2/15/2013 13:18 | 1 | 24915 | 24915.00 | 95.2% | 26177.36 | 50981.96 | 0.5135 | 0.4697 |

| Raw Count Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| 9D | 6 | 2/15/2013 13:15 | 1 | 22693 | 22693.00 | 99.3% | 22860.62 | 50983.38 | 0.4484 | 0.4624 |
| 9D | 7 | 2/15/2013 13:10 | 1 | 25159 | 25159.00 | 100.0% | 25159.00 | 50985.39 | 0.4935 | 0.4465 |
| 9D | 8 | 2/15/2013 13:07 | 1 | 18766 | 18766.00 | 97.0% | 19354.97 | 50986.91 | 0.3796 | 0.4297 |
| 10A | 1 | 2/15/2013 13:07 | 1 | 22993 | 22993.00 | 100.0% | 22993.00 | 50986.88 | 0.4510 | 0.5156 |
| 10A | 2 | 2/15/2013 13:18 | 1 | 24908 | 24908.00 | 98.7% | 25235.36 | 50981.83 | 0.4950 | 0.5124 |
| 10A | 3 | 2/15/2013 13:15 | 1 | 25972 | 25972.00 | 97.3% | 26694.70 | 50983.34 | 0.5236 | 0.5056 |
| 10A | 4 | 2/15/2013 13:11 | 1 | 25551 | 25551.00 | 93.6% | 27290.32 | 50985.34 | 0.5353 | 0.5028 |
| 10A | 5 | 2/15/2013 12:54 | 1 | 26172 | 26172.00 | 95.2% | 27498.05 | 50993.17 | 0.5392 | 0.4923 |
| 10A | 6 | 2/15/2013 13:04 | 1 | 24100 | 24100.00 | 99.3% | 24278.01 | 50988.32 | 0.4761 | 0.4841 |
| 10A | 7 | 2/15/2013 13:00 | 1 | 26093 | 26093.00 | 100.0% | 26093.00 | 50990.27 | 0.5117 | 0.4661 |
| 10A | 8 | 2/15/2013 12:58 | 1 | 19475 | 19475.00 | 97.0% | 20086.22 | 50991.60 | 0.3939 | 0.4470 |
| 10B | 1 | 2/15/2013 13:11 | 1 | 22828 | 22828.00 | 100.0% | 22828.00 | 50985.31 | 0.4477 | 0.5123 |
| 10B | 2 | 2/15/2013 13:07 | 1 | 24594 | 24594.00 | 98.7% | 24917.24 | 50986.84 | 0.4887 | 0.5090 |
| 10B | 3 | 2/15/2013 13:18 | 1 | 25749 | 25749.00 | 97.3% | 26465.49 | 50981.83 | 0.5191 | 0.5020 |
| 10B | 4 | 2/15/2013 13:15 | 1 | 25497 | 25497.00 | 93.6% | 27232.64 | 50983.30 | 0.5341 | 0.4991 |
| 10B | 5 | 2/15/2013 12:58 | 1 | 26074 | 26074.00 | 95.2% | 27395.08 | 50991.54 | 0.5372 | 0.4883 |
| 10B | 6 | 2/15/2013 12:54 | 1 | 23956 | 23956.00 | 99.3% | 24132.95 | 50993.17 | 0.4733 | 0.4798 |
| 10B | 7 | 2/15/2013 13:05 | 1 | 25717 | 25717.00 | 100.0% | 25717.00 | 50988.27 | 0.5044 | 0.4611 |
| 10B | 8 | 2/15/2013 13:00 | 1 | 19206 | 19206.00 | 97.0% | 19808.78 | 50990.23 | 0.3885 | 0.4414 |
| 10C | 1 | 2/15/2013 13:15 | 1 | 22920 | 22920.00 | 100.0% | 22920.00 | 50983.26 | 0.4496 | 0.5136 |
| 10C | 2 | 2/15/2013 13:11 | 1 | 24784 | 24784.00 | 98.7% | 25109.73 | 50985.27 | 0.4925 | 0.5104 |
| 10C | 3 | 2/15/2013 13:08 | 1 | 25610 | 25610.00 | 97.3% | 26322.63 | 50986.80 | 0.5163 | 0.5038 |
| 10C | 4 | 2/15/2013 13:18 | 1 | 25623 | 25623.00 | 93.6% | 27367.22 | 50981.83 | 0.5368 | 0.5010 |
| 10C | 5 | 2/15/2013 13:01 | 1 | 26296 | 26296.00 | 95.2% | 27628.33 | 50990.18 | 0.5418 | 0.4908 |
| 10C | 6 | 2/15/2013 12:58 | 1 | 23777 | 23777.00 | 99.3% | 23952.63 | 50991.49 | 0.4697 | 0.4827 |
| 10C | 7 | 2/15/2013 12:54 | 1 | 26396 | 26396.00 | 100.0% | 26396.00 | 50993.17 | 0.5176 | 0.4650 |
| 10C | 8 | 2/15/2013 13:05 | 1 | 19243 | 19243.00 | 97.0% | 19846.94 | 50988.24 | 0.3892 | 0.4463 |
| 10D | 1 | 2/15/2013 13:18 | 1 | 22791 | 22791.00 | 100.0% | 22791.00 | 50981.78 | 0.4470 | 0.5126 |
| 10D | 2 | 2/15/2013 13:15 | 1 | 24951 | 24951.00 | 98.7% | 25278.93 | 50983.22 | 0.4958 | 0.5097 |
| 10D | 3 | 2/15/2013 13:11 | 1 | 26000 | 26000.00 | 97.3% | 26723.48 | 50985.23 | 0.5241 | 0.5037 |
| 10D | 4 | 2/15/2013 13:08 | 1 | 25540 | 25540.00 | 93.6% | 27278.57 | 50986.75 | 0.5350 | 0.5012 |
| 10D | 5 | 2/15/2013 13:05 | 1 | 25889 | 25889.00 | 95.2% | 27200.71 | 50988.18 | 0.5335 | 0.4919 |
| 10D | 6 | 2/15/2013 13:01 | 1 | 23854 | 23854.00 | 99.3% | 24030.19 | 50990.14 | 0.4713 | 0.4846 |
| 10D | 7 | 2/15/2013 12:58 | 1 | 26394 | 26394.00 | 100.0% | 26394.00 | 50991.44 | 0.5176 | 0.4686 |
| 10D | 8 | 2/15/2013 12:54 | 1 | 19760 | 19760.00 | 97.0% | 20380.17 | 50993.17 | 0.3997 | 0.4517 |
| 11A | 1 | 2/15/2013 12:26 | 1 | 19465 | 19465.00 | 100.0% | 19465.00 | 51007.16 | 0.3816 | 0.4304 |
| 11A | 2 | 2/15/2013 12:37 | 1 | 20978 | 20978.00 | 98.7% | 21253.71 | 51001.72 | 0.4167 | 0.4286 |
| 11A | 3 | 2/15/2013 12:34 | 1 | 21798 | 21798.00 | 97.3% | 22404.55 | 51003.25 | 0.4393 | 0.4248 |
| 11A | 4 | 2/15/2013 12:30 | 1 | 21585 | 21585.00 | 93.6% | 23054.34 | 51004.95 | 0.4520 | 0.4233 |
| 11A | 5 | 2/15/2013 12:39 | 1 | 22052 | 22052.00 | 95.2% | 23169.30 | 51000.53 | 0.4543 | 0.4174 |
| 11A | 6 | 2/15/2013 12:48 | 1 | 20207 | 20207.00 | 99.3% | 20356.26 | 50996.49 | 0.3992 | 0.4128 |
| 11A | 7 | 2/15/2013 12:45 | 1 | 21925 | 21925.00 | 100.0% | 21925.00 | 50997.59 | 0.4299 | 0.4028 |
| 11A | 8 | 2/15/2013 12:43 | 1 | 17769 | 17769.00 | 97.0% | 18326.68 | 50998.96 | 0.3594 | 0.3921 |
| 11B | 1 | 2/15/2013 12:30 | 1 | 22955 | 22955.00 | 100.0% | 22955.00 | 51004.91 | 0.4501 | 0.5077 |
| 11B | 2 | 2/15/2013 12:26 | 1 | 24624 | 24624.00 | 98.7% | 24947.63 | 51007.09 | 0.4891 | 0.5053 |
| 11B | 3 | 2/15/2013 12:37 | 1 | 25818 | 25818.00 | 97.3% | 26536.41 | 51001.67 | 0.5203 | 0.5002 |
| 11B | 4 | 2/15/2013 12:34 | 1 | 25455 | 25455.00 | 93.6% | 27187.78 | 51003.21 | 0.5331 | 0.4981 |
| 11B | 5 | 2/15/2013 12:43 | 1 | 25722 | 25722.00 | 95.2% | 27025.25 | 50998.90 | 0.5299 | 0.4902 |
| 11B | 6 | 2/15/2013 12:39 | 1 | 23486 | 23486.00 | 99.3% | 23659.48 | 51000.49 | 0.4639 | 0.4841 |
| 11B | 7 | 2/15/2013 12:48 | 1 | 26243 | 26243.00 | 100.0% | 26243.00 | 50996.44 | 0.5146 | 0.4705 |
| 11B | 8 | 2/15/2013 12:45 | 1 | 20341 | 20341.00 | 97.0% | 20979.40 | 50997.52 | 0.4114 | 0.4562 |
| 11C | 1 | 2/15/2013 12:34 | 1 | 22849 | 22849.00 | 100.0% | 22849.00 | 51003.17 | 0.4480 | 0.5084 |
| 11C | 2 | 2/15/2013 12:30 | 1 | 24747 | 24747.00 | 98.7% | 25072.25 | 51004.83 | 0.4916 | 0.5055 |
| 11C | 3 | 2/15/2013 12:26 | 1 | 25794 | 25794.00 | 97.3% | 26511.75 | 51007.04 | 0.5198 | 0.4994 |
| 11C | 4 | 2/15/2013 12:37 | 1 | 25259 | 25259.00 | 93.6% | 26978.44 | 51001.63 | 0.5290 | 0.4969 |
| 11C | 5 | 2/15/2013 12:46 | 1 | 25754 | 25754.00 | 95.2% | 27058.87 | 50997.48 | 0.5306 | 0.4876 |
| 11C | 6 | 2/15/2013 12:43 | 1 | 23292 | 23292.00 | 99.3% | 23464.04 | 50998.79 | 0.4601 | 0.4803 |
| 11C | 7 | 2/15/2013 12:39 | 1 | 26032 | 26032.00 | 100.0% | 26032.00 | 51000.45 | 0.5104 | 0.4642 |
| 11C | 8 | 2/15/2013 12:48 | 1 | 19787 | 19787.00 | 97.0% | 20408.02 | 50996.40 | 0.4002 | 0.4472 |
| 11D | 1 | 2/15/2013 12:37 | 1 | 23032 | 23032.00 | 100.0% | 23032.00 | 51001.60 | 0.4516 | 0.5100 |
| 11D | 2 | 2/15/2013 12:34 | 1 | 24975 | 24975.00 | 98.7% | 25303.24 | 51003.13 | 0.4961 | 0.5079 |
| 11D | 3 | 2/15/2013 12:31 | 1 | 26164 | 26164.00 | 97.3% | 26892.04 | 51004.78 | 0.5272 | 0.5036 |
| 11D | 4 | 2/15/2013 12:26 | 1 | 25392 | 25392.00 | 93.6% | 27120.49 | 51006.98 | 0.5317 | 0.5018 |
| 11D | 5 | 2/15/2013 12:48 | 1 | 26139 | 26139.00 | 95.2% | 27463.38 | 50996.36 | 0.5385 | 0.4951 |
| 11D | 6 | 2/15/2013 12:46 | 1 | 23587 | 23587.00 | 99.3% | 23761.22 | 50997.43 | 0.4659 | 0.4899 |
| 11D | 7 | 2/15/2013 12:43 | 1 | 26126 | 26126.00 | 100.0% | 26126.00 | 50998.71 | 0.5123 | 0.4784 |
| 11D | 8 | 2/15/2013 12:40 | 1 | 21236 | 21236.00 | 97.0% | 21902.49 | 51000.41 | 0.4295 | 0.4662 |
| 12B | 1 | 2/15/2013 12:43 | 1 | 11423 | 11423.00 | 100.0% | 11423.00 | 50998.62 | 0.2240 | 0.2534 |
| 12B | 2 | 2/15/2013 12:40 | 1 | 12283 | 12283.00 | 98.7% | 12444.43 | 51000.35 | 0.2440 | 0.2527 |
| 12B | 3 | 2/15/2013 12:48 | 1 | 13000 | 13000.00 | 97.3% | 13361.74 | 50996.30 | 0.2620 | 0.2511 |
| 12B | 4 | 2/15/2013 12:46 | 1 | 12474 | 12474.00 | 93.6% | 13323.13 | 50997.35 | 0.2613 | 0.2505 |
| 12B | 5 | 2/15/2013 12:31 | 1 | 13323 | 13323.00 | 95.2% | 13998.03 | 51004.70 | 0.2744 | 0.2481 |
| 12B | 6 | 2/15/2013 12:26 | 1 | 12524 | 12524.00 | 99.3% | 12616.51 | 51006.87 | 0.2473 | 0.2462 |
| 12B | 7 | 2/15/2013 12:37 | 1 | 12656 | 12656.00 | 100.0% | 12656.00 | 51001.51 | 0.2481 | 0.2421 |
| 12B | 8 | 2/15/2013 12:35 | 1 | 10909 | 10909.00 | 97.0% | 11251.38 | 51002.78 | 0.2206 | 0.2377 |
| 12C | 1 | 2/15/2013 12:46 | 1 | 10621 | 10621.00 | 100.0% | 10621.00 | 50997.31 | 0.2083 | 0.2324 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12C | 2 | 2/15/2013 12:43 | 1 | 10886 | 10886.00 | 98.7% | 11029.07 | 50998.58 | 0.2163 | 0.2293 |
| 12C | 3 | 2/15/2013 12:40 | 1 | 10093 | 10093.00 | 97.3% | 10373.85 | 51000.32 | 0.2034 | 0.2226 |
| 12C | 4 | 2/15/2013 12:48 | 1 | 12768 | 12768.00 | 93.6% | 13637.15 | 50996.26 | 0.2674 | 0.2199 |
| 12C | 5 | 2/15/2013 12:35 | 1 | 11356 | 11356.00 | 95.2% | 11931.37 | 51002.73 | 0.2339 | 0.2097 |
| 12C | 6 | 2/15/2013 12:31 | 1 | 10436 | 10436.00 | 99.3% | 10513.08 | 51004.66 | 0.2061 | 0.2017 |
| 12C | 7 | 2/15/2013 12:26 | 1 | 8655 | 8655.00 | 100.0% | 8655.00 | 51006.80 | 0.1697 | 0.1841 |
| 12C | 8 | 2/15/2013 12:37 | 1 | 7925 | 7925.00 | 97.0% | 8173.73 | 51001.47 | 0.1603 | 0.1655 |
| 12D | 1 | 2/15/2013 12:48 | 1 | 22275 | 22275.00 | 100.0% | 22275.00 | 50996.21 | 0.4368 | 0.4874 |
| 12D | 2 | 2/15/2013 12:46 | 1 | 23929 | 23929.00 | 98.7% | 24243.50 | 50997.26 | 0.4754 | 0.4857 |
| 12D | 3 | 2/15/2013 12:43 | 1 | 24816 | 24816.00 | 97.3% | 25506.53 | 50998.52 | 0.5001 | 0.4823 |
| 12D | 4 | 2/15/2013 12:40 | 1 | 24308 | 24308.00 | 93.6% | 25962.70 | 51000.28 | 0.5091 | 0.4809 |
| 12D | 5 | 2/15/2013 12:37 | 1 | 25022 | 25022.00 | 95.2% | 26289.78 | 51001.42 | 0.5155 | 0.4756 |
| 12D | 6 | 2/15/2013 12:35 | 1 | 22695 | 22695.00 | 99.3% | 22862.63 | 51002.67 | 0.4483 | 0.4715 |
| 12D | 7 | 2/15/2013 12:31 | 1 | 25156 | 25156.00 | 100.0% | 25156.00 | 51004.58 | 0.4932 | 0.4624 |
| 12D | 8 | 2/15/2013 12:27 | 1 | 20790 | 20790.00 | 97.0% | 21442.50 | 51006.74 | 0.4204 | 0.4528 |
| 13A | 1 | 2/15/2013 11:39 | 1 | 22743 | 22743.00 | 100.0% | 22743.00 | 51030.02 | 0.4457 | 0.5033 |
| 13A | 2 | 2/15/2013 11:49 | 1 | 24809 | 24809.00 | 98.7% | 25135.06 | 51024.88 | 0.4926 | 0.5019 |
| 13A | 3 | 2/15/2013 11:47 | 1 | 26030 | 26030.00 | 97.3% | 26754.31 | 51025.93 | 0.5243 | 0.4988 |
| 13A | 4 | 2/15/2013 11:45 | 1 | 25231 | 25231.00 | 93.6% | 26948.53 | 51027.01 | 0.5281 | 0.4976 |
| 13A | 5 | 2/15/2013 12:12 | 1 | 25679 | 25679.00 | 95.2% | 26980.07 | 51013.70 | 0.5289 | 0.4929 |
| 13A | 6 | 2/15/2013 12:22 | 1 | 23601 | 23601.00 | 99.3% | 23775.33 | 51009.16 | 0.4661 | 0.4892 |
| 13A | 7 | 2/15/2013 12:19 | 1 | 26108 | 26108.00 | 100.0% | 26108.00 | 51010.44 | 0.5118 | 0.4810 |
| 13A | 8 | 2/15/2013 12:16 | 1 | 21741 | 21741.00 | 97.0% | 22423.34 | 51011.99 | 0.4396 | 0.4725 |
| 13B | 1 | 2/15/2013 11:45 | 1 | 23326 | 23326.00 | 100.0% | 23326.00 | 51026.99 | 0.4571 | 0.5143 |
| 13B | 2 | 2/15/2013 11:39 | 1 | 25000 | 25000.00 | 98.7% | 25328.57 | 51029.95 | 0.4963 | 0.5129 |
| 13B | 3 | 2/15/2013 11:49 | 1 | 26432 | 26432.00 | 97.3% | 27167.50 | 51024.83 | 0.5324 | 0.5100 |
| 13B | 4 | 2/15/2013 11:47 | 1 | 25874 | 25874.00 | 93.6% | 27635.30 | 51025.87 | 0.5416 | 0.5087 |
| 13B | 5 | 2/15/2013 12:16 | 1 | 26690 | 26690.00 | 95.2% | 28042.29 | 51011.93 | 0.5497 | 0.5042 |
| 13B | 6 | 2/15/2013 12:12 | 1 | 24326 | 24326.00 | 99.3% | 24505.68 | 51013.66 | 0.4804 | 0.5006 |
| 13B | 7 | 2/15/2013 12:22 | 1 | 26586 | 26586.00 | 100.0% | 26586.00 | 51009.10 | 0.5212 | 0.4927 |
| 13B | 8 | 2/15/2013 12:19 | 1 | 22201 | 22201.00 | 97.0% | 22897.78 | 51010.30 | 0.4489 | 0.4843 |
| 13C | 1 | 2/15/2013 11:47 | 1 | 23080 | 23080.00 | 100.0% | 23080.00 | 51025.84 | 0.4523 | 0.5099 |
| 13C | 2 | 2/15/2013 11:45 | 1 | 24850 | 24850.00 | 98.7% | 25176.60 | 51026.95 | 0.4934 | 0.5081 |
| 13C | 3 | 2/15/2013 11:39 | 1 | 26077 | 26077.00 | 97.3% | 26802.62 | 51029.89 | 0.5252 | 0.5041 |
| 13C | 4 | 2/15/2013 11:49 | 1 | 25534 | 25534.00 | 93.6% | 27272.16 | 51024.79 | 0.5345 | 0.5025 |
| 13C | 5 | 2/15/2013 12:19 | 1 | 26440 | 26440.00 | 95.2% | 27779.63 | 51010.25 | 0.5446 | 0.4965 |
| 13C | 6 | 2/15/2013 12:16 | 1 | 23843 | 23843.00 | 99.3% | 24019.11 | 51011.90 | 0.4709 | 0.4917 |
| 13C | 7 | 2/15/2013 12:12 | 1 | 25844 | 25844.00 | 100.0% | 25844.00 | 51013.62 | 0.5066 | 0.4813 |
| 13C | 8 | 2/15/2013 12:22 | 1 | 21603 | 21603.00 | 97.0% | 22281.01 | 51009.05 | 0.4368 | 0.4702 |
| 13D | 1 | 2/15/2013 11:49 | 1 | 22759 | 22759.00 | 100.0% | 22759.00 | 51024.77 | 0.4460 | 0.4983 |
| 13D | 2 | 2/15/2013 11:47 | 1 | 24457 | 24457.00 | 98.7% | 24778.43 | 51025.80 | 0.4856 | 0.4970 |
| 13D | 3 | 2/15/2013 11:45 | 1 | 25628 | 25628.00 | 97.3% | 26341.13 | 51026.90 | 0.5162 | 0.4942 |
| 13D | 4 | 2/15/2013 11:39 | 1 | 25066 | 25066.00 | 93.6% | 26772.30 | 51029.83 | 0.5246 | 0.4930 |
| 13D | 5 | 2/15/2013 12:22 | 1 | 25723 | 25723.00 | 95.2% | 27026.30 | 51009.00 | 0.5298 | 0.4888 |
| 13D | 6 | 2/15/2013 12:19 | 1 | 23187 | 23187.00 | 99.3% | 23358.27 | 51010.21 | 0.4579 | 0.4854 |
| 13D | 7 | 2/15/2013 12:16 | 1 | 25552 | 25552.00 | 100.0% | 25552.00 | 51011.79 | 0.5009 | 0.4780 |
| 13D | 8 | 2/15/2013 12:12 | 1 | 21943 | 21943.00 | 97.0% | 22631.68 | 51013.58 | 0.4436 | 0.4701 |
| 14A | 1 | 2/15/2013 12:12 | 1 | 21875 | 21875.00 | 100.0% | 21875.00 | 51013.88 | 0.4288 | 0.4926 |
| 14A | 2 | 2/15/2013 12:22 | 1 | 24524 | 24524.00 | 98.7% | 24846.32 | 51008.96 | 0.4871 | 0.4919 |
| 14A | 3 | 2/15/2013 12:18 | 1 | 25512 | 25512.00 | 97.3% | 26221.90 | 51010.63 | 0.5140 | 0.4903 |
| 14A | 4 | 2/15/2013 12:16 | 1 | 24999 | 24999.00 | 93.6% | 26700.74 | 51011.71 | 0.5234 | 0.4896 |
| 14A | 5 | 2/15/2013 11:39 | 1 | 25660 | 25660.00 | 95.2% | 26960.11 | 51029.77 | 0.5283 | 0.4872 |
| 14A | 6 | 2/15/2013 11:50 | 1 | 23262 | 23262.00 | 99.3% | 23433.82 | 51024.72 | 0.4593 | 0.4853 |
| 14A | 7 | 2/15/2013 11:47 | 1 | 25922 | 25922.00 | 100.0% | 25922.00 | 51025.75 | 0.5080 | 0.4811 |
| 14A | 8 | 2/15/2013 11:45 | 1 | 22048 | 22048.00 | 97.0% | 22739.98 | 51026.84 | 0.4456 | 0.4767 |
| 14B | 1 | 2/15/2013 12:16 | 1 | 23056 | 23056.00 | 100.0% | 23056.00 | 51011.67 | 0.4520 | 0.5052 |
| 14B | 2 | 2/15/2013 12:12 | 1 | 24712 | 24712.00 | 98.7% | 25036.79 | 51013.83 | 0.4908 | 0.5041 |
| 14B | 3 | 2/15/2013 12:22 | 1 | 25936 | 25936.00 | 97.3% | 26657.70 | 51008.92 | 0.5226 | 0.5020 |
| 14B | 4 | 2/15/2013 12:19 | 1 | 25683 | 25683.00 | 93.6% | 27431.30 | 51010.58 | 0.5378 | 0.5011 |
| 14B | 5 | 2/15/2013 11:45 | 1 | 25954 | 25954.00 | 95.2% | 27269.00 | 51026.78 | 0.5344 | 0.4977 |
| 14B | 6 | 2/15/2013 11:39 | 1 | 23872 | 23872.00 | 99.3% | 24048.33 | 51029.70 | 0.4713 | 0.4951 |
| 14B | 7 | 2/15/2013 11:50 | 1 | 26271 | 26271.00 | 100.0% | 26271.00 | 51024.67 | 0.5149 | 0.4893 |
| 14B | 8 | 2/15/2013 11:48 | 1 | 22456 | 22456.00 | 97.0% | 23160.78 | 51025.67 | 0.4539 | 0.4832 |
| 14C | 1 | 2/15/2013 12:19 | 1 | 22999 | 22999.00 | 100.0% | 22999.00 | 51010.54 | 0.4509 | 0.5104 |
| 14C | 2 | 2/15/2013 12:16 | 1 | 25216 | 25216.00 | 98.7% | 25547.41 | 51011.62 | 0.5008 | 0.5091 |
| 14C | 3 | 2/15/2013 12:12 | 1 | 26170 | 26170.00 | 97.3% | 26898.21 | 51013.79 | 0.5273 | 0.5062 |
| 14C | 4 | 2/15/2013 12:22 | 1 | 25729 | 25729.00 | 93.6% | 27480.43 | 51008.89 | 0.5387 | 0.5050 |
| 14C | 5 | 2/15/2013 11:48 | 1 | 26457 | 26457.00 | 95.2% | 27797.49 | 51025.63 | 0.5448 | 0.5005 |
| 14C | 6 | 2/15/2013 11:45 | 1 | 23806 | 23806.00 | 99.3% | 23981.84 | 51026.73 | 0.4700 | 0.4971 |
| 14C | 7 | 2/15/2013 11:39 | 1 | 26330 | 26330.00 | 100.0% | 26330.00 | 51029.60 | 0.5160 | 0.4894 |
| 14C | 8 | 2/15/2013 11:50 | 1 | 22288 | 22288.00 | 97.0% | 22987.51 | 51024.61 | 0.4505 | 0.4813 |
| 14D | 1 | 2/15/2013 12:22 | 1 | 22297 | 22297.00 | 100.0% | 22297.00 | 51008.86 | 0.4371 | 0.4895 |
| 14D | 2 | 2/15/2013 12:19 | 1 | 24355 | 24355.00 | 98.7% | 24675.09 | 51010.51 | 0.4837 | 0.4890 |
| 14D | 3 | 2/15/2013 12:17 | 1 | 25319 | 25319.00 | 97.3% | 26023.53 | 51011.58 | 0.5101 | 0.4877 |
| 14D | 4 | 2/15/2013 12:12 | 1 | 24492 | 24492.00 | 93.6% | 26159.23 | 51013.75 | 0.5128 | 0.4872 |
| 14D | 5 | 2/15/2013 11:50 | 1 | 25239 | 25239.00 | 95.2% | 26517.78 | 51024.57 | 0.5197 | 0.4853 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yield Corrected Sr-89 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-89 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 14D | 6 | 2/15/2013 11:48 | 1 | 23452 | 23452.00 | 99.3% | 23625.23 | 51025.59 | 0.4630 | 0.4839 |
| 14D | 7 | 2/15/2013 11:45 | 1 | 25637 | 25637.00 | 100.0% | 25637.00 | 51026.68 | 0.5024 | 0.4806 |
| 14D | 8 | 2/15/2013 11:40 | 1 | 22338 | 22338.00 | 97.0% | 23039.08 | 51029.54 | 0.4515 | 0.4772 |

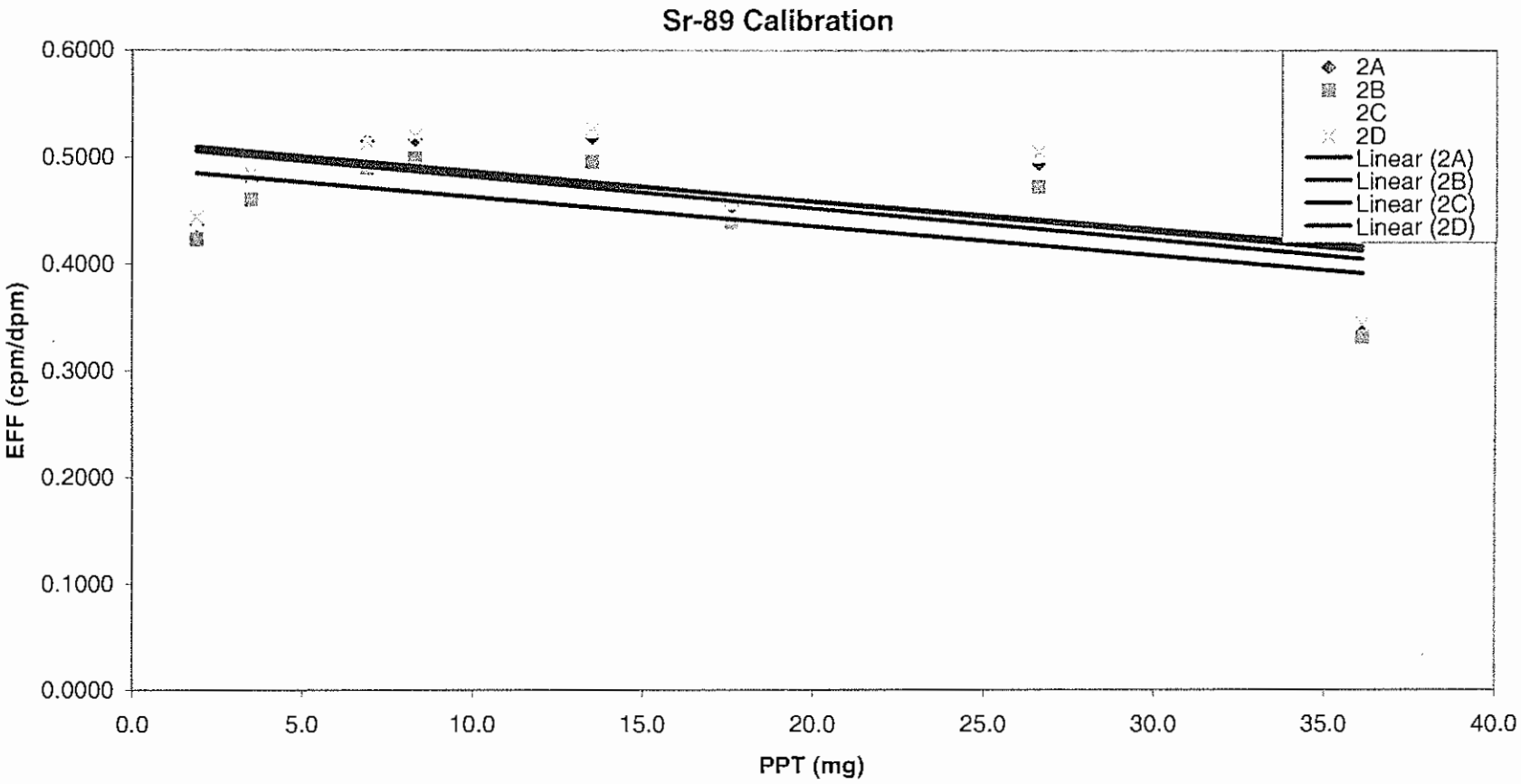



1A y = -3.005961E-03x + 5.200147E-01

1B y = -3.080004E-03x + 5.249165E-01

1C y = -3.366481E-03x + 5.309699E-01

1D y = -3.264044E-03x + 5.286987E-01

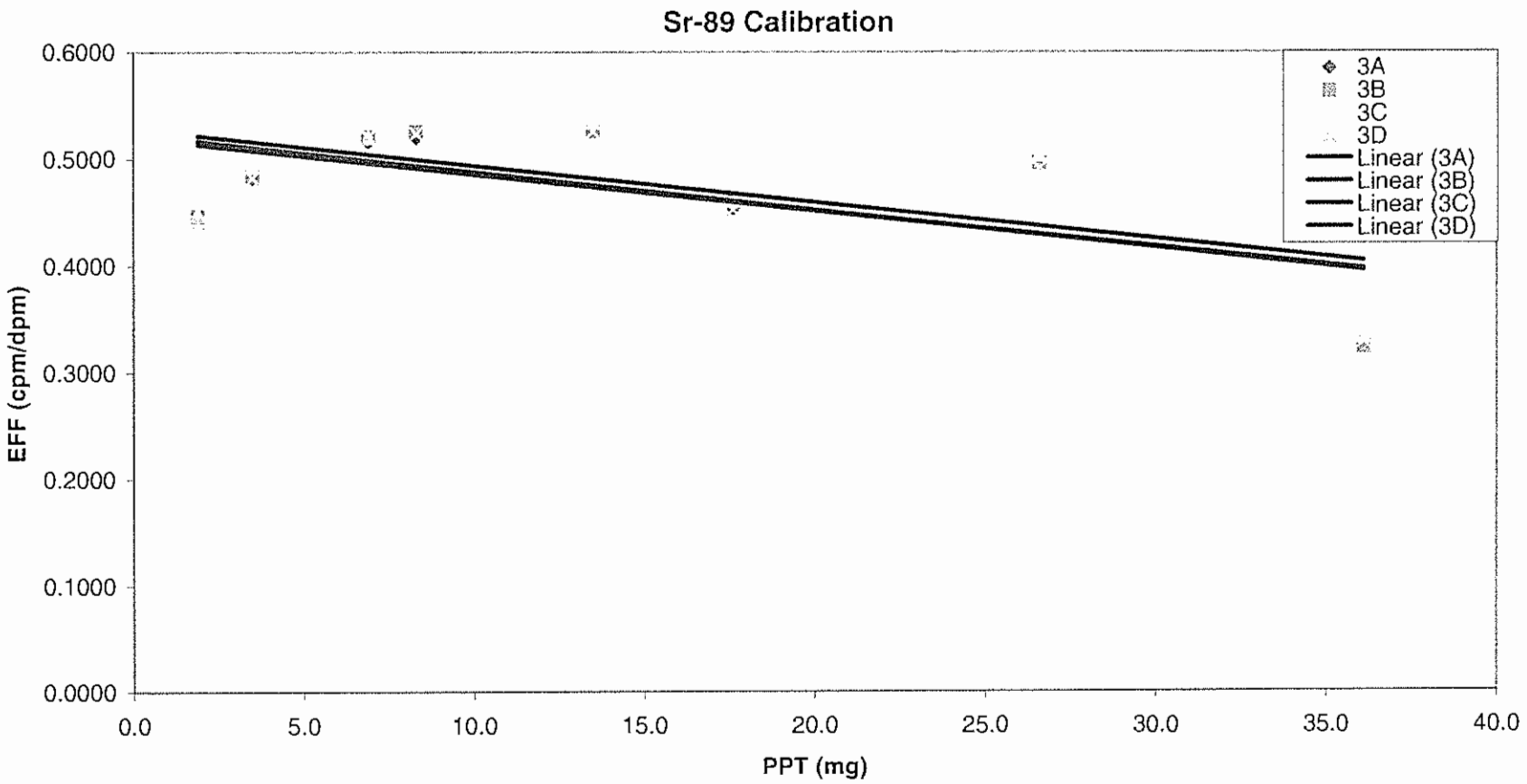



2A $y = -2.928324E-03x + 5.108792E-01$

2B $y = -2.726292E-03x + 4.901900E-01$

2C $y = -2.610435E-03x + 5.110680E-01$

2D $y = -2.840738E-03x + 5.152130E-01$

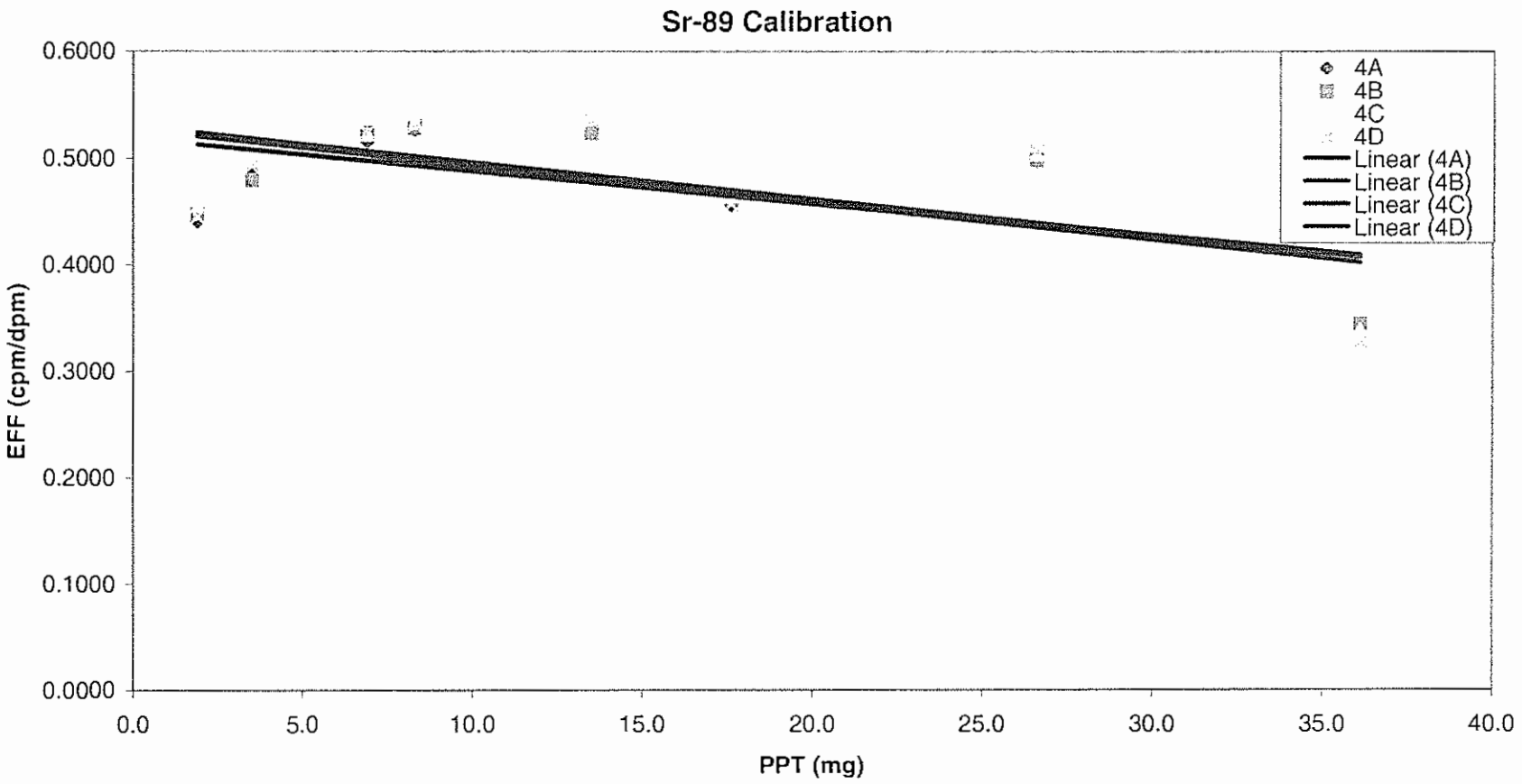



3A y = -3.397329E-03x + 5.200735E-01

3B y = -3.549394E-03x + 5.235380E-01

3C y = -3.425019E-03x + 5.282955E-01

3D y = -3.418573E-03x + 5.198403E-01

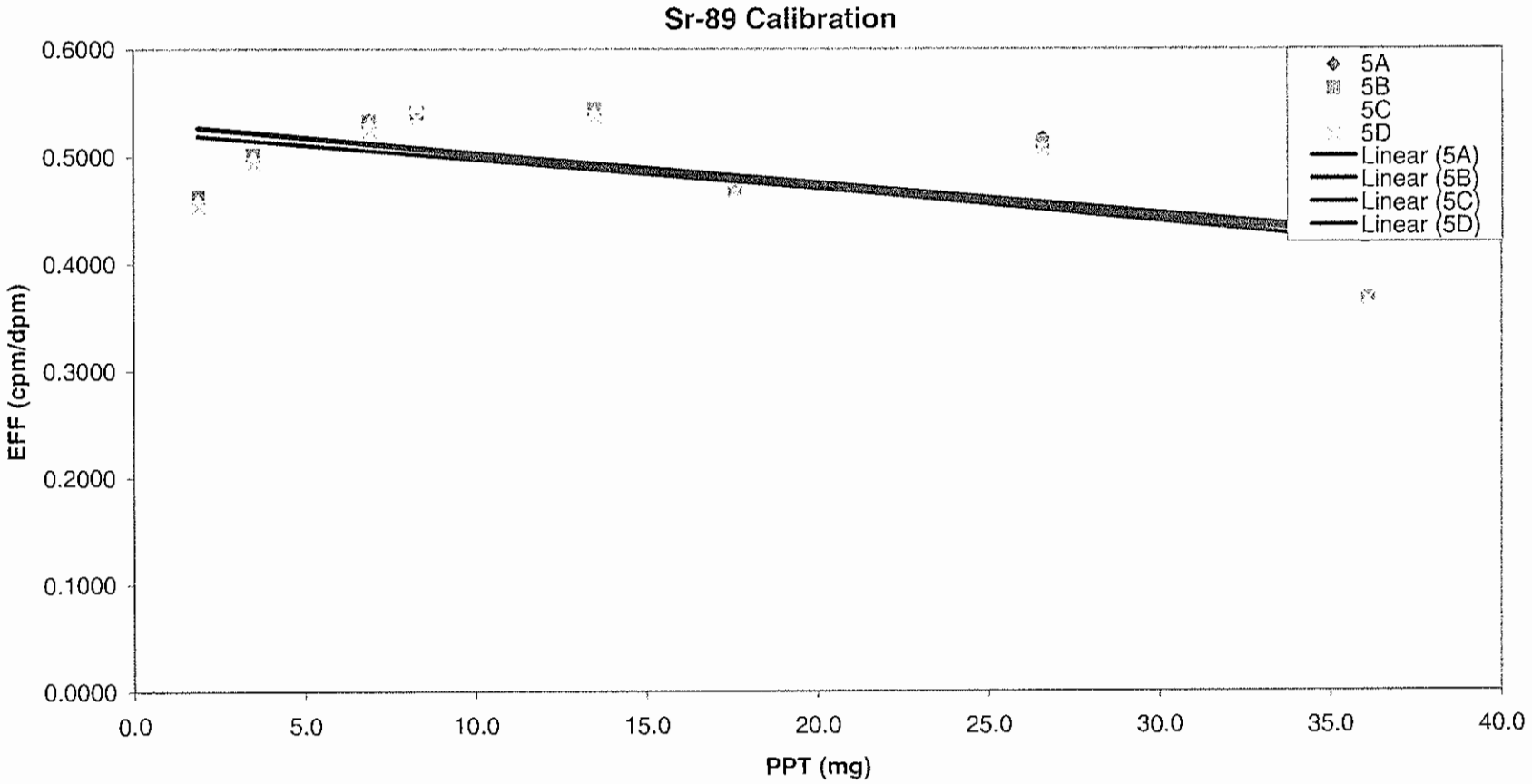



4A y = -3.075203E-03x + 5.186287E-01

4B y = -3.030756E-03x + 5.191729E-01

4C y = -3.419356E-03x + 5.308582E-01

4D y = -3.451883E-03x + 5.270219E-01

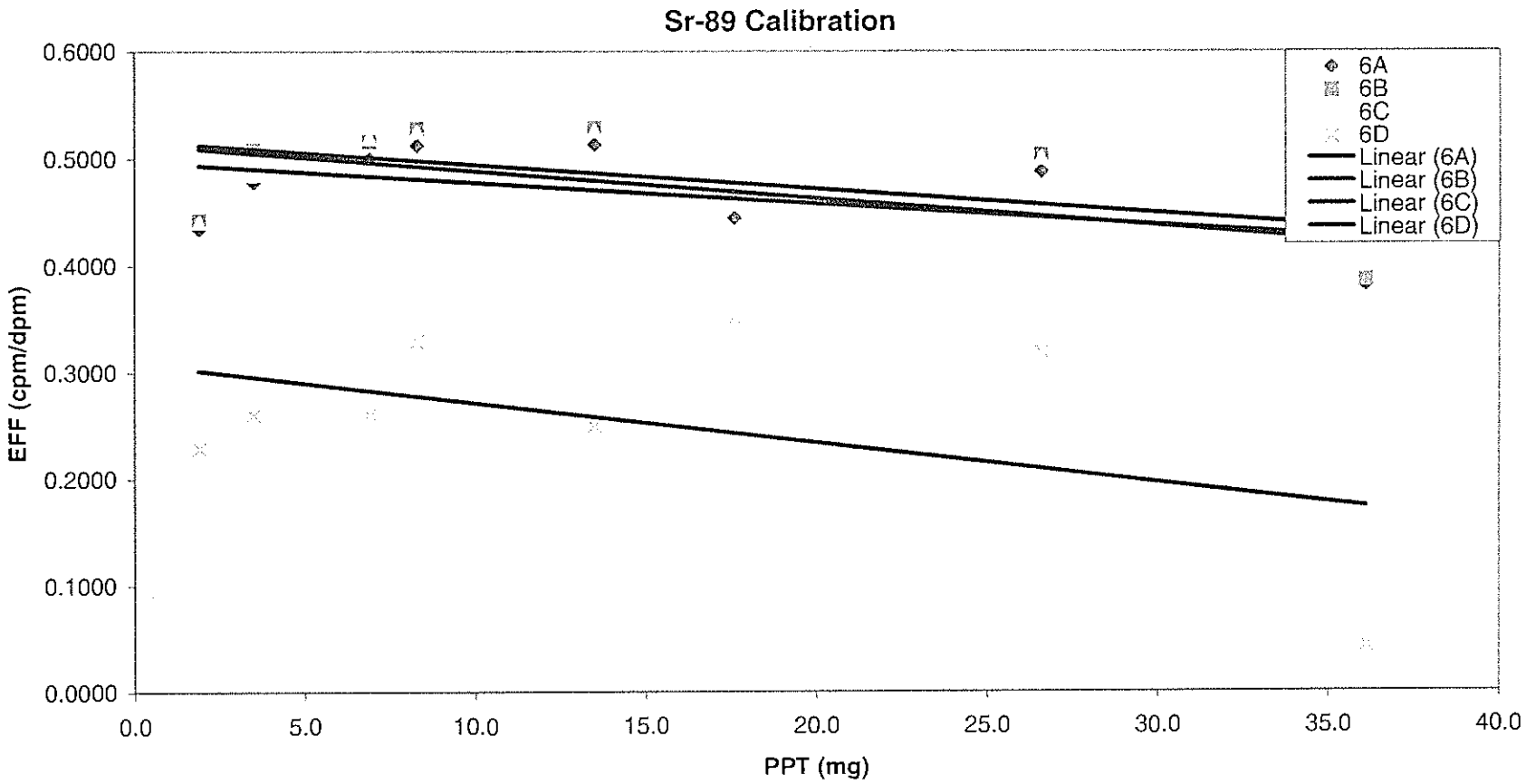



5A y = -2.786676E-03x + 5.316072E-01

5B y = -2.907347E-03x + 5.328835E-01

5C y = -3.085316E-03x + 5.324992E-01

5D y = -2.688295E-03x + 5.241561E-01



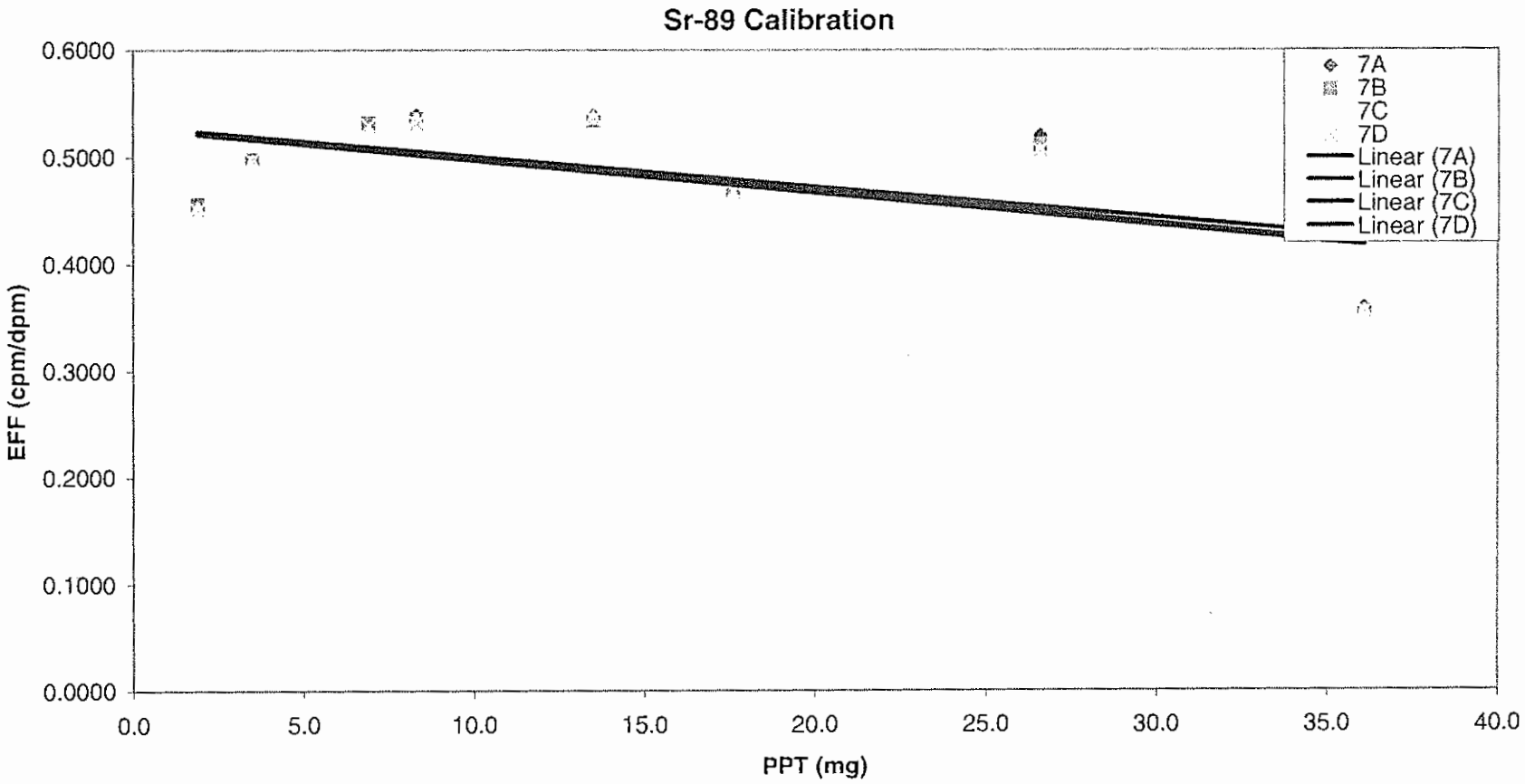

6A y = -1.958586E-03x + 4.970023E-01

6B y = -2.245183E-03x + 5.168520E-01

6C y = -2.542606E-03x + 5.139116E-01

6D y = -3.741354E-03x + 3.086324E-01

DCN: ITSI-0808-0004-0076, 8 May 2019



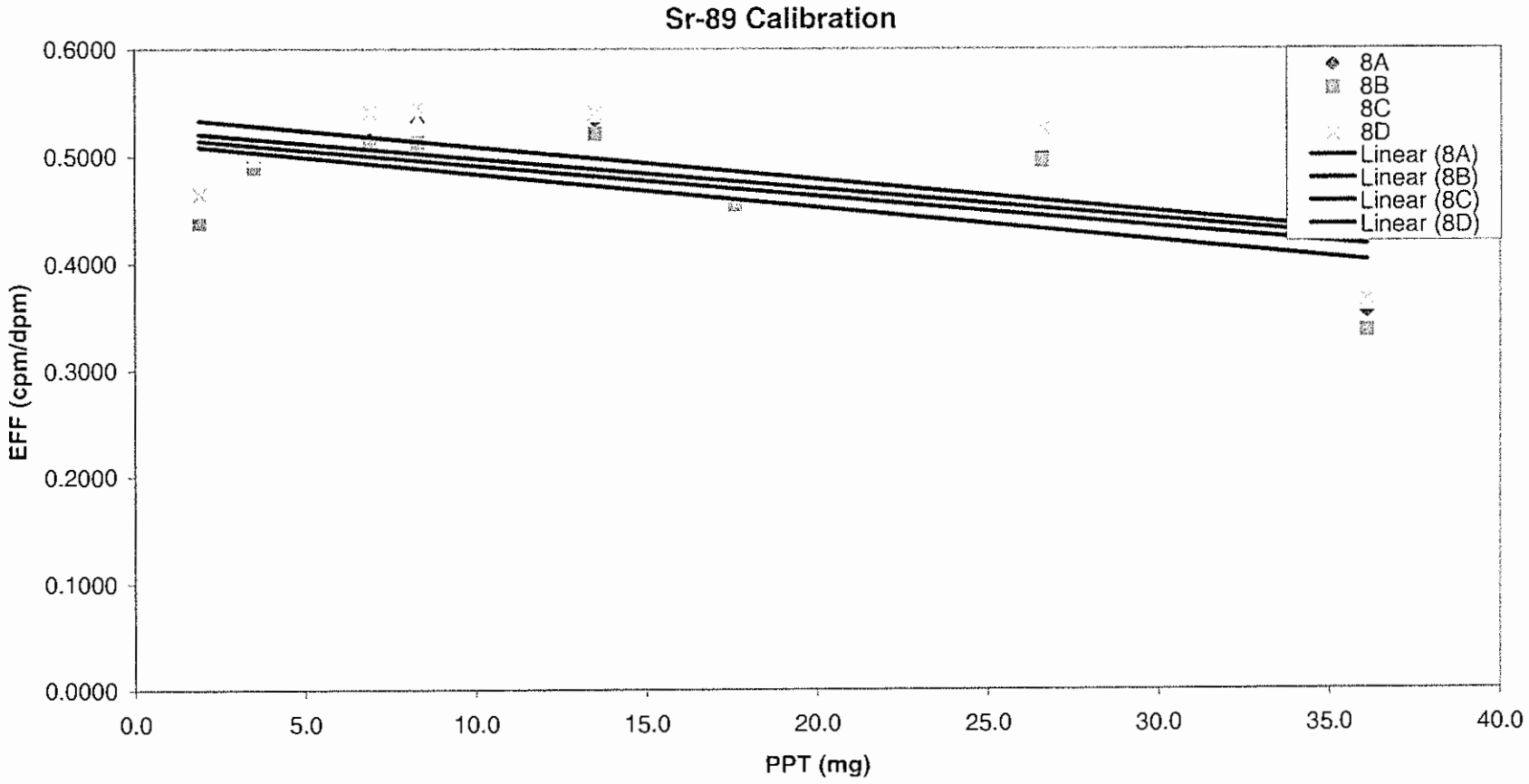

7A y = -2.837544E-03x + 5.293261E-01

7B y = -3.027427E-03x + 5.298861E-01

7C y = -3.010349E-03x + 5.270355E-01

7D y = -2.984826E-03x + 5.272911E-01

M-10297

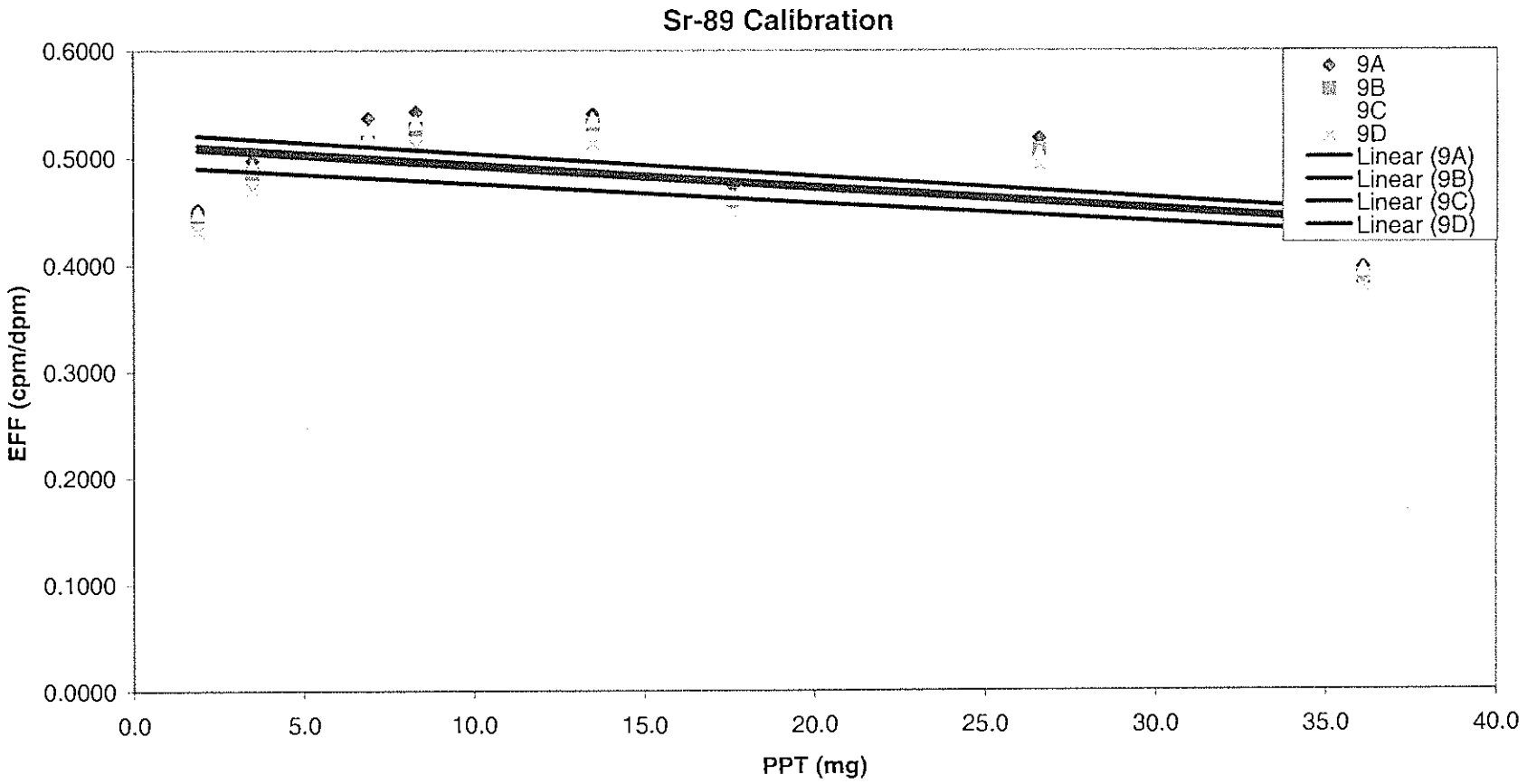



8A y = -2.835923E-03x + 5.197323E-01

8B y = -3.101285E-03x + 5.145438E-01

8C y = -2.803963E-03x + 5.261718E-01

8D y = -3.013335E-03x + 5.389462E-01

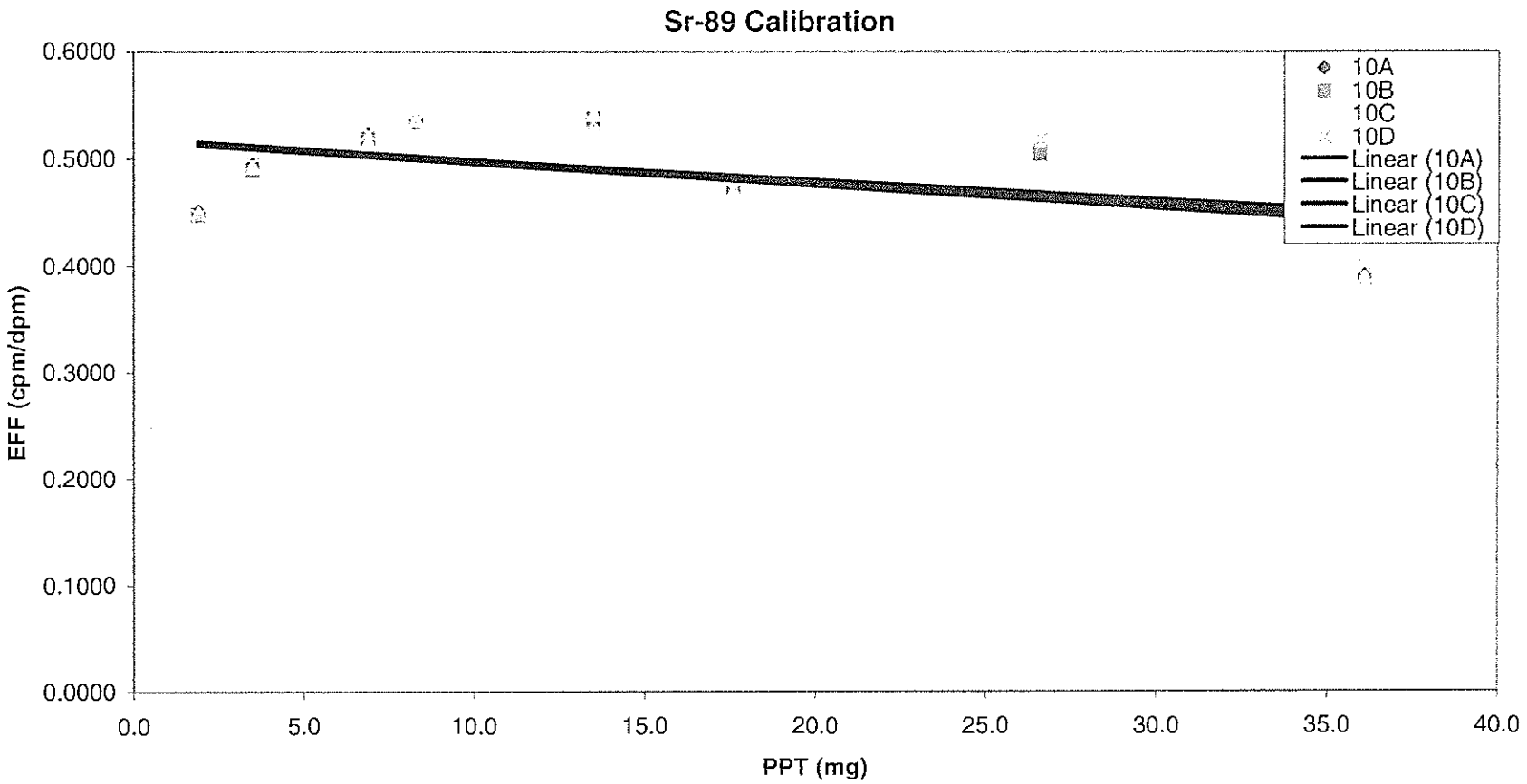



9A y = -2.054823E-03x + 5.244978E-01

9B y = -1.999215E-03x + 5.108739E-01

9C y = -2.037484E-03x + 5.155334E-01

9D y = -1.771991E-03x + 4.936228E-01

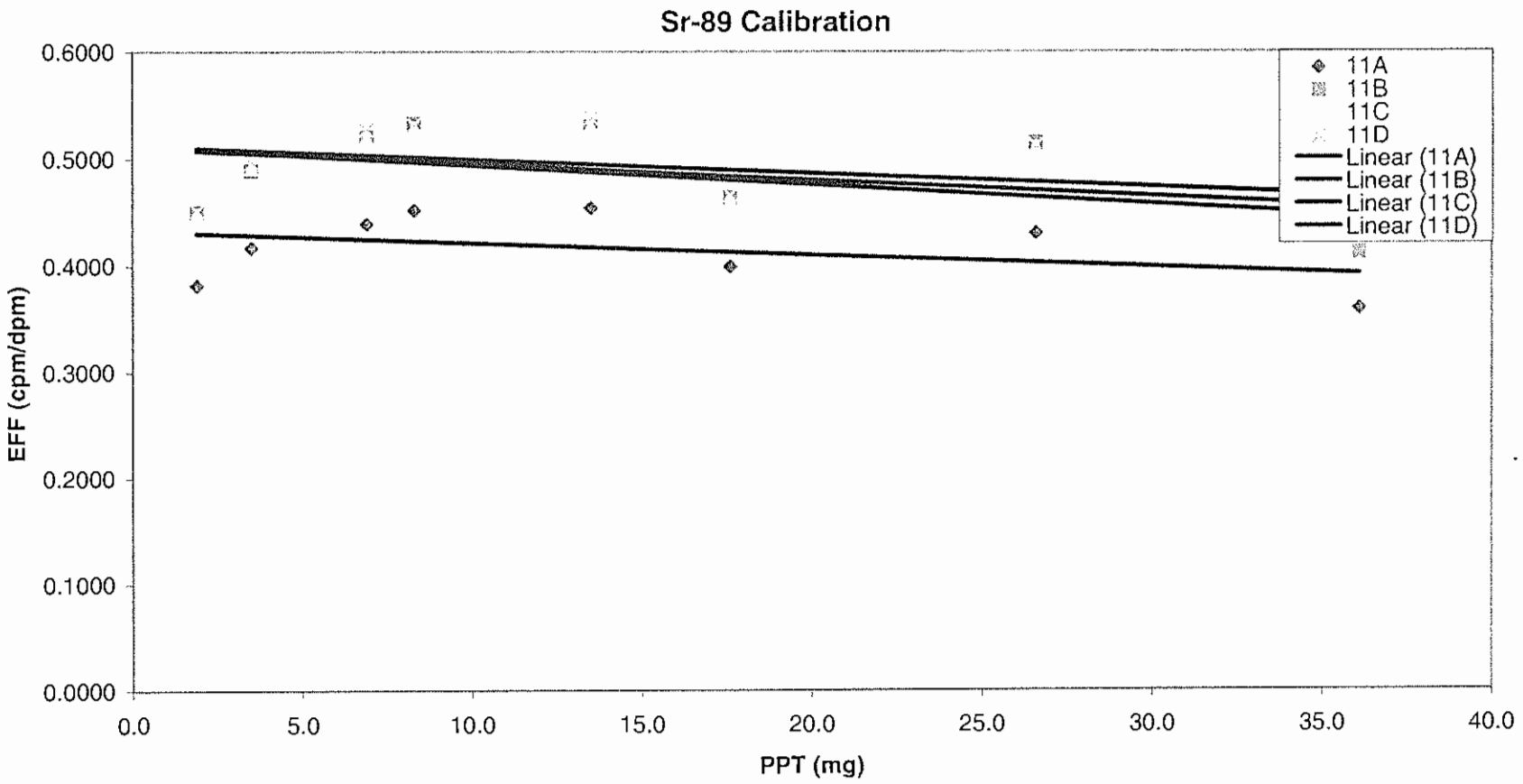



10A y = -2.004084E-03x + 5.193880E-01

10B y = -2.073233E-03x + 5.162797E-01

10C y = -1.966967E-03x + 5.173243E-01

10D y = -1.780592E-03x + 5.159685E-01

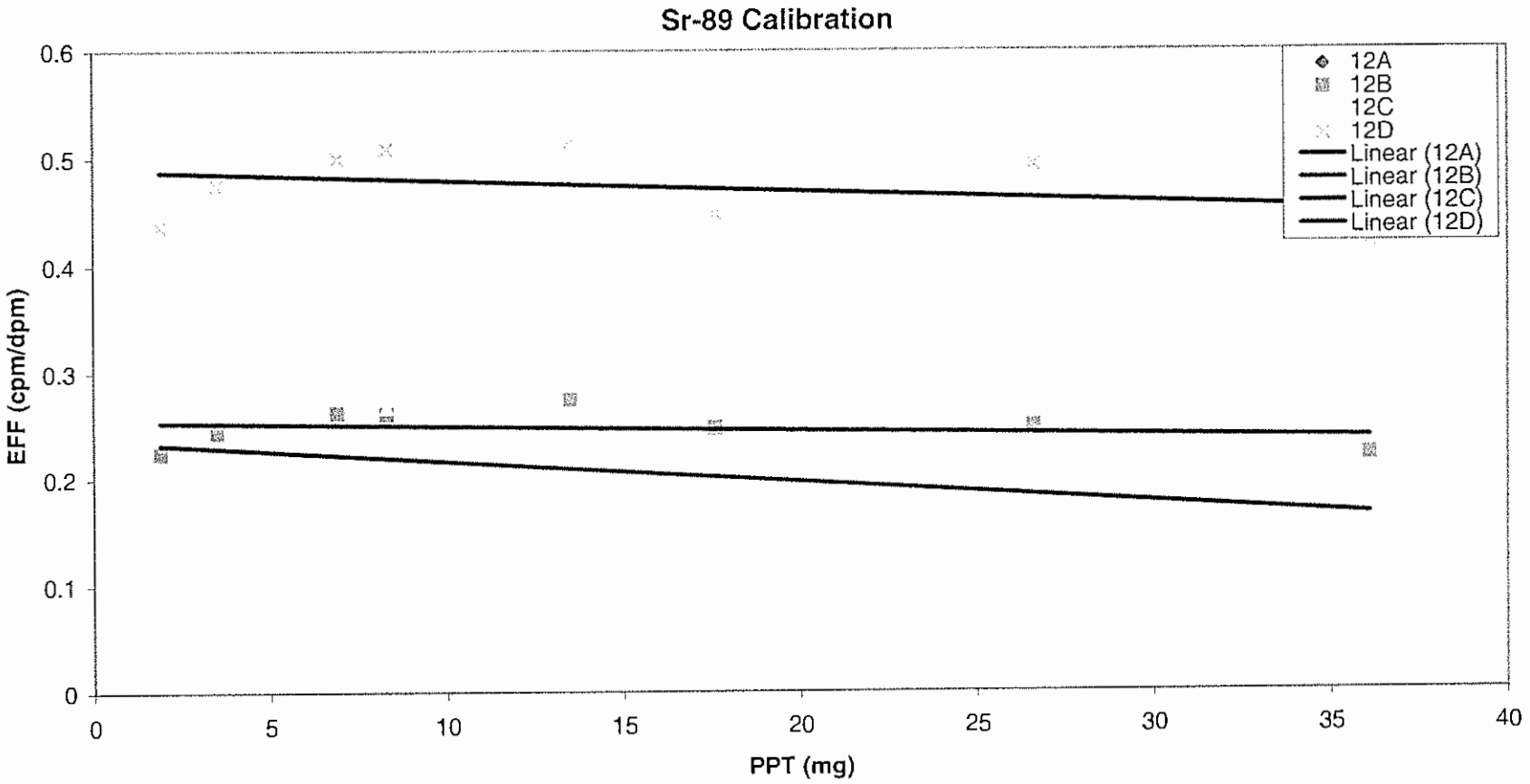



11A y = -1.120388E-03x + 4.325664E-01

11B y = -1.508069E-03x + 5.106068E-01

11C y = -1.789395E-03x + 5.117872E-01

11D y = -1.280551E-03x + 5.124197E-01

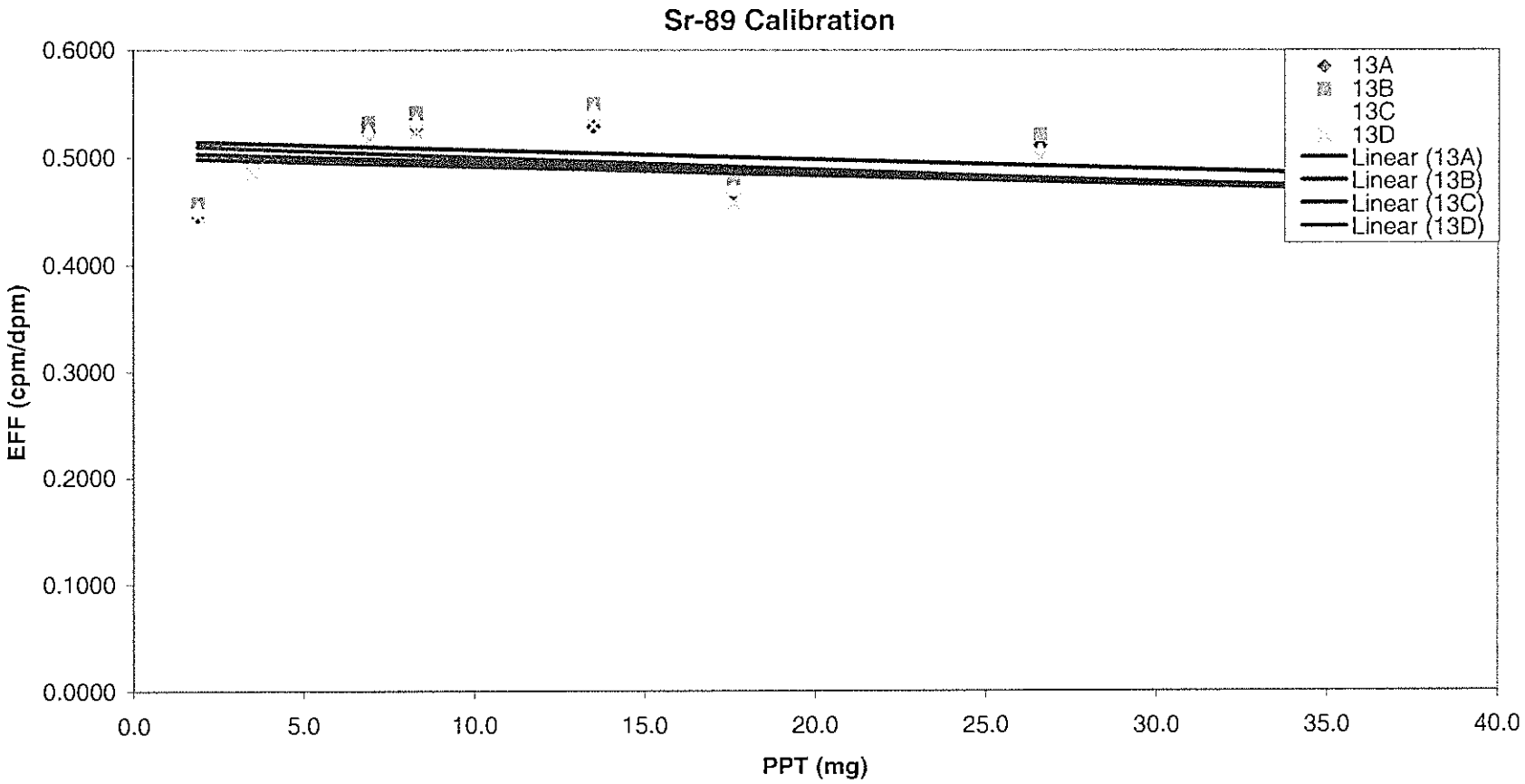



12A

12B y = -4.613917E-04x + 2.543237E-01

12C y = -1.955441E-03x + 2.361321E-01

12D y = -1.008951E-03x + 4.892691E-01

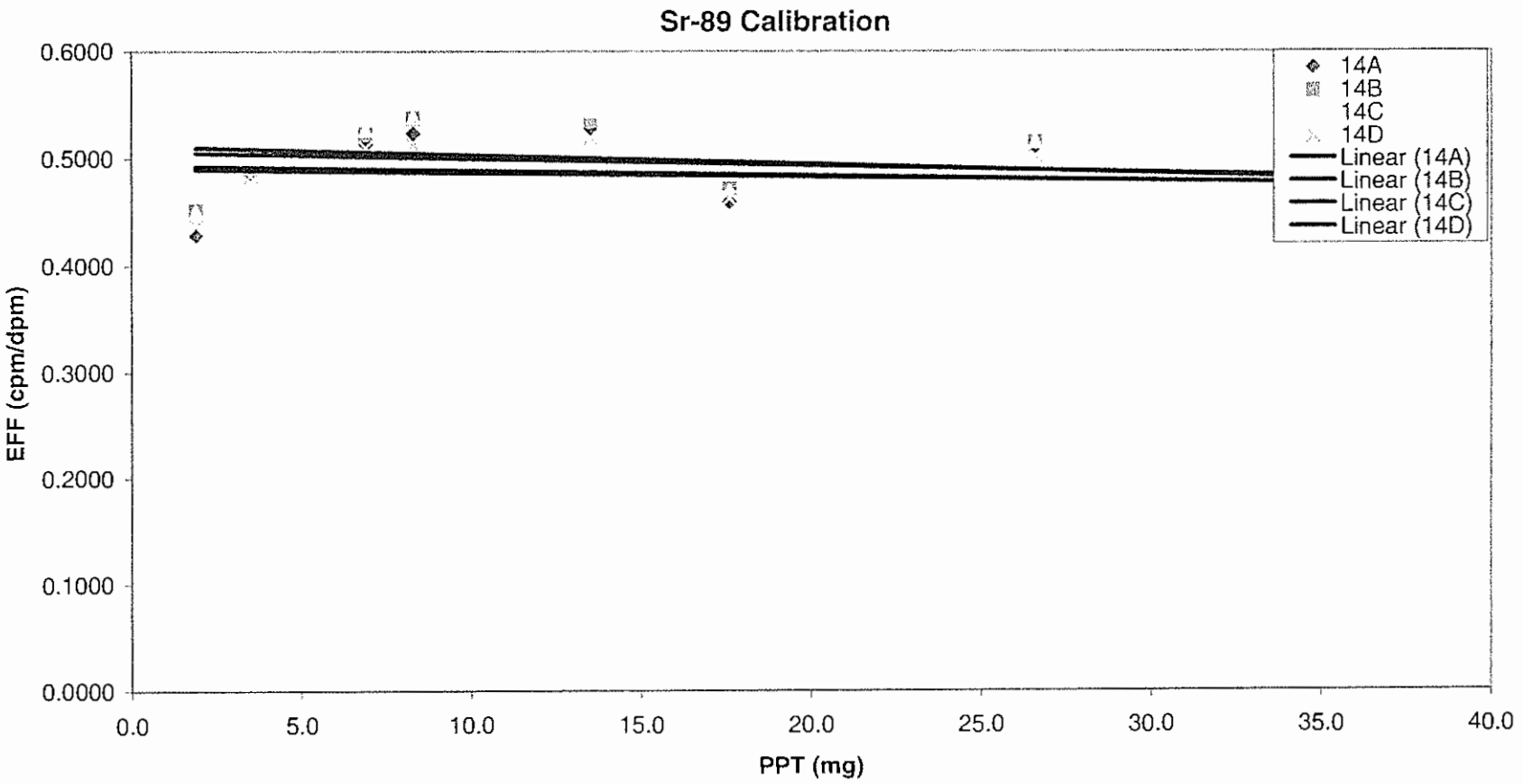



13A y = -9.030103E-04x + 5.050504E-01

13B y = -8.773138E-04x + 5.160069E-01

13C y = -1.160236E-03x + 5.121285E-01

13D y = -8.242116E-04x + 4.998858E-01




14A y = -4.660381E-04x + 4.934923E-01

14B y = -6.436680E-04x + 5.064001E-01

14C y = -8.515606E-04x + 5.120459E-01

14D y = -3.622979E-04x + 4.902315E-01

Current Calibration - PIC

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-89 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **Protean** | A0 | A1 | A2 | A3 | A4 |
| **1A** | 5.200147E-01 | -3.005961E-03 | | | |
| **1B** | 5.249165E-01 | -3.080004E-03 | | | |
| **1C** | 5.309699E-01 | -3.366481E-03 | | | |
| **1D** | 5.286987E-01 | -3.264044E-03 | | | |
| **2A** | 5.108792E-01 | -2.928324E-03 | | | |
| **2B** | 4.901900E-01 | -2.726292E-03 | | | |
| **2C** | 5.110680E-01 | -2.610435E-03 | | | |
| **2D** | 5.152130E-01 | -2.840738E-03 | | | |
| **3A** | 5.200735E-01 | -3.397329E-03 | | | |
| **3B** | 5.235380E-01 | -3.549394E-03 | | | |
| **3C** | 5.282955E-01 | -3.425019E-03 | | | |
| **3D** | 5.198403E-01 | -3.418573E-03 | | | |
| **4A** | 5.186287E-01 | -3.075203E-03 | | | |
| **4B** | 5.191729E-01 | -3.030756E-03 | | | |
| **4C** | 5.308582E-01 | -3.419356E-03 | | | |
| **4D** | 5.270219E-01 | -3.451883E-03 | | | |
| **5A** | 5.316072E-01 | -2.786676E-03 | | | |
| **5B** | 5.328835E-01 | -2.907347E-03 | | | |
| **5C** | 5.324992E-01 | -3.085316E-03 | | | |
| **5D** | 5.241561E-01 | -2.688295E-03 | | | |
| **6A** | 4.970023E-01 | -1.958586E-03 | | | |
| **6B** | 5.168520E-01 | -2.245183E-03 | | | |
| **6C** | 5.139116E-01 | -2.542606E-03 | | | |
| **6D** | 3.086324E-01 | -3.741354E-03 | | | |
| **7A** | 5.293261E-01 | -2.837544E-03 | | | |
| **7B** | 5.298861E-01 | -3.027427E-03 | | | |
| **7C** | 5.270355E-01 | -3.010349E-03 | | | |
| **7D** | 5.272911E-01 | -2.984826E-03 | | | |
| **8A** | 5.197323E-01 | -2.835923E-03 | | | |
| **8B** | 5.145438E-01 | -3.101285E-03 | | | |
| **8C** | 5.261718E-01 | -2.803963E-03 | | | |
| **8D** | 5.389462E-01 | -3.013335E-03 | | | |
| **9A** | 5.244978E-01 | -2.054823E-03 | | | |
| **9B** | 5.108739E-01 | -1.999215E-03 | | | |
| **9C** | 5.155334E-01 | -2.037484E-03 | | | |
| **9D** | 4.936228E-01 | -1.771991E-03 | | | |
| **10A** | 5.193880E-01 | -2.004084E-03 | | | |
| **10B** | 5.162797E-01 | -2.073233E-03 | | | |
| **10C** | 5.173243E-01 | -1.966967E-03 | | | |
| **10D** | 5.159685E-01 | -1.780592E-03 | | | |
| **11A** | 4.325664E-01 | -1.120388E-03 | | | |
| **11B** | 5.106068E-01 | -1.508069E-03 | | | |
| **11C** | 5.117872E-01 | -1.789395E-03 | | | |
| **11D** | 5.124197E-01 | -1.280551E-03 | | | |
| **12A** | #N/A | #N/A | | | |
| **12B** | 2.543237E-01 | -4.613917E-04 | | | |
| **12C** | 2.361321E-01 | -1.955441E-03 | | | |
| **12D** | 4.892691E-01 | -1.008951E-03 | | | |
| **13A** | 5.050504E-01 | -9.030103E-04 | | | |
| **13B** | 5.160069E-01 | -8.773138E-04 | | | |
| **13C** | 5.121285E-01 | -1.160236E-03 | | | |
| **13D** | 4.998858E-01 | -8.242116E-04 | | | |
| **14A** | 4.934923E-01 | -4.660381E-04 | | | |
| **14B** | 5.064001E-01 | -6.436680E-04 | | | |
| **14C** | 5.120459E-01 | -8.515606E-04 | | | |
| **14D** | 4.902315E-01 | -3.622979E-04 | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| C1 | 1A | 1 | 3 | 22671 | 2/15/2013 16:21 | 2/15/2013 16:22 | PIC | SR89C13 |
| C2 | 1A | 1 | 3 | 24304 | 2/15/2013 16:30 | 2/15/2013 16:31 | PIC | SR89C13 |
| C3 | 1A | 1 | 3 | 25873 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C4 | 1A | 1 | 5 | 24881 | 2/15/2013 16:24 | 2/15/2013 16:25 | PIC | SR89C13 |
| C5 | 1A | 1 | 5 | 25969 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C6 | 1A | 1 | 4 | 23419 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C7 | 1A | 1 | 6 | 25270 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C8 | 1A | 1 | 6 | 17057 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C1 | 1B | 1 | 14 | 22892 | 2/15/2013 16:24 | 2/15/2013 16:25 | PIC | SR89C13 |
| C2 | 1B | 1 | 22 | 24815 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C3 | 1B | 1 | 22 | 25632 | 2/15/2013 16:30 | 2/15/2013 16:31 | PIC | SR89C13 |
| C4 | 1B | 1 | 17 | 25351 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C5 | 1B | 1 | 31 | 26005 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C6 | 1B | 1 | 14 | 23585 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C7 | 1B | 1 | 23 | 25562 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C8 | 1B | 1 | 22 | 17129 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C1 | 1C | 1 | 252 | 23030 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C2 | 1C | 1 | 277 | 25093 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C3 | 1C | 1 | 288 | 26245 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C4 | 1C | 1 | 311 | 25504 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C5 | 1C | 1 | 309 | 25732 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C6 | 1C | 1 | 299 | 23516 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C7 | 1C | 1 | 318 | 25862 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C8 | 1C | 1 | 174 | 16780 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C1 | 1D | 1 | 216 | 23237 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C2 | 1D | 1 | 223 | 24810 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C3 | 1D | 1 | 247 | 26179 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C4 | 1D | 1 | 248 | 25241 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C5 | 1D | 1 | 218 | 26012 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C6 | 1D | 1 | 220 | 23271 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C7 | 1D | 1 | 261 | 25607 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C8 | 1D | 1 | 154 | 17078 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C1 | 2A | 1 | 8 | 22234 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C2 | 2A | 1 | 11 | 23993 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C3 | 2A | 1 | 8 | 25476 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C4 | 2A | 1 | 7 | 24595 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C5 | 2A | 1 | 2 | 25135 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C6 | 2A | 1 | 8 | 22948 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C7 | 2A | 1 | 11 | 25149 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C8 | 2A | 1 | 7 | 16736 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C1 | 2B | 1 | 0 | 21501 | 2/15/2013 16:35 | 2/15/2013 16:36 | PIC | SR89C13 |
| C2 | 2B | 1 | 0 | 23103 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C3 | 2B | 1 | 0 | 24238 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C4 | 2B | 1 | 0 | 23758 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C5 | 2B | 1 | 1 | 23999 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C6 | 2B | 1 | 0 | 22186 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C7 | 2B | 1 | 0 | 24035 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C8 | 2B | 1 | 0 | 16377 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C1 | 2C | 1 | 67 | 22296 | 2/15/2013 16:37 | 2/15/2013 16:38 | PIC | SR89C13 |
| C2 | 2C | 1 | 84 | 23951 | 2/15/2013 16:36 | 2/15/2013 16:37 | PIC | SR89C13 |
| C3 | 2C | 1 | 89 | 25463 | 2/15/2013 16:33 | 2/15/2013 16:34 | PIC | SR89C13 |
| C4 | 2C | 1 | 87 | 24962 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C5 | 2C | 1 | 98 | 25437 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C6 | 2C | 1 | 108 | 23144 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C7 | 2C | 1 | 99 | 25548 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C8 | 2C | 1 | 61 | 17333 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C1 | 2D | 1 | 42 | 22601 | 2/15/2013 16:39 | 2/15/2013 16:40 | PIC | SR89C13 |
| C2 | 2D | 1 | 41 | 24333 | 2/15/2013 16:38 | 2/15/2013 16:39 | PIC | SR89C13 |
| C3 | 2D | 1 | 43 | 25432 | 2/15/2013 16:36 | 2/15/2013 16:37 | PIC | SR89C13 |
| C4 | 2D | 1 | 56 | 24784 | 2/15/2013 16:34 | 2/15/2013 16:35 | PIC | SR89C13 |
| C5 | 2D | 1 | 32 | 25497 | 2/15/2013 16:31 | 2/15/2013 16:32 | PIC | SR89C13 |
| C6 | 2D | 1 | 40 | 23111 | 2/15/2013 16:28 | 2/15/2013 16:29 | PIC | SR89C13 |
| C7 | 2D | 1 | 58 | 25715 | 2/15/2013 16:25 | 2/15/2013 16:26 | PIC | SR89C13 |
| C8 | 2D | 1 | 37 | 17022 | 2/15/2013 16:22 | 2/15/2013 16:23 | PIC | SR89C13 |
| C1 | 3A | 1 | 389 | 22713 | 2/15/2013 17:08 | 2/15/2013 17:09 | PIC | SR89C13 |
| C2 | 3A | 1 | 405 | 24219 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C3 | 3A | 1 | 428 | 25568 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C4 | 3A | 1 | 397 | 24790 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C5 | 3A | 1 | 436 | 25636 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C6 | 3A | 1 | 429 | 22922 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C7 | 3A | 1 | 385 | 25188 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C8 | 3A | 1 | 237 | 16133 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C1 | 3B | 1 | 370 | 22710 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C2 | 3B | 1 | 373 | 24287 | 2/15/2013 17:08 | 2/15/2013 17:09 | PIC | SR89C13 |
| C3 | 3B | 1 | 412 | 25785 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C4 | 3B | 1 | 396 | 25095 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C5 | 3B | 1 | 375 | 25479 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C6 | 3B | 1 | 360 | 23180 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C7 | 3B | 1 | 384 | 25229 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C8 | 3B | 1 | 259 | 15914 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C1 | 3C | 1 | 157 | 22789 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C2 | 3C | 1 | 179 | 24757 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C3 | 3C | 1 | 159 | 25765 | 2/15/2013 17:08 | 2/15/2013 17:09 | PIC | SR89C13 |
| C4 | 3C | 1 | 176 | 25700 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C5 | 3C | 1 | 163 | 25884 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C6 | 3C | 1 | 162 | 23317 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C7 | 3C | 1 | 156 | 25638 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C8 | 3C | 1 | 115 | 16405 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C1 | 3D | 1 | 140 | 22440 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C2 | 3D | 1 | 176 | 24241 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C3 | 3D | 1 | 170 | 25787 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C4 | 3D | 1 | 163 | 24974 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C5 | 3D | 1 | 150 | 25471 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C6 | 3D | 1 | 163 | 22855 | 2/15/2013 17:26 | 2/15/2013 17:27 | PIC | SR89C13 |
| C7 | 3D | 1 | 147 | 24979 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C8 | 3D | 1 | 104 | 16191 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C1 | 4A | 1 | 156 | 22414 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C2 | 4A | 1 | 140 | 24462 | 2/15/2013 17:28 | 2/15/2013 17:29 | PIC | SR89C13 |
| C3 | 4A | 1 | 132 | 25519 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C4 | 4A | 1 | 149 | 25109 | 2/15/2013 17:23 | 2/15/2013 17:24 | PIC | SR89C13 |
| C5 | 4A | 1 | 147 | 25709 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C6 | 4A | 1 | 134 | 23050 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C7 | 4A | 1 | 143 | 25348 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C8 | 4A | 1 | 111 | 16794 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C1 | 4B | 1 | 0 | 22758 | 2/15/2013 17:24 | 2/15/2013 17:25 | PIC | SR89C13 |
| C2 | 4B | 1 | 0 | 24066 | 2/15/2013 17:20 | 2/15/2013 17:21 | PIC | SR89C13 |
| C3 | 4B | 1 | 0 | 25905 | 2/15/2013 17:29 | 2/15/2013 17:30 | PIC | SR89C13 |
| C4 | 4B | 1 | 0 | 25162 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C5 | 4B | 1 | 0 | 25354 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C6 | 4B | 1 | 0 | 23302 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C7 | 4B | 1 | 0 | 25359 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C8 | 4B | 1 | 0 | 16980 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C1 | 4C | 1 | 92 | 23173 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C2 | 4C | 1 | 95 | 25035 | 2/15/2013 17:24 | 2/15/2013 17:25 | PIC | SR89C13 |
| C3 | 4C | 1 | 112 | 25859 | 2/15/2013 17:21 | 2/15/2013 17:22 | PIC | SR89C13 |
| C4 | 4C | 1 | 107 | 25412 | 2/15/2013 17:29 | 2/15/2013 17:30 | PIC | SR89C13 |
| C5 | 4C | 1 | 105 | 26023 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C6 | 4C | 1 | 87 | 23478 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C7 | 4C | 1 | 97 | 25643 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C8 | 4C | 1 | 71 | 16702 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C1 | 4D | 1 | 286 | 22653 | 2/15/2013 17:29 | 2/15/2013 17:30 | PIC | SR89C13 |
| C2 | 4D | 1 | 296 | 24739 | 2/15/2013 17:27 | 2/15/2013 17:28 | PIC | SR89C13 |
| C3 | 4D | 1 | 336 | 25941 | 2/15/2013 17:24 | 2/15/2013 17:25 | PIC | SR89C13 |
| C4 | 4D | 1 | 268 | 25276 | 2/15/2013 17:21 | 2/15/2013 17:22 | PIC | SR89C13 |
| C5 | 4D | 1 | 303 | 25947 | 2/15/2013 17:16 | 2/15/2013 17:17 | PIC | SR89C13 |
| C6 | 4D | 1 | 262 | 23091 | 2/15/2013 17:13 | 2/15/2013 17:14 | PIC | SR89C13 |
| C7 | 4D | 1 | 277 | 25813 | 2/15/2013 17:11 | 2/15/2013 17:12 | PIC | SR89C13 |
| C8 | 4D | 1 | 173 | 16149 | 2/15/2013 17:09 | 2/15/2013 17:10 | PIC | SR89C13 |
| C1 | 5A | 1 | 95 | 23403 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C2 | 5A | 1 | 79 | 25086 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C3 | 5A | 1 | 94 | 26469 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C4 | 5A | 1 | 67 | 25794 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C5 | 5A | 1 | 56 | 26347 | 2/15/2013 14:15 | 2/15/2013 14:16 | PIC | SR89C13 |
| C6 | 5A | 1 | 82 | 24007 | 2/15/2013 14:30 | 2/15/2013 14:31 | PIC | SR89C13 |
| C7 | 5A | 1 | 80 | 26340 | 2/15/2013 14:27 | 2/15/2013 14:28 | PIC | SR89C13 |
| C8 | 5A | 1 | 56 | 18123 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C1 | 5B | 1 | 82 | 23574 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C2 | 5B | 1 | 93 | 25221 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C3 | 5B | 1 | 106 | 26417 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C4 | 5B | 1 | 81 | 25811 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C5 | 5B | 1 | 86 | 26405 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C6 | 5B | 1 | 95 | 23663 | 2/15/2013 14:15 | 2/15/2013 14:16 | PIC | SR89C13 |
| C7 | 5B | 1 | 88 | 26124 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C8 | 5B | 1 | 66 | 18167 | 2/15/2013 14:27 | 2/15/2013 14:28 | PIC | SR89C13 |
| C1 | 5C | 1 | 76 | 23369 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C2 | 5C | 1 | 106 | 25051 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C3 | 5C | 1 | 83 | 26297 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C4 | 5C | 1 | 86 | 26150 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C5 | 5C | 1 | 93 | 26199 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C6 | 5C | 1 | 90 | 23488 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C7 | 5C | 1 | 85 | 25842 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C8 | 5C | 1 | 60 | 17798 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C1 | 5D | 1 | 82 | 23109 | 2/15/2013 14:12 | 2/15/2013 14:13 | PIC | SR89C13 |
| C2 | 5D | 1 | 114 | 24806 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C3 | 5D | 1 | 99 | 26008 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C4 | 5D | 1 | 92 | 25558 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C5 | 5D | 1 | 94 | 26045 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C6 | 5D | 1 | 105 | 23651 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C7 | 5D | 1 | 106 | 25829 | 2/15/2013 14:25 | 2/15/2013 14:26 | PIC | SR89C13 |
| C8 | 5D | 1 | 79 | 18148 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C1 | 6A | 1 | 1 | 22130 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C2 | 6A | 1 | 2 | 24034 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C3 | 6A | 1 | 1 | 24798 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C4 | 6A | 1 | 0 | 24454 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C5 | 6A | 1 | 1 | 24903 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C6 | 6A | 1 | 0 | 22477 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |
| C7 | 6A | 1 | 5 | 24857 | 2/15/2013 13:48 | 2/15/2013 13:49 | PIC | SR89C13 |
| C8 | 6A | 1 | 3 | 18846 | 2/15/2013 13:45 | 2/15/2013 13:46 | PIC | SR89C13 |
| C1 | 6B | 1 | 57 | 22530 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C2 | 6B | 1 | 68 | 25573 | 2/15/2013 14:16 | 2/15/2013 14:17 | PIC | SR89C13 |
| C3 | 6B | 1 | 68 | 25565 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C4 | 6B | 1 | 69 | 25190 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C5 | 6B | 1 | 68 | 25651 | 2/15/2013 13:46 | 2/15/2013 13:47 | PIC | SR89C13 |
| C6 | 6B | 1 | 66 | 23552 | 2/15/2013 13:41 | 2/15/2013 13:42 | PIC | SR89C13 |
| C7 | 6B | 1 | 83 | 25638 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |
| C8 | 6B | 1 | 56 | 19075 | 2/15/2013 13:49 | 2/15/2013 13:50 | PIC | SR89C13 |
| C1 | 6C | 1 | 13 | 22479 | 2/15/2013 14:28 | 2/15/2013 14:29 | PIC | SR89C13 |
| C2 | 6C | 1 | 10 | 24382 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C3 | 6C | 1 | 10 | 25764 | 2/15/2013 14:17 | 2/15/2013 14:18 | PIC | SR89C13 |
| C4 | 6C | 1 | 6 | 25070 | 2/15/2013 14:31 | 2/15/2013 14:32 | PIC | SR89C13 |
| C5 | 6C | 1 | 18 | 25538 | 2/15/2013 13:49 | 2/15/2013 13:50 | PIC | SR89C13 |
| C6 | 6C | 1 | 16 | 23213 | 2/15/2013 13:46 | 2/15/2013 13:47 | PIC | SR89C13 |
| C7 | 6C | 1 | 7 | 25525 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C8 | 6C | 1 | 6 | 17935 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C1 | 6D | 1 | 0 | 11648 | 2/15/2013 14:32 | 2/15/2013 14:33 | PIC | SR89C13 |
| C2 | 6D | 1 | 0 | 13066 | 2/15/2013 14:29 | 2/15/2013 14:30 | PIC | SR89C13 |
| C3 | 6D | 1 | 0 | 12930 | 2/15/2013 14:26 | 2/15/2013 14:27 | PIC | SR89C13 |
| C4 | 6D | 1 | 0 | 15725 | 2/15/2013 14:17 | 2/15/2013 14:18 | PIC | SR89C13 |
| C5 | 6D | 1 | 0 | 12091 | 2/15/2013 14:13 | 2/15/2013 14:14 | PIC | SR89C13 |
| C6 | 6D | 1 | 0 | 17778 | 2/15/2013 13:50 | 2/15/2013 13:51 | PIC | SR89C13 |
| C7 | 6D | 1 | 0 | 16245 | 2/15/2013 13:46 | 2/15/2013 13:47 | PIC | SR89C13 |
| C8 | 6D | 1 | 1 | 2109 | 2/15/2013 13:38 | 2/15/2013 13:39 | PIC | SR89C13 |
| C1 | 7A | 1 | 131 | 23154 | 2/15/2013 14:40 | 2/15/2013 14:41 | PIC | SR89C13 |
| C2 | 7A | 1 | 141 | 24947 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C3 | 7A | 1 | 185 | 26400 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C4 | 7A | 1 | 154 | 25726 | 2/15/2013 14:51 | 2/15/2013 14:52 | PIC | SR89C13 |
| C5 | 7A | 1 | 172 | 26121 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C6 | 7A | 1 | 120 | 23722 | 2/15/2013 15:13 | 2/15/2013 15:14 | PIC | SR89C13 |
| C7 | 7A | 1 | 173 | 26485 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C8 | 7A | 1 | 121 | 17724 | 2/15/2013 15:05 | 2/15/2013 15:06 | PIC | SR89C13 |
| C1 | 7B | 1 | 167 | 23235 | 2/15/2013 14:51 | 2/15/2013 14:52 | PIC | SR89C13 |
| C2 | 7B | 1 | 184 | 25027 | 2/15/2013 14:40 | 2/15/2013 14:41 | PIC | SR89C13 |
| C3 | 7B | 1 | 191 | 26374 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C4 | 7B | 1 | 181 | 25565 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C5 | 7B | 1 | 200 | 25913 | 2/15/2013 15:06 | 2/15/2013 15:07 | PIC | SR89C13 |
| C6 | 7B | 1 | 161 | 23710 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C7 | 7B | 1 | 160 | 26047 | 2/15/2013 15:13 | 2/15/2013 15:14 | PIC | SR89C13 |
| C8 | 7B | 1 | 136 | 17556 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C1 | 7C | 1 | 59 | 23070 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C2 | 7C | 1 | 59 | 24941 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C3 | 7C | 1 | 79 | 25992 | 2/15/2013 14:41 | 2/15/2013 14:42 | PIC | SR89C13 |
| C4 | 7C | 1 | 83 | 25550 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C5 | 7C | 1 | 68 | 26073 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C6 | 7C | 1 | 60 | 23471 | 2/15/2013 15:06 | 2/15/2013 15:07 | PIC | SR89C13 |
| C7 | 7C | 1 | 67 | 25731 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C8 | 7C | 1 | 46 | 17544 | 2/15/2013 15:13 | 2/15/2013 15:14 | PIC | SR89C13 |
| C1 | 7D | 1 | 96 | 22969 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C2 | 7D | 1 | 94 | 25017 | 2/15/2013 14:54 | 2/15/2013 14:55 | PIC | SR89C13 |
| C3 | 7D | 1 | 138 | 26248 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C4 | 7D | 1 | 90 | 25375 | 2/15/2013 14:41 | 2/15/2013 14:42 | PIC | SR89C13 |
| C5 | 7D | 1 | 127 | 25995 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C6 | 7D | 1 | 106 | 23670 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C7 | 7D | 1 | 120 | 25810 | 2/15/2013 15:06 | 2/15/2013 15:07 | PIC | SR89C13 |
| C8 | 7D | 1 | 55 | 17546 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C1 | 8A | 1 | 5 | 22652 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C2 | 8A | 1 | 13 | 24637 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C3 | 8A | 1 | 21 | 25565 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C4 | 8A | 1 | 21 | 25423 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C5 | 8A | 1 | 17 | 25896 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C6 | 8A | 1 | 11 | 23169 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C7 | 8A | 1 | 21 | 25611 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C8 | 8A | 1 | 18 | 17494 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C1 | 8B | 1 | 1 | 22319 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C2 | 8B | 1 | 0 | 24615 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C3 | 8B | 1 | 1 | 25451 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C4 | 8B | 1 | 0 | 24461 | 2/15/2013 15:09 | 2/15/2013 15:10 | PIC | SR89C13 |
| C5 | 8B | 1 | 0 | 25258 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C6 | 8B | 1 | 0 | 22990 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C7 | 8B | 1 | 0 | 25222 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C8 | 8B | 1 | 0 | 16601 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C1 | 8C | 1 | 22 | 22927 | 2/15/2013 15:10 | 2/15/2013 15:11 | PIC | SR89C13 |
| C2 | 8C | 1 | 23 | 25010 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C3 | 8C | 1 | 17 | 26237 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C4 | 8C | 1 | 18 | 25433 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C5 | 8C | 1 | 21 | 26120 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C6 | 8C | 1 | 24 | 23608 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C7 | 8C | 1 | 14 | 26024 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C8 | 8C | 1 | 13 | 17848 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C1 | 8D | 1 | 31 | 23697 | 2/15/2013 15:14 | 2/15/2013 15:15 | PIC | SR89C13 |
| C2 | 8D | 1 | 37 | 25697 | 2/15/2013 15:10 | 2/15/2013 15:11 | PIC | SR89C13 |
| C3 | 8D | 1 | 57 | 26831 | 2/15/2013 15:07 | 2/15/2013 15:08 | PIC | SR89C13 |
| C4 | 8D | 1 | 37 | 26060 | 2/15/2013 15:00 | 2/15/2013 15:01 | PIC | SR89C13 |
| C5 | 8D | 1 | 49 | 26234 | 2/15/2013 14:57 | 2/15/2013 14:58 | PIC | SR89C13 |
| C6 | 8D | 1 | 34 | 23718 | 2/15/2013 14:55 | 2/15/2013 14:56 | PIC | SR89C13 |
| C7 | 8D | 1 | 43 | 26787 | 2/15/2013 14:52 | 2/15/2013 14:53 | PIC | SR89C13 |
| C8 | 8D | 1 | 21 | 18085 | 2/15/2013 14:45 | 2/15/2013 14:46 | PIC | SR89C13 |
| C1 | 9A | 1 | 42 | 23046 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C2 | 9A | 1 | 33 | 25056 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C3 | 9A | 1 | 49 | 26656 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C4 | 9A | 1 | 37 | 25929 | 2/15/2013 12:57 | 2/15/2013 12:58 | PIC | SR89C13 |
| C5 | 9A | 1 | 48 | 26267 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C6 | 9A | 1 | 30 | 23993 | 2/15/2013 13:17 | 2/15/2013 13:18 | PIC | SR89C13 |
| C7 | 9A | 1 | 47 | 26420 | 2/15/2013 13:14 | 2/15/2013 13:15 | PIC | SR89C13 |
| C8 | 9A | 1 | 32 | 19631 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C1 | 9B | 1 | 22 | 22752 | 2/15/2013 12:57 | 2/15/2013 12:58 | PIC | SR89C13 |
| C2 | 9B | 1 | 29 | 24464 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C3 | 9B | 1 | 27 | 25548 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C4 | 9B | 1 | 17 | 25161 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C5 | 9B | 1 | 24 | 25785 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C6 | 9B | 1 | 16 | 23221 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C7 | 9B | 1 | 25 | 25852 | 2/15/2013 13:17 | 2/15/2013 13:18 | PIC | SR89C13 |
| C8 | 9B | 1 | 16 | 19119 | 2/15/2013 13:14 | 2/15/2013 13:15 | PIC | SR89C13 |
| C1 | 9C | 1 | 40 | 22898 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C2 | 9C | 1 | 43 | 24745 | 2/15/2013 12:57 | 2/15/2013 12:58 | PIC | SR89C13 |
| C3 | 9C | 1 | 47 | 25810 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C4 | 9C | 1 | 39 | 25450 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C5 | 9C | 1 | 33 | 26012 | 2/15/2013 13:14 | 2/15/2013 13:15 | PIC | SR89C13 |
| C6 | 9C | 1 | 45 | 23438 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C7 | 9C | 1 | 35 | 25678 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C8 | 9C | 1 | 36 | 19493 | 2/15/2013 13:17 | 2/15/2013 13:18 | PIC | SR89C13 |
| C1 | 9D | 1 | 0 | 22005 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C2 | 9D | 1 | 0 | 23660 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C3 | 9D | 1 | 0 | 24728 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C4 | 9D | 1 | 1 | 24408 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C5 | 9D | 1 | 1 | 24915 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C6 | 9D | 1 | 1 | 22693 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C7 | 9D | 1 | 2 | 25159 | 2/15/2013 13:10 | 2/15/2013 13:11 | PIC | SR89C13 |
| C8 | 9D | 1 | 0 | 18766 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C1 | 10A | 1 | 10 | 22993 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C2 | 10A | 1 | 25 | 24908 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C3 | 10A | 1 | 16 | 25972 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C4 | 10A | 1 | 22 | 25551 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C5 | 10A | 1 | 17 | 26172 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C6 | 10A | 1 | 19 | 24100 | 2/15/2013 13:04 | 2/15/2013 13:05 | PIC | SR89C13 |
| C7 | 10A | 1 | 14 | 26093 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C8 | 10A | 1 | 6 | 19475 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C1 | 10B | 1 | 41 | 22828 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C2 | 10B | 1 | 48 | 24594 | 2/15/2013 13:07 | 2/15/2013 13:08 | PIC | SR89C13 |
| C3 | 10B | 1 | 42 | 25749 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C4 | 10B | 1 | 30 | 25497 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C5 | 10B | 1 | 51 | 26074 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C6 | 10B | 1 | 35 | 23956 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C7 | 10B | 1 | 37 | 25717 | 2/15/2013 13:05 | 2/15/2013 13:06 | PIC | SR89C13 |
| C8 | 10B | 1 | 24 | 19206 | 2/15/2013 13:00 | 2/15/2013 13:01 | PIC | SR89C13 |
| C1 | 10C | 1 | 36 | 22920 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C2 | 10C | 1 | 50 | 24784 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C3 | 10C | 1 | 53 | 25610 | 2/15/2013 13:08 | 2/15/2013 13:09 | PIC | SR89C13 |
| C4 | 10C | 1 | 49 | 25623 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C5 | 10C | 1 | 55 | 26296 | 2/15/2013 13:01 | 2/15/2013 13:02 | PIC | SR89C13 |
| C6 | 10C | 1 | 42 | 23777 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C7 | 10C | 1 | 38 | 26396 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C8 | 10C | 1 | 29 | 19243 | 2/15/2013 13:05 | 2/15/2013 13:06 | PIC | SR89C13 |
| C1 | 10D | 1 | 25 | 22791 | 2/15/2013 13:18 | 2/15/2013 13:19 | PIC | SR89C13 |
| C2 | 10D | 1 | 27 | 24951 | 2/15/2013 13:15 | 2/15/2013 13:16 | PIC | SR89C13 |
| C3 | 10D | 1 | 25 | 26000 | 2/15/2013 13:11 | 2/15/2013 13:12 | PIC | SR89C13 |
| C4 | 10D | 1 | 18 | 25540 | 2/15/2013 13:08 | 2/15/2013 13:09 | PIC | SR89C13 |
| C5 | 10D | 1 | 25 | 25889 | 2/15/2013 13:05 | 2/15/2013 13:06 | PIC | SR89C13 |
| C6 | 10D | 1 | 21 | 23854 | 2/15/2013 13:01 | 2/15/2013 13:02 | PIC | SR89C13 |
| C7 | 10D | 1 | 21 | 26394 | 2/15/2013 12:58 | 2/15/2013 12:59 | PIC | SR89C13 |
| C8 | 10D | 1 | 19 | 19760 | 2/15/2013 12:54 | 2/15/2013 12:55 | PIC | SR89C13 |
| C1 | 11A | 1 | 0 | 19465 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C2 | 11A | 1 | 0 | 20978 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C3 | 11A | 1 | 0 | 21798 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C4 | 11A | 1 | 0 | 21585 | 2/15/2013 12:30 | 2/15/2013 12:31 | PIC | SR89C13 |
| C5 | 11A | 1 | 1 | 22052 | 2/15/2013 12:39 | 2/15/2013 12:40 | PIC | SR89C13 |
| C6 | 11A | 1 | 0 | 20207 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C7 | 11A | 1 | 0 | 21925 | 2/15/2013 12:45 | 2/15/2013 12:46 | PIC | SR89C13 |
| C8 | 11A | 1 | 0 | 17769 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C1 | 11B | 1 | 0 | 22955 | 2/15/2013 12:30 | 2/15/2013 12:31 | PIC | SR89C13 |
| C2 | 11B | 1 | 0 | 24624 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C3 | 11B | 1 | 1 | 25818 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C4 | 11B | 1 | 1 | 25455 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C5 | 11B | 1 | 2 | 25722 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C6 | 11B | 1 | 1 | 23486 | 2/15/2013 12:39 | 2/15/2013 12:40 | PIC | SR89C13 |
| C7 | 11B | 1 | 0 | 26243 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C8 | 11B | 1 | 1 | 20341 | 2/15/2013 12:45 | 2/15/2013 12:46 | PIC | SR89C13 |
| C1 | 11C | 1 | 0 | 22849 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C2 | 11C | 1 | 0 | 24747 | 2/15/2013 12:30 | 2/15/2013 12:31 | PIC | SR89C13 |
| C3 | 11C | 1 | 0 | 25794 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C4 | 11C | 1 | 0 | 25259 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C5 | 11C | 1 | 0 | 25754 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C6 | 11C | 1 | 0 | 23292 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C7 | 11C | 1 | 0 | 26032 | 2/15/2013 12:39 | 2/15/2013 12:40 | PIC | SR89C13 |
| C8 | 11C | 1 | 1 | 19787 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C1 | 11D | 1 | 0 | 23032 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C2 | 11D | 1 | 0 | 24975 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C3 | 11D | 1 | 0 | 26164 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C4 | 11D | 1 | 0 | 25392 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C5 | 11D | 1 | 0 | 26139 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C6 | 11D | 1 | 0 | 23587 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C7 | 11D | 1 | 0 | 26126 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C8 | 11D | 1 | 0 | 21236 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C1 | 12A | 1 | 0 | 0 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C2 | 12A | 1 | 0 | 0 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C3 | 12A | 1 | 0 | 0 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C4 | 12A | 1 | 0 | 0 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C5 | 12A | 1 | 0 | 0 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C6 | 12A | 1 | 0 | 0 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C7 | 12A | 1 | 0 | 0 | 2/15/2013 12:34 | 2/15/2013 12:35 | PIC | SR89C13 |
| C8 | 12A | 1 | 0 | 0 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C1 | 12B | 1 | 0 | 11423 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C2 | 12B | 1 | 0 | 12283 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C3 | 12B | 1 | 0 | 13000 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C4 | 12B | 1 | 0 | 12474 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C5 | 12B | 1 | 0 | 13323 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C6 | 12B | 1 | 0 | 12524 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C7 | 12B | 1 | 0 | 12656 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C8 | 12B | 1 | 0 | 10909 | 2/15/2013 12:35 | 2/15/2013 12:36 | PIC | SR89C13 |
| C1 | 12C | 1 | 0 | 10621 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C2 | 12C | 1 | 0 | 10886 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C3 | 12C | 1 | 0 | 10093 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C4 | 12C | 1 | 0 | 12768 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C5 | 12C | 1 | 0 | 11356 | 2/15/2013 12:35 | 2/15/2013 12:36 | PIC | SR89C13 |
| C6 | 12C | 1 | 0 | 10436 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C7 | 12C | 1 | 0 | 8655 | 2/15/2013 12:26 | 2/15/2013 12:27 | PIC | SR89C13 |
| C8 | 12C | 1 | 0 | 7925 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C1 | 12D | 1 | 0 | 22275 | 2/15/2013 12:48 | 2/15/2013 12:49 | PIC | SR89C13 |
| C2 | 12D | 1 | 0 | 23929 | 2/15/2013 12:46 | 2/15/2013 12:47 | PIC | SR89C13 |
| C3 | 12D | 1 | 2 | 24816 | 2/15/2013 12:43 | 2/15/2013 12:44 | PIC | SR89C13 |
| C4 | 12D | 1 | 0 | 24308 | 2/15/2013 12:40 | 2/15/2013 12:41 | PIC | SR89C13 |
| C5 | 12D | 1 | 0 | 25022 | 2/15/2013 12:37 | 2/15/2013 12:38 | PIC | SR89C13 |
| C6 | 12D | 1 | 0 | 22695 | 2/15/2013 12:35 | 2/15/2013 12:36 | PIC | SR89C13 |
| C7 | 12D | 1 | 0 | 25156 | 2/15/2013 12:31 | 2/15/2013 12:32 | PIC | SR89C13 |
| C8 | 12D | 1 | 1 | 20790 | 2/15/2013 12:27 | 2/15/2013 12:28 | PIC | SR89C13 |
| C1 | 13A | 1 | 0 | 22743 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C2 | 13A | 1 | 0 | 24809 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C3 | 13A | 1 | 0 | 26030 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C4 | 13A | 1 | 0 | 25231 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C5 | 13A | 1 | 0 | 25679 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C6 | 13A | 1 | 0 | 23601 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C7 | 13A | 1 | 0 | 26108 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C8 | 13A | 1 | 3 | 21741 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C1 | 13B | 1 | 0 | 23326 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C2 | 13B | 1 | 0 | 25000 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C3 | 13B | 1 | 0 | 26432 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C4 | 13B | 1 | 0 | 25874 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C5 | 13B | 1 | 0 | 26690 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C6 | 13B | 1 | 0 | 24326 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C7 | 13B | 1 | 0 | 26586 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C8 | 13B | 1 | 1 | 22201 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C1 | 13C | 1 | 0 | 23080 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C2 | 13C | 1 | 0 | 24850 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C3 | 13C | 1 | 0 | 26077 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C4 | 13C | 1 | 0 | 25534 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C5 | 13C | 1 | 0 | 26440 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C6 | 13C | 1 | 0 | 23843 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C7 | 13C | 1 | 1 | 25844 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C8 | 13C | 1 | 0 | 21603 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C1 | 13D | 1 | 0 | 22759 | 2/15/2013 11:49 | 2/15/2013 11:50 | PIC | SR89C13 |
| C2 | 13D | 1 | 0 | 24457 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C3 | 13D | 1 | 1 | 25628 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C4 | 13D | 1 | 0 | 25066 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C5 | 13D | 1 | 0 | 25723 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C6 | 13D | 1 | 0 | 23187 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C7 | 13D | 1 | 0 | 25552 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C8 | 13D | 1 | 0 | 21943 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C1 | 14A | 1 | 0 | 21875 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C2 | 14A | 1 | 0 | 24524 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C3 | 14A | 1 | 0 | 25512 | 2/15/2013 12:18 | 2/15/2013 12:19 | PIC | SR89C13 |
| C4 | 14A | 1 | 0 | 24999 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C5 | 14A | 1 | 0 | 25660 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C6 | 14A | 1 | 0 | 23262 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C7 | 14A | 1 | 0 | 25922 | 2/15/2013 11:47 | 2/15/2013 11:48 | PIC | SR89C13 |
| C8 | 14A | 1 | 0 | 22048 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C1 | 14B | 1 | 1 | 23056 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C2 | 14B | 1 | 1 | 24712 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C3 | 14B | 1 | 0 | 25936 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C4 | 14B | 1 | 0 | 25683 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C5 | 14B | 1 | 1 | 25954 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C6 | 14B | 1 | 0 | 23872 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C7 | 14B | 1 | 0 | 26271 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C8 | 14B | 1 | 0 | 22456 | 2/15/2013 11:48 | 2/15/2013 11:49 | PIC | SR89C13 |
| C1 | 14C | 1 | 0 | 22999 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C2 | 14C | 1 | 0 | 25216 | 2/15/2013 12:16 | 2/15/2013 12:17 | PIC | SR89C13 |
| C3 | 14C | 1 | 0 | 26170 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C4 | 14C | 1 | 0 | 25729 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C5 | 14C | 1 | 0 | 26457 | 2/15/2013 11:48 | 2/15/2013 11:49 | PIC | SR89C13 |
| C6 | 14C | 1 | 0 | 23806 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C7 | 14C | 1 | 0 | 26330 | 2/15/2013 11:39 | 2/15/2013 11:40 | PIC | SR89C13 |
| C8 | 14C | 1 | 0 | 22288 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C1 | 14D | 1 | 0 | 22297 | 2/15/2013 12:22 | 2/15/2013 12:23 | PIC | SR89C13 |
| C2 | 14D | 1 | 0 | 24355 | 2/15/2013 12:19 | 2/15/2013 12:20 | PIC | SR89C13 |
| C3 | 14D | 1 | 0 | 25319 | 2/15/2013 12:17 | 2/15/2013 12:18 | PIC | SR89C13 |

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|---|---|---|---|---|---|---|---|---|
| C4 | 14D | 1 | 0 | 24492 | 2/15/2013 12:12 | 2/15/2013 12:13 | PIC | SR89C13 |
| C5 | 14D | 1 | 0 | 25239 | 2/15/2013 11:50 | 2/15/2013 11:51 | PIC | SR89C13 |
| C6 | 14D | 1 | 0 | 23452 | 2/15/2013 11:48 | 2/15/2013 11:49 | PIC | SR89C13 |
| C7 | 14D | 1 | 0 | 25637 | 2/15/2013 11:45 | 2/15/2013 11:46 | PIC | SR89C13 |
| C8 | 14D | 1 | 0 | 22338 | 2/15/2013 11:40 | 2/15/2013 11:41 | PIC | SR89C13 |

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## Sr-90 Calibration - PIC - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

| | |
|---|---|
| Separation Date/Time | 3/29/2013 14:10 |
| Y-90 Half Life (days) | 2.668875 |

The following detectors were not calibrated:
12A, 12B, 12C, 12D

| Carrier Data | | Std ID | 1858443 | |
|---|---|---|---|---|
| | | Std weight | 17.1 | mg/mL |
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 3.3 | 0.2 | 3.42 | 96.5% |
| 2 | 7.3 | 0.4 | 6.84 | 100.0% |
| 3 | 8.5 | 0.5 | 8.55 | 99.4% |
| 4 | 12.2 | 0.7 | 11.97 | 100.0% |
| 5 | 17.2 | 1 | 17.10 | 100.0% |
| 6 | 26.6 | 1.5 | 25.65 | 100.0% |
| 7 | 31.0 | 1.8 | 30.78 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered negligible.
**Decay corrected to mid-point of cou

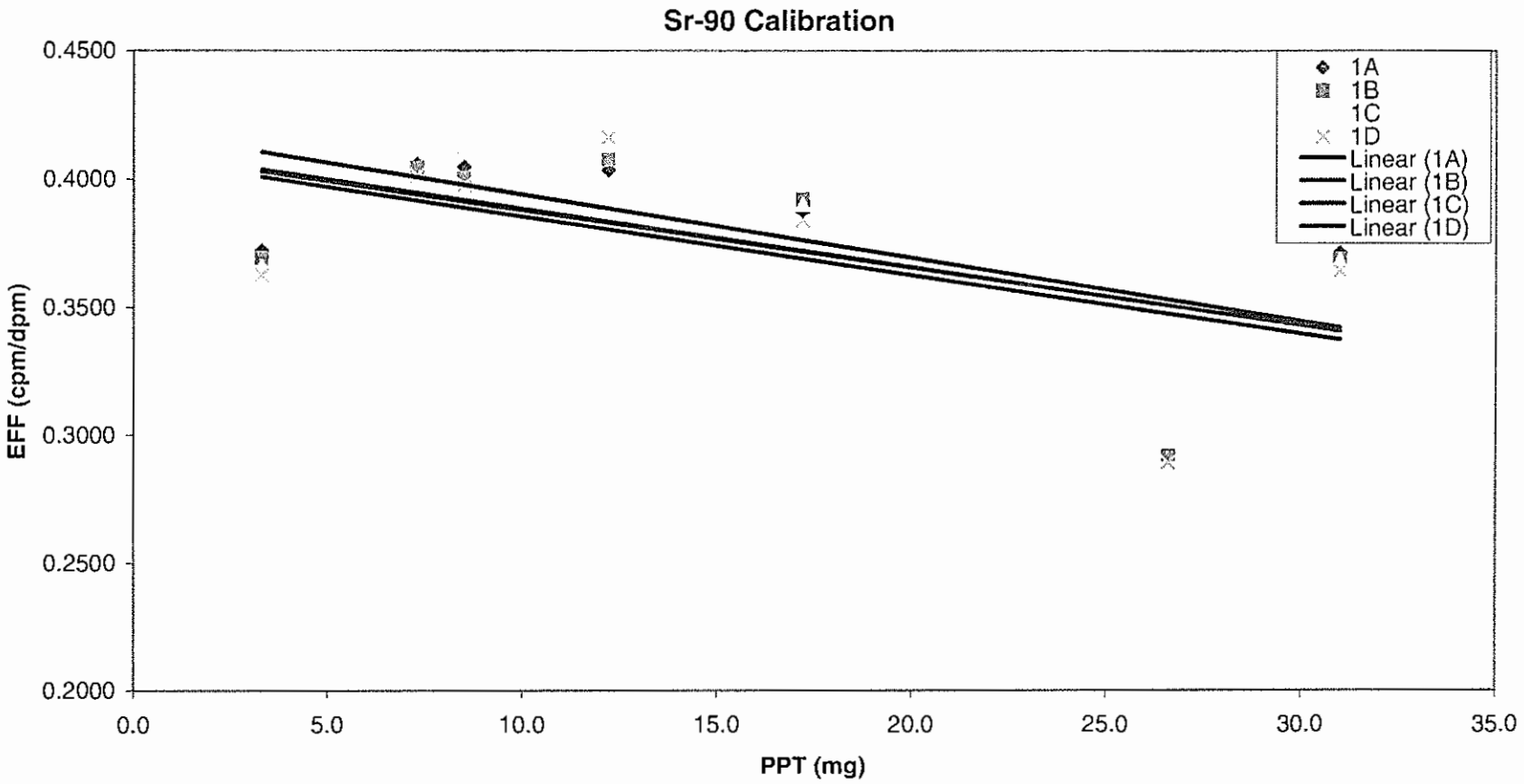
| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A | 1 | 3/30/2013 12:17 | 3 | 14094 | 4698.00 | 96.5% | 0.53530 | 0.21317 | 3565.42 | 9576.98 | 0.3723 | 0.4039 |
| 1A | 2 | 3/30/2013 13:18 | 3 | 15073 | 5024.33 | 100.0% | 0.53530 | 0.22169 | 3887.63 | 9576.95 | 0.4060 | 0.3948 |
| 1A | 3 | 3/30/2013 13:10 | 3 | 15044 | 5014.67 | 99.4% | 0.53530 | 0.22059 | 3877.15 | 9576.96 | 0.4048 | 0.3921 |
| 1A | 4 | 3/30/2013 13:02 | 3 | 14969 | 4989.67 | 100.0% | 0.53530 | 0.21950 | 3864.39 | 9576.96 | 0.4035 | 0.3836 |
| 1A | 5 | 3/30/2013 12:55 | 3 | 14480 | 4826.67 | 100.0% | 0.53530 | 0.21852 | 3706.40 | 9576.96 | 0.3870 | 0.3722 |
| 1A | 6 | 3/30/2013 12:41 | 3 | 11753 | 3917.67 | 100.0% | 0.53530 | 0.21653 | 2807.61 | 9576.97 | 0.2932 | 0.3508 |
| 1A | 7 | 3/30/2013 12:33 | 3 | 13985 | 4661.67 | 100.0% | 0.53530 | 0.21541 | 3557.36 | 9576.97 | 0.3714 | 0.3408 |
| 1B | 1 | 3/30/2013 12:25 | 3 | 14015 | 4671.67 | 96.5% | 0.53354 | 0.21423 | 3537.22 | 9576.98 | 0.3693 | 0.4030 |
| 1B | 2 | 3/30/2013 12:17 | 3 | 14889 | 4963.00 | 100.0% | 0.53354 | 0.21318 | 3873.70 | 9576.98 | 0.4045 | 0.3941 |
| 1B | 3 | 3/30/2013 13:18 | 3 | 14916 | 4972.00 | 99.4% | 0.53354 | 0.22169 | 3832.59 | 9576.95 | 0.4002 | 0.3914 |
| 1B | 4 | 3/30/2013 13:10 | 3 | 15096 | 5032.00 | 100.0% | 0.53354 | 0.22059 | 3904.87 | 9576.96 | 0.4077 | 0.3831 |
| 1B | 5 | 3/30/2013 13:02 | 3 | 14632 | 4877.33 | 100.0% | 0.53354 | 0.21946 | 3755.95 | 9576.96 | 0.3922 | 0.3719 |
| 1B | 6 | 3/30/2013 12:55 | 3 | 11749 | 3916.33 | 100.0% | 0.53354 | 0.21849 | 2799.92 | 9576.96 | 0.2924 | 0.3508 |
| 1B | 7 | 3/30/2013 12:41 | 3 | 13913 | 4637.67 | 100.0% | 0.53354 | 0.21649 | 3531.48 | 9576.97 | 0.3687 | 0.3409 |
| 1C | 1 | 3/30/2013 12:33 | 3 | 13961 | 4653.67 | 96.5% | 0.53619 | 0.21541 | 3507.31 | 9576.97 | 0.3662 | 0.4107 |
| 1C | 2 | 3/30/2013 12:25 | 3 | 15401 | 5133.67 | 100.0% | 0.53619 | 0.21423 | 4033.58 | 9576.98 | 0.4212 | 0.4008 |
| 1C | 3 | 3/30/2013 12:18 | 3 | 15175 | 5058.33 | 99.4% | 0.53619 | 0.21322 | 3956.99 | 9576.98 | 0.4132 | 0.3979 |
| 1C | 4 | 3/30/2013 13:18 | 3 | 15289 | 5096.33 | 100.0% | 0.53619 | 0.22169 | 3957.94 | 9576.95 | 0.4133 | 0.3887 |
| 1C | 5 | 3/30/2013 13:10 | 3 | 14609 | 4869.67 | 100.0% | 0.53619 | 0.22059 | 3736.93 | 9576.96 | 0.3902 | 0.3764 |
| 1C | 6 | 3/30/2013 13:02 | 3 | 11924 | 3974.67 | 100.0% | 0.53619 | 0.21946 | 2847.70 | 9576.96 | 0.2973 | 0.3531 |
| 1C | 7 | 3/30/2013 12:55 | 3 | 13954 | 4651.33 | 100.0% | 0.53619 | 0.21849 | 3529.37 | 9576.96 | 0.3685 | 0.3422 |
| 1D | 1 | 3/30/2013 12:41 | 3 | 13844 | 4614.67 | 96.5% | 0.53094 | 0.21649 | 3473.83 | 9576.97 | 0.3627 | 0.4009 |
| 1D | 2 | 3/30/2013 12:33 | 3 | 14825 | 4941.67 | 100.0% | 0.53094 | 0.21541 | 3846.37 | 9576.97 | 0.4016 | 0.3917 |
| 1D | 3 | 3/30/2013 12:25 | 3 | 14718 | 4906.00 | 99.4% | 0.53094 | 0.21423 | 3810.27 | 9576.98 | 0.3979 | 0.3890 |
| 1D | 4 | 3/30/2013 12:18 | 3 | 15215 | 5071.67 | 100.0% | 0.53094 | 0.21323 | 3987.43 | 9576.98 | 0.4164 | 0.3805 |
| 1D | 5 | 3/30/2013 13:18 | 3 | 14413 | 4804.33 | 100.0% | 0.53094 | 0.22169 | 3677.09 | 9576.95 | 0.3840 | 0.3691 |
| 1D | 6 | 3/30/2013 13:10 | 3 | 11672 | 3890.67 | 100.0% | 0.53094 | 0.22059 | 2769.01 | 9576.96 | 0.2891 | 0.3475 |
| 1D | 7 | 3/30/2013 13:02 | 3 | 13819 | 4606.33 | 100.0% | 0.53094 | 0.21946 | 3490.40 | 9576.96 | 0.3645 | 0.3374 |
| 2A | 1 | 3/30/2013 12:55 | 3 | 13666 | 4555.33 | 96.5% | 0.51176 | 0.21853 | 3445.37 | 9576.96 | 0.3598 | 0.3955 |
| 2A | 2 | 3/30/2013 12:41 | 3 | 14488 | 4829.33 | 100.0% | 0.51176 | 0.21654 | 3768.06 | 9576.97 | 0.3935 | 0.3867 |
| 2A | 3 | 3/30/2013 12:33 | 3 | 14873 | 4957.67 | 99.4% | 0.51176 | 0.21541 | 3895.69 | 9576.97 | 0.4068 | 0.3840 |
| 2A | 4 | 3/30/2013 12:25 | 3 | 14469 | 4823.00 | 100.0% | 0.51176 | 0.21423 | 3773.02 | 9576.98 | 0.3940 | 0.3758 |
| 2A | 5 | 3/30/2013 12:18 | 3 | 14051 | 4683.67 | 100.0% | 0.51176 | 0.21325 | 3638.49 | 9576.98 | 0.3799 | 0.3647 |
| 2A | 6 | 3/30/2013 13:18 | 3 | 11610 | 3870.00 | 100.0% | 0.51176 | 0.22168 | 2783.51 | 9576.95 | 0.2906 | 0.3439 |
| 2A | 7 | 3/30/2013 13:10 | 3 | 13591 | 4530.33 | 100.0% | 0.51176 | 0.22059 | 3449.18 | 9576.96 | 0.3602 | 0.3341 |
| 2B | 1 | 3/30/2013 13:02 | 3 | 13529 | 4509.67 | 96.5% | 0.51601 | 0.21951 | 3385.45 | 9576.96 | 0.3535 | 0.3921 |
| 2B | 2 | 3/30/2013 12:55 | 3 | 14792 | 4930.67 | 100.0% | 0.51601 | 0.21853 | 3850.76 | 9576.96 | 0.4021 | 0.3843 |
| 2B | 3 | 3/30/2013 12:41 | 3 | 14576 | 4858.67 | 99.4% | 0.51601 | 0.21654 | 3782.28 | 9576.97 | 0.3949 | 0.3820 |
| 2B | 4 | 3/30/2013 12:33 | 3 | 14582 | 4860.67 | 100.0% | 0.51601 | 0.21541 | 3796.13 | 9576.97 | 0.3964 | 0.3747 |
| 2B | 5 | 3/30/2013 12:25 | 3 | 14089 | 4696.33 | 100.0% | 0.51601 | 0.21428 | 3637.42 | 9576.98 | 0.3798 | 0.3649 |
| 2B | 6 | 3/30/2013 12:18 | 3 | 11449 | 3816.33 | 100.0% | 0.51601 | 0.21327 | 2762.41 | 9576.98 | 0.2884 | 0.3465 |
| 2B | 7 | 3/30/2013 13:18 | 3 | 13840 | 4613.33 | 100.0% | 0.51601 | 0.22168 | 3517.82 | 9576.95 | 0.3673 | 0.3379 |
| 2C | 1 | 3/30/2013 13:10 | 3 | 13679 | 4559.67 | 96.5% | 0.51812 | 0.22059 | 3425.28 | 9576.96 | 0.3577 | 0.3937 |
| 2C | 2 | 3/30/2013 13:02 | 3 | 14707 | 4902.33 | 100.0% | 0.51812 | 0.21951 | 3813.12 | 9576.96 | 0.3982 | 0.3872 |
| 2C | 3 | 3/30/2013 12:55 | 3 | 14753 | 4917.67 | 99.4% | 0.51812 | 0.21853 | 3826.96 | 9576.96 | 0.3996 | 0.3853 |
| 2C | 4 | 3/30/2013 12:41 | 3 | 14853 | 4951.00 | 100.0% | 0.51812 | 0.21653 | 3876.57 | 9576.97 | 0.4048 | 0.3793 |
| 2C | 5 | 3/30/2013 12:33 | 3 | 14390 | 4796.67 | 100.0% | 0.51812 | 0.21541 | 3727.79 | 9576.97 | 0.3892 | 0.3712 |
| 2C | 6 | 3/30/2013 12:25 | 3 | 11397 | 3799.00 | 100.0% | 0.51812 | 0.21428 | 2735.76 | 9576.98 | 0.2857 | 0.3560 |
| 2C | 7 | 3/30/2013 12:18 | 3 | 14284 | 4761.33 | 100.0% | 0.51812 | 0.21329 | 3703.01 | 9576.98 | 0.3867 | 0.3489 |
| 2D | 1 | 3/30/2013 13:18 | 3 | 13865 | 4621.67 | 96.5% | 0.51988 | 0.22168 | 3477.80 | 9576.95 | 0.3631 | 0.3954 |
| 2D | 2 | 3/30/2013 13:10 | 3 | 14898 | 4966.00 | 100.0% | 0.51988 | 0.22059 | 3867.69 | 9576.96 | 0.4039 | 0.3870 |
| 2D | 3 | 3/30/2013 13:02 | 3 | 14524 | 4841.33 | 99.4% | 0.51988 | 0.21951 | 3741.99 | 9576.96 | 0.3907 | 0.3845 |
| 2D | 4 | 3/30/2013 12:55 | 3 | 14804 | 4934.67 | 100.0% | 0.51988 | 0.21853 | 3846.65 | 9576.96 | 0.4017 | 0.3768 |
| 2D | 5 | 3/30/2013 12:41 | 3 | 14073 | 4691.00 | 100.0% | 0.51988 | 0.21653 | 3612.91 | 9576.97 | 0.3772 | 0.3664 |
| 2D | 6 | 3/30/2013 12:33 | 3 | 11483 | 3827.67 | 100.0% | 0.51988 | 0.21541 | 2755.15 | 9576.97 | 0.2877 | 0.3469 |
| 2D | 7 | 3/30/2013 12:25 | 3 | 13847 | 4615.67 | 100.0% | 0.51988 | 0.21428 | 3548.81 | 9576.98 | 0.3706 | 0.3377 |
| 3A | 1 | 3/30/2013 12:21 | 3 | 13645 | 4548.33 | 96.5% | 0.53079 | 0.21370 | 3422.53 | 9576.98 | 0.3574 | 0.3908 |
| 3A | 2 | 3/30/2013 13:21 | 3 | 14564 | 4854.67 | 100.0% | 0.53079 | 0.22223 | 3725.02 | 9576.95 | 0.3890 | 0.3817 |
| 3A | 3 | 3/30/2013 13:14 | 3 | 14572 | 4857.33 | 99.4% | 0.53079 | 0.22116 | 3726.48 | 9576.96 | 0.3891 | 0.3790 |
| 3A | 4 | 3/30/2013 13:06 | 3 | 14839 | 4946.33 | 100.0% | 0.53079 | 0.22010 | 3827.48 | 9576.96 | 0.3997 | 0.3706 |
| 3A | 5 | 3/30/2013 12:58 | 3 | 14177 | 4725.67 | 100.0% | 0.53079 | 0.21896 | 3612.62 | 9576.96 | 0.3772 | 0.3594 |
| 3A | 6 | 3/30/2013 12:51 | 3 | 11303 | 3767.67 | 100.0% | 0.53079 | 0.21793 | 2659.65 | 9576.97 | 0.2777 | 0.3381 |
| 3A | 7 | 3/30/2013 12:37 | 3 | 13572 | 4524.00 | 100.0% | 0.53079 | 0.21601 | 3425.94 | 9576.97 | 0.3577 | 0.3282 |
| 3B | 1 | 3/30/2013 12:29 | 3 | 13621 | 4540.33 | 96.5% | 0.53063 | 0.21488 | 3408.64 | 9576.97 | 0.3559 | 0.3883 |
| 3B | 2 | 3/30/2013 12:21 | 3 | 14585 | 4861.67 | 100.0% | 0.53063 | 0.21370 | 3775.68 | 9576.98 | 0.3942 | 0.3805 |
| 3B | 3 | 3/30/2013 13:21 | 3 | 14415 | 4805.00 | 99.4% | 0.53063 | 0.22223 | 3669.05 | 9576.95 | 0.3831 | 0.3782 |
| 3B | 4 | 3/30/2013 13:14 | 3 | 14709 | 4903.00 | 100.0% | 0.53063 | 0.22116 | 3779.10 | 9576.96 | 0.3946 | 0.3710 |
| 3B | 5 | 3/30/2013 13:06 | 3 | 14272 | 4757.33 | 100.0% | 0.53063 | 0.22010 | 3638.81 | 9576.96 | 0.3800 | 0.3613 |
| 3B | 6 | 3/30/2013 12:58 | 3 | 11627 | 3875.67 | 100.0% | 0.53063 | 0.21894 | 2763.04 | 9576.96 | 0.2885 | 0.3431 |
| 3B | 7 | 3/30/2013 12:51 | 3 | 13584 | 4561.33 | 100.0% | 0.53063 | 0.21793 | 3453.64 | 9576.97 | 0.3606 | 0.3346 |
| 3C | 1 | 3/30/2013 12:37 | 3 | 14011 | 4670.33 | 96.5% | 0.53195 | 0.21601 | 3529.65 | 9576.97 | 0.3686 | 0.4047 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3C | 2 | 3/30/2013 12:29 | 3 | 15274 | 5091.33 | 100.0% | 0.53195 | 0.21488 | 3996.63 | 9576.97 | 0.4173 | 0.3956 |
| 3C | 3 | 3/30/2013 12:21 | 3 | 14723 | 4907.67 | 99.4% | 0.53195 | 0.21370 | 3812.58 | 9576.98 | 0.3981 | 0.3929 |
| 3C | 4 | 3/30/2013 13:21 | 3 | 15163 | 5054.33 | 100.0% | 0.53195 | 0.22223 | 3922.22 | 9576.95 | 0.4095 | 0.3846 |
| 3C | 5 | 3/30/2013 13:14 | 3 | 14420 | 4806.67 | 100.0% | 0.53195 | 0.22116 | 3679.97 | 9576.96 | 0.3843 | 0.3733 |
| 3C | 6 | 3/30/2013 13:06 | 3 | 11833 | 3944.33 | 100.0% | 0.53195 | 0.22010 | 2823.06 | 9576.96 | 0.2948 | 0.3520 |
| 3C | 7 | 3/30/2013 12:58 | 3 | 14051 | 4683.67 | 100.0% | 0.53195 | 0.21895 | 3568.26 | 9576.96 | 0.3726 | 0.3421 |
| 3D | 1 | 3/30/2013 12:51 | 3 | 13662 | 4554.00 | 96.5% | 0.52104 | 0.21793 | 3426.97 | 9576.97 | 0.3578 | 0.3947 |
| 3D | 2 | 3/30/2013 12:37 | 3 | 14617 | 4872.33 | 100.0% | 0.52104 | 0.21601 | 3794.43 | 9576.97 | 0.3962 | 0.3857 |
| 3D | 3 | 3/30/2013 12:29 | 3 | 14360 | 4786.67 | 99.4% | 0.52104 | 0.21488 | 3708.10 | 9576.97 | 0.3872 | 0.3830 |
| 3D | 4 | 3/30/2013 12:21 | 3 | 14989 | 4996.33 | 100.0% | 0.52104 | 0.21370 | 3929.97 | 9576.98 | 0.4104 | 0.3748 |
| 3D | 5 | 3/30/2013 13:21 | 3 | 14309 | 4769.67 | 100.0% | 0.52104 | 0.22222 | 3660.77 | 9576.95 | 0.3822 | 0.3636 |
| 3D | 6 | 3/30/2013 13:14 | 3 | 11533 | 3844.33 | 100.0% | 0.52104 | 0.22116 | 2740.74 | 9576.96 | 0.2862 | 0.3426 |
| 3D | 7 | 3/30/2013 13:06 | 3 | 13555 | 4518.33 | 100.0% | 0.52104 | 0.22010 | 3420.03 | 9576.96 | 0.3571 | 0.3328 |
| 4A | 1 | 3/30/2013 12:58 | 3 | 14023 | 4674.33 | 96.5% | 0.53002 | 0.21898 | 3522.35 | 9576.96 | 0.3678 | 0.4038 |
| 4A | 2 | 3/30/2013 12:51 | 3 | 14894 | 4964.67 | 100.0% | 0.53002 | 0.21794 | 3858.41 | 9576.97 | 0.4029 | 0.3945 |
| 4A | 3 | 3/30/2013 12:37 | 3 | 14985 | 4995.00 | 99.4% | 0.53002 | 0.21599 | 3892.19 | 9576.97 | 0.4064 | 0.3917 |
| 4A | 4 | 3/30/2013 12:30 | 3 | 15019 | 5006.33 | 100.0% | 0.53002 | 0.21491 | 3915.47 | 9576.97 | 0.4088 | 0.3832 |
| 4A | 5 | 3/30/2013 12:21 | 3 | 14476 | 4825.33 | 100.0% | 0.53002 | 0.21372 | 3740.47 | 9576.98 | 0.3906 | 0.3716 |
| 4A | 6 | 3/30/2013 13:21 | 3 | 11639 | 3879.67 | 100.0% | 0.53002 | 0.22220 | 2751.79 | 9576.95 | 0.2873 | 0.3499 |
| 4A | 7 | 3/30/2013 13:14 | 3 | 14014 | 4671.33 | 100.0% | 0.53002 | 0.22119 | 3548.59 | 9576.95 | 0.3705 | 0.3397 |
| 4B | 1 | 3/30/2013 13:06 | 3 | 13871 | 4623.67 | 96.5% | 0.53481 | 0.22006 | 3455.57 | 9576.96 | 0.3608 | 0.4026 |
| 4B | 2 | 3/30/2013 12:58 | 3 | 15191 | 5063.67 | 100.0% | 0.53481 | 0.21898 | 3942.07 | 9576.96 | 0.4116 | 0.3939 |
| 4B | 3 | 3/30/2013 12:51 | 3 | 15008 | 5002.67 | 99.4% | 0.53481 | 0.21794 | 3879.86 | 9576.97 | 0.4051 | 0.3913 |
| 4B | 4 | 3/30/2013 12:37 | 3 | 15000 | 5000.00 | 100.0% | 0.53481 | 0.21599 | 3893.74 | 9576.97 | 0.4066 | 0.3832 |
| 4B | 5 | 3/30/2013 12:30 | 3 | 14550 | 4850.00 | 100.0% | 0.53481 | 0.21490 | 3749.30 | 9576.97 | 0.3915 | 0.3722 |
| 4B | 6 | 3/30/2013 12:21 | 3 | 11562 | 3854.00 | 100.0% | 0.53481 | 0.21372 | 2759.36 | 9576.98 | 0.2881 | 0.3517 |
| 4B | 7 | 3/30/2013 13:21 | 3 | 14136 | 4712.00 | 100.0% | 0.53481 | 0.22220 | 3573.94 | 9576.95 | 0.3732 | 0.3421 |
| 4C | 1 | 3/30/2013 13:14 | 3 | 14091 | 4697.00 | 96.5% | 0.53734 | 0.22119 | 3517.34 | 9576.95 | 0.3673 | 0.4019 |
| 4C | 2 | 3/30/2013 13:06 | 3 | 15137 | 5045.67 | 100.0% | 0.53734 | 0.22006 | 3913.20 | 9576.96 | 0.4086 | 0.3939 |
| 4C | 3 | 3/30/2013 12:58 | 3 | 15020 | 5006.67 | 99.4% | 0.53734 | 0.21898 | 3873.12 | 9576.96 | 0.4044 | 0.3917 |
| 4C | 4 | 3/30/2013 12:51 | 3 | 15005 | 5001.67 | 100.0% | 0.53734 | 0.21794 | 3880.13 | 9576.97 | 0.4052 | 0.3848 |
| 4C | 5 | 3/30/2013 12:37 | 3 | 14581 | 4860.33 | 100.0% | 0.53734 | 0.21599 | 3748.83 | 9576.97 | 0.3914 | 0.3756 |
| 4C | 6 | 3/30/2013 12:30 | 3 | 11676 | 3892.00 | 100.0% | 0.53734 | 0.21490 | 2786.08 | 9576.97 | 0.2909 | 0.3582 |
| 4C | 7 | 3/30/2013 12:21 | 3 | 14439 | 4813.00 | 100.0% | 0.53734 | 0.21375 | 3713.00 | 9576.98 | 0.3877 | 0.3501 |
| 4D | 1 | 3/30/2013 13:21 | 3 | 13872 | 4624.00 | 96.5% | 0.53162 | 0.22220 | 3451.58 | 9576.95 | 0.3604 | 0.3956 |
| 4D | 2 | 3/30/2013 13:14 | 3 | 15024 | 5008.00 | 100.0% | 0.53162 | 0.22119 | 3881.66 | 9576.95 | 0.4053 | 0.3870 |
| 4D | 3 | 3/30/2013 13:06 | 3 | 14688 | 4896.00 | 99.4% | 0.53162 | 0.22006 | 3769.01 | 9576.96 | 0.3935 | 0.3844 |
| 4D | 4 | 3/30/2013 12:58 | 3 | 14941 | 4980.33 | 100.0% | 0.53162 | 0.21899 | 3865.41 | 9576.96 | 0.4036 | 0.3765 |
| 4D | 5 | 3/30/2013 12:51 | 3 | 14023 | 4674.33 | 100.0% | 0.53162 | 0.21794 | 3564.75 | 9576.97 | 0.3722 | 0.3658 |
| 4D | 6 | 3/30/2013 12:37 | 3 | 11509 | 3836.33 | 100.0% | 0.53162 | 0.21599 | 2736.67 | 9576.97 | 0.2858 | 0.3457 |
| 4D | 7 | 3/30/2013 12:30 | 3 | 13924 | 4641.33 | 100.0% | 0.53162 | 0.21490 | 3547.19 | 9576.97 | 0.3704 | 0.3363 |
| 5A | 1 | 3/30/2013 13:25 | 3 | 14335 | 4778.33 | 96.5% | 0.53718 | 0.22270 | 3590.98 | 9576.95 | 0.3750 | 0.4129 |
| 5A | 2 | 3/30/2013 14:15 | 3 | 15370 | 5123.33 | 100.0% | 0.53718 | 0.22970 | 3941.61 | 9576.93 | 0.4116 | 0.4010 |
| 5A | 3 | 3/30/2013 14:07 | 3 | 15373 | 5124.33 | 99.4% | 0.53718 | 0.22864 | 3941.17 | 9576.93 | 0.4115 | 0.3974 |
| 5A | 4 | 3/30/2013 14:00 | 3 | 15258 | 5086.00 | 100.0% | 0.53718 | 0.22766 | 3914.80 | 9576.93 | 0.4088 | 0.3863 |
| 5A | 5 | 3/30/2013 13:53 | 3 | 14748 | 4916.00 | 100.0% | 0.53718 | 0.22668 | 3749.83 | 9576.94 | 0.3915 | 0.3714 |
| 5A | 6 | 3/30/2013 13:47 | 3 | 11926 | 3975.33 | 100.0% | 0.53718 | 0.22573 | 2814.04 | 9576.94 | 0.2938 | 0.3434 |
| 5A | 7 | 3/30/2013 13:40 | 3 | 13537 | 4512.33 | 100.0% | 0.53718 | 0.22477 | 3356.01 | 9576.94 | 0.3504 | 0.3302 |
| 5B | 1 | 3/30/2013 13:32 | 3 | 14174 | 4724.67 | 96.5% | 0.53788 | 0.22367 | 3530.60 | 9576.95 | 0.3687 | 0.4096 |
| 5B | 2 | 3/30/2013 13:25 | 3 | 15365 | 5121.67 | 100.0% | 0.53788 | 0.22270 | 3974.51 | 9576.95 | 0.4150 | 0.3982 |
| 5B | 3 | 3/30/2013 14:15 | 3 | 15151 | 5050.33 | 99.4% | 0.53788 | 0.22966 | 3860.34 | 9576.93 | 0.4031 | 0.3947 |
| 5B | 4 | 3/30/2013 14:07 | 3 | 15253 | 5084.33 | 100.0% | 0.53788 | 0.22864 | 3906.57 | 9576.93 | 0.4079 | 0.3841 |
| 5B | 5 | 3/30/2013 14:00 | 3 | 14820 | 4940.00 | 100.0% | 0.53788 | 0.22763 | 3767.44 | 9576.93 | 0.3934 | 0.3698 |
| 5B | 6 | 3/30/2013 13:53 | 3 | 11897 | 3965.67 | 100.0% | 0.53788 | 0.22668 | 2797.98 | 9576.94 | 0.2922 | 0.3429 |
| 5B | 7 | 3/30/2013 13:47 | 3 | 13533 | 4511.00 | 100.0% | 0.53788 | 0.22582 | 3347.73 | 9576.94 | 0.3496 | 0.3303 |
| 5C | 1 | 3/30/2013 13:39 | 3 | 14333 | 4777.67 | 96.5% | 0.53909 | 0.22471 | 3575.31 | 9576.94 | 0.3733 | 0.4156 |
| 5C | 2 | 3/30/2013 13:32 | 3 | 15507 | 5169.00 | 100.0% | 0.53909 | 0.22367 | 4014.22 | 9576.95 | 0.4192 | 0.4019 |
| 5C | 3 | 3/30/2013 13:25 | 3 | 15162 | 5054.00 | 99.4% | 0.53909 | 0.22270 | 3897.48 | 9576.95 | 0.4070 | 0.3978 |
| 5C | 4 | 3/30/2013 14:15 | 3 | 15436 | 5145.33 | 100.0% | 0.53909 | 0.22966 | 3959.63 | 9576.93 | 0.4135 | 0.3850 |
| 5C | 5 | 3/30/2013 14:07 | 3 | 14618 | 4872.67 | 100.0% | 0.53909 | 0.22854 | 3692.76 | 9576.93 | 0.3856 | 0.3677 |
| 5C | 6 | 3/30/2013 14:00 | 3 | 11698 | 3899.33 | 100.0% | 0.53909 | 0.22763 | 2724.11 | 9576.93 | 0.2844 | 0.3351 |
| 5C | 7 | 3/30/2013 13:54 | 3 | 13285 | 4428.33 | 100.0% | 0.53909 | 0.22673 | 3257.78 | 9576.94 | 0.3402 | 0.3199 |
| 5D | 1 | 3/30/2013 13:47 | 3 | 14052 | 4684.00 | 96.5% | 0.53831 | 0.22582 | 3477.46 | 9576.94 | 0.3631 | 0.4061 |
| 5D | 2 | 3/30/2013 13:39 | 3 | 15099 | 5033.00 | 100.0% | 0.53831 | 0.22471 | 3874.51 | 9576.94 | 0.4046 | 0.3938 |
| 5D | 3 | 3/30/2013 13:32 | 3 | 14907 | 4969.00 | 99.4% | 0.53831 | 0.22366 | 3809.14 | 9576.95 | 0.3977 | 0.3901 |
| 5D | 4 | 3/30/2013 13:25 | 3 | 15249 | 5083.00 | 100.0% | 0.53831 | 0.22270 | 3934.92 | 9576.95 | 0.4109 | 0.3788 |
| 5D | 5 | 3/30/2013 14:15 | 3 | 14837 | 4945.67 | 100.0% | 0.53831 | 0.22966 | 3761.66 | 9576.93 | 0.3928 | 0.3634 |
| 5D | 6 | 3/30/2013 14:07 | 3 | 11545 | 3848.33 | 100.0% | 0.53831 | 0.22854 | 2670.13 | 9576.93 | 0.2788 | 0.3346 |
| 5D | 7 | 3/30/2013 14:00 | 3 | 13288 | 4429.33 | 100.0% | 0.53831 | 0.22763 | 3255.82 | 9576.93 | 0.3400 | 0.3211 |
| 6A | 1 | 3/30/2013 13:54 | 3 | 13113 | 4371.00 | 96.5% | 0.47877 | 0.22672 | 3293.68 | 9576.94 | 0.3439 | 0.3692 |
| 6A | 2 | 3/30/2013 13:47 | 3 | 14330 | 4776.67 | 100.0% | 0.47877 | 0.22582 | 3741.28 | 9576.94 | 0.3907 | 0.3766 |
| 6A | 3 | 3/30/2013 13:39 | 3 | 14044 | 4681.33 | 99.4% | 0.47877 | 0.22473 | 3644.85 | 9576.94 | 0.3806 | 0.3728 |
| 6A | 4 | 3/30/2013 13:32 | 3 | 14336 | 4778.67 | 100.0% | 0.47877 | 0.22367 | 3753.12 | 9576.95 | 0.3919 | 0.3612 |
| 6A | 5 | 3/30/2013 13:25 | 3 | 13718 | 4572.67 | 100.0% | 0.47877 | 0.22273 | 3551.44 | 9576.95 | 0.3708 | 0.3455 |
| 6A | 6 | 3/30/2013 14:15 | 3 | 11049 | 3683.00 | 100.0% | 0.47877 | 0.22964 | 2630.07 | 9576.93 | 0.2746 | 0.3159 |
| 6A | 7 | 3/30/2013 14:07 | 3 | 12072 | 4024.00 | 100.0% | 0.47877 | 0.22860 | 2975.83 | 9576.93 | 0.3107 | 0.3021 |
| 6B | 1 | 3/30/2013 14:00 | 3 | 12617 | 4205.67 | 96.5% | 0.44887 | 0.22766 | 3191.42 | 9576.93 | 0.3332 | 0.3740 |
| 6B | 2 | 3/30/2013 13:54 | 3 | 13913 | 4637.67 | 100.0% | 0.44887 | 0.22673 | 3662.97 | 9576.94 | 0.3825 | 0.3632 |
| 6B | 3 | 3/30/2013 13:46 | 3 | 13094 | 4364.67 | 99.4% | 0.44887 | 0.22573 | 3388.60 | 9576.94 | 0.3538 | 0.3600 |
| 6B | 4 | 3/30/2013 13:39 | 3 | 13831 | 4610.33 | 100.0% | 0.44887 | 0.22473 | 3644.24 | 9576.94 | 0.3805 | 0.3500 |
| 6B | 5 | 3/30/2013 13:32 | 3 | 13414 | 4471.33 | 100.0% | 0.44887 | 0.22371 | 3509.65 | 9576.95 | 0.3665 | 0.3366 |
| 6B | 6 | 3/30/2013 13:25 | 3 | 10672 | 3557.33 | 100.0% | 0.44887 | 0.22272 | 2599.89 | 9576.95 | 0.2715 | 0.3112 |
| 6B | 7 | 3/30/2013 14:15 | 3 | 11765 | 3921.67 | 100.0% | 0.44887 | 0.22969 | 2934.25 | 9576.93 | 0.3064 | 0.2994 |
| 6C | 1 | 3/30/2013 14:07 | 3 | 14081 | 4693.67 | 96.5% | 0.51012 | 0.22860 | 3536.25 | 9576.93 | 0.3692 | 0.4020 |
| 6C | 2 | 3/30/2013 14:00 | 3 | 14961 | 4987.00 | 100.0% | 0.51012 | 0.22766 | 3874.82 | 9576.93 | 0.4046 | 0.3932 |
| 6C | 3 | 3/30/2013 13:53 | 3 | 15089 | 5029.67 | 99.4% | 0.51012 | 0.22668 | 3915.76 | 9576.94 | 0.4089 | 0.3905 |
| 6C | 4 | 3/30/2013 13:46 | 3 | 14784 | 4928.00 | 100.0% | 0.51012 | 0.22573 | 3825.24 | 9576.94 | 0.3994 | 0.3823 |
| 6C | 5 | 3/30/2013 13:39 | 3 | 14305 | 4768.33 | 100.0% | 0.51012 | 0.22473 | 3670.43 | 9576.94 | 0.3833 | 0.3713 |
| 6C | 6 | 3/30/2013 13:32 | 3 | 11626 | 3875.33 | 100.0% | 0.51012 | 0.22371 | 2782.44 | 9576.95 | 0.2905 | 0.3505 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6C | 7 | 3/30/2013 13:25 | 3 | 14025 | 4675.00 | 100.0% | 0.51012 | 0.22272 | 3586.91 | 9576.95 | 0.3745 | 0.3407 |
| 6D | 1 | 3/30/2013 14:15 | 3 | 12095 | 4031.67 | 96.5% | 0.45548 | 0.22969 | 2993.29 | 9576.93 | 0.3126 | 0.3433 |
| 6D | 2 | 3/30/2013 14:07 | 3 | 12930 | 4310.00 | 100.0% | 0.45548 | 0.22860 | 3312.81 | 9576.93 | 0.3459 | 0.3355 |
| 6D | 3 | 3/30/2013 14:00 | 3 | 12868 | 4289.33 | 99.4% | 0.45548 | 0.22765 | 3290.45 | 9576.93 | 0.3436 | 0.3332 |
| 6D | 4 | 3/30/2013 13:53 | 3 | 12981 | 4327.00 | 100.0% | 0.45548 | 0.22667 | 3338.24 | 9576.94 | 0.3486 | 0.3260 |
| 6D | 5 | 3/30/2013 13:46 | 3 | 12417 | 4139.00 | 100.0% | 0.45548 | 0.22573 | 3154.36 | 9576.94 | 0.3294 | 0.3164 |
| 6D | 6 | 3/30/2013 13:39 | 3 | 9991 | 3330.33 | 100.0% | 0.45548 | 0.22473 | 2350.04 | 9576.94 | 0.2454 | 0.2982 |
| 6D | 7 | 3/30/2013 13:32 | 3 | 12032 | 4010.67 | 100.0% | 0.45548 | 0.22371 | 3034.84 | 9576.95 | 0.3169 | 0.2897 |
| 7A | 1 | 3/30/2013 13:28 | 3 | 14545 | 4848.33 | 96.5% | 0.53735 | 0.22316 | 3658.13 | 9576.95 | 0.3820 | 0.4141 |
| 7A | 2 | 3/30/2013 14:18 | 3 | 15303 | 5101.00 | 100.0% | 0.53735 | 0.23017 | 3916.52 | 9576.93 | 0.4090 | 0.4013 |
| 7A | 3 | 3/30/2013 14:11 | 3 | 15303 | 5101.00 | 99.4% | 0.53735 | 0.22917 | 3914.70 | 9576.93 | 0.4088 | 0.3975 |
| 7A | 4 | 3/30/2013 14:04 | 3 | 15216 | 5072.00 | 100.0% | 0.53735 | 0.22812 | 3898.05 | 9576.93 | 0.4070 | 0.3857 |
| 7A | 5 | 3/30/2013 13:57 | 3 | 14738 | 4912.67 | 100.0% | 0.53735 | 0.22716 | 3743.65 | 9576.94 | 0.3909 | 0.3697 |
| 7A | 6 | 3/30/2013 13:50 | 3 | 11695 | 3898.33 | 100.0% | 0.53735 | 0.22622 | 2734.17 | 9576.94 | 0.2855 | 0.3396 |
| 7A | 7 | 3/30/2013 13:43 | 3 | 13540 | 4513.33 | 100.0% | 0.53735 | 0.22523 | 3354.28 | 9576.94 | 0.3502 | 0.3255 |
| 7B | 1 | 3/30/2013 13:36 | 3 | 14155 | 4718.33 | 96.5% | 0.53953 | 0.22424 | 3517.55 | 9576.95 | 0.3673 | 0.4106 |
| 7B | 2 | 3/30/2013 13:28 | 3 | 15340 | 5113.33 | 100.0% | 0.53953 | 0.22316 | 3960.24 | 9576.95 | 0.4135 | 0.3972 |
| 7B | 3 | 3/30/2013 14:18 | 3 | 15172 | 5057.33 | 99.4% | 0.53953 | 0.23010 | 3861.38 | 9576.93 | 0.4032 | 0.3932 |
| 7B | 4 | 3/30/2013 14:11 | 3 | 15304 | 5101.33 | 100.0% | 0.53953 | 0.22917 | 3917.19 | 9576.93 | 0.4090 | 0.3808 |
| 7B | 5 | 3/30/2013 14:03 | 3 | 14547 | 4849.00 | 100.0% | 0.53953 | 0.22808 | 3670.51 | 9576.93 | 0.3833 | 0.3641 |
| 7B | 6 | 3/30/2013 13:57 | 3 | 11731 | 3910.33 | 100.0% | 0.53953 | 0.22716 | 2736.58 | 9576.94 | 0.2857 | 0.3327 |
| 7B | 7 | 3/30/2013 13:50 | 3 | 13123 | 4374.33 | 100.0% | 0.53953 | 0.22626 | 3205.23 | 9576.94 | 0.3347 | 0.3180 |
| 7C | 1 | 3/30/2013 13:43 | 3 | 14289 | 4763.00 | 96.5% | 0.53213 | 0.22523 | 3573.45 | 9576.94 | 0.3731 | 0.4137 |
| 7C | 2 | 3/30/2013 13:36 | 3 | 15396 | 5132.00 | 100.0% | 0.53213 | 0.22424 | 3989.24 | 9576.95 | 0.4165 | 0.4006 |
| 7C | 3 | 3/30/2013 13:28 | 3 | 15144 | 5048.00 | 99.4% | 0.53213 | 0.22316 | 3904.02 | 9576.95 | 0.4076 | 0.3967 |
| 7C | 4 | 3/30/2013 14:18 | 3 | 15243 | 5081.00 | 100.0% | 0.53213 | 0.23010 | 3908.34 | 9576.93 | 0.4081 | 0.3846 |
| 7C | 5 | 3/30/2013 14:11 | 3 | 14647 | 4882.33 | 100.0% | 0.53213 | 0.22918 | 3714.40 | 9576.93 | 0.3878 | 0.3682 |
| 7C | 6 | 3/30/2013 14:03 | 3 | 11785 | 3928.33 | 100.0% | 0.53213 | 0.22808 | 2765.98 | 9576.93 | 0.2888 | 0.3375 |
| 7C | 7 | 3/30/2013 13:57 | 3 | 13310 | 4436.67 | 100.0% | 0.53213 | 0.22716 | 3279.00 | 9576.94 | 0.3424 | 0.3232 |
| 7D | 1 | 3/30/2013 13:50 | 3 | 14208 | 4736.00 | 96.5% | 0.53666 | 0.22626 | 3530.81 | 9576.94 | 0.3687 | 0.4092 |
| 7D | 2 | 3/30/2013 13:43 | 3 | 15261 | 5087.00 | 100.0% | 0.53666 | 0.22523 | 3929.42 | 9576.94 | 0.4103 | 0.3960 |
| 7D | 3 | 3/30/2013 13:36 | 3 | 14845 | 4948.33 | 99.4% | 0.53666 | 0.22424 | 3789.07 | 9576.95 | 0.3956 | 0.3920 |
| 7D | 4 | 3/30/2013 13:28 | 3 | 15230 | 5076.67 | 100.0% | 0.53666 | 0.22317 | 3929.68 | 9576.95 | 0.4103 | 0.3798 |
| 7D | 5 | 3/30/2013 14:18 | 3 | 14768 | 4922.67 | 100.0% | 0.53666 | 0.23011 | 3740.01 | 9576.93 | 0.3905 | 0.3632 |
| 7D | 6 | 3/30/2013 14:11 | 3 | 11438 | 3812.67 | 100.0% | 0.53666 | 0.22918 | 2634.79 | 9576.93 | 0.2751 | 0.3322 |
| 7D | 7 | 3/30/2013 14:03 | 3 | 13266 | 4422.00 | 100.0% | 0.53666 | 0.22808 | 3249.75 | 9576.93 | 0.3393 | 0.3176 |
| 8A | 1 | 3/30/2013 13:57 | 3 | 13895 | 4631.67 | 96.5% | 0.52553 | 0.22719 | 3446.66 | 9576.94 | 0.3599 | 0.4057 |
| 8A | 2 | 3/30/2013 13:50 | 3 | 14992 | 4997.33 | 100.0% | 0.52553 | 0.22628 | 3858.47 | 9576.94 | 0.4029 | 0.3905 |
| 8A | 3 | 3/30/2013 13:43 | 3 | 14765 | 4921.67 | 99.4% | 0.52553 | 0.22519 | 3781.62 | 9576.94 | 0.3949 | 0.3859 |
| 8A | 4 | 3/30/2013 13:36 | 3 | 15068 | 5022.67 | 100.0% | 0.52553 | 0.22427 | 3893.92 | 9576.95 | 0.4066 | 0.3718 |
| 8A | 5 | 3/30/2013 13:28 | 3 | 14209 | 4736.33 | 100.0% | 0.52553 | 0.22320 | 3612.98 | 9576.95 | 0.3773 | 0.3527 |
| 8A | 6 | 3/30/2013 14:18 | 3 | 11132 | 3710.67 | 100.0% | 0.52553 | 0.23013 | 2552.44 | 9576.93 | 0.2665 | 0.3168 |
| 8A | 7 | 3/30/2013 14:12 | 3 | 12521 | 4173.67 | 100.0% | 0.52553 | 0.22923 | 3019.94 | 9576.93 | 0.3153 | 0.3000 |
| 8B | 1 | 3/30/2013 14:04 | 3 | 13736 | 4578.67 | 96.5% | 0.51282 | 0.22811 | 3417.63 | 9576.93 | 0.3569 | 0.4011 |
| 8B | 2 | 3/30/2013 13:57 | 3 | 14887 | 4962.33 | 100.0% | 0.51282 | 0.22719 | 3846.56 | 9576.94 | 0.4016 | 0.3886 |
| 8B | 3 | 3/30/2013 13:50 | 3 | 14532 | 4844.00 | 99.4% | 0.51282 | 0.22621 | 3726.50 | 9576.94 | 0.3891 | 0.3848 |
| 8B | 4 | 3/30/2013 13:43 | 3 | 14897 | 4965.67 | 100.0% | 0.51282 | 0.22519 | 3859.69 | 9576.94 | 0.4030 | 0.3732 |
| 8B | 5 | 3/30/2013 13:36 | 3 | 14465 | 4821.67 | 100.0% | 0.51282 | 0.22427 | 3720.21 | 9576.95 | 0.3885 | 0.3576 |
| 8B | 6 | 3/30/2013 13:28 | 3 | 11620 | 3873.33 | 100.0% | 0.51282 | 0.22320 | 2777.15 | 9576.95 | 0.2900 | 0.3283 |
| 8B | 7 | 3/30/2013 14:18 | 3 | 12555 | 4185.00 | 100.0% | 0.51282 | 0.23015 | 3054.66 | 9576.93 | 0.3190 | 0.3145 |
| 8C | 1 | 3/30/2013 14:12 | 3 | 14553 | 4851.00 | 96.5% | 0.53584 | 0.22923 | 3631.87 | 9576.93 | 0.3792 | 0.4099 |
| 8C | 2 | 3/30/2013 14:04 | 3 | 15356 | 5118.67 | 100.0% | 0.53584 | 0.22811 | 3948.07 | 9576.93 | 0.4122 | 0.3991 |
| 8C | 3 | 3/30/2013 13:57 | 3 | 14984 | 4994.67 | 99.4% | 0.53584 | 0.22717 | 3822.04 | 9576.94 | 0.3991 | 0.3958 |
| 8C | 4 | 3/30/2013 13:50 | 3 | 15283 | 5094.33 | 100.0% | 0.53584 | 0.22621 | 3933.50 | 9576.94 | 0.4107 | 0.3858 |
| 8C | 5 | 3/30/2013 13:43 | 3 | 14518 | 4839.33 | 100.0% | 0.53584 | 0.22519 | 3683.72 | 9576.94 | 0.3846 | 0.3723 |
| 8C | 6 | 3/30/2013 13:36 | 3 | 12272 | 4090.67 | 100.0% | 0.53584 | 0.22427 | 2939.76 | 9576.95 | 0.3070 | 0.3468 |
| 8C | 7 | 3/30/2013 13:28 | 3 | 13541 | 4513.67 | 100.0% | 0.53584 | 0.22320 | 3368.29 | 9576.95 | 0.3517 | 0.3349 |
| 8D | 1 | 3/30/2013 14:18 | 3 | 14393 | 4797.67 | 96.5% | 0.54197 | 0.23015 | 3559.64 | 9576.93 | 0.3717 | 0.4137 |
| 8D | 2 | 3/30/2013 14:12 | 3 | 15368 | 5122.67 | 100.0% | 0.54197 | 0.22923 | 3932.84 | 9576.93 | 0.4107 | 0.4025 |
| 8D | 3 | 3/30/2013 14:04 | 3 | 15551 | 5183.67 | 99.4% | 0.54197 | 0.22810 | 3992.74 | 9576.93 | 0.4169 | 0.3992 |
| 8D | 4 | 3/30/2013 13:57 | 3 | 15442 | 5147.33 | 100.0% | 0.54197 | 0.22717 | 3968.22 | 9576.94 | 0.4144 | 0.3888 |
| 8D | 5 | 3/30/2013 13:50 | 3 | 14977 | 4992.33 | 100.0% | 0.54197 | 0.22620 | 3818.24 | 9576.94 | 0.3987 | 0.3749 |
| 8D | 6 | 3/30/2013 13:43 | 3 | 11985 | 3995.00 | 100.0% | 0.54197 | 0.22519 | 2826.18 | 9576.94 | 0.2951 | 0.3486 |
| 8D | 7 | 3/30/2013 13:36 | 3 | 13737 | 4579.00 | 100.0% | 0.54197 | 0.22427 | 3414.94 | 9576.95 | 0.3566 | 0.3363 |
| 9A | 1 | 3/30/2013 14:22 | 3 | 14571 | 4857.00 | 96.5% | 0.53774 | 0.23062 | 3626.15 | 9576.93 | 0.3786 | 0.4201 |
| 9A | 2 | 3/30/2013 15:14 | 3 | 15738 | 5246.00 | 100.0% | 0.53774 | 0.23789 | 4020.87 | 9576.90 | 0.4199 | 0.4045 |
| 9A | 3 | 3/30/2013 15:07 | 3 | 15197 | 5065.67 | 99.4% | 0.53774 | 0.23689 | 3838.56 | 9576.91 | 0.4008 | 0.3999 |
| 9A | 4 | 3/30/2013 14:57 | 3 | 15737 | 5245.67 | 100.0% | 0.53774 | 0.23556 | 4032.58 | 9576.91 | 0.4211 | 0.3855 |
| 9A | 5 | 3/30/2013 14:50 | 3 | 14772 | 4924.00 | 100.0% | 0.53774 | 0.23457 | 3715.98 | 9576.91 | 0.3880 | 0.3660 |
| 9A | 6 | 3/30/2013 14:42 | 3 | 11700 | 3900.00 | 100.0% | 0.53774 | 0.23349 | 2697.54 | 9576.92 | 0.2817 | 0.3294 |
| 9A | 7 | 3/30/2013 14:35 | 3 | 13004 | 4334.67 | 100.0% | 0.53774 | 0.23253 | 3137.16 | 9576.92 | 0.3276 | 0.3123 |
| 9B | 1 | 3/30/2013 14:28 | 3 | 14063 | 4687.67 | 96.5% | 0.52675 | 0.23155 | 3477.09 | 9576.92 | 0.3631 | 0.4037 |
| 9B | 2 | 3/30/2013 14:22 | 3 | 14946 | 4982.00 | 100.0% | 0.52675 | 0.23063 | 3818.55 | 9576.93 | 0.3987 | 0.3890 |
| 9B | 3 | 3/30/2013 15:15 | 3 | 14825 | 4941.67 | 99.4% | 0.52675 | 0.23795 | 3734.25 | 9576.90 | 0.3899 | 0.3846 |
| 9B | 4 | 3/30/2013 15:07 | 3 | 15236 | 5078.67 | 100.0% | 0.52675 | 0.23692 | 3883.52 | 9576.91 | 0.4055 | 0.3709 |
| 9B | 5 | 3/30/2013 14:57 | 3 | 14428 | 4809.33 | 100.0% | 0.52675 | 0.23552 | 3621.23 | 9576.91 | 0.3781 | 0.3525 |
| 9B | 6 | 3/30/2013 14:50 | 3 | 11183 | 3727.67 | 100.0% | 0.52675 | 0.23460 | 2544.19 | 9576.91 | 0.2657 | 0.3178 |
| 9B | 7 | 3/30/2013 14:43 | 3 | 12700 | 4233.33 | 100.0% | 0.52675 | 0.23354 | 3055.23 | 9576.92 | 0.3190 | 0.3016 |
| 9C | 1 | 3/30/2013 14:35 | 3 | 14218 | 4739.33 | 96.5% | 0.53222 | 0.23248 | 3511.30 | 9576.92 | 0.3666 | 0.4182 |
| 9C | 2 | 3/30/2013 14:28 | 3 | 15402 | 5134.00 | 100.0% | 0.53222 | 0.23156 | 3953.74 | 9576.92 | 0.4128 | 0.4000 |
| 9C | 3 | 3/30/2013 14:21 | 3 | 15296 | 5098.67 | 99.4% | 0.53222 | 0.23057 | 3916.53 | 9576.93 | 0.4090 | 0.3945 |
| 9C | 4 | 3/30/2013 15:15 | 3 | 15315 | 5105.00 | 100.0% | 0.53222 | 0.23795 | 3892.16 | 9576.90 | 0.4064 | 0.3776 |
| 9C | 5 | 3/30/2013 15:07 | 3 | 14853 | 4951.00 | 100.0% | 0.53222 | 0.23692 | 3743.42 | 9576.91 | 0.3909 | 0.3548 |
| 9C | 6 | 3/30/2013 14:57 | 3 | 10978 | 3659.33 | 100.0% | 0.53222 | 0.23552 | 2458.88 | 9576.91 | 0.2568 | 0.3119 |
| 9C | 7 | 3/30/2013 14:50 | 3 | 12385 | 4128.33 | 100.0% | 0.53222 | 0.23460 | 2932.54 | 9576.91 | 0.3062 | 0.2918 |
| 9D | 1 | 3/30/2013 14:43 | 3 | 13987 | 4662.33 | 96.5% | 0.51007 | 0.23353 | 3480.06 | 9576.92 | 0.3634 | 0.4105 |
| 9D | 2 | 3/30/2013 14:35 | 3 | 15196 | 5065.33 | 100.0% | 0.51007 | 0.23248 | 3929.71 | 9576.92 | 0.4103 | 0.3933 |
| 9D | 3 | 3/30/2013 14:28 | 3 | 14760 | 4920.00 | 99.4% | 0.51007 | 0.23156 | 3782.21 | 9576.92 | 0.3949 | 0.3882 |
| 9D | 4 | 3/30/2013 14:21 | 3 | 14958 | 4986.00 | 100.0% | 0.51007 | 0.23057 | 3859.69 | 9576.93 | 0.4030 | 0.3723 |

| Raw Count Data | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector (#) | Source ID (#) | Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
| 9D | 5 | 3/30/2013 15:15 | 3 | 14493 | 4831.00 | 100.0% | 0.51007 | 0.23795 | 3668.64 | 9576.90 | 0.3831 | 0.3509 |
| 9D | 6 | 3/30/2013 15:07 | 3 | 10632 | 3544.00 | 100.0% | 0.51007 | 0.23691 | 2385.70 | 9576.91 | 0.2492 | 0.3105 |
| 9D | 7 | 3/30/2013 14:57 | 3 | 12459 | 4153.00 | 100.0% | 0.51007 | 0.23552 | 3002.50 | 9576.91 | 0.3135 | 0.2917 |
| 10A | 1 | 3/30/2013 14:50 | 3 | 14585 | 4861.67 | 96.5% | 0.53055 | 0.23461 | 3626.29 | 9576.91 | 0.3786 | 0.4169 |
| 10A | 2 | 3/30/2013 14:43 | 3 | 15225 | 5075.00 | 100.0% | 0.53055 | 0.23354 | 3888.38 | 9576.92 | 0.4060 | 0.3995 |
| 10A | 3 | 3/30/2013 14:35 | 3 | 15080 | 5026.67 | 99.4% | 0.53055 | 0.23248 | 3838.51 | 9576.92 | 0.4008 | 0.3943 |
| 10A | 4 | 3/30/2013 14:28 | 3 | 15107 | 5035.67 | 100.0% | 0.53055 | 0.23156 | 3859.11 | 9576.92 | 0.4030 | 0.3782 |
| 10A | 5 | 3/30/2013 14:21 | 3 | 14855 | 4951.67 | 100.0% | 0.53055 | 0.23058 | 3780.08 | 9576.93 | 0.3947 | 0.3565 |
| 10A | 6 | 3/30/2013 15:15 | 3 | 11188 | 3729.33 | 100.0% | 0.53055 | 0.23795 | 2520.29 | 9576.90 | 0.2632 | 0.3156 |
| 10A | 7 | 3/30/2013 15:07 | 3 | 12557 | 4185.67 | 100.0% | 0.53055 | 0.23692 | 2981.89 | 9576.91 | 0.3114 | 0.2965 |
| 10B | 1 | 3/30/2013 14:57 | 3 | 14134 | 4711.33 | 96.5% | 0.52680 | 0.23556 | 3479.69 | 9576.91 | 0.3633 | 0.4101 |
| 10B | 2 | 3/30/2013 14:50 | 3 | 15177 | 5059.00 | 100.0% | 0.52680 | 0.23457 | 3875.59 | 9576.91 | 0.4047 | 0.3940 |
| 10B | 3 | 3/30/2013 14:43 | 3 | 14709 | 4903.00 | 99.4% | 0.52680 | 0.23354 | 3717.83 | 9576.92 | 0.3882 | 0.3892 |
| 10B | 4 | 3/30/2013 14:35 | 3 | 15366 | 5122.00 | 100.0% | 0.52680 | 0.23254 | 3948.80 | 9576.92 | 0.4123 | 0.3743 |
| 10B | 5 | 3/30/2013 14:29 | 3 | 14785 | 4928.33 | 100.0% | 0.52680 | 0.23160 | 3759.89 | 9576.92 | 0.3926 | 0.3542 |
| 10B | 6 | 3/30/2013 14:22 | 3 | 11381 | 3793.67 | 100.0% | 0.52680 | 0.23060 | 2630.24 | 9576.93 | 0.2746 | 0.3163 |
| 10B | 7 | 3/30/2013 15:14 | 3 | 12244 | 4081.33 | 100.0% | 0.52680 | 0.23789 | 2881.16 | 9576.90 | 0.3008 | 0.2986 |
| 10C | 1 | 3/30/2013 15:07 | 3 | 14391 | 4797.00 | 96.5% | 0.52915 | 0.23686 | 3552.94 | 9576.91 | 0.3710 | 0.4094 |
| 10C | 2 | 3/30/2013 14:57 | 3 | 15140 | 5046.67 | 100.0% | 0.52915 | 0.23556 | 3852.93 | 9576.91 | 0.4023 | 0.3955 |
| 10C | 3 | 3/30/2013 14:50 | 3 | 14971 | 4990.33 | 99.4% | 0.52915 | 0.23457 | 3794.65 | 9576.91 | 0.3962 | 0.3913 |
| 10C | 4 | 3/30/2013 14:42 | 3 | 15541 | 5180.33 | 100.0% | 0.52915 | 0.23350 | 3997.05 | 9576.92 | 0.4174 | 0.3784 |
| 10C | 5 | 3/30/2013 14:36 | 3 | 14457 | 4819.00 | 100.0% | 0.52915 | 0.23254 | 3640.56 | 9576.92 | 0.3801 | 0.3610 |
| 10C | 6 | 3/30/2013 14:29 | 3 | 11591 | 3863.67 | 100.0% | 0.52915 | 0.23159 | 2690.04 | 9576.92 | 0.2809 | 0.3262 |
| 10C | 7 | 3/30/2013 14:22 | 3 | 12946 | 4315.33 | 100.0% | 0.52915 | 0.23060 | 3146.72 | 9576.93 | 0.3286 | 0.3129 |
| 10D | 1 | 3/30/2013 15:14 | 3 | 14192 | 4730.67 | 96.5% | 0.53332 | 0.23789 | 3471.45 | 9576.90 | 0.3625 | 0.4099 |
| 10D | 2 | 3/30/2013 15:07 | 3 | 15388 | 5129.33 | 100.0% | 0.53332 | 0.23688 | 3919.44 | 9576.91 | 0.4093 | 0.3959 |
| 10D | 3 | 3/30/2013 14:57 | 3 | 15273 | 5091.00 | 99.4% | 0.53332 | 0.23556 | 3880.76 | 9576.91 | 0.4052 | 0.3916 |
| 10D | 4 | 3/30/2013 14:50 | 3 | 15258 | 5086.00 | 100.0% | 0.53332 | 0.23457 | 3887.93 | 9576.91 | 0.4060 | 0.3786 |
| 10D | 5 | 3/30/2013 14:42 | 3 | 14721 | 4907.00 | 100.0% | 0.53332 | 0.23350 | 3714.36 | 9576.92 | 0.3878 | 0.3610 |
| 10D | 6 | 3/30/2013 14:36 | 3 | 11720 | 3906.67 | 100.0% | 0.53332 | 0.23254 | 2718.92 | 9576.92 | 0.2839 | 0.3279 |
| 10D | 7 | 3/30/2013 14:29 | 3 | 12821 | 4273.67 | 100.0% | 0.53332 | 0.23160 | 3090.77 | 9576.92 | 0.3227 | 0.3124 |
| 11A | 1 | 3/30/2013 15:28 | 3 | 13341 | 4447.00 | 96.5% | 0.46775 | 0.23976 | 3333.90 | 9576.90 | 0.3481 | 0.3959 |
| 11A | 2 | 3/30/2013 15:31 | 3 | 14364 | 4788.00 | 100.0% | 0.46775 | 0.24023 | 3711.65 | 9576.90 | 0.3876 | 0.3772 |
| 11A | 3 | 3/30/2013 15:35 | 3 | 14259 | 4753.00 | 99.4% | 0.46775 | 0.24072 | 3668.31 | 9576.89 | 0.3830 | 0.3716 |
| 11A | 4 | 3/30/2013 15:38 | 3 | 14370 | 4790.00 | 100.0% | 0.46775 | 0.24121 | 3709.47 | 9576.89 | 0.3873 | 0.3543 |
| 11A | 5 | 3/30/2013 15:43 | 3 | 13698 | 4566.00 | 100.0% | 0.46775 | 0.24183 | 3482.71 | 9576.89 | 0.3637 | 0.3309 |
| 11A | 6 | 3/30/2013 15:47 | 3 | 9866 | 3288.67 | 100.0% | 0.46775 | 0.24234 | 2203.07 | 9576.89 | 0.2300 | 0.2870 |
| 11A | 7 | 3/30/2013 15:51 | 3 | 11413 | 3804.33 | 100.0% | 0.46775 | 0.24292 | 2715.15 | 9576.89 | 0.2836 | 0.2664 |
| 11B | 1 | 3/30/2013 15:54 | 3 | 14495 | 4831.67 | 96.5% | 0.53231 | 0.24340 | 3545.73 | 9576.88 | 0.3702 | 0.4201 |
| 11B | 2 | 3/30/2013 15:28 | 3 | 15572 | 5190.67 | 100.0% | 0.53231 | 0.23976 | 3968.40 | 9576.90 | 0.4144 | 0.4011 |
| 11B | 3 | 3/30/2013 15:31 | 3 | 15188 | 5062.67 | 99.4% | 0.53231 | 0.24024 | 3830.78 | 9576.90 | 0.4000 | 0.3953 |
| 11B | 4 | 3/30/2013 15:35 | 3 | 15612 | 5204.00 | 100.0% | 0.53231 | 0.24073 | 3976.79 | 9576.89 | 0.4152 | 0.3777 |
| 11B | 5 | 3/30/2013 15:39 | 3 | 14881 | 4960.33 | 100.0% | 0.53231 | 0.24122 | 3730.64 | 9576.89 | 0.3895 | 0.3539 |
| 11B | 6 | 3/30/2013 15:43 | 3 | 11037 | 3679.00 | 100.0% | 0.53231 | 0.24183 | 2446.17 | 9576.89 | 0.2554 | 0.3091 |
| 11B | 7 | 3/30/2013 15:47 | 3 | 12343 | 4114.33 | 100.0% | 0.53231 | 0.24235 | 2878.87 | 9576.89 | 0.3006 | 0.2882 |
| 11C | 1 | 3/30/2013 15:51 | 3 | 14267 | 4755.67 | 96.5% | 0.52945 | 0.24294 | 3479.05 | 9576.89 | 0.3633 | 0.4152 |
| 11C | 2 | 3/30/2013 15:55 | 3 | 15354 | 5118.00 | 100.0% | 0.52945 | 0.24341 | 3883.80 | 9576.88 | 0.4055 | 0.3956 |
| 11C | 3 | 3/30/2013 15:28 | 3 | 15138 | 5046.00 | 99.4% | 0.52945 | 0.23976 | 3823.14 | 9576.90 | 0.3992 | 0.3897 |
| 11C | 4 | 3/30/2013 15:31 | 3 | 15373 | 5124.33 | 100.0% | 0.52945 | 0.24025 | 3906.14 | 9576.89 | 0.4079 | 0.3716 |
| 11C | 5 | 3/30/2013 15:35 | 3 | 14902 | 4967.33 | 100.0% | 0.52945 | 0.24074 | 3746.66 | 9576.89 | 0.3912 | 0.3470 |
| 11C | 6 | 3/30/2013 15:39 | 3 | 10342 | 3447.33 | 100.0% | 0.52945 | 0.24123 | 2224.18 | 9576.89 | 0.2322 | 0.3009 |
| 11C | 7 | 3/30/2013 15:43 | 3 | 12297 | 4099.00 | 100.0% | 0.52945 | 0.24184 | 2872.74 | 9576.89 | 0.3000 | 0.2793 |
| 11D | 1 | 3/30/2013 15:47 | 3 | 14538 | 4846.00 | 96.5% | 0.53406 | 0.24237 | 3561.31 | 9576.89 | 0.3719 | 0.4230 |
| 11D | 2 | 3/30/2013 15:51 | 3 | 15591 | 5197.00 | 100.0% | 0.53406 | 0.24295 | 3954.43 | 9576.89 | 0.4129 | 0.4023 |
| 11D | 3 | 3/30/2013 15:55 | 3 | 15511 | 5170.33 | 99.4% | 0.53406 | 0.24342 | 3918.04 | 9576.88 | 0.4091 | 0.3961 |
| 11D | 4 | 3/30/2013 15:28 | 3 | 15573 | 5191.00 | 100.0% | 0.53406 | 0.23976 | 3964.73 | 9576.90 | 0.4140 | 0.3770 |
| 11D | 5 | 3/30/2013 15:32 | 3 | 14769 | 4923.00 | 100.0% | 0.53406 | 0.24026 | 3694.18 | 9576.89 | 0.3857 | 0.3512 |
| 11D | 6 | 3/30/2013 15:35 | 3 | 10450 | 3483.33 | 100.0% | 0.53406 | 0.24075 | 2252.00 | 9576.89 | 0.2351 | 0.3027 |
| 11D | 7 | 3/30/2013 15:39 | 3 | 12426 | 4142.00 | 100.0% | 0.53406 | 0.24124 | 2908.14 | 9576.89 | 0.3037 | 0.2800 |
| 13A | 1 | 3/30/2013 14:31 | 3 | 14517 | 4839.00 | 96.5% | 0.53002 | 0.23188 | 3619.17 | 9576.92 | 0.3779 | 0.4202 |
| 13A | 2 | 3/30/2013 15:25 | 3 | 15416 | 5138.67 | 100.0% | 0.53002 | 0.23932 | 3923.88 | 9576.90 | 0.4097 | 0.4041 |
| 13A | 3 | 3/30/2013 15:16 | 3 | 15553 | 5184.33 | 99.4% | 0.53002 | 0.23816 | 3968.33 | 9576.90 | 0.4144 | 0.3993 |
| 13A | 4 | 3/30/2013 15:09 | 3 | 15547 | 5182.33 | 100.0% | 0.53002 | 0.23718 | 3978.39 | 9576.90 | 0.4154 | 0.3844 |
| 13A | 5 | 3/30/2013 14:59 | 3 | 14769 | 4923.00 | 100.0% | 0.53002 | 0.23585 | 3725.83 | 9576.91 | 0.3890 | 0.3643 |
| 13A | 6 | 3/30/2013 14:53 | 3 | 11476 | 3825.33 | 100.0% | 0.53002 | 0.23491 | 2632.92 | 9576.91 | 0.2749 | 0.3266 |
| 13A | 7 | 3/30/2013 14:44 | 3 | 12935 | 4311.67 | 100.0% | 0.53002 | 0.23378 | 3125.02 | 9576.92 | 0.3263 | 0.3089 |
| 13B | 1 | 3/30/2013 14:37 | 3 | 14929 | 4976.33 | 96.5% | 0.54385 | 0.23280 | 3719.73 | 9576.92 | 0.3884 | 0.4290 |
| 13B | 2 | 3/30/2013 14:31 | 3 | 15677 | 5225.67 | 100.0% | 0.54385 | 0.23188 | 4017.94 | 9576.92 | 0.4195 | 0.4105 |
| 13B | 3 | 3/30/2013 15:25 | 3 | 15456 | 5152.00 | 99.4% | 0.54385 | 0.23932 | 3898.20 | 9576.90 | 0.4070 | 0.4049 |
| 13B | 4 | 3/30/2013 15:16 | 3 | 15818 | 5272.67 | 100.0% | 0.54385 | 0.23816 | 4032.25 | 9576.90 | 0.4210 | 0.3878 |
| 13B | 5 | 3/30/2013 15:09 | 3 | 15205 | 5068.33 | 100.0% | 0.54385 | 0.23718 | 3833.01 | 9576.90 | 0.4002 | 0.3646 |
| 13B | 6 | 3/30/2013 14:59 | 3 | 11264 | 3754.67 | 100.0% | 0.54385 | 0.23585 | 2526.27 | 9576.91 | 0.2638 | 0.3211 |
| 13B | 7 | 3/30/2013 14:53 | 3 | 12827 | 4275.67 | 100.0% | 0.54385 | 0.23491 | 3052.16 | 9576.91 | 0.3187 | 0.3007 |
| 13C | 1 | 3/30/2013 14:44 | 3 | 13771 | 4590.33 | 96.5% | 0.49054 | 0.23378 | 3452.11 | 9576.92 | 0.3605 | 0.4084 |
| 13C | 2 | 3/30/2013 14:37 | 3 | 14798 | 4932.67 | 100.0% | 0.49054 | 0.23280 | 3838.98 | 9576.92 | 0.4009 | 0.3907 |
| 13C | 3 | 3/30/2013 14:31 | 3 | 14645 | 4881.67 | 99.4% | 0.49054 | 0.23188 | 3785.90 | 9576.92 | 0.3953 | 0.3854 |
| 13C | 4 | 3/30/2013 15:25 | 3 | 15000 | 5000.00 | 100.0% | 0.49054 | 0.23932 | 3875.71 | 9576.90 | 0.4047 | 0.3690 |
| 13C | 5 | 3/30/2013 15:16 | 3 | 14263 | 4754.33 | 100.0% | 0.49054 | 0.23816 | 3635.49 | 9576.90 | 0.3796 | 0.3469 |
| 13C | 6 | 3/30/2013 15:09 | 3 | 10434 | 3478.00 | 100.0% | 0.49054 | 0.23718 | 2363.75 | 9576.90 | 0.2468 | 0.3053 |
| 13C | 7 | 3/30/2013 14:59 | 3 | 12050 | 4016.67 | 100.0% | 0.49054 | 0.23585 | 2908.67 | 9576.91 | 0.3037 | 0.2858 |
| 13D | 1 | 3/30/2013 14:53 | 3 | 14215 | 4738.33 | 96.5% | 0.52636 | 0.23491 | 3511.08 | 9576.91 | 0.3666 | 0.4177 |
| 13D | 2 | 3/30/2013 14:44 | 3 | 15393 | 5131.00 | 100.0% | 0.52636 | 0.23378 | 3952.50 | 9576.92 | 0.4127 | 0.4009 |
| 13D | 3 | 3/30/2013 14:37 | 3 | 15231 | 5077.00 | 99.4% | 0.52636 | 0.23280 | 3896.55 | 9576.92 | 0.4069 | 0.3958 |
| 13D | 4 | 3/30/2013 14:31 | 3 | 15518 | 5172.67 | 100.0% | 0.52636 | 0.23188 | 4003.76 | 9576.92 | 0.4181 | 0.3802 |
| 13D | 5 | 3/30/2013 15:25 | 3 | 14852 | 4950.67 | 100.0% | 0.52636 | 0.23932 | 3744.28 | 9576.90 | 0.3910 | 0.3591 |
| 13D | 6 | 3/30/2013 15:16 | 3 | 11056 | 3685.33 | 100.0% | 0.52636 | 0.23816 | 2484.81 | 9576.90 | 0.2595 | 0.3195 |
| 13D | 7 | 3/30/2013 15:09 | 3 | 12768 | 4256.00 | 100.0% | 0.52636 | 0.23718 | 3060.37 | 9576.90 | 0.3196 | 0.3010 |
| 14A | 1 | 3/30/2013 14:59 | 3 | 13882 | 4627.33 | 96.5% | 0.49881 | 0.23585 | 3459.65 | 9576.91 | 0.3612 | 0.4155 |
| 14A | 2 | 3/30/2013 14:52 | 3 | 14985 | 4995.00 | 100.0% | 0.49881 | 0.23488 | 3872.95 | 9576.91 | 0.4044 | 0.3955 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Yttrium Efficiency (cpm/dpm) | Y-90 Ingrowth | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Calculated Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14A | 3 | 3/30/2013 14:45 | 3 | 14874 | 4958.00 | 99.4% | 0.49881 | 0.23380 | 3834.57 | 9576.92 | 0.4004 | 0.3896 |
| 14A | 4 | 3/30/2013 14:38 | 3 | 15344 | 5114.67 | 100.0% | 0.49881 | 0.23285 | 4002.34 | 9576.92 | 0.4179 | 0.3711 |
| 14A | 5 | 3/30/2013 14:31 | 3 | 14151 | 4717.00 | 100.0% | 0.49881 | 0.23189 | 3609.23 | 9576.92 | 0.3769 | 0.3462 |
| 14A | 6 | 3/30/2013 15:24 | 3 | 10357 | 3452.33 | 100.0% | 0.49881 | 0.23929 | 2309.23 | 9576.90 | 0.2411 | 0.2993 |
| 14A | 7 | 3/30/2013 15:16 | 3 | 11816 | 3938.67 | 100.0% | 0.49881 | 0.23816 | 2800.94 | 9576.90 | 0.2925 | 0.2773 |
| 14B | 1 | 3/30/2013 15:09 | 3 | 14442 | 4814.00 | 96.5% | 0.52166 | 0.23715 | 3586.15 | 9576.90 | 0.3745 | 0.4137 |
| 14B | 2 | 3/30/2013 14:59 | 3 | 15221 | 5073.67 | 100.0% | 0.52166 | 0.23585 | 3895.37 | 9576.91 | 0.4067 | 0.3971 |
| 14B | 3 | 3/30/2013 14:52 | 3 | 14787 | 4929.00 | 99.4% | 0.52166 | 0.23488 | 3748.66 | 9576.91 | 0.3914 | 0.3922 |
| 14B | 4 | 3/30/2013 14:45 | 3 | 15252 | 5084.00 | 100.0% | 0.52166 | 0.23380 | 3915.99 | 9576.92 | 0.4089 | 0.3768 |
| 14B | 5 | 3/30/2013 14:38 | 3 | 14644 | 4881.33 | 100.0% | 0.52166 | 0.23285 | 3718.06 | 9576.92 | 0.3882 | 0.3561 |
| 14B | 6 | 3/30/2013 14:31 | 3 | 11477 | 3825.67 | 100.0% | 0.52166 | 0.23189 | 2667.19 | 9576.92 | 0.2785 | 0.3171 |
| 14B | 7 | 3/30/2013 15:24 | 3 | 12308 | 4102.67 | 100.0% | 0.52166 | 0.23929 | 2907.21 | 9576.90 | 0.3036 | 0.2988 |
| 14C | 1 | 3/30/2013 15:16 | 3 | 14188 | 4729.33 | 96.5% | 0.52711 | 0.23816 | 3483.34 | 9576.90 | 0.3637 | 0.4031 |
| 14C | 2 | 3/30/2013 15:09 | 3 | 15087 | 5029.00 | 100.0% | 0.52711 | 0.23715 | 3831.65 | 9576.90 | 0.4001 | 0.3911 |
| 14C | 3 | 3/30/2013 14:59 | 3 | 14907 | 4969.00 | 99.4% | 0.52711 | 0.23585 | 3771.38 | 9576.91 | 0.3938 | 0.3875 |
| 14C | 4 | 3/30/2013 14:52 | 3 | 15149 | 5049.67 | 100.0% | 0.52711 | 0.23488 | 3863.96 | 9576.91 | 0.4035 | 0.3765 |
| 14C | 5 | 3/30/2013 14:45 | 3 | 14790 | 4930.00 | 100.0% | 0.52711 | 0.23379 | 3749.76 | 9576.92 | 0.3915 | 0.3616 |
| 14C | 6 | 3/30/2013 14:38 | 3 | 11904 | 3968.00 | 100.0% | 0.52711 | 0.23284 | 2792.58 | 9576.92 | 0.2916 | 0.3335 |
| 14C | 7 | 3/30/2013 14:31 | 3 | 12979 | 4326.33 | 100.0% | 0.52711 | 0.23189 | 3155.73 | 9576.92 | 0.3295 | 0.3204 |
| 14D | 1 | 3/30/2013 15:24 | 3 | 13129 | 4376.33 | 96.5% | 0.47151 | 0.23929 | 3256.50 | 9576.90 | 0.3400 | 0.3650 |
| 14D | 2 | 3/30/2013 15:16 | 3 | 14162 | 4720.67 | 100.0% | 0.47151 | 0.23816 | 3645.22 | 9576.90 | 0.3806 | 0.3723 |
| 14D | 3 | 3/30/2013 15:09 | 3 | 14253 | 4751.00 | 99.4% | 0.47151 | 0.23715 | 3673.84 | 9576.90 | 0.3836 | 0.3685 |
| 14D | 4 | 3/30/2013 14:59 | 3 | 14346 | 4782.00 | 100.0% | 0.47151 | 0.23585 | 3716.98 | 9576.91 | 0.3881 | 0.3567 |
| 14D | 5 | 3/30/2013 14:52 | 3 | 13660 | 4553.33 | 100.0% | 0.47151 | 0.23488 | 3492.70 | 9576.91 | 0.3647 | 0.3409 |
| 14D | 6 | 3/30/2013 14:45 | 3 | 10732 | 3577.33 | 100.0% | 0.47151 | 0.23379 | 2521.62 | 9576.92 | 0.2633 | 0.3110 |
| 14D | 7 | 3/30/2013 14:38 | 3 | 12093 | 4031.00 | 100.0% | 0.47151 | 0.23284 | 2979.57 | 9576.92 | 0.3111 | 0.2971 |

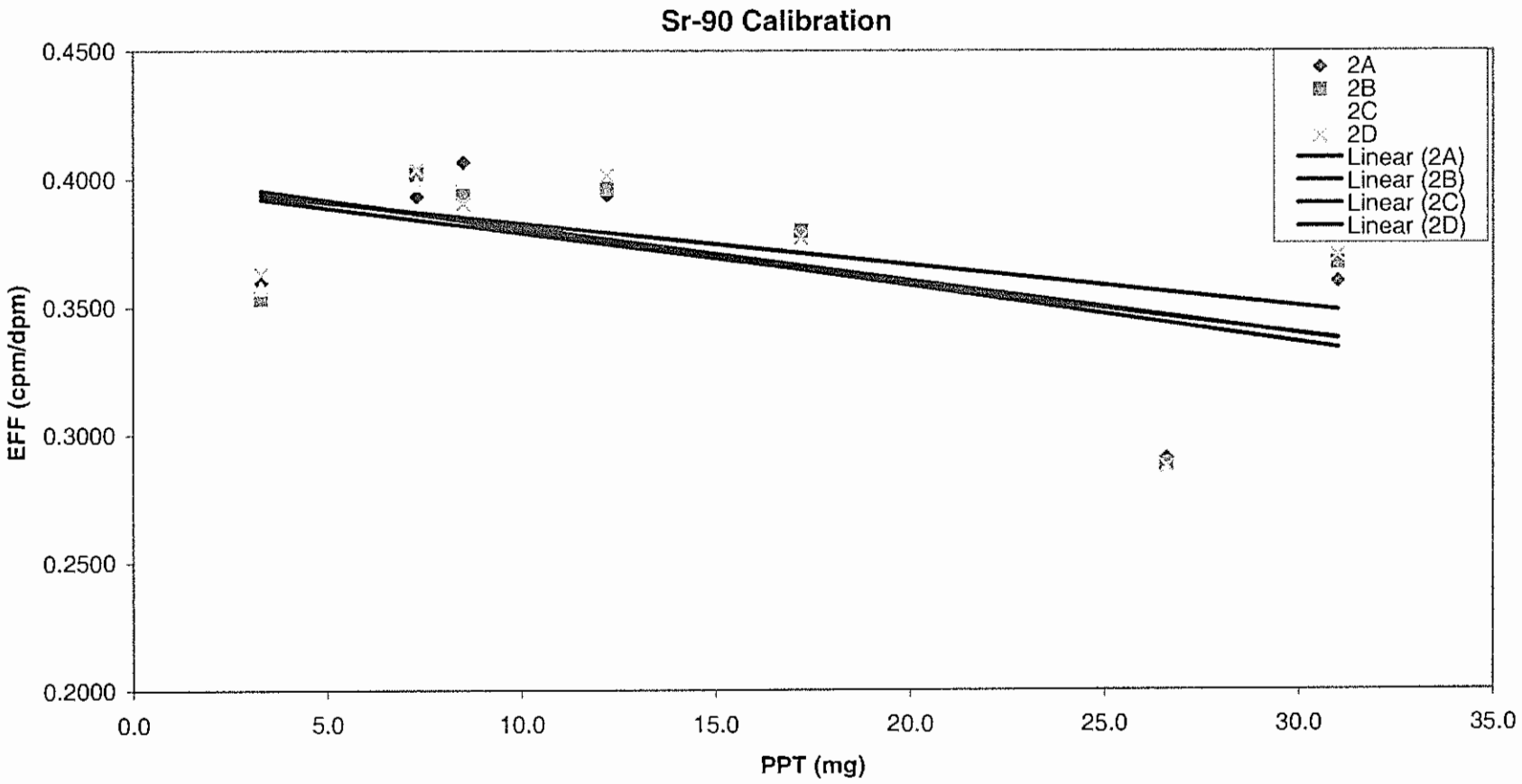



1A y = -2.279414E-03x + 4.114385E-01

1B y = -2.242680E-03x + 4.104277E-01

1C y = -2.472545E-03x + 4.188951E-01

1D y = -2.290631E-03x + 4.084494E-01

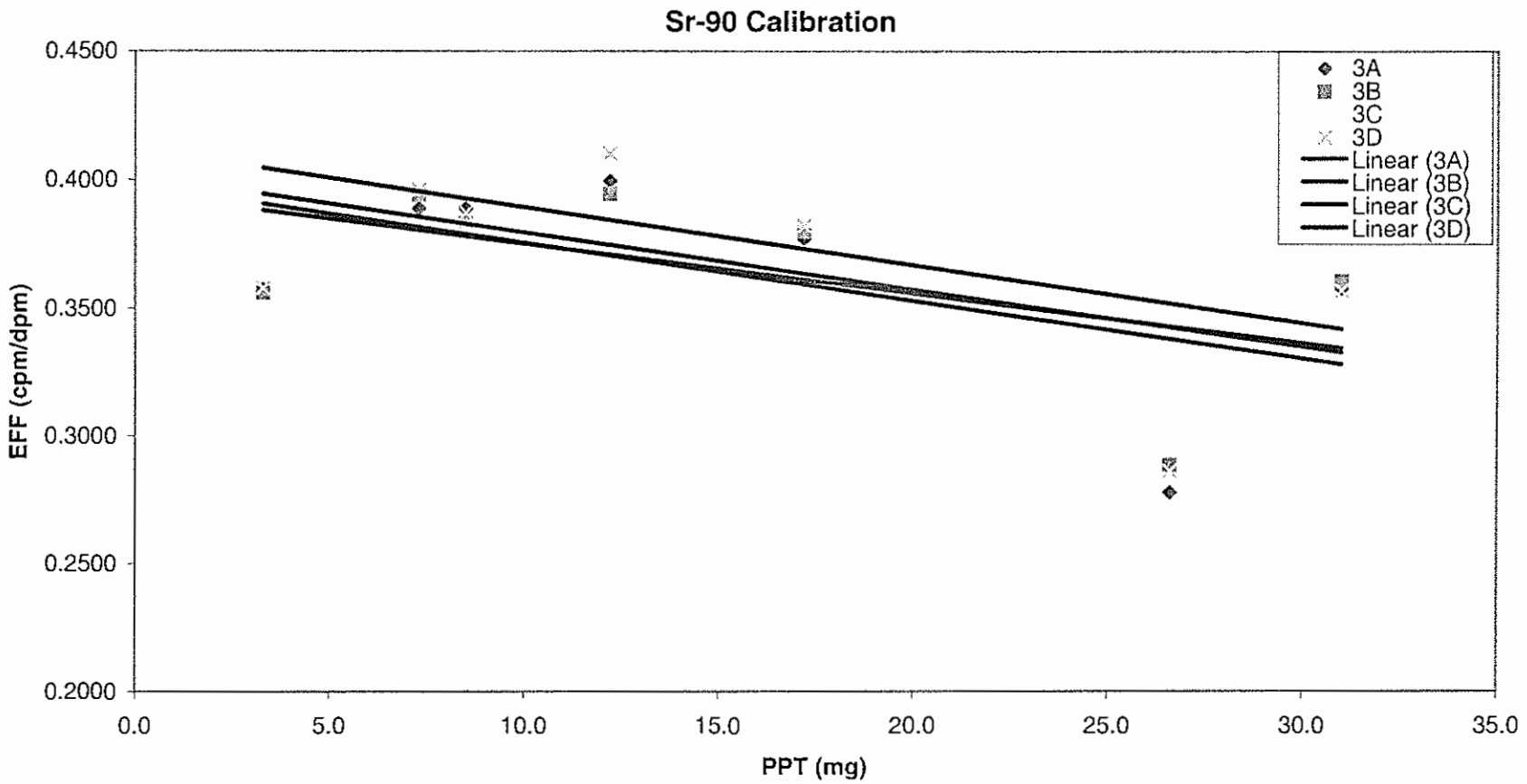



2A y = -2.217073E-03x + 4.028435E-01

2B y = -1.958094E-03x + 3.986039E-01

2C y = -1.615998E-03x + 3.990307E-01

2D y = -2.080413E-03x + 4.022292E-01

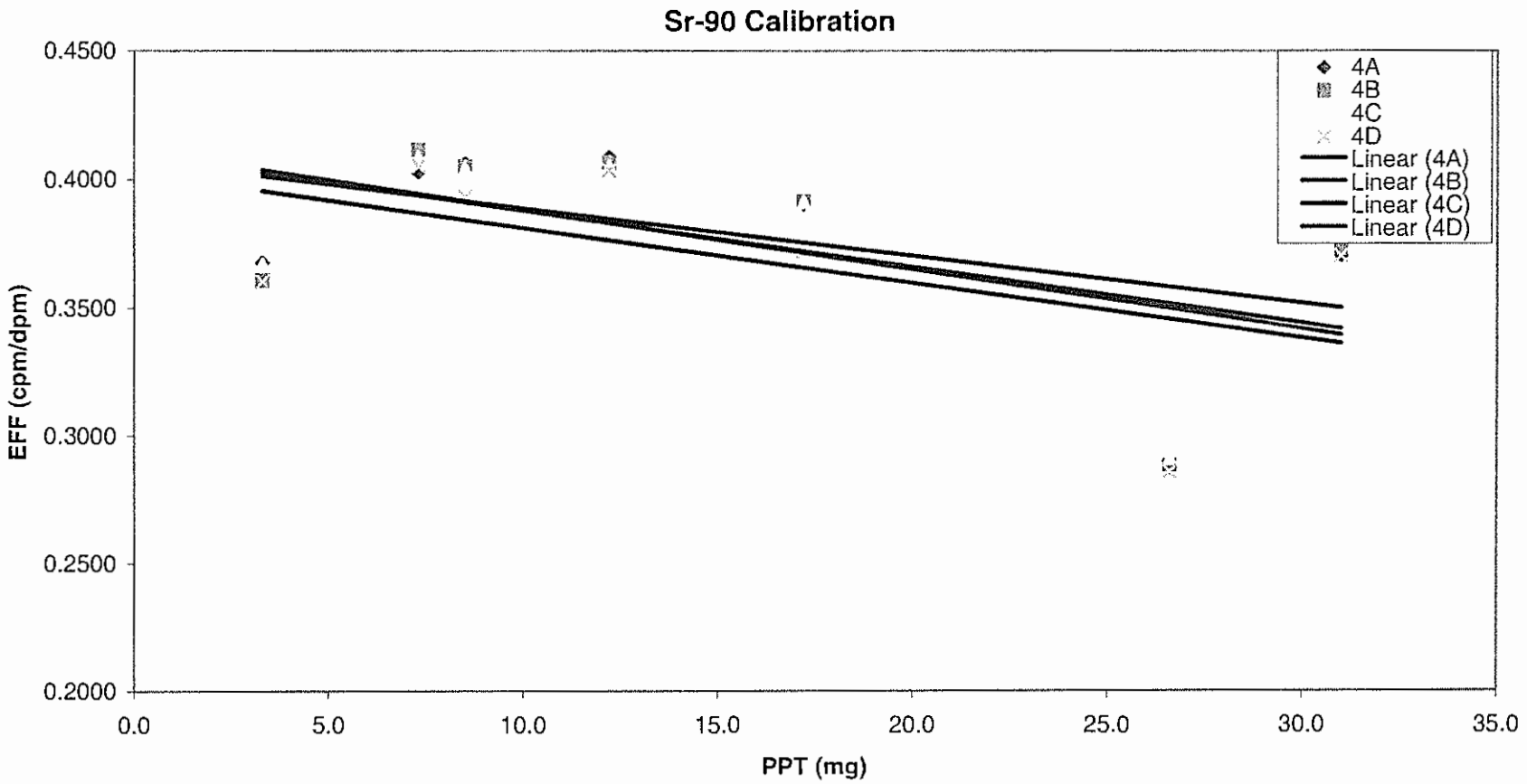



3A y = -2.259677E-03x + 3.982176E-01

3B y = -1.939291E-03x + 3.946777E-01

3C y = -2.259665E-03x + 4.121296E-01

3D y = -2.234962E-03x + 4.020361E-01

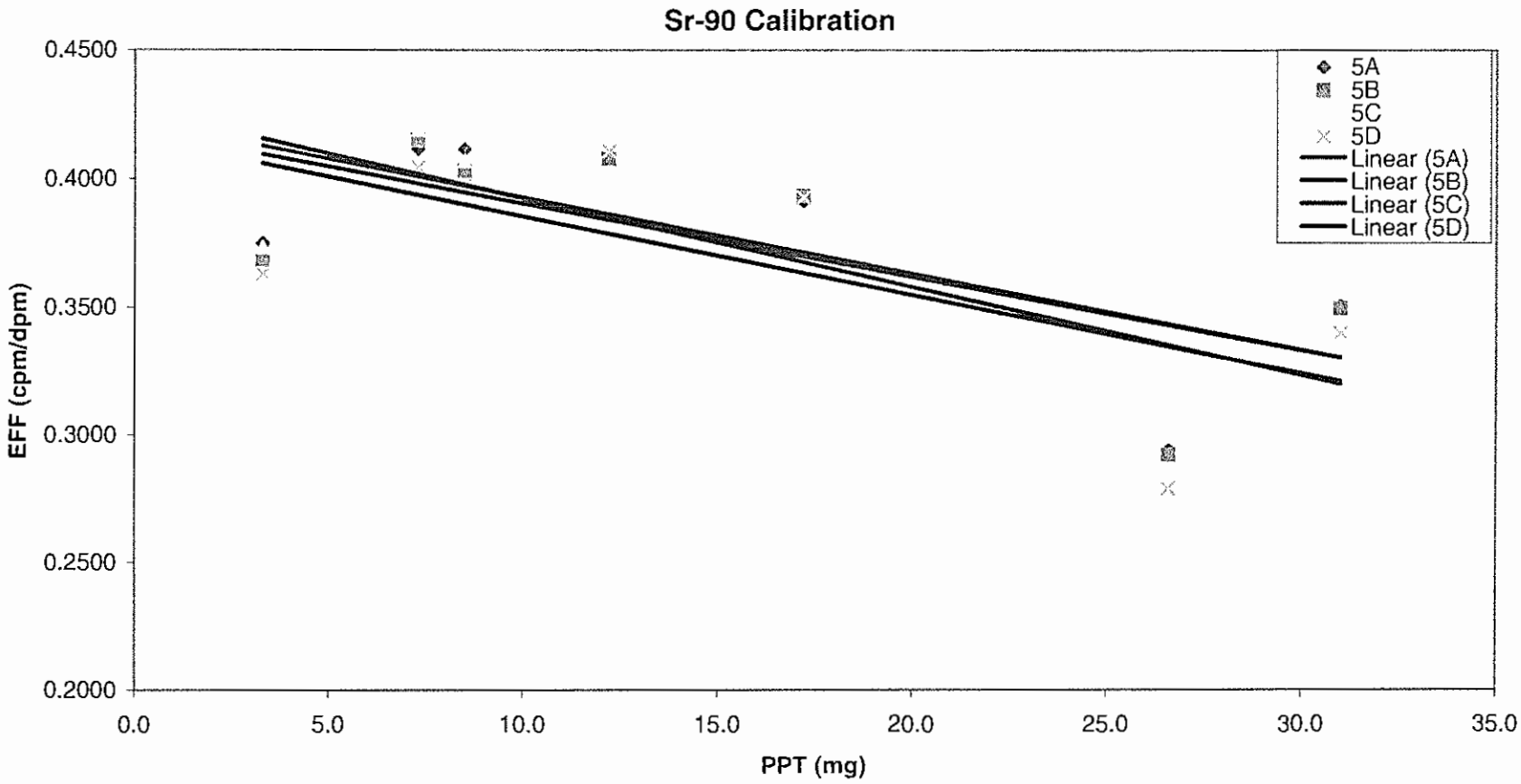



4A y = -2.314786E-03x + 4.114242E-01

4B y = -2.186682E-03x + 4.098489E-01

4C y = -1.846963E-03x + 4.073528E-01

4D y = -2.140852E-03x + 4.026301E-01

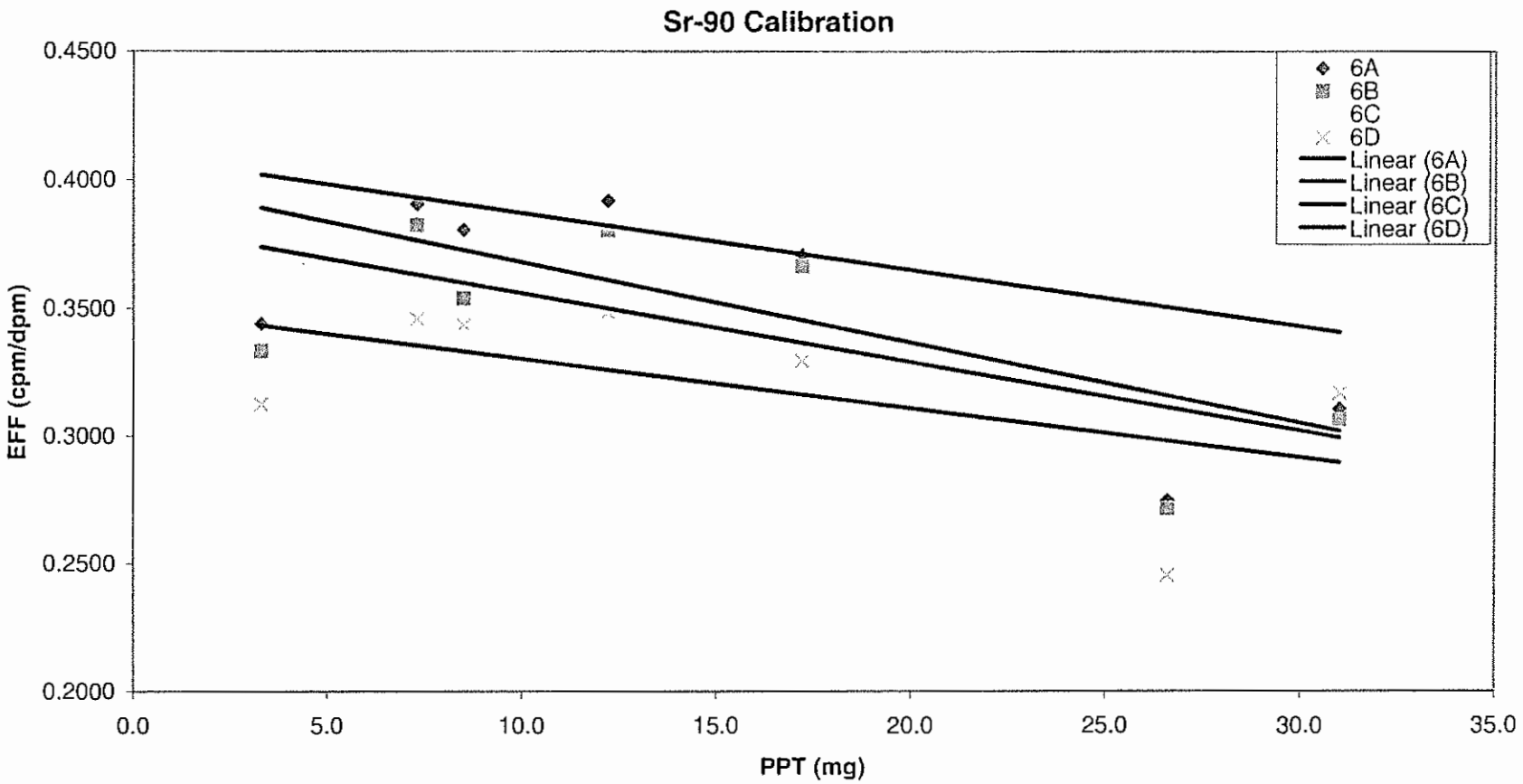



5A y = -2.984003E-03x + 4.227495E-01

5B y = -2.863352E-03x + 4.190820E-01

5C y = -3.460598E-03x + 4.271818E-01

5D y = -3.068168E-03x + 4.161972E-01

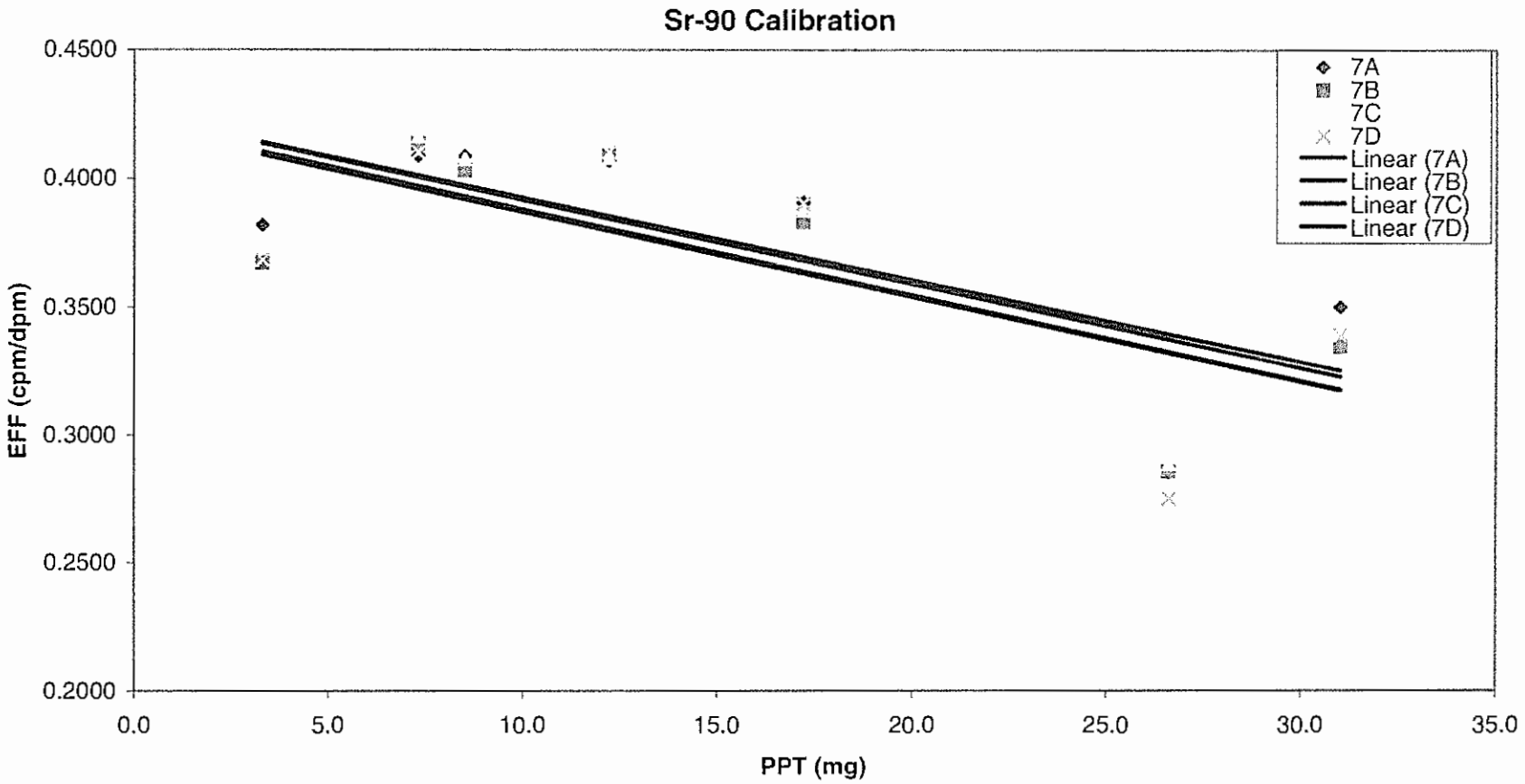



6A y = -3.144071E-03x + 3.995459E-01

6B y = -2.693844E-03x + 3.828880E-01

6C y = -2.212101E-03x + 4.093105E-01

6D y = -1.934101E-03x + 3.496389E-01

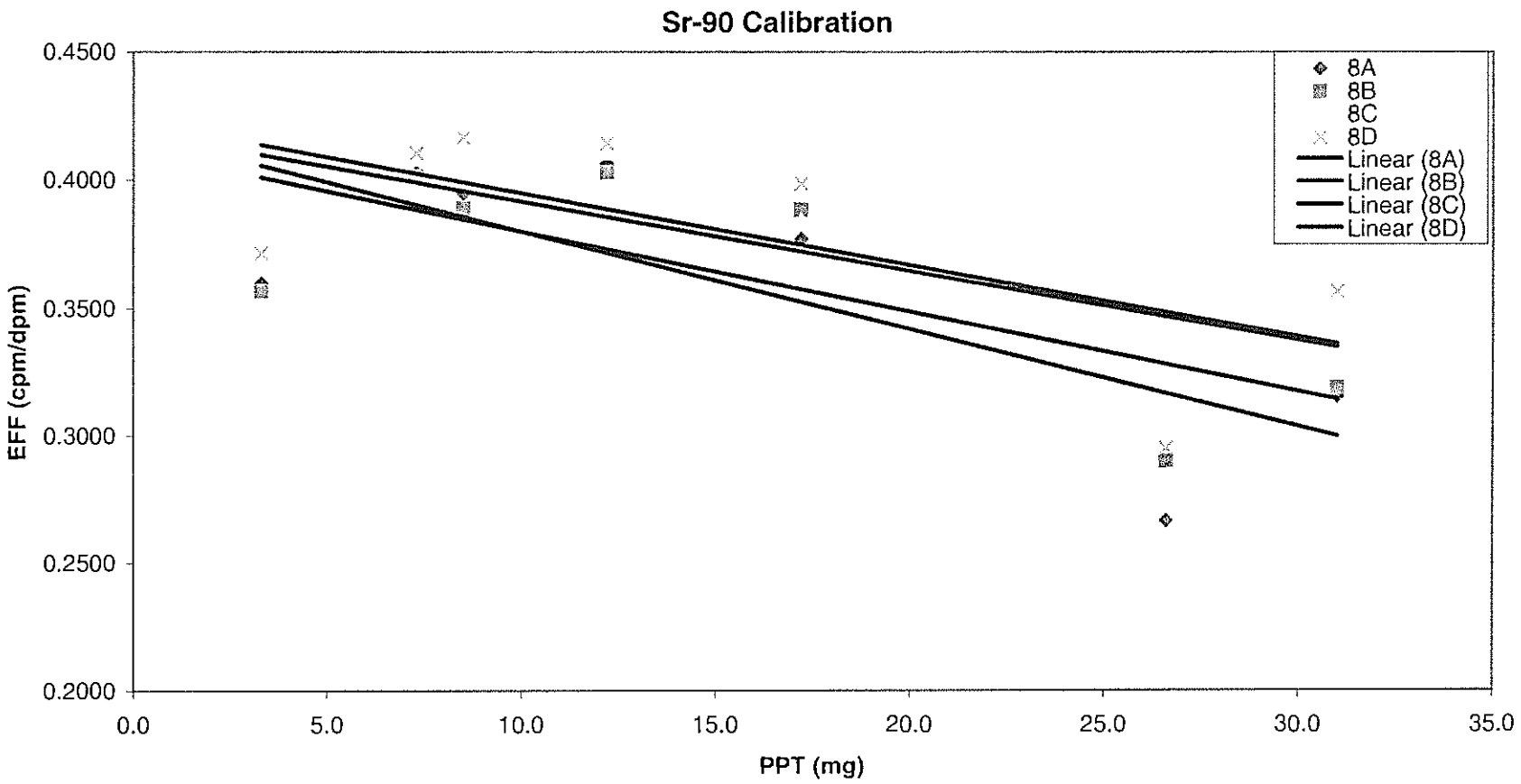



7A y = -3.200040E-03x + 4.246974E-01

7B y = -3.340259E-03x + 4.215895E-01

7C y = -3.267580E-03x + 4.244522E-01

7D y = -3.305734E-03x + 4.200945E-01

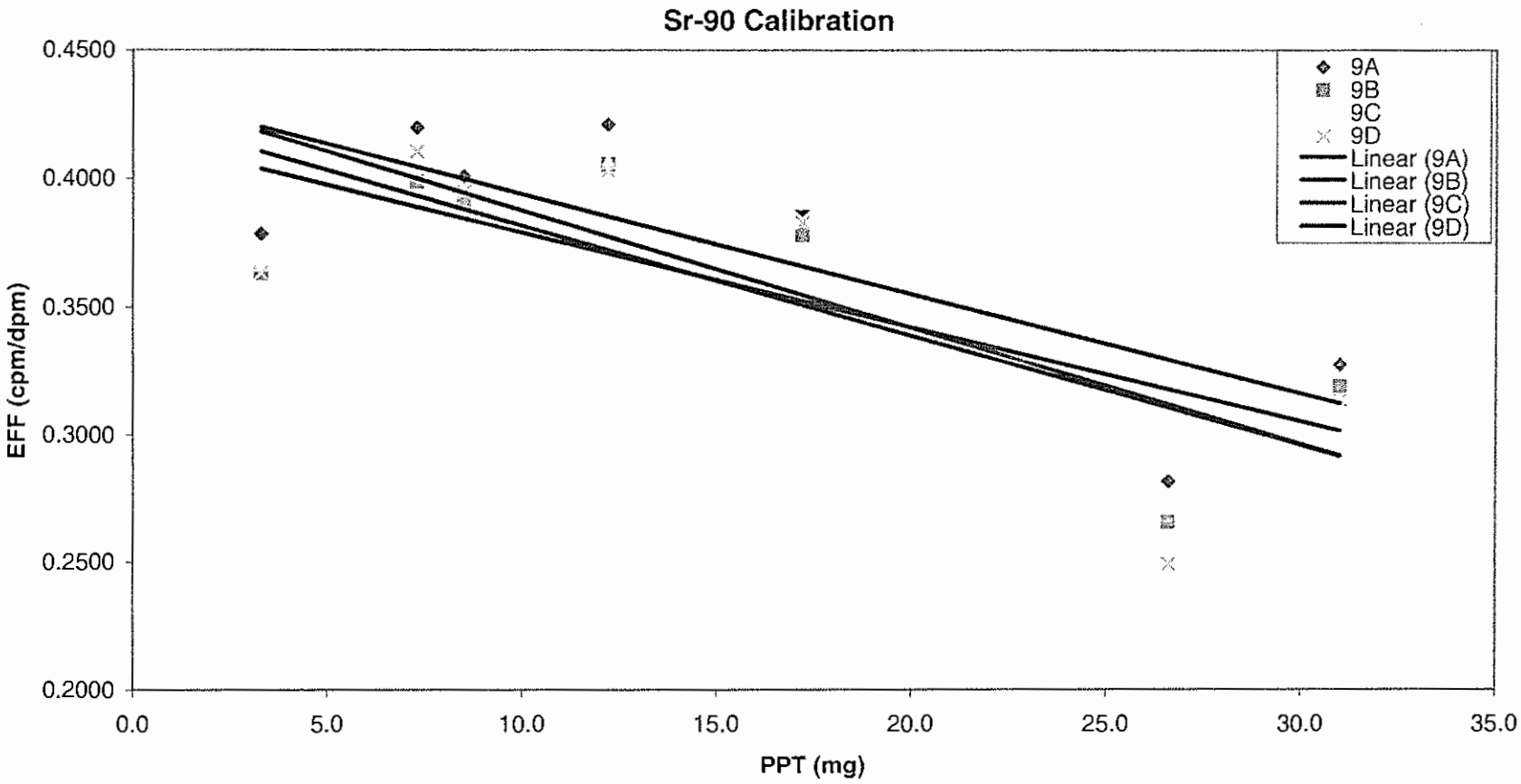



8A y = -3.815539E-03x + 4.183121E-01

8B y = -3.124360E-03x + 4.113619E-01

8C y = -2.707227E-03x + 4.188353E-01

8D y = -2.796572E-03x + 4.229571E-01

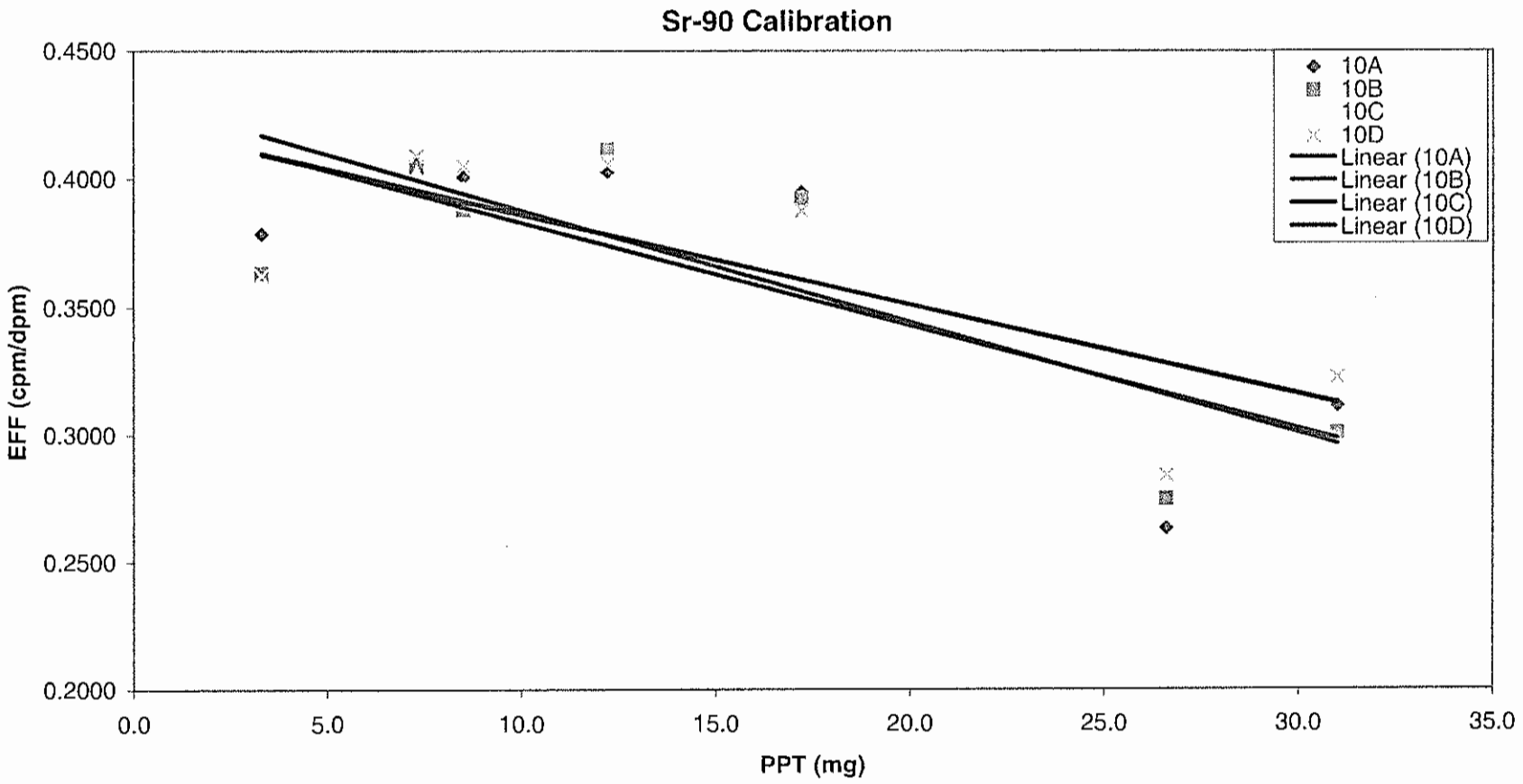



9A y = -3.891363E-03x + 4.329295E-01

9B y = -3.688512E-03x + 4.159108E-01

9C y = -4.563783E-03x + 4.332722E-01

9D y = -4.290468E-03x + 4.246685E-01

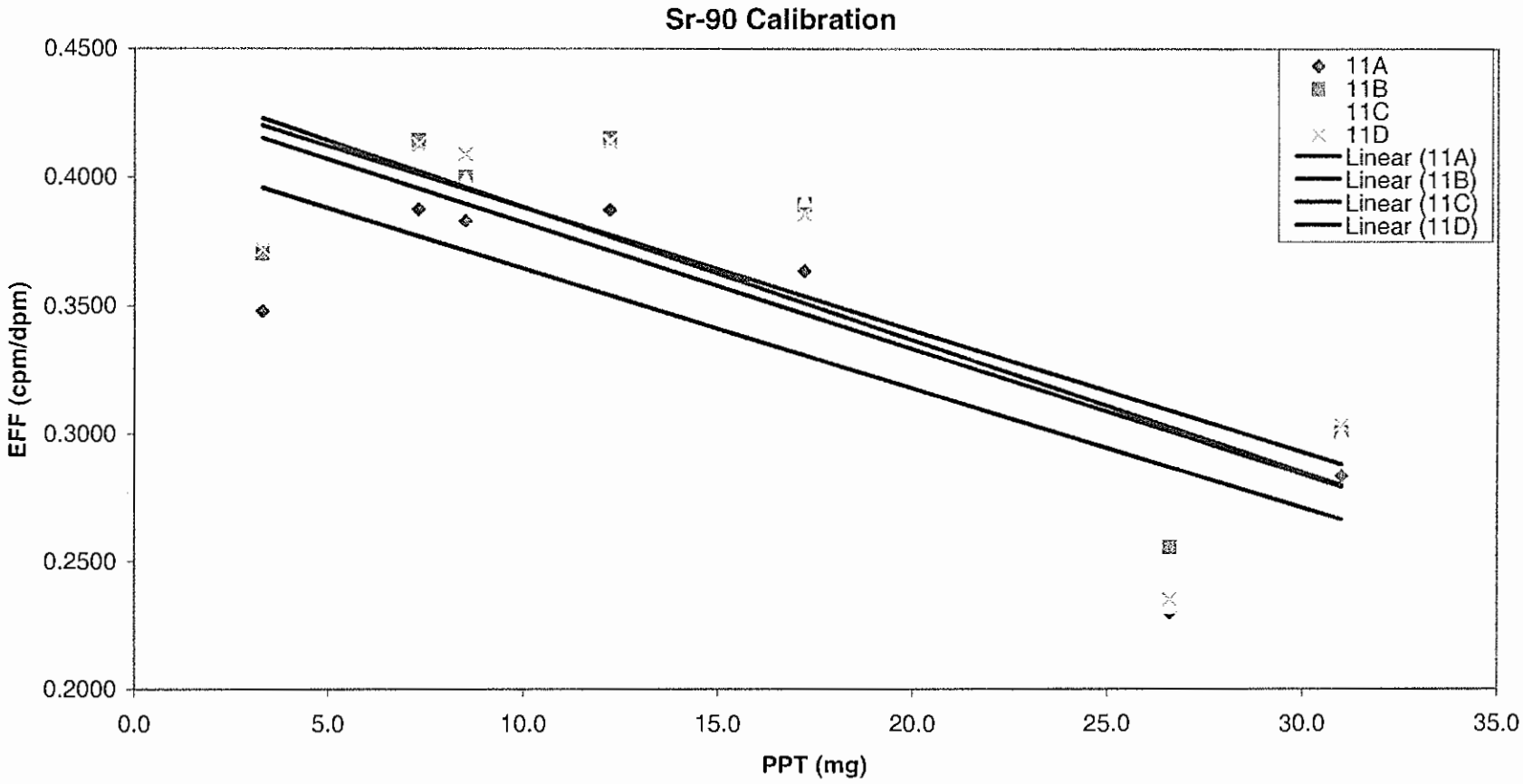



10A y = -4.347820E-03x + 4.312815E-01

10B y = -4.022619E-03x + 4.233487E-01

10C y = -3.484999E-03x + 4.208936E-01

10D y = -3.519529E-03x + 4.215478E-01

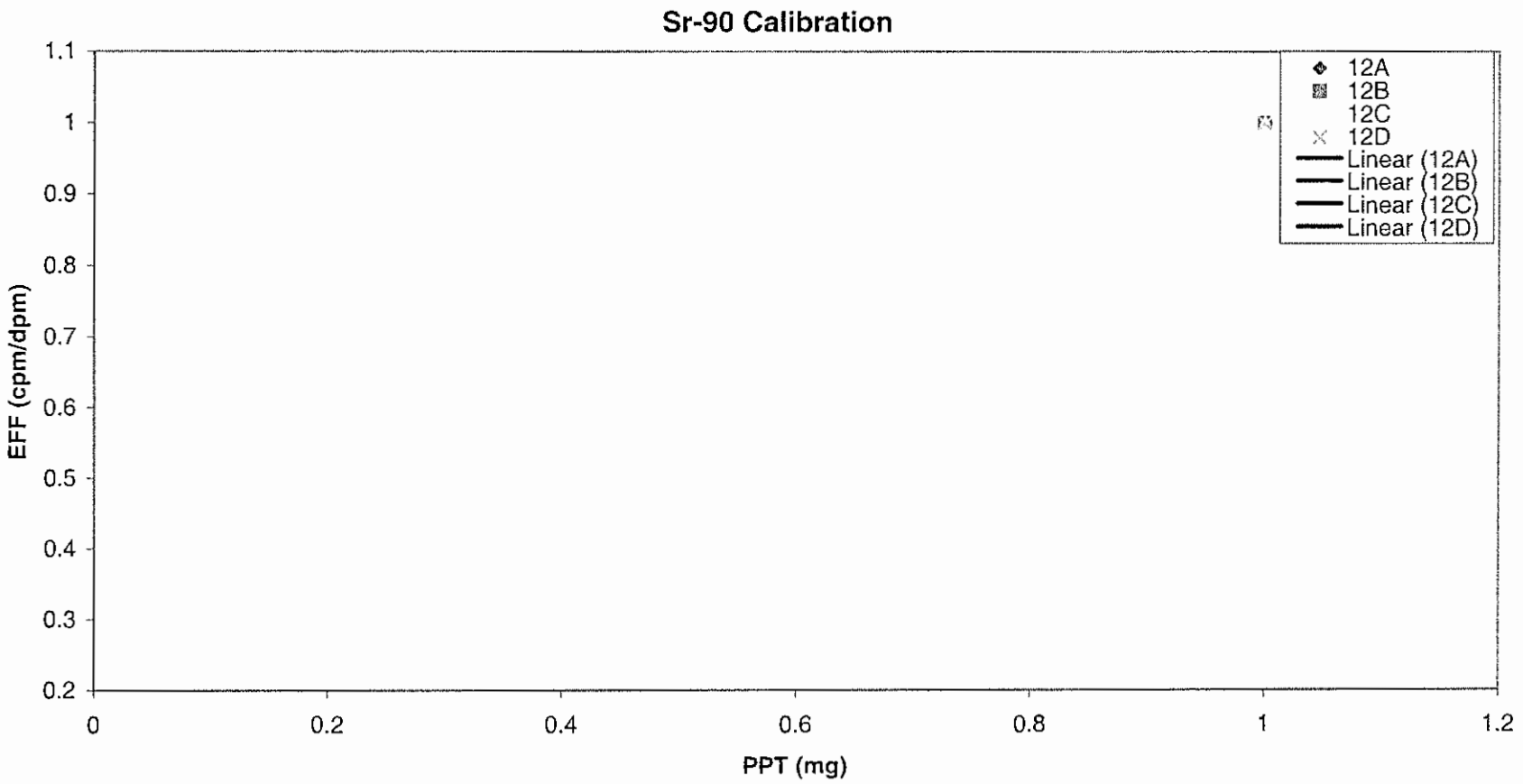



11A y = -4.676337E-03x + 4.113641E-01

11B y = -4.763146E-03x + 4.358297E-01

11C y = -4.907925E-03x + 4.314356E-01

11D y = -5.162403E-03x + 4.400233E-01



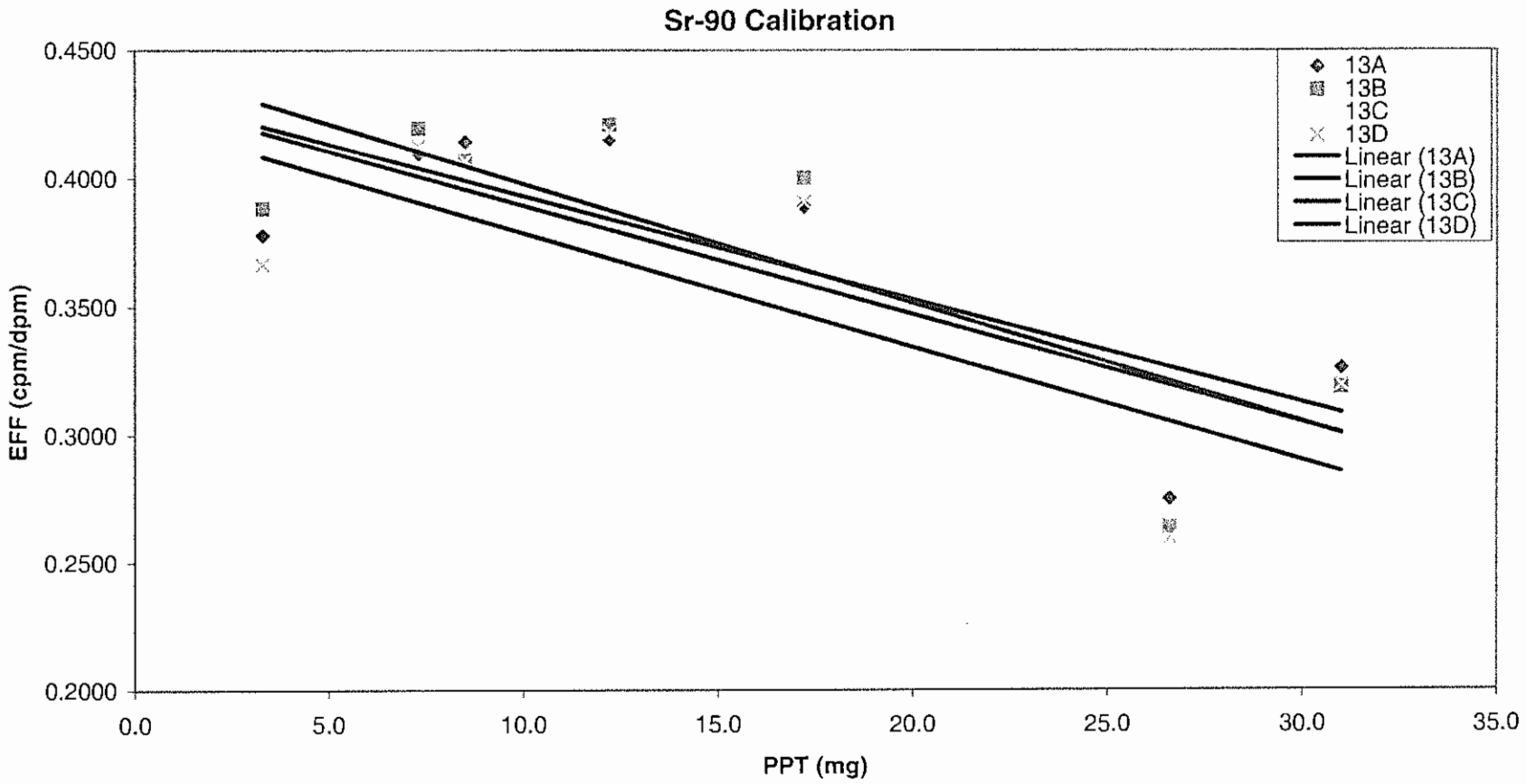

12A

12B

12C

12D

*Detectors not used in this calibration cycle. AP

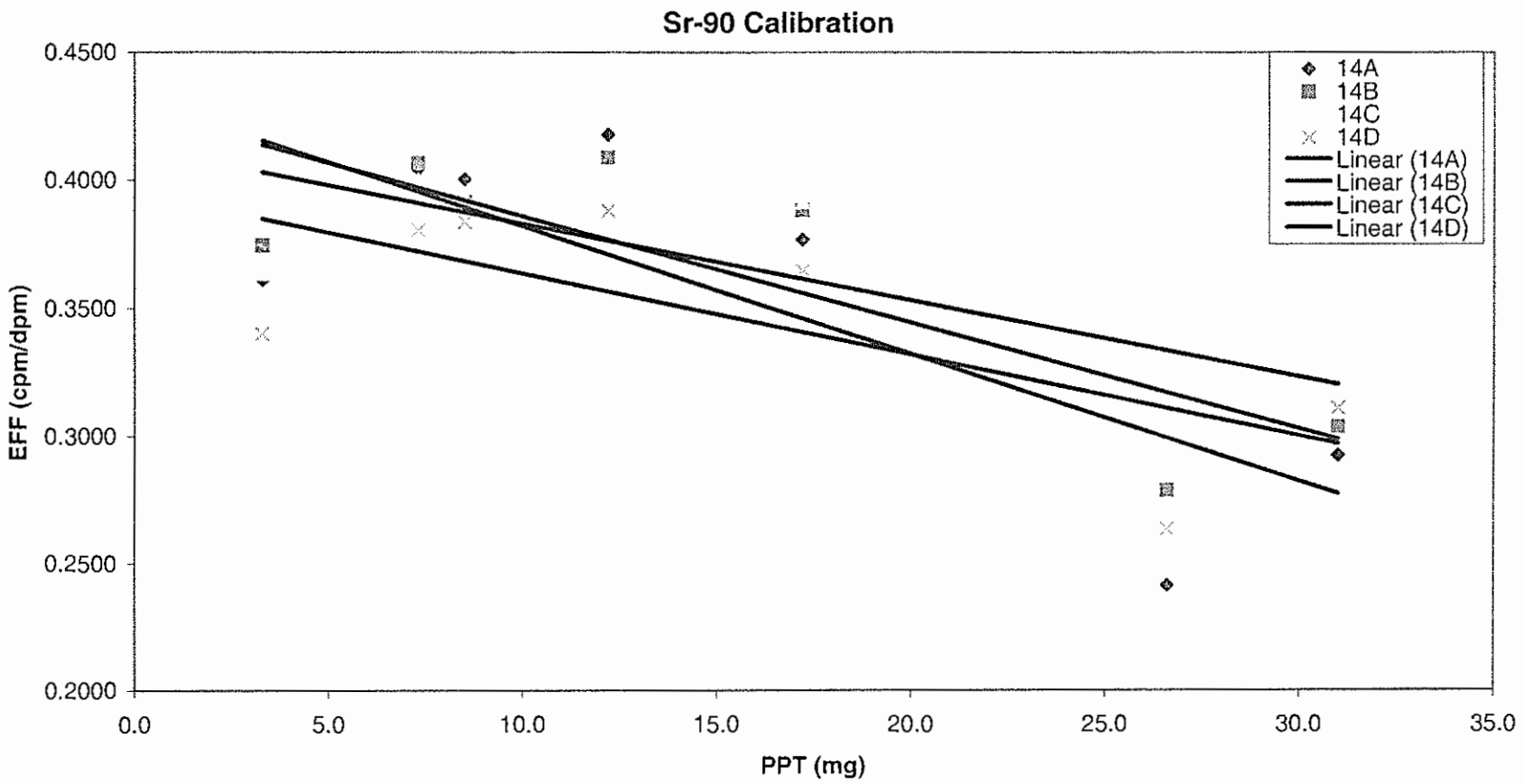



13A y = -4.016750E-03x + 4.334086E-01

13B y = -4.631961E-03x + 4.443149E-01

13C y = -4.427953E-03x + 4.230399E-01

13D y = -4.215610E-03x + 4.316464E-01




14A y = -4.987729E-03x + 4.319463E-01

14B y = -4.148939E-03x + 4.274329E-01

14C y = -2.983884E-03x + 4.129063E-01

14D y = -3.175399E-03x + 3.954898E-01

Current Calibration - PIC

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Sr-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **Protean** | A0 | A1 | A2 | A3 | A4 |
| **1A** | 4.114385E-01 | -2.279414E-03 | | | |
| **1B** | 4.104277E-01 | -2.242680E-03 | | | |
| **1C** | 4.188951E-01 | -2.472545E-03 | | | |
| **1D** | 4.084494E-01 | -2.290631E-03 | | | |
| **2A** | 4.028435E-01 | -2.217073E-03 | | | |
| **2B** | 3.986039E-01 | -1.958094E-03 | | | |
| **2C** | 3.990307E-01 | -1.615998E-03 | | | |
| **2D** | 4.022292E-01 | -2.080413E-03 | | | |
| **3A** | 3.982176E-01 | -2.259677E-03 | | | |
| **3B** | 3.946777E-01 | -1.939291E-03 | | | |
| **3C** | 4.121296E-01 | -2.259665E-03 | | | |
| **3D** | 4.020361E-01 | -2.234962E-03 | | | |
| **4A** | 4.114242E-01 | -2.314786E-03 | | | |
| **4B** | 4.098489E-01 | -2.186682E-03 | | | |
| **4C** | 4.073528E-01 | -1.846963E-03 | | | |
| **4D** | 4.026301E-01 | -2.140852E-03 | | | |
| **5A** | 4.227495E-01 | -2.984003E-03 | | | |
| **5B** | 4.190820E-01 | -2.863352E-03 | | | |
| **5C** | 4.271818E-01 | -3.460598E-03 | | | |
| **5D** | 4.161972E-01 | -3.068168E-03 | | | |
| **6A** | 3.995459E-01 | -3.144071E-03 | | | |
| **6B** | 3.828880E-01 | -2.693844E-03 | | | |
| **6C** | 4.093105E-01 | -2.212101E-03 | | | |
| **6D** | 3.496389E-01 | -1.934101E-03 | | | |
| **7A** | 4.246974E-01 | -3.200040E-03 | | | |
| **7B** | 4.215895E-01 | -3.340259E-03 | | | |
| **7C** | 4.244522E-01 | -3.267580E-03 | | | |
| **7D** | 4.200945E-01 | -3.305734E-03 | | | |
| **8A** | 4.183121E-01 | -3.815539E-03 | | | |
| **8B** | 4.113619E-01 | -3.124360E-03 | | | |
| **8C** | 4.188353E-01 | -2.707227E-03 | | | |
| **8D** | 4.229571E-01 | -2.796572E-03 | | | |
| **9A** | 4.329295E-01 | -3.891363E-03 | | | |
| **9B** | 4.159108E-01 | -3.688512E-03 | | | |
| **9C** | 4.332722E-01 | -4.563783E-03 | | | |
| **9D** | 4.246685E-01 | -4.290468E-03 | | | |
| **10A** | 4.312815E-01 | -4.347820E-03 | | | |
| **10B** | 4.233487E-01 | -4.022619E-03 | | | |
| **10C** | 4.208936E-01 | -3.484999E-03 | | | |
| **10D** | 4.215478E-01 | -3.519529E-03 | | | |
| **11A** | 4.113641E-01 | -4.676337E-03 | | | |
| **11B** | 4.358297E-01 | -4.763146E-03 | | | |
| **11C** | 4.314356E-01 | -4.907925E-03 | | | |
| **11D** | 4.400233E-01 | -5.162403E-03 | | | |
| **12A** | #N/A | #N/A | | | |
| **12B** | #N/A | #N/A | | | |
| **12C** | #N/A | #N/A | | | |
| **12D** | #N/A | #N/A | | | |
| **13A** | 4.334086E-01 | -4.016750E-03 | | | |
| **13B** | 4.443149E-01 | -4.631961E-03 | | | |
| **13C** | 4.230399E-01 | -4.427953E-03 | | | |
| **13D** | 4.316464E-01 | -4.215610E-03 | | | |
| **14A** | 4.319463E-01 | -4.987729E-03 | | | |
| **14B** | 4.274329E-01 | -4.148939E-03 | | | |
| **14C** | 4.129063E-01 | -2.983884E-03 | | | |
| **14D** | 3.954898E-01 | -3.175399E-03 | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| S1 | 1A | 3 | 9 | 14094 | 3/30/2013 12:17 | 3/30/2013 12:20 | PIC | Sr90S13 |
| S2 | 1A | 3 | 13 | 15073 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S3 | 1A | 3 | 10 | 15044 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S4 | 1A | 3 | 9 | 14969 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S5 | 1A | 3 | 21 | 14480 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S6 | 1A | 3 | 18 | 11753 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S7 | 1A | 3 | 11 | 13985 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S1 | 1B | 3 | 21 | 14015 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S2 | 1B | 3 | 21 | 14889 | 3/30/2013 12:17 | 3/30/2013 12:20 | PIC | Sr90S13 |
| S3 | 1B | 3 | 28 | 14916 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S4 | 1B | 3 | 19 | 15096 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S5 | 1B | 3 | 32 | 14632 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S6 | 1B | 3 | 26 | 11749 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S7 | 1B | 3 | 27 | 13913 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S1 | 1C | 3 | 290 | 13961 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S2 | 1C | 3 | 258 | 15401 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S3 | 1C | 3 | 242 | 15175 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S4 | 1C | 3 | 290 | 15289 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S5 | 1C | 3 | 283 | 14609 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S6 | 1C | 3 | 199 | 11924 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S7 | 1C | 3 | 266 | 13954 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S1 | 1D | 3 | 206 | 13844 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S2 | 1D | 3 | 183 | 14825 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S3 | 1D | 3 | 193 | 14718 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S4 | 1D | 3 | 197 | 15215 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S5 | 1D | 3 | 185 | 14413 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S6 | 1D | 3 | 142 | 11672 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S7 | 1D | 3 | 191 | 13819 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S1 | 2A | 3 | 4 | 13666 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S2 | 2A | 3 | 2 | 14488 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S3 | 2A | 3 | 0 | 14873 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S4 | 2A | 3 | 2 | 14469 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S5 | 2A | 3 | 6 | 14051 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S6 | 2A | 3 | 1 | 11610 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S7 | 2A | 3 | 2 | 13591 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S1 | 2B | 3 | 0 | 13529 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S2 | 2B | 3 | 2 | 14792 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S3 | 2B | 3 | 0 | 14576 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S4 | 2B | 3 | 1 | 14582 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S5 | 2B | 3 | 0 | 14089 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S6 | 2B | 3 | 2 | 11449 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S7 | 2B | 3 | 1 | 13840 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S1 | 2C | 3 | 22 | 13679 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S2 | 2C | 3 | 38 | 14707 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S3 | 2C | 3 | 27 | 14753 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S4 | 2C | 3 | 31 | 14853 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S5 | 2C | 3 | 31 | 14390 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S6 | 2C | 3 | 30 | 11397 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S7 | 2C | 3 | 19 | 14284 | 3/30/2013 12:18 | 3/30/2013 12:21 | PIC | Sr90S13 |
| S1 | 2D | 3 | 7 | 13865 | 3/30/2013 13:18 | 3/30/2013 13:21 | PIC | Sr90S13 |
| S2 | 2D | 3 | 17 | 14898 | 3/30/2013 13:10 | 3/30/2013 13:13 | PIC | Sr90S13 |
| S3 | 2D | 3 | 17 | 14524 | 3/30/2013 13:02 | 3/30/2013 13:05 | PIC | Sr90S13 |
| S4 | 2D | 3 | 16 | 14804 | 3/30/2013 12:55 | 3/30/2013 12:58 | PIC | Sr90S13 |
| S5 | 2D | 3 | 15 | 14073 | 3/30/2013 12:41 | 3/30/2013 12:44 | PIC | Sr90S13 |
| S6 | 2D | 3 | 13 | 11483 | 3/30/2013 12:33 | 3/30/2013 12:36 | PIC | Sr90S13 |
| S7 | 2D | 3 | 15 | 13847 | 3/30/2013 12:25 | 3/30/2013 12:28 | PIC | Sr90S13 |
| S1 | 3A | 3 | 441 | 13645 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S2 | 3A | 3 | 405 | 14564 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S3 | 3A | 3 | 425 | 14572 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S4 | 3A | 3 | 446 | 14839 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S5 | 3A | 3 | 402 | 14177 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S6 | 3A | 3 | 305 | 11303 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S7 | 3A | 3 | 410 | 13572 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S1 | 3B | 3 | 359 | 13621 | 3/30/2013 12:29 | 3/30/2013 12:32 | PIC | Sr90S13 |
| S2 | 3B | 3 | 365 | 14585 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S3 | 3B | 3 | 376 | 14415 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S4 | 3B | 3 | 365 | 14709 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S5 | 3B | 3 | 338 | 14272 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S6 | 3B | 3 | 265 | 11627 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S7 | 3B | 3 | 337 | 13684 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S1 | 3C | 3 | 144 | 14011 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S2 | 3C | 3 | 155 | 15274 | 3/30/2013 12:29 | 3/30/2013 12:32 | PIC | Sr90S13 |
| S3 | 3C | 3 | 165 | 14723 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S4 | 3C | 3 | 170 | 15163 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S5 | 3C | 3 | 159 | 14420 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S6 | 3C | 3 | 143 | 11833 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S7 | 3C | 3 | 175 | 14051 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S1 | 3D | 3 | 135 | 13662 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S2 | 3D | 3 | 152 | 14617 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S3 | 3D | 3 | 150 | 14360 | 3/30/2013 12:29 | 3/30/2013 12:32 | PIC | Sr90S13 |
| S4 | 3D | 3 | 160 | 14989 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S5 | 3D | 3 | 152 | 14309 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S6 | 3D | 3 | 111 | 11533 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S7 | 3D | 3 | 135 | 13555 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S1 | 4A | 3 | 128 | 14023 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S2 | 4A | 3 | 128 | 14894 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S3 | 4A | 3 | 131 | 14985 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S4 | 4A | 3 | 113 | 15019 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S5 | 4A | 3 | 115 | 14476 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S6 | 4A | 3 | 88 | 11639 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S7 | 4A | 3 | 114 | 14014 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S1 | 4B | 3 | 2 | 13871 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S2 | 4B | 3 | 0 | 15191 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S3 | 4B | 3 | 0 | 15008 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S4 | 4B | 3 | 0 | 15000 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S5 | 4B | 3 | 1 | 14550 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S6 | 4B | 3 | 0 | 11562 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S7 | 4B | 3 | 0 | 14136 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S1 | 4C | 3 | 108 | 14091 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S2 | 4C | 3 | 104 | 15137 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S3 | 4C | 3 | 104 | 15020 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S4 | 4C | 3 | 105 | 15005 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |
| S5 | 4C | 3 | 105 | 14581 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S6 | 4C | 3 | 74 | 11676 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S7 | 4C | 3 | 130 | 14439 | 3/30/2013 12:21 | 3/30/2013 12:24 | PIC | Sr90S13 |
| S1 | 4D | 3 | 287 | 13872 | 3/30/2013 13:21 | 3/30/2013 13:24 | PIC | Sr90S13 |
| S2 | 4D | 3 | 308 | 15024 | 3/30/2013 13:14 | 3/30/2013 13:17 | PIC | Sr90S13 |
| S3 | 4D | 3 | 344 | 14688 | 3/30/2013 13:06 | 3/30/2013 13:09 | PIC | Sr90S13 |
| S4 | 4D | 3 | 324 | 14941 | 3/30/2013 12:58 | 3/30/2013 13:01 | PIC | Sr90S13 |
| S5 | 4D | 3 | 305 | 14023 | 3/30/2013 12:51 | 3/30/2013 12:54 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S6 | 4D | 3 | 266 | 11509 | 3/30/2013 12:37 | 3/30/2013 12:40 | PIC | Sr90S13 |
| S7 | 4D | 3 | 292 | 13924 | 3/30/2013 12:30 | 3/30/2013 12:33 | PIC | Sr90S13 |
| S1 | 5A | 3 | 57 | 14335 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S2 | 5A | 3 | 72 | 15370 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S3 | 5A | 3 | 93 | 15373 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S4 | 5A | 3 | 92 | 15258 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S5 | 5A | 3 | 66 | 14748 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S6 | 5A | 3 | 65 | 11926 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S7 | 5A | 3 | 71 | 13537 | 3/30/2013 13:40 | 3/30/2013 13:43 | PIC | Sr90S13 |
| S1 | 5B | 3 | 63 | 14174 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S2 | 5B | 3 | 69 | 15365 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S3 | 5B | 3 | 79 | 15151 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S4 | 5B | 3 | 82 | 15253 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S5 | 5B | 3 | 65 | 14820 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S6 | 5B | 3 | 49 | 11897 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S7 | 5B | 3 | 76 | 13533 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S1 | 5C | 3 | 76 | 14333 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S2 | 5C | 3 | 88 | 15507 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S3 | 5C | 3 | 87 | 15162 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S4 | 5C | 3 | 76 | 15436 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S5 | 5C | 3 | 75 | 14618 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S6 | 5C | 3 | 50 | 11698 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S7 | 5C | 3 | 60 | 13285 | 3/30/2013 13:54 | 3/30/2013 13:57 | PIC | Sr90S13 |
| S1 | 5D | 3 | 71 | 14052 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S2 | 5D | 3 | 93 | 15099 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S3 | 5D | 3 | 110 | 14907 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S4 | 5D | 3 | 82 | 15249 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S5 | 5D | 3 | 76 | 14837 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S6 | 5D | 3 | 84 | 11545 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S7 | 5D | 3 | 78 | 13288 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S1 | 6A | 3 | 0 | 13113 | 3/30/2013 13:54 | 3/30/2013 13:57 | PIC | Sr90S13 |
| S2 | 6A | 3 | 0 | 14330 | 3/30/2013 13:47 | 3/30/2013 13:50 | PIC | Sr90S13 |
| S3 | 6A | 3 | 0 | 14044 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S4 | 6A | 3 | 0 | 14336 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S5 | 6A | 3 | 0 | 13718 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S6 | 6A | 3 | 1 | 11049 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S7 | 6A | 3 | 0 | 12072 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S1 | 6B | 3 | 1 | 12617 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S2 | 6B | 3 | 0 | 13913 | 3/30/2013 13:54 | 3/30/2013 13:57 | PIC | Sr90S13 |
| S3 | 6B | 3 | 0 | 13094 | 3/30/2013 13:46 | 3/30/2013 13:49 | PIC | Sr90S13 |
| S4 | 6B | 3 | 0 | 13831 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S5 | 6B | 3 | 0 | 13414 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S6 | 6B | 3 | 0 | 10672 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S7 | 6B | 3 | 0 | 11765 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S1 | 6C | 3 | 2 | 14081 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S2 | 6C | 3 | 3 | 14961 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S3 | 6C | 3 | 3 | 15089 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S4 | 6C | 3 | 1 | 14784 | 3/30/2013 13:46 | 3/30/2013 13:49 | PIC | Sr90S13 |
| S5 | 6C | 3 | 0 | 14305 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S6 | 6C | 3 | 3 | 11626 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S7 | 6C | 3 | 1 | 14025 | 3/30/2013 13:25 | 3/30/2013 13:28 | PIC | Sr90S13 |
| S1 | 6D | 3 | 17 | 12095 | 3/30/2013 14:15 | 3/30/2013 14:18 | PIC | Sr90S13 |
| S2 | 6D | 3 | 16 | 12930 | 3/30/2013 14:07 | 3/30/2013 14:10 | PIC | Sr90S13 |
| S3 | 6D | 3 | 22 | 12868 | 3/30/2013 14:00 | 3/30/2013 14:03 | PIC | Sr90S13 |
| S4 | 6D | 3 | 17 | 12981 | 3/30/2013 13:53 | 3/30/2013 13:56 | PIC | Sr90S13 |
| S5 | 6D | 3 | 18 | 12417 | 3/30/2013 13:46 | 3/30/2013 13:49 | PIC | Sr90S13 |
| S6 | 6D | 3 | 13 | 9991 | 3/30/2013 13:39 | 3/30/2013 13:42 | PIC | Sr90S13 |
| S7 | 6D | 3 | 25 | 12032 | 3/30/2013 13:32 | 3/30/2013 13:35 | PIC | Sr90S13 |
| S1 | 7A | 3 | 137 | 14545 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S2 | 7A | 3 | 148 | 15303 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S3 | 7A | 3 | 143 | 15303 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S4 | 7A | 3 | 150 | 15216 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S5 | 7A | 3 | 129 | 14738 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S6 | 7A | 3 | 102 | 11695 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S7 | 7A | 3 | 112 | 13540 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S1 | 7B | 3 | 156 | 14155 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S2 | 7B | 3 | 155 | 15340 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S3 | 7B | 3 | 151 | 15172 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S4 | 7B | 3 | 152 | 15304 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S5 | 7B | 3 | 143 | 14547 | 3/30/2013 14:03 | 3/30/2013 14:06 | PIC | Sr90S13 |
| S6 | 7B | 3 | 104 | 11731 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S7 | 7B | 3 | 128 | 13123 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S1 | 7C | 3 | 52 | 14289 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S2 | 7C | 3 | 55 | 15396 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S3 | 7C | 3 | 67 | 15144 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S4 | 7C | 3 | 45 | 15243 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S5 | 7C | 3 | 47 | 14647 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S6 | 7C | 3 | 34 | 11785 | 3/30/2013 14:03 | 3/30/2013 14:06 | PIC | Sr90S13 |
| S7 | 7C | 3 | 44 | 13310 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S1 | 7D | 3 | 86 | 14208 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S2 | 7D | 3 | 82 | 15261 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S3 | 7D | 3 | 100 | 14845 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S4 | 7D | 3 | 107 | 15230 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S5 | 7D | 3 | 83 | 14768 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S6 | 7D | 3 | 53 | 11438 | 3/30/2013 14:11 | 3/30/2013 14:14 | PIC | Sr90S13 |
| S7 | 7D | 3 | 74 | 13266 | 3/30/2013 14:03 | 3/30/2013 14:06 | PIC | Sr90S13 |
| S1 | 8A | 3 | 7 | 13895 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S2 | 8A | 3 | 4 | 14992 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S3 | 8A | 3 | 3 | 14765 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S4 | 8A | 3 | 6 | 15068 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S5 | 8A | 3 | 5 | 14209 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S6 | 8A | 3 | 4 | 11132 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S7 | 8A | 3 | 2 | 12521 | 3/30/2013 14:12 | 3/30/2013 14:15 | PIC | Sr90S13 |
| S1 | 8B | 3 | 1 | 13736 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S2 | 8B | 3 | 1 | 14887 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S3 | 8B | 3 | 0 | 14532 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S4 | 8B | 3 | 0 | 14897 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S5 | 8B | 3 | 0 | 14465 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S6 | 8B | 3 | 0 | 11620 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S7 | 8B | 3 | 0 | 12555 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S1 | 8C | 3 | 13 | 14553 | 3/30/2013 14:12 | 3/30/2013 14:15 | PIC | Sr90S13 |
| S2 | 8C | 3 | 10 | 15356 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S3 | 8C | 3 | 17 | 14984 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |
| S4 | 8C | 3 | 18 | 15283 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S5 | 8C | 3 | 6 | 14518 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S6 | 8C | 3 | 16 | 12272 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S7 | 8C | 3 | 13 | 13541 | 3/30/2013 13:28 | 3/30/2013 13:31 | PIC | Sr90S13 |
| S1 | 8D | 3 | 27 | 14393 | 3/30/2013 14:18 | 3/30/2013 14:21 | PIC | Sr90S13 |
| S2 | 8D | 3 | 24 | 15368 | 3/30/2013 14:12 | 3/30/2013 14:15 | PIC | Sr90S13 |
| S3 | 8D | 3 | 32 | 15551 | 3/30/2013 14:04 | 3/30/2013 14:07 | PIC | Sr90S13 |
| S4 | 8D | 3 | 19 | 15442 | 3/30/2013 13:57 | 3/30/2013 14:00 | PIC | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S5 | 8D | 3 | 24 | 14977 | 3/30/2013 13:50 | 3/30/2013 13:53 | PIC | Sr90S13 |
| S6 | 8D | 3 | 20 | 11985 | 3/30/2013 13:43 | 3/30/2013 13:46 | PIC | Sr90S13 |
| S7 | 8D | 3 | 16 | 13737 | 3/30/2013 13:36 | 3/30/2013 13:39 | PIC | Sr90S13 |
| S1 | 9A | 3 | 28 | 14571 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S2 | 9A | 3 | 30 | 15738 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90S13 |
| S3 | 9A | 3 | 30 | 15197 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S4 | 9A | 3 | 34 | 15737 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S5 | 9A | 3 | 30 | 14772 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S6 | 9A | 3 | 27 | 11700 | 3/30/2013 14:42 | 3/30/2013 14:45 | PIC | Sr90S13 |
| S7 | 9A | 3 | 27 | 13004 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S1 | 9B | 3 | 16 | 14063 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S2 | 9B | 3 | 12 | 14946 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S3 | 9B | 3 | 23 | 14825 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |
| S4 | 9B | 3 | 19 | 15236 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S5 | 9B | 3 | 16 | 14428 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S6 | 9B | 3 | 16 | 11183 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S7 | 9B | 3 | 21 | 12700 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S1 | 9C | 3 | 44 | 14218 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S2 | 9C | 3 | 32 | 15402 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S3 | 9C | 3 | 30 | 15296 | 3/30/2013 14:21 | 3/30/2013 14:24 | PIC | Sr90S13 |
| S4 | 9C | 3 | 38 | 15315 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |
| S5 | 9C | 3 | 41 | 14853 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S6 | 9C | 3 | 26 | 10978 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S7 | 9C | 3 | 26 | 12385 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S1 | 9D | 3 | 2 | 13987 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S2 | 9D | 3 | 0 | 15196 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S3 | 9D | 3 | 1 | 14760 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S4 | 9D | 3 | 0 | 14958 | 3/30/2013 14:21 | 3/30/2013 14:24 | PIC | Sr90S13 |
| S5 | 9D | 3 | 2 | 14493 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |
| S6 | 9D | 3 | 1 | 10632 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S7 | 9D | 3 | 0 | 12459 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S1 | 10A | 3 | 12 | 14585 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S2 | 10A | 3 | 11 | 15225 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S3 | 10A | 3 | 9 | 15080 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S4 | 10A | 3 | 18 | 15107 | 3/30/2013 14:28 | 3/30/2013 14:31 | PIC | Sr90S13 |
| S5 | 10A | 3 | 9 | 14855 | 3/30/2013 14:21 | 3/30/2013 14:24 | PIC | Sr90S13 |
| S6 | 10A | 3 | 11 | 11188 | 3/30/2013 15:15 | 3/30/2013 15:18 | PIC | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S7 | 10A | 3 | 9 | 12557 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S1 | 10B | 3 | 32 | 14134 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S2 | 10B | 3 | 32 | 15177 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S3 | 10B | 3 | 34 | 14709 | 3/30/2013 14:43 | 3/30/2013 14:46 | PIC | Sr90S13 |
| S4 | 10B | 3 | 38 | 15366 | 3/30/2013 14:35 | 3/30/2013 14:38 | PIC | Sr90S13 |
| S5 | 10B | 3 | 38 | 14785 | 3/30/2013 14:29 | 3/30/2013 14:32 | PIC | Sr90S13 |
| S6 | 10B | 3 | 31 | 11381 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S7 | 10B | 3 | 28 | 12244 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90S13 |
| S1 | 10C | 3 | 34 | 14391 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S2 | 10C | 3 | 48 | 15140 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S3 | 10C | 3 | 26 | 14971 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S4 | 10C | 3 | 40 | 15541 | 3/30/2013 14:42 | 3/30/2013 14:45 | PIC | Sr90S13 |
| S5 | 10C | 3 | 39 | 14457 | 3/30/2013 14:36 | 3/30/2013 14:39 | PIC | Sr90S13 |
| S6 | 10C | 3 | 28 | 11591 | 3/30/2013 14:29 | 3/30/2013 14:32 | PIC | Sr90S13 |
| S7 | 10C | 3 | 30 | 12946 | 3/30/2013 14:22 | 3/30/2013 14:25 | PIC | Sr90S13 |
| S1 | 10D | 3 | 20 | 14192 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90S13 |
| S2 | 10D | 3 | 26 | 15388 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90S13 |
| S3 | 10D | 3 | 13 | 15273 | 3/30/2013 14:57 | 3/30/2013 15:00 | PIC | Sr90S13 |
| S4 | 10D | 3 | 19 | 15258 | 3/30/2013 14:50 | 3/30/2013 14:53 | PIC | Sr90S13 |
| S5 | 10D | 3 | 29 | 14721 | 3/30/2013 14:42 | 3/30/2013 14:45 | PIC | Sr90S13 |
| S6 | 10D | 3 | 22 | 11720 | 3/30/2013 14:36 | 3/30/2013 14:39 | PIC | Sr90S13 |
| S7 | 10D | 3 | 20 | 12821 | 3/30/2013 14:29 | 3/30/2013 14:32 | PIC | Sr90S13 |
| S1 | 11A | 3 | 2 | 13341 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S2 | 11A | 3 | 0 | 14364 | 3/30/2013 15:31 | 3/30/2013 15:34 | PIC | Sr90S13 |
| S3 | 11A | 3 | 0 | 14259 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S4 | 11A | 3 | 1 | 14370 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90S13 |
| S5 | 11A | 3 | 0 | 13698 | 3/30/2013 15:43 | 3/30/2013 15:46 | PIC | Sr90S13 |
| S6 | 11A | 3 | 0 | 9866 | 3/30/2013 15:47 | 3/30/2013 15:50 | PIC | Sr90S13 |
| S7 | 11A | 3 | 2 | 11413 | 3/30/2013 15:51 | 3/30/2013 15:54 | PIC | Sr90S13 |
| S1 | 11B | 3 | 0 | 14495 | 3/30/2013 15:54 | 3/30/2013 15:57 | PIC | Sr90S13 |
| S2 | 11B | 3 | 0 | 15572 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S3 | 11B | 3 | 0 | 15188 | 3/30/2013 15:31 | 3/30/2013 15:34 | PIC | Sr90S13 |
| S4 | 11B | 3 | 0 | 15612 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S5 | 11B | 3 | 0 | 14881 | 3/30/2013 15:39 | 3/30/2013 15:42 | PIC | Sr90S13 |
| S6 | 11B | 3 | 0 | 11037 | 3/30/2013 15:43 | 3/30/2013 15:46 | PIC | Sr90S13 |
| S7 | 11B | 3 | 0 | 12343 | 3/30/2013 15:47 | 3/30/2013 15:50 | PIC | Sr90S13 |
| S1 | 11C | 3 | 1 | 14267 | 3/30/2013 15:51 | 3/30/2013 15:54 | PIC | Sr90S13 |

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|---|---|---|---|---|---|---|---|---|
| S2 | 11C | 3 | 0 | 15354 | 3/30/2013 15:55 | 3/30/2013 15:58 | PIC | Sr90S13 |
| S3 | 11C | 3 | 0 | 15138 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S4 | 11C | 3 | 0 | 15373 | 3/30/2013 15:31 | 3/30/2013 15:34 | PIC | Sr90S13 |
| S5 | 11C | 3 | 1 | 14902 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S6 | 11C | 3 | 1 | 10342 | 3/30/2013 15:39 | 3/30/2013 15:42 | PIC | Sr90S13 |
| S7 | 11C | 3 | 0 | 12297 | 3/30/2013 15:43 | 3/30/2013 15:46 | PIC | Sr90S13 |
| S1 | 11D | 3 | 1 | 14538 | 3/30/2013 15:47 | 3/30/2013 15:50 | PIC | Sr90S13 |
| S2 | 11D | 3 | 0 | 15591 | 3/30/2013 15:51 | 3/30/2013 15:54 | PIC | Sr90S13 |
| S3 | 11D | 3 | 0 | 15511 | 3/30/2013 15:55 | 3/30/2013 15:58 | PIC | Sr90S13 |
| S4 | 11D | 3 | 0 | 15573 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90S13 |
| S5 | 11D | 3 | 0 | 14769 | 3/30/2013 15:32 | 3/30/2013 15:35 | PIC | Sr90S13 |
| S6 | 11D | 3 | 0 | 10450 | 3/30/2013 15:35 | 3/30/2013 15:38 | PIC | Sr90S13 |
| S7 | 11D | 3 | 0 | 12426 | 3/30/2013 15:39 | 3/30/2013 15:42 | PIC | Sr90S13 |
| S1 | 13A | 3 | 0 | 14517 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S2 | 13A | 3 | 0 | 15416 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S3 | 13A | 3 | 1 | 15553 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S4 | 13A | 3 | 1 | 15547 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S5 | 13A | 3 | 0 | 14769 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S6 | 13A | 3 | 0 | 11476 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90S13 |
| S7 | 13A | 3 | 0 | 12935 | 3/30/2013 14:44 | 3/30/2013 14:47 | PIC | Sr90S13 |
| S1 | 13B | 3 | 2 | 14929 | 3/30/2013 14:37 | 3/30/2013 14:40 | PIC | Sr90S13 |
| S2 | 13B | 3 | 0 | 15677 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S3 | 13B | 3 | 0 | 15456 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S4 | 13B | 3 | 1 | 15818 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S5 | 13B | 3 | 0 | 15205 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S6 | 13B | 3 | 1 | 11264 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S7 | 13B | 3 | 0 | 12827 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90S13 |
| S1 | 13C | 3 | 1 | 13771 | 3/30/2013 14:44 | 3/30/2013 14:47 | PIC | Sr90S13 |
| S2 | 13C | 3 | 0 | 14798 | 3/30/2013 14:37 | 3/30/2013 14:40 | PIC | Sr90S13 |
| S3 | 13C | 3 | 0 | 14645 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S4 | 13C | 3 | 1 | 15000 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S5 | 13C | 3 | 0 | 14263 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S6 | 13C | 3 | 1 | 10434 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S7 | 13C | 3 | 1 | 12050 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S1 | 13D | 3 | 0 | 14215 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90S13 |
| S2 | 13D | 3 | 1 | 15393 | 3/30/2013 14:44 | 3/30/2013 14:47 | PIC | Sr90S13 |
| S3 | 13D | 3 | 0 | 15231 | 3/30/2013 14:37 | 3/30/2013 14:40 | PIC | Sr90S13 |

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| S4 | 13D | 3 | 0 | 15518 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S5 | 13D | 3 | 0 | 14852 | 3/30/2013 15:25 | 3/30/2013 15:28 | PIC | Sr90S13 |
| S6 | 13D | 3 | 1 | 11056 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S7 | 13D | 3 | 1 | 12768 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S1 | 14A | 3 | 0 | 13882 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S2 | 14A | 3 | 1 | 14985 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S3 | 14A | 3 | 0 | 14874 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S4 | 14A | 3 | 0 | 15344 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |
| S5 | 14A | 3 | 1 | 14151 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S6 | 14A | 3 | 1 | 10357 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90S13 |
| S7 | 14A | 3 | 0 | 11816 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S1 | 14B | 3 | 0 | 14442 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S2 | 14B | 3 | 0 | 15221 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S3 | 14B | 3 | 1 | 14787 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S4 | 14B | 3 | 0 | 15252 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S5 | 14B | 3 | 0 | 14644 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |
| S6 | 14B | 3 | 0 | 11477 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S7 | 14B | 3 | 1 | 12308 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90S13 |
| S1 | 14C | 3 | 1 | 14188 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S2 | 14C | 3 | 1 | 15087 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S3 | 14C | 3 | 0 | 14907 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S4 | 14C | 3 | 0 | 15149 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S5 | 14C | 3 | 0 | 14790 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S6 | 14C | 3 | 1 | 11904 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |
| S7 | 14C | 3 | 0 | 12979 | 3/30/2013 14:31 | 3/30/2013 14:34 | PIC | Sr90S13 |
| S1 | 14D | 3 | 0 | 13129 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90S13 |
| S2 | 14D | 3 | 0 | 14162 | 3/30/2013 15:16 | 3/30/2013 15:19 | PIC | Sr90S13 |
| S3 | 14D | 3 | 0 | 14253 | 3/30/2013 15:09 | 3/30/2013 15:12 | PIC | Sr90S13 |
| S4 | 14D | 3 | 0 | 14346 | 3/30/2013 14:59 | 3/30/2013 15:02 | PIC | Sr90S13 |
| S5 | 14D | 3 | 0 | 13660 | 3/30/2013 14:52 | 3/30/2013 14:55 | PIC | Sr90S13 |
| S6 | 14D | 3 | 0 | 10732 | 3/30/2013 14:45 | 3/30/2013 14:48 | PIC | Sr90S13 |
| S7 | 14D | 3 | 0 | 12093 | 3/30/2013 14:38 | 3/30/2013 14:41 | PIC | Sr90S13 |

M-10348

## Y-90 Calibration - PIC - Mar 2013

| Standard Data | | |
|---|---|---|
| | Isotope | Sr-90 |
| | Standard ID number | 1244-A |
| | Half Life (days) | 10555.725 |
| | Std. Act. (dpm/mL) | 21333.9626 |
| | Reference Date | 10/1/2008 |
| | Volume of spike (mL) | 0.5 |
| | Std. Nominal (dpm) | 9577.30 |
| | Decay Date | 3/30/2013 |

| | |
|---|---|
| Separation Date/Time | 3/29/2013 13:05 |
| Y-90 Half Life (days) | 2.668875 |

The following detectors were not calibrated:
12A, 12B, 12C, 12D

| Carrier Data | | Std ID | 1892786 | |
|---|---|---|---|---|
| | | Std weight | 31.85 | mg/mL |
| Source | Measured weight (mg) | Vol. Carrier Added (mL) | Theoretical weight (mg) | ***Recovery |
| 1 | 15.9 | 0.5 | 15.93 | 99.8% |
| 2 | 16.1 | 0.5 | 15.93 | 100.0% |
| 3 | 16.0 | 0.5 | 15.93 | 100.0% |
| 4 | 16.1 | 0.5 | 15.93 | 100.0% |
| 5 | 16.0 | 0.5 | 15.93 | 100.0% |
| 6 | 16.2 | 0.5 | 15.93 | 100.0% |
| 7 | 15.9 | 0.5 | 15.93 | 99.8% |
| 8 | 16.4 | 0.5 | 15.93 | 100.0% |

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered negligible.
**Decay corrected to mid-point of cou

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A | 1 | 3/30/2013 14:46 | 3 | 11551 | 3850.33 | 99.8% | 0.75713 | 5093.40 | 9576.92 | 0.5318 | |
| 1A | 2 | 3/30/2013 15:50 | 3 | 11713 | 3904.33 | 100.0% | 0.74845 | 5216.59 | 9576.89 | 0.5447 | |
| 1A | 3 | 3/30/2013 15:42 | 3 | 11569 | 3856.33 | 100.0% | 0.74950 | 5145.23 | 9576.89 | 0.5373 | |
| 1A | 4 | 3/30/2013 15:34 | 3 | 11605 | 3868.33 | 100.0% | 0.75061 | 5153.60 | 9576.89 | 0.5381 | |
| 1A | 5 | 3/30/2013 15:24 | 3 | 11518 | 3839.33 | 100.0% | 0.75196 | 5105.76 | 9576.90 | 0.5331 | |
| 1A | 6 | 3/30/2013 15:14 | 3 | 10892 | 3630.67 | 100.0% | 0.75326 | 4819.97 | 9576.90 | 0.5033 | |
| 1A | 7 | 3/30/2013 15:06 | 3 | 11867 | 3955.67 | 99.8% | 0.75430 | 5252.42 | 9576.91 | 0.5484 | |
| 1A | 8 | 3/30/2013 14:56 | 3 | 11847 | 3949.00 | 100.0% | 0.75572 | 5225.48 | 9576.91 | 0.5456 | 0.5353 |
| 1B | 1 | 3/30/2013 14:56 | 3 | 11717 | 3905.67 | 99.8% | 0.75569 | 5176.46 | 9576.91 | 0.5405 | |
| 1B | 2 | 3/30/2013 14:46 | 3 | 11796 | 3932.00 | 100.0% | 0.75708 | 5193.61 | 9576.91 | 0.5423 | |
| 1B | 3 | 3/30/2013 15:49 | 3 | 11430 | 3810.00 | 100.0% | 0.74847 | 5090.40 | 9576.89 | 0.5315 | |
| 1B | 4 | 3/30/2013 15:42 | 3 | 11535 | 3845.00 | 100.0% | 0.74953 | 5129.91 | 9576.89 | 0.5357 | |
| 1B | 5 | 3/30/2013 15:33 | 3 | 11451 | 3817.00 | 100.0% | 0.75064 | 5084.98 | 9576.89 | 0.5310 | |
| 1B | 6 | 3/30/2013 15:24 | 3 | 10732 | 3577.33 | 100.0% | 0.75196 | 4757.32 | 9576.90 | 0.4967 | |
| 1B | 7 | 3/30/2013 15:14 | 3 | 11951 | 3983.67 | 99.8% | 0.75328 | 5296.74 | 9576.90 | 0.5531 | |
| 1B | 8 | 3/30/2013 15:07 | 3 | 11648 | 3882.67 | 100.0% | 0.75428 | 5147.52 | 9576.91 | 0.5375 | 0.5335 |
| 1C | 1 | 3/30/2013 15:07 | 3 | 11759 | 3919.67 | 99.8% | 0.75428 | 5204.74 | 9576.91 | 0.5435 | |
| 1C | 2 | 3/30/2013 14:56 | 3 | 11847 | 3949.00 | 100.0% | 0.75569 | 5225.68 | 9576.91 | 0.5457 | |
| 1C | 3 | 3/30/2013 14:47 | 3 | 11562 | 3854.00 | 100.0% | 0.75700 | 5091.13 | 9576.91 | 0.5316 | |
| 1C | 4 | 3/30/2013 15:49 | 3 | 11823 | 3941.00 | 100.0% | 0.74847 | 5265.42 | 9576.89 | 0.5498 | |
| 1C | 5 | 3/30/2013 15:42 | 3 | 11680 | 3893.33 | 100.0% | 0.74953 | 5194.39 | 9576.89 | 0.5424 | |
| 1C | 6 | 3/30/2013 15:33 | 3 | 10544 | 3514.67 | 100.0% | 0.75064 | 4682.23 | 9576.89 | 0.4889 | |
| 1C | 7 | 3/30/2013 15:24 | 3 | 11779 | 3926.33 | 99.8% | 0.75196 | 5229.67 | 9576.90 | 0.5461 | |
| 1C | 8 | 3/30/2013 15:14 | 3 | 11722 | 3907.33 | 100.0% | 0.75328 | 5187.09 | 9576.90 | 0.5416 | 0.5362 |
| 1D | 1 | 3/30/2013 15:14 | 3 | 11522 | 3840.67 | 99.8% | 0.75328 | 5106.61 | 9576.90 | 0.5332 | |
| 1D | 2 | 3/30/2013 15:07 | 3 | 11771 | 3923.67 | 100.0% | 0.75426 | 5201.98 | 9576.91 | 0.5432 | |
| 1D | 3 | 3/30/2013 14:56 | 3 | 11535 | 3845.00 | 100.0% | 0.75569 | 5088.06 | 9576.91 | 0.5313 | |
| 1D | 4 | 3/30/2013 14:48 | 3 | 11874 | 3958.00 | 100.0% | 0.75682 | 5229.77 | 9576.91 | 0.5461 | |
| 1D | 5 | 3/30/2013 15:49 | 3 | 11432 | 3810.67 | 100.0% | 0.74847 | 5091.29 | 9576.89 | 0.5316 | |
| 1D | 6 | 3/30/2013 15:42 | 3 | 10327 | 3442.33 | 100.0% | 0.74952 | 4592.69 | 9576.89 | 0.4796 | |
| 1D | 7 | 3/30/2013 15:33 | 3 | 11718 | 3906.00 | 99.8% | 0.75064 | 5211.74 | 9576.89 | 0.5442 | |
| 1D | 8 | 3/30/2013 15:24 | 3 | 11631 | 3877.00 | 100.0% | 0.75196 | 5155.83 | 9576.90 | 0.5384 | 0.5309 |
| 2A | 1 | 3/30/2013 15:24 | 3 | 11102 | 3700.67 | 99.8% | 0.75196 | 4929.12 | 9576.90 | 0.5147 | |
| 2A | 2 | 3/30/2013 15:14 | 3 | 11053 | 3684.33 | 100.0% | 0.75326 | 4891.20 | 9576.90 | 0.5107 | |
| 2A | 3 | 3/30/2013 15:07 | 3 | 11160 | 3720.00 | 100.0% | 0.75426 | 4931.98 | 9576.91 | 0.5150 | |
| 2A | 4 | 3/30/2013 14:56 | 3 | 11334 | 3778.00 | 100.0% | 0.75569 | 4999.43 | 9576.91 | 0.5220 | |
| 2A | 5 | 3/30/2013 14:49 | 3 | 11092 | 3697.33 | 100.0% | 0.75673 | 4885.96 | 9576.91 | 0.5102 | |
| 2A | 6 | 3/30/2013 15:50 | 3 | 10202 | 3400.67 | 100.0% | 0.74845 | 4543.64 | 9576.89 | 0.4744 | |
| 2A | 7 | 3/30/2013 15:42 | 3 | 11309 | 3769.67 | 99.8% | 0.74949 | 5037.55 | 9576.89 | 0.5260 | |
| 2A | 8 | 3/30/2013 15:33 | 3 | 11236 | 3745.33 | 100.0% | 0.75064 | 4989.55 | 9576.89 | 0.5210 | 0.5118 |
| 2B | 1 | 3/30/2013 15:34 | 3 | 11237 | 3745.67 | 99.8% | 0.75060 | 4998.08 | 9576.89 | 0.5219 | |
| 2B | 2 | 3/30/2013 15:23 | 3 | 11258 | 3752.67 | 100.0% | 0.75200 | 4990.23 | 9576.90 | 0.5211 | |
| 2B | 3 | 3/30/2013 15:14 | 3 | 11080 | 3693.33 | 100.0% | 0.75330 | 4902.85 | 9576.90 | 0.5119 | |
| 2B | 4 | 3/30/2013 15:06 | 3 | 11228 | 3742.67 | 100.0% | 0.75430 | 4961.81 | 9576.91 | 0.5181 | |
| 2B | 5 | 3/30/2013 14:56 | 3 | 11031 | 3677.00 | 100.0% | 0.75572 | 4865.54 | 9576.91 | 0.5080 | |
| 2B | 6 | 3/30/2013 14:49 | 3 | 10699 | 3566.33 | 100.0% | 0.75673 | 4712.85 | 9576.91 | 0.4921 | |
| 2B | 7 | 3/30/2013 15:50 | 3 | 11366 | 3788.67 | 99.8% | 0.74844 | 5070.02 | 9576.89 | 0.5294 | |
| 2B | 8 | 3/30/2013 15:42 | 3 | 11316 | 3772.00 | 100.0% | 0.74949 | 5032.75 | 9576.89 | 0.5255 | 0.5160 |
| 2C | 1 | 3/30/2013 15:42 | 3 | 11254 | 3751.33 | 99.8% | 0.74949 | 5013.06 | 9576.89 | 0.5235 | |
| 2C | 2 | 3/30/2013 15:34 | 3 | 11196 | 3732.00 | 100.0% | 0.75060 | 4972.00 | 9576.89 | 0.5192 | |
| 2C | 3 | 3/30/2013 15:23 | 3 | 11123 | 3707.67 | 100.0% | 0.75200 | 4930.41 | 9576.90 | 0.5148 | |
| 2C | 4 | 3/30/2013 15:14 | 3 | 11257 | 3752.33 | 100.0% | 0.75330 | 4981.17 | 9576.90 | 0.5201 | |
| 2C | 5 | 3/30/2013 15:06 | 3 | 11037 | 3679.00 | 100.0% | 0.75430 | 4877.40 | 9576.91 | 0.5093 | |
| 2C | 6 | 3/30/2013 14:56 | 3 | 10818 | 3606.00 | 100.0% | 0.75572 | 4771.59 | 9576.91 | 0.4982 | |
| 2C | 7 | 3/30/2013 14:49 | 3 | 11625 | 3875.00 | 99.8% | 0.75666 | 5129.23 | 9576.91 | 0.5356 | |
| 2C | 8 | 3/30/2013 15:50 | 3 | 11273 | 3757.67 | 100.0% | 0.74844 | 5020.64 | 9576.89 | 0.5242 | 0.5181 |
| 2D | 1 | 3/30/2013 15:50 | 3 | 11170 | 3723.33 | 99.8% | 0.74844 | 4982.59 | 9576.89 | 0.5203 | |
| 2D | 2 | 3/30/2013 15:42 | 3 | 11062 | 3687.33 | 100.0% | 0.74949 | 4919.80 | 9576.89 | 0.5137 | |
| 2D | 3 | 3/30/2013 15:34 | 3 | 11193 | 3731.00 | 100.0% | 0.75060 | 4970.68 | 9576.89 | 0.5190 | |
| 2D | 4 | 3/30/2013 15:23 | 3 | 11423 | 3807.67 | 100.0% | 0.75200 | 5063.39 | 9576.90 | 0.5287 | |
| 2D | 5 | 3/30/2013 15:14 | 3 | 11240 | 3746.67 | 100.0% | 0.75330 | 4973.67 | 9576.90 | 0.5193 | |
| 2D | 6 | 3/30/2013 15:06 | 3 | 10285 | 3428.33 | 100.0% | 0.75430 | 4545.08 | 9576.91 | 0.4746 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2D | 7 | 3/30/2013 14:56 | 3 | 11687 | 3895.67 | 99.8% | 0.75572 | 5163.01 | 9576.91 | 0.5391 | |
| 2D | 8 | 3/30/2013 14:49 | 3 | 11832 | 3944.00 | 100.0% | 0.75666 | 5212.35 | 9576.91 | 0.5443 | 0.5199 |
| 3A | 1 | 3/30/2013 14:53 | 3 | 11701 | 3900.33 | 99.8% | 0.75616 | 5166.20 | 9576.91 | 0.5394 | |
| 3A | 2 | 3/30/2013 16:22 | 3 | 11614 | 3871.33 | 100.0% | 0.74414 | 5202.44 | 9576.87 | 0.5432 | |
| 3A | 3 | 3/30/2013 15:46 | 3 | 11501 | 3833.67 | 100.0% | 0.74893 | 5118.83 | 9576.89 | 0.5345 | |
| 3A | 4 | 3/30/2013 15:38 | 3 | 11680 | 3893.33 | 100.0% | 0.75002 | 5191.00 | 9576.89 | 0.5420 | |
| 3A | 5 | 3/30/2013 15:28 | 3 | 11179 | 3726.33 | 100.0% | 0.75134 | 4959.57 | 9576.90 | 0.5179 | |
| 3A | 6 | 3/30/2013 15:19 | 3 | 10626 | 3542.00 | 100.0% | 0.75252 | 4706.82 | 9576.90 | 0.4915 | |
| 3A | 7 | 3/30/2013 15:10 | 3 | 11829 | 3943.00 | 99.8% | 0.75379 | 5239.13 | 9576.90 | 0.5471 | |
| 3A | 8 | 3/30/2013 15:03 | 3 | 11508 | 3836.00 | 100.0% | 0.75475 | 5082.48 | 9576.91 | 0.5307 | 0.5308 |
| 3B | 1 | 3/30/2013 15:03 | 3 | 11658 | 3886.00 | 99.8% | 0.75475 | 5156.83 | 9576.91 | 0.5385 | |
| 3B | 2 | 3/30/2013 14:53 | 3 | 11625 | 3875.00 | 100.0% | 0.75616 | 5124.60 | 9576.91 | 0.5351 | |
| 3B | 3 | 3/30/2013 16:22 | 3 | 11173 | 3724.33 | 100.0% | 0.74414 | 5004.89 | 9576.87 | 0.5226 | |
| 3B | 4 | 3/30/2013 15:46 | 3 | 11497 | 3832.33 | 100.0% | 0.74893 | 5117.05 | 9576.89 | 0.5343 | |
| 3B | 5 | 3/30/2013 15:38 | 3 | 11424 | 3808.00 | 100.0% | 0.75002 | 5077.23 | 9576.89 | 0.5302 | |
| 3B | 6 | 3/30/2013 15:28 | 3 | 10607 | 3535.67 | 100.0% | 0.75134 | 4705.79 | 9576.90 | 0.4914 | |
| 3B | 7 | 3/30/2013 15:19 | 3 | 11866 | 3955.33 | 99.8% | 0.75252 | 5264.35 | 9576.90 | 0.5497 | |
| 3B | 8 | 3/30/2013 15:10 | 3 | 11767 | 3922.33 | 100.0% | 0.75379 | 5203.48 | 9576.90 | 0.5433 | 0.5306 |
| 3C | 1 | 3/30/2013 15:10 | 3 | 11610 | 3870.00 | 99.8% | 0.75379 | 5142.14 | 9576.90 | 0.5369 | |
| 3C | 2 | 3/30/2013 15:03 | 3 | 11528 | 3842.67 | 100.0% | 0.75475 | 5091.32 | 9576.91 | 0.5316 | |
| 3C | 3 | 3/30/2013 14:53 | 3 | 11751 | 3917.00 | 100.0% | 0.75616 | 5180.14 | 9576.91 | 0.5409 | |
| 3C | 4 | 3/30/2013 16:22 | 3 | 11509 | 3836.33 | 100.0% | 0.74414 | 5155.40 | 9576.87 | 0.5383 | |
| 3C | 5 | 3/30/2013 15:46 | 3 | 11490 | 3830.00 | 100.0% | 0.74893 | 5113.94 | 9576.89 | 0.5340 | |
| 3C | 6 | 3/30/2013 15:38 | 3 | 10363 | 3454.33 | 100.0% | 0.75002 | 4605.67 | 9576.89 | 0.4809 | |
| 3C | 7 | 3/30/2013 15:28 | 3 | 11782 | 3927.33 | 99.8% | 0.75134 | 5235.32 | 9576.90 | 0.5467 | |
| 3C | 8 | 3/30/2013 15:19 | 3 | 11810 | 3936.67 | 100.0% | 0.75252 | 5231.28 | 9576.90 | 0.5462 | 0.5319 |
| 3D | 1 | 3/30/2013 15:19 | 3 | 11458 | 3819.33 | 99.8% | 0.75252 | 5083.34 | 9576.90 | 0.5308 | |
| 3D | 2 | 3/30/2013 15:10 | 3 | 11260 | 3753.33 | 100.0% | 0.75379 | 4979.30 | 9576.90 | 0.5199 | |
| 3D | 3 | 3/30/2013 15:03 | 3 | 11499 | 3833.00 | 100.0% | 0.75475 | 5078.49 | 9576.91 | 0.5303 | |
| 3D | 4 | 3/30/2013 14:53 | 3 | 11444 | 3814.67 | 100.0% | 0.75616 | 5044.78 | 9576.91 | 0.5268 | |
| 3D | 5 | 3/30/2013 16:22 | 3 | 11039 | 3679.67 | 100.0% | 0.74414 | 4944.87 | 9576.87 | 0.5163 | |
| 3D | 6 | 3/30/2013 15:46 | 3 | 10203 | 3401.00 | 100.0% | 0.74893 | 4541.12 | 9576.89 | 0.4742 | |
| 3D | 7 | 3/30/2013 15:38 | 3 | 11594 | 3864.67 | 99.8% | 0.75002 | 5160.87 | 9576.89 | 0.5389 | |
| 3D | 8 | 3/30/2013 15:28 | 3 | 11466 | 3822.00 | 100.0% | 0.75134 | 5086.90 | 9576.90 | 0.5312 | 0.5210 |
| 4A | 1 | 3/30/2013 15:28 | 3 | 11533 | 3844.33 | 99.8% | 0.75137 | 5124.48 | 9576.90 | 0.5351 | |
| 4A | 2 | 3/30/2013 15:19 | 3 | 11688 | 3896.00 | 100.0% | 0.75252 | 5177.27 | 9576.90 | 0.5406 | |
| 4A | 3 | 3/30/2013 15:10 | 3 | 11649 | 3883.00 | 100.0% | 0.75382 | 5151.12 | 9576.90 | 0.5379 | |
| 4A | 4 | 3/30/2013 15:03 | 3 | 11603 | 3867.67 | 100.0% | 0.75477 | 5124.27 | 9576.91 | 0.5351 | |
| 4A | 5 | 3/30/2013 14:53 | 3 | 11409 | 3803.00 | 100.0% | 0.75618 | 5029.20 | 9576.91 | 0.5251 | |
| 4A | 6 | 3/30/2013 16:21 | 3 | 10217 | 3405.67 | 100.0% | 0.74416 | 4576.51 | 9576.87 | 0.4779 | |
| 4A | 7 | 3/30/2013 15:46 | 3 | 11782 | 3927.33 | 99.8% | 0.74895 | 5252.00 | 9576.89 | 0.5484 | |
| 4A | 8 | 3/30/2013 15:38 | 3 | 11639 | 3879.67 | 100.0% | 0.75001 | 5172.80 | 9576.89 | 0.5401 | 0.5300 |
| 4B | 1 | 3/30/2013 15:38 | 3 | 11605 | 3868.33 | 99.8% | 0.75001 | 5165.80 | 9576.89 | 0.5394 | |
| 4B | 2 | 3/30/2013 15:28 | 3 | 11505 | 3835.00 | 100.0% | 0.75137 | 5104.03 | 9576.90 | 0.5330 | |
| 4B | 3 | 3/30/2013 15:19 | 3 | 11446 | 3815.33 | 100.0% | 0.75252 | 5070.08 | 9576.90 | 0.5294 | |
| 4B | 4 | 3/30/2013 15:10 | 3 | 11555 | 3851.67 | 100.0% | 0.75383 | 5109.47 | 9576.90 | 0.5335 | |
| 4B | 5 | 3/30/2013 15:03 | 3 | 11501 | 3833.67 | 100.0% | 0.75477 | 5079.23 | 9576.91 | 0.5304 | |
| 4B | 6 | 3/30/2013 14:53 | 3 | 11310 | 3770.00 | 100.0% | 0.75618 | 4985.57 | 9576.91 | 0.5206 | |
| 4B | 7 | 3/30/2013 16:21 | 3 | 11770 | 3923.33 | 99.8% | 0.74416 | 5280.43 | 9576.87 | 0.5514 | |
| 4B | 8 | 3/30/2013 15:46 | 3 | 11638 | 3879.33 | 100.0% | 0.74895 | 5179.67 | 9576.89 | 0.5409 | 0.5348 |
| 4C | 1 | 3/30/2013 15:46 | 3 | 11691 | 3897.00 | 99.8% | 0.74895 | 5211.44 | 9576.89 | 0.5442 | |
| 4C | 2 | 3/30/2013 15:38 | 3 | 11555 | 3851.67 | 100.0% | 0.75001 | 5135.47 | 9576.89 | 0.5362 | |
| 4C | 3 | 3/30/2013 15:28 | 3 | 11702 | 3900.67 | 100.0% | 0.75137 | 5191.43 | 9576.90 | 0.5421 | |
| 4C | 4 | 3/30/2013 15:19 | 3 | 11727 | 3909.00 | 100.0% | 0.75252 | 5194.56 | 9576.90 | 0.5424 | |
| 4C | 5 | 3/30/2013 15:10 | 3 | 11434 | 3811.33 | 100.0% | 0.75383 | 5055.97 | 9576.90 | 0.5279 | |
| 4C | 6 | 3/30/2013 15:03 | 3 | 10920 | 3640.00 | 100.0% | 0.75477 | 4822.65 | 9576.91 | 0.5036 | |
| 4C | 7 | 3/30/2013 14:53 | 3 | 12089 | 4029.67 | 99.8% | 0.75618 | 5337.34 | 9576.91 | 0.5573 | |
| 4C | 8 | 3/30/2013 16:21 | 3 | 11653 | 3884.33 | 100.0% | 0.74416 | 5219.73 | 9576.87 | 0.5450 | 0.5373 |
| 4D | 1 | 3/30/2013 16:21 | 3 | 11486 | 3828.67 | 99.8% | 0.74416 | 5153.02 | 9576.87 | 0.5381 | |
| 4D | 2 | 3/30/2013 15:46 | 3 | 11498 | 3832.67 | 100.0% | 0.74896 | 5117.33 | 9576.89 | 0.5343 | |
| 4D | 3 | 3/30/2013 15:38 | 3 | 11268 | 3756.00 | 100.0% | 0.75001 | 5007.91 | 9576.89 | 0.5229 | |
| 4D | 4 | 3/30/2013 15:28 | 3 | 11646 | 3882.00 | 100.0% | 0.75137 | 5166.55 | 9576.90 | 0.5395 | |
| 4D | 5 | 3/30/2013 15:19 | 3 | 11638 | 3879.33 | 100.0% | 0.75252 | 5155.14 | 9576.90 | 0.5383 | |
| 4D | 6 | 3/30/2013 15:10 | 3 | 10716 | 3572.00 | 100.0% | 0.75383 | 4738.48 | 9576.90 | 0.4948 | |
| 4D | 7 | 3/30/2013 15:03 | 3 | 11892 | 3964.00 | 99.8% | 0.75478 | 5260.15 | 9576.91 | 0.5493 | |
| 4D | 8 | 3/30/2013 14:53 | 3 | 11641 | 3880.33 | 100.0% | 0.75618 | 5131.48 | 9576.91 | 0.5358 | 0.5316 |
| 5A | 1 | 3/30/2013 16:26 | 3 | 11655 | 3885.00 | 99.8% | 0.74359 | 5232.90 | 9576.87 | 0.5464 | |
| 5A | 2 | 3/30/2013 17:24 | 3 | 11486 | 3828.67 | 100.0% | 0.73586 | 5202.99 | 9576.85 | 0.5433 | |
| 5A | 3 | 3/30/2013 17:16 | 3 | 11067 | 3689.00 | 100.0% | 0.73693 | 5005.90 | 9576.85 | 0.5227 | |
| 5A | 4 | 3/30/2013 17:08 | 3 | 11784 | 3928.00 | 100.0% | 0.73797 | 5322.71 | 9576.85 | 0.5558 | |
| 5A | 5 | 3/30/2013 16:59 | 3 | 11476 | 3825.33 | 100.0% | 0.73910 | 5175.65 | 9576.86 | 0.5404 | |
| 5A | 6 | 3/30/2013 16:51 | 3 | 10191 | 3397.00 | 100.0% | 0.74024 | 4589.06 | 9576.86 | 0.4792 | |
| 5A | 7 | 3/30/2013 16:43 | 3 | 11950 | 3983.33 | 99.8% | 0.74133 | 5381.71 | 9576.86 | 0.5619 | |
| 5A | 8 | 3/30/2013 16:34 | 3 | 11683 | 3894.33 | 100.0% | 0.74243 | 5245.41 | 9576.87 | 0.5477 | 0.5372 |
| 5B | 1 | 3/30/2013 16:34 | 3 | 11610 | 3870.00 | 99.8% | 0.74244 | 5220.72 | 9576.87 | 0.5451 | |
| 5B | 2 | 3/30/2013 16:26 | 3 | 11459 | 3819.67 | 100.0% | 0.74358 | 5136.88 | 9576.87 | 0.5364 | |
| 5B | 3 | 3/30/2013 17:24 | 3 | 11519 | 3839.67 | 100.0% | 0.73586 | 5217.94 | 9576.85 | 0.5448 | |
| 5B | 4 | 3/30/2013 17:15 | 3 | 11560 | 3853.33 | 100.0% | 0.73695 | 5228.79 | 9576.85 | 0.5460 | |
| 5B | 5 | 3/30/2013 17:08 | 3 | 11373 | 3791.00 | 100.0% | 0.73798 | 5136.99 | 9576.85 | 0.5364 | |
| 5B | 6 | 3/30/2013 16:59 | 3 | 10226 | 3408.67 | 100.0% | 0.73912 | 4611.80 | 9576.86 | 0.4816 | |
| 5B | 7 | 3/30/2013 16:51 | 3 | 11833 | 3944.33 | 99.8% | 0.74025 | 5336.74 | 9576.86 | 0.5573 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5B | 8 | 3/30/2013 16:42 | 3 | 11831 | 3943.67 | 100.0% | 0.74134 | 5319.62 | 9576.86 | 0.5555 | 0.5379 |
| 5C | 1 | 3/30/2013 16:42 | 3 | 11633 | 3877.67 | 99.8% | 0.74134 | 5238.82 | 9576.86 | 0.5470 | |
| 5C | 2 | 3/30/2013 16:34 | 3 | 11756 | 3918.67 | 100.0% | 0.74244 | 5278.07 | 9576.87 | 0.5511 | |
| 5C | 3 | 3/30/2013 16:26 | 3 | 11398 | 3799.33 | 100.0% | 0.74355 | 5109.72 | 9576.87 | 0.5335 | |
| 5C | 4 | 3/30/2013 17:24 | 3 | 11733 | 3911.00 | 100.0% | 0.73586 | 5314.89 | 9576.85 | 0.5550 | |
| 5C | 5 | 3/30/2013 17:15 | 3 | 11330 | 3776.67 | 100.0% | 0.73695 | 5124.75 | 9576.85 | 0.5351 | |
| 5C | 6 | 3/30/2013 17:08 | 3 | 10272 | 3424.00 | 100.0% | 0.73798 | 4639.68 | 9576.85 | 0.4845 | |
| 5C | 7 | 3/30/2013 16:59 | 3 | 11798 | 3932.67 | 99.8% | 0.73912 | 5329.12 | 9576.86 | 0.5565 | |
| 5C | 8 | 3/30/2013 16:51 | 3 | 11698 | 3899.33 | 100.0% | 0.74025 | 5267.58 | 9576.86 | 0.5500 | 0.5391 |
| 5D | 1 | 3/30/2013 16:51 | 3 | 11647 | 3882.33 | 99.8% | 0.74025 | 5252.87 | 9576.86 | 0.5485 | |
| 5D | 2 | 3/30/2013 16:42 | 3 | 11618 | 3872.67 | 100.0% | 0.74134 | 5223.87 | 9576.86 | 0.5455 | |
| 5D | 3 | 3/30/2013 16:34 | 3 | 11265 | 3755.00 | 100.0% | 0.74244 | 5057.63 | 9576.87 | 0.5281 | |
| 5D | 4 | 3/30/2013 16:26 | 3 | 11705 | 3901.67 | 100.0% | 0.74354 | 5247.44 | 9576.87 | 0.5479 | |
| 5D | 5 | 3/30/2013 17:24 | 3 | 11262 | 3754.00 | 100.0% | 0.73586 | 5101.53 | 9576.85 | 0.5327 | |
| 5D | 6 | 3/30/2013 17:15 | 3 | 10373 | 3457.67 | 100.0% | 0.73695 | 4691.88 | 9576.85 | 0.4899 | |
| 5D | 7 | 3/30/2013 17:08 | 3 | 11696 | 3898.67 | 99.8% | 0.73798 | 5291.19 | 9576.85 | 0.5525 | |
| 5D | 8 | 3/30/2013 16:59 | 3 | 11921 | 3973.67 | 100.0% | 0.73912 | 5376.23 | 9576.86 | 0.5614 | 0.5383 |
| 6A | 1 | 3/30/2013 16:59 | 3 | 10267 | 3422.33 | 99.8% | 0.73912 | 4637.59 | 9576.86 | 0.4842 | |
| 6A | 2 | 3/30/2013 16:51 | 3 | 10393 | 3464.33 | 100.0% | 0.74025 | 4679.94 | 9576.86 | 0.4887 | |
| 6A | 3 | 3/30/2013 16:42 | 3 | 10000 | 3333.33 | 100.0% | 0.74134 | 4496.37 | 9576.86 | 0.4695 | |
| 6A | 4 | 3/30/2013 16:34 | 3 | 10268 | 3422.67 | 100.0% | 0.74244 | 4610.02 | 9576.87 | 0.4814 | |
| 6A | 5 | 3/30/2013 16:26 | 3 | 10193 | 3397.67 | 100.0% | 0.74353 | 4569.67 | 9576.87 | 0.4772 | |
| 6A | 6 | 3/30/2013 17:24 | 3 | 9216 | 3072.00 | 100.0% | 0.73587 | 4174.64 | 9576.85 | 0.4359 | |
| 6A | 7 | 3/30/2013 17:15 | 3 | 10341 | 3447.00 | 99.8% | 0.73695 | 4684.77 | 9576.85 | 0.4892 | |
| 6A | 8 | 3/30/2013 17:08 | 3 | 10688 | 3562.67 | 100.0% | 0.73798 | 4827.57 | 9576.85 | 0.5041 | 0.4788 |
| 6B | 1 | 3/30/2013 17:07 | 3 | 9650 | 3216.67 | 99.8% | 0.73802 | 4365.37 | 9576.85 | 0.4558 | |
| 6B | 2 | 3/30/2013 16:59 | 3 | 9600 | 3200.00 | 100.0% | 0.73916 | 4329.24 | 9576.86 | 0.4521 | |
| 6B | 3 | 3/30/2013 16:50 | 3 | 9488 | 3162.67 | 100.0% | 0.74029 | 4272.20 | 9576.86 | 0.4461 | |
| 6B | 4 | 3/30/2013 16:42 | 3 | 9316 | 3105.33 | 100.0% | 0.74138 | 4188.59 | 9576.86 | 0.4374 | |
| 6B | 5 | 3/30/2013 16:34 | 3 | 9565 | 3188.33 | 100.0% | 0.74249 | 4294.14 | 9576.87 | 0.4484 | |
| 6B | 6 | 3/30/2013 16:26 | 3 | 8925 | 2975.00 | 100.0% | 0.74351 | 4001.29 | 9576.87 | 0.4178 | |
| 6B | 7 | 3/30/2013 17:23 | 3 | 9759 | 3253.00 | 99.8% | 0.73591 | 4427.33 | 9576.85 | 0.4623 | |
| 6B | 8 | 3/30/2013 17:15 | 3 | 9976 | 3325.33 | 100.0% | 0.73695 | 4512.30 | 9576.85 | 0.4712 | 0.4489 |
| 6C | 1 | 3/30/2013 17:15 | 3 | 11087 | 3695.67 | 99.8% | 0.73695 | 5022.71 | 9576.85 | 0.5245 | |
| 6C | 2 | 3/30/2013 17:07 | 3 | 10791 | 3597.00 | 100.0% | 0.73802 | 4873.84 | 9576.85 | 0.5089 | |
| 6C | 3 | 3/30/2013 16:59 | 3 | 10739 | 3579.67 | 100.0% | 0.73916 | 4842.90 | 9576.86 | 0.5057 | |
| 6C | 4 | 3/30/2013 16:50 | 3 | 11188 | 3729.33 | 100.0% | 0.74029 | 5037.67 | 9576.86 | 0.5260 | |
| 6C | 5 | 3/30/2013 16:42 | 3 | 10825 | 3608.33 | 100.0% | 0.74138 | 4867.06 | 9576.86 | 0.5082 | |
| 6C | 6 | 3/30/2013 16:34 | 3 | 9783 | 3261.00 | 100.0% | 0.74249 | 4392.01 | 9576.87 | 0.4586 | |
| 6C | 7 | 3/30/2013 16:26 | 3 | 11152 | 3717.33 | 99.8% | 0.74350 | 5007.66 | 9576.87 | 0.5229 | |
| 6C | 8 | 3/30/2013 17:23 | 3 | 11124 | 3708.00 | 100.0% | 0.73591 | 5038.67 | 9576.85 | 0.5261 | 0.5101 |
| 6D | 1 | 3/30/2013 17:23 | 3 | 9649 | 3216.33 | 99.8% | 0.73591 | 4377.44 | 9576.85 | 0.4571 | |
| 6D | 2 | 3/30/2013 17:15 | 3 | 9827 | 3275.67 | 100.0% | 0.73695 | 4444.91 | 9576.85 | 0.4641 | |
| 6D | 3 | 3/30/2013 17:07 | 3 | 9547 | 3182.33 | 100.0% | 0.73802 | 4311.98 | 9576.85 | 0.4503 | |
| 6D | 4 | 3/30/2013 16:59 | 3 | 9754 | 3251.33 | 100.0% | 0.73916 | 4398.70 | 9576.86 | 0.4593 | |
| 6D | 5 | 3/30/2013 16:50 | 3 | 9554 | 3184.67 | 100.0% | 0.74029 | 4301.92 | 9576.86 | 0.4492 | |
| 6D | 6 | 3/30/2013 16:42 | 3 | 8807 | 2935.67 | 100.0% | 0.74138 | 3959.73 | 9576.86 | 0.4136 | |
| 6D | 7 | 3/30/2013 16:34 | 3 | 9897 | 3299.00 | 99.8% | 0.74249 | 4450.17 | 9576.87 | 0.4647 | |
| 6D | 8 | 3/30/2013 16:26 | 3 | 10375 | 3458.33 | 100.0% | 0.74348 | 4651.53 | 9576.87 | 0.4857 | 0.4555 |
| 7A | 1 | 3/30/2013 16:30 | 3 | 11560 | 3853.33 | 99.8% | 0.74307 | 5193.85 | 9576.87 | 0.5423 | |
| 7A | 2 | 3/30/2013 17:27 | 3 | 11626 | 3875.33 | 100.0% | 0.73534 | 5270.10 | 9576.84 | 0.5503 | |
| 7A | 3 | 3/30/2013 17:19 | 3 | 11273 | 3757.67 | 100.0% | 0.73642 | 5102.60 | 9576.85 | 0.5328 | |
| 7A | 4 | 3/30/2013 17:11 | 3 | 11725 | 3908.33 | 100.0% | 0.73748 | 5299.56 | 9576.85 | 0.5534 | |
| 7A | 5 | 3/30/2013 17:03 | 3 | 11401 | 3800.33 | 100.0% | 0.73857 | 5145.55 | 9576.85 | 0.5373 | |
| 7A | 6 | 3/30/2013 16:55 | 3 | 10164 | 3388.00 | 100.0% | 0.73970 | 4580.23 | 9576.86 | 0.4783 | |
| 7A | 7 | 3/30/2013 16:47 | 3 | 11939 | 3979.67 | 99.8% | 0.74080 | 5380.59 | 9576.86 | 0.5618 | |
| 7A | 8 | 3/30/2013 16:38 | 3 | 11566 | 3855.33 | 100.0% | 0.74190 | 5196.58 | 9576.87 | 0.5426 | 0.5374 |
| 7B | 1 | 3/30/2013 16:38 | 3 | 11760 | 3920.00 | 99.8% | 0.74190 | 5292.07 | 9576.87 | 0.5526 | |
| 7B | 2 | 3/30/2013 16:30 | 3 | 11681 | 3893.67 | 100.0% | 0.74307 | 5239.97 | 9576.87 | 0.5471 | |
| 7B | 3 | 3/30/2013 17:27 | 3 | 11371 | 3790.33 | 100.0% | 0.73534 | 5154.50 | 9576.84 | 0.5382 | |
| 7B | 4 | 3/30/2013 17:19 | 3 | 11697 | 3899.00 | 100.0% | 0.73642 | 5294.52 | 9576.85 | 0.5528 | |
| 7B | 5 | 3/30/2013 17:11 | 3 | 11369 | 3789.67 | 100.0% | 0.73748 | 5138.65 | 9576.85 | 0.5366 | |
| 7B | 6 | 3/30/2013 17:03 | 3 | 10315 | 3438.33 | 100.0% | 0.73857 | 4655.41 | 9576.85 | 0.4861 | |
| 7B | 7 | 3/30/2013 16:55 | 3 | 11866 | 3955.33 | 99.8% | 0.73970 | 5355.63 | 9576.86 | 0.5592 | |
| 7B | 8 | 3/30/2013 16:46 | 3 | 11568 | 3856.00 | 100.0% | 0.74080 | 5205.17 | 9576.86 | 0.5435 | 0.5395 |
| 7C | 1 | 3/30/2013 16:47 | 3 | 11611 | 3870.33 | 99.8% | 0.74080 | 5232.75 | 9576.86 | 0.5464 | |
| 7C | 2 | 3/30/2013 16:38 | 3 | 11340 | 3780.00 | 100.0% | 0.74190 | 5095.05 | 9576.87 | 0.5320 | |
| 7C | 3 | 3/30/2013 16:30 | 3 | 11305 | 3768.33 | 100.0% | 0.74307 | 5071.30 | 9576.87 | 0.5295 | |
| 7C | 4 | 3/30/2013 17:27 | 3 | 11354 | 3784.67 | 100.0% | 0.73534 | 5146.80 | 9576.84 | 0.5374 | |
| 7C | 5 | 3/30/2013 17:19 | 3 | 11424 | 3808.00 | 100.0% | 0.73642 | 5170.95 | 9576.85 | 0.5399 | |
| 7C | 6 | 3/30/2013 17:11 | 3 | 10295 | 3431.67 | 100.0% | 0.73748 | 4653.22 | 9576.85 | 0.4859 | |
| 7C | 7 | 3/30/2013 17:03 | 3 | 11620 | 3873.33 | 99.8% | 0.73857 | 5252.65 | 9576.85 | 0.5485 | |
| 7C | 8 | 3/30/2013 16:55 | 3 | 11421 | 3807.00 | 100.0% | 0.73970 | 5146.69 | 9576.86 | 0.5374 | 0.5321 |
| 7D | 1 | 3/30/2013 16:55 | 3 | 11688 | 3896.00 | 99.8% | 0.73970 | 5275.29 | 9576.86 | 0.5508 | |
| 7D | 2 | 3/30/2013 16:47 | 3 | 11681 | 3893.67 | 100.0% | 0.74080 | 5256.03 | 9576.86 | 0.5488 | |
| 7D | 3 | 3/30/2013 16:38 | 3 | 11287 | 3762.33 | 100.0% | 0.74190 | 5071.24 | 9576.87 | 0.5295 | |
| 7D | 4 | 3/30/2013 16:30 | 3 | 11695 | 3898.33 | 100.0% | 0.74307 | 5246.25 | 9576.87 | 0.5478 | |
| 7D | 5 | 3/30/2013 17:27 | 3 | 11332 | 3777.33 | 100.0% | 0.73534 | 5136.82 | 9576.84 | 0.5364 | |
| 7D | 6 | 3/30/2013 17:19 | 3 | 10278 | 3426.00 | 100.0% | 0.73642 | 4652.24 | 9576.85 | 0.4858 | |
| 7D | 7 | 3/30/2013 17:11 | 3 | 11645 | 3881.67 | 99.8% | 0.73748 | 5271.68 | 9576.85 | 0.5505 | |
| 7D | 8 | 3/30/2013 17:03 | 3 | 11537 | 3845.67 | 100.0% | 0.73857 | 5206.94 | 9576.85 | 0.5437 | 0.5367 |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8A | 1 | 3/30/2013 17:03 | 3 | 11089 | 3696.33 | 99.8% | 0.73859 | 5012.42 | 9576.85 | 0.5234 | |
| 8A | 2 | 3/30/2013 16:55 | 3 | 11355 | 3785.00 | 100.0% | 0.73972 | 5116.78 | 9576.86 | 0.5343 | |
| 8A | 3 | 3/30/2013 16:46 | 3 | 11121 | 3707.00 | 100.0% | 0.74083 | 5003.86 | 9576.86 | 0.5225 | |
| 8A | 4 | 3/30/2013 16:38 | 3 | 11478 | 3826.00 | 100.0% | 0.74193 | 5156.82 | 9576.87 | 0.5385 | |
| 8A | 5 | 3/30/2013 16:30 | 3 | 11256 | 3752.00 | 100.0% | 0.74304 | 5049.52 | 9576.87 | 0.5273 | |
| 8A | 6 | 3/30/2013 17:27 | 3 | 10002 | 3334.00 | 100.0% | 0.73537 | 4533.77 | 9576.84 | 0.4734 | |
| 8A | 7 | 3/30/2013 17:19 | 3 | 11411 | 3803.67 | 99.8% | 0.73645 | 5173.02 | 9576.85 | 0.5402 | |
| 8A | 8 | 3/30/2013 17:11 | 3 | 11544 | 3848.00 | 100.0% | 0.73750 | 5217.59 | 9576.85 | 0.5448 | 0.5255 |
| 8B | 1 | 3/30/2013 17:11 | 3 | 11077 | 3692.33 | 99.8% | 0.73750 | 5014.41 | 9576.85 | 0.5236 | |
| 8B | 2 | 3/30/2013 17:03 | 3 | 11109 | 3703.00 | 100.0% | 0.73859 | 5013.58 | 9576.85 | 0.5235 | |
| 8B | 3 | 3/30/2013 16:55 | 3 | 11001 | 3667.00 | 100.0% | 0.73973 | 4957.23 | 9576.86 | 0.5176 | |
| 8B | 4 | 3/30/2013 16:46 | 3 | 11116 | 3705.33 | 100.0% | 0.74083 | 5001.61 | 9576.86 | 0.5223 | |
| 8B | 5 | 3/30/2013 16:38 | 3 | 10804 | 3601.33 | 100.0% | 0.74193 | 4854.01 | 9576.87 | 0.5068 | |
| 8B | 6 | 3/30/2013 16:30 | 3 | 9694 | 3231.33 | 100.0% | 0.74305 | 4348.77 | 9576.87 | 0.4541 | |
| 8B | 7 | 3/30/2013 17:27 | 3 | 11250 | 3750.00 | 99.8% | 0.73537 | 5107.49 | 9576.84 | 0.5333 | |
| 8B | 8 | 3/30/2013 17:19 | 3 | 11031 | 3677.00 | 100.0% | 0.73645 | 4992.90 | 9576.85 | 0.5214 | 0.5128 |
| 8C | 1 | 3/30/2013 17:19 | 3 | 11611 | 3870.33 | 99.8% | 0.73645 | 5263.69 | 9576.85 | 0.5496 | |
| 8C | 2 | 3/30/2013 17:11 | 3 | 11556 | 3852.00 | 100.0% | 0.73751 | 5223.00 | 9576.85 | 0.5454 | |
| 8C | 3 | 3/30/2013 17:03 | 3 | 11315 | 3771.67 | 100.0% | 0.73859 | 5106.55 | 9576.85 | 0.5332 | |
| 8C | 4 | 3/30/2013 16:55 | 3 | 11562 | 3854.00 | 100.0% | 0.73973 | 5210.03 | 9576.86 | 0.5440 | |
| 8C | 5 | 3/30/2013 16:46 | 3 | 11426 | 3808.67 | 100.0% | 0.74083 | 5141.09 | 9576.86 | 0.5368 | |
| 8C | 6 | 3/30/2013 16:38 | 3 | 10288 | 3429.33 | 100.0% | 0.74193 | 4622.18 | 9576.87 | 0.4826 | |
| 8C | 7 | 3/30/2013 16:30 | 3 | 11706 | 3902.00 | 99.8% | 0.74305 | 5259.62 | 9576.87 | 0.5492 | |
| 8C | 8 | 3/30/2013 17:27 | 3 | 11532 | 3844.00 | 100.0% | 0.73537 | 5227.30 | 9576.84 | 0.5458 | 0.5358 |
| 8D | 1 | 3/30/2013 17:27 | 3 | 11532 | 3844.00 | 99.8% | 0.73537 | 5235.52 | 9576.84 | 0.5467 | |
| 8D | 2 | 3/30/2013 17:19 | 3 | 11838 | 3946.00 | 100.0% | 0.73644 | 5358.18 | 9576.85 | 0.5595 | |
| 8D | 3 | 3/30/2013 17:11 | 3 | 11402 | 3800.67 | 100.0% | 0.73751 | 5153.40 | 9576.85 | 0.5381 | |
| 8D | 4 | 3/30/2013 17:03 | 3 | 11541 | 3847.00 | 100.0% | 0.73859 | 5208.56 | 9576.85 | 0.5439 | |
| 8D | 5 | 3/30/2013 16:55 | 3 | 11561 | 3853.67 | 100.0% | 0.73972 | 5209.59 | 9576.86 | 0.5440 | |
| 8D | 6 | 3/30/2013 16:46 | 3 | 10407 | 3469.00 | 100.0% | 0.74083 | 4682.61 | 9576.86 | 0.4890 | |
| 8D | 7 | 3/30/2013 16:38 | 3 | 11975 | 3991.67 | 99.8% | 0.74193 | 5388.58 | 9576.87 | 0.5627 | |
| 8D | 8 | 3/30/2013 16:30 | 3 | 11785 | 3928.33 | 100.0% | 0.74304 | 5286.82 | 9576.87 | 0.5520 | 0.5420 |
| 9A | 1 | 3/30/2013 17:32 | 3 | 11659 | 3886.33 | 99.8% | 0.73476 | 5297.57 | 9576.84 | 0.5532 | |
| 9A | 2 | 3/30/2013 18:41 | 3 | 11487 | 3829.00 | 100.0% | 0.72567 | 5276.49 | 9576.81 | 0.5510 | |
| 9A | 3 | 3/30/2013 18:30 | 3 | 11268 | 3756.00 | 100.0% | 0.72712 | 5165.61 | 9576.82 | 0.5394 | |
| 9A | 4 | 3/30/2013 18:17 | 3 | 11367 | 3789.00 | 100.0% | 0.72882 | 5198.80 | 9576.82 | 0.5429 | |
| 9A | 5 | 3/30/2013 18:07 | 3 | 11199 | 3733.00 | 100.0% | 0.73018 | 5112.42 | 9576.83 | 0.5338 | |
| 9A | 6 | 3/30/2013 17:58 | 3 | 10112 | 3370.67 | 100.0% | 0.73134 | 4608.90 | 9576.83 | 0.4813 | |
| 9A | 7 | 3/30/2013 17:49 | 3 | 11654 | 3884.67 | 99.8% | 0.73244 | 5312.08 | 9576.83 | 0.5547 | |
| 9A | 8 | 3/30/2013 17:40 | 3 | 11504 | 3834.67 | 100.0% | 0.73364 | 5226.88 | 9576.84 | 0.5458 | 0.5377 |
| 9B | 1 | 3/30/2013 17:40 | 3 | 11269 | 3756.33 | 99.8% | 0.73367 | 5128.00 | 9576.84 | 0.5355 | |
| 9B | 2 | 3/30/2013 17:32 | 3 | 11252 | 3750.67 | 100.0% | 0.73474 | 5104.75 | 9576.84 | 0.5330 | |
| 9B | 3 | 3/30/2013 18:41 | 3 | 10930 | 3643.33 | 100.0% | 0.72567 | 5020.64 | 9576.81 | 0.5242 | |
| 9B | 4 | 3/30/2013 18:30 | 3 | 11070 | 3690.00 | 100.0% | 0.72713 | 5074.72 | 9576.82 | 0.5299 | |
| 9B | 5 | 3/30/2013 18:17 | 3 | 10957 | 3652.33 | 100.0% | 0.72881 | 5011.36 | 9576.82 | 0.5233 | |
| 9B | 6 | 3/30/2013 18:06 | 3 | 9962 | 3320.67 | 100.0% | 0.73021 | 4547.57 | 9576.83 | 0.4749 | |
| 9B | 7 | 3/30/2013 17:58 | 3 | 11504 | 3834.67 | 99.8% | 0.73136 | 5251.47 | 9576.83 | 0.5484 | |
| 9B | 8 | 3/30/2013 17:49 | 3 | 11466 | 3822.00 | 100.0% | 0.73246 | 5218.04 | 9576.83 | 0.5449 | 0.5267 |
| 9C | 1 | 3/30/2013 17:49 | 3 | 11302 | 3767.33 | 99.8% | 0.73246 | 5151.50 | 9576.83 | 0.5379 | |
| 9C | 2 | 3/30/2013 17:40 | 3 | 11541 | 3847.00 | 100.0% | 0.73367 | 5243.53 | 9576.84 | 0.5475 | |
| 9C | 3 | 3/30/2013 17:32 | 3 | 11133 | 3711.00 | 100.0% | 0.73474 | 5050.76 | 9576.84 | 0.5274 | |
| 9C | 4 | 3/30/2013 18:41 | 3 | 11241 | 3747.00 | 100.0% | 0.72567 | 5163.51 | 9576.81 | 0.5392 | |
| 9C | 5 | 3/30/2013 18:30 | 3 | 11355 | 3785.00 | 100.0% | 0.72713 | 5205.37 | 9576.82 | 0.5435 | |
| 9C | 6 | 3/30/2013 18:17 | 3 | 9940 | 3313.33 | 100.0% | 0.72880 | 4546.26 | 9576.82 | 0.4747 | |
| 9C | 7 | 3/30/2013 18:06 | 3 | 11315 | 3771.67 | 99.8% | 0.73021 | 5173.32 | 9576.83 | 0.5402 | |
| 9C | 8 | 3/30/2013 17:58 | 3 | 11501 | 3833.67 | 100.0% | 0.73136 | 5241.86 | 9576.83 | 0.5473 | 0.5322 |
| 9D | 1 | 3/30/2013 17:58 | 3 | 10904 | 3634.67 | 99.8% | 0.73136 | 4977.58 | 9576.83 | 0.5198 | |
| 9D | 2 | 3/30/2013 17:49 | 3 | 10843 | 3614.33 | 100.0% | 0.73246 | 4934.52 | 9576.83 | 0.5153 | |
| 9D | 3 | 3/30/2013 17:40 | 3 | 10806 | 3602.00 | 100.0% | 0.73367 | 4909.59 | 9576.84 | 0.5127 | |
| 9D | 4 | 3/30/2013 17:32 | 3 | 11058 | 3686.00 | 100.0% | 0.73474 | 5016.75 | 9576.84 | 0.5238 | |
| 9D | 5 | 3/30/2013 18:41 | 3 | 10540 | 3513.33 | 100.0% | 0.72567 | 4841.51 | 9576.81 | 0.5055 | |
| 9D | 6 | 3/30/2013 18:30 | 3 | 9592 | 3197.33 | 100.0% | 0.72713 | 4397.17 | 9576.82 | 0.4591 | |
| 9D | 7 | 3/30/2013 18:17 | 3 | 10852 | 3617.33 | 99.8% | 0.72879 | 4971.26 | 9576.82 | 0.5191 | |
| 9D | 8 | 3/30/2013 18:06 | 3 | 11020 | 3673.33 | 100.0% | 0.73021 | 5030.55 | 9576.83 | 0.5253 | 0.5101 |
| 10A | 1 | 3/30/2013 18:07 | 3 | 11136 | 3712.00 | 99.8% | 0.73019 | 5091.62 | 9576.83 | 0.5317 | |
| 10A | 2 | 3/30/2013 17:58 | 3 | 11627 | 3875.67 | 100.0% | 0.73134 | 5299.43 | 9576.83 | 0.5534 | |
| 10A | 3 | 3/30/2013 17:49 | 3 | 11376 | 3792.00 | 100.0% | 0.73244 | 5177.22 | 9576.83 | 0.5406 | |
| 10A | 4 | 3/30/2013 17:40 | 3 | 11242 | 3747.33 | 100.0% | 0.73364 | 5107.84 | 9576.84 | 0.5334 | |
| 10A | 5 | 3/30/2013 17:32 | 3 | 11144 | 3714.67 | 100.0% | 0.73473 | 5055.83 | 9576.84 | 0.5279 | |
| 10A | 6 | 3/30/2013 18:41 | 3 | 10013 | 3337.67 | 100.0% | 0.72567 | 4599.43 | 9576.81 | 0.4803 | |
| 10A | 7 | 3/30/2013 18:30 | 3 | 11308 | 3769.33 | 99.8% | 0.72711 | 5192.11 | 9576.82 | 0.5422 | |
| 10A | 8 | 3/30/2013 18:17 | 3 | 11203 | 3734.33 | 100.0% | 0.72878 | 5124.07 | 9576.82 | 0.5350 | 0.5305 |
| 10B | 1 | 3/30/2013 18:17 | 3 | 11287 | 3762.33 | 99.8% | 0.72877 | 5170.67 | 9576.82 | 0.5399 | |
| 10B | 2 | 3/30/2013 18:06 | 3 | 11442 | 3814.00 | 100.0% | 0.73022 | 5223.05 | 9576.83 | 0.5454 | |
| 10B | 3 | 3/30/2013 17:57 | 3 | 11205 | 3735.00 | 100.0% | 0.73138 | 5106.77 | 9576.83 | 0.5332 | |
| 10B | 4 | 3/30/2013 17:49 | 3 | 11271 | 3757.00 | 100.0% | 0.73243 | 5129.49 | 9576.83 | 0.5356 | |
| 10B | 5 | 3/30/2013 17:40 | 3 | 10906 | 3635.33 | 100.0% | 0.73366 | 4955.07 | 9576.84 | 0.5174 | |
| 10B | 6 | 3/30/2013 17:32 | 3 | 10051 | 3350.33 | 100.0% | 0.73477 | 4559.71 | 9576.84 | 0.4761 | |
| 10B | 7 | 3/30/2013 18:41 | 3 | 11185 | 3728.33 | 99.8% | 0.72567 | 5145.86 | 9576.81 | 0.5373 | |
| 10B | 8 | 3/30/2013 18:30 | 3 | 11060 | 3686.67 | 100.0% | 0.72715 | 5069.99 | 9576.82 | 0.5294 | 0.5268 |
| 10C | 1 | 3/30/2013 18:30 | 3 | 11164 | 3721.33 | 99.8% | 0.72715 | 5125.72 | 9576.82 | 0.5352 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10C | 2 | 3/30/2013 18:17 | 3 | 11215 | 3738.33 | 100.0% | 0.72876 | 5129.69 | 9576.82 | 0.5356 | |
| 10C | 3 | 3/30/2013 18:06 | 3 | 11291 | 3763.67 | 100.0% | 0.73023 | 5154.07 | 9576.83 | 0.5382 | |
| 10C | 4 | 3/30/2013 17:57 | 3 | 11187 | 3729.00 | 100.0% | 0.73138 | 5098.56 | 9576.83 | 0.5324 | |
| 10C | 5 | 3/30/2013 17:49 | 3 | 11206 | 3735.33 | 100.0% | 0.73249 | 5099.52 | 9576.83 | 0.5325 | |
| 10C | 6 | 3/30/2013 17:40 | 3 | 9876 | 3292.00 | 100.0% | 0.73366 | 4487.10 | 9576.84 | 0.4685 | |
| 10C | 7 | 3/30/2013 17:32 | 3 | 11580 | 3860.00 | 99.8% | 0.73477 | 5261.61 | 9576.84 | 0.5494 | |
| 10C | 8 | 3/30/2013 18:41 | 3 | 11286 | 3762.00 | 100.0% | 0.72567 | 5184.18 | 9576.81 | 0.5413 | 0.5291 |
| 10D | 1 | 3/30/2013 18:41 | 3 | 11152 | 3717.33 | 99.8% | 0.72567 | 5130.70 | 9576.81 | 0.5357 | |
| 10D | 2 | 3/30/2013 18:30 | 3 | 11354 | 3784.67 | 100.0% | 0.72715 | 5204.77 | 9576.82 | 0.5435 | |
| 10D | 3 | 3/30/2013 18:17 | 3 | 11090 | 3696.67 | 100.0% | 0.72875 | 5072.60 | 9576.82 | 0.5297 | |
| 10D | 4 | 3/30/2013 18:06 | 3 | 11325 | 3775.00 | 100.0% | 0.73024 | 5169.56 | 9576.83 | 0.5398 | |
| 10D | 5 | 3/30/2013 17:57 | 3 | 11230 | 3743.33 | 100.0% | 0.73138 | 5118.17 | 9576.83 | 0.5344 | |
| 10D | 6 | 3/30/2013 17:49 | 3 | 10120 | 3373.33 | 100.0% | 0.73249 | 4605.27 | 9576.83 | 0.4809 | |
| 10D | 7 | 3/30/2013 17:40 | 3 | 11635 | 3878.33 | 99.8% | 0.73366 | 5294.61 | 9576.84 | 0.5529 | |
| 10D | 8 | 3/30/2013 17:32 | 3 | 11605 | 3868.33 | 100.0% | 0.73477 | 5264.69 | 9576.84 | 0.5497 | 0.5333 |
| 11A | 1 | 3/30/2013 18:56 | 3 | 9741 | 3247.00 | 99.8% | 0.72375 | 4493.38 | 9576.81 | 0.4692 | |
| 11A | 2 | 3/30/2013 18:59 | 3 | 9916 | 3305.33 | 100.0% | 0.72328 | 4569.91 | 9576.80 | 0.4772 | |
| 11A | 3 | 3/30/2013 19:03 | 3 | 9726 | 3242.00 | 100.0% | 0.72283 | 4485.17 | 9576.80 | 0.4683 | |
| 11A | 4 | 3/30/2013 19:06 | 3 | 9922 | 3307.33 | 100.0% | 0.72238 | 4578.41 | 9576.80 | 0.4781 | |
| 11A | 5 | 3/30/2013 19:10 | 3 | 9559 | 3186.33 | 100.0% | 0.72188 | 4413.92 | 9576.80 | 0.4609 | |
| 11A | 6 | 3/30/2013 19:14 | 3 | 8701 | 2900.33 | 100.0% | 0.72142 | 4020.33 | 9576.80 | 0.4198 | |
| 11A | 7 | 3/30/2013 19:17 | 3 | 9858 | 3286.00 | 99.8% | 0.72096 | 4564.98 | 9576.80 | 0.4767 | |
| 11A | 8 | 3/30/2013 19:21 | 3 | 10182 | 3394.00 | 100.0% | 0.72050 | 4710.64 | 9576.79 | 0.4919 | 0.4678 |
| 11B | 1 | 3/30/2013 19:21 | 3 | 11084 | 3694.67 | 99.8% | 0.72049 | 5136.07 | 9576.79 | 0.5363 | |
| 11B | 2 | 3/30/2013 18:55 | 3 | 11264 | 3754.67 | 100.0% | 0.72377 | 5187.67 | 9576.81 | 0.5417 | |
| 11B | 3 | 3/30/2013 18:59 | 3 | 11176 | 3725.33 | 100.0% | 0.72327 | 5150.67 | 9576.80 | 0.5378 | |
| 11B | 4 | 3/30/2013 19:03 | 3 | 11078 | 3692.67 | 100.0% | 0.72282 | 5108.71 | 9576.80 | 0.5334 | |
| 11B | 5 | 3/30/2013 19:06 | 3 | 11235 | 3745.00 | 100.0% | 0.72237 | 5184.34 | 9576.80 | 0.5413 | |
| 11B | 6 | 3/30/2013 19:10 | 3 | 9954 | 3318.00 | 100.0% | 0.72187 | 4596.41 | 9576.80 | 0.4800 | |
| 11B | 7 | 3/30/2013 19:14 | 3 | 11315 | 3771.67 | 99.8% | 0.72141 | 5236.42 | 9576.80 | 0.5468 | |
| 11B | 8 | 3/30/2013 19:17 | 3 | 11208 | 3736.00 | 100.0% | 0.72095 | 5182.04 | 9576.80 | 0.5411 | 0.5323 |
| 11C | 1 | 3/30/2013 19:17 | 3 | 11241 | 3747.00 | 99.8% | 0.72094 | 5205.55 | 9576.80 | 0.5436 | |
| 11C | 2 | 3/30/2013 19:21 | 3 | 11141 | 3713.67 | 100.0% | 0.72048 | 5154.43 | 9576.79 | 0.5382 | |
| 11C | 3 | 3/30/2013 18:55 | 3 | 10818 | 3606.00 | 100.0% | 0.72377 | 4982.26 | 9576.81 | 0.5202 | |
| 11C | 4 | 3/30/2013 18:59 | 3 | 11117 | 3705.67 | 100.0% | 0.72326 | 5123.54 | 9576.80 | 0.5350 | |
| 11C | 5 | 3/30/2013 19:03 | 3 | 10902 | 3634.00 | 100.0% | 0.72280 | 5027.64 | 9576.80 | 0.5250 | |
| 11C | 6 | 3/30/2013 19:06 | 3 | 9885 | 3295.00 | 100.0% | 0.72234 | 4561.54 | 9576.80 | 0.4763 | |
| 11C | 7 | 3/30/2013 19:10 | 3 | 11500 | 3833.33 | 99.8% | 0.72186 | 5318.74 | 9576.80 | 0.5554 | |
| 11C | 8 | 3/30/2013 19:14 | 3 | 11232 | 3744.00 | 100.0% | 0.72140 | 5189.91 | 9576.80 | 0.5419 | 0.5295 |
| 11D | 1 | 3/30/2013 19:14 | 3 | 11225 | 3741.67 | 99.8% | 0.72139 | 5194.91 | 9576.80 | 0.5424 | |
| 11D | 2 | 3/30/2013 19:17 | 3 | 11169 | 3723.00 | 100.0% | 0.72093 | 5164.15 | 9576.80 | 0.5392 | |
| 11D | 3 | 3/30/2013 19:21 | 3 | 11003 | 3667.67 | 100.0% | 0.72047 | 5090.67 | 9576.79 | 0.5316 | |
| 11D | 4 | 3/30/2013 18:55 | 3 | 11450 | 3816.67 | 100.0% | 0.72377 | 5273.35 | 9576.81 | 0.5506 | |
| 11D | 5 | 3/30/2013 18:59 | 3 | 11115 | 3705.00 | 100.0% | 0.72325 | 5122.70 | 9576.80 | 0.5349 | |
| 11D | 6 | 3/30/2013 19:03 | 3 | 10052 | 3350.67 | 100.0% | 0.72279 | 4635.72 | 9576.80 | 0.4841 | |
| 11D | 7 | 3/30/2013 19:06 | 3 | 11275 | 3758.33 | 99.8% | 0.72234 | 5211.21 | 9576.80 | 0.5441 | |
| 11D | 8 | 3/30/2013 19:10 | 3 | 11312 | 3770.67 | 100.0% | 0.72185 | 5223.62 | 9576.80 | 0.5454 | 0.5341 |
| 13A | 1 | 3/30/2013 17:42 | 3 | 11235 | 3745.00 | 99.8% | 0.73343 | 5114.19 | 9576.84 | 0.5340 | |
| 13A | 2 | 3/30/2013 18:52 | 3 | 11208 | 3736.00 | 100.0% | 0.72422 | 5158.67 | 9576.81 | 0.5387 | |
| 13A | 3 | 3/30/2013 18:42 | 3 | 11169 | 3723.00 | 100.0% | 0.72553 | 5131.41 | 9576.81 | 0.5358 | |
| 13A | 4 | 3/30/2013 18:32 | 3 | 11398 | 3799.33 | 100.0% | 0.72684 | 5227.20 | 9576.82 | 0.5458 | |
| 13A | 5 | 3/30/2013 18:16 | 3 | 10869 | 3623.00 | 100.0% | 0.72900 | 4969.84 | 9576.82 | 0.5189 | |
| 13A | 6 | 3/30/2013 18:08 | 3 | 9992 | 3330.67 | 100.0% | 0.73004 | 4562.30 | 9576.83 | 0.4764 | |
| 13A | 7 | 3/30/2013 17:59 | 3 | 11451 | 3817.00 | 99.8% | 0.73116 | 5228.66 | 9576.83 | 0.5460 | |
| 13A | 8 | 3/30/2013 17:50 | 3 | 11458 | 3819.33 | 100.0% | 0.73234 | 5215.25 | 9576.83 | 0.5446 | 0.5300 |
| 13B | 1 | 3/30/2013 17:50 | 3 | 11616 | 3872.00 | 99.8% | 0.73234 | 5295.45 | 9576.83 | 0.5529 | |
| 13B | 2 | 3/30/2013 17:42 | 3 | 11784 | 3928.00 | 100.0% | 0.73342 | 5355.74 | 9576.84 | 0.5592 | |
| 13B | 3 | 3/30/2013 18:52 | 3 | 11414 | 3804.67 | 100.0% | 0.72422 | 5253.48 | 9576.81 | 0.5486 | |
| 13B | 4 | 3/30/2013 18:42 | 3 | 11721 | 3907.00 | 100.0% | 0.72553 | 5385.02 | 9576.81 | 0.5623 | |
| 13B | 5 | 3/30/2013 18:32 | 3 | 11341 | 3780.33 | 100.0% | 0.72684 | 5201.06 | 9576.82 | 0.5431 | |
| 13B | 6 | 3/30/2013 18:16 | 3 | 10020 | 3340.00 | 100.0% | 0.72900 | 4581.64 | 9576.82 | 0.4784 | |
| 13B | 7 | 3/30/2013 18:08 | 3 | 11591 | 3863.67 | 99.8% | 0.73004 | 5300.72 | 9576.83 | 0.5535 | |
| 13B | 8 | 3/30/2013 17:59 | 3 | 11611 | 3870.33 | 100.0% | 0.73116 | 5293.39 | 9576.83 | 0.5527 | 0.5438 |
| 13C | 1 | 3/30/2013 17:59 | 3 | 10571 | 3523.67 | 99.8% | 0.73116 | 4826.86 | 9576.83 | 0.5040 | |
| 13C | 2 | 3/30/2013 17:50 | 3 | 10471 | 3490.33 | 100.0% | 0.73234 | 4765.97 | 9576.83 | 0.4977 | |
| 13C | 3 | 3/30/2013 17:42 | 3 | 10006 | 3335.33 | 100.0% | 0.73342 | 4547.65 | 9576.84 | 0.4749 | |
| 13C | 4 | 3/30/2013 18:52 | 3 | 10545 | 3515.00 | 100.0% | 0.72422 | 4853.51 | 9576.81 | 0.5068 | |
| 13C | 5 | 3/30/2013 18:42 | 3 | 10119 | 3373.00 | 100.0% | 0.72553 | 4649.02 | 9576.81 | 0.4854 | |
| 13C | 6 | 3/30/2013 18:32 | 3 | 9281 | 3093.67 | 100.0% | 0.72684 | 4256.33 | 9576.82 | 0.4444 | |
| 13C | 7 | 3/30/2013 18:16 | 3 | 10583 | 3527.67 | 99.8% | 0.72900 | 4846.68 | 9576.82 | 0.5061 | |
| 13C | 8 | 3/30/2013 18:08 | 3 | 10593 | 3531.00 | 100.0% | 0.73004 | 4836.72 | 9576.83 | 0.5050 | 0.4905 |
| 13D | 1 | 3/30/2013 18:08 | 3 | 11247 | 3749.00 | 99.8% | 0.73004 | 5143.41 | 9576.83 | 0.5371 | |
| 13D | 2 | 3/30/2013 17:59 | 3 | 11383 | 3794.33 | 100.0% | 0.73116 | 5189.47 | 9576.83 | 0.5419 | |
| 13D | 3 | 3/30/2013 17:50 | 3 | 11166 | 3722.00 | 100.0% | 0.73234 | 5082.31 | 9576.83 | 0.5307 | |
| 13D | 4 | 3/30/2013 17:42 | 3 | 11081 | 3693.67 | 100.0% | 0.73342 | 5036.23 | 9576.84 | 0.5259 | |
| 13D | 5 | 3/30/2013 18:52 | 3 | 10857 | 3619.00 | 100.0% | 0.72422 | 4997.11 | 9576.81 | 0.5218 | |
| 13D | 6 | 3/30/2013 18:42 | 3 | 9916 | 3305.33 | 100.0% | 0.72553 | 4555.75 | 9576.81 | 0.4757 | |
| 13D | 7 | 3/30/2013 18:32 | 3 | 11472 | 3824.00 | 99.8% | 0.72684 | 5269.41 | 9576.82 | 0.5502 | |
| 13D | 8 | 3/30/2013 18:16 | 3 | 11052 | 3684.00 | 100.0% | 0.72900 | 5053.50 | 9576.82 | 0.5277 | 0.5264 |
| 14A | 1 | 3/30/2013 18:16 | 3 | 10482 | 3494.00 | 99.8% | 0.72899 | 4800.44 | 9576.82 | 0.5013 | |
| 14A | 2 | 3/30/2013 18:08 | 3 | 10501 | 3500.33 | 100.0% | 0.73004 | 4794.74 | 9576.83 | 0.5007 | |

| Detector (#) | Source ID (#) | Raw Count Data Start Time | Count Time (min) | Beta (counts) | Raw Beta (cpm) | Recovery (%) | Y-90 Decay | Corrected Sr-90 (cpm)* | Decay Corrected Nominal (dpm)** | Sr-90 Efficiency (cpm/dpm) | Average Efficiency (cpm/dpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14A | 3 | 3/30/2013 17:59 | 3 | 10445 | 3481.67 | 100.0% | 0.73117 | 4761.81 | 9576.83 | 0.4972 | |
| 14A | 4 | 3/30/2013 17:50 | 3 | 10843 | 3614.33 | 100.0% | 0.73235 | 4935.26 | 9576.83 | 0.5153 | |
| 14A | 5 | 3/30/2013 17:42 | 3 | 10518 | 3506.00 | 100.0% | 0.73342 | 4780.36 | 9576.84 | 0.4992 | |
| 14A | 6 | 3/30/2013 18:52 | 3 | 9358 | 3119.33 | 100.0% | 0.72421 | 4307.20 | 9576.81 | 0.4498 | |
| 14A | 7 | 3/30/2013 18:42 | 3 | 10784 | 3594.67 | 99.8% | 0.72553 | 4962.36 | 9576.81 | 0.5182 | |
| 14A | 8 | 3/30/2013 18:32 | 3 | 10628 | 3542.67 | 100.0% | 0.72683 | 4874.13 | 9576.82 | 0.5090 | 0.4988 |
| 14B | 1 | 3/30/2013 18:32 | 3 | 11086 | 3695.33 | 99.8% | 0.72683 | 5092.17 | 9576.82 | 0.5317 | |
| 14B | 2 | 3/30/2013 18:16 | 3 | 11179 | 3726.33 | 100.0% | 0.72899 | 5111.61 | 9576.82 | 0.5337 | |
| 14B | 3 | 3/30/2013 18:08 | 3 | 10895 | 3631.67 | 100.0% | 0.73003 | 4974.65 | 9576.83 | 0.5194 | |
| 14B | 4 | 3/30/2013 17:59 | 3 | 11247 | 3749.00 | 100.0% | 0.73117 | 5127.40 | 9576.83 | 0.5354 | |
| 14B | 5 | 3/30/2013 17:50 | 3 | 10884 | 3628.00 | 100.0% | 0.73235 | 4953.93 | 9576.83 | 0.5173 | |
| 14B | 6 | 3/30/2013 17:42 | 3 | 10007 | 3335.67 | 100.0% | 0.73342 | 4548.12 | 9576.84 | 0.4749 | |
| 14B | 7 | 3/30/2013 18:52 | 3 | 11217 | 3739.00 | 99.8% | 0.72421 | 5170.98 | 9576.81 | 0.5399 | |
| 14B | 8 | 3/30/2013 18:42 | 3 | 10856 | 3618.67 | 100.0% | 0.72553 | 4987.65 | 9576.81 | 0.5208 | 0.5217 |
| 14C | 1 | 3/30/2013 18:42 | 3 | 11122 | 3707.33 | 99.8% | 0.72553 | 5117.90 | 9576.81 | 0.5344 | |
| 14C | 2 | 3/30/2013 18:32 | 3 | 11162 | 3720.67 | 100.0% | 0.72683 | 5119.03 | 9576.82 | 0.5345 | |
| 14C | 3 | 3/30/2013 18:16 | 3 | 11091 | 3697.00 | 100.0% | 0.72899 | 5071.37 | 9576.82 | 0.5295 | |
| 14C | 4 | 3/30/2013 18:08 | 3 | 11118 | 3706.00 | 100.0% | 0.73003 | 5076.48 | 9576.83 | 0.5301 | |
| 14C | 5 | 3/30/2013 17:59 | 3 | 11059 | 3686.33 | 100.0% | 0.73117 | 5041.69 | 9576.83 | 0.5264 | |
| 14C | 6 | 3/30/2013 17:50 | 3 | 9894 | 3298.00 | 100.0% | 0.73235 | 4503.32 | 9576.83 | 0.4702 | |
| 14C | 7 | 3/30/2013 17:42 | 3 | 11536 | 3845.33 | 99.8% | 0.73342 | 5251.28 | 9576.84 | 0.5483 | |
| 14C | 8 | 3/30/2013 18:52 | 3 | 11305 | 3768.33 | 100.0% | 0.72421 | 5203.36 | 9576.81 | 0.5433 | 0.5271 |
| 14D | 1 | 3/30/2013 18:52 | 3 | 9871 | 3290.33 | 99.8% | 0.72421 | 4550.48 | 9576.81 | 0.4752 | |
| 14D | 2 | 3/30/2013 18:42 | 3 | 10046 | 3348.67 | 100.0% | 0.72553 | 4615.51 | 9576.81 | 0.4819 | |
| 14D | 3 | 3/30/2013 18:32 | 3 | 9868 | 3289.33 | 100.0% | 0.72683 | 4525.58 | 9576.82 | 0.4726 | |
| 14D | 4 | 3/30/2013 18:16 | 3 | 10294 | 3431.33 | 100.0% | 0.72899 | 4706.94 | 9576.82 | 0.4915 | |
| 14D | 5 | 3/30/2013 18:08 | 3 | 9934 | 3311.33 | 100.0% | 0.73003 | 4535.86 | 9576.83 | 0.4736 | |
| 14D | 6 | 3/30/2013 17:59 | 3 | 8873 | 2957.67 | 100.0% | 0.73117 | 4045.13 | 9576.83 | 0.4224 | |
| 14D | 7 | 3/30/2013 17:50 | 3 | 10119 | 3373.00 | 99.8% | 0.73235 | 4612.99 | 9576.83 | 0.4817 | |
| 14D | 8 | 3/30/2013 17:42 | 3 | 9971 | 3323.67 | 100.0% | 0.73342 | 4531.76 | 9576.84 | 0.4732 | 0.4715 |

Current Calibration - PIC

| Geometry | Tuffryn Filter | | | | |
|---|---|---|---|---|---|
| Y-90 | **Cal Date** | 3/1/2013 | **Exp Date** | 2/28/2014 | |
| **Protean** | A0 | A1 | A2 | A3 | A4 |
| **1A** | 5.353041E-01 | | | | |
| **1B** | 5.335355E-01 | | | | |
| **1C** | 5.361905E-01 | | | | |
| **1D** | 5.309386E-01 | | | | |
| **2A** | 5.117578E-01 | | | | |
| **2B** | 5.160091E-01 | | | | |
| **2C** | 5.181153E-01 | | | | |
| **2D** | 5.198782E-01 | | | | |
| **3A** | 5.307887E-01 | | | | |
| **3B** | 5.306288E-01 | | | | |
| **3C** | 5.319471E-01 | | | | |
| **3D** | 5.210413E-01 | | | | |
| **4A** | 5.300209E-01 | | | | |
| **4B** | 5.348062E-01 | | | | |
| **4C** | 5.373425E-01 | | | | |
| **4D** | 5.316186E-01 | | | | |
| **5A** | 5.371844E-01 | | | | |
| **5B** | 5.378783E-01 | | | | |
| **5C** | 5.390942E-01 | | | | |
| **5D** | 5.383112E-01 | | | | |
| **6A** | 4.787655E-01 | | | | |
| **6B** | 4.488744E-01 | | | | |
| **6C** | 5.101166E-01 | | | | |
| **6D** | 4.554777E-01 | | | | |
| **7A** | 5.373508E-01 | | | | |
| **7B** | 5.395290E-01 | | | | |
| **7C** | 5.321346E-01 | | | | |
| **7D** | 5.366649E-01 | | | | |
| **8A** | 5.255350E-01 | | | | |
| **8B** | 5.128248E-01 | | | | |
| **8C** | 5.358420E-01 | | | | |
| **8D** | 5.419739E-01 | | | | |
| **9A** | 5.377399E-01 | | | | |
| **9B** | 5.267472E-01 | | | | |
| **9C** | 5.322234E-01 | | | | |
| **9D** | 5.100714E-01 | | | | |
| **10A** | 5.305456E-01 | | | | |
| **10B** | 5.268003E-01 | | | | |
| **10C** | 5.291475E-01 | | | | |
| **10D** | 5.333235E-01 | | | | |
| **11A** | 4.677546E-01 | | | | |
| **11B** | 5.323064E-01 | | | | |
| **11C** | 5.294515E-01 | | | | |
| **11D** | 5.340554E-01 | | | | |
| **12A** | #N/A | | | | |
| **12B** | #N/A | | | | |
| **12C** | #N/A | | | | |
| **12D** | #N/A | | | | |
| **13A** | 5.300233E-01 | | | | |
| **13B** | 5.438454E-01 | | | | |
| **13C** | 4.905428E-01 | | | | |
| **13D** | 5.263644E-01 | | | | |
| **14A** | 4.988124E-01 | | | | |
| **14B** | 5.216565E-01 | | | | |
| **14C** | 5.271115E-01 | | | | |
| **14D** | 4.715060E-01 | | | | |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| Y1 | 1A | 3 | 10 | 11551 | 3/30/2013 14:46 | 3/30/2013 14:49 | PIC | Sr90Y13 |
| Y2 | 1A | 3 | 5 | 11713 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y3 | 1A | 3 | 10 | 11569 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y4 | 1A | 3 | 5 | 11605 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y5 | 1A | 3 | 13 | 11518 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y6 | 1A | 3 | 6 | 10892 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y7 | 1A | 3 | 6 | 11867 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y8 | 1A | 3 | 5 | 11847 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y1 | 1B | 3 | 12 | 11717 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y2 | 1B | 3 | 8 | 11796 | 3/30/2013 14:46 | 3/30/2013 14:49 | PIC | Sr90Y13 |
| Y3 | 1B | 3 | 10 | 11430 | 3/30/2013 15:49 | 3/30/2013 15:52 | PIC | Sr90Y13 |
| Y4 | 1B | 3 | 12 | 11535 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y5 | 1B | 3 | 9 | 11451 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y6 | 1B | 3 | 8 | 10732 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y7 | 1B | 3 | 14 | 11951 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y8 | 1B | 3 | 16 | 11648 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y1 | 1C | 3 | 96 | 11759 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y2 | 1C | 3 | 104 | 11847 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y3 | 1C | 3 | 98 | 11562 | 3/30/2013 14:47 | 3/30/2013 14:50 | PIC | Sr90Y13 |
| Y4 | 1C | 3 | 91 | 11823 | 3/30/2013 15:49 | 3/30/2013 15:52 | PIC | Sr90Y13 |
| Y5 | 1C | 3 | 106 | 11680 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y6 | 1C | 3 | 88 | 10544 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y7 | 1C | 3 | 100 | 11779 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y8 | 1C | 3 | 89 | 11722 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y1 | 1D | 3 | 68 | 11522 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y2 | 1D | 3 | 83 | 11771 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y3 | 1D | 3 | 75 | 11535 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y4 | 1D | 3 | 73 | 11874 | 3/30/2013 14:48 | 3/30/2013 14:51 | PIC | Sr90Y13 |
| Y5 | 1D | 3 | 66 | 11432 | 3/30/2013 15:49 | 3/30/2013 15:52 | PIC | Sr90Y13 |
| Y6 | 1D | 3 | 79 | 10327 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y7 | 1D | 3 | 79 | 11718 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y8 | 1D | 3 | 91 | 11631 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y1 | 2A | 3 | 2 | 11102 | 3/30/2013 15:24 | 3/30/2013 15:27 | PIC | Sr90Y13 |
| Y2 | 2A | 3 | 0 | 11053 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y3 | 2A | 3 | 1 | 11160 | 3/30/2013 15:07 | 3/30/2013 15:10 | PIC | Sr90Y13 |
| Y4 | 2A | 3 | 2 | 11334 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y5 | 2A | 3 | 0 | 11092 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y6 | 2A | 3 | 2 | 10202 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y7 | 2A | 3 | 0 | 11309 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y8 | 2A | 3 | 0 | 11236 | 3/30/2013 15:33 | 3/30/2013 15:36 | PIC | Sr90Y13 |
| Y1 | 2B | 3 | 0 | 11237 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y2 | 2B | 3 | 1 | 11258 | 3/30/2013 15:23 | 3/30/2013 15:26 | PIC | Sr90Y13 |
| Y3 | 2B | 3 | 2 | 11080 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y4 | 2B | 3 | 0 | 11228 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y5 | 2B | 3 | 1 | 11031 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y6 | 2B | 3 | 0 | 10699 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y7 | 2B | 3 | 0 | 11366 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y8 | 2B | 3 | 0 | 11316 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y1 | 2C | 3 | 8 | 11254 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y2 | 2C | 3 | 8 | 11196 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y3 | 2C | 3 | 8 | 11123 | 3/30/2013 15:23 | 3/30/2013 15:26 | PIC | Sr90Y13 |
| Y4 | 2C | 3 | 12 | 11257 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y5 | 2C | 3 | 9 | 11037 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y6 | 2C | 3 | 19 | 10818 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y7 | 2C | 3 | 7 | 11625 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y8 | 2C | 3 | 13 | 11273 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y1 | 2D | 3 | 5 | 11170 | 3/30/2013 15:50 | 3/30/2013 15:53 | PIC | Sr90Y13 |
| Y2 | 2D | 3 | 3 | 11062 | 3/30/2013 15:42 | 3/30/2013 15:45 | PIC | Sr90Y13 |
| Y3 | 2D | 3 | 6 | 11193 | 3/30/2013 15:34 | 3/30/2013 15:37 | PIC | Sr90Y13 |
| Y4 | 2D | 3 | 7 | 11423 | 3/30/2013 15:23 | 3/30/2013 15:26 | PIC | Sr90Y13 |
| Y5 | 2D | 3 | 5 | 11240 | 3/30/2013 15:14 | 3/30/2013 15:17 | PIC | Sr90Y13 |
| Y6 | 2D | 3 | 4 | 10285 | 3/30/2013 15:06 | 3/30/2013 15:09 | PIC | Sr90Y13 |
| Y7 | 2D | 3 | 8 | 11687 | 3/30/2013 14:56 | 3/30/2013 14:59 | PIC | Sr90Y13 |
| Y8 | 2D | 3 | 9 | 11832 | 3/30/2013 14:49 | 3/30/2013 14:52 | PIC | Sr90Y13 |
| Y1 | 3A | 3 | 168 | 11701 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y2 | 3A | 3 | 156 | 11614 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y3 | 3A | 3 | 144 | 11501 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y4 | 3A | 3 | 161 | 11680 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y5 | 3A | 3 | 140 | 11179 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y6 | 3A | 3 | 125 | 10626 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y7 | 3A | 3 | 148 | 11829 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y8 | 3A | 3 | 152 | 11508 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y1 | 3B | 3 | 142 | 11658 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y2 | 3B | 3 | 130 | 11625 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y3 | 3B | 3 | 124 | 11173 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y4 | 3B | 3 | 111 | 11497 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y5 | 3B | 3 | 125 | 11424 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y6 | 3B | 3 | 114 | 10607 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y7 | 3B | 3 | 141 | 11866 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y8 | 3B | 3 | 141 | 11767 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y1 | 3C | 3 | 63 | 11610 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y2 | 3C | 3 | 60 | 11528 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y3 | 3C | 3 | 47 | 11751 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y4 | 3C | 3 | 74 | 11509 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y5 | 3C | 3 | 64 | 11490 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y6 | 3C | 3 | 48 | 10363 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y7 | 3C | 3 | 57 | 11782 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y8 | 3C | 3 | 67 | 11810 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y1 | 3D | 3 | 62 | 11458 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y2 | 3D | 3 | 54 | 11260 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y3 | 3D | 3 | 50 | 11499 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y4 | 3D | 3 | 45 | 11444 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y5 | 3D | 3 | 56 | 11039 | 3/30/2013 16:22 | 3/30/2013 16:25 | PIC | Sr90Y13 |
| Y6 | 3D | 3 | 42 | 10203 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y7 | 3D | 3 | 70 | 11594 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y8 | 3D | 3 | 61 | 11466 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y1 | 4A | 3 | 48 | 11533 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y2 | 4A | 3 | 53 | 11688 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y3 | 4A | 3 | 58 | 11649 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y4 | 4A | 3 | 51 | 11603 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y5 | 4A | 3 | 36 | 11409 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y6 | 4A | 3 | 50 | 10217 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y7 | 4A | 3 | 47 | 11782 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y8 | 4A | 3 | 53 | 11639 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y1 | 4B | 3 | 0 | 11605 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y2 | 4B | 3 | 1 | 11505 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y3 | 4B | 3 | 0 | 11446 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y4 | 4B | 3 | 0 | 11555 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y5 | 4B | 3 | 2 | 11501 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y6 | 4B | 3 | 0 | 11310 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y7 | 4B | 3 | 1 | 11770 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y8 | 4B | 3 | 1 | 11638 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y1 | 4C | 3 | 39 | 11691 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y2 | 4C | 3 | 59 | 11555 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y3 | 4C | 3 | 39 | 11702 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y4 | 4C | 3 | 39 | 11727 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y5 | 4C | 3 | 49 | 11434 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y6 | 4C | 3 | 39 | 10920 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y7 | 4C | 3 | 46 | 12089 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y8 | 4C | 3 | 43 | 11653 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y1 | 4D | 3 | 122 | 11486 | 3/30/2013 16:21 | 3/30/2013 16:24 | PIC | Sr90Y13 |
| Y2 | 4D | 3 | 123 | 11498 | 3/30/2013 15:46 | 3/30/2013 15:49 | PIC | Sr90Y13 |
| Y3 | 4D | 3 | 114 | 11268 | 3/30/2013 15:38 | 3/30/2013 15:41 | PIC | Sr90Y13 |
| Y4 | 4D | 3 | 115 | 11646 | 3/30/2013 15:28 | 3/30/2013 15:31 | PIC | Sr90Y13 |
| Y5 | 4D | 3 | 125 | 11638 | 3/30/2013 15:19 | 3/30/2013 15:22 | PIC | Sr90Y13 |
| Y6 | 4D | 3 | 107 | 10716 | 3/30/2013 15:10 | 3/30/2013 15:13 | PIC | Sr90Y13 |
| Y7 | 4D | 3 | 133 | 11892 | 3/30/2013 15:03 | 3/30/2013 15:06 | PIC | Sr90Y13 |
| Y8 | 4D | 3 | 137 | 11641 | 3/30/2013 14:53 | 3/30/2013 14:56 | PIC | Sr90Y13 |
| Y1 | 5A | 3 | 28 | 11655 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y2 | 5A | 3 | 27 | 11486 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y3 | 5A | 3 | 28 | 11067 | 3/30/2013 17:16 | 3/30/2013 17:19 | PIC | Sr90Y13 |
| Y4 | 5A | 3 | 28 | 11784 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y5 | 5A | 3 | 27 | 11476 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y6 | 5A | 3 | 26 | 10191 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y7 | 5A | 3 | 23 | 11950 | 3/30/2013 16:43 | 3/30/2013 16:46 | PIC | Sr90Y13 |
| Y8 | 5A | 3 | 29 | 11683 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y1 | 5B | 3 | 30 | 11610 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y2 | 5B | 3 | 15 | 11459 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y3 | 5B | 3 | 24 | 11519 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y4 | 5B | 3 | 25 | 11560 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y5 | 5B | 3 | 33 | 11373 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y6 | 5B | 3 | 36 | 10226 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y7 | 5B | 3 | 28 | 11833 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y8 | 5B | 3 | 30 | 11831 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y1 | 5C | 3 | 38 | 11633 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y2 | 5C | 3 | 19 | 11756 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y3 | 5C | 3 | 36 | 11398 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y4 | 5C | 3 | 37 | 11733 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y5 | 5C | 3 | 27 | 11330 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y6 | 5C | 3 | 25 | 10272 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y7 | 5C | 3 | 27 | 11798 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y8 | 5C | 3 | 22 | 11698 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y1 | 5D | 3 | 28 | 11647 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y2 | 5D | 3 | 28 | 11618 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y3 | 5D | 3 | 36 | 11265 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y4 | 5D | 3 | 31 | 11705 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y5 | 5D | 3 | 36 | 11262 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y6 | 5D | 3 | 36 | 10373 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y7 | 5D | 3 | 42 | 11696 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y8 | 5D | 3 | 31 | 11921 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y1 | 6A | 3 | 0 | 10267 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y2 | 6A | 3 | 0 | 10393 | 3/30/2013 16:51 | 3/30/2013 16:54 | PIC | Sr90Y13 |
| Y3 | 6A | 3 | 0 | 10000 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y4 | 6A | 3 | 0 | 10268 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y5 | 6A | 3 | 1 | 10193 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y6 | 6A | 3 | 0 | 9216 | 3/30/2013 17:24 | 3/30/2013 17:27 | PIC | Sr90Y13 |
| Y7 | 6A | 3 | 0 | 10341 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y8 | 6A | 3 | 0 | 10688 | 3/30/2013 17:08 | 3/30/2013 17:11 | PIC | Sr90Y13 |
| Y1 | 6B | 3 | 0 | 9650 | 3/30/2013 17:07 | 3/30/2013 17:10 | PIC | Sr90Y13 |
| Y2 | 6B | 3 | 0 | 9600 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y3 | 6B | 3 | 0 | 9488 | 3/30/2013 16:50 | 3/30/2013 16:53 | PIC | Sr90Y13 |
| Y4 | 6B | 3 | 0 | 9316 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y5 | 6B | 3 | 0 | 9565 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y6 | 6B | 3 | 0 | 8925 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y7 | 6B | 3 | 0 | 9759 | 3/30/2013 17:23 | 3/30/2013 17:26 | PIC | Sr90Y13 |
| Y8 | 6B | 3 | 0 | 9976 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y1 | 6C | 3 | 0 | 11087 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y2 | 6C | 3 | 2 | 10791 | 3/30/2013 17:07 | 3/30/2013 17:10 | PIC | Sr90Y13 |
| Y3 | 6C | 3 | 3 | 10739 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y4 | 6C | 3 | 2 | 11188 | 3/30/2013 16:50 | 3/30/2013 16:53 | PIC | Sr90Y13 |
| Y5 | 6C | 3 | 1 | 10825 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y6 | 6C | 3 | 3 | 9783 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y7 | 6C | 3 | 1 | 11152 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y8 | 6C | 3 | 0 | 11124 | 3/30/2013 17:23 | 3/30/2013 17:26 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y1 | 6D | 3 | 15 | 9649 | 3/30/2013 17:23 | 3/30/2013 17:26 | PIC | Sr90Y13 |
| Y2 | 6D | 3 | 12 | 9827 | 3/30/2013 17:15 | 3/30/2013 17:18 | PIC | Sr90Y13 |
| Y3 | 6D | 3 | 14 | 9547 | 3/30/2013 17:07 | 3/30/2013 17:10 | PIC | Sr90Y13 |
| Y4 | 6D | 3 | 20 | 9754 | 3/30/2013 16:59 | 3/30/2013 17:02 | PIC | Sr90Y13 |
| Y5 | 6D | 3 | 19 | 9554 | 3/30/2013 16:50 | 3/30/2013 16:53 | PIC | Sr90Y13 |
| Y6 | 6D | 3 | 6 | 8807 | 3/30/2013 16:42 | 3/30/2013 16:45 | PIC | Sr90Y13 |
| Y7 | 6D | 3 | 17 | 9897 | 3/30/2013 16:34 | 3/30/2013 16:37 | PIC | Sr90Y13 |
| Y8 | 6D | 3 | 20 | 10375 | 3/30/2013 16:26 | 3/30/2013 16:29 | PIC | Sr90Y13 |
| Y1 | 7A | 3 | 54 | 11560 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y2 | 7A | 3 | 51 | 11626 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y3 | 7A | 3 | 43 | 11273 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y4 | 7A | 3 | 61 | 11725 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y5 | 7A | 3 | 53 | 11401 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y6 | 7A | 3 | 50 | 10164 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y7 | 7A | 3 | 43 | 11939 | 3/30/2013 16:47 | 3/30/2013 16:50 | PIC | Sr90Y13 |
| Y8 | 7A | 3 | 53 | 11566 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y1 | 7B | 3 | 58 | 11760 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y2 | 7B | 3 | 58 | 11681 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y3 | 7B | 3 | 79 | 11371 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y4 | 7B | 3 | 53 | 11697 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y5 | 7B | 3 | 65 | 11369 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y6 | 7B | 3 | 52 | 10315 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y7 | 7B | 3 | 65 | 11866 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y8 | 7B | 3 | 45 | 11568 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y1 | 7C | 3 | 20 | 11611 | 3/30/2013 16:47 | 3/30/2013 16:50 | PIC | Sr90Y13 |
| Y2 | 7C | 3 | 22 | 11340 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y3 | 7C | 3 | 33 | 11305 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y4 | 7C | 3 | 26 | 11354 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y5 | 7C | 3 | 18 | 11424 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y6 | 7C | 3 | 17 | 10295 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y7 | 7C | 3 | 28 | 11620 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y8 | 7C | 3 | 19 | 11421 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y1 | 7D | 3 | 52 | 11688 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y2 | 7D | 3 | 42 | 11681 | 3/30/2013 16:47 | 3/30/2013 16:50 | PIC | Sr90Y13 |
| Y3 | 7D | 3 | 28 | 11287 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y4 | 7D | 3 | 39 | 11695 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y5 | 7D | 3 | 27 | 11332 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y6 | 7D | 3 | 31 | 10278 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y7 | 7D | 3 | 27 | 11645 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y8 | 7D | 3 | 31 | 11537 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y1 | 8A | 3 | 1 | 11089 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y2 | 8A | 3 | 4 | 11355 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y3 | 8A | 3 | 0 | 11121 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y4 | 8A | 3 | 5 | 11478 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y5 | 8A | 3 | 0 | 11256 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y6 | 8A | 3 | 3 | 10002 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y7 | 8A | 3 | 1 | 11411 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y8 | 8A | 3 | 3 | 11544 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y1 | 8B | 3 | 0 | 11077 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y2 | 8B | 3 | 0 | 11109 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y3 | 8B | 3 | 0 | 11001 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y4 | 8B | 3 | 0 | 11116 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y5 | 8B | 3 | 1 | 10804 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y6 | 8B | 3 | 0 | 9694 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y7 | 8B | 3 | 0 | 11250 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y8 | 8B | 3 | 0 | 11031 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y1 | 8C | 3 | 6 | 11611 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y2 | 8C | 3 | 4 | 11556 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y3 | 8C | 3 | 7 | 11315 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y4 | 8C | 3 | 6 | 11562 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y5 | 8C | 3 | 4 | 11426 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y6 | 8C | 3 | 12 | 10288 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y7 | 8C | 3 | 9 | 11706 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y8 | 8C | 3 | 3 | 11532 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y1 | 8D | 3 | 12 | 11532 | 3/30/2013 17:27 | 3/30/2013 17:30 | PIC | Sr90Y13 |
| Y2 | 8D | 3 | 10 | 11838 | 3/30/2013 17:19 | 3/30/2013 17:22 | PIC | Sr90Y13 |
| Y3 | 8D | 3 | 11 | 11402 | 3/30/2013 17:11 | 3/30/2013 17:14 | PIC | Sr90Y13 |
| Y4 | 8D | 3 | 20 | 11541 | 3/30/2013 17:03 | 3/30/2013 17:06 | PIC | Sr90Y13 |
| Y5 | 8D | 3 | 15 | 11561 | 3/30/2013 16:55 | 3/30/2013 16:58 | PIC | Sr90Y13 |
| Y6 | 8D | 3 | 12 | 10407 | 3/30/2013 16:46 | 3/30/2013 16:49 | PIC | Sr90Y13 |
| Y7 | 8D | 3 | 15 | 11975 | 3/30/2013 16:38 | 3/30/2013 16:41 | PIC | Sr90Y13 |
| Y8 | 8D | 3 | 12 | 11785 | 3/30/2013 16:30 | 3/30/2013 16:33 | PIC | Sr90Y13 |
| Y1 | 9A | 3 | 10 | 11659 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y2 | 9A | 3 | 15 | 11487 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y3 | 9A | 3 | 12 | 11268 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y4 | 9A | 3 | 12 | 11367 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y5 | 9A | 3 | 12 | 11199 | 3/30/2013 18:07 | 3/30/2013 18:10 | PIC | Sr90Y13 |
| Y6 | 9A | 3 | 12 | 10112 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y7 | 9A | 3 | 9 | 11654 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y8 | 9A | 3 | 9 | 11504 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y1 | 9B | 3 | 7 | 11269 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y2 | 9B | 3 | 8 | 11252 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y3 | 9B | 3 | 13 | 10930 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y4 | 9B | 3 | 8 | 11070 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y5 | 9B | 3 | 13 | 10957 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y6 | 9B | 3 | 6 | 9962 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y7 | 9B | 3 | 8 | 11504 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y8 | 9B | 3 | 7 | 11466 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y1 | 9C | 3 | 14 | 11302 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y2 | 9C | 3 | 16 | 11541 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y3 | 9C | 3 | 17 | 11133 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y4 | 9C | 3 | 21 | 11241 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y5 | 9C | 3 | 14 | 11355 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y6 | 9C | 3 | 10 | 9940 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y7 | 9C | 3 | 17 | 11315 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y8 | 9C | 3 | 20 | 11501 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y1 | 9D | 3 | 0 | 10904 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y2 | 9D | 3 | 2 | 10843 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y3 | 9D | 3 | 0 | 10806 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y4 | 9D | 3 | 0 | 11058 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y5 | 9D | 3 | 0 | 10540 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y6 | 9D | 3 | 2 | 9592 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y7 | 9D | 3 | 0 | 10852 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y8 | 9D | 3 | 0 | 11020 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y1 | 10A | 3 | 4 | 11136 | 3/30/2013 18:07 | 3/30/2013 18:10 | PIC | Sr90Y13 |
| Y2 | 10A | 3 | 4 | 11627 | 3/30/2013 17:58 | 3/30/2013 18:01 | PIC | Sr90Y13 |
| Y3 | 10A | 3 | 6 | 11376 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y4 | 10A | 3 | 9 | 11242 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y5 | 10A | 3 | 4 | 11144 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y6 | 10A | 3 | 3 | 10013 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y7 | 10A | 3 | 8 | 11308 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y8 | 10A | 3 | 6 | 11203 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y1 | 10B | 3 | 11 | 11287 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y2 | 10B | 3 | 14 | 11442 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y3 | 10B | 3 | 14 | 11205 | 3/30/2013 17:57 | 3/30/2013 18:00 | PIC | Sr90Y13 |
| Y4 | 10B | 3 | 19 | 11271 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y5 | 10B | 3 | 10 | 10906 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y6 | 10B | 3 | 11 | 10051 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y7 | 10B | 3 | 17 | 11185 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y8 | 10B | 3 | 18 | 11060 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y1 | 10C | 3 | 7 | 11164 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y2 | 10C | 3 | 10 | 11215 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y3 | 10C | 3 | 13 | 11291 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y4 | 10C | 3 | 14 | 11187 | 3/30/2013 17:57 | 3/30/2013 18:00 | PIC | Sr90Y13 |
| Y5 | 10C | 3 | 17 | 11206 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y6 | 10C | 3 | 7 | 9876 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y7 | 10C | 3 | 22 | 11580 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y8 | 10C | 3 | 16 | 11286 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y1 | 10D | 3 | 6 | 11152 | 3/30/2013 18:41 | 3/30/2013 18:44 | PIC | Sr90Y13 |
| Y2 | 10D | 3 | 11 | 11354 | 3/30/2013 18:30 | 3/30/2013 18:33 | PIC | Sr90Y13 |
| Y3 | 10D | 3 | 15 | 11090 | 3/30/2013 18:17 | 3/30/2013 18:20 | PIC | Sr90Y13 |
| Y4 | 10D | 3 | 11 | 11325 | 3/30/2013 18:06 | 3/30/2013 18:09 | PIC | Sr90Y13 |
| Y5 | 10D | 3 | 9 | 11230 | 3/30/2013 17:57 | 3/30/2013 18:00 | PIC | Sr90Y13 |
| Y6 | 10D | 3 | 6 | 10120 | 3/30/2013 17:49 | 3/30/2013 17:52 | PIC | Sr90Y13 |
| Y7 | 10D | 3 | 6 | 11635 | 3/30/2013 17:40 | 3/30/2013 17:43 | PIC | Sr90Y13 |
| Y8 | 10D | 3 | 10 | 11605 | 3/30/2013 17:32 | 3/30/2013 17:35 | PIC | Sr90Y13 |
| Y1 | 11A | 3 | 1 | 9741 | 3/30/2013 18:56 | 3/30/2013 18:59 | PIC | Sr90Y13 |
| Y2 | 11A | 3 | 1 | 9916 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y3 | 11A | 3 | 0 | 9726 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |
| Y4 | 11A | 3 | 0 | 9922 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y5 | 11A | 3 | 0 | 9559 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y6 | 11A | 3 | 1 | 8701 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y7 | 11A | 3 | 1 | 9858 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y8 | 11A | 3 | 0 | 10182 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y1 | 11B | 3 | 0 | 11084 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y2 | 11B | 3 | 0 | 11264 | 3/30/2013 18:55 | 3/30/2013 18:58 | PIC | Sr90Y13 |
| Y3 | 11B | 3 | 1 | 11176 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y4 | 11B | 3 | 0 | 11078 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |

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|---|---|---|---|---|---|---|---|---|
| Y5 | 11B | 3 | 0 | 11235 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y6 | 11B | 3 | 0 | 9954 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y7 | 11B | 3 | 0 | 11315 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y8 | 11B | 3 | 0 | 11208 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y1 | 11C | 3 | 1 | 11241 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y2 | 11C | 3 | 0 | 11141 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y3 | 11C | 3 | 0 | 10818 | 3/30/2013 18:55 | 3/30/2013 18:58 | PIC | Sr90Y13 |
| Y4 | 11C | 3 | 0 | 11117 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y5 | 11C | 3 | 0 | 10902 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |
| Y6 | 11C | 3 | 0 | 9885 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y7 | 11C | 3 | 0 | 11500 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y8 | 11C | 3 | 0 | 11232 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y1 | 11D | 3 | 0 | 11225 | 3/30/2013 19:14 | 3/30/2013 19:17 | PIC | Sr90Y13 |
| Y2 | 11D | 3 | 0 | 11169 | 3/30/2013 19:17 | 3/30/2013 19:20 | PIC | Sr90Y13 |
| Y3 | 11D | 3 | 0 | 11003 | 3/30/2013 19:21 | 3/30/2013 19:24 | PIC | Sr90Y13 |
| Y4 | 11D | 3 | 1 | 11450 | 3/30/2013 18:55 | 3/30/2013 18:58 | PIC | Sr90Y13 |
| Y5 | 11D | 3 | 0 | 11115 | 3/30/2013 18:59 | 3/30/2013 19:02 | PIC | Sr90Y13 |
| Y6 | 11D | 3 | 0 | 10052 | 3/30/2013 19:03 | 3/30/2013 19:06 | PIC | Sr90Y13 |
| Y7 | 11D | 3 | 0 | 11275 | 3/30/2013 19:06 | 3/30/2013 19:09 | PIC | Sr90Y13 |
| Y8 | 11D | 3 | 0 | 11312 | 3/30/2013 19:10 | 3/30/2013 19:13 | PIC | Sr90Y13 |
| Y1 | 13A | 3 | 0 | 11235 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y2 | 13A | 3 | 1 | 11208 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y3 | 13A | 3 | 0 | 11169 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y4 | 13A | 3 | 0 | 11398 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y5 | 13A | 3 | 0 | 10869 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y6 | 13A | 3 | 2 | 9992 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y7 | 13A | 3 | 0 | 11451 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y8 | 13A | 3 | 0 | 11458 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y1 | 13B | 3 | 0 | 11616 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y2 | 13B | 3 | 0 | 11784 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y3 | 13B | 3 | 1 | 11414 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y4 | 13B | 3 | 0 | 11721 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y5 | 13B | 3 | 0 | 11341 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y6 | 13B | 3 | 0 | 10020 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y7 | 13B | 3 | 3 | 11591 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y8 | 13B | 3 | 0 | 11611 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y1 | 13C | 3 | 0 | 10571 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y2 | 13C | 3 | 0 | 10471 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y3 | 13C | 3 | 0 | 10006 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y4 | 13C | 3 | 0 | 10545 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y5 | 13C | 3 | 0 | 10119 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y6 | 13C | 3 | 0 | 9281 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y7 | 13C | 3 | 0 | 10583 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y8 | 13C | 3 | 0 | 10593 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y1 | 13D | 3 | 0 | 11247 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y2 | 13D | 3 | 0 | 11383 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y3 | 13D | 3 | 0 | 11166 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y4 | 13D | 3 | 1 | 11081 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y5 | 13D | 3 | 1 | 10857 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y6 | 13D | 3 | 0 | 9916 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y7 | 13D | 3 | 2 | 11472 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y8 | 13D | 3 | 0 | 11052 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y1 | 14A | 3 | 0 | 10482 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y2 | 14A | 3 | 0 | 10501 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y3 | 14A | 3 | 0 | 10445 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y4 | 14A | 3 | 0 | 10843 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y5 | 14A | 3 | 0 | 10518 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y6 | 14A | 3 | 0 | 9358 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y7 | 14A | 3 | 0 | 10784 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y8 | 14A | 3 | 0 | 10628 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y1 | 14B | 3 | 2 | 11086 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y2 | 14B | 3 | 0 | 11179 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y3 | 14B | 3 | 0 | 10895 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y4 | 14B | 3 | 0 | 11247 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y5 | 14B | 3 | 0 | 10884 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y6 | 14B | 3 | 1 | 10007 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y7 | 14B | 3 | 0 | 11217 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y8 | 14B | 3 | 1 | 10856 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y1 | 14C | 3 | 0 | 11122 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y2 | 14C | 3 | 0 | 11162 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y3 | 14C | 3 | 0 | 11091 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y4 | 14C | 3 | 0 | 11118 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y5 | 14C | 3 | 0 | 11059 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y6 | 14C | 3 | 2 | 9894 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y7 | 14C | 3 | 1 | 11536 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |
| Y8 | 14C | 3 | 0 | 11305 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y1 | 14D | 3 | 0 | 9871 | 3/30/2013 18:52 | 3/30/2013 18:55 | PIC | Sr90Y13 |
| Y2 | 14D | 3 | 0 | 10046 | 3/30/2013 18:42 | 3/30/2013 18:45 | PIC | Sr90Y13 |
| Y3 | 14D | 3 | 0 | 9868 | 3/30/2013 18:32 | 3/30/2013 18:35 | PIC | Sr90Y13 |
| Y4 | 14D | 3 | 0 | 10294 | 3/30/2013 18:16 | 3/30/2013 18:19 | PIC | Sr90Y13 |
| Y5 | 14D | 3 | 1 | 9934 | 3/30/2013 18:08 | 3/30/2013 18:11 | PIC | Sr90Y13 |
| Y6 | 14D | 3 | 0 | 8873 | 3/30/2013 17:59 | 3/30/2013 18:02 | PIC | Sr90Y13 |
| Y7 | 14D | 3 | 0 | 10119 | 3/30/2013 17:50 | 3/30/2013 17:53 | PIC | Sr90Y13 |
| Y8 | 14D | 3 | 0 | 9971 | 3/30/2013 17:42 | 3/30/2013 17:45 | PIC | Sr90Y13 |

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# Strontium-89 & 90 Liquid

Filename : SR8990.XLS
File type : Excel
Version # : 1.3.9

Batch : 1082959
Analyst : AF1
Prep Date : 2/14/2014
Sr-89 Method Uncertainty : 0.0829
Sr-90 Method Uncertainty : 0.0821

Geometry: Tuffryn Filter

Sr Carrier S/N : 2046474
Carrier Exp Date : 12/5/2014
Carrier Volume Added: 2.00
Carrier Weight (mg/ml): 16.40
Carrier Weight StDev.: 0.16

Y Carrier S/N : 2073992
Carrier Exp Date : 5/14/2014
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 33.18
Carrier Weight StDev.: 0.29

Procedure Code : GFCGANBL
Parmname1 : Strontium-89
Parmname2 : Strontium-90
Required MDA Sr-89 : 1 pCi/L
Required MDA Sr-90 : 1 pCi/L
Sr-89 Abundance : 1.00
Sr-90 Abundance : 1.00
Halflife of Sr-89 : 50.53 days
Halflife of Sr-90 : 28.9 years
Halflife of Y-90 : 64.053 hours

| Sample Characteristics | | | | | Carrier Calculations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Net Weight (mg) | | Net Weight StDev. (mg) | | Carrier Aliquot (mL) | | Carrier Aliquot StDev. (mL) | |
| Pos. | Sample ID | Sample Aliquot L | Sample Aliquot StDev. L | Sample Date/Time | Sr | Y | Sr | Y | Sr | Y | Sr | Y |
| 1 | 1202347886.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 2 | 1202347887.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 3 | 1202347888.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 4 | 1202347889.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 5 | 1202347890.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 6 | 1202347891.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 7 | 1202347892.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 8 | 1202347893.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 9 | 1202347894.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 10 | 1202347895.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 11 | 1202347896.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 12 | 1202347897.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 13 | 1202347898.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 14 | 1202347899.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 15 | 1202347900.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 16 | 1202347901.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 17 | 1202347902.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 18 | 1202347903.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 19 | 1202347904.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 20 | 1202347905.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 21 | 1202347906.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 22 | 1202347907.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 23 | 1202347908.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 24 | ~~1202347909.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~10.5~~ | ~~16.0~~ | ~~0.052459~~ | ~~0.076098~~ | ~~2.1~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| 25 | 1202347910.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 26 | 1202347911.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 27 | 1202347912.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 28 | 1202347913.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 29 | 1202347914.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 30 | 1202347915.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 31 | 1202347916.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 32 | 1202347917.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |
| 33 | 1202347918.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 34 | 1202347919.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 35 | 1202347920.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 36 | 1202347921.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 37 | 1202347922.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 38 | 1202347923.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 39 | 1202347924.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 40 | 1202347925.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |



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**Pipet, 0.1 ml Stdev : +/-** 0.000200 ml
**Pipet, 0.5 ml Stdev : +/-** 0.001000 ml
**Pipet, 1 ml Stdev : +/-** 0.002000 ml
**Pipet, 5 ml Stdev : +/-** 0.010000 ml

**Analytical SOP:** GL-RAD-A-001
**Instrument SOP:** GL-RAD-I-016

| 1st Count Raw Data | | | | | | | 1st Count Calibration Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Counting | Gross Counts | | | Count | | | | Detector Efficiency (cpm/dpm) | | Detector Efficiency | | | Weekly Bkg Count | Weekly Bkg Count |
| Pos. | Detector ID | Time (min.) | Alpha | Beta | Gross Beta CPM | Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Sr-89 | Sr-90 | Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Start Date/Time | Time (min.) |
| 1 | 1A | 15 | 10 | 5104 | 340.211 | 2/15/2014 14:51 | PIC | 3/1/2013 | 2/28/2014 | 0.5158 | 0.4082 | 0.00738 | 0.08357 | 0.640 | 2/8/2014 18:42 | 500 |
| 2 | 1B | 15 | 24 | 5583 | 372.049 | 2/15/2014 14:51 | PIC | 3/1/2013 | 2/28/2014 | 0.5138 | 0.4024 | 0.00711 | 0.09452 | 0.542 | 2/8/2014 18:42 | 500 |
| 3 | 1C | 15 | 123 | 5897 | 392.833 | 2/15/2014 14:51 | PIC | 3/1/2013 | 2/28/2014 | 0.5101 | 0.4036 | 0.00847 | 0.03664 | 0.488 | 2/8/2014 18:42 | 500 |
| 4 | 1D | 15 | 86 | 5453 | 363.268 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.5062 | 0.3926 | 0.00692 | 0.04635 | 0.566 | 2/8/2014 18:42 | 500 |
| 5 | 2A | 15 | 2 | 4218 | 281.173 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4857 | 0.3838 | 0.01914 | 0.20325 | 0.362 | 2/8/2014 18:42 | 500 |
| 6 | 2B | 15 | 1 | 3707 | 247.116 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4648 | 0.3804 | 0.02111 | 0.26439 | 1.410 | 2/8/2014 18:42 | 500 |
| 7 | 2C | 15 | 5 | 2564 | 170.907 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4860 | 0.3835 | 0.01274 | 0.07815 | 0.434 | 2/8/2014 18:42 | 500 |
| 8 | 2D | 15 | 3 | 2004 | 133.551 | 2/15/2014 14:52 | PIC | 3/1/2013 | 2/28/2014 | 0.4854 | 0.3804 | 0.00745 | 0.24410 | 1.518 | 2/8/2014 18:42 | 500 |
| 9 | 3A | 15 | 127 | 5014 | 333.882 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.5153 | 0.3951 | 0.01401 | 0.04546 | 1.412 | 2/8/2014 18:42 | 500 |
| 10 | 3B | 15 | 97 | 5701 | 379.878 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.5108 | 0.3877 | 0.01614 | 0.02910 | 0.610 | 2/8/2014 18:42 | 500 |
| 11 | 3C | 15 | 82 | 5706 | 380.129 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.5071 | 0.3981 | 0.00988 | 0.04957 | 0.702 | 2/8/2014 18:42 | 500 |
| 12 | 3D | 15 | 60 | 5332 | 355.228 | 2/15/2014 15:07 | PIC | 3/1/2013 | 2/28/2014 | 0.4963 | 0.3866 | 0.02297 | 0.05968 | 0.478 | 2/8/2014 18:42 | 500 |
| 13 | 4A | 15 | 62 | 4309 | 287.080 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4922 | 0.3915 | 0.01123 | 0.04520 | 0.978 | 2/8/2014 18:42 | 500 |
| 14 | 4B | 15 | 4 | 3768 | 251.143 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4910 | 0.3895 | 0.01519 | 0.21231 | 1.680 | 2/8/2014 18:42 | 500 |
| 15 | 4C | 15 | 28 | 2625 | 174.883 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4980 | 0.3896 | 0.00889 | 0.06258 | 0.566 | 2/8/2014 18:42 | 500 |
| 16 | 4D | 15 | 65 | 2050 | 136.509 | 2/15/2014 15:27 | PIC | 3/1/2013 | 2/28/2014 | 0.4908 | 0.3802 | 0.00773 | 0.03636 | 1.640 | 2/8/2014 18:42 | 500 |
| 17 | 5A | 15 | 17 | 5215 | 347.617 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5277 | 0.4186 | 0.00851 | 0.04340 | 0.406 | 2/8/2014 18:43 | 500 |
| 18 | 5B | 15 | 34 | 5889 | 392.500 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5224 | 0.4088 | 0.00426 | 0.04404 | 0.634 | 2/8/2014 18:43 | 500 |
| 19 | 5C | 15 | 37 | 5870 | 391.196 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5134 | 0.4057 | 0.00657 | 0.05568 | 0.602 | 2/8/2014 18:43 | 500 |
| 20 | 5D | 15 | 37 | 5637 | 375.702 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5056 | 0.3950 | 0.00925 | 0.03986 | 0.618 | 2/8/2014 18:42 | 500 |
| 21 | 6A | 15 | 22 | 4417 | 294.385 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4802 | 0.3725 | 0.02228 | 0.05539 | 1.296 | 2/8/2014 18:42 | 500 |
| 22 | 6B | 15 | 47 | 3783 | 252.071 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4960 | 0.3578 | 0.00851 | 0.04114 | 0.612 | 2/8/2014 18:42 | 500 |
| 23 | 6C | 15 | 1 | 2590 | 172.664 | 2/15/2014 15:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4895 | 0.3881 | 0.01970 | 0.04464 | 0.886 | 2/8/2014 18:42 | 500 |
| ~~24~~ | ~~6D~~ | ~~15~~ | ~~0~~ | ~~0~~ | ~~0.000~~ | ~~2/15/2014 15:23~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.2693~~ | ~~0.3293~~ | ~~0.01311~~ | ~~0.00000~~ | ~~0.000~~ | ~~12:00:00 AM~~ | 0 |
| 25 | 7A | 15 | 9 | 5352 | 356.767 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5254 | 0.4202 | 0.00594 | 0.05453 | 0.530 | 2/15/2014 16:09 | 500 |
| 26 | 7B | 15 | 4 | 5898 | 393.187 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5190 | 0.4096 | 0.00627 | 0.04721 | 0.656 | 2/15/2014 16:09 | 500 |
| 27 | 7C | 15 | 4 | 6053 | 403.512 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5084 | 0.4042 | 0.00790 | 0.07920 | 0.362 | 2/15/2014 16:09 | 500 |
| 28 | 7D | 15 | 2 | 5843 | 389.525 | 2/16/2014 8:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5067 | 0.3973 | 0.01113 | 0.06531 | 0.616 | 2/15/2014 16:09 | 500 |
| 29 | 8A | 15 | 4 | 4531 | 301.991 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.4953 | 0.3855 | 0.01579 | 0.28356 | 0.820 | 2/15/2014 16:09 | 500 |
| 30 | 8B | 15 | 0 | 4022 | 268.133 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.4857 | 0.3823 | 0.02148 | 0.29967 | 0.694 | 2/15/2014 16:09 | 500 |
| 31 | 8C | 15 | 2 | 2590 | 172.626 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.4993 | 0.3928 | 0.01955 | 0.30761 | 0.450 | 2/15/2014 16:09 | 500 |
| 32 | 8D | 15 | 8 | 2127 | 141.761 | 2/16/2014 8:29 | PIC | 3/1/2013 | 2/28/2014 | 0.5073 | 0.3936 | 0.00609 | 0.07307 | 0.954 | 2/15/2014 16:09 | 500 |
| 33 | 9A | 15 | 9 | 5371 | 357.871 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5216 | 0.4275 | 0.00758 | 0.32569 | 0.676 | 2/15/2014 16:09 | 500 |
| 34 | 9B | 15 | 10 | 5928 | 395.160 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5037 | 0.4026 | 0.00754 | 0.05980 | 0.948 | 2/15/2014 16:09 | 500 |
| 35 | 9C | 15 | 17 | 6174 | 411.527 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5029 | 0.4050 | 0.00584 | 0.06471 | 0.600 | 2/15/2014 16:09 | 500 |
| 36 | 9D | 15 | 21 | 5971 | 397.996 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4814 | 0.3951 | 0.02610 | 0.05015 | 0.608 | 2/15/2014 16:09 | 500 |
| 37 | 10A | 15 | 1 | 4544 | 302.924 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.5022 | 0.3939 | 0.00651 | 0.13452 | 0.582 | 2/15/2014 16:09 | 500 |
| 38 | 10B | 15 | 0 | 3861 | 257.400 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4970 | 0.3859 | 0.00652 | 0.07336 | 0.398 | 2/15/2014 16:09 | 500 |
| 39 | 10C | 15 | 3 | 2820 | 187.984 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4984 | 0.3874 | 0.00638 | 0.07912 | 0.612 | 2/15/2014 16:09 | 500 |
| 40 | 10D | 15 | 8 | 2184 | 145.549 | 2/16/2014 8:46 | PIC | 3/1/2013 | 2/28/2014 | 0.4973 | 0.3846 | 0.00557 | 0.09654 | 0.662 | 2/15/2014 16:09 | 500 |

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| 2nd Count Raw Data | | | | | | | 2nd Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency Y-90 (cpm/dpm) | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | 1A | 15 | 3 | 1321 | 88.050 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5353 | 0.00738 | 0.08357 | 0.460 | 2/22/2014 17:15 | 500 |
| 2 | 1B | 15 | 3 | 1427 | 95.114 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5335 | 0.00711 | 0.09452 | 0.552 | 2/22/2014 17:15 | 500 |
| 3 | 1C | 15 | 19 | 1518 | 101.154 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5362 | 0.00847 | 0.03664 | 0.574 | 2/22/2014 17:15 | 500 |
| 4 | 1D | 15 | 11 | 1364 | 90.899 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5309 | 0.00692 | 0.04635 | 0.516 | 2/22/2014 17:15 | 500 |
| 5 | 2A | 15 | 1 | 1111 | 74.053 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5118 | 0.01914 | 0.20325 | 0.400 | 2/22/2014 17:15 | 500 |
| 6 | 2B | 15 | 8 | 939 | 62.459 | 2/27/2014 4:38 | PIC | 3/1/2013 | 2/28/2014 | 0.5160 | 0.02111 | 0.26439 | 1.516 | 2/22/2014 17:15 | 500 |
| 7 | 2C | 15 | 2 | 677 | 45.123 | 2/27/2014 4:39 | PIC | 3/1/2013 | 2/28/2014 | 0.5181 | 0.01274 | 0.07815 | 0.342 | 2/22/2014 17:15 | 500 |
| 8 | 2D | 15 | 1 | 535 | 35.650 | 2/27/2014 4:39 | PIC | 3/1/2013 | 2/28/2014 | 0.5199 | 0.00745 | 0.24410 | 1.346 | 2/22/2014 17:15 | 500 |
| 9 | 3A | 15 | 21 | 1287 | 85.736 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5308 | 0.01401 | 0.04546 | 2.460 | 2/22/2014 17:15 | 500 |
| 10 | 3B | 15 | 9 | 1421 | 94.716 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5306 | 0.01614 | 0.02910 | 0.506 | 2/22/2014 17:15 | 500 |
| 11 | 3C | 15 | 8 | 1490 | 99.307 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5319 | 0.00988 | 0.04957 | 0.664 | 2/22/2014 17:15 | 500 |
| 12 | 3D | 15 | 4 | 1424 | 94.917 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5210 | 0.02297 | 0.05968 | 0.412 | 2/22/2014 17:15 | 500 |
| 13 | 4A | 15 | 2 | 1208 | 80.527 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5300 | 0.01123 | 0.04520 | 0.810 | 2/22/2014 17:15 | 500 |
| 14 | 4B | 15 | 1 | 869 | 57.919 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5348 | 0.01519 | 0.21231 | 1.834 | 2/22/2014 17:15 | 500 |
| 15 | 4C | 15 | 2 | 682 | 45.458 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5373 | 0.00889 | 0.06258 | 0.566 | 2/22/2014 17:15 | 500 |
| 16 | 4D | 15 | 14 | 563 | 37.499 | 2/27/2014 4:54 | PIC | 3/1/2013 | 2/28/2014 | 0.5316 | 0.00773 | 0.03636 | 1.624 | 2/22/2014 17:15 | 500 |
| 17 | 5A | 15 | 1 | 1301 | 86.730 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5372 | 0.00851 | 0.04340 | 0.482 | 2/22/2014 17:15 | 500 |
| 18 | 5B | 15 | 6 | 1417 | 94.449 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5379 | 0.00426 | 0.04404 | 0.612 | 2/22/2014 17:15 | 500 |
| 19 | 5C | 15 | 5 | 1493 | 99.515 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5391 | 0.00657 | 0.05568 | 0.474 | 2/22/2014 17:15 | 500 |
| 20 | 5D | 15 | 11 | 1486 | 99.037 | 2/27/2014 5:12 | PIC | 3/1/2013 | 2/28/2014 | 0.5383 | 0.00925 | 0.03986 | 0.876 | 2/22/2014 17:15 | 500 |
| 21 | 6A | 15 | 7 | 1100 | 73.307 | 2/27/2014 5:17 | PIC | 3/1/2013 | 2/28/2014 | 0.4788 | 0.02228 | 0.05539 | 1.448 | 2/22/2014 17:15 | 500 |
| 22 | 6B | 15 | 8 | 910 | 60.645 | 2/27/2014 5:17 | PIC | 3/1/2013 | 2/28/2014 | 0.4489 | 0.00851 | 0.04114 | 0.634 | 2/22/2014 17:15 | 500 |
| 23 | 6C | 15 | 1 | 679 | 45.264 | 2/27/2014 5:17 | PIC | 3/1/2013 | 2/28/2014 | 0.5101 | 0.01970 | 0.04464 | 1.042 | 2/22/2014 17:15 | 500 |
| ~~24~~ | ~~6D~~ | ~~15~~ | ~~0~~ | ~~0~~ | ~~0.000~~ | ~~2/27/2014 5:17~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.4655~~ | ~~0.01311~~ | ~~0.00000~~ | FAIL | ~~12:00:00 AM~~ | 0 |
| 25 | 7A | 15 | 6 | 1230 | 81.978 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5374 | 0.00594 | 0.05453 | 0.588 | 2/22/2014 17:15 | 500 |
| 26 | 7B | 15 | 2 | 1365 | 90.994 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5395 | 0.00627 | 0.04721 | 0.592 | 2/22/2014 17:15 | 500 |
| 27 | 7C | 15 | 2 | 1504 | 100.256 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5321 | 0.00790 | 0.07920 | 0.344 | 2/22/2014 17:15 | 500 |
| 28 | 7D | 15 | 3 | 1383 | 92.187 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5367 | 0.01113 | 0.06531 | 0.398 | 2/22/2014 17:15 | 500 |
| 29 | 8A | 15 | 2 | 1096 | 73.029 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5255 | 0.01579 | 0.28356 | 0.600 | 2/22/2014 17:15 | 500 |
| 30 | 8B | 15 | 2 | 891 | 59.360 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5128 | 0.02148 | 0.29967 | 0.450 | 2/22/2014 17:15 | 500 |
| 31 | 8C | 15 | 1 | 582 | 38.779 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5358 | 0.01955 | 0.30761 | 0.468 | 2/22/2014 17:15 | 500 |
| 32 | 8D | 15 | 2 | 551 | 36.724 | 2/27/2014 5:34 | PIC | 3/1/2013 | 2/28/2014 | 0.5420 | 0.00609 | 0.07307 | 1.088 | 2/22/2014 17:15 | 500 |
| 33 | 9A | 15 | 8 | 1336 | 88.893 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5377 | 0.00758 | 0.32569 | 0.666 | 2/22/2014 17:15 | 500 |
| 34 | 9B | 15 | 2 | 1397 | 93.125 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5267 | 0.00754 | 0.05980 | 0.594 | 2/22/2014 17:15 | 500 |
| 35 | 9C | 15 | 3 | 1539 | 102.587 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5322 | 0.00584 | 0.06471 | 0.618 | 2/22/2014 17:15 | 500 |
| 36 | 9D | 15 | 7 | 1467 | 97.777 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5101 | 0.02610 | 0.05015 | 0.572 | 2/22/2014 17:15 | 500 |
| 37 | 10A | 15 | 1 | 1106 | 73.724 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5305 | 0.00651 | 0.13452 | 0.462 | 2/22/2014 17:15 | 500 |
| 38 | 10B | 15 | 3 | 842 | 56.119 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5268 | 0.00652 | 0.07336 | 0.454 | 2/22/2014 17:15 | 500 |
| 39 | 10C | 15 | 0 | 649 | 43.267 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5291 | 0.00638 | 0.07912 | 0.504 | 2/22/2014 17:15 | 500 |
| 40 | 10D | 15 | 2 | 580 | 38.654 | 2/27/2014 5:50 | PIC | 3/1/2013 | 2/28/2014 | 0.5333 | 0.00557 | 0.09654 | 0.528 | 2/22/2014 17:15 | 500 |

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**Correction Factors**

| Pos. | Separation Date/Time Strontium | Separation Date/Time Yttrium | Yttrium Ingrowth (Sr-89 calc) | Yttrium Ingrowth (Sr-90 calc) | Yttrium Decay | Decay from Sample Date Sr-89 | Decay from Sample Date Sr-90 | Net Count Rate Y-90 | Net Count Rate Sr-90 | Gross CPM Sr-89 | Calculated Sample Recovery % Sr | Calculated Sample Recovery % Y | Sample Recovery % Error Sr | Sample Recovery % Error Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0370 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 4.8684 | 88.2034 | 247.139121 | 85.4% | 97.0% | 1.68% | 1.12% |
| 2 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 4.0906 | 91.3272 | 276.630926 | 110% | 100% | 1.33% | 1.12% |
| 3 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 5.0556 | 103.1656 | 284.611671 | 94.5% | 94.0% | 1.25% | 1.12% |
| 4 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8281 | 0.9780 | 0.9999 | 5.1056 | 80.7418 | 277.420138 | 84.1% | 106% | 1.25% | 1.12% |
| 5 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.3449 | 69.0777 | 206.750322 | 65.5% | 102% | 1.22% | 1.12% |
| 6 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0371 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.1150 | 58.6012 | 183.39947 | 56.7% | 98.3% | 1.23% | 1.12% |
| 7 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0372 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.4660 | 44.3262 | 121.115078 | 39.0% | 95.8% | 1.21% | 1.12% |
| 8 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0372 | 0.9424 | 0.8280 | 0.9780 | 0.9999 | 5.3640 | 33.3555 | 94.8316603 | 30.5% | 96.4% | 1.20% | 1.12% |
| 9 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 4.9946 | 82.0819 | 246.805305 | 85.4% | 97.0% | 1.68% | 1.12% |
| 10 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 4.3947 | 88.4109 | 287.072927 | 110% | 100% | 1.33% | 1.12% |
| 11 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 5.3436 | 100.9022 | 273.863259 | 94.5% | 94.0% | 1.25% | 1.12% |
| 12 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0398 | 0.9424 | 0.8257 | 0.9778 | 0.9999 | 5.7506 | 84.9505 | 264.526914 | 84.1% | 106% | 1.25% | 1.12% |
| 13 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 6.7625 | 73.8554 | 206.461915 | 65.5% | 102% | 1.22% | 1.12% |
| 14 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 5.4992 | 53.4323 | 192.211899 | 56.7% | 98.3% | 1.23% | 1.12% |
| 15 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 6.3962 | 43.6501 | 124.836829 | 39.0% | 95.8% | 1.21% | 1.12% |
| 16 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0433 | 0.9424 | 0.8257 | 0.9776 | 0.9999 | 6.5440 | 34.1862 | 95.7788528 | 30.5% | 96.4% | 1.20% | 1.12% |
| 17 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 5.5445 | 89.2900 | 252.782978 | 85.4% | 97.0% | 1.68% | 1.12% |
| 18 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 4.6919 | 91.8976 | 295.910697 | 110% | 100% | 1.33% | 1.12% |
| 19 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 5.7502 | 102.2128 | 283.233019 | 94.5% | 94.0% | 1.25% | 1.12% |
| 20 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8230 | 0.9777 | 0.9999 | 6.4018 | 87.5555 | 281.744368 | 84.1% | 106% | 1.25% | 1.12% |
| 21 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8223 | 0.9777 | 0.9999 | 6.0292 | 70.4143 | 217.941918 | 65.5% | 102% | 1.22% | 1.12% |
| 22 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8223 | 0.9777 | 0.9999 | 5.8203 | 62.8391 | 183.411772 | 56.7% | 98.3% | 1.23% | 1.12% |
| 23 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.0426 | 0.9424 | 0.8222 | 0.9777 | 0.9999 | 6.2330 | 45.3031 | 121.127575 | 39.0% | 95.8% | 1.21% | 1.12% |
| ~~24~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.0426~~ | ~~0.9424~~ | ~~0.8222~~ | ~~0.9777~~ | ~~0.9999~~ | #VALUE! | #VALUE! | #VALUE! | ~~30.5%~~ | ~~96.4%~~ | ~~1.20%~~ | ~~1.12%~~ |
| 25 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2041 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 25.1972 | 84.9041 | 246.665958 | 85.4% | 97.0% | 1.68% | 1.12% |
| 26 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2042 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 21.7700 | 88.7856 | 282.631812 | 110% | 100% | 1.33% | 1.12% |
| 27 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2042 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 27.9432 | 104.4786 | 271.090383 | 94.5% | 94.0% | 1.25% | 1.12% |
| 28 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2042 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 28.8365 | 82.9169 | 277.771264 | 84.1% | 106% | 1.25% | 1.12% |
| 29 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 29.2240 | 67.1193 | 205.647716 | 65.5% | 102% | 1.22% | 1.12% |
| 30 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 27.4725 | 57.8638 | 182.797097 | 56.7% | 98.3% | 1.23% | 1.12% |
| 31 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 25.9670 | 37.9386 | 108.720078 | 39.0% | 95.8% | 1.21% | 1.12% |
| 32 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2043 | 0.9424 | 0.8198 | 0.9682 | 0.9998 | 30.9205 | 34.7373 | 76.103306 | 30.5% | 96.4% | 1.20% | 1.12% |
| 33 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 27.7440 | 93.8385 | 236.288741 | 85.4% | 97.0% | 1.68% | 1.12% |
| 34 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 22.6315 | 91.7799 | 280.748787 | 110% | 100% | 1.33% | 1.12% |
| 35 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 28.9623 | 107.1372 | 275.427172 | 94.5% | 94.0% | 1.25% | 1.12% |
| 36 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 31.0100 | 92.1444 | 274.842134 | 84.1% | 106% | 1.25% | 1.12% |
| 37 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 30.0025 | 68.9189 | 204.002987 | 65.5% | 102% | 1.22% | 1.12% |
| 38 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 26.3500 | 53.8912 | 177.158783 | 56.7% | 98.3% | 1.23% | 1.12% |
| 39 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 29.4144 | 42.4178 | 116.151967 | 39.0% | 95.8% | 1.21% | 1.12% |
| 40 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2067 | 0.9424 | 0.8173 | 0.9680 | 0.9998 | 33.5679 | 37.0139 | 74.9666967 | 30.5% | 96.4% | 1.20% | 1.12% |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-89 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-89 LCS S/N :** 1680-A
**LCS Exp Date :** 3/24/2014
**LCS Activity (dpm/ml):** 2849.70
**LCS Volume Added:** 0.20
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-89 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.5547 | 1.8037 | 1 | 4.6534 | 1289.2558 | 2.46% | 246.4991 | 4.0592 | 41.6123 | 220.7315 | | LCS | | | 1283.6485 | 100.4% |
| 2 | 1.8356 | 1.2959 | 1 | 3.4086 | 1127.4500 | 2.17% | 276.0889 | 4.2945 | 34.3734 | 191.0559 | | LCS | | | 1283.6485 | 87.8% |
| 3 | 2.0375 | 1.4385 | 1 | 3.8324 | 1357.2562 | 2.15% | 284.1237 | 4.3560 | 40.7852 | 230.2264 | | LCS | | | 1283.6485 | 105.7% |
| 4 | 2.4837 | 1.7535 | 1 | 4.5884 | 1496.9580 | 2.11% | 276.8541 | 4.3007 | 45.5776 | 253.1659 | | LCS | | | 1283.6485 | 116.6% |
| 5 | 2.6574 | 1.8761 | 1 | 5.1990 | 1492.9767 | 2.90% | 206.3883 | 3.7127 | 52.6396 | 264.8673 | | LCS | | | 1283.6485 | 116.3% |
| 6 | 6.3343 | 4.4721 | 1 | 10.6915 | 1590.0292 | 3.11% | 181.9895 | 3.4971 | 59.8850 | 285.7860 | | LCS | | | 1283.6485 | 123.9% |
| 7 | 4.8842 | 3.4483 | 1 | 9.3251 | 1465.4049 | 2.94% | 120.6811 | 2.8417 | 67.6319 | 258.5682 | | LCS | | | 1283.6485 | 114.2% |
| 8 | 11.7071 | 8.2653 | 1 | 19.6432 | 1452.2154 | 3.04% | 93.3137 | 2.5150 | 76.7145 | 256.6145 | | LCS | | | 1283.6485 | 113.1% |
| 9 | 3.7988 | 2.6820 | 1 | 6.4112 | 1284.8885 | 2.74% | 245.3933 | 4.0567 | 41.6320 | 224.0413 | | LCS | | | 1283.6485 | 100.1% |
| 10 | 1.9593 | 1.3833 | 1 | 3.5884 | 1177.0214 | 2.59% | 286.4629 | 4.3749 | 35.2319 | 204.7869 | | LCS | | | 1283.6485 | 91.7% |
| 11 | 2.4587 | 1.7359 | 1 | 4.4330 | 1313.0009 | 2.23% | 273.1813 | 4.2732 | 40.2554 | 223.7059 | | LCS | | | 1283.6485 | 102.3% |
| 12 | 2.3284 | 1.6439 | 1 | 4.3910 | 1456.4930 | 3.06% | 264.0489 | 4.1995 | 45.4026 | 262.0776 | | LCS | | | 1283.6485 | 113.5% |
| 13 | 4.3117 | 3.0441 | 1 | 7.5164 | 1467.3415 | 2.45% | 205.4839 | 3.7103 | 51.9296 | 252.7955 | | LCS | | | 1283.6485 | 114.3% |
| 14 | 6.5481 | 4.6230 | 1 | 10.9010 | 1576.5302 | 2.71% | 190.5319 | 3.5802 | 58.0620 | 275.4183 | | LCS | | | 1283.6485 | 122.8% |
| 15 | 5.4449 | 3.8441 | 1 | 10.0590 | 1473.0553 | 2.76% | 124.2708 | 2.8851 | 67.0288 | 256.8151 | | LCS | | | 1283.6485 | 114.8% |
| 16 | 12.0388 | 8.4995 | 1 | 20.0784 | 1449.4466 | 3.04% | 94.1389 | 2.5276 | 76.2764 | 256.3172 | | LCS | | | 1283.6485 | 112.9% |
| 17 | 1.9895 | 1.4046 | 1 | 3.8320 | 1290.6260 | 2.49% | 252.3770 | 4.1052 | 41.1477 | 221.3036 | | LCS | | | 1283.6485 | 100.5% |
| 18 | 1.9532 | 1.3790 | 1 | 3.5615 | 1186.3420 | 2.05% | 295.2767 | 4.4417 | 34.9772 | 199.8033 | | LCS | | | 1283.6485 | 92.4% |
| 19 | 2.2492 | 1.5880 | 1 | 4.1256 | 1341.9241 | 2.09% | 282.6310 | 4.3455 | 40.4394 | 226.7714 | | LCS | | | 1283.6485 | 104.5% |
| 20 | 2.5990 | 1.8349 | 1 | 4.7527 | 1522.2294 | 2.19% | 281.1264 | 4.3341 | 45.9971 | 258.7562 | | LCS | | | 1283.6485 | 118.6% |
| 21 | 5.0876 | 3.5919 | 1 | 8.6476 | 1585.7306 | 3.09% | 216.6459 | 3.8121 | 54.6888 | 285.3155 | | LCS | | | 1283.6485 | 123.5% |
| 22 | 3.9123 | 2.7621 | 1 | 7.1625 | 1497.2958 | 2.43% | 182.7598 | 3.4970 | 56.1407 | 256.7697 | | LCS | | | 1283.6485 | 116.6% |
| 23 | 6.9308 | 4.8932 | 1 | 12.1983 | 1450.0789 | 3.31% | 120.2416 | 2.8420 | 67.1764 | 263.0017 | | LCS | | | 1283.6485 | 113.0% |
| 24 | #DIV/0! | #DIV/0! | 1 | #DIV/0! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | | LCS | | | 1283.6486 | #VALUE! |
| 25 | 2.3057 | 1.6278 | 1 | 4.2931 | 1276.7506 | 2.42% | 246.1360 | 4.0553 | 41.2297 | 217.9509 | | LCS | | | 1283.6485 | 99.5% |
| 26 | 2.0196 | 1.4258 | 1 | 3.6685 | 1151.5795 | 2.13% | 281.9758 | 4.3409 | 34.7471 | 194.6979 | | LCS | | | 1283.6485 | 89.7% |
| 27 | 1.7786 | 1.2557 | 1 | 3.4798 | 1310.7893 | 2.16% | 270.7284 | 4.2513 | 40.3437 | 222.3543 | | LCS | | | 1283.6485 | 102.1% |
| 28 | 2.6146 | 1.8459 | 1 | 4.7831 | 1512.1999 | 2.28% | 277.1553 | 4.3034 | 46.0208 | 258.3554 | | LCS | | | 1283.6485 | 117.8% |
| 29 | 3.9613 | 2.7967 | 1 | 7.0264 | 1467.5373 | 2.69% | 204.8277 | 3.7029 | 51.9995 | 256.6651 | | LCS | | | 1283.6485 | 114.3% |
| 30 | 4.2961 | 3.0331 | 1 | 7.7554 | 1538.0812 | 3.13% | 182.1031 | 3.4911 | 57.7939 | 276.8450 | | LCS | | | 1283.6485 | 119.8% |
| 31 | 4.8905 | 3.4527 | 1 | 9.2935 | 1292.7748 | 3.39% | 108.2701 | 2.6924 | 63.0096 | 235.2797 | | LCS | | | 1283.6485 | 100.7% |
| 32 | 8.9697 | 6.3327 | 1 | 15.6736 | 1130.3198 | 3.29% | 75.1493 | 2.2529 | 66.4156 | 203.3409 | | LCS | | | 1283.6485 | 88.1% |
| 33 | 2.6230 | 1.8519 | 1 | 4.7468 | 1231.1230 | 2.49% | 235.6127 | 3.9691 | 40.6493 | 211.1751 | | LCS | | | 1283.6485 | 95.9% |
| 34 | 2.5020 | 1.7665 | 1 | 4.3747 | 1177.6339 | 2.17% | 279.8008 | 4.3265 | 35.6905 | 199.6368 | | LCS | | | 1283.6485 | 91.7% |
| 35 | 2.3151 | 1.6345 | 1 | 4.2481 | 1345.3374 | 2.08% | 274.8272 | 4.2852 | 41.1149 | 227.2880 | | LCS | | | 1283.6485 | 104.8% |
| 36 | 2.7345 | 1.9306 | 1 | 5.0100 | 1575.1635 | 3.29% | 274.2341 | 4.2807 | 48.1915 | 288.3190 | | LCS | | | 1283.6485 | 122.7% |
| 37 | 3.2925 | 2.3246 | 1 | 6.0629 | 1437.9276 | 2.28% | 203.4210 | 3.6880 | 51.0962 | 244.9366 | | LCS | | | 1283.6485 | 112.0% |
| 38 | 3.1799 | 2.2451 | 1 | 6.1412 | 1459.2627 | 2.39% | 176.7608 | 3.4368 | 55.6101 | 249.4452 | | LCS | | | 1283.6485 | 113.7% |
| 39 | 5.7134 | 4.0337 | 1 | 10.4598 | 1382.0497 | 2.77% | 115.5400 | 2.7829 | 65.2453 | 240.7107 | | LCS | | | 1283.6485 | 107.7% |
| 40 | 7.6239 | 5.3826 | 1 | 13.8345 | 1140.3485 | 3.29% | 74.3047 | 2.2359 | 67.2548 | 205.4815 | | LCS | | | 1283.6485 | 88.8% |

M-10372

DCN: ITSI-0808-0004-0076, 8 May 2019

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

| | |
|---|---|
| **Sr-90 Spike S/N :** | N/A |
| **Spike Exp Date :** | N/A |
| **Spike Activity (dpm/ml):** | N/A |
| **Spike Volume Added:** | N/A |

| | | | |
|---|---|---|---|
| **Sr-90 LCS S/N :** | 1243-L | | |
| **LCS Exp Date :** | 12/4/2014 | | |
| **LCS Activity (dpm/ml):** | 506.15 | **LCS2 Activity (dpm/ml):** | 0.00 |
| **LCS Volume Added:** | 0.50 | **LCS2 Volume Added (ml):** | 0.00 |

**SR-90 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.6949 | 1.9026 | 1 | 5.1069 | 570.0264 | 3.07% | 87.5900 | 2.4230 | 24.1217 | 97.9478 | | LCS | | | 569.9889 | 100.0% |
| 2 | 2.2344 | 1.5775 | 1 | 4.1401 | 465.7794 | 2.98% | 94.5624 | 2.5183 | 18.9750 | 79.7206 | | LCS | | | 569.9889 | 81.7% |
| 3 | 2.8017 | 1.9780 | 1 | 5.1674 | 609.1867 | 2.94% | 100.5796 | 2.5971 | 24.0611 | 104.1230 | | LCS | | | 569.9889 | 106.9% |
| 4 | 2.6708 | 1.8856 | 1 | 4.9892 | 550.4038 | 3.02% | 90.3833 | 2.4619 | 22.9322 | 94.3871 | | LCS | | | 569.9889 | 96.6% |
| 5 | 3.2425 | 2.2892 | 1 | 6.2578 | 618.4597 | 3.74% | 73.6531 | 2.2221 | 28.5397 | 109.3794 | | LCS | | | 569.9889 | 108.5% |
| 6 | 7.5475 | 5.3286 | 1 | 12.6652 | 611.8586 | 4.11% | 60.9430 | 2.0413 | 31.3467 | 110.1300 | | LCS | | | 569.9889 | 107.3% |
| 7 | 5.3187 | 3.7550 | 1 | 10.4893 | 667.0469 | 4.23% | 44.7809 | 1.7346 | 39.5192 | 120.7415 | | LCS | | | 569.9889 | 117.0% |
| 8 | 13.3763 | 9.4438 | 1 | 22.6643 | 647.7920 | 4.69% | 34.3044 | 1.5425 | 44.5503 | 120.0725 | | LCS | | | 569.9889 | 113.6% |
| 9 | 6.3037 | 4.4505 | 1 | 10.2175 | 548.1804 | 3.39% | 83.2763 | 2.3918 | 24.0136 | 95.4205 | | LCS | | | 569.9889 | 96.2% |
| 10 | 2.1573 | 1.5231 | 1 | 4.0396 | 467.9532 | 3.31% | 94.2099 | 2.5130 | 19.0388 | 81.1996 | | LCS | | | 569.9889 | 82.1% |
| 11 | 3.0462 | 2.1507 | 1 | 5.5259 | 603.9708 | 3.01% | 98.6429 | 2.5733 | 24.0311 | 103.5002 | | LCS | | | 569.9889 | 106.0% |
| 12 | 2.4389 | 1.7219 | 1 | 4.6884 | 588.1241 | 3.69% | 94.5054 | 2.5157 | 23.8782 | 103.7549 | | LCS | | | 569.9889 | 103.2% |
| 13 | 4.4679 | 3.1544 | 1 | 7.9349 | 648.1626 | 3.31% | 79.7173 | 2.3173 | 28.7377 | 112.4622 | | LCS | | | 569.9889 | 113.7% |
| 14 | 8.0323 | 5.6709 | 1 | 13.2846 | 544.8290 | 3.98% | 56.0852 | 1.9659 | 29.1283 | 97.4360 | | LCS | | | 569.9889 | 95.6% |
| 15 | 6.6159 | 4.6709 | 1 | 12.2223 | 646.5810 | 4.13% | 44.8923 | 1.7412 | 38.2494 | 116.4908 | | LCS | | | 569.9889 | 113.4% |
| 16 | 14.4082 | 10.1723 | 1 | 24.0482 | 664.3327 | 4.62% | 35.8754 | 1.5822 | 44.6857 | 122.6366 | | LCS | | | 569.9889 | 116.6% |
| 17 | 2.7661 | 1.9529 | 1 | 5.2109 | 562.8148 | 3.12% | 86.2484 | 2.4048 | 23.8566 | 96.8974 | | LCS | | | 569.9889 | 98.7% |
| 18 | 2.3482 | 1.6579 | 1 | 4.2990 | 461.3273 | 2.93% | 93.8370 | 2.5095 | 18.7560 | 78.8219 | | LCS | | | 569.9889 | 80.9% |
| 19 | 2.5480 | 1.7989 | 1 | 4.8102 | 600.3459 | 2.91% | 99.0408 | 2.5759 | 23.7366 | 102.4853 | | LCS | | | 569.9889 | 105.3% |
| 20 | 3.4537 | 2.4383 | 1 | 6.0853 | 593.2512 | 2.99% | 98.1614 | 2.5699 | 23.6100 | 101.6099 | | LCS | | | 569.9889 | 104.1% |
| 21 | 6.6406 | 4.6883 | 1 | 11.1844 | 649.5001 | 3.96% | 71.8595 | 2.2113 | 30.3590 | 116.0394 | | LCS | | | 569.9889 | 113.9% |
| 22 | 5.6503 | 3.9891 | 1 | 10.3028 | 697.4684 | 3.63% | 60.0107 | 2.0110 | 35.5005 | 122.7396 | | LCS | | | 569.9889 | 122.4% |
| 23 | 9.4956 | 6.7040 | 1 | 16.4550 | 673.7429 | 4.54% | 44.2217 | 1.7377 | 40.2108 | 123.8669 | | LCS | | | 569.9889 | 118.2% |
| ~~24~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | ~~#VALUE!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#VALUE!~~ |
| 25 | 3.0664 | 2.1649 | 1 | 5.6398 | 533.0740 | 3.14% | 81.3902 | 2.3380 | 23.1883 | 91.8406 | | LCS | | | 569.9889 | 93.5% |
| 26 | 2.3116 | 1.6320 | 1 | 4.2482 | 444.8448 | 3.01% | 90.4017 | 2.4632 | 18.3543 | 76.2473 | | LCS | | | 569.9889 | 78.0% |
| 27 | 2.2078 | 1.5587 | 1 | 4.3505 | 615.9813 | 2.93% | 99.9121 | 2.5854 | 24.1371 | 105.2403 | | LCS | | | 569.9889 | 108.1% |
| 28 | 2.3442 | 1.6551 | 1 | 4.5273 | 558.6279 | 3.13% | 91.7889 | 2.4792 | 22.8482 | 96.1950 | | LCS | | | 569.9889 | 98.0% |
| 29 | 3.9063 | 2.7579 | 1 | 7.1678 | 598.2425 | 3.61% | 72.4289 | 2.2068 | 27.6011 | 105.1595 | | LCS | | | 569.9889 | 105.0% |
| 30 | 4.1795 | 2.9507 | 1 | 7.9423 | 601.1383 | 4.16% | 58.9100 | 1.9895 | 30.7427 | 108.4232 | | LCS | | | 569.9889 | 105.5% |
| 31 | 6.0766 | 4.2902 | 1 | 11.4900 | 557.3653 | 4.76% | 38.3115 | 1.6082 | 35.4283 | 103.6964 | | LCS | | | 569.9889 | 97.8% |
| 32 | 11.6519 | 8.2264 | 1 | 20.1119 | 651.9870 | 4.57% | 35.6356 | 1.5654 | 43.3693 | 120.1000 | | LCS | | | 569.9889 | 114.4% |
| 33 | 3.2709 | 2.3093 | 1 | 5.9314 | 579.1572 | 3.07% | 88.2270 | 2.4347 | 24.1291 | 99.5119 | | LCS | | | 569.9889 | 101.6% |
| 34 | 2.3788 | 1.6795 | 1 | 4.3700 | 467.7647 | 3.01% | 92.5314 | 2.4919 | 19.0186 | 80.1771 | | LCS | | | 569.9889 | 82.1% |
| 35 | 2.9675 | 2.0951 | 1 | 5.4267 | 630.4337 | 2.86% | 101.9691 | 2.6154 | 24.4130 | 107.4252 | | LCS | | | 569.9889 | 110.6% |
| 36 | 2.9657 | 2.0938 | 1 | 5.4721 | 624.2849 | 3.87% | 97.2046 | 2.5533 | 24.7582 | 111.0460 | | LCS | | | 569.9889 | 109.5% |
| 37 | 3.4055 | 2.4043 | 1 | 6.4499 | 601.1954 | 3.29% | 73.2624 | 2.2172 | 27.4696 | 104.2273 | | LCS | | | 569.9889 | 105.5% |
| 38 | 4.0988 | 2.8938 | 1 | 7.7802 | 554.5974 | 3.71% | 55.6647 | 1.9345 | 29.0988 | 97.9285 | | LCS | | | 569.9889 | 97.3% |
| 39 | 6.4048 | 4.5219 | 1 | 11.9989 | 631.8690 | 4.18% | 42.7627 | 1.6987 | 37.8952 | 114.0776 | | LCS | | | 569.9889 | 110.9% |
| 40 | 8.2733 | 5.8411 | 1 | 15.4117 | 710.9750 | 4.39% | 38.1258 | 1.6056 | 45.2053 | 129.7585 | | LCS | | | 569.9889 | 124.7% |

M-10373

# Strontium-89 & 90 Liquid

DCN: ITSI-0808-0004-0076, 8 May 2019

Filename : SR8990.XLS
File type : Excel
Version # : 1.3.9

**Batch :** 1082959
**Analyst :** AF1
**Prep Date :** 2/14/2014
**Sr-89 Method Uncertainty :** 0.0829
**Sr-90 Method Uncertainty :** 0.0821

**Geometry:** Tuffryn Filter

| | |
|---|---|
| **Sr Carrier S/N :** | 2046474 |
| **Carrier Exp Date :** | 12/5/2014 |
| **Carrier Volume Added:** | 2.00 |
| **Carrier Weight (mg/ml):** | 16.40 |
| **Carrier Weight StDev.:** | 0.16 |
| **Y Carrier S/N :** | 2073992 |
| **Carrier Exp Date :** | 5/14/2014 |
| **Carrier Volume Added:** | 0.50 |
| **Carrier Weight (mg/ml):** | 33.18 |
| **Carrier Weight StDev.:** | 0.29 |

| | | |
|---|---|---|
| **Procedure Code :** | GFCGANBL | |
| **Parmname1 :** | Strontium-89 | |
| **Parmname2 :** | Strontium-90 | |
| **Required MDA Sr-89 :** | 1 | pCi/L |
| **Required MDA Sr-90 :** | 1 | pCi/L |
| **Sr-89 Abundance :** | 1.00 | |
| **Sr-90 Abundance :** | 1.00 | |
| **Halflife of Sr-89 :** | 50.53 | days |
| **Halflife of Sr-90 :** | 28.9 | years |
| **Halflife of Y-90 :** | 64.053 | hours |

| Sample Characteristics | | | | | Carrier Calculations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Net Weight (mg) | | Net Weight StDev. (mg) | | Carrier Aliquot (mL) | | Carrier Aliquot StDev. (mL) | |
| Pos. | Sample ID | Sample Aliquot L | Sample Aliquot StDev. L | Sample Date/Time | Sr | Y | Sr | Y | Sr | Y | Sr | Y |
| 1 | 1202347886.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 2 | 1202347887.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 3 | 1202347888.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 4 | 1202347889.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| ~~5~~ | ~~1202347890.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~8.6~~ | ~~17.0~~ | ~~0.044293~~ | ~~0.080396~~ | ~~0.8~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| ~~6~~ | ~~1202347891.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~9.3~~ | ~~16.3~~ | ~~0.047301~~ | ~~0.077387~~ | ~~1.0~~ | ~~0.5~~ | ~~0.002000~~ | ~~0.001000~~ |
| ~~7~~ | ~~1202347892.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~9.6~~ | ~~15.9~~ | ~~0.048591~~ | ~~0.075668~~ | ~~1.5~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| ~~8~~ | ~~1202347893.1~~ | ~~0.2000~~ | ~~1.6007E-05~~ | ~~2/14/2014 0:00~~ | ~~10.5~~ | ~~16.0~~ | ~~0.052459~~ | ~~0.076098~~ | ~~2.1~~ | ~~0.5~~ | ~~0.000200~~ | ~~0.001000~~ |
| 9 | 1202347894.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 1.4 | 16.1 | 0.013347 | 0.076528 | 0.1 | 0.5 | 0.000200 | 0.001000 |
| 10 | 1202347895.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 3.6 | 16.6 | 0.022803 | 0.078677 | 0.2 | 0.5 | 0.000200 | 0.001000 |
| 11 | 1202347896.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.2 | 15.6 | 0.033978 | 0.074379 | 0.4 | 0.5 | 0.000200 | 0.001000 |
| 12 | 1202347897.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 6.9 | 17.6 | 0.036986 | 0.082975 | 0.5 | 0.5 | 0.001000 | 0.001000 |
| 13 | 1202347898.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 8.6 | 17.0 | 0.044293 | 0.080396 | 0.8 | 0.5 | 0.000200 | 0.001000 |
| 14 | 1202347899.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.3 | 16.3 | 0.047301 | 0.077387 | 1.0 | 0.5 | 0.002000 | 0.001000 |
| 15 | 1202347900.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 9.6 | 15.9 | 0.048591 | 0.075668 | 1.5 | 0.5 | 0.000200 | 0.001000 |
| 16 | 1202347901.1 | 0.2000 | 1.6007E-05 | 2/14/2014 0:00 | 10.5 | 16.0 | 0.052459 | 0.076098 | 2.1 | 0.5 | 0.000200 | 0.001000 |

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**Pipet, 0.1 ml Stdev : +/-** 0.000200 ml
**Pipet, 0.5 ml Stdev : +/-** 0.001000 ml
**Pipet, 1 ml Stdev : +/-** 0.002000 ml
**Pipet, 5 ml Stdev : +/-** 0.010000 ml

**Analytical SOP:** GL-RAD-A-001
**Instrument SOP:** GL-RAD-I-016

| 1st Count Raw Data | | | | | | | 1st Count Calibration Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Counting | Gross Counts | | | Count | | | Calibration | Detector Efficiency (cpm/dpm) | | Detector Efficiency Error | Alpha | | Weekly Bkg Count | Weekly Bkg Count |
| Pos. | Detector ID | Time (min.) | Alpha | Beta | Gross Beta CPM | Start Date/Time | Counted on | Calibration Date | Due Date | Sr-89 | Sr-90 | (cpm/dpm) | X-Talk | Weekly Bkg CPM | Start Date/Time | Time (min.) |
| 1 | 11A | 15 | 5 | 5433 | 362.144 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.4310 | 0.4048 | 0.01317 | 0.16835 | 0.414 | 2/15/2014 16:11 | 500 |
| 2 | 11B | 15 | 0 | 5998 | 399.867 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.5052 | 0.4187 | 0.00697 | 0.10683 | 1.744 | 2/15/2014 16:11 | 500 |
| 3 | 11C | 15 | 0 | 6114 | 407.600 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.5007 | 0.4010 | 0.01278 | 0.11616 | 0.380 | 2/15/2014 16:11 | 500 |
| 4 | 11D | 15 | 0 | 5851 | 390.067 | 2/16/2014 9:05 | PIC | 3/1/2013 | 2/28/2014 | 0.5036 | 0.4044 | 0.01068 | 0.10178 | 0.508 | 2/15/2014 16:11 | 500 |
| ~~5~~ | ~~12A~~ | ~~15~~ | ~~3~~ | ~~4446~~ | ~~296.369~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.0000~~ | ~~0.01964~~ | ~~0.15696~~ | ~~0.528~~ | ~~2/15/2014 16:11~~ | ~~500~~ |
| ~~6~~ | ~~12B~~ | ~~15~~ | ~~2~~ | ~~4077~~ | ~~271.766~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.2500~~ | ~~0.0000~~ | ~~0.01114~~ | ~~0.25754~~ | ~~0.684~~ | ~~2/15/2014 16:11~~ | ~~500~~ |
| ~~7~~ | ~~12C~~ | ~~15~~ | ~~3~~ | ~~2736~~ | ~~182.387~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.2174~~ | ~~0.0000~~ | ~~0.01666~~ | ~~0.06736~~ | ~~0.806~~ | ~~2/15/2014 16:11~~ | ~~500~~ |
| ~~8~~ | ~~12D~~ | ~~15~~ | ~~0~~ | ~~2182~~ | ~~146.133~~ | ~~2/16/2014 9:05~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.4787~~ | ~~0.0000~~ | ~~0.01845~~ | ~~0.09744~~ | ~~1.514~~ | ~~2/15/2014 16:12~~ | ~~500~~ |
| 9 | 13A | 15 | 6 | 4729 | 315.238 | 2/16/2014 9:28 | PIC | 3/1/2013 | 2/28/2014 | 0.5038 | 0.4278 | 0.00714 | 0.07148 | 0.583 | 2/15/2014 15:40 | 1000 |
| 10 | 13B | 15 | 0 | 5994 | 399.600 | 2/16/2014 9:29 | PIC | 3/1/2013 | 2/28/2014 | 0.5128 | 0.4276 | 0.00967 | 0.08951 | 0.394 | 2/15/2014 15:40 | 1000 |
| 11 | 13C | 15 | 3 | 6028 | 401.811 | 2/16/2014 9:29 | PIC | 3/1/2013 | 2/28/2014 | 0.5049 | 0.3956 | 0.01708 | 0.27848 | 0.309 | 2/15/2014 15:40 | 1000 |
| 12 | 13D | 15 | 1 | 5501 | 366.728 | 2/16/2014 9:28 | PIC | 3/1/2013 | 2/28/2014 | 0.4942 | 0.4026 | 0.01144 | 0.08747 | 0.609 | 2/15/2014 15:40 | 1000 |
| 13 | 14A | 15 | 1 | 4185 | 278.980 | 2/16/2014 9:23 | PIC | 3/1/2013 | 2/28/2014 | 0.4895 | 0.3891 | 0.02119 | 0.30489 | 0.618 | 2/15/2014 15:40 | 1000 |
| 14 | 14B | 15 | 1 | 3590 | 239.318 | 2/16/2014 9:23 | PIC | 3/1/2013 | 2/28/2014 | 0.5004 | 0.3888 | 0.01028 | 0.23739 | 0.790 | 2/15/2014 15:40 | 1000 |
| 15 | 14C | 15 | 1 | 2816 | 187.706 | 2/16/2014 9:24 | PIC | 3/1/2013 | 2/28/2014 | 0.5039 | 0.3843 | 0.01828 | 0.40549 | 0.423 | 2/15/2014 15:40 | 1000 |
| 16 | 14D | 15 | 3 | 2177 | 145.073 | 2/16/2014 9:24 | PIC | 3/1/2013 | 2/28/2014 | 0.4864 | 0.3621 | 0.00738 | 0.29929 | 0.535 | 2/15/2014 15:40 | 1000 |

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| 2nd Count Raw Data | | | | | | | 2nd Count Calibration Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | Detector ID | Counting Time (min.) | Gross Counts Alpha | Gross Counts Beta | Gross Beta CPM | Count Start Date/Time | Counted on | Calibration Date | Calibration Due Date | Detector Efficiency Y-90 (cpm/dpm) | Detector Efficiency Error (cpm/dpm) | Alpha X-Talk | Weekly Bkg CPM | Weekly Bkg Count Start Date/Time | Weekly Bkg Count Time (min.) |
| 1 | 11A | 15 | 2 | 1267 | 84.444 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.4678 | 0.01317 | 0.16835 | 0.420 | 2/22/2014 17:16 | 500 |
| 2 | 11B | 15 | 1 | 1438 | 95.860 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.5323 | 0.00697 | 0.10683 | 1.984 | 2/22/2014 17:16 | 500 |
| 3 | 11C | 15 | 4 | 1552 | 103.436 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.5295 | 0.01278 | 0.11616 | 0.404 | 2/22/2014 17:17 | 500 |
| 4 | 11D | 15 | 1 | 1371 | 91.393 | 2/27/2014 6:11 | PIC | 3/1/2013 | 2/28/2014 | 0.5341 | 0.01068 | 0.10178 | 0.496 | 2/22/2014 17:17 | 500 |
| ~~5~~ | ~~12A~~ | ~~15~~ | 4 | ~~1089~~ | ~~72.558~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01964~~ | ~~0.15696~~ | ~~1.528~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| ~~6~~ | ~~12B~~ | ~~15~~ | ~~2~~ | ~~947~~ | ~~63.099~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01114~~ | ~~0.25754~~ | ~~0.844~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| ~~7~~ | ~~12C~~ | ~~15~~ | ~~1~~ | ~~664~~ | ~~44.262~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01666~~ | ~~0.06736~~ | ~~0.756~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| ~~8~~ | ~~12D~~ | ~~15~~ | ~~11~~ | ~~636~~ | ~~42.329~~ | ~~2/27/2014 6:11~~ | ~~PIC~~ | ~~3/1/2013~~ | ~~2/28/2014~~ | ~~0.0000~~ | ~~0.01845~~ | ~~0.09744~~ | ~~1.314~~ | ~~2/22/2014 17:17~~ | ~~500~~ |
| 9 | 13A | 15 | 4 | 1269 | 84.581 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.5300 | 0.00714 | 0.07148 | 0.660 | 2/22/2014 17:17 | 1000 |
| 10 | 13B | 15 | 4 | 1412 | 94.109 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.5438 | 0.00967 | 0.08951 | 0.613 | 2/22/2014 17:18 | 1000 |
| 11 | 13C | 15 | 7 | 1408 | 93.737 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.4905 | 0.01708 | 0.27848 | 0.307 | 2/22/2014 17:18 | 1000 |
| 12 | 13D | 15 | 0 | 1433 | 95.533 | 2/27/2014 6:31 | PIC | 3/1/2013 | 2/28/2014 | 0.5264 | 0.01144 | 0.08747 | 0.672 | 2/22/2014 17:18 | 1000 |
| 13 | 14A | 15 | 0 | 1158 | 77.200 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.4988 | 0.02119 | 0.30489 | 2.141 | 2/22/2014 17:18 | 1000 |
| 14 | 14B | 15 | 1 | 922 | 61.451 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.5217 | 0.01028 | 0.23739 | 2.871 | 2/22/2014 17:18 | 1000 |
| 15 | 14C | 15 | 3 | 625 | 41.586 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.5271 | 0.01828 | 0.40549 | 0.539 | 2/22/2014 17:18 | 1000 |
| 16 | 14D | 15 | 0 | 486 | 32.400 | 2/27/2014 6:32 | PIC | 3/1/2013 | 2/28/2014 | 0.4715 | 0.00738 | 0.29929 | 1.015 | 2/22/2014 17:18 | 1000 |

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**Correction Factors**

| Pos. | Separation Date/Time Strontium | Separation Date/Time Yttrium | Yttrium Ingrowth (Sr-89 calc) | Yttrium Ingrowth (Sr-90 calc) | Yttrium Decay | Decay from Sample Date Sr-89 | Decay from Sample Date Sr-90 | Net Count Rate Y-90 | Net Count Rate Sr-90 | Gross CPM Sr-89 | Calculated Sample Recovery % Sr | Calculated Sample Recovery % Y | Sample Recovery % Error Sr | Sample Recovery % Error Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 26.8590 | 97.6478 | 237.63702 | 85.4% | 97.0% | 1.68% | 1.12% |
| 2 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 23.3399 | 96.1635 | 280.363252 | 110% | 100% | 1.33% | 1.12% |
| 3 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 29.7480 | 108.1470 | 269.705003 | 94.5% | 94.0% | 1.25% | 1.12% |
| 4 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2094 | 0.9424 | 0.8144 | 0.9678 | 0.9998 | 29.4775 | 84.5490 | 276.040157 | 84.1% | 106% | 1.25% | 1.12% |
| ~~5~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~65.5%~~ | ~~102%~~ | ~~1.22%~~ | ~~1.12%~~ |
| ~~6~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~56.7%~~ | ~~98.3%~~ | ~~1.23%~~ | ~~1.12%~~ |
| ~~7~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~39.0%~~ | ~~95.8%~~ | ~~1.21%~~ | ~~1.12%~~ |
| ~~8~~ | ~~2/15/2014 11:30~~ | ~~2/26/2014 11:20~~ | ~~0.2095~~ | ~~0.9424~~ | ~~0.8143~~ | ~~0.9678~~ | ~~0.9998~~ | #DIV/0! | #DIV/0! | #DIV/0! | ~~30.5%~~ | ~~96.4%~~ | ~~1.20%~~ | ~~1.12%~~ |
| 9 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2126 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 27.3440 | 91.2960 | 196.598045 | 85.4% | 97.0% | 1.68% | 1.12% |
| 10 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2128 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 23.7170 | 96.1098 | 279.773204 | 110% | 100% | 1.33% | 1.12% |
| 11 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2128 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 27.5226 | 104.8101 | 269.478254 | 94.5% | 94.0% | 1.25% | 1.12% |
| 12 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2127 | 0.9424 | 0.8113 | 0.9676 | 0.9998 | 31.3658 | 89.4535 | 245.908178 | 84.1% | 106% | 1.25% | 1.12% |
| 13 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2120 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 31.7555 | 74.7357 | 172.488454 | 65.5% | 102% | 1.22% | 1.12% |
| 14 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2120 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 28.6512 | 58.1379 | 152.528335 | 56.7% | 98.3% | 1.23% | 1.12% |
| 15 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2121 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 29.1853 | 40.8421 | 117.678932 | 39.0% | 95.8% | 1.21% | 1.12% |
| 16 | 2/15/2014 11:30 | 2/26/2014 11:20 | 0.2121 | 0.9424 | 0.8112 | 0.9677 | 0.9998 | 28.5644 | 32.6968 | 83.8123247 | 30.5% | 96.4% | 1.20% | 1.12% |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-89 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-89 LCS S/N :** 1680-A
**LCS Exp Date :** 3/24/2014
**LCS Activity (dpm/ml):** 2849.70
**LCS Volume Added:** 0.20
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-89 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.4848 | 1.7543 | 1 | 4.7736 | **1500.4318** | 2.71% | 237.2230 | 3.9804 | 49.3444 | 261.0889 | | LCS | | | 1283.6485 | 116.9% |
| 2 | 3.3841 | 2.3892 | 1 | 5.6179 | **1169.3837** | 2.16% | 278.6193 | 4.3237 | 35.5678 | 198.0842 | | LCS | | | 1283.6485 | 91.1% |
| 3 | 1.8509 | 1.3067 | 1 | 3.5970 | **1324.4517** | 2.38% | 269.3250 | 4.2404 | 40.8718 | 227.7531 | | LCS | | | 1283.6485 | 103.2% |
| 4 | 2.3899 | 1.6873 | 1 | 4.4729 | **1513.1570** | 2.27% | 275.5322 | 4.2900 | 46.1764 | 258.2081 | | LCS | | | 1283.6485 | 117.9% |
| ~~5~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| ~~6~~ | ~~8.2878~~ | ~~5.8513~~ | ~~1~~ | ~~14.9851~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| ~~7~~ | ~~15.0384~~ | ~~10.6172~~ | ~~1~~ | ~~26.7215~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| ~~8~~ | ~~11.9797~~ | ~~8.4578~~ | ~~1~~ | ~~20.1047~~ | ~~**#DIV/0!**~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~1283.6485~~ | ~~#DIV/0!~~ |
| 9 | 2.5047 | 1.7684 | 1 | 4.6192 | **1060.8940** | 2.59% | 196.0150 | 3.6204 | 38.4054 | 182.9747 | | LCS | | | 1283.6485 | 82.6% |
| 10 | 1.5732 | 1.1107 | 1 | 3.0485 | **1155.3012** | 2.26% | 279.3792 | 4.3188 | 35.0041 | 196.8223 | | LCS | | | 1283.6485 | 90.0% |
| 11 | 1.6433 | 1.1602 | 1 | 3.2959 | **1312.8677** | 2.64% | 269.1693 | 4.2386 | 40.5202 | 229.3745 | | LCS | | | 1283.6485 | 102.3% |
| 12 | 2.6475 | 1.8691 | 1 | 4.8577 | **1373.0110** | 2.37% | 245.2992 | 4.0490 | 44.4204 | 235.6685 | | LCS | | | 1283.6485 | 107.0% |
| 13 | 3.4564 | 2.4403 | 1 | 6.3314 | **1246.7860** | 3.14% | 171.8705 | 3.3911 | 48.2162 | 225.0686 | | LCS | | | 1283.6485 | 97.1% |
| 14 | 4.4186 | 3.1196 | 1 | 7.8795 | **1244.5768** | 2.64% | 151.7383 | 3.1889 | 51.2659 | 216.1910 | | LCS | | | 1283.6485 | 97.0% |
| 15 | 4.6661 | 3.2943 | 1 | 8.9560 | **1387.9603** | 3.24% | 117.2559 | 2.8010 | 64.9851 | 250.2109 | | LCS | | | 1283.6485 | 108.1% |
| 16 | 6.9578 | 4.9123 | 1 | 12.9635 | **1307.0142** | 3.17% | 83.2773 | 2.3639 | 72.7175 | 232.5962 | | LCS | | | 1283.6485 | 101.8% |

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Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

**Sr-90 Spike S/N :** N/A
**Spike Exp Date :** N/A
**Spike Activity (dpm/ml):** N/A
**Spike Volume Added:** N/A

**Sr-90 LCS S/N :** 1243-L
**LCS Exp Date :** 12/4/2014
**LCS Activity (dpm/ml):** 506.15
**LCS Volume Added:** 0.50
**LCS2 Activity (dpm/ml):** 0.00
**LCS2 Volume Added (ml):** 0.00

**SR-90 Results**

| Pos. | Decision Level pCi/L | Critical Level pCi/L | Required MDA pCi/L | MDA pCi/L | Sample Act. Conc. pCi/L | Sample Act. Error % | Net Count Rate CPM | Net Count Rate Error CPM | 2 SIGMA Counting Uncertainty pCi/L | 2 SIGMA Total Prop. Uncertainty pCi/L | Sample QC | Sample Type | RPD | RER | Nominal pCi/L | Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.9970 | 2.1159 | 1 | 5.7466 | **636.4092** | 3.31% | 84.0242 | 2.3729 | 27.0353 | 110.4249 | | LCS | | | 569.9889 | 111.7% |
| 2 | 4.3178 | 3.0484 | 1 | 7.1009 | **471.3181** | 3.00% | 93.8755 | 2.5288 | 19.0984 | 80.7449 | | LCS | | | 569.9889 | 82.7% |
| 3 | 2.4207 | 1.7090 | 1 | 4.6656 | **642.6763** | 3.06% | 103.0317 | 2.6261 | 24.6413 | 110.3840 | | LCS | | | 569.9889 | 112.8% |
| 4 | 2.6473 | 1.8690 | 1 | 4.9692 | **559.5984** | 3.12% | 90.8972 | 2.4686 | 22.8613 | 96.3502 | | LCS | | | 569.9889 | 98.2% |
| ~~5~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~3.83%~~ | ~~71.0301~~ | ~~2.2001~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| ~~6~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~3.65%~~ | ~~62.2550~~ | ~~2.0514~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| ~~7~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~4.43%~~ | ~~43.5062~~ | ~~1.7182~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| ~~8~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | ~~1~~ | ~~#DIV/0!~~ | ~~**#DIV/0!**~~ | ~~4.63%~~ | ~~41.0145~~ | ~~1.6806~~ | ~~#DIV/0!~~ | ~~#DIV/0!~~ | | ~~LCS~~ | | | ~~569.9889~~ | ~~#DIV/0!~~ |
| 9 | 3.3037 | 2.3325 | 1 | 6.0068 | **563.0656** | 3.13% | 83.9209 | 2.3747 | 23.8781 | 96.9527 | | LCS | | | 569.9889 | 98.8% |
| 10 | 2.3408 | 1.6526 | 1 | 4.2917 | **461.1880** | 3.06% | 93.4965 | 2.5049 | 18.5169 | 79.2010 | | LCS | | | 569.9889 | 80.9% |
| 11 | 2.2694 | 1.6022 | 1 | 4.5560 | **631.3798** | 3.37% | 93.4297 | 2.4999 | 25.3174 | 109.8108 | | LCS | | | 569.9889 | 110.8% |
| 12 | 3.1152 | 2.1994 | 1 | 5.6527 | **594.7711** | 3.10% | 94.8613 | 2.5238 | 23.7142 | 102.3204 | | LCS | | | 569.9889 | 104.3% |
| 13 | 7.7987 | 5.5059 | 1 | 12.7706 | **660.0442** | 3.86% | 75.0590 | 2.2691 | 29.9013 | 117.3526 | | LCS | | | 569.9889 | 115.8% |
| 14 | 10.4105 | 7.3499 | 1 | 16.7271 | **593.8241** | 3.78% | 58.5798 | 2.0247 | 30.7572 | 105.1783 | | LCS | | | 569.9889 | 104.2% |
| 15 | 6.6500 | 4.6950 | 1 | 12.3789 | **613.4260** | 4.59% | 41.0466 | 1.6652 | 37.2924 | 113.0822 | | LCS | | | 569.9889 | 107.6% |
| 16 | 12.9767 | 9.1617 | 1 | 22.5736 | **666.9753** | 4.87% | 31.3850 | 1.4700 | 46.8148 | 124.8046 | | LCS | | | 569.9889 | 117.0% |

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| SampleID | Instr | Time (min.) | Alpha Counts | Beta Counts | Count Start Time | Count End Time | Machine | Batch ID |
|---|---|---|---|---|---|---|---|---|
| 1st Count | | | | | | | | |
| V1 | 1A | 15 | 10 | 5104 | 2/15/2014 14:51 | 2/15/2014 15:06 | PIC | SR89V14 |
| V2 | 1B | 15 | 24 | 5583 | 2/15/2014 14:51 | 2/15/2014 15:06 | PIC | SR89V14 |
| V3 | 1C | 15 | 123 | 5897 | 2/15/2014 14:51 | 2/15/2014 15:06 | PIC | SR89V14 |
| V4 | 1D | 15 | 86 | 5453 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V5 | 2A | 15 | 2 | 4218 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V6 | 2B | 15 | 1 | 3707 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V7 | 2C | 15 | 5 | 2564 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V8 | 2D | 15 | 3 | 2004 | 2/15/2014 14:52 | 2/15/2014 15:07 | PIC | SR89V14 |
| V1 | 3A | 15 | 127 | 5014 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V2 | 3B | 15 | 97 | 5701 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V3 | 3C | 15 | 82 | 5706 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V4 | 3D | 15 | 60 | 5332 | 2/15/2014 15:07 | 2/15/2014 15:22 | PIC | SR89V14 |
| V5 | 4A | 15 | 62 | 4309 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V6 | 4B | 15 | 4 | 3768 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V7 | 4C | 15 | 28 | 2625 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V8 | 4D | 15 | 65 | 2050 | 2/15/2014 15:27 | 2/15/2014 15:42 | PIC | SR89V14 |
| V1 | 5A | 15 | 17 | 5215 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V2 | 5B | 15 | 34 | 5889 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V3 | 5C | 15 | 37 | 5870 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V4 | 5D | 15 | 37 | 5637 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V5 | 6A | 15 | 22 | 4417 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V6 | 6B | 15 | 47 | 3783 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V7 | 6C | 15 | 1 | 2590 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V8 | 6D | 15 | 0 | 0 | 2/15/2014 15:23 | 2/15/2014 15:38 | PIC | SR89V14 |
| V1 | 7A | 15 | 9 | 5352 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V2 | 7B | 15 | 4 | 5898 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V3 | 7C | 15 | 4 | 6053 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V4 | 7D | 15 | 2 | 5843 | 2/16/2014 8:28 | 2/16/2014 8:43 | PIC | SR89V14 |
| V5 | 8A | 15 | 4 | 4531 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V6 | 8B | 15 | 0 | 4022 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V7 | 8C | 15 | 2 | 2590 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V8 | 8D | 15 | 8 | 2127 | 2/16/2014 8:29 | 2/16/2014 8:44 | PIC | SR89V14 |
| V1 | 9A | 15 | 9 | 5371 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V2 | 9B | 15 | 10 | 5928 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V3 | 9C | 15 | 17 | 6174 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V4 | 9D | 15 | 21 | 5971 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V5 | 10A | 15 | 1 | 4544 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V6 | 10B | 15 | 0 | 3861 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V7 | 10C | 15 | 3 | 2820 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V8 | 10D | 15 | 8 | 2184 | 2/16/2014 8:46 | 2/16/2014 9:01 | PIC | SR89V14 |
| V1 | 11A | 15 | 5 | 5433 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V2 | 11B | 15 | 0 | 5998 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V3 | 11C | 15 | 0 | 6114 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V4 | 11D | 15 | 0 | 5851 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V5 | 12A | 15 | 3 | 4446 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V6 | 12B | 15 | 2 | 4077 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V7 | 12C | 15 | 3 | 2736 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V8 | 12D | 15 | 0 | 2192 | 2/16/2014 9:05 | 2/16/2014 9:20 | PIC | SR89V14 |
| V1 | 13A | 15 | 6 | 4729 | 2/16/2014 9:28 | 2/16/2014 9:43 | PIC | SR89V14 |
| V2 | 13B | 15 | 0 | 5994 | 2/16/2014 9:29 | 2/16/2014 9:44 | PIC | SR89V14 |
| V3 | 13C | 15 | 3 | 6028 | 2/16/2014 9:29 | 2/16/2014 9:44 | PIC | SR89V14 |
| V4 | 13D | 15 | 1 | 5501 | 2/16/2014 9:28 | 2/16/2014 9:43 | PIC | SR89V14 |
| V5 | 14A | 15 | 1 | 4185 | 2/16/2014 9:23 | 2/16/2014 9:38 | PIC | SR89V14 |
| V6 | 14B | 15 | 1 | 3590 | 2/16/2014 9:23 | 2/16/2014 9:38 | PIC | SR89V14 |
| V7 | 14C | 15 | 1 | 2816 | 2/16/2014 9:24 | 2/16/2014 9:39 | PIC | SR89V14 |
| V8 | 14D | 15 | 3 | 2177 | 2/16/2014 9:24 | 2/16/2014 9:39 | PIC | SR89V14 |

2nd Count

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV1 | 1A | 15 | 3 | 1321 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV2 | 1B | 15 | 3 | 1427 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV3 | 1C | 15 | 19 | 1518 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV4 | 1D | 15 | 11 | 1364 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV5 | 2A | 15 | 1 | 1111 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV6 | 2B | 15 | 8 | 939 | 2/27/2014 4:38 | 2/27/2014 4:53 | PIC | SR90V14 |
| SV7 | 2C | 15 | 2 | 677 | 2/27/2014 4:39 | 2/27/2014 4:54 | PIC | SR90V14 |
| SV8 | 2D | 15 | 1 | 535 | 2/27/2014 4:39 | 2/27/2014 4:54 | PIC | SR90V14 |
| SV1 | 3A | 15 | 21 | 1287 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV2 | 3B | 15 | 9 | 1421 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV3 | 3C | 15 | 8 | 1490 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV4 | 3D | 15 | 4 | 1424 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV5 | 4A | 15 | 2 | 1208 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV6 | 4B | 15 | 1 | 869 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV7 | 4C | 15 | 2 | 682 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV8 | 4D | 15 | 14 | 563 | 2/27/2014 4:54 | 2/27/2014 5:09 | PIC | SR90V14 |
| SV1 | 5A | 15 | 1 | 1301 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV2 | 5B | 15 | 6 | 1417 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV3 | 5C | 15 | 5 | 1493 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV4 | 5D | 15 | 11 | 1486 | 2/27/2014 5:12 | 2/27/2014 5:27 | PIC | SR90V14 |
| SV5 | 6A | 15 | 7 | 1100 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV6 | 6B | 15 | 8 | 910 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV7 | 6C | 15 | 1 | 679 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV8 | 6D | 15 | 0 | 0 | 2/27/2014 5:17 | 2/27/2014 5:32 | PIC | SR90V14 |
| SV1 | 7A | 15 | 6 | 1230 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV2 | 7B | 15 | 2 | 1365 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV3 | 7C | 15 | 2 | 1504 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV4 | 7D | 15 | 3 | 1383 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV5 | 8A | 15 | 2 | 1096 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV6 | 8B | 15 | 2 | 891 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV7 | 8C | 15 | 1 | 582 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV8 | 8D | 15 | 2 | 551 | 2/27/2014 5:34 | 2/27/2014 5:49 | PIC | SR90V14 |
| SV1 | 9A | 15 | 8 | 1336 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV2 | 9B | 15 | 2 | 1397 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV3 | 9C | 15 | 3 | 1539 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV4 | 9D | 15 | 7 | 1467 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV5 | 10A | 15 | 1 | 1106 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV6 | 10B | 15 | 3 | 842 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV7 | 10C | 15 | 0 | 649 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV8 | 10D | 15 | 2 | 580 | 2/27/2014 5:50 | 2/27/2014 6:05 | PIC | SR90V14 |
| SV1 | 11A | 15 | 2 | 1267 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV2 | 11B | 15 | 1 | 1438 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV3 | 11C | 15 | 4 | 1552 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV4 | 11D | 15 | 1 | 1371 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV5 | 12A | 15 | 4 | 1089 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV6 | 12B | 15 | 2 | 947 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV7 | 12C | 15 | 1 | 664 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV8 | 12D | 15 | 11 | 636 | 2/27/2014 6:11 | 2/27/2014 6:26 | PIC | SR90V14 |
| SV1 | 13A | 15 | 4 | 1269 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |
| SV2 | 13B | 15 | 4 | 1412 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SV3 | 13C | 15 | 7 | 1408 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |
| SV4 | 13D | 15 | 0 | 1433 | 2/27/2014 6:31 | 2/27/2014 6:46 | PIC | SR90V14 |
| SV5 | 14A | 15 | 0 | 1158 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |
| SV6 | 14B | 15 | 1 | 922 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |
| SV7 | 14C | 15 | 3 | 625 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |
| SV8 | 14D | 15 | 0 | 486 | 2/27/2014 6:32 | 2/27/2014 6:47 | PIC | SR90V14 |

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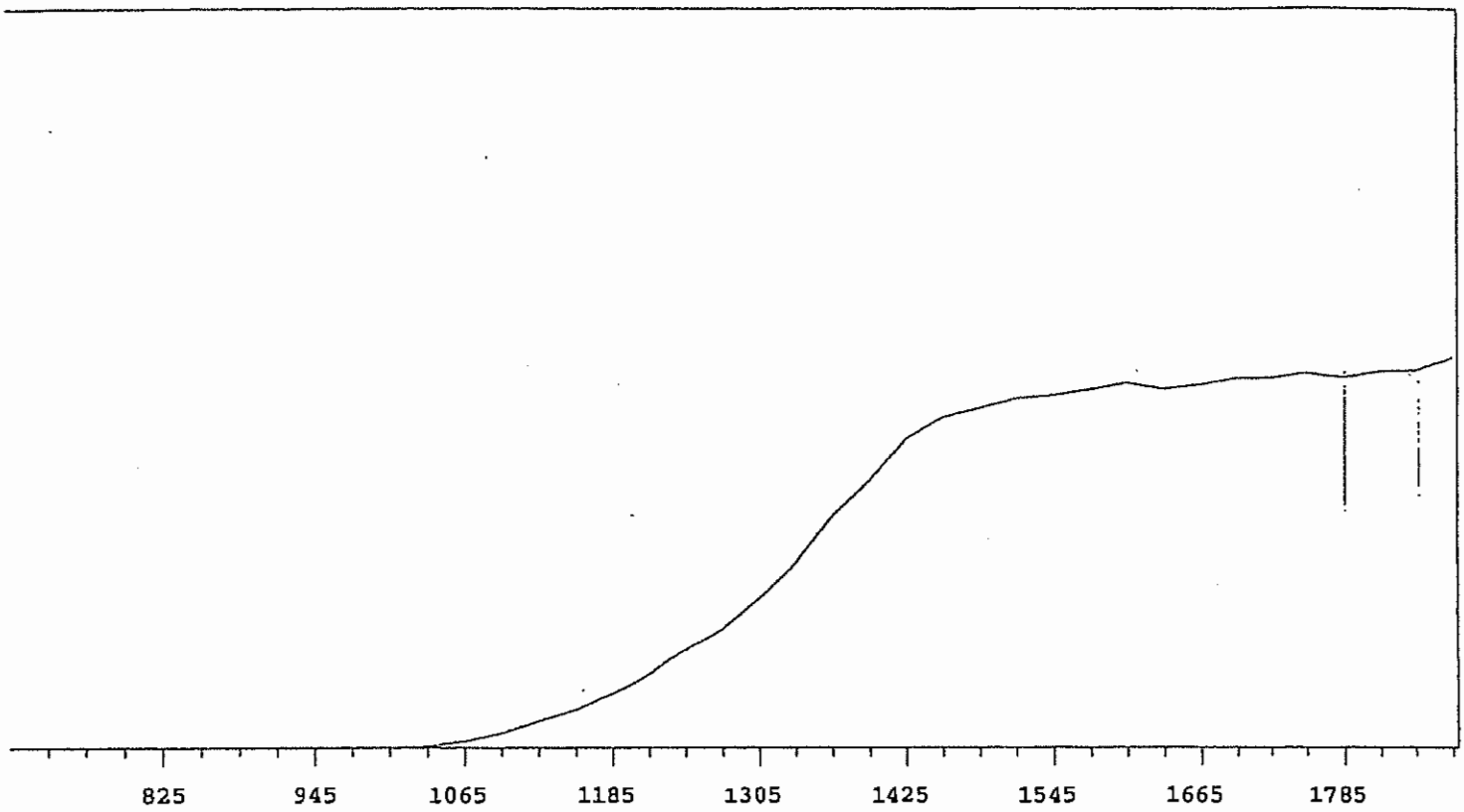
MPC 9600 Plateau  Instrument 1  MPC 9604 Detector A  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575



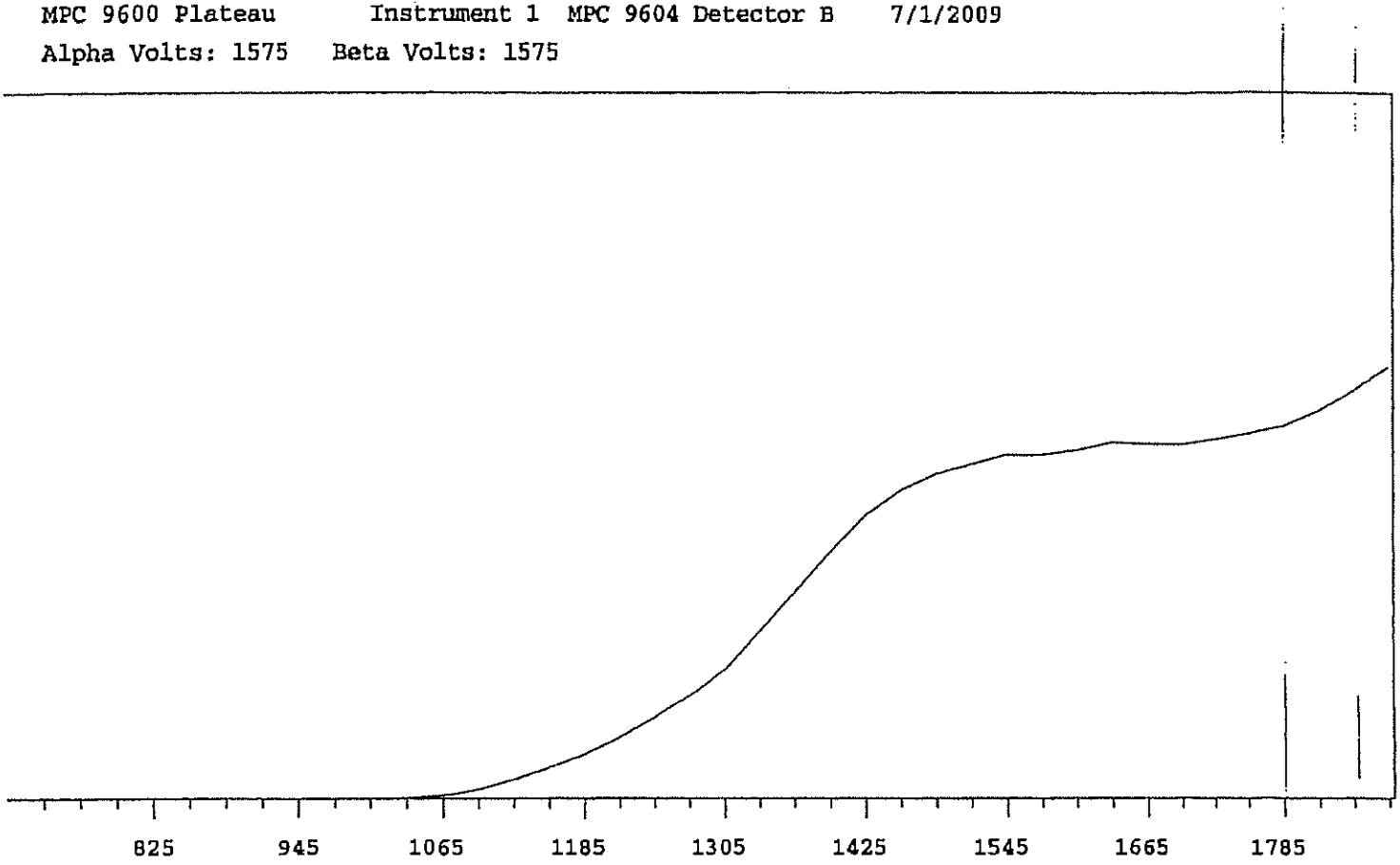

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | +0.00 |
| 825 | 0 | >100 |
| 855 | 1 | >100 |
| 885 | 0 | +55.56 |
| 915 | 2 | +66.67 |
| 945 | 0 | >100 |
| 975 | 2 | >100 |
| 1005 | 42 | >100 |
| 1035 | 145 | >100 |
| 1065 | 544 | >100 |
| 1095 | 1136 | >100 |
| 1125 | 1967 | >100 |
| 1155 | 2845 | >100 |
| 1185 | 4078 | >100 |
| 1215 | 5483 | +93.18 |
| 1245 | 7400 | +83.35 |
| 1275 | 9328 | +75.40 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 11640 | +69.78 |
| 1335 | 14241 | +62.88 |
| 1365 | 17534 | +55.91 |
| 1395 | 20127 | +45.04 |
| 1425 | 23254 | +31.29 |
| 1455 | 24902 | +20.41 |
| 1485 | 25605 | +10.49 |
| 1515 | 26310 | +6.44 |
| 1545 | 26535 | +5.31 |
| 1575 | 26953 | +2.79 |
| 1605 | 27399 | +1.83 |
| 1635 | 27000 | +1.71 |
| 1665 | 27255 | +1.62 |
| 1695 | 27723 | +3.14 |
| 1725 | 27705 | +1.56 |
| 1755 | 28072 | +1.15 |
| 1785 | 27729 | +1.43 |
| 1815 | 28194 | +3.24 |
| 1845 | 28243 | |
| 1875 | 29191 | |

9/1/09

MPC 9600 Plateau  Instrument 1  MPC 9604 Detector B  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575

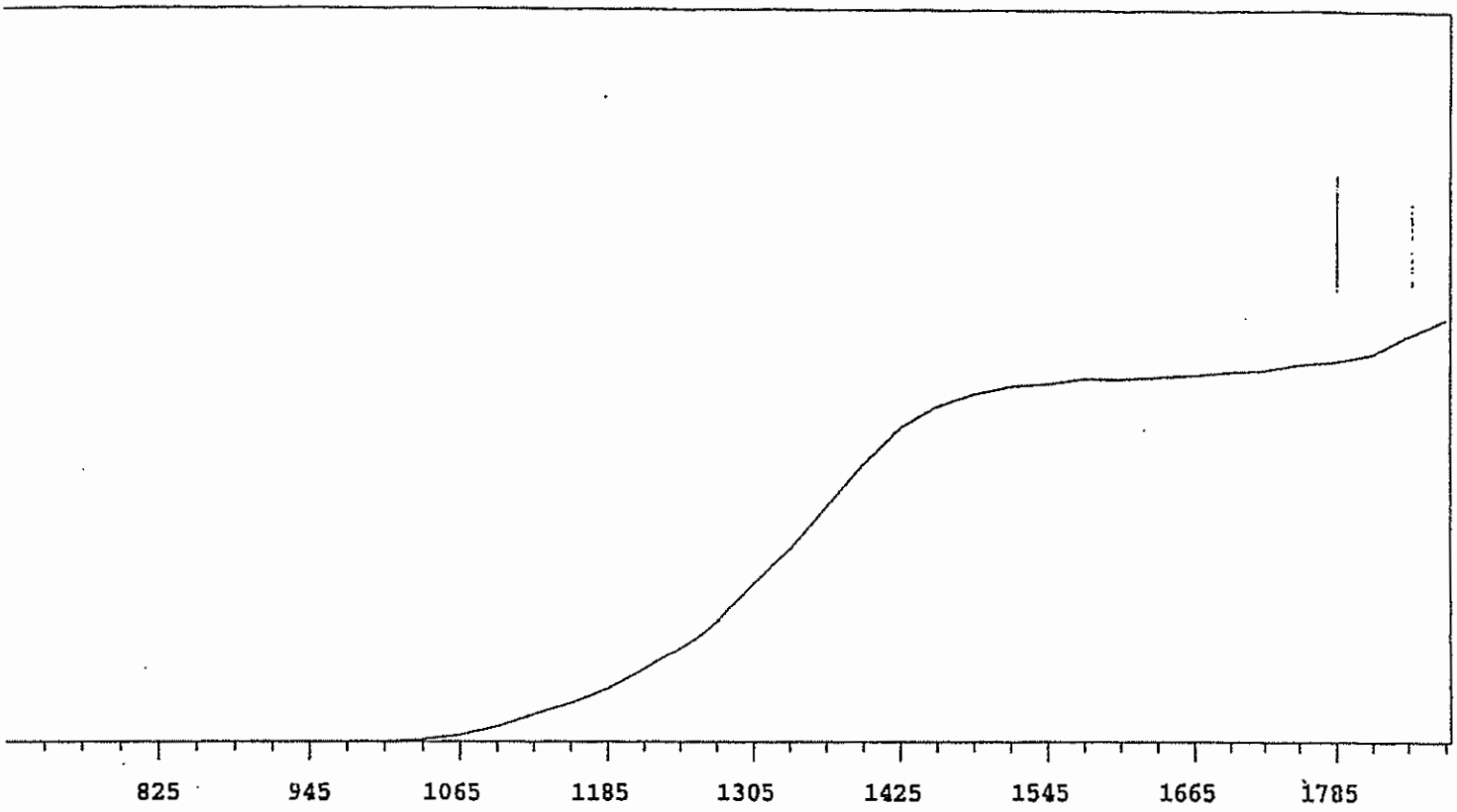



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +55.56 |
| 795 | 1 | +83.33 |
| 825 | 1 | +55.56 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | +0.00 |
| 945 | 1 | >100 |
| 975 | 0 | >100 |
| 1005 | 4 | >100 |
| 1035 | 56 | >100 |
| 1065 | 292 | >100 |
| 1095 | 890 | >100 |
| 1125 | 1841 | >100 |
| 1155 | 2936 | >100 |
| 1185 | 4179 | >100 |
| 1215 | 5837 | >100 |
| 1245 | 7821 | +91.28 |
| 1275 | 10638 | +83.88 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13188 | +75.92 |
| 1335 | 16818 | +67.60 |
| 1365 | 20420 | +59.86 |
| 1395 | 24341 | +47.85 |
| 1425 | 27854 | +35.51 |
| 1455 | 30288 | +23.26 |
| 1485 | 31798 | +14.54 |
| 1515 | 32622 | +8.32 |
| 1545 | 33496 | +5.11 |
| 1575 | 33475 | +4.43 |
| 1605 | 33903 | +3.09 |
| 1635 | 34654 | +2.46 |
| 1665 | 34485 | +1.74 |
| 1695 | 34445 | +1.84 |
| 1725 | 34908 | +3.91 |
| 1755 | 35401 | +6.80 |
| 1785 | 36062 | +10.27 |
| 1815 | 37505 | +14.30 |
| 1845 | 39508 | |
| 1875 | 41843 | |

MPC 9600 Plateau  Instrument 1  MPC 9604 Detector C  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575

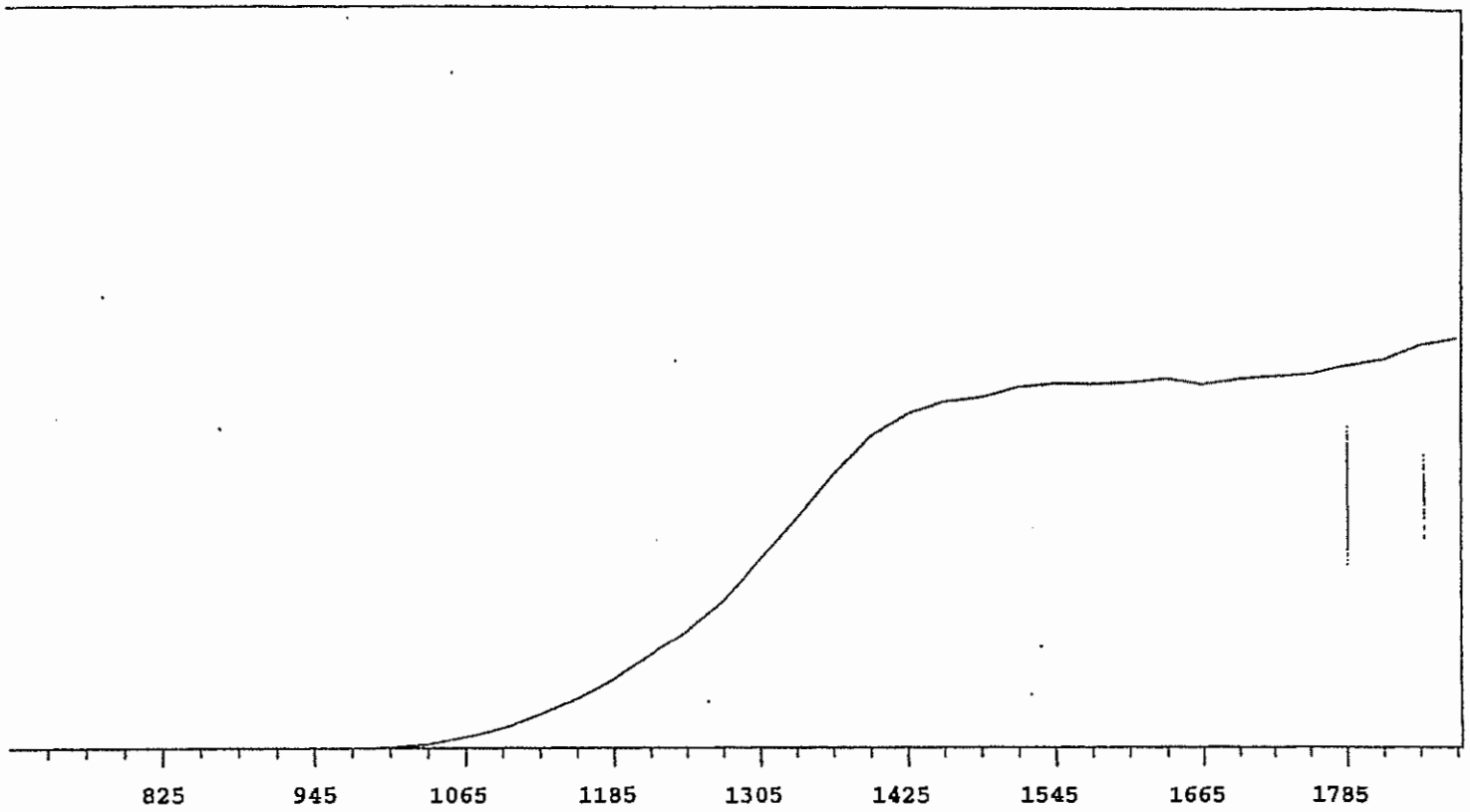



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 1 | -55.56 |
| 855 | 1 | +55.56 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 32 | >100 |
| 1035 | 206 | >100 |
| 1065 | 639 | >100 |
| 1095 | 1416 | >100 |
| 1125 | 2551 | >100 |
| 1155 | 3619 | >100 |
| 1185 | 5037 | +98.68 |
| 1215 | 6875 | +91.19 |
| 1245 | 8915 | +85.53 |
| 1275 | 11519 | +77.28 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14817 | +71.06 |
| 1335 | 17823 | +63.34 |
| 1365 | 21704 | +53.63 |
| 1395 | 25422 | +42.55 |
| 1425 | 28424 | +29.21 |
| 1455 | 30244 | +18.11 |
| 1485 | 31305 | +10.10 |
| 1515 | 31989 | +6.07 |
| 1545 | 32223 | +3.43 |
| 1575 | 32671 | +2.15 |
| 1605 | 32621 | +1.68 |
| 1635 | 32837 | +1.52 |
| 1665 | 32961 | +2.01 |
| 1695 | 33249 | +2.64 |
| 1725 | 33409 | +3.21 |
| 1755 | 33931 | +4.07 |
| 1785 | 34234 | +7.20 |
| 1815 | 34909 | +10.28 |
| 1845 | 36660 | |
| 1875 | 38205 | |

MPC 9600 Plateau  Instrument 1  MPC 9604 Detector D  7/1/2009

Alpha Volts: 1575  Beta Volts: 1575

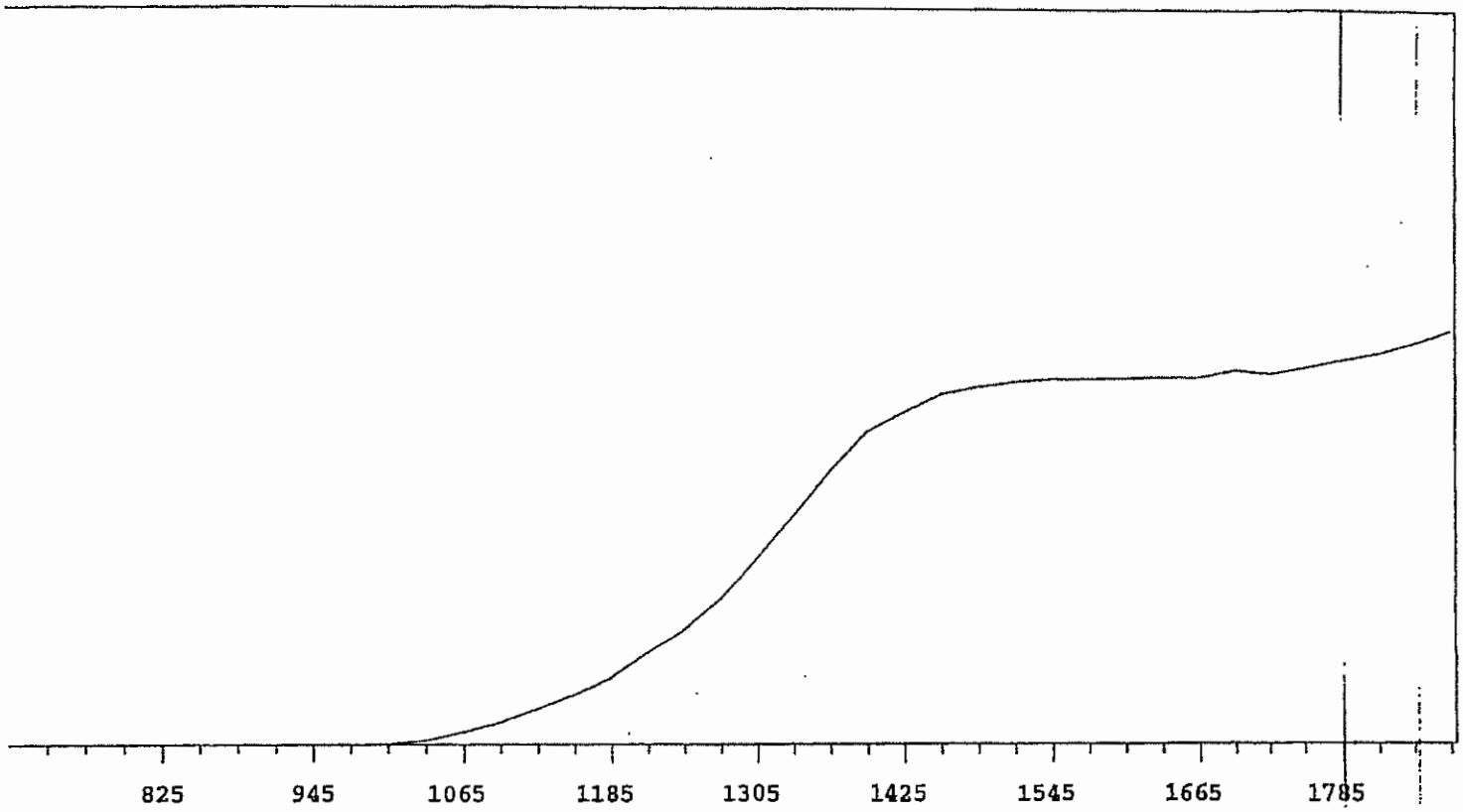



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +0.00 |
| 795 | 1 | +0.00 |
| 825 | 0 | +0.00 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 8 | >100 |
| 1005 | 75 | >100 |
| 1035 | 303 | >100 |
| 1065 | 872 | >100 |
| 1095 | 1656 | >100 |
| 1125 | 2729 | >100 |
| 1155 | 3862 | >100 |
| 1185 | 5425 | +98.19 |
| 1215 | 7256 | +88.82 |
| 1245 | 9510 | +81.89 |
| 1275 | 11944 | +74.07 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15202 | +66.36 |
| 1335 | 18216 | +57.86 |
| 1365 | 21597 | +45.58 |
| 1395 | 24648 | +32.96 |
| 1425 | 26505 | +19.92 |
| 1455 | 27475 | +11.42 |
| 1485 | 27836 | +7.08 |
| 1515 | 28609 | +4.51 |
| 1545 | 28896 | +2.93 |
| 1575 | 28862 | +1.66 |
| 1605 | 28969 | +0.36 |
| 1635 | 29292 | +0.80 |
| 1665 | 28836 | +1.06 |
| 1695 | 29279 | +1.48 |
| 1725 | 29439 | +3.59 |
| 1755 | 29642 | +4.07 |
| 1785 | 30243 | +6.51 |
| 1815 | 30699 | +7.79 |
| 1845 | 31876 | |
| 1875 | 32444 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

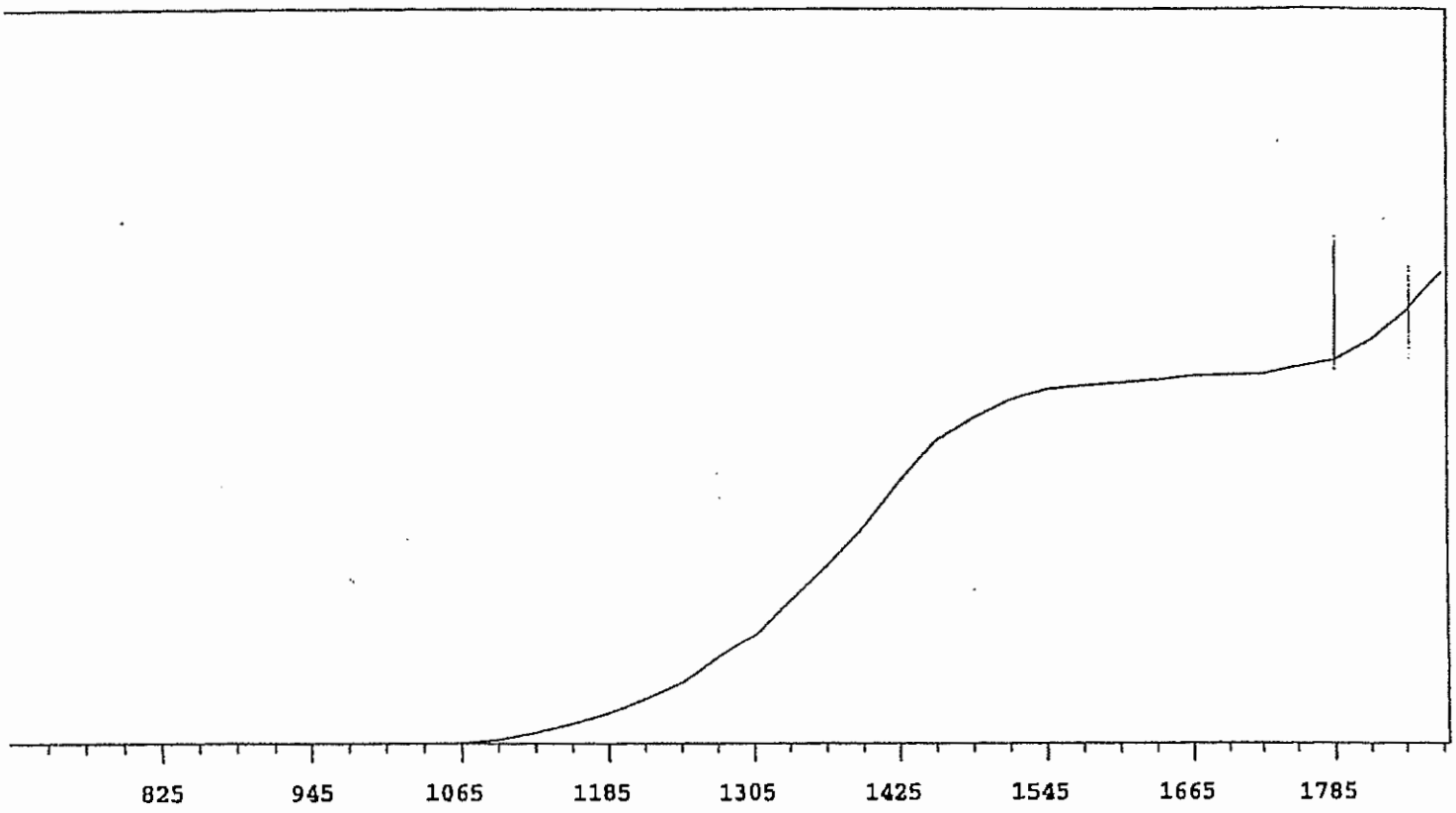



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +83.33 |
| 795 | 0 | -83.33 |
| 825 | 1 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +100.00 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 12 | >100 |
| 1005 | 91 | >100 |
| 1035 | 421 | >100 |
| 1065 | 1239 | >100 |
| 1095 | 2155 | >100 |
| 1125 | 3527 | >100 |
| 1155 | 4974 | >100 |
| 1185 | 6647 | +97.44 |
| 1215 | 9250 | +89.00 |
| 1245 | 12041 | +82.15 |
| 1275 | 15094 | +73.81 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19017 | +67.45 |
| 1335 | 23157 | +59.23 |
| 1365 | 27625 | +45.78 |
| 1395 | 31465 | +32.72 |
| 1425 | 33352 | +20.41 |
| 1455 | 35084 | +11.74 |
| 1485 | 35819 | +7.11 |
| 1515 | 36292 | +3.35 |
| 1545 | 36527 | +1.63 |
| 1575 | 36540 | +0.87 |
| 1605 | 36585 | +0.48 |
| 1635 | 36742 | +1.76 |
| 1665 | 36691 | +1.53 |
| 1695 | 37461 | +1.89 |
| 1725 | 37073 | +3.07 |
| 1755 | 37603 | +4.02 |
| 1785 | 38346 | +6.58 |
| 1815 | 39111 | +7.95 |
| 1845 | 40115 | |
| 1875 | 41409 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector B  7/1/2009

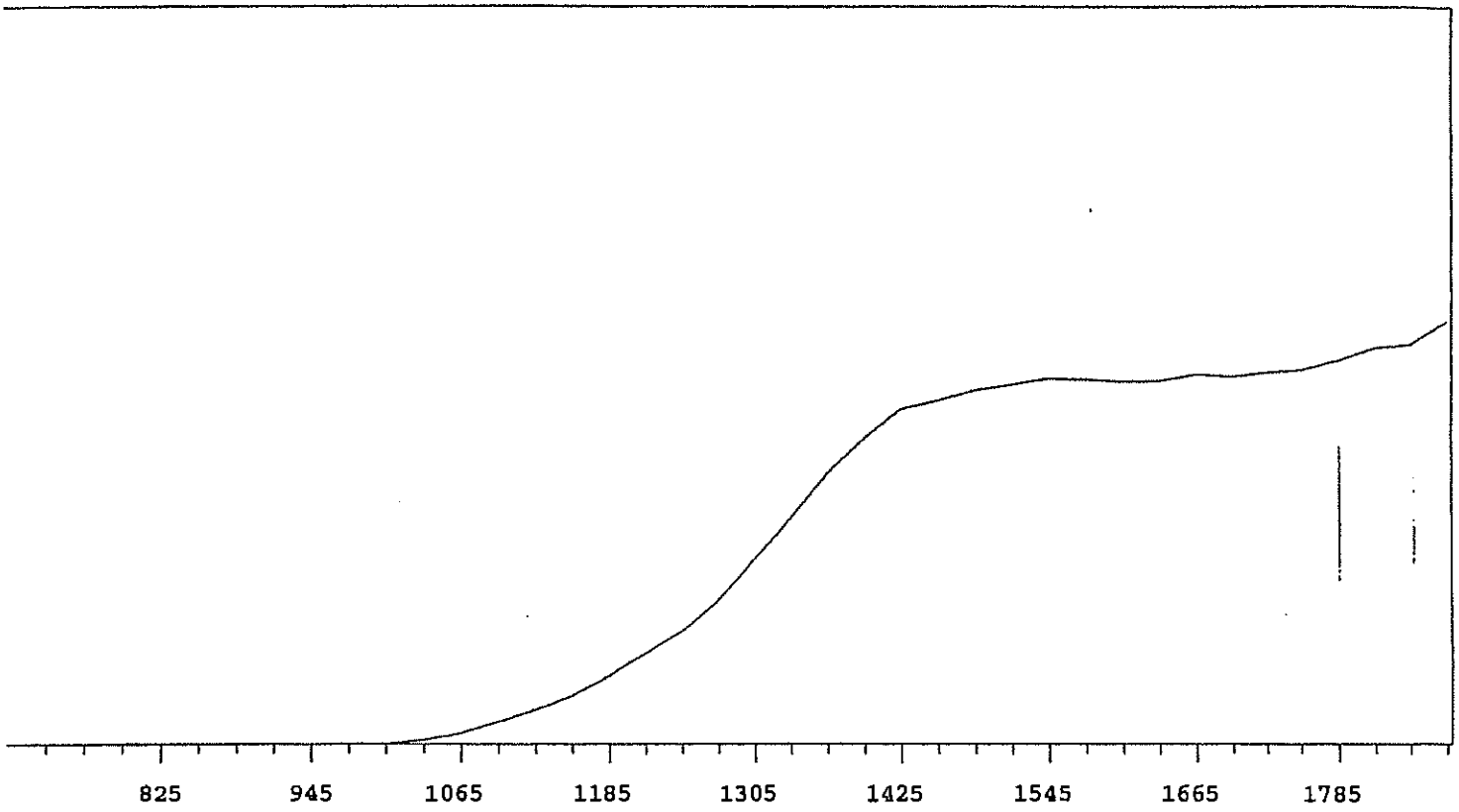
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 2 | >100 |
| 1005 | 3 | >100 |
| 1035 | 14 | >100 |
| 1065 | 127 | >100 |
| 1095 | 500 | >100 |
| 1125 | 1332 | >100 |
| 1155 | 2373 | >100 |
| 1185 | 3614 | >100 |
| 1215 | 5227 | >100 |
| 1245 | 7060 | +97.33 |
| 1275 | 9574 | +90.30 |
| 1305 | 12541 | +83.18 |
| 1335 | 16192 | +74.48 |
| 1365 | 20083 | +67.17 |
| 1395 | 24273 | +58.43 |
| 1425 | 29090 | +46.86 |
| 1455 | 33223 | +34.56 |
| 1485 | 35608 | +22.67 |
| 1515 | 37581 | +13.63 |
| 1545 | 38762 | +8.18 |
| 1575 | 39185 | +4.42 |
| 1605 | 39484 | +3.06 |
| 1635 | 39806 | +2.61 |
| 1665 | 40264 | +2.03 |
| 1695 | 40353 | +2.32 |
| 1725 | 40431 | +3.28 |
| 1755 | 41127 | +7.09 |
| 1785 | 41882 | +12.40 |
| 1815 | 44049 | +18.52 |
| 1845 | 46950 | |
| 1875 | 51097 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

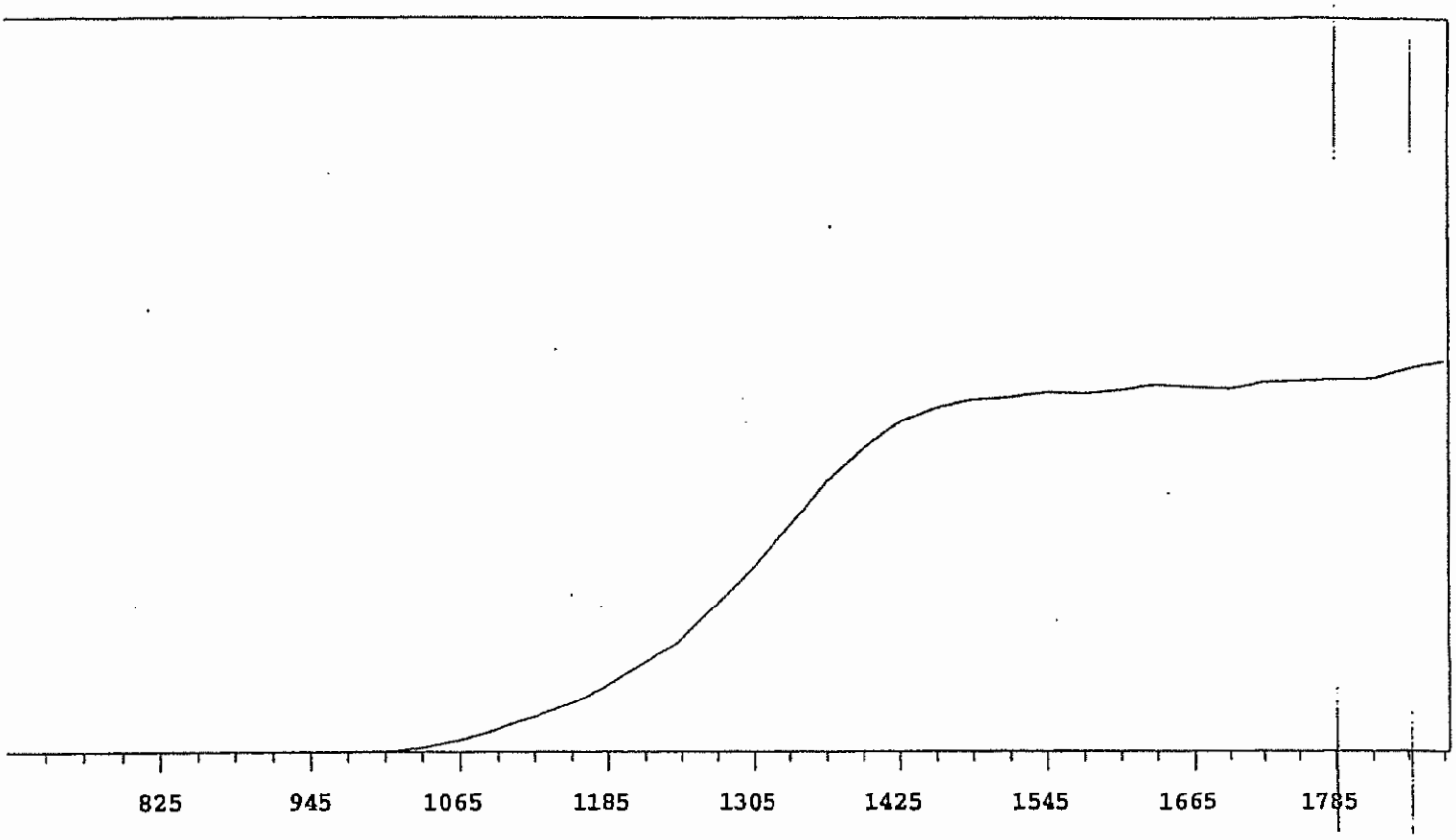



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 17 | >100 |
| 1005 | 87 | >100 |
| 1035 | 438 | >100 |
| 1065 | 1055 | >100 |
| 1095 | 2114 | >100 |
| 1125 | 3282 | >100 |
| 1155 | 4625 | >100 |
| 1185 | 6554 | +97.66 |
| 1215 | 8743 | +88.09 |
| 1245 | 11345 | +81.31 |
| 1275 | 14261 | +74.60 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18216 | +67.74 |
| 1335 | 21995 | +58.11 |
| 1365 | 26173 | +46.11 |
| 1395 | 29479 | +32.75 |
| 1425 | 32186 | +20.62 |
| 1455 | 33022 | +12.13 |
| 1485 | 33981 | +7.22 |
| 1515 | 34520 | +4.95 |
| 1545 | 35095 | +2.07 |
| 1575 | 35014 | +0.38 |
| 1605 | 34812 | +0.55 |
| 1635 | 34859 | +1.11 |
| 1665 | 35460 | +1.94 |
| 1695 | 35273 | +1.95 |
| 1725 | 35629 | +2.73 |
| 1755 | 35811 | +5.77 |
| 1785 | 36656 | +6.44 |
| 1815 | 37896 | +9.21 |
| 1845 | 38145 | |
| 1875 | 40283 | |

MPC 9600 Plateau  Instrument 2  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

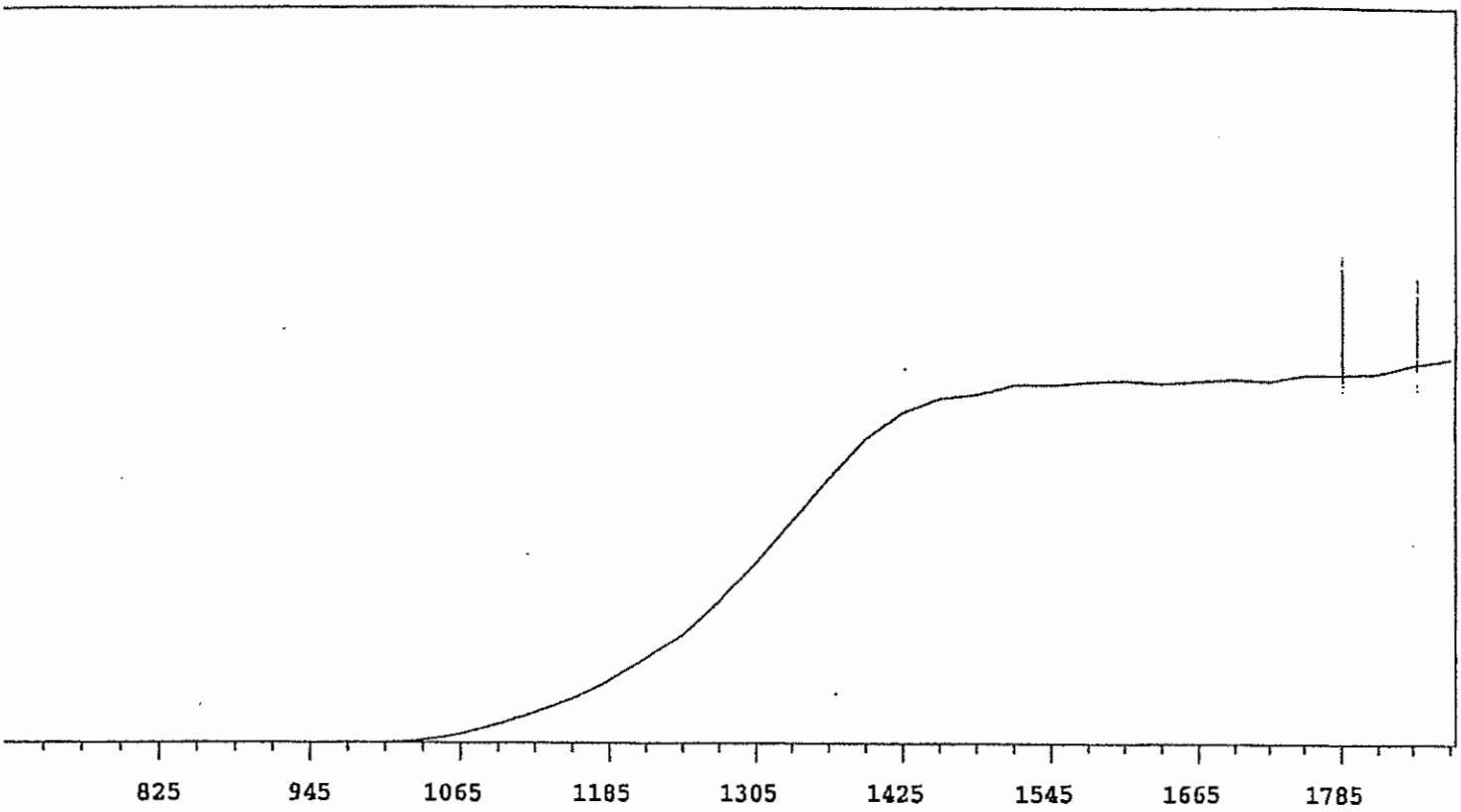



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +83.33 |
| 795 | 2 | +55.56 |
| 825 | 1 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 9 | >100 |
| 1005 | 89 | >100 |
| 1035 | 439 | >100 |
| 1065 | 1198 | >100 |
| 1095 | 2164 | >100 |
| 1125 | 3436 | >100 |
| 1155 | 4917 | >100 |
| 1185 | 6762 | +96.59 |
| 1215 | 9006 | +89.14 |
| 1245 | 11800 | +81.34 |
| 1275 | 15132 | +73.59 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18675 | +65.94 |
| 1335 | 22620 | +55.69 |
| 1365 | 26869 | +44.63 |
| 1395 | 29957 | +32.08 |
| 1425 | 32494 | +20.49 |
| 1455 | 33836 | +11.98 |
| 1485 | 34627 | +6.45 |
| 1515 | 34849 | +3.22 |
| 1545 | 35298 | +1.98 |
| 1575 | 35180 | +2.37 |
| 1605 | 35503 | +1.57 |
| 1635 | 36006 | +0.99 |
| 1665 | 35722 | +0.89 |
| 1695 | 35597 | +0.93 |
| 1725 | 36188 | +1.86 |
| 1755 | 36272 | +1.90 |
| 1785 | 36389 | +2.55 |
| 1815 | 36529 | +4.39 |
| 1845 | 37459 | |
| 1875 | 38170 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

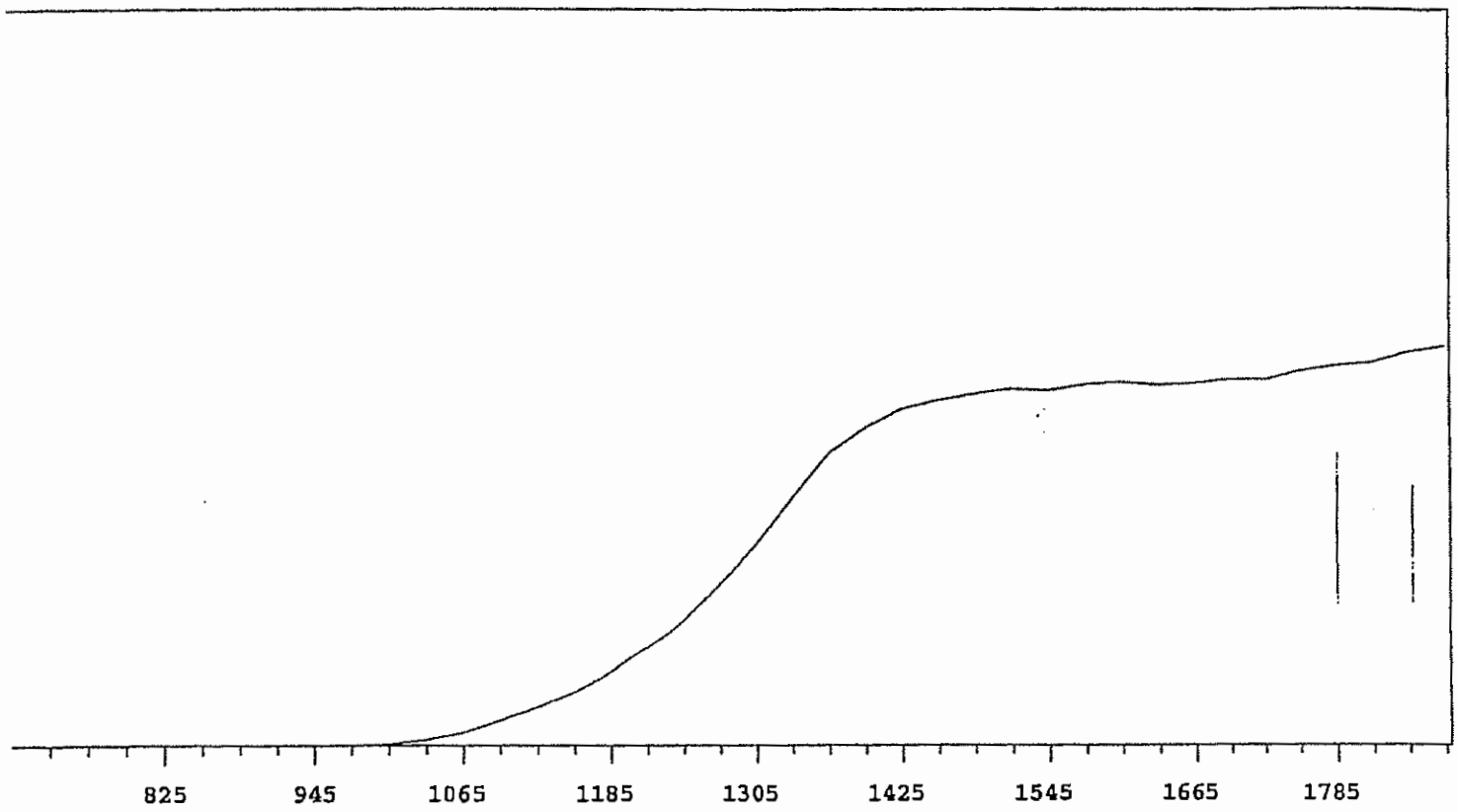



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +55.56 |
| 795 | 1 | >100 |
| 825 | 1 | +0.00 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 9 | >100 |
| 1005 | 53 | >100 |
| 1035 | 302 | >100 |
| 1065 | 878 | >100 |
| 1095 | 1805 | >100 |
| 1125 | 2887 | >100 |
| 1155 | 4163 | >100 |
| 1185 | 5842 | +99.81 |
| 1215 | 7959 | +90.90 |
| 1245 | 10323 | +83.03 |
| 1275 | 13250 | +75.91 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16654 | +68.57 |
| 1335 | 20416 | +59.26 |
| 1365 | 24191 | +47.28 |
| 1395 | 27643 | +34.04 |
| 1425 | 29891 | +21.08 |
| 1455 | 31183 | +12.30 |
| 1485 | 31558 | +6.67 |
| 1515 | 32444 | +4.05 |
| 1545 | 32413 | +2.90 |
| 1575 | 32704 | +0.81 |
| 1605 | 32837 | +0.71 |
| 1635 | 32629 | +0.49 |
| 1665 | 32797 | +0.16 |
| 1695 | 32964 | +1.32 |
| 1725 | 32746 | +1.40 |
| 1755 | 33308 | +1.56 |
| 1785 | 33318 | +3.21 |
| 1815 | 33456 | +3.92 |
| 1845 | 34283 | |
| 1875 | 34815 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

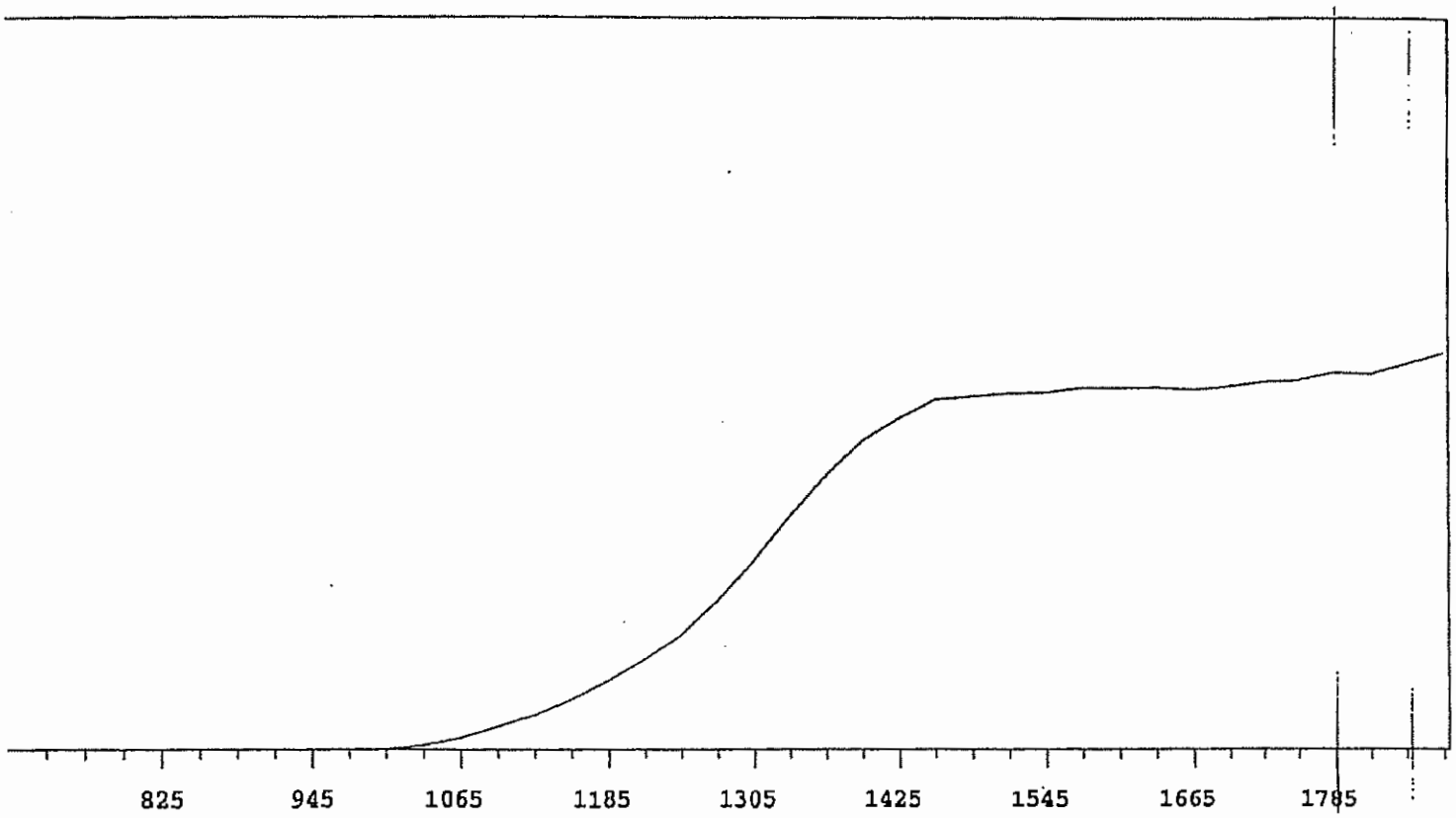



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 1 | |
| 765 | 0 | -55.56 |
| 795 | 0 | >100 |
| 825 | 1 | >100 |
| 855 | 3 | +33.33 |
| 885 | 0 | +0.00 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 29 | >100 |
| 1005 | 165 | >100 |
| 1035 | 613 | >100 |
| 1065 | 1394 | >100 |
| 1095 | 2558 | >100 |
| 1125 | 3702 | >100 |
| 1155 | 5222 | >100 |
| 1185 | 7161 | +96.06 |
| 1215 | 9507 | +89.18 |
| 1245 | 12552 | +81.52 |
| 1275 | 16030 | +73.64 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19810 | +64.73 |
| 1335 | 23962 | +52.62 |
| 1365 | 28091 | +39.27 |
| 1395 | 30594 | +25.61 |
| 1425 | 32381 | +14.86 |
| 1455 | 33206 | +8.91 |
| 1485 | 33832 | +4.41 |
| 1515 | 34260 | +3.01 |
| 1545 | 34071 | +2.33 |
| 1575 | 34623 | +1.34 |
| 1605 | 34848 | +1.22 |
| 1635 | 34564 | +0.89 |
| 1665 | 34733 | +1.01 |
| 1695 | 35144 | +2.76 |
| 1725 | 35084 | +3.66 |
| 1755 | 35839 | +3.97 |
| 1785 | 36332 | +5.39 |
| 1815 | 36654 | +5.35 |
| 1845 | 37609 | |
| 1875 | 38164 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector C  7/1/2009

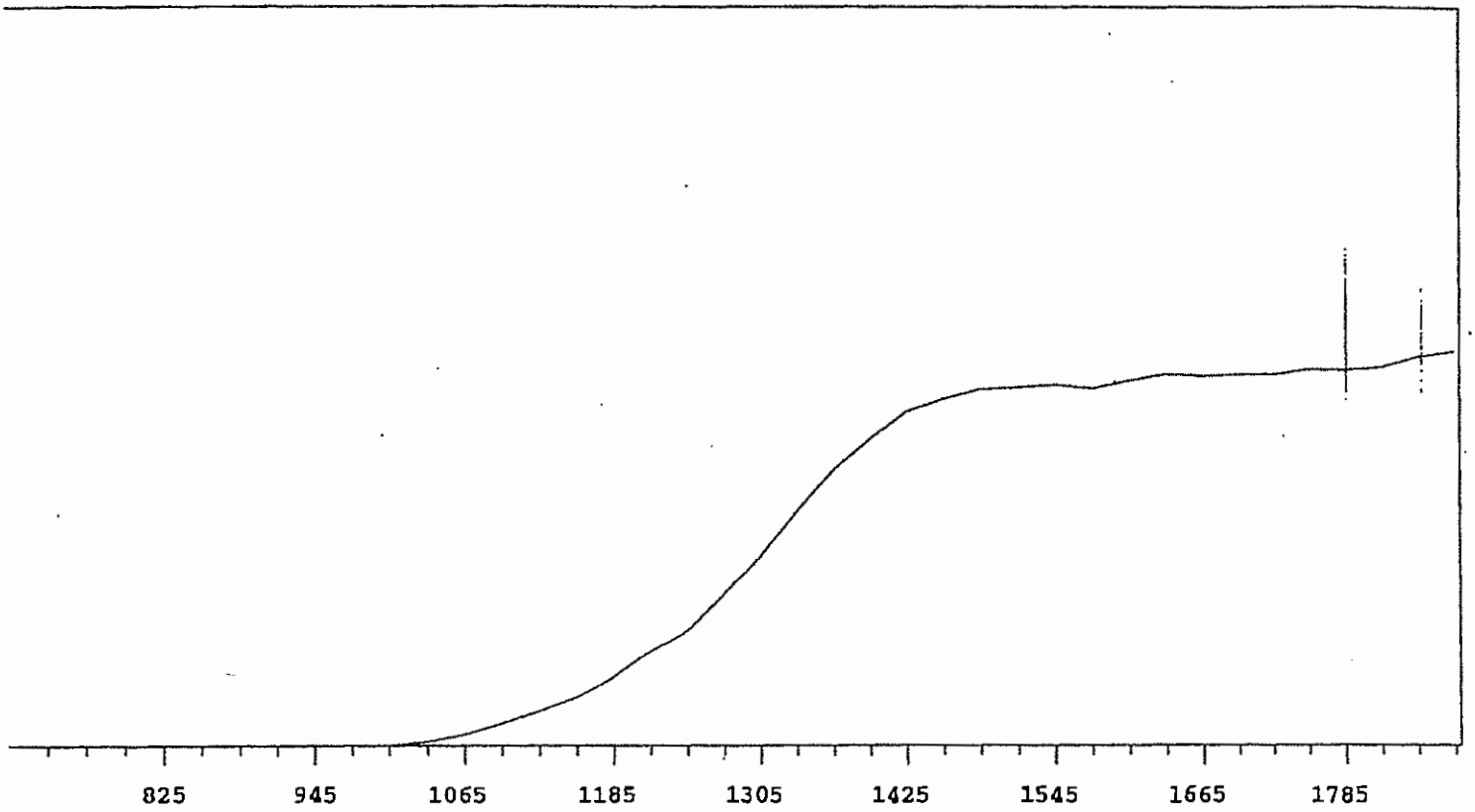
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 1 | |
| 765 | 1 | |
| 795 | 0 | >100 |
| 825 | 0 | +0.00 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 1 | >100 |
| 945 | 1 | >100 |
| 975 | 17 | >100 |
| 1005 | 122 | >100 |
| 1035 | 533 | >100 |
| 1065 | 1287 | >100 |
| 1095 | 2493 | >100 |
| 1125 | 3753 | >100 |
| 1155 | 5482 | >100 |
| 1185 | 7538 | +99.39 |
| 1215 | 10305 | +90.31 |
| 1245 | 13415 | +82.57 |
| 1275 | 17141 | +75.13 |
| 1305 | 21412 | +66.80 |
| 1335 | 26262 | +56.32 |
| 1365 | 30679 | +43.71 |
| 1395 | 34466 | +31.61 |
| 1425 | 36949 | +20.14 |
| 1455 | 38998 | +11.16 |
| 1485 | 39313 | +5.34 |
| 1515 | 39625 | +2.44 |
| 1545 | 39751 | +2.04 |
| 1575 | 40227 | +1.45 |
| 1605 | 40228 | +0.56 |
| 1635 | 40255 | +0.13 |
| 1665 | 40075 | +1.22 |
| 1695 | 40384 | +1.95 |
| 1725 | 40900 | +3.50 |
| 1755 | 41028 | +3.05 |
| 1785 | 41899 | +3.71 |
| 1815 | 41767 | +5.64 |
| 1845 | 42852 | |
| 1875 | 44132 | |

MPC 9600 Plateau  Instrument 3  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

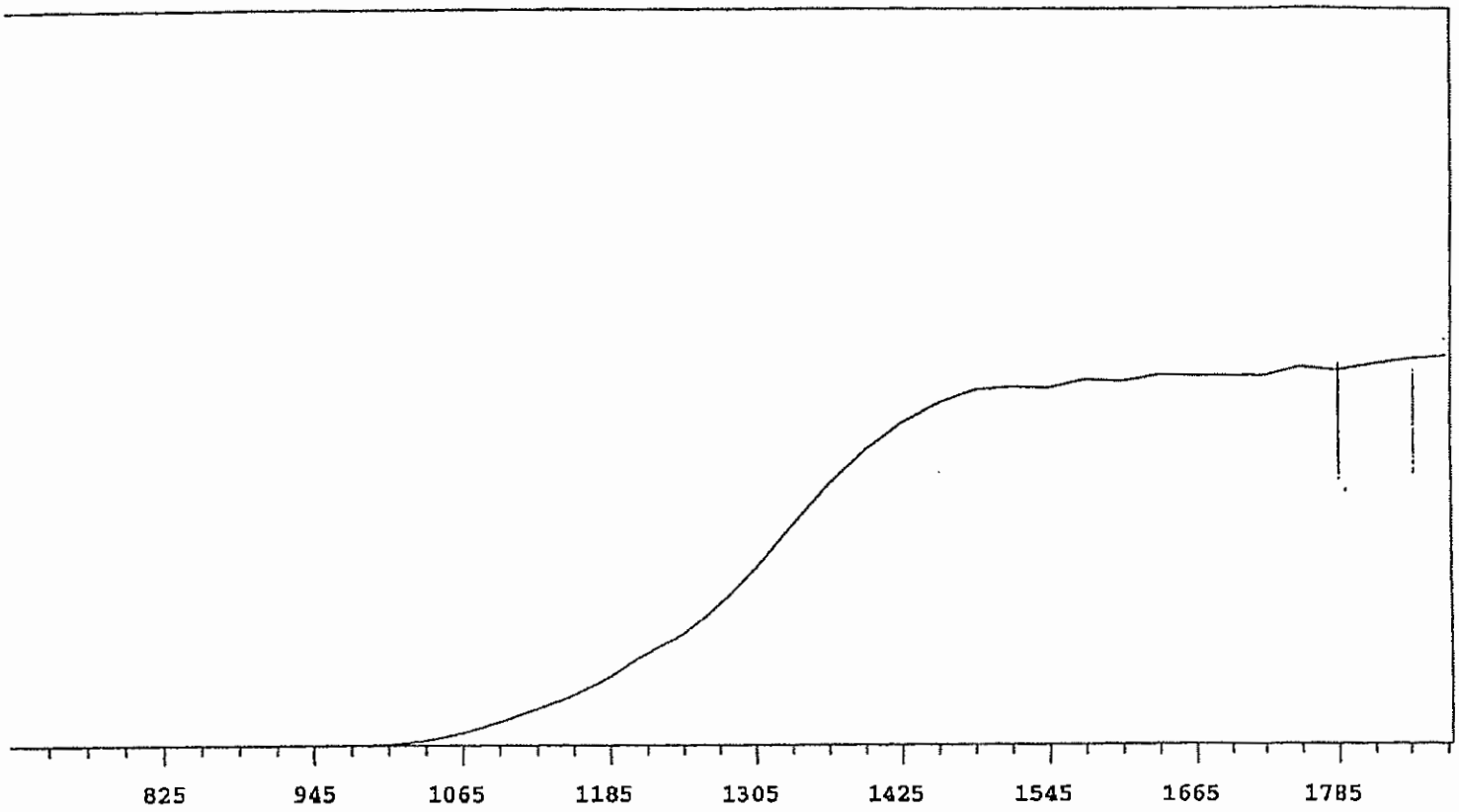



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +0.00 |
| 795 | 1 | >100 |
| 825 | 0 | +83.33 |
| 855 | 0 | -83.33 |
| 885 | 1 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 12 | >100 |
| 1005 | 51 | >100 |
| 1035 | 298 | >100 |
| 1065 | 848 | >100 |
| 1095 | 1649 | >100 |
| 1125 | 2535 | >100 |
| 1155 | 3602 | >100 |
| 1185 | 5036 | +98.31 |
| 1215 | 6880 | +91.37 |
| 1245 | 8822 | +82.29 |
| 1275 | 11546 | +74.61 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14171 | +66.45 |
| 1335 | 17362 | +54.90 |
| 1365 | 20310 | +43.83 |
| 1395 | 22647 | +30.82 |
| 1425 | 24551 | +20.19 |
| 1455 | 25440 | +11.69 |
| 1485 | 26124 | +5.90 |
| 1515 | 26245 | +2.21 |
| 1545 | 26428 | +1.39 |
| 1575 | 26151 | +2.69 |
| 1605 | 26721 | +2.72 |
| 1635 | 27168 | +2.80 |
| 1665 | 27007 | +0.87 |
| 1695 | 27135 | +0.70 |
| 1725 | 27089 | +1.24 |
| 1755 | 27414 | +1.43 |
| 1785 | 27373 | +3.21 |
| 1815 | 27581 | +4.34 |
| 1845 | 28332 | |
| 1875 | 28750 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

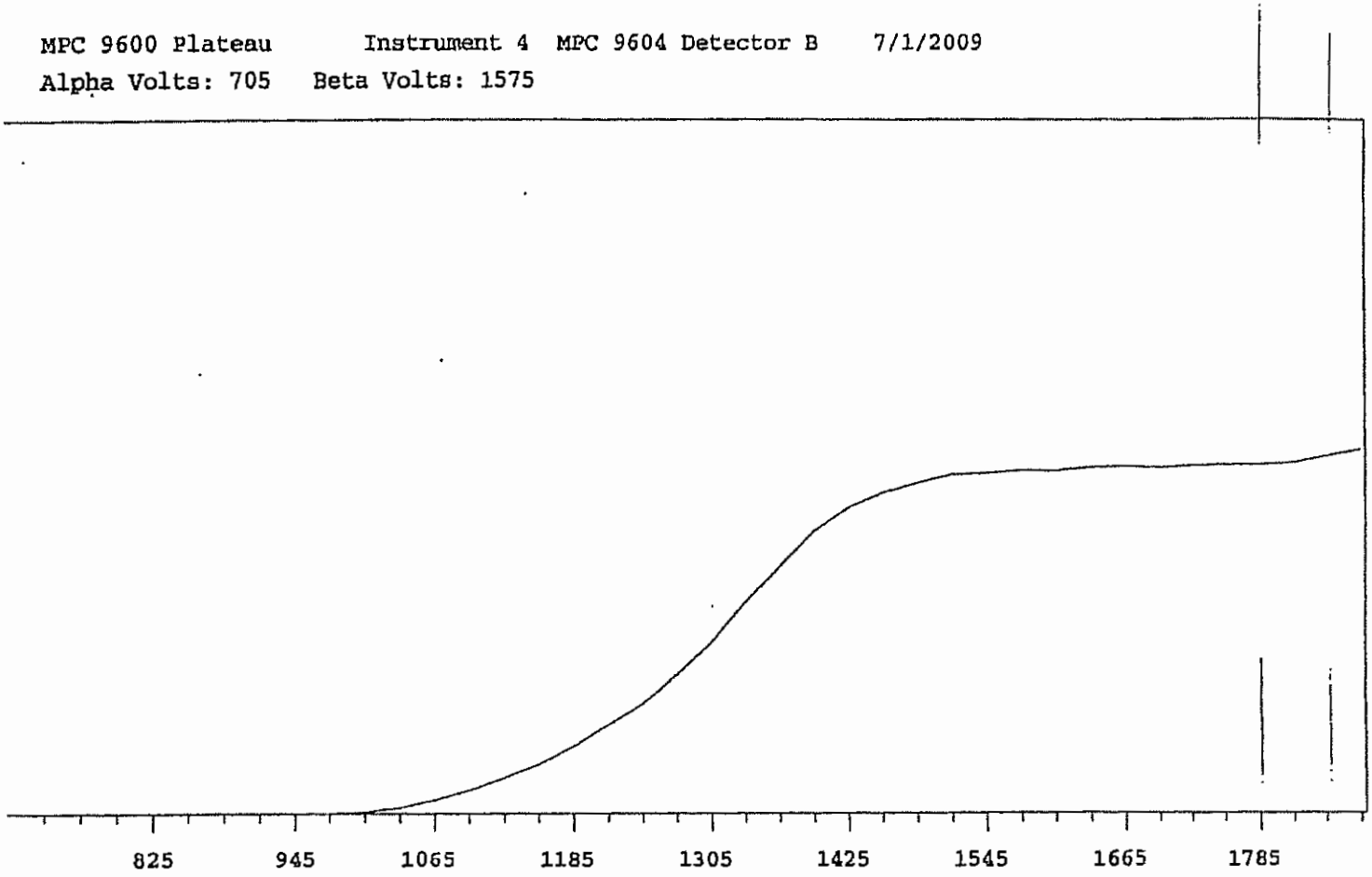



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 2 | +55.56 |
| 855 | 1 | >100 |
| 885 | 0 | -55.56 |
| 915 | 3 | >100 |
| 945 | 0 | >100 |
| 975 | 16 | >100 |
| 1005 | 114 | >100 |
| 1035 | 451 | >100 |
| 1065 | 1100 | >100 |
| 1095 | 2068 | >100 |
| 1125 | 3189 | >100 |
| 1155 | 4386 | >100 |
| 1185 | 6094 | +94.81 |
| 1215 | 8184 | +87.09 |
| 1245 | 10489 | +78.88 |
| 1275 | 13273 | +72.66 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16442 | +66.24 |
| 1335 | 20146 | +57.40 |
| 1365 | 23769 | +46.40 |
| 1395 | 26926 | +34.68 |
| 1425 | 29276 | +24.40 |
| 1455 | 31037 | +15.28 |
| 1485 | 32197 | +7.91 |
| 1515 | 32425 | +4.33 |
| 1545 | 32314 | +2.14 |
| 1575 | 33071 | +2.66 |
| 1605 | 32918 | +2.52 |
| 1635 | 33435 | +1.02 |
| 1665 | 33382 | +0.73 |
| 1695 | 33349 | +1.07 |
| 1725 | 33324 | +1.28 |
| 1755 | 34001 | +2.26 |
| 1785 | 33701 | +3.08 |
| 1815 | 34304 | +2.97 |
| 1845 | 34744 | |
| 1875 | 35012 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector B  7/1/2009

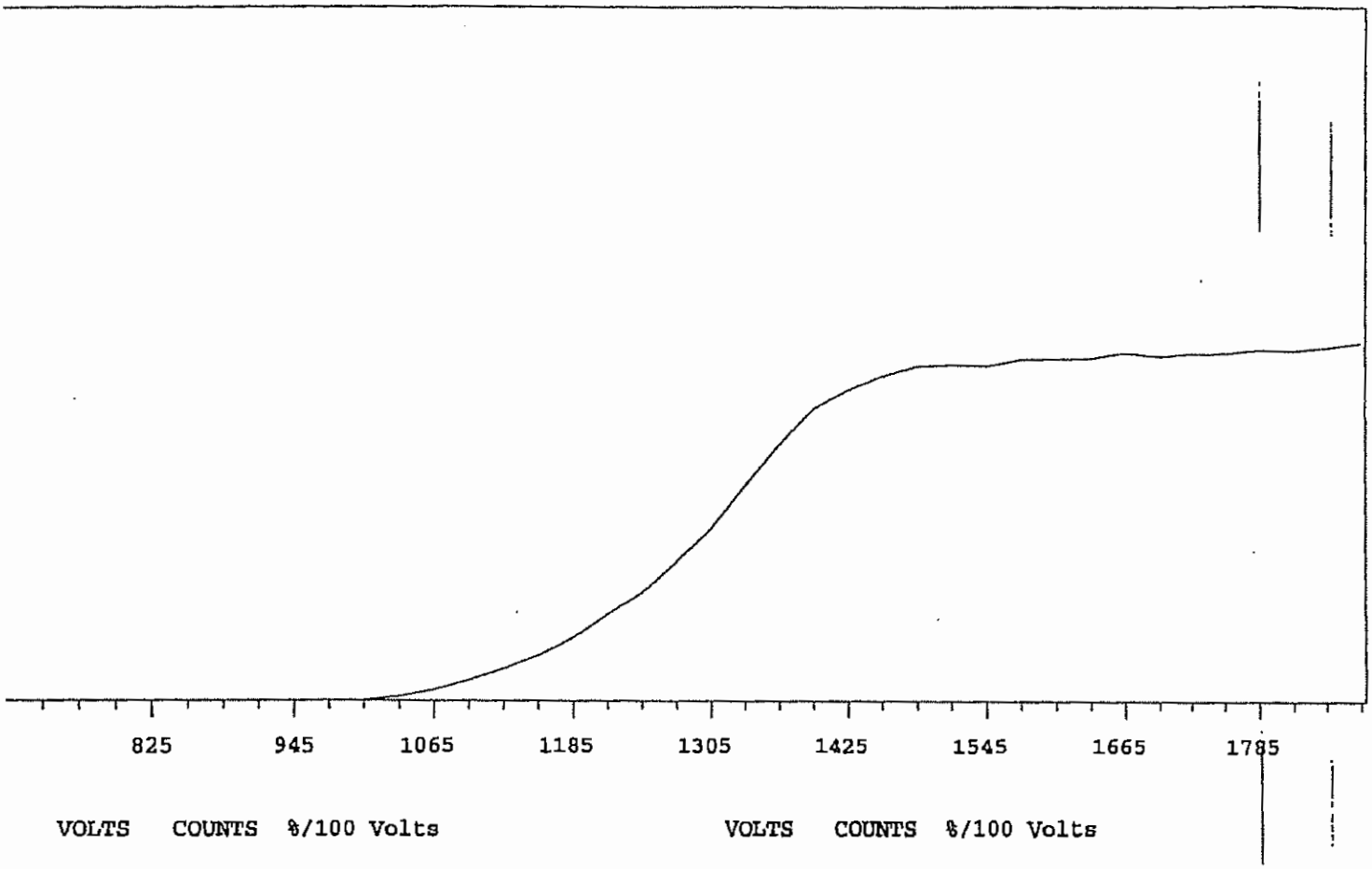
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +0.00 |
| 795 | 1 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 31 | >100 |
| 1005 | 176 | >100 |
| 1035 | 550 | >100 |
| 1065 | 1218 | >100 |
| 1095 | 2114 | >100 |
| 1125 | 3212 | >100 |
| 1155 | 4416 | >100 |
| 1185 | 6066 | +92.28 |
| 1215 | 7936 | +85.60 |
| 1245 | 10288 | +76.79 |
| 1275 | 13020 | +70.59 |
| 1305 | 15747 | +62.38 |
| 1335 | 19230 | +54.19 |
| 1365 | 22255 | +44.46 |
| 1395 | 25299 | +32.45 |
| 1425 | 27370 | +22.24 |
| 1455 | 28625 | +14.10 |
| 1485 | 29467 | +8.56 |
| 1515 | 30213 | +5.29 |
| 1545 | 30326 | +2.77 |
| 1575 | 30564 | +1.57 |
| 1605 | 30548 | +1.52 |
| 1635 | 30820 | +0.85 |
| 1665 | 30898 | +0.79 |
| 1695 | 30779 | +0.44 |
| 1725 | 30934 | +0.45 |
| 1755 | 31008 | +0.96 |
| 1785 | 30991 | +2.01 |
| 1815 | 31196 | +3.80 |
| 1845 | 31781 | |
| 1875 | 32406 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

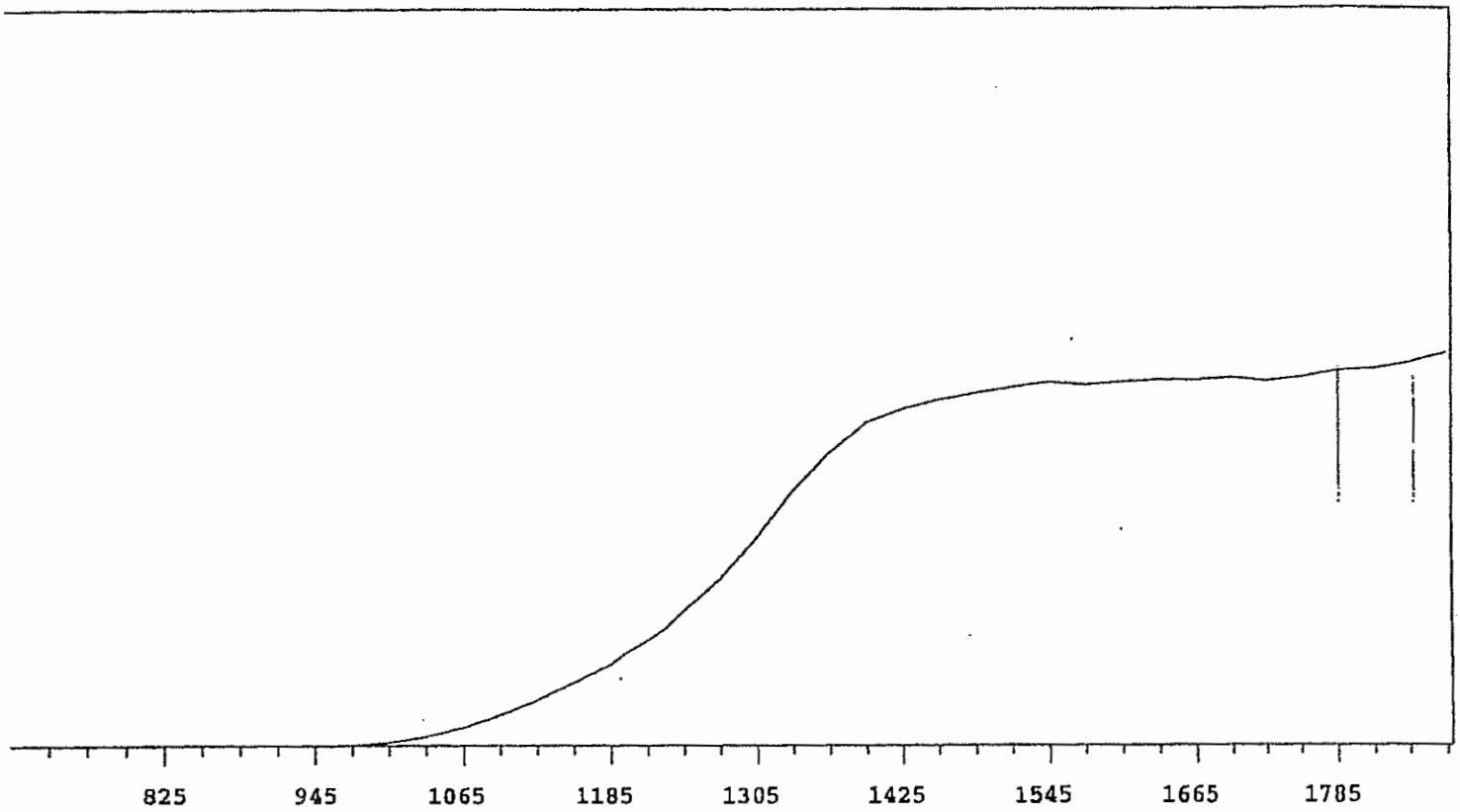



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +55.56 |
| 795 | 2 | +0.00 |
| 825 | 0 | -55.56 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 24 | >100 |
| 1005 | 134 | >100 |
| 1035 | 558 | >100 |
| 1065 | 1361 | >100 |
| 1095 | 2511 | >100 |
| 1125 | 3762 | >100 |
| 1155 | 5246 | >100 |
| 1185 | 7268 | +96.29 |
| 1215 | 9733 | +88.98 |
| 1245 | 12701 | +79.94 |
| 1275 | 16176 | +73.13 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19796 | +65.77 |
| 1335 | 24338 | +57.55 |
| 1365 | 28686 | +45.86 |
| 1395 | 32750 | +32.27 |
| 1425 | 34919 | +20.83 |
| 1455 | 36434 | +11.45 |
| 1485 | 37407 | +5.80 |
| 1515 | 37623 | +3.32 |
| 1545 | 37528 | +2.07 |
| 1575 | 38277 | +2.12 |
| 1605 | 38338 | +2.70 |
| 1635 | 38426 | +1.12 |
| 1665 | 39007 | +1.06 |
| 1695 | 38592 | +0.64 |
| 1725 | 38870 | +0.63 |
| 1755 | 38868 | +1.30 |
| 1785 | 39238 | +1.45 |
| 1815 | 39169 | +2.34 |
| 1845 | 39570 | |
| 1875 | 40086 | |

MPC 9600 Plateau  Instrument 4  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

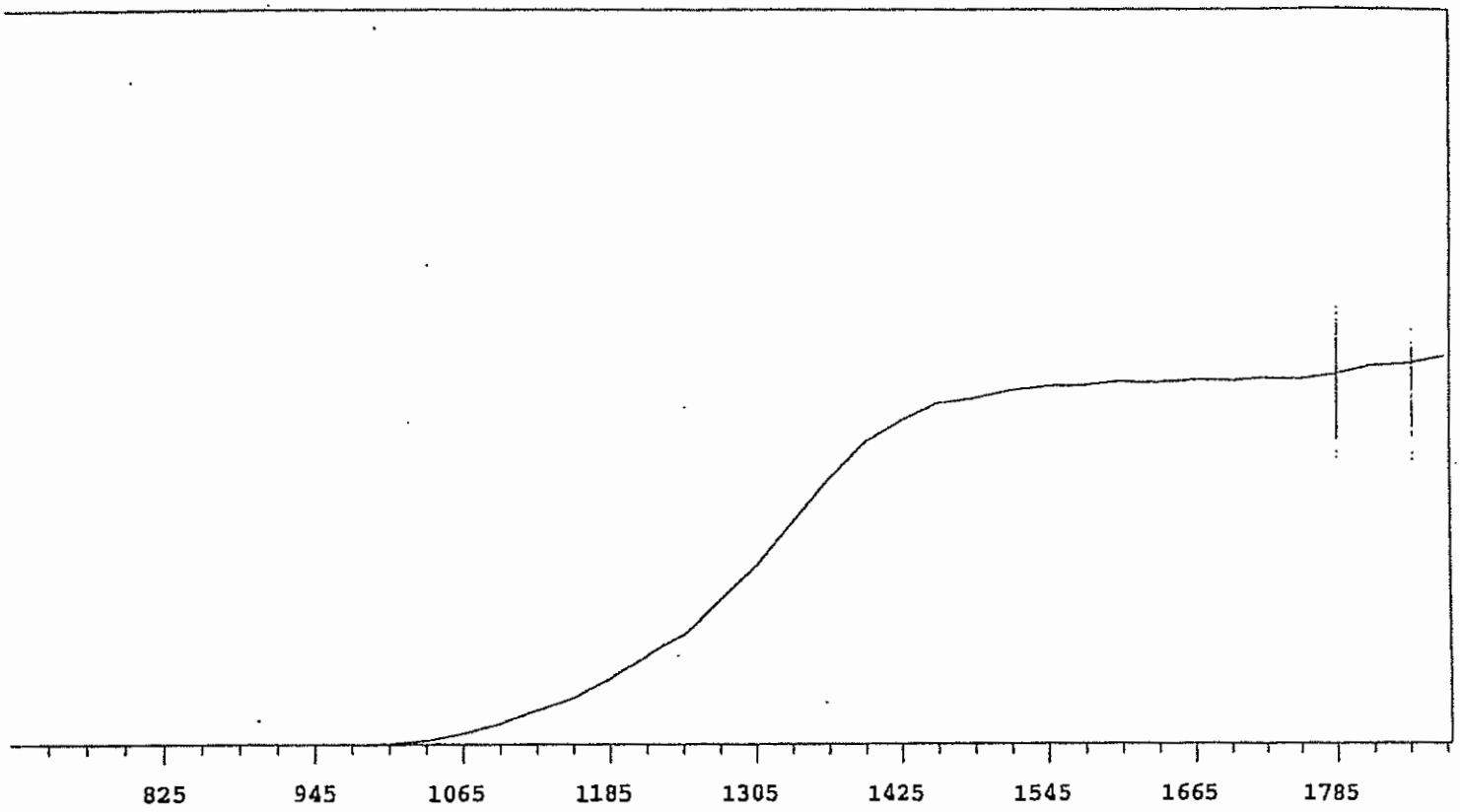



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +0.00 |
| 795 | 0 | >100 |
| 825 | 1 | +83.33 |
| 855 | 1 | +55.56 |
| 885 | 0 | +0.00 |
| 915 | 1 | >100 |
| 945 | 1 | >100 |
| 975 | 60 | >100 |
| 1005 | 297 | >100 |
| 1035 | 855 | >100 |
| 1065 | 1647 | >100 |
| 1095 | 2700 | >100 |
| 1125 | 3921 | >100 |
| 1155 | 5471 | +96.54 |
| 1185 | 7042 | +90.21 |
| 1215 | 9405 | +82.23 |
| 1245 | 12266 | +76.33 |
| 1275 | 14989 | +69.38 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18491 | +61.09 |
| 1335 | 22444 | +51.56 |
| 1365 | 25756 | +37.44 |
| 1395 | 28379 | +23.82 |
| 1425 | 29517 | +14.00 |
| 1455 | 30309 | +8.08 |
| 1485 | 30874 | +6.03 |
| 1515 | 31345 | +3.66 |
| 1545 | 31782 | +2.17 |
| 1575 | 31567 | +1.31 |
| 1605 | 31789 | +0.78 |
| 1635 | 31963 | +1.34 |
| 1665 | 31956 | +0.29 |
| 1695 | 32123 | +0.20 |
| 1725 | 31850 | +1.46 |
| 1755 | 32114 | +2.39 |
| 1785 | 32665 | +3.95 |
| 1815 | 32876 | +4.96 |
| 1845 | 33399 | |
| 1875 | 34206 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

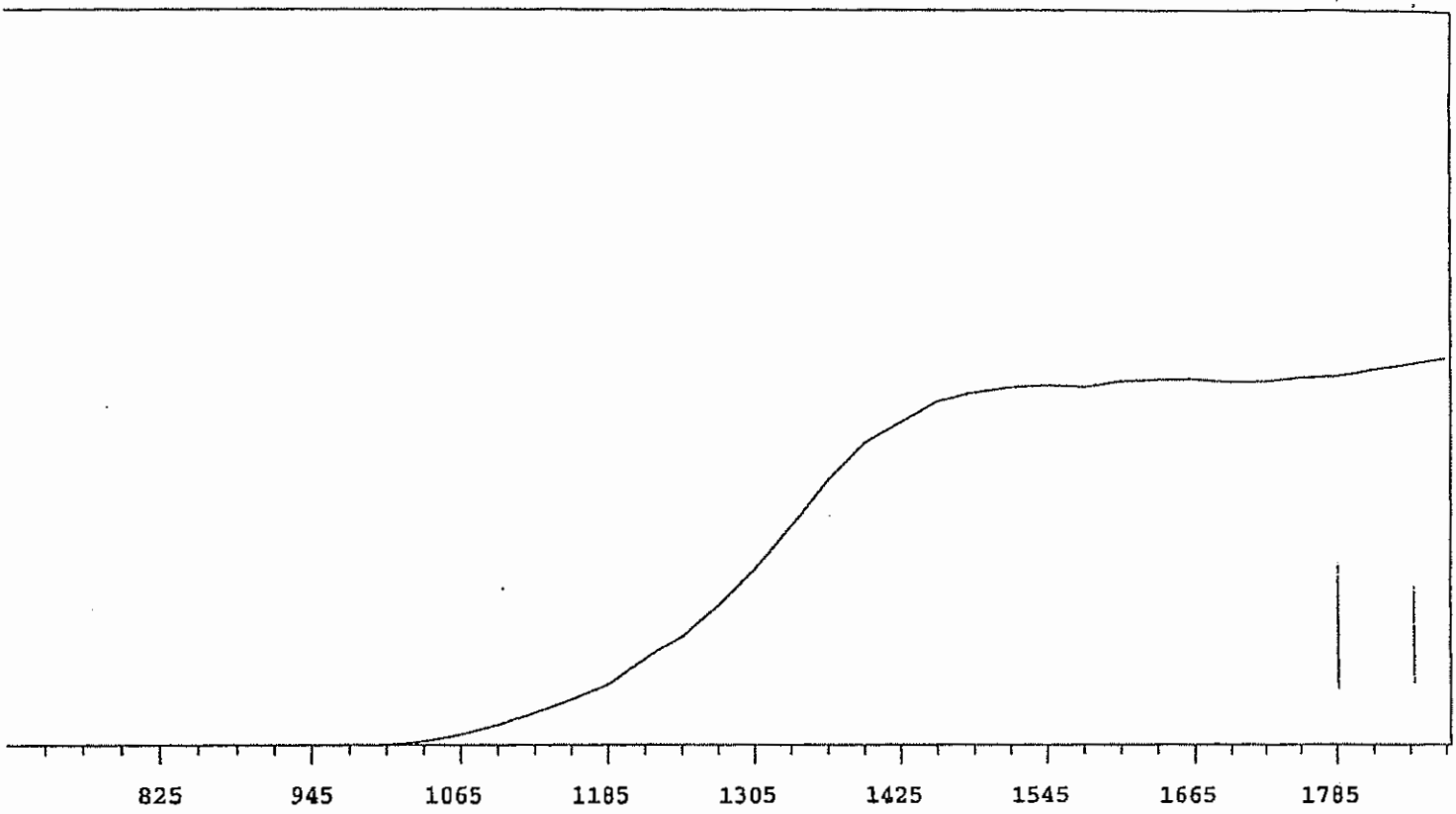



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | |
| 795 | 1 | +83.33 |
| 825 | 1 | -83.33 |
| 855 | 1 | >100 |
| 885 | 0 | -55.56 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 9 | >100 |
| 1005 | 76 | >100 |
| 1035 | 308 | >100 |
| 1065 | 814 | >100 |
| 1095 | 1600 | >100 |
| 1125 | 2598 | >100 |
| 1155 | 3596 | >100 |
| 1185 | 5065 | +96.05 |
| 1215 | 6773 | +90.23 |
| 1245 | 8717 | +81.43 |
| 1275 | 11391 | +74.83 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13974 | +68.00 |
| 1335 | 17170 | +58.62 |
| 1365 | 20456 | +47.04 |
| 1395 | 23332 | +33.83 |
| 1425 | 24996 | +21.10 |
| 1455 | 26290 | +12.40 |
| 1485 | 26683 | +7.74 |
| 1515 | 27270 | +4.43 |
| 1545 | 27590 | +3.48 |
| 1575 | 27635 | +1.71 |
| 1605 | 27932 | +1.20 |
| 1635 | 27807 | +0.88 |
| 1665 | 28006 | +0.62 |
| 1695 | 27964 | +0.63 |
| 1725 | 28112 | +0.98 |
| 1755 | 28020 | +2.84 |
| 1785 | 28392 | +3.76 |
| 1815 | 29028 | +5.17 |
| 1845 | 29220 | |
| 1875 | 29849 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

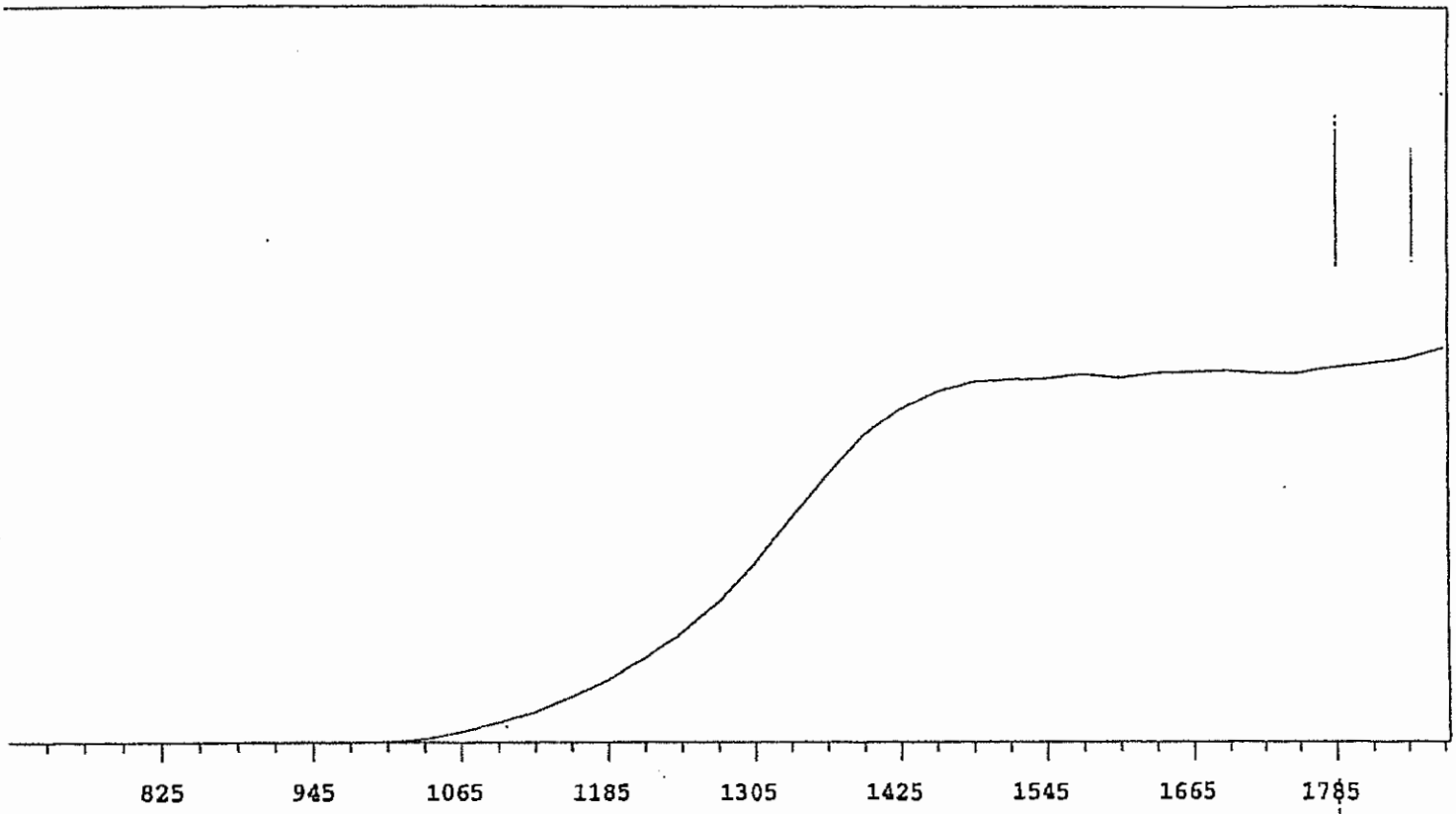



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 1 | >100 |
| 855 | 1 | +41.67 |
| 885 | 2 | -33.33 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 17 | >100 |
| 1005 | 87 | >100 |
| 1035 | 336 | >100 |
| 1065 | 1010 | >100 |
| 1095 | 1955 | >100 |
| 1125 | 3124 | >100 |
| 1155 | 4486 | >100 |
| 1185 | 6017 | >100 |
| 1215 | 8507 | +91.20 |
| 1245 | 11148 | +82.59 |
| 1275 | 14003 | +74.21 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 17414 | +68.46 |
| 1335 | 21540 | +59.98 |
| 1365 | 25854 | +46.75 |
| 1395 | 29222 | +33.38 |
| 1425 | 31128 | +21.52 |
| 1455 | 32995 | +13.26 |
| 1485 | 33846 | +8.09 |
| 1515 | 34289 | +3.25 |
| 1545 | 34528 | +2.00 |
| 1575 | 34311 | +1.78 |
| 1605 | 34866 | +1.78 |
| 1635 | 35046 | +1.14 |
| 1665 | 35087 | -0.26 |
| 1695 | 34795 | +0.11 |
| 1725 | 34857 | +0.93 |
| 1755 | 35220 | +2.81 |
| 1785 | 35363 | +3.98 |
| 1815 | 36028 | +4.79 |
| 1845 | 36577 | |
| 1875 | 37207 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector C  7/1/2009

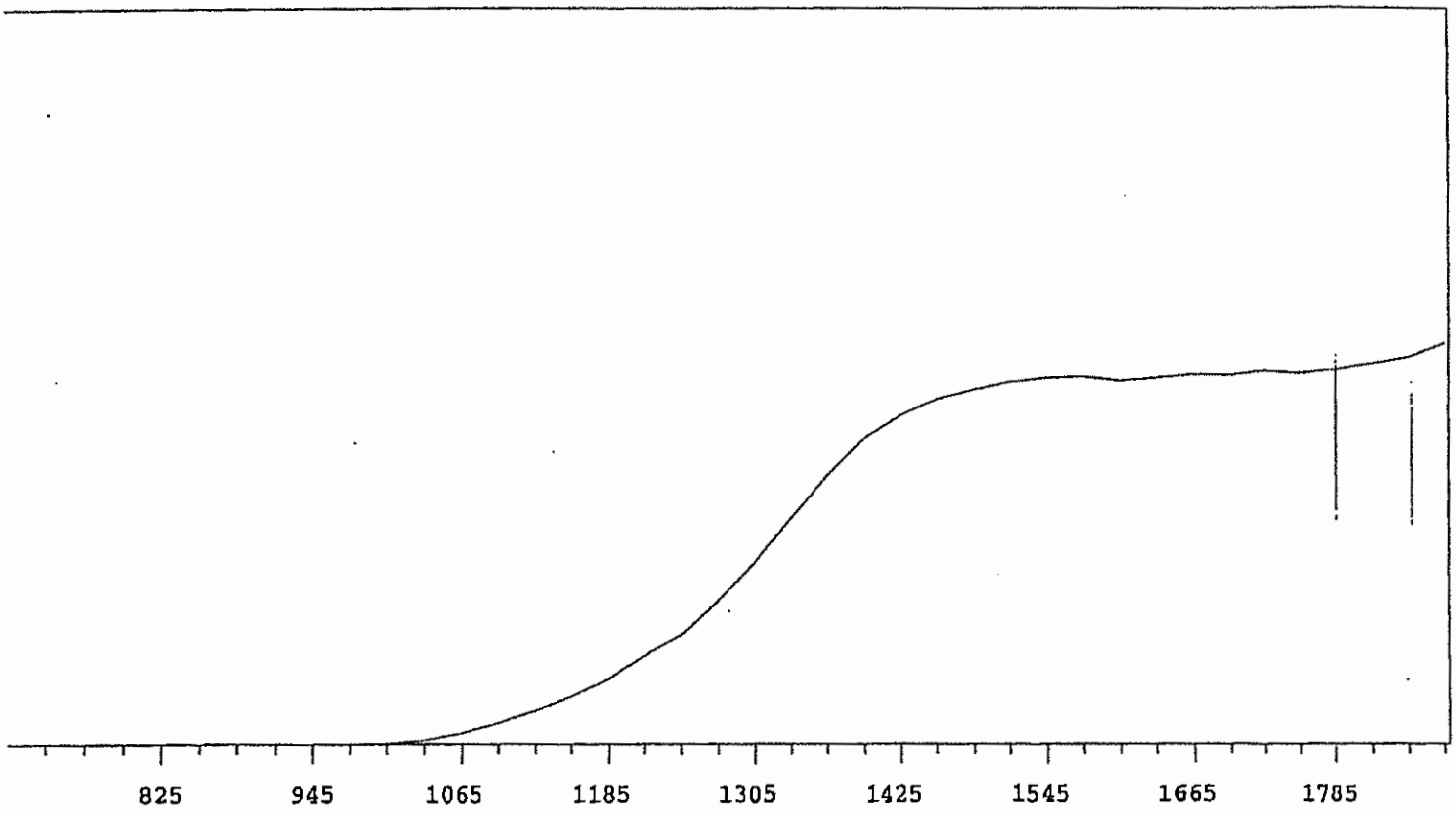
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 1 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 7 | >100 |
| 1005 | 56 | >100 |
| 1035 | 305 | >100 |
| 1065 | 982 | >100 |
| 1095 | 1874 | >100 |
| 1125 | 2890 | >100 |
| 1155 | 4260 | >100 |
| 1185 | 6001 | >100 |
| 1215 | 8050 | +91.54 |
| 1245 | 10895 | +82.98 |
| 1275 | 13556 | +76.26 |
| 1305 | 17085 | +68.24 |
| 1335 | 21135 | +59.99 |
| 1365 | 25066 | +47.39 |
| 1395 | 28530 | +33.93 |
| 1425 | 30823 | +22.30 |
| 1455 | 32287 | +12.93 |
| 1485 | 33217 | +6.71 |
| 1515 | 33474 | +3.57 |
| 1545 | 33517 | +1.17 |
| 1575 | 33921 | +1.13 |
| 1605 | 33584 | +1.27 |
| 1635 | 34014 | +1.12 |
| 1665 | 34116 | +0.98 |
| 1695 | 34225 | -0.22 |
| 1725 | 33980 | +0.58 |
| 1755 | 33971 | +1.96 |
| 1785 | 34541 | +3.64 |
| 1815 | 34954 | +5.38 |
| 1845 | 35375 | |
| 1875 | 36384 | |

MPC 9600 Plateau  Instrument 5  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

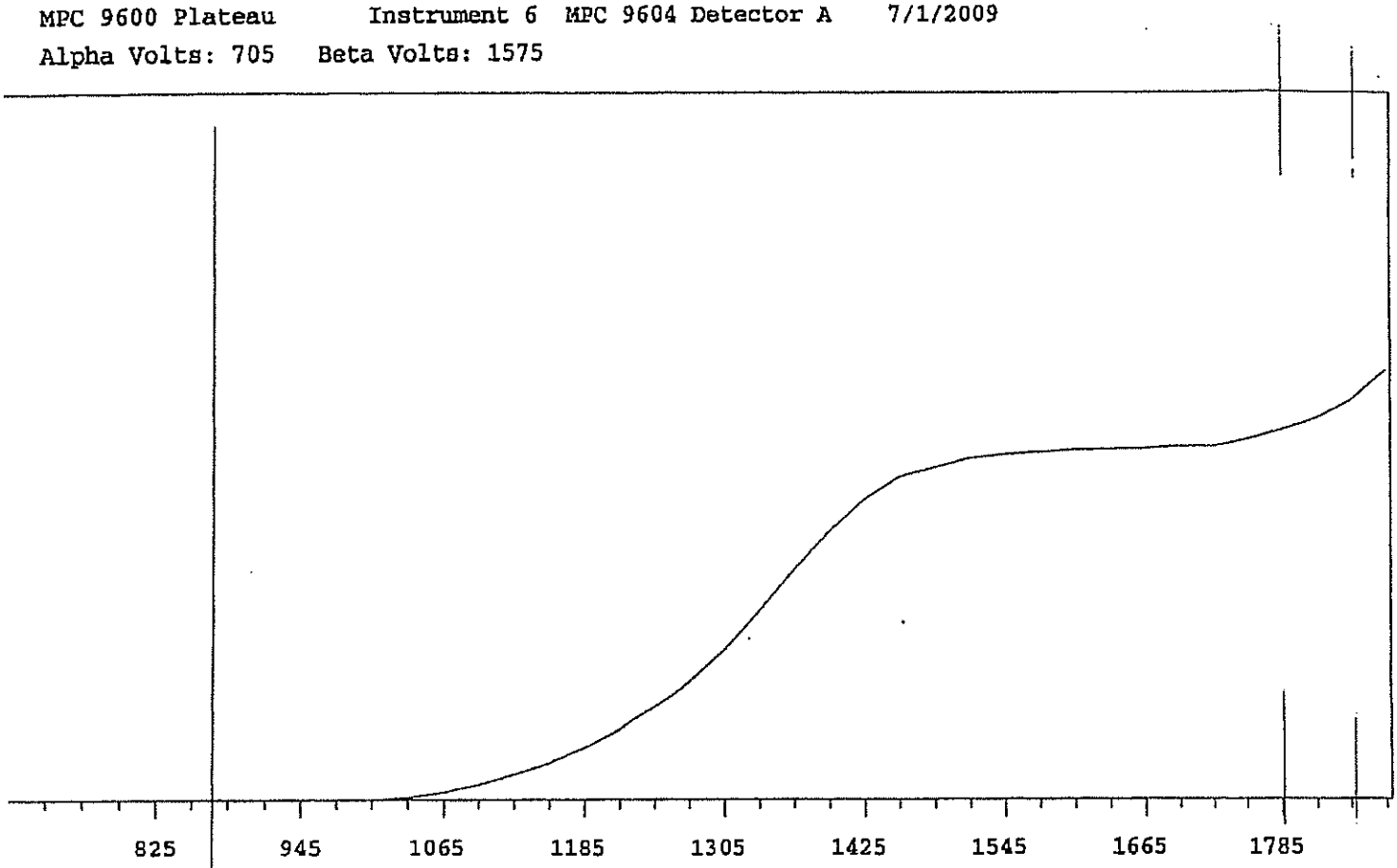



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 6 | >100 |
| 1005 | 81 | >100 |
| 1035 | 318 | >100 |
| 1065 | 897 | >100 |
| 1095 | 1710 | >100 |
| 1125 | 2714 | >100 |
| 1155 | 3925 | >100 |
| 1185 | 5395 | +97.31 |
| 1215 | 7282 | +88.49 |
| 1245 | 9426 | +81.36 |
| 1275 | 12007 | +75.65 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15025 | +68.87 |
| 1335 | 18640 | +58.97 |
| 1365 | 22048 | +45.84 |
| 1395 | 24877 | +32.08 |
| 1425 | 26653 | +20.83 |
| 1455 | 27899 | +13.08 |
| 1485 | 28670 | +8.43 |
| 1515 | 29257 | +5.13 |
| 1545 | 29568 | +2.06 |
| 1575 | 29683 | +0.52 |
| 1605 | 29362 | +0.57 |
| 1635 | 29589 | +0.80 |
| 1665 | 29870 | +1.82 |
| 1695 | 29783 | +0.90 |
| 1725 | 30077 | +0.75 |
| 1755 | 29889 | +2.02 |
| 1785 | 30152 | +3.33 |
| 1815 | 30656 | +6.54 |
| 1845 | 31211 | |
| 1875 | 32389 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

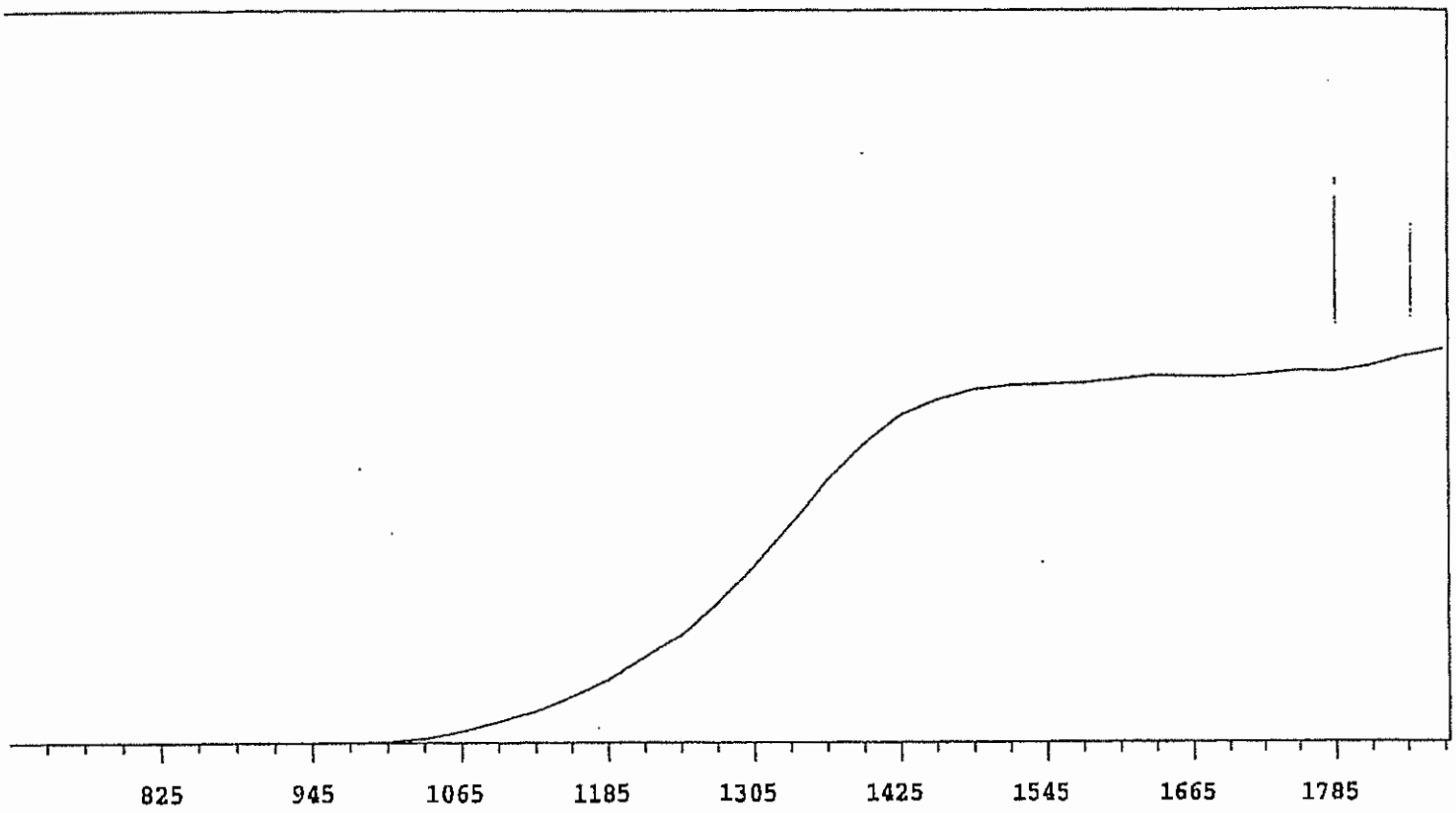



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 7 | >100 |
| 1005 | 31 | >100 |
| 1035 | 238 | >100 |
| 1065 | 810 | >100 |
| 1095 | 1637 | >100 |
| 1125 | 2743 | >100 |
| 1155 | 3932 | >100 |
| 1185 | 5579 | >100 |
| 1215 | 7602 | +94.41 |
| 1245 | 10078 | +84.86 |
| 1275 | 13091 | +77.67 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16217 | +71.57 |
| 1335 | 20184 | +63.76 |
| 1365 | 24605 | +53.98 |
| 1395 | 28528 | +41.40 |
| 1425 | 31675 | +28.02 |
| 1455 | 33899 | +17.93 |
| 1485 | 34826 | +10.65 |
| 1515 | 35815 | +6.13 |
| 1545 | 36225 | +4.15 |
| 1575 | 36456 | +2.28 |
| 1605 | 36747 | +1.47 |
| 1635 | 36801 | +1.26 |
| 1665 | 36859 | +0.85 |
| 1695 | 37095 | +1.85 |
| 1725 | 37072 | +4.01 |
| 1755 | 37724 | +6.65 |
| 1785 | 38802 | +10.33 |
| 1815 | 40036 | +14.71 |
| 1845 | 41975 | |
| 1875 | 45123 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

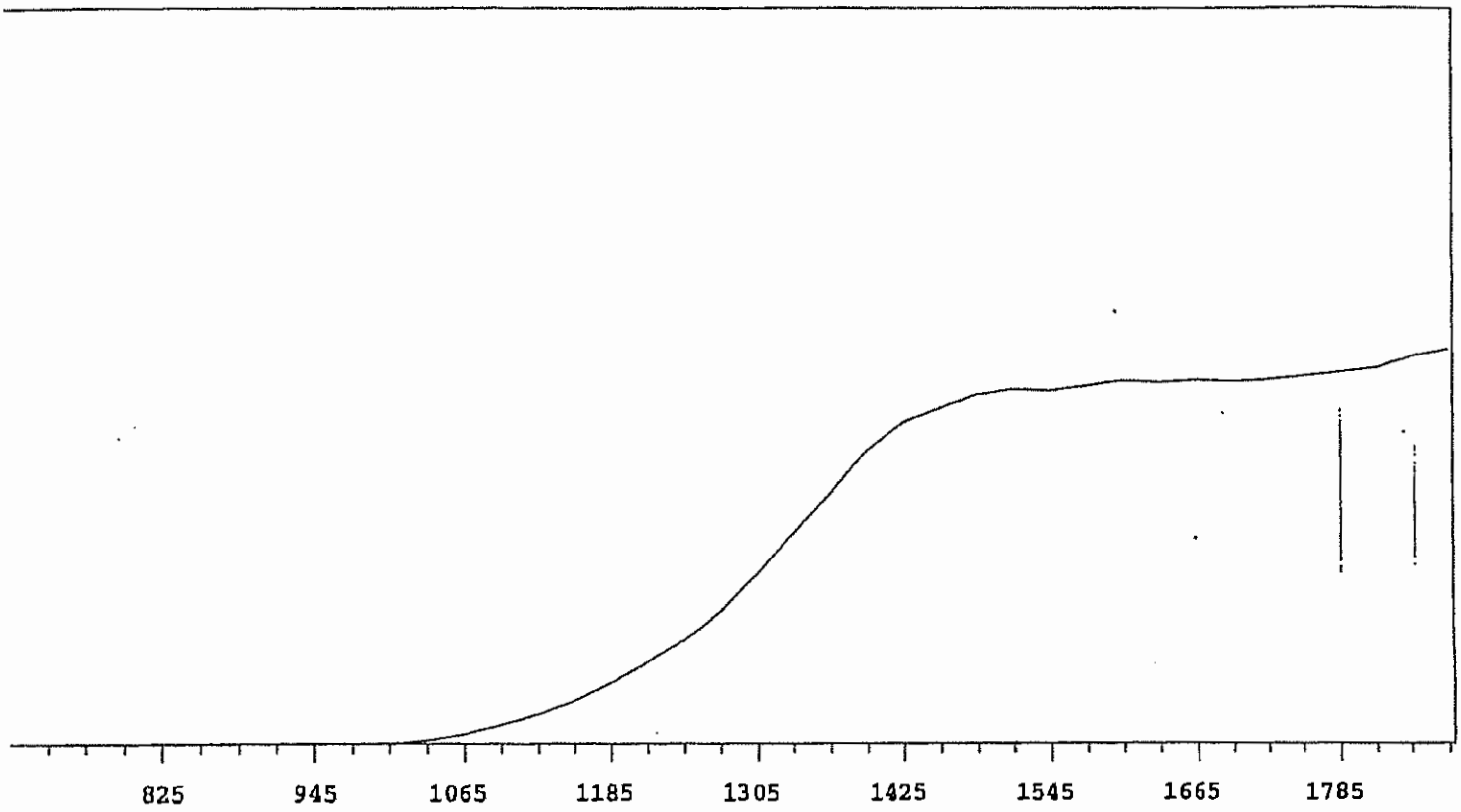



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 1 | +83.33 |
| 855 | 1 | -83.33 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 5 | >100 |
| 975 | 18 | >100 |
| 1005 | 125 | >100 |
| 1035 | 482 | >100 |
| 1065 | 1255 | >100 |
| 1095 | 2318 | >100 |
| 1125 | 3540 | >100 |
| 1155 | 5288 | >100 |
| 1185 | 7168 | +98.51 |
| 1215 | 9760 | +88.48 |
| 1245 | 12656 | +81.52 |
| 1275 | 16065 | +74.58 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 20094 | +68.67 |
| 1335 | 24665 | +59.40 |
| 1365 | 29591 | +47.86 |
| 1395 | 33376 | +34.51 |
| 1425 | 36440 | +22.50 |
| 1455 | 38024 | +13.58 |
| 1485 | 39187 | +7.04 |
| 1515 | 39608 | +3.63 |
| 1545 | 39722 | +2.10 |
| 1575 | 39894 | +2.32 |
| 1605 | 40298 | +2.09 |
| 1635 | 40711 | +1.41 |
| 1665 | 40574 | +0.80 |
| 1695 | 40608 | +1.02 |
| 1725 | 40839 | +1.28 |
| 1755 | 41201 | +1.97 |
| 1785 | 41065 | +3.74 |
| 1815 | 41711 | +5.42 |
| 1845 | 42917 | |
| 1875 | 43699 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

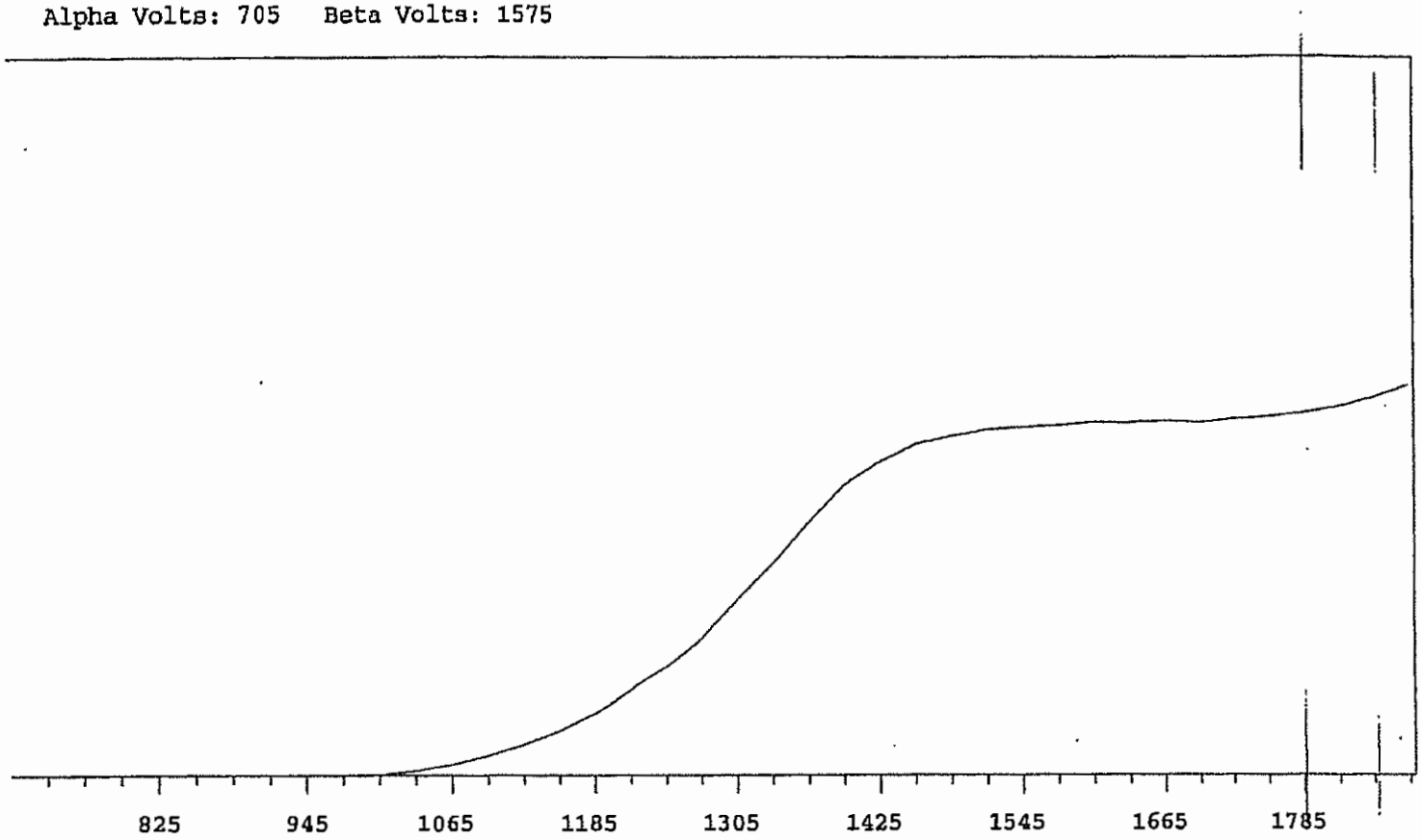



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 0 | +0.00 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 8 | >100 |
| 1005 | 70 | >100 |
| 1035 | 353 | >100 |
| 1065 | 990 | >100 |
| 1095 | 1956 | >100 |
| 1125 | 3024 | >100 |
| 1155 | 4400 | >100 |
| 1185 | 6173 | +99.75 |
| 1215 | 8230 | +89.85 |
| 1245 | 10904 | +82.36 |
| 1275 | 13747 | +76.18 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 17350 | +67.80 |
| 1335 | 21371 | +60.27 |
| 1365 | 25084 | +49.32 |
| 1395 | 29177 | +36.15 |
| 1425 | 31927 | +24.86 |
| 1455 | 33217 | +14.70 |
| 1485 | 34545 | +7.74 |
| 1515 | 35097 | +4.64 |
| 1545 | 34927 | +2.96 |
| 1575 | 35439 | +2.21 |
| 1605 | 35939 | +2.41 |
| 1635 | 35763 | +0.94 |
| 1665 | 36053 | +0.35 |
| 1695 | 35886 | +1.15 |
| 1725 | 36066 | +1.77 |
| 1755 | 36379 | +3.03 |
| 1785 | 36768 | +4.80 |
| 1815 | 37193 | +6.14 |
| 1845 | 38320 | |
| 1875 | 39061 | |

MPC 9600 Plateau  Instrument 6  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

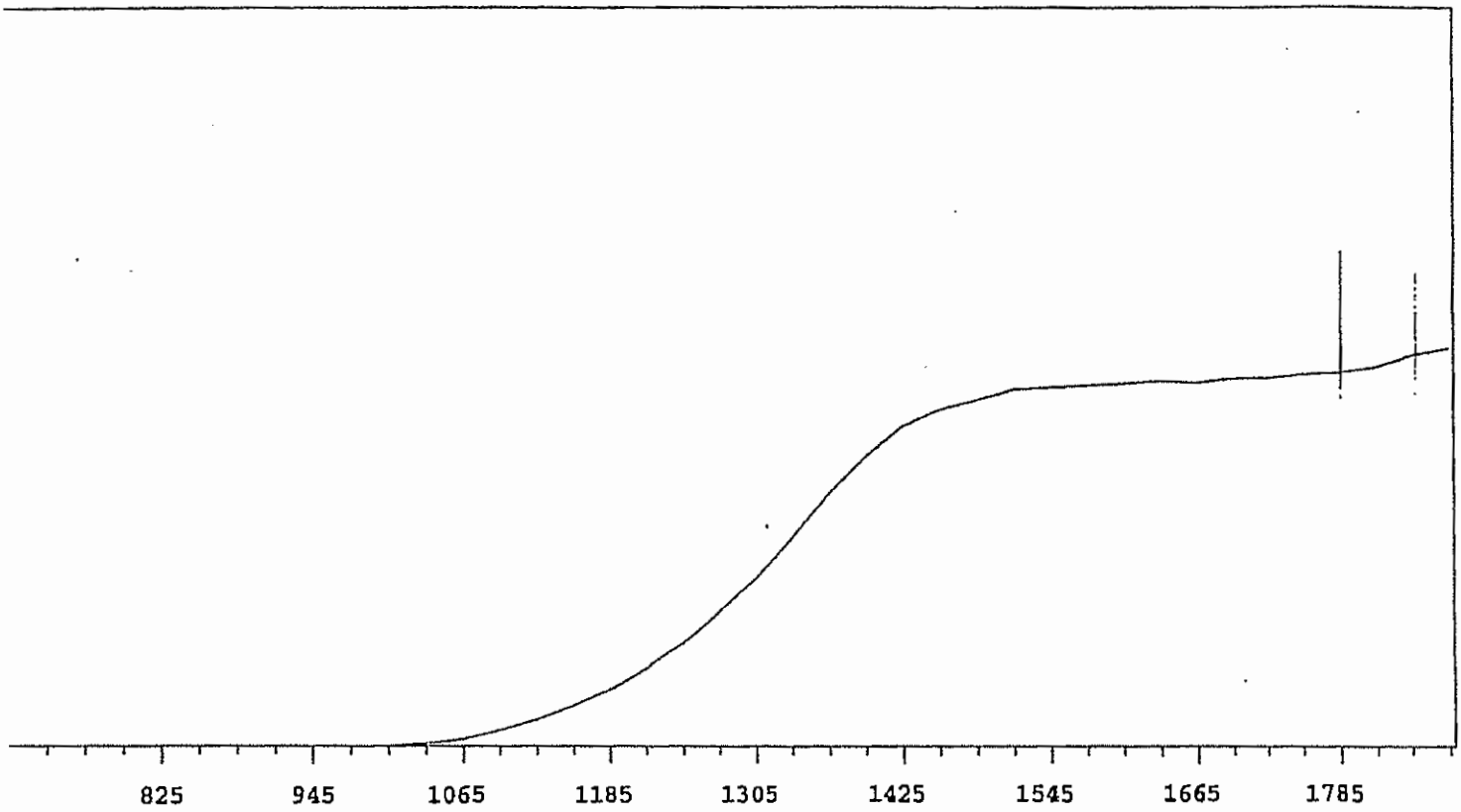



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 1 | +0.00 |
| 825 | 0 | >100 |
| 855 | 0 | +0.00 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 14 | >100 |
| 1005 | 109 | >100 |
| 1035 | 481 | >100 |
| 1065 | 1177 | >100 |
| 1095 | 2133 | >100 |
| 1125 | 3243 | >100 |
| 1155 | 4554 | >100 |
| 1185 | 6285 | +98.38 |
| 1215 | 8468 | +89.75 |
| 1245 | 11266 | +83.13 |
| 1275 | 14088 | +74.43 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 17954 | +65.82 |
| 1335 | 21482 | +57.64 |
| 1365 | 25373 | +45.78 |
| 1395 | 29042 | +34.80 |
| 1425 | 31373 | +23.29 |
| 1455 | 33143 | +14.25 |
| 1485 | 34006 | +8.49 |
| 1515 | 34662 | +4.71 |
| 1545 | 34892 | +3.14 |
| 1575 | 35129 | +1.86 |
| 1605 | 35411 | +1.49 |
| 1635 | 35380 | +0.62 |
| 1665 | 35554 | +0.65 |
| 1695 | 35385 | +1.18 |
| 1725 | 35755 | +1.89 |
| 1755 | 35907 | +3.26 |
| 1785 | 36305 | +4.62 |
| 1815 | 36870 | +6.98 |
| 1845 | 37807 | |
| 1875 | 39047 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

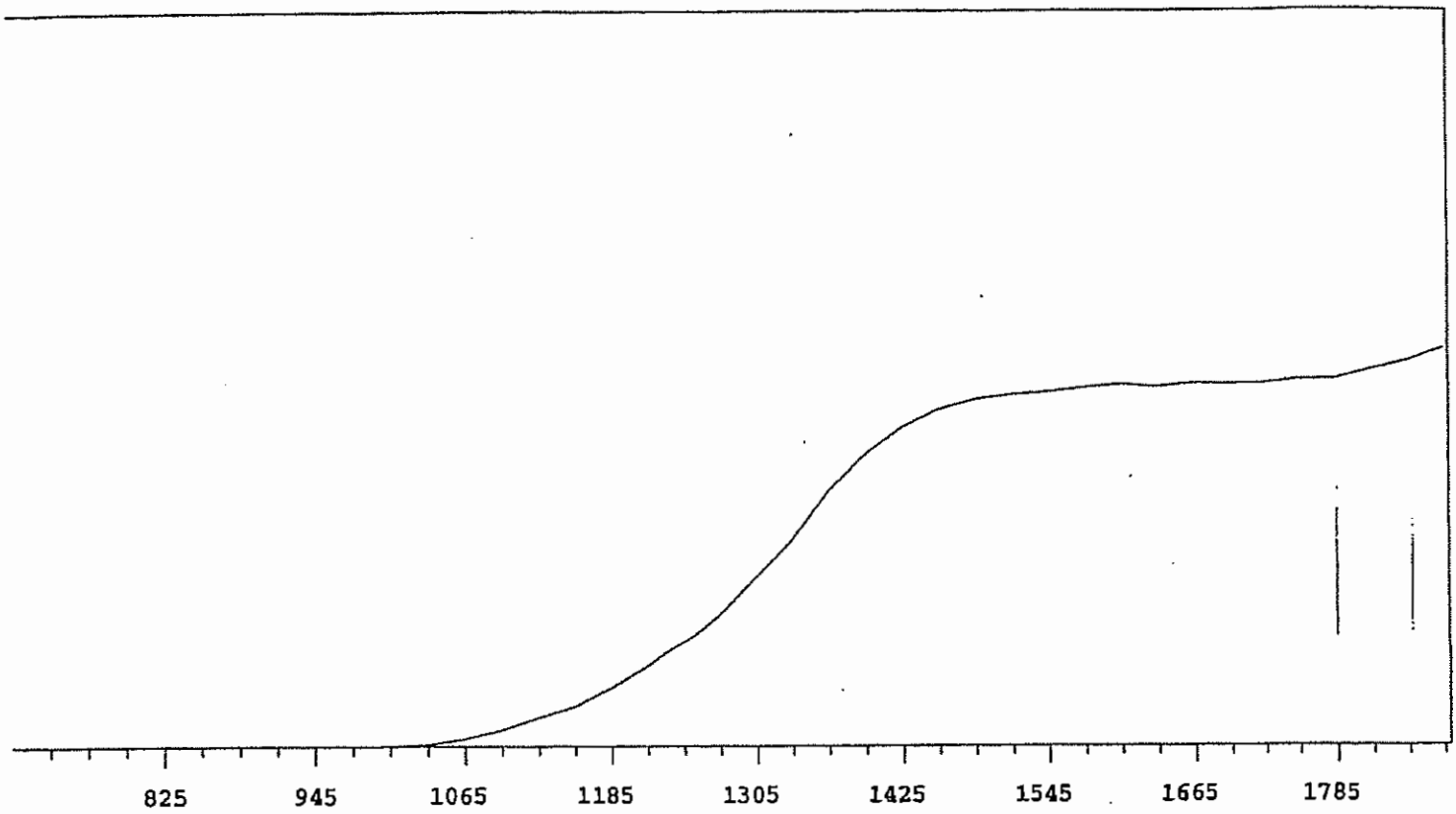



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 1 | +83.33 |
| 855 | 1 | -83.33 |
| 885 | 0 | -55.56 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 3 | >100 |
| 1005 | 42 | >100 |
| 1035 | 242 | >100 |
| 1065 | 613 | >100 |
| 1095 | 1353 | >100 |
| 1125 | 2213 | >100 |
| 1155 | 3256 | >100 |
| 1185 | 4474 | >100 |
| 1215 | 5932 | +94.10 |
| 1245 | 8072 | +87.32 |
| 1275 | 10579 | +79.61 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13228 | +70.36 |
| 1335 | 16271 | +60.12 |
| 1365 | 19506 | +49.19 |
| 1395 | 22188 | +36.46 |
| 1425 | 24373 | +24.43 |
| 1455 | 25649 | +15.99 |
| 1485 | 26433 | +9.58 |
| 1515 | 27195 | +5.74 |
| 1545 | 27367 | +3.24 |
| 1575 | 27490 | +1.86 |
| 1605 | 27608 | +1.22 |
| 1635 | 27841 | +1.33 |
| 1665 | 27695 | +1.11 |
| 1695 | 27999 | +1.42 |
| 1725 | 27992 | +2.04 |
| 1755 | 28289 | +2.52 |
| 1785 | 28408 | +4.56 |
| 1815 | 28863 | +5.70 |
| 1845 | 29664 | |
| 1875 | 30148 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

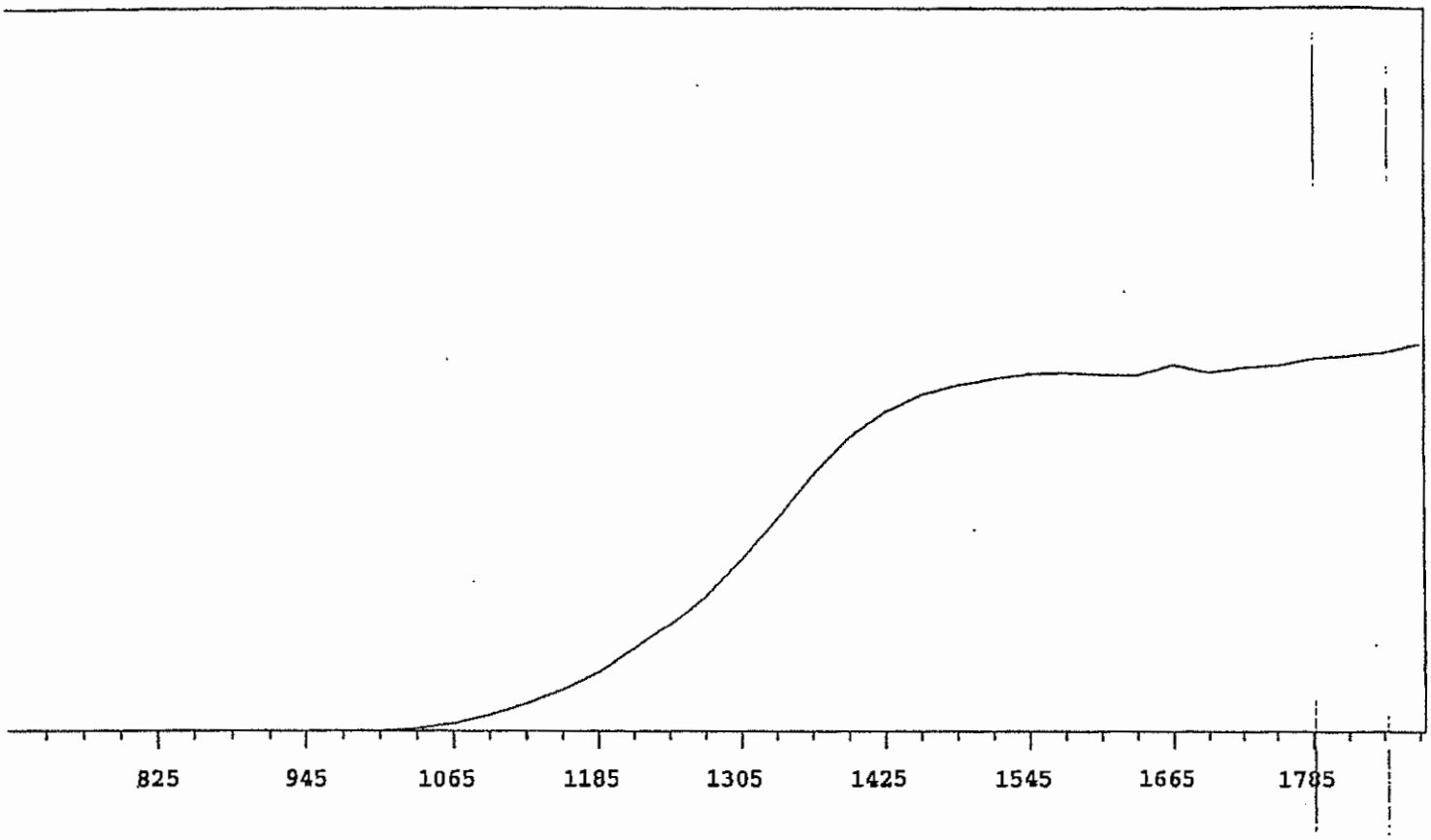



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 1 | >100 |
| 975 | 3 | >100 |
| 1005 | 34 | >100 |
| 1035 | 221 | >100 |
| 1065 | 825 | >100 |
| 1095 | 1709 | >100 |
| 1125 | 2873 | >100 |
| 1155 | 4078 | >100 |
| 1185 | 5858 | >100 |
| 1215 | 7809 | +91.82 |
| 1245 | 10336 | +85.02 |
| 1275 | 13215 | +77.79 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16978 | +70.97 |
| 1335 | 20569 | +61.39 |
| 1365 | 24989 | +48.97 |
| 1395 | 28389 | +36.69 |
| 1425 | 30977 | +24.05 |
| 1455 | 32727 | +14.93 |
| 1485 | 33697 | +8.42 |
| 1515 | 34195 | +4.89 |
| 1545 | 34437 | +3.49 |
| 1575 | 34850 | +2.11 |
| 1605 | 35174 | +1.62 |
| 1635 | 34923 | +0.68 |
| 1665 | 35250 | +0.35 |
| 1695 | 35171 | +1.24 |
| 1725 | 35237 | +1.02 |
| 1755 | 35584 | +2.79 |
| 1785 | 35587 | +4.59 |
| 1815 | 36485 | +6.74 |
| 1845 | 37270 | |
| 1875 | 38453 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector C  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

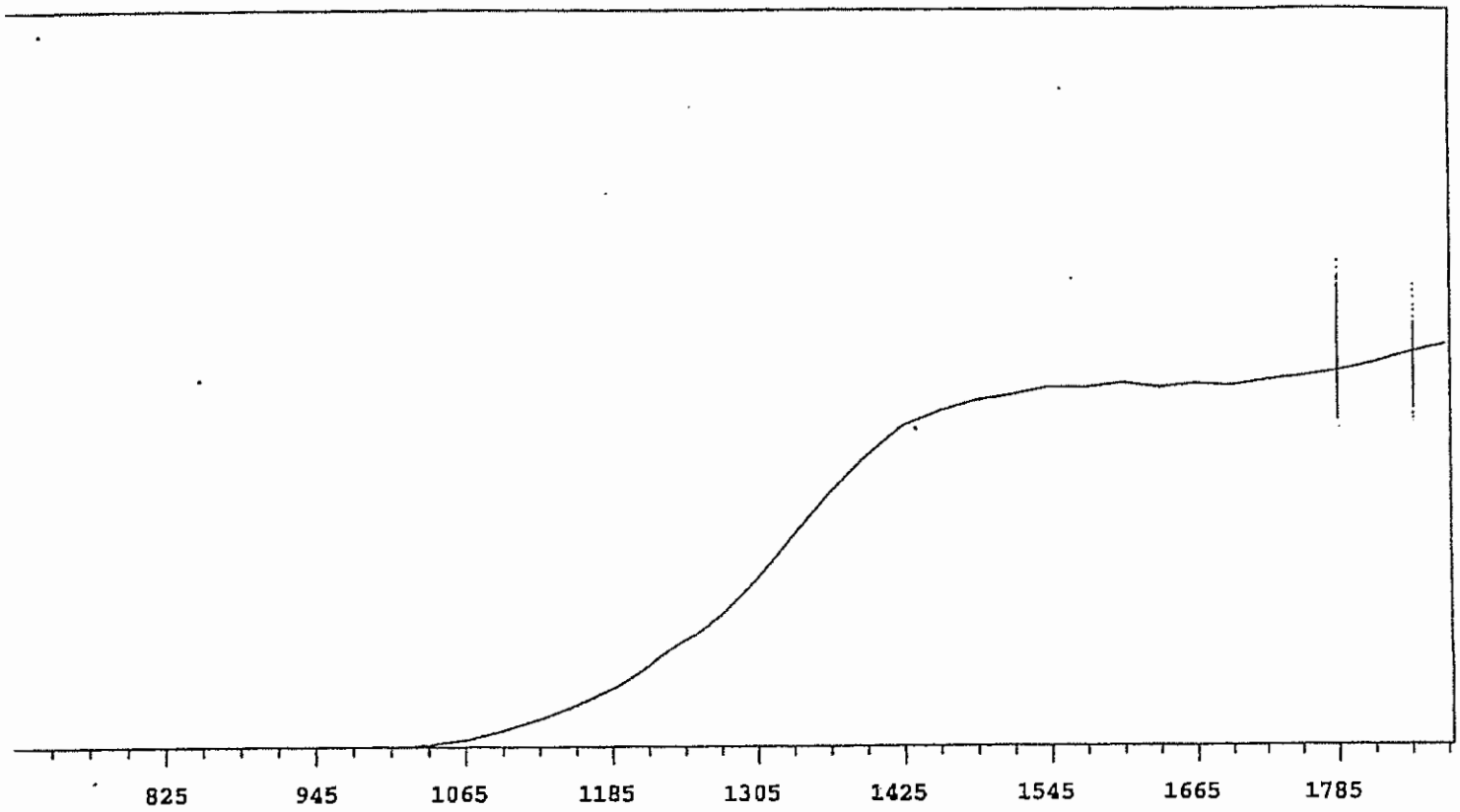



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 57 | >100 |
| 1035 | 277 | >100 |
| 1065 | 817 | >100 |
| 1095 | 1666 | >100 |
| 1125 | 2766 | >100 |
| 1155 | 4077 | >100 |
| 1185 | 5667 | >100 |
| 1215 | 7694 | +91.50 |
| 1245 | 10209 | +84.83 |
| 1275 | 12950 | +77.50 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16543 | +70.03 |
| 1335 | 20257 | +60.71 |
| 1365 | 24245 | +48.17 |
| 1395 | 27602 | +35.50 |
| 1425 | 30019 | +23.48 |
| 1455 | 31614 | +14.53 |
| 1485 | 32522 | +8.91 |
| 1515 | 33103 | +5.28 |
| 1545 | 33572 | +2.60 |
| 1575 | 33695 | +0.70 |
| 1605 | 33525 | +1.48 |
| 1635 | 33477 | +0.99 |
| 1665 | 34432 | +1.49 |
| 1695 | 33745 | +1.43 |
| 1725 | 34149 | +1.60 |
| 1755 | 34350 | +3.69 |
| 1785 | 34955 | +3.62 |
| 1815 | 35251 | +4.44 |
| 1845 | 35592 | |
| 1875 | 36382 | |

MPC 9600 Plateau  Instrument 7  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

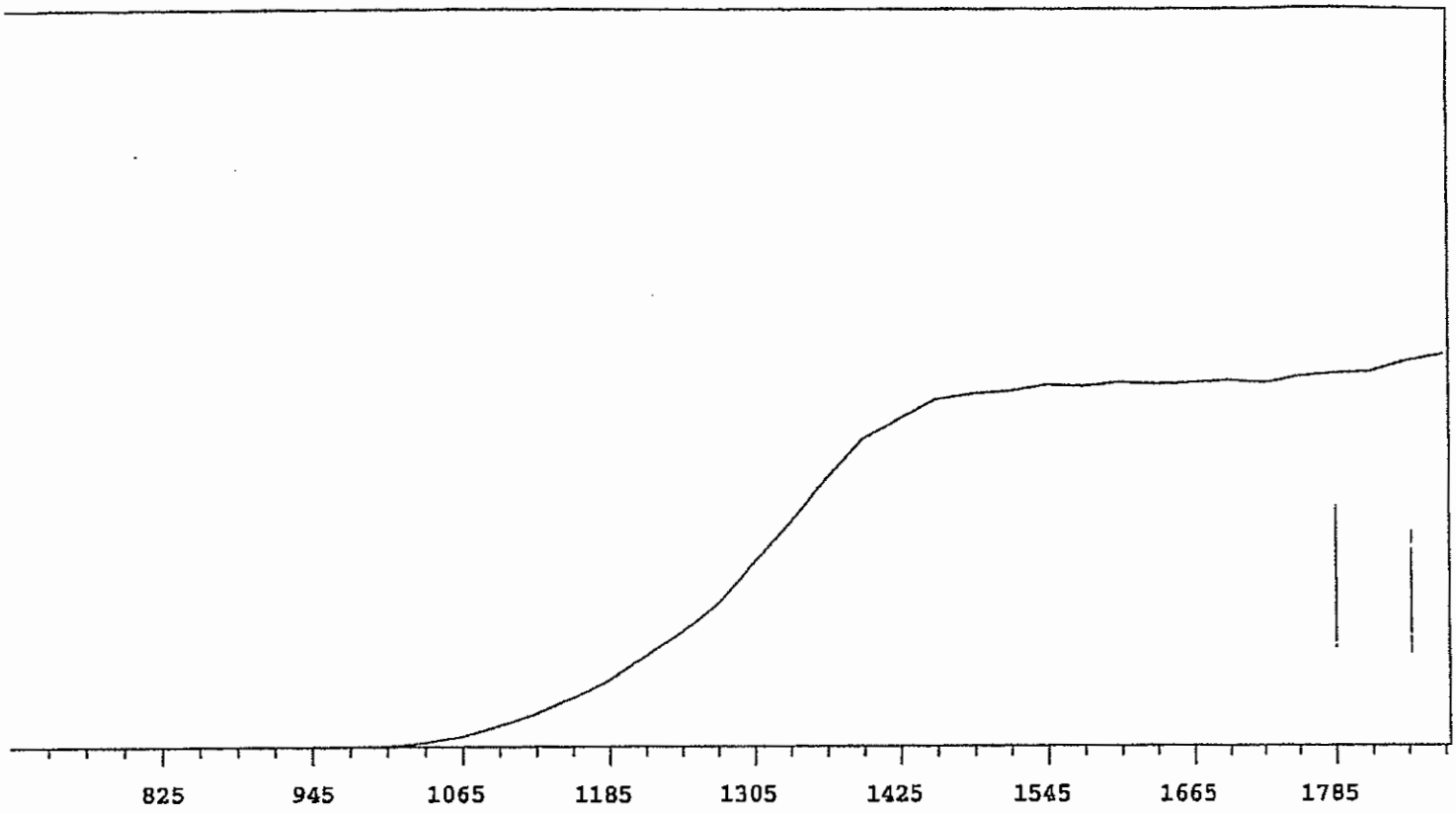



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 5 | >100 |
| 1005 | 29 | >100 |
| 1035 | 204 | >100 |
| 1065 | 609 | >100 |
| 1095 | 1354 | >100 |
| 1125 | 2316 | >100 |
| 1155 | 3418 | >100 |
| 1185 | 4654 | >100 |
| 1215 | 6455 | +92.99 |
| 1245 | 8669 | +86.45 |
| 1275 | 10931 | +79.15 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 14016 | +71.42 |
| 1335 | 17436 | +62.21 |
| 1365 | 20814 | +50.32 |
| 1395 | 23760 | +36.91 |
| 1425 | 26302 | +24.91 |
| 1455 | 27519 | +15.17 |
| 1485 | 28410 | +8.91 |
| 1515 | 28843 | +5.41 |
| 1545 | 29396 | +3.58 |
| 1575 | 29357 | +1.54 |
| 1605 | 29719 | +0.51 |
| 1635 | 29358 | +0.23 |
| 1665 | 29623 | +0.57 |
| 1695 | 29509 | +2.12 |
| 1725 | 29896 | +2.84 |
| 1755 | 30165 | +4.42 |
| 1785 | 30570 | +5.65 |
| 1815 | 31180 | +6.95 |
| 1845 | 31995 | |
| 1875 | 32717 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector A  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

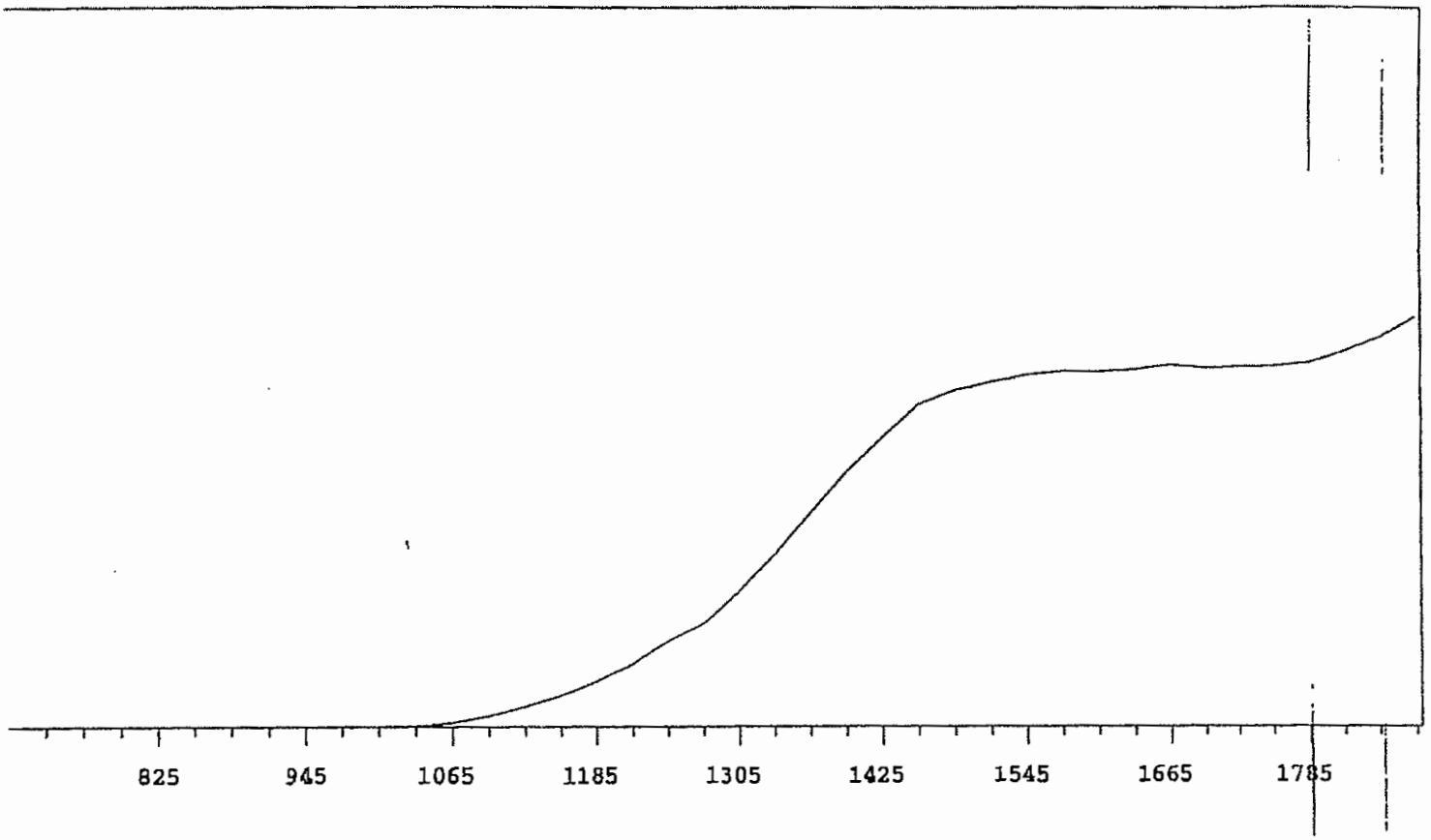



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 9 | >100 |
| 1005 | 96 | >100 |
| 1035 | 468 | >100 |
| 1065 | 1084 | >100 |
| 1095 | 2286 | >100 |
| 1125 | 3479 | >100 |
| 1155 | 4912 | >100 |
| 1185 | 6819 | +98.23 |
| 1215 | 9153 | +89.05 |
| 1245 | 12105 | +83.21 |
| 1275 | 15122 | +75.24 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 19482 | +67.45 |
| 1335 | 23344 | +59.35 |
| 1365 | 27793 | +45.86 |
| 1395 | 31916 | +34.29 |
| 1425 | 33979 | +21.61 |
| 1455 | 35993 | +11.71 |
| 1485 | 36530 | +7.04 |
| 1515 | 36796 | +3.11 |
| 1545 | 37393 | +2.44 |
| 1575 | 37279 | +1.41 |
| 1605 | 37650 | +0.49 |
| 1635 | 37458 | +0.91 |
| 1665 | 37579 | +0.12 |
| 1695 | 37828 | +1.10 |
| 1725 | 37535 | +1.72 |
| 1755 | 38104 | +2.18 |
| 1785 | 38416 | +4.12 |
| 1815 | 38633 | +4.92 |
| 1845 | 39649 | |
| 1875 | 40366 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector B  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

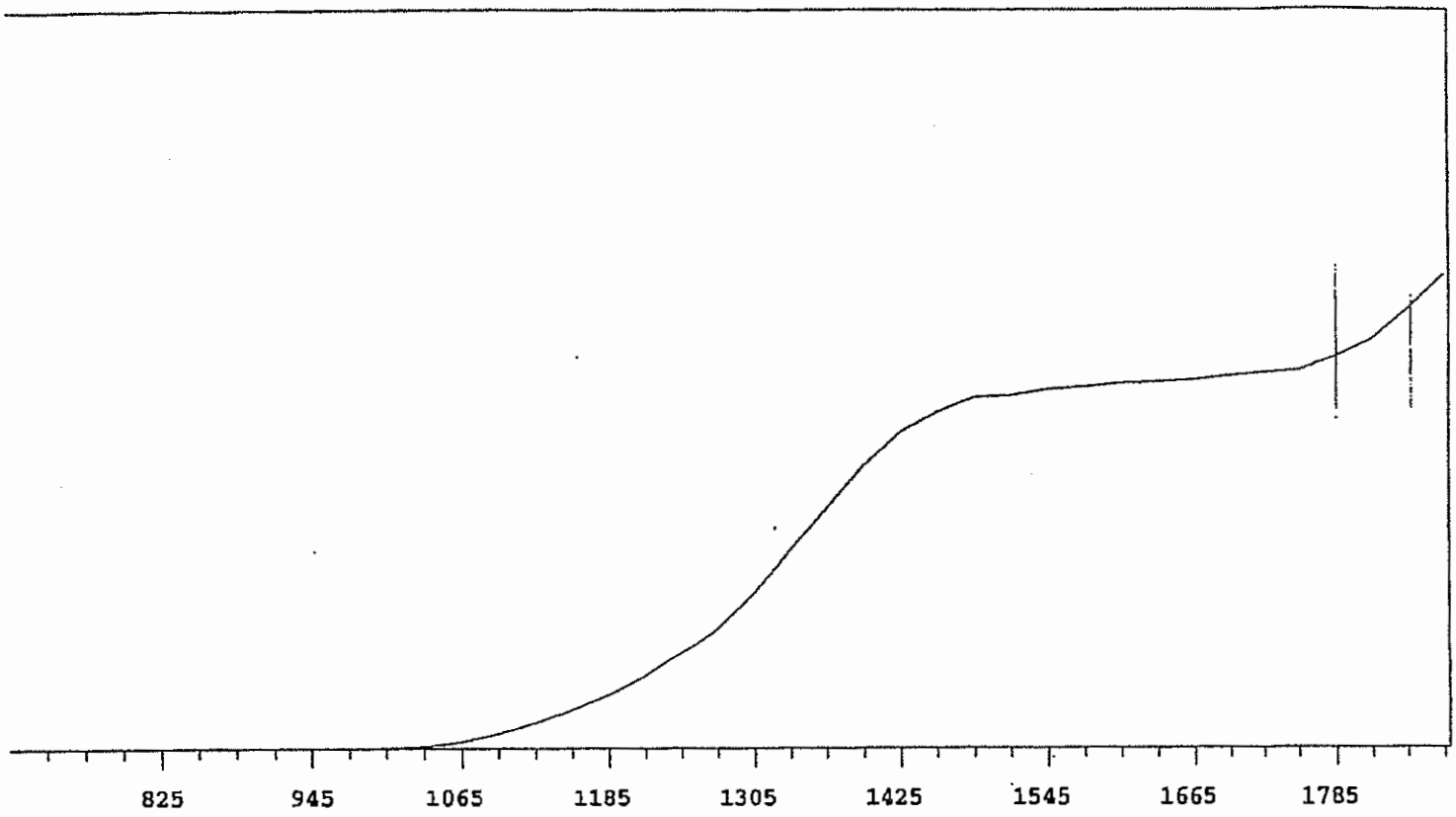



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 0 | >100 |
| 1005 | 20 | >100 |
| 1035 | 122 | >100 |
| 1065 | 511 | >100 |
| 1095 | 1263 | >100 |
| 1125 | 2390 | >100 |
| 1155 | 3641 | >100 |
| 1185 | 5246 | >100 |
| 1215 | 7212 | +98.32 |
| 1245 | 9897 | +89.80 |
| 1275 | 12742 | +82.40 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16337 | +74.91 |
| 1335 | 20471 | +68.07 |
| 1365 | 25012 | +57.86 |
| 1395 | 29694 | +47.48 |
| 1425 | 33409 | +35.17 |
| 1455 | 37013 | +23.27 |
| 1485 | 38629 | +14.35 |
| 1515 | 39529 | +7.69 |
| 1545 | 40284 | +4.34 |
| 1575 | 40711 | +2.52 |
| 1605 | 40642 | +1.97 |
| 1635 | 40879 | +1.11 |
| 1665 | 41405 | +0.98 |
| 1695 | 41011 | +0.30 |
| 1725 | 41182 | +0.41 |
| 1755 | 41178 | +3.28 |
| 1785 | 41573 | +6.47 |
| 1815 | 42858 | +10.82 |
| 1845 | 44440 | |
| 1875 | 46780 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector C  7/1/2009 .

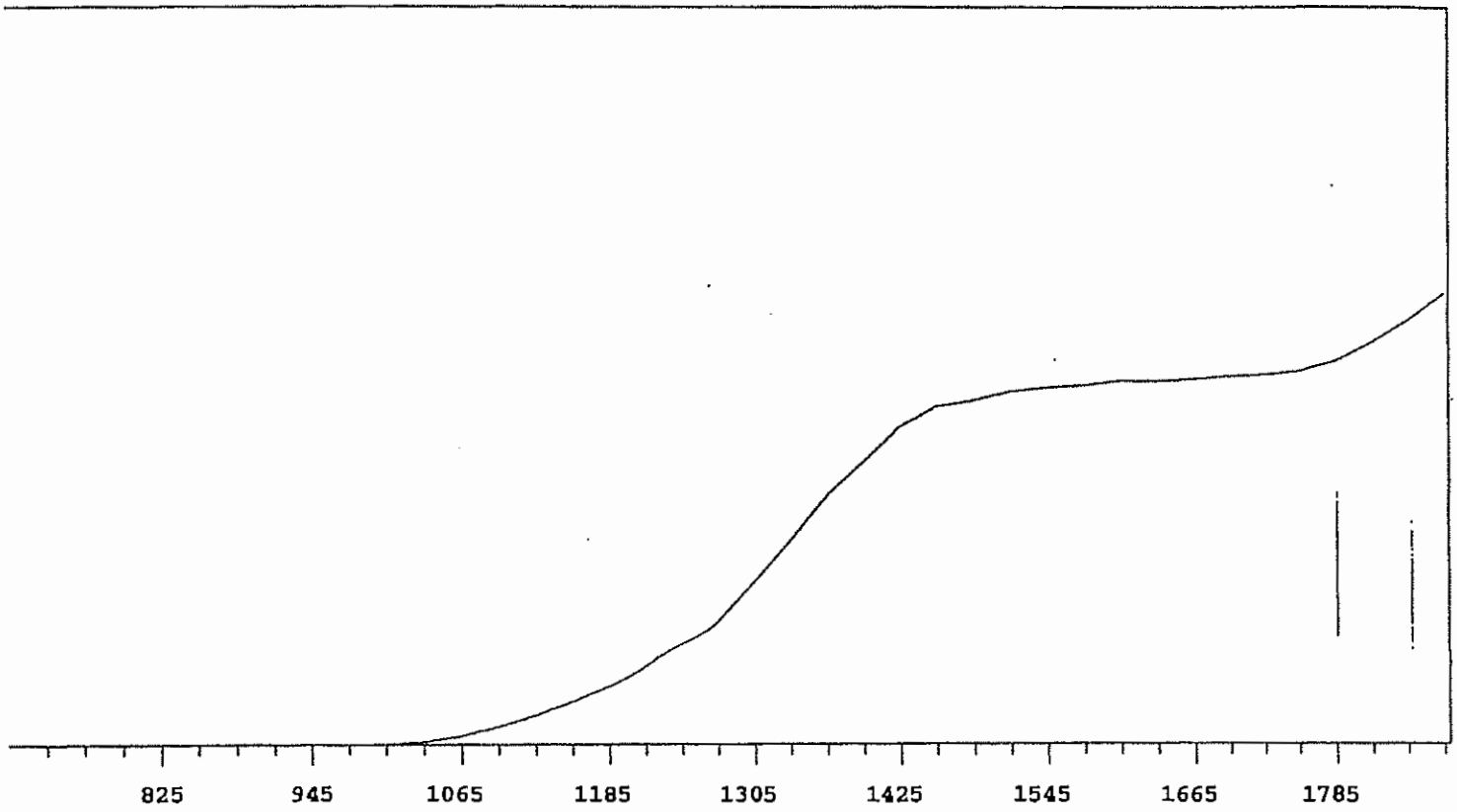
Alpha Volts: 705  Beta Volts: 1575




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 46 | >100 |
| 1035 | 202 | >100 |
| 1065 | 697 | >100 |
| 1095 | 1532 | >100 |
| 1125 | 2614 | >100 |
| 1155 | 3953 | >100 |
| 1185 | 5474 | >100 |
| 1215 | 7466 | +93.09 |
| 1245 | 9842 | +86.73 |
| 1275 | 12814 | +80.29 |
| 1305 | 16303 | +72.82 |
| 1335 | 20309 | +64.32 |
| 1365 | 24364 | +53.82 |
| 1395 | 28527 | +40.95 |
| 1425 | 31774 | +28.74 |
| 1455 | 33631 | +16.87 |
| 1485 | 35030 | +9.25 |
| 1515 | 35208 | +5.21 |
| 1545 | 35741 | +3.27 |
| 1575 | 36019 | +2.95 |
| 1605 | 36373 | +2.21 |
| 1635 | 36484 | +2.27 |
| 1665 | 36713 | +2.28 |
| 1695 | 37093 | +2.46 |
| 1725 | 37325 | +4.17 |
| 1755 | 37543 | +7.52 |
| 1785 | 38833 | +13.43 |
| 1815 | 40656 | +19.49 |
| 1845 | 43753 | |
| 1875 | 47246 | |

MPC 9600 Plateau  Instrument 8  MPC 9604 Detector D  7/1/2009

Alpha Volts: 705  Beta Volts: 1575

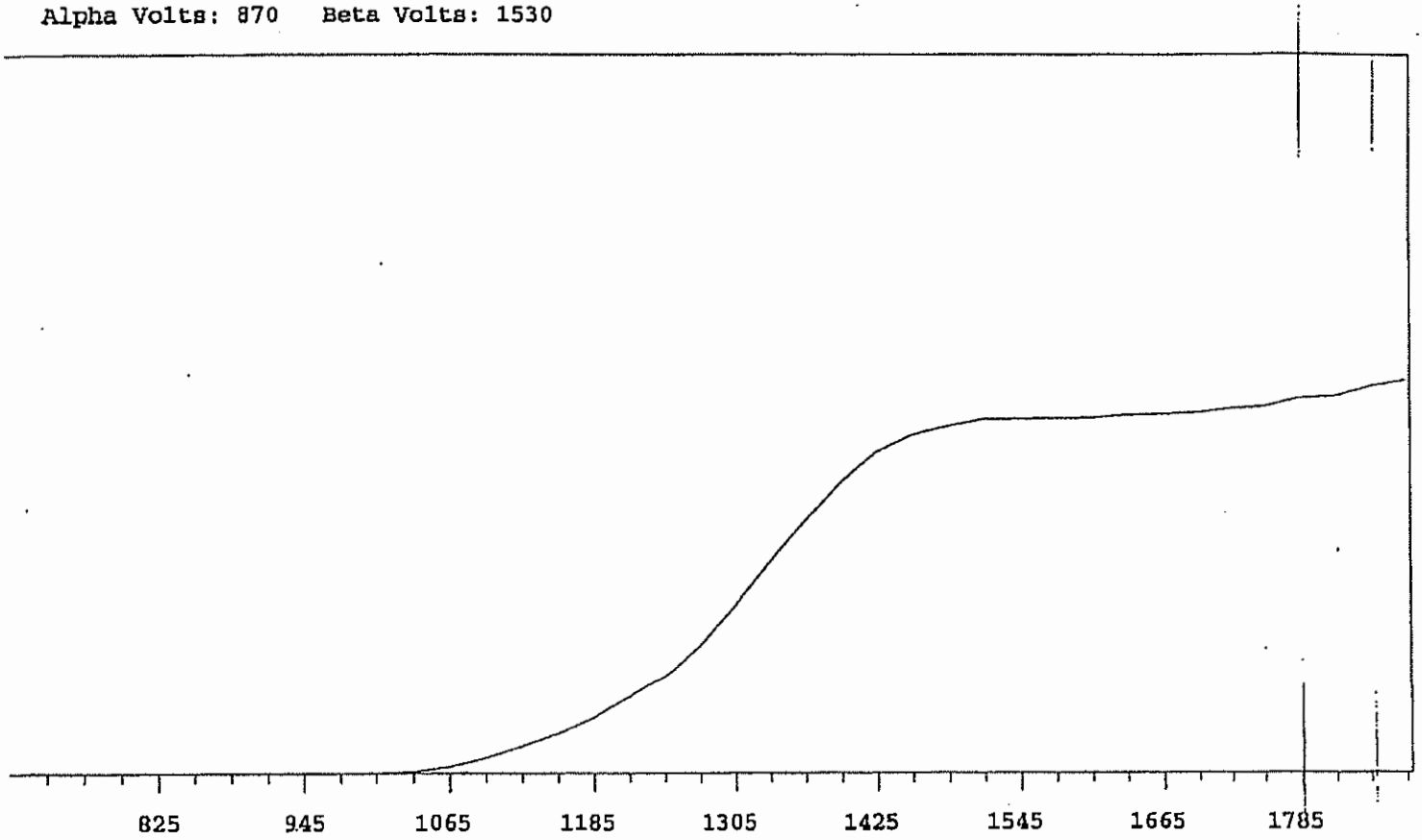



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 5 | >100 |
| 1005 | 47 | >100 |
| 1035 | 243 | >100 |
| 1065 | 792 | >100 |
| 1095 | 1744 | >100 |
| 1125 | 2933 | >100 |
| 1155 | 4123 | >100 |
| 1185 | 5780 | >100 |
| 1215 | 7791 | +91.58 |
| 1245 | 10478 | +84.93 |
| 1275 | 13118 | +77.50 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16889 | +70.18 |
| 1335 | 20600 | +61.29 |
| 1365 | 24824 | +50.40 |
| 1395 | 28208 | +38.85 |
| 1425 | 31539 | +25.79 |
| 1455 | 33391 | +16.06 |
| 1485 | 33991 | +8.60 |
| 1515 | 34782 | +5.01 |
| 1545 | 35201 | +4.10 |
| 1575 | 35380 | +2.50 |
| 1605 | 35849 | +1.87 |
| 1635 | 35784 | +1.79 |
| 1665 | 36000 | +1.43 |
| 1695 | 36269 | +2.10 |
| 1725 | 36381 | +3.46 |
| 1755 | 36733 | +6.86 |
| 1785 | 37669 | +11.78 |
| 1815 | 39465 | +16.64 |
| 1845 | 41803 | |
| 1875 | 44665 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector A  7/1/2009

Alpha Volts: 870  Beta Volts: 1530

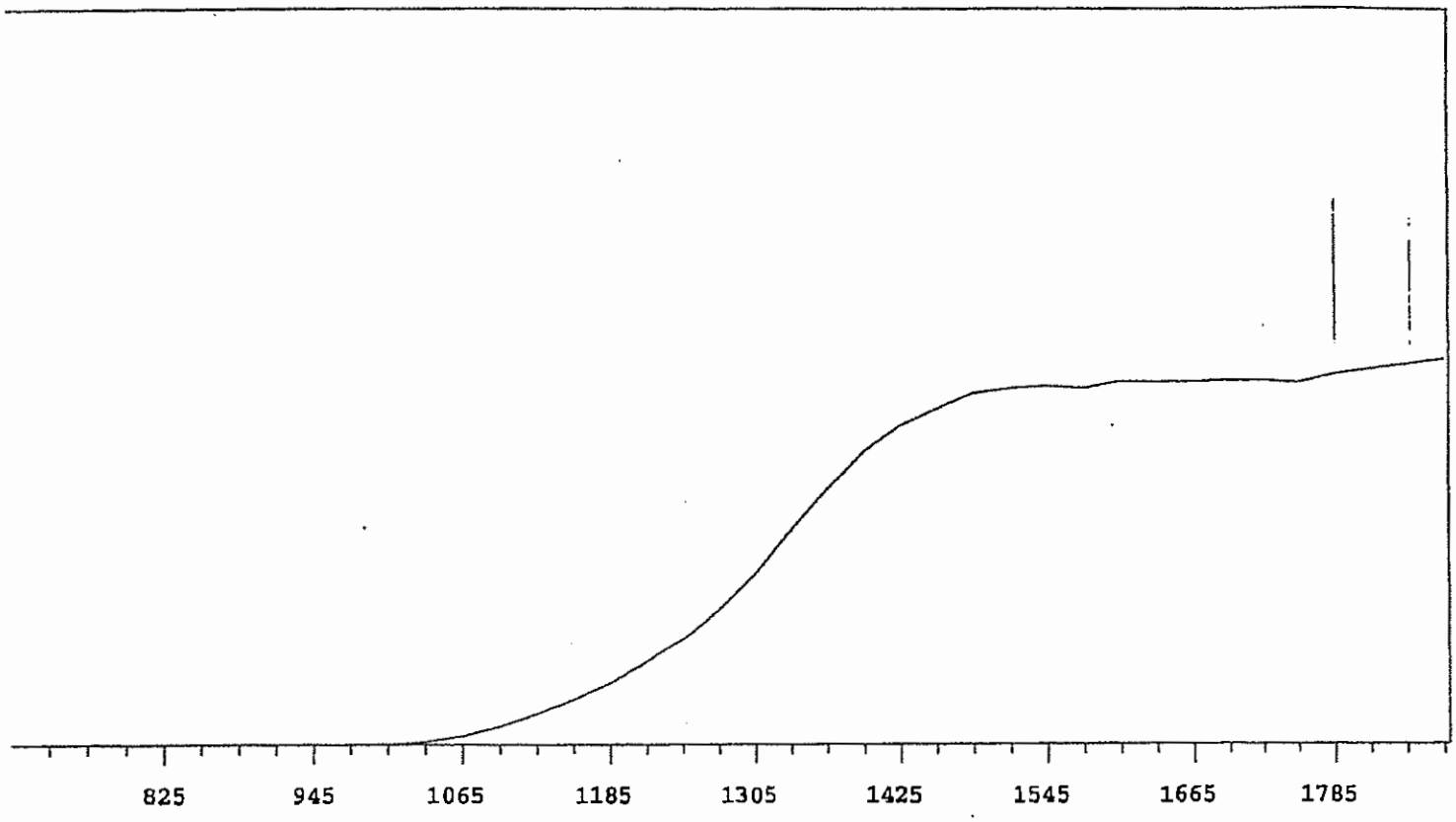



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 1 | +0.00 |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 2 | >100 |
| 1005 | 33 | >100 |
| 1035 | 203 | >100 |
| 1065 | 668 | >100 |
| 1095 | 1403 | >100 |
| 1125 | 2545 | >100 |
| 1155 | 3800 | >100 |
| 1185 | 5363 | >100 |
| 1215 | 7355 | +95.00 |
| 1245 | 9807 | +87.69 |
| 1275 | 12700 | +80.28 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16226 | +71.71 |
| 1335 | 20083 | +61.95 |
| 1365 | 23913 | +49.99 |
| 1395 | 27526 | +36.97 |
| 1425 | 30193 | +24.54 |
| 1455 | 31747 | +14.71 |
| 1485 | 32544 | +7.71 |
| 1515 | 33198 | +3.66 |
| 1545 | 33188 | +1.51 |
| 1575 | 33227 | +0.73 |
| 1605 | 33278 | +1.04 |
| 1635 | 33518 | +1.38 |
| 1665 | 33565 | +1.95 |
| 1695 | 33774 | +1.99 |
| 1725 | 34135 | +3.30 |
| 1755 | 34244 | +3.67 |
| 1785 | 35022 | +4.84 |
| 1815 | 35229 | +5.93 |
| 1845 | 36179 | |
| 1875 | 36821 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector B  7/1/2009

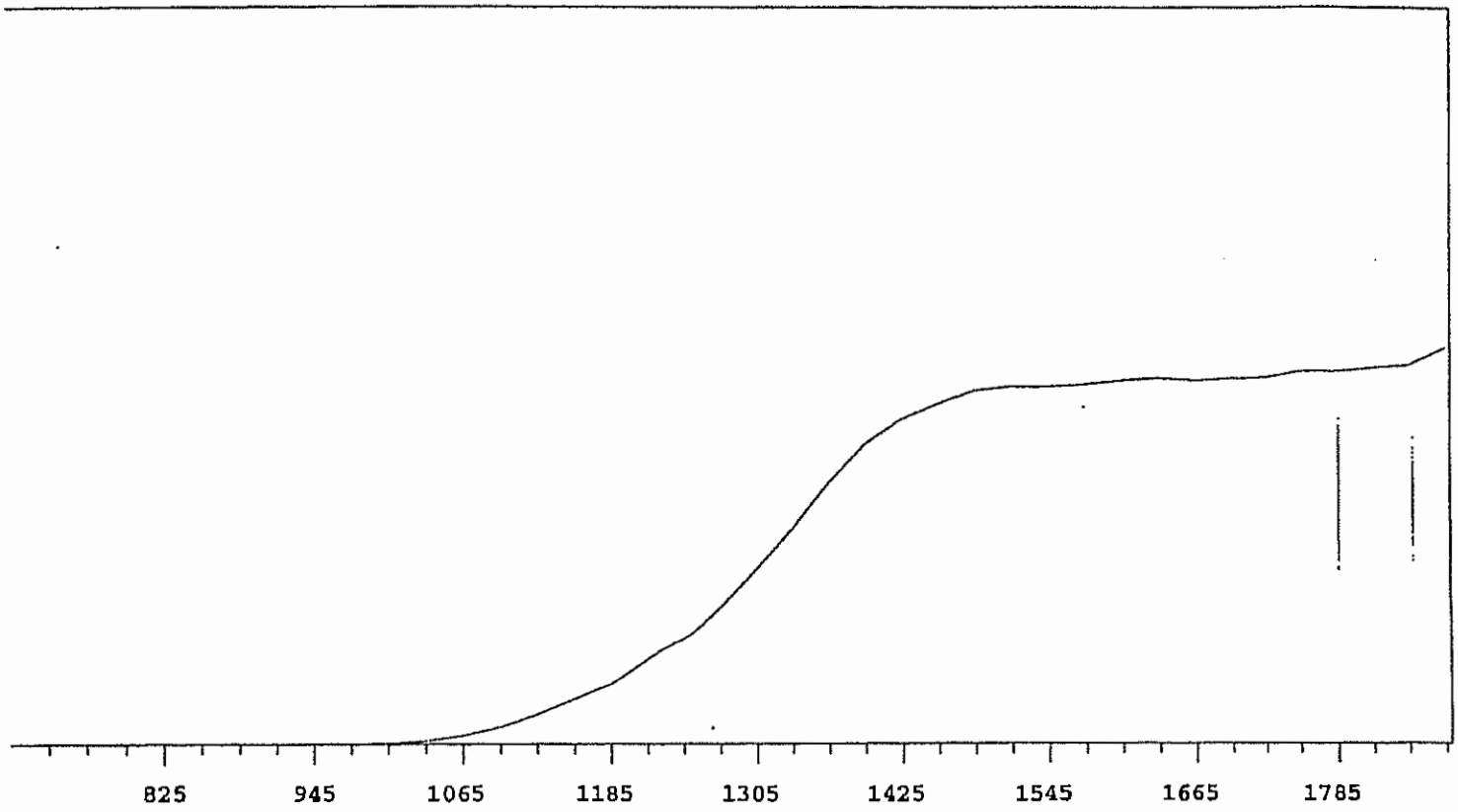
Alpha Volts: 870  Beta Volts: 1530




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 45 | >100 |
| 1035 | 300 | >100 |
| 1065 | 836 | >100 |
| 1095 | 1742 | >100 |
| 1125 | 2896 | >100 |
| 1155 | 4198 | >100 |
| 1185 | 5849 | >100 |
| 1215 | 7887 | +92.20 |
| 1245 | 10561 | +83.55 |
| 1275 | 13442 | +76.62 |
| 1305 | 16723 | +68.78 |
| 1335 | 20749 | +60.55 |
| 1365 | 24686 | +48.78 |
| 1395 | 28343 | +35.24 |
| 1425 | 30657 | +24.31 |
| 1455 | 32208 | +15.22 |
| 1485 | 33662 | +9.32 |
| 1515 | 34098 | +4.47 |
| 1545 | 34326 | +2.17 |
| 1575 | 34133 | +1.60 |
| 1605 | 34758 | +1.41 |
| 1635 | 34706 | +1.35 |
| 1665 | 34769 | +0.30 |
| 1695 | 34830 | -0.10 |
| 1725 | 34850 | +0.90 |
| 1755 | 34613 | +2.41 |
| 1785 | 35351 | +3.87 |
| 1815 | 35849 | +4.97 |
| 1845 | 36285 | |
| 1875 | 36814 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector C  7/1/2009

Alpha Volts: 870  Beta Volts: 1530

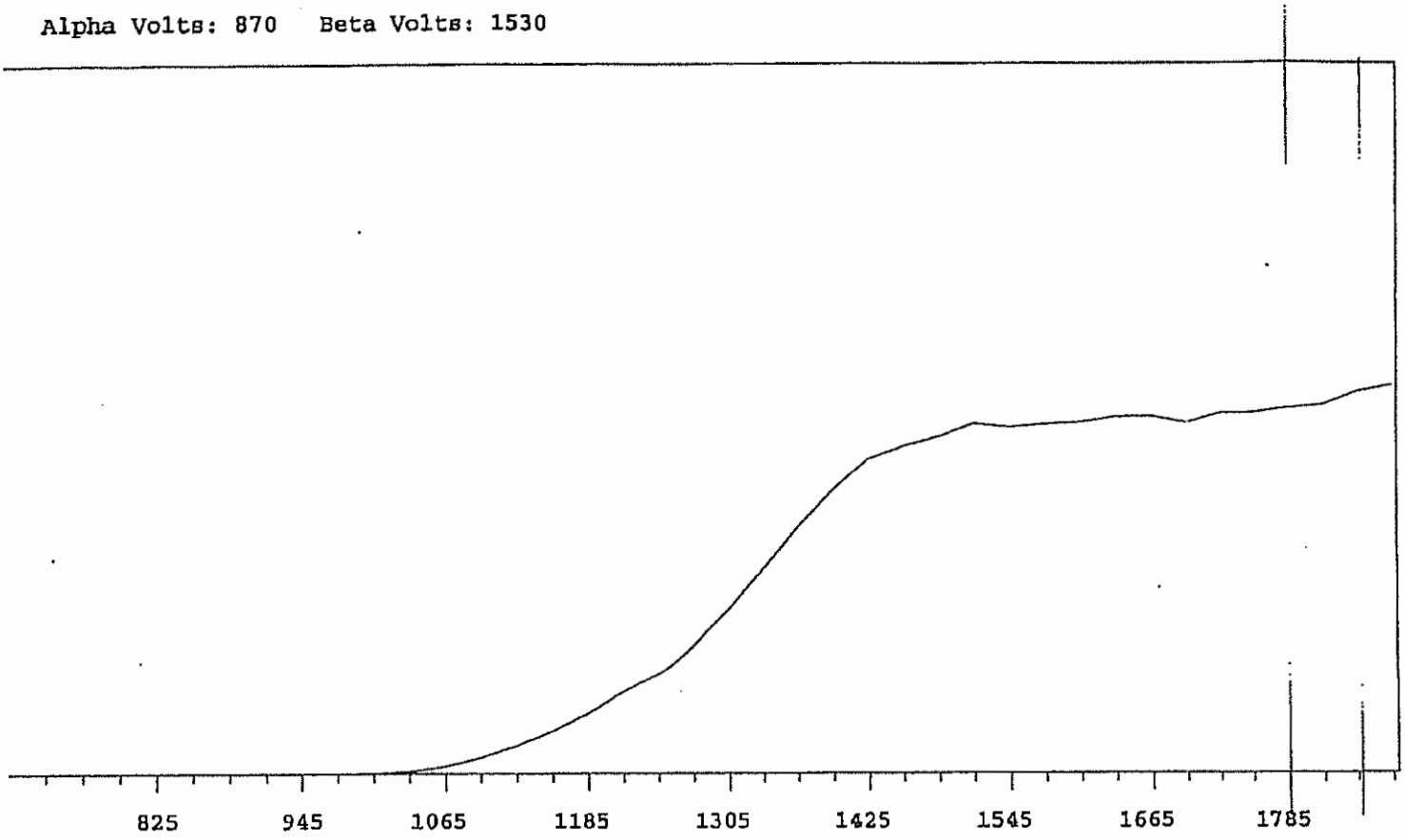



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 1 | >100 |
| 945 | 2 | >100 |
| 975 | 3 | >100 |
| 1005 | 64 | >100 |
| 1035 | 349 | >100 |
| 1065 | 970 | >100 |
| 1095 | 1982 | >100 |
| 1125 | 3328 | >100 |
| 1155 | 5012 | >100 |
| 1185 | 6669 | >100 |
| 1215 | 9448 | +92.67 |
| 1245 | 12293 | +86.58 |
| 1275 | 15917 | +76.99 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 20192 | +70.39 |
| 1335 | 24524 | +60.97 |
| 1365 | 29650 | +48.44 |
| 1395 | 33904 | +35.09 |
| 1425 | 36549 | +22.73 |
| 1455 | 38217 | +13.58 |
| 1485 | 39628 | +7.51 |
| 1515 | 40035 | +3.73 |
| 1545 | 40020 | +1.92 |
| 1575 | 40236 | +2.06 |
| 1605 | 40680 | +1.62 |
| 1635 | 40953 | +1.03 |
| 1665 | 40643 | +0.43 |
| 1695 | 40882 | +1.41 |
| 1725 | 40979 | +2.18 |
| 1755 | 41654 | +2.20 |
| 1785 | 41602 | +2.27 |
| 1815 | 41935 | +4.50 |
| 1845 | 42259 | |
| 1875 | 44183 | |

MPC 9600 Plateau  Instrument 9  MPC 9604 Detector D  7/1/2009

Alpha Volts: 870  Beta Volts: 1530

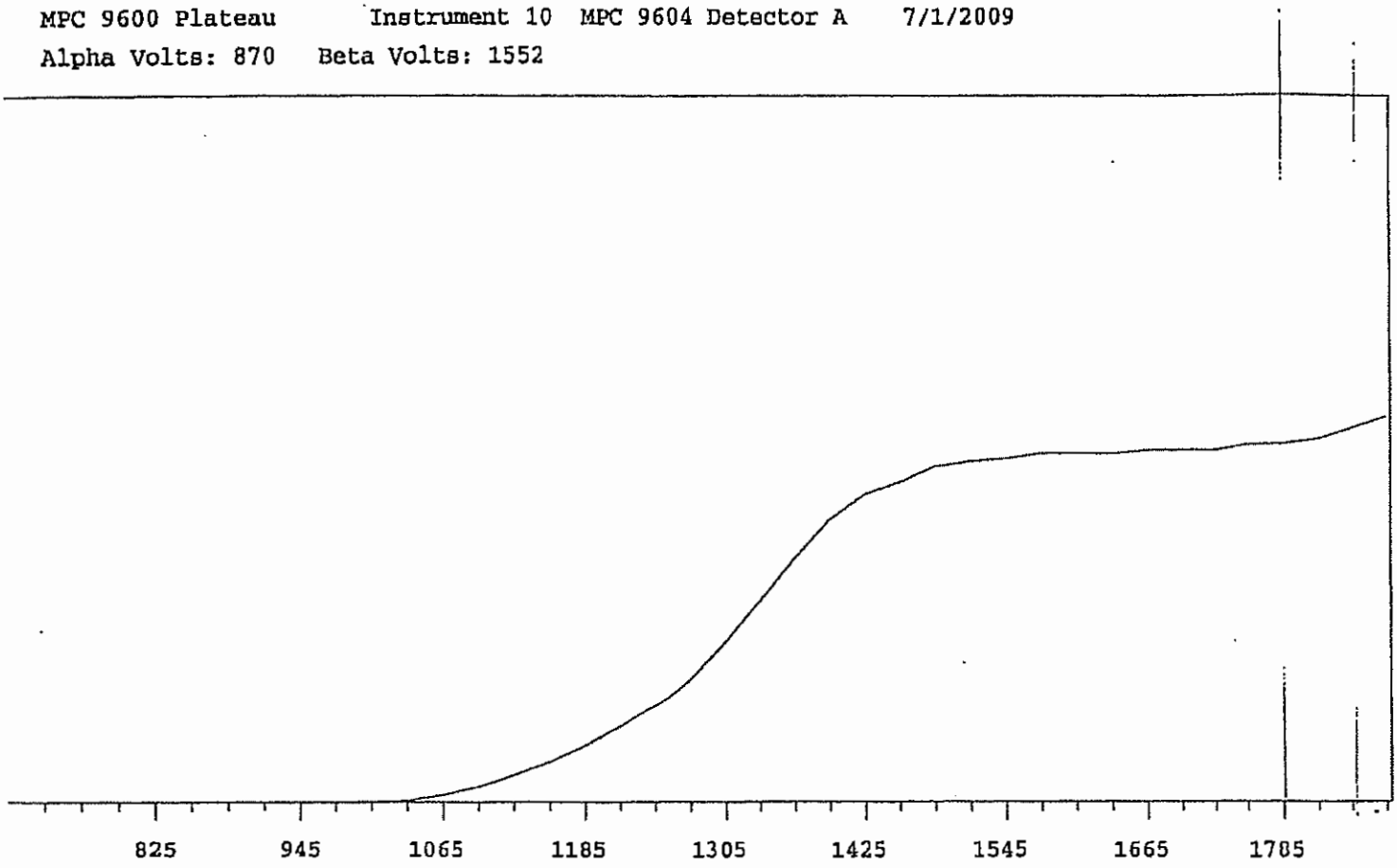



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 5 | >100 |
| 1005 | 35 | >100 |
| 1035 | 186 | >100 |
| 1065 | 618 | >100 |
| 1095 | 1280 | >100 |
| 1125 | 2141 | >100 |
| 1155 | 3268 | >100 |
| 1185 | 4659 | >100 |
| 1215 | 6343 | +90.68 |
| 1245 | 8064 | +83.46 |
| 1275 | 10497 | +77.03 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 13319 | +70.94 |
| 1335 | 16319 | +61.35 |
| 1365 | 19577 | +50.27 |
| 1395 | 22498 | +36.85 |
| 1425 | 24782 | +23.90 |
| 1455 | 25761 | +15.37 |
| 1485 | 26486 | +8.38 |
| 1515 | 27503 | +5.11 |
| 1545 | 27223 | +2.67 |
| 1575 | 27453 | +1.71 |
| 1605 | 27604 | +2.70 |
| 1635 | 28021 | +0.78 |
| 1665 | 28059 | +1.05 |
| 1695 | 27548 | +0.90 |
| 1725 | 28280 | +2.16 |
| 1755 | 28290 | +3.51 |
| 1785 | 28600 | +4.46 |
| 1815 | 28879 | +6.35 |
| 1845 | 29913 | |
| 1875 | 30417 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector A  7/1/2009

Alpha Volts: 870  Beta Volts: 1552

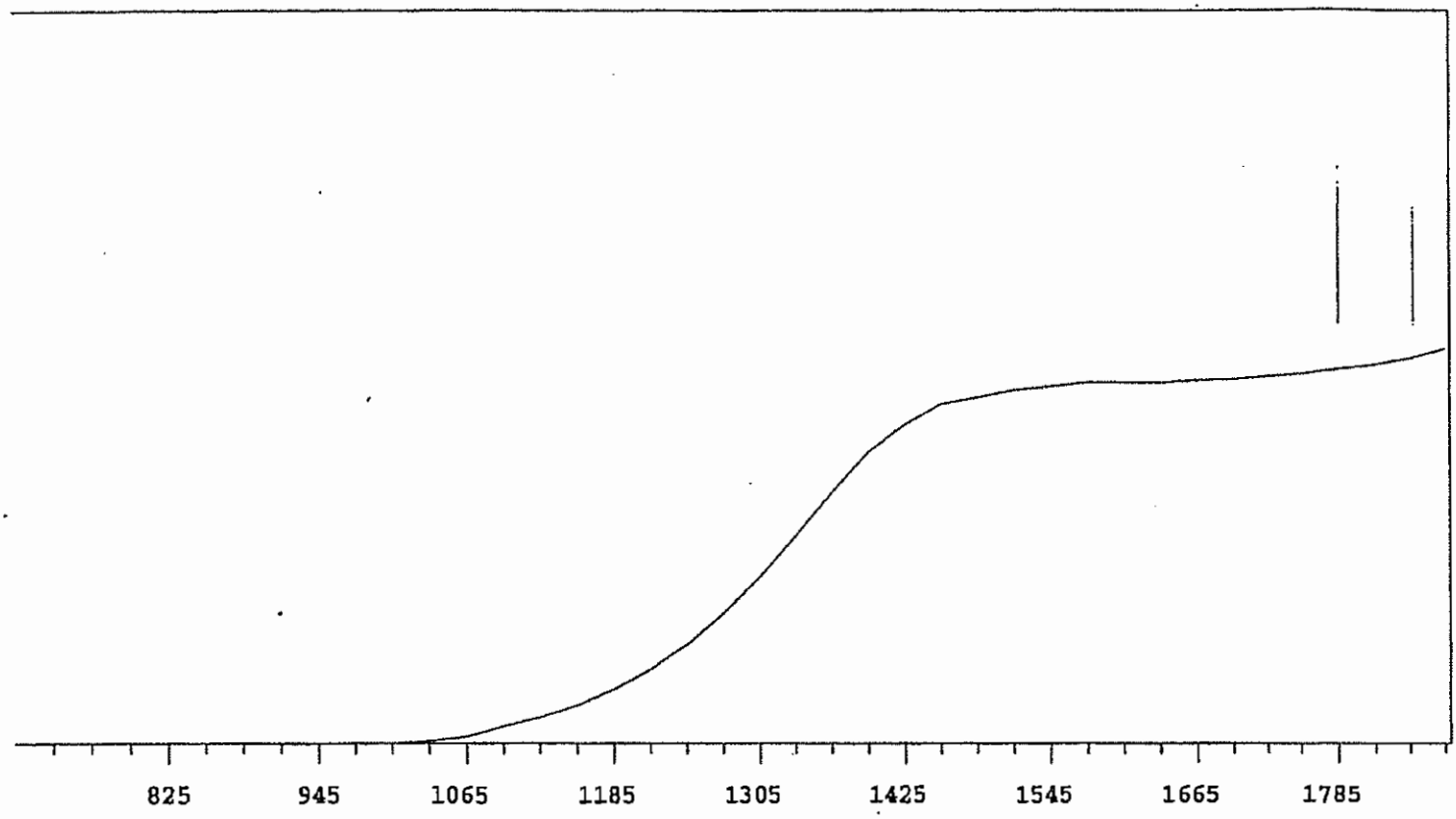



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 37 | >100 |
| 1035 | 198 | >100 |
| 1065 | 687 | >100 |
| 1095 | 1491 | >100 |
| 1125 | 2580 | >100 |
| 1155 | 3920 | >100 |
| 1185 | 5588 | >100 |
| 1215 | 7384 | +91.32 |
| 1245 | 9794 | +84.81 |
| 1275 | 12572 | +79.73 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 16076 | +72.76 |
| 1335 | 19985 | +63.85 |
| 1365 | 24102 | +50.95 |
| 1395 | 27819 | +36.01 |
| 1425 | 30228 | +23.86 |
| 1455 | 31343 | +14.40 |
| 1485 | 32811 | +8.77 |
| 1515 | 33243 | +6.10 |
| 1545 | 33518 | +3.25 |
| 1575 | 34010 | +1.98 |
| 1605 | 34061 | +1.59 |
| 1635 | 33973 | +0.97 |
| 1665 | 34346 | +0.93 |
| 1695 | 34366 | +1.72 |
| 1725 | 34341 | +1.54 |
| 1755 | 34860 | +2.47 |
| 1785 | 34897 | +4.50 |
| 1815 | 35377 | +6.60 |
| 1845 | 36458 | |
| 1875 | 37630 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector B  7/1/2009

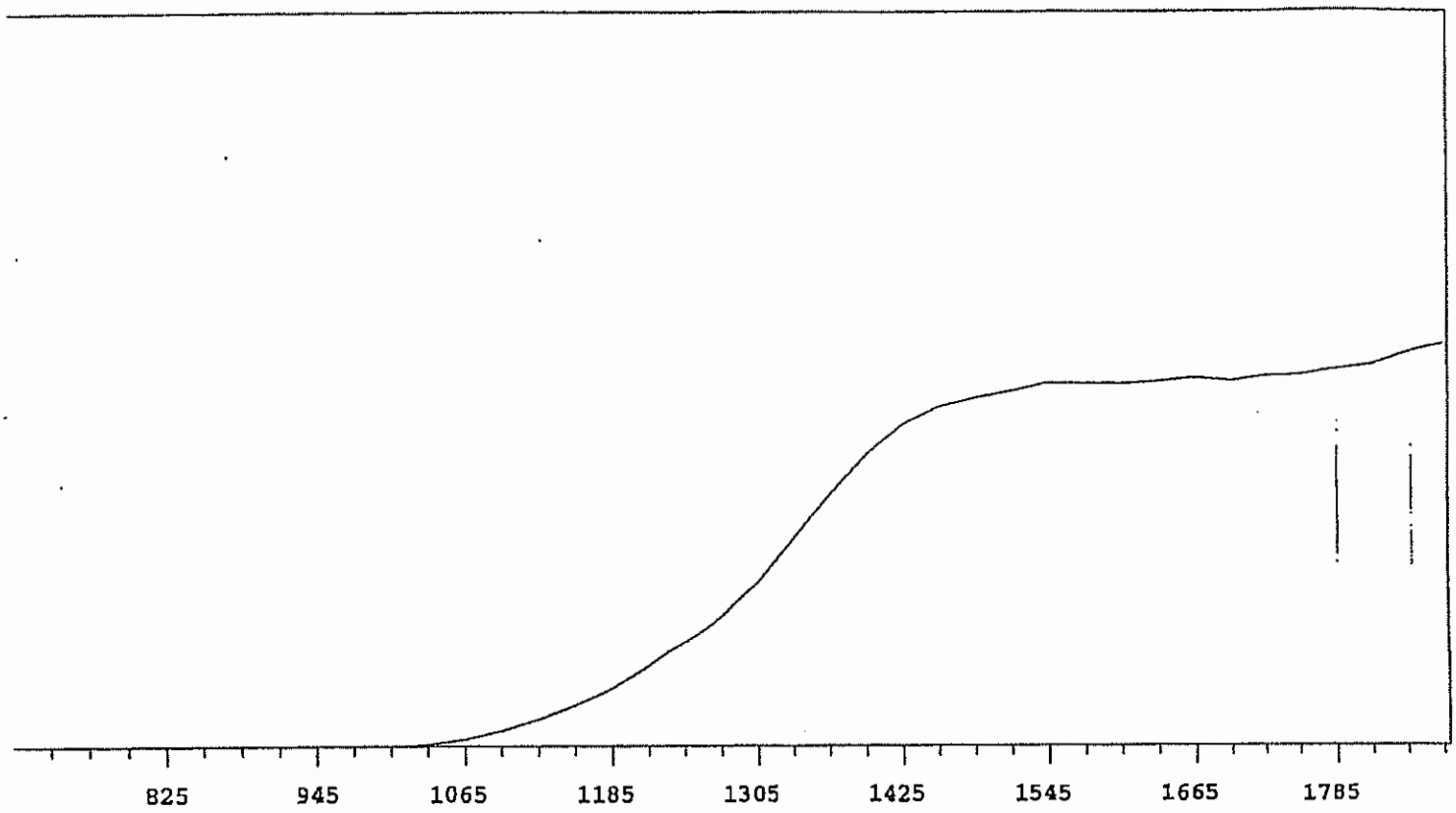
Alpha Volts: 870  Beta Volts: 1552




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 7 | >100 |
| 1005 | 28 | >100 |
| 1035 | 190 | >100 |
| 1065 | 597 | >100 |
| 1095 | 1474 | >100 |
| 1125 | 2383 | >100 |
| 1155 | 3680 | >100 |
| 1185 | 5131 | >100 |
| 1215 | 6808 | +89.95 |
| 1245 | 8990 | +83.03 |
| 1275 | 11493 | +77.30 |
| 1305 | 14469 | +71.08 |
| 1335 | 17904 | +63.07 |
| 1365 | 21677 | +51.20 |
| 1395 | 25027 | +38.06 |
| 1425 | 27237 | +24.55 |
| 1455 | 28914 | +14.61 |
| 1485 | 29480 | +8.48 |
| 1515 | 30075 | +5.06 |
| 1545 | 30374 | +3.42 |
| 1575 | 30738 | +1.68 |
| 1605 | 30703 | +1.08 |
| 1635 | 30679 | +0.77 |
| 1665 | 30902 | +1.46 |
| 1695 | 30992 | +1.89 |
| 1725 | 31224 | +2.40 |
| 1755 | 31397 | +3.27 |
| 1785 | 31826 | +4.13 |
| 1815 | 32236 | +5.59 |
| 1845 | 32782 | |
| 1875 | 33632 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector C  7/1/2009

Alpha Volts: 870  Beta Volts: 1552

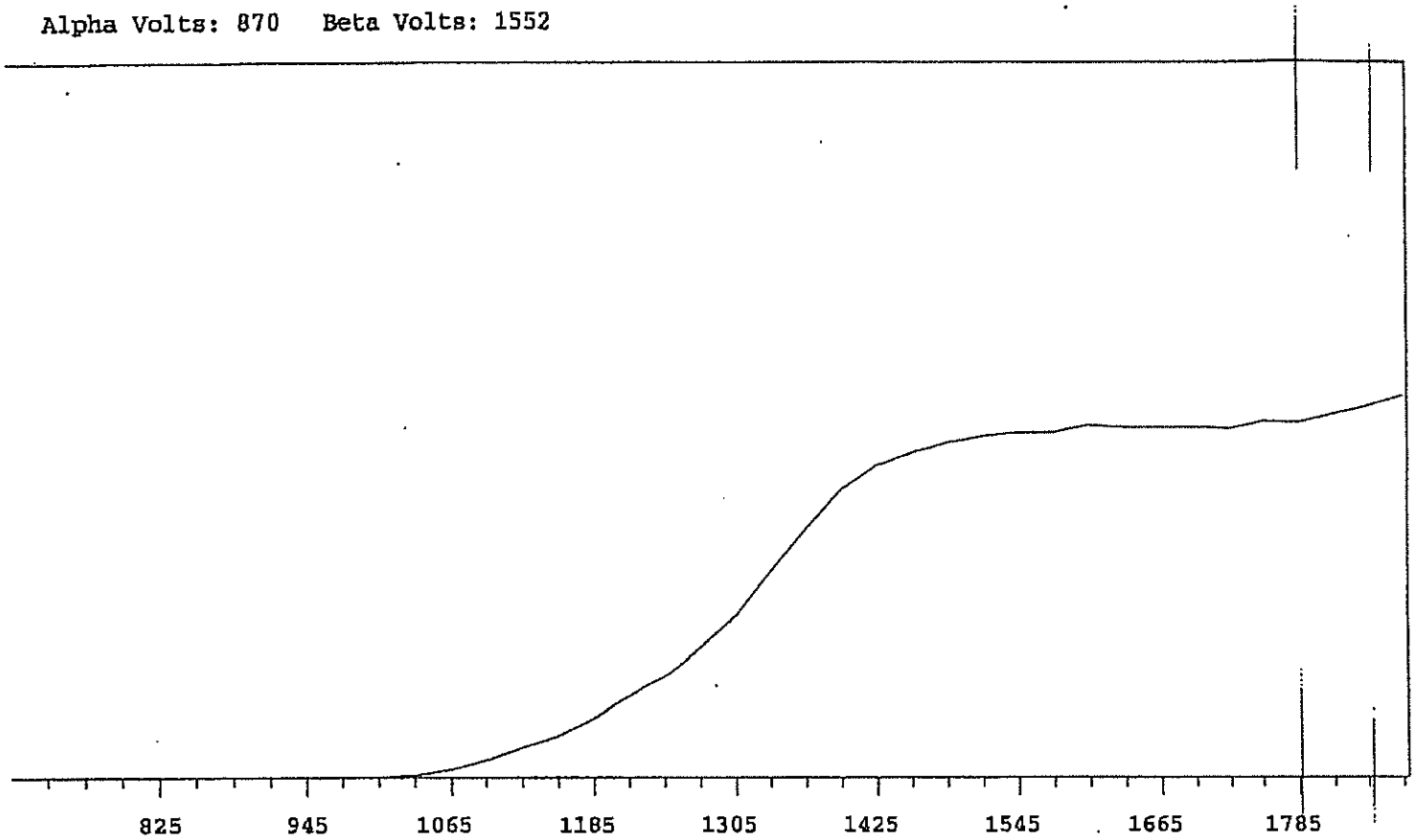



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 0 | >100 |
| 945 | 2 | >100 |
| 975 | 2 | >100 |
| 1005 | 36 | >100 |
| 1035 | 220 | >100 |
| 1065 | 780 | >100 |
| 1095 | 1712 | >100 |
| 1125 | 2926 | >100 |
| 1155 | 4297 | >100 |
| 1185 | 6097 | >100 |
| 1215 | 8397 | +95.11 |
| 1245 | 11155 | +85.84 |
| 1275 | 14430 | +78.79 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 18051 | +71.16 |
| 1335 | 22586 | +62.34 |
| 1365 | 26973 | +51.47 |
| 1395 | 31137 | +38.24 |
| 1425 | 34321 | +25.70 |
| 1455 | 36267 | +15.37 |
| 1485 | 37197 | +9.21 |
| 1515 | 37851 | +5.38 |
| 1545 | 38622 | +3.00 |
| 1575 | 38600 | +1.55 |
| 1605 | 38538 | +1.03 |
| 1635 | 38786 | +0.91 |
| 1665 | 39129 | +1.38 |
| 1695 | 38832 | +1.20 |
| 1725 | 39323 | +2.00 |
| 1755 | 39390 | +3.35 |
| 1785 | 40031 | +4.86 |
| 1815 | 40466 | +6.64 |
| 1845 | 41713 | |
| 1875 | 42620 | |

MPC 9600 Plateau  Instrument 10  MPC 9604 Detector D  7/1/2009

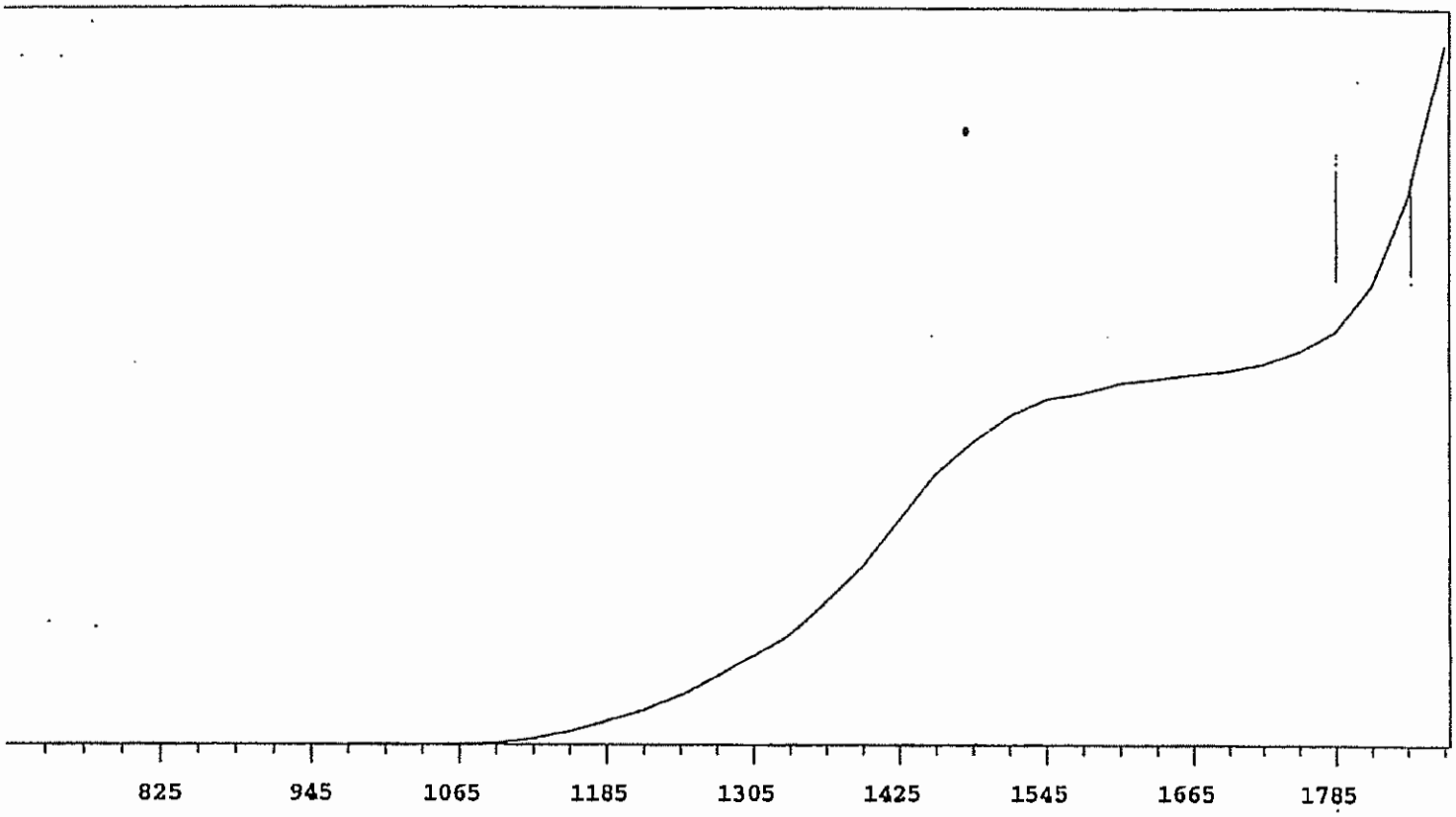
Alpha Volts: 870  Beta Volts: 1552




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 3 | >100 |
| 1005 | 49 | >100 |
| 1035 | 244 | >100 |
| 1065 | 764 | >100 |
| 1095 | 1584 | >100 |
| 1125 | 2677 | >100 |
| 1155 | 3763 | >100 |
| 1185 | 5395 | >100 |
| 1215 | 7350 | +93.71 |
| 1245 | 9655 | +83.52 |
| 1275 | 12504 | +76.82 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 15430 | +69.87 |
| 1335 | 19258 | +61.49 |
| 1365 | 23018 | +50.06 |
| 1395 | 26562 | +35.34 |
| 1425 | 28750 | +22.67 |
| 1455 | 29911 | +13.20 |
| 1485 | 30798 | +8.01 |
| 1515 | 31375 | +4.83 |
| 1545 | 31684 | +3.74 |
| 1575 | 31721 | +2.38 |
| 1605 | 32398 | +1.44 |
| 1635 | 32154 | +0.64 |
| 1665 | 32157 | -0.77 |
| 1695 | 32152 | +0.99 |
| 1725 | 32029 | +1.41 |
| 1755 | 32699 | +3.00 |
| 1785 | 32566 | +4.71 |
| 1815 | 33351 | +5.92 |
| 1845 | 34031 | |
| 1875 | 34941 | |

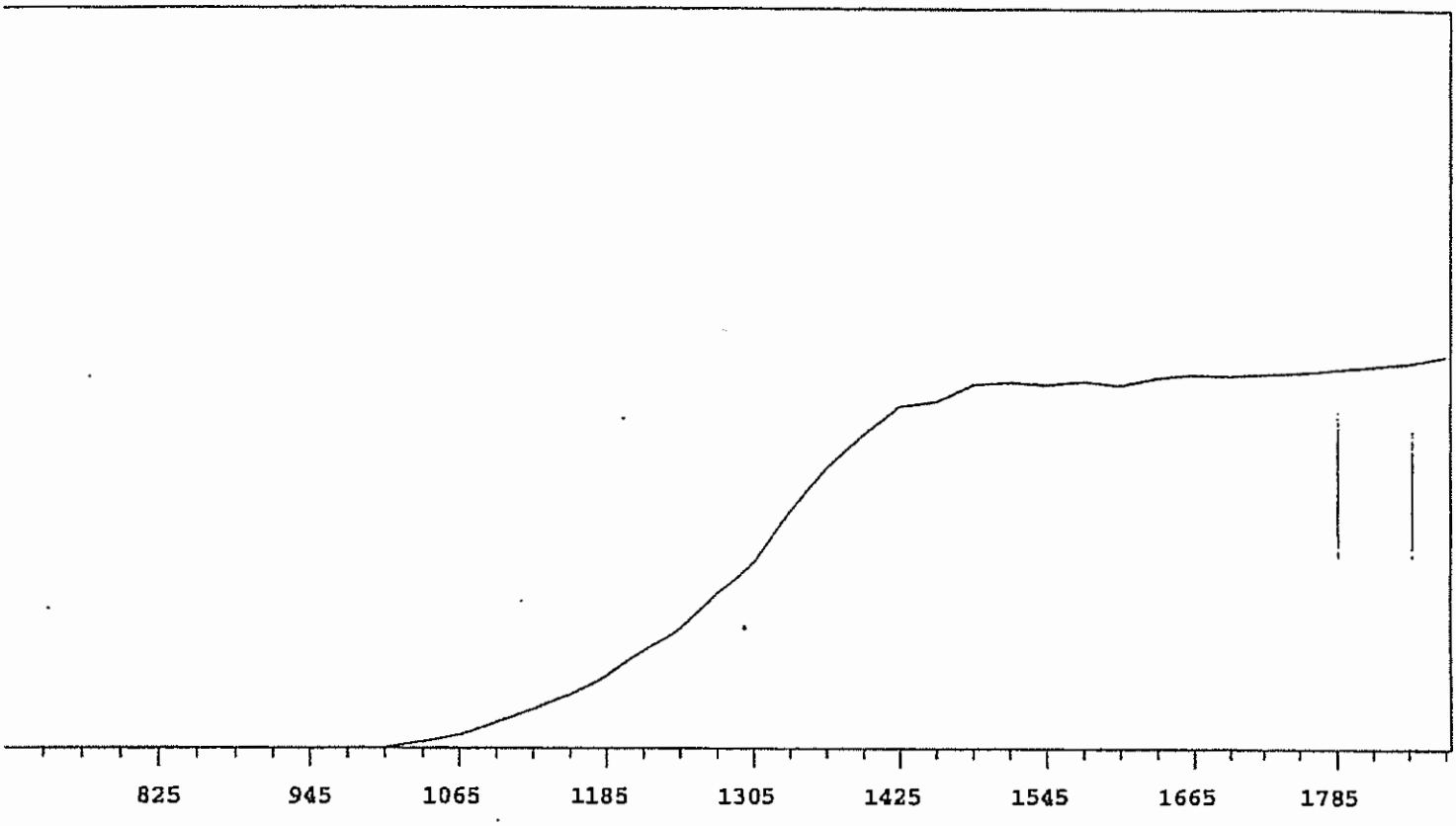
Plateau 7/1/09 Instrument 11 MPC 9604 Detector A 7/1/2009
Alpha Volts: 1515 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | +0.00 |
| 975 | 0 | >100 |
| 1005 | 0 | >100 |
| 1035 | 2 | >100 |
| 1065 | 9 | >100 |
| 1095 | 61 | >100 |
| 1125 | 248 | >100 |
| 1155 | 528 | >100 |
| 1185 | 882 | >100 |
| 1215 | 1270 | >100 |
| 1245 | 1786 | >100 |
| 1275 | 2478 | +93.67 |
| 1305 | 3225 | +87.64 |
| 1335 | 4189 | +80.15 |
| 1365 | 5428 | +75.12 |
| 1395 | 6662 | +68.60 |
| 1425 | 8241 | +58.14 |
| 1455 | 9857 | +46.65 |
| 1485 | 11018 | +33.24 |
| 1515 | 11953 | +21.01 |
| 1545 | 12538 | +13.57 |
| 1575 | 12760 | +8.35 |
| 1605 | 13114 | +5.84 |
| 1635 | 13258 | +4.78 |
| 1665 | 13430 | +3.99 |
| 1695 | 13551 | +5.46 |
| 1725 | 13771 | +8.65 |
| 1755 | 14204 | +16.44 |
| 1785 | 14916 | +30.03 |
| 1815 | 16579 | +48.74 |
| 1845 | 19717 | |
| 1875 | 25029 | |

Plateau 7/1/09 Instrument 11 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

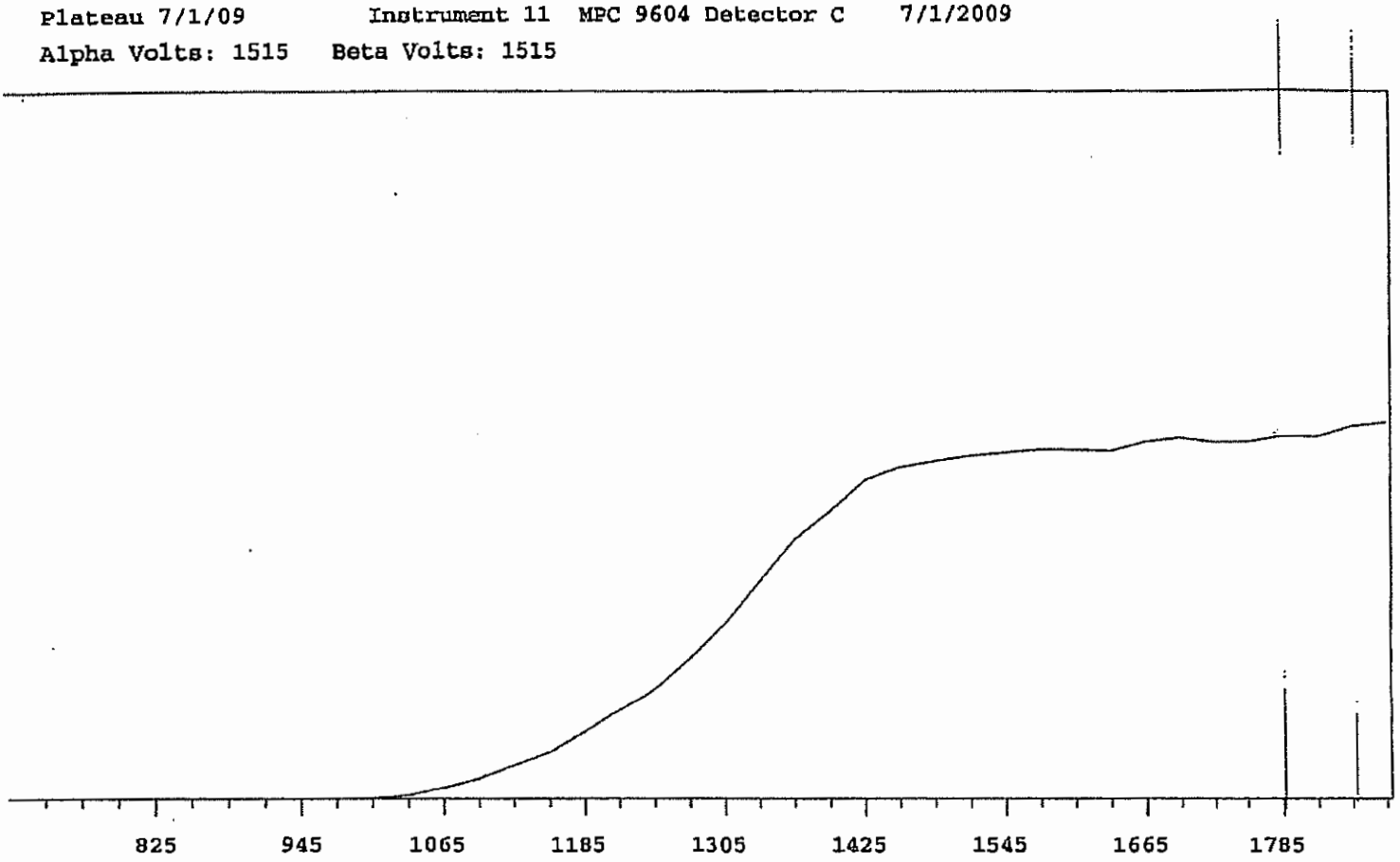



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 11 | >100 |
| 1005 | 47 | >100 |
| 1035 | 280 | >100 |
| 1065 | 610 | >100 |
| 1095 | 1192 | >100 |
| 1125 | 1789 | >100 |
| 1155 | 2466 | >100 |
| 1185 | 3337 | +94.91 |
| 1215 | 4526 | +88.85 |
| 1245 | 5885 | +78.40 |
| 1275 | 7518 | +72.09 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8947 | +65.63 |
| 1335 | 11238 | +56.58 |
| 1365 | 13246 | +46.66 |
| 1395 | 14838 | +30.69 |
| 1425 | 16166 | +20.11 |
| 1455 | 16396 | +11.95 |
| 1485 | 17161 | +5.61 |
| 1515 | 17274 | +3.59 |
| 1545 | 17144 | -0.00 |
| 1575 | 17323 | +0.80 |
| 1605 | 17136 | +2.21 |
| 1635 | 17484 | +1.94 |
| 1665 | 17638 | +2.16 |
| 1695 | 17580 | +0.85 |
| 1725 | 17655 | +1.05 |
| 1755 | 17700 | +1.98 |
| 1785 | 17857 | +2.38 |
| 1815 | 18006 | +3.36 |
| 1845 | 18140 | |
| 1875 | 18468 | |

Plateau 7/1/09 Instrument 11 MPC 9604 Detector C 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

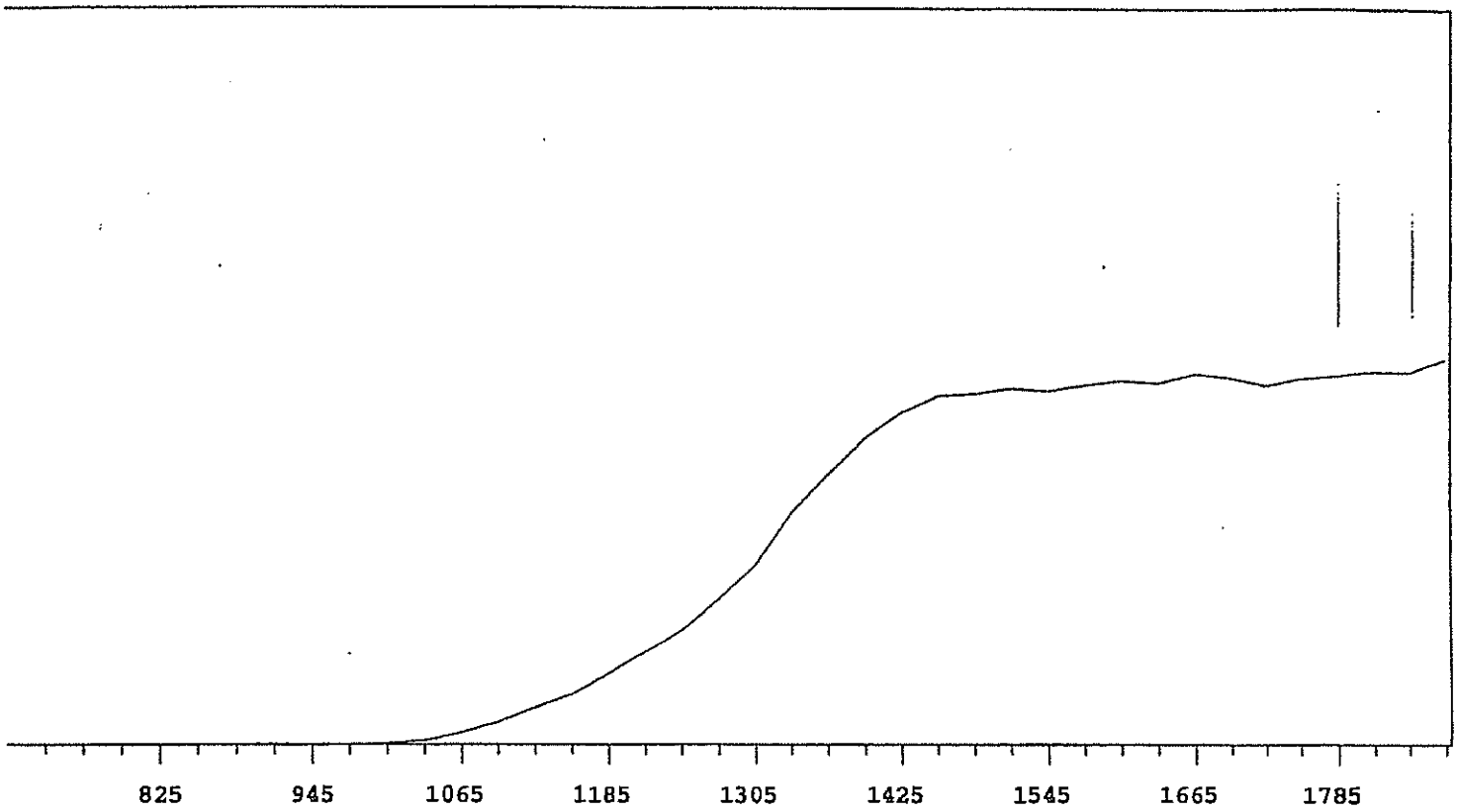



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | +0.00 |
| 795 | 0 | >100 |
| 825 | 1 | +0.00 |
| 855 | 0 | >100 |
| 885 | 0 | +0.00 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 7 | >100 |
| 1005 | 46 | >100 |
| 1035 | 191 | >100 |
| 1065 | 540 | >100 |
| 1095 | 957 | >100 |
| 1125 | 1597 | >100 |
| 1155 | 2217 | >100 |
| 1185 | 3154 | +98.74 |
| 1215 | 4239 | +89.75 |
| 1245 | 5550 | +79.98 |
| 1275 | 6980 | +73.12 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8636 | +66.44 |
| 1335 | 10593 | +56.56 |
| 1365 | 12582 | +46.23 |
| 1395 | 13957 | +33.45 |
| 1425 | 15443 | +21.49 |
| 1455 | 16048 | +13.14 |
| 1485 | 16331 | +6.45 |
| 1515 | 16603 | +4.19 |
| 1545 | 16736 | +2.73 |
| 1575 | 16884 | +1.11 |
| 1605 | 16875 | +1.91 |
| 1635 | 16813 | +2.86 |
| 1665 | 17257 | +2.60 |
| 1695 | 17425 | +1.58 |
| 1725 | 17238 | +0.49 |
| 1755 | 17230 | +0.63 |
| 1785 | 17482 | +3.27 |
| 1815 | 17468 | +4.46 |
| 1845 | 17977 | |
| 1875 | 18163 | |

Plateau 7/1/09 Instrument 11 MPC 9604 Detector D 7/1/2009

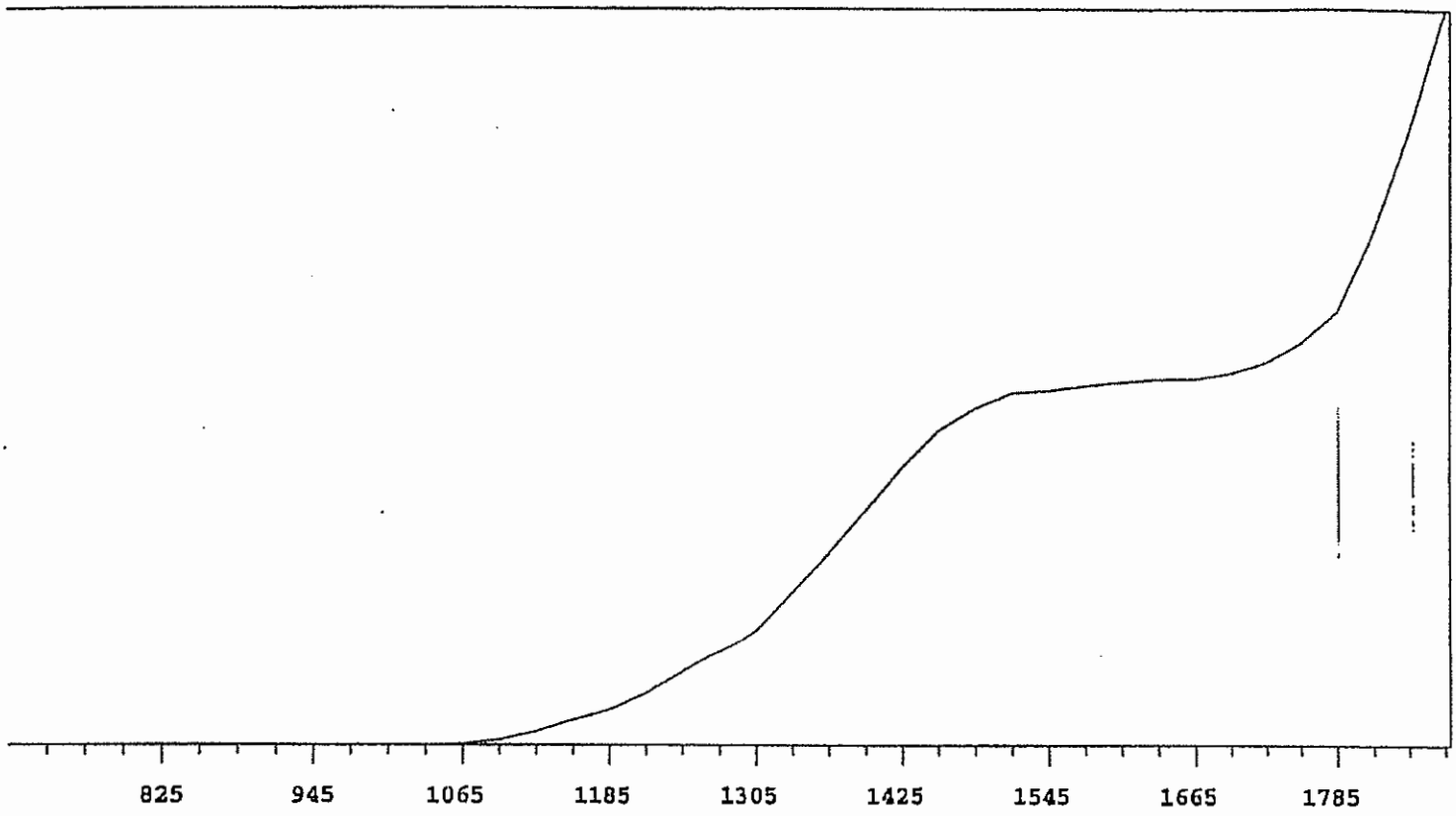
Alpha Volts: 1515 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts | VOLTS | COUNTS | %/100 Volts |
|---|---|---|---|---|---|
| 705 | 0 | | 1305 | 7679 | +65.97 |
| 735 | 0 | | 1335 | 9737 | +57.57 |
| 765 | 0 | | 1365 | 11301 | +45.87 |
| 795 | 0 | >100 | 1395 | 12767 | +31.71 |
| 825 | 0 | >100 | 1425 | 13767 | +19.90 |
| 855 | 1 | +83.33 | 1455 | 14399 | +10.72 |
| 885 | 1 | +55.56 | 1485 | 14467 | +4.38 |
| 915 | 0 | >100 | 1515 | 14671 | +2.12 |
| 945 | 1 | >100 | 1545 | 14576 | +2.61 |
| 975 | 9 | >100 | 1575 | 14808 | +1.80 |
| 1005 | 60 | >100 | 1605 | 14974 | +3.15 |
| 1035 | 173 | >100 | 1635 | 14872 | +1.76 |
| 1065 | 480 | >100 | 1665 | 15248 | -0.41 |
| 1095 | 911 | >100 | 1695 | 15067 | -0.27 |
| 1125 | 1508 | >100 | 1725 | 14784 | -0.43 |
| 1155 | 2024 | >100 | 1755 | 15044 | +2.01 |
| 1185 | 2872 | +97.38 | 1785 | 15163 | +2.82 |
| 1215 | 3858 | +89.30 | 1815 | 15333 | +3.61 |
| 1245 | 5070 | +78.02 | 1845 | 15278 | |
| 1275 | 6322 | +73.30 | 1875 | 15817 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector A 7/1/2009

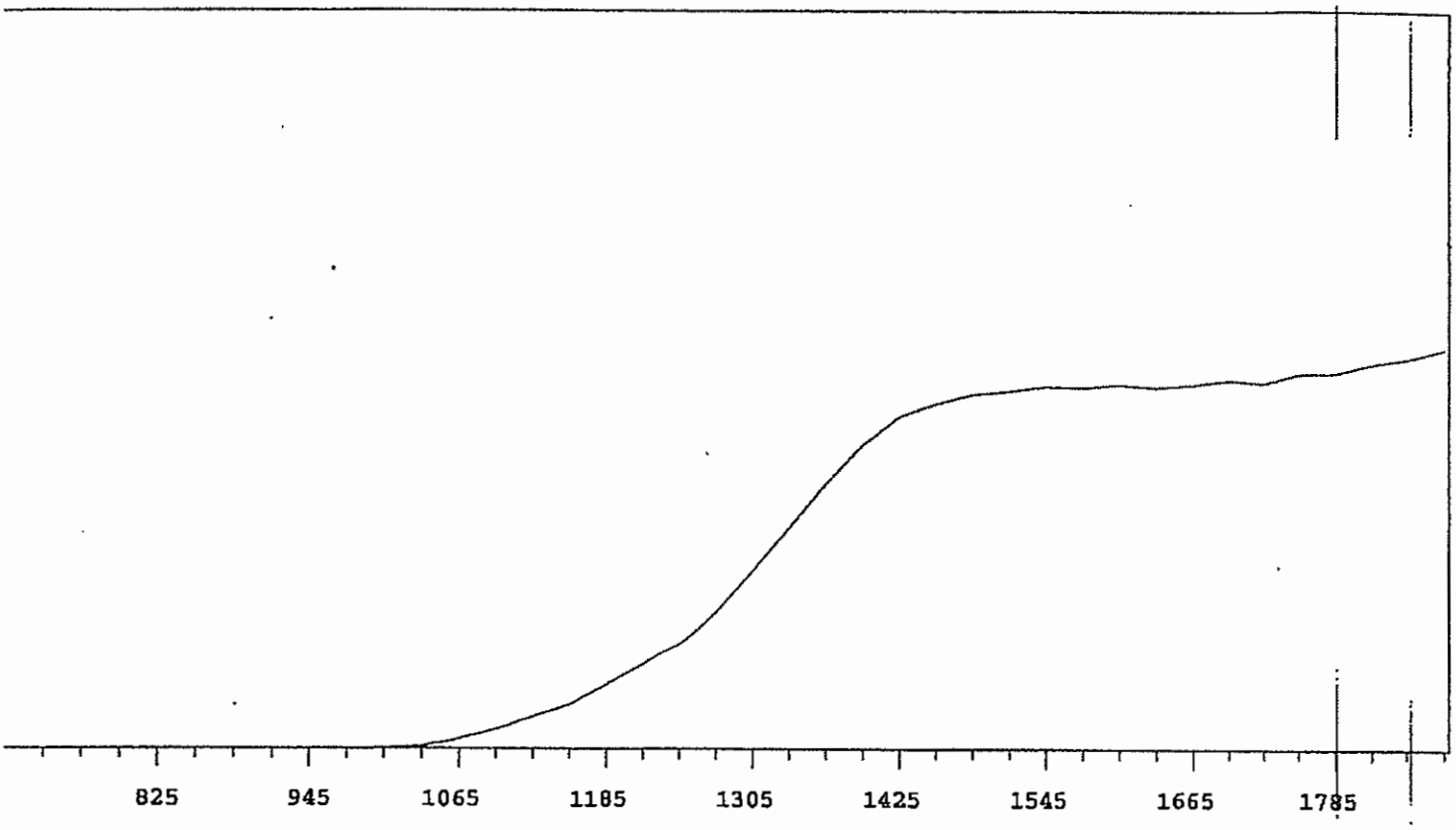
Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 3 | >100 |
| 1035 | 17 | >100 |
| 1065 | 84 | >100 |
| 1095 | 267 | >100 |
| 1125 | 709 | >100 |
| 1155 | 1299 | >100 |
| 1185 | 1813 | >100 |
| 1215 | 2638 | >100 |
| 1245 | 3777 | +96.47 |
| 1275 | 4915 | +87.98 |
| 1305 | 6302 | +80.03 |
| 1335 | 8191 | +73.78 |
| 1365 | 10140 | +66.18 |
| 1395 | 12247 | +55.83 |
| 1425 | 14468 | +43.92 |
| 1455 | 16303 | +31.28 |
| 1485 | 17411 | +18.64 |
| 1515 | 18150 | +9.87 |
| 1545 | 18275 | +5.30 |
| 1575 | 18496 | +3.16 |
| 1605 | 18685 | +2.66 |
| 1635 | 18820 | +2.63 |
| 1665 | 18855 | +4.16 |
| 1695 | 19152 | +7.70 |
| 1725 | 19706 | +13.90 |
| 1755 | 20640 | +26.51 |
| 1785 | 22308 | +40.92 |
| 1815 | 26460 | +51.46 |
| 1845 | 31616 | |
| 1875 | 37348 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

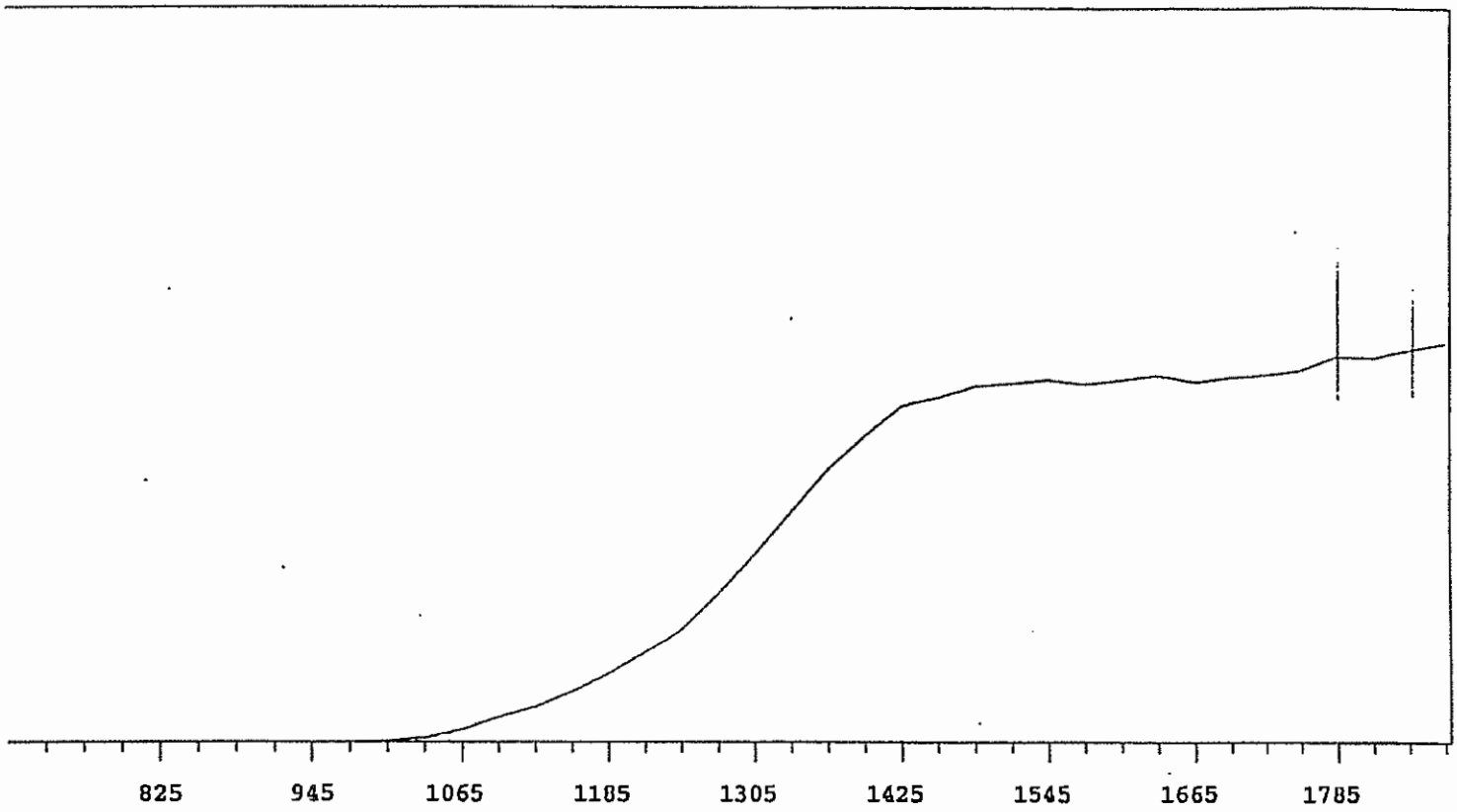



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 1 | +83.33 |
| 885 | 1 | -83.33 |
| 915 | 0 | -55.56 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 43 | >100 |
| 1035 | 165 | >100 |
| 1065 | 557 | >100 |
| 1095 | 1055 | >100 |
| 1125 | 1775 | >100 |
| 1155 | 2470 | >100 |
| 1185 | 3617 | +98.46 |
| 1215 | 4757 | +90.95 |
| 1245 | 6186 | +83.59 |
| 1275 | 8021 | +77.85 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 10207 | +70.42 |
| 1335 | 12473 | +60.75 |
| 1365 | 14900 | +48.87 |
| 1395 | 17101 | +35.36 |
| 1425 | 18643 | +22.53 |
| 1455 | 19350 | +12.34 |
| 1485 | 19848 | +6.68 |
| 1515 | 20014 | +3.51 |
| 1545 | 20278 | +2.03 |
| 1575 | 20186 | +0.80 |
| 1605 | 20375 | +0.32 |
| 1635 | 20209 | +1.36 |
| 1665 | 20364 | +0.83 |
| 1695 | 20607 | +2.43 |
| 1725 | 20429 | +2.51 |
| 1755 | 20924 | +3.64 |
| 1785 | 20984 | +5.11 |
| 1815 | 21470 | +5.63 |
| 1845 | 21773 | |
| 1875 | 22346 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector C 7/1/2009

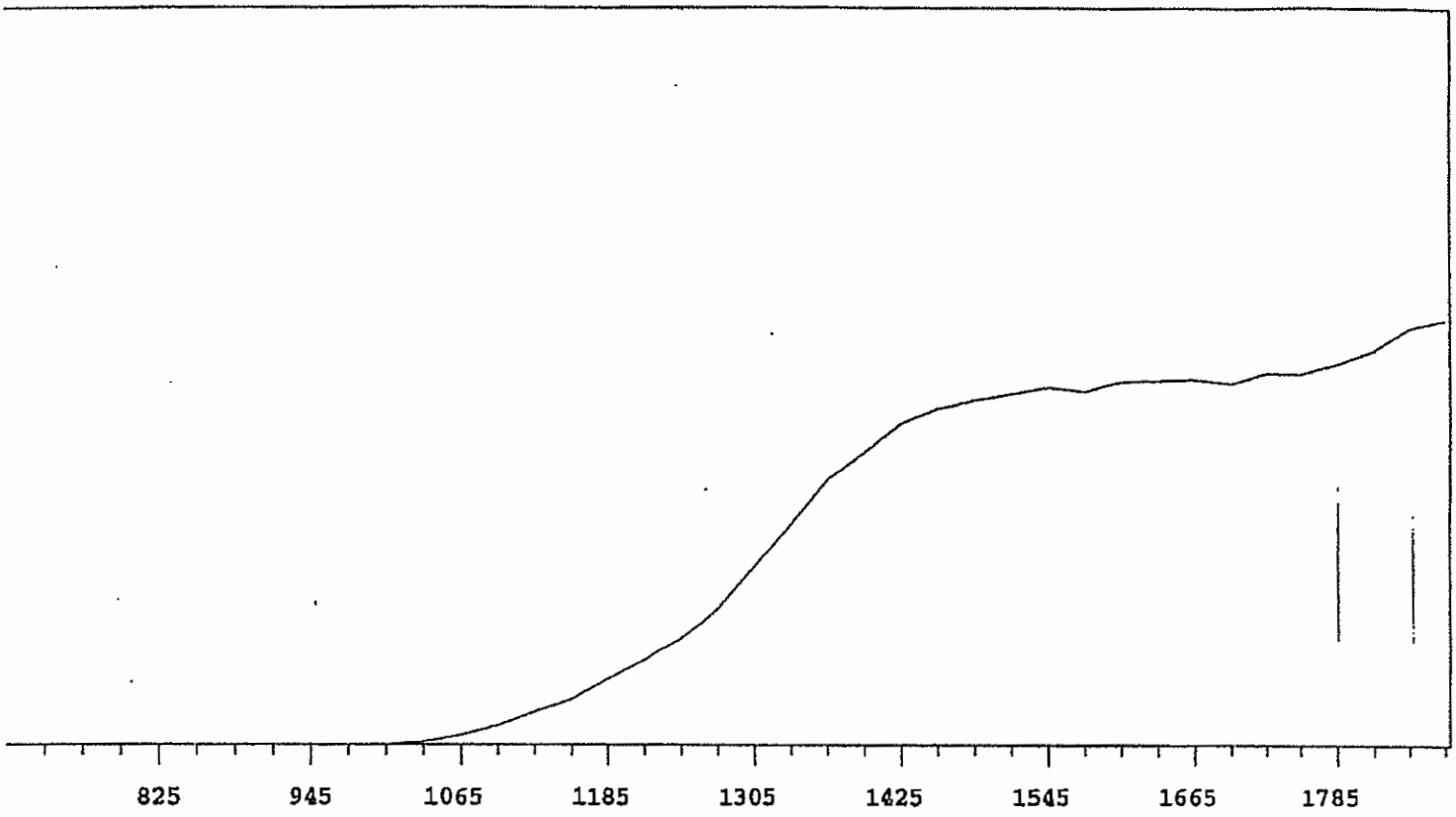
Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 7 | >100 |
| 1005 | 52 | >100 |
| 1035 | 214 | >100 |
| 1065 | 590 | >100 |
| 1095 | 1201 | >100 |
| 1125 | 1759 | >100 |
| 1155 | 2569 | >100 |
| 1185 | 3440 | +95.13 |
| 1215 | 4583 | +87.74 |
| 1245 | 5985 | +81.67 |
| 1275 | 7682 | +74.54 |
| 1305 | 9543 | +67.01 |
| 1335 | 11617 | +56.47 |
| 1365 | 13791 | +45.47 |
| 1395 | 15387 | +31.66 |
| 1425 | 16819 | +20.02 |
| 1455 | 17210 | +11.63 |
| 1485 | 17742 | +6.05 |
| 1515 | 17892 | +3.04 |
| 1545 | 18070 | +1.09 |
| 1575 | 17856 | +1.43 |
| 1605 | 18054 | +0.42 |
| 1635 | 18287 | +1.06 |
| 1665 | 17969 | +0.78 |
| 1695 | 18187 | +1.48 |
| 1725 | 18317 | +4.89 |
| 1755 | 18518 | +4.76 |
| 1785 | 19156 | +5.18 |
| 1815 | 19100 | +5.18 |
| 1845 | 19496 | |
| 1875 | 19842 | |

Plateau 7/1/09 Instrument 12 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

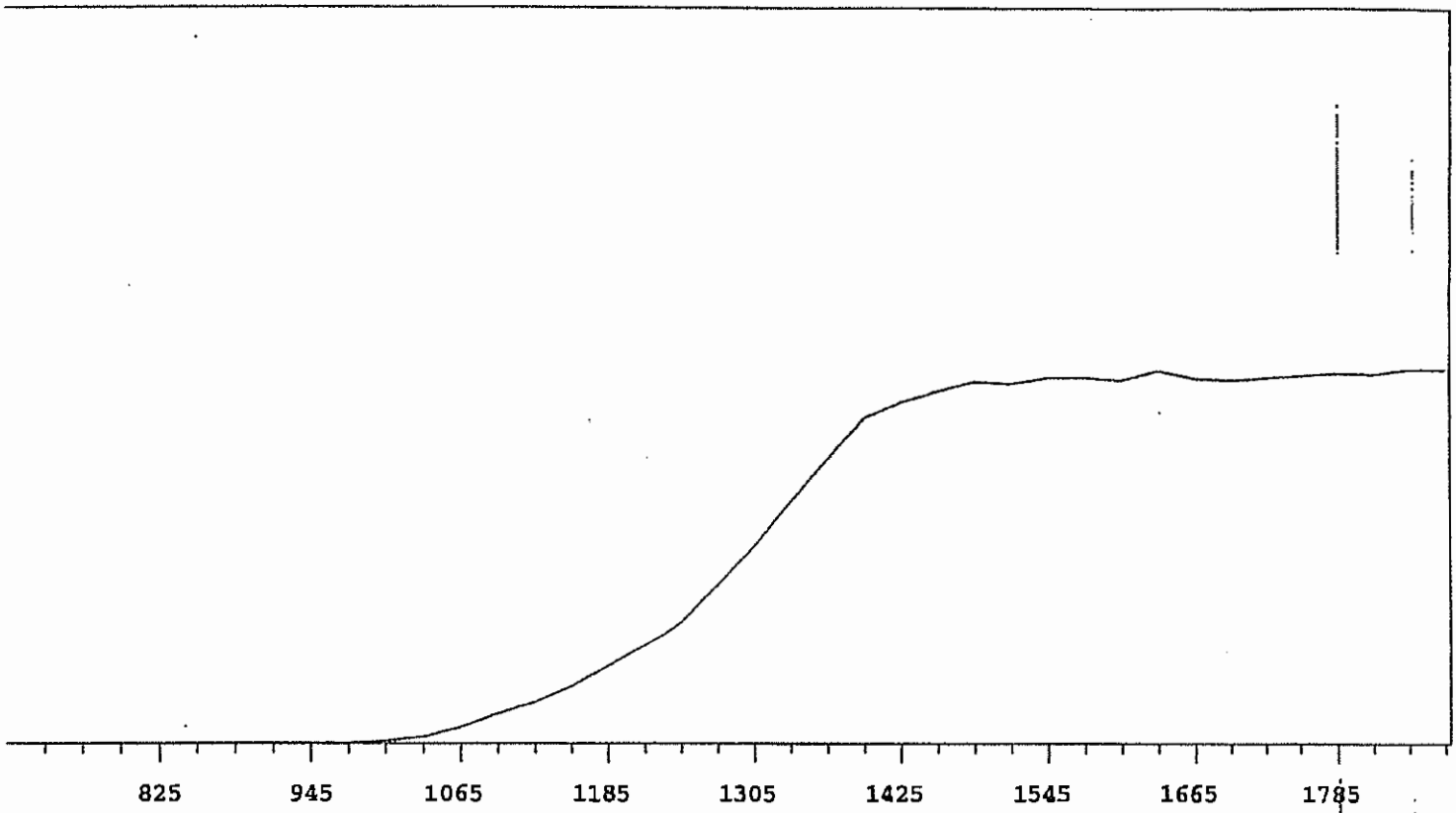



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 26 | >100 |
| 1035 | 169 | >100 |
| 1065 | 483 | >100 |
| 1095 | 955 | >100 |
| 1125 | 1639 | >100 |
| 1155 | 2233 | >100 |
| 1185 | 3262 | +98.61 |
| 1215 | 4306 | +89.77 |
| 1245 | 5662 | +82.36 |
| 1275 | 7113 | +76.36 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 9144 | +69.92 |
| 1335 | 11120 | +58.43 |
| 1365 | 13399 | +45.40 |
| 1395 | 14711 | +32.57 |
| 1425 | 16134 | +20.69 |
| 1455 | 16805 | +13.46 |
| 1485 | 17209 | +7.90 |
| 1515 | 17500 | +4.31 |
| 1545 | 17812 | +3.48 |
| 1575 | 17629 | +2.80 |
| 1605 | 18066 | +2.23 |
| 1635 | 18122 | +1.44 |
| 1665 | 18166 | +1.20 |
| 1695 | 17967 | +1.60 |
| 1725 | 18469 | +3.41 |
| 1755 | 18409 | +6.35 |
| 1785 | 18884 | +9.47 |
| 1815 | 19535 | +11.98 |
| 1845 | 20630 | |
| 1875 | 21076 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

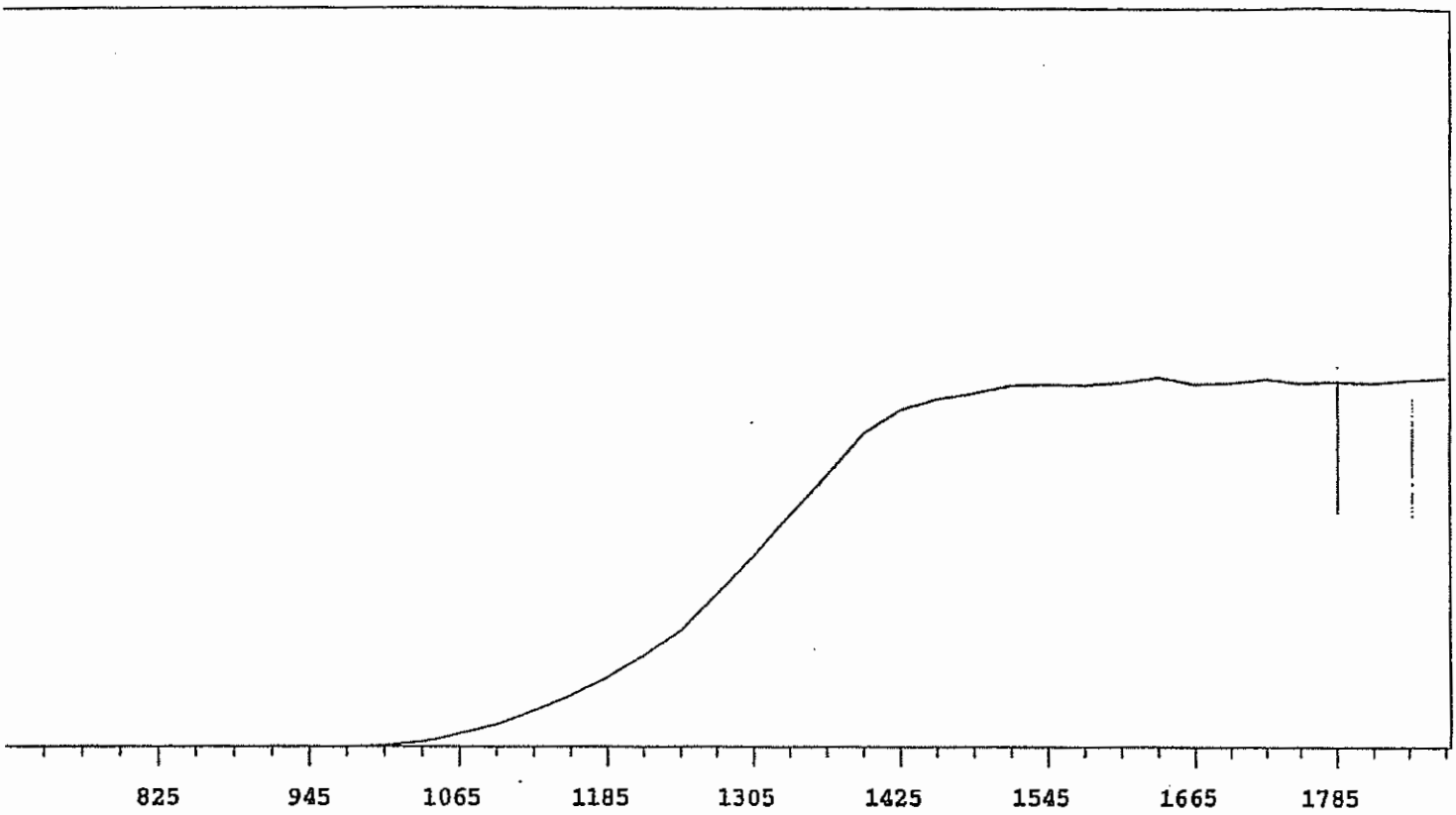



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 1 | |
| 765 | 0 | +55.56 |
| 795 | 2 | >100 |
| 825 | 0 | +0.00 |
| 855 | 0 | >100 |
| 885 | 1 | >100 |
| 915 | 0 | >100 |
| 945 | 1 | >100 |
| 975 | 14 | >100 |
| 1005 | 104 | >100 |
| 1035 | 281 | >100 |
| 1065 | 720 | >100 |
| 1095 | 1302 | >100 |
| 1125 | 1834 | >100 |
| 1155 | 2544 | >100 |
| 1185 | 3485 | +92.28 |
| 1215 | 4624 | +85.50 |
| 1245 | 5878 | +77.82 |
| 1275 | 7515 | +71.49 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 9209 | +64.55 |
| 1335 | 11200 | +55.94 |
| 1365 | 13123 | +43.27 |
| 1395 | 14957 | +29.04 |
| 1425 | 15658 | +17.41 |
| 1455 | 16123 | +8.01 |
| 1485 | 16530 | +4.92 |
| 1515 | 16437 | +2.71 |
| 1545 | 16704 | +0.83 |
| 1575 | 16707 | +2.14 |
| 1605 | 16602 | +0.55 |
| 1635 | 17024 | -0.28 |
| 1665 | 16684 | -0.42 |
| 1695 | 16597 | -0.85 |
| 1725 | 16711 | +1.27 |
| 1755 | 16796 | +1.51 |
| 1785 | 16903 | +1.57 |
| 1815 | 16880 | +1.46 |
| 1845 | 17066 | |
| 1875 | 17085 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

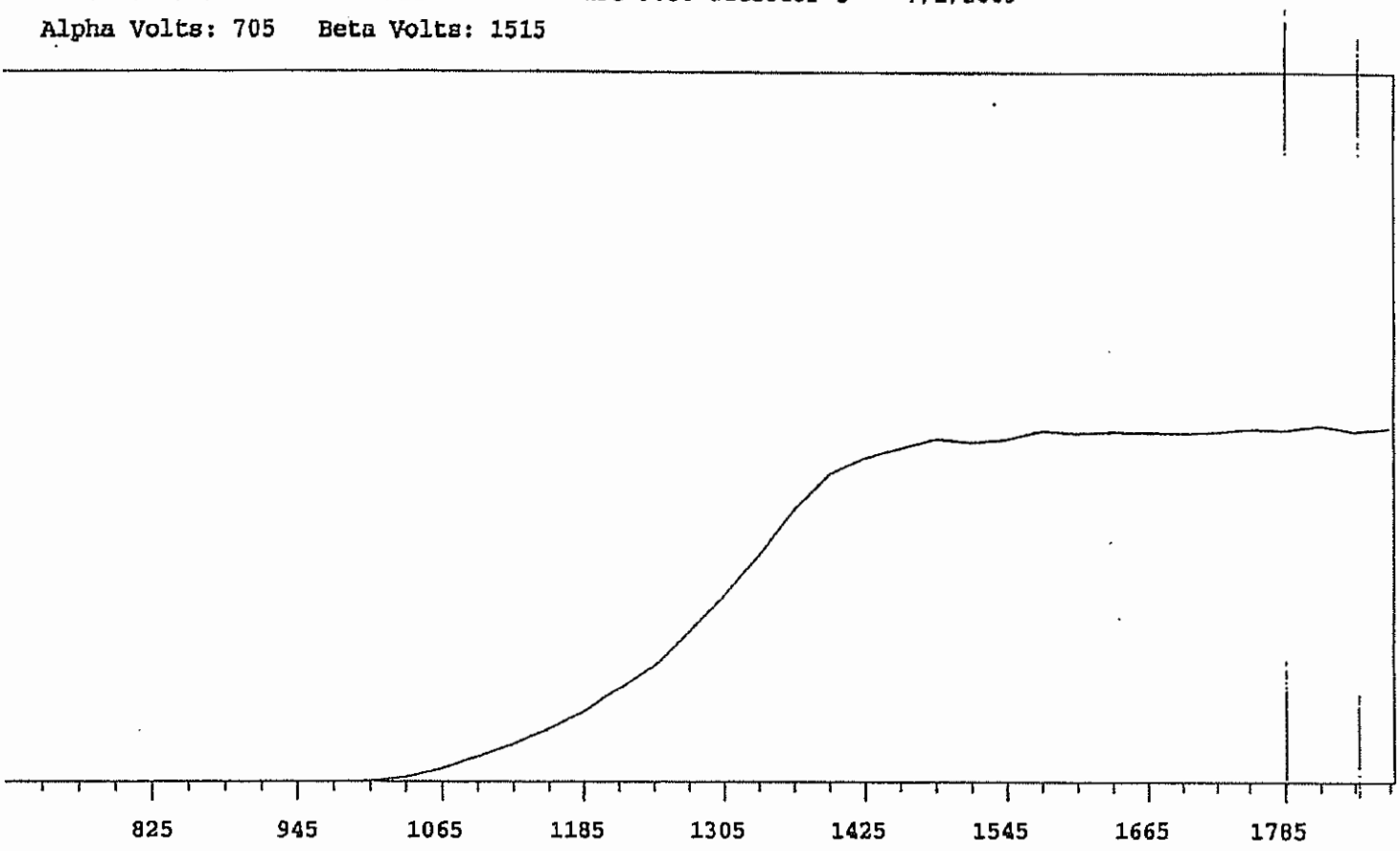



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 1 | >100 |
| 945 | 0 | >100 |
| 975 | 4 | >100 |
| 1005 | 70 | >100 |
| 1035 | 257 | >100 |
| 1065 | 648 | >100 |
| 1095 | 1116 | >100 |
| 1125 | 1784 | >100 |
| 1155 | 2560 | >100 |
| 1185 | 3531 | +96.11 |
| 1215 | 4568 | +89.22 |
| 1245 | 6137 | +81.65 |
| 1275 | 7855 | +74.42 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 9666 | +64.39 |
| 1335 | 11722 | +55.91 |
| 1365 | 13680 | +44.91 |
| 1395 | 15677 | +31.56 |
| 1425 | 16786 | +19.46 |
| 1455 | 17283 | +10.57 |
| 1485 | 17608 | +5.95 |
| 1515 | 17972 | +3.32 |
| 1545 | 18006 | +1.84 |
| 1575 | 17970 | +1.58 |
| 1605 | 18104 | +0.74 |
| 1635 | 18351 | +0.24 |
| 1665 | 18016 | +0.16 |
| 1695 | 18080 | -0.63 |
| 1725 | 18283 | +0.29 |
| 1755 | 18047 | -0.47 |
| 1785 | 18110 | -0.32 |
| 1815 | 18040 | +1.17 |
| 1845 | 18200 | |
| 1875 | 18320 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

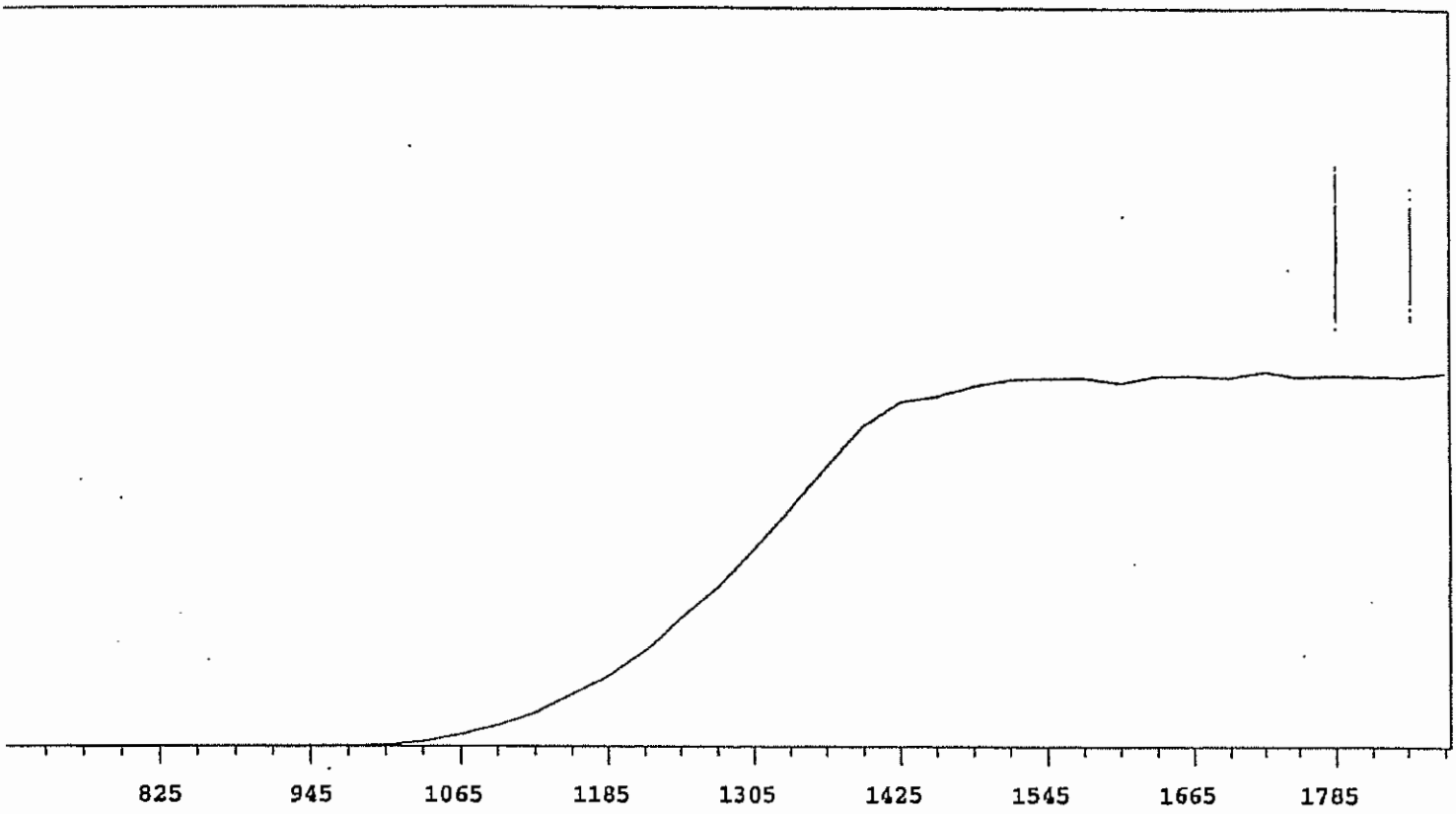



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 9 | >100 |
| 1005 | 93 | >100 |
| 1035 | 325 | >100 |
| 1065 | 834 | >100 |
| 1095 | 1525 | >100 |
| 1125 | 2318 | >100 |
| 1155 | 3233 | >100 |
| 1185 | 4357 | +92.07 |
| 1215 | 5755 | +85.64 |
| 1245 | 7438 | +78.35 |
| 1275 | 9463 | +70.89 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 11573 | +64.95 |
| 1335 | 13929 | +56.47 |
| 1365 | 16726 | +43.82 |
| 1395 | 18834 | +29.38 |
| 1425 | 19743 | +16.84 |
| 1455 | 20314 | +7.95 |
| 1485 | 20860 | +4.16 |
| 1515 | 20670 | +3.23 |
| 1545 | 20844 | +2.09 |
| 1575 | 21330 | +2.48 |
| 1605 | 21188 | +1.16 |
| 1635 | 21280 | -0.32 |
| 1665 | 21237 | +0.08 |
| 1695 | 21202 | +0.42 |
| 1725 | 21254 | +0.60 |
| 1755 | 21406 | +1.41 |
| 1785 | 21326 | +0.42 |
| 1815 | 21619 | +0.16 |
| 1845 | 21282 | |
| 1875 | 21478 | |

Plateau 7/1/09 Instrument 13 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

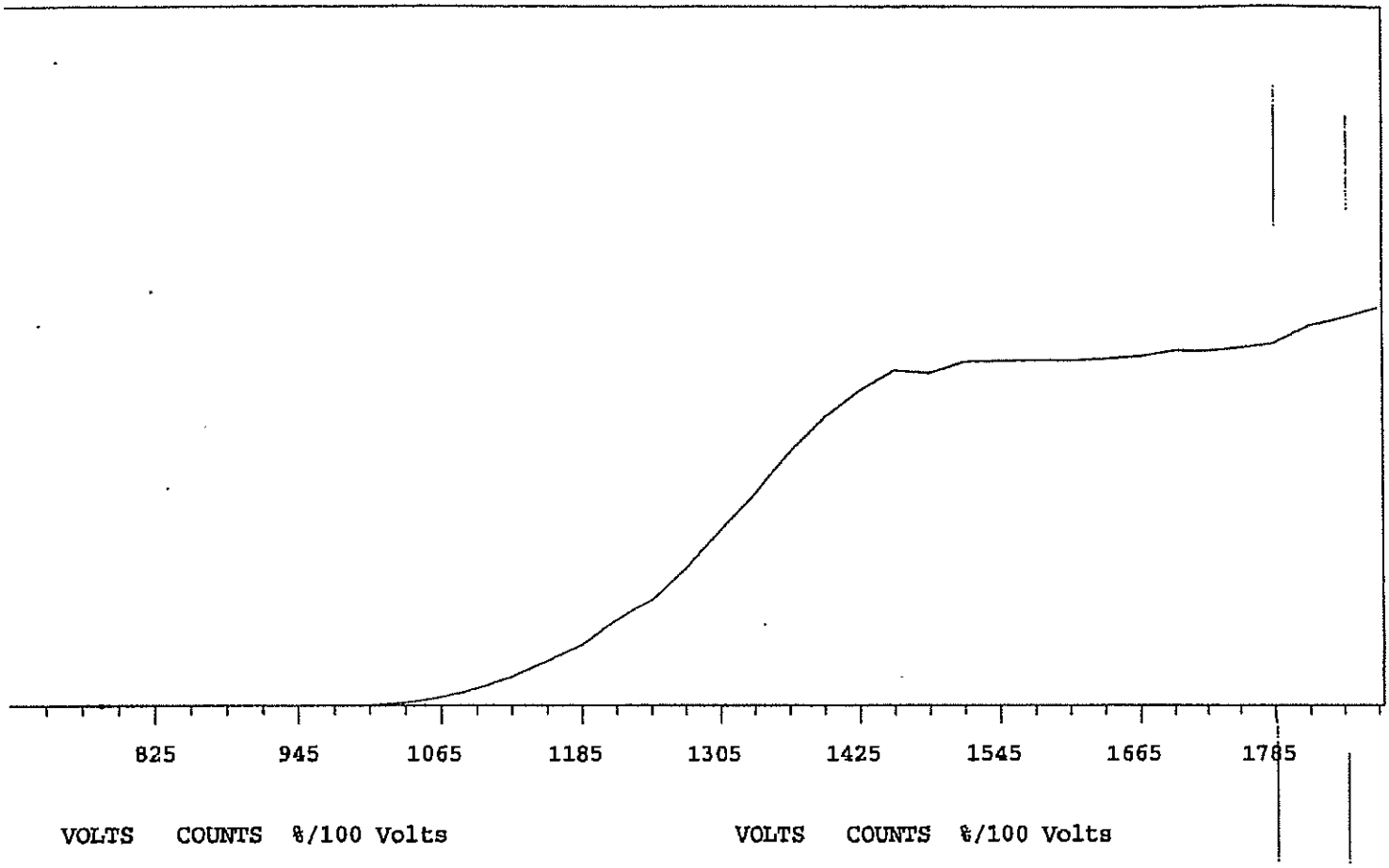



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 1 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 9 | >100 |
| 1005 | 58 | >100 |
| 1035 | 228 | >100 |
| 1065 | 544 | >100 |
| 1095 | 936 | >100 |
| 1125 | 1468 | >100 |
| 1155 | 2110 | >100 |
| 1185 | 2770 | +94.71 |
| 1215 | 3670 | +85.91 |
| 1245 | 4937 | +79.46 |
| 1275 | 6066 | +70.79 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 7524 | +61.93 |
| 1335 | 9002 | +55.36 |
| 1365 | 10542 | +44.70 |
| 1395 | 12064 | +31.21 |
| 1425 | 12981 | +19.20 |
| 1455 | 13192 | +10.41 |
| 1485 | 13570 | +5.93 |
| 1515 | 13820 | +4.08 |
| 1545 | 13866 | +0.75 |
| 1575 | 13880 | +0.21 |
| 1605 | 13695 | +0.59 |
| 1635 | 13950 | +0.77 |
| 1665 | 13954 | +1.92 |
| 1695 | 13911 | +0.19 |
| 1725 | 14116 | +0.02 |
| 1755 | 13908 | -0.24 |
| 1785 | 13960 | -0.81 |
| 1815 | 13939 | +0.71 |
| 1845 | 13931 | |
| 1875 | 14071 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

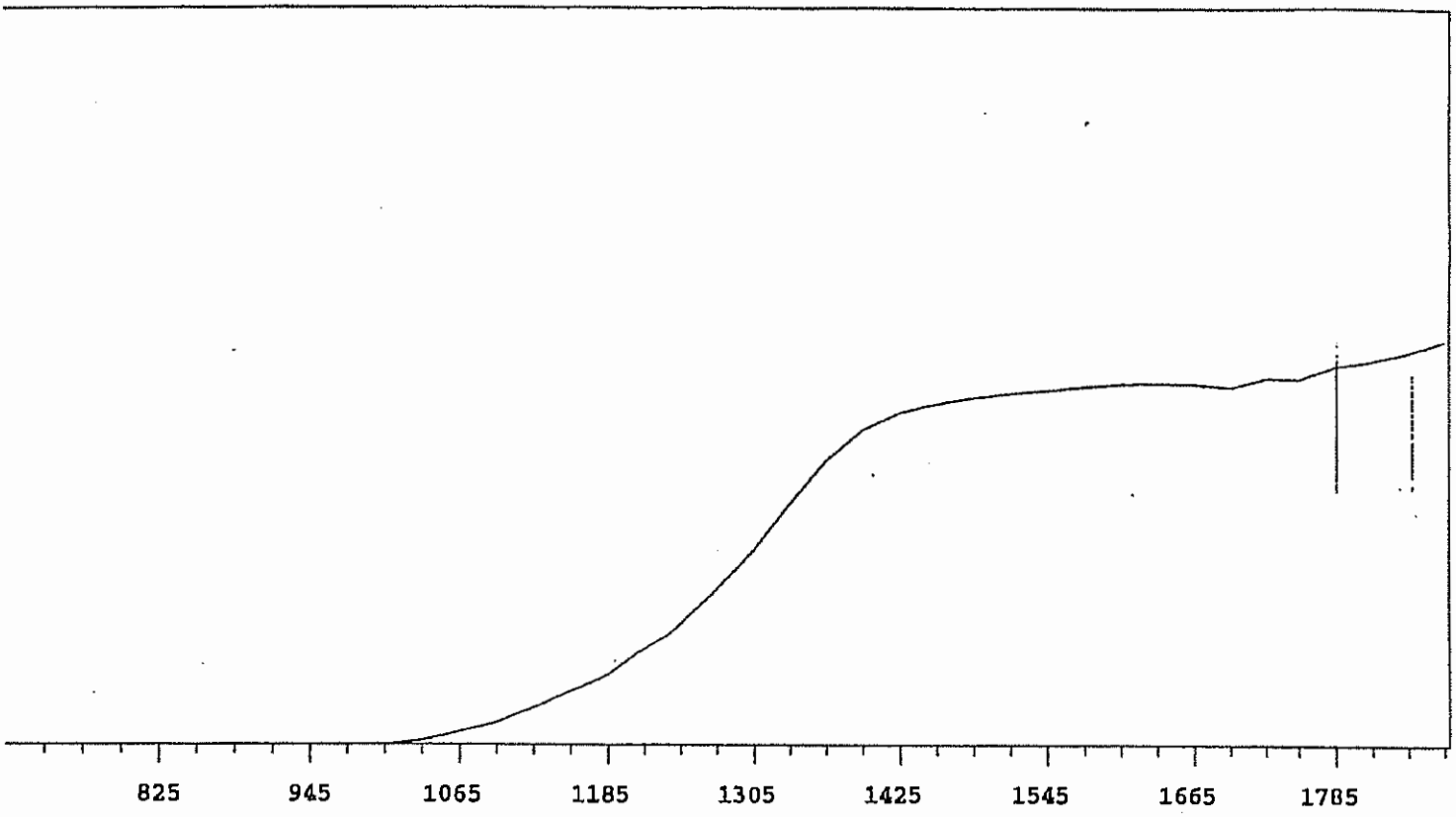



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 0 | >100 |
| 1005 | 18 | >100 |
| 1035 | 137 | >100 |
| 1065 | 430 | >100 |
| 1095 | 865 | >100 |
| 1125 | 1444 | >100 |
| 1155 | 2151 | >100 |
| 1185 | 2981 | >100 |
| 1215 | 4168 | +92.14 |
| 1245 | 5377 | +84.73 |
| 1275 | 6924 | +74.92 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8778 | +67.49 |
| 1335 | 10502 | +57.68 |
| 1365 | 12516 | +46.36 |
| 1395 | 14215 | +35.88 |
| 1425 | 15472 | +22.01 |
| 1455 | 16469 | +12.99 |
| 1485 | 16342 | +6.70 |
| 1515 | 16874 | +3.07 |
| 1545 | 16918 | +2.53 |
| 1575 | 16950 | +0.58 |
| 1605 | 16943 | +0.95 |
| 1635 | 17008 | +2.13 |
| 1665 | 17130 | +2.45 |
| 1695 | 17403 | +2.43 |
| 1725 | 17377 | +2.43 |
| 1755 | 17515 | +4.88 |
| 1785 | 17710 | +7.54 |
| 1815 | 18533 | +9.04 |
| 1845 | 18905 | |
| 1875 | 19415 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

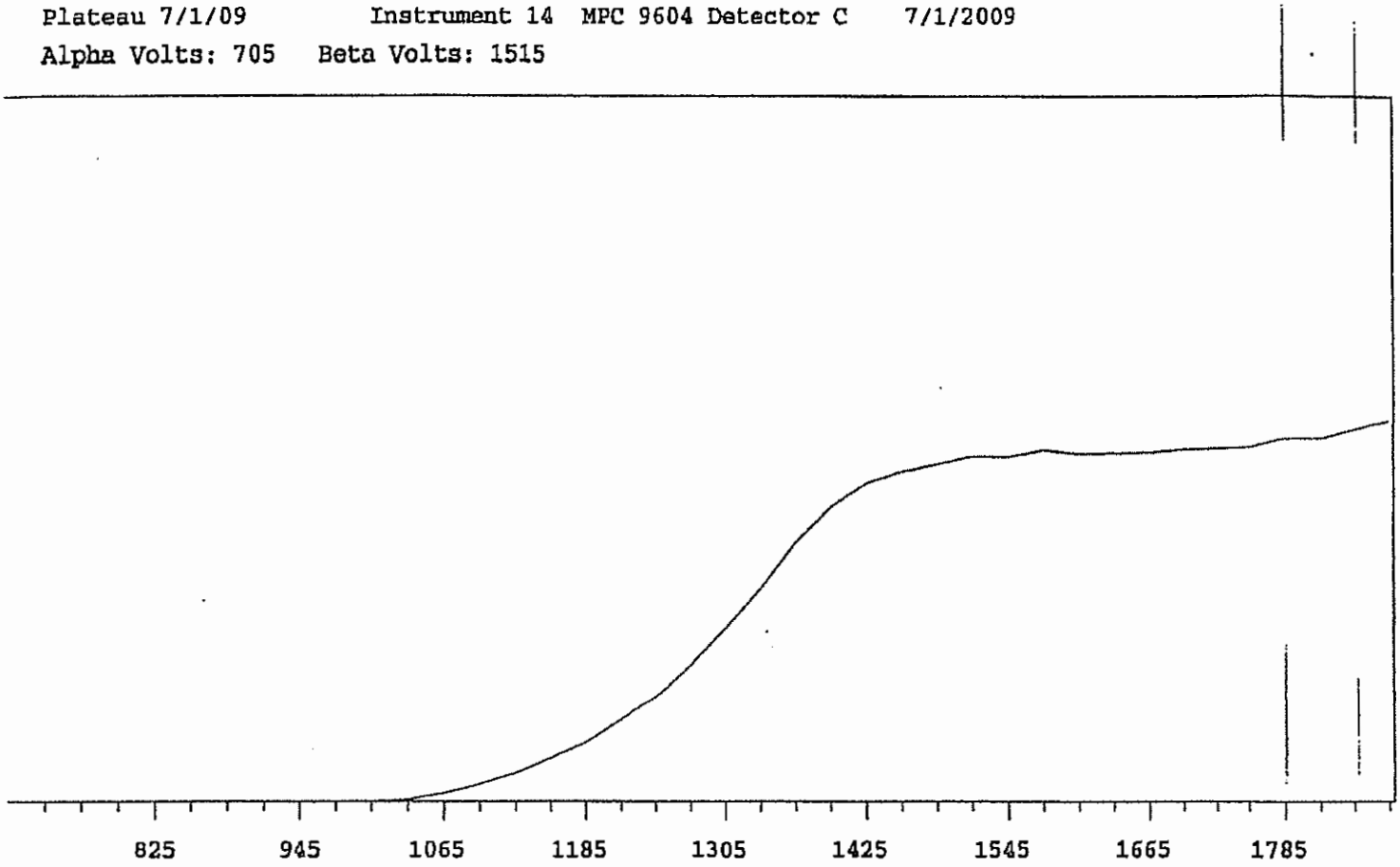



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 1 | +0.00 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 3 | >100 |
| 1005 | 40 | >100 |
| 1035 | 210 | >100 |
| 1065 | 590 | >100 |
| 1095 | 983 | >100 |
| 1125 | 1645 | >100 |
| 1155 | 2342 | >100 |
| 1185 | 3045 | +96.43 |
| 1215 | 4201 | +90.42 |
| 1245 | 5579 | +83.64 |
| 1275 | 7121 | +74.44 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8797 | +65.44 |
| 1335 | 10726 | +54.47 |
| 1365 | 12570 | +41.11 |
| 1395 | 13917 | +26.79 |
| 1425 | 14687 | +15.44 |
| 1455 | 15048 | +8.47 |
| 1485 | 15318 | +5.00 |
| 1515 | 15494 | +3.76 |
| 1545 | 15606 | +3.04 |
| 1575 | 15776 | +2.35 |
| 1605 | 15889 | +1.44 |
| 1635 | 15907 | -0.16 |
| 1665 | 15881 | +0.64 |
| 1695 | 15741 | +1.21 |
| 1725 | 16124 | +3.63 |
| 1755 | 16076 | +5.41 |
| 1785 | 16588 | +5.79 |
| 1815 | 16830 | +7.53 |
| 1845 | 17185 | |
| 1875 | 17682 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

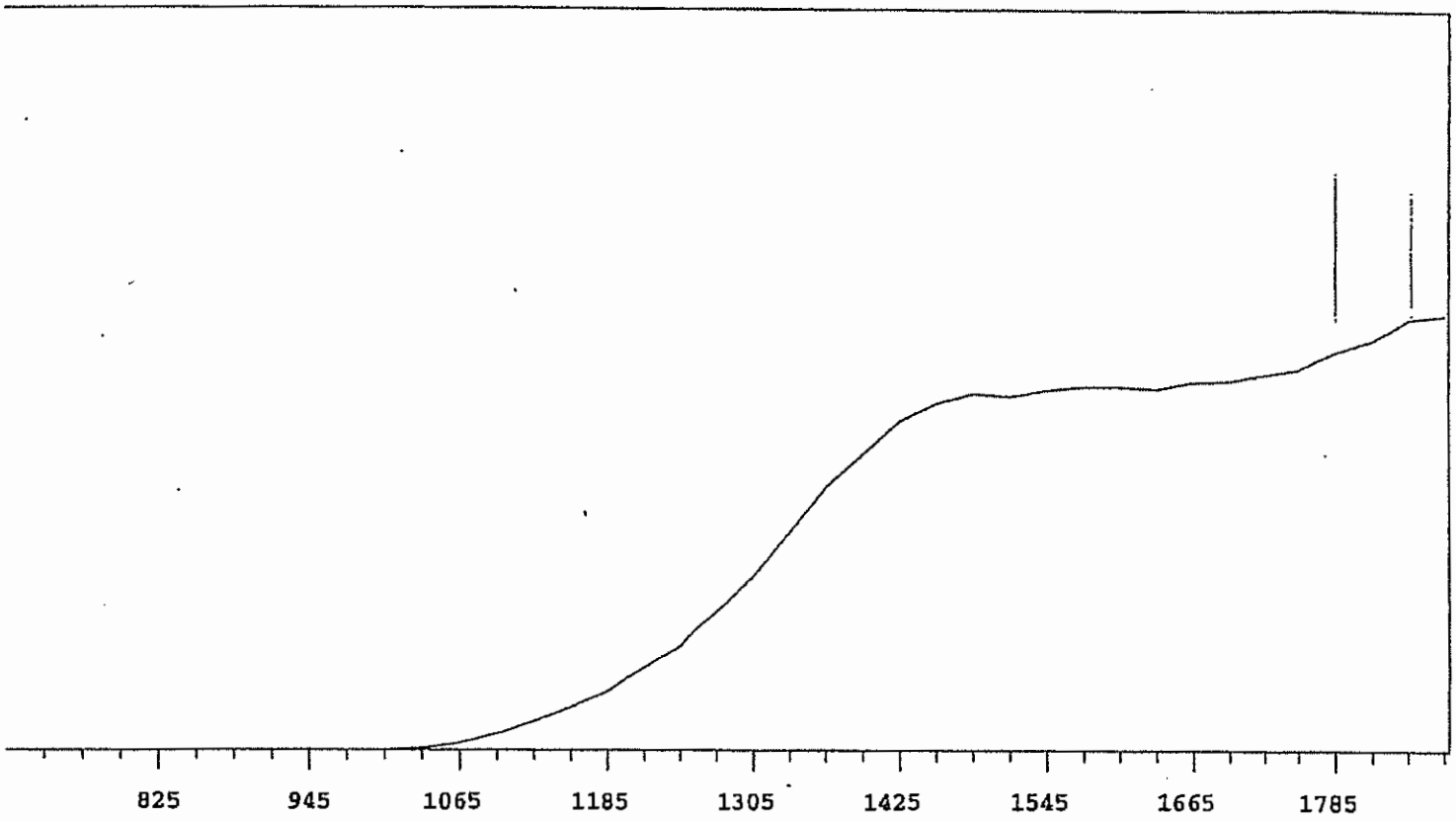



| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 1 | +0.00 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 2 | >100 |
| 1005 | 21 | >100 |
| 1035 | 132 | >100 |
| 1065 | 491 | >100 |
| 1095 | 1036 | >100 |
| 1125 | 1698 | >100 |
| 1155 | 2517 | >100 |
| 1185 | 3468 | >100 |
| 1215 | 4721 | +91.83 |
| 1245 | 6175 | +85.13 |
| 1275 | 8025 | +76.82 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 10118 | +69.76 |
| 1335 | 12269 | +59.65 |
| 1365 | 14810 | +47.35 |
| 1395 | 16773 | +33.46 |
| 1425 | 18104 | +20.13 |
| 1455 | 18720 | +11.98 |
| 1485 | 19122 | +6.50 |
| 1515 | 19580 | +4.77 |
| 1545 | 19527 | +2.48 |
| 1575 | 19902 | +0.81 |
| 1605 | 19690 | +0.53 |
| 1635 | 19739 | +0.23 |
| 1665 | 19765 | +1.29 |
| 1695 | 19932 | +1.40 |
| 1725 | 19976 | +2.72 |
| 1755 | 20051 | +2.92 |
| 1785 | 20523 | +4.26 |
| 1815 | 20542 | +5.57 |
| 1845 | 21035 | |
| 1875 | 21528 | |

Plateau 7/1/09 Instrument 14 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515




| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 705 | 0 | |
| 735 | 0 | |
| 765 | 0 | |
| 795 | 0 | >100 |
| 825 | 0 | >100 |
| 855 | 0 | >100 |
| 885 | 0 | >100 |
| 915 | 0 | >100 |
| 945 | 0 | >100 |
| 975 | 1 | >100 |
| 1005 | 14 | >100 |
| 1035 | 130 | >100 |
| 1065 | 363 | >100 |
| 1095 | 785 | >100 |
| 1125 | 1357 | >100 |
| 1155 | 1996 | >100 |
| 1185 | 2735 | +99.45 |
| 1215 | 3785 | +94.20 |
| 1245 | 4857 | +86.43 |
| 1275 | 6571 | +78.80 |

| VOLTS | COUNTS | %/100 Volts |
|---|---|---|
| 1305 | 8095 | +71.16 |
| 1335 | 10052 | +58.38 |
| 1365 | 11990 | +47.92 |
| 1395 | 13400 | +35.01 |
| 1425 | 14808 | +23.58 |
| 1455 | 15554 | +13.45 |
| 1485 | 15987 | +6.39 |
| 1515 | 15861 | +3.45 |
| 1545 | 16156 | +2.18 |
| 1575 | 16297 | +1.72 |
| 1605 | 16297 | +1.33 |
| 1635 | 16208 | +1.62 |
| 1665 | 16526 | +2.92 |
| 1695 | 16581 | +3.94 |
| 1725 | 16832 | +5.91 |
| 1755 | 17039 | +8.68 |
| 1785 | 17800 | +11.53 |
| 1815 | 18351 | +11.46 |
| 1845 | 19265 | |
| 1875 | 19468 | |

showfile.cgi

DCN: ITSI-0808-0004-0076, 8 May 2019

# Standardization of Strontium Carrier 1858443

v1.2

| Analyst | VXC2 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Strontium |
| Serial Number | 1858443 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 12/11/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 1747929 |
| Parent Exp. Date | 3/5/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Strontium/mL | mg Strontium/g |
|---|---|---|---|---|---|---|
| 1 | 1.0326 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.24 |
| 2 | 1.0306 | 0.0248 | 0.0423 | 0.0175 | 17.50 | 16.98 |
| 3 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |
| 4 | 1.0299 | 0.0248 | 0.0426 | 0.0178 | 17.80 | 17.28 |

Mean Value (mg/mL) = 17.73
Stdev (mg/mL) = ± 0.15
1.0% of Mean Value = 0.177250
Pass
Expiration Date 12/11/2013

Mean Value (mg/1.0mL) = 17.73

Standardization Rule
A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

V. [illegible]
12/11/12

M-10440



http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

# Standardization of Yttrium Carrier 1892786

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1892786 |
| Amount of Std. (mL) | 1.0 |
| Standard Prepared | 3/15/2013 |

| Parent Information | |
|---|---|
| Parent Serial # | 1731870.1 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium /mL | mg Yttrium /g |
|---|---|---|---|---|---|---|
| 1 | 1.0100 | 0.0242 | 0.0560 | 0.0318 | 31.80 | 31.49 |
| 2 | 1.0200 | 0.0242 | 0.0562 | 0.0320 | 32.00 | 31.37 |
| 3 | 1.0100 | 0.0242 | 0.0559 | 0.0317 | 31.70 | 31.39 |
| 4 | 1.0100 | 0.0242 | 0.0561 | 0.0319 | 31.90 | 31.58 |

Mean Value (mg/mL) = 31.85
Stdev (mg/mL) = ± 0.13
1.0% of Mean Value = 0.318500
Pass
Expiration Date 1/26/2014

Mean Value (mg/1.0mL) = 31.85

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

Jennifer L. Robb

# Standardization of Yttrium Carrier 1840837

v1.2

| Analyst | JXR1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Yttrium |
| Serial Number | 1840837 |
| Amount of Std. (mL) | 0.5 |
| Standard Prepared | 10/25/2012 |

| Parent Information | |
|---|---|
| Parent Serial # | 17318701 |
| Parent Exp. Date | 1/26/2014 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Yttrium/mL | mg Yttrium/g |
|---|---|---|---|---|---|---|
| 1 | 0.5000 | 0.0241 | 0.0399 | 0.0158 | 31.60 | 31.60 |
| 2 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |
| 3 | 0.5000 | 0.0244 | 0.0400 | 0.0156 | 31.20 | 31.20 |
| 4 | 0.5000 | 0.0246 | 0.0401 | 0.0155 | 31.00 | 31.00 |

Mean Value (mg/mL) = 31.20
Stdev (mg/mL) = ± 0.28
1.0% of Mean Value = 0.312000
Pass
Expiration Date 10/25/2013

Mean Value (mg/0.5mL) = 15.60

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

Jennifer L. Robb

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

92552
Sr-89 5 mL Liquid in Flame Sealed Vial

1633

**Customer:** General Engineering Labs
**P.O. No.:** GEL1202747, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty*, % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 2.121E+05 | 0.1 | 0.9 | 1.8 | 12/13/2012 |

*Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.07181 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: K. Eardley
K. Eardley, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 11 DEC 12

RECEIVED 12/14/12 AM

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-062

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1633 |
| Prepared By: | Ashley Drochter |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 12/13/2012 |
| Ampoule Mass (g): | 5.07181 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-062 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Bethany Fiem |
| Prep Date: | 01/08/2013 |
| Verification Date: | 01/09/2013 |
| Expiration Date: | 08/22/2013 |
| Primary Code: | 1633-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.9257 g |
| Density(g/mL): | 0.9986 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / (5.07181 g * 100 mL ) = 123593.8614 dpm/mL |
| (4.9257 g) * (212100 Bq) * (60 dpm/Bq) / ( 0.9986 g/mL)/ (5.07181 g * 100 mL) = 123767.0118 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1633-A

v1.0.2

| | |
|---|---|
| Instrument | Silver |
| Analyst | BF1 |
| Verification Prep Date | 1/8/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1633-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 12/13/2012 |
| Ref. Act. (DPM/mL) | 123593.8614 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 1/8/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 1/9/2013 | 89.20 | 8539.17 | 44.60 |
| 2 | 1/9/2013 | 88.90 | 8565.00 | 44.60 |
| 3 | 1/9/2013 | 88.90 | 8571.67 | 44.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 8494.57 | 1.011371 | 83990.64 | 8399.06 |
| 2 | 8520.40 | 1.011371 | 84246.04 | 8424.60 |
| 3 | 8527.07 | 1.011371 | 84311.99 | 8431.20 |

| | dpm/mL |
|---|---|
| Mean Value = | 84182.89 |
| Stdev = | 169.7251269 |
| Certificate Value* = | 85338.6 |
| Two sigma = | 339.450 |
| 10 % of Mean = | 8418.289 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.65% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 8/22/2013 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-89 source 1633-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Sr-89 source 1618-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

1-11-13

Amanda L. [illegible]
1/11/13

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-004

Isotope: Sr-89

Date Standards Prepared: 2-14-13

Standard ID: 1633-A

Matrix of Planchett/Filter: Sr Carbonate ppt on 25mm 0.45um filter

Amount Used (g or ml): 1.0

Standard Activity (DPM/g or mL): 123593.861 *

Residue/Carrier Agent: Sr Carrier 1858443 exp 12-11-1

Reference Date: 12-13-12

Pipette ID Used: 4043264

Expiration Date: 8-22-13

Balance ID Used: 1113021018

*Not decay corrected

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | $C_1$ | 0.1 | 0.0246 | 0.0265 | 1.9 |
| | $C_2$ | 0.2 | 0.0241 | 0.0276 | 3.5 |
| | $C_3$ | 0.4 | 0.0246 | 0.0315 | 6.9 |
| | $C_4$ | 0.5 | 0.0242 | 0.0325 | 8.3 |
| | $C_5$ | 0.8 | 0.0236 | 0.0371 | 13.5 |
| | $C_6$ | 1.0 | 0.0236 | 0.0412 | 17.6 |
| | $C_7$ | 1.5 | 0.0236 | 0.0502 | 26.6 |
| | $C_8$ | 2.1 | 0.0238 | 0.0599 | 36.1 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

WI ✓ WL 2/25/13

MM 2/14/13

Prepared By: [signature] Date: 2-14-13

Reviewed By: [signature] Date: 2/25/13

Eckert & Ziegler
Analytics

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www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1244

78351-278

Sr-90 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 2

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.691 E4 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
5.01862 grams 0.1M HCl solution with 30 µg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED 10/7/08
RC-S-048-125

End of Certificate

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1244 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 5.01862 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-125 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 02/12/2013 |
| Verification Date: | 02/12/2013 |
| Expiration Date: | 02/12/2014 |
| Primary Code: | 1244-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 4.8346 g |
| Density(g/mL): | 0.9984 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / (5.01862 g * 100 mL ) = 21333.9626 dpm/mL |
| (4.8346 g) * (36910 Bq) * (60 dpm/Bq) / ( 0.9984 g/mL)/ (5.01862 g * 100 mL) = 21367.7236 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

DCN: ITSI-0808-0004-0076, 8 May 2019

showfile.cgi

# Verification for Sr-90 Standard 1244-A

v1.0.2

| | |
|---|---|
| Instrument | GOLD |
| Analyst | BF |
| Verification Prep Date | 2/12/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1244-A |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 21333.9626 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 2/12/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 2/12/2013 | 57.70 | 3807.92 | 38.20 |
| 2 | 2/12/2013 | 55.70 | 3846.92 | 38.20 |
| 3 | 2/12/2013 | 56.20 | 3861.54 | 38.20 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 3769.72 | 2.046222 | 18422.83 | 1842.28 |
| 2 | 3808.72 | 2.046222 | 18613.42 | 1861.34 |
| 3 | 3823.34 | 2.046222 | 18684.87 | 1868.49 |

| | dpm/mL |
|---|---|
| Mean Value = | 18573.71 |
| Stdev = | 135.4612019 |
| Certificate Value* = | 19212.6 |
| Two sigma = | 270.922 |
| 10 % of Mean = | 1857.371 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 96.67% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 2/12/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1244-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

Amanda Litchi 2/14/13

2-13-13

http://prodsvr01.gel.com:7778/cgi-bin/showfile.cgi?file=/var/opt/vCap...

5/8/2019 10:39 AM

## General Engineering Laboratories
## GFC Calibration Source Preparation Sheet
Sr-90 (Sr portion)

Applicable SOP Number: GL-RAD-A-004 | Isotope: Sr-90

Date Standards Prepared: 3/29/13

Standard ID: 1244-A | Matrix of Planchet/Filter: Sr Carbonate ppt on 25mm 0.45µm filter

Amount Used (g or ml): 0.5

Standard Activity (DPM/g or mL): ~~2133.9629~~ 21333.9626 (AP 3/29/13) | Residue/Carrier Agent: Sr carrier 1858443

Reference Date: 10/1/08 | Pipette ID Used: 1795419 / 2154115 / 4043269 / 11518634

Expiration Date: 2/12/14 | Balance ID Used: 1113021018

Std carrier wt. 121 mg/mL | Sep Date/Time: 3-29-13 / 1410

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) | |
|---|---|---|---|---|---|---|
| | $S_1$ | 0.2 | 0.0239 | 0.0272 | 3.3 | |
| | $S_2$ | 0.4 | 0.0241 | 0.0314 | 7.3 | |
| | $S_3$ | 0.5 | ~~0.0247~~ 0.0243 | 0.0328 | 8.5 | 0.0243 |
| | $S_4$ | 0.7 | 0.0243 | 0.0365 | 12.2 | |
| | $S_5$ | 1.0 | 0.0245 | 0.0417 | 17.2 | |
| | $S_6$ | 1.5 | 0.0246 | 0.0512 | 26.6 | |
| | $S_7$ | 1.8 | 0.0246 | 0.0556 | 31.0 | |
| | ~~$S_8$~~ | 2.1 | 0.0247 | 0.0608 | ~~36.1~~ | (AP 3/29/13) |

(AP 3/29/13) (AP 3/29/13) (AP 3/29/13) *RR 4/1/13

Prepared By: [signature] Date: 3-29-13

Reviewed By: [signature] Date: 4/1/13

**General Engineering Laboratories**
**GFC Calibration Source Preparation Sheet**
Sr-90 Yttrium Portion

Applicable SOP Number: GL-RAD-A-004 | Isotope: Sr-90 (Y-90)

Date Standards Prepared: 3/29/13

Standard ID: 1244-A | Matrix of Planchet/Filter: Yttrium oxalate ppt on 25 mm 0.45 µm filter

Amount Used (g or ml): 0.5

Standard Activity (DPM/g or mL): 21333.9626 | Residue/Carrier Agent: Y-H carrier 1892786

Reference Date: 10/1/08 | Pipette ID Used: 2154115

Expiration Date: 2/12/14 | Balance ID Used: ~~93~~ 8 3-29-13 1113021018

Std carrier Y-H. 31.86 mg/mL | Sep date/time: 3/29/13 1305

| | Standard Number | Residue Volume(mL) | Initial Wt. (g) | Final Wt. (g) | Net Wt. (mg) |
|---|---|---|---|---|---|
| | Y1 | 0.5 | 0.0239 | 0.0398 | 15.9 |
| | Y2 | 0.5 | 0.0240 | 0.0401 | 16.1 |
| | Y3 | 0.5 | 0.0242 | 0.0402 | 16.0 |
| | Y4 | 0.5 | 0.0242 | 0.0403 | 16.1 |
| | Y5 | 0.5 | 0.0244 | 0.0404 | 16.0 |
| | Y6 | 0.5 | 0.0245 | 0.0407 | 16.2 |
| | Y7 | 0.5 | 0.0245 | 0.0404 | 15.9 |
| | Y8 | 0.5 | 0.0249 | 0.0413 | 16.4 |

wt ✓

AP 3/29/13

Prepared By: [signature] Date: 3-29-13

Reviewed By: [signature] Date: 4/1/13

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# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

1680

94136

Sr-89 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs, LLC
**P.O. No.:** GEL1304373, Item 6 Product Code: 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty* , % Type $u_A$ | $u_B$ | U | Reference Date (12:00 PM EST) |
|---|---|---|---|---|---|---|
| Sr-89 | 5.053E+01 | 1.878E+05 | 0.1 | 0.9 | 1.8 | 07/15/2013 |

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**
Impurities: γ-impurities<0.1%.
5.02926 g 0.1M HCl solution with approximately 30 µg/g Sr carrier.

Source Prepared by: R. Ormsby
R. Ormsby, Radiochemist

QA Approved:
J.D. McCorvey, Counting Room Manager

Date: 15 Jul 13

RECEIVED 7/17/13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-109

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1680 |
| Prepared By: | Gregory Ramsay |
| Carrier Conc: | 0.1M HCl |
| Reference Date: | 07/15/2013 |
| Ampoule Mass (g): | 5.02926 g |
| Uncertainty: | +/- 1.8 % |
| LogBook No: | RC-S-065-109 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-89 |
| Prepared By: | Gregory Ramsay |
| Prep Date: | 11/07/2013 |
| Verification Date: | 11/07/2013 |
| Expiration Date: | 03/24/2014 |
| Primary Code: | 1680-A |
| Dilution(mL): | 200 mL |
| Mass of Parent(g): | 4.7905 g |
| Density(g/mL): | 0.9979 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)** |
| **(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)** |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / (5.02926 g * 200 mL ) = 53665.3046 dpm/mL |
| (4.7905 g) * (187800 Bq) * (60 dpm/Bq) / ( 0.9979 g/mL)/ (5.02926 g * 200 mL) = 53778.2389 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|

GEL Laboratories LLC
Version 1.0 9/18/2000

DCN: ITSI-0808-0004-0076, 8 May 2019

# Verification for Sr-89 Standard 1680-A

v1.0.1

| | |
|---|---|
| Instrument | RED |
| Analyst | GXR1 |
| Verification Prep Date | 11/7/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-89 |
| Serial Number | 1680-A |
| Isotope Halflife | 50.5300 D |
| Reference Date | 7/15/2013 |
| Ref. Act. (DPM/mL) | 53665.3046 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 11/7/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 11/8/2013 | 61.90 | 1139.80 | 39.60 |
| 2 | 11/8/2013 | 60.50 | 1139.20 | 39.60 |
| 3 | 11/8/2013 | 62.00 | 1128.40 | 39.60 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 1100.20 | 1.021162 | 10774.00 | 1077.40 |
| 2 | 1099.60 | 1.021162 | 10768.12 | 1076.81 |
| 3 | 1088.80 | 1.021162 | 10662.36 | 1066.24 |

| | dpm/mL |
|---|---|
| Mean Value = | 10734.83 |
| Stdev = | 62.82650264 |
| Certificate Value* = | 10930.2 |
| Two sigma = | 125.653 |
| 10 % of Mean = | 1073.483 |
| Rule A (Pass/Fail) | Pass |
| % Recovery | 98.21% |
| Rule B (Pass/Fail) | Pass |
| Expiration Date | 3/24/2014 |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-89 source 1680-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRED for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 11/7/2013 using Sr-89 source 1657-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

11/25/13

11/14/13

11/25/13

M-10454

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# CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

1243

## 78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.856 E5 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

RECEIVED

DCN: ITSI-0808-0004-0076, 8 May 2019

# Verification for Sr-90 Standard 1243-L

v1.0.1

| | |
|---|---|
| Instrument | GREEN |
| Analyst | GXR1 |
| Verification Prep Date | 12/4/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1243-L |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 575.747476 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 12/4/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 12/5/2013 | 63.60 | 146.60 | 48.40 |
| 2 | 12/5/2013 | 63.10 | 147.60 | 48.40 |
| 3 | 12/5/2013 | 62.70 | 140.00 | 48.40 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 98.20 | 1.961352 | 500.67 | 50.07 |
| 2 | 99.20 | 1.961352 | 505.77 | 50.58 |
| 3 | 91.60 | 1.961352 | 467.02 | 46.70 |

| | dpm/mL |
|---|---|
| Mean Value = | 491.16 |
| Stdev = | 21.05469752 |
| **Certificate Value* =** | **508.5** |
| **Two sigma =** | 42.109 |
| **10 % of Mean =** | 49.116 |
| **Rule A (Pass/Fail)** | **Pass** |
| **% Recovery** | 96.59% |
| **Rule B (Pass/Fail)** | **Pass** |
| **Expiration Date** | **12/4/2014** |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-L by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/4/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12/13/13

Amanda L. Fehn 12/13/13

M-10456

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1243 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 10.41484 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-124 |

| A Solution Material Info | |
|---|---|
| Isotope: | Strontium-90 |
| Prepared By: | Daniel Roy |
| Prep Date: | 12/19/2008 |
| Verification Date: | 12/04/2013 |
| Expiration Date: | 12/04/2014 |
| Primary Code: | 1243-A |
| Dilution(mL): | 100 mL |
| Mass of Parent(g): | 10.2164 g |
| Density(g/mL): | 0.9991 |
| Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| |
|---|
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL) |
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g) |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL ) = 226951.7634 dpm/mL |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / ( 0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|
| 01/21/2010 | Bethany Fiem | 2.2467 | 1000 | 1243-B | 510.329369 dpm/mL | 01/21/2010 | 01/21/2011 |
| 08/03/2010 | Bethany Fiem | 2.5604 | 1000 | 1243-C | 581.5851 dpm/mL | 08/03/2010 | 08/03/2011 |
| 01/12/2011 | Bethany Fiem | 2.4946 | 1000 | 1243-D | 566.6389 dpm/mL | 01/12/2011 | 01/12/2012 |
| 08/12/2011 | Tim Chandler | 3.3115 | 100 | 1243-G | 18.7877 dpm/mL | 08/11/2011 | 08/11/2012 |
| 08/17/2011 | Tim Chandler | 2.5541 | 100 | 1243-H | 14.49064 dpm/mL | 08/18/2011 | 08/16/2012 |
| 06/21/2011 | Tim Chandler | .0235 | 100 | 1243-E | 53.37936 dpm/mL | 06/25/2012 | 06/20/2013 |
| 07/05/2011 | Bethany Fiem | 2.6072 | 1000 | 1243-F | 592.2156 dpm/mL | 07/05/2011 | 07/05/2012 |
| 01/31/2012 | Gregory Ramsay | 2.6792 | 1000 | 1243-I | 608.5701 dpm/ml | 01/31/2012 | 01/31/2013 |
| 08/29/2012 | Bethany Fiem | 2.6799 | 1000 | 1243-J | 608.729104 dpm/mL | 09/14/2012 | 09/11/2013 |
| 02/12/2013 | Gregory Ramsay | 2.6526 | 1000 | 1243-K | 602.528 dpm/ml | 01/15/2014 | 01/15/2015 |
| 12/04/2013 | Gregory Ramsay | 2.5347 | 1000 | 1243-L | 575.747476 dpm/ml | 12/04/2013 | 12/04/2014 |

GEL Laboratories LLC
Version 1.0 9/18/2000

# Strontium 89/90 Queue Sheet

02/27/14

Batch #: 1366732 Analyst: AF1 First Client Due Date: Internal Due Date: 03/13/2014 Comments

Sr-89/90 Spike Code(s): — / — Expiration Date: — / — Vol(s): — / — Sr Sep. Date/time: 2/15/14 11:30

Sr-89/90 LCS Code(s): 1680-A / 1243-L Expiration Date: 3/24/14 / 12/9/14 Vol(s): 0.2 / 0.5 Y Sep. Date/time: 2/26/14 11:20

Sr Carrier Code: 2046474 Exp Date: 12/15/14 Vol: * Sdt Wt: 8.2 Y Carrier Code: 2073992 Exp Date: 5/19/14 Vol: 0.5 Sdt Wt: 16.59

Prep Date: 2/14/14 Initials: AF1 Pipet ID: — Balance #: — Analytical Scale #: 1118210 18 Witness: —

| Sample ID | Client Description | Type | RDL (Carrier Volume) | Date Collected | Matrix | Client | Rad | Pos # | Wet/Dry Aliquot (mL) or (g) | Det # 1 & 2 | Initial Sr wt (g) | Final Sr wt (g) | Net Sr wt (mg) | Initial Y wt (g) | Final Y wt (g) | Net Y wt (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1203036037-1 | LCS for batch 1366732 | LCS | 0.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V1 | 200 | | 0.0270 | 0.0284 | 1.4 | 0.0259 | 0.0426 | 16.1 |
| 1203036038-1 | LCS for batch 1366732 | LCS | 0.2 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V2 | 200 | | 0.0240 | 0.0276 | 3.6 | 0.0278 | 0.0444 | 16.6 |
| 1203036039-1 | LCS for batch 1366732 | LCS | 0.4 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V3 | 200 | | 0.0280 | 0.0342 | 6.2 | 0.0271 | 0.0427 | 15.6 |
| 1203036040-1 | LCS for batch 1366732 | LCS | 0.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V4 | 200 | | 0.0243 | 0.0312 | 6.9 | 0.0281 | 0.0457 | 17.6 |
| 1203036041-1 | LCS for batch 1366732 | LCS | 0.8 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V5 | 200 | | 0.0231 | 0.0325 | 8.6 | 0.0271 | 0.0441 | 17.0 |
| 1203036042-1 | LCS for batch 1366732 | LCS | 1.0 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V6 | 200 | | 0.0261 | 0.0354 | 9.3 | 0.0282 | 0.0445 | 16.3 |
| 1203036043-1 | LCS for batch 1366732 | LCS | 1.5 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V7 | 200 | | 0.0280 | 0.0376 | 9.6 | 0.0275 | 0.0434 | 15.9 |
| 1203036044-1 | LCS for batch 1366732 | LCS | 2.1 | JAN-17-14 12:30 PM | SOIL | QC ACCOUNT | | V8 | 200 | | 0.0262 | 0.0367 | 10.5 | 0.0266 | 0.0426 | 16.0 |

WH ✓ WH ✓

Solid Sample Dissolution by: LEACH or DIGESTION (Circle One)

Data Reviewed By: [signature]

*GEL Laboratories LLC, Radiochemistry Division*

Page 1 of 1

DCN: ITSI-0808-0004-0076, 8 May 2019

M-10458

# Continuing Calibration Data

# Gas Flow Proportional Counter Backgrounds as of 10-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Above | Beta bkg | 05-Apr 15:37 | 1000 | 2.149 | 0.676 | 1.605 | +6.51 |
| LB4100B3 | Above | Beta bkg | 05-Apr 15:34 | 1000 | 2.111 | 0.777 | 1.874 | +4.30 |
| LB4100C4 | Above | Beta bkg | 07-Apr 11:14 | 500 | 6.836 | 0.555 | 2.577 | +15.64 |
| LB4100G2 | Above | Beta bkg | 05-Apr 15:32 | 1000 | 1.685 | 0.526 | 1.544 | +3.83 |
| LB4100J4 | Above | Alpha bkg | 05-Apr 15:33 | 1000 | 0.551 | -6.68E-2 | 0.397 | +5.00 |
| PIC3A | Above | Alpha bkg | 05-Apr 15:34 | 1000 | 1.132 | -1.09E-1 | 0.333 | +13.83 |
| PIC3A | Above | Beta bkg | 05-Apr 15:34 | 1000 | 9.320 | -1.30E-1 | 1.970 | +24.00 |
| PIC11B | Above | Beta bkg | 05-Apr 14:28 | 1000 | 2.286 | 1.057 | 2.312 | +2.88 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Beta bkg

**Reviewed by** R Bird

**Date** 4-10-14

GEL Laboratories LLC

# Gas Flow Proportional Counter Backgrounds as of 14-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Above | Beta bkg | 12-Apr 16:08 | 500 | 1.932 | 0.676 | 1.605 | +5.11 |
| LB4100C4 | Above | Beta bkg | 12-Apr 17:05 | 500 | 10.316 | 0.555 | 2.577 | +25.96 |
| LB4100D2 | Above | Alpha bkg | 12-Apr 18:19 | 500 | 0.302 | -3.71E-2 | 0.386 | +1.80 |
| LB4100G2 | Above | Beta bkg | 12-Apr 16:23 | 500 | 1.566 | 0.526 | 1.544 | +3.13 |
| LB4100G4 | Above | Beta bkg | 12-Apr 16:23 | 500 | 1.762 | 0.465 | 1.556 | +4.13 |
| LB4100J4 | Above | Alpha bkg | 12-Apr 16:03 | 500 | 0.570 | -6.68E-2 | 0.397 | +5.25 |
| PIC3A | Above | Alpha bkg | 12-Apr 16:00 | 500 | 1.042 | -1.09E-1 | 0.333 | +12.61 |
| PIC3A | Above | Beta bkg | 12-Apr 16:00 | 500 | 3.122 | -1.30E-1 | 1.970 | +6.29 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Beta bkg

**Reviewed by** KMJ

**Date** 4/14/14

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 11-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM or dec | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Below | Alpha eff | 11-Apr 06:08 | 5 | 7017 | 7717 | 9555 | -5.28 |
| LB4100A3 | Above | Alpha XTalk | 11-Apr 06:08 | 5 | 0.381 | 0.262 | 0.374 | +3.39 |
| LB4100A3 | need 2nd | Beta bkg | 11-Apr 04:49 | 60 | 1.117 | 0.676 | 1.605 | -0.15 |
| LB4100B3 | need 2nd | Alpha bkg | 11-Apr 04:50 | 60 | 0.083 | -5.80E-2 | 0.171 | +0.70 |
| LB4100B3 | Below | Alpha eff | 11-Apr 06:08 | 5 | 16863 | 17650 | 21120 | -4.36 |
| LB4100B3 | need 2nd | Beta bkg | 11-Apr 04:50 | 60 | 1.583 | 0.777 | 1.874 | +1.41 |
| LB4100C1 | Above | Alpha eff | 11-Apr 06:39 | 5 | 12177 | 10840 | 11520 | +8.80 |
| LB4100C1 | need 2nd | Beta bkg | 11-Apr 04:58 | 60 | 1.600 | 0.971 | 1.797 | +1.57 |
| LB4100C1 | Above | Beta eff | 11-Apr 06:23 | 5 | 18380 | 16250 | 17770 | +5.41 |
| LB4100C4 | Above | Beta bkg | 11-Apr 04:58 | 60 | 6.083 | 0.555 | 2.577 | +13.40 |
| LB4100D1 | Below | Alpha eff | 11-Apr 06:42 | 5 | 3768 | 10830 | 12970 | -22.80 |
| LB4100D1 | Below | Beta eff | 11-Apr 06:31 | 5 | 26658 | 50120 | 59690 | -17.71 |
| LB4100D2 | Above | Alpha eff | 11-Apr 06:42 | 5 | 9330 | 7641 | 9274 | +3.20 |
| LB4100D2 | Above | Beta bkg | 11-Apr 05:12 | 60 | 1.650 | 0.598 | 1.647 | +3.02 |
| LB4100D2 | Above | Beta eff | 11-Apr 06:31 | 5 | 26679 | 21520 | 24360 | +7.90 |
| LB4100G2 | Above | Beta bkg | 11-Apr 04:52 | 60 | 1.733 | 0.526 | 1.544 | +4.12 |
| LB4100H3 | Below | Alpha eff | 11-Apr 06:17 | 5 | 19659 | 19690 | 22880 | -3.06 |
| LB4100J4 | Above | Alpha bkg | 11-Apr 04:49 | 60 | 0.450 | -6.68E-2 | 0.397 | +3.69 |
| LB4100J4 | need 2nd | Beta bkg | 11-Apr 04:49 | 60 | 1.333 | 0.515 | 1.464 | +2.17 |
| PIC3A | Above | Alpha bkg | 11-Apr 05:01 | 60 | 1.050 | -1.09E-1 | 0.333 | +12.72 |
| PIC3A | Above | Beta bkg | 11-Apr 05:01 | 60 | 2.183 | -1.30E-1 | 1.970 | +3.61 |
| PIC5D | Above | Alpha bkg | 11-Apr 07:37 | 60 | 0.450 | -3.69E-2 | 0.380 | +4.01 |
| PIC5D | Above | Beta bkg | 11-Apr 07:37 | 60 | 2.367 | 0.169 | 2.772 | +2.07 |
| PIC6A | Above | Beta bkg | 11-Apr 05:02 | 60 | 2.133 | -2.48E-2 | 2.460 | +2.21 |
| PIC8A | Below | Beta bkg | 11-Apr 05:03 | 60 | 0.350 | 0.359 | 1.098 | -3.07 |
| PIC8A | Above | Beta XTalk | 11-Apr 07:09 | 5 | 5.34E-4 | 2.90E-5 | 1.99E-4 | +14.80 |
| PIC11B | Below | Alpha eff | 11-Apr 07:43 | 5 | 13304 | 13320 | 14870 | -3.06 |
| PIC11B | Above | Alpha XTalk | 11-Apr 07:43 | 5 | 0.331 | 0.241 | 0.311 | +4.65 |
| PIC11B | need 2nd | Beta bkg | 11-Apr 05:04 | 60 | 1.850 | 1.057 | 2.312 | +0.79 |
| PIC11B | Below | Beta eff | 11-Apr 07:27 | 5 | 21487 | 21580 | 23950 | -3.23 |
| PIC12B | Above | Alpha bkg | 11-Apr 07:55 | 60 | 0.517 | -5.26E-3 | 0.318 | +6.68 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC12B | Above | Beta bkg | 11-Apr 07:55 | 60 | 1.950 | 0.018 | 1.302 | +6.03 |
| PIC12C | Above | Beta bkg | 11-Apr 07:55 | 60 | 1.483 | 0.162 | 1.384 | +3.49 |
| PIC12D | Above | Alpha XTalk | 11-Apr 07:44 | 5 | 0.289 | 0.265 | 0.284 | +4.55 |
| PIC12D | Below | Beta eff | 11-Apr 07:27 | 5 | 44522 | 45230 | 48150 | -4.45 |
| PIC13C | Above | Alpha bkg | 11-Apr 07:55 | 60 | 0.750 | -8.64E-2 | 0.370 | +8.01 |
| PIC13C | Above | Beta bkg | 11-Apr 07:55 | 60 | 2.050 | -5.86E-1 | 1.840 | +3.52 |
| PIC13D | Above | Alpha bkg | 11-Apr 07:55 | 60 | 0.683 | -2.30E-2 | 0.391 | +7.23 |
| PIC13D | Below | Alpha eff | 11-Apr 07:34 | 5 | 11053 | 11070 | 11520 | -3.23 |
| PIC13D | Above | Beta bkg | 11-Apr 07:55 | 60 | 2.067 | -1.82E-1 | 1.915 | +3.43 |
| PIC14B | Below | Alpha eff | 11-Apr 07:34 | 5 | 9835 | 9895 | 11040 | -3.31 |
| PIC14B | Above | Beta bkg | 11-Apr 07:55 | 60 | 1.383 | -1.22E-1 | 1.083 | +4.50 |
| PIC14B | Below | Beta eff | 11-Apr 07:45 | 5 | 22701 | 23580 | 26300 | -4.94 |
| PIC14D | Below | Alpha eff | 11-Apr 07:35 | 5 | 14752 | 15070 | 16840 | -4.08 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

**Reviewed by** R Buist

**Date** 4-11-14

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 12-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM or dec | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | Below | Alpha eff | 12-Apr 11:49 | 5 | 7255 | 7717 | 9555 | -4.51 |
| LB4100A3 | need 2nd | Alpha XTalk | 12-Apr 11:49 | 5 | 0.366 | 0.262 | 0.374 | +2.60 |
| LB4100B3 | Below | Alpha eff | 12-Apr 11:49 | 5 | 17409 | 17650 | 21120 | -3.42 |
| LB4100C1 | Above | Alpha eff | 12-Apr 12:05 | 5 | 12101 | 10840 | 11520 | +8.12 |
| LB4100C1 | Above | Beta eff | 12-Apr 11:49 | 5 | 18560 | 16250 | 17770 | +6.12 |
| LB4100C3 | Below | Alpha eff | 12-Apr 12:05 | 5 | 8224 | 8458 | 10100 | -3.85 |
| LB4100C4 | Below | Alpha eff | 12-Apr 12:05 | 5 | 7593 | 7639 | 9591 | -3.14 |
| LB4100C4 | Above | Beta bkg | 12-Apr 10:26 | 60 | 8.850 | 0.555 | 2.577 | +21.61 |
| LB4100D1 | Below | Alpha eff | 12-Apr 12:08 | 5 | 2757 | 10830 | 12970 | -25.64 |
| LB4100D1 | Above | Alpha XTalk | 12-Apr 12:08 | 5 | 0.268 | 0.215 | 0.264 | +3.48 |
| LB4100D1 | Below | Beta eff | 12-Apr 11:57 | 5 | 24956 | 50120 | 59690 | -18.78 |
| LB4100D2 | Above | Alpha bkg | 12-Apr 10:37 | 60 | 0.383 | -3.71E-2 | 0.386 | +2.96 |
| LB4100D2 | Above | Alpha eff | 12-Apr 12:08 | 5 | 9450 | 7641 | 9274 | +3.65 |
| LB4100D2 | need 2nd | Beta bkg | 12-Apr 10:37 | 60 | 1.567 | 0.598 | 1.647 | +2.54 |
| LB4100D2 | Above | Beta eff | 12-Apr 11:57 | 5 | 27469 | 21520 | 24360 | +9.57 |
| LB4100G1 | Below | Beta eff | 12-Apr 12:22 | 5 | 15265 | 17550 | 18960 | -12.73 |
| LB4100G2 | need 2nd | Beta bkg | 12-Apr 10:19 | 60 | 1.467 | 0.526 | 1.544 | +2.54 |
| LB4100G2 | Below | Beta eff | 12-Apr 12:22 | 5 | 17815 | 18900 | 20650 | -6.72 |
| LB4100G3 | Below | Beta eff | 12-Apr 12:22 | 5 | 20746 | 23020 | 24680 | -11.22 |
| LB4100G4 | Below | Alpha eff | 12-Apr 12:14 | 5 | 10042 | 10090 | 11040 | -3.30 |
| LB4100G4 | Below | Beta eff | 12-Apr 12:22 | 5 | 18908 | 21470 | 22720 | -15.30 |
| LB4100H1 | Above | Beta bkg | 12-Apr 10:16 | 60 | 1.850 | 0.446 | 1.647 | +4.01 |
| LB4100H3 | need 2nd | Alpha eff | 12-Apr 12:14 | 5 | 19770 | 19690 | 22880 | -2.85 |
| LB4100I4 | Below | Beta eff | 12-Apr 12:04 | 5 | 20756 | 20880 | 22380 | -3.49 |
| LB4100J4 | Above | Alpha bkg | 12-Apr 10:16 | 60 | 0.433 | -6.68E-2 | 0.397 | +3.48 |
| PIC1B | Above | Alpha bkg | 12-Apr 11:05 | 60 | 0.417 | -5.36E-2 | 0.391 | +3.35 |
| PIC2B | Below | Alpha eff | 12-Apr 10:02 | 5 | 8742 | 8756 | 9768 | -3.08 |
| PIC2B | Below | Beta eff | 12-Apr 10:58 | 5 | 19306 | 19470 | 23090 | -3.27 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC3A | Above | Alpha bkg | 12-Apr 11:06 | 60 | 1.150 | -1.09E-1 | 0.333 | +14.08 |
| PIC3A | Above | Beta bkg | 12-Apr 11:06 | 60 | 7.900 | -1.30E-1 | 1.970 | +19.94 |
| PIC5A | Above | Beta bkg | 12-Apr 11:11 | 60 | 2.267 | -7.85E-1 | 1.927 | +3.75 |
| PIC5C | Above | Alpha bkg | 12-Apr 11:11 | 60 | 0.383 | -5.16E-2 | 0.393 | +2.86 |
| PIC5D | Above | Alpha bkg | 12-Apr 11:11 | 60 | 0.800 | -3.69E-2 | 0.380 | +9.05 |
| PIC5D | Above | Beta bkg | 12-Apr 11:11 | 60 | 3.750 | 0.169 | 2.772 | +5.25 |
| PIC6A | Above | Beta bkg | 12-Apr 11:11 | 60 | 2.283 | -2.48E-2 | 2.460 | +2.57 |
| PIC6B | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.417 | 0.093 | 0.372 | +3.96 |
| PIC6C | Above | Beta bkg | 12-Apr 11:12 | 60 | 1.583 | 0.299 | 1.531 | +3.25 |
| PIC7A | Above | Beta bkg | 12-Apr 11:12 | 60 | 1.533 | 0.118 | 1.095 | +5.69 |
| PIC7B | Below | Beta eff | 12-Apr 12:37 | 5 | 22679 | 22750 | 23860 | -3.38 |
| PIC8A | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.217 | -3.33E-2 | 0.185 | +3.89 |
| PIC8C | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.767 | 0.062 | 0.348 | +11.80 |
| PIC8C | Above | Beta bkg | 12-Apr 11:12 | 60 | 1.183 | 0.117 | 0.850 | +5.73 |
| PIC8C | Below | Beta eff | 12-Apr 10:15 | 5 | 24352 | 24390 | 27310 | -3.08 |
| PIC8D | Above | Alpha bkg | 12-Apr 11:12 | 60 | 0.317 | -3.46E-2 | 0.358 | +2.37 |
| PIC9D | Above | Alpha bkg | 12-Apr 11:23 | 60 | 0.417 | 0.055 | 0.363 | +4.04 |
| PIC9D | Below | Alpha eff | 12-Apr 11:09 | 5 | 10978 | 11050 | 11500 | -3.96 |
| PIC10A | Above | Beta bkg | 12-Apr 11:23 | 60 | 1.433 | 0.036 | 1.391 | +3.19 |
| PIC11A | Above | Beta bkg | 12-Apr 11:32 | 60 | 0.833 | 0.090 | 0.751 | +3.74 |
| PIC11B | need 2nd | Alpha eff | 12-Apr 11:24 | 5 | 13458 | 13320 | 14870 | -2.47 |
| PIC11B | need 2nd | Alpha XTalk | 12-Apr 11:24 | 5 | 0.311 | 0.241 | 0.311 | +2.98 |
| PIC11B | Above | Beta bkg | 12-Apr 11:32 | 60 | 2.267 | 1.057 | 2.312 | +2.78 |
| PIC11B | Below | Beta eff | 12-Apr 11:10 | 5 | 21404 | 21580 | 23950 | -3.45 |
| PIC11C | Above | Alpha bkg | 12-Apr 11:32 | 60 | 0.683 | -7.52E-2 | 0.367 | +7.29 |
| PIC11C | Above | Beta bkg | 12-Apr 11:32 | 60 | 1.867 | -3.45E-1 | 1.788 | +3.22 |
| PIC12A | Above | Alpha bkg | 12-Apr 11:32 | 60 | 0.383 | -3.97E-2 | 0.326 | +3.95 |
| PIC12A | Above | Beta bkg | 12-Apr 11:32 | 60 | 2.117 | -2.40E-1 | 2.007 | +3.29 |
| PIC12B | need 2nd | Alpha bkg | 12-Apr 11:32 | 60 | 0.083 | -5.26E-3 | 0.318 | -1.36 |
| PIC12B | Above | Beta bkg | 12-Apr 11:32 | 60 | 1.500 | 0.018 | 1.302 | +3.93 |
| PIC12C | Above | Beta bkg | 12-Apr 11:33 | 60 | 1.783 | 0.162 | 1.384 | +4.96 |
| PIC12D | Above | Alpha XTalk | 12-Apr 11:24 | 5 | 0.295 | 0.265 | 0.284 | +6.31 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC12D | Below | Beta eff | 12-Apr 11:10 | 5 | 44281 | 45230 | 48150 | -4.95 |
| PIC13A | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.433 | -6.82E-2 | 0.394 | +3.51 |
| PIC13B | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.517 | -7.18E-2 | 0.387 | +4.70 |
| PIC13B | Above | Beta bkg | 12-Apr 11:33 | 60 | 2.100 | -4.61E-1 | 2.120 | +2.95 |
| PIC13C | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.350 | -8.64E-2 | 0.370 | +2.74 |
| PIC13C | Below | Alpha eff | 12-Apr 11:15 | 5 | 9835 | 9893 | 11400 | -3.23 |
| PIC13C | need 2nd | Beta bkg | 12-Apr 11:33 | 60 | 1.217 | -5.86E-1 | 1.840 | +1.46 |
| PIC13D | Above | Alpha bkg | 12-Apr 11:33 | 60 | 0.500 | -2.30E-2 | 0.391 | +4.58 |
| PIC13D | need 2nd | Alpha eff | 12-Apr 11:15 | 5 | 11162 | 11070 | 11520 | -1.77 |
| PIC13D | Above | Beta bkg | 12-Apr 11:33 | 60 | 1.933 | -1.82E-1 | 1.915 | +3.05 |
| PIC14B | Below | Alpha eff | 12-Apr 11:31 | 5 | 9792 | 9895 | 11040 | -3.54 |
| PIC14B | need 2nd | Beta bkg | 12-Apr 11:39 | 60 | 0.900 | -1.22E-1 | 1.083 | +2.09 |
| PIC14B | Below | Beta eff | 12-Apr 11:25 | 5 | 22775 | 23580 | 26300 | -4.78 |
| PIC14D | Below | Alpha eff | 12-Apr 11:32 | 5 | 14763 | 15070 | 16840 | -4.04 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

**Reviewed by** R. Brink

**Date** 4-12-14

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 14-Apr-2014

**Detectors LB4100 A1 through J4 and PIC 1A through 14D**

| Short Name | Status | Parmname | Run Time | Count Time | CPM or dec | Low Limit | High Limit | Stdev |
|---|---|---|---|---|---|---|---|---|
| LB4100A3 | need 2nd | Beta bkg | 14-Apr 05:47 | 60 | 1.083 | 0.676 | 1.605 | -0.37 |
| LB4100C1 | Above | Alpha eff | 14-Apr 08:51 | 5 | 12163 | 10840 | 11520 | +8.67 |
| LB4100C1 | Above | Beta eff | 14-Apr 07:05 | 5 | 18170 | 16250 | 17770 | +4.58 |
| LB4100C2 | Below | Alpha eff | 14-Apr 08:59 | 5 | 12483 | 12650 | 14880 | -3.45 |
| LB4100C2 | Above | Alpha XTalk | 14-Apr 08:59 | 5 | 0.290 | 0.215 | 0.282 | +3.77 |
| LB4100C2 | need 2nd | Beta bkg | 14-Apr 07:45 | 60 | 1.733 | 0.772 | 1.985 | +1.75 |
| LB4100C3 | Below | Alpha eff | 14-Apr 08:51 | 5 | 8082 | 8458 | 10100 | -4.37 |
| LB4100C4 | Above | Beta bkg | 14-Apr 05:54 | 60 | 12.200 | 0.555 | 2.577 | +31.55 |
| LB4100C4 | need 2nd | Beta XTalk | 14-Apr 07:05 | 5 | 8.94E-5 | 5.82E-5 | 3.79E-4 | -2.42 |
| LB4100D1 | Below | Alpha eff | 14-Apr 08:05 | 5 | 2343 | 10830 | 12970 | -26.80 |
| LB4100D1 | Above | Alpha XTalk | 14-Apr 08:05 | 5 | 0.279 | 0.215 | 0.264 | +4.86 |
| LB4100D1 | Below | Beta bkg | 14-Apr 06:06 | 60 | 0.283 | 0.411 | 1.470 | -3.72 |
| LB4100D1 | Below | Beta eff | 14-Apr 07:41 | 5 | 23715 | 50120 | 59690 | -19.55 |
| LB4100D2 | need 2nd | Alpha bkg | 14-Apr 06:06 | 60 | 0.217 | -3.71E-2 | 0.386 | +0.60 |
| LB4100D2 | Above | Alpha eff | 14-Apr 08:05 | 5 | 9937 | 7641 | 9274 | +5.44 |
| LB4100D2 | Above | Beta eff | 14-Apr 07:41 | 5 | 29600 | 21520 | 24360 | +14.07 |
| LB4100D3 | Above | Alpha eff | 14-Apr 08:08 | 5 | 21883 | 18220 | 20980 | +4.96 |
| LB4100D4 | Above | Alpha eff | 14-Apr 08:05 | 5 | 19104 | 15600 | 18200 | +5.09 |
| LB4100G2 | Above | Beta bkg | 14-Apr 05:46 | 60 | 1.717 | 0.526 | 1.544 | +4.02 |
| LB4100G4 | need 2nd | Beta bkg | 14-Apr 05:46 | 60 | 0.833 | 0.465 | 1.556 | -0.98 |
| LB4100G4 | Below | Beta eff | 14-Apr 06:50 | 5 | 21396 | 21470 | 22720 | -3.35 |
| LB4100J4 | Above | Alpha bkg | 14-Apr 05:47 | 60 | 0.633 | -6.68E-2 | 0.397 | +6.07 |
| PIC3A | Above | Alpha bkg | 14-Apr 05:56 | 60 | 1.400 | -1.09E-1 | 0.333 | +17.47 |
| PIC3A | Above | Beta bkg | 14-Apr 05:56 | 60 | 10.667 | -1.30E-1 | 1.970 | +27.84 |
| PIC4B | need 2nd | Alpha eff | 14-Apr 05:48 | 5 | 9060 | 8981 | 9434 | -1.96 |
| PIC4B | Above | Beta bkg | 14-Apr 08:12 | 60 | 2.150 | 0.393 | 2.054 | +3.35 |
| PIC5D | Above | Beta bkg | 14-Apr 10:02 | 60 | 2.183 | 0.169 | 2.772 | +1.64 |
| PIC6A | Above | Beta bkg | 14-Apr 10:02 | 60 | 2.283 | -2.48E-2 | 2.460 | +2.57 |
| PIC10D | Below | Alpha eff | 14-Apr 06:08 | 5 | 16885 | 16900 | 17890 | -3.09 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PIC10D | need 2nd | Beta eff | 14-Apr 06:17 | 5 | 44557 | 44060 | 46690 | -1.87 |
| PIC11B | need 2nd | Alpha XTalk | 14-Apr 06:17 | 5 | 0.308 | 0.241 | 0.311 | +2.70 |
| PIC11B | Above | Beta bkg | 14-Apr 06:41 | 60 | 3.083 | 1.057 | 2.312 | +6.69 |
| PIC11B | Below | Beta eff | 14-Apr 06:09 | 5 | 21166 | 21580 | 23950 | -4.05 |
| PIC12D | Above | Alpha XTalk | 14-Apr 08:32 | 5 | 0.291 | 0.265 | 0.284 | +5.27 |
| PIC12D | Below | Beta eff | 14-Apr 06:09 | 5 | 44447 | 45230 | 48150 | -4.61 |
| PIC13C | Below | Alpha eff | 14-Apr 06:24 | 5 | 9859 | 9893 | 11400 | -3.13 |
| PIC14B | Below | Alpha eff | 14-Apr 06:24 | 5 | 9841 | 9895 | 11040 | -3.29 |
| PIC14B | Above | Beta bkg | 14-Apr 07:50 | 60 | 1.883 | -1.22E-1 | 1.083 | +6.98 |
| PIC14D | Below | Alpha eff | 14-Apr 06:24 | 5 | 14698 | 15070 | 16840 | -4.26 |

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

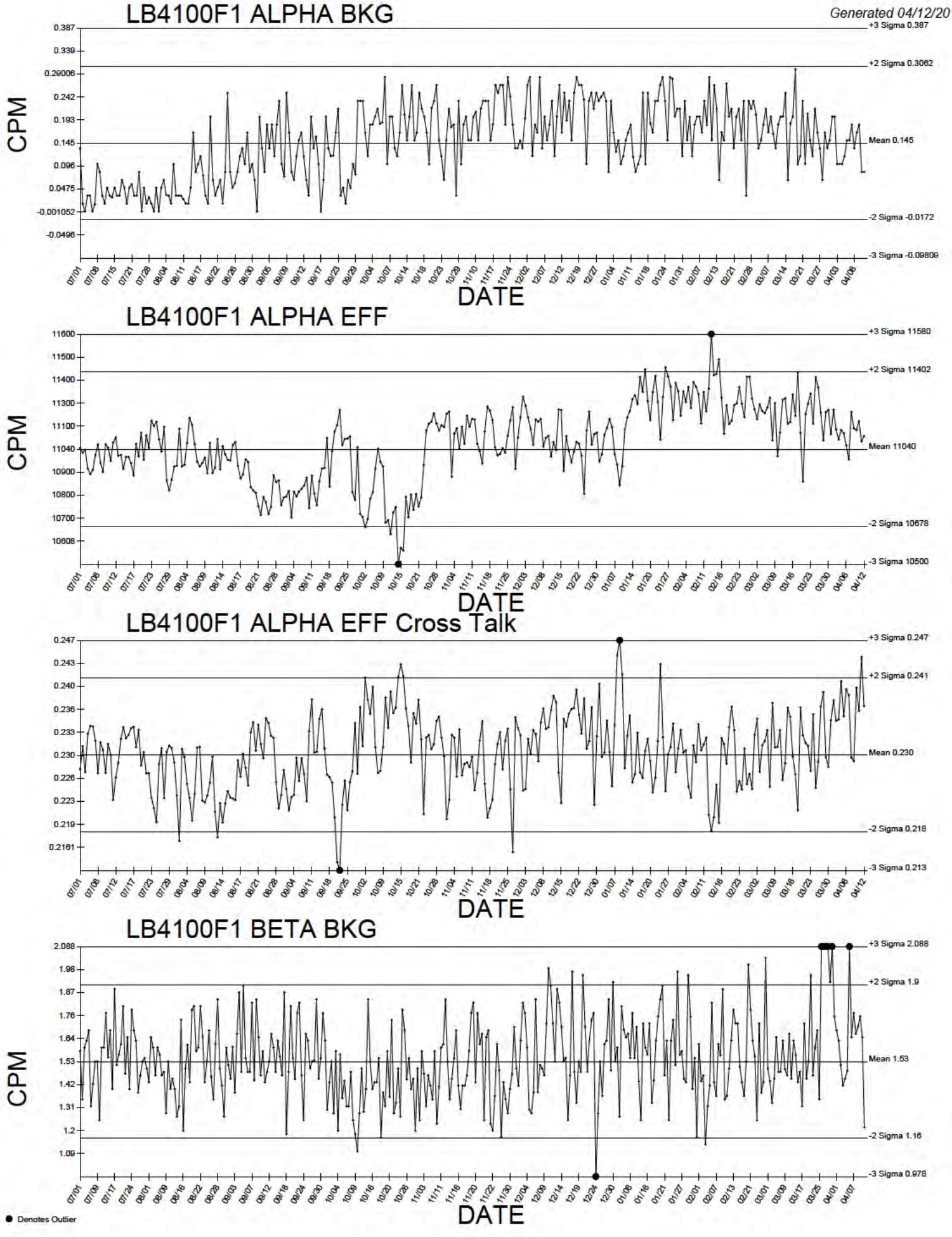
PIC6D Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

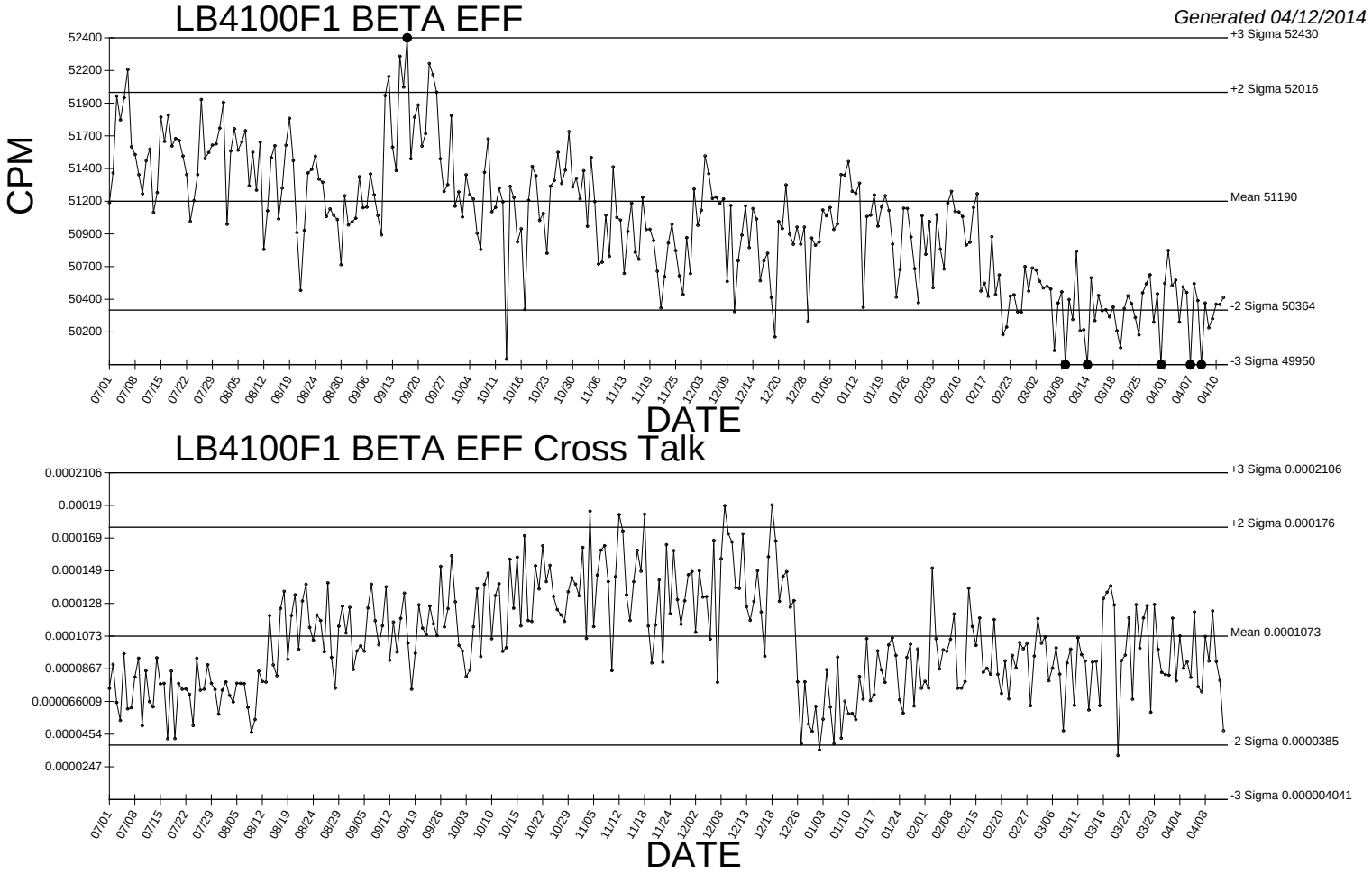
**Reviewed by** _____

**Date** 4/14/14

GEL Laboratories LLC

# Background and Efficiency Data

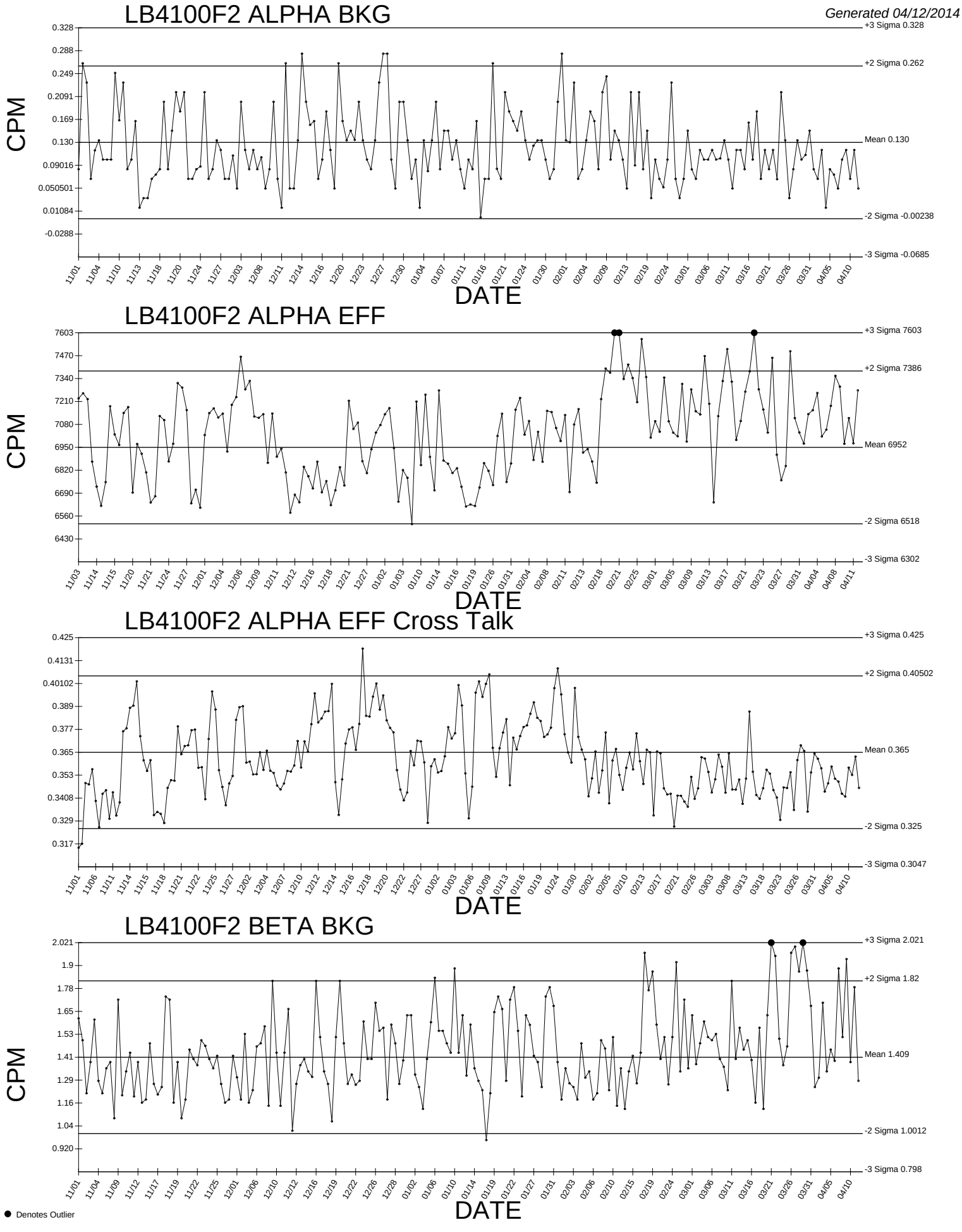

LB4100F1 ALPHA BKG
Generated 04/12/2014
CPM
DATE
+3 Sigma 0.387
+2 Sigma 0.3062
Mean 0.145
-2 Sigma -0.0172
-3 Sigma -0.09809
LB4100F1 ALPHA EFF
+3 Sigma 11580
+2 Sigma 11402
Mean 11040
-2 Sigma 10678
-3 Sigma 10500
LB4100F1 ALPHA EFF Cross Talk
+3 Sigma 0.247
+2 Sigma 0.241
Mean 0.230
-2 Sigma 0.218
-3 Sigma 0.213
LB4100F1 BETA BKG
+3 Sigma 2.088
+2 Sigma 1.9
Mean 1.53
-2 Sigma 1.16
-3 Sigma 0.978
Denotes Outlier

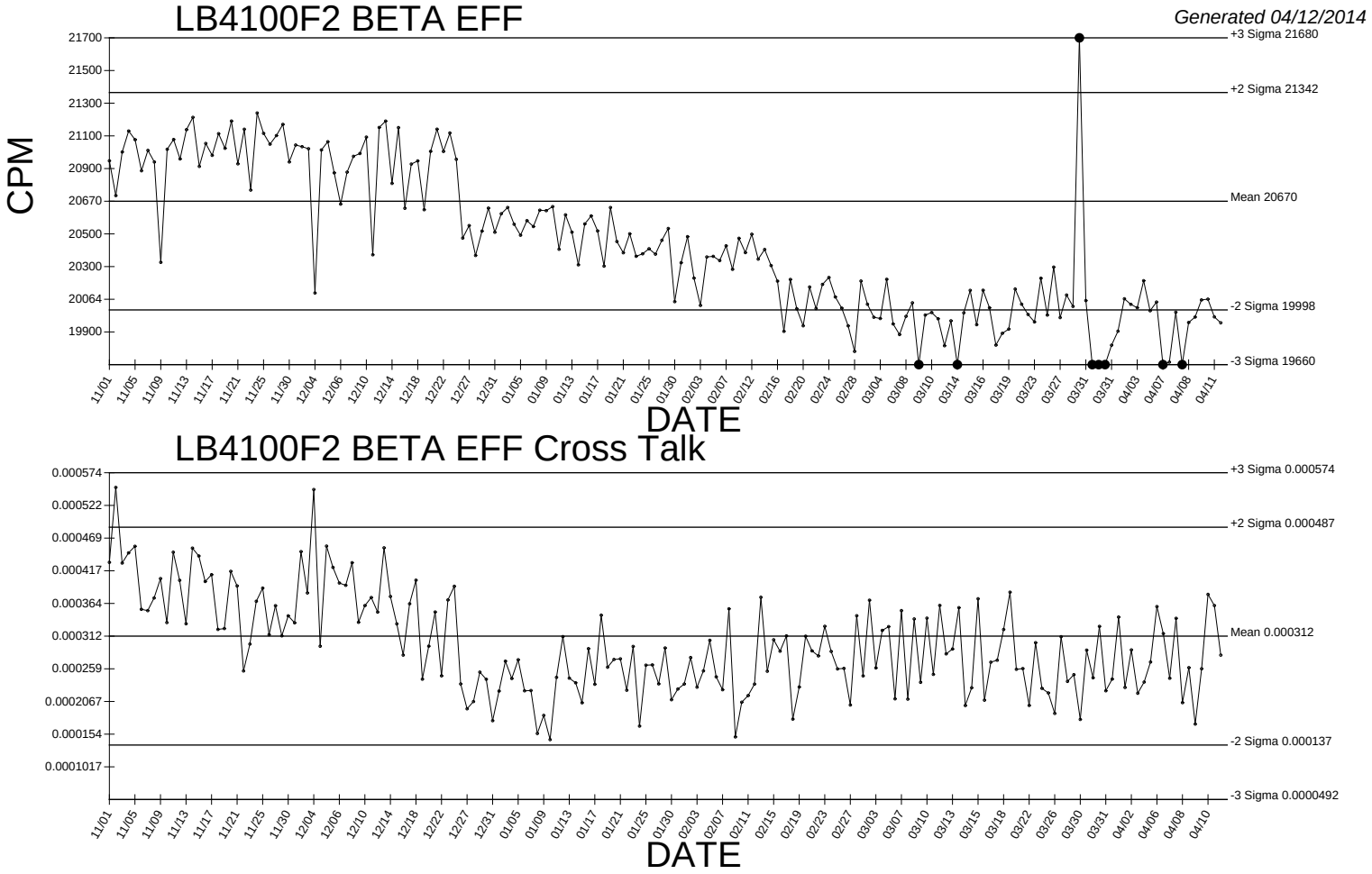






● Denotes Outlier

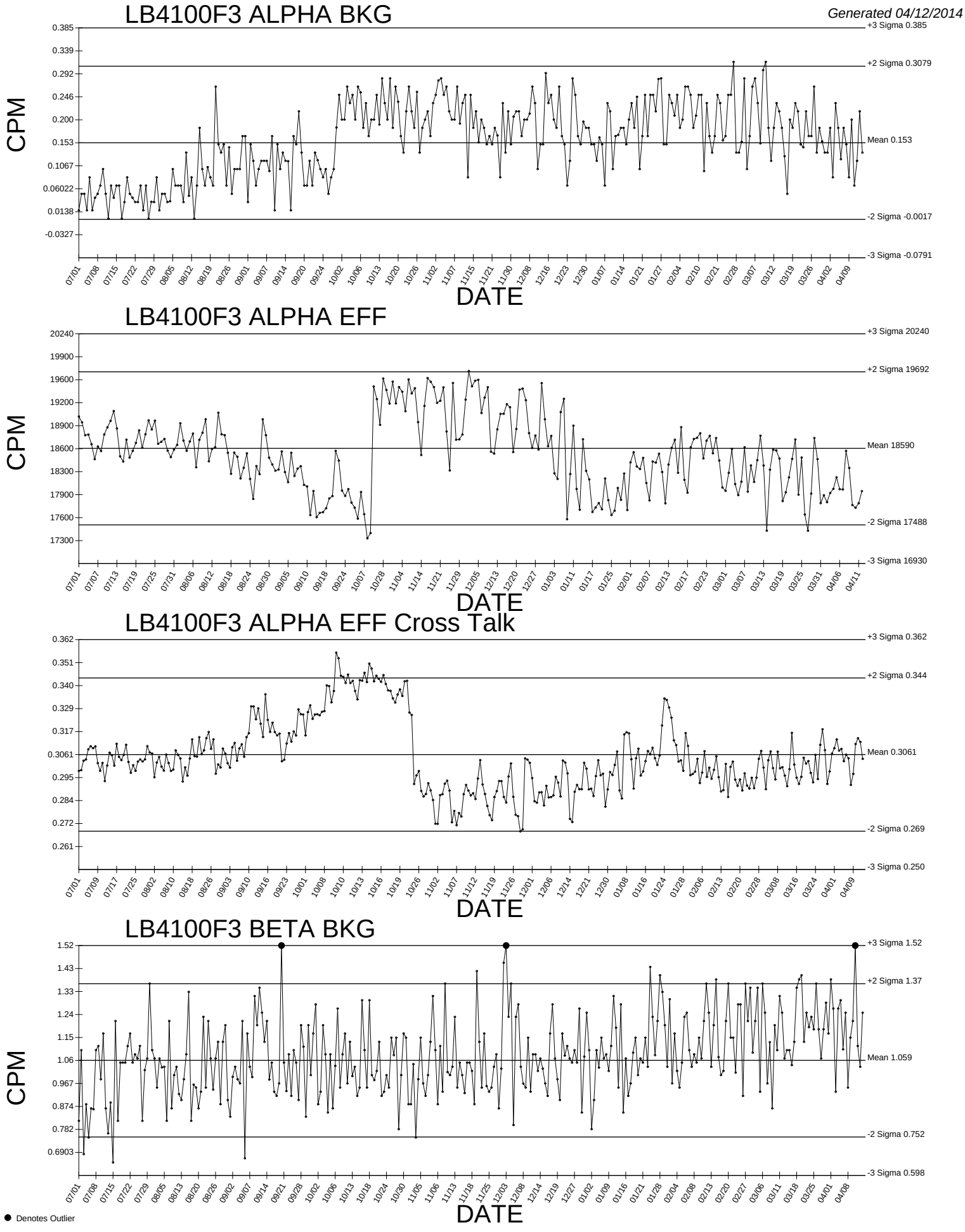

LB4100F2 ALPHA BKG
Generated 04/12/2014
CPM
DATE
+3 Sigma 0.328
+2 Sigma 0.262
Mean 0.130
-2 Sigma -0.00238
-3 Sigma -0.0685
LB4100F2 ALPHA EFF
+3 Sigma 7603
+2 Sigma 7386
Mean 6952
-2 Sigma 6518
-3 Sigma 6302
LB4100F2 ALPHA EFF Cross Talk
+3 Sigma 0.425
+2 Sigma 0.40502
Mean 0.365
-2 Sigma 0.325
-3 Sigma 0.3047
LB4100F2 BETA BKG
+3 Sigma 2.021
+2 Sigma 1.82
Mean 1.409
-2 Sigma 1.0012
-3 Sigma 0.798
● Denotes Outlier

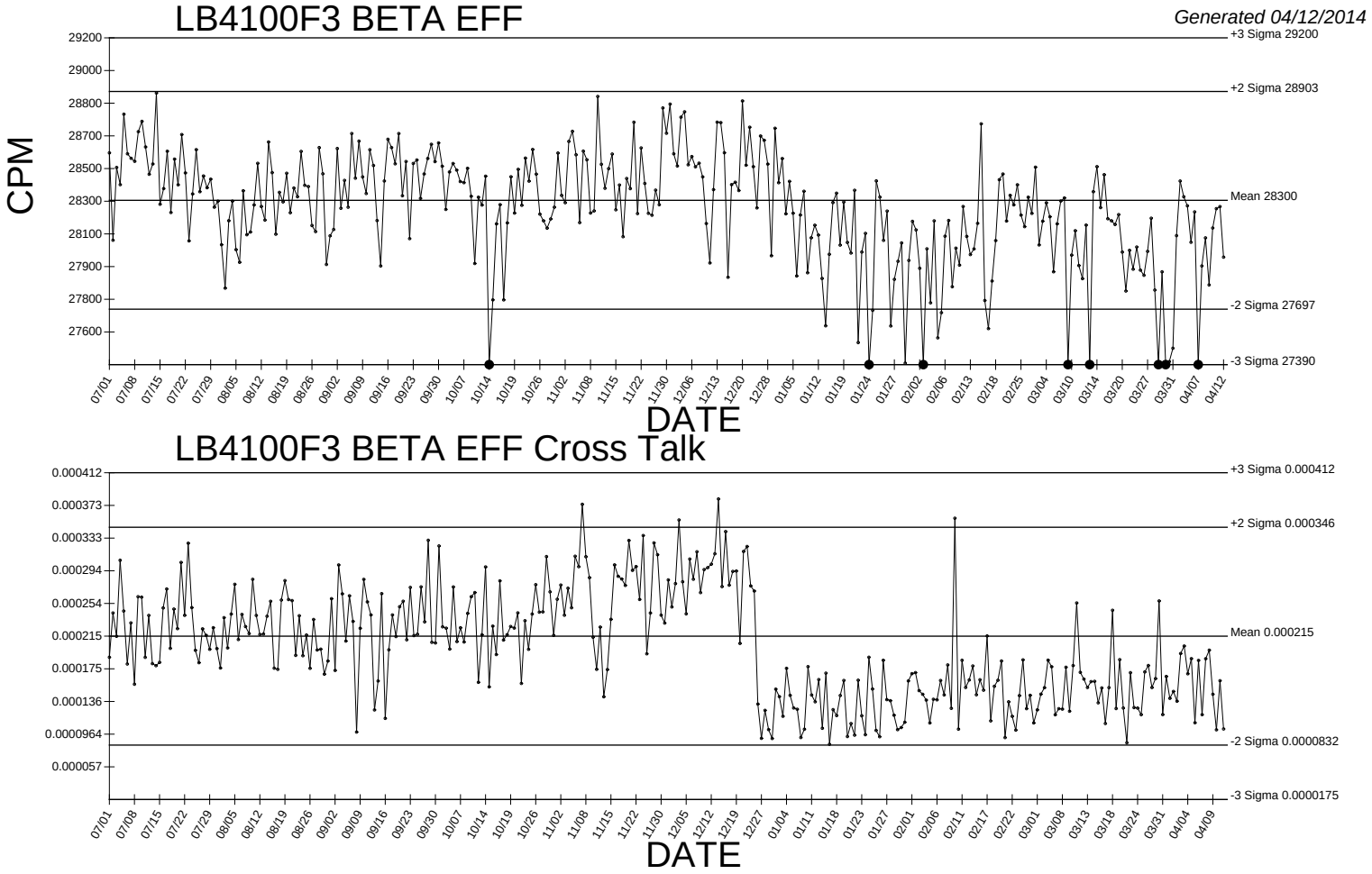






● Denotes Outlier

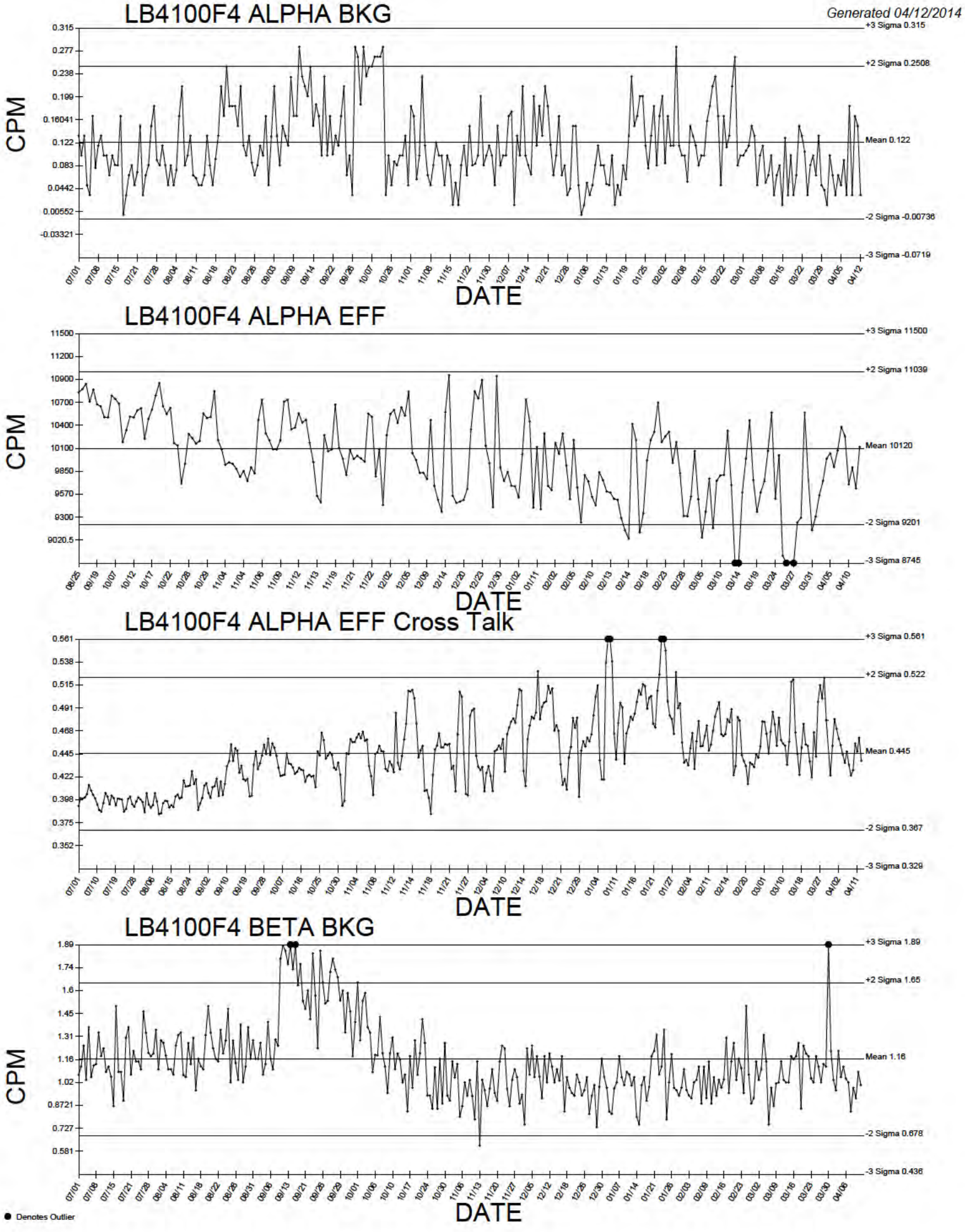

LB4100F3 ALPHA BKG
Generated 04/12/2014
CPM
DATE
+3 Sigma 0.385
+2 Sigma 0.3079
Mean 0.153
-2 Sigma -0.0017
-3 Sigma -0.0791
LB4100F3 ALPHA EFF
+3 Sigma 20240
+2 Sigma 19692
Mean 18590
-2 Sigma 17488
-3 Sigma 16930
LB4100F3 ALPHA EFF Cross Talk
+3 Sigma 0.362
+2 Sigma 0.344
Mean 0.3061
-2 Sigma 0.269
-3 Sigma 0.250
LB4100F3 BETA BKG
+3 Sigma 1.52
+2 Sigma 1.37
Mean 1.059
-2 Sigma 0.752
-3 Sigma 0.598
● Denotes Outlier

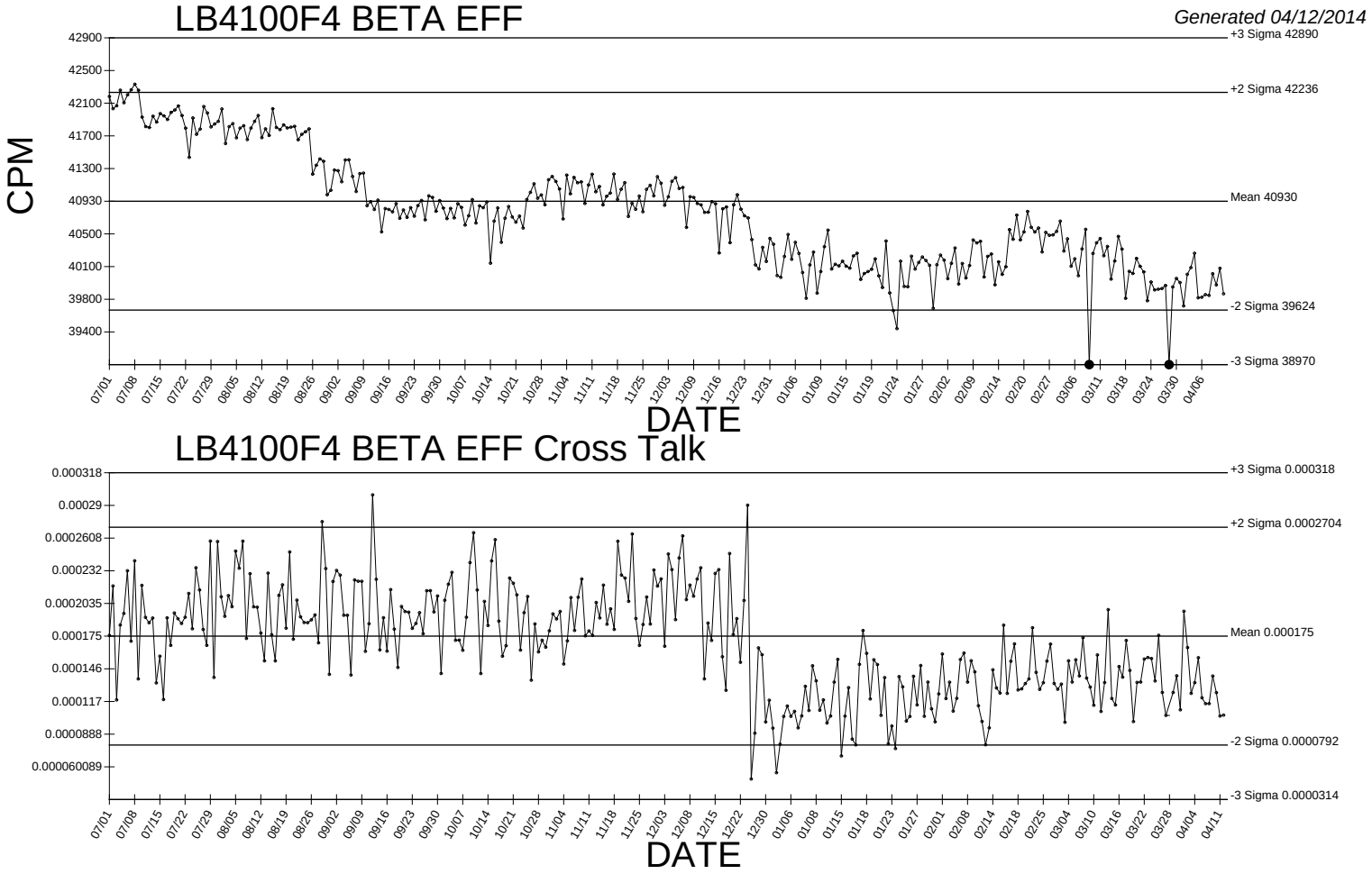






● Denotes Outlier

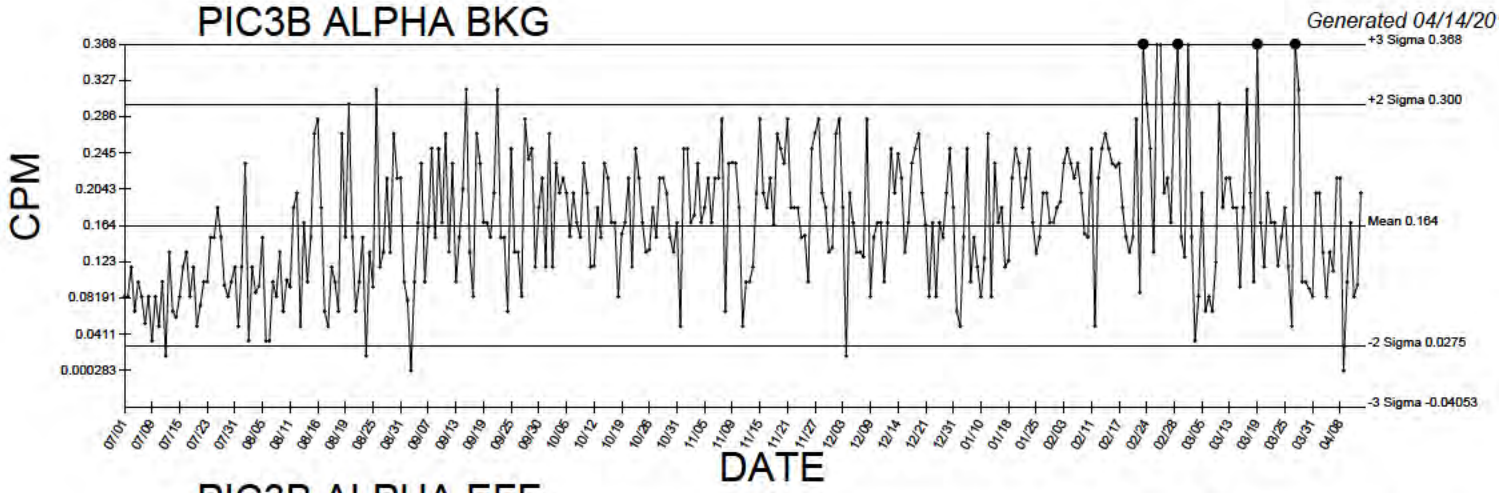

LB4100F4 ALPHA BKG
Generated 04/12/2014
CPM
0.315
0.277
0.238
0.199
0.16041
0.122
0.083
0.0442
0.00552
-0.03321
+3 Sigma 0.315
+2 Sigma 0.2508
Mean 0.122
-2 Sigma -0.00736
-3 Sigma -0.0719
07/01 07/08 07/15 07/21 07/28 08/04 08/11 08/18 08/23 08/26 09/03 09/09 09/14 09/22 09/26 10/07 10/26 11/01 11/08 11/15 11/22 11/30 12/07 12/14 12/21 12/28 01/06 01/13 01/19 01/25 02/02 02/08 02/15 02/22 03/01 03/08 03/15 03/22 03/29 04/05 04/12
DATE
LB4100F4 ALPHA EFF
CPM
11500
11200
10900
10700
10400
10100
9850
9570
9300
9020.5
+3 Sigma 11500
+2 Sigma 11039
Mean 10120
-2 Sigma 9201
-3 Sigma 8745
08/25 09/19 10/07 10/12 10/17 10/22 10/28 10/29 11/04 11/04 11/06 11/09 11/12 11/13 11/19 11/21 11/22 12/02 12/05 12/09 12/14 12/20 12/23 12/30 01/02 01/11 02/02 02/05 02/10 02/13 02/14 02/18 02/23 02/28 03/05 03/10 03/14 03/19 03/24 03/27 03/31 04/05 04/10
DATE
LB4100F4 ALPHA EFF Cross Talk
0.561
0.538
0.515
0.491
0.468
0.445
0.422
0.398
0.375
0.352
+3 Sigma 0.561
+2 Sigma 0.522
Mean 0.445
-2 Sigma 0.367
-3 Sigma 0.329
07/01 07/10 07/19 07/28 08/06 08/15 08/24 09/02 09/10 09/19 09/28 10/07 10/16 10/25 10/30 11/04 11/08 11/12 11/14 11/18 11/21 11/27 12/04 12/10 12/14 12/18 12/21 12/29 01/04 01/11 01/16 01/21 01/27 02/04 02/11 02/14 02/20 03/01 03/10 03/18 03/27 04/02 04/11
DATE
LB4100F4 BETA BKG
CPM
1.89
1.74
1.6
1.45
1.31
1.16
1.02
0.8721
0.727
0.581
+3 Sigma 1.89
+2 Sigma 1.65
Mean 1.16
-2 Sigma 0.678
-3 Sigma 0.436
07/01 07/08 07/15 07/21 07/28 08/04 08/11 08/18 08/22 08/28 08/31 09/06 09/13 09/21 09/26 09/29 10/01 10/06 10/10 10/17 10/24 10/30 11/06 11/13 11/20 11/27 12/05 12/12 12/18 12/26 12/30 01/07 01/14 01/21 01/28 02/03 02/09 02/16 02/23 03/02 03/09 03/16 03/23 03/30 04/06
DATE
Denotes Outlier

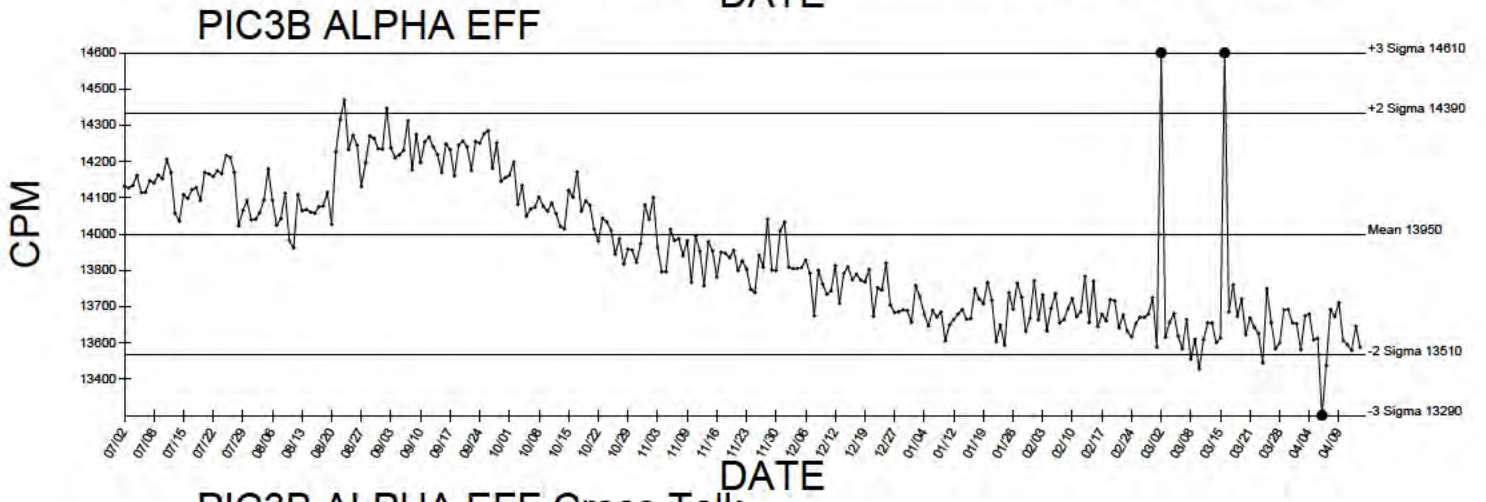


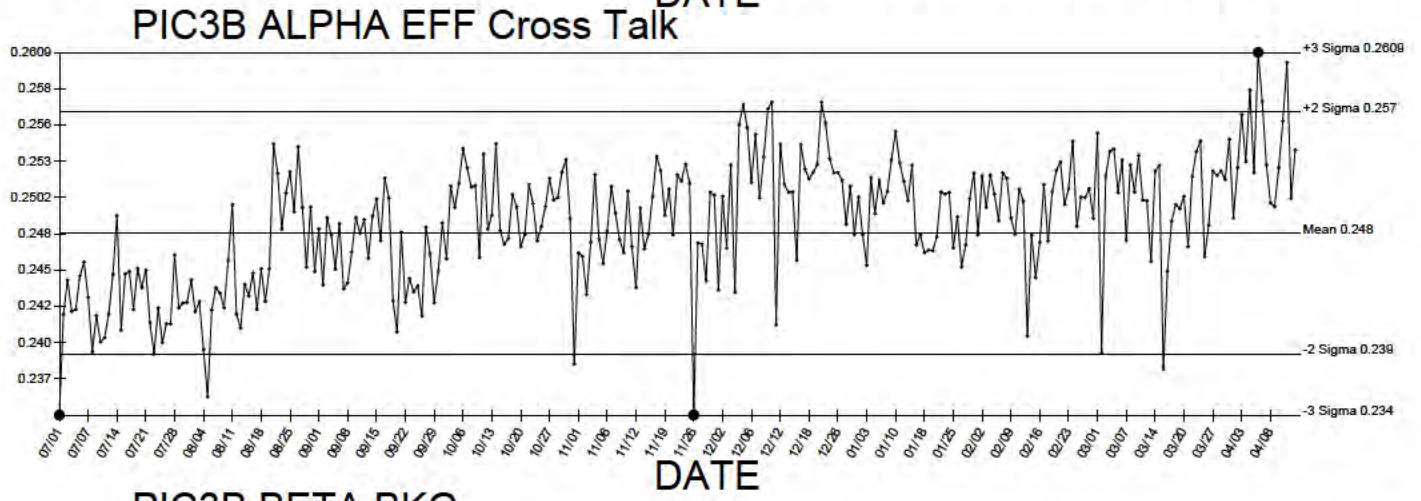


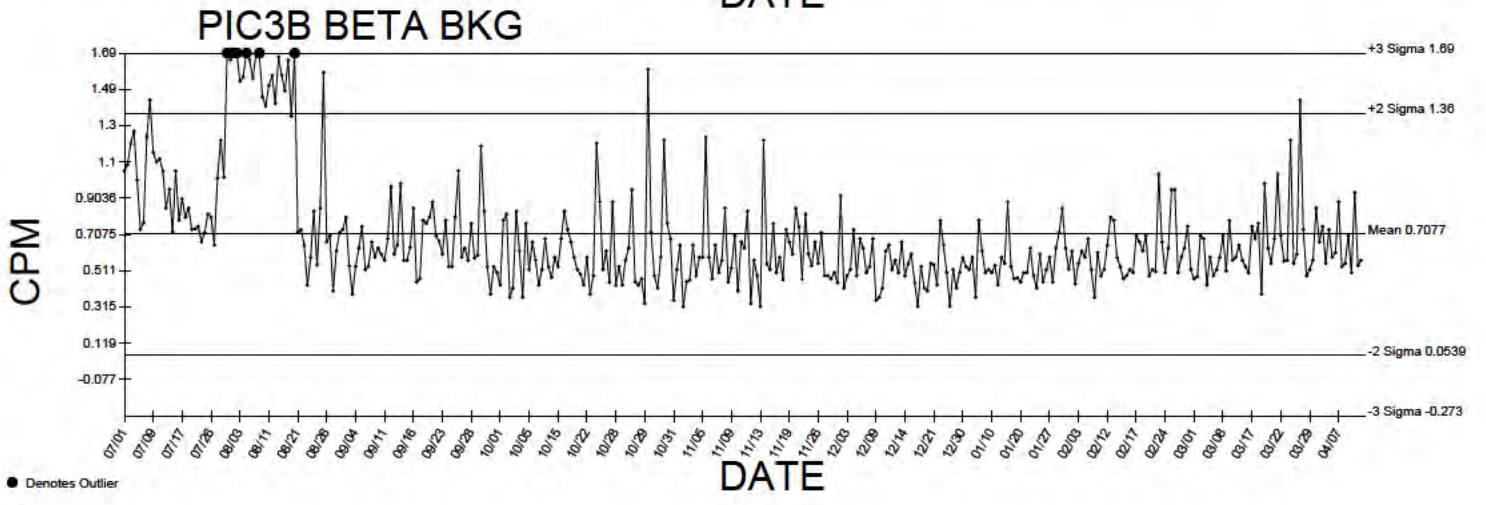


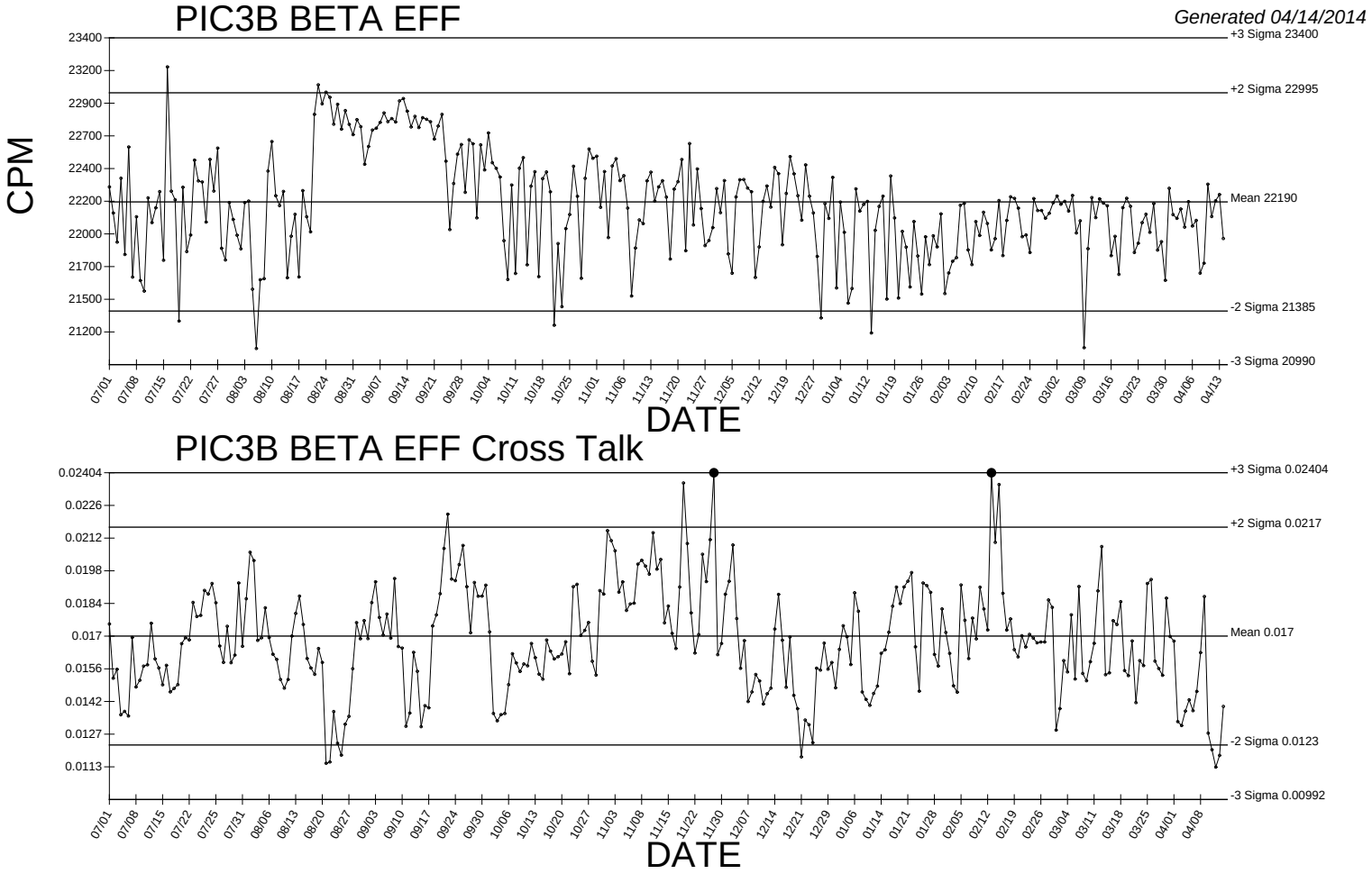
● Denotes Outlier


PIC3B ALPHA BKG
Generated 04/14/2014
CPM
DATE
+3 Sigma 0.368
+2 Sigma 0.300
Mean 0.164
-2 Sigma 0.0275
-3 Sigma -0.04053


PIC3B ALPHA EFF
CPM
DATE
+3 Sigma 14610
+2 Sigma 14390
Mean 13950
-2 Sigma 13510
-3 Sigma 13290


PIC3B ALPHA EFF Cross Talk
DATE
+3 Sigma 0.2609
+2 Sigma 0.257
Mean 0.248
-2 Sigma 0.239
-3 Sigma 0.234

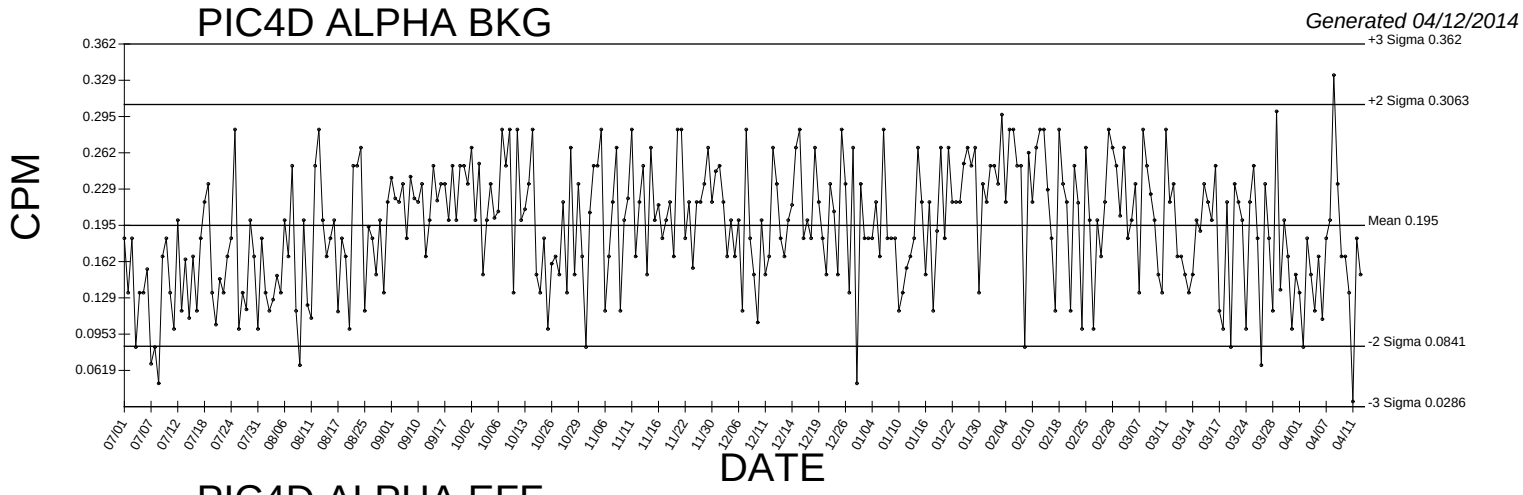

PIC3B BETA BKG
CPM
DATE
+3 Sigma 1.69
+2 Sigma 1.36
Mean 0.7077
-2 Sigma 0.0539
-3 Sigma -0.273
Denotes Outlier

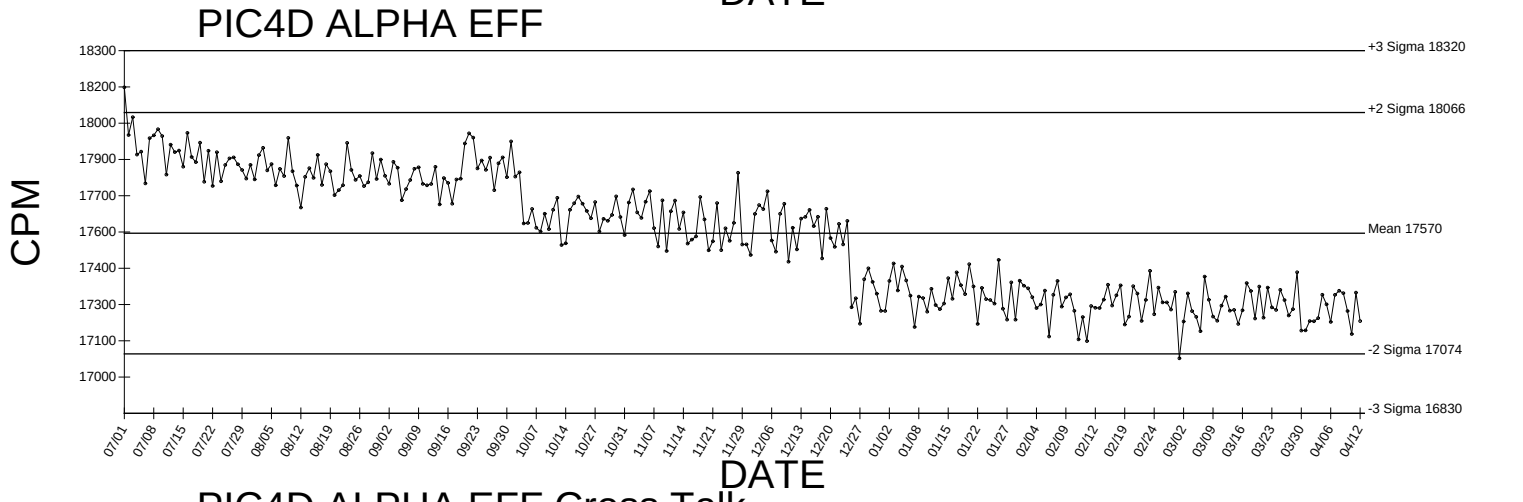


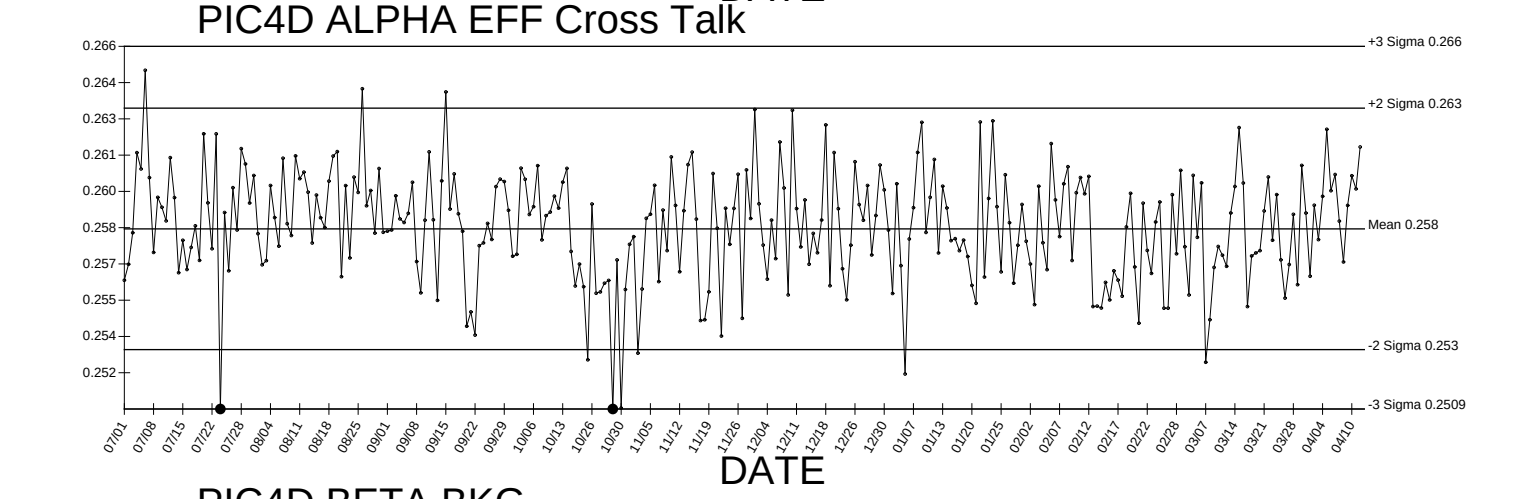


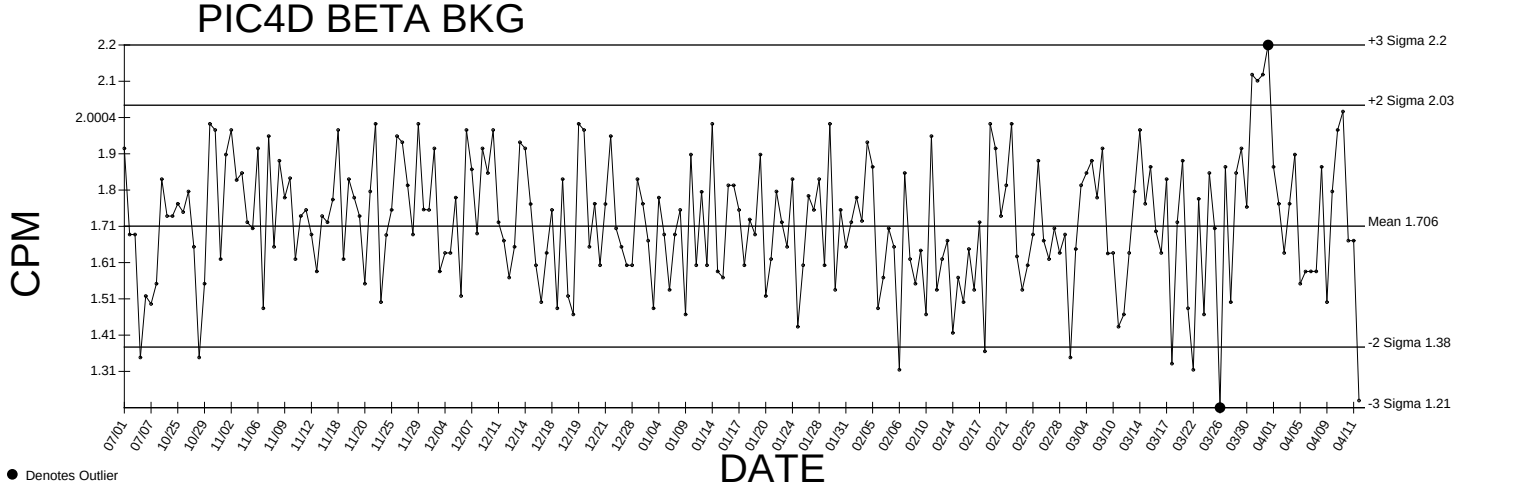


● Denotes Outlier

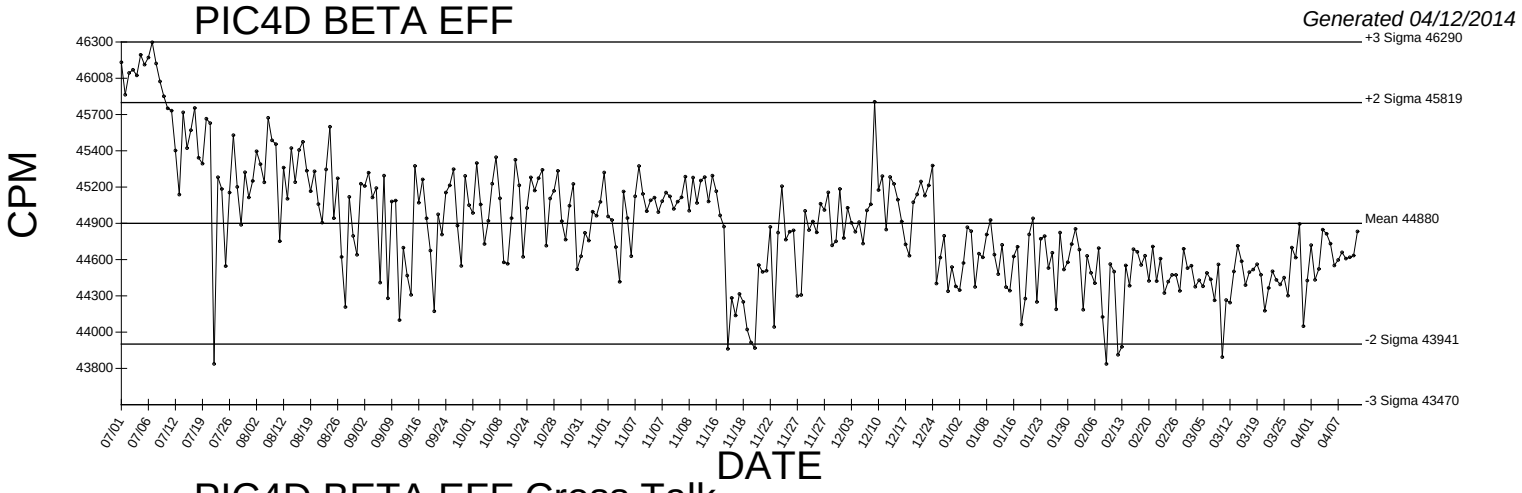


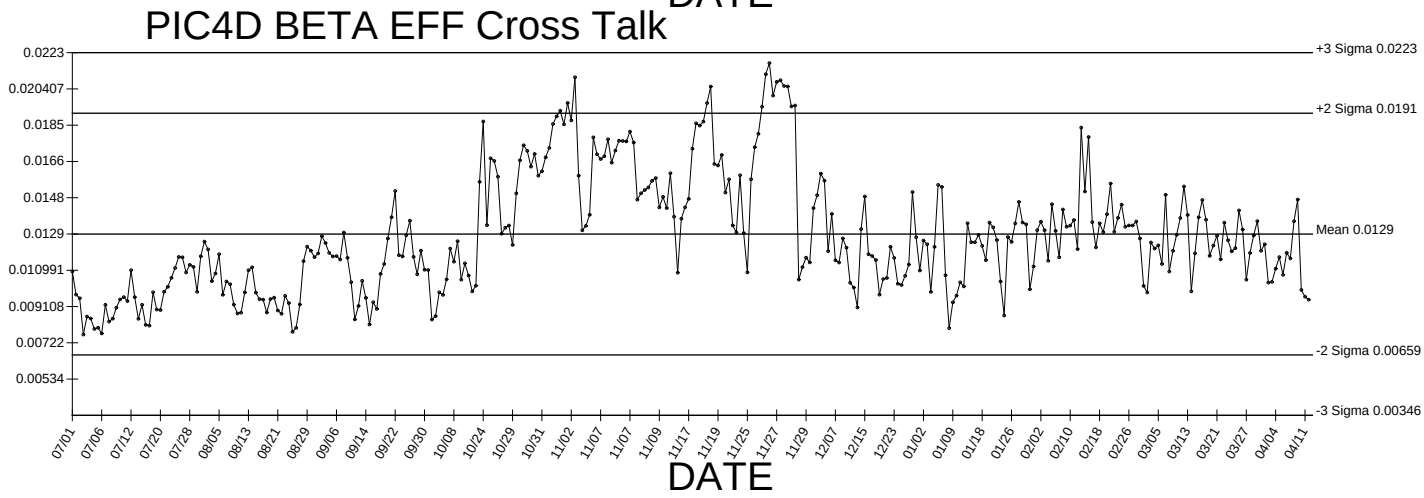




● Denotes Outlier

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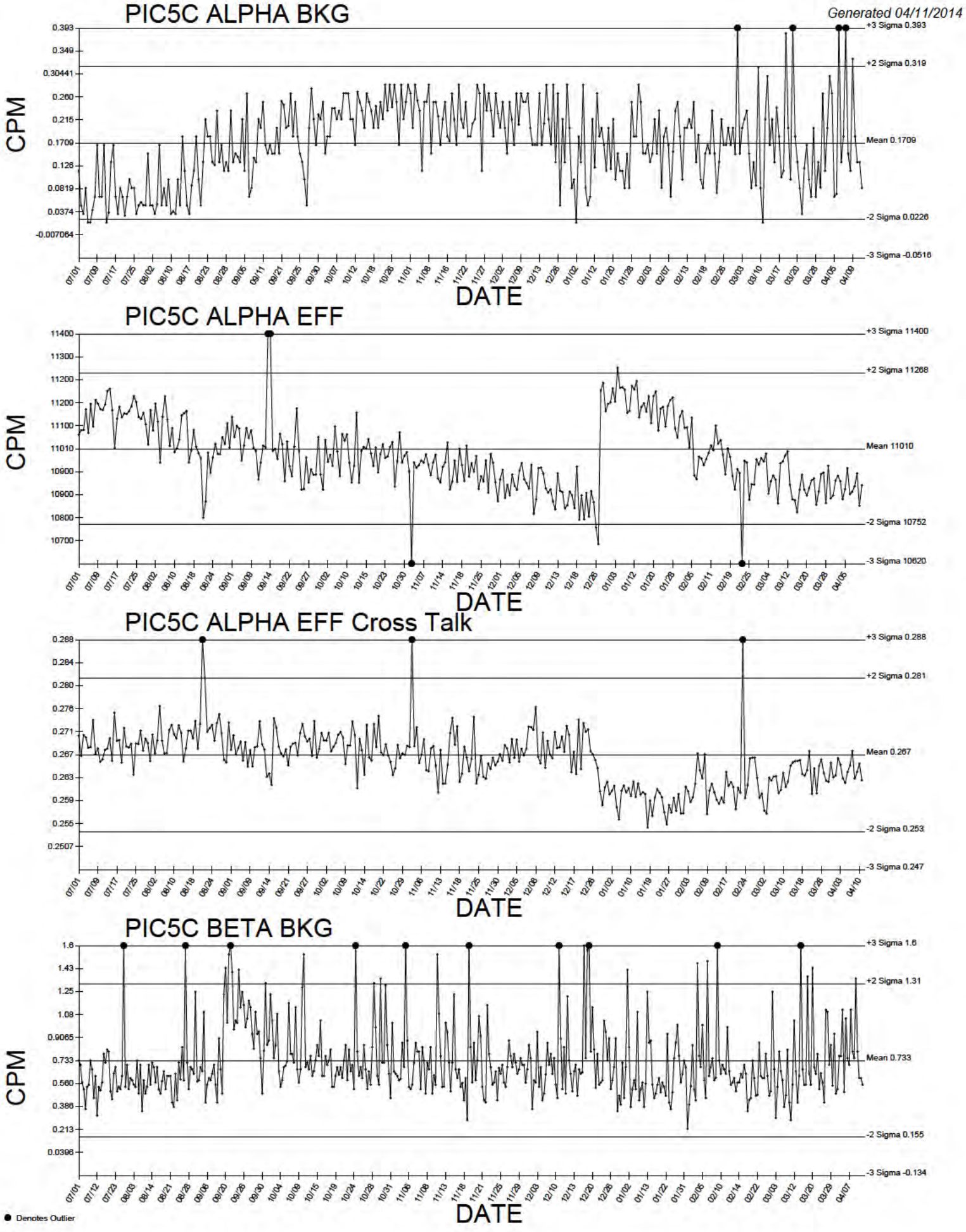
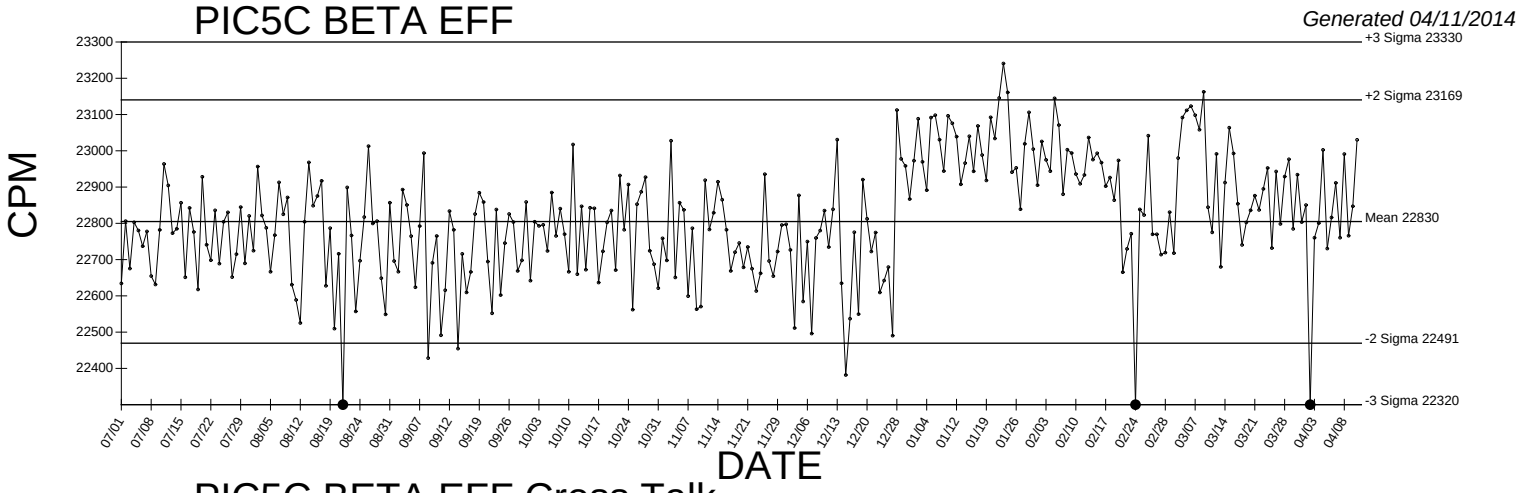
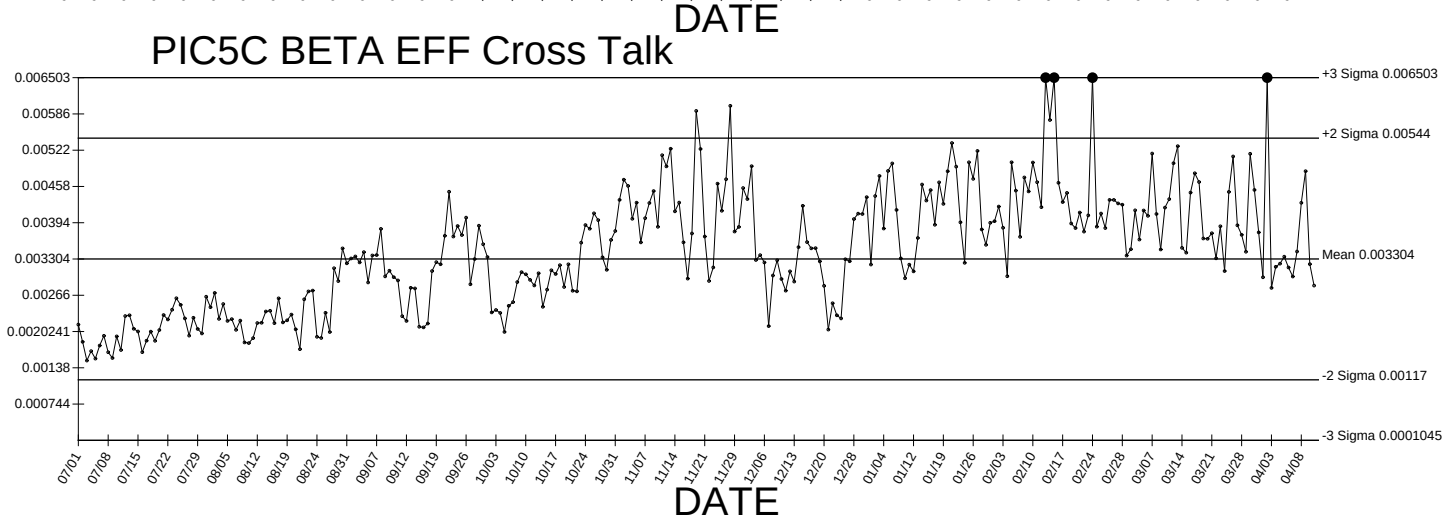
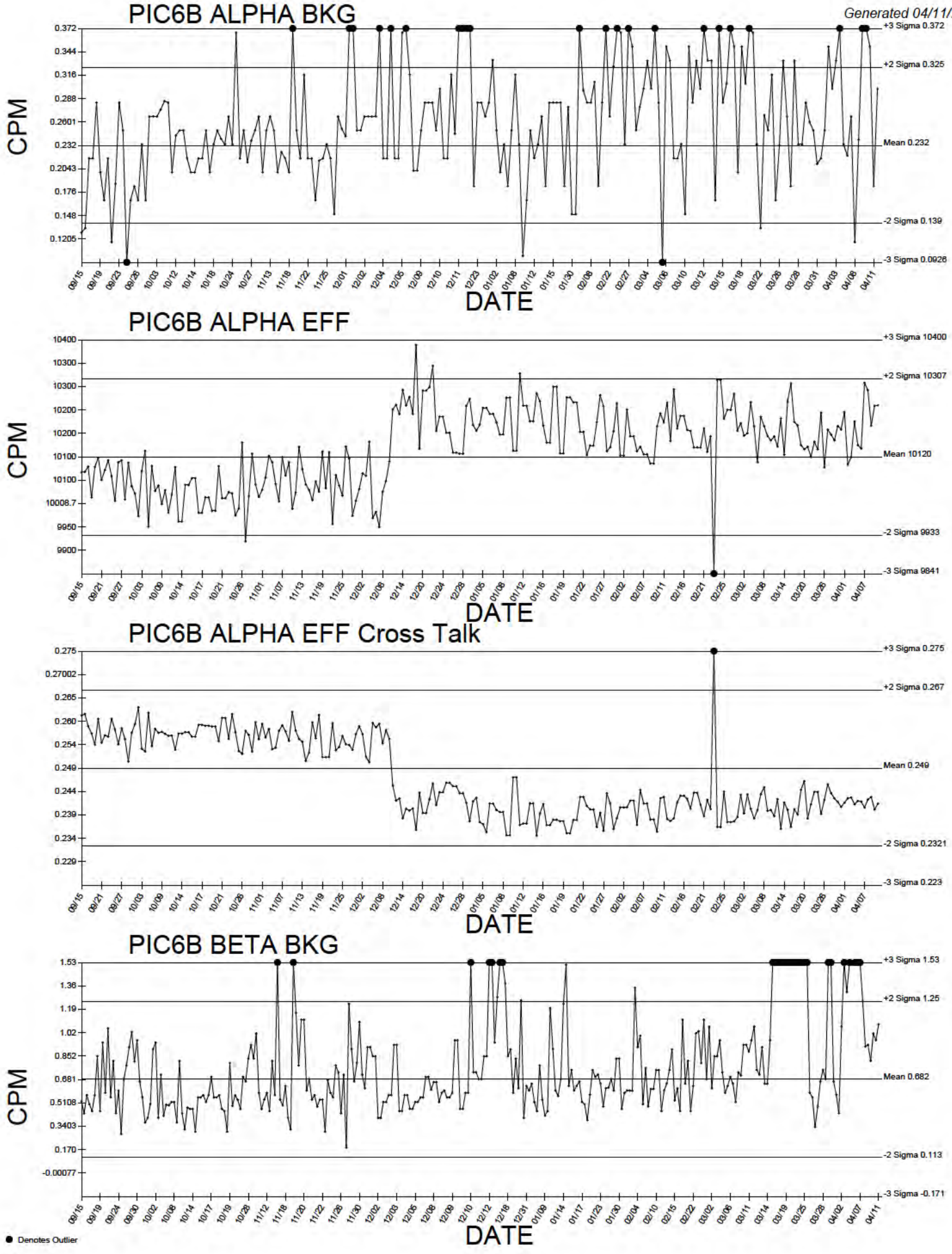
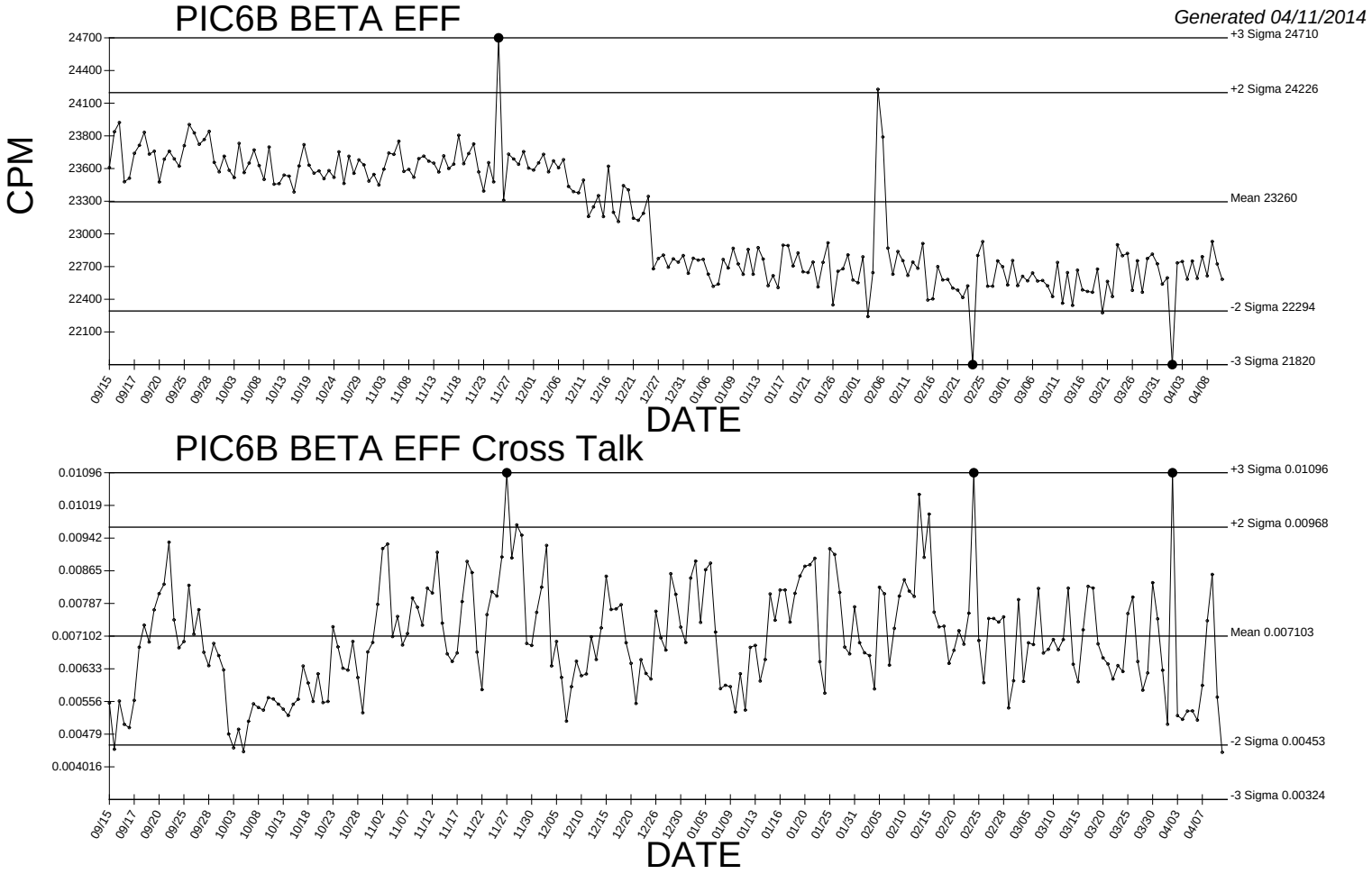

PIC5C ALPHA BKG
Generated 04/11/2014
CPM
0.393
0.349
0.30441
0.260
0.215
0.1709
0.126
0.0819
0.0374
-0.007064
+3 Sigma 0.393
+2 Sigma 0.319
Mean 0.1709
-2 Sigma 0.0226
-3 Sigma -0.0516
DATE
PIC5C ALPHA EFF
CPM
11400
11300
11200
11200
11100
11010
10900
10900
10800
10700
+3 Sigma 11400
+2 Sigma 11268
Mean 11010
-2 Sigma 10752
-3 Sigma 10620
DATE
PIC5C ALPHA EFF Cross Talk
0.288
0.284
0.280
0.276
0.271
0.267
0.263
0.259
0.255
0.2507
+3 Sigma 0.288
+2 Sigma 0.281
Mean 0.267
-2 Sigma 0.253
-3 Sigma 0.247
DATE
PIC5C BETA BKG
CPM
1.6
1.43
1.25
1.08
0.9065
0.733
0.560
0.386
0.213
0.0396
+3 Sigma 1.6
+2 Sigma 1.31
Mean 0.733
-2 Sigma 0.155
-3 Sigma -0.134
DATE
Denotes Outlier




● Denotes Outlier

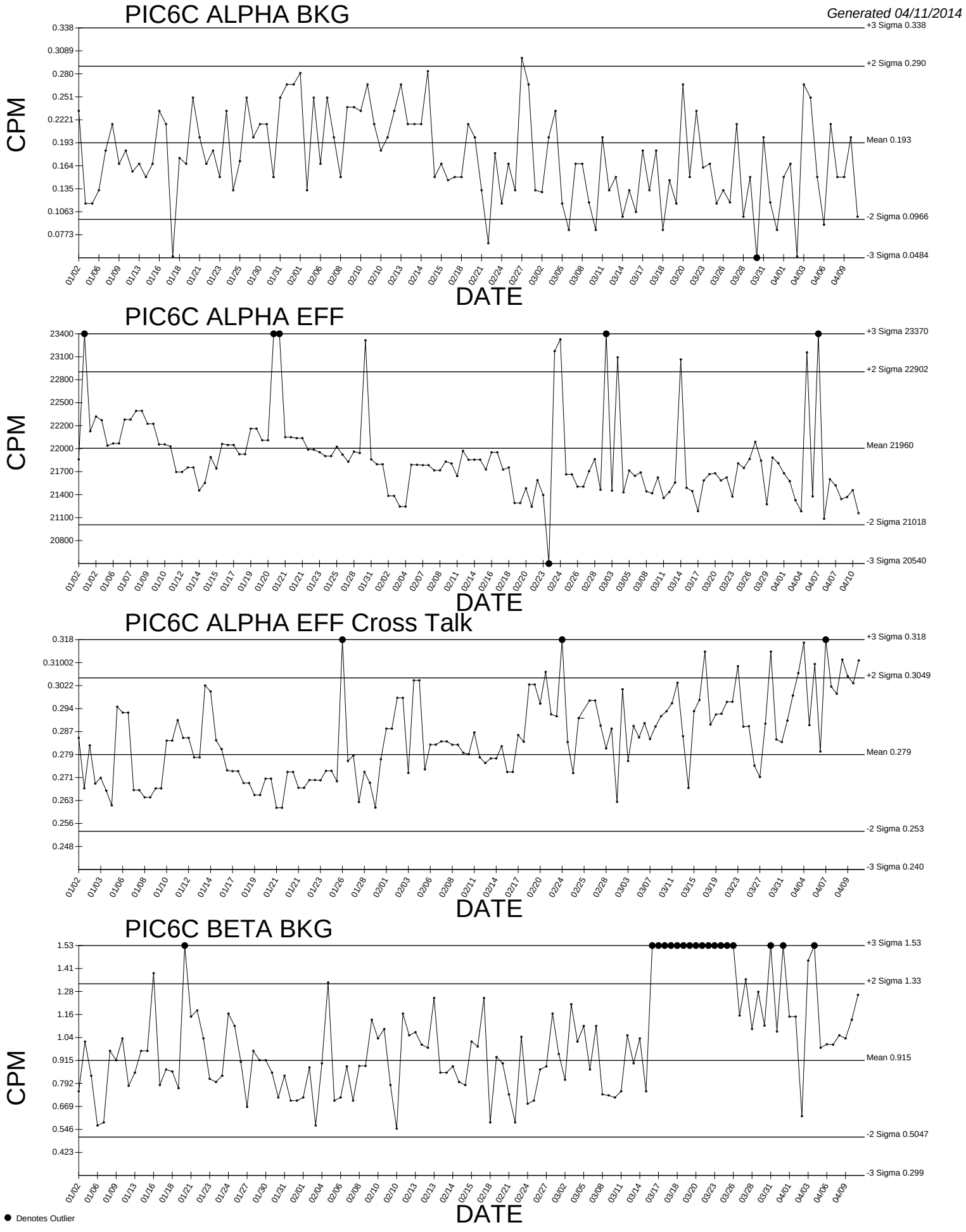

PIC6B ALPHA BKG
Generated 04/11/2014
CPM
DATE
+3 Sigma 0.372
+2 Sigma 0.325
Mean 0.232
-2 Sigma 0.139
-3 Sigma 0.0926
PIC6B ALPHA EFF
+3 Sigma 10400
+2 Sigma 10307
Mean 10120
-2 Sigma 9933
-3 Sigma 9841
PIC6B ALPHA EFF Cross Talk
+3 Sigma 0.275
+2 Sigma 0.267
Mean 0.249
-2 Sigma 0.2321
-3 Sigma 0.223
PIC6B BETA BKG
+3 Sigma 1.53
+2 Sigma 1.25
Mean 0.682
-2 Sigma 0.113
-3 Sigma -0.171
Denotes Outlier

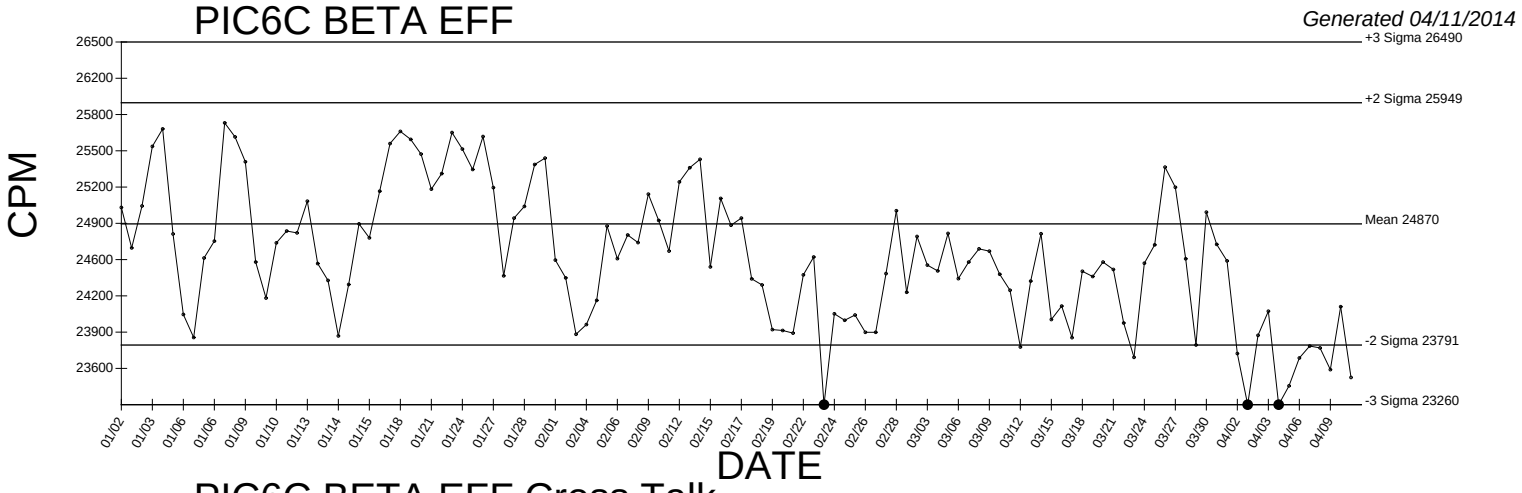


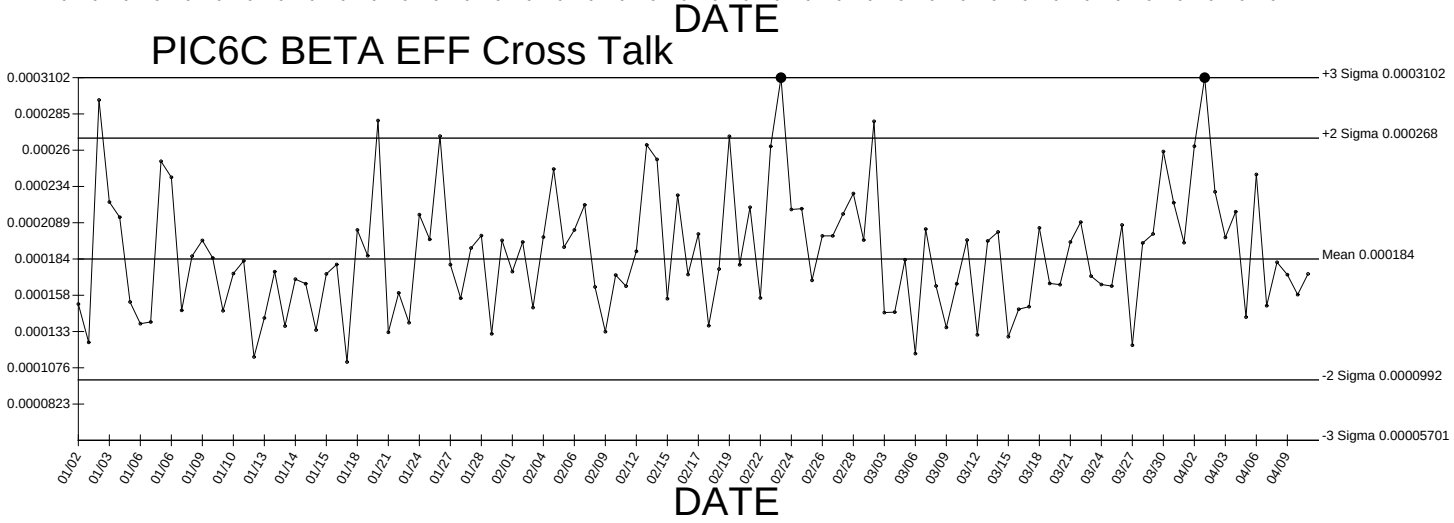




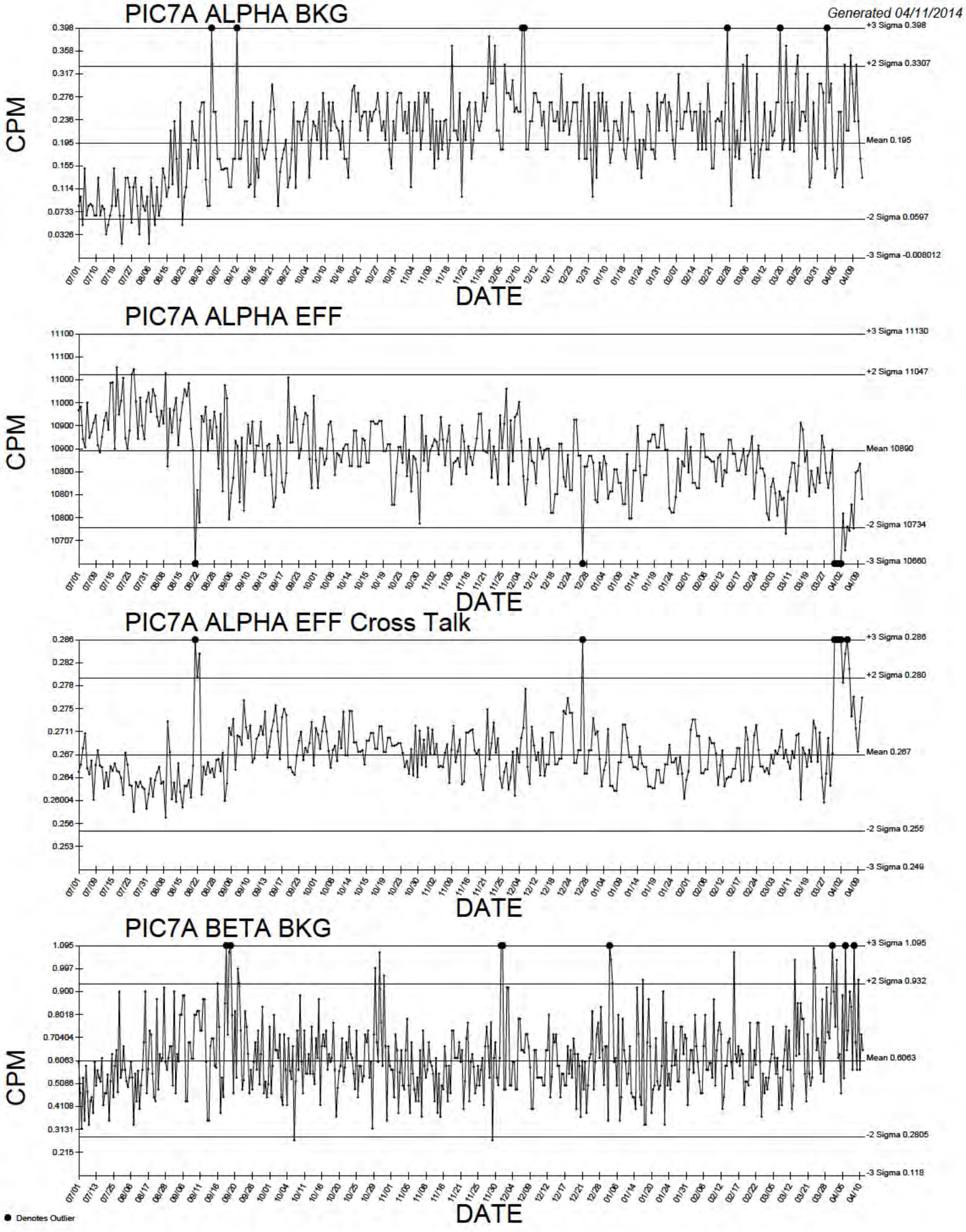
● Denotes Outlier

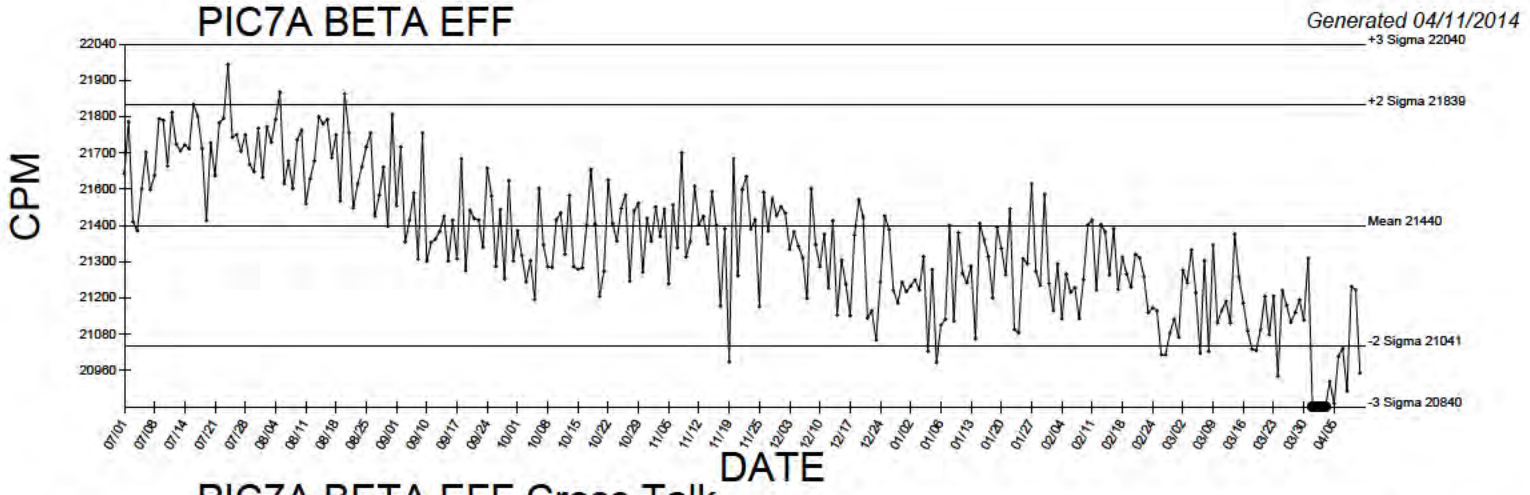

PIC6C ALPHA BKG
Generated 04/11/2014
CPM
DATE
+3 Sigma 0.338
+2 Sigma 0.290
Mean 0.193
-2 Sigma 0.0966
-3 Sigma 0.0484
PIC6C ALPHA EFF
+3 Sigma 23370
+2 Sigma 22902
Mean 21960
-2 Sigma 21018
-3 Sigma 20540
PIC6C ALPHA EFF Cross Talk
+3 Sigma 0.318
+2 Sigma 0.3049
Mean 0.279
-2 Sigma 0.253
-3 Sigma 0.240
PIC6C BETA BKG
+3 Sigma 1.53
+2 Sigma 1.33
Mean 0.915
-2 Sigma 0.5047
-3 Sigma 0.299
Denotes Outlier

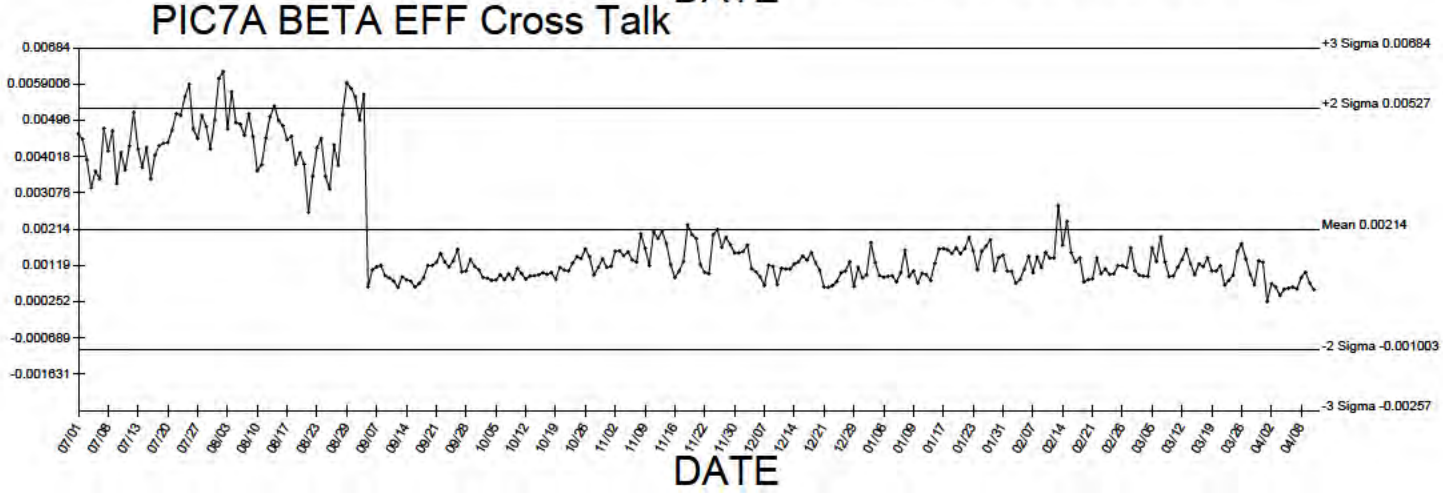



● Denotes Outlier


PIC7A ALPHA BKG
Generated 04/11/2014
CPM
DATE
+3 Sigma 0.398
+2 Sigma 0.3307
Mean 0.195
-2 Sigma 0.0597
-3 Sigma -0.008012
PIC7A ALPHA EFF
+3 Sigma 11130
+2 Sigma 11047
Mean 10890
-2 Sigma 10734
-3 Sigma 10660
PIC7A ALPHA EFF Cross Talk
+3 Sigma 0.286
+2 Sigma 0.280
Mean 0.267
-2 Sigma 0.255
-3 Sigma 0.249
PIC7A BETA BKG
+3 Sigma 1.095
+2 Sigma 0.932
Mean 0.6063
-2 Sigma 0.2805
-3 Sigma 0.118
Denotes Outlier




● Denotes Outlier

# RAD Standards Traceability

# Standardization of Strontium Carrier 2046474

v1.2

| Analyst | AF1 |
|---|---|

| Standard Information | |
|---|---|
| Isotope | Strontium |
| Serial Number | 2046474 |
| Amount of Std. (mL) | 0.5 |
| Standard Prepared | 12/5/2013 |

| Parent Information | |
|---|---|
| Parent Serial # | 1949033 |
| Parent Exp. Date | 8/5/2015 |

| Std # | Weight of carrier added (g) | Weight of crucible or filter (g) | Weight of crucible or filter + ppt. (g) | Weight of ppt. (g) | mg Strontium/mL | mg Strontium/g |
|---|---|---|---|---|---|---|
| 1 | 0.5000 | 0.0238 | 0.0320 | 0.0082 | 16.40 | 16.40 |
| 2 | 0.5100 | 0.0242 | 0.0325 | 0.0083 | 16.60 | 16.27 |
| 3 | 0.5200 | 0.0244 | 0.0325 | 0.0081 | 16.20 | 15.58 |
| 4 | 0.5100 | 0.0248 | 0.0330 | 0.0082 | 16.40 | 16.08 |

| | |
|---|---|
| **Mean Value (mg/mL) =** | 16.40 |
| **Stdev (mg/mL) =** | ± 0.16 |
| **1.0% of Mean Value =** | 0.164000 |
| | **Pass** |
| **Expiration Date** | **12/5/2014** |
| **Mean Value (mg/0.5mL) =** | 8.20 |

**Standardization Rule**

**A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.**

M 12/10/13

Amanda L. Fehn

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC
**P.O. No.:** 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| Isotope: | Sr-90 |
| Activity (Bq): | 3.856 E5 |
| Half-Life: | 28.79 years |
| Calibration Date: | October 1, 2008 12:00 EST |
| Relative Expanded Uncertainty (k=2): | 1.7% |

**Comments:**
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager



RECEIVED
M-10492

# Standard Traceability Log Rad

| Source Material Info | |
|---|---|
| Parent Code: | 1243 |
| Prepared By: | Daniel Roy |
| Carrier Conc: | 0.1M HCL |
| Reference Date: | 10/01/2008 |
| Ampoule Mass (g): | 10.41484 g |
| Uncertainty: | +/- 1.7 % |
| LogBook No: | RC-S-048-124 |

| A Solution Material Info | | | |
|---|---|---|---|
| Isotope: | Strontium-90 | | |
| Prepared By: | Daniel Roy | | |
| Prep Date: | 12/19/2008 | | |
| Verification Date: | 12/04/2013 | | |
| Expiration Date: | 12/04/2014 | | |
| Primary Code: | 1243-A | | |
| Dilution(mL): | 100 mL | | |
| Mass of Parent(g): | 10.2164 g | | |
| Density(g/mL): | 0.9991 | Balance ID: | 38080204 |

**Calculations Converting parent activity to dpm/mL|dpm/g**

| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL) |
|---|
| (Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g) |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL ) = 226951.7634 dpm/mL |
| (10.2164 g) * (385600 Bq) * (60 dpm/Bq) / ( 0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g |

**Secondary Standards**

| Prep Date | Preparer | Mass Primary | Dilution (mL) | Code | Conc dpm/mL | Verification Date | Expiration Date |
|---|---|---|---|---|---|---|---|
| 01/21/2010 | Bethany Fiem | 2.2467 | 1000 | 1243-B | 510.329369 dpm/mL | 01/21/2010 | 01/21/2011 |
| 08/03/2010 | Bethany Fiem | 2.5604 | 1000 | 1243-C | 581.5851 dpm/mL | 08/03/2010 | 08/03/2011 |
| 01/12/2011 | Bethany Fiem | 2.4946 | 1000 | 1243-D | 566.6389 dpm/mL | 01/12/2011 | 01/12/2012 |
| 08/12/2011 | Tim Chandler | 3.3115 | 100 | 1243-G | 18.7877 dpm/mL | 03/26/2014 | 03/25/2015 |
| 08/17/2011 | Tim Chandler | 2.5541 | 100 | 1243-H | 14.49064 dpm/mL | 03/26/2014 | 03/25/2015 |
| 06/21/2011 | Tim Chandler | .0235 | 100 | 1243-E | 53.37936 dpm/mL | 03/19/2014 | 06/20/2014 |
| 07/05/2011 | Bethany Fiem | 2.6072 | 1000 | 1243-F | 592.2156 dpm/mL | 07/05/2011 | 07/05/2012 |
| 01/31/2012 | Gregory Ramsay | 2.6792 | 1000 | 1243-I | 608.5701 dpm/ml | 01/31/2012 | 01/31/2013 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 08/29/2012 | Bethany Fiem | 2.6799 | 1000 | 1243-J | 608.729104 dpm/mL | 09/14/2012 | 09/11/2013 |
| 02/12/2013 | Gregory Ramsay | 2.6526 | 1000 | 1243-K | 602.528 dpm/ml | 01/15/2014 | 01/15/2015 |
| 12/04/2013 | Gregory Ramsay | 2.5347 | 1000 | 1243-L | 575.747476 dpm/ml | 12/04/2013 | 12/04/2014 |

GEL Laboratories LLC
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1243-L

v1.0.1

| | |
|---|---|
| Instrument | GREEN |
| Analyst | GXR1 |
| Verification Prep Date | 12/4/2013 |

| Standard Information | |
|---|---|
| Isotope | Sr-90 |
| Serial Number | 1243-L |
| Isotope Halflife | 28.9000 Y |
| Reference Date | 10/1/2008 |
| Ref. Act. (DPM/mL) | 575.747476 |
| Amount of Std. (mL) | 0.1 |
| Standard Prep Date | 12/4/2013 |

| Std # | Count Date | Quench Number | Gross cpm | Bkg cpm |
|---|---|---|---|---|
| 1 | 12/5/2013 | 63.60 | 146.60 | 48.40 |
| 2 | 12/5/2013 | 63.10 | 147.60 | 48.40 |
| 3 | 12/5/2013 | 62.70 | 140.00 | 48.40 |

| Std # | Net cpm | Calculated Avg. Eff. | Standard dpm/mL | Measured dpm |
|---|---|---|---|---|
| 1 | 98.20 | 1.961352 | 500.67 | 50.07 |
| 2 | 99.20 | 1.961352 | 505.77 | 50.58 |
| 3 | 91.60 | 1.961352 | 467.02 | 46.70 |

| | dpm/mL |
|---|---|
| **Mean Value =** | 491.16 |
| **Stdev =** | 21.05469752 |
| **Certificate Value* =** | **508.5** |
| **Two sigma =** | 42.109 |
| **10 % of Mean =** | 49.116 |
| **Rule A (Pass/Fail)** | **Pass** |
| **% Recovery** | 96.59% |
| **Rule B (Pass/Fail)** | **Pass** |
| **Expiration Date** | **12/4/2014** |

**Verification Rules**

**Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule B = The determined mean value shall be within 5% of the certificate value.**

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-L by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/4/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12/13/13

Amanda L. Tehu 12/13/13

# Runlogs

# Instrument Run Log

**Instrument Type: GFPC** **Batch ID: 1377649**

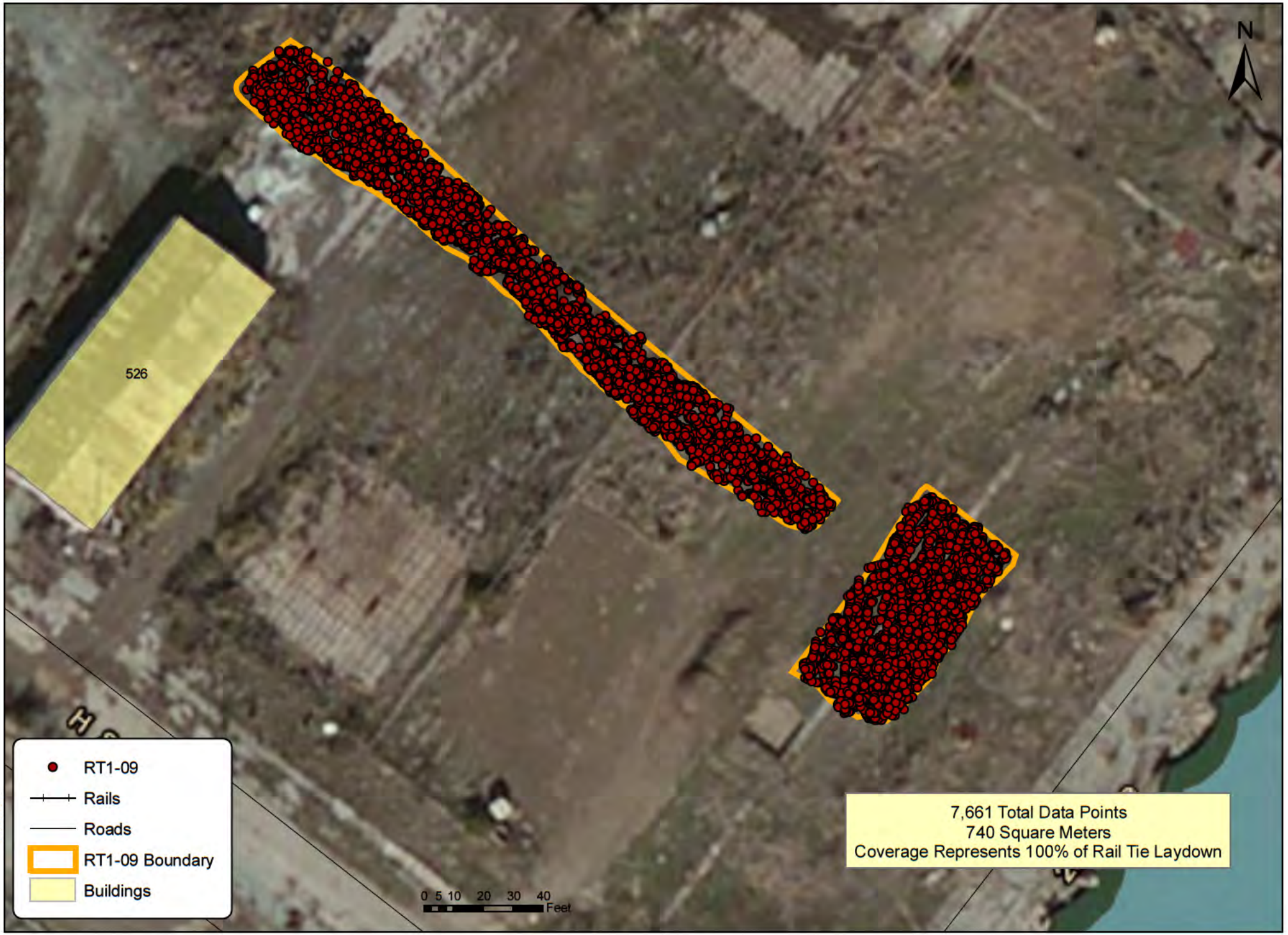
| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 345760002 | SAMPLE | KSD1 | PIC4C | APR-12-14 12:53:26 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345762001 | SAMPLE | KSD1 | PIC4B | APR-12-14 12:53:37 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345763001 | SAMPLE | KSD1 | PIC4D | APR-12-14 12:53:44 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345760001 | SAMPLE | KSD1 | PIC10D | APR-12-14 12:54:46 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345760003 | SAMPLE | KSD1 | PIC10B | APR-12-14 12:54:51 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345761002 | SAMPLE | KSD1 | PIC10C | APR-12-14 12:55:02 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345761001 | SAMPLE | KSD1 | PIC14A | APR-12-14 12:55:56 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345761003 | SAMPLE | KSD1 | PIC14C | APR-12-14 12:56:03 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345762002 | SAMPLE | KSD1 | PIC11D | APR-12-14 12:56:09 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345763002 | SAMPLE | KSD1 | LB4100A1 | APR-12-14 13:04:38 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345763003 | SAMPLE | KSD1 | LB4100A2 | APR-12-14 13:04:38 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345764001 | SAMPLE | KSD1 | LB4100F1 | APR-12-14 13:05:04 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345764002 | SAMPLE | KSD1 | LB4100F2 | APR-12-14 13:05:05 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203062517 | MB | KSD1 | LB4100F3 | APR-12-14 13:05:05 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203062518 | DUP | KSD1 | LB4100F4 | APR-12-14 13:05:06 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203062519 | LCS | KSD1 | PIC3B | APR-14-14 10:58:28 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |

# Instrument Run Log

**Instrument Type: GFPC** **Batch ID: 1379182**

| Sample ID | Sample Type | Analyst | Instrument | Run Date | Status | Geometry | Calibration Date |
|---|---|---|---|---|---|---|---|
| 1203065849 | MB | KSD1 | PIC6B | APR-11-14 15:04:47 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203065850 | DUP | KSD1 | PIC6C | APR-11-14 15:04:47 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345762003 | SAMPLE | KSD1 | PIC5B | APR-11-14 15:04:53 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345764003 | SAMPLE | KSD1 | PIC5C | APR-11-14 15:04:53 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 1203065851 | LCS | KSD1 | PIC7A | APR-11-14 15:04:54 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |
| 345746003 | SAMPLE | KSD1 | PIC6C | APR-11-14 16:50:00 | DONE | Tuffryn Filter | 01-MAR-13 00:00 |

**RT1-09**
**Coverage Area**




DCN: ITSI-0808-0004-0076, 8 May 2019

M-10499

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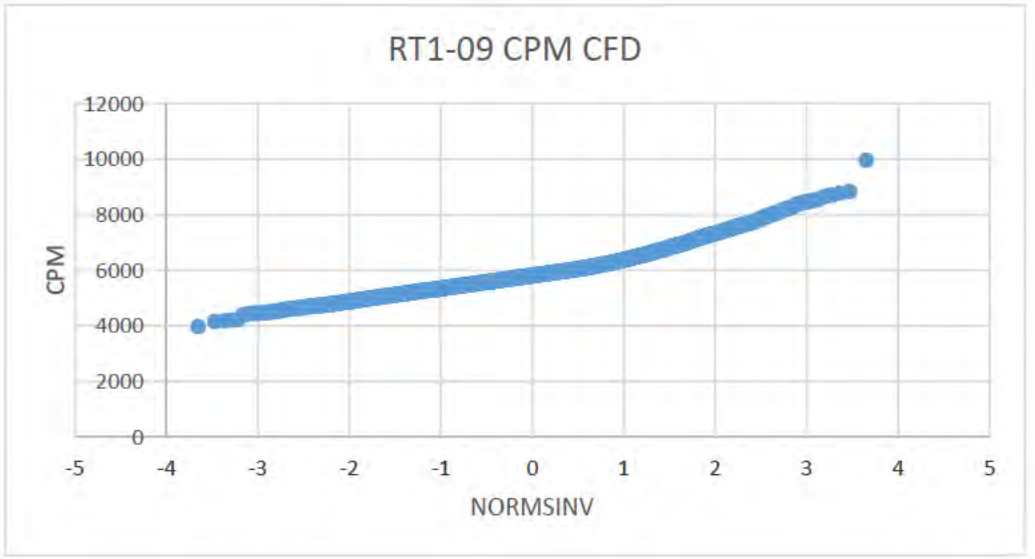
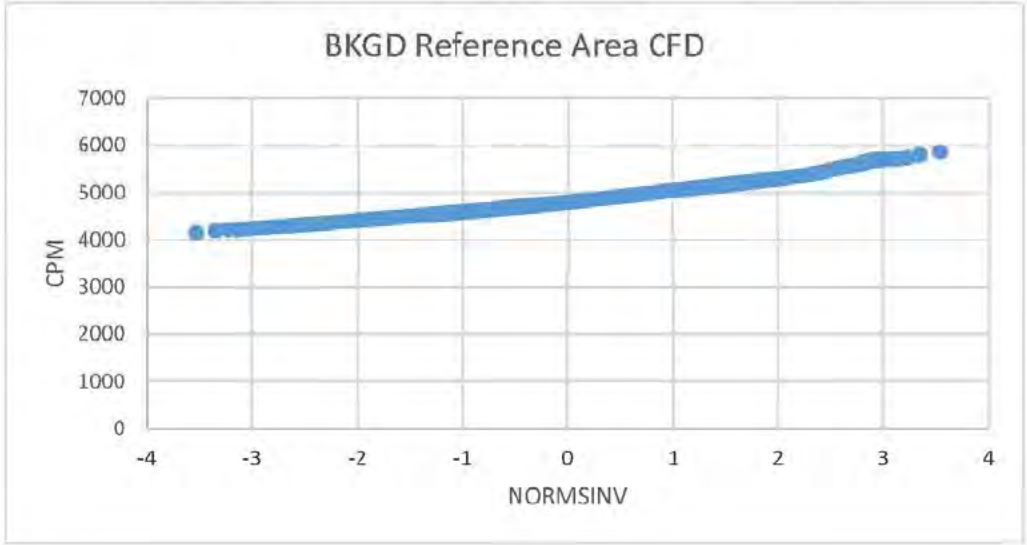
**RT1-09 GWS SUMMARY**

| Statistical Parameter | cpm |
|---|---|
| Mean | 5,869 |
| Median | 5,806 |
| Mode | 5,797 |
| Low CPS | 3,972 |
| High CPS | 9,960 |
| Range | 5,988 |
| Standard Deviation | 581 |
| # of Data Points | 7,661 |
| | |
| Mean (BKGD Ref. Area) | 4,819 |
| Median (BKGD Ref. Area) | 4,803 |
| Mode (BKGD Ref. Area) | 4,736 |
| Low CPM (BKGD Ref. Area) | 4,148 |
| High CPM (BKGD Ref. Area) | 5,868 |
| Range (BKGD Ref. Area) | 1,720 |
| Standard Deviation (BKGD Ref. Area) | 226 |



# RT1-09
## Sample Locations / BA Sigma Values

| Systematic Samples | | | |
|---|---|---|---|
| Easting | Northing | Label | Sample ID |
| 6022727.9 | 2089204.7 | S01 | 04-PDV-RT1300-09-0001 |
| 6022747.8 | 2089204.7 | S02 | 04-PDV-RT1300-09-0002 |
| 6022767.8 | 2089204.7 | S03 | 04-PDV-RT1300-09-0003 |
| 6022747.8 | 2089224.6 | S04 | 04-PDV-RT1300-09-0004 |
| 6022767.8 | 2089224.6 | S05 | 04-PDV-RT1300-09-0005 |
| 6022767.8 | 2089244.6 | S06 | 04-PDV-RT1300-09-0006 |
| 6022787.7 | 2089244.6 | S07 | 04-PDV-RT1300-09-0007 |
| 6022721.9 | 2089259.5 | S08 | 04-PDV-RT1300-09-0008 |
| 6022682 | 2089279.5 | S09 | 04-PDV-RT1300-09-0009 |
| 6022701.9 | 2089279.5 | S10 | 04-PDV-RT1300-09-0010 |
| 6022662 | 2089299.4 | S11 | 04-PDV-RT1300-09-0011 |
| 6022682 | 2089299.4 | S12 | 04-PDV-RT1300-09-0012 |
| 6022642.1 | 2089319.4 | S13 | 04-PDV-RT1300-09-0013 |
| 6022662 | 2089319.4 | S14 | 04-PDV-RT1300-09-0014 |
| 6022622.1 | 2089339.3 | S15 | 04-PDV-RT1300-09-0015 |
| 6022602.2 | 2089359.3 | S16 | 04-PDV-RT1300-09-0016 |
| 6022562.3 | 2089379.2 | S17 | 04-PDV-RT1300-09-0017 |
| 6022582.3 | 2089379.2 | S18 | 04-PDV-RT1300-09-0018 |
| 6022542.4 | 2089399.1 | S19 | 04-PDV-RT1300-09-0019 |
| 6022562.3 | 2089399.1 | S20 | 04-PDV-RT1300-09-0020 |

| Bias Samples | | | |
|---|---|---|---|
| Easting | Northing | Label | Sample ID |
| 6022580.2 | 2089365.6 | B1 | 04-PDV-RT1300-09-0021 |
| 6022594.7 | 2089356.2 | B2 | 04-PDV-RT1300-09-0022 |
| 6022773.6 | 2089237.3 | B3 | 04-PDV-RT1300-09-0023 |
| 6022751.1 | 2089202 | B4 | 04-PDV-RT1300-09-0024 |

DCN: ITSI-0808-0004-0076, 8 May 2019

M-10503

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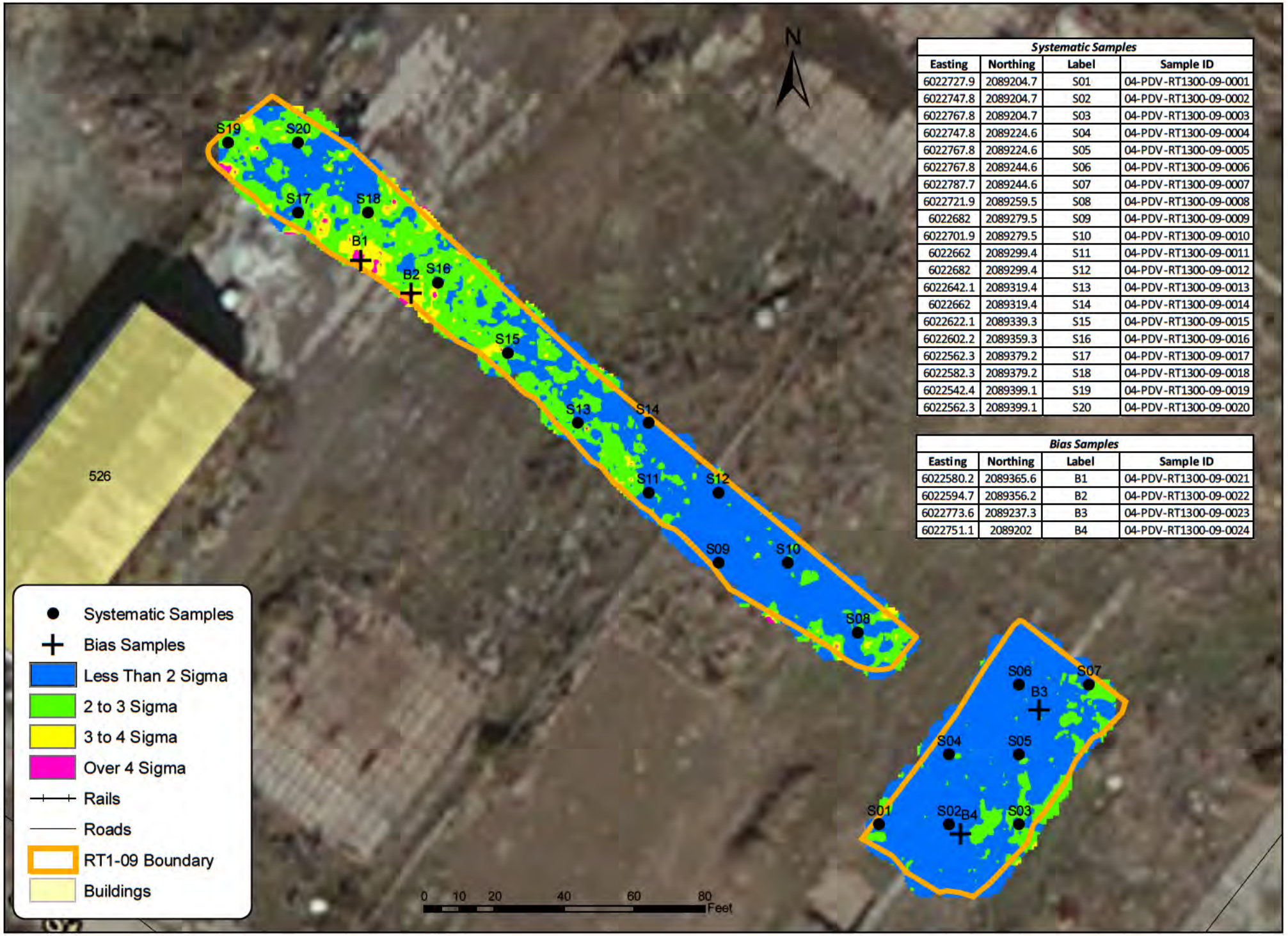
# RT1-09
## Sample Locations / CA Sigma Values




| *Systematic Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022727.9 | 2089204.7 | S01 | 04-PDV-RT1300-09-0001 |
| 6022747.8 | 2089204.7 | S02 | 04-PDV-RT1300-09-0002 |
| 6022767.8 | 2089204.7 | S03 | 04-PDV-RT1300-09-0003 |
| 6022747.8 | 2089224.6 | S04 | 04-PDV-RT1300-09-0004 |
| 6022767.8 | 2089224.6 | S05 | 04-PDV-RT1300-09-0005 |
| 6022767.8 | 2089244.6 | S06 | 04-PDV-RT1300-09-0006 |
| 6022787.7 | 2089244.6 | S07 | 04-PDV-RT1300-09-0007 |
| 6022721.9 | 2089259.5 | S08 | 04-PDV-RT1300-09-0008 |
| 6022682 | 2089279.5 | S09 | 04-PDV-RT1300-09-0009 |
| 6022701.9 | 2089279.5 | S10 | 04-PDV-RT1300-09-0010 |
| 6022662 | 2089299.4 | S11 | 04-PDV-RT1300-09-0011 |
| 6022682 | 2089299.4 | S12 | 04-PDV-RT1300-09-0012 |
| 6022642.1 | 2089319.4 | S13 | 04-PDV-RT1300-09-0013 |
| 6022662 | 2089319.4 | S14 | 04-PDV-RT1300-09-0014 |
| 6022622.1 | 2089339.3 | S15 | 04-PDV-RT1300-09-0015 |
| 6022602.2 | 2089359.3 | S16 | 04-PDV-RT1300-09-0016 |
| 6022562.3 | 2089379.2 | S17 | 04-PDV-RT1300-09-0017 |
| 6022582.3 | 2089379.2 | S18 | 04-PDV-RT1300-09-0018 |
| 6022542.4 | 2089399.1 | S19 | 04-PDV-RT1300-09-0019 |
| 6022562.3 | 2089399.1 | S20 | 04-PDV-RT1300-09-0020 |

| *Bias Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022580.2 | 2089365.6 | B1 | 04-PDV-RT1300-09-0021 |
| 6022594.7 | 2089356.2 | B2 | 04-PDV-RT1300-09-0022 |
| 6022773.6 | 2089237.3 | B3 | 04-PDV-RT1300-09-0023 |
| 6022751.1 | 2089202 | B4 | 04-PDV-RT1300-09-0024 |

M-10505

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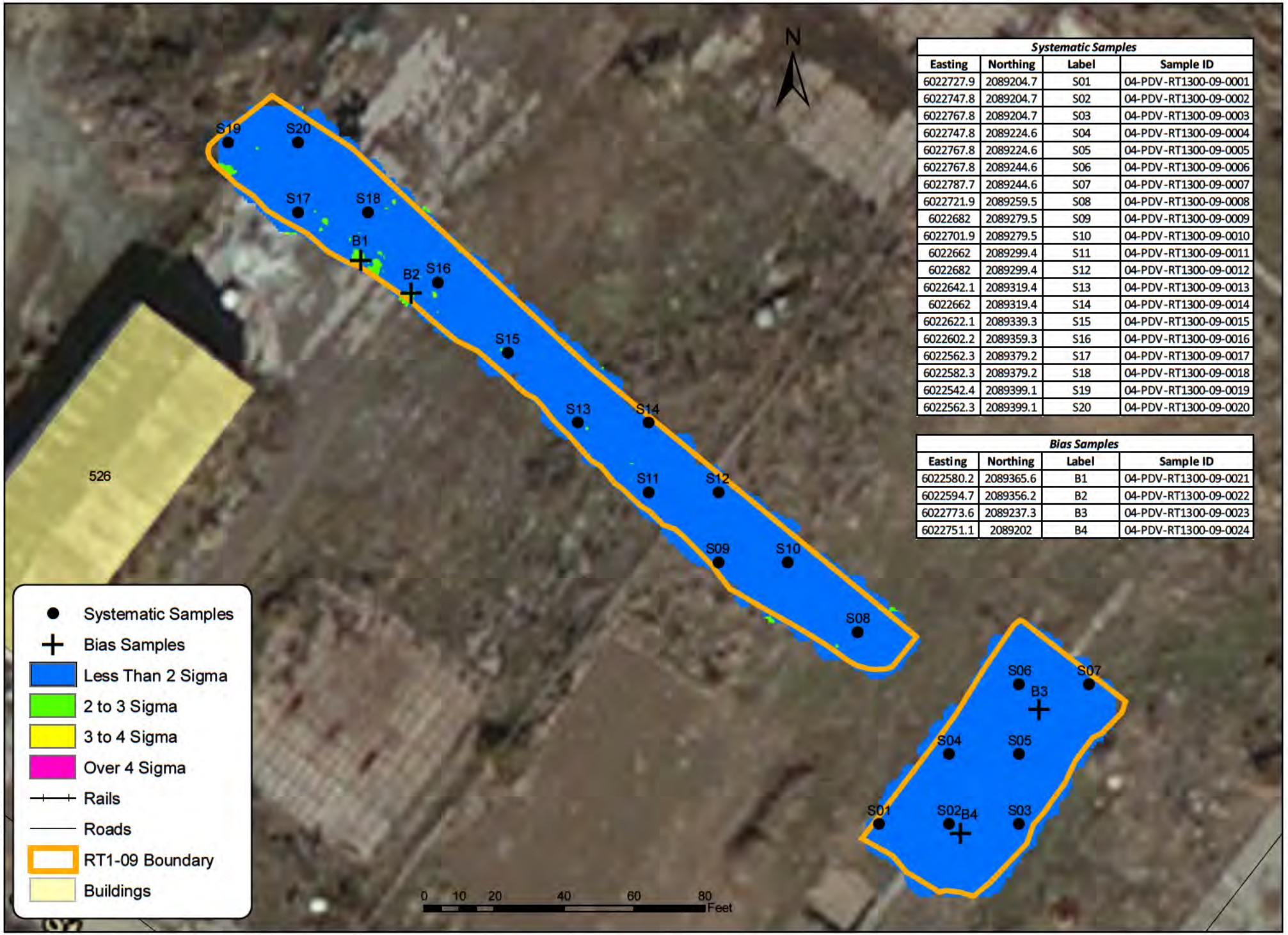
# RT1-09
## Sample Locations / IA Sigma Values




| *Systematic Samples* | | | |
|---|---|---|---|
| Easting | Northing | Label | Sample ID |
| 6022727.9 | 2089204.7 | S01 | 04-PDV-RT1300-09-0001 |
| 6022747.8 | 2089204.7 | S02 | 04-PDV-RT1300-09-0002 |
| 6022767.8 | 2089204.7 | S03 | 04-PDV-RT1300-09-0003 |
| 6022747.8 | 2089224.6 | S04 | 04-PDV-RT1300-09-0004 |
| 6022767.8 | 2089224.6 | S05 | 04-PDV-RT1300-09-0005 |
| 6022767.8 | 2089244.6 | S06 | 04-PDV-RT1300-09-0006 |
| 6022787.7 | 2089244.6 | S07 | 04-PDV-RT1300-09-0007 |
| 6022721.9 | 2089259.5 | S08 | 04-PDV-RT1300-09-0008 |
| 6022682 | 2089279.5 | S09 | 04-PDV-RT1300-09-0009 |
| 6022701.9 | 2089279.5 | S10 | 04-PDV-RT1300-09-0010 |
| 6022662 | 2089299.4 | S11 | 04-PDV-RT1300-09-0011 |
| 6022682 | 2089299.4 | S12 | 04-PDV-RT1300-09-0012 |
| 6022642.1 | 2089319.4 | S13 | 04-PDV-RT1300-09-0013 |
| 6022662 | 2089319.4 | S14 | 04-PDV-RT1300-09-0014 |
| 6022622.1 | 2089339.3 | S15 | 04-PDV-RT1300-09-0015 |
| 6022602.2 | 2089359.3 | S16 | 04-PDV-RT1300-09-0016 |
| 6022562.3 | 2089379.2 | S17 | 04-PDV-RT1300-09-0017 |
| 6022582.3 | 2089379.2 | S18 | 04-PDV-RT1300-09-0018 |
| 6022542.4 | 2089399.1 | S19 | 04-PDV-RT1300-09-0019 |
| 6022562.3 | 2089399.1 | S20 | 04-PDV-RT1300-09-0020 |

| *Bias Samples* | | | |
|---|---|---|---|
| Easting | Northing | Label | Sample ID |
| 6022580.2 | 2089365.6 | B1 | 04-PDV-RT1300-09-0021 |
| 6022594.7 | 2089356.2 | B2 | 04-PDV-RT1300-09-0022 |
| 6022773.6 | 2089237.3 | B3 | 04-PDV-RT1300-09-0023 |
| 6022751.1 | 2089202 | B4 | 04-PDV-RT1300-09-0024 |

M-10507

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| GILBANE | | | | | | | | | RADIOLOGICAL SURVEY FORM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTRACT NO / TO NO: N62473-10-D-0808 | | | PROJECT TITLE / LOCATION: Rad Remediation D-1, Phase II / HPNS | | | | | | ITSI GILBANE PROJECT NO: 07204.0004 | | |
| Survey No.: 07204.0004-0637-G | | | Date: 1/10/14 | | | Location: Zone RT1 | | | Survey Type: Gamma | | |
| Donte Love | | | North Tom | | | Ed Palser | | | Ed P | | |
| Tech Printed Name | | | Signature | | | RSO Printed Name | | | Signature | | |
| Instrument(s) | | | | | | | | | | | |
| Model | Serial | Cal Due Date | Probe Model | Probe Serial | Cal Due Date | BKG α | BKG β | BKG γ | BKG µr/Hr | Eff. α | Eff. β |
| 2221 | 144867 | 10/11/14 | 44-10 | RN19769 | 10/11/14 | n/a | n/a | 4274 | n/a | n/a | n/a |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Map

Rail Road Tie - RT-09
Zone RT1

| Sample Location | Gamma Readings |
|---|---|
| 1 | 4799 |
| 2 | 5251 |
| 3 | 4855 |
| 4 | 4263 |
| 5 | 4432 |
| 6 | 4163 |
| 7 | 3876 |
| 8 | 4277 |
| 9 | 4436 |
| 10 | 4177 |
| 11 | 4380 |
| 12 | 4657 |
| 13 | 3808 |
| 14 | 5146 |
| 15 | 4305 |
| 16 | 4750 |
| 17 | 4660 |
| 18 | 4032 |
| 19 | 4439 |
| 20 | 3982 |
| 21 | 4892 |
| 22 | 5085 |
| 23 | 4536 |
| 24 | 4286 |

**Comments**: Gamma BKGD values represent the average CPM of the background reference area for the specfic instrument. The 3 sigma investigative value for instrument 144867/RN19769 is 5010 CPM. All static locations are co-located with the sample locations. Elevated readings are consistant with the BKGD values for the specfic area being surveyed. Please refer to the sample analysis for all static readings above the 3 sigma value.

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# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250 640 @ 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-09-0001 | SN | 11/7/2013 | 1130 | JL | X | | RT1300-09-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-09-0002 | SN | 11/7/2013 | 1140 | JL | X | | RT1300-09-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-09-0003 | SN | 11/7/2013 | 1143 | JL | X | | RT1300-09-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-09-0004 | SN | 11/7/2013 | 1145 | JL | X | | RT1300-09-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-09-0005 | SN | 11/7/2013 | 1150 | JL | X | | RT1300-09-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-09-0006 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-09-0007 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-09-0008 | SN | 11/7/2013 | 1311 | JL | X | | RT1300-09-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-09-0009 | SN | 11/7/2013 | 1315 | JL | X | | RT1300-09-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-09-0010 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0010 | N1 | 0.00 | 0.00 |
| **Cooler # 3** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Lou | 11-8-13 | 10:00 | Susan Y Martin | 11-8-13 | 1000 |
| R. Hurtz | 12/10/13 | 0955 | Susan Y Martin | 12-10-13 | 0955 |
| | | | | | |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11-08-13 1102 OK

M-10511

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

**Analytical Test Method**

E901.1 - Solid Ra-226 and CS-137

GS186 - Ra-226 and CS-137 Screening

| Code | Matrix |
|---|---|
| **SN** | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250640 DW 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 | GS186 | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-09-0011 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-09-0012 | SN | 11/7/2013 | 1325 | JL | X | | RT1300-09-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-09-0013 | SN | 11/7/2013 | 1330 | JL | X | | RT1300-09-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-09-0014 | SN | 11/7/2013 | 1335 | JL | X | | RT1300-09-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-09-0015 | SN | 11/7/2013 | 1342 | JL | X | | RT1300-09-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-09-0016 | SN | 11/7/2013 | 1344 | JL | X | | RT1300-09-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-09-0017 | SN | 11/7/2013 | 1350 | JL | X | | RT1300-09-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-09-0018 | SN | 11/7/2013 | 1355 | JL | X | | RT1300-09-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-09-0019 | SN | 11/7/2013 | 1356 | JL | X | | RT1300-09-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-09-0020 | SN | 11/7/2013 | 1400 | | X | | RT1300-09-0020 | N1 | 0.00 | 0.00 |

**Cooler # 3** | **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 11-8-13 | 10:00 |
| [signature] | 12/10/13 | 0955 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 11-8-13 | 1000 |
| [signature] | 12-10-13 | 0955 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11/8/13 1102 OK

M-10512

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| **SN** | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250640 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **21** | 04-PDV-RT1300-09-0021 | SN | 11/7/2013 | 1500 | JL | X | X | RT1300-09-0021 | N1 | 0.00 | 0.00 |
| **22** | 04-PDV-RT1300-09-0022 | SN | 11/7/2013 | 1555 | JL | X | X | RT1300-09-0022 | N1 | 0.00 | 0.00 |
| **23** | 04-PDV-RT1300-09-0023 | SN | 11/7/2013 | 1545 | JL | X | X | RT1300-09-0023 | N1 | 0.00 | 0.00 |
| **24** | 04-PDV-RT1300-09-0024 | SN | 11/7/2013 | 1548 | JL | X | X | RT1300-09-0024 | N1 | 0.00 | 0.00 |
| **Cooler # 3** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| [illegible] | 12/10/13 | 0955 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| [illegible] | 11-8-13 | 1000 |
| [illegible] | 12-10-13 | 0955 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/08/13 1102 OK

M-10513

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# Summary of Definitive Laboratory Results* for Decision Unit: 09

Gilbane

| Sample ID | Nuclide | Activity | Flags | Activity Units |
|---|---|---|---|---|
| Sample Delivery Group (SDG): 341147 | | | | |
| Analysis Type: GA01R – Gamma Spec by DOE HASL 300, Ga-01-R | | | | |
| 04-PDV-RT1300-09-0001 | | | | |
| | Cesium 137 | .00236 | U | pCi/g |
| | Radium 226 | .0468 | U | pCi/g |
| 04-PDV-RT1300-09-0002 | | | | |
| | Cesium 137 | .027 | U | pCi/g |
| | Radium 226 | .0114 | U | pCi/g |
| 04-PDV-RT1300-09-0003 | | | | |
| | Cesium 137 | -.00771 | U | pCi/g |
| | Radium 226 | -.0221 | U | pCi/g |
| 04-PDV-RT1300-09-0004 | | | | |
| | Cesium 137 | -.0122 | U | pCi/g |
| | Radium 226 | .0397 | U | pCi/g |
| 04-PDV-RT1300-09-0005 | | | | |
| | Cesium 137 | .00238 | U | pCi/g |
| | Radium 226 | .0106 | U | pCi/g |
| 04-PDV-RT1300-09-0006 | | | | |
| | Cesium 137 | .015 | U | pCi/g |
| | Radium 226 | .0236 | U | pCi/g |
| 04-PDV-RT1300-09-0007 | | | | |
| | Cesium 137 | -.00831 | U | pCi/g |
| | Radium 226 | .00939 | U | pCi/g |
| 04-PDV-RT1300-09-0008 | | | | |
| | Cesium 137 | .00465 | U | pCi/g |
| | Radium 226 | .0202 | U | pCi/g |
| 04-PDV-RT1300-09-0009 | | | | |
| | Cesium 137 | .023 | U | pCi/g |
| | Radium 226 | .008 | U | pCi/g |
| 04-PDV-RT1300-09-0010 | | | | |
| | Cesium 137 | .00695 | U | pCi/g |
| | Radium 226 | .0851 | U | pCi/g |
| 04-PDV-RT1300-09-0011 | | | | |
| | Cesium 137 | .0298 | U | pCi/g |
| | Radium 226 | .0708 | U | pCi/g |
| 04-PDV-RT1300-09-0012 | | | | |
| | Cesium 137 | .01 | U | pCi/g |
| | Radium 226 | .00319 | U | pCi/g |
| 04-PDV-RT1300-09-0013 | | | | |
| | Cesium 137 | .00136 | U | pCi/g |
| | Radium 226 | .137 | U | pCi/g |



*Results for both preliminary and definitive analyses are unvalidated at the time of this summary report.

# Summary of Definitive Laboratory Results* for Decision Unit: 09

| Sample ID | Nuclide | Activity | Flags | Activity Units |
|---|---|---|---|---|
| 04-PDV-RT1300-09-0014 | | | | |
| | Cesium 137 | .00206 | U | pCi/g |
| | Radium 226 | .0696 | U | pCi/g |
| 04-PDV-RT1300-09-0015 | | | | |
| | Cesium 137 | -.0107 | U | pCi/g |
| | Radium 226 | .0953 | U | pCi/g |
| 04-PDV-RT1300-09-0016 | | | | |
| | Cesium 137 | -.00457 | U | pCi/g |
| | Radium 226 | .00806 | U | pCi/g |
| 04-PDV-RT1300-09-0017 | | | | |
| | Cesium 137 | .00373 | U | pCi/g |
| | Radium 226 | .0622 | U | pCi/g |
| 04-PDV-RT1300-09-0018 | | | | |
| | Cesium 137 | -.00315 | U | pCi/g |
| | Radium 226 | .0756 | U | pCi/g |
| 04-PDV-RT1300-09-0019 | | | | |
| | Cesium 137 | .00786 | U | pCi/g |
| | Radium 226 | .0237 | U | pCi/g |
| 04-PDV-RT1300-09-0020 | | | | |
| | Cesium 137 | .00133 | U | pCi/g |
| | Radium 226 | .0439 | U | pCi/g |
| 04-PDV-RT1300-09-0021 | | | | |
| | Cesium 137 | .00682 | U | pCi/g |
| | Radium 226 | .0563 | U | pCi/g |
| 04-PDV-RT1300-09-0022 | | | | |
| | Cesium 137 | .00729 | U | pCi/g |
| | Radium 226 | .128 | U | pCi/g |
| 04-PDV-RT1300-09-0023 | | | | |
| | Cesium 137 | .0122 | U | pCi/g |
| | Radium 226 | .0759 | U | pCi/g |
| 04-PDV-RT1300-09-0024 | | | | |
| | Cesium 137 | -.0289 | U | pCi/g |
| | Radium 226 | -.0678 | U | pCi/g |



*Results for both preliminary and definitive analyses are unvalidated at the time of this summary report.

# Packing Slip:

**Curtis & Tompkins**
**HPSD1**
**SDG: 341147**
**Attn:John Goyette**

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# DODQSM Cover Sheet

# DOD-QSM Cover Sheet

## HPSD1

February 13, 2014

**GEL Laboratories, LLC**
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

**Project Manager:** Valerie Davis
**Phone Extension:** 4485
**Email:** Valerie.Davis@gel.com

**Contract Purchase Order:** PO#

**Work Order:** 341147 **SDG:** 341147

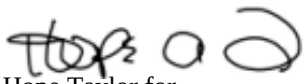
**Client Contact:**
John Goyette
Curtis & Tompkins
2323 5th Street
Berkeley, California 94710

**Project Identification:** HPSD1

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 11, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,



Hope Taylor for
Valerie Davis
Project Manager

# Case Narrative

**DODQSM Case Narrative**
**for**
**Curtis & Tompkins**
**SDG: 341147**

**February 13, 2014**

**Laboratory Identification:**

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

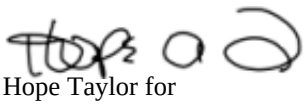
**Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on December 11, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

**Sample Identification** The laboratory received the following samples:

| Laboratory ID | Client ID |
|---|---|
| 341147001 | 04-PDV-RT1300-09-0001 |
| 341147002 | 04-PDV-RT1300-09-0002 |
| 341147003 | 04-PDV-RT1300-09-0003 |
| 341147004 | 04-PDV-RT1300-09-0004 |
| 341147005 | 04-PDV-RT1300-09-0005 |
| 341147006 | 04-PDV-RT1300-09-0006 |
| 341147007 | 04-PDV-RT1300-09-0007 |
| 341147008 | 04-PDV-RT1300-09-0008 |
| 341147009 | 04-PDV-RT1300-09-0009 |
| 341147010 | 04-PDV-RT1300-09-0010 |
| 341147011 | 04-PDV-RT1300-09-0011 |
| 341147012 | 04-PDV-RT1300-09-0012 |
| 341147013 | 04-PDV-RT1300-09-0013 |
| 341147014 | 04-PDV-RT1300-09-0014 |
| 341147015 | 04-PDV-RT1300-09-0015 |
| 341147016 | 04-PDV-RT1300-09-0016 |
| 341147017 | 04-PDV-RT1300-09-0017 |
| 341147018 | 04-PDV-RT1300-09-0018 |
| 341147019 | 04-PDV-RT1300-09-0019 |
| 341147020 | 04-PDV-RT1300-09-0020 |
| 341147021 | 04-PDV-RT1300-09-0021 |
| 341147022 | 04-PDV-RT1300-09-0022 |
| 341147023 | 04-PDV-RT1300-09-0023 |
| 341147024 | 04-PDV-RT1300-09-0024 |

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.



Hope Taylor for
Valerie Davis
Project Manager

# Chain of Custody and Supporting Documentation

Relog 341147

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

COC # HPSD1-0035

Gilbane

~~339225~~

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag, |

250 640 @ 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-09-0001 | SN | 11/7/2013 | 1130 | JL | X | | RT1300-09-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-09-0002 | SN | 11/7/2013 | 1140 | JL | X | | RT1300-09-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-09-0003 | SN | 11/7/2013 | 1143 | JL | X | | RT1300-09-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-09-0004 | SN | 11/7/2013 | 1145 | JL | X | | RT1300-09-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-09-0005 | SN | 11/7/2013 | 1150 | JL | X | | RT1300-09-0005 | N1 | 0.00 | 0.00 |
| 6 | 04-PDV-RT1300-09-0006 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-09-0007 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-09-0008 | SN | 11/7/2013 | 1311 | JL | X | | RT1300-09-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-09-0009 | SN | 11/7/2013 | 1315 | JL | X | | RT1300-09-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-09-0010 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0010 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Lou | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| R. Hurtz | 12/10/13 | 0955 | [signature] | 12-10-13 | 0955 |
| | | | [signature] | 121113 | 1030 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[signature] 11-08-13 1102 OK

M-10527

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag, |

250640 11-08-13 B/N 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-09-0011 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-09-0012 | SN | 11/7/2013 | 1325 | JL | X | | RT1300-09-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-09-0013 | SN | 11/7/2013 | 1330 | JL | X | | RT1300-09-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-09-0014 | SN | 11/7/2013 | 1335 | JL | X | | RT1300-09-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-09-0015 | SN | 11/7/2013 | 1342 | JL | X | | RT1300-09-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-09-0016 | SN | 11/7/2013 | 1344 | JL | X | | RT1300-09-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-09-0017 | SN | 11/7/2013 | 1350 | JL | X | | RT1300-09-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-09-0018 | SN | 11/7/2013 | 1355 | JL | X | | RT1300-09-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-09-0019 | SN | 11/7/2013 | 1356 | JL | X | | RT1300-09-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-09-0020 | SN | 11/7/2013 | 1400 | | X | | RT1300-09-0020 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R Stutz | 12/10/13 | 0955 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| [illegible] | 11-8-13 | 1000 |
| [illegible] | 12-10-13 | 0955 |
| [illegible] | 121113 | 1030 |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/8/13 1102 OK

M-10528

## CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

250640 11-8-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PDV-RT1300-09-0021 | SN | 11/7/2013 | 1500 | JL | X | X | RT1300-09-0021 | N1 | 0.00 | 0.00 |
| 22 | 04-PDV-RT1300-09-0022 | SN | 11/7/2013 | 1555 | JL | X | X | RT1300-09-0022 | N1 | 0.00 | 0.00 |
| 23 | 04-PDV-RT1300-09-0023 | SN | 11/7/2013 | 1545 | JL | X | X | RT1300-09-0023 | N1 | 0.00 | 0.00 |
| 24 | 04-PDV-RT1300-09-0024 | SN | 11/7/2013 | 1548 | JL | X | X | RT1300-09-0024 | N1 | 0.00 | 0.00 |

Cooler # 3 — Turnaround Time: 0 Days

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| [illegible] | 12/10/13 | 0955 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| Susan Turbeville | 11-8-13 | 1000 |
| Susan Turbeville | 12-10-13 | 0955 |
| [illegible] 0.2 | 121113 | 1630 |
| | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/08/13 1102 OK



M-10529

GEL Laboratories LLC

# SAMPLE RECEIPT & REVIEW FORM

| | |
|---|---|
| Client: CURL | SDG/AR/COC/Work Order: 335225 |
| Received By: JP | Date Received: 12-11-13 |

| Suspected Hazard Information | Yes | No | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. |
|---|---|---|---|
| COC/Samples marked as radioactive? | | / | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0cpm |
| Classified Radioactive II or III by RSO? | | / | If yes, Were swipes taken of sample contatiners < action levels? |
| COC/Samples marked containing PCBs? | | / | |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | | / | If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group. |
| Shipped as a DOT Hazardous? | | / | Hazard Class Shipped: UN#: |
| Samples identified as Foreign Soil? | | / | |

| | Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|---|---|---|---|---|
| 1 | Shipping containers received intact and sealed? | / | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 | Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | | | / | Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius. See continuation form |
| 2a | Daily check performed and passed on IR temperature gun? | / | | | Temperature Device Serial #: 130402460 Secondary Temperature Device Serial # (If Applicable): |
| 3 | Chain of custody documents included with shipment? | / | | | |
| 4 | Sample containers intact and sealed? | / | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 | Samples requiring chemical preservation at proper pH? | | / | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 | VOA vials free of headspace (defined as < 6mm bubble)? | | / | | Sample ID's and containers affected: |
| 7 | Are Encore containers present? | | | / | (If yes, immediately deliver to Volatiles laboratory) |
| 8 | Samples received within holding time? | / | | | ID's and tests affected: |
| 9 | Sample ID's on COC match ID's on bottles? | / | | | Sample ID's and containers affected: |
| 10 | Date & time on COC match date & time on bottles? | / | | | Sample ID's affected: |
| 11 | Number of containers received match number indicated on COC? | | | / | Sample ID's affected: Received 2 bags with handwritten ID of Clean Railroad Ties 12-4-13@1430 |
| 12 | Are sample containers identifiable as GEL provided? | | | / | |
| 13 | COC form is properly signed in relinquished/received sections? | / | | | |
| 14 | Carrier and tracking number. | | | | Circle Applicable: (FedEx Air) FedEx Ground UPS Field Services Courier Other |
| | | | | | See continuation form |

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AT Date 12/13 Page 1 of 2

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GEL | Laboratories LLC **SAMPLE RECEIPT & REVIEW CONTINUATION FORM**

Client: CURL Received By: JP Date Received: 12/13 SDG/AR/COC/Work Order: 337225

| | | |
|---|---|---|
| 7973 | 6520 | 5520 |
| " | " | 5531 |
| 8040 | 9124 | 7657 |
| 7973 | 6520 | 5510 |
| " | " | 5483 |
| " | " | 5472 |
| " | " | 5494 |
| " | " | 5461 |
| " | " | 5509 |

PM (or PMA) review: Initials HH Date 12/13/13 Page 2 of 2

M-10531

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

# Laboratory Certifications

**List of current GEL Certifications as of 13 February 2014**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−13−8 |
| Utah NELAP | SC000122013−11 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780−12 |
| Wisconsin | 999887790 |

# Radiological Analysis

**Radiochemistry Case Narrative**
**Curtis & Tompkins (CURL)**
**SDG 341147**

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid (Standard List)** |
| Analytical Method: | DOE HASL 300, 4.5.2.3/Ga-01-R |
| Analytical Batch Number: | 1359496 |

| Sample ID | Client ID |
|---|---|
| 341147001 | 04-PDV-RT1300-09-0001 |
| 341147002 | 04-PDV-RT1300-09-0002 |
| 341147003 | 04-PDV-RT1300-09-0003 |
| 341147004 | 04-PDV-RT1300-09-0004 |
| 341147005 | 04-PDV-RT1300-09-0005 |
| 341147006 | 04-PDV-RT1300-09-0006 |
| 341147007 | 04-PDV-RT1300-09-0007 |
| 341147008 | 04-PDV-RT1300-09-0008 |
| 341147009 | 04-PDV-RT1300-09-0009 |
| 341147010 | 04-PDV-RT1300-09-0010 |
| 341147011 | 04-PDV-RT1300-09-0011 |
| 341147012 | 04-PDV-RT1300-09-0012 |
| 341147013 | 04-PDV-RT1300-09-0013 |
| 341147014 | 04-PDV-RT1300-09-0014 |
| 341147015 | 04-PDV-RT1300-09-0015 |
| 341147016 | 04-PDV-RT1300-09-0016 |
| 341147017 | 04-PDV-RT1300-09-0017 |
| 341147018 | 04-PDV-RT1300-09-0018 |
| 341147019 | 04-PDV-RT1300-09-0019 |
| 341147020 | 04-PDV-RT1300-09-0020 |
| 1203017838 | Method Blank (MB) |
| 1203017839 | 341147001(04-PDV-RT1300-09-0001) Sample Duplicate (DUP) |
| 1203017840 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 341147001 (04-PDV-RT1300-09-0001).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid (Standard List)** |
| Analytical Method: | DOE HASL 300, 4.5.2.3/Ga-01-R |
| Analytical Batch Number: | 1361908 |

| Sample ID | Client ID |
|---|---|
| 341147021 | 04-PDV-RT1300-09-0021 |
| 341147022 | 04-PDV-RT1300-09-0022 |
| 341147023 | 04-PDV-RT1300-09-0023 |
| 341147024 | 04-PDV-RT1300-09-0024 |
| 1203023699 | Method Blank (MB) |
| 1203023700 | 341140021(04-PDV-RT1300-06-0021) Sample Duplicate (DUP) |
| 1203023701 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 341140021 (04-PDV-RT1300-06-0021).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
Additional comments were not required for this sample set.

**Qualifier Information**

| Qualifier | Reason | Analyte | Sample | Client Sample |
|---|---|---|---|---|
| UI | Data rejected due to no valid peak. | Uranium-235 | 341147022 | 04-PDV-RT1300-09-0022 |

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Qualifier Definition Report
## for

CURL001 Curtis & Tompkins

Client SDG: 341147 GEL Work Order: 341147

**The Qualifiers in this report are defined as follows:**

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

UI Gamma Spectroscopy--Uncertain identification

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:** Heather McCarty **Name: Heather McCarty**

**Date: 14 FEB 2014** **Title: Analyst II**

# Sample Data Summary

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street
Berkeley, California 94710
Report Date: February 14, 2014
Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0001
Sample ID: 341147001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.136 | +/-0.165 | 0.331 | +/-0.177 | | pCi/g | | RXF2 | 02/07/14 | 0842 | 1359496 | 1 |
| Bismuth-212 | U | 0.270 | +/-0.471 | 1.00 | +/-0.487 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0468 | +/-0.0717 | 0.144 | +/-0.0748 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00236 | +/-0.0386 | 0.077 | +/-0.0386 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0152 | +/-0.0296 | 0.0738 | +/-0.0304 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0404 | +/-0.0975 | 0.190 | +/-0.0992 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0645 | +/-0.0766 | 0.115 | +/-0.0821 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0256 | +/-0.0763 | 0.111 | +/-0.0772 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0229 | +/-0.0962 | 0.152 | +/-0.0967 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.166 | +/-0.451 | 1.07 | +/-0.458 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0434 | +/-0.194 | 0.446 | +/-0.201 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0468 | +/-0.0717 | 0.144 | +/-0.0748 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0129 | +/-0.0392 | 0.0798 | +/-0.0396 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.141 | +/-0.122 | 0.216 | +/-0.139 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.622 | +/-1.47 | 2.63 | +/-1.50 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0532 | +/-0.186 | 0.314 | +/-0.187 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0002
Sample ID: 341147002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0644 | +/-0.147 | 0.230 | +/-0.150 | | pCi/g | | RXF2 | 02/07/14 | 0842 | 1359496 | 1 |
| Bismuth-212 | U | -0.577 | +/-0.561 | 0.878 | +/-0.621 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0114 | +/-0.0732 | 0.138 | +/-0.0734 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.027 | +/-0.0363 | 0.0749 | +/-0.0383 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0134 | +/-0.0326 | 0.0634 | +/-0.0331 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0392 | +/-0.107 | 0.184 | +/-0.108 | | pCi/g | | | | | | |
| Europium-154 | U | -0.041 | +/-0.0835 | 0.151 | +/-0.0856 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0126 | +/-0.0576 | 0.095 | +/-0.0579 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0208 | +/-0.0735 | 0.142 | +/-0.0741 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.167 | +/-0.327 | 0.639 | +/-0.336 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.147 | +/-0.256 | 0.557 | +/-0.315 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0114 | +/-0.0732 | 0.138 | +/-0.0734 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.00189 | +/-0.0333 | 0.0619 | +/-0.0333 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0318 | +/-0.110 | 0.215 | +/-0.112 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.521 | +/-1.69 | 2.42 | +/-1.71 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0178 | +/-0.181 | 0.328 | +/-0.181 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0003
Sample ID: 341147003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.00265 | +/-0.0975 | 0.151 | +/-0.0975 | | pCi/g | | RXF2 | 02/07/14 | 0843 | 1359496 | 1 |
| Bismuth-212 | U | -0.148 | +/-0.425 | 0.767 | +/-0.430 | | pCi/g | | | | | | |
| Bismuth-214 | U | -0.0221 | +/-0.071 | 0.133 | +/-0.0717 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00771 | +/-0.0342 | 0.065 | +/-0.0344 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0276 | +/-0.0291 | 0.0585 | +/-0.0318 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0245 | +/-0.0807 | 0.154 | +/-0.0815 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0215 | +/-0.079 | 0.139 | +/-0.0796 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0144 | +/-0.0614 | 0.0785 | +/-0.0614 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0612 | +/-0.0674 | 0.135 | +/-0.073 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.572 | +/-0.577 | 0.822 | +/-0.579 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.046 | +/-0.172 | 0.379 | +/-0.181 | | pCi/g | | | | | | |
| Radium-226 | U | -0.0221 | +/-0.071 | 0.133 | +/-0.0717 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00715 | +/-0.0378 | 0.0494 | +/-0.0378 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0433 | +/-0.111 | 0.226 | +/-0.112 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.534 | +/-0.934 | 1.77 | +/-0.972 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.212 | +/-0.170 | 0.269 | +/-0.196 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0004
Sample ID: 341147004
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0124 | +/-0.0423 | 0.0676 | +/-0.0427 | | pCi/g | | RXF2 | 02/07/14 | 0843 | 1359496 | 1 |
| Bismuth-212 | U | -0.181 | +/-0.411 | 0.728 | +/-0.419 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0397 | +/-0.0744 | 0.152 | +/-0.0766 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0122 | +/-0.0363 | 0.0656 | +/-0.0367 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00792 | +/-0.0325 | 0.0663 | +/-0.0327 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0625 | +/-0.0846 | 0.174 | +/-0.0895 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0291 | +/-0.0597 | 0.117 | +/-0.0612 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0175 | +/-0.0601 | 0.0982 | +/-0.0606 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0537 | +/-0.0861 | 0.135 | +/-0.0896 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.283 | +/-0.453 | 1.12 | +/-0.471 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.246 | +/-0.266 | 0.421 | +/-0.403 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0397 | +/-0.0744 | 0.152 | +/-0.0766 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0182 | +/-0.0375 | 0.0697 | +/-0.0385 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0257 | +/-0.150 | 0.298 | +/-0.150 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.228 | +/-0.819 | 1.21 | +/-0.828 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.112 | +/-0.158 | 0.285 | +/-0.167 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0005
Sample ID: 341147005
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0207 | +/-0.255 | 0.429 | +/-0.255 | | pCi/g | | RXF2 | 02/07/14 | 0843 | 1359496 | 1 |
| Bismuth-212 | U | -0.367 | +/-0.374 | 0.638 | +/-0.410 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0106 | +/-0.0782 | 0.141 | +/-0.0783 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00238 | +/-0.039 | 0.0637 | +/-0.039 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0269 | +/-0.0335 | 0.0838 | +/-0.0357 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0178 | +/-0.0852 | 0.163 | +/-0.0856 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0303 | +/-0.042 | 0.141 | +/-0.0442 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0176 | +/-0.0639 | 0.124 | +/-0.0644 | | pCi/g | | | | | | |
| Lead-214 | U | 0.107 | +/-0.0727 | 0.146 | +/-0.0878 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.342 | +/-0.541 | 0.641 | +/-0.542 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.167 | +/-0.283 | 0.625 | +/-0.351 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0106 | +/-0.0782 | 0.141 | +/-0.0783 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0104 | +/-0.0337 | 0.0579 | +/-0.0341 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0142 | +/-0.129 | 0.271 | +/-0.129 | | pCi/g | | | | | | |
| Thorium-234 | U | 1.70 | +/-2.85 | 3.91 | +/-2.98 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0684 | +/-0.189 | 0.327 | +/-0.191 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0006
Sample ID: 341147006
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.124 | +/-0.122 | 0.186 | +/-0.135 | | pCi/g | | RXF2 | 02/07/14 | 0844 | 1359496 | 1 |
| Bismuth-212 | U | -0.0433 | +/-0.469 | 0.983 | +/-0.469 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0236 | +/-0.0827 | 0.168 | +/-0.0834 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.015 | +/-0.0335 | 0.0756 | +/-0.0342 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0142 | +/-0.0325 | 0.0629 | +/-0.0332 | | pCi/g | | | | | | |
| Europium-152 | U | 0.082 | +/-0.163 | 0.211 | +/-0.167 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0108 | +/-0.0989 | 0.216 | +/-0.0991 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0435 | +/-0.0675 | 0.123 | +/-0.0704 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0386 | +/-0.0807 | 0.168 | +/-0.0826 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.112 | +/-0.607 | 1.34 | +/-0.609 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.268 | +/-0.323 | 0.498 | +/-0.462 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0236 | +/-0.0827 | 0.168 | +/-0.0834 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0302 | +/-0.0346 | 0.0683 | +/-0.0373 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.00602 | +/-0.137 | 0.304 | +/-0.137 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.135 | +/-1.03 | 1.83 | +/-1.03 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0174 | +/-0.172 | 0.313 | +/-0.172 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0007
Sample ID: 341147007
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.149 | +/-0.195 | 0.360 | +/-0.195 | | pCi/g | | RXF2 | 02/07/14 | 0859 | 1359496 | 1 |
| Bismuth-212 | U | 0.0671 | +/-0.410 | 0.830 | +/-0.411 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00939 | +/-0.0784 | 0.146 | +/-0.0785 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00831 | +/-0.033 | 0.0611 | +/-0.0332 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0172 | +/-0.0389 | 0.0701 | +/-0.0397 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0179 | +/-0.0842 | 0.162 | +/-0.0846 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0512 | +/-0.0929 | 0.163 | +/-0.0958 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0121 | +/-0.0691 | 0.135 | +/-0.0693 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0749 | +/-0.0589 | 0.133 | +/-0.0681 | | pCi/g | | | | | | |
| Potassium-40 | | 1.23 | +/-0.794 | 0.705 | +/-0.801 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0257 | +/-0.230 | 0.467 | +/-0.232 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00939 | +/-0.0784 | 0.146 | +/-0.0785 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00678 | +/-0.0391 | 0.0791 | +/-0.0392 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.134 | +/-0.134 | 0.309 | +/-0.148 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.943 | +/-2.18 | 2.72 | +/-2.19 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0446 | +/-0.195 | 0.348 | +/-0.196 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0008
Sample ID: 341147008
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0522 | +/-0.169 | 0.327 | +/-0.171 | | pCi/g | | RXF2 | 02/07/14 | 0900 | 1359496 | 1 |
| Bismuth-212 | U | -0.238 | +/-0.454 | 0.687 | +/-0.467 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0202 | +/-0.0692 | 0.139 | +/-0.0698 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00465 | +/-0.0295 | 0.059 | +/-0.0295 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.00758 | +/-0.0377 | 0.0754 | +/-0.0379 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0172 | +/-0.0777 | 0.147 | +/-0.0781 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0086 | +/-0.102 | 0.217 | +/-0.102 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0828 | +/-0.0615 | 0.122 | +/-0.0723 | | pCi/g | | | | | | |
| Lead-214 | U | -0.0283 | +/-0.0717 | 0.134 | +/-0.0729 | | pCi/g | | | | | | |
| Potassium-40 | | 1.68 | +/-0.580 | 0.585 | +/-0.599 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.000542 | +/-0.248 | 0.503 | +/-0.248 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0202 | +/-0.0692 | 0.139 | +/-0.0698 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0103 | +/-0.0361 | 0.0751 | +/-0.0364 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0315 | +/-0.0899 | 0.212 | +/-0.0911 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.807 | +/-2.25 | 2.55 | +/-2.26 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0165 | +/-0.157 | 0.287 | +/-0.157 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0009
Sample ID: 341147009
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0928 | +/-0.238 | 0.424 | +/-0.242 | | pCi/g | | RXF2 | 02/07/14 | 0900 | 1359496 | 1 |
| Bismuth-212 | U | 0.024 | +/-0.430 | 0.826 | +/-0.430 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.008 | +/-0.0678 | 0.136 | +/-0.0679 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.023 | +/-0.0343 | 0.0732 | +/-0.0359 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0104 | +/-0.0277 | 0.0663 | +/-0.0281 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00225 | +/-0.0859 | 0.165 | +/-0.0859 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0253 | +/-0.0644 | 0.128 | +/-0.0655 | | pCi/g | | | | | | |
| Lead-212 | U | -0.00044 | +/-0.0604 | 0.104 | +/-0.0604 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0105 | +/-0.0691 | 0.135 | +/-0.0693 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.361 | +/-0.354 | 0.875 | +/-0.391 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0747 | +/-0.224 | 0.487 | +/-0.243 | | pCi/g | | | | | | |
| Radium-226 | U | 0.008 | +/-0.0678 | 0.136 | +/-0.0679 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.00689 | +/-0.0337 | 0.0646 | +/-0.0339 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.045 | +/-0.144 | 0.296 | +/-0.145 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.0221 | +/-1.96 | 3.76 | +/-1.96 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0422 | +/-0.188 | 0.329 | +/-0.189 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0010
Sample ID: 341147010
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0649 | +/-0.0825 | 0.134 | +/-0.0877 | | pCi/g | | RXF2 | 02/07/14 | 0905 | 1359496 | 1 |
| Bismuth-212 | U | 0.369 | +/-0.229 | 0.682 | +/-0.285 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0851 | +/-0.0609 | 0.128 | +/-0.0723 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00695 | +/-0.0319 | 0.064 | +/-0.0321 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00923 | +/-0.0281 | 0.0631 | +/-0.0284 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0217 | +/-0.0606 | 0.121 | +/-0.0614 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0211 | +/-0.0431 | 0.084 | +/-0.0441 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0317 | +/-0.0509 | 0.0575 | +/-0.051 | | pCi/g | | | | | | |
| Lead-214 | U | 0.021 | +/-0.0462 | 0.0922 | +/-0.0472 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.572 | +/-0.341 | 0.900 | +/-0.431 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0424 | +/-0.190 | 0.402 | +/-0.198 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0851 | +/-0.0609 | 0.128 | +/-0.0723 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.00124 | +/-0.0294 | 0.0577 | +/-0.0294 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.109 | +/-0.0934 | 0.171 | +/-0.0948 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.946 | +/-0.791 | 1.44 | +/-0.924 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0703 | +/-0.159 | 0.246 | +/-0.162 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0011
Sample ID: 341147011
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0393 | +/-0.0672 | 0.131 | +/-0.0695 | | pCi/g | | RXF2 | 02/07/14 | 0905 | 1359496 | 1 |
| Bismuth-212 | U | 0.144 | +/-0.320 | 0.666 | +/-0.326 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0708 | +/-0.0575 | 0.117 | +/-0.066 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0298 | +/-0.0491 | 0.0502 | +/-0.0492 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0114 | +/-0.0291 | 0.0637 | +/-0.0296 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00844 | +/-0.0644 | 0.110 | +/-0.0645 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0778 | +/-0.0668 | 0.0957 | +/-0.0758 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0616 | +/-0.0585 | 0.085 | +/-0.065 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0386 | +/-0.0657 | 0.113 | +/-0.0681 | | pCi/g | | | | | | |
| Potassium-40 | | 0.904 | +/-0.459 | 0.488 | +/-0.467 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.034 | +/-0.165 | 0.316 | +/-0.170 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0708 | +/-0.0575 | 0.117 | +/-0.066 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0138 | +/-0.0314 | 0.0466 | +/-0.0314 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.113 | +/-0.108 | 0.189 | +/-0.121 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.514 | +/-0.655 | 1.21 | +/-0.704 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0663 | +/-0.142 | 0.266 | +/-0.145 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0012
Sample ID: 341147012
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0442 | +/-0.160 | 0.289 | +/-0.161 | | pCi/g | | RXF2 | 02/07/14 | 0906 | 1359496 | 1 |
| Bismuth-212 | U | 0.179 | +/-0.246 | 0.611 | +/-0.260 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00319 | +/-0.0618 | 0.120 | +/-0.0618 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.010 | +/-0.0226 | 0.0491 | +/-0.0231 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00528 | +/-0.0196 | 0.0496 | +/-0.0198 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0221 | +/-0.0639 | 0.118 | +/-0.0647 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0699 | +/-0.0703 | 0.0921 | +/-0.0773 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0218 | +/-0.0488 | 0.0881 | +/-0.0498 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0315 | +/-0.0619 | 0.126 | +/-0.0635 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.0895 | +/-0.376 | 0.788 | +/-0.378 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0241 | +/-0.181 | 0.366 | +/-0.183 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00319 | +/-0.0618 | 0.120 | +/-0.0618 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0186 | +/-0.0261 | 0.0491 | +/-0.0274 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0181 | +/-0.0835 | 0.176 | +/-0.084 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.287 | +/-1.95 | 3.21 | +/-1.96 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.153 | +/-0.257 | 0.323 | +/-0.257 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0013
Sample ID: 341147013
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0502 | +/-0.112 | 0.199 | +/-0.114 | | pCi/g | | RXF2 | 02/07/14 | 0910 | 1359496 | 1 |
| Bismuth-212 | U | -0.178 | +/-0.390 | 0.693 | +/-0.398 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.137 | +/-0.090 | 0.157 | +/-0.110 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00136 | +/-0.0365 | 0.0759 | +/-0.0365 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0108 | +/-0.0283 | 0.0676 | +/-0.0287 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0153 | +/-0.0866 | 0.167 | +/-0.0869 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0678 | +/-0.103 | 0.240 | +/-0.108 | | pCi/g | | | | | | |
| Lead-212 | U | -0.0356 | +/-0.0548 | 0.0994 | +/-0.0571 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0136 | +/-0.0863 | 0.154 | +/-0.0865 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.391 | +/-0.436 | 1.05 | +/-0.472 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.00576 | +/-0.220 | 0.453 | +/-0.221 | | pCi/g | | | | | | |
| Radium-226 | U | 0.137 | +/-0.090 | 0.157 | +/-0.110 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0252 | +/-0.0269 | 0.0409 | +/-0.027 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.011 | +/-0.102 | 0.234 | +/-0.102 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.365 | +/-1.13 | 2.21 | +/-1.15 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0357 | +/-0.173 | 0.305 | +/-0.174 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC
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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0014
Sample ID: 341147014
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0131 | +/-0.0499 | 0.0767 | +/-0.0503 | | pCi/g | | RXF2 | 02/07/14 | 0911 | 1359496 | 1 |
| Bismuth-212 | U | 0.339 | +/-0.355 | 0.890 | +/-0.388 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0696 | +/-0.129 | 0.176 | +/-0.133 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00206 | +/-0.0237 | 0.0503 | +/-0.0237 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00845 | +/-0.0394 | 0.0883 | +/-0.0396 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0532 | +/-0.0664 | 0.144 | +/-0.0708 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0409 | +/-0.0868 | 0.157 | +/-0.0888 | | pCi/g | | | | | | |
| Lead-212 | U | 0.028 | +/-0.0617 | 0.101 | +/-0.0631 | | pCi/g | | | | | | |
| Lead-214 | U | 0.120 | +/-0.151 | 0.161 | +/-0.160 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.228 | +/-0.557 | 0.990 | +/-0.557 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.258 | +/-0.218 | 0.274 | +/-0.386 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0696 | +/-0.129 | 0.176 | +/-0.133 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0143 | +/-0.038 | 0.0742 | +/-0.0386 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0385 | +/-0.130 | 0.273 | +/-0.132 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.0314 | +/-0.729 | 0.779 | +/-0.729 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0568 | +/-0.134 | 0.267 | +/-0.137 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0015
Sample ID: 341147015
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.221 | +/-0.182 | 0.246 | +/-0.182 | | pCi/g | | RXF2 | 02/07/14 | 0911 | 1359496 | 1 |
| Bismuth-212 | U | 0.278 | +/-0.307 | 0.687 | +/-0.332 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0953 | +/-0.0526 | 0.112 | +/-0.0684 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0107 | +/-0.029 | 0.0572 | +/-0.0294 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0152 | +/-0.0256 | 0.0594 | +/-0.0266 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0039 | +/-0.0668 | 0.123 | +/-0.0668 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0216 | +/-0.0795 | 0.151 | +/-0.0801 | | pCi/g | | | | | | |
| Lead-212 | U | -0.0387 | +/-0.0433 | 0.0746 | +/-0.0468 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0372 | +/-0.0571 | 0.113 | +/-0.0596 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.451 | +/-0.323 | 0.559 | +/-0.325 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0286 | +/-0.178 | 0.353 | +/-0.181 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0953 | +/-0.0526 | 0.112 | +/-0.0684 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0102 | +/-0.0233 | 0.0499 | +/-0.0238 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0291 | +/-0.0769 | 0.151 | +/-0.0782 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.682 | +/-1.19 | 2.06 | +/-1.24 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.124 | +/-0.145 | 0.246 | +/-0.156 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0016
Sample ID: 341147016
Matrix: Solid
Collect Date: 07-DEC-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0874 | +/-0.120 | 0.201 | +/-0.126 | | pCi/g | | RXF2 | 02/07/14 | 0911 | 1359496 | 1 |
| Bismuth-212 | U | 0.143 | +/-0.354 | 0.741 | +/-0.361 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.00806 | +/-0.078 | 0.134 | +/-0.0781 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00457 | +/-0.026 | 0.0478 | +/-0.0261 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00655 | +/-0.0286 | 0.0606 | +/-0.0288 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0659 | +/-0.0611 | 0.133 | +/-0.0682 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0197 | +/-0.0585 | 0.137 | +/-0.0592 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0409 | +/-0.0479 | 0.071 | +/-0.048 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0177 | +/-0.0542 | 0.078 | +/-0.0542 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.0753 | +/-0.287 | 0.701 | +/-0.290 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0671 | +/-0.147 | 0.344 | +/-0.169 | | pCi/g | | | | | | |
| Radium-226 | U | 0.00806 | +/-0.078 | 0.134 | +/-0.0781 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0153 | +/-0.0264 | 0.0558 | +/-0.0273 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0594 | +/-0.115 | 0.246 | +/-0.118 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.881 | +/-1.08 | 1.93 | +/-1.16 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.018 | +/-0.154 | 0.272 | +/-0.155 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0017
Sample ID: 341147017
Matrix: Solid
Collect Date: 07-DEC-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0135 | +/-0.0647 | 0.111 | +/-0.065 | | pCi/g | | RXF2 | 02/07/14 | 0912 | 1359496 | 1 |
| Bismuth-212 | U | -0.102 | +/-0.228 | 0.417 | +/-0.233 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0622 | +/-0.0482 | 0.0977 | +/-0.056 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00373 | +/-0.0205 | 0.0292 | +/-0.0205 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00626 | +/-0.0244 | 0.0554 | +/-0.0245 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0331 | +/-0.0558 | 0.0798 | +/-0.0579 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0058 | +/-0.0536 | 0.111 | +/-0.0537 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0462 | +/-0.0464 | 0.0749 | +/-0.051 | | pCi/g | | | | | | |
| Lead-214 | U | 0.035 | +/-0.0665 | 0.091 | +/-0.0684 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.449 | +/-0.280 | 0.456 | +/-0.282 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0168 | +/-0.150 | 0.293 | +/-0.152 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0622 | +/-0.0482 | 0.0977 | +/-0.056 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0173 | +/-0.0297 | 0.0356 | +/-0.0298 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0868 | +/-0.0608 | 0.0862 | +/-0.073 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.277 | +/-0.986 | 0.968 | +/-0.988 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0441 | +/-0.0999 | 0.180 | +/-0.102 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0018
Sample ID: 341147018
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0706 | +/-0.179 | 0.328 | +/-0.182 | | pCi/g | | RXF2 | 02/07/14 | 0917 | 1359496 | 1 |
| Bismuth-212 | U | 0.0874 | +/-0.314 | 0.693 | +/-0.317 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0756 | +/-0.0664 | 0.143 | +/-0.0749 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.00315 | +/-0.0217 | 0.0464 | +/-0.0217 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00116 | +/-0.0316 | 0.0703 | +/-0.0316 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0292 | +/-0.0628 | 0.114 | +/-0.0642 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0031 | +/-0.0756 | 0.170 | +/-0.0756 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0222 | +/-0.0486 | 0.0978 | +/-0.0496 | | pCi/g | | | | | | |
| Lead-214 | U | 0.011 | +/-0.0648 | 0.124 | +/-0.065 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.399 | +/-0.447 | 1.04 | +/-0.483 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.259 | +/-0.202 | 0.289 | +/-0.378 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0756 | +/-0.0664 | 0.143 | +/-0.0749 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0191 | +/-0.0253 | 0.059 | +/-0.0268 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0195 | +/-0.115 | 0.233 | +/-0.116 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.363 | +/-1.58 | 3.06 | +/-1.59 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.0353 | +/-0.149 | 0.265 | +/-0.150 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette
Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0019
Sample ID: 341147019
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.0203 | +/-0.193 | 0.370 | +/-0.193 | | pCi/g | | RXF2 | 02/07/14 | 0917 | 1359496 | 1 |
| Bismuth-212 | U | 0.140 | +/-0.404 | 0.861 | +/-0.409 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0237 | +/-0.0649 | 0.129 | +/-0.0658 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00786 | +/-0.0334 | 0.0598 | +/-0.0336 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.000592 | +/-0.0322 | 0.0732 | +/-0.0322 | | pCi/g | | | | | | |
| Europium-152 | U | -0.00267 | +/-0.0756 | 0.130 | +/-0.0756 | | pCi/g | | | | | | |
| Europium-154 | U | 0.00956 | +/-0.0858 | 0.185 | +/-0.0859 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0451 | +/-0.0901 | 0.113 | +/-0.0925 | | pCi/g | | | | | | |
| Lead-214 | U | 0.034 | +/-0.0604 | 0.119 | +/-0.0624 | | pCi/g | | | | | | |
| Potassium-40 | | 1.22 | +/-0.528 | 0.536 | +/-0.538 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.125 | +/-0.208 | 0.488 | +/-0.259 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0237 | +/-0.0649 | 0.129 | +/-0.0658 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0175 | +/-0.0325 | 0.0686 | +/-0.0335 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.116 | +/-0.102 | 0.254 | +/-0.116 | | pCi/g | | | | | | |
| Thorium-234 | U | -1.05 | +/-1.63 | 2.91 | +/-1.71 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.110 | +/-0.159 | 0.298 | +/-0.167 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0020
Sample ID: 341147020
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0464 | +/-0.197 | 0.322 | +/-0.198 | | pCi/g | | RXF2 | 02/07/14 | 1000 | 1359496 | 1 |
| Bismuth-212 | U | -0.214 | +/-0.399 | 0.723 | +/-0.411 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0439 | +/-0.0839 | 0.140 | +/-0.0863 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00133 | +/-0.031 | 0.0566 | +/-0.031 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0189 | +/-0.0203 | 0.0637 | +/-0.0221 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0238 | +/-0.0806 | 0.154 | +/-0.0814 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0487 | +/-0.0784 | 0.203 | +/-0.0815 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0166 | +/-0.0467 | 0.0937 | +/-0.0473 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0499 | +/-0.0736 | 0.146 | +/-0.0772 | | pCi/g | | | | | | |
| Potassium-40 | U | -0.118 | +/-0.286 | 0.735 | +/-0.291 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.241 | +/-0.241 | 0.364 | +/-0.383 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0439 | +/-0.0839 | 0.140 | +/-0.0863 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0145 | +/-0.0318 | 0.0684 | +/-0.0325 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.00507 | +/-0.096 | 0.205 | +/-0.096 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.187 | +/-1.69 | 2.82 | +/-1.69 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.122 | +/-0.193 | 0.358 | +/-0.201 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0021
Sample ID: 341147021
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.0146 | +/-0.221 | 0.408 | +/-0.221 | | pCi/g | | RXF2 | 02/12/14 | 1429 | 1361908 | 1 |
| Bismuth-212 | U | 0.307 | +/-0.416 | 0.957 | +/-0.439 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0563 | +/-0.076 | 0.164 | +/-0.0803 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00682 | +/-0.031 | 0.0659 | +/-0.0312 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0261 | +/-0.0434 | 0.101 | +/-0.045 | | pCi/g | | | | | | |
| Europium-152 | U | 0.00606 | +/-0.0897 | 0.156 | +/-0.0898 | | pCi/g | | | | | | |
| Europium-154 | U | 0.0534 | +/-0.112 | 0.258 | +/-0.115 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0792 | +/-0.0936 | 0.0889 | +/-0.0941 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0672 | +/-0.0845 | 0.147 | +/-0.0901 | | pCi/g | | | | | | |
| Potassium-40 | | 1.40 | +/-0.626 | 0.544 | +/-0.638 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0448 | +/-0.276 | 0.577 | +/-0.282 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0563 | +/-0.076 | 0.164 | +/-0.0803 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0123 | +/-0.0472 | 0.0671 | +/-0.0472 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.118 | +/-0.148 | 0.321 | +/-0.158 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.106 | +/-1.80 | 3.49 | +/-1.80 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.229 | +/-0.368 | 0.378 | +/-0.368 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0022
Sample ID: 341147022
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.243 | +/-0.402 | 0.721 | +/-0.417 | | pCi/g | | RXF2 | 02/12/14 | 1430 | 1361908 | 1 |
| Bismuth-212 | U | 0.115 | +/-0.649 | 1.35 | +/-0.651 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.128 | +/-0.183 | 0.260 | +/-0.192 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.00729 | +/-0.0491 | 0.101 | +/-0.0492 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0289 | +/-0.0643 | 0.144 | +/-0.0656 | | pCi/g | | | | | | |
| Europium-152 | U | -0.0613 | +/-0.126 | 0.223 | +/-0.129 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0147 | +/-0.147 | 0.306 | +/-0.147 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0337 | +/-0.091 | 0.159 | +/-0.0923 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0432 | +/-0.129 | 0.221 | +/-0.130 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.653 | +/-0.766 | 1.84 | +/-0.823 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.114 | +/-0.354 | 0.672 | +/-0.381 | | pCi/g | | | | | | |
| Radium-226 | U | 0.128 | +/-0.183 | 0.260 | +/-0.192 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0134 | +/-0.0538 | 0.108 | +/-0.0541 | | pCi/g | | | | | | |
| Thorium-232 | U | -0.0245 | +/-0.178 | 0.377 | +/-0.178 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.244 | +/-3.70 | 5.76 | +/-3.70 | | pCi/g | | | | | | |
| Uranium-235 | UI | 0.00 | +/-0.382 | 0.634 | +/-0.387 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0023
Sample ID: 341147023
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | -0.112 | +/-0.0683 | 0.107 | +/-0.0864 | | pCi/g | | RXF2 | 02/12/14 | 1430 | 1361908 | 1 |
| Bismuth-212 | U | 0.405 | +/-0.743 | 1.42 | +/-0.767 | | pCi/g | | | | | | |
| Bismuth-214 | U | 0.0759 | +/-0.130 | 0.213 | +/-0.135 | | pCi/g | | | | | | |
| Cesium-137 | U | 0.0122 | +/-0.0536 | 0.097 | +/-0.0539 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.0139 | +/-0.0556 | 0.103 | +/-0.056 | | pCi/g | | | | | | |
| Europium-152 | U | -0.057 | +/-0.164 | 0.248 | +/-0.166 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0109 | +/-0.153 | 0.290 | +/-0.153 | | pCi/g | | | | | | |
| Lead-212 | U | 0.0308 | +/-0.122 | 0.135 | +/-0.122 | | pCi/g | | | | | | |
| Lead-214 | U | 0.0897 | +/-0.186 | 0.220 | +/-0.191 | | pCi/g | | | | | | |
| Potassium-40 | U | 0.717 | +/-0.832 | 0.984 | +/-0.835 | | pCi/g | | | | | | |
| Protactinium-234 | U | -0.0744 | +/-0.416 | 0.751 | +/-0.426 | | pCi/g | | | | | | |
| Radium-226 | U | 0.0759 | +/-0.130 | 0.213 | +/-0.135 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | 0.0478 | +/-0.0721 | 0.0739 | +/-0.0723 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.232 | +/-0.288 | 0.432 | +/-0.309 | | pCi/g | | | | | | |
| Thorium-234 | U | -0.26 | +/-0.812 | 1.48 | +/-0.823 | | pCi/g | | | | | | |
| Uranium-235 | U | -0.367 | +/-0.310 | 0.459 | +/-0.314 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## Certificate of Analysis

Company : Curtis & Tompkins Laboratories
Address : 2323 5th Street

Berkeley, California 94710

Report Date: February 14, 2014

Contact: John Goyette

Project: HPSD1

Client Sample ID: 04-PDV-RT1300-09-0024
Sample ID: 341147024
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: CURL00113
Client ID: CURL001

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid (Standard List) "As Received"* | | | | | | | | | | | | | |
| Americium-241 | U | 0.113 | +/-0.250 | 0.415 | +/-0.256 | | pCi/g | | RXF2 | 02/12/14 | 1431 | 1361908 | 1 |
| Bismuth-212 | U | 0.0525 | +/-0.692 | 1.29 | +/-0.693 | | pCi/g | | | | | | |
| Bismuth-214 | U | -0.0678 | +/-0.144 | 0.234 | +/-0.147 | | pCi/g | | | | | | |
| Cesium-137 | U | -0.0289 | +/-0.0712 | 0.107 | +/-0.0724 | 0.113 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.020 | +/-0.0719 | 0.123 | +/-0.0725 | | pCi/g | | | | | | |
| Europium-152 | U | 0.0503 | +/-0.150 | 0.274 | +/-0.152 | | pCi/g | | | | | | |
| Europium-154 | U | -0.0516 | +/-0.207 | 0.319 | +/-0.208 | | pCi/g | | | | | | |
| Lead-212 | U | 0.156 | +/-0.125 | 0.157 | +/-0.125 | | pCi/g | | | | | | |
| Lead-214 | U | -0.0477 | +/-0.164 | 0.232 | +/-0.165 | | pCi/g | | | | | | |
| Potassium-40 | | 2.69 | +/-1.00 | 1.13 | +/-1.03 | | pCi/g | | | | | | |
| Protactinium-234 | U | 0.0163 | +/-0.345 | 0.679 | +/-0.345 | | pCi/g | | | | | | |
| Radium-226 | U | -0.0678 | +/-0.144 | 0.234 | +/-0.147 | 1.47 | pCi/g | | | | | | |
| Thallium-208 | U | -0.0301 | +/-0.0758 | 0.109 | +/-0.077 | | pCi/g | | | | | | |
| Thorium-232 | U | 0.0768 | +/-0.314 | 0.447 | +/-0.316 | | pCi/g | | | | | | |
| Thorium-234 | U | 0.725 | +/-2.92 | 3.69 | +/-2.94 | | pCi/g | | | | | | |
| Uranium-235 | U | 0.0952 | +/-0.397 | 0.529 | +/-0.399 | | pCi/g | | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | DOE HASL 300, 4.5.2.3/Ga-01-R |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# Quality Control Data

## QC Summary

**Report Date: February 14, 2014**



**Curtis & Tompkins Laboratories**
**2323 5th Street**
**Berkeley, California**

**Contact:** **John Goyette**

**Workorder:** **341147**

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359496 | | | | | | | | | | | |
| QC1203017839 341147001 DUP | | | | | | | | | | | |
| Americium-241 | U | 0.136 | U | 0.0354 | pCi/g | N/A | | N/A | RXF2 | 02/07/14 | 10:01 |
| | Uncertainty | +/-0.165 | | +/-0.0754 | | | | | | | |
| Bismuth-212 | U | 0.270 | U | 0.307 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.471 | | +/-0.351 | | | | | | | |
| Bismuth-214 | U | 0.0468 | U | -0.0196 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0717 | | +/-0.0717 | | | | | | | |
| Cesium-137 | U | 0.00236 | U | 0.00682 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0386 | | +/-0.0263 | | | | | | | |
| Cobalt-60 | U | 0.0152 | U | -0.0216 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0296 | | +/-0.0264 | | | | | | | |
| Europium-152 | U | 0.0404 | U | 0.0385 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0975 | | +/-0.0822 | | | | | | | |
| Europium-154 | U | -0.0645 | U | 0.0145 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0766 | | +/-0.0542 | | | | | | | |
| Lead-212 | U | 0.0256 | U | 0.00315 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0763 | | +/-0.050 | | | | | | | |
| Lead-214 | U | 0.0229 | U | 0.0587 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0962 | | +/-0.0685 | | | | | | | |
| Potassium-40 | U | 0.166 | U | -0.13 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.451 | | +/-0.470 | | | | | | | |
| Protactinium-234 | U | 0.0434 | U | 0.118 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.194 | | +/-0.247 | | | | | | | |
| Radium-226 | U | 0.0468 | U | -0.0196 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0717 | | +/-0.0717 | | | | | | | |
| Thallium-208 | U | 0.0129 | U | 0.0069 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0392 | | +/-0.0332 | | | | | | | |
| Thorium-232 | U | -0.141 | U | -0.0039 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.122 | | +/-0.133 | | | | | | | |
| Thorium-234 | U | -0.622 | U | 1.62 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-1.47 | | +/-1.26 | | | | | | | |
| Uranium-235 | U | -0.0532 | U | -0.0575 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.186 | | +/-0.166 | | | | | | | |
| QC1203017840 LCS | | | | | | | | | | | |
| Americium-241 | 322 | | | 347 | pCi/g | | 108 | (75%-125%) | | 02/07/14 | 08:45 |
| | Uncertainty | | | +/-10.3 | | | | | | | |
| Bismuth-212 | | | U | -0.798 | pCi/g | | | | | | |
| | Uncertainty | | | +/-8.89 | | | | | | | |
| Bismuth-214 | | | U | -0.39 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Cesium-137 | 132 | | | 136 | pCi/g | | 102 | (75%-125%) | | | |

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359496 | | | | | | | | | | | |
| | Uncertainty | | | +/-2.47 | | | | | | | |
| Cobalt-60 | 174 | | | 172 | pCi/g | | 99.2 | (75%-125%) | RXF2 | 02/07/14 | 08:45 |
| | Uncertainty | | | +/-3.23 | | | | | | | |
| Europium-152 | | | U | 0.0499 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.74 | | | | | | | |
| Europium-154 | | | U | 0.925 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.07 | | | | | | | |
| Lead-212 | | | U | -0.0109 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.928 | | | | | | | |
| Lead-214 | | | U | 0.530 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.42 | | | | | | | |
| Potassium-40 | | | U | -0.725 | pCi/g | | | | | | |
| | Uncertainty | | | +/-2.85 | | | | | | | |
| Protactinium-234 | | | U | -0.466 | pCi/g | | | | | | |
| | Uncertainty | | | +/-7.38 | | | | | | | |
| Radium-226 | | | U | -0.39 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Thallium-208 | | | U | 0.237 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.595 | | | | | | | |
| Thorium-232 | | | U | -0.489 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.15 | | | | | | | |
| Thorium-234 | | | U | 15.8 | pCi/g | | | | | | |
| | Uncertainty | | | +/-40.4 | | | | | | | |
| Uranium-235 | | | U | -2.0 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.08 | | | | | | | |
| QC1203017838 MB | | | | | | | | | | | |
| Americium-241 | | | U | -0.0104 | pCi/g | | | | | 02/07/14 | 10:01 |
| | Uncertainty | | | +/-0.118 | | | | | | | |
| Bismuth-212 | | | U | 0.175 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.351 | | | | | | | |
| Bismuth-214 | | | U | 0.0215 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0579 | | | | | | | |
| Cesium-137 | | | U | -0.0207 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0226 | | | | | | | |
| Cobalt-60 | | | U | 0.0188 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.030 | | | | | | | |
| Europium-152 | | | U | -0.0458 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0723 | | | | | | | |
| Europium-154 | | | U | 0.0104 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0694 | | | | | | | |
| Lead-212 | | | U | -0.0187 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0468 | | | | | | | |
| Lead-214 | | | U | 0.0423 | pCi/g | | | | | | |
| | Uncertainty | | | | | | | | | | |

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1359496 | | | | | | | | | | | |
| | | | | +/-0.0577 | | | | | | | |
| Potassium-40 | | | U | -0.0472 | pCi/g | | | | RXF2 | 02/07/14 | 10:01 |
| | Uncertainty | | | +/-0.270 | | | | | | | |
| Protactinium-234 | | | U | -0.0535 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.164 | | | | | | | |
| Radium-226 | | | U | 0.0215 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0579 | | | | | | | |
| Thallium-208 | | | U | -0.0099 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0265 | | | | | | | |
| Thorium-232 | | | U | -0.0502 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0964 | | | | | | | |
| Thorium-234 | | | U | 0.184 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.946 | | | | | | | |
| Uranium-235 | | | U | -0.0139 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.140 | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| QC1203023700 341140021 DUP | | | | | | | | | | | |
| Americium-241 | U | -0.0173 | U | -0.0186 | pCi/g | N/A | | N/A | RXF2 | 02/12/14 | 14:38 |
| | Uncertainty | +/-0.062 | | +/-0.196 | | | | | | | |
| Bismuth-212 | U | 0.253 | U | -0.333 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.579 | | +/-0.581 | | | | | | | |
| Bismuth-214 | U | 0.0696 | U | -0.0498 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0752 | | | | | | | |
| Cesium-137 | U | 0.0271 | U | 0.0177 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0463 | | +/-0.0422 | | | | | | | |
| Cobalt-60 | U | -0.00483 | U | 0.0318 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0417 | | +/-0.0422 | | | | | | | |
| Europium-152 | U | 0.0815 | U | 0.0195 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.112 | | +/-0.121 | | | | | | | |
| Europium-154 | U | -0.128 | U | 0.100 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.142 | | +/-0.124 | | | | | | | |
| Lead-212 | U | 0.0132 | U | 0.0699 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0843 | | +/-0.079 | | | | | | | |
| Lead-214 | U | -0.0845 | U | 0.0675 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0838 | | +/-0.0941 | | | | | | | |
| Potassium-40 | U | 0.182 | U | 0.0504 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.587 | | +/-0.366 | | | | | | | |
| Protactinium-234 | U | -0.194 | U | 0.171 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.271 | | +/-0.289 | | | | | | | |
| Radium-226 | U | 0.0696 | U | -0.0498 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.108 | | +/-0.0752 | | | | | | | |
| Thallium-208 | U | -0.0305 | U | 0.00172 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.0573 | | +/-0.0349 | | | | | | | |

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| Thorium-232 | U | -0.0645 | U | 0.0627 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.189 | | +/-0.128 | | | | | | | |
| Thorium-234 | U | -0.0897 | U | -1.55 | pCi/g | N/A | | N/A | RXF2 | 02/12/14 | 14:38 |
| | Uncertainty | +/-0.716 | | +/-1.68 | | | | | | | |
| Uranium-235 | U | -0.0492 | U | -0.0487 | pCi/g | N/A | | N/A | | | |
| | Uncertainty | +/-0.192 | | +/-0.186 | | | | | | | |
| QC1203023701 LCS | | | | | | | | | | | |
| Americium-241 | 424 | | | 478 | pCi/g | | 113 | (75%-125%) | | 02/12/14 | 16:15 |
| | Uncertainty | | | +/-10.9 | | | | | | | |
| Bismuth-212 | | | U | -7.66 | pCi/g | | | | | | |
| | Uncertainty | | | +/-10.0 | | | | | | | |
| Bismuth-214 | | | U | -0.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.33 | | | | | | | |
| Cesium-137 | 174 | | | 184 | pCi/g | | 105 | (75%-125%) | | | |
| | Uncertainty | | | +/-3.26 | | | | | | | |
| Cobalt-60 | 228 | | | 231 | pCi/g | | 101 | (75%-125%) | | | |
| | Uncertainty | | | +/-4.09 | | | | | | | |
| Europium-152 | | | U | 0.182 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.85 | | | | | | | |
| Europium-154 | | | U | -0.291 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.31 | | | | | | | |
| Lead-212 | | | U | 0.193 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.00 | | | | | | | |
| Lead-214 | | | U | -0.377 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.44 | | | | | | | |
| Potassium-40 | | | U | -0.516 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.43 | | | | | | | |
| Protactinium-234 | | | U | -2.14 | pCi/g | | | | | | |
| | Uncertainty | | | +/-9.07 | | | | | | | |
| Radium-226 | | | U | -0.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.33 | | | | | | | |
| Thallium-208 | | | U | -0.374 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.673 | | | | | | | |
| Thorium-232 | | | U | -4.21 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.96 | | | | | | | |
| Thorium-234 | | | U | -52.6 | pCi/g | | | | | | |
| | Uncertainty | | | +/-30.4 | | | | | | | |
| Uranium-235 | | | U | 0.871 | pCi/g | | | | | | |
| | Uncertainty | | | +/-3.30 | | | | | | | |
| QC1203023699 MB | | | | | | | | | | | |
| Americium-241 | | | U | 0.0211 | pCi/g | | | | | 02/12/14 | 14:36 |
| | Uncertainty | | | +/-0.0752 | | | | | | | |
| Bismuth-212 | | | U | -0.198 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.344 | | | | | | | |
| Bismuth-214 | | | U | 0.000196 | pCi/g | | | | | | |

## QC Summary

**Workorder:** 341147



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | | |
| Batch 1361908 | | | | | | | | | | | |
| | Uncertainty | | | +/-0.0778 | | | | | | | |
| Cesium-137 | | | U | -0.00326 | pCi/g | | | | RXF2 | 02/12/14 | 14:36 |
| | Uncertainty | | | +/-0.0267 | | | | | | | |
| Cobalt-60 | | | U | 0.00792 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0284 | | | | | | | |
| Europium-152 | | | U | 0.0274 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0722 | | | | | | | |
| Europium-154 | | | U | 0.0217 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.067 | | | | | | | |
| Lead-212 | | | U | 0.0387 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0457 | | | | | | | |
| Lead-214 | | | U | 0.0111 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0612 | | | | | | | |
| Potassium-40 | | | U | 0.379 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.334 | | | | | | | |
| Protactinium-234 | | | U | 0.185 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.204 | | | | | | | |
| Radium-226 | | | U | 0.000196 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0778 | | | | | | | |
| Thallium-208 | | | U | -0.0173 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0249 | | | | | | | |
| Thorium-232 | | | U | 0.101 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.0809 | | | | | | | |
| Thorium-234 | | | U | 0.116 | pCi/g | | | | | | |
| | Uncertainty | | | +/-1.14 | | | | | | | |
| Uranium-235 | | | U | -0.0569 | pCi/g | | | | | | |
| | Uncertainty | | | +/-0.151 | | | | | | | |

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD

## QC Summary

**Workorder:** **341147**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---|---|
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Y | Other specific qualifiers were required to properly define the results. Consult case narrative. |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. |
| h | Preparation or preservation holding time was exceeded |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Summary of Definitive Laboratory Results* for Decision Unit: 09

| Sample ID | Nuclide | Activity | Flags | Activity Units |
|---|---|---|---|---|
| Sample Delivery Group (SDG): 345764 | | | | |
| 04-PDV-RT1300-09-0006 | | | | |
| | Analysis Type: E905.0 – Gas Flow Proportional Counting | | | |
| | Strontium Total | 0 | U | pCi/g |
| 04-PDV-RT1300-09-0015 | | | | |
| | Analysis Type: E905.0 – Gas Flow Proportional Counting | | | |
| | Strontium Total | 0 | U | pCi/g |
| 04-PDV-RT1300-09-0023 | | | | |
| | Analysis Type: E905.0 – Gas Flow Proportional Counting | | | |
| | Strontium Total | 0 | U | pCi/g |



*Results for both preliminary and definitive analyses are unvalidated at the time of this summary report.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com


## Certificate of Analysis Report
## for

ITSI003 ITSI Gilbane Company

Client SDG: 345764 GEL Work Order: 345764

**The Qualifiers in this report are defined as follows:**

* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

** Indicates the analyte is a Tracer compound.

** Indicates the analyte is a surrogate compound.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by Heather Shaffer

# GEL LABORATORIES LLC

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# Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive
Walnut Creek, California 94598
Report Date: April 14, 2014
Contact: Ms. Kriston Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-09-0006
Sample ID: 345764001
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.0781 | +/-0.0823 | 0.137 | +/-0.0846 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1305 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 68.3 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 14, 2014

Contact: Ms. Kriston Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-09-0015
Sample ID: 345764002
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | 0.102 | +/-0.0876 | 0.144 | +/-0.0913 | 0.166 | pCi/g | | KSD1 | 04/12/14 | 1305 | 1377649 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1377649 | 63.4 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


# Certificate of Analysis

Company : ITSI Gilbane Company
Address : 2730 Shadelands Drive

Walnut Creek, California 94598

Report Date: April 14, 2014

Contact: Ms. Kriston Carlyon
Project: Hunter's Point Rad Analysis - Total Sr

Client Sample ID: 04-PDV-RT1300-09-0023
Sample ID: 345764003
Matrix: Solid
Collect Date: 07-NOV-13
Receive Date: 11-DEC-13
Collector: Client

Project: ITSI00301
Client ID: ITSI003

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Total Sr, Solid "As Received"* | | | | | | | | | | | | | |
| Total Strontium | U | -0.0235 | +/-0.0482 | 0.102 | +/-0.0482 | 0.166 | pCi/g | | KSD1 | 04/11/14 | 1504 | 1379182 | 1 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 905.0 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---|---|---|---|---|
| Strontium Carrier | GFPC, Total Sr, Solid "As Received" | 1379182 | 72.0 | (25%-125%) |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com


## QC Summary

**Client :** **ITSI Gilbane Company**
**2730 Shadelands Drive**
**Walnut Creek, California**
**Contact:** **Ms. Kriston Carlyon**
**Workorder:** **345764**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow** | | | | | | | | | | |
| Batch 1377649 | | | | | | | | | | |
| QC1203062518 345763001 DUP | | | | | | | | | | |
| Total Strontium | U | 0.131 | U | 0.00903 | pCi/g | 0 | | N/A | KSD1 | 04/12/1413:05 |
| | Uncert: | +/-0.102 | | +/-0.0698 | | | | | | |
| | TPU: | +/-0.107 | | +/-0.0698 | | | | | | |
| QC1203062519 LCS | | | | | | | | | | |
| Total Strontium | 3.88 | | | 4.03 | pCi/g | | 104 | (75%-125%) | KSD1 | 04/14/1410:58 |
| | Uncert: | | | +/-0.202 | | | | | | |
| | TPU: | | | +/-1.05 | | | | | | |
| QC1203062517 MB | | | | | | | | | | |
| Total Strontium | | | U | 0.0386 | pCi/g | | | | KSD1 | 04/12/1413:05 |
| | Uncert: | | | +/-0.0554 | | | | | | |
| | TPU: | | | +/-0.0563 | | | | | | |
| Batch 1379182 | | | | | | | | | | |
| QC1203065850 345746003 DUP | | | | | | | | | | |
| Total Strontium | U | -0.0556 | U | -0.0647 | pCi/g | 0 | | N/A | KSD1 | 04/11/1415:04 |
| | Uncert: | +/-0.0636 | | +/-0.0626 | | | | | | |
| | TPU: | +/-0.0636 | | +/-0.0626 | | | | | | |
| QC1203065851 LCS | | | | | | | | | | |
| Total Strontium | 4.30 | | | 4.31 | pCi/g | | 100 | (75%-125%) | KSD1 | 04/11/1415:04 |
| | Uncert: | | | +/-0.247 | | | | | | |
| | TPU: | | | +/-1.12 | | | | | | |
| QC1203065849 MB | | | | | | | | | | |
| Total Strontium | | | U | -0.0487 | pCi/g | | | | KSD1 | 04/11/1415:04 |
| | Uncert: | | | +/-0.0553 | | | | | | |
| | TPU: | | | +/-0.0553 | | | | | | |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

| | |
|---|---|
| ** | Analyte is a Tracer compound |
| < | Result is less than value reported |
| > | Result is greater than value reported |
| BD | Results are either below the MDC or tracer recovery is low |
| FA | Failed analysis. |
| H | Analytical holding time was exceeded |
| J | Value is estimated |
| K | Analyte present. Reported value may be biased high. Actual value is expected to be lower. |
| L | Analyte present. Reported value may be biased low. Actual value is expected to be higher. |
| M | M if above MDC and less than LLD |

## QC Summary

**Workorder:** **345764**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|

| | |
|---|---|
| M | REMP Result > MDC/CL and < RDL |
| N/A | RPD or %Recovery limits do not apply. |
| N1 | See case narrative |
| ND | Analyte concentration is not detected above the detection limit |
| NJ | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Q | One or more quality control criteria have not been met. Refer to the applicable narrative or DER. |
| R | Sample results are rejected |
| U | Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. |
| UI | Gamma Spectroscopy--Uncertain identification |
| UJ | Gamma Spectroscopy--Uncertain identification |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Y | Other specific qualifiers were required to properly define the results. Consult case narrative. |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. |
| h | Preparation or preservation holding time was exceeded |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**There are no "Data Exception Reports" associated with this analytical report.**

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

Relog 345764

~~Relog 341147~~

~~339225~~

COC # HPSD1-0035

Gilbane

| | |
|---|---|
| Project Name: HPSD1 | Laboratory: Curtis & Tompkins, Berkeley, CA |
| Project Number: 07204.0004 | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| WBS Code: 0058000 | Ship to: 2323 5th St., Berkley, CA 94710 |

Comments:

Equipment:

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250 640 @ 11-08-13 BIN 11

Analytical Test Method: E901.1 - Solid Ra-226 and CS-137; GS186 - Ra-226 and CS-137 Screening

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PDV-RT1300-09-0001 | SN | 11/7/2013 | 1130 | JL | X | | RT1300-09-0001 | N1 | 0.00 | 0.00 |
| 2 | 04-PDV-RT1300-09-0002 | SN | 11/7/2013 | 1140 | JL | X | | RT1300-09-0002 | N1 | 0.00 | 0.00 |
| 3 | 04-PDV-RT1300-09-0003 | SN | 11/7/2013 | 1143 | JL | X | | RT1300-09-0003 | N1 | 0.00 | 0.00 |
| 4 | 04-PDV-RT1300-09-0004 | SN | 11/7/2013 | 1145 | JL | X | | RT1300-09-0004 | N1 | 0.00 | 0.00 |
| 5 | 04-PDV-RT1300-09-0005 | SN | 11/7/2013 | 1150 | JL | X | | RT1300-09-0005 | N1 | 0.00 | 0.00 |
| * 6 | 04-PDV-RT1300-09-0006 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0006 | N1 | 0.00 | 0.00 |
| 7 | 04-PDV-RT1300-09-0007 | SN | 11/7/2013 | 1155 | JL | X | | RT1300-09-0007 | N1 | 0.00 | 0.00 |
| 8 | 04-PDV-RT1300-09-0008 | SN | 11/7/2013 | 1311 | JL | X | | RT1300-09-0008 | N1 | 0.00 | 0.00 |
| 9 | 04-PDV-RT1300-09-0009 | SN | 11/7/2013 | 1315 | JL | X | | RT1300-09-0009 | N1 | 0.00 | 0.00 |
| 10 | 04-PDV-RT1300-09-0010 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0010 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) | Date | Time |
|---|---|---|---|---|---|
| James Lou | 11-8-13 | 10:00 | [signature] | 11-8-13 | 1000 |
| R. Hutz | 12/10/13 | 0955 | [signature] | 12-10-13 | 0955 |
| | | | [signature] | 121113 | 1030 |
| | | | | | |

Shipping Date / Carrier / Airbill Number

Shipping Date: 11/8/2013

Recevied by Laboratory: (Signature, Date, Time) & condition

[signature] 11-08-13 1102 OK

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

COC # HPSD1-0035

Gilbane

| | |
|---|---|
| Project Name: HPSD1 | Laboratory: Curtis & Tompkins, Berkeley, CA |
| Project Number: 07204.0004 | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| WBS Code: 0058000 | Ship to: 2323 5th St., Berkley, CA 94710 |

Comments:

Equipment:

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250640 11-08-13 B/N 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PDV-RT1300-09-0011 | SN | 11/7/2013 | 1320 | JL | X | | RT1300-09-0011 | N1 | 0.00 | 0.00 |
| 12 | 04-PDV-RT1300-09-0012 | SN | 11/7/2013 | 1325 | JL | X | | RT1300-09-0012 | N1 | 0.00 | 0.00 |
| 13 | 04-PDV-RT1300-09-0013 | SN | 11/7/2013 | 1330 | JL | X | | RT1300-09-0013 | N1 | 0.00 | 0.00 |
| 14 | 04-PDV-RT1300-09-0014 | SN | 11/7/2013 | 1335 | JL | X | | RT1300-09-0014 | N1 | 0.00 | 0.00 |
| 15 | 04-PDV-RT1300-09-0015 | SN | 11/7/2013 | 1342 | JL | X | | RT1300-09-0015 | N1 | 0.00 | 0.00 |
| 16 | 04-PDV-RT1300-09-0016 | SN | 11/7/2013 | 1344 | JL | X | | RT1300-09-0016 | N1 | 0.00 | 0.00 |
| 17 | 04-PDV-RT1300-09-0017 | SN | 11/7/2013 | 1350 | JL | X | | RT1300-09-0017 | N1 | 0.00 | 0.00 |
| 18 | 04-PDV-RT1300-09-0018 | SN | 11/7/2013 | 1355 | JL | X | | RT1300-09-0018 | N1 | 0.00 | 0.00 |
| 19 | 04-PDV-RT1300-09-0019 | SN | 11/7/2013 | 1356 | JL | X | | RT1300-09-0019 | N1 | 0.00 | 0.00 |
| 20 | 04-PDV-RT1300-09-0020 | SN | 11/7/2013 | 1400 | | X | | RT1300-09-0020 | N1 | 0.00 | 0.00 |
| Cooler # 3 | | Turnaround Time: 0 Days | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| James Love | 11-8-13 | 10:00 |
| R Dahlquist | 12/10/13 | 0955 |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| Susan Cheyne | 11-8-13 | 1000 |
| Susan Myers | 12-10-13 | 0955 |
| FedEx | 121113 | 1030 |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| Shipping Date: 11/8/2013 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| cgallegos 11/8/13 1102 OK |



DCN: ITSI-0808-0004-0076, 8 May 2019

M-10586

# CHAIN-OF-CUSTODY RECORD

ITSI Gilbane
Ed Palser
Walnut Creek
(505) 400-4076 EXT: epalser@itsi.com

**COC # HPSD1-0035**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: Curtis & Tompkins, Berkeley, CA |
| **Project Number: 07204.0004** | Point of contact: Mike Dahlquist (510) 486-0900 mike.dahlquist@ctberk.com |
| **WBS Code: 0058000** | Ship to: 2323 5th St., Berkley, CA 94710 |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SN | MISCELLANEOUS SOLID MATERIALS - BUILDING MATERIALS |

| Code | Container/Preservative |
|---|---|
| | 1" 1 Gallon Ziploc Bag. |

250640 11-08-13 BIN 11

Event: Railroad Tie Survey

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | GS186 - Ra-226 and CS-137 Screening | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PDV-RT1300-09-0021 | SN | 11/7/2013 | 1500 | JL | X | X | RT1300-09-0021 | N1 | 0.00 | 0.00 |
| 22 | 04-PDV-RT1300-09-0022 | SN | 11/7/2013 | 1555 | JL | X | X | RT1300-09-0022 | N1 | 0.00 | 0.00 |
| 23 | 04-PDV-RT1300-09-0023 | SN | 11/7/2013 | 1545 | JL | X | X | RT1300-09-0023 | N1 | 0.00 | 0.00 |
| 24 | 04-PDV-RT1300-09-0024 | SN | 11/7/2013 | 1548 | JL | X | X | RT1300-09-0024 | N1 | 0.00 | 0.00 |

Cooler # 3 — Turnaround Time: 0 Days

| Relinquished by: *(Signature)* | Date | Time | Received by: *(Signature)* | Date | Time |
|---|---|---|---|---|---|
| James Love | 11-8-13 | 10:00 | [illegible] | 11-8-13 | 1000 |
| [illegible] | 12/10/13 | 0955 | [illegible] | 12-10-13 | 0955 |
| | | | [illegible] | 121113 | 1630 |
| | | | | | |

**Shipping Date / Carrier / Airbill Number**

Shipping Date: 11/8/2013

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

[illegible] 11/10/13 1100 OK

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# APPENDIX N

# POST-REMOVAL SURVEY AND SAMPLING DATA

# (Available Electronically)

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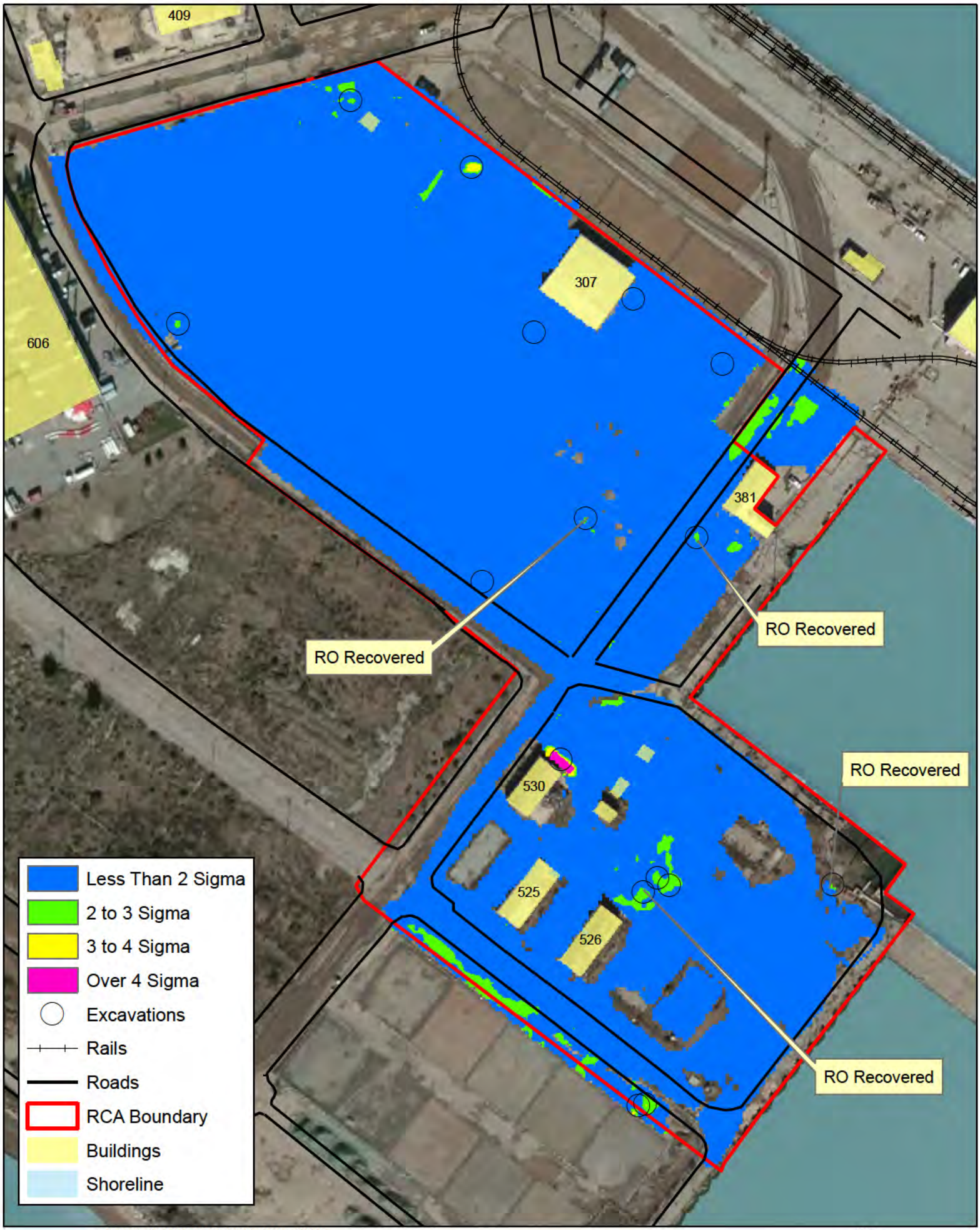
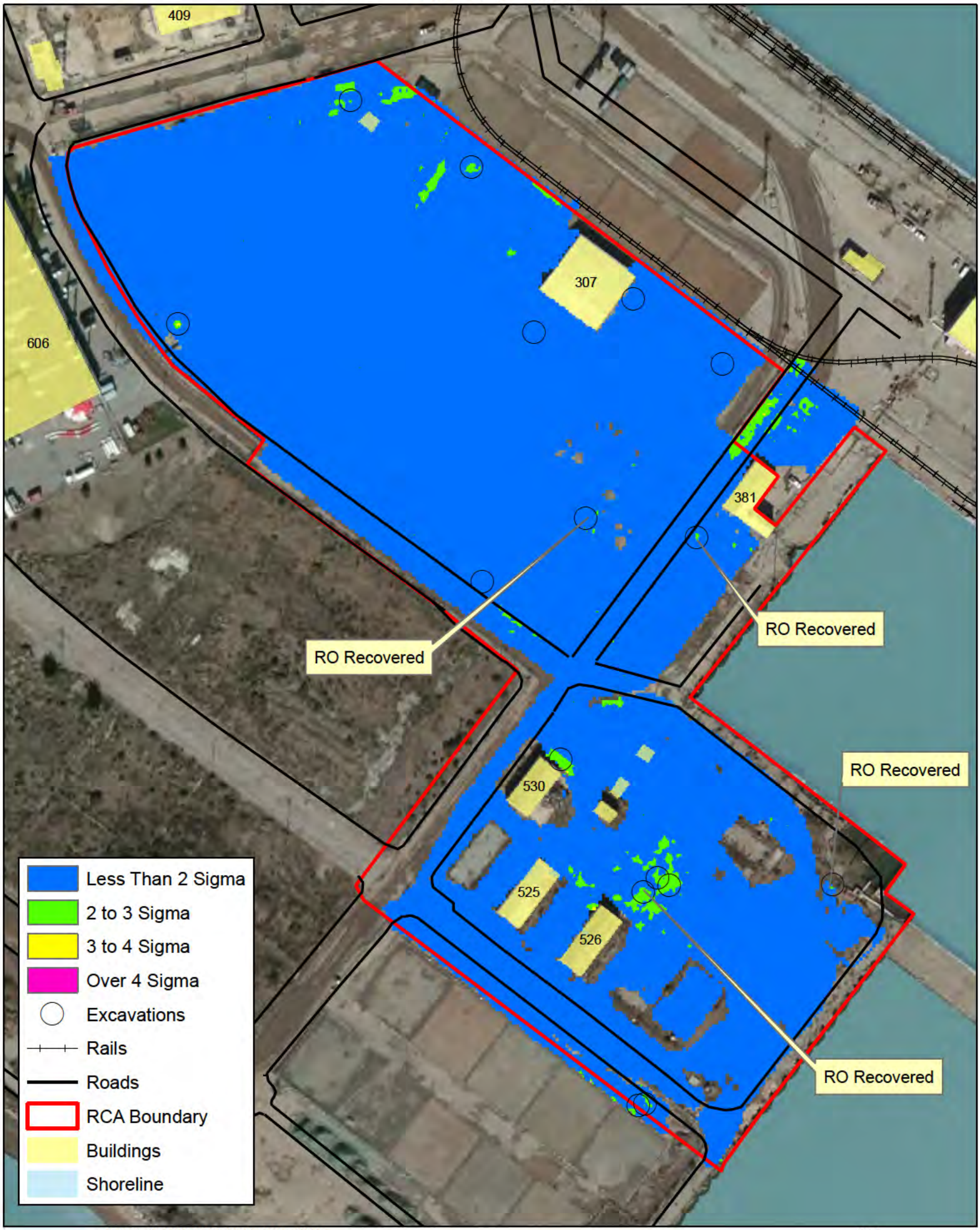
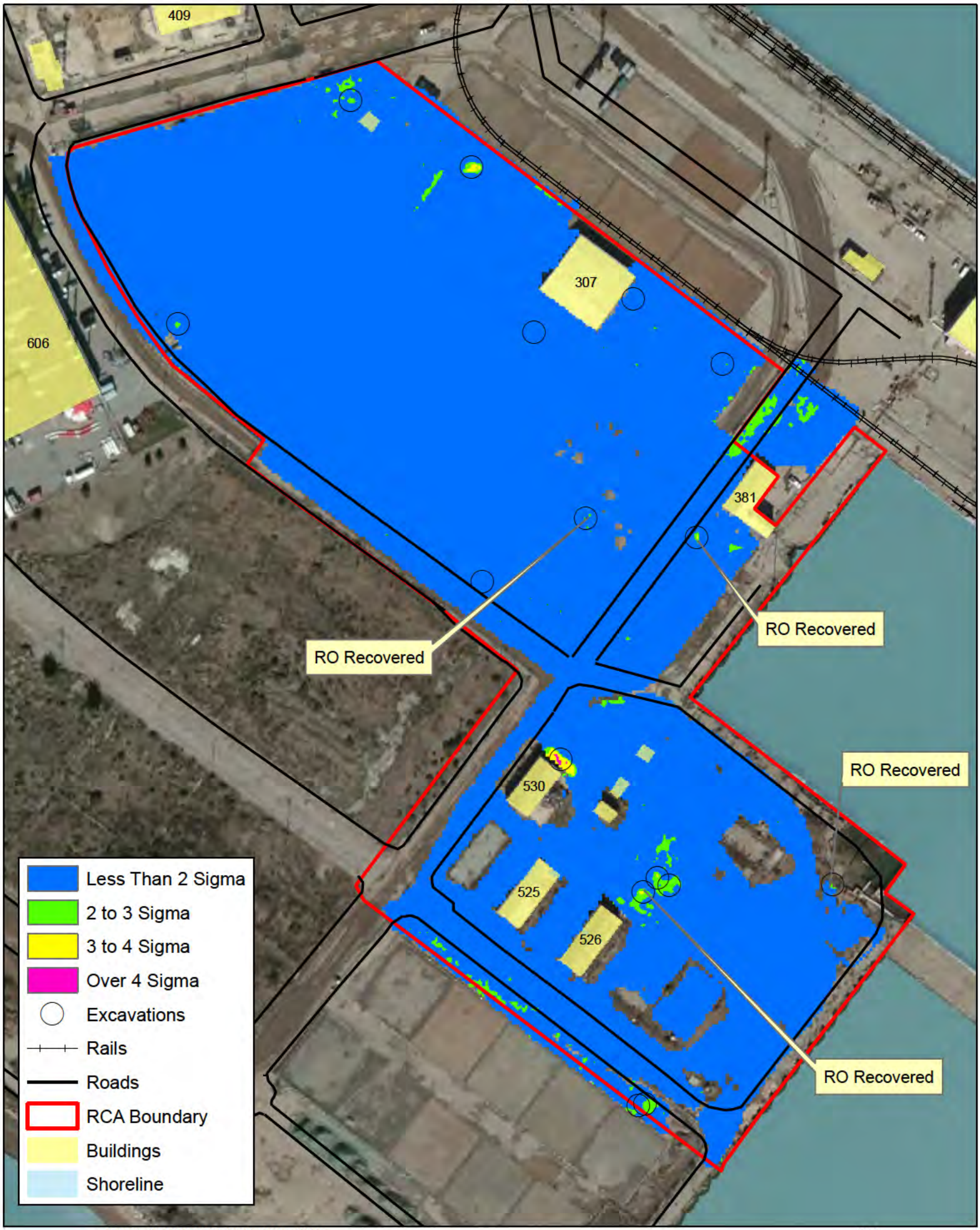
HPNS Parcel D1 Device Removal & Investigation Excvations
Total Gamma IA SIgma Values



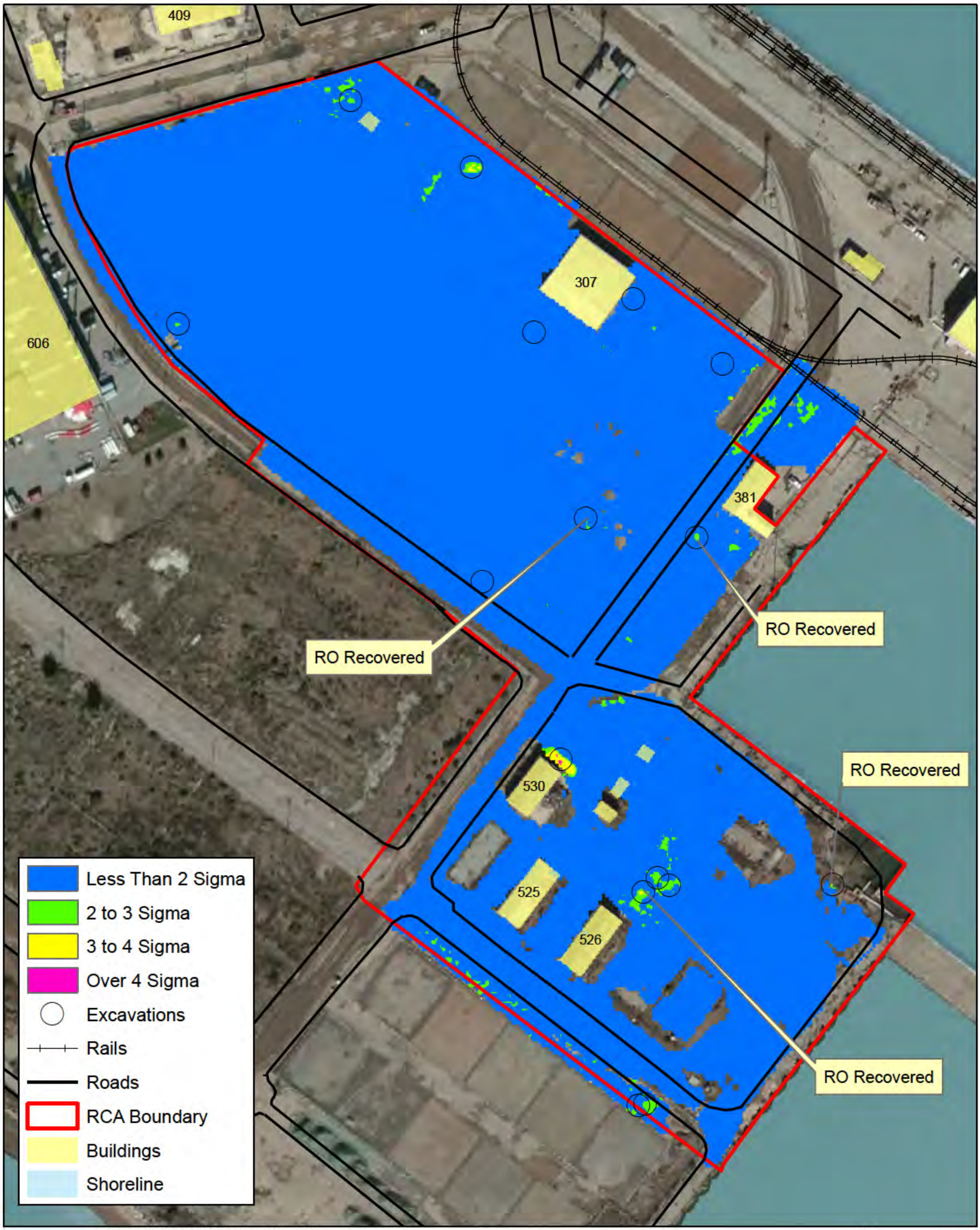
HPNS Parcel D1 Device Removal & Investigation Excvations
Potassium IA SIgma Values



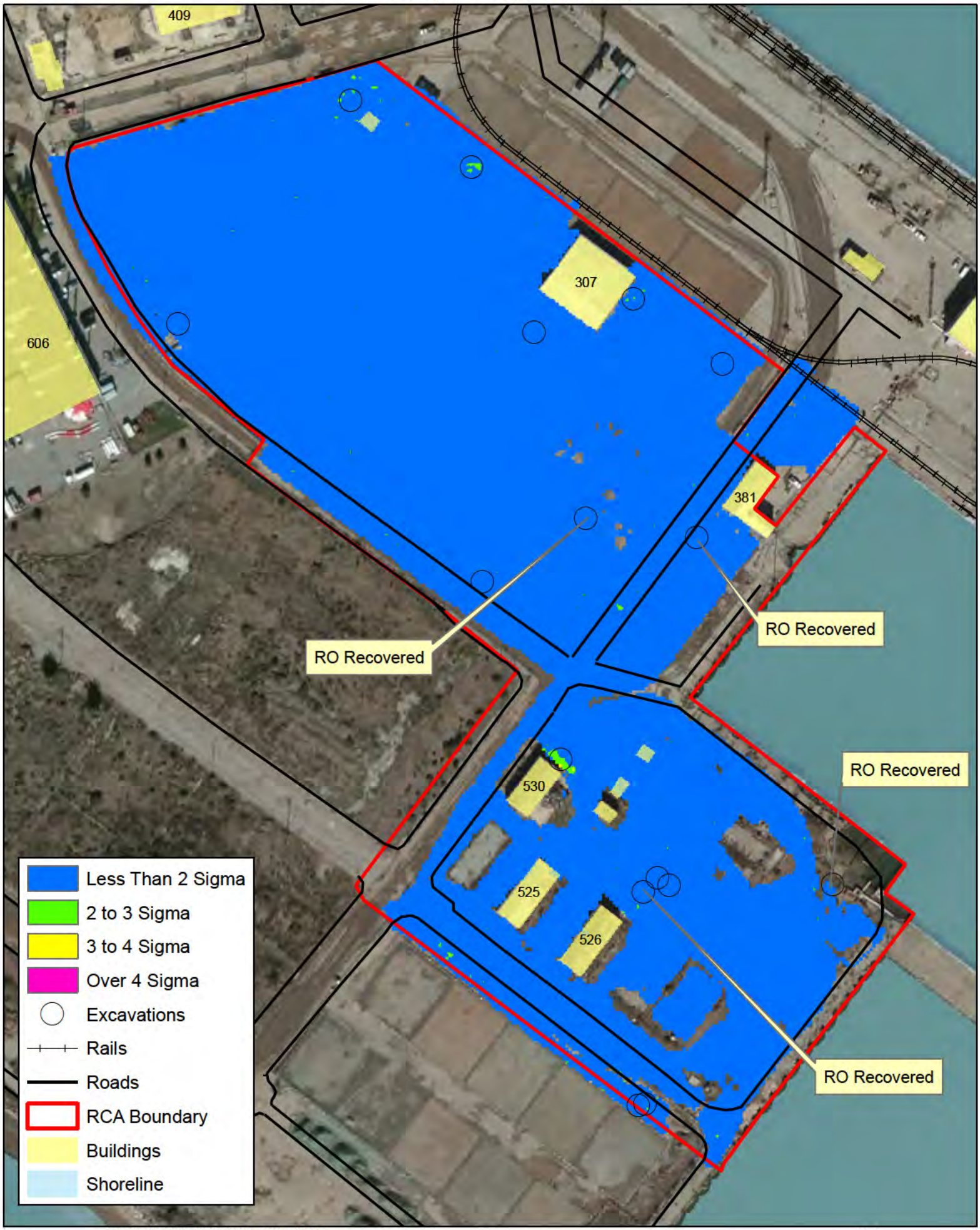
HPNS Parcel D1 Device Removal & Investigation Excvations
Cs-137 IA SIgma Values



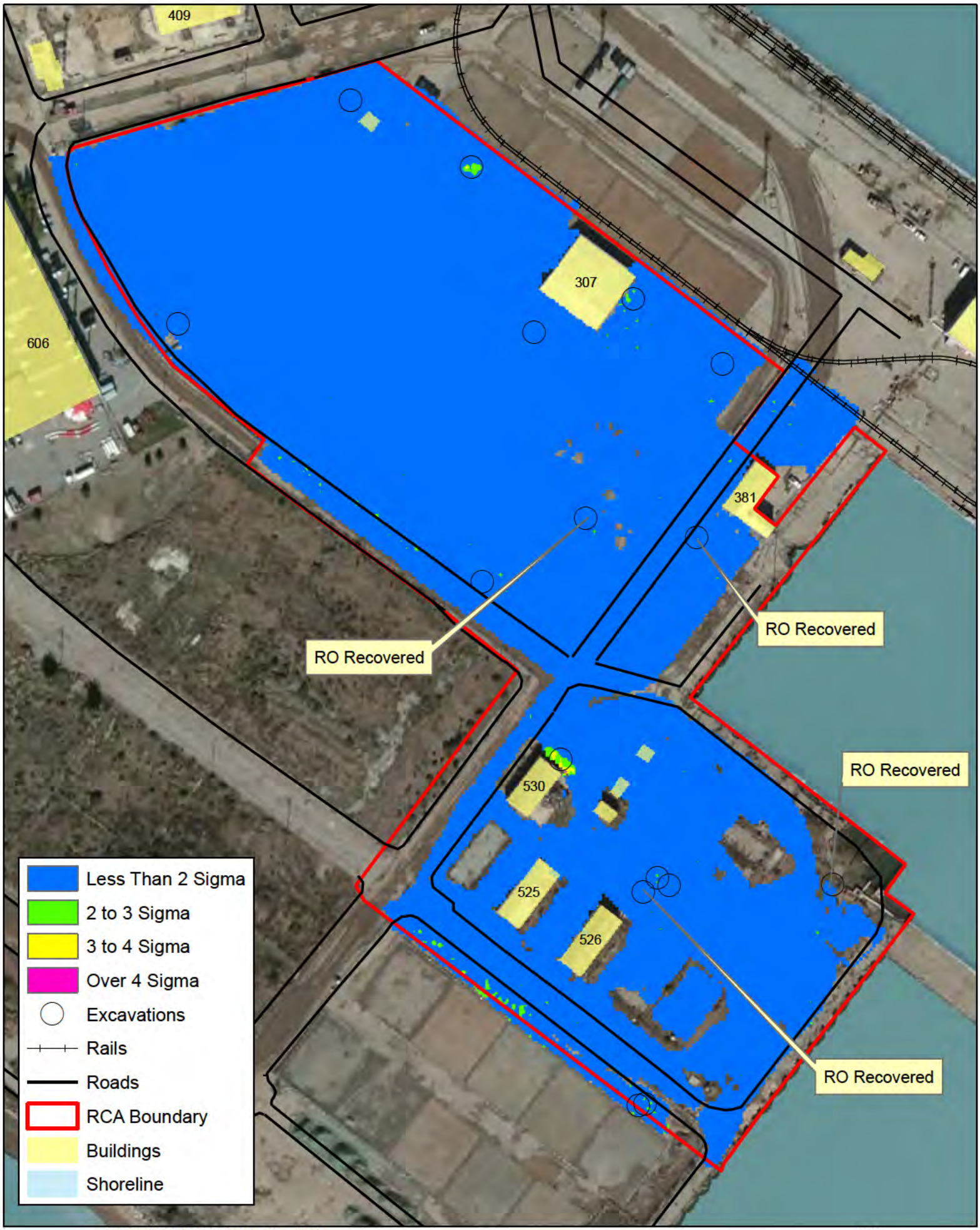
HPNS Parcel D1 Device Removal & Investigation Excvations
Ra-226 (609 KeV) IA SIgma Values



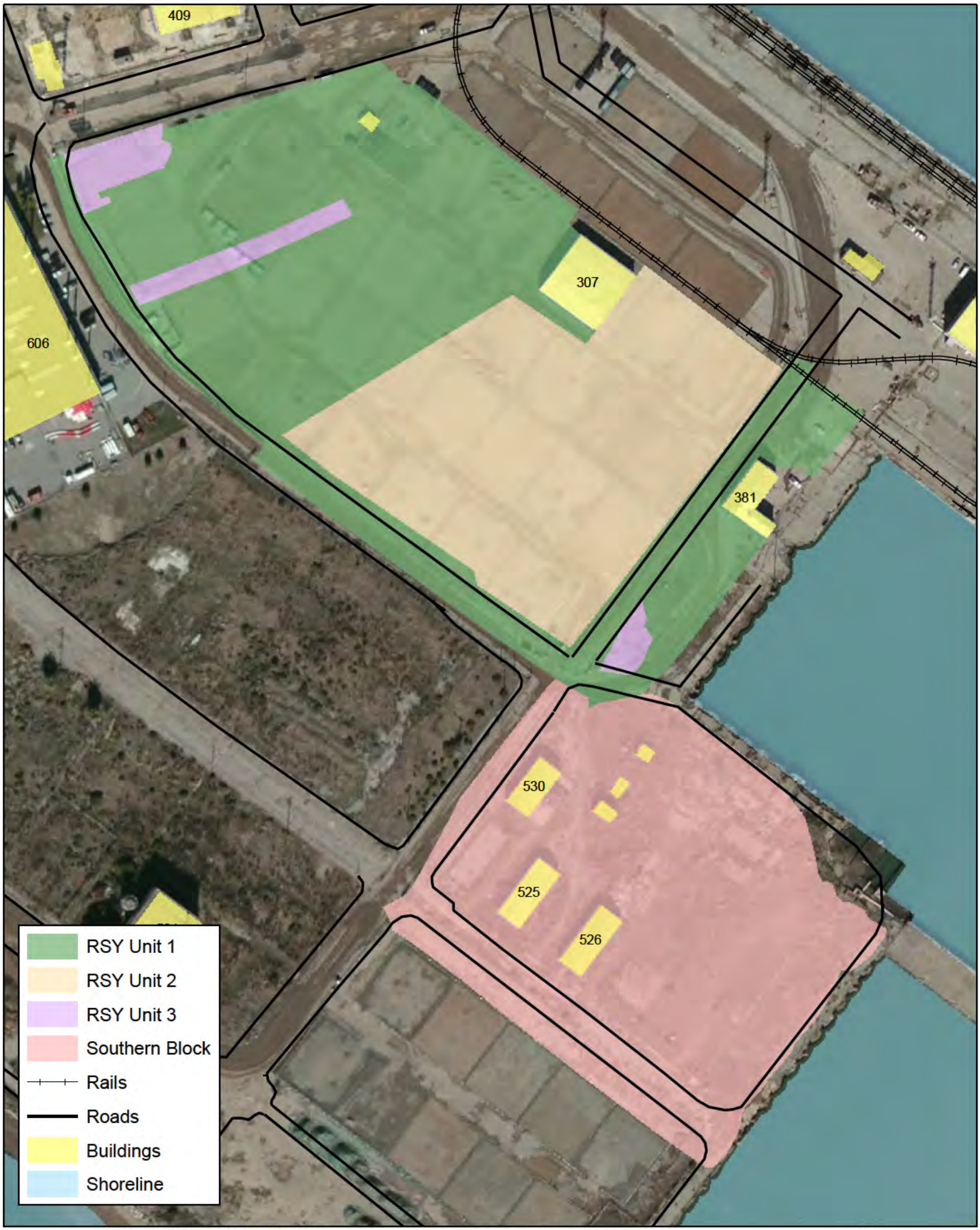
HPNS Parcel D1 Device Removal & Investigation Excvations
Ra-226 (1764 KeV) IA SIgma Values



HPNS Parcel D1 Device Removal & Investigation Excvations
Thorium IA SIgma Values



HPNS Parcel D1 Device Removal & Investigation Excvations
Investigation Units



HPNS Parcel D1 Device Removal & Investigation Excvations

| | | |
|---|---|---|
| Gilbane | Client: United States Navy BRAC | ***BORING ID: 04-PD-RO-01*** |
| | Project Number: J204000400 | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | |
| | Coordinates: Easting: 1461217.995989, Northing: 448648.553656 | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | Date Started: 02-24-2016 |
| | Sample Type(s): Grab Sample | Date Completed: 02-24-2016 |
| Weather: 50°, Clear and Sunny | Logged By: Chris Knuteson | Final Depth of Investigation: 20" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | Water Level: Not Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7510 | | | FILL | Compacted gravel FILL with mixed sands. Sands are medium to coarse grained, poorly sorted with high silt content | | |
| 3 | | | | | | FILL | | | |
| | | | 7588 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 7563 | | | FILL | | 04-PD-RO-01 | 8" |
| 9 | | | | | | FILL | | | |
| | | | 7497 | | | FILL | | | |
| 12 | | | | | | FILL | | | |
| | | | 7413 | | | FILL | | | |
| 15 | | | | | | FILL | | | |
| | | | 6314 | | | SM | Sharp lithological contact at approximately 15" | | |
| 18 | | | | | | SM | SAND, light to medium brown, well sorted, fine to medium grained, dry, non-plastic, noncohesive, uniform sub-rounded grains with trace silt and mixed small gravels | | |
| | | | 6289 | | | SM | | | |
| 21 | | | | | | | Excavation Terminated at 20" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | | |
|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: 04-PD-RO-02*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1461201.556943, Northing: 448638.546771 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-24-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-24-2016 |
| Weather: 60°, Clear and Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: 36" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: Not Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 6516 | | | FILL | FILL, rubble and debris; concrete, metal shards, gravel and sand. | | |
| 3 | | | 6714 | | | FILL | | | |
| | | | | | | FILL | | | |
| 6 | | | 6794 | | | FILL | | | |
| | | | | | | FILL | | | |
| 12 | | | 7218 | | | FILL | | | |
| | | | | | | SM | Gradual lithologic contact at approximately 12" | | |
| 15 | | | | | | SM | | | |
| | | | 8114 | | | SM | | 04-PD-RO-02 | 16" |
| 18 | | | | | | SM | | | |
| | | | 8004 | | | SM | | | |
| 21 | | | | | | SM | | | |
| | | | | | | SM | | | |
| 24 | | | 7907 | | | SM | SAND, light to medium brown, well sorted, fine to medium grained, dry, non-plastic, noncohesive, uniform sub-rounded grains with trace silt and mixed small gravels, no sedimentary structures observed | | |
| | | | | | | SM | | | |
| 27 | | | | | | SM | | | |
| | | | 7599 | | | SM | | | |
| 30 | | | | | | SM | | | |
| | | | | | | SM | | | |
| 33 | | | 7019 | | | SM | | | |
| | | | | | | SM | | | |
| 36 | | | 7447 | | | SM | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Gilbane

Client: United States Navy BRAC
Project Number: J204000400
Site Location: Hunters Point Naval Base, California (Parcel D-1)
Coordinates: Easting: 1461215.131938, Northing: 448963.044383
Investigation Method: John Deere 310J Backhoe (Excavation)
Sample Type(s): Grab Sample

**BORING ID: 04-PD-RO-03**

Sheet: 1 of 1
Date Started: 02-24-2016
Date Completed: 02-24-2016
Final Depth of Investigation: 36"
Water Level: None Encountered

Weather: 66°, Clear, Sunny
Drilling Contractor: Gilbane Operator
Logged By: Chris Knuteson
Assist By: Chris Bryson

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7014 | | | | Asphalt at surface to 2" | | |
| 3 | | | | | | FILL | | | |
| | | | 7367 | | | FILL | FILL, mixed gravel and sands, debris, rubble, metal, glass, moderate fuel oil odor, soil stained (black/gray), high silt content. | | |
| 6 | | | | | | FILL | | | |
| | | | 88,819 | | | FILL | | | |
| 12 | | | | | | FILL | | | |
| | | | 169,777 | | | FILL | RADIOLOGICAL OBJECT FOUND IN FILL MATERIAL | | |
| 15 | | | | | | FILL | | | |
| | | | 181,991 | | | FILL | 252,914 CPM on contact | 04-PD-RO 03 | 18" |
| 18 | | | | | | FILL | | | |
| | | | 7098 | | | FILL | | | |
| 21 | | | 7112 | | | FILL | | | |
| | | | 6820 | | | SM | Sharp lithological contact at approximatly 21" | | |
| 24 | | | | | | SM | | | |
| | | | 6600 | | | SM | | | |
| 27 | | | | | | SM | | | |
| | | | 6659 | | | SM | SAND, light bown, very well sorted, fine grained, high quartz content, shell fragments, rounded grains, trace silt | | |
| 30 | | | | | | SM | | | |
| | | | 6651 | | | SM | | | |
| 33 | | | | | | SM | | | |
| | | | 6967 | | | SM | | | |
| 36 | | | 6615 | | | SM | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.
Additional excavation bounding samples also collected.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | |
|---|---|---|
| Gilbane | Client: United States Navy BRAC | ***BORING ID: 04-PD-RO-04*** |
| | Project Number: J204000400 | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | |
| | Coordinates: Easting: 1461235.859280, Northing: 448985.202141 | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | Date Started: 02-24-2016 |
| | Sample Type(s): Grab Sample | Date Completed: 02-24-2016 |
| Weather: 60°, Clear, Sunny | Logged By: Chris Knuteson | Final Depth of Investigation: 36" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 6118 | | | | Asphalt to 2" | | |
| 3 | | | 7110 | | | | FILL, mixed gravel and sands, debris, rubble, metal, glass, high silt content. | | |
| 6 | | | 7310 | | | | | | |
| 12 | | | 7098 | | | | | | |
| 15 | | | 7137 | | | | | | |
| 18 | | | 7271 | | | | | 04-PD-RO-04 | 18" |
| 21 | | | 7000 | | | | Gradual lithological contact at approximatly 20" | | |
| 24 | | | 7168 | | | | SAND, light bown, very well sorted, fine grained, high quartz content, rounded grains, trace silt | | |
| 27 | | | 7173 | | | | | | |
| 30 | | | 7003 | | | | | | |
| 33 | | | 7211 | | | | | | |
| 36 | | | 7210 | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |
| | | |
| | | |
| | | |
| | | |
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| | | |

Gilbane

Client: United States Navy BRAC
Project Number: J204000400
Site Location: Hunters Point Naval Base, California (Parcel D-1)
Coordinates: Easting: 1461496.027810, Northing: 448974.486541
Investigation Method: John Deere 310J Backhoe (Excavation)
Sample Type(s): Grab Sample

**BORING ID: 04-PD-RO-05**

Sheet: 1 of 1
Date Started: 02-24-2016
Date Completed: 02-24-2016
Final Depth of Investigation: 18"
Water Level: None Encountered

Weather: 64°, Clear, Sunny
Drilling Contractor: Gilbane Operator
Logged By: Chris Knuteson
Assist By: Chris Bryson

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 8132 | | | FILL | Compacted sand/ class five gravel to 2" | | |
| 3 | | | 11,233 | | | FILL | FILL, gravel, sub angular, poorly sorted, coarse grained. Sand fill, poorly sorted, coarse grained | | |
| 6 | | | | | | FILL | | | |
| | | | 99,877 | | | FILL | RADIOLOGICAL OBJECT FOUND IN FILL MATERIAL | 04-PD-RO 05 | 10" |
| 12 | | | 101,113 | | | FILL | 131,889 CPM on contact | | |
| | | | 8678 | | | FILL | | | |
| 15 | | | | | | FILL | | | |
| | | | 8091 | | | FILL | Gradual lithologic contact at approximatly 16" | | |
| 18 | | | 8055 | | | SM | SAND, very well sorted, well rounded, light to medium brown, trace silt, fine grained | | |
| | | | | | | | Excavation terminated at 18" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | | |
|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: 04-PD-RO-06*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1461253.169773, Northing: 448973.755322 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-24-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-24-2016 |
| Weather: 63°, Clear, Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: 36" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7031 | | | | Asphalt to 1" (heavily worn, broken) | | |
| 3 | | | 7110 | | | FILL | 1" Minus rock (angular rock with sand/silt/fines to aid in compaction) to 3", GRAVEL, sand base, sand is course, poorly sorted, fill sand, medium to dark brown. | | |
| 6 | | | 7115 | | | FILL | | | |
| 12 | | | 6936 | | | FILL | | 04-PD-RO-06 | 10" |
| 15 | | | | | | FILL | | | |
| 18 | | | 6118 | | | FILL | | | |
| 21 | | | | | | SM | Sharp lithological contact at 18" | | |
| 24 | | | 7095 | | | SM | SAND, fine grained, well sorted, sub-rounded grains, shell fragments, high quartz content, trace silt, | | |
| 27 | | | 7045 | | | SM | | | |
| 30 | | | 7099 | | | SM | | | |
| 33 | | | 7036 | | | SM | | | |
| 36 | | | 7005 | | | SM | | | |
| | | | 7009 | | | SM | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | |
|---|---|---|
| Gilbane | Client: United States Navy BRAC | **BORING ID: 04-PD-RO-07** |
| | Project Number: J204000400 | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | |
| | Coordinates: Easting: 1461092.463825, Northing: 449159.538892 | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | Date Started: 02-24-2016 |
| | Sample Type(s): Grab Sample | Date Completed: 02-24-2016 |
| Weather: 70°, Clear, Sunny | Logged By: Chris Knuteson | Final Depth of Investigation: 36" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 8122 | | | OL | Compacted silt/gravel fill to 3", mixed organics (grass) | | |
| 3 | | | | | | OL | | | |
| | | | 8769 | | | SM | SAND, green/brown color, well sorted, high silt content, lenses of oxidation (1mm-2mm in height) colored red/oarnge, moist/damp | | |
| 6 | | | | | | SM | | | |
| | | | 8410 | | | SM | | | |
| 12 | | | 9005 | | | SM | | 04-PD-RO-07 | 12" |
| | | | 8991 | | | SM | | | |
| 15 | | | | | | SM | | | |
| | | | 8212 | | | SM | | | |
| 18 | | | | | | SM | | | |
| | | | 8891 | | | SM | | | |
| 21 | | | | | | SM | | | |
| | | | 8775 | | | SM | | | |
| 24 | | | | | | SM | | | |
| | | | 8418 | | | SM | Sharp lithological contact at 24" | | |
| 27 | | | | | | SM | | | |
| | | | 8219 | | | SM | | | |
| 30 | | | | | | SM | | | |
| | | | 8009 | | | SM | SAND, medium to dark brown, well sorted, sub rounded grains, with moderate silt | | |
| 33 | | | | | | SM | | | |
| | | | 8089 | | | SM | | | |
| 36 | | | 8066 | | | SM | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |
| | | |
| | | |
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| | | |

Gilbane

| | |
|---|---|
| Client: | United States Navy BRAC |
| Project Number: | J204000400 |
| Site Location: | Hunters Point Naval Base, California (Parcel D-1) |
| Coordinates: | Easting: 1461298.300458, Northing: 449489.892634 |
| Investigation Method: | John Deere 310J Backhoe (Excavation) |
| Sample Type(s): | Grab Sample |

**BORING ID: 04-PD-RO-08**

Sheet: 1 of 1
Date Started: 02-24-2016
Date Completed: 02-24-2016
Final Depth of Investigation: 36"
Water Level: None Encountered

Weather: 50°, Clear, Sunny
Drilling Contractor: Gilbane Operator
Logged By: Chris Knuteson
Assist By: Chris Bryson

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 8667 | | | FILL | | | |
| 3 | | | | | | FILL | | | |
| | | | 10,111 | | | FILL | FILL, compacted asphalt base, silt and gravel, 1" minus material | | |
| 6 | | | 15,886 | | | FILL | | | |
| | | | | | | FILL | | | |
| 12 | | | 18,881 | | | FILL | | | |
| | | | 20,114 | | | FILL | RADIOLOGICAL OBJECT FOUND IN FILL MATERIAL<br>20,114 CPM on contact | 04-PD-RO 08 | 14" |
| 15 | | | | | | FILL | | | |
| | | | 7661 | | | FILL | | | |
| 18 | | | | | | FILL | | | |
| | | | 7699 | | | FILL | | | |
| 21 | | | | | | FILL | | | |
| | | | 7598 | | | FILL | | | |
| 24 | | | | | | FILL | | | |
| | | | 7608 | | | FILL | | | |
| 27 | | | | | | FILL | | | |
| | | | 7685 | | | FILL | | | |
| 30 | | | | | | FILL | | | |
| | | | 7588 | | | FILL | | | |
| 33 | | | | | | SP | Sharp lithological contact at 32" | | |
| | | | 7290 | | | SP | SAND, medium to dark brown, with mixed gravel and silts. Sand is poorly sorted, subrounded, gravel is sub angular and medium to coarse grained. | | |
| 36 | | | 7611 | | | SP | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| | | |
|---|---|---|
| Gilbane | Client: United States Navy BRAC | ***BORING ID: 04-PD-RO-09*** |
| | Project Number: J204000400 | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | |
| | Coordinates: Easting: 1460959.670178, Northing: 450039.410394 | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | Date Started: 02-23-2016 |
| | Sample Type(s): Grab Sample | Date Completed: 02-23-2016 |
| Weather: 60°, Clear, Sunny | Logged By: Chris Knuteson | Final Depth of Investigation: 60" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 3 | | | 7834 | | | FILL | Compacted class five gravel with fines, grey to dark grey, to 5" | | |
| | | | 9955 | | | FILL | | | |
| 6 | | | | | | ML | SAND, grey/green, fine to medium grained, sub rounded, well sorted, very high silt content | 04-PD-RO-09 | 10" |
| | | | 10,112 | | | ML | | | |
| 12 | | | | | | ML | | | |
| | | | 9965 | | | ML | | | |
| 15 | | | | | | ML | | | |
| | | | 9986 | | | ML | | | |
| 18 | | | | | | ML | | | |
| | | | 9910 | | | ML | | | |
| 21 | | | | | | ML | | | |
| | | | 9801 | | | ML | | | |
| 24 | | | | | | ML | | | |
| | | | 9444 | | | ML | | | |
| 27 | | | | | | ML | | | |
| | | | 9401 | | | ML | | | |
| 30 | | | | | | ML | | | |
| | | | 9405 | | | ML | | | |
| 33 | | | | | | ML | | | |
| | | | 9442 | | | ML | | | |
| 36 | | | | | | SM | SAND, with high silt content, well sorted, sub rounded grains, moist, medium to dark grey | | |
| | | | 9319 | | | SM | | | |
| 39 | | | | | | SM | | | |
| | | | 9323 | | | SM | | | |
| 42 | | | | | | SM | | | |
| | | | 9316 | | | SM | | | |
| 45 | | | | | | SM | | | |
| | | | 9325 | | | SM | | | |
| 48 | | | | | | SM | | | |
| | | | 9300 | | | SM | | | |
| 51 | | | | | | SM | | | |
| | | | 9315 | | | SM | | | |
| 54 | | | | | | SM | | | |
| | | | 9316 | | | SM | | | |
| 57 | | | | | | SM | | | |
| | | | 9301 | | | SM | | | |
| 60 | | | 9308 | | | SM | | | |
| | | | | | | | End of excavation at 60" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | | |
|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: 04-PD-RO-10*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1460524.153872, Northing: 449806.868351 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-23-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-23-2016 |
| Weather: 60°, Clear, Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: 24" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 3 | | | 7516 | | | | Asphalt to 5", new asphalt patch (compared to immediate area) | | |
| 6 | | | 5510 | | | FILL | Asphalt compacted base, fill, gravel fines, poorly sorted, light grey to dark grey. | 04-PD-RO-10 | 8" |
| 12 | | | 5655 | | | FILL | | | |
| 15 | | | 5122 | | | FILL | | | |
| 18 | | | 5202 | | | FILL | | | |
| 21 | | | 5049 | | | FILL | | | |
| 24 | | | 4988 | | | GM | SAND/GRAVEL fill, high silt content, light to medium brown, poorly sorted, sub rounded, gravel includes small cobbles (sub rounded) and angular granite rocks, moist | | |
| | | | | | | GM | | | |
| | | | | | | GM | Excavation terminated at 24" due to utility concern in immediate area | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

Gilbane

Client: United States Navy BRAC
Project Number: J204000400
Site Location: Hunters Point Naval Base, California (Parcel D-1)
Coordinates: Easting: 1461129.312249, Northing: 449518.121744
Investigation Method: John Deere 310J Backhoe (Excavation)
Sample Type(s): Grab Sample

**BORING ID: : 04-PD-RO-11**

Sheet: 1 of 1
Date Started: 02-23-2016
Date Completed: 02-23-2016

Weather: 50°, Clear, Sunny
Drilling Contractor: Gilbane Operator
Logged By: Chris Knuteson
Assist By: Chris Bryson
Final Depth of Investigation: 36"
Water Level: None Encountered

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | 8508 | | | FILL | | | |
| 3 | | | | | | FILL | FILL, compacted sand and silt with 1" minus, cobbles to 9" in diameter, rubble material (concrete, metal, glass shards), grey to dark grey | | |
| | | | 9040 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 9671 | | | FILL | | | |
| 12 | | | 28,995 | | | FILL | RADIOLOGICAL OBJECT FOUND IN FILL MATERIAL<br>30,972 CPM on contact | 04-PD-RO 11 | 12" |
| 15 | | | 8855 | | | SW | | | |
| | | | | | | SW | | | |
| 18 | | | 8025 | | | SW | | | |
| | | | | | | SW | | | |
| 21 | | | 8036 | | | SW | | | |
| | | | | | | SW | | | |
| 24 | | | 8182 | | | SW | SAND, coarse grained, poorly sorted, sub rounded grains, with trace angular gravel, medium to dark brown, moist | | |
| | | | | | | SW | | | |
| 27 | | | 8081 | | | SW | | | |
| | | | | | | SW | | | |
| 30 | | | 8503 | | | SW | | | |
| | | | | | | SW | | | |
| 33 | | | 8254 | | | SW | | | |
| | | | | | | SW | | | |
| 36 | | | 8069 | | | SW | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | | |
|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: : 04-PD-RO-12*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1460780.504924, Northing: 450138.518773 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-23-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-23-2016 |
| Weather: 66°, Clear, Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: 36" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 9112 | | | FILL | GRAVEL, class five, compacted, with 1" minus base, fill with concrete, metal shard, fire brick (red) and fines | | |
| 3 | | | | | | FILL | | | |
| | | | 9389 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 10,251 | | | FILL | | | |
| 12 | | | 12,010 | | | FILL | | 04-PD-RO-12 | 12" |
| | | | | | | FILL | | | |
| 15 | | | 10,116 | | | FILL | | | |
| | | | | | | FILL | | | |
| 18 | | | 9193 | | | FILL | | | |
| | | | | | | SM | Sharp lithological contact at 18" | | |
| 21 | | | 7515 | | | SM | | | |
| | | | | | | SM | | | |
| 24 | | | 7599 | | | SM | | | |
| | | | | | | SM | | | |
| 27 | | | 7485 | | | SM | | | |
| | | | | | | SM | SAND, light brown, fine to medium grained, well sorted, rounded, shell fragments, high quartz content, moist (beach sand?) | | |
| 30 | | | 7429 | | | SM | | | |
| | | | | | | SM | | | |
| 33 | | | 7111 | | | SM | | | |
| | | | | | | SM | | | |
| 36 | | | 7251 | | | SM | | | |
| | | | 7112 | | | SM | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |
| | | |
| | | |
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|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: 04-PD-RO-13*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1460976.238489, Northing: 449424.188114 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-24-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-24-2016 |
| Weather: 70°, Clear, Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: 48" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 6386 | | | FILL | | | |
| 3 | | | | | | FILL | | | |
| | | | 6711 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 6651 | | | FILL | | | |
| 12 | | | | | | FILL | Compacted fill material, large cobbles and gravel, 1" minus material, medium brown, wire, rebar fragments, silt | | |
| | | | 6522 | | | FILL | | | |
| 15 | | | | | | FILL | | | |
| | | | 6685 | | | FILL | | | |
| 18 | | | | | | FILL | | | |
| | | | 6632 | | | FILL | | | |
| 21 | | | | | | FILL | | | |
| | | | 6527 | | | SP/SM | Sharp lithological contact at approximatly 21" | | |
| 24 | | | | | | SP/SM | | | |
| | | | 6511 | | | SP/SM | | | |
| 27 | | | | | | SP/SM | | | |
| | | | 6741 | | | SP/SM | | 04-PD-RO-13 | 28" |
| 30 | | | | | | SP/SM | | | |
| | | | 6603 | | | SP/SM | | | |
| 33 | | | | | | SP/SM | | | |
| | | | 6518 | | | SP/SM | Silty SAND, sand is very fine, rounded grains, well sprted, large (1mm-5mm) silt clumps, oxidation staining (light green), moist | | |
| 36 | | | | | | SP/SM | | | |
| | | | 6536 | | | SP/SM | | | |
| 39 | | | | | | SP/SM | | | |
| | | | 6565 | | | SP/SM | | | |
| 42 | | | | | | SP/SM | | | |
| | | | 6584 | | | SP/SM | | | |
| 45 | | | | | | SP/SM | | | |
| | | | 6652 | | | SP/SM | Same as above, rock fragments of serpantine encountered at 45", pebble to small cobble sized | | |
| 48 | | | 6618 | | | SP/SM | | | |
| | | | | | | | Excavation terminated at 48" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |

| | | | |
|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: 04-PD-RO-14*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1461333.250113, Northing: 449747.442375 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-23-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-23-2016 |
| Weather: 70°, Clear, Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: 36" |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7218 | | | FILL | Compacted asphalt base/coarse gravel fill, anfular to sub angular, 1" minus material, very silty, light brown with grey | | |
| 3 | | | | | | FILL | | | |
| | | | 7196 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 7036 | | | FILL | | | |
| 12 | | | | | | FILL | | | |
| | | | 7316 | | | FILL | Sharp lithological contact at approximatly 12" | 04-PD-RO-14 | 12" |
| 15 | | | | | | FILL | | | |
| | | | 6589 | | | FILL | GRAVEL fill material with red brick fragments, heavily oxidized (red) silt and sand with trace clay, moist | | |
| 18 | | | | | | FILL | | | |
| | | | 6599 | | | FILL | | | |
| 21 | | | | | | FILL | | | |
| | | | 6523 | | | FILL | | | |
| 24 | | | | | | FILL | | | |
| | | | 6613 | | | FILL | | | |
| 27 | | | | | | FILL | | | |
| | | | 6847 | | | FILL | | | |
| 30 | | | | | | FILL | | | |
| | | | 6689 | | | FILL | | | |
| 33 | | | | | | FILL | | | |
| | | | 6600 | | | FILL | | | |
| 36 | | | 6609 | | | FILL | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |
| | | |
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| | | | |
|---|---|---|---|
| Gilbane | Client: United States Navy BRAC | | ***BORING ID: 04-PD-RO-15*** |
| | Project Number: J204000400 | | |
| | Site Location: Hunters Point Naval Base, California (Parcel D-1) | | |
| | Coordinates: Easting: 1461199.769281, Northing: 449843.930973 | | Sheet: 1 of 1 |
| | Investigation Method: John Deere 310J Backhoe (Excavation) | | Date Started: 02-23-2016 |
| | Sample Type(s): Grab Sample | | Date Completed: 02-23-2016 |
| Weather: 70°, Clear, Sunny | Logged By: Chris Knuteson | | Final Depth of Investigation: |
| Drilling Contractor: Gilbane Operator | Assist By: Chris Bryson | | Water Level: None Encountered |

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7375 | | | FILL | Compacted asphalt base, silty fill with small rock fragments (1mm-10mm), coarse sand and gravel, poorly sorted, sub rounded, 1" minus material with fines, mostly brown to dark brown | | |
| 3 | | | | | | FILL | | | |
| | | | 8881 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 10,001 | | | FILL | | | |
| 12 | | | 10,812 | | | GP/GM | Gradual lithological contact at approximatly 15" | 04-PD-RO-15 | 12" |
| | | | | | | GP/GM | | | |
| 15 | | | 6637 | | | GP/GM | SILT/GRAVEL, sub rounded, poorly sorted, coarse, moist, light to dark grey | | |
| | | | | | | GP/GM | | | |
| 18 | | | 6633 | | | GP/GM | | | |
| | | | | | | GP/GM | | | |
| 21 | | | 6689 | | | GP/GM | | | |
| | | | | | | GP/GM | | | |
| 24 | | | 6755 | | | GP/GM | | | |
| | | | | | | GP/GM | | | |
| 27 | | | 6715 | | | GP/GM | | | |
| | | | | | | GP/GM | | | |
| 30 | | | 6729 | | | GP/GM | | | |
| | | | | | | GP/GM | | | |
| 33 | | | 6733 | | | GP/GM | | | |
| | | | | | | GP/GM | | | |
| 36 | | | 6661 | | | GP/GM | | | |
| | | | | | | | Excavation terminated at 36" below grade | | |

**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| | | None Encountered |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Gilbane

Client: United States Navy BRAC
Project Number: J204000400
Site Location: Hunters Point Naval Base, California (Parcel D-1)
Coordinates:
Investigation Method: John Deere 310J Backhoe (Excavation)
Sample Type(s): Grab Sample

**BORING ID: 04-PD-RO-15**

Sheet: 1 of 1
Date Started: 02-23-2016
Date Completed: 02-23-2016

Weather: 50°, Clear, Sunny
Drilling Contractor: Gilbane Operator
Logged By: Chris Knuteson
Assist By: Chris Bryson
Final Depth of Investigation: 72"
Water Level: 72"

| Depth (inches) | Geotechnical sample ID | Sample Depth (inches) | Counts Per Minute on Contact (CPM) | Notes #1 | Notes #2 | U.S.C.S | MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known) | Lab Sample ID | Lab Sample Depth (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7510 | | | FILL | Asphalt to 2" | | |
| 3 | | | | | | FILL | Asphalt Base, sand and gravel (mixed), compacted | | |
| | | | 7002 | | | FILL | | | |
| 6 | | | | | | FILL | | | |
| | | | 4910 | | | FILL | | | |
| 12 | | | | | | FILL | | | |
| | | | 4501 | | | FILL | | | |
| 15 | | | | | | FILL | | | |
| | | | 5398 | | | FILL | FILL material, gravel, glass, metal, broken up bricks, cobbles, sand, rebar fragments, silt | | |
| 18 | | | | | | FILL | | | |
| | | | 5333 | | | FILL | | | |
| 21 | | | | | | FILL | | | |
| | | | 5369 | | | FILL | | | |
| 24 | | | | | | FILL | SILT/GRAVEL fill, oxidation (red/orange), cobbles, coarse sand and gravel | | |
| | | | 7789 | | | FILL | | 04-PD-RO 16 | 24" |
| 27 | | | | | | FILL | | | |
| | | | 7755 | | | FILL | | | |
| 30 | | | | | | FILL | Same as above, sand and silt increasing, moist | | |
| | | | 6561 | | | FILL | | | |
| 33 | | | | | | FILL | | | |
| | | | 6517 | | | FILL | | | |
| 36 | | | | | | FILL | | | |
| | | | 6590 | | | FILL | | | |
| 39 | | | | | | FILL | | | |
| | | | 6781 | | | FILL | | | |
| 42 | | | | | | FILL | | | |
| | | | 6629 | | | FILL | | | |
| 45 | | | | | | FILL | | | |
| | | | 6836 | | | FILL | | | |
| 48 | | | | | | FILL | Same as above, silt increasing, sand becoming better sorted, sub rounded grains | | |
| | | | 6962 | | | FILL | | | |
| 51 | | | | | | FILL | | | |
| | | | 6664 | | | FILL | | | |
| 54 | | | | | | FILL | | | |
| | | | 6671 | | | FILL | | | |
| 57 | | | | | | FILL | | | |
| | | | 6947 | | | FILL | | | |
| 60 | | | | | | FILL | Same as above, cobbles decreasing | | |
| | | | 6359 | | | FILL | | | |
| 63 | | | | | | FILL | | | |
| | | | 6638 | | | FILL | | | |
| 66 | | | | | | FILL | | | |
| | | | 6889 | | | FILL | | | |
| 69 | | | | | | FILL | | | |
| | | | 6751 | | | FILL | | | |
| 72 | | | 6853 | | | FILL | Same as above, water encountered at 72" | | |
| | | | | | | | Excavation terminated at 72" | | |

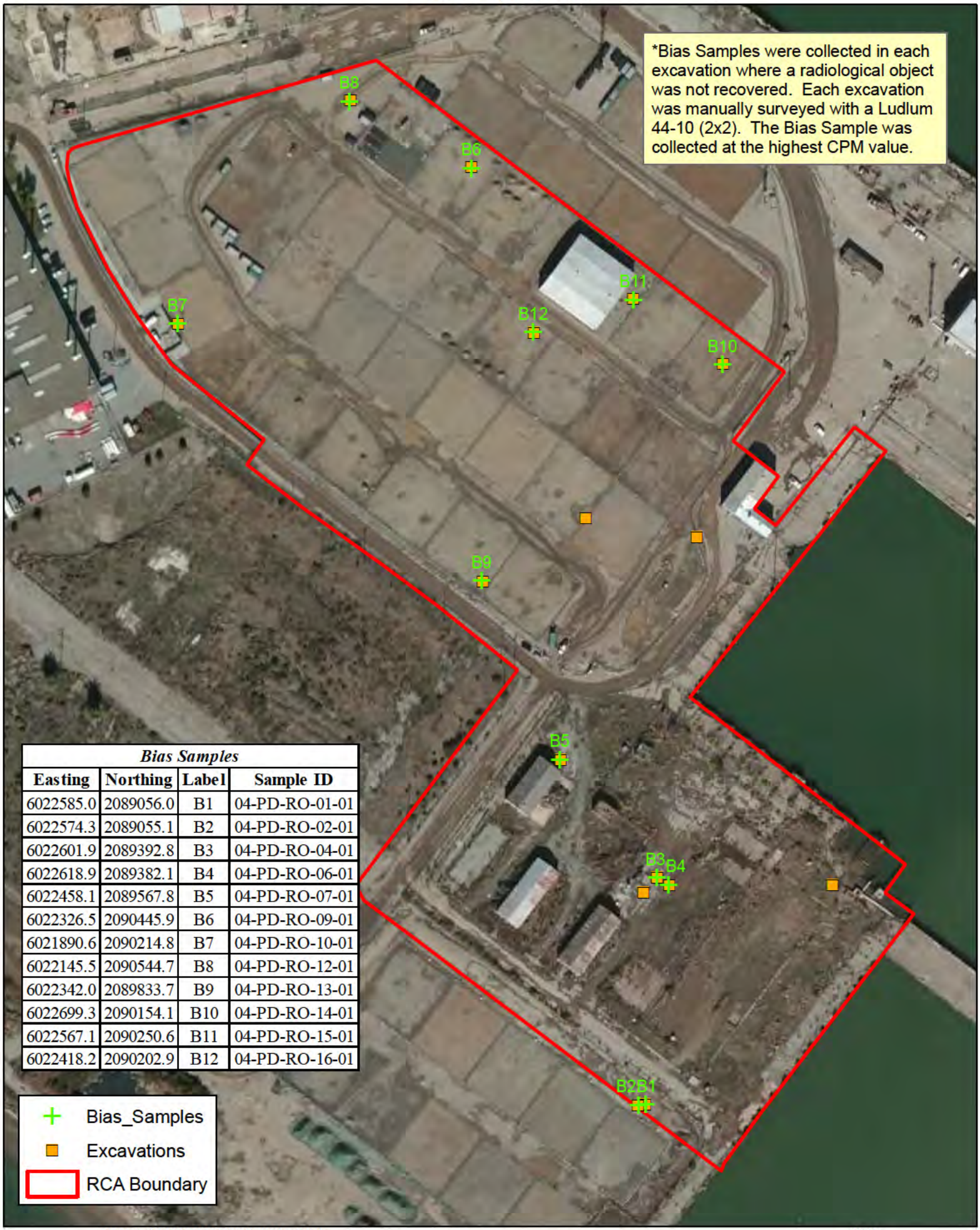
**NOTES:** Ludlum 2221 with a 44-10 Sodium Iodide detector used for field CPM measurements.
One bias sample collected at the depth with the highest CPM reading in the excavation.

Completed by: Chris Knuteson, CHMM
Envirachem, Inc.

| Date | Time | Depth to groundwater during investigation |
|---|---|---|
| 2/23/2016 | 11am | 72" |

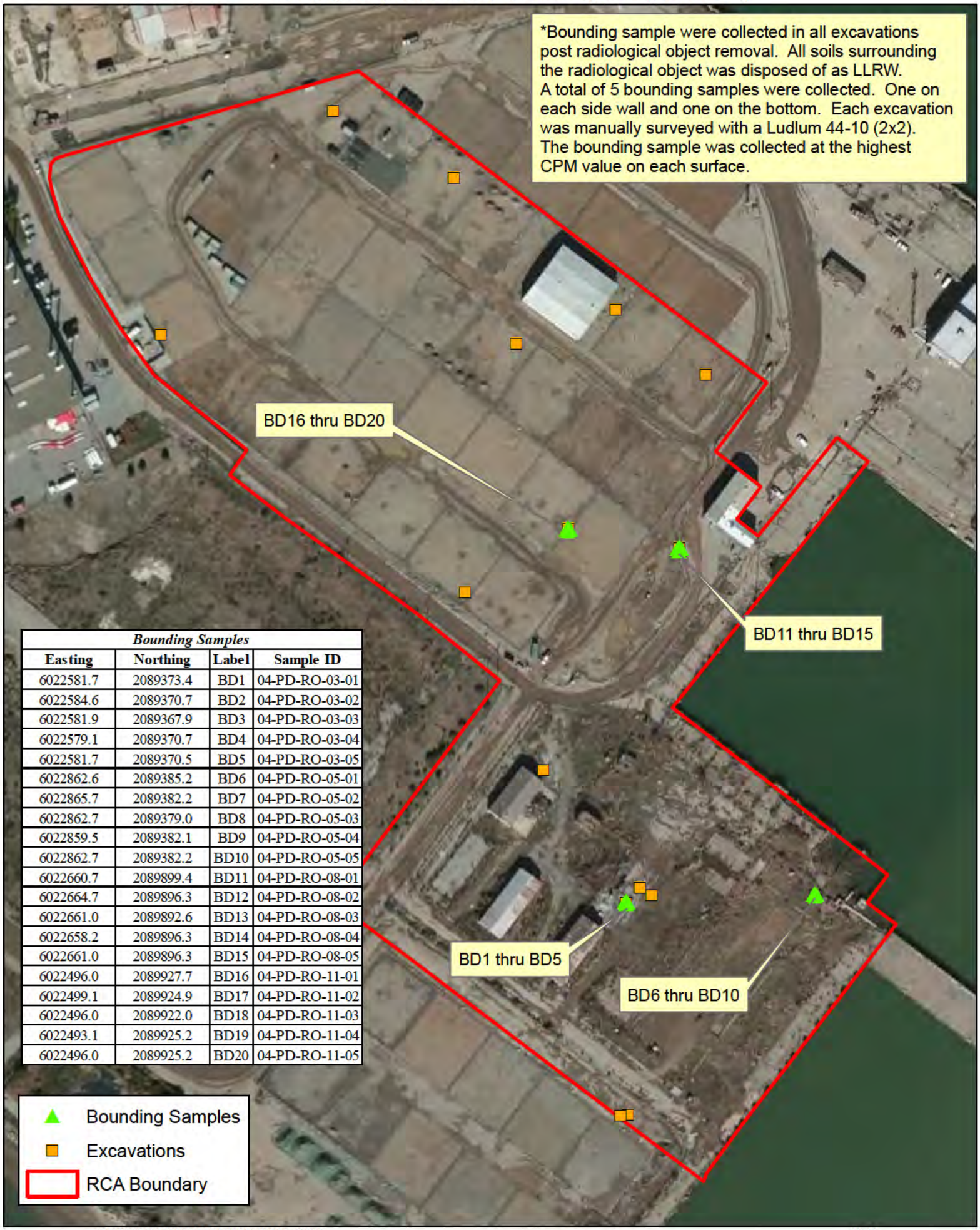
HPNS Parcel D1 Device Removal & Investigation Excvations
Recovered Radiological Objects

HPNS Parcel D1 Device Removal & Investigation Excvations
Bias Sample Locations




| *Bias Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022585.0 | 2089056.0 | B1 | 04-PD-RO-01-01 |
| 6022574.3 | 2089055.1 | B2 | 04-PD-RO-02-01 |
| 6022601.9 | 2089392.8 | B3 | 04-PD-RO-04-01 |
| 6022618.9 | 2089382.1 | B4 | 04-PD-RO-06-01 |
| 6022458.1 | 2089567.8 | B5 | 04-PD-RO-07-01 |
| 6022326.5 | 2090445.9 | B6 | 04-PD-RO-09-01 |
| 6021890.6 | 2090214.8 | B7 | 04-PD-RO-10-01 |
| 6022145.5 | 2090544.7 | B8 | 04-PD-RO-12-01 |
| 6022342.0 | 2089833.7 | B9 | 04-PD-RO-13-01 |
| 6022699.3 | 2090154.1 | B10 | 04-PD-RO-14-01 |
| 6022567.1 | 2090250.6 | B11 | 04-PD-RO-15-01 |
| 6022418.2 | 2090202.9 | B12 | 04-PD-RO-16-01 |

HPNS Parcel D1 Device Removal & Investigation Excvations
Bounding Sample Locations (Post Radiological Object Removal)




| *Bounding Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022581.7 | 2089373.4 | BD1 | 04-PD-RO-03-01 |
| 6022584.6 | 2089370.7 | BD2 | 04-PD-RO-03-02 |
| 6022581.9 | 2089367.9 | BD3 | 04-PD-RO-03-03 |
| 6022579.1 | 2089370.7 | BD4 | 04-PD-RO-03-04 |
| 6022581.7 | 2089370.5 | BD5 | 04-PD-RO-03-05 |
| 6022862.6 | 2089385.2 | BD6 | 04-PD-RO-05-01 |
| 6022865.7 | 2089382.2 | BD7 | 04-PD-RO-05-02 |
| 6022862.7 | 2089379.0 | BD8 | 04-PD-RO-05-03 |
| 6022859.5 | 2089382.1 | BD9 | 04-PD-RO-05-04 |
| 6022862.7 | 2089382.2 | BD10 | 04-PD-RO-05-05 |
| 6022660.7 | 2089899.4 | BD11 | 04-PD-RO-08-01 |
| 6022664.7 | 2089896.3 | BD12 | 04-PD-RO-08-02 |
| 6022661.0 | 2089892.6 | BD13 | 04-PD-RO-08-03 |
| 6022658.2 | 2089896.3 | BD14 | 04-PD-RO-08-04 |
| 6022661.0 | 2089896.3 | BD15 | 04-PD-RO-08-05 |
| 6022496.0 | 2089927.7 | BD16 | 04-PD-RO-11-01 |
| 6022499.1 | 2089924.9 | BD17 | 04-PD-RO-11-02 |
| 6022496.0 | 2089922.0 | BD18 | 04-PD-RO-11-03 |
| 6022493.1 | 2089925.2 | BD19 | 04-PD-RO-11-04 |
| 6022496.0 | 2089925.2 | BD20 | 04-PD-RO-11-05 |

**Bias & Bounding Sample Locations**
**Summary of Definitive Laboratory Results for SDG 16-00670.txt**

| Sample ID | Analysis Code | Nuclide | Activity | Flag | Activity Units | Release Limit | Exceeds Release Limit |
|---|---|---|---|---|---|---|---|
| 04-PD-RO-01-01 | E901.1 | Cesium 137 | -0.0110 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.356 | U | PCI/G | 1.00 | N |
| 04-PD-RO-02-01 | E901.1 | Cesium 137 | 0.00600 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.264 | | PCI/G | 1.00 | N |
| 04-PD-RO-03-01 | E901.1 | Cesium 137 | 0.0220 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.284 | | PCI/G | 1.00 | N |
| 04-PD-RO-03-02 | E901.1 | Cesium 137 | 0.0190 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.389 | | PCI/G | 1.00 | N |
| 04-PD-RO-03-03 | E901.1 | Radium 226 | 0.415 | | PCI/G | 1.00 | N |
| | | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| 04-PD-RO-03-04 | E901.1 | Cesium 137 | 0.00500 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.440 | | PCI/G | 1.00 | N |
| 04-PD-RO-03-05 | E901.1 | Radium 226 | 0.445 | | PCI/G | 1.00 | N |
| | | Cesium 137 | -0.00600 | U | PCI/G | 0.0700 | N |
| 04-PD-RO-04-01 | E901.1 | Cesium 137 | 0.0180 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.291 | | PCI/G | 1.00 | N |
| 04-PD-RO-05-01 | E901.1 | Cesium 137 | -0.00300 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.297 | | PCI/G | 1.00 | N |
| 04-PD-RO-05-02 | E901.1 | Cesium 137 | 0.00100 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.381 | | PCI/G | 1.00 | N |
| 04-PD-RO-05-03 | E901.1 | Cesium 137 | 0.00200 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.156 | | PCI/G | 1.00 | N |
| 04-PD-RO-05-04 | E901.1 | Radium 226 | 0.359 | | PCI/G | 1.00 | N |
| | | Cesium 137 | 0.00600 | U | PCI/G | 0.0700 | N |

**Bias & Bounding Sample Locations**
**Summary of Definitive Laboratory Results for SDG 16-00670.txt**

| Sample ID | Analysis Code | Nuclide | Activity | Flag | Activity Units | Release Limit | Exceeds Release Limit |
|---|---|---|---|---|---|---|---|
| 04-PD-RO-05-05 | E901.1 | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.340 | | PCI/G | 1.00 | N |
| 04-PD-RO-06-01 | E901.1 | Cesium 137 | 0.00200 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.220 | | PCI/G | 1.00 | N |
| 04-PD-RO-07-01 | E901.1 | Cesium 137 | 0.0100 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.191 | | PCI/G | 1.00 | N |
| 04-PD-RO-08-01 | E901.1 | Cesium 137 | -0.00200 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.363 | | PCI/G | 1.00 | N |
| 04-PD-RO-08-02 | E901.1 | Cesium 137 | -0.0110 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.463 | | PCI/G | 1.00 | N |
| 04-PD-RO-08-03 | E901.1 | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.302 | | PCI/G | 1.00 | N |
| 04-PD-RO-08-04 | E901.1 | Cesium 137 | 0.0120 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.538 | | PCI/G | 1.00 | N |
| 04-PD-RO-08-05 | E901.1 | Cesium 137 | -0.00200 | UJ | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.132 | U | PCI/G | 1.00 | N |
| 04-PD-RO-09-01 | E901.1 | Radium 226 | 0.644 | J | PCI/G | 1.00 | N |
| | | Cesium 137 | -0.0190 | U | PCI/G | 0.0700 | N |
| 04-PD-RO-10-01 | E901.1 | Cesium 137 | -0.00300 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.578 | | PCI/G | 1.00 | N |
| 04-PD-RO-11-01 | E901.1 | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.365 | | PCI/G | 1.00 | N |
| 04-PD-RO-11-02 | E901.1 | Cesium 137 | 0.0180 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.270 | | PCI/G | 1.00 | N |

**Bias & Bounding Sample Locations**
**Summary of Definitive Laboratory Results for SDG 16-00670.txt**

| Sample ID | Analysis Code | Nuclide | Activity | Flag | Activity Units | Release Limit | Exceeds Release Limit |
|---|---|---|---|---|---|---|---|
| 04-PD-RO-11-03 | E901.1 | Cesium 137 | -0.0120 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.616 | | PCI/G | 1.00 | N |
| 04-PD-RO-11-04 | E901.1 | Cesium 137 | 0.0100 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.276 | | PCI/G | 1.00 | N |
| 04-PD-RO-11-05 | E901.1 | Cesium 137 | 0.00700 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.290 | | PCI/G | 1.00 | N |
| 04-PD-RO-12-01 | E901.1 | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.212 | | PCI/G | 1.00 | N |
| 04-PD-RO-13-01 | E901.1 | Cesium 137 | 0.00900 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.375 | | PCI/G | 1.00 | N |
| 04-PD-RO-14-01 | E901.1 | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.252 | | PCI/G | 1.00 | N |
| 04-PD-RO-15-01 | E901.1 | Cesium 137 | 0.0370 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.290 | | PCI/G | 1.00 | N |
| 04-PD-RO-16-01 | E901.1 | Cesium 137 | 0.0110 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.268 | | PCI/G | 1.00 | N |

U = The associated value is not detected.

Additional Footnotes

In cases where the result is considered non-detect and the MDA of the result exceeded the screening criteria, the reported activity for the affected isotope has been replaced with the reported MDA.

2609 North River Road, Port Allen, Louisiana 70767

(800) 401-4277 -- FAX (225) 381-2996

# ARS International, LLC

## Laboratory Analysis Report

## ARS1-16-00670 RECOUNT
## COC # HPSD1-284

***Prepared for:***

## ITSI Gilbane

**Ed Palser**
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**Concord, CA 94520**

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**Fax:**

**Project Manager Review**

**Management Review**

Notes: ARS International, LLC assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

**Contact Person: Questions regarding this analytical report should be addressed to:**

**Project Manager**

**ProjectManagers@amrad.com**

**Phone: 225.381.2991**
**Fax: 225.381.2996**

ACCREDITED
DoD ELAP

**LELAP Cert# 01949**

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Case Narrative

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

INTERNATIONAL

CASE NARRATIVE

| | |
|---|---|
| **Client:** | ITSI Gilbane |
| **Project:** | 07204.0007 |
| **COC ID:** | HPSE2-0284 |
| **ARS SDG Number:** | ARS1-16-00670 |
| **Received Date:** | 03/28/2016 |
| **Report Date:** | 05/06/2016 |

**SAMPLE RECEIPT**

The samples were received in good condition. The samples were screened for radioactive contamination as per procedure **ARS-062 "Sample Receiving"**.

**ANALYTICAL DATA**

This data package contains sample and QC results for thirty-two (32) soil samples requested for the above referenced project on 03/28/16.

The analysis for gamma spectroscopy were performed using **SOP ARS-007/EPA 901.1M.** A 21-day ingrowth period was performed on these samples. The Ra-226 results were taken from the Bi-214 activity, the Th-232 results were taken from the Ra-228 activity and the Th-234 results were taken from the U-238 activity.

The analysis for Strontium was performed using **SOP ARS-032/Eichrom SRW-01**.

The following analytical batches are associated with these samples: ARS1-B16-00563 and ARS1-B16-00564 for EPA 901.1M and ARS1-B16-00514 for Strontium.

For Gamma Spec batch ARS1-B16-00563, sample 04-PD-RO-05-04 (ARS1-16-00670-012) was used as the sample duplicate and for batch ARS1-B16-00564, sample 04-PD-RO-09-01 (ARS1-16-00670-021) was designated as the sample duplicate. Lastly, for Strontium batch ARS1-B16-00514 the sample used for the sample duplicate was 07-PE-0068-21 (ARS1-16-00645-021).

The result data that are flagged with "U" indicate that the activity is below the MDC.

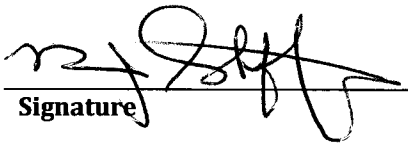
Sample results are being reported on "dry weight" basis.

Sample 04-PD-RO-10-01 (ARS1-16-00670-022) was biased low.

On May 5, 2016, the following samples were recounted to meet the detection limit for Cs-137. The samples are ARS1-16-00670-001, 004, 005, 010, 016, 021, 022, 023, 025, 028 and 031. The respective ITSI Gilbane identifications are 04-PD-RO-01-01, 03-02, 03-03, 05-02, 08-01, 09-01, 10-01, 11-01, 11-03, 12-01 and 15-01.

**American Radiation Services Project Manager/Laboratory Director's Comments:**

*"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. I certify that this electronic image and all hardcopies produced from this image accurately represent the data and is in compliance with the company specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager/Technical Director or the Manager's designee."*

| | | |
|---|---|---|
|  | Laboratory Manager, ARS International | 5-6-16 |
| **Signature** | **Title** | **Date** |

2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

# Notes (Case Narrative):

## Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.
2.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
3.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
4.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).
5.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).
9.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).
10.0) Gamma spectroscopy results are calculated values based on the **ORTEC**® GammaVision ENV32 Analysis Engine.
11.0) ACLASS DOD and ISO 17025 certification applies only to the following analytes and methods: Gross Alpha and Gross Beta (EPA 900, SM7110B&C, SW846 9310); Radium 226 (EPA 903, EPA 903.1, SM 7500 Ra-B, SW846 9315); Radium 228 (EPA 904, SM 7500 Ra-B SW846 9320); Iodine-131(EPA 901.1); Uranium by ICPMS (EPA 200.8); Strontium 89/90 (EPA 905, Eichrom SRW01, HASL 300 Sr-03-RC); Tritium (EPA 906, EPA 906M); Gamma Emitters (EPA 901.1, SM7120B, HASL 300 Ga-01-R); Americium-241, Curium 242/244, Plutonium 239/240 and 241, Thorium 228/230/232, Uranium 234/233 and 238 (Eichrom ACW03 VBS); Lead 210 (HASL 300 Pb-01-RC, Eichrom OTW01); Polonium 210 (HASL 300 Po-01-RC, HASL 300 Po-02-RC); Technetium-99 (Eichrom TCW02, Eichrom TCS01M).

## Method References:

1.0) **EPA 600/4-80-032**; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.
2.0) **Standard Methods for the Examination of Water and Wastewater** (On-Line Edition)
3.0) **EPA SW-846**; Test Methods for Evaluating Solid Waste, (On-Line edition)
4.0) **EPA 600/4/79-020**; Methods for Chemical Analysis of Water and Waste, March 1983.
5.0) **HASL 300;** The Procedures Manual of the Environmental Measurements Laboratory, Volume I, 28th Edition February, 1997.

## Definitions:

| | |
|---|---|
| **CSU** | Combined Standard Uncertainty |
| **DLC** | Decision Level Concentration (ANSI N42.23) or critical level |
| **DO** | Duplicate Original |
| **DUP** | Method Duplicate |
| **LCS/LCSD** | Laboratory Control Sample/Laboratory Control Sample Duplicate |
| **MDA** | Minimum Detectable Activity |
| **MDC** | (Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis |
| **MBL** | Method Blank |
| **MS/MSD** | Matrix Spike/Matrix Spike Duplicate |
| **N/A** | Not Applicable |
| **NR** | Not Referenced |

## Data Qualifiers:

| | |
|---|---|
| **B** | The analyte is found in both the associated method blank and the sample. This flag indicates probable blank contamination. |
| **D** | Sample analysis accomplished through dilution. |
| **J** | Reported result is approximated as it falls outside instrument calibration limits. |
| **Q** | One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery). |
| **S** | Spike |
| ***SC** | Subcontracted out to another qualified laboratory |
| **U** | Activity is below the MDC or MDL |

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Sample Identification

## Cross Reference

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

ARS INTERNATIONAL

## SAMPLE IDENTIFICATION CROSS-REFERENCE

| ITSI Gilbane SAMPLE ID NUMBER(s) | ARS SAMPLE ID NUMBER(s) |
|---|---|
| 04-PD-RO-01-01 | ARS1-16-00670-001 |
| 04-PD-RO-02-01 | ARS1-16-00670-002 |
| 04-PD-RO-03-01 | ARS1-16-00670-003 |
| 04-PD-RO-03-02 | ARS1-16-00670-004 |
| 04-PD-RO-03-03 | ARS1-16-00670-005 |
| 04-PD-RO-03-04 | ARS1-16-00670-006 |
| 04-PD-RO-03-05 | ARS1-16-00670-007 |
| 04-PD-RO-04-01 | ARS1-16-00670-008 |
| 04-PD-RO-05-01 | ARS1-16-00670-009 |
| 04-PD-RO-05-02 | ARS1-16-00670-010 |
| 04-PD-RO-05-03 | ARS1-16-00670-011 |
| 04-PD-RO-05-04 | ARS1-16-00670-012 |
| 04-PD-RO-05-05 | ARS1-16-00670-013 |
| 04-PD-RO-06-01 | ARS1-16-00670-014 |
| 04-PD-RO-07-01 | ARS1-16-00670-015 |
| 04-PD-RO-08-01 | ARS1-16-00670-016 |
| 04-PD-RO-08-02 | ARS1-16-00670-017 |
| 04-PD-RO-08-03 | ARS1-16-00670-018 |
| 04-PD-RO-08-04 | ARS1-16-00670-019 |
| 04-PD-RO-08-05 | ARS1-16-00670-020 |
| 04-PD-RO-09-01 | ARS1-16-00670-021 |
| 04-PD-RO-10-01 | ARS1-16-00670-022 |
| 04-PD-RO-11-01 | ARS1-16-00670-023 |
| 04-PD-RO-11-02 | ARS1-16-00670-024 |
| 04-PD-RO-11-03 | ARS1-16-00670-025 |
| 04-PD-RO-11-04 | ARS1-16-00670-026 |
| 04-PD-RO-11-05 | ARS1-16-00670-027 |
| 04-PD-RO-12-01 | ARS1-16-00670-028 |
| 04-PD-RO-13-01 | ARS1-16-00670-029 |
| 04-PD-RO-14-01 | ARS1-16-00670-030 |
| 04-PD-RO-15-01 | ARS1-16-00670-031 |
| 04-PD-RO-16-01 | ARS1-16-00670-032 |

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
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# Chain of Custody
## and Supporting Documentation

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| **SO** | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PD-RO-01-01 | SO | 3/10/2016 | 1110 | DB | X | X | 04-PD-RO-01-01 | N1 | 0.00 | 5.00 |
| 2 | 04-PD-RO-02-01 | SO | 3/10/2016 | 1115 | | X | | 04-PD-RO-02-01 | N1 | 0.00 | 5.00 |
| 3 | 04-PD-RO-03-01 | SO | 3/10/2016 | 1120 | | X | X | 04-PD-RO-03-01 | N1 | 0.00 | 5.00 |
| 4 | 04-PD-RO-03-02 | SO | 3/10/2016 | 1122 | | X | | 04-PD-RO-03-02 | N1 | 0.00 | 5.00 |
| 5 | 04-PD-RO-03-03 | SO | 3/10/2016 | 1124 | | X | | 04-PD-RO-03-03 | N1 | 0.00 | 5.00 |
| 6 | 04-PD-RO-03-04 | SO | 3/10/2016 | 1127 | | X | | 04-PD-RO-03-04 | N1 | 0.00 | 5.00 |
| 7 | 04-PD-RO-03-05 | SO | 3/10/2016 | 1130 | | X | | 04-PD-RO-03-05 | N1 | 0.00 | 5.00 |
| 8 | 04-PD-RO-04-01 | SO | 3/10/2016 | 1135 | | X | | 04-PD-RO-04-01 | N1 | 0.00 | 5.00 |
| 9 | 04-PD-RO-05-01 | SO | 3/10/2016 | 1140 | | X | | 04-PD-RO-05-01 | N1 | 0.00 | 5.00 |
| 10 | 04-PD-RO-05-02 | SO | 3/10/2016 | 1143 | DB | X | | 04-PD-RO-05-02 | N1 | 0.00 | 5.00 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| **Relinquished by: *(Signature)*** | **Date** | **Time** |
|---|---|---|
| D-Bl QO | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| **Received by: *(Signature)*** | **Date** | **Time** |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| | 3-28-16 | 0422 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

3/23/16 / Fedex / 7759 4635 9357

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PD-RO-05-03 | SO | 3/10/2016 | 1145 | DB | X | | 04-PD-RO-05-03 | N1 | 0.00 | 5.00 |
| 12 | 04-PD-RO-05-04 | SO | 3/10/2016 | 1147 | | X | | 04-PD-RO-05-04 | N1 | 0.00 | 5.00 |
| 13 | 04-PD-RO-05-05 | SO | 3/10/2016 | 1150 | | X | | 04-PD-RO-05-05 | N1 | 0.00 | 5.00 |
| 14 | 04-PD-RO-06-01 | SO | 3/10/2016 | 1155 | | X | | 04-PD-RO-06-01 | N1 | 0.00 | 5.00 |
| 15 | 04-PD-RO-07-01 | SO | 3/10/2016 | 1200 | | X | | 04-PD-RO-07-01 | N1 | 0.00 | 5.00 |
| 16 | 04-PD-RO-08-01 | SO | 3/10/2016 | 1205 | | X | X | 04-PD-RO-08-01 | N1 | 0.00 | 5.00 |
| 17 | 04-PD-RO-08-02 | SO | 3/10/2016 | 1207 | | X | | 04-PD-RO-08-02 | N1 | 0.00 | 5.00 |
| 18 | 04-PD-RO-08-03 | SO | 3/10/2016 | 1210 | | X | | 04-PD-RO-08-03 | N1 | 0.00 | 5.00 |
| 19 | 04-PD-RO-08-04 | SO | 3/10/2016 | 1213 | | X | | 04-PD-RO-08-04 | N1 | 0.00 | 5.00 |
| 20 | 04-PD-RO-08-05 | SO | 3/10/2016 | 1215 | DB | X | | 04-PD-RO-08-05 | N1 | 0.00 | 5.00 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| [signature] | 3-28-16 | 0582 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| 3/23/16 / Fedex / 7759 4635 9357 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| |

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| **SO** | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PD-RO-09-01 | SO | 3/10/2016 | 1220 | DB | X | | 04-PD-RO-09-01 | N1 | 0.00 | 5.00 |
| 22 | 04-PD-RO-10-01 | SO | 3/10/2016 | 1225 | | X | | 04-PD-RO-10-01 | N1 | 0.00 | 5.00 |
| 23 | 04-PD-RO-11-01 | SO | 3/10/2016 | 1230 | | X | | 04-PD-RO-11-01 | N1 | 0.00 | 5.00 |
| 24 | 04-PD-RO-11-02 | SO | 3/10/2016 | 1232 | | X | | 04-PD-RO-11-02 | N1 | 0.00 | 5.00 |
| 25 | 04-PD-RO-11-03 | SO | 3/10/2016 | 1234 | | X | | 04-PD-RO-11-03 | N1 | 0.00 | 5.00 |
| 26 | 04-PD-RO-11-04 | SO | 3/10/2016 | 1237 | | X | | 04-PD-RO-11-04 | N1 | 0.00 | 5.00 |
| 27 | 04-PD-RO-11-05 | SO | 3/10/2016 | 1239 | | X | | 04-PD-RO-11-05 | N1 | 0.00 | 5.00 |
| 28 | 04-PD-RO-12-01 | SO | 3/10/2016 | 1243 | | X | | 04-PD-RO-12-01 | N1 | 0.00 | 5.00 |
| 29 | 04-PD-RO-13-01 | SO | 3/10/2016 | 1245 | | X | | 04-PD-RO-13-01 | N1 | 0.00 | 5.00 |
| 30 | 04-PD-RO-14-01 | SO | 3/10/2016 | 1247 | DB | X | | 04-PD-RO-14-01 | N1 | 0.00 | 5.00 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| [signature] | 3-28-16 | 0922 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| 3/23/16 / Fedex / 7759 4685 9357 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| |

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| **SO** | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 04-PD-RO-15-01 | SO | 3/10/2016 | 1255 | DB | X | X | 04-PD-RO-15-01 | N1 | 0.00 | 5.00 |
| 32 | 04-PD-RO-16-01 | SO | 3/10/2016 | 1300 | DB | X | | 04-PD-RO-16-01 | N1 | 0.00 | 5.00 |

**Cooler # 1** | **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED - EX | 03.23.2016 | 1600 |
| [signature] | 3-28-16 | 0822 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| 3/23/16 /Fedex/ 7759 4635 9857 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| |

COMPANY NAME: Gilbane SDG: MSI-16-00070

**SHIPPING CONTAINER**

| | | | |
|---|---|---|---|
| Good Condition | ☑ Yes | ☐ No | |
| Radioactive | ☐ Yes | ☑ No | |
| UN2910 | ☐ Yes | ☑ No | |
| Sec. Seals | ☐ Yes | ☑ No | |
| Seals Intact | ☐ Yes | ☐ No | ☑ N/A |
| Air Bill | ☐ Yes | ☑ No | |

**COC PRESENT WITH SAMPLES**

| | | |
|---|---|---|
| COC | ☑ Yes | ☐ No |

**SAMPLE CONTAINER(S)**

| | | | |
|---|---|---|---|
| Good Condition | ☑ Yes | ☐ No | |
| Sec. Seals | ☐ Yes | ☑ No | |
| Seal Intact | ☐ Yes | ☐ No | ☑ N/A |
| Marked Radioactive | ☐ Yes | ☑ No | |

# Samples Rcv 32

Matrix [ AF , AQ , BI , FE , LT , SI , SO , UR , VG ]

**External and Internal Surveys**

| | | | | | |
|---|---|---|---|---|---|
| Exposure Rate Meter: | M3 124334 | Serial No.: | RN 17782 | Calibration Due Date: | 1/25/17 |
| Count Rate Meter: | M3 237983 | Serial No.: | PR 165363 | Calibration Due Date: | 2/3/17 |

| | | | | |
|---|---|---|---|---|
| Background Exposure Rate (µR/hr) | 19 | Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) | 21 | µR/hr |
| Background Count Rate (cpm) | 70 | Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) | 80 | cpm |
| | | Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd) | 80 | cpm |

| Sample Label/Comments/Notes | pH Orig | pH Final | Mark if Preserve | Acid Lot # | Weight(g) / Volume(mL) | µR/hr | cpm |
|---|---|---|---|---|---|---|---|
| | pH ≤ 2 is Acceptable | | | | | Acceptance Limits <500 µR/hr | <100 cpm/cm² |
| 04-PP-RO -01-01 | | | ☐ | | 1711 | 19 | 80 |
| -02-01 | | | ☐ | | 2039 | 19 | 80 |
| -03-01 | | | ☐ | | 812 | 19 | 80 |
| -03-02 | | | ☐ | | 974 | 19 | 80 |
| -03-03 | | | ☐ | JMW | 985 | 19 | 80 |
| -03-04 | | | ☐ | 3-28-16 | 951 | 19 | 80 |
| -03-05 | | | ☐ | | 1137 | 19 | 80 |
| -04-01 | | | ☐ | | 1015 | 19 | 80 |
| -05-01 | | | ☐ | | 948 | 19 | 80 |
| -05-02 | | | ☐ | | 951 | 19 | 80 |
| -05-03 | | | ☐ | | 1094 | 19 | 80 |
| -05-04 | | | ☐ | | 966 | 19 | 80 |
| -05-05 | | | ☐ | | 986 | 19 | 80 |
| -06-01 | | | ☐ | | 1007 | 19 | 80 |
| -07-01 | | | ☐ | | 1026 | 19 | 80 |
| -08-01 | | | ☐ | | 1401 | 19 | 80 |
| -08-02 | | | ☐ | | 1188 | 19 | 80 |
| -08-03 | | | ☐ | | 1605 | 19 | 80 |
| -08-04 | | | ☐ | | 1394 | 19 | 80 |

Surveyors' Name: [signature] Date/Time Surveyed: 3-28-16 0922

**COMPANY NAME:** Gilbane **SDG:** MSI-16-00670

**SHIPPING CONTAINER**

JW 4-28-16

| | | |
|---|---|---|
| Good Condition | ☐ Yes | ☐ No |
| Radioactive | ☐ Yes | ☐ No |
| UN2910 | ☐ Yes | ☐ No |
| Sec. Seals | ☐ Yes | ☐ No |
| Seals Intact | ☐ Yes ☐ No | ☐ N/A |
| Air Bill | ☐ Yes | ☐ No |

**COC PRESENT WITH SAMPLES**

| | | |
|---|---|---|
| COC | ☑ Yes | ☐ No |

**SAMPLE CONTAINER(S)**

| | | |
|---|---|---|
| Good Condition | ☑ Yes | ☐ No |
| Sec. Seals | ☐ Yes | ☑ No |
| Seal Intact | ☐ Yes ☐ No | ☑ N/A |
| Marked Radioactive | ☐ Yes | ☑ No |

# Samples Rcv: 13

Matrix: [ AF , AQ , BI , FE , LT , SI , (SO) , UR , VG ]

**External and Internal Surveys**

| | | | | | |
|---|---|---|---|---|---|
| Exposure Rate Meter: | M3 124334 | Serial No.: | RN 17782 | Calibration Due Date: | 1/25/17 |
| Count Rate Meter: | M3 237983 | Serial No.: | PR 165363 | Calibration Due Date: | 2/3/17 |

| | | | |
|---|---|---|---|
| Background Exposure Rate (µR/hr) | 19 | Max Exposure Rate on Shipping Containers Externals (Plus Bkgd) | µR/hr |
| Background Count Rate (cpm) | 70 | Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) JW 4-28-16 | cpm |
| | | Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd) | cpm |

| Sample Label/Comments/Notes | pH Orig | pH Final | Mark if Preserve (pH ≤ 2 is Acceptable) | Acid Lot # | Weight(g) / Volume(mL) | µR/hr (Acceptance Limits <500 µR/hr) | cpm (Acceptance Limits <100 cpm/cm²) |
|---|---|---|---|---|---|---|---|
| 04-PD-RO-08-05 | | | ☐ | | 1194 | 19 | & |
| -09-01 | | | ☐ | | 2252 | 19 | & |
| -10-01 | | | ☐ | JW | 1653 | 19 | & |
| -11-01 | | | ☐ | 3-28-16 | 2228 | 19 | & |
| -11-02 | | | ☐ | | 1656 | 19 | & |
| -11-03 | | | ☐ | | 1757 | 19 | & |
| -11-04 | | | ☐ | | 1522 | 19 | & |
| -11-05 | | | ☐ | | 1842 | 19 | & |
| -12-01 | | | ☐ | | 1203 | 19 | & |
| -13-01 | | | ☐ | | 1158 | 19 | & |
| -14-01 | | | ☐ | | 1175 | 19 | & |
| -15-01 | | | ☐ | | 1737 | 19 | & |
| -16-01 | | | ☐ | | 1691 | 19 | & |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |

Surveyors' Name: _____ Date/Time Surveyed: 3-18-16 1200

# DQO Report for SDG

ARS1-16-00670



DCN: ITSI-0808-0004-0076, 8 May 2019

| Analysis Code | Prep Type | Units | Aliquot | Procedure | Count Time | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GAM-A-025 | DGAM | pCi | g | ARS-007 | | | | | | | | |
| | Group | Isotope | | RDL | LCS LL/UL | MS LL/UL | RadY LL/UL | GravY LL/UL | RER | RPD | LOD/LOQ | Surr LL/UL |
| | Gilbane | Ac-228 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Am-241 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Bi-212 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Bi-214 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Co-60 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Cs-137 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Eu-152 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Eu-154 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | K-40 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pa-234 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-210 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-212 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-214 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Ra-226 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Ra-228 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Th-234 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Tl-208 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | U-235 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | U-238 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| GPC-A-012 | DRAD | pCi | g | ARS-032 | | | | | | | | |
| | Group | Isotope | | RDL | LCS LL/UL | MS LL/UL | RadY LL/UL | GravY LL/UL | RER | RPD | LOD/LOQ | Surr LL/UL |
| | STD | Sr-90 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |

| Analysis Code | Fraction | Units | Aliquot |
|---|---|---|---|
| GAM-A-025 | 001 | pCi | g |
| | 002 | pCi | g |
| | 003 | pCi | g |
| | 004 | pCi | g |
| | 005 | pCi | g |
| | 006 | pCi | g |

User: RVARNELL Last Modified: 3/28/2016 1:19:49 PM

DCN: ITSI-0808-0004-0076, 8 May 2019

| | | | |
|---|---|---|---|
| GAM-A-025 | 007 | pCi | g |
| | 008 | pCi | g |
| | 009 | pCi | g |
| | 010 | pCi | g |
| | 011 | pCi | g |
| | 012 | pCi | g |
| | 013 | pCi | g |
| | 014 | pCi | g |
| | 015 | pCi | g |
| | 016 | pCi | g |
| | 017 | pCi | g |
| | 018 | pCi | g |
| | 019 | pCi | g |
| | 020 | pCi | g |
| | 021 | pCi | g |
| | 022 | pCi | g |
| | 023 | pCi | g |
| | 024 | pCi | g |
| | 025 | pCi | g |
| | 026 | pCi | g |
| | 027 | pCi | g |
| | 028 | pCi | g |
| | 029 | pCi | g |
| | 030 | pCi | g |
| | 031 | pCi | g |
| | 032 | pCi | g |
| GPC-A-012 | 001 | pCi | g |
| | 003 | pCi | g |
| | 016 | pCi | g |
| | 031 | pCi | g |

DCN: ITSI-0808-0004-0076, 8 May 2019

# SDG Report - Samples and Containers

## SDG Specific Data

| | | | | | |
|---|---|---|---|---|---|
| SDG | ARS1-16-00670 | TAT Days | 28 | Project Type | Environmental |
| Sample Count | 32 Rpt Level 2 | Date Received | 3/28/2016 | COC Number | HPSD1-284 |
| Client | ITSI Gilbane | Client Deadline | 4/25/2016 | PO Number | |
| Client Code | 848 | Internal Deadline | 4/24/2016 | Job Number | |
| Profile Number | PN-00831 | Lab Deadline | 4/22/2016 | Job Location | |
| Temperature (C) | | Comments | | | |

## Samples and Containers Checked In Thus Far

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 04-PD-RO-01-01 | SO | 3/10/2016 11:10 AM | 3/10/2016 11:10 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229510 | 1 | 1711.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 002 | 04-PD-RO-02-01 | SO | 3/10/2016 11:15 AM | 3/10/2016 11:15 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229511 | 1 | 2039.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 003 | 04-PD-RO-03-01 | SO | 3/10/2016 11:20 AM | 3/10/2016 11:20 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229512 | 1 | 812.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 004 | 04-PD-RO-03-02 | SO | 3/10/2016 11:22 AM | 3/10/2016 11:22 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229513 | 1 | 974.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 005 | 04-PD-RO-03-03 | SO | 3/10/2016 11:24 AM | 3/10/2016 11:24 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229514 | 1 | 985.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 006 | 04-PD-RO-03-04 | SO | 3/10/2016 11:27 AM | 3/10/2016 11:27 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229515 | 1 | 951.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 007 | 04-PD-RO-03-05 | SO | 3/10/2016 11:30 AM | 3/10/2016 11:30 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229516 | 1 | 1137.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 008 | 04-PD-RO-04-01 | SO | 3/10/2016 11:35 AM | 3/10/2016 11:35 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229517 | 1 | 1015.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 009 | 04-PD-RO-05-01 | SO | 3/10/2016 11:40 AM | 3/10/2016 11:40 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229518 | 1 | 948.00 | Ziploc Bag | | | 80 | 19 | N N/A |
| 010 | 04-PD-RO-05-02 | SO | 3/10/2016 11:43 AM | 3/10/2016 11:43 AM | H | 30 | 5 | WO4 | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor VOA Head AF Units AF Rate AF Mins AF Vol |
| | 229519 | 1 | 951.00 | Ziploc Bag | | | 80 | 19 | N N/A |

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| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **011** | 04-PD-RO-05-03 | SO | 3/10/2016 11:45 AM | 3/10/2016 11:45 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229520 | 1 | 1094.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **012** | 04-PD-RO-05-04 | SO | 3/10/2016 11:47 AM | 3/10/2016 11:47 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229521 | 1 | 966.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **013** | 04-PD-RO-05-05 | SO | 3/10/2016 11:50 AM | 3/10/2016 11:50 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229522 | 1 | 986.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **014** | 04-PD-RO-06-01 | SO | 3/10/2016 11:55 AM | 3/10/2016 11:55 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229523 | 1 | 1007.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **015** | 04-PD-RO-07-01 | SO | 3/10/2016 12:00 PM | 3/10/2016 12:00 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229524 | 1 | 1026.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **016** | 04-PD-RO-08-01 | SO | 3/10/2016 12:05 PM | 3/10/2016 12:05 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229525 | 1 | 1401.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **017** | 04-PD-RO-08-02 | SO | 3/10/2016 12:07 PM | 3/10/2016 12:07 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229526 | 1 | 1188.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **018** | 04-PD-RO-08-03 | SO | 3/10/2016 12:10 PM | 3/10/2016 12:10 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229527 | 1 | 1605.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **019** | 04-PD-RO-08-04 | SO | 3/10/2016 12:13 PM | 3/10/2016 12:13 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229528 | 1 | 1384.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **020** | 04-PD-RO-08-05 | SO | 3/10/2016 12:15 PM | 3/10/2016 12:15 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229529 | 1 | 1194.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **021** | 04-PD-RO-09-01 | SO | 3/10/2016 12:20 PM | 3/10/2016 12:20 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229530 | 1 | 2252.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **022** | 04-PD-RO-10-01 | SO | 3/10/2016 12:25 PM | 3/10/2016 12:25 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229531 | 1 | 1653.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **023** | 04-PD-RO-11-01 | SO | 3/10/2016 12:30 PM | 3/10/2016 12:30 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229532 | 1 | 2228.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **024** | 04-PD-RO-11-02 | SO | 3/10/2016 12:32 PM | 3/10/2016 12:32 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229533 | 1 | 1656.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **025** | 04-PD-RO-11-03 | SO | 3/10/2016 12:34 PM | 3/10/2016 12:34 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229534 | 1 | 1757.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **026** | 04-PD-RO-11-04 | SO | 3/10/2016 12:37 PM | 3/10/2016 12:37 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229535 | 1 | 1522.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **027** | 04-PD-RO-11-05 | SO | 3/10/2016 12:39 PM | 3/10/2016 12:39 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229536 | 1 | 1842.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **028** | 04-PD-RO-12-01 | SO | 3/10/2016 12:43 PM | 3/10/2016 12:43 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229537 | 1 | 1203.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **029** | 04-PD-RO-13-01 | SO | 3/10/2016 12:45 PM | 3/10/2016 12:45 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229538 | 1 | 1158.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **030** | 04-PD-RO-14-01 | SO | 3/10/2016 12:47 PM | 3/10/2016 12:47 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229539 | 1 | 1175.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **031** | 04-PD-RO-15-01 | SO | 3/10/2016 12:55 PM | 3/10/2016 12:55 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229540 | 1 | 1737.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **032** | 04-PD-RO-16-01 | SO | 3/10/2016 1:00 PM | 3/10/2016 1:00 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | |
| | 229541 | 1 | 1691.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |

DCN: ITSI-0808-0004-0076, 8 May 2019

DCN: ITSI-0808-0004-0076, 8 May 2019

# SDG Report - Analysis Assignments

| SDG | ARS1-16-00670 | Sample Count | 32 |
|---|---|---|---|
| Client | ITSI Gilbane | Analysis Count | 2-64 |

**Sample Count Totals Per Analysis**

| Analysis Code | Analysis Description | Samples Count |
|---|---|---|
| GAM-A-025 | Gamma Spec - 21 Day Ingrowth in (Soil, Sludge, Waste, Sediment,Biota [SO, BI, VG]) | 32 |
| GPC-A-012 | Strontium-90 in (Soil, Sludge, Biota, Sediment [SO, BI, VG]) | 32 |

**Analyses Assigned Per Fraction**

| Fraction | Analysis Code | X = Assigned |
|---|---|---|
| 001 | GPC-A-012 | X |
| 001 | GAM-A-025 | X |
| 002 | GPC-A-012 | X |
| 002 | GAM-A-025 | X |
| 003 | GPC-A-012 | X |
| 003 | GAM-A-025 | X |
| 004 | GPC-A-012 | X |
| 004 | GAM-A-025 | X |
| 005 | GPC-A-012 | X |
| 005 | GAM-A-025 | X |
| 006 | GPC-A-012 | X |
| 006 | GAM-A-025 | X |
| 007 | GPC-A-012 | X |
| 007 | GAM-A-025 | X |
| 008 | GPC-A-012 | X |
| 008 | GAM-A-025 | X |
| 009 | GPC-A-012 | X |
| 009 | GAM-A-025 | X |
| 010 | GPC-A-012 | X |
| 010 | GAM-A-025 | X |
| 011 | GPC-A-012 | X |
| 011 | GAM-A-025 | X |
| 012 | GPC-A-012 | X |
| 012 | GAM-A-025 | X |
| 013 | GPC-A-012 | X |
| 013 | GAM-A-025 | X |
| 014 | GPC-A-012 | X |

| | | |
|---|---|---|
| 014 | GAM-A-025 | X |
| 015 | GPC-A-012 | X |
| 015 | GAM-A-025 | X |
| 016 | GPC-A-012 | X |
| 016 | GAM-A-025 | X |
| 017 | GPC-A-012 | X |
| 017 | GAM-A-025 | X |
| 018 | GPC-A-012 | X |
| 018 | GAM-A-025 | X |
| 019 | GPC-A-012 | X |
| 019 | GAM-A-025 | X |
| 020 | GPC-A-012 | X |
| 020 | GAM-A-025 | X |
| 021 | GPC-A-012 | X |
| 021 | GAM-A-025 | X |
| 022 | GPC-A-012 | X |
| 022 | GAM-A-025 | X |
| 023 | GPC-A-012 | X |
| 023 | GAM-A-025 | X |
| 024 | GPC-A-012 | X |
| 024 | GAM-A-025 | X |
| 025 | GPC-A-012 | X |
| 025 | GAM-A-025 | X |
| 026 | GPC-A-012 | X |
| 026 | GAM-A-025 | X |
| 027 | GPC-A-012 | X |
| 027 | GAM-A-025 | X |
| 028 | GPC-A-012 | X |
| 028 | GAM-A-025 | X |
| 029 | GPC-A-012 | X |
| 029 | GAM-A-025 | X |
| 030 | GPC-A-012 | X |
| 030 | GAM-A-025 | X |

| | | |
|---|---|---|
| 031 | GPC-A-012 | X |
| 031 | GAM-A-025 | X |
| 032 | GPC-A-012 | X |
| 032 | GAM-A-025 | X |

ORIGIN ID:JCCA (415) 671-0773
HENRY NG
GILBANE
ITSI GILBANE TRAILER HUNTERS POINT
FISHER AVE @ SPEAR AVE BLDG 241
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 23MAR16
ACTWGT: 70.00 LB
CAD: 102700259/INET3730
DIMS: 19x13x14 IN
BILL THIRD PARTY

TO CAROLYN DICHARRY
ARS INC.
2609 NORTH RIVER ROAD
PORT ALLEN LA 70767
(225) 381-2991 REF: J204000700
INV:
PO: DEPT:

540J1/CF34/727F

FedEx Express

J161016020501uv

3 of 3
MPS# 0263 7759 4635 9210
Mstr# 7759 4635 9357
0201

THU - 24 MAR 10:30A
PRIORITY OVERNIGHT

70767
LA-US MSY

XH OPLA

**After printing this label**:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
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3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning**: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID:JCCA (415) 671-0773
HENRY NG
GILBANE
ITSI GILBANE TRAILER HUNTERS POINT
FISHER AVE @ SPEAR AVE BLDG 241
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 23MAR16
ACTWGT: 70.00 LB
CAD: 102700259/INET3730
DIMS: 19x13x14 IN
BILL THIRD PARTY

TO **CAROLYN DICHARRY**
**ARS INC.**
**2609 NORTH RIVER ROAD**
**PORT ALLEN LA 70767**
(225) 381-2991
INV:
PO:
REF: J204000700
DEPT:

FedEx Express

J16161602050luv

540J1/CF34/727F

**XH OPLA**

1 of 3

TRK# 0201 **7759 4635 9357**

**## MASTER ##**

**THU - 24 MAR 10:30A**
**PRIORITY OVERNIGHT**

**70767**
LA-US **MSY**

**After printing this label**:
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**Warning**: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along w ith the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx w ill not be responsible for any claim in excess of $100 per package, w hether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage w hether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jew elry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed w ithin strict time limits, see current FedEx Service Guide.

## Rodney Varnell

**From:** Rodney Varnell
**Sent:** Wednesday, March 30, 2016 8:52 AM
**To:** 'Carlyon Peyton, Kristen'
**Cc:** Project Managers
**Subject:** Receipt Package for C of C HPSD1-284
**Attachments:** ARS1-16-00670 Sample Receipt Package.pdf

Good morning Kristen,

Please see the attached receipt package for C of C # HPSD1-284 (SDG ARS1-16-00670) received on 03282016.

Thank you,

**Rodney J. Varnell**
Project Manager
rvarnell@amrad.com

INTERNATIONAL

ARS International, LLC
2609 North River Road
Port Allen, LA 70767-3469

225.381.2991 Office
225.381.2996 FAX
www.amrad.com

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# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane



DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

E901.1 - Solid Ra-226 and CS-137

E905.0 - Solid Sr-90 and Sr-T

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 | E905.0 | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PD-RO-01-01 | SO | 3/10/2016 | 1110 | DB | X | X | 04-PD-RO-01-01 | N1 | 0.00 | 5.00 |
| 2 | 04-PD-RO-02-01 | SO | 3/10/2016 | 1115 | | X | | 04-PD-RO-02-01 | N1 | 0.00 | 5.00 |
| 3 | 04-PD-RO-03-01 | SO | 3/10/2016 | 1120 | | X | X | 04-PD-RO-03-01 | N1 | 0.00 | 5.00 |
| 4 | 04-PD-RO-03-02 | SO | 3/10/2016 | 1122 | | X | | 04-PD-RO-03-02 | N1 | 0.00 | 5.00 |
| 5 | 04-PD-RO-03-03 | SO | 3/10/2016 | 1124 | | X | | 04-PD-RO-03-03 | N1 | 0.00 | 5.00 |
| 6 | 04-PD-RO-03-04 | SO | 3/10/2016 | 1127 | | X | | 04-PD-RO-03-04 | N1 | 0.00 | 5.00 |
| 7 | 04-PD-RO-03-05 | SO | 3/10/2016 | 1130 | | X | | 04-PD-RO-03-05 | N1 | 0.00 | 5.00 |
| 8 | 04-PD-RO-04-01 | SO | 3/10/2016 | 1135 | | X | | 04-PD-RO-04-01 | N1 | 0.00 | 5.00 |
| 9 | 04-PD-RO-05-01 | SO | 3/10/2016 | 1140 | | X | | 04-PD-RO-05-01 | N1 | 0.00 | 5.00 |
| 10 | 04-PD-RO-05-02 | SO | 3/10/2016 | 1143 | DB | X | | 04-PD-RO-05-02 | N1 | 0.00 | 5.00 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| **Relinquished by: *(Signature)*** | **Date** | **Time** |
|---|---|---|
| DB QD | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| **Received by: *(Signature)*** | **Date** | **Time** |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| | 3-28-16 | 0422 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

3/23/16 / Fedex / 7759 4635 9357

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

E901.1 - Solid Ra-226 and CS-137

E905.0 - Solid Sr-90 and Sr-T

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 | E905.0 | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PD-RO-05-03 | SO | 3/10/2016 | 1145 | DB | X | | 04-PD-RO-05-03 | N1 | 0.00 | 5.00 |
| 12 | 04-PD-RO-05-04 | SO | 3/10/2016 | 1147 | | X | | 04-PD-RO-05-04 | N1 | 0.00 | 5.00 |
| 13 | 04-PD-RO-05-05 | SO | 3/10/2016 | 1150 | | X | | 04-PD-RO-05-05 | N1 | 0.00 | 5.00 |
| 14 | 04-PD-RO-06-01 | SO | 3/10/2016 | 1155 | | X | | 04-PD-RO-06-01 | N1 | 0.00 | 5.00 |
| 15 | 04-PD-RO-07-01 | SO | 3/10/2016 | 1200 | | X | | 04-PD-RO-07-01 | N1 | 0.00 | 5.00 |
| 16 | 04-PD-RO-08-01 | SO | 3/10/2016 | 1205 | | X | X | 04-PD-RO-08-01 | N1 | 0.00 | 5.00 |
| 17 | 04-PD-RO-08-02 | SO | 3/10/2016 | 1207 | | X | | 04-PD-RO-08-02 | N1 | 0.00 | 5.00 |
| 18 | 04-PD-RO-08-03 | SO | 3/10/2016 | 1210 | | X | | 04-PD-RO-08-03 | N1 | 0.00 | 5.00 |
| 19 | 04-PD-RO-08-04 | SO | 3/10/2016 | 1213 | | X | | 04-PD-RO-08-04 | N1 | 0.00 | 5.00 |
| 20 | 04-PD-RO-08-05 | SO | 3/10/2016 | 1215 | DB | X | | 04-PD-RO-08-05 | N1 | 0.00 | 5.00 |

**Cooler # 1** | **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| [signature] | 3-24-16 | 0832 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

3/23/16 / Fedex / 7759 4635 9357

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 04-PD-RO-09-01 | SO | 3/10/2016 | 1220 | DB | X | | 04-PD-RO-09-01 | N1 | 0.00 | 5.00 |
| 22 | 04-PD-RO-10-01 | SO | 3/10/2016 | 1225 | | X | | 04-PD-RO-10-01 | N1 | 0.00 | 5.00 |
| 23 | 04-PD-RO-11-01 | SO | 3/10/2016 | 1230 | | X | | 04-PD-RO-11-01 | N1 | 0.00 | 5.00 |
| 24 | 04-PD-RO-11-02 | SO | 3/10/2016 | 1232 | | X | | 04-PD-RO-11-02 | N1 | 0.00 | 5.00 |
| 25 | 04-PD-RO-11-03 | SO | 3/10/2016 | 1234 | | X | | 04-PD-RO-11-03 | N1 | 0.00 | 5.00 |
| 26 | 04-PD-RO-11-04 | SO | 3/10/2016 | 1237 | | X | | 04-PD-RO-11-04 | N1 | 0.00 | 5.00 |
| 27 | 04-PD-RO-11-05 | SO | 3/10/2016 | 1239 | | X | | 04-PD-RO-11-05 | N1 | 0.00 | 5.00 |
| 28 | 04-PD-RO-12-01 | SO | 3/10/2016 | 1243 | | X | | 04-PD-RO-12-01 | N1 | 0.00 | 5.00 |
| 29 | 04-PD-RO-13-01 | SO | 3/10/2016 | 1245 | | X | | 04-PD-RO-13-01 | N1 | 0.00 | 5.00 |
| 30 | 04-PD-RO-14-01 | SO | 3/10/2016 | 1247 | DB | X | | 04-PD-RO-14-01 | N1 | 0.00 | 5.00 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| [signature] | 3-24-16 | 0922 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

3/23/16 / Fedex / 7759 4685 9357

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palser
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-284**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

E901.1 - Solid Ra-226 and CS-137

E905.0 - Solid Sr-90 and Sr-T

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Southern Block and RSY-2 Pad Footprint Area

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 | E905.0 | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 04-PD-RO-15-01 | SO | 3/10/2016 | 1255 | DB | X | X | 04-PD-RO-15-01 | N1 | 0.00 | 5.00 |
| 32 | 04-PD-RO-16-01 | SO | 3/10/2016 | 1300 | DB | X | | 04-PD-RO-16-01 | N1 | 0.00 | 5.00 |

**Cooler # 1** | **Turnaround Time: 0 Days**

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03-23-2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED - EX | 03-23-2016 | 1600 |
| [signature] | 3-28-16 | 0822 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

3/23/16 /Fedex/ 7759 4635 9857

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**



N-59

DCN: ITSI-0808-0004-0076, 8 May 2019



# SDG Report - Samples and Containers

**SDG Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| SDG | ARS1-16-00670 | TAT Days | 28 | Project Type | Environmental |
| Sample Count | 10 Rpt Level 2 | Date Received | 3/28/2016 | COC Number | HPSD1-284 |
| Client | ITSI Gilbane | Client Deadline | 4/25/2016 | PO Number | |
| Client Code | 848 | Internal Deadline | 4/24/2016 | Job Number | |
| Profile Number | PN-00831 | Lab Deadline | 4/22/2016 | Job Location | |
| Temperature (C) | | Comments | | | |

**Samples and Containers Checked In Thus Far**

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 04-PD-RO-01-01 | SO | 3/10/2016 11:10 AM | 3/10/2016 11:10 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229510 | 1 | 1711.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 002 | 04-PD-RO-02-01 | SO | 3/10/2016 11:15 AM | 3/10/2016 11:15 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229511 | 1 | 2039.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 003 | 04-PD-RO-03-01 | SO | 3/10/2016 11:20 AM | 3/10/2016 11:20 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229512 | 1 | 812.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 004 | 04-PD-RO-03-02 | SO | 3/10/2016 11:22 AM | 3/10/2016 11:22 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229513 | 1 | 974.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 005 | 04-PD-RO-03-03 | SO | 3/10/2016 11:24 AM | 3/10/2016 11:24 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229514 | 1 | 985.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 006 | 04-PD-RO-03-04 | SO | 3/10/2016 11:27 AM | 3/10/2016 11:27 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229515 | 1 | 951.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 007 | 04-PD-RO-03-05 | SO | 3/10/2016 11:30 AM | 3/10/2016 11:30 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229516 | 1 | 1137.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 008 | 04-PD-RO-04-01 | SO | 3/10/2016 11:35 AM | 3/10/2016 11:35 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229517 | 1 | 1015.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 009 | 04-PD-RO-05-01 | SO | 3/10/2016 11:40 AM | 3/10/2016 11:40 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229518 | 1 | 948.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 010 | 04-PD-RO-05-02 | SO | 3/10/2016 11:43 AM | 3/10/2016 11:43 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229519 | 1 | 951.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | |

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| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **011** | 04-PD-RO-05-03 | SO | 3/10/2016 11:45 AM | 3/10/2016 11:45 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229520 | 1 | 1094.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **012** | 04-PD-RO-05-04 | SO | 3/10/2016 11:47 AM | 3/10/2016 11:47 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229521 | 1 | 966.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **013** | 04-PD-RO-05-05 | SO | 3/10/2016 11:50 AM | 3/10/2016 11:50 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229522 | 1 | 986.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **014** | 04-PD-RO-06-01 | SO | 3/10/2016 11:55 AM | 3/10/2016 11:55 AM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229523 | 1 | 1007.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **015** | 04-PD-RO-07-01 | SO | 3/10/2016 12:00 PM | 3/10/2016 12:00 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229524 | 1 | 1026.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **016** | 04-PD-RO-08-01 | SO | 3/10/2016 12:05 PM | 3/10/2016 12:05 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229525 | 1 | 1401.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **017** | 04-PD-RO-08-02 | SO | 3/10/2016 12:07 PM | 3/10/2016 12:07 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229526 | 1 | 1188.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **018** | 04-PD-RO-08-03 | SO | 3/10/2016 12:10 PM | 3/10/2016 12:10 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229527 | 1 | 1605.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **019** | 04-PD-RO-08-04 | SO | 3/10/2016 12:13 PM | 3/10/2016 12:13 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229528 | 1 | 1384.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **020** | 04-PD-RO-08-05 | SO | 3/10/2016 12:15 PM | 3/10/2016 12:15 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229529 | 1 | 1194.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **021** | 04-PD-RO-09-01 | SO | 3/10/2016 12:20 PM | 3/10/2016 12:20 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229530 | 1 | 2252.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **022** | 04-PD-RO-10-01 | SO | 3/10/2016 12:25 PM | 3/10/2016 12:25 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229531 | 1 | 1653.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **023** | 04-PD-RO-11-01 | SO | 3/10/2016 12:30 PM | 3/10/2016 12:30 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229532 | 1 | 2228.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |
| **024** | 04-PD-RO-11-02 | SO | 3/10/2016 12:32 PM | 3/10/2016 12:32 PM | H | 30 | 5 | WO4 | | | | | | | | | |
| | IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | |
| | 229533 | 1 | 1656.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **025** | 04-PD-RO-11-03 | SO | 3/10/2016 12:34 PM | 3/10/2016 12:34 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229534 | 1 | 1757.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **026** | 04-PD-RO-11-04 | SO | 3/10/2016 12:37 PM | 3/10/2016 12:37 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229535 | 1 | 1522.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **027** | 04-PD-RO-11-05 | SO | 3/10/2016 12:39 PM | 3/10/2016 12:39 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229536 | 1 | 1842.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **028** | 04-PD-RO-12-01 | SO | 3/10/2016 12:43 PM | 3/10/2016 12:43 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229537 | 1 | 1203.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **029** | 04-PD-RO-13-01 | SO | 3/10/2016 12:45 PM | 3/10/2016 12:45 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229538 | 1 | 1158.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **030** | 04-PD-RO-14-01 | SO | 3/10/2016 12:47 PM | 3/10/2016 12:47 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229539 | 1 | 1175.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **031** | 04-PD-RO-15-01 | SO | 3/10/2016 12:55 PM | 3/10/2016 12:55 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229540 | 1 | 1737.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |
| **032** | 04-PD-RO-16-01 | SO | 3/10/2016 1:00 PM | 3/10/2016 1:00 PM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | | | |
| | 229541 | 1 | 1691.00 | Ziploc Bag | | | 80 | 19 | | N | N/A | | | | | | | |



DCN: ITSI-0808-0004-0076, 8 May 2019

DCN: ITSI-0808-0004-0076, 8 May 2019



# SDG Report - Analysis Assignments

| | | | |
|---|---|---|---|
| SDG | ARS1-16-00670 | Sample Count | |
| Client | ITSI Gilbane | Analysis Count | 2-64 |

**Sample Count Totals Per Analysis**

| Analysis Code | Analysis Description | Samples Count |
|---|---|---|
| GAM-A-025 | Gamma Spec - 21 Day Ingrowth in (Soil, Sludge, Waste, Sediment,Biota [SO, BI, VG]) | 32 |
| GPC-A-012 | Strontium-90 in (Soil, Sludge, Biota, Sediment [SO, BI, VG]) | 32 |

**Analyses Assigned Per Fraction**

| Fraction | Analysis Code | X = Assigned |
|---|---|---|
| 001 | GPC-A-012 | X |
| 001 | GAM-A-025 | X |
| 002 | GPC-A-012 | X |
| 002 | GAM-A-025 | X |
| 003 | GPC-A-012 | X |
| 003 | GAM-A-025 | X |
| 004 | GPC-A-012 | X |
| 004 | GAM-A-025 | X |
| 005 | GPC-A-012 | X |
| 005 | GAM-A-025 | X |
| 006 | GPC-A-012 | X |
| 006 | GAM-A-025 | X |
| 007 | GPC-A-012 | X |
| 007 | GAM-A-025 | X |
| 008 | GPC-A-012 | X |
| 008 | GAM-A-025 | X |
| 009 | GPC-A-012 | X |
| 009 | GAM-A-025 | X |
| 010 | GPC-A-012 | X |
| 010 | GAM-A-025 | X |
| 011 | GPC-A-012 | X |
| 011 | GAM-A-025 | X |
| 012 | GPC-A-012 | X |
| 012 | GAM-A-025 | X |
| 013 | GPC-A-012 | X |
| 013 | GAM-A-025 | X |
| 014 | GPC-A-012 | X |

| | | |
|---|---|---|
| 014 | GAM-A-025 | X |
| 015 | GPC-A-012 | X |
| 015 | GAM-A-025 | X |
| 016 | GPC-A-012 | X |
| 016 | GAM-A-025 | X |
| 017 | GPC-A-012 | X |
| 017 | GAM-A-025 | X |
| 018 | GPC-A-012 | X |
| 018 | GAM-A-025 | X |
| 019 | GPC-A-012 | X |
| 019 | GAM-A-025 | X |
| 020 | GPC-A-012 | X |
| 020 | GAM-A-025 | X |
| 021 | GPC-A-012 | X |
| 021 | GAM-A-025 | X |
| 022 | GPC-A-012 | X |
| 022 | GAM-A-025 | X |
| 023 | GPC-A-012 | X |
| 023 | GAM-A-025 | X |
| 024 | GPC-A-012 | X |
| 024 | GAM-A-025 | X |
| 025 | GPC-A-012 | X |
| 025 | GAM-A-025 | X |
| 026 | GPC-A-012 | X |
| 026 | GAM-A-025 | X |
| 027 | GPC-A-012 | X |
| 027 | GAM-A-025 | X |
| 028 | GPC-A-012 | X |
| 028 | GAM-A-025 | X |
| 029 | GPC-A-012 | X |
| 029 | GAM-A-025 | X |
| 030 | GPC-A-012 | X |
| 030 | GAM-A-025 | X |

| | | |
|---|---|---|
| 031 | GPC-A-012 | X |
| 031 | GAM-A-025 | X |
| 032 | GPC-A-012 | X |
| 032 | GAM-A-025 | X |

# DQO Report for SDG

ARS1-16-00670



DCN: ITSI-0808-0004-0076, 8 May 2019



| Analysis Code | Prep Type | Units | Aliquot | Procedure | Count Time | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GAM-A-025 | DGAM | pCi | g | ARS-007 | | | | | | | | |
| | Group | Isotope | RDL | LCS LL/UL | MS LL/UL | Rad Y LL/UL | Gray Y LL/UL | RER | RPD | LOD/LOQ | Surr LL/UL | |
| | Gilbane | Ac-228 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Am-241 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Bi-212 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Bi-214 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Co-60 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Cs-137 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Eu-152 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Eu-154 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | K-40 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Pa-234 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Pb-210 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Pb-212 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Pb-214 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Ra-226 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Ra-228 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Th-234 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | Tl-208 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | U-235 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| | Gilbane | U-238 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |
| GPC-A-012 | DRAD | pCi | g | ARS-032 | | | | | | | | |
| | Group | Isotope | RDL | LCS LL/UL | MS LL/UL | Rad Y LL/UL | Gray Y LL/UL | RER | RPD | LOD/LOQ | Surr LL/UL | |
| | STD | Sr-90 | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A | |

| Analysis Code | Fraction | Units | Aliquot |
|---|---|---|---|
| GAM-A-025 | 001 | pCi | g |
| | 002 | pCi | g |
| | 003 | pCi | g |
| | 004 | pCi | g |
| | 005 | pCi | g |
| | 006 | pCi | g |

User: RVARNELL Last Modified: 3/28/2016 1:19:49 PM

| | | | |
|---|---|---|---|
| GAM-A-025 | 007 | pCi | g |
| | 008 | pCi | g |
| | 009 | pCi | g |
| | 010 | pCi | g |
| | 011 | pCi | g |
| | 012 | pCi | g |
| | 013 | pCi | g |
| | 014 | pCi | g |
| | 015 | pCi | g |
| | 016 | pCi | g |
| | 017 | pCi | g |
| | 018 | pCi | g |
| | 019 | pCi | g |
| | 020 | pCi | g |
| | 021 | pCi | g |
| | 022 | pCi | g |
| | 023 | pCi | g |
| | 024 | pCi | g |
| | 025 | pCi | g |
| | 026 | pCi | g |
| | 027 | pCi | g |
| | 028 | pCi | g |
| | 029 | pCi | g |
| | 030 | pCi | g |
| | 031 | pCi | g |
| | 032 | pCi | g |
| GPC-A-012 | 001 | pCi | g |
| | 002 | pCi | g |
| | 003 | pCi | g |
| | 004 | pCi | g |
| | 005 | pCi | g |
| | 006 | pCi | g |
| | 007 | pCi | g |

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| | | | |
|---|---|---|---|
| GPC-A-012 | 008 | pCi | g |
| | 009 | pCi | g |
| | 010 | pCi | g |
| | 011 | pCi | g |
| | 012 | pCi | g |
| | 013 | pCi | g |
| | 014 | pCi | g |
| | 015 | pCi | g |
| | 016 | pCi | g |
| | 017 | pCi | g |
| | 018 | pCi | g |
| | 019 | pCi | g |
| | 020 | pCi | g |
| | 021 | pCi | g |
| | 022 | pCi | g |
| | 023 | pCi | g |
| | 024 | pCi | g |
| | 025 | pCi | g |
| | 026 | pCi | g |
| | 027 | pCi | g |
| | 028 | pCi | g |
| | 029 | pCi | g |
| | 030 | pCi | g |
| | 031 | pCi | g |
| | 032 | pCi | g |



N-68

# ARS FILE TRACKING SHEET

**SDG:** ARS1-16-00670

| Task | Date / Time | Initials |
|---|---|---|
| Date & Time Samples Received | 03-28-16 09:22 | JRN |
| ICOC Initiated/Storage Location: WO4 | 03-28-16 11:15 | JRN |
| Technical Checks Performed | | |
| Report Written / EDD Generated _____/____\|_____ | | |
| Quality Assurance Checks Performed on Report | | |
| Management Checks Performed on Report | | |
| *Preliminary Report Scan* | | |
| Report E-mailed/Faxed | | |
| Invoice Completed Invoice #:_____ | | |
| Requires Report Mailed Yes / No | | |
| Requires Original COC mailed Yes / No | | |
| Report Reviewed and Imaged | | |

## SPECIAL REQUIREMENTS

| Requirement | Yes | No |
|---|---|---|
| 3 Hour Rush | ☐ | ☑ |
| 24 Hour Rush | ☐ | ☑ |
| 48 Hour Rush | ☐ | ☑ |
| 3 Day Rush | ☐ | ☑ |
| 5 Day Rush | ☐ | ☑ |
| 10 Day Rush | ☐ | ☑ |
| Standard Oil/Gas Client (5 Day) | ☐ | ☑ |
| Standard Turnaround | ☑ | ☐ |

**NOTES**

COMPANY NAME: Gilbane SDG: ARSI-16-00070

**SHIPPING CONTAINER**

| | | |
|---|---|---|
| Good Condition | ☑ Yes | ☐ No |
| Radioactive | ☐ Yes | ☑ No |
| UN2910 | ☐ Yes | ☑ No |
| Sec. Seals | ☐ Yes | ☑ No |
| Seals Intact | ☐ Yes ☐ No | ☑ N/A |
| Air Bill | ☐ Yes | ☑ No |

**COC PRESENT WITH SAMPLES**

| | |
|---|---|
| COC | ☑ Yes ☐ No |

**SAMPLE CONTAINER(S)**

| | | |
|---|---|---|
| Good Condition | ☑ Yes | ☐ No |
| Sec. Seals | ☐ Yes | ☑ No |
| Seal Intact | ☐ Yes ☐ No | ☑ N/A |
| Marked Radioactive | ☐ Yes | ☑ No |

# Samples Rcv 32

Matrix [ AF , AQ , BI , FE , LT , SI , (SO) , UR , VG ]

**External and Internal Surveys**

| | | | | | |
|---|---|---|---|---|---|
| Exposure Rate Meter: | M3 124334 | Serial No.: | RN 17782 | Calibration Due Date: | 1/25/17 |
| Count Rate Meter: | M3 237983 | Serial No.: | PR 165363 | Calibration Due Date: | 2/3/17 |

| | | | |
|---|---|---|---|
| Background Exposure Rate (µR/hr) | 19 | Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) | 21 µR/hr |
| Background Count Rate (cpm) | 70 | Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) | 80 cpm |
| | | Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd) | 80 cpm |

| Sample Label/Comments/Notes | pH Orig (pH ≤ 2 is Acceptable) | pH Final | Mark if Preserve | Acid Lot # | Weight(g) / Volume(mL) | Acceptance Limits <500 µR/hr: µR/hr | Acceptance Limits <100 cpm/cm²: cpm |
|---|---|---|---|---|---|---|---|
| 04-PD-RO-01-01 | | | ☐ | | 1711 | 19 | 80 |
| -02-01 | | | ☐ | | 2039 | 19 | 80 |
| -03-01 | | | ☐ | | 812 | 19 | 80 |
| -03-02 | | | ☐ | | 974 | 19 | 80 |
| -03-03 | | | ☐ | JMH | 985 | 19 | 80 |
| -03-04 | | | ☐ | 3-28-16 | 951 | 19 | 80 |
| -03-05 | | | ☐ | | 1137 | 19 | 80 |
| -04-01 | | | ☐ | | 1015 | 19 | 80 |
| -05-01 | | | ☐ | | 948 | 19 | 80 |
| -05-02 | | | ☐ | | 951 | 19 | 80 |
| -05-03 | | | ☐ | | 1094 | 19 | 80 |
| -05-04 | | | ☐ | | 966 | 19 | 80 |
| -05-05 | | | ☐ | | 986 | 19 | 80 |
| -06-01 | | | ☐ | | 1007 | 19 | 80 |
| -07-01 | | | ☐ | | 1026 | 19 | 80 |
| -08-01 | | | ☐ | | 1401 | 19 | 80 |
| -08-02 | | | ☐ | | 1188 | 19 | 80 |
| -08-03 | | | ☐ | | 1605 | 19 | 80 |
| -08-04 | | | ☐ | | 1384 | 19 | 80 |

Surveyors' Name: _____ Date/Time Surveyed: 3-28-16 0922

**COMPANY NAME:** _____ **SDG:** _____

**SHIPPING CONTAINER**

| | | | |
|---|---|---|---|
| Good Condition | ☐ Yes | ☐ No | |
| Radioactive | ☐ Yes | ☐ No | |
| UN2910 | ☐ Yes | ☐ No | |
| Sec. Seals | ☐ Yes | ☐ No | |
| Seals Intact | ☐ Yes | ☐ No | ☐ N/A |
| Air Bill | ☐ Yes | ☐ No | |

**COC PRESENT WITH SAMPLES**

| | | |
|---|---|---|
| COC | ☐ Yes | ☐ No |

**SAMPLE CONTAINER(S)**

| | | | |
|---|---|---|---|
| Good Condition | ☐ Yes | ☐ No | |
| Sec. Seals | ☐ Yes | ☐ No | |
| Seal Intact | ☐ Yes | ☐ No | ☐ N/A |
| Marked Radioactive | ☐ Yes | ☐ No | |

# Samples Rcv _____

Matrix [ AF , AQ , BI , FE , LT , SI , SO , UR , VG ]

**External and Internal Surveys**

| | | | | | |
|---|---|---|---|---|---|
| Exposure Rate Meter: | M3 124334 | Serial No.: | RN 17782 | Calibration Due Date: | 1/25/17 |
| Count Rate Meter: | M3 237983 | Serial No.: | PR 165363 | Calibration Due Date: | 2/3/17 |

Background Exposure Rate (μR/hr) _____ Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) _____ μR/hr

Background Count Rate (cpm) _____ Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) _____ cpm

Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd) _____ cpm

| | pH ≤ 2 is Acceptable | | | | | Acceptance Limits <500 μR/hr | <100 cpm/cm² |
|---|---|---|---|---|---|---|---|
| **Sample Label/Comments/Notes** | **pH Orig** | **pH Final** | **Mark if Preserve** | **Acid Lot #** | **Weight(g) / Volume(mL)** | **μR/hr** | **cpm** |
| 04-PD-RO-08-05 | | | ☐ | | 1194 | 19 | & |
| -09-01 | | | ☐ | | 2252 | 19 | & |
| -10-01 | | | ☐ | JW | 1653 | 19 | & |
| -11-01 | | | ☐ | 3-28-16 | 2228 | 19 | & |
| -11-02 | | | ☐ | | 1656 | 19 | & |
| -11-03 | | | ☐ | | 1757 | 19 | & |
| -11-04 | | | ☐ | | 1522 | 19 | & |
| -11-05 | | | ☐ | | 1842 | 19 | & |
| -12-01 | | | ☐ | | 1203 | 19 | & |
| -13-01 | | | ☐ | | 1158 | 19 | & |
| -14-01 | | | ☐ | | 1175 | 19 | & |
| -15-01 | | | ☐ | | 1737 | 19 | & |
| -16-01 | | | ☐ | | 1691 | 19 | & |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |

Surveyors' Name: _____ Date/Time Surveyed: _____

ORIGIN ID:JCCA (415) 671-0773
HENRY NG
GILBANE
ITSI GILBANE TRAILER HUNTERS POINT
FISHER AVE @ SPEAR AVE BLDG 241
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 23MAR16
ACTWGT: 70.00 LB
CAD: 102700259/NET3730
DIMS: 19x13x14 IN

BILL THIRD PARTY

TO **CAROLYN DICHARRY**
**ARS INC.**
**2609 NORTH RIVER ROAD**
**PORT ALLEN LA 70767**
(225) 381-2991
INV:
PO:
REF: I20400700
DEPT:

FedEx Express

540J1/CF34/727F

**THU - 24 MAR 10:30A**
**PRIORITY OVERNIGHT**

3 of 3
MPS# 0263 **7759 4635 9210**
Mstr# **7759 4635 9357** 0201

**XH OPLA**

**70767**
LA-US **MSY**

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ORIGIN ID:JCCA (415) 671-0773
HENRY NG
GILBANE
ITSI GILBANE TRAILER HUNTERS POINT
FISHER AVE @ SPEAR AVE BLDG 241
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 23MAR16
ACTWGT: 70.00 LB
CAD: 102700259/INET3730
DIMS: 19x13x14 IN
BILL THIRD PARTY

TO **CAROLYN DICHARRY**
**ARS INC.**
**2609 NORTH RIVER ROAD**
**PORT ALLEN LA 70767**
(225) 381-2991
INV:
PO:
REF: 2040007700
DEPT:

FedEx Express

J1616160205Mlav

540J1/CF34/727F

**XH OPLA**

1 of 3

TRK# 0201 **7759 4635 9357**

## MASTER ##

**THU - 24 MAR 10:30A**
**PRIORITY OVERNIGHT**

**70767**
LA-US **MSY**

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2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-01-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-001
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.036 | 0.056 | 0.094 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Bi-212 | 0.117 | 0.213 | 0.368 | 0.184 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Bi-214 | 0.356 | 0.091 | 0.098 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Co-60 | -0.013 | 0.083 | 0.078 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Cs-137 | -0.011 | 0.046 | 0.059 | 0.029 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Eu-152 | -0.006 | 0.008 | 0.178 | 0.089 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Eu-154 | 0.015 | 0.050 | 0.069 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| K-40 | 12.617 | 1.730 | 0.797 | 0.399 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Pa-234 | 0.068 | 0.051 | 0.095 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Pb-210 | 0.144 | 0.721 | 1.250 | 0.625 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Pb-212 | 0.365 | 0.079 | 0.083 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Pb-214 | 0.391 | 0.095 | 0.092 | 0.046 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Ra-226 | 0.356 | 0.091 | 0.098 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Sr-T | 0.049 | 0.094 | 0.159 | 0.074 | U | pCi/g | ARS-032/EichromSRW-1 | 04/14/16 13:36 | AN | 98% |
| Th-232 | 0.283 | 0.112 | 0.188 | 0.094 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Th-234 | 0.503 | 0.477 | 0.969 | 0.485 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| Tl-208 | 0.090 | 0.036 | 0.049 | 0.025 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |
| U-235 | 0.015 | 0.041 | 0.231 | 0.116 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:40 | WJS | NA |

**NOTES:** **RECOUNT**

Project Manager Review

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ARS INTERNATIONAL

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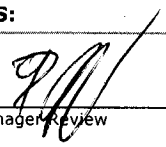
**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-02-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-002
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.003 | 0.107 | 0.154 | 0.077 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Bi-212 | 0.112 | 0.345 | 0.493 | 0.247 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Bi-214 | 0.264 | 0.111 | 0.129 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Co-60 | 0.000 | 0.001 | 0.085 | 0.043 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Cs-137 | 0.006 | 0.034 | 0.062 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Eu-152 | 0.040 | 0.059 | 0.198 | 0.099 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Eu-154 | 0.026 | 0.055 | 0.077 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| K-40 | 11.270 | 1.574 | 0.907 | 0.454 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Pa-234 | 0.055 | 0.109 | 0.128 | 0.064 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Pb-210 | 0.514 | 0.776 | 1.390 | 0.695 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Pb-212 | 0.343 | 0.080 | 0.079 | 0.039 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Pb-214 | 0.299 | 0.092 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Ra-226 | 0.264 | 0.111 | 0.129 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Th-232 | 0.327 | 0.171 | 0.221 | 0.111 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Th-234 | 0.763 | 0.601 | 1.320 | 0.660 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| Tl-208 | 0.108 | 0.045 | 0.060 | 0.030 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |
| U-235 | 0.102 | 0.164 | 0.309 | 0.155 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:38 | WJS | NA |

**NOTES:**



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ARS INTERNATIONAL

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-03-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-003
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.011 | 0.064 | 0.110 | 0.055 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Bi-212 | 0.129 | 0.210 | 0.565 | 0.283 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Bi-214 | 0.284 | 0.092 | 0.106 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Co-60 | 0.019 | 0.016 | 0.059 | 0.029 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Cs-137 | 0.022 | 0.030 | 0.039 | 0.020 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Eu-152 | 0.138 | 0.152 | 0.197 | 0.099 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Eu-154 | 0.000 | 0.087 | 0.082 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| K-40 | 11.849 | 1.509 | 0.255 | 0.128 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Pa-234 | 0.123 | 0.150 | 0.136 | 0.068 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Pb-210 | 0.971 | 0.871 | 1.210 | 0.605 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Pb-212 | 0.379 | 0.078 | 0.075 | 0.038 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Pb-214 | 0.387 | 0.102 | 0.103 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Ra-226 | 0.284 | 0.092 | 0.106 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Sr-T | 0.110 | 0.121 | 0.194 | 0.090 | U | pCi/g | ARS-032/EichromSRW-1 | 04/14/16 13:36 | AN | 89% |
| Th-232 | 0.437 | 0.162 | 0.164 | 0.082 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Th-234 | 0.537 | 0.647 | 1.030 | 0.515 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| Tl-208 | 0.146 | 0.047 | 0.045 | 0.022 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |
| U-235 | 0.051 | 0.045 | 0.056 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 07:50 | WJS | NA |

**NOTES:**

Project Manager Review

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-03-02
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-004
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.010 | 0.080 | 0.136 | 0.068 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Bi-212 | 0.232 | 0.257 | 0.462 | 0.231 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Bi-214 | 0.389 | 0.112 | 0.120 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Co-60 | 0.006 | 0.041 | 0.074 | 0.037 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Cs-137 | 0.019 | 0.033 | 0.056 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Eu-152 | 0.009 | 0.086 | 0.283 | 0.142 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Eu-154 | 0.060 | 0.072 | 0.093 | 0.046 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| K-40 | 12.559 | 1.531 | 0.550 | 0.275 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Pa-234 | 0.099 | 0.119 | 0.141 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Pb-210 | 0.137 | 1.195 | 2.080 | 1.040 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Pb-212 | 0.224 | 0.081 | 0.117 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Pb-214 | 0.367 | 0.091 | 0.130 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Ra-226 | 0.389 | 0.112 | 0.120 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Th-232 | 0.387 | 0.138 | 0.177 | 0.089 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Th-234 | 0.619 | 0.505 | 1.170 | 0.585 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| Tl-208 | 0.137 | 0.047 | 0.062 | 0.031 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |
| U-235 | 0.057 | 0.139 | 0.303 | 0.152 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:41 | WJS | NA |

**NOTES:** **RECOUNT**

Project Manager Review

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LELAP Certificate# 01949

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-03-03
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-005
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.007 | 0.055 | 0.093 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Bi-212 | 0.613 | 0.249 | 0.260 | 0.130 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Bi-214 | 0.415 | 0.090 | 0.074 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Co-60 | 0.000 | 0.030 | 0.063 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Cs-137 | 0.000 | 0.019 | 0.047 | 0.024 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Eu-152 | 0.057 | 0.030 | 0.148 | 0.074 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Eu-154 | 0.018 | 0.063 | 0.066 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| K-40 | 11.606 | 1.298 | 0.359 | 0.180 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Pa-234 | 0.001 | 0.091 | 0.101 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Pb-210 | 0.000 | 0.635 | 1.180 | 0.590 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Pb-212 | 0.479 | 0.074 | 0.066 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Pb-214 | 0.432 | 0.092 | 0.087 | 0.044 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Ra-226 | 0.415 | 0.090 | 0.074 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Th-232 | 0.416 | 0.164 | 0.185 | 0.093 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Th-234 | 0.494 | 0.399 | 1.010 | 0.505 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| Tl-208 | 0.157 | 0.045 | 0.040 | 0.020 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |
| U-235 | 0.046 | 0.188 | 0.256 | 0.128 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 07:50 | WJS | NA |

**NOTES:** **RECOUNT**

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1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-03-04
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-006
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.029 | 0.097 | 0.165 | 0.083 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Bi-212 | 0.415 | 0.400 | 0.600 | 0.300 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Bi-214 | 0.440 | 0.131 | 0.139 | 0.070 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Co-60 | 0.000 | 0.043 | 0.104 | 0.052 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Cs-137 | 0.005 | 0.037 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Eu-152 | 0.095 | 0.129 | 0.260 | 0.130 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Eu-154 | 0.023 | 0.053 | 0.098 | 0.049 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| K-40 | 13.229 | 1.814 | 0.703 | 0.352 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Pa-234 | 0.108 | 0.132 | 0.166 | 0.083 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Pb-210 | 0.181 | 0.979 | 1.780 | 0.890 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Pb-212 | 0.528 | 0.109 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Pb-214 | 0.569 | 0.137 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Ra-226 | 0.440 | 0.131 | 0.139 | 0.070 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Th-232 | 0.541 | 0.150 | 0.184 | 0.092 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Th-234 | 0.821 | 0.640 | 1.670 | 0.835 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| Tl-208 | 0.159 | 0.062 | 0.068 | 0.034 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |
| U-235 | 0.103 | 0.056 | 0.078 | 0.039 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:01 | WJS | NA |

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1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-03-05
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-007
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.043 | 0.380 | 0.175 | 0.088 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Bi-212 | 0.219 | 0.264 | 0.434 | 0.217 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Bi-214 | 0.445 | 0.104 | 0.083 | 0.042 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Co-60 | -0.018 | 0.067 | 0.083 | 0.042 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Cs-137 | -0.006 | 0.035 | 0.064 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Eu-152 | 0.085 | 0.078 | 0.191 | 0.096 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Eu-154 | 0.017 | 0.045 | 0.069 | 0.035 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| K-40 | 12.773 | 1.596 | 0.787 | 0.394 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Pa-234 | 0.043 | 0.082 | 0.142 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Pb-210 | 0.358 | 0.902 | 1.590 | 0.795 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Pb-212 | 0.359 | 0.086 | 0.090 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Pb-214 | 0.348 | 0.085 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Ra-226 | 0.445 | 0.104 | 0.083 | 0.042 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Th-232 | 0.457 | 0.121 | 0.098 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Th-234 | 0.676 | 0.419 | 1.670 | 0.835 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| Tl-208 | 0.119 | 0.045 | 0.060 | 0.030 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |
| U-235 | 0.100 | 0.176 | 0.281 | 0.141 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:09 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-04-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-008
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000 | 0.028 | 0.105 | 0.053 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Bi-212 | 0.441 | 0.302 | 0.297 | 0.149 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Bi-214 | 0.291 | 0.102 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Co-60 | 0.032 | 0.040 | 0.048 | 0.024 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Cs-137 | 0.018 | 0.029 | 0.038 | 0.019 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Eu-152 | 0.077 | 0.069 | 0.185 | 0.093 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Eu-154 | 0.038 | 0.062 | 0.066 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| K-40 | 10.495 | 1.295 | 0.207 | 0.104 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Pa-234 | 0.119 | 0.069 | 0.124 | 0.062 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Pb-210 | 0.282 | 0.696 | 1.030 | 0.515 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Pb-212 | 0.345 | 0.069 | 0.069 | 0.035 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Pb-214 | 0.330 | 0.090 | 0.084 | 0.042 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Ra-226 | 0.291 | 0.102 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Th-232 | 0.237 | 0.113 | 0.226 | 0.113 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Th-234 | 0.240 | 0.378 | 1.040 | 0.520 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| Tl-208 | 0.137 | 0.035 | 0.022 | 0.011 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |
| U-235 | 0.069 | 0.188 | 0.240 | 0.120 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:22 | WJS | NA |

**NOTES:**

Project Manager Review

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ARS INTERNATIONAL
2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-05-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-009
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000 | 0.060 | 0.107 | 0.054 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Bi-212 | 0.215 | 0.308 | 0.519 | 0.260 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Bi-214 | 0.297 | 0.095 | 0.092 | 0.046 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Co-60 | 0.002 | 0.050 | 0.093 | 0.046 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Cs-137 | -0.003 | 0.090 | 0.058 | 0.029 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Eu-152 | 0.022 | 0.044 | 0.181 | 0.091 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Eu-154 | 0.055 | 0.079 | 0.079 | 0.040 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| K-40 | 12.941 | 1.983 | 0.972 | 0.486 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Pa-234 | 0.046 | 0.079 | 0.128 | 0.064 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Pb-210 | -0.079 | 0.804 | 1.270 | 0.635 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Pb-212 | 0.263 | 0.086 | 0.106 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Pb-214 | 0.364 | 0.116 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Ra-226 | 0.297 | 0.095 | 0.092 | 0.046 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Th-232 | 0.232 | 0.130 | 0.266 | 0.133 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Th-234 | 0.461 | 0.455 | 1.200 | 0.600 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| Tl-208 | 0.087 | 0.039 | 0.052 | 0.026 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |
| U-235 | 0.098 | 0.080 | 0.372 | 0.186 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:32 | WJS | NA |

**NOTES:**

Project Manager Review

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1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-05-02
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-010
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.005 | 0.099 | 0.114 | 0.057 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Bi-212 | 0.273 | 0.286 | 0.318 | 0.159 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Bi-214 | 0.381 | 0.085 | 0.070 | 0.035 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Co-60 | -0.016 | 0.054 | 0.064 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Cs-137 | 0.001 | 0.027 | 0.048 | 0.024 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Eu-152 | 0.007 | 0.023 | 0.167 | 0.084 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Eu-154 | 0.033 | 0.074 | 0.061 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| K-40 | 12.988 | 1.400 | 0.589 | 0.295 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Pa-234 | 0.055 | 0.125 | 0.103 | 0.052 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Pb-210 | -0.496 | 5.940 | 1.270 | 0.635 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Pb-212 | 0.305 | 0.070 | 0.075 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Pb-214 | 0.349 | 0.078 | 0.089 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Ra-226 | 0.381 | 0.085 | 0.070 | 0.035 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Th-232 | 0.479 | 0.111 | 0.119 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Th-234 | 0.479 | 0.276 | 1.140 | 0.570 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| Tl-208 | 0.110 | 0.038 | 0.043 | 0.021 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |
| U-235 | 0.013 | 0.132 | 0.230 | 0.115 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:02 | WJS | NA |

**NOTES:** **RECOUNT**

Project Manager Review

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2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-05-03
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-011
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.048 | 0.085 | 0.142 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Bi-212 | 0.109 | 0.364 | 0.593 | 0.297 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Bi-214 | 0.156 | 0.118 | 0.154 | 0.077 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Co-60 | -0.015 | 0.054 | 0.097 | 0.049 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Cs-137 | 0.002 | 0.033 | 0.063 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Eu-152 | 0.045 | 0.064 | 0.208 | 0.104 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Eu-154 | 0.038 | 0.066 | 0.089 | 0.045 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| K-40 | 11.424 | 1.674 | 0.493 | 0.247 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Pa-234 | 0.065 | 0.106 | 0.154 | 0.077 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Pb-210 | 0.380 | 0.945 | 1.720 | 0.860 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Pb-212 | 0.357 | 0.098 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Pb-214 | 0.367 | 0.119 | 0.157 | 0.079 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Ra-226 | 0.156 | 0.118 | 0.154 | 0.077 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Th-232 | 0.185 | 0.107 | 0.294 | 0.147 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Th-234 | 0.909 | 0.545 | 1.580 | 0.790 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| Tl-208 | 0.086 | 0.057 | 0.085 | 0.042 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |
| U-235 | 0.082 | 0.056 | 0.079 | 0.039 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:34 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-05-04
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-012
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.031 | 0.913 | 0.141 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Bi-212 | 0.093 | 0.316 | 0.473 | 0.237 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Bi-214 | 0.359 | 0.107 | 0.097 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Co-60 | 0.028 | 0.032 | 0.053 | 0.026 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Cs-137 | 0.006 | 0.032 | 0.058 | 0.029 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Eu-152 | 0.051 | 0.158 | 0.404 | 0.202 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Eu-154 | 0.017 | 0.036 | 0.078 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| K-40 | 11.683 | 1.504 | 0.705 | 0.353 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Pa-234 | 0.035 | 0.061 | 0.125 | 0.063 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Pb-210 | -0.229 | 1.896 | 1.660 | 0.830 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Pb-212 | 0.345 | 0.082 | 0.081 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Pb-214 | 0.320 | 0.100 | 0.114 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Ra-226 | 0.359 | 0.107 | 0.097 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Th-232 | 0.373 | 0.129 | 0.179 | 0.090 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Th-234 | 0.327 | 0.538 | 1.330 | 0.665 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| Tl-208 | 0.077 | 0.046 | 0.058 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |
| U-235 | 0.084 | 0.134 | 0.260 | 0.130 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:41 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-05-05
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-013
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000 | 0.034 | 0.130 | 0.065 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Bi-212 | 0.207 | 0.232 | 0.543 | 0.272 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Bi-214 | 0.340 | 0.108 | 0.103 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Co-60 | 0.054 | 0.040 | 0.044 | 0.022 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Cs-137 | 0.000 | 0.005 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Eu-152 | 0.045 | 0.064 | 0.201 | 0.101 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Eu-154 | 0.019 | 0.090 | 0.059 | 0.030 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| K-40 | 11.577 | 1.498 | 0.440 | 0.220 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Pa-234 | 0.051 | 0.122 | 0.107 | 0.054 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Pb-210 | 0.000 | 0.522 | 1.430 | 0.715 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Pb-212 | 0.393 | 0.075 | 0.066 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Pb-214 | 0.361 | 0.101 | 0.092 | 0.046 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Ra-226 | 0.340 | 0.108 | 0.103 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Th-232 | 0.438 | 0.114 | 0.062 | 0.031 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Th-234 | 0.992 | 0.439 | 1.060 | 0.530 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| Tl-208 | 0.112 | 0.050 | 0.054 | 0.027 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |
| U-235 | 0.041 | 0.039 | 0.050 | 0.025 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 08:53 | WJS | NA |

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-06-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-014
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.010 | 0.069 | 0.121 | 0.061 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Bi-212 | 0.117 | 0.235 | 0.419 | 0.210 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Bi-214 | 0.220 | 0.090 | 0.119 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Co-60 | -0.004 | 0.156 | 0.103 | 0.052 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Cs-137 | 0.002 | 0.034 | 0.062 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Eu-152 | 0.041 | 0.054 | 0.235 | 0.118 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Eu-154 | 0.025 | 0.043 | 0.082 | 0.041 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| K-40 | 13.663 | 2.076 | 1.080 | 0.540 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Pa-234 | 0.054 | 0.079 | 0.110 | 0.055 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Pb-210 | 0.337 | 0.681 | 1.280 | 0.640 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Pb-212 | 0.395 | 0.095 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Pb-214 | 0.326 | 0.102 | 0.117 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Ra-226 | 0.220 | 0.090 | 0.119 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Th-232 | 0.301 | 0.143 | 0.257 | 0.129 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Th-234 | 0.639 | 0.466 | 1.310 | 0.655 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| Tl-208 | 0.147 | 0.063 | 0.066 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |
| U-235 | 0.038 | 0.040 | 0.065 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:05 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-07-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-015
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.070 | 0.061 | 0.096 | 0.048 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Bi-212 | 0.133 | 0.294 | 0.522 | 0.261 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Bi-214 | 0.191 | 0.101 | 0.148 | 0.074 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Co-60 | -0.003 | 0.071 | 0.089 | 0.045 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Cs-137 | 0.010 | 0.033 | 0.061 | 0.030 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Eu-152 | 0.087 | 0.176 | 0.271 | 0.136 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Eu-154 | 0.038 | 0.080 | 0.064 | 0.032 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| K-40 | 11.696 | 1.612 | 0.430 | 0.215 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Pa-234 | 0.054 | 0.115 | 0.162 | 0.081 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Pb-210 | -0.393 | 2.257 | 1.980 | 0.990 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Pb-212 | 0.280 | 0.093 | 0.116 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Pb-214 | 0.253 | 0.091 | 0.146 | 0.073 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Ra-226 | 0.191 | 0.101 | 0.148 | 0.074 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Th-232 | 0.224 | 0.148 | 0.260 | 0.130 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Th-234 | 0.337 | 0.588 | 1.420 | 0.710 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| Tl-208 | 0.104 | 0.048 | 0.071 | 0.035 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |
| U-235 | 0.047 | 0.096 | 0.367 | 0.184 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:06 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-08-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-016
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.022 | 0.080 | 0.135 | 0.068 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Bi-212 | 0.125 | 0.207 | 0.363 | 0.182 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Bi-214 | 0.363 | 0.109 | 0.114 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Co-60 | -0.002 | 0.074 | 0.085 | 0.043 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Cs-137 | -0.002 | 0.085 | 0.047 | 0.024 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Eu-152 | 0.064 | 0.095 | 0.225 | 0.113 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Eu-154 | 0.015 | 0.061 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| K-40 | 13.606 | 1.604 | 0.491 | 0.246 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Pa-234 | 0.100 | 0.115 | 0.120 | 0.060 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Pb-210 | -0.025 | 0.980 | 1.740 | 0.870 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Pb-212 | 0.308 | 0.087 | 0.104 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Pb-214 | 0.452 | 0.106 | 0.123 | 0.062 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Ra-226 | 0.363 | 0.109 | 0.114 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Sr-T | 0.029 | 0.095 | 0.164 | 0.076 | U | pCi/g | ARS-032/EichromSRW-1 | 04/14/16 13:36 | AN | 99% |
| Th-232 | 0.206 | 0.147 | 0.236 | 0.118 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Th-234 | 0.476 | 0.510 | 1.160 | 0.580 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| Tl-208 | 0.067 | 0.041 | 0.064 | 0.032 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |
| U-235 | 0.141 | 0.152 | 0.301 | 0.151 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:27 | WJS | NA |

**NOTES:** **RECOUNT**

Project Manager Review

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-08-02
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-017
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.015 | 0.268 | 0.149 | 0.075 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Bi-212 | 0.199 | 0.275 | 0.460 | 0.230 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Bi-214 | 0.463 | 0.114 | 0.104 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Co-60 | -0.010 | 0.099 | 0.087 | 0.043 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Cs-137 | -0.011 | 0.038 | 0.067 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Eu-152 | 0.083 | 0.054 | 0.252 | 0.126 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Eu-154 | -0.005 | 0.019 | 0.078 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| K-40 | 13.182 | 1.663 | 0.755 | 0.378 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Pa-234 | 0.076 | 0.050 | 0.116 | 0.058 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Pb-210 | 1.175 | 0.960 | 1.440 | 0.720 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Pb-212 | 0.345 | 0.088 | 0.094 | 0.047 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Pb-214 | 0.368 | 0.094 | 0.108 | 0.054 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Ra-226 | 0.463 | 0.114 | 0.104 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Th-232 | 0.226 | 0.129 | 0.238 | 0.119 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Th-234 | 0.769 | 0.454 | 1.400 | 0.700 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| Tl-208 | 0.114 | 0.046 | 0.051 | 0.026 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |
| U-235 | 0.133 | 0.167 | 0.252 | 0.126 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:12 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-08-03
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-018
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000 | 0.062 | 0.131 | 0.066 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Bi-212 | 0.524 | 0.295 | 0.312 | 0.156 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Bi-214 | 0.302 | 0.149 | 0.170 | 0.085 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Co-60 | 0.002 | 0.025 | 0.101 | 0.051 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Cs-137 | 0.000 | 0.026 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Eu-152 | 0.133 | 0.096 | 0.209 | 0.105 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Eu-154 | 0.085 | 0.121 | 0.082 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| K-40 | 15.401 | 1.823 | 0.450 | 0.225 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Pa-234 | 0.040 | 0.162 | 0.116 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Pb-210 | 0.189 | 0.990 | 1.480 | 0.740 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Pb-212 | 0.364 | 0.079 | 0.083 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Pb-214 | 0.487 | 0.123 | 0.110 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Ra-226 | 0.302 | 0.149 | 0.170 | 0.085 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Th-232 | 0.488 | 0.145 | 0.131 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Th-234 | 0.375 | 0.362 | 1.350 | 0.675 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| Tl-208 | 0.194 | 0.048 | 0.029 | 0.014 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |
| U-235 | 0.095 | 0.190 | 0.306 | 0.153 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:26 | WJS | NA |

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-08-04
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-019
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.013 | 0.088 | 0.151 | 0.076 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Bi-212 | 0.135 | 0.363 | 0.498 | 0.249 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Bi-214 | 0.538 | 0.138 | 0.126 | 0.063 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Co-60 | -0.028 | 0.085 | 0.113 | 0.057 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Cs-137 | 0.012 | 0.038 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Eu-152 | 0.027 | 0.054 | 0.239 | 0.120 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Eu-154 | 0.051 | 0.071 | 0.084 | 0.042 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| K-40 | 18.970 | 2.511 | 0.860 | 0.430 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Pa-234 | 0.062 | 0.117 | 0.142 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Pb-210 | 0.351 | 0.875 | 1.590 | 0.795 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Pb-212 | 0.547 | 0.118 | 0.123 | 0.062 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Pb-214 | 0.591 | 0.156 | 0.153 | 0.077 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Ra-226 | 0.538 | 0.138 | 0.126 | 0.063 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Th-232 | 0.586 | 0.167 | 0.255 | 0.128 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Th-234 | 0.723 | 0.580 | 1.340 | 0.670 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| Tl-208 | 0.201 | 0.061 | 0.057 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |
| U-235 | 0.068 | 0.044 | 0.070 | 0.035 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:38 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-08-05
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-020
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.050 | 0.075 | 0.125 | 0.063 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Bi-212 | 0.299 | 0.363 | 0.583 | 0.292 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Bi-214 | 0.132 | 0.096 | 0.155 | 0.078 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Co-60 | 0.007 | 0.043 | 0.080 | 0.040 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Cs-137 | -0.002 | 0.605 | 0.067 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Eu-152 | 0.076 | 0.121 | 0.234 | 0.117 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Eu-154 | 0.000 | 0.001 | 0.081 | 0.040 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| K-40 | 7.946 | 1.347 | 0.480 | 0.240 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Pa-234 | 0.060 | 0.111 | 0.120 | 0.060 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Pb-210 | 0.020 | 1.019 | 1.950 | 0.975 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Pb-212 | 0.226 | 0.080 | 0.098 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Pb-214 | 0.152 | 0.085 | 0.140 | 0.070 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Ra-226 | 0.132 | 0.096 | 0.155 | 0.078 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Th-232 | 0.103 | 0.129 | 0.292 | 0.146 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Th-234 | 0.609 | 0.614 | 1.330 | 0.665 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| Tl-208 | 0.071 | 0.057 | 0.061 | 0.031 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |
| U-235 | 0.095 | 0.181 | 0.330 | 0.165 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 09:39 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-09-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-021
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.006 | 0.077 | 0.132 | 0.066 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Bi-212 | 0.585 | 0.319 | 0.416 | 0.208 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Bi-214 | 0.644 | 0.120 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Co-60 | -0.003 | 0.241 | 0.075 | 0.037 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Cs-137 | -0.019 | 0.046 | 0.064 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Eu-152 | 0.045 | 0.104 | 0.215 | 0.108 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Eu-154 | 0.048 | 0.105 | 0.077 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| K-40 | 18.945 | 2.180 | 0.759 | 0.380 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pa-234 | 0.062 | 0.159 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pb-210 | 0.082 | 0.853 | 1.510 | 0.755 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pb-212 | 0.975 | 0.135 | 0.110 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pb-214 | 0.781 | 0.127 | 0.093 | 0.047 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Ra-226 | 0.644 | 0.120 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Th-232 | 1.009 | 0.187 | 0.138 | 0.069 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Th-234 | 1.132 | 0.490 | 1.100 | 0.550 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Tl-208 | 0.319 | 0.062 | 0.053 | 0.027 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| U-235 | 0.047 | 0.046 | 0.333 | 0.167 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |

**NOTES:** **RECOUNT**

Project Manager Review

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-10-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-022
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.003 | 0.086 | 0.145 | 0.073 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Bi-212 | 0.332 | 0.382 | 0.448 | 0.224 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Bi-214 | 0.578 | 0.128 | 0.126 | 0.063 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Co-60 | -0.012 | 0.044 | 0.078 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Cs-137 | -0.003 | 0.035 | 0.062 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Eu-152 | 0.078 | 0.114 | 0.234 | 0.117 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Eu-154 | 0.007 | 0.084 | 0.059 | 0.030 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| K-40 | 9.961 | 1.305 | 0.491 | 0.246 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pa-234 | 0.049 | 0.099 | 0.136 | 0.068 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pb-210 | 0.413 | 1.004 | 1.650 | 0.825 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pb-212 | 0.507 | 0.109 | 0.120 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Pb-214 | 0.676 | 0.135 | 0.118 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Ra-226 | 0.578 | 0.128 | 0.126 | 0.063 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Th-232 | 0.490 | 0.125 | 0.194 | 0.097 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Th-234 | 0.753 | 0.473 | 1.240 | 0.620 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| Tl-208 | 0.229 | 0.058 | 0.055 | 0.028 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |
| U-235 | 0.087 | 0.043 | 0.064 | 0.032 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:16 | WJS | NA |

**NOTES:** **RECOUNT**

Project Manager Review

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-11-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-023
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.007 | 0.063 | 0.093 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Bi-212 | 0.199 | 0.322 | 0.392 | 0.196 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Bi-214 | 0.365 | 0.095 | 0.083 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Co-60 | 0.008 | 0.046 | 0.056 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Cs-137 | 0.000 | 0.022 | 0.049 | 0.025 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Eu-152 | 0.058 | 0.044 | 0.141 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Eu-154 | 0.000 | 0.041 | 0.060 | 0.030 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| K-40 | 12.189 | 1.353 | 0.487 | 0.244 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Pa-234 | 0.083 | 0.125 | 0.093 | 0.046 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Pb-210 | 0.241 | 0.559 | 0.825 | 0.413 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Pb-212 | 0.309 | 0.059 | 0.060 | 0.030 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Pb-214 | 0.398 | 0.089 | 0.075 | 0.038 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Ra-226 | 0.365 | 0.095 | 0.083 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Th-232 | 0.322 | 0.096 | 0.086 | 0.043 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Th-234 | 0.152 | 0.599 | 0.872 | 0.436 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| Tl-208 | 0.129 | 0.038 | 0.034 | 0.017 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |
| U-235 | 0.056 | 0.040 | 0.044 | 0.022 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:37 | WJS | NA |

**NOTES:** **RECOUNT**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-11-02
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-024
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.019 | 0.485 | 0.117 | 0.059 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Bi-212 | 0.162 | 0.252 | 0.426 | 0.213 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Bi-214 | 0.270 | 0.112 | 0.117 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Co-60 | -0.002 | 0.218 | 0.076 | 0.038 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Cs-137 | 0.018 | 0.032 | 0.054 | 0.027 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Eu-152 | 0.009 | 0.023 | 0.161 | 0.081 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Eu-154 | 0.020 | 0.093 | 0.064 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| K-40 | 12.657 | 1.586 | 0.756 | 0.378 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Pa-234 | 0.042 | 0.054 | 0.146 | 0.073 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Pb-210 | 0.241 | 0.756 | 1.380 | 0.690 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Pb-212 | 0.172 | 0.064 | 0.088 | 0.044 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Pb-214 | 0.311 | 0.082 | 0.101 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Ra-226 | 0.270 | 0.112 | 0.117 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Th-232 | 0.220 | 0.116 | 0.199 | 0.100 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Th-234 | 0.511 | 0.185 | 1.190 | 0.595 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| Tl-208 | 0.102 | 0.040 | 0.055 | 0.028 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |
| U-235 | 0.068 | 0.111 | 0.200 | 0.100 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:15 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-11-03
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-025
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.001 | 0.079 | 0.137 | 0.069 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Bi-212 | 0.742 | 0.258 | 0.261 | 0.131 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Bi-214 | 0.616 | 0.113 | 0.099 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Co-60 | 0.024 | 0.040 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Cs-137 | -0.012 | 0.033 | 0.057 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Eu-152 | 0.047 | 0.097 | 0.200 | 0.100 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Eu-154 | 0.050 | 0.084 | 0.072 | 0.036 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| K-40 | 20.700 | 2.009 | 0.735 | 0.368 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Pa-234 | 0.068 | 0.098 | 0.125 | 0.063 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Pb-210 | 0.830 | 0.829 | 1.330 | 0.665 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Pb-212 | 0.546 | 0.097 | 0.090 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Pb-214 | 0.618 | 0.103 | 0.127 | 0.064 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Ra-226 | 0.616 | 0.113 | 0.099 | 0.049 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Th-232 | 0.501 | 0.156 | 0.203 | 0.102 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Th-234 | 0.873 | 0.494 | 1.180 | 0.590 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| Tl-208 | 0.187 | 0.055 | 0.058 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |
| U-235 | 0.056 | 0.182 | 0.330 | 0.165 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 08:49 | WJS | NA |

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-11-04
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-026
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.008 | 0.079 | 0.137 | 0.069 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Bi-212 | 0.143 | 0.276 | 0.570 | 0.285 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Bi-214 | 0.276 | 0.095 | 0.116 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Co-60 | -0.004 | 0.062 | 0.087 | 0.043 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Cs-137 | 0.010 | 0.037 | 0.066 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Eu-152 | 0.072 | 0.118 | 0.160 | 0.080 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Eu-154 | 0.078 | 0.100 | 0.083 | 0.041 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| K-40 | 11.788 | 1.603 | 0.548 | 0.274 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pa-234 | 0.074 | 0.108 | 0.121 | 0.061 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pb-210 | 0.470 | 0.901 | 1.640 | 0.820 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pb-212 | 0.356 | 0.100 | 0.114 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pb-214 | 0.325 | 0.100 | 0.120 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Ra-226 | 0.276 | 0.095 | 0.116 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Th-232 | 0.270 | 0.139 | 0.256 | 0.128 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Th-234 | 0.505 | 0.444 | 1.320 | 0.660 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Tl-208 | 0.127 | 0.050 | 0.054 | 0.027 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| U-235 | -0.079 | 0.568 | 0.403 | 0.202 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-11-05
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-027
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.041 | 0.053 | 0.087 | 0.043 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Bi-212 | 0.154 | 0.336 | 0.502 | 0.251 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Bi-214 | 0.290 | 0.097 | 0.106 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Co-60 | -0.009 | 0.102 | 0.084 | 0.042 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Cs-137 | 0.007 | 0.036 | 0.064 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Eu-152 | 0.020 | 0.050 | 0.295 | 0.148 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Eu-154 | -0.001 | 0.101 | 0.073 | 0.036 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| K-40 | 10.977 | 1.752 | 1.130 | 0.565 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pa-234 | 0.052 | 0.098 | 0.094 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pb-210 | -0.648 | 25.931 | 2.010 | 1.005 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pb-212 | 0.321 | 0.088 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Pb-214 | 0.268 | 0.090 | 0.103 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Ra-226 | 0.290 | 0.097 | 0.106 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Th-232 | 0.281 | 0.110 | 0.106 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Th-234 | 0.369 | 0.494 | 1.120 | 0.560 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| Tl-208 | 0.122 | 0.041 | 0.039 | 0.019 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |
| U-235 | 0.042 | 0.050 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:47 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-12-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-028
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.037 | 0.082 | 0.138 | 0.069 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Bi-212 | 0.171 | 0.281 | 0.481 | 0.241 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Bi-214 | 0.212 | 0.086 | 0.118 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Co-60 | 0.006 | 0.031 | 0.087 | 0.043 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Cs-137 | 0.000 | 0.047 | 0.058 | 0.029 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Eu-152 | 0.151 | 0.141 | 0.244 | 0.122 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Eu-154 | 0.034 | 0.102 | 0.082 | 0.041 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| K-40 | 23.925 | 2.293 | 0.351 | 0.176 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Pa-234 | 0.060 | 0.112 | 0.134 | 0.067 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Pb-210 | -0.055 | 1.018 | 1.700 | 0.850 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Pb-212 | 0.300 | 0.079 | 0.097 | 0.048 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Pb-214 | 0.276 | 0.085 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Ra-226 | 0.212 | 0.086 | 0.118 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Th-232 | 0.181 | 0.108 | 0.230 | 0.115 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Th-234 | 0.885 | 0.780 | 1.210 | 0.605 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| Tl-208 | 0.070 | 0.042 | 0.065 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |
| U-235 | -0.062 | 0.157 | 0.325 | 0.163 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:17 | WJS | NA |

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ARS INTERNATIONAL

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-13-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-029
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.002 | 0.090 | 0.137 | 0.069 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Bi-212 | 0.198 | 0.269 | 0.448 | 0.224 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Bi-214 | 0.375 | 0.106 | 0.133 | 0.067 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Co-60 | -0.003 | 0.139 | 0.030 | 0.015 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Cs-137 | 0.009 | 0.033 | 0.060 | 0.030 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Eu-152 | 0.055 | 0.117 | 0.222 | 0.111 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Eu-154 | 0.027 | 0.071 | 0.078 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| K-40 | 8.498 | 1.261 | 0.726 | 0.363 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Pa-234 | 0.064 | 0.118 | 0.112 | 0.056 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Pb-210 | -0.183 | 1.382 | 1.480 | 0.740 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Pb-212 | 0.402 | 0.097 | 0.099 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Pb-214 | 0.449 | 0.109 | 0.108 | 0.054 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Ra-226 | 0.375 | 0.106 | 0.133 | 0.067 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Th-232 | 0.306 | 0.120 | 0.193 | 0.097 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Th-234 | 0.373 | 0.541 | 1.270 | 0.635 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| Tl-208 | 0.177 | 0.045 | 0.034 | 0.017 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |
| U-235 | 0.084 | 0.166 | 0.274 | 0.137 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 10:48 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-14-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-030
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.026 | 0.075 | 0.111 | 0.056 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Bi-212 | 0.237 | 0.213 | 0.459 | 0.230 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Bi-214 | 0.252 | 0.091 | 0.089 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Co-60 | 0.000 | 0.007 | 0.076 | 0.038 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Cs-137 | 0.000 | 0.007 | 0.052 | 0.026 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Eu-152 | 0.051 | 0.107 | 0.153 | 0.077 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Eu-154 | 0.000 | 0.055 | 0.074 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| K-40 | 7.005 | 1.143 | 0.282 | 0.141 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Pa-234 | 0.003 | 0.120 | 0.112 | 0.056 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Pb-210 | 0.000 | 0.502 | 1.530 | 0.765 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Pb-212 | 0.230 | 0.062 | 0.062 | 0.031 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Pb-214 | 0.308 | 0.092 | 0.102 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Ra-226 | 0.252 | 0.091 | 0.089 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Th-232 | 0.396 | 0.126 | 0.105 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Th-234 | 0.343 | 0.677 | 0.986 | 0.493 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| Tl-208 | 0.082 | 0.055 | 0.063 | 0.031 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |
| U-235 | 0.053 | 0.047 | 0.056 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:20 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-15-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.004
**ARS Sample ID:** ARS1-16-00670-031
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.038 | 0.059 | 0.085 | 0.042 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Bi-212 | 0.252 | 0.226 | 0.270 | 0.135 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Bi-214 | 0.290 | 0.082 | 0.082 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Co-60 | 0.002 | 0.019 | 0.064 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Cs-137 | 0.037 | 0.032 | 0.039 | 0.020 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Eu-152 | 0.026 | 0.032 | 0.158 | 0.079 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Eu-154 | 0.015 | 0.091 | 0.053 | 0.026 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| K-40 | 8.039 | 1.059 | 0.210 | 0.105 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Pa-234 | 0.021 | 0.150 | 0.095 | 0.047 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Pb-210 | 0.061 | 0.513 | 0.894 | 0.447 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Pb-212 | 0.317 | 0.060 | 0.051 | 0.025 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Pb-214 | 0.300 | 0.077 | 0.078 | 0.039 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Ra-226 | 0.290 | 0.082 | 0.082 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Sr-T | -0.043 | 0.087 | 0.161 | 0.075 | U | pCi/g | ARS-032/EichromSRW-1 | 04/14/16 13:36 | AN | 95% |
| Th-232 | 0.257 | 0.095 | 0.081 | 0.041 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Th-234 | 0.361 | 0.343 | 0.827 | 0.414 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| Tl-208 | 0.125 | 0.045 | 0.041 | 0.020 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |
| U-235 | 0.070 | 0.138 | 0.232 | 0.116 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:24 | WJS | NA |

**NOTES:** **RECOUNT**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00670
**Client Sample ID:** 04-PD-RO-16-01
**Sample Collection Date:** 03/10/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00670-032
**Date Received:** 03/28/16
**Report Date:** 04/25/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.052 | 0.059 | 0.096 | 0.048 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Bi-212 | 0.132 | 0.249 | 0.438 | 0.219 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Bi-214 | 0.268 | 0.114 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Co-60 | -0.004 | 0.169 | 0.031 | 0.015 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Cs-137 | 0.011 | 0.029 | 0.052 | 0.026 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Eu-152 | 0.016 | 0.031 | 0.214 | 0.107 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Eu-154 | 0.043 | 0.068 | 0.066 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| K-40 | 4.422 | 1.150 | 1.160 | 0.580 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Pa-234 | 0.048 | 0.048 | 0.127 | 0.064 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Pb-210 | -0.753 | 30.133 | 1.590 | 0.795 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Pb-212 | 0.180 | 0.075 | 0.110 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Pb-214 | 0.285 | 0.108 | 0.121 | 0.061 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Ra-226 | 0.268 | 0.114 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Th-232 | 0.157 | 0.136 | 0.233 | 0.117 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Th-234 | 0.372 | 0.445 | 1.150 | 0.575 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| Tl-208 | 0.065 | 0.043 | 0.058 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |
| U-235 | 0.044 | 0.033 | 0.268 | 0.134 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:21 | WJS | NA |

**NOTES:**

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# Radiological Analysis

## Quality Control Results

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

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# QC Results Report

**Sample Delivery Group:** ARS1-16-00645, 00646, 00670, 00671, 00749

## Laboratory Control Sample Evaluation

| Analysis Batch | QC Type | Analyte | Analysis Results | CSU 1 (2s) | MDC | Expected Value | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Percent Recovery (%) | LCS Acceptance Range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | LCS | Sr-T | 23.045 | 3.551 | 0.417 | 21.050 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 109 | 75%-125% |

## Blank Evaluation

| Analysis Batch | QC Type | Analyte | Analysis Results | CSU 1 (2s) | MDC | Expected Value | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | MBL | Sr-T | 0.012 | 0.231 | 0.404 | NA | U | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN |

## RER Duplicate Evaluation

| Analysis Batch | QC Type | Analysis Description | Result 1 | CSU 1 (2s) | Result 2 | CSU 2 (2s) | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | RER | RER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | LCSD | Sr-T | 23.045 | 3.551 | 23.470 | 3.609 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 0.06 | < 1 |

## DER Duplicate Evaluation

| Analysis Batch | QC Type | Analysis Description | Result 1 | CSU 1 (2s) | Result 2 | CSU 2 (2s) | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | DER | DER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | LCSD | Sr-T | 23.045 | 3.551 | 23.470 | 3.609 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 0.17 | < 3 |

## Sample RER Duplicate Evaluation

| Analysis Batch | QC Type | Analyte | DUP Original Result | CSU 1 (2s) | DUP Result | CSU 2 (2s) | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | RER | RER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | DUP | Sr-T | -0.070 | 0.102 | 0.023 | 0.10 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 0.46 | < 1 |

## Sample DER Duplicate Evaluation

| Analysis Batch | QC Type | Analyte | DUP Original Result | CSU 1 (2s) | DUP Result | CSU 2 (2s) | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | DER | DER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | DUP | Sr-T | -0.070 | 0.102 | 0.023 | 0.10 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 1.29 | < 3 |

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# QC Results per Analytical Batch

| Analytical Batch | ARS1-B16-00563 |
|---|---|
| SDG | ARS1-16-00670 |
| Analysis | Gamma Spec (Solid) |
| Analysis Test Method | ARS-007/EPA 901.1M |
| Analysis Code | GAM-A-025 |
| Report Units | pCi/g |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| Laboratory Control Sample | Recovery (%): | > 75 | < 125 |
| Matrix Spike | Recovery (%): | > 60 | < 140 |
| Duplicate | Replicate Error Ratio (RER): | | < 1 |
| | Duplicate Error Ratio (DER): | | < 3 |
| | Relative Percent Difference (RPD %): | | ≤ 25 |

## Laboratory Control Sample

Analysis Date: 04/19/16 06:08 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B16-00563-01 | LCS | AM-241 | 21700 | 1700 | 22748 | 95 | 670 |
| ARS1-B16-00563-01 | LCS | CO-60 | 41100 | 1900 | 42793 | 96 | 520 |
| ARS1-B16-00563-01 | LCS | CS-137 | 35300 | 1700 | 35450 | 100 | 340 |

## Duplicate RER/DER/RPD

Analysis Date: 04/19/16 06:22 | Analysis Technician: WJS

| Analyte | Result LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 21730 | 1749 | 22880 | 1810 | 0.32 | 0.90 | 5.2 |
| CO-60 | 41070 | 1926 | 41920 | 1673 | 0.24 | 0.66 | 2.0 |
| CS-137 | 35260 | 1720 | 36460 | 1763 | 0.34 | 0.95 | 3.3 |

## Duplicate RER/DER/RPD (Dup Sample)

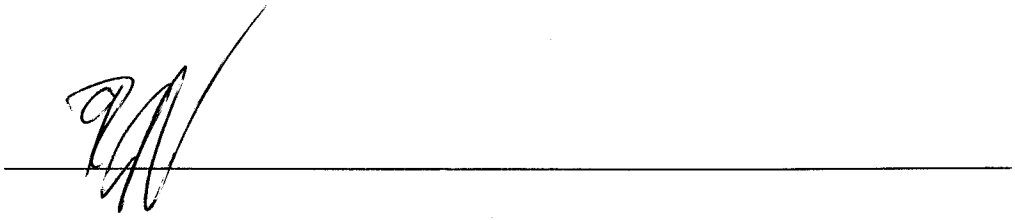
Analysis Date: | Analysis Technician:

| Analyte | Result DO | CSU DO (2s) | Results DUP | CSU DUP (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| BI-214 | 0.35922 | 0.10716 | 0.51333 | 0.13952 | 0.62 | 1.72 | 35.3 |
| CO-60 | 0.028134 | 0.032188 | 0.011671 | 0.020754 | 0.31 | 0.84 | 82.7 |
| CS-137 | 0.0056198 | 0.032085 | -0.0065124 | 0.071233 | 0.12 | 0.30 | 2718.4 |

## Method Blank

Analysis Date: 04/19/16 05:47 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B16-00563-03 | MBL | AM-241 | 0 | 15 | 28 | U |
| ARS1-B16-00563-03 | MBL | CO-60 | 0 | 18 | 34 | U |
| ARS1-B16-00563-03 | MBL | CS-137 | 1.7 | 9.3 | 18 | U |



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# QC Results per Analytical Batch

| Analytical Batch | ARS1-B16-00564 |
|---|---|
| SDG | ARS1-16-00670 |
| Analysis | Gamma Spec (Solid) |
| Analysis Test Method | ARS-007/EPA 901.1M |
| Analysis Code | GAM-A-025 |
| Report Units | pCi/g |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| Laboratory Control Sample | Recovery (%): | > 75 | < 125 |
| Matrix Spike | Recovery (%): | > 60 | < 140 |
| Duplicate | Replicate Error Ratio (RER): | | < 1 |
| | Duplicate Error Ratio (DER): | | < 3 |
| | Relative Percent Difference (RPD %): | | ≤ 25 |

## Laboratory Control Sample

Analysis Date: 04/19/16 09:39 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B16-00564-01 | LCS | AM-241 | 21600 | 1700 | 22748 | 95 | 710 |
| ARS1-B16-00564-01 | LCS | CO-60 | 40300 | 1600 | 42793 | 94 | 410 |
| ARS1-B16-00564-01 | LCS | CS-137 | 35700 | 1600 | 35450 | 101 | 290 |

## Duplicate RER/DER/RPD

Analysis Date: 04/19/16 09:57 | Analysis Technician: WJS

| Analyte | Result LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 21640 | 1690 | 22480 | 1733 | 0.25 | 0.68 | 3.8 |
| CO-60 | 40310 | 1618 | 41870 | 1828 | 0.45 | 1.25 | 3.8 |
| CS-137 | 35720 | 1596 | 36470 | 1716 | 0.23 | 0.63 | 2.1 |

## Duplicate RER/DER/RPD (Dup Sample)

Analysis Date: | Analysis Technician:

| Analyte | Result DO | CSU DO (2s) | Results DUP | CSU DUP (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| BI-214 | 0.90249 | 0.18186 | 1.0129 | 0.18521 | 0.30 | 0.83 | 11.5 |
| CO-60 | -0.00055164 | 0.022066 | 0 | 0.015173 | 0.01 | 0.04 | 200.0 |
| CS-137 | -0.013959 | 0.068818 | 0.02817 | 0.044655 | 0.37 | 1.01 | 592.9 |

## Method Blank

Analysis Date: 04/19/16 09:43 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B16-00564-03 | MBL | AM-241 | -15 | 74 | 31 | U |
| ARS1-B16-00564-03 | MBL | CO-60 | -2 | 11 | 19 | U |
| ARS1-B16-00564-03 | MBL | CS-137 | 0 | 13 | 24 | U |

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# QC Results per Analytical Batch

| | |
|---|---|
| **Analytical Batch** | **ARS1-B16-00697** |
| **SDG** | **ARS1-16-00670** |
| **Analysis** | **Gamma Spec (Solid)** |
| **Analysis Test Method** | **ARS-007/EPA 901.1M** |
| **Analysis Code** | **GAM-A-025** |
| **Report Units** | **pCi/g** |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| **Laboratory Control Sample** | **Recovery (%):** | **> 75** | **< 125** |
| **Matrix Spike** | **Recovery (%):** | **> 60** | **< 140** |
| **Duplicate** | **Replicate Error Ratio (RER):** | | **< 1** |
| | **Duplicate Error Ratio (DER):** | | **< 3** |
| | **Relative Percent Difference (RPD %):** | | **≤ 25** |

## Laboratory Control Sample

Analysis Date: 05/05/16 07:02 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B16-00697-01 | **LCS** | AM-241 | 22080.000 | 1694.400 | 22747.748 | 97.1 | 687.200 |
| ARS1-B16-00697-01 | **LCS** | CO-60 | 40783.000 | 1639.697 | 42792.793 | 95.3 | 484.300 |
| ARS1-B16-00697-01 | **LCS** | CS-137 | 35628.000 | 1634.836 | 35450.450 | 100.5 | 379.400 |

## Duplicate RER/DER/RPD

Analysis Date: 05/05/16 07:14 | Analysis Technician: WJS

| Analyte | Result LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 22080.000 | 1694.400 | 22330.000 | 1822.900 | 0.071 | 0.197 | 1.1 |
| CO-60 | 40783.000 | 1639.697 | 41906.000 | 1684.900 | 0.338 | 0.936 | 2.7 |
| CS-137 | 35628.000 | 1634.836 | 36257.000 | 1584.500 | 0.195 | 0.542 | 1.8 |

## Duplicate RER/DER/RPD (Dup Sample)

Analysis Date: 05/05/16 07:39 | Analysis Technician: WJS

| Analyte | Result DO | CSU DO (2s) | Results DUP | CSU DUP (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| BI-214 | 0.644 | 0.120 | 0.761 | 0.138 | 0.455 | 1.257 | 16.7 |
| CO-60 | -0.003 | 0.241 | -0.013 | 0.048 | 0.034 | 0.079 | |
| CS-137 | -0.019 | 0.046 | 0.009 | 0.033 | 0.345 | 0.943 | |

## Method Blank

Analysis Date: 05/05/16 09:36 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B16-00697-03 | **MBL** | AM-241 | -1.913 | 14.485 | 19.400 | U |
| ARS1-B16-00697-03 | **MBL** | CO-60 | -1.867 | 8.341 | 12.900 | U |
| ARS1-B16-00697-03 | **MBL** | CS-137 | 0.000 | 3.456 | 6.950 | U |

Project Manager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

LELAP Certificate# 01949

DCN: ITSI-0808-0004-0076, 8 May 2019

**SDG** **ARS1-16-00670**

| # | Date | Dept | Technical Note | User ID |
|---|---|---|---|---|
| 1 | 03/30/2016 10:22 AM | SDG | User Deleted Analysis from Sample; Fraction: 002; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 2 | 03/30/2016 10:23 AM | SDG | User Deleted Analysis from Sample; Fraction: 004; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 3 | 03/30/2016 10:24 AM | SDG | User Deleted Analysis from Sample; Fraction: 005; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 4 | 03/30/2016 10:25 AM | SDG | User Deleted Analysis from Sample; Fraction: 006; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 5 | 03/30/2016 10:30 AM | SDG | User Deleted Analysis from Sample; Fraction: 007; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 6 | 03/30/2016 10:32 AM | SDG | User Deleted Analysis from Sample; Fraction: 008; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 7 | 03/30/2016 10:33 AM | SDG | User Deleted Analysis from Sample; Fraction: 009; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 8 | 03/30/2016 10:34 AM | SDG | User Deleted Analysis from Sample; Fraction: 010; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 9 | 03/30/2016 10:34 AM | SDG | User Deleted Analysis from Sample; Fraction: 011; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 10 | 03/30/2016 10:34 AM | SDG | User Deleted Analysis from Sample; Fraction: 012; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 11 | 03/30/2016 10:35 AM | SDG | User Deleted Analysis from Sample; Fraction: 013; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 12 | 03/30/2016 10:35 AM | SDG | User Deleted Analysis from Sample; Fraction: 014; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 13 | 03/30/2016 10:36 AM | SDG | User Deleted Analysis from Sample; Fraction: 015; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 14 | 03/30/2016 10:36 AM | SDG | User Deleted Analysis from Sample; Fraction: 017; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 15 | 03/30/2016 10:37 AM | SDG | User Deleted Analysis from Sample; Fraction: 018; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 16 | 03/30/2016 10:37 AM | SDG | User Deleted Analysis from Sample; Fraction: 019; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 17 | 03/30/2016 10:38 AM | SDG | User Deleted Analysis from Sample; Fraction: 020; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 18 | 03/30/2016 10:39 AM | SDG | User Deleted Analysis from Sample; Fraction: 021; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 19 | 03/30/2016 10:39 AM | SDG | User Deleted Analysis from Sample; Fraction: 022; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 20 | 03/30/2016 10:40 AM | SDG | User Deleted Analysis from Sample; Fraction: 032; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 21 | 03/30/2016 10:40 AM | SDG | User Deleted Analysis from Sample; Fraction: 023; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 22 | 03/30/2016 10:41 AM | SDG | User Deleted Analysis from Sample; Fraction: 024; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 23 | 03/30/2016 10:42 AM | SDG | User Deleted Analysis from Sample; Fraction: 025; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 24 | 03/30/2016 10:42 AM | SDG | User Deleted Analysis from Sample; Fraction: 026; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 25 | 03/30/2016 10:43 AM | SDG | User Deleted Analysis from Sample; Fraction: 027; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 26 | 03/30/2016 10:43 AM | SDG | User Deleted Analysis from Sample; Fraction: 028; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 27 | 03/30/2016 10:44 AM | SDG | User Deleted Analysis from Sample; Fraction: 029; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 28 | 03/30/2016 10:45 AM | SDG | User Deleted Analysis from Sample; Fraction: 030; Analysis: GPC-A-012 -- Reason: not requested | RVARNELL |
| 29 | 04/19/2016 12:36 PM | SDG | ARS1-16-00670-022 is bias low. WJS 4-19-16 | BSCHREITER |

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Radiological Analysis

## EPA 901.1M

*SDG# ARS1-16-00670*

*COC# HPSE2-284*

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Analytical Results

## Sample Data Summary

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

# Analytical Batch Report

DCN: ITSI-0808-0004-0076, 8 May 2019

**Analysis Batch ID** **ARS1-B16-00563**

**Method** ARS-007 **Analysis** GAM-A-025 **Matrix** SO

**Description** Gamma Spec (Solid)

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00563-01 | LCS | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00563-02 | LCSD | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00563-03 | MBL | | | | | | | | | |
| ARS1-B16-00563-04 | DUP | | | | | | | | | |
| ARS1-B16-00563-05 | TRG | | | | **ARS1-16-00670** | 001 | 1 | 04-PD-RO-01-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-06 | TRG | | | | **ARS1-16-00670** | 002 | 1 | 04-PD-RO-02-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-07 | TRG | | | | **ARS1-16-00670** | 003 | 1 | 04-PD-RO-03-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-08 | TRG | | | | **ARS1-16-00670** | 004 | 1 | 04-PD-RO-03-02 | Gilbane | 04/22/16 |
| ARS1-B16-00563-09 | TRG | | | | **ARS1-16-00670** | 005 | 1 | 04-PD-RO-03-03 | Gilbane | 04/22/16 |
| ARS1-B16-00563-10 | TRG | | | | **ARS1-16-00670** | 006 | 1 | 04-PD-RO-03-04 | Gilbane | 04/22/16 |
| ARS1-B16-00563-11 | TRG | | | | **ARS1-16-00670** | 007 | 1 | 04-PD-RO-03-05 | Gilbane | 04/22/16 |
| ARS1-B16-00563-12 | TRG | | | | **ARS1-16-00670** | 008 | 1 | 04-PD-RO-04-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-13 | TRG | | | | **ARS1-16-00670** | 009 | 1 | 04-PD-RO-05-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-14 | TRG | | | | **ARS1-16-00670** | 010 | 1 | 04-PD-RO-05-02 | Gilbane | 04/22/16 |
| ARS1-B16-00563-15 | TRG | | | | **ARS1-16-00670** | 011 | 1 | 04-PD-RO-05-03 | Gilbane | 04/22/16 |
| ARS1-B16-00563-16 | DO | | | | **ARS1-16-00670** | 012 | 1 | 04-PD-RO-05-04 | Gilbane | 04/22/16 |
| ARS1-B16-00563-17 | TRG | | | | **ARS1-16-00670** | 013 | 1 | 04-PD-RO-05-05 | Gilbane | 04/22/16 |
| ARS1-B16-00563-18 | TRG | | | | **ARS1-16-00670** | 014 | 1 | 04-PD-RO-06-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-19 | TRG | | | | **ARS1-16-00670** | 015 | 1 | 04-PD-RO-07-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-20 | TRG | | | | **ARS1-16-00670** | 016 | 1 | 04-PD-RO-08-01 | Gilbane | 04/22/16 |
| ARS1-B16-00563-21 | TRG | | | | **ARS1-16-00670** | 017 | 1 | 04-PD-RO-08-02 | Gilbane | 04/22/16 |
| ARS1-B16-00563-22 | TRG | | | | **ARS1-16-00670** | 018 | 1 | 04-PD-RO-08-03 | Gilbane | 04/22/16 |
| ARS1-B16-00563-23 | TRG | | | | **ARS1-16-00670** | 019 | 1 | 04-PD-RO-08-04 | Gilbane | 04/22/16 |
| ARS1-B16-00563-24 | TRG | | | | **ARS1-16-00670** | 020 | 1 | 04-PD-RO-08-05 | Gilbane | 04/22/16 |

# Analytical Batch Report



DCN: ITSI-0808-0004-0076, 8 May 2019

**Analysis Batch ID** **ARS1-B16-00564**

**Method** ARS-007 **Analysis** GAM-A-025 **Matrix** SO

**Description** Gamma Spec (Solid)

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00564-01 | LCS | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00564-02 | LCSD | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00564-03 | MBL | | | | | | | | | |
| ARS1-B16-00564-04 | DUP | | | | | | | | | |
| ARS1-B16-00564-05 | DO | | | | **ARS1-16-00670** | 021 | 1 | 04-PD-RO-09-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-06 | TRG | | | | **ARS1-16-00670** | 022 | 1 | 04-PD-RO-10-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-07 | TRG | | | | **ARS1-16-00670** | 023 | 1 | 04-PD-RO-11-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-08 | TRG | | | | **ARS1-16-00670** | 024 | 1 | 04-PD-RO-11-02 | Gilbane | 04/22/16 |
| ARS1-B16-00564-09 | TRG | | | | **ARS1-16-00670** | 025 | 1 | 04-PD-RO-11-03 | Gilbane | 04/22/16 |
| ARS1-B16-00564-10 | TRG | | | | **ARS1-16-00670** | 026 | 1 | 04-PD-RO-11-04 | Gilbane | 04/22/16 |
| ARS1-B16-00564-11 | TRG | | | | **ARS1-16-00670** | 027 | 1 | 04-PD-RO-11-05 | Gilbane | 04/22/16 |
| ARS1-B16-00564-12 | TRG | | | | **ARS1-16-00670** | 028 | 1 | 04-PD-RO-12-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-13 | TRG | | | | **ARS1-16-00670** | 029 | 1 | 04-PD-RO-13-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-14 | TRG | | | | **ARS1-16-00670** | 030 | 1 | 04-PD-RO-14-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-15 | TRG | | | | **ARS1-16-00670** | 031 | 1 | 04-PD-RO-15-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-16 | TRG | | | | **ARS1-16-00670** | 032 | 1 | 04-PD-RO-16-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-17 | TRG | | | | **ARS1-16-00671** | 001 | 1 | 04-PD-STK-01-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-18 | TRG | | | | **ARS1-16-00671** | 002 | 1 | 04-PD-STK-01-02 | Gilbane | 04/22/16 |
| ARS1-B16-00564-19 | TRG | | | | **ARS1-16-00671** | 003 | 1 | 04-PD-STK-01-03 | Gilbane | 04/22/16 |
| ARS1-B16-00564-20 | TRG | | | | **ARS1-16-00671** | 004 | 1 | 04-PD-STK-01-04 | Gilbane | 04/22/16 |
| ARS1-B16-00564-21 | TRG | | | | **ARS1-16-00671** | 005 | 1 | 04-PD-STK-01-05 | Gilbane | 04/22/16 |
| ARS1-B16-00564-22 | TRG | | | | **ARS1-16-00671** | 006 | 1 | 04-PD-STK-01-06 | Gilbane | 04/22/16 |
| ARS1-B16-00564-23 | TRG | | | | **ARS1-16-00671** | 007 | 1 | 04-PD-STK-01-07 | Gilbane | 04/22/16 |
| ARS1-B16-00564-24 | TRG | | | | **ARS1-16-00671** | 008 | 1 | 04-PD-STK-01-08 | Gilbane | 04/22/16 |

DCN: ITSI-0808-0004-0076, 8 May 2019

**Analysis Batch ID** **ARS1-B16-00697**

| Method | ARS-007 | Analysis | GAM-A-025 | Matrix | SO |
|---|---|---|---|---|---|
| Description | Gamma Spec (Solid) | | | | |

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00697-01 | LCS | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00697-02 | LCSD | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00697-03 | MBL | | | | | | | | | |
| ARS1-B16-00697-04 | DUP | | | | | | | | | |
| ARS1-B16-00697-05 | TRG | | | | **ARS1-16-00670** | 001 | 2 | 04-PD-RO-01-01 | Gilbane | 04/22/16 |
| ARS1-B16-00697-06 | TRG | | | | **ARS1-16-00670** | 004 | 2 | 04-PD-RO-03-02 | Gilbane | 04/22/16 |
| ARS1-B16-00697-07 | TRG | | | | **ARS1-16-00670** | 005 | 2 | 04-PD-RO-03-03 | Gilbane | 04/22/16 |
| ARS1-B16-00697-08 | TRG | | | | **ARS1-16-00670** | 010 | 2 | 04-PD-RO-05-02 | Gilbane | 04/22/16 |
| ARS1-B16-00697-09 | TRG | | | | **ARS1-16-00670** | 016 | 2 | 04-PD-RO-08-01 | Gilbane | 04/22/16 |
| ARS1-B16-00697-10 | DO | | | | **ARS1-16-00670** | 021 | 2 | 04-PD-RO-09-01 | Gilbane | 04/22/16 |
| ARS1-B16-00697-11 | TRG | | | | **ARS1-16-00670** | 022 | 2 | 04-PD-RO-10-01 | Gilbane | 04/22/16 |
| ARS1-B16-00697-12 | TRG | | | | **ARS1-16-00670** | 023 | 2 | 04-PD-RO-11-01 | Gilbane | 04/22/16 |
| ARS1-B16-00697-13 | TRG | | | | **ARS1-16-00670** | 025 | 2 | 04-PD-RO-11-03 | Gilbane | 04/22/16 |
| ARS1-B16-00697-14 | TRG | | | | **ARS1-16-00670** | 028 | 2 | 04-PD-RO-12-01 | Gilbane | 04/22/16 |
| ARS1-B16-00697-15 | TRG | | | | **ARS1-16-00670** | 031 | 2 | 04-PD-RO-15-01 | Gilbane | 04/22/16 |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-21 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-017 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 017 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.3277E-01 | pCi/g | 1.6697E-01 | 2.5200E-01 | 1.2600E-01 | | | |
| **RA-226** | 3.4577E-01 | pCi/g | 5.7756E-01 | 1.0100E+00 | 5.0500E-01 | | | |
| **RA-228** | 2.2565E-01 | pCi/g | 1.2941E-01 | 2.3800E-01 | 1.1900E-01 | | | |
| **AM-241** | -1.4773E-02 | pCi/g | 2.6782E-01 | 1.4900E-01 | 7.4500E-02 | | | |
| **PB-210** | 1.1749E+00 | pCi/g | 9.5965E-01 | 1.4400E+00 | 7.2000E-01 | | | |
| **U-238** | 7.6907E-01 | pCi/g | 4.5353E-01 | 1.4000E+00 | 7.0000E-01 | | | |
| **K-40** | 1.3182E+01 | pCi/g | 1.6632E+00 | 7.5500E-01 | 3.7750E-01 | | | |
| **PB-214** | 3.6821E-01 | pCi/g | 9.4118E-02 | 1.0800E-01 | 5.4000E-02 | | | |
| **BI-214** | 4.6273E-01 | pCi/g | 1.1354E-01 | 1.0400E-01 | 5.2000E-02 | | | |
| **BI-212** | 1.9877E-01 | pCi/g | 2.7509E-01 | 4.6000E-01 | 2.3000E-01 | | | |
| **PB-212** | 3.4468E-01 | pCi/g | 8.7716E-02 | 9.3700E-02 | 4.6850E-02 | | | |
| **TL-208** | 1.1419E-01 | pCi/g | 4.5511E-02 | 5.1300E-02 | 2.5650E-02 | | | |
| **PA-234** | 7.5539E-02 | pCi/g | 5.0417E-02 | 1.1600E-01 | 5.8000E-02 | | | |
| **CS-137** | -1.0931E-02 | pCi/g | 3.8117E-02 | 6.7300E-02 | 3.3650E-02 | | | |
| **CO-60** | -1.0086E-02 | pCi/g | 9.9401E-02 | 8.6700E-02 | 4.3350E-02 | | | |
| **EU-152** | 8.3381E-02 | pCi/g | 5.4252E-02 | 2.5200E-01 | 1.2600E-01 | | | |
| **EU-154** | -5.1580E-03 | pCi/g | 1.8508E-02 | 7.7700E-02 | 3.8850E-02 | | | |
| **Total Gamma** | 1.7478E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 5.0636E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06815.An1

Sample description
Batch ID: 16-00563-21
SDG: ARS1-16-00670-017 Tech: WJS

Spectrum Filename: C:\User\ARS06815.An1

Acquisition information
Start time: 19-Apr-2016 09:12:14
Live time: 1800
Real time: 1803
Dead time: 0.14 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4220E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4220E+02) =
2.9223E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06815.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1276

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.58 | 1. | 741.72 | 0.93 | 2.738E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| 42.10 | 2. | 664.49 | 0.93 | 2.955E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 1.974E-02 | EU154 |
| 46.20 | 35. | 25.59 | 0.99 | 3.277E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.51 | 39. | 31.99 | 0.93 | 3.195E-02 | 45.40 | 9.000 | 5.989E-01 | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.72 | -5. | 313.36 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.11 | 7. | 58.59 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.46 | 65. | 24.13 | 0.96 | 5.124E-02 | | | | |
| 77.15 | 104. | 15.63 | 0.97 | 5.241E-02 | | | | |
| 92.87 | 48. | 25.40 | 0.98 | 5.721E-02 | 92.38 | 2.570 | 1.419E+00 | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.87 | 39. | 25.70 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 96.46 | 27. | 33.17 | 0.98 | 5.768E-02 | 94.67 | 15.500 | 1.341E-01 | PA234 |
| 99.08 | 8. | 102.59 | 0.99 | 5.851E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 111.85 | 13. | 73.65 | 1.00 | 5.943E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 145.44 | 12. | 70.21 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.03 | 8. | 117.36 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.91 | 15. | 43.36 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 204.71 | 12. | 79.67 | 1.09 | 4.793E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.38 | 153. | 11.29 | 1.14 | 4.326E-02 | 238.63 | 43.100 | 3.432E-01 | PB212 |
| 239.27 | 9. | 158.22 | 1.12 | 4.279E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 294.92 | 56. | 19.10 | 1.17 | 3.686E-02 | 295.21 | 18.500 | 3.608E-01 | PB214 |
| 299.78 | 10. | 76.32 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.14 | 35. | 28.11 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 3.891E-01 | Ra228 |
| 344.48 | 2. | 366.18 | 1.22 | 3.271E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.72 | 108. | 11.33 | 1.14 | 3.217E-02 | | | | |
| 351.72 | 108. | 11.33 | 1.14 | 3.217E-02 | 351.92 | 35.800 | 3.832E-01 | PB214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 510.61 | 38. | 18.15 | 0.78 | 2.413E-02 | 510.72 | 22.500 | 3.045E-01 | TL208 |
| 568.41 | 0. | 319.96 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.07 | 49. | 18.01 | 0.74 | 2.185E-02 | 583.14 | 86.000 | 1.142E-01 | TL208 |
| 609.08 | 105. | 11.25 | 0.65 | 2.115E-02 | 609.31 | 44.791 | 4.627E-01 | BI214 |
| 726.68 | 10. | 64.89 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 733.75 | 2. | 288.04 | 1.57 | 1.847E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 860.02 | 10. | 67.03 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 910.62 | 23. | 33.54 | 1.72 | 1.577E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 926.14 | 2. | 273.38 | 1.74 | 1.558E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 933.89 | 4. | 164.32 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 964.76 | 2. | 404.63 | 1.77 | 1.513E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 968.90 | 8. | 80.41 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1085.60 | 7. | 77.37 | 1.87 | 1.387E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.04 | 29. | 22.71 | 0.50 | 1.355E-02 | 1120.29 | 14.797 | 6.239E-01 | BI214 |
| 1236.01 | 1. | 407.92 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.25 | 3. | 121.81 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.90 | 4. | 134.95 | 2.12 | 1.146E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1409.30 | 5. | 105.59 | 2.13 | 1.136E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.58 | 355. | 5.21 | 1.87 | 1.104E-02 | 1460.75 | 10.700 | 1.318E+01 | K40 |
| 1764.06 | 8. | 58.64 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 297.55 | 74.57 | 112. | 44. | 0.025 | 76.70 | 0.574 | TH-234 | s |
| 308.29 | 77.26 | 108. | 79. | 0.044 | 46.42 | 0.814 | PB-212 | |
| 1406.41 | 351.72 | 121. | 3. | 0.002 | 1066.22 | 1.140 | PB-214 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.55 | 39.58 | 61. | 1. | 0.001 | 1483.44 | 0.929s |
| EU-154 | 167.63 | 42.10 | 68. | 2. | 0.001 | 1328.98 | 0.932s |
| EU-152 | 185.30 | 46.51 | 60. | 39. | 0.022 | 63.97 | 0.935s |
| PB-210 | 184.03 | 46.20 | 75. | 35. | 0.019 | 51.19 | 0.990s |
| EU-154 | 191.70 | 48.11 | 93. | -22. | -0.012 | 128.75 | 0.938s |
| Am-241 | 238.14 | 59.72 | 114. | -5. | -0.003 | 626.72 | 0.948s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 251.71 | 63.11 | 134. | 7. | 0.004 | 117.18 | 0.952s |
| U-238 | 370.73 | 92.87 | 76. | 48. | 0.026 | 50.80 | 0.980s |
| U-238 | 370.76 | 92.87 | 85. | 39. | 0.022 | 51.40 | 0.980s |
| PA-234 | 385.11 | 96.46 | 27. | 27. | 0.015 | 66.34 | 0.982s |
| PA-234 | 395.60 | 99.08 | 57. | 8. | 0.004 | 205.18 | 0.987s |
| PA-234 | 446.69 | 111.85 | 49. | 13. | 0.007 | 147.29 | 0.998s |
| EU-154 | 492.86 | 123.39 | 73. | -7. | -0.004 | 358.75 | 1.009s |
| U-235 | 581.06 | 145.44 | 47. | 12. | 0.007 | 140.42 | 1.029s |
| U-235 | 651.46 | 163.03 | 59. | 8. | 0.004 | 234.71 | 1.048s |
| RA-226 | 743.00 | 185.91 | 74. | 15. | 0.008 | 86.73 | 1.069s |
| U-235 | 818.21 | 204.71 | 49. | 12. | 0.007 | 159.33 | 1.087s |
| PA-234 | 906.86 | 226.87 | 54. | -2. | -0.001 | 1327.20 | 1.108s |
| PB-212 | 952.93 | 238.38 | 63. | 146. | 0.081 | 22.59 | 1.136 |
| PB-214 | 956.47 | 239.27 | 107. | 9. | 0.005 | 316.45 | 1.122s |
| EU-152 | 971.55 | 243.04 | 75. | -19. | -0.011 | 137.33 | 1.124s |
| EU-154 | 990.64 | 247.81 | 43. | -5. | -0.003 | 381.02 | 1.128s |
| PB-214 | 1179.13 | 294.92 | 38. | 56. | 0.031 | 38.19 | 1.172s |
| PB-212 | 1198.60 | 299.78 | 23. | 10. | 0.005 | 152.65 | 1.176s |
| Ra-228 | 1352.10 | 338.14 | 33. | 35. | 0.020 | 56.21 | 1.212 |
| EU-152 | 1377.44 | 344.48 | 37. | 2. | 0.001 | 732.37 | 1.217s |
| PB-214 | 1406.28 | 351.68 | 30. | 98. | 0.054 | 23.40 | 1.224 |
| TL-208 | 2042.30 | 510.61 | 53. | 38. | 0.021 | 36.31 | 0.778s |
| TL-208 | 2332.28 | 583.07 | 17. | 49. | 0.027 | 36.01 | 0.740s |
| BI-214 | 2436.40 | 609.08 | 18. | 100. | 0.055 | 22.51 | 0.651s |
| CS-137 | 2646.90 | 661.68 | 25. | -4. | -0.002 | 348.68 | 1.505s |
| PA-234 | 2794.21 | 698.48 | 27. | -6. | -0.003 | 289.05 | 1.538s |
| EU-154 | 2898.40 | 724.51 | 29. | -5. | -0.003 | 346.69 | 1.559s |
| BI-212 | 2907.11 | 726.68 | 19. | 10. | 0.006 | 129.78 | 1.563s |
| PA-234 | 2935.41 | 733.75 | 25. | 2. | 0.001 | 576.08 | 1.568s |
| PA-234 | 3233.04 | 808.10 | 42. | 0. | 0.000 | 2000.00 | 1.633s |
| TL-208 | 3440.89 | 860.02 | 17. | 10. | 0.005 | 134.07 | 1.679s |
| EU-152 | 3465.59 | 866.19 | 19. | -4. | -0.002 | 348.97 | 1.685s |
| EU-154 | 3496.34 | 873.87 | 22. | -3. | -0.002 | 458.73 | 1.690s |
| PA-234 | 3533.20 | 883.08 | 14. | -3. | -0.002 | 366.67 | 1.698s |
| Ra-228 | 3643.46 | 910.62 | 22. | 23. | 0.013 | 67.08 | 1.722s |
| PA-234 | 3705.60 | 926.14 | 22. | 2. | 0.001 | 546.76 | 1.735s |
| BI-214 | 3736.61 | 933.89 | 24. | 4. | 0.002 | 328.64 | 1.742 |
| PA-234 | 3795.53 | 948.60 | 16. | -4. | -0.002 | 390.57 | 1.754s |
| EU-152 | 3854.18 | 963.25 | 30. | -4. | -0.002 | 446.08 | 1.767s |
| Ra-228 | 3860.21 | 964.76 | 29. | 2. | 0.001 | 809.26 | 1.768s |
| Ra-228 | 3876.79 | 968.90 | 26. | 8. | 0.004 | 160.81 | 1.771s |
| EU-152 | 4344.09 | 1085.60 | 9. | 7. | 0.004 | 154.74 | 1.870s |
| BI-214 | 4481.97 | 1120.04 | 5. | 29. | 0.016 | 45.42 | 0.499s |
| CO-60 | 4696.75 | 1173.67 | 25. | -3. | -0.002 | 725.76 | 1.942s |
| BI-214 | 4946.40 | 1236.01 | 22. | 1. | 0.000 | 815.85 | 1.995s |
| EU-154 | 5097.95 | 1273.85 | 21. | -3. | -0.001 | 503.55 | 2.025s |
| CO-60 | 5335.78 | 1333.24 | 16. | -1. | 0.000 | 1720.68 | 2.071s |
| BI-214 | 5512.07 | 1377.25 | 5. | 3. | 0.002 | 243.63 | 2.107s |

American Radiation Services Spectrum name: ARS06815.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 5578.77 | 1393.90 | 10. | 4. | 0.002 | 269.91 | 2.120s |
| EU-152 | 5640.43 | 1409.30 | 12. | 5. | 0.003 | 211.18 | 2.131s |
| K-40 | 5845.84 | 1460.58 | 14. | 355. | 0.197 | 10.41 | 1.866 |
| BI-212 | 6486.71 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.297s |
| BI-214 | 7061.63 | 1764.06 | 10. | 8. | 0.004 | 117.28 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 1.3277E-01 | | | | | | |
| | | | 143.76 | 8.589E-02 | ?(P | 2.521E-01 | 7.02E+01 G | |
| | | | 205.31 | 2.383E-01 | ?(P | 6.867E-01 | 7.97E+01 G | |
| | | | 163.35 | 1.320E-01 | ?(P | 6.574E-01 | 1.17E+02 G | |
| RA-226 | | 3.4577E-01 | | | | | | |
| | | | 186.21 | 3.458E-01 | ?(P | 1.011E+00 | 4.34E+01 G K | |
| Ra-228 | | 2.2565E-01 | | | | | | |
| | | | 911.07 | 2.160E-01 | ?(P | 2.380E-01 | 3.35E+01 G | |
| | | | 968.90 | 1.292E-01 | ?(P | 4.388E-01 | 8.04E+01 G | |
| | | | 338.40 | 3.891E-01 | ?(P | 3.254E-01 | 2.81E+01 G | |
| | | | 964.60 | 1.017E-01 | - | 1.479E+00 | 4.05E+02 G | |
| Am-241 | T | -1.4773E-02 | | | | | | |
| | | | 59.54 | -1.477E-02 | &(P | 1.486E-01 | 3.13E+02 G K | |
| PB-210 | | 1.1749E+00 | | | | | | |
| | | | 46.52 | 1.175E+00 | (P | 1.441E+00 | 2.56E+01 G | |
| U-238 | | 7.6907E-01 | | | | | | |
| | | | 63.29 | 1.618E-01 | (P | 1.403E+00 | 5.86E+01 G | |
| | | | 92.80 | 1.002E+00 | (P | 1.166E+00 | 2.57E+01 G | |
| | | | 92.38 | 1.419E+00 | &(P | 1.296E+00 | 2.54E+01 G | |
| K-40 | | 1.3182E+01 | | | | | | |
| | | | 1460.75 | 1.318E+01 | (P | 7.551E-01 | 5.21E+00 G | |
| PB-214 | | 3.6821E-01 | | | | | | |
| | | | 351.92 | 3.721E-01 | (P | 1.084E-01 | 1.17E+01 G | |
| | | | 295.21 | 3.608E-01 | *(P | 2.029E-01 | 1.91E+01 G | |
| | | | 241.98 | 1.175E-01 | - P | 6.969E-01 | 1.58E+02 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-214 | 4.6273E-01 | | | | | | |
| | | 609.31 | 4.627E-01 | (P | 1.044E-01 | 1.13E+01 | G |
| | | 1764.49 | 2.307E-01 | & P | 5.248E-01 | 5.86E+01 | G |
| | | 1120.29 | 6.239E-01 | + P | 2.983E-01 | 2.27E+01 | G |
| | | 1238.11 | 4.960E-02 | & P | 1.467E+00 | 4.08E+02 | G |
| | | 768.36 | -1.104E-02 | % P | 1.095E+00 | 1.00E+03 | G |
| | | 1377.67 | 2.980E-01 | - | 1.320E+00 | 1.22E+02 | G |
| | | 934.06 | 3.540E-01 | - P | 2.393E+00 | 1.64E+02 | G |
| BI-212 | 1.9877E-01 | | | | | | |
| | | 727.17 | 1.988E-01 | (P | 4.599E-01 | 6.49E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 1.161E+00 | 1.00E+03 | G |
| | | 785.42 | 1.625E-02 | % | 3.177E+00 | 5.31E+03 | G |
| PB-212 | 3.4468E-01 | | | | | | |
| | | 238.63 | 3.432E-01 | (P | 9.368E-02 | 1.13E+01 | G |
| | | 300.09 | 3.638E-01 | ?( | 9.316E-01 | 7.63E+01 | G |
| TL-208 | 1.1419E-01 | | | | | | |
| | | 583.14 | 1.142E-01 | (P | 5.133E-02 | 1.80E+01 | G |
| | | 510.72 | 3.045E-01 | + P | 2.969E-01 | 1.82E+01 | G |
| | | 860.47 | 2.177E-01 | + | 4.830E-01 | 6.70E+01 | G |
| | | 277.36 | -5.197E-03 | % P | 6.001E-01 | 1.81E+03 | G |
| | | 763.30 | -7.398E-02 | % P | 3.937E+00 | 1.63E+03 | G |
| PA-234 | 7.5539E-02 | | | | | | |
| | | 98.44 | -5.587E-03 | %(P | 1.165E-01 | 9.09E+03 | G |
| | | 946.00 | 1.970E-03 | % | 3.133E-01 | 4.24E+03 | G |
| | | 131.28 | -1.374E-03 | % | 1.640E-01 | 3.40E+03 | G |
| | | 94.67 | 1.341E-01 | ?( | 1.331E-01 | 3.32E+01 | G |
| | | 883.24 | -6.878E-02 | + | 4.561E-01 | 1.83E+02 | G |
| | | 926.70 | 4.493E-02 | ?(P | 6.249E-01 | 2.73E+02 | G |
| | | 569.26 | 1.542E-03 | % P | 4.676E-01 | 3.20E+02 | G |
| | | 111.00 | 1.156E-01 | ?(P | 3.045E-01 | 7.36E+01 | G |
| | | 733.00 | 4.892E-02 | ?(P | 7.242E-01 | 2.88E+02 | G |
| | | 949.00 | -1.336E-01 | + P | 7.943E-01 | 1.95E+02 | G |
| | | 880.51 | -3.972E-02 | % P | 9.021E-01 | 1.52E+03 | G |
| | | 226.87 | -2.369E-02 | + | 5.552E-01 | 6.64E+02 | G |
| | | 831.10 | -3.577E-02 | % P | 1.034E+00 | 6.29E+03 | G |
| | | 808.10 | 0.000E+00 | - | 1.704E+00 | 1.00E+03 | G |
| | | 99.70 | 1.290E-01 | ?(P | 6.033E-01 | 1.03E+02 | G |
| | | 699.10 | -2.857E-01 | + P | 1.349E+00 | 1.45E+02 | G |
| | | 898.60 | -9.112E-02 | % P | 1.733E+00 | 7.02E+03 | G |
| | | 1394.10 | 3.568E-01 | ?( | 1.728E+00 | 1.35E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CS-137 | -1.0931E-02 | | | | | | |
| | | 661.66 | -1.093E-02 | ?( | 6.731E-02 | 1.74E+02 | G |
| CO-60 | -1.0086E-02 | | | | | | |
| | | 1173.24 | -1.009E-02 | ?(P | 8.670E-02 | 3.63E+02 | K |
| | | 1332.50 | -2.853E-03 | + P | 7.810E-02 | 8.60E+02 | K |
| EU-152 | 8.3381E-02 | | | | | | |
| | | 40.12 | -1.290E-02 | %(P | 2.523E-01 | 1.00E+03 | G |
| | | 121.78 | 1.645E-03 | % P | 1.076E-01 | 1.56E+03 | G |
| | | 344.30 | 7.476E-03 | &(P | 1.544E-01 | 3.66E+02 | G |
| | | 1408.08 | 9.215E-02 | ?(P | 3.475E-01 | 1.06E+02 | G |
| | | 39.52 | 1.499E-02 | ?( | 3.913E-01 | 7.42E+02 | G |
| | | 964.00 | -7.065E-02 | + | 5.583E-01 | 2.23E+02 | G |
| | | 1112.07 | -1.326E-02 | % | 6.320E-01 | 1.31E+03 | G |
| | | 778.90 | -1.397E-02 | % P | 4.716E-01 | 2.02E+05 | G |
| | | 1085.80 | 2.006E-01 | ?( | 5.245E-01 | 7.74E+01 | G |
| | | 45.40 | 5.989E-01 | ?(P | 5.900E-01 | 3.20E+01 | G |
| | | 244.67 | -2.576E-01 | + P | 5.855E-01 | 6.87E+01 | G |
| | | 867.39 | -2.350E-01 | & | 1.463E+00 | 1.74E+02 | G |
| EU-154 | -5.1580E-03 | | | | | | |
| | | 123.10 | -1.259E-02 | ?( | 7.770E-02 | 1.79E+02 | G |
| | | 1274.80 | -2.690E-02 | + P | 2.430E-01 | 2.52E+02 | G |
| | | 723.30 | -5.466E-02 | & | 3.330E-01 | 1.73E+02 | G |
| | | 1004.80 | -2.716E-02 | % P | 3.997E-01 | 8.28E+02 | G |
| | | 43.00 | -1.575E-04 | & | 4.469E-01 | 8.03E+04 | G |
| | | 873.20 | -7.749E-02 | + P | 5.895E-01 | 2.29E+02 | G |
| | | 996.30 | 1.964E-03 | % | 6.719E-01 | 9.23E+03 | G |
| | | 42.31 | 3.606E-02 | &( | 8.396E-01 | 6.64E+02 | G |
| | | 248.04 | -8.102E-02 | + P | 5.237E-01 | 1.91E+02 | G |
| | | 591.70 | -8.843E-04 | % | 1.198E+00 | 3.70E+04 | G |
| | | 48.70 | -6.696E-01 | + | 1.423E+00 | 6.44E+01 | G |
| | | 756.70 | 3.259E-02 | % | 1.244E+00 | 1.02E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 1.3277E-01 | 1.6660E-01 | 1.6697E-01 | 0.252E+00 |
| RA-226 #A | 3.4577E-01 | 5.7681E-01 | 5.7756E-01 | 0.101E+01 |
| Ra-228 #A | 2.2565E-01 | 1.2852E-01 | 1.2941E-01 | 0.238E+00 |
| Am-241 #A | -1.4773E-02 | 2.6781E-01 | 2.6782E-01 | 0.149E+00 |
| PB-210 #A | 1.1749E+00 | 9.5262E-01 | 9.5965E-01 | 0.144E+01 |
| U-238 #A | 7.6907E-01 | 4.4951E-01 | 4.5353E-01 | 0.140E+01 |
| K-40 | 1.3182E+01 | 1.4277E+00 | 1.6632E+00 | 0.755E+00 |
| PB-214 # | 3.6821E-01 | 8.7863E-02 | 9.4118E-02 | 0.108E+00 |
| BI-214 | 4.6273E-01 | 1.0988E-01 | 1.1354E-01 | 0.104E+00 |
| BI-212 #A | 1.9877E-01 | 2.7477E-01 | 2.7509E-01 | 0.460E+00 |
| PB-212 | 3.4468E-01 | 8.1741E-02 | 8.7716E-02 | 0.937E-01 |
| TL-208 | 1.1419E-01 | 4.4910E-02 | 4.5511E-02 | 0.513E-01 |
| PA-234 #A | 7.5539E-02 | 5.0110E-02 | 5.0417E-02 | 0.116E+00 |
| CS-137 #A | -1.0931E-02 | 3.8114E-02 | 3.8117E-02 | 0.673E-01 |
| CO-60 #A | -1.0086E-02 | 9.9400E-02 | 9.9401E-02 | 0.867E-01 |
| EU-152 #A | 8.3381E-02 | 5.3447E-02 | 5.4252E-02 | 0.252E+00 |
| EU-154 #A | -5.1580E-03 | 1.8504E-02 | 1.8508E-02 | 0.777E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

American Radiation Services Spectrum name: ARS06815.An1

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 2.7 to 1998.2 keV) | 1.528E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-22 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-018 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 018 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.5461E-02 | pCi/g | 1.9023E-01 | 3.0600E-01 | 1.5300E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 6.0031E-01 | 1.0500E+00 | 5.2500E-01 | | | |
| **RA-228** | 4.8773E-01 | pCi/g | 1.4482E-01 | 1.3100E-01 | 6.5500E-02 | | | |
| **AM-241** | 0.0000E+00 | pCi/g | 6.2253E-02 | 1.3100E-01 | 6.5500E-02 | | | |
| **PB-210** | 1.8875E-01 | pCi/g | 9.9012E-01 | 1.4800E+00 | 7.4000E-01 | | | |
| **U-238** | 3.7472E-01 | pCi/g | 3.6172E-01 | 1.3500E+00 | 6.7500E-01 | | | |
| **K-40** | 1.5401E+01 | pCi/g | 1.8226E+00 | 4.5000E-01 | 2.2500E-01 | | | |
| **PB-214** | 4.8700E-01 | pCi/g | 1.2270E-01 | 1.1000E-01 | 5.5000E-02 | | | |
| **BI-214** | 3.0231E-01 | pCi/g | 1.4883E-01 | 1.7000E-01 | 8.5000E-02 | | | |
| **BI-212** | 5.2364E-01 | pCi/g | 2.9487E-01 | 3.1200E-01 | 1.5600E-01 | | | |
| **PB-212** | 3.6400E-01 | pCi/g | 7.9484E-02 | 8.2800E-02 | 4.1400E-02 | | | |
| **TL-208** | 1.9364E-01 | pCi/g | 4.8133E-02 | 2.8900E-02 | 1.4450E-02 | | | |
| **PA-234** 4.012E-02 | ~~1.4648E-01~~ | pCi/g | 1.6168E-01 | 1.1600E-01 | 5.8000E-02 | | | |
| **CS-137** | 0.0000E+00 | pCi/g | 2.5657E-02 | 6.8000E-02 | 3.4000E-02 | | | |
| **CO-60** | 2.3148E-03 | pCi/g | 2.5476E-02 | 1.0100E-01 | 5.0500E-02 | | | |
| **EU-152** | 1.3270E-01 | pCi/g | 9.5829E-02 | 2.0900E-01 | 1.0450E-01 | | | |
| **EU-154** | 8.4997E-02 | pCi/g | 1.2109E-01 | 8.2100E-02 | 4.1050E-02 | | | |
| **Total Gamma** | 1.8785E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 5.2708E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  4/19/2016 9:55:59 AM
                                Spectrum name: ARS08219.An1

Sample description
     Batch ID:  16-00563-22
     SDG:  ARS1-16-00670-018  Tech:  WJS

Spectrum Filename: C:\User\ARS08219.An1

Acquisition information
       Start time:                 4/19/2016 9:25:44 AM
       Live time:                1800
       Real time:                1807
       Dead time:                   0.41 %
       Detector ID:                    9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                   250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:               12/12/2014 9:34:56 AM
            Zero offset:           0.447 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:               1/5/2015 10:02:55 AM
            Type:                  Polynomial
            Uncertainty:           1.535 %
            Coefficients:         -0.447430  -4.056056   0.358945
                                  -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:      ITSI COUNT.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G702W050
       Start channel:            100 (    25.46keV )
       Stop channel:            8000 (  1999.20keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    1
       Sample Size:                3.5293E+02 +/- 0.000E+00%
       Activity scaling factor:    1.0000E+06/(  1.0000E+00*  3.5293E+02) =
                                   2.8334E+03
       Detection limit method:     Reg. Guide 4.16 Method
       Random error:               1.0000000E+00
       Systematic error:           1.0000000E+00
       Fraction Limit:            60.000%
       Background width:           average of five points.
       Half lives decay limit:    12.000
```

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1392

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.16 | 16. | 63.58 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 8.600E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 8.600E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 1.642E-01 | EU152 |
| 42.45 | 4. | 297.46 | 0.97 | 2.811E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 42.31 | 7.300 | PBC<MDA | EU154 |
| 42.94 | 15. | 82.38 | 0.97 | 2.866E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.43 | 6. | 262.24 | 0.97 | 3.135E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 61.44 | 16. | 68.11 | 0.99 | 4.342E-02 | | | | |
| 63.25 | 12. | 90.93 | 0.99 | 4.466E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | 2.793E-01 | U238 |
| 72.53 | 20. | 63.28 | 1.00 | 5.012E-02 | | | | |
| 75.22 | 60. | 26.45 | 1.01 | 5.143E-02 | | | | |
| 76.96 | 86. | 21.29 | 1.01 | 5.220E-02 | | | | |
| 87.28 | 20. | 64.45 | 0.27 | 5.573E-02 | | | | |
| 92.98 | 35. | 48.10 | 1.03 | 5.693E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 94.99 | 5. | 145.24 | 0.12 | 5.729E-02 | | | | |
| 98.52 | 14. | 98.70 | 1.03 | 5.774E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 98.44 | 25.100 | 4.012E-02 | PA234 |
| 120.21 | 8. | 122.64 | 1.06 | 5.801E-02 | | | | |
| 121.61 | 9. | 104.62 | 1.06 | 5.791E-02 | 121.78 | 29.240 | 2.314E-02 | EU152 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 121.78 | 29.240 | 2.314E-02 | EU152 |
| 141.67 | 1. | 980.52 | 0.29 | 5.577E-02 | | | | |
| 143.65 | 10. | 135.10 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 155.76 | 6. | 184.12 | 0.00 | 5.376E-02 | | | | |
| 163.59 | 6. | 234.03 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.74 | 28. | 47.06 | 0.57 | 4.919E-02 | 185.72 | 57.200 | 4.233E-02 | U235 |
| | | | | | 186.21 | 3.640 | 6.662E-01 | RA226 |
| 205.12 | 7. | 127.34 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 209.02 | 33. | 33.99 | 0.89 | 4.584E-02 | | | | |
| 226.73 | 11. | 123.00 | 1.17 | 4.350E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 235.18 | 14. | 67.98 | 1.18 | 4.248E-02 | | | | |
| 238.50 | 146. | 11.20 | 1.18 | 4.209E-02 | 238.63 | 43.100 | 3.415E-01 | PB212 |
| 241.84 | 36. | 34.97 | 1.19 | 4.167E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 248.02 | 5. | 231.37 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 8.389E-02 | EU154 |
| 277.43 | 13. | 84.33 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.05 | 61. | 20.49 | 0.90 | 3.634E-02 | 295.21 | 18.500 | 3.881E-01 | PB214 |
| 338.38 | 20. | 62.00 | 1.29 | 3.297E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 351.72 | 133. | 11.64 | 1.30 | 3.208E-02 | 351.92 | 35.800 | 4.870E-01 | PB214 |
| 510.90 | 98. | 15.47 | 1.15 | 2.466E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 569.07 | 7. | 134.71 | 1.52 | 2.287E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| | | | | | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.10 | 84. | 11.99 | 0.47 | 2.249E-02 | 583.14 | 86.000 | 1.848E-01 | TL208 |
| 591.02 | 8. | 126.51 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.69 | 95. | 15.03 | 0.68 | 2.180E-02 | 609.31 | 44.791 | 4.054E-01 | BI214 |
| 698.73 | 7. | 147.70 | 1.64 | 1.982E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| | | | | | 699.10 | 4.600 | 3.267E-01 | PA234 |
| 723.72 | 2. | 370.41 | 1.66 | 1.935E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| | | | | | 723.30 | 19.700 | 2.790E-02 | EU154 |
| 727.25 | 28. | 27.96 | 1.67 | 1.928E-02 | 727.17 | 11.800 | 5.236E-01 | BI212 |
| | | | | | 727.17 | 11.800 | 5.236E-01 | BI212 |
| 756.39 | 11. | 80.08 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 6.088E-01 | EU154 |
| 763.30 | 5. | 110.64 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.36 | 7. | 87.18 | 1.71 | 1.855E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 807.97 | 10. | 65.80 | 1.74 | 1.790E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 4.850E-01 | PA234 |
| 830.95 | 2. | 307.38 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 1.082E-01 | PA234 |
| 860.15 | 12. | 72.24 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 866.75 | 6. | 104.78 | 1.80 | 1.702E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | 3.791E-01 | EU152 |
| 873.95 | 2. | 484.10 | 1.80 | 1.694E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| | | | | | 873.20 | 11.300 | PBC<MDA | EU154 |
| 911.76 | 47. | 17.46 | 0.36 | 1.642E-02 | 911.07 | 29.000 | 4.233E-01 | Ra228 |
| 926.85 | 5. | 127.26 | 1.85 | 1.622E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 926.70 | 11.000 | PBC<MDA | PA234 |
| 949.22 | 7. | 119.31 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 968.99 | 39. | 22.65 | 0.57 | 1.570E-02 | 968.90 | 17.460 | 5.947E-01 | Ra228 |
| 1005.36 | 3. | 196.12 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| | | | | | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1113.25 | 14. | 42.60 | 2.01 | 1.416E-02 | 1112.07 | 13.580 | 3.208E-01 | EU152 |
| | | | | | 1112.07 | 13.580 | 3.208E-01 | EU152 |
| 1119.99 | 8. | 153.04 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1237.92 | 26. | 32.93 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | 1.450E+00 | BI214 |
| 1274.66 | 14. | 71.15 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| | | | | | 1274.80 | 35.500 | 1.273E-01 | EU154 |
| 1333.25 | 1. | 550.28 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| | | | | | 1332.50 | 99.982 | 4.628E-03 | CO60 |
| 1377.13 | 9. | 39.18 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | 7.976E-01 | BI214 |
| 1407.30 | 11. | 35.66 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | 1.809E-01 | EU152 |
| | | | | | 1408.08 | 21.210 | 1.809E-01 | EU152 |
| 1461.12 | 440. | 4.86 | 1.68 | 1.134E-02 | 1460.75 | 10.700 | 1.540E+01 | K40 |
| 1621.12 | 4. | 169.87 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| | | | | | 1620.56 | 2.750 | 5.239E-01 | BI212 |
| 1764.64 | 26. | 19.61 | 0.42 | 9.535E-03 | 1764.49 | 15.357 | 7.349E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 243.87 | 61.46 | 52. | 16. | 3.708E+02 | 136.21 | 0.991 | NP-239 | |
| 251.11 | 63.27 | 51. | 12. | 2.626E+02 | 181.86 | 0.993 | TH-234 | |
| 288.20 | 72.51 | 70. | 20. | 3.979E+02 | 126.56 | 1.003 | AU-196 | D |
| 298.98 | 75.21 | 96. | 60. | 1.167E+03 | 52.89 | 1.006 | TH-234 | D |
| 305.93 | 76.94 | 123. | 86. | 1.641E+03 | 42.58 | 1.008 | TL-208 | D |
| 347.19 | 87.28 | 73. | 20. | 3.661E+02 | 128.90 | 0.272 | PB-212 | sM |
| 378.00 | 94.99 | 29. | 5. | 9.077E+01 | 290.48 | 0.124 | RA-226 | sc |
| 478.85 | 120.19 | 40. | 8. | 1.321E+02 | 245.28 | 1.055 | ND-147 | sc |
| 484.44 | 121.59 | 42. | 9. | 1.590E+02 | 209.24 | 1.057 | EU-152 | sc |
| 621.00 | 155.76 | 49. | 6. | 1.079E+02 | 368.24 | 0.000 | - | sc |
| 833.23 | 209.02 | 35. | 27. | 5.981E+02 | 71.69 | 1.150 | AC-228 | D |
| 937.84 | 235.13 | 40. | 15. | 3.533E+02 | 129.86 | 1.178 | ZR-95 | D |
| 2041.43 | 510.90 | 29. | 98. | 3.983E+03 | 30.93 | 1.152 | NA-22 | 1 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 154.77 | 39.16 | 35. | 16. | 0.009 | 127.17 | 0.967s |
| EU-152 | 155.75 | 39.40 | 60. | -7. | -0.004 | 358.00 | 0.967s |
| EU-154 | 167.93 | 42.45 | 61. | 4. | 0.002 | 594.92 | 0.970s |
| EU-154 | 169.89 | 42.94 | 51. | 15. | 0.008 | 164.76 | 0.970s |
| EU-152 | 181.46 | 45.83 | 89. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 183.83 | 46.43 | 77. | 6. | 0.003 | 524.48 | 0.974s |
| EU-154 | 190.00 | 47.97 | 88. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 234.34 | 59.06 | 88. | 0. | 0.000 | 2000.00 | 0.989s |
| U-238 | 251.12 | 63.26 | 128. | 0. | 0.000 | 2000.00 | 0.993s |
| U-238 | 369.30 | 92.81 | 159. | 0. | 0.000 | 2000.00 | 1.025s |
| U-238 | 369.99 | 92.98 | 89. | 35. | 0.019 | 96.20 | 1.025 |
| PA-234 | 373.26 | 93.80 | 122. | -11. | -0.006 | 340.31 | 1.027s |
| PA-234 | 392.13 | 98.52 | 62. | 14. | 0.008 | 197.41 | 1.031s |
| PA-234 | 439.72 | 110.42 | 74. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 485.79 | 121.94 | 60. | -4. | -0.002 | 732.12 | 1.057s |
| EU-154 | 488.15 | 122.53 | 83. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 522.40 | 131.10 | 85. | -8. | -0.004 | 385.28 | 1.067s |
| U-235 | 572.59 | 143.65 | 71. | 10. | 0.006 | 270.19 | 1.081 |
| U-235 | 652.31 | 163.59 | 60. | 6. | 0.003 | 468.07 | 1.102 |
| U-235 | 740.82 | 185.72 | 44. | 24. | 0.013 | 91.54 | 1.126D |
| RA-226 | 742.78 | 186.21 | 80. | 0. | 0.000 | 2000.00 | 0.566D |
| U-235 | 819.16 | 205.31 | 33. | 7. | 0.004 | 254.68 | 1.146D |
| PA-234 | 904.81 | 226.73 | 64. | 11. | 0.006 | 246.01 | 1.170s |
| PB-212 | 952.41 | 238.63 | 49. | 155. | 0.086 | 20.60 | 1.182D |
| PB-214 | 965.81 | 241.98 | 59. | 36. | 0.020 | 69.94 | 1.185D |
| EU-154 | 989.94 | 248.02 | 51. | 5. | 0.003 | 462.74 | 1.192s |
| TL-208 | 1107.59 | 277.43 | 35. | 13. | 0.007 | 168.66 | 1.223 |
| PB-214 | 1178.10 | 295.06 | 56. | 49. | 0.027 | 60.90 | 1.241s |
| PB-212 | 1197.57 | 299.93 | 66. | -8. | -0.004 | 389.78 | 1.246 |
| Ra-228 | 1351.33 | 338.38 | 46. | 20. | 0.011 | 124.00 | 1.286s |
| EU-152 | 1378.68 | 345.22 | 47. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1404.69 | 351.72 | 34. | 131. | 0.073 | 23.71 | 1.296s |
| TL-208 | 2041.66 | 510.96 | 154. | 0. | 0.000 | 2000.00 | 2.710s |
| PA-234 | 2274.14 | 569.07 | 22. | 7. | 0.004 | 269.43 | 1.517s |
| TL-208 | 2330.27 | 583.10 | 5. | 84. | 0.047 | 23.99 | 0.470s |
| EU-154 | 2361.92 | 591.02 | 25. | 8. | 0.004 | 253.02 | 1.539s |
| BI-214 | 2436.32 | 609.61 | 61. | 68. | 0.038 | 48.84 | 1.556s |
| CS-137 | 2647.65 | 662.43 | 30. | 0. | 0.000 | 2000.00 | 1.606s |
| PA-234 | 2792.89 | 698.73 | 27. | 7. | 0.004 | 295.41 | 1.641s |
| EU-154 | 2892.87 | 723.72 | 22. | 2. | 0.001 | 740.81 | 1.664s |
| BI-212 | 2907.00 | 727.25 | 9. | 28. | 0.016 | 55.92 | 1.667s |
| EU-154 | 3023.60 | 756.39 | 18. | 11. | 0.006 | 160.17 | 1.695s |
| TL-208 | 3051.25 | 763.30 | 10. | 5. | 0.003 | 221.28 | 1.701D |
| BI-214 | 3071.48 | 768.36 | 16. | 7. | 0.004 | 174.37 | 1.705D |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-212 | 3135.10 | 784.25 | 22. | 0. | 0.000 | 2000.00 | 1.721s |
| PA-234 | 3230.00 | 807.97 | 9. | 10. | 0.006 | 131.61 | 1.742s |
| PA-234 | 3321.94 | 830.95 | 14. | 2. | 0.001 | 614.75 | 1.762s |
| TL-208 | 3438.82 | 860.15 | 15. | 12. | 0.006 | 144.48 | 1.789s |
| EU-152 | 3465.23 | 866.75 | 10. | 6. | 0.004 | 209.55 | 1.795s |
| EU-154 | 3494.05 | 873.95 | 16. | 2. | 0.001 | 968.20 | 1.800s |
| PA-234 | 3524.40 | 881.54 | 30. | 0. | 0.000 | 2000.00 | 1.807s |
| PA-234 | 3594.18 | 898.97 | 23. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3645.37 | 911.76 | 7. | 47. | 0.026 | 34.93 | 0.357s |
| PA-234 | 3705.76 | 926.85 | 11. | 5. | 0.003 | 254.51 | 1.848s |
| BI-214 | 3737.62 | 934.82 | 20. | 0. | 0.000 | 2000.00 | 1.854s |
| PA-234 | 3784.04 | 946.41 | 24. | -4. | -0.002 | 476.18 | 1.864s |
| PA-234 | 3795.28 | 949.22 | 16. | 7. | 0.004 | 238.61 | 1.867s |
| EU-152 | 3855.44 | 964.25 | 32. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.47 | 964.51 | 36. | -4. | -0.002 | 592.66 | 1.881 |
| Ra-228 | 3874.41 | 968.99 | 10. | 38. | 0.021 | 46.19 | 0.571s |
| EU-154 | 3975.50 | 994.25 | 36. | 0. | 0.000 | 2000.00 | 1.908s |
| EU-154 | 4019.97 | 1005.36 | 5. | 3. | 0.001 | 392.24 | 1.915s |
| EU-152 | 4341.96 | 1085.80 | 27. | 0. | 0.000 | 2000.00 | 1.984s |
| EU-152 | 4451.83 | 1113.25 | 6. | 14. | 0.008 | 85.19 | 2.006s |
| BI-214 | 4478.79 | 1119.99 | 33. | 8. | 0.004 | 306.08 | 2.013s |
| CO-60 | 4689.39 | 1172.59 | 40. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4950.92 | 1237.92 | 11. | 26. | 0.014 | 65.86 | 2.109 |
| EU-154 | 5098.00 | 1274.66 | 18. | 14. | 0.007 | 142.29 | 2.137s |
| CO-60 | 5332.58 | 1333.25 | 12. | 1. | 0.001 | 1100.57 | 2.183s |
| BI-214 | 5508.30 | 1377.13 | 1. | 9. | 0.005 | 78.36 | 2.217s |
| PA-234 | 5572.17 | 1393.08 | 18. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5629.08 | 1407.30 | 1. | 11. | 0.006 | 71.33 | 2.240s |
| K-40 | 5844.62 | 1461.12 | 5. | 439. | 0.244 | 9.77 | 1.684s |
| BI-212 | 6485.37 | 1621.12 | 6. | 4. | 0.002 | 339.75 | 2.394s |
| BI-214 | 7059.54 | 1764.46 | 1. | 25. | 0.014 | 41.51 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
| U-235 | | 9.5461E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 3.564E-02 | } | 5.094E-02 | 4.58E+01 | 5.72E+01 G K |
| | | | 143.76 | 7.664E-02 | (P | 3.055E-01 | 1.35E+02 | 1.05E+01 G |
| | | | 205.31 | 1.336E-01 | (P | 5.769E-01 | 1.27E+02 | 4.70E+00 G |
| | | | 163.35 | 9.942E-02 | (P | 6.689E-01 | 2.34E+02 | 4.70E+00 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | | Comments |
|---|---|---|---|---|---|---|---|
| Ra-228 | 4.8773E-01 | | | | 2.10E+03 | | |
| | | 911.07 | 4.233E-01 | ( | 1.311E-01 | 1.75E+01 | 2.90E+01 G |
| | | 968.90 | 5.947E-01 | (P | 2.669E-01 | 2.31E+01 | 1.75E+01 G |
| | | 338.40 | 2.202E-01 | - | 3.668E-01 | 6.20E+01 | 1.20E+01 G |
| | | 964.60 | -2.064E-01 | - | 1.522E+00 | 2.96E+02 | 5.45E+00 G |
| PB-210 | 1.8875E-01 | | | | 7.45E+03 | | |
| | | 46.52 | 1.887E-01 | ?(P | 1.483E+00 | 2.62E+02 | 4.00E+00 G |
| U-238 | 3.7472E-01 | | | | 1.63E+12 | | |
| | | 63.29 | 0.000E+00 | ?(P | 1.352E+00 | 1.00E+03 | 3.90E+00 G |
| | | 92.80 | 8.619E-01 | (P | 1.165E+00 | 4.81E+01 | 3.00E+00 G |
| | | 92.38 | 0.000E+00 | & P | 1.789E+00 | 1.00E+03 | 2.57E+00 G |
| K-40 | 1.5401E+01 | | | | 4.68E+11 | | |
| | | 1460.75 | 1.540E+01 | (P | 4.502E-01 | 4.88E+00 | 1.07E+01 G |
| PB-214 | 4.8700E-01 | | | | 5.84E+05 | | |
| | | 351.92 | 4.870E-01 | (P | 1.101E-01 | 1.19E+01 | 3.58E+01 G |
| | | 295.21 | 3.102E-01 | - | 2.380E-01 | 3.04E+01 | 1.85E+01 G |
| | | 241.98 | 4.870E-01 | (P | 5.250E-01 | 3.50E+01 | 7.50E+00 G |
| BI-214 | 3.0231E-01 | | | | 5.84E+05 | | |
| | | 609.31 | 2.981E-01 | ?(P | 1.697E-01 | 2.44E+01 | 4.48E+01 G |
| | | 1764.49 | 7.349E-01 | + P | 2.141E-01 | 2.08E+01 | 1.54E+01 G |
| | | 1120.29 | 1.634E-01 | - | 6.020E-01 | 1.53E+02 | 1.48E+01 G |
| | | 1238.11 | 1.450E+00 | + | 1.013E+00 | 3.29E+01 | 5.86E+00 G |
| | | 768.36 | 3.417E-01 | ( | 1.016E+00 | 8.72E+01 | 4.80E+00 G |
| | | 1377.67 | 7.976E-01 | + P | 7.192E-01 | 3.92E+01 | 3.92E+00 G |
| | | 934.06 | 0.000E+00 | & P | 2.043E+00 | 1.00E+03 | 3.03E+00 G |
| BI-212 | 5.2364E-01 | | | | 2.10E+03 | | |
| | | 727.17 | 5.236E-01 | ?( | 3.121E-01 | 2.80E+01 | 1.18E+01 G |
| | | 1620.56 | 5.239E-01 | &( | 2.184E+00 | 1.70E+02 | 2.75E+00 G |
| | | 785.42 | 0.000E+00 | - | 2.890E+00 | 1.00E+03 | 2.00E+00 G |
| PB-212 | 3.6400E-01 | | | | 2.10E+03 | | |
| | | 238.63 | 3.640E-01 | (P | 8.281E-02 | 1.03E+01 | 4.31E+01 G |
| | | 300.09 | -2.718E-01 | - | 1.475E+00 | 1.95E+02 | 3.27E+00 G |
| TL-208 | 1.9364E-01 | | | | 2.10E+03 | | |
| | | 583.14 | 1.848E-01 | ( | 2.889E-02 | 1.20E+01 | 8.60E+01 G |
| | | 510.72 | 0.000E+00 | - P | 4.647E-01 | 1.00E+03 | 2.25E+01 G |
| | | 860.47 | 2.422E-01 | ?(P | 4.337E-01 | 7.22E+01 | 1.20E+01 G |
| | | 277.36 | 2.208E-01 | (P | 5.236E-01 | 8.43E+01 | 6.50E+00 G |
| | | 763.30 | 6.122E-01 | + | 2.386E+00 | 1.11E+02 | 1.70E+00 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PA-234 | 1.4648E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 4.012E-02 | ?( | 1.160E-01 | 9.87E+01 | 2.51E+01 G |
| | | 946.00 | -5.546E-02 | + | 3.410E-01 | 2.38E+02 | 2.00E+01 G |
| | | 131.28 | -2.984E-02 | - | 1.703E-01 | 1.93E+02 | 2.00E+01 G |
| | | 94.67 | -5.195E-02 | + | 2.596E-01 | 1.70E+02 | 1.55E+01 G |
| | | 883.24 | -2.110E-02 | % | 5.868E-01 | 1.07E+03 | 1.20E+01 G |
| | | 926.70 | 1.273E-01 | ?(P | 4.273E-01 | 1.27E+02 | 1.10E+01 G |
| | | 569.26 | 1.219E-01 | ?(P | 4.412E-01 | 1.35E+02 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | - P | 3.647E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 9.659E-03 | & P | 5.958E-01 | 2.25E+03 | 8.50E+00 G |
| | | 949.00 | 2.357E-01 | &(P | 7.325E-01 | 1.19E+02 | 7.80E+00 G |
| | | 880.51 | 0.000E+00 | & P | 1.092E+00 | 1.00E+03 | 6.50E+00 G |
| | | 226.87 | 1.722E-01 | ?(P | 5.998E-01 | 1.23E+02 | 6.50E+00 G |
| | | 831.10 | 1.082E-01 | ?( | 8.856E-01 | 3.07E+02 | 5.60E+00 G |
| | | 808.10 | 4.850E-01 | ?( | 8.095E-01 | 6.58E+01 | 4.90E+00 G |
| | | 99.70 | 1.304E-02 | % | 7.031E-01 | 1.79E+03 | 4.70E+00 G |
| | | 699.10 | 3.267E-01 | &( | 1.256E+00 | 1.48E+02 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | & P | 1.619E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | - P | 2.073E+00 | 1.00E+03 | 3.90E+00 G |
| CO-60 | 2.3148E-03 | | | | | 1.93E+03 | |
| | | 1173.24 | 0.000E+00 | ?(P | 1.005E-01 | 1.00E+03 | 9.99E+01 K |
| | | 1332.50 | 4.628E-03 | ?( | 6.465E-02 | 5.50E+02 | 1.00E+02 K |
| EU-152 | 1.3270E-01 | | | | | 4.64E+03 | |
| | | 40.12 | -3.763E-02 | ?( | 2.086E-01 | 1.79E+02 | 3.00E+01 G |
| | | 121.78 | -8.795E-03 | + | 9.714E-02 | 3.66E+02 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | & P | 1.676E-01 | 1.00E+03 | 2.70E+01 G |
| | | 1408.08 | 1.809E-01 | ?(P | 1.424E-01 | 3.57E+01 | 2.12E+01 G |
| | | 39.52 | 1.642E-01 | &( | 3.108E-01 | 6.36E+01 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | - P | 5.391E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 3.208E-01 | ?( | 3.017E-01 | 4.26E+01 | 1.36E+01 G |
| | | 778.90 | -1.783E-02 | % | 4.800E-01 | 1.00E+03 | 1.30E+01 G |
| | | 1085.80 | 0.000E+00 | - P | 7.685E-01 | 1.00E+03 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 7.205E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | 1.125E-02 | % | 5.247E-01 | 1.59E+03 | 7.62E+00 G |
| | | 867.39 | 3.791E-01 | ?( | 1.030E+00 | 1.05E+02 | 4.18E+00 G |
| EU-154 | 8.4997E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | &(P | 8.209E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 1.273E-01 | &( | 2.093E-01 | 7.11E+01 | 3.55E+01 G |
| | | 723.30 | 2.790E-02 | ?( | 2.769E-01 | 3.70E+02 | 1.97E+01 G |
| | | 1004.80 | 4.077E-02 | ?(P | 2.144E-01 | 1.96E+02 | 1.76E+01 G |
| | | 43.00 | 1.700E-01 | &( | 4.078E-01 | 8.24E+01 | 1.31E+01 G |
| | | 873.20 | 3.645E-02 | ?(P | 4.792E-01 | 4.84E+02 | 1.13E+01 G |
| | | 996.30 | 0.000E+00 | - | 7.943E-01 | 1.00E+03 | 1.07E+01 G |
| | | 42.31 | 9.014E-02 | (P | 8.085E-01 | 2.97E+02 | 7.30E+00 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 248.04 | 8.389E-02 | ?( | 5.643E-01 | 2.31E+02 | 6.60E+00 G |
| | | 591.70 | 3.241E-01 | ?(P | 1.085E+00 | 1.27E+02 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | - P | 1.413E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | 6.088E-01 | &( | 1.244E+00 | 8.01E+01 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*************** D I S C A R D E D I S O T O P E P E A K S ***************

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.16 | 35. | 16. | 0.009 | 127.17 | 1.642E-01 | |
| EU-152 | 39.40 | 60. | -7. | -0.004 | 358.00 | -3.763E-02 | |
| EU-154 | 42.45 | 61. | 4. | 0.002 | 594.92 | 9.014E-02 | P |
| EU-154 | 42.94 | 51. | 15. | 0.008 | 164.76 | 1.700E-01 | |
| PB-210 | 46.43 | 77. | 6. | 0.003 | 524.48 | 1.887E-01 | P |
| U-238 | 92.98 | 89. | 35. | 0.019 | 96.20 | 8.619E-01 | P |
| PA-234 | 93.80 | 122. | -11. | -0.006 | 340.31 | -5.195E-02 | |
| PA-234 | 98.52 | 62. | 14. | 0.008 | 197.41 | 4.012E-02 | |
| EU-152 | 121.94 | 60. | -4. | -0.002 | 732.12 | -8.795E-03 | |
| PA-234 | 131.10 | 85. | -8. | -0.004 | 385.28 | -2.984E-02 | |
| PA-234 | 226.73 | 64. | 11. | 0.006 | 246.01 | 1.722E-01 | P |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 248.02 | 51. | 5. | 0.003 | 462.74 | 8.389E-02 | |
| PA-234 | 569.07 | 22. | 7. | 0.004 | 269.43 | 1.219E-01 | P |
| EU-154 | 591.02 | 25. | 8. | 0.004 | 253.02 | 3.241E-01 | P |
| PA-234 | 698.73 | 27. | 7. | 0.004 | 295.41 | 3.267E-01 | |
| EU-154 | 723.72 | 22. | 2. | 0.001 | 740.81 | 2.790E-02 | |
| BI-212 | 727.25 | 9. | 28. | 0.016 | 55.92 | 5.236E-01 | |
| EU-154 | 756.39 | 18. | 11. | 0.006 | 160.17 | 6.088E-01 | |
| PA-234 | 807.97 | 9. | 10. | 0.006 | 131.61 | 4.850E-01 | |
| PA-234 | 830.95 | 14. | 2. | 0.001 | 614.75 | 1.082E-01 | |
| EU-152 | 866.75 | 10. | 6. | 0.004 | 209.55 | 3.791E-01 | |
| EU-154 | 873.95 | 16. | 2. | 0.001 | 968.20 | 3.645E-02 | P |
| PA-234 | 926.85 | 11. | 5. | 0.003 | 254.51 | 1.273E-01 | P |
| PA-234 | 946.41 | 24. | -4. | -0.002 | 476.18 | -5.546E-02 | |
| PA-234 | 949.22 | 16. | 7. | 0.004 | 238.61 | 2.357E-01 | P |
| EU-154 | 1005.36 | 5. | 3. | 0.001 | 392.24 | 4.077E-02 | P |
| EU-152 | 1113.25 | 6. | 14. | 0.008 | 85.19 | 3.208E-01 | |
| EU-154 | 1274.66 | 18. | 14. | 0.007 | 142.29 | 1.273E-01 | |
| CO-60 | 1333.25 | 12. | 1. | 0.001 | 1100.57 | 4.628E-03 | |
| EU-152 | 1407.30 | 1. | 11. | 0.006 | 71.33 | 1.809E-01 | P |
| BI-212 | 1621.12 | 6. | 4. | 0.002 | 339.75 | 5.239E-01 | |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 9.5461E-02 | 1.9011E-01 | 1.9023E-01 | 0.306E+00 |
| RA-226 #B | 0.0000E+00 | 6.0031E-01 | 6.0031E-01 | 0.105E+01 |
| Ra-228 | 4.8773E-01 | 1.4122E-01 | 1.4482E-01 | 0.131E+00 |
| Am-241 #A | 0.0000E+00 | 6.2253E-02 | 6.2253E-02 | 0.131E+00 |
| PB-210 #A | 1.8875E-01 | 9.8994E-01 | 9.9012E-01 | 0.148E+01 |
| U-238 #A | 3.7472E-01 | 3.6050E-01 | 3.6172E-01 | 0.135E+01 |
| K-40 | 1.5401E+01 | 1.5042E+00 | 1.8226E+00 | 0.450E+00 |
| PB-214 | 4.8700E-01 | 1.1546E-01 | 1.2270E-01 | 0.110E+00 |
| BI-214 | 3.0231E-01 | 1.4763E-01 | 1.4883E-01 | 0.170E+00 |
| BI-212 # | 5.2364E-01 | 2.9284E-01 | 2.9487E-01 | 0.312E+00 |
| PB-212 | 3.6400E-01 | 7.4996E-02 | 7.9484E-02 | 0.828E-01 |
| TL-208 | 1.9364E-01 | 4.6449E-02 | 4.8133E-02 | 0.289E-01 |
| PA-234 #C | 1.4648E-01 | 1.6132E-01 | 1.6168E-01 | 0.116E+00 |
| CS-137 #A | 0.0000E+00 | 2.5657E-02 | 2.5657E-02 | 0.680E-01 |
| CO-60 #A | 2.3148E-03 | 2.5476E-02 | 2.5476E-02 | 0.101E+00 |
| EU-152 #A | 1.3270E-01 | 9.4649E-02 | 9.5829E-02 | 0.209E+00 |
| EU-154 #C | 8.4997E-02 | 1.2094E-01 | 1.2109E-01 | 0.821E-01 |

ORTEC g v - i (3263) Env32  G702W050  4/19/2016 9:55:59 AM
Spectrum name: ARS08219.An1

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   25.5 to  1999.2 keV)     1.724E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-23 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-019 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 019 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.7811E-02 | pCi/g | 4.4002E-02 | 6.9900E-02 | 3.4950E-02 | | | |
| **RA-226** | 1.0720E+00 | pCi/g | 6.9985E-01 | 1.1100E+00 | 5.5500E-01 | | | |
| **RA-228** | 5.8623E-01 | pCi/g | 1.6653E-01 | 2.5500E-01 | 1.2750E-01 | | | |
| **AM-241** | -1.2813E-02 | pCi/g | 8.7716E-02 | 1.5100E-01 | 7.5500E-02 | | | |
| **PB-210** | 3.5051E-01 | pCi/g | 8.7482E-01 | 1.5900E+00 | 7.9500E-01 | | | |
| **U-238** | 7.2273E-01 | pCi/g | 5.8015E-01 | 1.3400E+00 | 6.7000E-01 | | | |
| **K-40** | 1.8970E+01 | pCi/g | 2.5111E+00 | 8.6000E-01 | 4.3000E-01 | | | |
| **PB-214** | 5.9123E-01 | pCi/g | 1.5594E-01 | 1.5300E-01 | 7.6500E-02 | | | |
| **BI-214** | 5.3770E-01 | pCi/g | 1.3777E-01 | 1.2600E-01 | 6.3000E-02 | | | |
| **BI-212** | 1.3510E-01 | pCi/g | 3.6297E-01 | 4.9800E-01 | 2.4900E-01 | | | |
| **PB-212** | 5.4671E-01 | pCi/g | 1.1827E-01 | 1.2300E-01 | 6.1500E-02 | | | |
| **TL-208** | 2.0094E-01 | pCi/g | 6.1101E-02 | 5.7300E-02 | 2.8650E-02 | | | |
| **PA-234** | 6.2088E-02 | pCi/g | 1.1651E-01 | 1.4200E-01 | 7.1000E-02 | | | |
| **CS-137** | 1.2007E-02 | pCi/g | 3.8485E-02 | 6.8200E-02 | 3.4100E-02 | | | |
| **CO-60** | -2.8499E-02 | pCi/g | 8.5079E-02 | 1.1300E-01 | 5.6500E-02 | | | |
| **EU-152** | 2.7189E-02 | pCi/g | 5.4040E-02 | 2.3900E-01 | 1.1950E-01 | | | |
| **EU-154** | 5.0835E-02 | pCi/g | 7.1056E-02 | 8.4300E-02 | 4.2150E-02 | | | |
| **Total Gamma** | 2.3933E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 6.9354E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 10:08:10
American Radiation Services     Spectrum name: ARS05252.An1

Sample description
     Batch ID:  16-00563-23
     SDG:  ARS1-16-00670-019  Tech:  WJS

Spectrum Filename: C:\User\ARS05252.An1

Acquisition information
       Start time:                4/19/2016 09:38:08
       Live time:               1800
       Real time:               1801
       Dead time:                  0.07 %
       Detector ID:                   2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.7081E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.7081E+02) =
                                  2.6968E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 10:08:10
American Radiation Services Spectrum name: ARS05252.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2945

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.34 | 14. | 69.81 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.28 | 12. | 99.22 | 0.74 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.40 | 10. | 41.67 | 0.74 | 2.755E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.32 | 22. | 61.32 | 0.63 | 4.053E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.68 | 93. | 17.83 | 0.79 | 4.750E-02 | | | | |
| 77.20 | 121. | 14.37 | 0.80 | 4.858E-02 | | | | |
| 92.38 | 14. | 113.09 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.80 | 28. | 44.19 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.49 | 6. | 195.49 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 98.44 | 25.100 | PBC<MDA | PA234 |
| 111.39 | 4. | 325.67 | 0.85 | 5.184E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| | | | | | 111.00 | 8.550 | 3.668E-02 | PA234 |
| 124.18 | 5. | 268.74 | 0.87 | 5.046E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 130.97 | 5. | 189.85 | 0.88 | 4.930E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| | | | | | 131.28 | 20.000 | PBC<MDA | PA234 |
| 163.28 | 19. | 58.32 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.80 | 40. | 25.11 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| | | | | | 185.72 | 57.200 | PBC<MDA | U235 |
| 185.82 | 40. | 26.02 | 0.97 | 4.120E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| 226.58 | 12. | 91.09 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.69 | 215. | 9.42 | 0.99 | 3.535E-02 | 238.63 | 43.100 | 5.449E-01 | PB212 |
| 241.66 | 45. | 29.83 | 1.18 | 3.505E-02 | 241.98 | 7.500 | 6.951E-01 | PB214 |
| 277.35 | 15. | 59.93 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.94 | 96. | 15.10 | 0.71 | 3.089E-02 | 295.21 | 18.500 | 6.313E-01 | PB214 |
| 300.79 | 14. | 59.74 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.89 | 54. | 23.61 | 0.54 | 2.826E-02 | 338.40 | 12.010 | 6.410E-01 | Ra228 |
| 352.00 | 142. | 12.40 | 0.75 | 2.755E-02 | 351.92 | 35.800 | 5.488E-01 | PB214 |
| 511.20 | 42. | 18.12 | 0.48 | 2.149E-02 | 510.72 | 22.500 | 3.545E-01 | TL208 |
| 583.48 | 84. | 14.09 | 0.40 | 1.957E-02 | 583.14 | 86.000 | 2.009E-01 | TL208 |
| 609.40 | 119. | 11.54 | 0.82 | 1.895E-02 | 609.31 | 44.791 | 5.341E-01 | BI214 |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 10:08:10
American Radiation Services Spectrum name: ARS05252.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 662.01 | 5. | 139.59 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 726.19 | 3. | 141.57 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 762.92 | 4. | 159.96 | 1.74 | 1.592E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.26 | 11. | 63.90 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 808.16 | 2. | 349.32 | 1.78 | 1.519E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 1.078E-01 | PA234 |
| 861.26 | 0. | 909.47 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 873.60 | 2. | 212.02 | 1.85 | 1.421E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 898.73 | 1. | 368.98 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| | | | | | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.96 | 54. | 20.01 | 0.52 | 1.368E-02 | 911.07 | 29.000 | 5.523E-01 | Ra228 |
| 949.89 | 5. | 119.14 | 1.93 | 1.318E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 962.18 | 0. | 632.46 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| 964.78 | 4. | 114.16 | 1.94 | 1.298E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 969.08 | 28. | 26.75 | 1.95 | 1.292E-02 | 968.90 | 17.460 | 5.009E-01 | Ra228 |
| 1085.46 | 2. | 422.53 | 2.05 | 1.156E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1111.54 | 1. | 818.39 | 2.07 | 1.128E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1121.19 | 37. | 23.38 | 1.40 | 1.119E-02 | 1120.29 | 14.797 | 9.147E-01 | BI214 |
| 1239.17 | 19. | 49.13 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1274.13 | 3. | 191.56 | 2.19 | 9.709E-03 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1378.12 | 1. | 527.86 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1407.11 | 3. | 170.03 | 2.28 | 8.617E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.31 | 412. | 4.95 | 2.09 | 8.224E-03 | 1460.75 | 10.700 | 1.897E+01 | K40 |
| 1619.30 | 2. | 179.76 | 2.38 | 7.151E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.15 | 74.64 | 122. | 82. | 0.045 | 46.57 | 0.779 | TH-234 | s |
| 308.26 | 77.16 | 104. | 115. | 0.064 | 32.38 | 0.996 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 159.88 | 40.09 | 64. | -12. | -0.007 | 200.22 | 0.750 |
| EU-154 | 168.88 | 42.34 | 44. | 14. | 0.008 | 139.61 | 0.750s |
| EU-154 | 172.67 | 43.29 | 81. | -14. | -0.008 | 194.44 | 0.750s |
| EU-152 | 181.13 | 45.40 | 67. | 12. | 0.007 | 198.43 | 0.742D |
| PB-210 | 185.61 | 46.52 | 75. | 10. | 0.005 | 83.34 | 0.744D |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 10:08:10
American Radiation Services Spectrum name: ARS05252.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 195.96 | 49.11 | 79. | -3. | -0.001 | 974.18 | 0.750s |
| Am-241 | 240.01 | 60.11 | 104. | -4. | -0.002 | 684.55 | 0.766s |
| U-238 | 252.76 | 63.30 | 112. | 21. | 0.012 | 93.92 | 0.772 |
| U-238 | 369.17 | 92.38 | 129. | 14. | 0.008 | 226.19 | 0.820D |
| U-238 | 370.85 | 92.80 | 97. | 28. | 0.016 | 88.39 | 0.821D |
| PA-234 | 376.29 | 94.16 | 148. | -21. | -0.012 | 167.99 | 0.824s |
| PA-234 | 393.63 | 98.49 | 86. | 6. | 0.003 | 390.99 | 0.830s |
| PA-234 | 445.26 | 111.39 | 83. | 4. | 0.002 | 651.33 | 0.850s |
| EU-152 | 487.95 | 122.06 | 94. | -6. | -0.004 | 434.29 | 0.868s |
| EU-154 | 496.47 | 124.18 | 73. | 5. | 0.003 | 537.48 | 0.870s |
| PA-234 | 523.63 | 130.97 | 89. | 5. | 0.003 | 379.71 | 0.883s |
| U-235 | 652.95 | 163.28 | 68. | 19. | 0.010 | 116.65 | 0.934s |
| U-235 | 743.08 | 185.80 | 67. | 40. | 0.022 | 50.23 | 0.969s |
| RA-226 | 743.18 | 185.82 | 68. | 40. | 0.022 | 52.04 | 0.970s |
| U-235 | 820.81 | 205.22 | 83. | -7. | -0.004 | 445.98 | 1.000s |
| PA-234 | 906.33 | 226.58 | 54. | 12. | 0.006 | 182.19 | 1.033s |
| PB-212 | 954.79 | 238.69 | 88. | 205. | 0.114 | 18.84 | 0.991 |
| PB-214 | 966.66 | 241.66 | 56. | 45. | 0.025 | 59.67 | 1.183s |
| EU-152 | 974.18 | 243.53 | 73. | -13. | -0.007 | 197.78 | 1.060s |
| EU-154 | 992.55 | 248.12 | 50. | -5. | -0.003 | 451.11 | 1.065s |
| TL-208 | 1109.51 | 277.35 | 42. | 15. | 0.009 | 119.86 | 1.109 |
| PB-214 | 1179.94 | 294.94 | 45. | 89. | 0.049 | 30.19 | 0.710s |
| PB-212 | 1203.37 | 300.79 | 36. | 14. | 0.008 | 119.47 | 1.142 |
| Ra-228 | 1355.85 | 338.89 | 36. | 54. | 0.030 | 47.23 | 0.544s |
| PB-214 | 1408.35 | 352.00 | 55. | 134. | 0.074 | 24.79 | 0.752s |
| TL-208 | 2045.57 | 511.20 | 60. | 42. | 0.024 | 36.25 | 0.477s |
| PA-234 | 2277.31 | 569.09 | 33. | -6. | -0.003 | 392.33 | 1.509s |
| TL-208 | 2334.90 | 583.48 | 20. | 84. | 0.046 | 28.19 | 0.397s |
| EU-154 | 2367.80 | 591.70 | 33. | 0. | 0.000 | 2000.00 | 1.536s |
| BI-214 | 2438.64 | 609.40 | 26. | 112. | 0.062 | 23.09 | 0.818s |
| CS-137 | 2649.23 | 662.01 | 24. | 5. | 0.003 | 279.18 | 1.621s |
| PA-234 | 2798.32 | 699.25 | 30. | -5. | -0.003 | 346.33 | 1.664s |
| EU-154 | 2894.88 | 723.37 | 38. | -8. | -0.004 | 229.16 | 1.692s |
| BI-212 | 2906.16 | 726.19 | 21. | 3. | 0.002 | 283.13 | 1.696s |
| PA-234 | 2933.41 | 733.00 | 50. | 0. | 0.000 | 2000.00 | 1.703s |
| TL-208 | 3053.19 | 762.92 | 17. | 4. | 0.002 | 319.91 | 1.737s |
| BI-214 | 3074.57 | 768.26 | 20. | 11. | 0.006 | 127.79 | 1.742s |
| EU-152 | 3113.63 | 778.02 | 26. | -6. | -0.003 | 257.36 | 1.753s |
| BI-212 | 3129.53 | 781.99 | 26. | -4. | -0.002 | 344.84 | 1.760s |
| PA-234 | 3234.26 | 808.16 | 23. | 2. | 0.001 | 698.63 | 1.785s |
| PA-234 | 3326.10 | 831.10 | 38. | 0. | 0.000 | 2000.00 | 1.809s |
| EU-152 | 3469.50 | 866.92 | 24. | -4. | -0.002 | 467.57 | 1.846s |
| EU-154 | 3496.22 | 873.60 | 24. | 2. | 0.001 | 424.04 | 1.852s |
| PA-234 | 3596.82 | 898.73 | 24. | 1. | 0.001 | 737.97 | 1.878s |
| Ra-228 | 3649.81 | 911.96 | 23. | 54. | 0.030 | 40.01 | 0.518s |
| BI-214 | 3738.26 | 934.06 | 28. | 0. | 0.000 | 2000.00 | 1.912s |
| PA-234 | 3777.42 | 943.84 | 20. | -1. | -0.001 | 1162.54 | 1.923s |
| PA-234 | 3801.62 | 949.89 | 17. | 5. | 0.003 | 238.27 | 1.926s |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 10:08:10
American Radiation Services Spectrum name: ARS05252.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 3858.11 | 964.00 | 28. | 0. | 0.000 | 1264.91 | 1.940D |
| Ra-228 | 3860.51 | 964.60 | 8. | 4. | 0.002 | 228.32 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 16. | 28. | 0.016 | 53.51 | 1.945D |
| EU-154 | 3984.55 | 995.59 | 32. | -4. | -0.002 | 369.23 | 1.970s |
| EU-152 | 4344.34 | 1085.46 | 27. | 2. | 0.001 | 845.06 | 2.048s |
| EU-152 | 4448.74 | 1111.54 | 29. | 1. | 0.001 | 1636.78 | 2.070 |
| BI-214 | 4487.35 | 1121.19 | 13. | 37. | 0.021 | 46.76 | 1.399s |
| CO-60 | 4696.89 | 1173.53 | 34. | -7. | -0.004 | 262.39 | 2.118s |
| BI-214 | 4959.64 | 1239.17 | 35. | 19. | 0.010 | 98.25 | 2.167s |
| EU-154 | 5099.59 | 1274.13 | 17. | 3. | 0.002 | 383.12 | 2.192s |
| BI-214 | 5515.89 | 1378.12 | 13. | 1. | 0.001 | 1055.71 | 2.259s |
| PA-234 | 5583.02 | 1394.88 | 11. | -3. | -0.002 | 341.53 | 2.268s |
| EU-152 | 5631.98 | 1407.11 | 15. | 3. | 0.002 | 340.06 | 2.276 |
| K-40 | 5848.93 | 1461.31 | 12. | 412. | 0.229 | 9.90 | 2.091 |
| BI-212 | 6481.46 | 1619.30 | 6. | 2. | 0.001 | 359.52 | 2.381s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 6.7811E-02 | | | | | | |
| | | | 185.72 | 6.781E-02 | (P | 6.992E-02 | 2.51E+01 G K | |
| | | | 143.76 | -1.485E-02 & | P | 4.498E-01 | 1.00E+03 G | |
| | | | 205.31 | -1.659E-01 & | P | 1.002E+00 | 2.23E+02 G | |
| | | | 163.35 | 3.647E-01 + | P | 7.972E-01 | 5.83E+01 G | |
| RA-226 | | 1.0720E+00 | | | | | | |
| | | | 186.21 | 1.072E+00 | (P | 1.110E+00 | 2.60E+01 G K | |
| Ra-228 | | 5.8623E-01 | | | | | | |
| | | | 911.07 | 5.523E-01 | (P | 2.553E-01 | 2.00E+01 G | |
| | | | 968.90 | 5.009E-01 | (P | 3.841E-01 | 2.68E+01 G | |
| | | | 338.40 | 6.410E-01 | (P | 3.671E-01 | 2.36E+01 G | |
| | | | 964.60 | 2.346E-01 } | | 9.226E-01 | 1.14E+02 G | |
| Am-241 | T | -1.2813E-02 | | | | | | |
| | | | 59.54 | -1.281E-02 ?( | | 1.512E-01 | 3.42E+02 G K | |
| PB-210 | | 3.5051E-01 | | | | | | |
| | | | 46.52 | 3.505E-01 | (P | 1.587E+00 | 4.17E+01 G | |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 10:08:10
American Radiation Services Spectrum name: ARS05252.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| U-238 | 7.2273E-01 | | | | | | |
| | | 63.29 | 5.379E-01 | ?(P | 1.336E+00 | 4.70E+01 | G |
| | | 92.80 | 7.227E-01 | } P | 1.258E+00 | 4.42E+01 | G |
| | | 92.38 | 4.130E-01 | } P | 1.683E+00 | 1.13E+02 | G |
| K-40 | 1.8970E+01 | | | | | | |
| | | 1460.75 | 1.897E+01 | (P | 8.596E-01 | 4.95E+00 | G |
| PB-214 | 5.9123E-01 | | | | | | |
| | | 351.92 | 5.488E-01 | (P | 1.534E-01 | 1.24E+01 | G |
| | | 295.21 | 6.313E-01 | @(P | 2.408E-01 | 1.51E+01 | G |
| | | 241.98 | 6.951E-01 | (P | 5.783E-01 | 2.98E+01 | G |
| BI-214 | 5.3770E-01 | | | | | | |
| | | 609.31 | 5.341E-01 | (P | 1.264E-01 | 1.15E+01 | G |
| | | 1764.49 | -6.329E-02 | % P | 8.436E-01 | 3.82E+03 | G |
| | | 1120.29 | 9.147E-01 | + | 4.708E-01 | 2.34E+01 | G |
| | | 1238.11 | 1.285E+00 | + P | 2.084E+00 | 4.91E+01 | G |
| | | 768.36 | 5.716E-01 | ?(P | 1.241E+00 | 6.39E+01 | G |
| | | 1377.67 | 1.164E-01 | - | 2.304E+00 | 5.28E+02 | G |
| | | 934.06 | 0.000E+00 | & | 2.752E+00 | 1.00E+03 | G |
| BI-212 | 1.3510E-01 | | | | | | |
| | | 727.17 | 7.168E-02 | ?(P | 4.981E-01 | 1.42E+02 | G |
| | | 1620.56 | 4.073E-01 | ?(P | 2.899E+00 | 1.80E+02 | G |
| | | 785.42 | -5.715E-01 | + P | 3.471E+00 | 1.72E+02 | G |
| PB-212 | 5.4671E-01 | | | | | | |
| | | 238.63 | 5.449E-01 | (P | 1.233E-01 | 9.42E+00 | G |
| | | 300.09 | 5.711E-01 | (P | 1.243E+00 | 5.97E+01 | G |
| TL-208 | 2.0094E-01 | | | | | | |
| | | 583.14 | 2.009E-01 | (P | 5.728E-02 | 1.41E+01 | G |
| | | 510.72 | 3.545E-01 | + P | 3.241E-01 | 1.81E+01 | G |
| | | 860.47 | 5.996E-03 | % P | 6.066E-01 | 9.09E+02 | G |
| | | 277.36 | 2.974E-01 | + P | 6.411E-01 | 5.99E+01 | G |
| | | 763.30 | 5.770E-01 | + | 3.289E+00 | 1.60E+02 | G |
| PA-234 | 6.2088E-02 | | | | | | |
| | | 98.44 | 1.738E-02 | ?(P | 1.417E-01 | 1.95E+02 | G |
| | | 946.00 | -1.679E-02 | + | 3.587E-01 | 5.81E+02 | G |
| | | 131.28 | 2.097E-02 | &(P | 1.913E-01 | 1.90E+02 | G |
| | | 94.67 | -1.059E-01 | + | 2.966E-01 | 8.40E+01 | G |
| | | 883.24 | -5.573E-03 | % P | 3.931E-01 | 1.00E+03 | G |
| | | 926.70 | 1.440E-03 | % | 6.841E-01 | 1.29E+04 | G |
| | | 569.26 | -1.151E-01 | + P | 5.766E-01 | 1.96E+02 | G |
| | | 111.00 | 3.668E-02 | &( | 4.137E-01 | 3.26E+02 | G |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 10:08:10
American Radiation Services Spectrum name: ARS05252.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 733.00 | 0.000E+00 | - | 1.033E+00 | 1.00E+03 | G |
| | | 949.00 | 1.861E-01 | ?(P | 8.549E-01 | 1.19E+02 | G |
| | | 880.51 | -3.159E-04 | % P | 1.524E+00 | 1.00E+03 | G |
| | | 226.87 | 1.986E-01 | ?(P | 6.300E-01 | 9.11E+01 | G |
| | | 831.10 | 0.000E+00 | - | 1.526E+00 | 1.00E+03 | G |
| | | 808.10 | 1.078E-01 | &( | 1.363E+00 | 3.49E+02 | G |
| | | 99.70 | -5.000E-04 | % | 7.601E-01 | 4.34E+04 | G |
| | | 699.10 | -2.448E-01 | + P | 1.450E+00 | 1.73E+02 | G |
| | | 898.60 | 8.278E-02 | ?(P | 1.851E+00 | 3.69E+02 | G |
| | | 1394.10 | -3.528E-01 | + | 2.189E+00 | 1.71E+02 | G |
| CS-137 | 1.2007E-02 | | | | | | |
| | | 661.66 | 1.201E-02 | &(P | 6.824E-02 | 1.40E+02 | G |
| CO-60 | -2.8499E-02 | | | | | | |
| | | 1173.24 | -2.850E-02 | ?(P | 1.133E-01 | 1.31E+02 | K |
| | | 1332.50 | -1.503E-03 | % P | 9.738E-02 | 1.85E+03 | K |
| EU-152 | 2.7189E-02 | | | | | | |
| | | 40.12 | -7.050E-02 | ( | 2.387E-01 | 1.00E+02 | G |
| | | 121.78 | -1.760E-02 | + | 1.313E-01 | 2.17E+02 | G |
| | | 344.30 | -3.169E-03 | & | 1.734E-01 | 1.53E+03 | G |
| | | 1408.08 | 7.545E-02 | ( | 4.607E-01 | 1.70E+02 | G |
| | | 39.52 | 1.218E-02 | % | 4.839E-01 | 1.13E+03 | G |
| | | 964.00 | 0.000E+00 | } P | 5.861E-01 | 6.32E+02 | G |
| | | 1112.07 | 2.496E-02 | ( | 7.395E-01 | 8.18E+02 | G |
| | | 778.90 | -1.179E-01 | + | 5.275E-01 | 1.29E+02 | G |
| | | 1085.80 | 5.964E-02 | &( | 9.092E-01 | 4.23E+02 | G |
| | | 45.40 | 2.054E-01 | ( | 6.885E-01 | 9.92E+01 | G |
| | | 244.67 | -1.948E-01 | + | 6.502E-01 | 9.89E+01 | G |
| | | 867.39 | -2.379E-01 | + P | 1.725E+00 | 2.34E+02 | G |
| EU-154 | 5.0835E-02 | | | | | | |
| | | 123.10 | 9.055E-03 | ?( | 8.434E-02 | 2.69E+02 | G |
| | | 1274.80 | 3.788E-02 | ?( | 2.606E-01 | 1.92E+02 | G |
| | | 723.30 | -9.877E-02 | + | 3.882E-01 | 1.15E+02 | G |
| | | 1004.80 | -6.908E-04 | % P | 4.376E-01 | 1.78E+03 | G |
| | | 43.00 | -1.700E-01 | + | 5.568E-01 | 9.72E+01 | G |
| | | 873.20 | 6.097E-02 | ?(P | 6.482E-01 | 2.12E+02 | G |
| | | 996.30 | -1.346E-01 | + | 8.730E-01 | 1.85E+02 | G |
| | | 42.31 | 3.297E-01 | ?( | 7.643E-01 | 6.98E+01 | G |
| | | 248.04 | -8.079E-02 | + | 6.355E-01 | 2.26E+02 | G |
| | | 591.70 | 0.000E+00 | - | 1.337E+00 | 1.00E+03 | G |
| | | 48.70 | -8.738E-02 | + | 1.482E+00 | 4.87E+02 | G |
| | | 756.70 | -8.267E-03 | % P | 1.010E+00 | 1.00E+03 | G |

( - This peak used in the nuclide activity average.

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American Radiation Services Spectrum name: ARS05252.An1

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 6.7811E-02 | 4.3635E-02 | 4.4002E-02 | 0.699E-01 |
| RA-226 | #A | 1.0720E+00 | 6.9539E-01 | 6.9985E-01 | 0.111E+01 |
| Ra-228 | | 5.8623E-01 | 1.6201E-01 | 1.6653E-01 | 0.255E+00 |
| Am-241 | #A | -1.2813E-02 | 8.7712E-02 | 8.7716E-02 | 0.151E+00 |
| PB-210 | A | 3.5051E-01 | 8.7414E-01 | 8.7482E-01 | 0.159E+01 |
| U-238 | A | 7.2273E-01 | 5.7741E-01 | 5.8015E-01 | 0.134E+01 |
| K-40 | | 1.8970E+01 | 1.9177E+00 | 2.5111E+00 | 0.860E+00 |
| PB-214 | | 5.9123E-01 | 1.4448E-01 | 1.5594E-01 | 0.153E+00 |
| BI-214 | | 5.3770E-01 | 1.3206E-01 | 1.3777E-01 | 0.126E+00 |
| BI-212 | #A | 1.3510E-01 | 3.6285E-01 | 3.6297E-01 | 0.498E+00 |
| PB-212 | | 5.4671E-01 | 1.0797E-01 | 1.1827E-01 | 0.123E+00 |
| TL-208 | | 2.0094E-01 | 5.9143E-02 | 6.1101E-02 | 0.573E-01 |
| PA-234 | #A | 6.2088E-02 | 1.1642E-01 | 1.1651E-01 | 0.142E+00 |
| CS-137 | #A | 1.2007E-02 | 3.8479E-02 | 3.8485E-02 | 0.682E-01 |
| CO-60 | #B | -2.8499E-02 | 8.5071E-02 | 8.5079E-02 | 0.113E+00 |
| EU-152 | A | 2.7189E-02 | 5.3953E-02 | 5.4040E-02 | 0.239E+00 |
| EU-154 | #A | 5.0835E-02 | 7.0972E-02 | 7.1056E-02 | 0.843E-01 |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 10:08:10
American Radiation Services     Spectrum name: ARS05252.An1


  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity ( 1085.6 to  1998.6 keV)     2.253E+01  pCi/g
```

# Ortec Gamma

| | | | | | |
|---|---|---|---|---|---|
| Batch Sample ID | ARS1-B16-00563-24 | | | | |
| Sample Setup | | | | | |
| Description | ORTEC GAMMA | | | | |
| InternalID | ARS1-16-00670-020 | | Geometry | tuna can solid, 250 | |
| AnalysisBatch | ARS1-B16-00563 | | Fraction | 020 | |
| SDG | ARS1-16-00670 | | Run | 1 | |
| AnalysisCode | GAM-A-025 | | Detector ID | 1 | |
| Library | ITSI COUNT.Lib | | Detector Name | (ARS07) | |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.4676E-02 | pCi/g | 1.8065E-01 | 3.3000E-01 | 1.6500E-01 | | | |
| **RA-226** | 6.6137E-01 | pCi/g | 5.9702E-01 | 9.4600E-01 | 4.7300E-01 | | | |
| **RA-228** | 1.0288E-01 | pCi/g | 1.2944E-01 | 2.9200E-01 | 1.4600E-01 | | | |
| **AM-241** | 5.0387E-02 | pCi/g | 7.5091E-02 | 1.2500E-01 | 6.2500E-02 | | | |
| **PB-210** | 2.0305E-02 | pCi/g | 1.0186E+00 | 1.9500E+00 | 9.7500E-01 | | | |
| **U-238** | 6.0864E-01 | pCi/g | 6.1428E-01 | 1.3300E+00 | 6.6500E-01 | | | |
| **K-40** | 7.9459E+00 | pCi/g | 1.3473E+00 | 4.8000E-01 | 2.4000E-01 | | | |
| **PB-214** | 1.5150E-01 | pCi/g | 8.4711E-02 | 1.4000E-01 | 7.0000E-02 | | | |
| **BI-214** | 1.3176E-01 | pCi/g | 9.5891E-02 | 1.5500E-01 | 7.7500E-02 | | | |
| **BI-212** | 2.9898E-01 | pCi/g | 3.6285E-01 | 5.8300E-01 | 2.9150E-01 | | | |
| **PB-212** | 2.2566E-01 | pCi/g | 7.9994E-02 | 9.7800E-02 | 4.8900E-02 | | | |
| **TL-208** | 7.0550E-02 | pCi/g | 5.7380E-02 | 6.1100E-02 | 3.0550E-02 | | | |
| **PA-234** | 5.9996E-02 | pCi/g | 1.1132E-01 | 1.2000E-01 | 6.0000E-02 | | | |
| **CS-137** | -2.4305E-03 | pCi/g | 6.0477E-01 | 6.6700E-02 | 3.3350E-02 | | | |
| **CO-60** | 7.1801E-03 | pCi/g | 4.2759E-02 | 7.9900E-02 | 3.9950E-02 | | | |
| **EU-152** | 7.6043E-02 | pCi/g | 1.2100E-01 | 2.3400E-01 | 1.1700E-01 | | | |
| **EU-154** | 2.5007E-04 | pCi/g | 1.1681E-03 | 8.0800E-02 | 4.0400E-02 | | | |
| **Total Gamma** | 1.0506E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 3.0131E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07856.An1

Sample description
Batch ID: 16-00563-24
SDG: ARS1-16-00670-020 Tech: WJS

Spectrum Filename: C:\User\ARS07856.An1

Acquisition information
Start time: 19-Apr-2016 09:38:46
Live time: 1800
Real time: 1801
Dead time: 0.08 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.3975E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.3975E+02) =
2.9433E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1032

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.89 | 7. | 158.98 | 0.90 | 2.053E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 4.725E-02 | EU152 |
| 39.94 | 10. | 96.90 | 0.90 | 2.099E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 7.129E-02 | EU152 |
| 43.90 | 2. | 417.78 | 0.91 | 2.269E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.50 | 0. | 42.31 | 0.91 | 2.569E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.54 | -2. | 45.06 | 0.91 | 2.508E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 60.13 | 15. | 74.45 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.67 | 6. | 37.47 | 0.93 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 92.54 | 44. | 34.01 | 0.76 | 4.749E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.13 | 10. | 79.47 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 131.21 | 6. | 154.83 | 0.99 | 4.696E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 143.91 | 0. | 235.69 | 1.00 | 4.553E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.66 | 10. | 83.10 | 1.02 | 4.295E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.41 | 22. | 45.04 | 1.04 | 3.986E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 205.91 | 7. | 117.89 | 1.06 | 3.743E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.70 | 74. | 15.45 | 1.42 | 3.368E-02 | 238.63 | 43.100 | 2.257E-01 | PB212 |
| 277.56 | 10. | 94.12 | 1.12 | 3.012E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.01 | 14. | 47.62 | 1.14 | 2.872E-02 | 295.21 | 18.500 | PBC<MDA | PB214 |
| 299.27 | 16. | 47.45 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 352.05 | 34. | 23.32 | 1.19 | 2.509E-02 | 351.92 | 35.800 | 1.675E-01 | PB214 |
| 511.22 | 11. | 23.89 | 1.32 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.38 | 17. | 28.81 | 1.10 | 1.715E-02 | 583.14 | 86.000 | PBC<MDA | TL208 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 609.35 | 22. | 26.30 | 1.41 | 1.661E-02 | 609.31 | 44.791 | PBC<MDA | BI214 |
| 698.72 | 3. | 193.73 | 1.48 | 1.502E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 727.59 | 11. | 52.44 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 768.19 | 5. | 104.04 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 783.60 | 2. | 209.78 | 1.55 | 1.380E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 807.69 | 3. | 158.03 | 1.57 | 1.351E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 858.05 | 2. | 118.91 | 1.61 | 1.291E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 881.11 | 2. | 208.40 | 1.62 | 1.269E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.45 | 7. | 67.02 | 1.65 | 1.238E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 929.87 | 0. | 816.39 | 1.66 | 1.222E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 933.42 | 8. | 62.23 | 1.66 | 1.215E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 963.57 | 2. | 168.48 | 1.69 | 1.187E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| 969.78 | 6. | 59.10 | 1.69 | 1.182E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1119.98 | 4. | 84.15 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1173.87 | 2. | 276.07 | 1.84 | 1.022E-02 | 1173.24 | 99.900 | HL>Cutoff | CO60 |
| 1239.07 | 2. | 179.70 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1407.33 | 4. | 84.24 | 2.00 | 8.824E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.96 | 167. | 7.74 | 0.71 | 8.554E-03 | 1460.75 | 10.700 | 7.946E+00 | K40 |
| 1764.73 | 2. | 64.46 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

No unknown peaks passed sensitivity test.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 159.23 | 39.89 | 54. | 7. | 0.004 | 317.97 | 0.904s |
| EU-152 | 159.45 | 39.94 | 43. | 10. | 0.006 | 193.80 | 0.905s |
| EU-154 | 175.29 | 43.90 | 38. | 2. | 0.001 | 835.56 | 0.907s |
| EU-152 | 185.83 | 46.54 | 82. | -2. | -0.001 | 90.11 | 0.910s |
| Am-241 | 240.22 | 60.13 | 54. | 15. | 0.008 | 148.89 | 0.923s |
| U-238 | 254.36 | 63.67 | 82. | 6. | 0.003 | 74.94 | 0.927s |
| U-238 | 370.01 | 92.57 | 105. | 30. | 0.017 | 69.84 | 0.954 |
| U-238 | 370.16 | 92.61 | 107. | 25. | 0.014 | 65.26 | 0.954 |
| PA-234 | 382.16 | 95.61 | 76. | -10. | -0.005 | 264.66 | 0.956s |
| PA-234 | 392.23 | 98.13 | 42. | 10. | 0.006 | 158.94 | 0.959s |
| PA-234 | 399.89 | 100.04 | 67. | -11. | -0.006 | 213.21 | 0.960s |
| PA-234 | 444.11 | 111.09 | 57. | -4. | -0.002 | 723.84 | 0.971s |
| EU-152 | 483.18 | 120.86 | 47. | -6. | -0.003 | 330.26 | 0.981s |
| EU-154 | 493.10 | 123.34 | 49. | -4. | -0.002 | 467.04 | 0.982s |
| PA-234 | 524.59 | 131.21 | 42. | 6. | 0.003 | 309.67 | 0.990s |
| U-235 | 654.43 | 163.66 | 41. | 10. | 0.006 | 166.20 | 1.019s |
| RA-226 | 741.47 | 185.41 | 37. | 22. | 0.012 | 90.09 | 1.040s |
| U-235 | 823.46 | 205.91 | 37. | 7. | 0.004 | 235.79 | 1.057s |
| PB-212 | 954.66 | 238.70 | 40. | 74. | 0.041 | 30.90 | 1.418s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PB-214 | 972.30 | 243.11 | 44. | -5. | -0.003 | 552.52 | 1.090s |
| EU-152 | 972.05 | 243.05 | 39. | -10. | -0.006 | 183.21 | 1.093s |
| EU-154 | 991.00 | 247.78 | 42. | -5. | -0.003 | 367.00 | 1.096s |
| TL-208 | 1110.12 | 277.56 | 40. | 10. | 0.005 | 188.24 | 1.122s |
| PB-214 | 1179.93 | 295.01 | 32. | 14. | 0.008 | 95.24 | 1.138s |
| PB-212 | 1197.00 | 299.27 | 22. | 16. | 0.009 | 94.90 | 1.142s |
| PB-214 | 1408.15 | 352.05 | 30. | 34. | 0.019 | 46.63 | 1.188s |
| TL-208 | 2044.91 | 511.22 | 57. | 11. | 0.006 | 47.78 | 1.324 |
| TL-208 | 2333.61 | 583.38 | 14. | 17. | 0.009 | 57.61 | 1.095s |
| EU-154 | 2365.79 | 591.43 | 17. | -3. | -0.002 | 390.82 | 1.392s |
| BI-214 | 2437.49 | 609.35 | 25. | 22. | 0.012 | 52.61 | 1.406s |
| PA-234 | 2795.02 | 698.72 | 19. | 3. | 0.002 | 387.46 | 1.479s |
| EU-154 | 2893.15 | 723.25 | 20. | -4. | -0.002 | 376.01 | 1.499s |
| BI-212 | 2910.49 | 727.59 | 18. | 11. | 0.006 | 104.88 | 1.502s |
| PA-234 | 2936.42 | 734.07 | 21. | -5. | -0.003 | 296.51 | 1.507s |
| BI-214 | 3072.92 | 768.19 | 15. | 5. | 0.003 | 208.08 | 1.535s |
| BI-212 | 3134.54 | 783.60 | 10. | 2. | 0.001 | 419.56 | 1.548 |
| PA-234 | 3230.94 | 807.69 | 12. | 3. | 0.002 | 316.06 | 1.566s |
| PA-234 | 3324.57 | 831.10 | 15. | 0. | 0.000 | 2000.00 | 1.584s |
| TL-208 | 3432.36 | 858.05 | 9. | 2. | 0.001 | 237.81 | 1.607s |
| EU-152 | 3469.73 | 867.39 | 18. | 0. | 0.000 | 2000.00 | 1.612s |
| EU-154 | 3492.83 | 873.16 | 14. | -3. | -0.002 | 464.63 | 1.617s |
| PA-234 | 3524.63 | 881.11 | 10. | 2. | 0.001 | 416.80 | 1.622s |
| Ra-228 | 3645.99 | 911.45 | 20. | 7. | 0.004 | 134.04 | 1.646s |
| PA-234 | 3719.66 | 929.87 | 8. | 0. | 0.000 | 1632.77 | 1.658s |
| BI-214 | 3733.84 | 933.42 | 9. | 8. | 0.005 | 124.46 | 1.663s |
| EU-152 | 3854.46 | 963.57 | 10. | 2. | 0.001 | 336.96 | 1.686s |
| Ra-228 | 3867.56 | 966.84 | 17. | -4. | -0.002 | 290.38 | 1.686s |
| Ra-228 | 3879.32 | 969.78 | 10. | 6. | 0.004 | 118.20 | 1.689s |
| EU-154 | 3989.07 | 997.22 | 13. | -2. | -0.001 | 437.72 | 1.710s |
| EU-154 | 4016.52 | 1004.08 | 16. | -4. | -0.002 | 288.86 | 1.716s |
| EU-152 | 4448.17 | 1112.00 | 13. | -2. | -0.001 | 541.83 | 1.795s |
| BI-214 | 4480.10 | 1119.98 | 15. | 4. | 0.002 | 168.30 | 1.801s |
| CO-60 | 4695.65 | 1173.87 | 11. | 2. | 0.001 | 552.14 | 1.839s |
| BI-214 | 4956.42 | 1239.07 | 19. | 2. | 0.001 | 359.41 | 1.884s |
| CO-60 | 5330.13 | 1332.50 | 0. | 0. | 0.000 | 2000.00 | 1.949s |
| PA-234 | 5576.50 | 1394.10 | 15. | 0. | 0.000 | 2000.00 | 1.990s |
| EU-152 | 5629.44 | 1407.33 | 5. | 4. | 0.002 | 168.47 | 1.999s |
| K-40 | 5843.91 | 1460.96 | 2. | 165. | 0.091 | 15.48 | 0.708s |
| BI-214 | 7058.78 | 1764.73 | 10. | 2. | 0.001 | 128.91 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 9.4676E-02 | | | | | | |
| | | | 143.76 | -1.342E-03 | %(P | 3.298E-01 | 2.36E+02 G | |
| | | | 205.31 | 1.846E-01 | &(P | 7.802E-01 | 1.18E+02 G | |
| | | | 163.35 | 2.192E-01 | (P | 7.151E-01 | 8.31E+01 G | |
| RA-226 | | 6.6137E-01 | | | | | | |
| | | | 186.21 | 6.614E-01 | ( | 9.456E-01 | 4.50E+01 G | K |
| Ra-228 | | 1.0288E-01 | | | | | | |
| | | | 911.07 | 8.160E-02 | ?(P | 2.922E-01 | 6.70E+01 G | |
| | | | 968.90 | 1.382E-01 | ?(P | 3.687E-01 | 5.91E+01 G | |
| | | | 338.40 | -3.565E-02 | % P | 4.197E-01 | 1.04E+03 G | |
| | | | 964.60 | -2.887E-01 | + | 1.487E+00 | 1.45E+02 G | |
| Am-241 | T | 5.0387E-02 | | | | | | |
| | | | 59.54 | 5.039E-02 | &( | 1.250E-01 | 7.44E+01 G | K |
| PB-210 | | 2.0305E-02 | | | | | | |
| | | | 46.52 | 2.031E-02 | %(P | 1.949E+00 | 4.23E+01 G | |
| U-238 | | 6.0864E-01 | | | | | | |
| | | | 63.29 | 1.752E-01 | *(P | 1.328E+00 | 3.75E+01 G | |
| | | | 92.80 | 7.661E-01 | (P | 1.575E+00 | 3.26E+01 G | |
| | | | 92.38 | 1.083E+00 | (P | 1.825E+00 | 3.49E+01 G | |
| K-40 | | 7.9459E+00 | | | | | | |
| | | | 1460.75 | 7.946E+00 | (P | 4.803E-01 | 7.74E+00 G | |
| PB-214 | | 1.5150E-01 | | | | | | |
| | | | 351.92 | 1.675E-01 | (P | 1.399E-01 | 2.33E+01 G | |
| | | | 295.21 | 1.205E-01 | ?(P | 2.428E-01 | 4.76E+01 G | |
| | | | 241.98 | -9.345E-02 | - P | 5.966E-01 | 2.76E+02 G | |
| BI-214 | | 1.3176E-01 | | | | | | |
| | | | 609.31 | 1.308E-01 | @(P | 1.546E-01 | 2.63E+01 G | |
| | | | 1764.49 | 8.081E-02 | ?(P | 6.810E-01 | 6.45E+01 G | |
| | | | 1120.29 | 1.230E-01 | &(P | 5.768E-01 | 8.41E+01 G | |
| | | | 1238.11 | 1.252E-01 | ?(P | 1.767E+00 | 1.80E+02 G | |
| | | | 768.36 | 3.388E-01 | ?(P | 1.355E+00 | 1.04E+02 G | |
| | | | 1377.67 | -7.046E-02 | % P | 1.922E+00 | 2.64E+03 G | |
| | | | 934.06 | 9.978E-01 | + | 2.024E+00 | 6.22E+01 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-212 | 2.9898E-01 | | | | | | |
| | | 727.17 | 2.881E-01 | &(P | 5.825E-01 | 5.24E+01 | G |
| | | 1620.56 | 2.191E-02 | % | 3.233E+00 | 3.72E+03 | G |
| | | 785.42 | 3.633E-01 | ( | 2.816E+00 | 2.10E+02 | G |
| PB-212 | 2.2566E-01 | | | | | | |
| | | 238.63 | 2.257E-01 | (P | 9.782E-02 | 1.54E+01 | G |
| | | 300.09 | 7.598E-01 | & P | 1.182E+00 | 4.74E+01 | G |
| TL-208 | 7.0550E-02 | | | | | | |
| | | 583.14 | 4.982E-02 | (P | 6.106E-02 | 2.88E+01 | G |
| | | 510.72 | 1.152E-01 | (P | 3.940E-01 | 2.39E+01 | G |
| | | 860.47 | 5.277E-02 | ?(P | 4.674E-01 | 1.19E+02 | G |
| | | 277.36 | 2.232E-01 | &(P | 7.261E-01 | 9.41E+01 | G |
| | | 763.30 | -2.480E-02 | % P | 4.724E+00 | 1.00E+03 | G |
| PA-234 | 5.9996E-02 | | | | | | |
| | | 98.44 | 3.789E-02 | &(P | 1.201E-01 | 7.95E+01 | G |
| | | 946.00 | -1.186E-02 | % P | 3.242E-01 | 1.00E+03 | G |
| | | 131.28 | 2.901E-02 | &( | 1.557E-01 | 1.55E+02 | G |
| | | 94.67 | -5.751E-02 | + | 2.594E-01 | 1.32E+02 | G |
| | | 883.24 | 8.738E-03 | % | 5.500E-01 | 1.65E+03 | G |
| | | 926.70 | 1.417E-02 | ?(P | 5.201E-01 | 8.16E+02 | G |
| | | 569.26 | -3.073E-02 | % P | 1.934E-01 | 1.00E+03 | G |
| | | 111.00 | -4.341E-02 | & P | 4.045E-01 | 3.62E+02 | G |
| | | 733.00 | -1.925E-01 | + P | 8.661E-01 | 1.48E+02 | G |
| | | 949.00 | -3.323E-02 | % P | 1.089E+00 | 2.23E+03 | G |
| | | 880.51 | 1.015E-01 | &(P | 9.532E-01 | 2.08E+02 | G |
| | | 226.87 | -4.165E-03 | % P | 6.261E-01 | 5.41E+03 | G |
| | | 831.10 | 0.000E+00 | & | 1.234E+00 | 1.00E+03 | G |
| | | 808.10 | 2.172E-01 | ?( | 1.240E+00 | 1.58E+02 | G |
| | | 99.70 | -2.205E-01 | + | 7.967E-01 | 1.07E+02 | G |
| | | 699.10 | 1.988E-01 | ?(P | 1.469E+00 | 1.94E+02 | G |
| | | 898.60 | -8.782E-02 | % P | 1.883E+00 | 6.73E+04 | G |
| | | 1394.10 | 0.000E+00 | - | 2.644E+00 | 1.00E+03 | G |
| CS-137 | -2.4305E-03 | | | | | | |
| | | 661.66 | -2.431E-03 | %(P | 6.666E-02 | 6.57E+03 | G |
| CO-60 | 7.1801E-03 | | | | | | |
| | | 1173.24 | 7.180E-03 | &(P | 7.993E-02 | 2.76E+02 | K |
| | | 1332.50 | 0.000E+00 | & | 3.528E-02 | 1.00E+03 | K |
| EU-152 | 7.6043E-02 | | | | | | |
| | | 40.12 | 7.129E-02 | ( | 2.344E-01 | 9.69E+01 | G |
| | | 121.78 | -1.912E-02 | & | 1.094E-01 | 1.65E+02 | G |
| | | 344.30 | -1.273E-02 | % P | 1.574E-01 | 8.57E+02 | G |

American Radiation Services Spectrum name: ARS07856.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1408.08 | 9.032E-02 | ?(P | 3.187E-01 | 8.42E+01 | G |
| | | 39.52 | 9.060E-02 | &( | 4.970E-01 | 1.59E+02 | G |
| | | 964.00 | 4.908E-02 | ?(P | 4.384E-01 | 1.68E+02 | G |
| | | 1112.07 | -5.888E-02 | - | 5.895E-01 | 2.71E+02 | G |
| | | 778.90 | -9.392E-03 | % P | 5.273E-01 | 1.01E+04 | G |
| | | 1085.80 | -6.485E-03 | % P | 7.328E-01 | 1.00E+03 | G |
| | | 45.40 | -3.928E-02 | - P | 8.813E-01 | 4.51E+01 | G |
| | | 244.67 | -1.796E-01 | & | 5.571E-01 | 9.16E+01 | G |
| | | 867.39 | 0.000E+00 | - | 1.842E+00 | 1.00E+03 | G |
| EU-154 | 2.5007E-04 | | | | | | |
| | | 123.10 | -9.904E-03 | ?( | 8.078E-02 | 2.34E+02 | G |
| | | 1274.80 | 2.080E-03 | % | 1.664E-01 | 1.93E+03 | G |
| | | 723.30 | -5.395E-02 | + | 3.620E-01 | 1.88E+02 | G |
| | | 1004.80 | -9.492E-02 | + P | 4.638E-01 | 1.44E+02 | G |
| | | 43.00 | -3.898E-02 | % P | 5.523E-01 | 9.61E+02 | G |
| | | 873.20 | -9.323E-02 | + P | 6.218E-01 | 2.32E+02 | G |
| | | 996.30 | -8.780E-02 | + | 7.024E-01 | 2.19E+02 | G |
| | | 42.31 | 5.653E-02 | ?( | 8.399E-01 | 4.18E+02 | G |
| | | 248.04 | -1.054E-01 | + | 6.744E-01 | 1.84E+02 | G |
| | | 591.70 | -1.790E-01 | + | 1.257E+00 | 1.95E+02 | G |
| | | 48.70 | 4.759E-03 | % | 1.668E+00 | 9.99E+03 | G |
| | | 756.70 | 3.309E-02 | & | 1.453E+00 | 1.15E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 9.4676E-02 | 1.8054E-01 | 1.8065E-01 | 0.330E+00 |
| RA-226 | #A | 6.6137E-01 | 5.9583E-01 | 5.9702E-01 | 0.946E+00 |
| Ra-228 | #A | 1.0288E-01 | 1.2928E-01 | 1.2944E-01 | 0.292E+00 |
| Am-241 | #A | 5.0387E-02 | 7.5023E-02 | 7.5091E-02 | 0.125E+00 |
| PB-210 | #A | 2.0305E-02 | 1.0186E+00 | 1.0186E+00 | 0.195E+01 |
| U-238 | #A | 6.0864E-01 | 6.1249E-01 | 6.1428E-01 | 0.133E+01 |
| K-40 | | 7.9459E+00 | 1.2478E+00 | 1.3473E+00 | 0.480E+00 |
| PB-214 | # | 1.5150E-01 | 8.3773E-02 | 8.4711E-02 | 0.140E+00 |
| BI-214 | #A | 1.3176E-01 | 9.5574E-02 | 9.5891E-02 | 0.155E+00 |
| BI-212 | A | 2.9898E-01 | 3.6237E-01 | 3.6285E-01 | 0.583E+00 |
| PB-212 | # | 2.2566E-01 | 7.8445E-02 | 7.9994E-02 | 0.978E-01 |
| TL-208 | | 7.0550E-02 | 5.7212E-02 | 5.7380E-02 | 0.611E-01 |
| PA-234 | #A | 5.9996E-02 | 1.1123E-01 | 1.1132E-01 | 0.120E+00 |
| CS-137 | #A | -2.4305E-03 | 6.0477E-01 | 6.0477E-01 | 0.667E-01 |
| CO-60 | #A | 7.1801E-03 | 4.2758E-02 | 4.2759E-02 | 0.799E-01 |
| EU-152 | #A | 7.6043E-02 | 1.1990E-01 | 1.2100E-01 | 0.234E+00 |
| EU-154 | #A | 2.5007E-04 | 1.1679E-03 | 1.1681E-03 | 0.808E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 2.6 to 2000.1 keV) 8.541E+00 pCi/g

The library has energies which are not separable.

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00564-04 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | - | | |
| AnalysisBatch | ARS1-B16-00564 | Geometry | 250mL Tuna Can 1.5g/ |
| SDG | | Fraction | |
| AnalysisCode | | Run | 0 |
| Library | ITSI COUNT.Lib | Detector ID | 1 |
| | | Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.0065E-02 | pCi/g | 2.6514E-01 | 3.9900E-01 | 1.9950E-01 | | | |
| **RA-226** | 4.1173E-01 | pCi/g | 8.3651E-01 | 1.4000E+00 | 7.0000E-01 | | | |
| **RA-228** | 7.4321E-01 | pCi/g | 2.1141E-01 | 2.6300E-01 | 1.3150E-01 | | | |
| **AM-241** | 4.4698E-02 | pCi/g | 1.0616E-01 | 1.5400E-01 | 7.7000E-02 | | | |
| **PB-210** | 1.2812E+00 | pCi/g | 9.9033E-01 | 1.4300E+00 | 7.1500E-01 | | | |
| **U-238** | 1.5000E+00 | pCi/g | 7.0591E-01 | 1.5200E+00 | 7.6000E-01 | | | |
| **K-40** | 1.7204E+01 | pCi/g | 1.9613E+00 | 5.3100E-01 | 2.6550E-01 | | | |
| **PB-214** | 9.6963E-01 | pCi/g | 1.7953E-01 | 1.4800E-01 | 7.4000E-02 | | | |
| **BI-214** | 1.0129E+00 | pCi/g | 1.8521E-01 | 1.3800E-01 | 6.9000E-02 | | | |
| **BI-212** | 9.1177E-01 | pCi/g | 3.6359E-01 | 3.0800E-01 | 1.5400E-01 | | | |
| **PB-212** | 1.0421E+00 | pCi/g | 1.3586E-01 | 9.7400E-02 | 4.8700E-02 | | | |
| **TL-208** | 2.8579E-01 | pCi/g | 7.9469E-02 | 7.7500E-02 | 3.8750E-02 | | | |
| **PA-234** | 1.5805E-01 | pCi/g | 7.5091E-02 | 1.6900E-01 | 8.4500E-02 | | | |
| **CS-137** | 2.8170E-02 | pCi/g | 4.4655E-02 | 5.7900E-02 | 2.8950E-02 | | | |
| **CO-60** | 0.0000E+00 | pCi/g | 1.5173E-02 | 1.1100E-01 | 5.5500E-02 | | | |
| **EU-152** | 8.8046E-02 | pCi/g | 8.0599E-02 | 2.6200E-01 | 1.3100E-01 | | | |
| **EU-154** | 8.3649E-02 | pCi/g | 1.2461E-01 | 1.0300E-01 | 5.1500E-02 | | | |
| **Total Gamma** | 2.5855E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 7.2023E+01 | pCi/g | | | | | | |
| | | | | | | | | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

Sample description
Batch ID: 16-00564-04
SDG: DUP Tech: WJS

Spectrum Filename: C:\User\ARS08221.An1

Acquisition information
Start time: 4/19/2016 10:11:27 AM
Live time: 1800
Real time: 1808
Dead time: 0.43 %
Detector ID: 9

Detector system
(ARS08) MCB 129

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration
Created: 12/12/2014 9:34:56 AM
Zero offset: 0.447 keV
Gain: 0.250 keV/channel
Quadratic: -3.417E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2015 10:02:55 AM
Type: Polynomial
Uncertainty: 1.535 %
Coefficients: -0.447430 -4.056056 0.358945
-0.033786 0.001201 -0.000016

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G702W050
Start channel: 100 ( 25.46keV )
Stop channel: 8000 ( 1999.20keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 1
Sample Size: 3.5724E+02 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.5724E+02) =
2.7992E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1682

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 26.22 | 10. | 88.40 | 0.45 | 1.539E-02 | | | | |
| 32.24 | 7. | 119.32 | 0.96 | 2.015E-02 | | | | |
| 33.58 | 14. | 78.15 | 0.96 | 2.122E-02 | | | | |
| 34.94 | 11. | 96.64 | 0.96 | 2.229E-02 | | | | |
| 39.49 | 8. | 185.62 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 4.248E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 4.248E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 8.112E-02 | EU152 |
| 42.18 | 20. | 74.40 | 0.97 | 2.811E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.77 | 30. | 47.45 | 0.56 | 3.158E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 57.96 | 26. | 60.92 | 0.67 | 4.088E-02 | | | | |
| 59.35 | 16. | 118.71 | 0.99 | 4.205E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| | | | | | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.28 | 43. | 42.54 | 0.48 | 4.467E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | 1.037E+00 | U238 |
| 72.68 | 28. | 57.23 | 1.00 | 5.022E-02 | | | | |
| 74.81 | 195. | 11.36 | 1.01 | 5.125E-02 | | | | |
| 77.27 | 284. | 8.21 | 1.01 | 5.235E-02 | | | | |
| 87.13 | 106. | 17.51 | 1.02 | 5.569E-02 | | | | |
| 90.04 | 95. | 18.26 | 1.02 | 5.638E-02 | | | | |
| 92.76 | 59. | 35.86 | 1.02 | 5.685E-02 | 92.38 | 2.570 | 1.706E+00 | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | 1.706E+00 | U238 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 92.92 | 80. | 26.11 | 1.03 | 5.693E-02 | 92.38 | 2.570 | 2.304E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.971E+00 | U238 |
| 122.65 | 2. | 828.85 | 1.06 | 5.780E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |
| 130.81 | 3. | 658.83 | 1.07 | 5.703E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| | | | | | 131.28 | 20.000 | 9.826E-03 | PA234 |
| 133.68 | 16. | 77.44 | 1.07 | 5.676E-02 | | | | |
| 135.22 | 27. | 49.87 | 1.07 | 5.658E-02 | | | | |
| 143.51 | 13. | 147.15 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.15 | 5. | 409.25 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.10 | 85. | 21.83 | 1.06 | 4.914E-02 | 185.72 | 57.200 | 1.276E-01 | U235 |
| | | | | | 186.21 | 3.640 | 2.007E+00 | RA226 |
| 201.30 | 20. | 61.16 | 0.76 | 4.692E-02 | | | | |
| 205.39 | 5. | 276.22 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 226.57 | 2. | 940.76 | 1.17 | 4.350E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.49 | 450. | 5.43 | 1.18 | 4.209E-02 | 238.63 | 43.100 | 1.042E+00 | PB212 |
| 241.69 | 76. | 21.35 | 1.19 | 4.171E-02 | 241.98 | 7.500 | 1.005E+00 | PB214 |
| 247.03 | 7. | 187.52 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 1.088E-01 | EU154 |
| 277.57 | 26. | 39.03 | 0.49 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.04 | 150. | 11.03 | 0.97 | 3.634E-02 | 295.21 | 18.500 | 9.389E-01 | PB214 |
| 299.48 | 40. | 34.46 | 0.88 | 3.590E-02 | 300.09 | 3.270 | 1.432E+00 | PB212 |
| 338.09 | 120. | 13.17 | 1.42 | 3.300E-02 | 338.40 | 12.010 | 1.279E+00 | Ra228 |
| 351.78 | 270. | 8.14 | 1.12 | 3.208E-02 | 351.92 | 35.800 | 9.819E-01 | PB214 |
| 409.47 | 22. | 38.85 | 0.55 | 2.880E-02 | | | | |
| 420.96 | 2. | 180.44 | 0.23 | 2.825E-02 | | | | |
| 457.46 | 7. | 95.49 | 0.23 | 2.664E-02 | | | | |
| 510.24 | 117. | 18.40 | 0.67 | 2.468E-02 | 510.72 | 22.500 | 4.228E-01 | TL208 |
| 520.44 | 13. | 57.87 | 0.27 | 2.434E-02 | | | | |
| 551.89 | 13. | 53.63 | 0.41 | 2.336E-02 | | | | |
| 575.35 | 4. | 107.24 | 0.38 | 2.270E-02 | | | | |
| 583.38 | 153. | 11.44 | 1.38 | 2.248E-02 | 583.14 | 86.000 | 3.321E-01 | TL208 |
| 592.03 | 3. | 343.25 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.41 | 226. | 8.46 | 1.44 | 2.181E-02 | 609.31 | 44.791 | 9.637E-01 | BI214 |
| 658.28 | 21. | 41.74 | 0.45 | 2.067E-02 | | | | |
| 661.67 | 12. | 79.23 | 1.61 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| | | | | | 661.66 | 85.210 | PBC<MDA | CS137 |
| 692.68 | 29. | 29.33 | 0.45 | 1.995E-02 | | | | |
| 700.03 | 4. | 292.83 | 1.64 | 1.982E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| | | | | | 699.10 | 4.600 | 1.844E-01 | PA234 |
| 727.06 | 45. | 19.66 | 1.67 | 1.928E-02 | 727.17 | 11.800 | 8.313E-01 | BI212 |
| | | | | | 727.17 | 11.800 | 8.313E-01 | BI212 |
| 732.57 | 30. | 23.47 | 1.67 | 1.917E-02 | 733.00 | 8.500 | 7.703E-01 | PA234 |
| | | | | | 733.00 | 8.500 | 7.703E-01 | PA234 |
| 763.43 | 6. | 97.24 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.49 | 10. | 68.62 | 1.71 | 1.855E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 859.70 | 16. | 61.25 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 884.08 | 8. | 94.89 | 1.81 | 1.680E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | 1.772E-01 | PA234 |
| 911.59 | 99. | 13.21 | 1.26 | 1.642E-02 | 911.07 | 29.000 | 8.735E-01 | Ra228 |
| 927.20 | 9. | 107.67 | 1.85 | 1.622E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| | | | | | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.00 | 7. | 138.79 | 1.85 | 1.613E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 946.19 | 12. | 66.48 | 1.86 | 1.598E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| | | | | | 946.00 | 20.000 | 1.644E-01 | PA234 |
| 964.49 | 18. | 45.42 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 8.583E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | PBC<MDA | EU152 |
| 964.60 | 34. | 21.80 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.661E+00 | Ra228 |
| 969.41 | 61. | 16.88 | 0.62 | 1.570E-02 | 968.90 | 17.460 | 9.324E-01 | Ra228 |
| 1004.83 | 7. | 136.70 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| | | | | | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.71 | 3. | 372.67 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.26 | 14. | 67.13 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1121.54 | 15. | 58.87 | 2.01 | 1.407E-02 | | | | |
| 1155.97 | 31. | 23.04 | 0.39 | 1.374E-02 | | | | |
| 1238.78 | 37. | 22.16 | 0.55 | 1.301E-02 | 1238.11 | 5.859 | 2.034E+00 | BI214 |
| 1297.96 | 12. | 36.80 | 0.48 | 1.253E-02 | | | | |
| 1377.78 | 4. | 217.73 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.82 | 7. | 86.98 | 2.23 | 1.180E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| | | | | | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1461.10 | 498. | 4.60 | 2.21 | 1.134E-02 | 1460.75 | 10.700 | 1.720E+01 | K40 |
| 1541.79 | 2. | 129.10 | 0.27 | 1.081E-02 | | | | |
| 1621.58 | 8. | 74.73 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| | | | | | 1620.56 | 2.750 | 1.257E+00 | BI212 |
| 1764.51 | 40. | 16.19 | 2.49 | 9.535E-03 | 1764.49 | 15.357 | 1.157E+00 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 103.04 | 26.22 | 35. | 10. | 6.433E+02 | 176.80 | 0.446 | AM-241 | |
| 127.10 | 32.24 | 34. | 7. | 3.596E+02 | 238.64 | 0.958 | XE-138 | |
| 132.48 | 33.59 | 55. | 14. | 6.710E+02 | 156.29 | 0.960 | CS-134 | |
| 137.92 | 34.95 | 51. | 11. | 4.934E+02 | 193.29 | 0.961 | BA-139 | |
| 229.95 | 57.96 | 96. | 26. | 6.311E+02 | 121.85 | 0.670 | EU-155 | sM |
| 251.21 | 63.28 | 129. | 43. | 9.694E+02 | 85.08 | 0.481 | TH-234 | sM |
| 288.81 | 72.70 | 115. | 28. | 5.588E+02 | 114.47 | 1.003 | AU-196 | D |
| 297.32 | 74.82 | 149. | 195. | 3.812E+03 | 22.72 | 1.005 | HG-203 | D |
| 307.17 | 77.29 | 130. | 284. | 5.427E+03 | 16.42 | 1.008 | PB-212 | D |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| Channel | Energy | Background | Net area | Eff*Area | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 346.57 | 87.14 | 119. | 106. | 1.901E+03 | 35.01 | 1.019 | TH-234 | D |
| 358.22 | 90.05 | 102. | 95. | 1.679E+03 | 36.51 | 1.022 | AC-228 | D |
| 532.73 | 133.73 | 68. | 16. | 2.806E+02 | 154.88 | 1.070 | CE-144 | c |
| 538.87 | 135.27 | 79. | 27. | 4.817E+02 | 99.73 | 1.071 | J-134 | D |
| 803.44 | 201.30 | 60. | 21. | 4.460E+02 | 113.57 | 1.142 | PU-239 | D |
| 1635.68 | 409.47 | 19. | 22. | 7.568E+02 | 77.70 | 0.549 | AC-228 | s |
| 1681.63 | 420.96 | 10. | 2. | 8.851E+01 | 360.89 | 0.234 | - | sc |
| 1827.66 | 457.46 | 17. | 7. | 2.665E+02 | 190.99 | 0.228 | MO-99 | sc |
| 2079.58 | 520.44 | 15. | 13. | 5.218E+02 | 115.73 | 0.270 | - | s |
| 2205.41 | 551.89 | 11. | 13. | 5.393E+02 | 107.26 | 0.414 | W-187 | s |
| 2299.25 | 575.35 | 8. | 4. | 1.762E+02 | 214.48 | 0.376 | - | sc |
| 2631.04 | 658.28 | 17. | 21. | 1.026E+03 | 83.49 | 0.447 | RB-89 | s |
| 2768.66 | 692.68 | 11. | 29. | 1.444E+03 | 58.66 | 0.451 | SB-122 | s |
| 4485.02 | 1121.57 | 32. | 15. | 1.073E+03 | 117.74 | 2.014 | TA-182 | D |
| 4622.83 | 1155.97 | 4. | 31. | 2.256E+03 | 46.07 | 0.391 | BI-214 | s |
| 5191.27 | 1297.96 | 3. | 12. | 9.578E+02 | 73.60 | 0.481 | J-133 | s |
| 6167.67 | 1541.79 | 2. | 2. | 1.387E+02 | 258.20 | 0.273 | - | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.12 | 39.49 | 85. | 8. | 0.004 | 371.23 | 0.967s |
| EU-152 | 157.00 | 39.71 | 100. | -4. | -0.002 | 796.87 | 0.967s |
| EU-154 | 166.87 | 42.18 | 78. | 20. | 0.011 | 148.80 | 0.970s |
| EU-154 | 168.06 | 42.48 | 99. | -3. | -0.002 | 1039.55 | 0.970s |
| EU-152 | 180.00 | 45.47 | 121. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 183.83 | 46.43 | 74. | 38. | 0.021 | 76.65 | 0.584s |
| EU-154 | 193.00 | 48.72 | 118. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 235.52 | 59.35 | 128. | 16. | 0.009 | 237.42 | 0.989s |
| U-238 | 251.04 | 63.23 | 167. | 42. | 0.023 | 107.22 | 0.993s |
| U-238 | 369.09 | 92.76 | 145. | 59. | 0.033 | 71.72 | 1.025s |
| U-238 | 369.73 | 92.92 | 132. | 80. | 0.044 | 52.21 | 1.025s |
| PA-234 | 372.42 | 93.59 | 229. | -19. | -0.011 | 259.30 | 1.027s |
| PA-234 | 390.06 | 98.00 | 142. | -3. | -0.001 | 1471.92 | 1.031s |
| PA-234 | 444.49 | 111.61 | 133. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 485.92 | 121.98 | 136. | 0. | 0.000 | 2000.00 | 1.057s |
| EU-154 | 488.62 | 122.65 | 137. | 2. | 0.001 | 1657.70 | 1.058s |
| PA-234 | 521.26 | 130.81 | 113. | 3. | 0.001 | 1317.67 | 1.067s |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-235 | 572.04 | 143.51 | 127. | 13. | 0.007 | 294.31 | 1.081 |
| U-235 | 650.58 | 163.15 | 120. | 5. | 0.003 | 818.50 | 1.102 |
| U-235 | 740.82 | 185.72 | 129. | 56. | 0.031 | 55.78 | 1.126D |
| RA-226 | 742.78 | 186.21 | 149. | 18. | 0.010 | 203.08 | 1.057D |
| U-235 | 819.16 | 205.31 | 91. | 5. | 0.003 | 552.43 | 1.147D |
| PA-234 | 904.18 | 226.57 | 95. | 2. | 0.001 | 1881.51 | 1.170s |
| PB-212 | 952.41 | 238.63 | 71. | 450. | 0.250 | 10.85 | 1.182D |
| PB-214 | 965.81 | 241.98 | 93. | 73. | 0.041 | 44.03 | 1.185D |
| EU-152 | 977.00 | 244.78 | 95. | -21. | -0.012 | 163.99 | 1.188s |
| EU-154 | 986.00 | 247.03 | 57. | 7. | 0.004 | 375.04 | 1.192s |
| TL-208 | 1108.13 | 277.57 | 33. | 26. | 0.015 | 78.06 | 0.486s |
| PB-214 | 1178.00 | 295.04 | 46. | 150. | 0.083 | 22.06 | 0.972s |
| PB-212 | 1195.78 | 299.48 | 50. | 40. | 0.022 | 68.92 | 0.880s |
| Ra-228 | 1350.20 | 338.09 | 38. | 120. | 0.067 | 26.33 | 1.416 |
| EU-152 | 1376.05 | 344.56 | 57. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1404.93 | 351.78 | 66. | 268. | 0.149 | 16.43 | 1.119 |
| TL-208 | 2038.77 | 510.24 | 124. | 56. | 0.031 | 82.63 | 0.672s |
| PA-234 | 2272.32 | 568.62 | 43. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2331.20 | 583.34 | 50. | 129. | 0.072 | 27.03 | 1.531 |
| EU-154 | 2366.00 | 592.03 | 25. | 3. | 0.002 | 686.50 | 1.539s |
| BI-214 | 2435.53 | 609.41 | 40. | 224. | 0.124 | 17.19 | 1.442 |
| CS-137 | 2644.60 | 661.67 | 21. | 12. | 0.007 | 158.46 | 1.606s |
| PA-234 | 2798.07 | 700.03 | 36. | 4. | 0.002 | 585.66 | 1.641s |
| EU-154 | 2897.38 | 724.85 | 45. | 0. | 0.000 | 2000.00 | 1.664s |
| BI-212 | 2906.23 | 727.06 | 9. | 45. | 0.025 | 39.33 | 1.667s |
| PA-234 | 2928.30 | 732.57 | 5. | 30. | 0.017 | 46.93 | 1.673s |
| TL-208 | 3051.25 | 763.30 | 15. | 6. | 0.003 | 194.48 | 1.701D |
| BI-214 | 3071.48 | 768.36 | 18. | 10. | 0.006 | 137.24 | 1.705D |
| EU-152 | 3116.33 | 779.57 | 45. | 0. | 0.000 | 2000.00 | 1.715s |
| BI-212 | 3138.53 | 785.11 | 58. | -16. | -0.009 | 196.51 | 1.721s |
| PA-234 | 3225.63 | 806.88 | 36. | -4. | -0.002 | 585.66 | 1.742s |
| TL-208 | 3437.00 | 859.70 | 20. | 16. | 0.009 | 122.50 | 1.789s |
| EU-152 | 3463.67 | 866.36 | 29. | -5. | -0.003 | 434.70 | 1.795s |
| EU-154 | 3496.67 | 874.61 | 31. | 0. | 0.000 | 2000.00 | 1.800s |
| PA-234 | 3519.69 | 880.36 | 25. | 0. | 0.000 | 2000.00 | 1.807s |
| PA-234 | 3534.56 | 884.08 | 14. | 8. | 0.005 | 189.77 | 1.809s |
| PA-234 | 3593.69 | 898.85 | 43. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3644.35 | 911.51 | 34. | 84. | 0.047 | 34.93 | 1.834s |
| PA-234 | 3707.16 | 927.20 | 20. | 9. | 0.005 | 215.35 | 1.848s |
| BI-214 | 3734.35 | 934.00 | 25. | 7. | 0.004 | 277.58 | 1.854s |
| PA-234 | 3783.16 | 946.19 | 14. | 12. | 0.007 | 132.95 | 1.864 |
| PA-234 | 3794.38 | 949.00 | 31. | 0. | 0.000 | 2000.00 | 1.867s |
| EU-152 | 3856.39 | 964.49 | 11. | 18. | 0.010 | 90.84 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 10. | 34. | 0.019 | 43.60 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 29. | 49. | 0.027 | 42.93 | 1.884D |
| EU-154 | 3986.02 | 996.88 | 36. | -8. | -0.005 | 306.32 | 1.908s |
| EU-154 | 4017.84 | 1004.83 | 21. | 7. | 0.004 | 273.39 | 1.915s |
| EU-152 | 4341.58 | 1085.71 | 32. | 3. | 0.002 | 745.34 | 1.984s |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 4445.50 | 1111.67 | 33. | -2. | -0.001 | 1199.58 | 2.006s |
| BI-214 | 4479.99 | 1120.29 | 40. | 14. | 0.008 | 134.26 | 2.013D |
| CO-60 | 4690.90 | 1172.97 | 51. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4953.27 | 1238.51 | 50. | 6. | 0.003 | 537.33 | 2.109s |
| EU-154 | 5100.00 | 1275.16 | 23. | -3. | -0.002 | 624.50 | 2.137s |
| CO-60 | 5327.75 | 1332.04 | 35. | 0. | 0.000 | 2000.00 | 2.183s |
| BI-214 | 5510.88 | 1377.78 | 19. | 4. | 0.002 | 435.46 | 2.217s |
| PA-234 | 5575.10 | 1393.82 | 6. | 7. | 0.004 | 173.95 | 2.230s |
| EU-152 | 5626.29 | 1406.60 | 19. | 0. | 0.000 | 2000.00 | 2.240s |
| K-40 | 5844.51 | 1461.10 | 7. | 497. | 0.276 | 9.24 | 2.213 |
| BI-212 | 6487.24 | 1621.58 | 6. | 8. | 0.005 | 149.46 | 2.394s |
| BI-214 | 7059.76 | 1764.51 | 1. | 40. | 0.022 | 32.38 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| U-235 | | 9.0065E-02 | | | | | 1.39E+09 | | |
| | | | 185.72 | 8.335E-02 | } | 8.306E-02 | 2.79E+01 | 5.72E+01 | G K |
| | | | 143.76 | 9.255E-02 | (P | 3.987E-01 | 1.47E+02 | 1.05E+01 | G |
| | | | 205.31 | 9.619E-02 | (P | 9.099E-01 | 2.76E+02 | 4.70E+00 | G |
| | | | 163.35 | 7.839E-02 | (P | 9.152E-01 | 4.09E+02 | 4.70E+00 | G |
| RA-226 | | 4.1173E-01 | | | | | 5.84E+05 | | |
| | | | | | | | Derived Ave Activity | | |
| | | | 186.21 | 4.117E-01 | }( | 1.403E+00 | 1.02E+02 | 3.64E+00 | G K |
| Ra-228 | | 7.4321E-01 | | | | | 2.10E+03 | | |
| | | | 911.07 | 7.426E-01 | ?( | 2.631E-01 | 1.75E+01 | 2.90E+01 | G |
| | | | 968.90 | 7.442E-01 | (P | 4.292E-01 | 2.15E+01 | 1.75E+01 | G |
| | | | 338.40 | 1.279E+00 | + | 3.316E-01 | 1.32E+01 | 1.20E+01 | G |
| | | | 964.60 | 1.661E+00 | + | 8.681E-01 | 2.18E+01 | 5.45E+00 | G |
| Am-241 | T | 4.4698E-02 | | | | | 1.58E+05 | | |
| | | | 59.54 | 4.470E-02 | ?(P | 1.543E-01 | 1.19E+02 | 3.59E+01 | G K |
| PB-210 | | 1.2812E+00 | | | | | 7.45E+03 | | |
| | | | 46.52 | 1.281E+00 | (P | 1.432E+00 | 3.83E+01 | 4.00E+00 | G |
| U-238 | | 1.5000E+00 | | | | | 1.63E+12 | | |
| | | | 63.29 | 1.002E+00 | ?(P | 1.520E+00 | 5.36E+01 | 3.90E+00 | G |
| | | | 92.80 | 1.971E+00 | (P | 1.384E+00 | 2.61E+01 | 3.00E+00 | G |
| | | | 92.38 | 1.706E+00 | &(P | 1.691E+00 | 3.59E+01 | 2.57E+00 | G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.7204E+01 | | | | | 4.68E+11 | |
| | | 1460.75 | 1.720E+01 | (P | 5.307E-01 | 4.62E+00 | 1.07E+01 G |
| PB-214 | 9.6963E-01 | | | | | 5.84E+05 | |
| | | 351.92 | 9.819E-01 | (P | 1.483E-01 | 8.22E+00 | 3.58E+01 G |
| | | 295.21 | 9.389E-01 | ( | 2.144E-01 | 1.10E+01 | 1.85E+01 G |
| | | 241.98 | 9.867E-01 | (P | 6.395E-01 | 2.20E+01 | 7.50E+00 G |
| BI-214 | 1.0129E+00 | | | | | 5.84E+05 | |
| | | 609.31 | 9.637E-01 | (P | 1.385E-01 | 8.59E+00 | 4.48E+01 G |
| | | 1764.49 | 1.157E+00 | ?(P | 2.115E-01 | 1.62E+01 | 1.54E+01 G |
| | | 1120.29 | 2.907E-01 | - | 6.462E-01 | 6.71E+01 | 1.48E+01 G |
| | | 1238.11 | 3.031E-01 | - | 1.956E+00 | 2.69E+02 | 5.86E+00 G |
| | | 768.36 | 4.699E-01 | - | 1.070E+00 | 6.86E+01 | 4.80E+00 G |
| | | 1377.67 | 3.832E-01 | - P | 2.058E+00 | 2.18E+02 | 3.92E+00 G |
| | | 934.06 | 6.312E-01 | - P | 2.224E+00 | 1.39E+02 | 3.03E+00 G |
| BI-212 | 9.1177E-01 | | | | | 2.10E+03 | |
| | | 727.17 | 8.313E-01 | ?( | 3.083E-01 | 1.97E+01 | 1.18E+01 G |
| | | 1620.56 | 1.257E+00 | ?( | 2.158E+00 | 7.47E+01 | 2.75E+00 G |
| | | 785.42 | -1.783E+00 | - | 4.413E+00 | 9.83E+01 | 2.00E+00 G |
| PB-212 | 1.0421E+00 | | | | | 2.10E+03 | |
| | | 238.63 | 1.042E+00 | (P | 9.737E-02 | 5.42E+00 | 4.31E+01 G |
| | | 300.09 | 1.432E+00 | + | 1.277E+00 | 3.45E+01 | 3.27E+00 G |
| TL-208 | 2.8579E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 2.804E-01 | ?( | 7.751E-02 | 1.35E+01 | 8.60E+01 G |
| | | 510.72 | 4.228E-01 | + P | 4.139E-01 | 4.13E+01 | 2.25E+01 G |
| | | 860.47 | 3.246E-01 | ?(P | 4.834E-01 | 6.13E+01 | 1.20E+01 G |
| | | 277.36 | 4.505E-01 | + P | 4.993E-01 | 3.90E+01 | 6.50E+00 G |
| | | 763.30 | 8.120E-01 | + | 2.726E+00 | 9.72E+01 | 1.70E+00 G |
| PA-234 | 1.5805E-01 | | | | | 1.65E+12 | |
| | | 98.44 | -7.734E-03 | &( | 1.687E-01 | 7.36E+02 | 2.51E+01 G |
| | | 946.00 | 1.644E-01 | ?( | 2.690E-01 | 6.65E+01 | 2.00E+01 G |
| | | 131.28 | 9.826E-03 | ?( | 1.928E-01 | 6.59E+02 | 2.00E+01 G |
| | | 94.67 | -9.238E-02 | + | 3.473E-01 | 1.30E+02 | 1.55E+01 G |
| | | 883.24 | 1.772E-01 | &( | 4.265E-01 | 9.49E+01 | 1.20E+01 G |
| | | 926.70 | 2.042E-01 | ?(P | 5.586E-01 | 1.08E+02 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | - P | 5.881E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | - P | 4.763E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 7.703E-01 | &(P | 3.421E-01 | 2.35E+01 | 8.50E+00 G |
| | | 949.00 | 0.000E+00 | - P | 9.628E-01 | 1.00E+03 | 7.80E+00 G |
| | | 880.51 | 0.000E+00 | - P | 9.960E-01 | 1.00E+03 | 6.50E+00 G |
| | | 226.87 | 2.646E-02 | ?(P | 7.163E-01 | 9.41E+02 | 6.50E+00 G |
| | | 831.10 | 3.564E-02 | % | 1.096E+00 | 1.17E+03 | 5.60E+00 G |

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Spectrum name: ARS08221.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | -1.917E-01 | + | 1.470E+00 | 2.93E+02 | 4.90E+00 G |
| | | 99.70 | 7.727E-03 | % | 8.550E-01 | 3.71E+03 | 4.70E+00 G |
| | | 699.10 | 1.844E-01 | ?( | 1.414E+00 | 2.93E+02 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 2.101E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 6.173E-01 | ?(P | 1.310E+00 | 8.70E+01 | 3.90E+00 G |
| CS-137 | 2.8170E-02 | | | | | 1.10E+04 | |
| | | 661.66 | 2.817E-02 | &(P | 5.793E-02 | 7.92E+01 | 8.52E+01 G |
| EU-152 | 8.8046E-02 | | | | | 4.64E+03 | |
| | | 40.12 | -2.124E-02 | ?( | 2.619E-01 | 3.98E+02 | 3.00E+01 G |
| | | 121.78 | 0.000E+00 | + | 1.416E-01 | 1.00E+03 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | + P | 1.818E-01 | 1.00E+03 | 2.70E+01 G |
| | | 1408.08 | 0.000E+00 | + P | 3.893E-01 | 1.00E+03 | 2.12E+01 G |
| | | 39.52 | 8.112E-02 | ?( | 4.631E-01 | 1.86E+02 | 1.60E+01 G |
| | | 964.00 | 3.208E-01 | ?(P | 3.380E-01 | 4.54E+01 | 1.46E+01 G |
| | | 1112.07 | -4.371E-02 | + | 6.443E-01 | 6.00E+02 | 1.36E+01 G |
| | | 778.90 | 0.000E+00 | - | 5.983E-01 | 1.00E+03 | 1.30E+01 G |
| | | 1085.80 | 8.766E-02 | ?(P | 8.223E-01 | 3.73E+02 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 8.236E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | -2.802E-01 | + | 6.421E-01 | 8.20E+01 | 7.62E+00 G |
| | | 867.39 | -2.957E-01 | + | 1.644E+00 | 2.17E+02 | 4.18E+00 G |
| EU-154 | 8.3649E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 4.188E-03 | &(P | 1.028E-01 | 8.29E+02 | 4.05E+01 G |
| | | 1274.80 | -3.104E-02 | + | 2.349E-01 | 3.12E+02 | 3.55E+01 G |
| | | 723.30 | 0.000E+00 | - | 3.745E-01 | 1.00E+03 | 1.97E+01 G |
| | | 1004.80 | 1.106E-01 | ?(P | 3.753E-01 | 1.37E+02 | 1.76E+01 G |
| | | 43.00 | -3.545E-02 | + | 5.498E-01 | 5.20E+02 | 1.31E+01 G |
| | | 873.20 | 0.000E+00 | - P | 6.280E-01 | 1.00E+03 | 1.13E+01 G |
| | | 996.30 | -2.085E-01 | + | 7.847E-01 | 1.53E+02 | 1.07E+01 G |
| | | 42.31 | 4.167E-01 | &(P | 8.965E-01 | 7.44E+01 | 7.30E+00 G |
| | | 248.04 | 1.088E-01 | ?( | 5.888E-01 | 1.88E+02 | 6.60E+00 G |
| | | 591.70 | 1.149E-01 | ?(P | 1.071E+00 | 3.43E+02 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | - P | 1.599E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | 5.467E-02 | % | 1.677E+00 | 1.16E+03 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

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Spectrum name: ARS08221.An1

- \- Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

\- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*************** D I S C A R D E D I S O T O P E P E A K S ***************

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.49 | 85. | 8. | 0.004 | 371.23 | 8.112E-02 | |
| EU-152 | 39.71 | 100. | -4. | -0.002 | 796.87 | -2.124E-02 | |
| EU-154 | 42.18 | 78. | 20. | 0.011 | 148.80 | 4.167E-01 | P |
| EU-154 | 42.48 | 99. | -3. | -0.002 | 1039.55 | -3.545E-02 | |
| Am-241 | 59.35 | 128. | 16. | 0.009 | 237.42 | 4.470E-02 | P |
| U-238 | 63.23 | 167. | 42. | 0.023 | 107.22 | 1.002E+00 | P |
| U-238 | 92.76 | 145. | 59. | 0.033 | 71.72 | 1.706E+00 | P |
| U-238 | 92.92 | 132. | 80. | 0.044 | 52.21 | 1.971E+00 | P |
| PA-234 | 93.59 | 229. | -19. | -0.011 | 259.30 | -9.238E-02 | |
| PA-234 | 98.00 | 142. | -3. | -0.001 | 1471.92 | -7.734E-03 | |
| EU-154 | 122.65 | 137. | 2. | 0.001 | 1657.70 | 4.188E-03 | P |
| PA-234 | 130.81 | 113. | 3. | 0.001 | 1317.67 | 9.826E-03 | |
| PA-234 | 226.57 | 95. | 2. | 0.001 | 1881.51 | 2.646E-02 | P |
| EU-152 | 244.78 | 95. | -21. | -0.012 | 163.99 | -2.802E-01 | |
| EU-154 | 247.03 | 57. | 7. | 0.004 | 375.04 | 1.088E-01 | |
| EU-154 | 592.03 | 25. | 3. | 0.002 | 686.50 | 1.149E-01 | P |
| CS-137 | 661.67 | 21. | 12. | 0.007 | 158.46 | 2.817E-02 | P |
| PA-234 | 700.03 | 36. | 4. | 0.002 | 585.66 | 1.844E-01 | |
| BI-212 | 727.06 | 9. | 45. | 0.025 | 39.33 | 8.313E-01 | |
| PA-234 | 732.57 | 5. | 30. | 0.017 | 46.93 | 7.703E-01 | P |
| BI-212 | 785.11 | 58. | -16. | -0.009 | 196.51 | -1.783E+00 | |
| PA-234 | 806.88 | 36. | -4. | -0.002 | 585.66 | -1.917E-01 | |
| EU-152 | 866.36 | 29. | -5. | -0.003 | 434.70 | -2.957E-01 | |
| PA-234 | 884.08 | 14. | 8. | 0.005 | 189.77 | 1.772E-01 | |
| PA-234 | 927.20 | 20. | 9. | 0.005 | 215.35 | 2.042E-01 | P |
| PA-234 | 946.19 | 14. | 12. | 0.007 | 132.95 | 1.644E-01 | |
| EU-152 | 964.49 | 11. | 18. | 0.010 | 90.84 | 3.208E-01 | P |
| EU-154 | 996.88 | 36. | -8. | -0.005 | 306.32 | -2.085E-01 | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 10:41:42 AM
Spectrum name: ARS08221.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 1004.83 | 21. | 7. | 0.004 | 273.39 | 1.106E-01 | P |
| EU-152 | 1085.71 | 32. | 3. | 0.002 | 745.34 | 8.766E-02 | P |
| EU-152 | 1111.67 | 33. | -2. | -0.001 | 1199.58 | -4.371E-02 | |
| EU-154 | 1275.16 | 23. | -3. | -0.002 | 624.50 | -3.104E-02 | |
| PA-234 | 1393.82 | 6. | 7. | 0.004 | 173.95 | 6.173E-01 | P |
| BI-212 | 1621.58 | 6. | 8. | 0.005 | 149.46 | 1.257E+00 | |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 9.0065E-02 | 2.6507E-01 | 2.6514E-01 | 0.399E+00 |
| RA-226 #A | 4.1173E-01 | 8.3613E-01 | 8.3651E-01 | 0.140E+01 |
| Ra-228 | 7.4321E-01 | 2.0567E-01 | 2.1141E-01 | 0.263E+00 |
| Am-241 #A | 4.4698E-02 | 1.0612E-01 | 1.0616E-01 | 0.154E+00 |
| PB-210 A | 1.2812E+00 | 9.8204E-01 | 9.9033E-01 | 0.143E+01 |
| U-238 #A | 1.5000E+00 | 6.9581E-01 | 7.0591E-01 | 0.152E+01 |
| K-40 | 1.7204E+01 | 1.5891E+00 | 1.9613E+00 | 0.531E+00 |
| PB-214 | 9.6963E-01 | 1.5935E-01 | 1.7953E-01 | 0.148E+00 |
| BI-214 | 1.0129E+00 | 1.7411E-01 | 1.8521E-01 | 0.138E+00 |
| BI-212 # | 9.1177E-01 | 3.5858E-01 | 3.6359E-01 | 0.308E+00 |
| PB-212 | 1.0421E+00 | 1.1302E-01 | 1.3586E-01 | 0.974E-01 |
| TL-208 | 2.8579E-01 | 7.7255E-02 | 7.9469E-02 | 0.775E-01 |
| PA-234 #A | 1.5805E-01 | 7.4180E-02 | 7.5091E-02 | 0.169E+00 |
| CS-137 #A | 2.8170E-02 | 4.4638E-02 | 4.4655E-02 | 0.579E-01 |
| CO-60 #A | 0.0000E+00 | 1.5173E-02 | 1.5173E-02 | 0.111E+00 |
| EU-152 #A | 8.8046E-02 | 7.9982E-02 | 8.0599E-02 | 0.262E+00 |
| EU-154 #A | 8.3649E-02 | 1.2447E-01 | 1.2461E-01 | 0.103E+00 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 2.254E+01 pCi/g

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-05 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-021 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | tuna can solid, 250 |
| Fraction | 021 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.4733E-01 | pCi/g | 3.0381E-01 | 5.1400E-01 | 2.5700E-01 | | | |
| **RA-226** | 2.4189E+00 | pCi/g | 1.1901E+00 | 1.4700E+00 | 7.3500E-01 | | | |
| **RA-228** | 9.7339E-01 | pCi/g | 2.2983E-01 | 1.7100E-01 | 8.5500E-02 | | | |
| **AM-241** | 6.2924E-02 | pCi/g | 9.6709E-02 | 1.6100E-01 | 8.0500E-02 | | | |
| **PB-210** | 6.5102E-01 | pCi/g | 1.2807E+00 | 2.1000E+00 | 1.0500E+00 | | | |
| **U-238** | 6.1317E-01 | pCi/g | 6.0064E-01 | 2.1600E+00 | 1.0800E+00 | | | |
| **K-40** | 1.7215E+01 | pCi/g | 2.1428E+00 | 6.4000E-01 | 3.2000E-01 | | | |
| **PB-214** | 9.7587E-01 | pCi/g | 1.8581E-01 | 1.5400E-01 | 7.7000E-02 | | | |
| **BI-214** | 9.0249E-01 | pCi/g | 1.8186E-01 | 1.6200E-01 | 8.1000E-02 | | | |
| **BI-212** | 6.2162E-01 | pCi/g | 5.4348E-01 | 7.0400E-01 | 3.5200E-01 | | | |
| **PB-212** | 8.6854E-01 | pCi/g | 1.6582E-01 | 1.6800E-01 | 8.4000E-02 | | | |
| **TL-208** | 3.0545E-01 | pCi/g | 8.3529E-02 | 8.3700E-02 | 4.1850E-02 | | | |
| **PA-234** | 8.1488E-02 | pCi/g | 1.8381E-01 | 1.9100E-01 | 9.5500E-02 | | | |
| **CS-137** | -1.3959E-02 | pCi/g | 6.8818E-02 | 9.0600E-02 | 4.5300E-02 | | | |
| **CO-60** | -5.5164E-04 | pCi/g | 2.2066E-02 | 1.1100E-01 | 5.5500E-02 | | | |
| **EU-152** | 1.1270E-01 | pCi/g | 1.5123E-01 | 3.4100E-01 | 1.7050E-01 | | | |
| **EU-154** | 7.7363E-02 | pCi/g | 1.1381E-01 | 1.2800E-01 | 6.4000E-02 | | | |
| **Total Gamma** | 2.6027E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 7.2366E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07857.An1

Sample description
Batch ID: 16-00564-05
SDG: ARS1-16-00670-021 Tech: WJS

Spectrum Filename: C:\User\ARS07857.An1

Acquisition information
Start time: 19-Apr-2016 10:12:16
Live time: 1800
Real time: 1802
Dead time: 0.10 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4738E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4738E+02) =
2.8787E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1766

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.89 | 9. | 168.17 | 0.90 | 2.099E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 43.26 | 7. | 170.59 | 0.91 | 2.322E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.17 | 15. | 35.31 | 0.49 | 2.569E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 57.99 | 19. | 76.78 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 62.84 | -14. | 166.83 | 0.93 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.56 | 118. | 18.10 | 0.94 | 4.333E-02 | | | | |
| 77.28 | 180. | 12.78 | 0.94 | 4.423E-02 | | | | |
| 86.98 | 62. | 31.25 | 0.60 | 4.664E-02 | | | | |
| 93.22 | 43. | 37.32 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 93.25 | 38. | 36.14 | 0.95 | 4.753E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.22 | 5. | 243.26 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 110.85 | 10. | 141.37 | 0.97 | 4.832E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 123.72 | 4. | 435.73 | 0.98 | 4.770E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 135.19 | 21. | 63.51 | 0.63 | 4.654E-02 | | | | |
| 143.78 | 16. | 81.56 | 1.00 | 4.553E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 185.99 | 81. | 24.44 | 0.42 | 3.986E-02 | 186.21 | 3.640 | 2.419E+00 | RA226 |
| 238.58 | 301. | 8.62 | 1.14 | 3.369E-02 | 238.63 | 43.100 | 8.685E-01 | PB212 |
| 244.36 | 14. | 71.49 | 1.09 | 3.334E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 250.01 | 12. | 73.48 | 1.10 | 3.274E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 295.29 | 117. | 14.36 | 1.27 | 2.871E-02 | 295.21 | 18.500 | 9.214E-01 | PB214 |
| 299.68 | 2. | 392.14 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.08 | 60. | 24.54 | 1.00 | 2.586E-02 | 338.40 | 12.010 | 8.315E-01 | Ra228 |
| 351.98 | 209. | 8.33 | 1.46 | 2.509E-02 | 351.92 | 35.800 | 1.004E+00 | PB214 |
| 511.32 | 60. | 16.14 | 0.53 | 1.892E-02 | 510.72 | 22.500 | 6.129E-01 | TL208 |
| 583.34 | 104. | 12.50 | 1.27 | 1.715E-02 | 583.14 | 86.000 | 3.055E-01 | TL208 |
| 609.44 | 163. | 9.16 | 1.70 | 1.661E-02 | 609.31 | 44.791 | 9.464E-01 | BI214 |
| 698.58 | 5. | 130.39 | 1.48 | 1.502E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 727.39 | 16. | 49.48 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 763.11 | 4. | 177.32 | 1.53 | 1.409E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 767.99 | 10. | 74.39 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 779.50 | 6. | 113.16 | 1.54 | 1.388E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 785.88 | 8. | 85.64 | 1.55 | 1.380E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 835.22 | 2. | 268.69 | 1.58 | 1.324E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 874.16 | 3. | 179.16 | 1.62 | 1.277E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 911.56 | 79. | 11.72 | 1.67 | 1.238E-02 | 911.07 | 29.000 | 9.505E-01 | Ra228 |
| 926.92 | 1. | 423.26 | 1.66 | 1.222E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.21 | 7. | 83.83 | 1.66 | 1.215E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 949.22 | 3. | 165.17 | 1.67 | 1.201E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 969.06 | 53. | 18.01 | 1.28 | 1.182E-02 | 968.90 | 17.460 | 1.109E+00 | Ra228 |
| 996.33 | 6. | 104.11 | 1.71 | 1.158E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1087.89 | 9. | 65.07 | 1.78 | 1.085E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.29 | 24. | 33.18 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1238.47 | 4. | 130.99 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1378.00 | 6. | 92.36 | 1.98 | 8.985E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1407.34 | 3. | 162.00 | 2.00 | 8.824E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.00 | 365. | 5.30 | 1.97 | 8.555E-03 | 1460.75 | 10.700 | 1.721E+01 | K40 |
| 1620.50 | 5. | 82.13 | 2.14 | 7.817E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.67 | 20. | 23.57 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | 7.903E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 297.76 | 74.51 | 229. | 74. | 0.041 | 66.05 | 0.630 | TH-234 | s |
| 308.65 | 77.24 | 242. | 142. | 0.079 | 38.34 | 1.024 | PB-212 | |
| 347.65 | 86.98 | 140. | 62. | 0.034 | 62.49 | 0.598 | TH-234 | s |
| 540.51 | 135.19 | 69. | 21. | 0.012 | 119.48 | 0.628 | J-134 | s |
| 742.94 | 185.78 | 85. | 64. | 0.036 | 52.56 | 0.402 | U-235 | l |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 163.24 | 40.89 | 102. | 9. | 0.005 | 336.35 | 0.905s |
| EU-154 | 158.52 | 39.71 | 62. | -4. | -0.002 | 573.75 | 0.907s |
| EU-154 | 172.72 | 43.26 | 93. | 7. | 0.004 | 341.18 | 0.908s |
| PB-210 | 184.37 | 46.17 | 103. | 15. | 0.009 | 70.62 | 0.492s |

American Radiation Services Spectrum name: ARS07857.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 191.65 | 47.99 | 153. | -20. | -0.011 | 176.83 | 0.913s |
| Am-241 | 231.63 | 57.99 | 97. | 19. | 0.011 | 153.56 | 0.923s |
| U-238 | 251.05 | 62.84 | 241. | -14. | -0.008 | 333.66 | 0.927s |
| U-238 | 372.60 | 93.22 | 203. | 43. | 0.024 | 74.65 | 0.954s |
| U-238 | 372.72 | 93.25 | 213. | 38. | 0.021 | 72.28 | 0.954s |
| PA-234 | 378.41 | 94.67 | 223. | -8. | -0.005 | 519.08 | 0.956s |
| PA-234 | 392.61 | 98.22 | 118. | 5. | 0.003 | 486.53 | 0.959s |
| PA-234 | 398.56 | 99.71 | 127. | -6. | -0.004 | 510.15 | 0.960s |
| PA-234 | 443.13 | 110.85 | 128. | 10. | 0.006 | 282.73 | 0.971s |
| EU-154 | 494.62 | 123.72 | 135. | 4. | 0.002 | 871.45 | 0.982s |
| PA-234 | 527.48 | 131.93 | 111. | -13. | -0.007 | 236.04 | 0.990s |
| U-235 | 574.89 | 143.78 | 135. | 16. | 0.009 | 163.11 | 1.001s |
| U-235 | 659.84 | 165.01 | 84. | -8. | -0.004 | 396.99 | 1.019s |
| RA-226 | 743.76 | 185.99 | 101. | 81. | 0.045 | 48.87 | 0.416s |
| PA-234 | 906.07 | 226.56 | 137. | -14. | -0.008 | 237.93 | 1.077s |
| PB-212 | 954.19 | 238.58 | 133. | 292. | 0.162 | 17.24 | 1.144s |
| PB-214 | 977.31 | 244.36 | 55. | 14. | 0.008 | 142.99 | 1.090 |
| EU-152 | 981.49 | 245.41 | 108. | -18. | -0.010 | 172.48 | 1.093s |
| EU-154 | 999.91 | 250.01 | 35. | 12. | 0.007 | 146.96 | 1.096s |
| PB-214 | 1181.07 | 295.29 | 61. | 113. | 0.063 | 28.72 | 1.269s |
| PB-212 | 1198.65 | 299.68 | 53. | 2. | 0.001 | 784.28 | 1.142s |
| Ra-228 | 1352.27 | 338.08 | 58. | 60. | 0.033 | 49.08 | 1.003 |
| PB-214 | 1407.85 | 351.98 | 39. | 209. | 0.116 | 16.66 | 1.461s |
| TL-208 | 2045.31 | 511.32 | 64. | 60. | 0.034 | 32.28 | 0.535s |
| TL-208 | 2333.46 | 583.34 | 31. | 104. | 0.058 | 25.01 | 1.266 |
| EU-154 | 2366.37 | 591.57 | 26. | -4. | -0.002 | 417.58 | 1.392s |
| BI-214 | 2437.84 | 609.44 | 29. | 163. | 0.090 | 18.33 | 1.696s |
| CS-137 | 2649.97 | 662.46 | 29. | -4. | -0.002 | 427.91 | 1.449s |
| PA-234 | 2794.45 | 698.58 | 23. | 5. | 0.003 | 260.77 | 1.479s |
| EU-154 | 2888.84 | 722.17 | 34. | -2. | -0.001 | 970.16 | 1.499s |
| BI-212 | 2909.71 | 727.39 | 30. | 16. | 0.009 | 98.96 | 1.502s |
| PA-234 | 2936.55 | 734.10 | 26. | -5. | -0.003 | 385.01 | 1.507s |
| TL-208 | 3052.58 | 763.11 | 22. | 4. | 0.002 | 354.63 | 1.531 |
| BI-214 | 3072.11 | 767.99 | 25. | 10. | 0.006 | 148.78 | 1.535s |
| EU-152 | 3118.16 | 779.50 | 20. | 6. | 0.003 | 226.31 | 1.543s |
| BI-212 | 3143.66 | 785.88 | 22. | 8. | 0.005 | 171.29 | 1.548s |
| PA-234 | 3229.78 | 807.40 | 22. | -1. | -0.001 | 1194.29 | 1.566s |
| PA-234 | 3341.04 | 835.22 | 15. | 2. | 0.001 | 537.38 | 1.584s |
| EU-152 | 3464.07 | 865.98 | 26. | -5. | -0.003 | 307.14 | 1.612s |
| EU-154 | 3496.81 | 874.16 | 20. | 3. | 0.002 | 358.32 | 1.617s |
| PA-234 | 3525.55 | 881.34 | 28. | -4. | -0.002 | 420.98 | 1.624s |
| PA-234 | 3593.51 | 898.33 | 25. | -3. | -0.002 | 608.06 | 1.636s |
| Ra-228 | 3646.42 | 911.56 | 6. | 79. | 0.044 | 23.44 | 1.674 |
| PA-234 | 3707.85 | 926.92 | 18. | 1. | 0.001 | 846.53 | 1.658s |
| BI-214 | 3737.02 | 934.21 | 14. | 7. | 0.004 | 167.65 | 1.663s |
| PA-234 | 3786.88 | 946.67 | 22. | -2. | -0.001 | 877.54 | 1.672s |
| PA-234 | 3797.05 | 949.22 | 14. | 3. | 0.002 | 330.34 | 1.674s |
| EU-152 | 3866.96 | 966.69 | 68. | -19. | -0.011 | 135.51 | 1.686s |

American Radiation Services Spectrum name: ARS07857.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Ra-228 | 3876.44 | 969.06 | 13. | 53. | 0.029 | 36.01 | 1.276s |
| EU-154 | 3985.49 | 996.33 | 16. | 6. | 0.003 | 208.23 | 1.710s |
| EU-152 | 4351.75 | 1087.89 | 14. | 9. | 0.005 | 130.15 | 1.776s |
| EU-152 | 4455.72 | 1113.89 | 27. | -6. | -0.003 | 249.04 | 1.795s |
| BI-214 | 4481.36 | 1120.29 | 26. | 24. | 0.013 | 66.35 | 1.801s |
| BI-214 | 4954.05 | 1238.47 | 30. | 4. | 0.002 | 261.98 | 1.884s |
| EU-154 | 5099.34 | 1274.80 | 20. | 0. | 0.000 | 2000.00 | 1.909s |
| CO-60 | 5330.13 | 1332.50 | 30. | 0. | 0.000 | 2000.00 | 1.949s |
| BI-214 | 5512.12 | 1378.00 | 15. | 6. | 0.003 | 184.72 | 1.979s |
| PA-234 | 5577.64 | 1394.38 | 14. | -3. | -0.002 | 385.69 | 1.990s |
| EU-152 | 5629.44 | 1407.34 | 12. | 3. | 0.001 | 324.01 | 1.999s |
| K-40 | 5844.05 | 1461.00 | 5. | 365. | 0.203 | 10.61 | 1.970 |
| BI-212 | 6481.99 | 1620.50 | 7. | 5. | 0.003 | 164.25 | 2.135s |
| BI-214 | 7058.57 | 1764.67 | 9. | 20. | 0.011 | 47.13 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 1.4733E-01 | | | | | |
| | | | 143.76 | 1.473E-01 | (P | 5.140E-01 8.16E+01 | G |
| | | | 205.31 | -7.067E-03 & | P | 1.315E+00 1.00E+03 | G |
| | | | 163.35 | -1.731E-01 & | P | 9.739E-01 1.98E+02 | G |
| RA-226 | | 2.4189E+00 | | | | | |
| | | | 186.21 | 2.419E+00 | ( | 1.474E+00 2.44E+01 | G K |
| Ra-228 | | 9.7339E-01 | | | | | |
| | | | 911.07 | 9.505E-01 | (P | 1.710E-01 1.17E+01 | G |
| | | | 968.90 | 1.109E+00 | (P | 4.090E-01 1.80E+01 | G |
| | | | 338.40 | 8.315E-01 | (P | 5.327E-01 2.45E+01 | G |
| | | | 964.60 | -1.402E-02 % | | 2.195E+00 4.36E+03 | G |
| Am-241 | T | 6.2924E-02 | | | | | |
| | | | 59.54 | 6.292E-02 &( | | 1.609E-01 7.68E+01 | G K |
| PB-210 | | 6.5102E-01 | | | | | |
| | | | 46.52 | 6.510E-01 *(P | | 2.098E+00 3.53E+01 | G |
| U-238 | | 6.1317E-01 | | | | | |
| | | | 63.29 | -3.909E-01 ?(P | | 2.165E+00 1.67E+02 | G |
| | | | 92.80 | 1.146E+00 | (P | 2.144E+00 3.61E+01 | G |
| | | | 92.38 | 1.515E+00 &(P | | 2.449E+00 3.73E+01 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.7215E+01 | | | | | | |
| | | 1460.75 | 1.721E+01 | (P | 6.399E-01 | 5.30E+00 | G |
| PB-214 | 9.7587E-01 | | | | | | |
| | | 351.92 | 1.004E+00 | (P | 1.536E-01 | 8.33E+00 | G |
| | | 295.21 | 9.214E-01 | @(P | 3.175E-01 | 1.44E+01 | G |
| | | 241.98 | 2.340E-01 | - P | 6.439E-01 | 7.15E+01 | G |
| BI-214 | 9.0249E-01 | | | | | | |
| | | 609.31 | 9.464E-01 | (P | 1.619E-01 | 9.16E+00 | G |
| | | 1764.49 | 7.903E-01 | ?(P | 6.455E-01 | 2.36E+01 | G |
| | | 1120.29 | 6.524E-01 | - P | 7.335E-01 | 3.32E+01 | G |
| | | 1238.11 | 3.196E-01 | - P | 2.125E+00 | 1.31E+02 | G |
| | | 768.36 | 6.384E-01 | - P | 1.678E+00 | 7.44E+01 | G |
| | | 1377.67 | 6.931E-01 | & P | 2.526E+00 | 9.24E+01 | G |
| | | 934.06 | 8.215E-01 | ?( | 2.343E+00 | 8.38E+01 | G |
| BI-212 | 6.2162E-01 | | | | | | |
| | | 727.17 | 3.895E-01 | (P | 7.043E-01 | 4.95E+01 | G |
| | | 1620.56 | 1.105E+00 | &( | 3.101E+00 | 8.21E+01 | G |
| | | 785.42 | 1.327E+00 | ?( | 3.853E+00 | 8.56E+01 | G |
| PB-212 | 8.6854E-01 | | | | | | |
| | | 238.63 | 8.685E-01 | (P | 1.682E-01 | 8.62E+00 | G |
| | | 300.09 | 1.029E-01 | - P | 1.712E+00 | 3.92E+02 | G |
| TL-208 | 3.0545E-01 | | | | | | |
| | | 583.14 | 3.055E-01 | (P | 8.371E-02 | 1.25E+01 | G |
| | | 510.72 | 6.129E-01 | + P | 4.050E-01 | 1.61E+01 | G |
| | | 860.47 | -7.477E-02 | % P | 8.114E-01 | 7.70E+02 | G |
| | | 277.36 | -3.896E-02 | % P | 1.119E+00 | 9.17E+02 | G |
| | | 763.30 | 6.855E-01 | + P | 4.477E+00 | 1.77E+02 | G |
| PA-234 | 8.1488E-02 | | | | | | |
| | | 98.44 | 1.663E-02 | ?(P | 1.913E-01 | 2.43E+02 | G |
| | | 946.00 | -3.896E-02 | + P | 4.432E-01 | 4.39E+02 | G |
| | | 131.28 | -5.989E-02 | & | 2.388E-01 | 1.18E+02 | G |
| | | 94.67 | -4.799E-02 | + | 4.225E-01 | 2.60E+02 | G |
| | | 883.24 | -1.052E-01 | & | 7.844E-01 | 2.10E+02 | G |
| | | 926.70 | 4.469E-02 | &(P | 7.267E-01 | 4.23E+02 | G |
| | | 569.26 | -3.006E-02 | % P | 6.544E-01 | 1.00E+03 | G |
| | | 111.00 | 1.091E-01 | ?(P | 5.807E-01 | 1.41E+02 | G |
| | | 733.00 | -1.624E-01 | + P | 9.224E-01 | 1.93E+02 | G |
| | | 949.00 | 1.348E-01 | ?(P | 9.317E-01 | 1.65E+02 | G |
| | | 880.51 | 3.094E-02 | % P | 1.277E+00 | 6.79E+02 | G |
| | | 226.87 | -2.722E-01 | & P | 1.089E+00 | 1.19E+02 | G |
| | | 831.10 | 1.232E-01 | &( | 1.212E+00 | 2.69E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | -7.314E-02 | + | 1.598E+00 | 5.97E+02 | G |
| | | 99.70 | -1.208E-01 | + | 1.055E+00 | 2.55E+02 | G |
| | | 699.10 | 3.308E-01 | &(P | 1.565E+00 | 1.30E+02 | G |
| | | 898.60 | -2.878E-01 | + P | 2.243E+00 | 3.04E+02 | G |
| | | 1394.10 | -3.552E-01 | + | 2.486E+00 | 1.93E+02 | G |
| CS-137 | -1.3959E-02 | | | | | | |
| | | 661.66 | -1.396E-02 | &(P | 9.062E-02 | 2.14E+02 | G |
| CO-60 | -5.5164E-04 | | | | | | |
| | | 1173.24 | -5.516E-04 | &(P | 1.109E-01 | 1.00E+03 | K |
| | | 1332.50 | 0.000E+00 | + | 1.318E-01 | 1.00E+03 | K |
| EU-152 | 1.1270E-01 | | | | | | |
| | | 40.12 | 5.940E-02 | ?( | 3.410E-01 | 1.68E+02 | G |
| | | 121.78 | 3.919E-03 | % | 1.529E-01 | 1.12E+03 | G |
| | | 344.30 | -6.350E-03 | & P | 1.988E-01 | 4.05E+03 | G |
| | | 1408.08 | 5.791E-02 | ?(P | 4.319E-01 | 1.62E+02 | G |
| | | 39.52 | -1.654E-02 | & | 6.930E-01 | 1.21E+03 | G |
| | | 964.00 | -4.736E-01 | & P | 1.026E+00 | 6.78E+01 | G |
| | | 1112.07 | -1.850E-01 | + | 7.993E-01 | 1.25E+02 | G |
| | | 778.90 | 1.323E-01 | ?(P | 5.668E-01 | 1.13E+02 | G |
| | | 1085.80 | 3.563E-01 | ?(P | 7.813E-01 | 6.51E+01 | G |
| | | 45.40 | -5.316E-01 | % P | 1.092E+00 | 4.11E+04 | G |
| | | 244.67 | -3.040E-01 | + | 8.770E-01 | 8.62E+01 | G |
| | | 867.39 | -3.967E-01 | + | 2.137E+00 | 1.54E+02 | G |
| EU-154 | 7.7363E-02 | | | | | | |
| | | 123.10 | 8.519E-03 | ?( | 1.275E-01 | 4.36E+02 | G |
| | | 1274.80 | 0.000E+00 | - | 3.008E-01 | 1.00E+03 | G |
| | | 723.30 | -2.578E-02 | + | 4.476E-01 | 4.85E+02 | G |
| | | 1004.80 | 8.588E-04 | % P | 6.136E-01 | 2.86E+03 | G |
| | | 43.00 | 9.283E-02 | ?(P | 6.780E-01 | 1.71E+02 | G |
| | | 873.20 | 8.801E-02 | &(P | 7.091E-01 | 1.79E+02 | G |
| | | 996.30 | 2.034E-01 | ?( | 7.346E-01 | 1.04E+02 | G |
| | | 42.31 | -1.029E-01 | & | 1.029E+00 | 2.87E+02 | G |
| | | 248.04 | 2.462E-01 | ?( | 6.036E-01 | 7.35E+01 | G |
| | | 591.70 | -1.985E-01 | + | 1.471E+00 | 2.09E+02 | G |
| | | 48.70 | -7.505E-01 | + | 2.216E+00 | 8.84E+01 | G |
| | | 756.70 | 3.493E-02 | % | 1.997E+00 | 1.57E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 1.4733E-01 | 3.0365E-01 | 3.0381E-01 | 0.514E+00 |
| RA-226 | 2.4189E+00 | 1.1821E+00 | 1.1901E+00 | 0.147E+01 |
| Ra-228 | 9.7339E-01 | 2.2155E-01 | 2.2983E-01 | 0.171E+00 |
| Am-241 #A | 6.2924E-02 | 9.6627E-02 | 9.6709E-02 | 0.161E+00 |
| PB-210 #A | 6.5102E-01 | 1.2770E+00 | 1.2807E+00 | 0.210E+01 |
| U-238 #A | 6.1317E-01 | 5.9878E-01 | 6.0064E-01 | 0.216E+01 |
| K-40 | 1.7215E+01 | 1.8385E+00 | 2.1428E+00 | 0.640E+00 |
| PB-214 # | 9.7587E-01 | 1.6724E-01 | 1.8581E-01 | 0.154E+00 |
| BI-214 | 9.0249E-01 | 1.7386E-01 | 1.8186E-01 | 0.162E+00 |
| BI-212 #A | 6.2162E-01 | 5.4207E-01 | 5.4348E-01 | 0.704E+00 |
| PB-212 # | 8.6854E-01 | 1.5447E-01 | 1.6582E-01 | 0.168E+00 |
| TL-208 | 3.0545E-01 | 8.1345E-02 | 8.3529E-02 | 0.837E-01 |
| PA-234 #A | 8.1488E-02 | 1.8372E-01 | 1.8381E-01 | 0.191E+00 |
| CS-137 #A | -1.3959E-02 | 6.8815E-02 | 6.8818E-02 | 0.906E-01 |
| CO-60 #B | -5.5164E-04 | 2.2066E-02 | 2.2066E-02 | 0.111E+00 |
| EU-152 #A | 1.1270E-01 | 1.4929E-01 | 1.5123E-01 | 0.341E+00 |
| EU-154 #A | 7.7363E-02 | 1.1369E-01 | 1.1381E-01 | 0.128E+00 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

American Radiation Services Spectrum name: ARS07857.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

| | | | |
|---|---|---|---|
| Total Activity ( | 2.6 to 2000.1 keV) | 2.431E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00563-04 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | - | | |
| AnalysisBatch | ARS1-B16-00563 | Geometry | tuna can solid, 250 |
| SDG | | Fraction | |
| AnalysisCode | | Run | 0 |
| Library | ITSI COUNT.Lib | Detector ID | 1 |
| | | Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 3.0556E-03 | pCi/g | 8.8885E-03 | 3.3600E-01 | 1.6800E-01 | | | |
| **RA-226** | 1.7328E+00 | pCi/g | 8.4853E-01 | 1.0600E+00 | 5.3000E-01 | | | |
| **RA-228** | 4.2667E-01 | pCi/g | 1.3464E-01 | 2.5100E-01 | 1.2550E-01 | | | |
| **AM-241** | 8.5699E-02 | pCi/g | 7.0738E-02 | 1.1100E-01 | 5.5500E-02 | | | |
| **PB-210** | 8.2783E-01 | pCi/g | 1.2657E+00 | 2.0400E+00 | 1.0200E+00 | | | |
| **U-238** | 3.8445E-01 | pCi/g | 6.3694E-01 | 1.5100E+00 | 7.5500E-01 | | | |
| **K-40** | 1.2785E+01 | pCi/g | 1.7183E+00 | 4.4100E-01 | 2.2050E-01 | | | |
| **PB-214** | 3.1421E-01 | pCi/g | 1.0718E-01 | 1.3900E-01 | 6.9500E-02 | | | |
| **BI-214** | 5.1333E-01 | pCi/g | 1.3952E-01 | 1.3300E-01 | 6.6500E-02 | | | |
| **BI-212** | 1.3103E-01 | pCi/g | 3.0294E-01 | 5.3900E-01 | 2.6950E-01 | | | |
| **PB-212** | 4.0484E-01 | pCi/g | 9.9433E-02 | 1.1000E-01 | 5.5000E-02 | | | |
| **TL-208** | 1.8100E-01 | pCi/g | 6.6139E-02 | 7.0500E-02 | 3.5250E-02 | | | |
| **PA-234** | 6.8479E-02 | pCi/g | 1.5078E-01 | 1.5300E-01 | 7.6500E-02 | | | |
| **CS-137** | -6.5124E-03 | pCi/g | 7.1233E-02 | 7.0500E-02 | 3.5250E-02 | | | |
| **CO-60** | 1.1671E-02 | pCi/g | 2.0754E-02 | 9.1900E-02 | 4.5950E-02 | | | |
| **EU-152** | 5.9264E-02 | pCi/g | 1.0312E-01 | 2.9000E-01 | 1.4500E-01 | | | |
| **EU-154** | 2.9240E-02 | pCi/g | 6.5821E-02 | 7.6900E-02 | 3.8450E-02 | | | |
| **Total Gamma** | 1.7959E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 5.1530E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07852.An1

Sample description
Batch ID: 16-00563-04
SDG: DUP Tech: WJS

Spectrum Filename: C:\User\ARS07852.An1

Acquisition information
Start time: 19-Apr-2016 07:26:47
Live time: 1800
Real time: 1802
Dead time: 0.09 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.7025E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.7025E+02) =
2.7009E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS07852.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1997

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.27 | 5. | 254.00 | 0.90 | 2.053E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 3.381E-02 | EU152 |
| 40.31 | 8. | 165.27 | 0.90 | 2.099E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 5.119E-02 | EU152 |
| 46.89 | 21. | 32.91 | 0.43 | 2.569E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 58.35 | 28. | 41.15 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.54 | 6. | 48.72 | 0.93 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.27 | 84. | 24.60 | 1.10 | 4.424E-02 | | | | |
| 92.82 | 21. | 50.66 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.84 | 15. | 47.94 | 0.95 | 4.753E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 97.93 | 9. | 127.42 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 110.15 | 11. | 99.65 | 0.97 | 4.832E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 120.89 | 8. | 121.09 | 0.98 | 4.779E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 131.28 | 13. | 110.50 | 0.99 | 4.696E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 162.49 | 7. | 121.25 | 1.02 | 4.295E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.10 | 62. | 24.32 | 1.33 | 3.986E-02 | 186.21 | 3.640 | 1.733E+00 | RA226 |
| 238.64 | 145. | 11.07 | 1.37 | 3.368E-02 | 238.63 | 43.100 | 4.048E-01 | PB212 |
| 242.33 | 21. | 48.75 | 1.09 | 3.334E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 295.26 | 38. | 25.23 | 1.14 | 2.872E-02 | 295.21 | 18.500 | 2.902E-01 | PB214 |
| 300.61 | 27. | 34.32 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.31 | 57. | 19.58 | 0.43 | 2.586E-02 | 338.40 | 12.010 | 7.409E-01 | Ra228 |
| 351.95 | 71. | 15.19 | 1.19 | 2.509E-02 | 351.92 | 35.800 | 3.196E-01 | PB214 |
| 511.13 | 33. | 20.69 | 0.83 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.23 | 66. | 16.32 | 0.69 | 1.715E-02 | 583.14 | 86.000 | 1.810E-01 | TL208 |
| 594.46 | 1. | 874.52 | 1.39 | 1.697E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.46 | 96. | 12.11 | 0.87 | 1.660E-02 | 609.31 | 44.791 | 4.763E-01 | BI214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 727.41 | 6. | 87.95 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 768.30 | 6. | 95.13 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 808.25 | 2. | 327.34 | 1.57 | 1.351E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 831.26 | 1. | 700.22 | 1.58 | 1.324E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 911.08 | 23. | 27.84 | 1.65 | 1.238E-02 | 911.07 | 29.000 | 2.641E-01 | Ra228 |
| 935.05 | 4. | 130.46 | 1.66 | 1.215E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 950.17 | 2. | 313.38 | 1.67 | 1.201E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 963.79 | 4. | 180.21 | 1.69 | 1.186E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.400E-01 | Ra228 |
| 964.00 | 3. | 198.10 | 1.69 | 1.187E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 969.65 | 24. | 24.88 | 0.28 | 1.182E-02 | 968.90 | 17.460 | 4.806E-01 | Ra228 |
| 993.80 | 4. | 112.50 | 1.71 | 1.158E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1005.41 | 1. | 734.35 | 1.72 | 1.151E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1086.89 | 2. | 358.10 | 1.78 | 1.085E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1113.05 | 5. | 133.62 | 1.79 | 1.065E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.47 | 25. | 24.25 | 0.52 | 1.059E-02 | 1120.29 | 14.797 | 6.451E-01 | BI214 |
| 1172.58 | 1. | 985.19 | 1.84 | 1.022E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1330.91 | 5. | 88.89 | 1.95 | 9.235E-03 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1394.26 | 2. | 201.30 | 1.99 | 8.897E-03 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1408.11 | 3. | 119.79 | 2.00 | 8.824E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.00 | 289. | 5.86 | 1.48 | 8.555E-03 | 1460.75 | 10.700 | 1.278E+01 | K40 |
| 1764.67 | 14. | 23.57 | 0.56 | 7.232E-03 | 1764.49 | 15.357 | 4.992E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide |
|---|---|---|---|---|---|---|---|
| 308.78 | 77.27 | 131. | 84. | 0.047 | 49.20 | 1.101 | PB-212 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 160.76 | 40.27 | 86. | 5. | 0.003 | 508.00 | 0.904s |
| EU-152 | 160.91 | 40.31 | 82. | 8. | 0.004 | 330.53 | 0.905s |
| EU-154 | 168.85 | 42.30 | 92. | -11. | -0.006 | 261.78 | 0.907s |
| EU-154 | 168.89 | 42.30 | 81. | -13. | -0.007 | 229.76 | 0.908s |
| EU-152 | 180.83 | 45.29 | 142. | -31. | -0.017 | 885.59 | 0.910s |

American Radiation Services Spectrum name: ARS07852.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PB-210 | 187.24 | 46.89 | 110. | 21. | 0.012 | 65.82 | 0.429s |
| Am-241 | 233.10 | 58.35 | 50. | 28. | 0.015 | 82.30 | 0.923s |
| U-238 | 253.87 | 63.54 | 129. | 6. | 0.003 | 97.44 | 0.927s |
| U-238 | 370.99 | 92.82 | 144. | 21. | 0.012 | 101.32 | 0.954s |
| U-238 | 371.08 | 92.84 | 147. | 15. | 0.008 | 95.87 | 0.954s |
| PA-234 | 378.40 | 94.67 | 132. | 0. | 0.000 | 2000.00 | 0.956s |
| PA-234 | 391.46 | 97.93 | 84. | 9. | 0.005 | 254.84 | 0.959s |
| PA-234 | 440.33 | 110.15 | 63. | 11. | 0.006 | 199.31 | 0.971s |
| EU-152 | 483.31 | 120.89 | 46. | 8. | 0.005 | 242.18 | 0.981s |
| PA-234 | 524.88 | 131.28 | 93. | 13. | 0.007 | 221.00 | 0.990 |
| U-235 | 582.47 | 145.67 | 63. | -7. | -0.004 | 721.71 | 1.001s |
| U-235 | 649.75 | 162.49 | 55. | 7. | 0.004 | 242.50 | 1.019s |
| RA-226 | 744.22 | 186.10 | 57. | 62. | 0.034 | 48.63 | 1.330s |
| U-235 | 819.80 | 204.99 | 61. | -3. | -0.001 | 959.08 | 1.057s |
| PA-234 | 904.08 | 226.06 | 54. | -5. | -0.003 | 465.77 | 1.077s |
| PB-212 | 954.44 | 238.64 | 62. | 145. | 0.081 | 22.14 | 1.373s |
| PB-214 | 969.18 | 242.33 | 55. | 21. | 0.012 | 97.50 | 1.090s |
| EU-152 | 978.54 | 244.67 | 81. | 0. | 0.000 | 2000.00 | 1.093s |
| EU-154 | 992.66 | 248.20 | 65. | -8. | -0.005 | 282.93 | 1.096s |
| TL-208 | 1098.38 | 274.62 | 23. | -3. | -0.001 | 576.89 | 1.122s |
| PB-214 | 1180.93 | 295.26 | 38. | 38. | 0.021 | 50.47 | 1.138s |
| PB-212 | 1202.36 | 300.61 | 31. | 27. | 0.015 | 68.64 | 1.142 |
| Ra-228 | 1353.18 | 338.31 | 29. | 57. | 0.032 | 39.16 | 0.427s |
| PB-214 | 1407.76 | 351.95 | 36. | 71. | 0.039 | 30.37 | 1.188s |
| TL-208 | 2044.57 | 511.13 | 61. | 33. | 0.018 | 41.39 | 0.829s |
| PA-234 | 2275.90 | 568.96 | 28. | -5. | -0.003 | 362.23 | 1.373s |
| TL-208 | 2333.00 | 583.23 | 24. | 66. | 0.037 | 32.65 | 0.688s |
| EU-154 | 2377.94 | 594.46 | 12. | 1. | 0.000 | 1749.05 | 1.392s |
| BI-214 | 2437.93 | 609.46 | 22. | 87. | 0.049 | 24.22 | 0.873s |
| CS-137 | 2646.14 | 661.50 | 19. | -2. | -0.001 | 837.65 | 1.449s |
| EU-154 | 2893.34 | 723.30 | 46. | 0. | 0.000 | 2000.00 | 1.499s |
| BI-212 | 2909.80 | 727.41 | 19. | 6. | 0.003 | 175.90 | 1.502s |
| PA-234 | 2938.37 | 734.56 | 28. | -5. | -0.003 | 352.70 | 1.507s |
| EU-154 | 3031.34 | 757.80 | 31. | -3. | -0.002 | 527.04 | 1.526s |
| BI-214 | 3073.36 | 768.30 | 18. | 6. | 0.003 | 190.26 | 1.535s |
| EU-152 | 3119.29 | 779.78 | 19. | -3. | -0.001 | 602.31 | 1.543s |
| BI-212 | 3154.10 | 788.48 | 9. | -1. | 0.000 | 1251.69 | 1.548s |
| PA-234 | 3233.15 | 808.25 | 18. | 2. | 0.001 | 654.68 | 1.566s |
| PA-234 | 3325.21 | 831.26 | 19. | 1. | 0.000 | 1400.44 | 1.584s |
| EU-152 | 3471.16 | 867.75 | 20. | -4. | -0.002 | 302.75 | 1.612s |
| EU-154 | 3494.53 | 873.59 | 19. | -3. | -0.002 | 460.93 | 1.617s |
| PA-234 | 3521.54 | 880.34 | 15. | -1. | -0.001 | 1012.59 | 1.622s |
| PA-234 | 3533.17 | 883.25 | 16. | -1. | -0.001 | 998.60 | 1.624s |
| PA-234 | 3586.86 | 896.67 | 23. | -6. | -0.003 | 304.17 | 1.636s |
| Ra-228 | 3644.49 | 911.08 | 17. | 23. | 0.013 | 55.68 | 1.646s |
| PA-234 | 3724.70 | 931.13 | 8. | -1. | 0.000 | 1014.66 | 1.658s |
| BI-214 | 3740.39 | 935.05 | 15. | 4. | 0.002 | 260.93 | 1.663s |
| PA-234 | 3800.85 | 950.17 | 19. | 2. | 0.001 | 626.76 | 1.674s |

American Radiation Services Spectrum name: ARS07852.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 3856.20 | 964.00 | 24. | 3. | 0.002 | 396.20 | 1.686s |
| Ra-228 | 3855.34 | 963.79 | 22. | 4. | 0.002 | 360.43 | 1.686s |
| Ra-228 | 3878.80 | 969.65 | 8. | 24. | 0.014 | 49.77 | 0.278s |
| EU-154 | 3975.38 | 993.80 | 8. | 4. | 0.002 | 225.00 | 1.710s |
| EU-152 | 4347.75 | 1086.89 | 17. | 2. | 0.001 | 716.21 | 1.776s |
| EU-152 | 4452.38 | 1113.05 | 16. | 5. | 0.003 | 267.24 | 1.795s |
| BI-214 | 4482.05 | 1120.47 | 7. | 25. | 0.014 | 48.51 | 0.520s |
| EU-154 | 5086.34 | 1271.55 | 15. | -1. | 0.000 | 1807.82 | 1.909s |
| CO-60 | 5323.77 | 1330.91 | 7. | 5. | 0.003 | 177.79 | 1.949s |
| BI-214 | 5507.75 | 1376.91 | 16. | -4. | -0.002 | 380.20 | 1.979s |
| PA-234 | 5577.12 | 1394.26 | 11. | 2. | 0.001 | 402.60 | 1.990s |
| EU-152 | 5632.54 | 1408.11 | 9. | 3. | 0.002 | 239.58 | 1.999s |
| K-40 | 5844.06 | 1461.00 | 2. | 289. | 0.160 | 11.72 | 1.484s |
| BI-212 | 6482.22 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.135s |
| BI-214 | 7058.56 | 1764.67 | 4. | 14. | 0.008 | 47.14 | 0.563s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 3.0556E-03 | | | | | | |
| | | | 143.76 | -6.220E-02 | ?(P | 3.364E-01 | 3.61E+02 | G |
| | | | 205.31 | -6.031E-02 | + P | 9.047E-01 | 4.80E+02 | G |
| | | | 163.35 | 1.488E-01 | ?(P | 7.492E-01 | 1.21E+02 | G |
| RA-226 | | 1.7328E+00 | | | | | | |
| | | | 186.21 | 1.733E+00 | ( | 1.059E+00 | 2.43E+01 | G K |
| Ra-228 | | 4.2667E-01 | | | | | | |
| | | | 911.07 | 2.641E-01 | ?(P | 2.507E-01 | 2.78E+01 | G |
| | | | 968.90 | 4.806E-01 | (P | 3.045E-01 | 2.49E+01 | G |
| | | | 338.40 | 7.409E-01 | (P | 3.645E-01 | 1.96E+01 | G |
| | | | 964.60 | 2.400E-01 | - | 1.536E+00 | 1.80E+02 | G |
| Am-241 | T | 8.5699E-02 | | | | | | |
| | | | 59.54 | 8.570E-02 | &( | 1.114E-01 | 4.11E+01 | G K |
| PB-210 | | 8.2783E-01 | | | | | | |
| | | | 46.52 | 8.278E-01 | (P | 2.036E+00 | 3.29E+01 | G |
| U-238 | | 3.8445E-01 | | | | | | |
| | | | 63.29 | 1.493E-01 | (P | 1.508E+00 | 4.87E+01 | G |
| | | | 92.80 | 4.270E-01 | ?(P | 1.686E+00 | 4.79E+01 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 92.38 | 6.916E-01 | ?(P | 1.951E+00 | 5.07E+01 | G |
| K-40 | 1.2785E+01 | | | | | | |
| | | 1460.75 | 1.278E+01 | (P | 4.408E-01 | 5.86E+00 | G |
| PB-214 | 3.1421E-01 | | | | | | |
| | | 351.92 | 3.196E-01 | *(P | 1.390E-01 | 1.52E+01 | G |
| | | 295.21 | 2.902E-01 | *(P | 2.411E-01 | 2.52E+01 | G |
| | | 241.98 | 3.478E-01 | ?(P | 6.039E-01 | 4.88E+01 | G |
| BI-214 | 5.1333E-01 | | | | | | |
| | | 609.31 | 4.763E-01 | (P | 1.330E-01 | 1.21E+01 | G |
| | | 1764.49 | 4.992E-01 | ?(P | 4.530E-01 | 2.36E+01 | G |
| | | 1120.29 | 6.451E-01 | (P | 3.906E-01 | 2.43E+01 | G |
| | | 1238.11 | -1.261E-01 | % P | 2.242E+00 | 1.00E+03 | G |
| | | 768.36 | 3.772E-01 | - P | 1.341E+00 | 9.51E+01 | G |
| | | 1377.67 | -4.302E-01 | - P | 2.448E+00 | 1.90E+02 | G |
| | | 934.06 | 4.888E-01 | ?( | 2.256E+00 | 1.30E+02 | G |
| BI-212 | 1.3103E-01 | | | | | | |
| | | 727.17 | 1.310E-01 | &(P | 5.391E-01 | 8.79E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 1.390E+00 | 1.00E+03 | G |
| | | 785.42 | -1.019E-01 | & | 2.461E+00 | 6.26E+02 | G |
| PB-212 | 4.0484E-01 | | | | | | |
| | | 238.63 | 4.048E-01 | (P | 1.101E-01 | 1.11E+01 | G |
| | | 300.09 | 1.182E+00 | + P | 1.257E+00 | 3.43E+01 | G |
| TL-208 | 1.8100E-01 | | | | | | |
| | | 583.14 | 1.810E-01 | *(P | 7.045E-02 | 1.63E+01 | G |
| | | 510.72 | 3.140E-01 | + P | 3.727E-01 | 2.07E+01 | G |
| | | 860.47 | -4.345E-02 | & P | 4.006E-01 | 1.00E+03 | G |
| | | 277.36 | -5.331E-02 | & P | 5.187E-01 | 2.88E+02 | G |
| | | 763.30 | -2.276E-02 | % P | 4.862E+00 | 1.00E+03 | G |
| PA-234 | 6.8479E-02 | | | | | | |
| | | 98.44 | 2.919E-02 | &(P | 1.530E-01 | 1.27E+02 | G |
| | | 946.00 | -1.254E-02 | % P | 3.281E-01 | 5.06E+03 | G |
| | | 131.28 | 5.497E-02 | ?( | 2.053E-01 | 1.11E+02 | G |
| | | 94.67 | 0.000E+00 | - | 3.088E-01 | 1.00E+03 | G |
| | | 883.24 | -3.116E-02 | + | 5.761E-01 | 4.99E+02 | G |
| | | 926.70 | -2.638E-02 | + P | 4.830E-01 | 5.07E+02 | G |
| | | 569.26 | -1.211E-01 | + P | 6.068E-01 | 1.81E+02 | G |
| | | 111.00 | 1.042E-01 | ?(P | 3.908E-01 | 9.97E+01 | G |
| | | 733.00 | -1.710E-01 | + P | 9.042E-01 | 1.76E+02 | G |
| | | 949.00 | 6.875E-02 | ?(P | 1.006E+00 | 3.13E+02 | G |
| | | 880.51 | -7.138E-02 | + P | 1.008E+00 | 5.06E+02 | G |
| | | 226.87 | -8.246E-02 | + P | 6.620E-01 | 2.33E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 831.10 | 4.860E-02 | ?( | 1.257E+00 | 7.00E+02 | G |
| | | 808.10 | 1.143E-01 | ?( | 1.368E+00 | 3.27E+02 | G |
| | | 99.70 | 7.205E-03 | % | 8.548E-01 | 3.40E+03 | G |
| | | 699.10 | -4.809E-02 | % P | 1.443E+00 | 1.05E+03 | G |
| | | 898.60 | -4.494E-01 | + P | 2.015E+00 | 1.52E+02 | G |
| | | 1394.10 | 2.829E-01 | ?( | 2.095E+00 | 2.01E+02 | G |
| CS-137 | -6.5124E-03 | | | | | | |
| | | 661.66 | -6.512E-03 | &(P | 7.050E-02 | 4.19E+02 | G |
| CO-60 | 1.1671E-02 | | | | | | |
| | | 1173.24 | 1.995E-03 | %(P | 9.193E-02 | 9.85E+02 | K |
| | | 1332.50 | 2.134E-02 | ?( | 6.566E-02 | 8.89E+01 | K |
| EU-152 | 5.9264E-02 | | | | | | |
| | | 40.12 | 5.119E-02 | ?( | 2.897E-01 | 1.65E+02 | G |
| | | 121.78 | 2.394E-02 | &( | 9.936E-02 | 1.21E+02 | G |
| | | 344.30 | -7.219E-03 | & P | 1.933E-01 | 1.00E+03 | G |
| | | 1408.08 | 6.789E-02 | &(P | 3.578E-01 | 1.20E+02 | G |
| | | 39.52 | 6.482E-02 | &( | 5.679E-01 | 2.54E+02 | G |
| | | 964.00 | 6.647E-02 | ?(P | 6.022E-01 | 1.98E+02 | G |
| | | 1112.07 | 1.285E-01 | &( | 6.059E-01 | 1.34E+02 | G |
| | | 778.90 | -5.633E-02 | + P | 5.149E-01 | 3.01E+02 | G |
| | | 1085.80 | 5.521E-02 | ?(P | 8.065E-01 | 3.58E+02 | G |
| | | 45.40 | -5.612E-01 | + P | 1.047E+00 | 4.43E+02 | G |
| | | 244.67 | 0.000E+00 | - | 7.173E-01 | 1.00E+03 | G |
| | | 867.39 | -3.311E-01 | + | 1.772E+00 | 1.51E+02 | G |
| EU-154 | 2.9240E-02 | | | | | | |
| | | 123.10 | 1.692E-03 | %( | 7.685E-02 | 1.28E+03 | G |
| | | 1274.80 | -7.422E-03 | + | 2.512E-01 | 9.04E+02 | G |
| | | 723.30 | 0.000E+00 | - | 4.834E-01 | 1.00E+03 | G |
| | | 1004.80 | 1.149E-02 | % P | 4.446E-01 | 7.34E+02 | G |
| | | 43.00 | -1.725E-01 | + P | 5.956E-01 | 1.15E+02 | G |
| | | 873.20 | -9.603E-02 | + P | 6.444E-01 | 2.30E+02 | G |
| | | 996.30 | 1.333E-01 | &( | 5.323E-01 | 1.13E+02 | G |
| | | 42.31 | -2.607E-01 | + | 1.160E+00 | 1.31E+02 | G |
| | | 248.04 | -1.565E-01 | + | 7.581E-01 | 1.41E+02 | G |
| | | 591.70 | 2.954E-02 | ?( | 9.821E-01 | 8.75E+02 | G |
| | | 48.70 | -4.469E-02 | % | 1.856E+00 | 1.20E+03 | G |
| | | 756.70 | -2.137E-01 | + | 2.001E+00 | 2.64E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 3.0556E-03 | 8.8861E-03 | 8.8885E-03 | 0.336E+00 |
| RA-226 | 1.7328E+00 | 8.4274E-01 | 8.4853E-01 | 0.106E+01 |
| Ra-228 | 4.2667E-01 | 1.3195E-01 | 1.3464E-01 | 0.251E+00 |
| Am-241 #A | 8.5699E-02 | 7.0530E-02 | 7.0738E-02 | 0.111E+00 |
| PB-210 A | 8.2783E-01 | 1.2596E+00 | 1.2657E+00 | 0.204E+01 |
| U-238 #A | 3.8445E-01 | 6.3625E-01 | 6.3694E-01 | 0.151E+01 |
| K-40 | 1.2785E+01 | 1.5114E+00 | 1.7183E+00 | 0.441E+00 |
| PB-214 # | 3.1421E-01 | 1.0396E-01 | 1.0718E-01 | 0.139E+00 |
| BI-214 | 5.1333E-01 | 1.3618E-01 | 1.3952E-01 | 0.133E+00 |
| BI-212 #A | 1.3103E-01 | 3.0283E-01 | 3.0294E-01 | 0.539E+00 |
| PB-212 | 4.0484E-01 | 9.5379E-02 | 9.9433E-02 | 0.110E+00 |
| TL-208 | 1.8100E-01 | 6.5176E-02 | 6.6139E-02 | 0.705E-01 |
| PA-234 #A | 6.8479E-02 | 1.5070E-01 | 1.5078E-01 | 0.153E+00 |
| CS-137 #A | -6.5124E-03 | 7.1232E-02 | 7.1233E-02 | 0.705E-01 |
| CO-60 #B | 1.1671E-02 | 2.0749E-02 | 2.0754E-02 | 0.919E-01 |
| EU-152 #A | 5.9264E-02 | 1.0233E-01 | 1.0312E-01 | 0.290E+00 |
| EU-154 #A | 2.9240E-02 | 6.5791E-02 | 6.5821E-02 | 0.769E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

American Radiation Services Spectrum name: ARS07852.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

| | | | |
|---|---|---|---|
| Total Activity ( | 2.6 to 2000.1 keV) | 1.696E+01 | pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-04 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | - |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | |
| AnalysisCode | |
| Library | ITSI COUNT.Lib |
| Geometry | tuna can solid, 250 |
| Fraction | |
| Run | 0 |
| Detector ID | 1 |
| Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.4372E-02 | pCi/g | 1.8093E-01 | 4.2800E-01 | 2.1400E-01 | | | |
| **RA-226** | 2.3309E+00 | pCi/g | 9.1139E-01 | 1.1400E+00 | 5.7000E-01 | | | |
| **RA-228** | 8.5012E-01 | pCi/g | 2.2281E-01 | 2.2100E-01 | 1.1050E-01 | | | |
| **AM-241** | 4.0472E-02 | pCi/g | 1.0323E-01 | 1.7300E-01 | 8.6500E-02 | | | |
| **PB-210** | 2.2721E-01 | pCi/g | 1.1188E+00 | 1.9900E+00 | 9.9500E-01 | | | |
| **U-238** | 8.2522E-01 | pCi/g | 5.7981E-01 | 1.5100E+00 | 7.5500E-01 | | | |
| **K-40** | 1.5362E+01 | pCi/g | 1.7455E+00 | 6.7300E-01 | 3.3650E-01 | | | |
| **PB-214** | 8.8773E-01 | pCi/g | 1.5758E-01 | 1.3300E-01 | 6.6500E-02 | | | |
| **BI-214** | 7.6102E-01 | pCi/g | 1.3763E-01 | 1.3900E-01 | 6.9500E-02 | | | |
| **BI-212** | 4.5430E-01 | pCi/g | 3.3862E-01 | 5.0300E-01 | 2.5150E-01 | | | |
| **PB-212** | 1.0187E+00 | pCi/g | 1.4218E-01 | 1.2600E-01 | 6.3000E-02 | | | |
| **TL-208** | 2.7681E-01 | pCi/g | 7.0164E-02 | 6.8800E-02 | 3.4400E-02 | | | |
| **PA-234** | 8.8983E-02 | pCi/g | 1.3145E-01 | 1.6400E-01 | 8.2000E-02 | | | |
| **CS-137** | 8.8672E-03 | pCi/g | 3.3297E-02 | 5.9100E-02 | 2.9550E-02 | | | |
| **CO-60** | -1.2847E-02 | pCi/g | 4.8269E-02 | 7.8300E-02 | 3.9150E-02 | | | |
| **EU-152** | 3.1930E-02 | pCi/g | 8.4207E-02 | 2.6500E-01 | 1.3250E-01 | | | |
| **EU-154** | 6.3063E-02 | pCi/g | 1.0949E-01 | 9.7300E-02 | 4.8650E-02 | | | |
| **Total Gamma** | 2.3292E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 6.5385E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07972.An1

Sample description
Batch ID: 16-00697-04
SDG: DUP Tech: WJS

Spectrum Filename: C:\User\ARS07972.An1

Acquisition information
Start time: 05-May-2016 07:39:16
Live time: 2700
Real time: 2703
Dead time: 0.10 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.5724E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.5724E+02) =
2.7992E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS07972.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1318

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.08 | 14. | 140.26 | 0.91 | 2.269E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.45 | 8. | 41.34 | 0.91 | 2.569E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.54 | 19. | 127.50 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.25 | 86. | 29.90 | 0.70 | 3.840E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.67 | 179. | 15.13 | 0.94 | 4.340E-02 | | | | |
| 77.19 | 315. | 9.12 | 0.94 | 4.423E-02 | | | | |
| 92.47 | 36. | 35.01 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.89 | 42. | 46.06 | 0.95 | 4.753E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 109.52 | 22. | 68.70 | 0.97 | 4.832E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 144.02 | 1. | 292.79 | 1.00 | 4.553E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 186.04 | 123. | 19.46 | 0.48 | 3.988E-02 | 186.21 | 3.640 | 2.375E+00 | RA226 |
| 205.40 | 12. | 135.77 | 1.06 | 3.743E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.64 | 500. | 5.79 | 1.09 | 3.369E-02 | 238.63 | 43.100 | 9.372E-01 | PB212 |
| 241.83 | 84. | 21.43 | 1.09 | 3.337E-02 | 241.98 | 7.500 | 9.043E-01 | PB214 |
| 246.27 | 14. | 86.75 | 1.10 | 3.274E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 269.97 | 75. | 22.02 | 0.67 | 3.074E-02 | | | | |
| 277.41 | 23. | 61.98 | 1.12 | 3.012E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.27 | 176. | 13.11 | 1.54 | 2.872E-02 | 295.21 | 18.500 | 9.260E-01 | PB214 |
| 299.95 | 18. | 80.76 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.32 | 148. | 11.28 | 0.78 | 2.587E-02 | 338.40 | 12.010 | 1.293E+00 | Ra228 |
| 343.70 | 8. | 107.85 | 1.18 | 2.552E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.99 | 289. | 7.59 | 1.27 | 2.509E-02 | 351.92 | 35.800 | 8.718E-01 | PB214 |
| 511.06 | 46. | 18.76 | 1.26 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.04 | 151. | 11.46 | 1.21 | 1.715E-02 | 583.14 | 86.000 | 2.683E-01 | TL208 |
| 609.53 | 202. | 8.05 | 1.41 | 1.661E-02 | 609.31 | 44.791 | 7.605E-01 | BI214 |
| 659.68 | 4. | 152.30 | 1.45 | 1.563E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.48 | 27. | 33.80 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 732.84 | 2. | 256.91 | 1.51 | 1.451E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 767.62 | 11. | 88.96 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 786.09 | 6. | 144.32 | 1.55 | 1.380E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 808.09 | 8. | 88.56 | 1.57 | 1.351E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 830.35 | 4. | 219.02 | 1.58 | 1.324E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.91 | 15. | 54.78 | 1.61 | 1.291E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 867.40 | 6. | 134.98 | 1.61 | 1.283E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| 881.65 | 5. | 133.68 | 1.62 | 1.269E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.33 | 109. | 12.17 | 1.45 | 1.238E-02 | 911.07 | 29.000 | 8.501E-01 | Ra228 |
| 933.38 | 12. | 66.77 | 1.66 | 1.215E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 969.05 | 36. | 25.36 | 1.69 | 1.182E-02 | 968.90 | 17.460 | 4.835E-01 | Ra228 |
| 996.07 | 7. | 116.22 | 1.71 | 1.158E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1007.34 | 3. | 196.00 | 1.72 | 1.151E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1120.49 | 39. | 24.02 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | 6.954E-01 | BI214 |
| 1238.49 | 17. | 44.97 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1327.93 | 1. | 418.94 | 1.95 | 9.235E-03 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1394.22 | 1. | 381.60 | 1.99 | 8.897E-03 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1409.14 | 2. | 263.76 | 2.00 | 8.824E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.12 | 506. | 4.66 | 1.92 | 8.553E-03 | 1460.75 | 10.700 | 1.536E+01 | K40 |
| 1619.54 | 3. | 164.73 | 2.14 | 7.817E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.96 | 23. | 23.32 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | 5.765E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.54 | 74.71 | 322. | 110. | 0.041 | 51.81 | 0.960 | TL-208 | |
| 308.59 | 77.22 | 306. | 248. | 0.092 | 24.82 | 0.931 | PB-212 | |
| 1079.78 | 269.97 | 70. | 75. | 0.028 | 44.05 | 0.670 | AC-228 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.00 | 39.58 | 179. | -7. | -0.003 | 554.40 | 0.904s |
| EU-154 | 167.97 | 42.08 | 181. | 14. | 0.005 | 280.51 | 0.907 |
| PB-210 | 185.49 | 46.45 | 227. | 8. | 0.003 | 82.67 | 0.911s |
| EU-154 | 191.47 | 47.95 | 235. | -19. | -0.007 | 232.43 | 0.913s |
| Am-241 | 237.84 | 59.54 | 279. | 19. | 0.007 | 254.99 | 0.923s |
| U-238 | 252.68 | 63.25 | 280. | 47. | 0.017 | 59.79 | 0.695s |

American Radiation Services Spectrum name: ARS07972.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 369.24 | 92.38 | 255. | 36. | 0.013 | 70.01 | 0.954D |
| U-238 | 370.92 | 92.80 | 285. | 42. | 0.016 | 92.11 | 0.954D |
| PA-234 | 376.57 | 94.21 | 409. | -46. | -0.017 | 128.35 | 0.956s |
| PA-234 | 437.83 | 109.52 | 127. | 22. | 0.008 | 137.41 | 0.971s |
| EU-154 | 487.53 | 121.94 | 190. | -4. | -0.002 | 873.44 | 0.982s |
| PA-234 | 523.91 | 131.04 | 223. | -8. | -0.003 | 556.78 | 0.990s |
| RA-226 | 743.93 | 186.03 | 146. | 121. | 0.045 | 38.68 | 0.475s |
| U-235 | 821.43 | 205.40 | 146. | 12. | 0.005 | 271.54 | 1.057s |
| PB-212 | 954.12 | 238.57 | 179. | 528. | 0.195 | 11.80 | 1.501s |
| PB-214 | 966.89 | 241.76 | 135. | 78. | 0.029 | 52.09 | 0.796s |
| EU-152 | 977.56 | 244.42 | 186. | -22. | -0.008 | 179.45 | 1.093s |
| EU-154 | 984.96 | 246.27 | 70. | 14. | 0.005 | 173.49 | 1.096s |
| TL-208 | 1109.53 | 277.41 | 95. | 23. | 0.009 | 123.96 | 1.122s |
| PB-214 | 1180.98 | 295.27 | 118. | 176. | 0.065 | 26.23 | 1.538s |
| PB-212 | 1199.72 | 299.95 | 107. | 18. | 0.007 | 161.52 | 1.142s |
| Ra-228 | 1353.22 | 338.32 | 52. | 143. | 0.053 | 22.55 | 0.782s |
| EU-152 | 1374.75 | 343.70 | 58. | 8. | 0.003 | 215.70 | 1.181s |
| PB-214 | 1407.90 | 351.99 | 73. | 280. | 0.104 | 15.18 | 1.270 |
| TL-208 | 2044.28 | 511.06 | 106. | 46. | 0.017 | 37.51 | 1.255 |
| PA-234 | 2276.64 | 569.14 | 54. | -6. | -0.002 | 464.72 | 1.373s |
| TL-208 | 2332.24 | 583.04 | 52. | 141. | 0.052 | 22.92 | 1.208 |
| BI-214 | 2438.20 | 609.53 | 54. | 202. | 0.075 | 16.09 | 1.406 |
| CS-137 | 2638.84 | 659.68 | 30. | 4. | 0.002 | 304.59 | 1.449s |
| EU-154 | 2890.88 | 722.68 | 38. | -3. | -0.001 | 545.52 | 1.499s |
| BI-212 | 2910.08 | 727.48 | 37. | 27. | 0.010 | 67.60 | 1.502s |
| PA-234 | 2931.52 | 732.84 | 34. | 2. | 0.001 | 513.82 | 1.507s |
| EU-154 | 3026.08 | 756.48 | 36. | -4. | -0.002 | 406.12 | 1.526s |
| TL-208 | 3048.73 | 762.15 | 44. | -4. | -0.001 | 574.69 | 1.531s |
| BI-214 | 3070.65 | 767.62 | 52. | 11. | 0.004 | 177.91 | 1.535s |
| EU-152 | 3119.24 | 779.77 | 44. | -6. | -0.002 | 356.91 | 1.543s |
| BI-212 | 3144.53 | 786.09 | 38. | 6. | 0.002 | 288.63 | 1.548s |
| PA-234 | 3232.52 | 808.09 | 22. | 8. | 0.003 | 177.12 | 1.566s |
| PA-234 | 3321.58 | 830.35 | 33. | 4. | 0.001 | 438.05 | 1.584s |
| TL-208 | 3443.81 | 860.91 | 37. | 15. | 0.005 | 109.56 | 1.607s |
| EU-152 | 3469.79 | 867.40 | 26. | 6. | 0.002 | 269.96 | 1.612s |
| EU-154 | 3502.24 | 875.52 | 28. | -6. | -0.002 | 339.49 | 1.617s |
| PA-234 | 3526.78 | 881.65 | 27. | 5. | 0.002 | 267.37 | 1.622s |
| PA-234 | 3533.14 | 883.24 | 24. | 0. | 0.000 | 2000.00 | 1.624s |
| Ra-228 | 3645.48 | 911.33 | 30. | 109. | 0.040 | 24.35 | 1.448 |
| BI-214 | 3733.70 | 933.38 | 27. | 12. | 0.005 | 133.55 | 1.663s |
| PA-234 | 3789.26 | 947.27 | 39. | -6. | -0.002 | 369.01 | 1.672s |
| PA-234 | 3789.25 | 947.27 | 36. | -6. | -0.002 | 313.91 | 1.674s |
| Ra-228 | 3852.76 | 963.14 | 37. | -2. | -0.001 | 766.64 | 1.686s |
| Ra-228 | 3876.37 | 969.05 | 31. | 36. | 0.013 | 50.71 | 1.689s |
| EU-154 | 3984.47 | 996.07 | 31. | 7. | 0.003 | 232.43 | 1.710s |
| EU-154 | 4029.53 | 1007.34 | 25. | 3. | 0.001 | 391.99 | 1.716s |
| EU-152 | 4448.46 | 1112.07 | 37. | -3. | -0.001 | 649.48 | 1.795s |
| BI-214 | 4482.13 | 1120.49 | 34. | 39. | 0.014 | 48.04 | 1.801s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| CO-60 | 4679.52 | 1169.84 | 31. | -5. | -0.002 | 360.65 | 1.839s |
| BI-214 | 4954.11 | 1238.49 | 33. | 17. | 0.006 | 89.94 | 1.884s |
| EU-154 | 5092.68 | 1273.13 | 28. | -3. | -0.001 | 543.24 | 1.909s |
| CO-60 | 5311.84 | 1327.93 | 8. | 1. | 0.000 | 837.87 | 1.949s |
| BI-214 | 5532.36 | 1383.06 | 15. | -2. | -0.001 | 770.29 | 1.979s |
| PA-234 | 5576.97 | 1394.22 | 15. | 1. | 0.001 | 763.20 | 1.990s |
| EU-152 | 5636.64 | 1409.14 | 21. | 2. | 0.001 | 527.52 | 1.999s |
| K-40 | 5844.56 | 1461.12 | 17. | 502. | 0.186 | 9.32 | 1.917 |
| BI-212 | 6478.15 | 1619.54 | 12. | 3. | 0.001 | 329.45 | 2.135s |
| BI-214 | 7059.72 | 1764.96 | 15. | 23. | 0.008 | 46.64 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 6.4372E-02 | | | | | |
| | | | 143.76 | 4.743E-03 | &(P | 4.285E-01 2.93E+02 G | |
| | | | 205.31 | 1.976E-01 | ?(P | 9.397E-01 1.36E+02 G | |
| | | | 163.35 | -5.033E-02 | % P | 7.123E-01 1.04E+03 G | |
| RA-226 | | 2.3309E+00 | | | | | |
| | | | 186.21 | 2.331E+00 | *( | 1.141E+00 1.93E+01 G K | |
| Ra-228 | | 8.5012E-01 | | | | | |
| | | | 911.07 | 8.501E-01 | (P | 2.208E-01 1.22E+01 G | |
| | | | 968.90 | 4.835E-01 | - P | 3.884E-01 2.54E+01 G | |
| | | | 338.40 | 1.293E+00 | + P | 3.267E-01 1.13E+01 G | |
| | | | 964.60 | -9.831E-02 | - | 1.340E+00 3.83E+02 G | |
| Am-241 | T | 4.0472E-02 | | | | | |
| | | | 59.54 | 4.047E-02 | ?( | 1.731E-01 1.27E+02 G K | |
| PB-210 | | 2.2721E-01 | | | | | |
| | | | 46.52 | 2.272E-01 | (P | 1.987E+00 4.13E+01 G | |
| U-238 | | 8.2522E-01 | | | | | |
| | | | 63.29 | 8.780E-01 | *(P | 1.509E+00 2.99E+01 G | |
| | | | 92.80 | 8.252E-01 | } P | 1.598E+00 4.61E+01 G | |
| | | | 92.38 | 8.252E-01 | } P | 1.771E+00 3.50E+01 G | |
| K-40 | | 1.5362E+01 | | | | | |
| | | | 1460.75 | 1.536E+01 | (P | 6.731E-01 4.66E+00 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-214 | 8.8773E-01 | | | | | | |
| | | 351.92 | 8.718E-01 | (P | 1.331E-01 | 7.59E+00 | G |
| | | 295.21 | 9.260E-01 | @(P | 2.817E-01 | 1.31E+01 | G |
| | | 241.98 | 8.692E-01 | (P | 6.380E-01 | 2.60E+01 | G |
| BI-214 | 7.6102E-01 | | | | | | |
| | | 609.31 | 7.605E-01 | (P | 1.394E-01 | 8.05E+00 | G |
| | | 1764.49 | 5.765E-01 | - P | 5.272E-01 | 2.33E+01 | G |
| | | 1120.29 | 6.954E-01 | (P | 5.331E-01 | 2.40E+01 | G |
| | | 1238.11 | 8.420E-01 | ?(P | 1.436E+00 | 4.50E+01 | G |
| | | 768.36 | 4.739E-01 | - P | 1.518E+00 | 8.90E+01 | G |
| | | 1377.67 | -1.954E-01 | - P | 1.652E+00 | 3.85E+02 | G |
| | | 934.06 | 9.319E-01 | ?( | 2.059E+00 | 6.68E+01 | G |
| BI-212 | 4.5430E-01 | | | | | | |
| | | 727.17 | 4.320E-01 | (P | 5.031E-01 | 3.38E+01 | G |
| | | 1620.56 | 4.174E-01 | ?( | 2.484E+00 | 1.65E+02 | G |
| | | 785.42 | 6.366E-01 | &( | 3.184E+00 | 1.44E+02 | G |
| PB-212 | 1.0187E+00 | | | | | | |
| | | 238.63 | 1.019E+00 | (P | 1.256E-01 | 5.90E+00 | G |
| | | 300.09 | 5.495E-01 | & P | 1.540E+00 | 8.08E+01 | G |
| TL-208 | 2.7681E-01 | | | | | | |
| | | 583.14 | 2.683E-01 | (P | 6.885E-02 | 1.15E+01 | G |
| | | 510.72 | 3.004E-01 | (P | 3.342E-01 | 1.88E+01 | G |
| | | 860.47 | 2.628E-01 | ?(P | 5.648E-01 | 5.48E+01 | G |
| | | 277.36 | 3.330E-01 | ?(P | 6.880E-01 | 6.20E+01 | G |
| | | 763.30 | -4.104E-01 | - P | 3.920E+00 | 2.87E+02 | G |
| PA-234 | 8.8983E-02 | | | | | | |
| | | 98.44 | -7.715E-03 | %(P | 1.636E-01 | 2.77E+03 | G |
| | | 946.00 | -6.791E-02 | + P | 3.695E-01 | 1.85E+02 | G |
| | | 131.28 | -2.285E-02 | + | 2.159E-01 | 2.78E+02 | G |
| | | 94.67 | -1.735E-01 | & | 3.672E-01 | 6.42E+01 | G |
| | | 883.24 | 0.000E+00 | & | 4.682E-01 | 1.00E+03 | G |
| | | 926.70 | -1.940E-03 | % P | 5.314E-01 | 1.00E+03 | G |
| | | 569.26 | -9.871E-02 | + P | 5.721E-01 | 2.32E+02 | G |
| | | 111.00 | 1.525E-01 | ?(P | 3.747E-01 | 6.87E+01 | G |
| | | 733.00 | 4.518E-02 | ?(P | 6.814E-01 | 2.57E+02 | G |
| | | 949.00 | -1.855E-01 | + P | 9.163E-01 | 1.57E+02 | G |
| | | 880.51 | 1.752E-01 | &(P | 9.147E-01 | 1.34E+02 | G |
| | | 226.87 | -9.017E-04 | & P | 8.084E-01 | 1.00E+03 | G |
| | | 831.10 | 1.446E-01 | ?( | 1.117E+00 | 2.19E+02 | G |
| | | 808.10 | 3.470E-01 | ?( | 1.045E+00 | 8.86E+01 | G |
| | | 99.70 | 1.742E-02 | & | 8.396E-01 | 1.41E+03 | G |
| | | 699.10 | -1.127E-02 | % P | 1.712E+00 | 1.00E+03 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 898.60 | -8.420E-02 | % P | 1.542E+00 | 1.00E+03 | G |
| | | 1394.10 | 1.198E-01 | ?( | 1.690E+00 | 3.82E+02 | G |
| CS-137 | 8.8672E-03 | | | | | | |
| | | 661.66 | 8.867E-03 | &(P | 5.912E-02 | 1.52E+02 | G |
| CO-60 | -1.2847E-02 | | | | | | |
| | | 1173.24 | -1.285E-02 | &(P | 7.826E-02 | 1.80E+02 | K |
| | | 1332.50 | 3.072E-03 | + | 4.942E-02 | 4.19E+02 | K |
| EU-152 | 3.1930E-02 | | | | | | |
| | | 40.12 | -7.085E-04 | %( | 2.650E-01 | 1.08E+04 | G |
| | | 121.78 | 7.250E-04 | % | 1.388E-01 | 5.59E+03 | G |
| | | 344.30 | 3.423E-02 | ?(P | 1.552E-01 | 1.08E+02 | G |
| | | 1408.08 | 2.377E-02 | ?(P | 3.630E-01 | 2.64E+02 | G |
| | | 39.52 | -5.877E-02 | + | 5.549E-01 | 2.77E+02 | G |
| | | 964.00 | -1.844E-02 | % P | 9.736E-01 | 1.00E+03 | G |
| | | 1112.07 | -5.240E-02 | + | 6.033E-01 | 3.25E+02 | G |
| | | 778.90 | -9.330E-02 | + P | 5.197E-01 | 1.78E+02 | G |
| | | 1085.80 | 1.141E-02 | % P | 7.763E-01 | 1.22E+03 | G |
| | | 45.40 | -5.336E-01 | % P | 9.263E-01 | 1.54E+03 | G |
| | | 244.67 | -2.461E-01 | + | 7.370E-01 | 8.97E+01 | G |
| | | 867.39 | 2.930E-01 | ?( | 1.379E+00 | 1.35E+02 | G |
| EU-154 | 6.3063E-02 | | | | | | |
| | | 123.10 | -6.527E-03 | ?( | 9.732E-02 | 4.37E+02 | G |
| | | 1274.80 | -2.322E-02 | & | 2.251E-01 | 2.72E+02 | G |
| | | 723.30 | -3.174E-02 | + | 3.057E-01 | 2.73E+02 | G |
| | | 1004.80 | 4.634E-02 | ?(P | 3.588E-01 | 1.96E+02 | G |
| | | 43.00 | -2.181E-02 | % P | 6.698E-01 | 1.00E+03 | G |
| | | 873.20 | -1.088E-01 | + P | 5.356E-01 | 1.70E+02 | G |
| | | 996.30 | 1.618E-01 | ?( | 6.478E-01 | 1.16E+02 | G |
| | | 42.31 | 2.339E-01 | ?( | 1.107E+00 | 1.40E+02 | G |
| | | 248.04 | 1.853E-01 | &( | 5.396E-01 | 8.67E+01 | G |
| | | 591.70 | 1.638E-02 | & | 7.272E-01 | 1.18E+03 | G |
| | | 48.70 | -4.530E-01 | + | 1.765E+00 | 1.16E+02 | G |
| | | 756.70 | -2.072E-01 | + | 1.477E+00 | 2.03E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 6.4372E-02 | 1.8088E-01 | 1.8093E-01 | 0.428E+00 |
| RA-226 # | 2.3309E+00 | 9.0162E-01 | 9.1139E-01 | 0.114E+01 |
| Ra-228 | 8.5012E-01 | 2.1632E-01 | 2.2281E-01 | 0.221E+00 |
| Am-241 #A | 4.0472E-02 | 1.0320E-01 | 1.0323E-01 | 0.173E+00 |
| PB-210 #A | 2.2721E-01 | 1.1182E+00 | 1.1188E+00 | 0.199E+01 |
| U-238 A | 8.2522E-01 | 5.7632E-01 | 5.7981E-01 | 0.151E+01 |
| K-40 | 1.5362E+01 | 1.4428E+00 | 1.7455E+00 | 0.673E+00 |
| PB-214 | 8.8773E-01 | 1.3931E-01 | 1.5758E-01 | 0.133E+00 |
| BI-214 # | 7.6102E-01 | 1.3007E-01 | 1.3763E-01 | 0.139E+00 |
| BI-212 #A | 4.5430E-01 | 3.3741E-01 | 3.3862E-01 | 0.503E+00 |
| PB-212 | 1.0187E+00 | 1.2334E-01 | 1.4218E-01 | 0.126E+00 |
| TL-208 | 2.7681E-01 | 6.8024E-02 | 7.0164E-02 | 0.688E-01 |
| PA-234 #A | 8.8983E-02 | 1.3129E-01 | 1.3145E-01 | 0.164E+00 |
| CS-137 #A | 8.8672E-03 | 3.3295E-02 | 3.3297E-02 | 0.591E-01 |
| CO-60 #A | -1.2847E-02 | 4.8266E-02 | 4.8269E-02 | 0.783E-01 |
| EU-152 #A | 3.1930E-02 | 8.3928E-02 | 8.4207E-02 | 0.265E+00 |
| EU-154 #A | 6.3063E-02 | 1.0941E-01 | 1.0949E-01 | 0.973E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

American Radiation Services Spectrum name: ARS07972.An1

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.0 to 2000.1 keV) | 2.155E+01 | pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-05 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-001 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 001 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.4536E-02 | pCi/g | 4.1423E-02 | 2.3100E-01 | 1.1550E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 5.1802E-01 | 9.6300E-01 | 4.8150E-01 | | | |
| **RA-228** | 2.8336E-01 | pCi/g | 1.1160E-01 | 1.8800E-01 | 9.4000E-02 | | | |
| **AM-241** | 3.6131E-02 | pCi/g | 5.6225E-02 | 9.3600E-02 | 4.6800E-02 | | | |
| **PB-210** | 1.4384E-01 | pCi/g | 7.2105E-01 | 1.2500E+00 | 6.2500E-01 | | | |
| **U-238** | 5.0326E-01 | pCi/g | 4.7662E-01 | 9.6900E-01 | 4.8450E-01 | | | |
| **K-40** | 1.2617E+01 | pCi/g | 1.7300E+00 | 7.9700E-01 | 3.9850E-01 | | | |
| **PB-214** | 3.9101E-01 | pCi/g | 9.4748E-02 | 9.1500E-02 | 4.5750E-02 | | | |
| **BI-214** | 3.5576E-01 | pCi/g | 9.1361E-02 | 9.7500E-02 | 4.8750E-02 | | | |
| **BI-212** | 1.1699E-01 | pCi/g | 2.1260E-01 | 3.6800E-01 | 1.8400E-01 | | | |
| **PB-212** | 3.6464E-01 | pCi/g | 7.8540E-02 | 8.2900E-02 | 4.1450E-02 | | | |
| **TL-208** | 9.0084E-02 | pCi/g | 3.6187E-02 | 4.9000E-02 | 2.4500E-02 | | | |
| **PA-234** | 6.8030E-02 | pCi/g | 5.0641E-02 | 9.4500E-02 | 4.7250E-02 | | | |
| **CS-137** | -1.0712E-02 | pCi/g | 4.6491E-02 | 5.8500E-02 | 2.9250E-02 | | | |
| **CO-60** | -1.2728E-02 | pCi/g | 8.2544E-02 | 7.8100E-02 | 3.9050E-02 | | | |
| **EU-152** | -6.3868E-03 | pCi/g | 8.2497E-03 | 1.7800E-01 | 8.9000E-02 | | | |
| **EU-154** | 1.5483E-02 | pCi/g | 5.0055E-02 | 6.8500E-02 | 3.4250E-02 | | | |
| **Total Gamma** | 1.5000E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.3467E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 08:25:08
American Radiation Services     Spectrum name: ARS05348.An1

Sample description
     Batch ID:  16-00697-05
     SDG:  ARS1-16-00670-001  Tech:  WJS

Spectrum Filename: C:\User\ARS05348.An1

Acquisition information
       Start time:                5/5/2016 07:40:05
       Live time:              2700
       Real time:              2702
       Dead time:                 0.07 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.6584E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.6584E+02) =
                                  2.7334E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 08:25:08
American Radiation Services Spectrum name: ARS05348.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 25 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2104

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.38 | 127. | 10.96 | 0.44 | 7.349E-03 | | | | |
| 42.25 | 8. | 161.61 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 6.340E-02 | EU154 |
| | | | | | 42.31 | 7.300 | 1.163E-01 | EU154 |
| 43.94 | 14. | 85.61 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.35 | 6. | 42.32 | 0.95 | 2.755E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.13 | 18. | 77.74 | 0.77 | 3.751E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.07 | 54. | 32.88 | 0.84 | 4.034E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.72 | 99. | 17.23 | 0.79 | 4.754E-02 | | | | |
| 77.04 | 161. | 11.66 | 0.79 | 4.854E-02 | | | | |
| 87.12 | 48. | 33.22 | 0.81 | 5.136E-02 | | | | |
| 90.00 | 52. | 27.29 | 0.82 | 5.181E-02 | | | | |
| 92.32 | 18. | 61.51 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.74 | 29. | 41.03 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 94.61 | 19. | 64.69 | 0.82 | 5.225E-02 | 94.67 | 15.500 | PBC<MDA | PA234 |
| 98.08 | 4. | 224.73 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 99.27 | 26. | 54.07 | 0.79 | 5.239E-02 | 99.70 | 4.700 | 2.889E-01 | PA234 |
| 111.43 | 15. | 91.45 | 0.37 | 5.184E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 142.20 | 0. | 392.46 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.14 | 5. | 172.94 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.63 | 13. | 142.47 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| 204.64 | 2. | 215.31 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.54 | 218. | 9.15 | 1.00 | 3.537E-02 | 238.63 | 43.100 | 3.646E-01 | PB212 |
| 246.74 | 1. | 654.42 | 1.06 | 3.450E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 1.692E-02 | EU154 |
| 295.16 | 91. | 17.73 | 0.84 | 3.087E-02 | 295.21 | 18.500 | 3.864E-01 | PB214 |
| 338.10 | 40. | 29.12 | 1.20 | 2.826E-02 | 338.40 | 12.010 | 3.190E-01 | Ra228 |
| | | | | | 338.40 | 12.010 | 3.190E-01 | Ra228 |
| 351.66 | 155. | 10.14 | 1.01 | 2.757E-02 | 351.92 | 35.800 | 3.934E-01 | PB214 |
| 510.75 | 40. | 16.57 | 0.97 | 2.149E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 568.60 | 3. | 151.26 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 582.93 | 55. | 17.93 | 1.53 | 1.957E-02 | 583.14 | 86.000 | 8.995E-02 | TL208 |
| 608.86 | 116. | 11.27 | 0.72 | 1.895E-02 | 609.31 | 44.791 | 3.742E-01 | BI214 |
| 726.65 | 8. | 74.34 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 756.47 | 2. | 400.70 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | PBC<MDA | EU154 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 08:25:08
American Radiation Services Spectrum name: ARS05348.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 761.93 | 1. | 781.55 | 1.74 | 1.592E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 860.52 | 1. | 415.84 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 879.93 | 1. | 724.80 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 883.24 | 5. | 98.71 | 1.86 | 1.407E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 910.82 | 39. | 21.55 | 1.89 | 1.368E-02 | 911.07 | 29.000 | 2.686E-01 | Ra228 |
| | | | | | 911.07 | 29.000 | 2.686E-01 | Ra228 |
| 934.11 | 3. | 205.80 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 946.00 | 2. | 238.92 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 949.00 | 4. | 133.68 | 1.93 | 1.318E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.13 | 1. | 618.96 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 5.265E-02 | Ra228 |
| | | | | | 964.60 | 5.452 | 5.265E-02 | Ra228 |
| 1111.54 | 2. | 394.90 | 2.07 | 1.128E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.00 | 19. | 41.93 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1237.60 | 7. | 97.05 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1378.24 | 7. | 102.67 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.72 | 4. | 129.86 | 2.27 | 8.724E-03 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1407.57 | 2. | 229.93 | 2.28 | 8.617E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.03 | 419. | 5.20 | 1.23 | 8.230E-03 | 1460.75 | 10.700 | 1.262E+01 | K40 |
| 1764.08 | 8. | 53.12 | 2.43 | 6.316E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 81.00 | 20.38 | 32. | 127. | 0.047 | 21.92 | 0.442 | RU-103 | s |
| 298.51 | 74.73 | 107. | 80. | 0.030 | 42.87 | 0.485 | TH-234 | s |
| 307.81 | 77.05 | 147. | 150. | 0.056 | 29.90 | 0.812 | PB-212 | |
| 347.69 | 87.01 | 107. | 59. | 0.022 | 58.76 | 0.434 | TH-234 | s |
| 359.22 | 89.89 | 69. | 49. | 0.018 | 57.23 | 0.634 | AC-228 | M |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 164.06 | 41.14 | 79. | -14. | -0.005 | 192.12 | 0.750s |
| EU-154 | 168.52 | 42.25 | 70. | 8. | 0.003 | 323.22 | 0.750s |
| EU-154 | 171.52 | 43.00 | 58. | 0. | 0.000 | 2000.00 | 0.750s |
| EU-152 | 175.26 | 43.94 | 61. | 14. | 0.005 | 171.23 | 0.750 |
| PB-210 | 184.94 | 46.35 | 105. | 6. | 0.002 | 84.64 | 0.947s |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 08:25:08
American Radiation Services Spectrum name: ARS05348.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Am-241 | 236.07 | 59.13 | 87. | 18. | 0.007 | 155.48 | 0.766s |
| U-238 | 251.85 | 63.07 | 131. | 36. | 0.014 | 65.75 | 0.843s |
| U-238 | 369.17 | 92.38 | 119. | 18. | 0.007 | 123.01 | 0.820D |
| U-238 | 370.85 | 92.80 | 119. | 29. | 0.011 | 82.07 | 0.821D |
| PA-234 | 378.33 | 94.67 | 67. | 19. | 0.007 | 129.37 | 0.824D |
| PA-234 | 393.42 | 98.44 | 84. | 4. | 0.002 | 449.46 | 0.829D |
| PA-234 | 398.47 | 99.70 | 61. | 34. | 0.013 | 74.07 | 0.831D |
| PA-234 | 445.40 | 111.43 | 74. | 15. | 0.005 | 182.91 | 0.365s |
| EU-154 | 492.51 | 123.20 | 108. | -6. | -0.002 | 466.76 | 0.870s |
| U-235 | 652.40 | 163.14 | 110. | 5. | 0.002 | 345.89 | 0.934s |
| U-235 | 742.77 | 185.72 | 93. | 13. | 0.005 | 284.95 | 0.969D |
| RA-226 | 744.73 | 186.21 | 115. | 0. | 0.000 | 2000.00 | 0.970D |
| U-235 | 818.51 | 204.64 | 56. | 2. | 0.001 | 430.62 | 1.000 |
| PA-234 | 907.72 | 226.93 | 90. | -12. | -0.005 | 232.86 | 1.033s |
| PB-212 | 954.21 | 238.54 | 87. | 203. | 0.075 | 18.30 | 1.000 |
| EU-152 | 977.98 | 244.48 | 97. | -2. | -0.001 | 1270.40 | 1.060s |
| EU-154 | 987.00 | 246.74 | 42. | 1. | 0.001 | 1308.84 | 1.065s |
| TL-208 | 1110.69 | 277.64 | 65. | -5. | -0.002 | 770.12 | 1.109s |
| PB-214 | 1180.81 | 295.16 | 73. | 81. | 0.030 | 35.46 | 0.842s |
| Ra-228 | 1352.68 | 338.10 | 53. | 40. | 0.015 | 58.25 | 1.198s |
| EU-152 | 1377.29 | 344.24 | 42. | -2. | -0.001 | 784.70 | 1.206s |
| PB-214 | 1406.99 | 351.66 | 42. | 142. | 0.053 | 20.28 | 1.010 |
| TL-208 | 2043.79 | 510.75 | 80. | 40. | 0.015 | 33.14 | 0.969s |
| PA-234 | 2275.35 | 568.60 | 32. | 3. | 0.001 | 302.51 | 1.509 |
| TL-208 | 2332.70 | 582.93 | 35. | 55. | 0.020 | 35.85 | 1.526 |
| BI-214 | 2436.50 | 608.86 | 35. | 116. | 0.043 | 22.54 | 0.722s |
| CS-137 | 2646.86 | 661.41 | 41. | -6. | -0.002 | 371.56 | 1.621s |
| PA-234 | 2798.20 | 699.22 | 32. | -3. | -0.001 | 521.90 | 1.664s |
| EU-154 | 2894.18 | 723.20 | 44. | -10. | -0.004 | 204.72 | 1.692s |
| BI-212 | 2908.00 | 726.65 | 26. | 8. | 0.003 | 148.69 | 1.696s |
| PA-234 | 2931.53 | 732.53 | 31. | -4. | -0.002 | 364.49 | 1.703s |
| EU-154 | 3027.37 | 756.47 | 28. | 2. | 0.001 | 801.40 | 1.729s |
| TL-208 | 3049.20 | 761.93 | 28. | 1. | 0.000 | 1563.11 | 1.737s |
| EU-152 | 3116.93 | 778.85 | 23. | -4. | -0.002 | 322.53 | 1.753s |
| BI-212 | 3151.15 | 787.39 | 24. | -1. | 0.000 | 1868.79 | 1.761s |
| PA-234 | 3234.03 | 808.10 | 26. | 0. | 0.000 | 2000.00 | 1.785s |
| TL-208 | 3443.86 | 860.52 | 25. | 1. | 0.000 | 831.68 | 1.839s |
| PA-234 | 3523.89 | 880.51 | 27. | 1. | 0.000 | 1449.60 | 1.860D |
| PA-234 | 3534.82 | 883.24 | 10. | 5. | 0.002 | 197.42 | 1.862D |
| Ra-228 | 3645.22 | 910.82 | 28. | 39. | 0.014 | 43.11 | 1.890s |
| PA-234 | 3727.41 | 931.35 | 16. | -2. | -0.001 | 686.49 | 1.905s |
| BI-214 | 3738.47 | 934.11 | 21. | 3. | 0.001 | 411.61 | 1.912s |
| PA-234 | 3786.05 | 946.00 | 15. | 2. | 0.001 | 477.85 | 1.923D |
| PA-234 | 3798.06 | 949.00 | 15. | 4. | 0.001 | 267.35 | 1.926D |
| Ra-228 | 3858.64 | 964.13 | 35. | 1. | 0.001 | 1237.92 | 1.941s |
| EU-154 | 3990.38 | 997.04 | 25. | -1. | 0.000 | 1807.19 | 1.970s |
| EU-154 | 4020.65 | 1004.60 | 29. | -3. | -0.001 | 576.45 | 1.978s |
| EU-152 | 4448.74 | 1111.54 | 24. | 2. | 0.001 | 789.80 | 2.070 |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 4482.61 | 1120.00 | 21. | 19. | 0.007 | 83.85 | 2.077s |
| CO-60 | 4695.65 | 1173.22 | 35. | -5. | -0.002 | 494.16 | 2.118s |
| BI-214 | 4953.38 | 1237.60 | 26. | 7. | 0.003 | 194.10 | 2.167s |
| EU-154 | 5107.15 | 1276.01 | 24. | -3. | -0.001 | 436.64 | 2.192s |
| BI-214 | 5516.39 | 1378.24 | 20. | 7. | 0.002 | 205.34 | 2.259s |
| PA-234 | 5578.35 | 1393.72 | 13. | 4. | 0.002 | 259.73 | 2.268s |
| EU-152 | 5633.80 | 1407.57 | 12. | 2. | 0.001 | 459.85 | 2.276s |
| K-40 | 5843.84 | 1460.03 | 24. | 406. | 0.150 | 10.39 | 1.226s |
| BI-214 | 7061.06 | 1764.08 | 14. | 8. | 0.003 | 106.24 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 1.4536E-02 | | | | | |
| | | | 185.72 | 1.454E-02 | } P | 5.514E-02 1.42E+02 G K | |
| | | | 143.76 | 1.478E-03 | %(P | 2.306E-01 3.92E+02 G | |
| | | | 205.31 | 3.643E-02 | (P | 5.640E-01 2.15E+02 G | |
| | | | 163.35 | 6.658E-02 | &(P | 6.757E-01 1.73E+02 G | |
| RA-226 | | 0.0000E+00 | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 9.630E-01 1.00E+03 G K | |
| Ra-228 | | 2.8336E-01 | | | | | |
| | | | 911.07 | 2.686E-01 | ?(P | 1.879E-01 2.16E+01 G | |
| | | | 968.90 | -1.557E-02 | % P | 3.915E-01 1.00E+03 G | |
| | | | 338.40 | 3.190E-01 | ?(P | 2.951E-01 2.91E+01 G | |
| | | | 964.60 | 5.265E-02 | & | 1.168E+00 6.19E+02 G | |
| Am-241 | T | 3.6131E-02 | | | | | |
| | | | 59.54 | 3.613E-02 | ?( | 9.365E-02 7.77E+01 G K | |
| PB-210 | | 1.4384E-01 | | | | | |
| | | | 46.52 | 1.438E-01 | (P | 1.254E+00 4.23E+01 G | |
| U-238 | | 5.0326E-01 | | | | | |
| | | | 63.29 | 6.319E-01 | (P | 9.690E-01 3.29E+01 G | |
| | | | 92.80 | 5.033E-01 | } P | 9.363E-01 4.10E+01 G | |
| | | | 92.38 | 3.672E-01 | } P | 1.093E+00 6.15E+01 G | |

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American Radiation Services Spectrum name: ARS05348.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.2617E+01 | | | | | | |
| | | 1460.75 | 1.262E+01 | (P | 7.973E-01 | 5.20E+00 | G |
| PB-214 | 3.9101E-01 | | | | | | |
| | | 351.92 | 3.934E-01 | (P | 9.147E-02 | 1.01E+01 | G |
| | | 295.21 | 3.864E-01 | (P | 2.042E-01 | 1.77E+01 | G |
| | | 241.98 | -1.701E-02 | % P | 4.895E-01 | 1.26E+03 | G |
| BI-214 | 3.5576E-01 | | | | | | |
| | | 609.31 | 3.742E-01 | (P | 9.748E-02 | 1.13E+01 | G |
| | | 1764.49 | 2.375E-01 | & P | 5.640E-01 | 5.31E+01 | G |
| | | 1120.29 | 3.083E-01 | ?( | 3.998E-01 | 4.19E+01 | G |
| | | 1238.11 | 3.348E-01 | ?(P | 1.231E+00 | 9.71E+01 | G |
| | | 768.36 | -1.499E-02 | % P | 1.307E+00 | 1.00E+03 | G |
| | | 1377.67 | 5.234E-01 | + | 1.853E+00 | 1.03E+02 | G |
| | | 934.06 | 2.205E-01 | - | 1.623E+00 | 2.06E+02 | G |
| BI-212 | 1.1699E-01 | | | | | | |
| | | 727.17 | 1.170E-01 | &(P | 3.676E-01 | 7.43E+01 | G |
| | | 1620.56 | -2.674E-02 | % P | 2.644E+00 | 8.26E+03 | G |
| | | 785.42 | -6.663E-02 | & P | 2.266E+00 | 9.34E+02 | G |
| PB-212 | 3.6464E-01 | | | | | | |
| | | 238.63 | 3.646E-01 | (P | 8.286E-02 | 9.15E+00 | G |
| | | 300.09 | -6.688E-02 | & P | 1.136E+00 | 2.57E+03 | G |
| TL-208 | 9.0084E-02 | | | | | | |
| | | 583.14 | 8.995E-02 | ?(P | 4.898E-02 | 1.79E+01 | G |
| | | 510.72 | 2.272E-01 | + P | 2.510E-01 | 1.66E+01 | G |
| | | 860.47 | 1.478E-02 | - P | 4.126E-01 | 4.16E+02 | G |
| | | 277.36 | -6.344E-02 | & P | 5.278E-01 | 3.85E+02 | G |
| | | 763.30 | 9.684E-02 | ?( | 2.746E+00 | 7.82E+02 | G |
| PA-234 | 6.8030E-02 | | | | | | |
| | | 98.44 | 8.443E-03 | (P | 9.449E-02 | 2.25E+02 | G |
| | | 946.00 | 2.437E-02 | ( | 2.127E-01 | 2.39E+02 | G |
| | | 131.28 | -7.511E-03 | & P | 1.443E-01 | 6.02E+03 | G |
| | | 94.67 | 6.458E-02 | ( | 1.379E-01 | 6.47E+01 | G |
| | | 883.24 | 7.361E-02 | (P | 2.774E-01 | 9.87E+01 | G |
| | | 926.70 | -3.169E-02 | + | 3.995E-01 | 3.43E+02 | G |
| | | 569.26 | 3.604E-02 | (P | 3.851E-01 | 1.51E+02 | G |
| | | 111.00 | 9.013E-02 | ( | 2.649E-01 | 9.15E+01 | G |
| | | 733.00 | -8.718E-02 | + | 5.585E-01 | 1.82E+02 | G |
| | | 949.00 | 9.887E-02 | (P | 5.572E-01 | 1.34E+02 | G |
| | | 880.51 | 3.048E-02 | (P | 8.099E-01 | 7.25E+02 | G |
| | | 226.87 | -1.426E-01 | + P | 5.405E-01 | 1.16E+02 | G |
| | | 831.10 | -1.901E-02 | & | 8.647E-01 | 1.24E+03 | G |

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American Radiation Services Spectrum name: ARS05348.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | 0.000E+00 | - | 9.661E-01 | 1.00E+03 | G |
| | | 99.70 | 3.751E-01 | ( | 4.354E-01 | 3.70E+01 | G |
| | | 699.10 | -1.168E-01 | + P | 1.018E+00 | 2.61E+02 | G |
| | | 898.60 | -8.528E-02 | % P | 1.315E+00 | 1.15E+03 | G |
| | | 1394.10 | 3.396E-01 | ?( | 1.565E+00 | 1.30E+02 | G |
| CS-137 | -1.0712E-02 | | | | | | |
| | | 661.66 | -1.071E-02 | ?(P | 5.848E-02 | 1.86E+02 | G |
| CO-60 | -1.2728E-02 | | | | | | |
| | | 1173.24 | -1.273E-02 | ?(P | 7.807E-02 | 2.47E+02 | K |
| | | 1332.50 | -1.621E-03 | % P | 5.359E-02 | 1.02E+03 | K |
| EU-152 | -6.3868E-03 | | | | | | |
| | | 40.12 | -5.492E-02 | ?( | 1.777E-01 | 9.61E+01 | G |
| | | 121.78 | -2.277E-03 | % | 1.012E-01 | 1.28E+03 | G |
| | | 344.30 | -8.625E-03 | + | 1.198E-01 | 3.92E+02 | G |
| | | 1408.08 | 3.380E-02 | + | 2.857E-01 | 2.30E+02 | G |
| | | 39.52 | -8.227E-03 | % | 3.511E-01 | 1.22E+03 | G |
| | | 964.00 | -1.481E-02 | % P | 8.306E-01 | 1.00E+03 | G |
| | | 1112.07 | 3.193E-02 | + | 4.564E-01 | 3.95E+02 | G |
| | | 778.90 | -5.958E-02 | + | 3.390E-01 | 1.61E+02 | G |
| | | 1085.80 | 3.027E-04 | % | 6.657E-01 | 6.05E+04 | G |
| | | 45.40 | 1.554E-01 | ( | 4.468E-01 | 8.56E+01 | G |
| | | 244.67 | -2.281E-02 | + | 5.027E-01 | 6.35E+02 | G |
| | | 867.39 | -3.411E-02 | % P | 1.255E+00 | 1.00E+03 | G |
| EU-154 | 1.5483E-02 | | | | | | |
| | | 123.10 | -8.561E-03 | ?( | 6.852E-02 | 2.33E+02 | G |
| | | 1274.80 | -2.578E-02 | + | 2.009E-01 | 2.18E+02 | G |
| | | 723.30 | -8.021E-02 | + | 2.794E-01 | 1.02E+02 | G |
| | | 1004.80 | -4.049E-02 | + P | 3.444E-01 | 2.88E+02 | G |
| | | 43.00 | 0.000E+00 | + | 3.220E-01 | 1.00E+03 | G |
| | | 873.20 | -2.361E-02 | % P | 6.473E-01 | 1.00E+03 | G |
| | | 996.30 | -1.591E-02 | + | 5.251E-01 | 9.04E+02 | G |
| | | 42.31 | 1.163E-01 | ?( | 6.450E-01 | 1.62E+02 | G |
| | | 248.04 | 1.692E-02 | &( | 3.944E-01 | 6.54E+02 | G |
| | | 591.70 | -2.117E-02 | % | 7.977E-01 | 1.03E+03 | G |
| | | 48.70 | -1.194E-02 | % | 1.114E+00 | 2.68E+03 | G |
| | | 756.70 | 7.101E-02 | &(P | 1.147E+00 | 4.01E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

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% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 1.4536E-02 | 4.1409E-02 | 4.1423E-02 | 0.231E+00 |
| RA-226 #B | 0.0000E+00 | 5.1802E-01 | 5.1802E-01 | 0.963E+00 |
| Ra-228 # | 2.8336E-01 | 1.1003E-01 | 1.1160E-01 | 0.188E+00 |
| Am-241 #A | 3.6131E-02 | 5.6174E-02 | 5.6225E-02 | 0.936E-01 |
| PB-210 A | 1.4384E-01 | 7.2091E-01 | 7.2105E-01 | 0.125E+01 |
| U-238 A | 5.0326E-01 | 4.7500E-01 | 4.7662E-01 | 0.969E+00 |
| K-40 | 1.2617E+01 | 1.3529E+00 | 1.7300E+00 | 0.797E+00 |
| PB-214 | 3.9101E-01 | 8.6441E-02 | 9.4748E-02 | 0.915E-01 |
| BI-214 | 3.5576E-01 | 8.7589E-02 | 9.1361E-02 | 0.975E-01 |
| BI-212 #A | 1.1699E-01 | 2.1243E-01 | 2.1260E-01 | 0.368E+00 |
| PB-212 | 3.6464E-01 | 7.1638E-02 | 7.8540E-02 | 0.829E-01 |
| TL-208 # | 9.0084E-02 | 3.5527E-02 | 3.6187E-02 | 0.490E-01 |
| PA-234 A | 6.8030E-02 | 5.0387E-02 | 5.0641E-02 | 0.945E-01 |
| CS-137 #A | -1.0712E-02 | 4.6487E-02 | 4.6491E-02 | 0.585E-01 |
| CO-60 #B | -1.2728E-02 | 8.2543E-02 | 8.2544E-02 | 0.781E-01 |
| EU-152 A | -6.3868E-03 | 8.2182E-03 | 8.2497E-03 | 0.178E+00 |
| EU-154 #A | 1.5483E-02 | 5.0044E-02 | 5.0055E-02 | 0.685E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 08:25:08
American Radiation Services     Spectrum name: ARS05348.An1

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  964.0 to  1998.6 keV)     1.466E+01  pCi/g
```

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-06 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-002 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 002 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.0179E-01 | pCi/g | 1.6386E-01 | 3.0900E-01 | 1.5450E-01 | | | |
| **RA-226** | 4.1198E-01 | pCi/g | 5.6434E-01 | 9.7900E-01 | 4.8950E-01 | | | |
| **RA-228** | 3.2654E-01 | pCi/g | 1.7085E-01 | 2.2100E-01 | 1.1050E-01 | | | |
| **AM-241** | -2.9516E-03 | pCi/g | 1.0723E-01 | 1.5400E-01 | 7.7000E-02 | | | |
| **PB-210** | 5.1384E-01 | pCi/g | 7.7621E-01 | 1.3900E+00 | 6.9500E-01 | | | |
| **U-238** | 7.6307E-01 | pCi/g | 6.0144E-01 | 1.3200E+00 | 6.6000E-01 | | | |
| **K-40** | 1.1270E+01 | pCi/g | 1.5741E+00 | 9.0700E-01 | 4.5350E-01 | | | |
| **PB-214** | 2.9939E-01 | pCi/g | 9.2136E-02 | 1.1500E-01 | 5.7500E-02 | | | |
| **BI-214** | 2.6447E-01 | pCi/g | 1.1065E-01 | 1.2900E-01 | 6.4500E-02 | | | |
| **BI-212** | 1.1154E-01 | pCi/g | 3.4507E-01 | 4.9300E-01 | 2.4650E-01 | | | |
| **PB-212** | 3.4317E-01 | pCi/g | 7.9961E-02 | 7.8600E-02 | 3.9300E-02 | | | |
| **TL-208** | 1.0847E-01 | pCi/g | 4.4957E-02 | 5.9900E-02 | 2.9950E-02 | | | |
| **PA-234** | 5.4634E-02 | pCi/g | 1.0885E-01 | 1.2800E-01 | 6.4000E-02 | | | |
| **CS-137** | 6.4861E-03 | pCi/g | 3.4139E-02 | 6.1600E-02 | 3.0800E-02 | | | |
| **CO-60** | -2.0491E-04 | pCi/g | 6.6138E-04 | 8.5400E-02 | 4.2700E-02 | | | |
| **EU-152** | 4.0065E-02 | pCi/g | 5.8811E-02 | 1.9800E-01 | 9.9000E-02 | | | |
| **EU-154** | 2.5585E-02 | pCi/g | 5.5235E-02 | 7.7200E-02 | 3.8600E-02 | | | |
| **Total Gamma** | 1.4641E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.2622E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06812.An1

Sample description
Batch ID: 16-00563-06
SDG: ARS1-16-00670-002 Tech: WJS

Spectrum Filename: C:\User\ARS06812.An1

Acquisition information
Start time: 19-Apr-2016 07:37:36
Live time: 1800
Real time: 1803
Dead time: 0.19 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4225E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4225E+02) =
2.9218E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06812.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1730

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 27.44 | 543. | 5.43 | 1.41 | 1.799E-02 | | | | |
| 46.73 | 15. | 32.27 | 0.94 | 3.277E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.72 | -1. | 173.47 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.37 | 21. | 65.77 | 0.63 | 4.542E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.56 | 66. | 23.37 | 0.96 | 5.122E-02 | | | | |
| 77.35 | 86. | 18.41 | 0.97 | 5.243E-02 | | | | |
| 92.61 | 33. | 34.08 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.63 | 42. | 33.56 | 0.98 | 5.721E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 121.83 | 17. | 72.63 | 1.01 | 5.934E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 131.58 | 5. | 228.97 | 1.02 | 5.871E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 143.42 | 10. | 96.72 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.08 | 10. | 88.48 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.82 | 17. | 38.51 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 225.74 | 10. | 99.55 | 1.11 | 4.480E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.34 | 153. | 10.19 | 1.05 | 4.326E-02 | 238.63 | 43.100 | 3.432E-01 | PB212 |
| 241.80 | 23. | 55.64 | 1.12 | 4.279E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 276.88 | 15. | 59.36 | 1.16 | 3.866E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.02 | 42. | 27.47 | 1.17 | 3.686E-02 | 295.21 | 18.500 | 2.734E-01 | PB214 |
| 300.83 | 2. | 462.40 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.90 | 32. | 27.46 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 3.494E-01 | Ra228 |
| 351.56 | 107. | 13.15 | 0.88 | 3.218E-02 | | | | |
| 351.56 | 107. | 13.15 | 0.88 | 3.218E-02 | 351.92 | 35.800 | 3.778E-01 | PB214 |
| 510.52 | 6. | 28.27 | 1.37 | 2.413E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 569.37 | 5. | 96.97 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 582.81 | 46. | 18.66 | 1.44 | 2.185E-02 | 583.14 | 86.000 | 1.085E-01 | TL208 |
| 608.94 | 49. | 18.58 | 1.46 | 2.115E-02 | 609.31 | 44.791 | 2.249E-01 | BI214 |
| 660.80 | 3. | 263.16 | 1.51 | 1.990E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 721.67 | 1. | 442.51 | 1.56 | 1.865E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| 727.17 | 4. | 144.36 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 755.38 | 5. | 107.88 | 1.59 | 1.805E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.20 | 6. | 108.25 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 785.19 | 2. | 260.38 | 1.61 | 1.757E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 808.43 | 2. | 344.58 | 1.63 | 1.721E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 832.46 | 2. | 188.57 | 1.65 | 1.686E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.26 | 1. | 431.81 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 878.96 | 0. | 547.29 | 1.70 | 1.617E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 897.92 | 3. | 109.44 | 1.71 | 1.593E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.10 | 32. | 24.65 | 1.72 | 1.577E-02 | 911.07 | 29.000 | 3.057E-01 | Ra228 |
| 964.25 | 7. | 89.44 | 1.77 | 1.513E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 3.868E-01 | Ra228 |
| 964.28 | 7. | 92.15 | 1.77 | 1.514E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 3.793E-01 | Ra228 |
| 968.78 | 5. | 116.16 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 995.72 | 2. | 340.47 | 1.79 | 1.478E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1112.57 | 4. | 143.51 | 1.89 | 1.362E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.57 | 24. | 24.33 | 0.35 | 1.355E-02 | 1120.29 | 14.797 | 5.276E-01 | BI214 |
| 1237.42 | 6. | 100.70 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1333.54 | 3. | 155.50 | 2.07 | 1.187E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1408.65 | 2. | 307.46 | 2.13 | 1.136E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.52 | 303. | 5.91 | 1.95 | 1.104E-02 | 1460.75 | 10.700 | 1.127E+01 | K40 |
| 1764.39 | 11. | 33.29 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 109.00 | 27.44 | 117. | 543. | 0.302 | 10.87 | 1.409 | SB-124 | s |
| 297.39 | 74.53 | 94. | 58. | 0.032 | 56.66 | 0.645 | TH-234 | s |
| 308.55 | 77.32 | 95. | 73. | 0.041 | 46.70 | 0.390 | PB-212 | s |
| 1405.77 | 351.56 | 115. | 18. | 0.010 | 177.93 | 0.882 | PB-214 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.11 | 39.47 | 57. | -5. | -0.003 | 462.59 | 0.929s |
| EU-152 | 161.96 | 40.68 | 56. | -6. | -0.003 | 674.75 | 0.930s |
| EU-154 | 171.14 | 42.97 | 62. | -2. | -0.001 | 1097.98 | 0.932 |
| PB-210 | 186.15 | 46.73 | 70. | 15. | 0.009 | 64.55 | 0.936s |
| EU-154 | 194.64 | 48.85 | 78. | -9. | -0.005 | 296.16 | 0.938s |
| U-238 | 252.55 | 63.33 | 118. | 15. | 0.009 | 84.53 | 0.952s |
| U-238 | 369.80 | 92.63 | 117. | 42. | 0.023 | 67.12 | 0.980s |
| U-238 | 369.73 | 92.61 | 126. | 33. | 0.018 | 68.15 | 0.980s |
| PA-234 | 378.73 | 94.86 | 126. | -9. | -0.005 | 348.45 | 0.982s |
| PA-234 | 395.58 | 99.08 | 78. | -10. | -0.005 | 344.46 | 0.987s |
| EU-152 | 486.60 | 121.83 | 67. | 17. | 0.009 | 145.25 | 1.008s |
| EU-154 | 494.28 | 123.75 | 72. | -2. | -0.001 | 1599.72 | 1.009s |
| PA-234 | 525.61 | 131.58 | 69. | 5. | 0.003 | 457.94 | 1.017s |
| U-235 | 572.99 | 143.42 | 73. | 10. | 0.006 | 193.43 | 1.029s |
| U-235 | 651.63 | 163.08 | 46. | 10. | 0.005 | 176.95 | 1.048s |
| RA-226 | 742.61 | 185.82 | 69. | 17. | 0.010 | 77.03 | 1.069s |
| PA-234 | 902.34 | 225.74 | 41. | 10. | 0.005 | 199.10 | 1.108s |
| PB-212 | 952.74 | 238.34 | 43. | 146. | 0.081 | 20.38 | 1.051 |
| PB-214 | 966.59 | 241.80 | 75. | 23. | 0.013 | 111.28 | 1.122s |
| EU-152 | 976.15 | 244.19 | 72. | -14. | -0.008 | 183.00 | 1.124s |
| TL-208 | 1106.98 | 276.88 | 37. | 15. | 0.008 | 118.73 | 1.155s |
| PB-214 | 1179.55 | 295.02 | 60. | 42. | 0.024 | 54.93 | 1.172 |
| PB-212 | 1202.81 | 300.83 | 43. | 2. | 0.001 | 924.81 | 1.176 |
| Ra-228 | 1351.13 | 337.90 | 23. | 32. | 0.018 | 54.93 | 1.212s |
| PB-214 | 1406.45 | 351.72 | 35. | 81. | 0.045 | 26.91 | 1.224s |
| TL-208 | 2041.93 | 510.52 | 69. | 6. | 0.003 | 56.55 | 1.370s |
| PA-234 | 2277.45 | 569.37 | 24. | 5. | 0.003 | 193.95 | 1.423s |
| TL-208 | 2331.26 | 582.81 | 24. | 46. | 0.026 | 37.33 | 1.435 |
| EU-154 | 2366.82 | 591.70 | 23. | 0. | 0.000 | 2000.00 | 1.443s |
| BI-214 | 2435.84 | 608.94 | 29. | 49. | 0.027 | 37.17 | 1.458s |
| CS-137 | 2643.39 | 660.80 | 21. | 3. | 0.001 | 526.33 | 1.505s |
| EU-154 | 2887.04 | 721.67 | 17. | 1. | 0.001 | 885.02 | 1.559 |
| BI-212 | 2909.09 | 727.17 | 22. | 4. | 0.002 | 288.73 | 1.563s |
| EU-154 | 3021.98 | 755.38 | 12. | 5. | 0.003 | 215.76 | 1.589s |
| TL-208 | 3058.96 | 764.62 | 24. | -4. | -0.002 | 363.34 | 1.594s |
| BI-214 | 3073.31 | 768.20 | 18. | 6. | 0.003 | 216.51 | 1.599 |
| BI-212 | 3141.32 | 785.19 | 16. | 2. | 0.001 | 520.77 | 1.614s |
| PA-234 | 3234.37 | 808.43 | 13. | 2. | 0.001 | 689.16 | 1.633s |
| PA-234 | 3330.54 | 832.46 | 17. | 2. | 0.001 | 377.14 | 1.653s |
| TL-208 | 3441.85 | 860.26 | 20. | 1. | 0.001 | 863.62 | 1.679s |
| EU-152 | 3470.39 | 867.39 | 18. | 0. | 0.000 | 2000.00 | 1.685s |
| PA-234 | 3532.66 | 882.94 | 14. | -2. | -0.001 | 439.94 | 1.698s |
| PA-234 | 3592.64 | 897.92 | 13. | 3. | 0.002 | 218.88 | 1.712s |
| Ra-228 | 3645.40 | 911.10 | 19. | 32. | 0.018 | 49.30 | 1.722s |

American Radiation Services Spectrum name: ARS06812.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 3858.29 | 964.28 | 18. | 7. | 0.004 | 184.29 | 1.767s |
| Ra-228 | 3858.20 | 964.25 | 18. | 7. | 0.004 | 178.87 | 1.768s |
| Ra-228 | 3876.31 | 968.78 | 27. | 5. | 0.003 | 232.33 | 1.771s |
| EU-154 | 3984.19 | 995.72 | 14. | 2. | 0.001 | 680.94 | 1.794s |
| EU-152 | 4342.17 | 1085.12 | 15. | -3. | -0.002 | 357.93 | 1.870s |
| EU-152 | 4452.06 | 1112.57 | 15. | 4. | 0.002 | 287.02 | 1.891s |
| BI-214 | 4484.12 | 1120.57 | 5. | 24. | 0.013 | 48.66 | 0.350s |
| CO-60 | 4700.45 | 1174.60 | 24. | -4. | -0.002 | 556.95 | 1.942s |
| BI-214 | 4952.03 | 1237.42 | 18. | 6. | 0.003 | 201.40 | 1.995s |
| CO-60 | 5336.99 | 1333.54 | 11. | 3. | 0.002 | 310.99 | 2.071s |
| BI-214 | 5513.74 | 1377.67 | 11. | 0. | 0.000 | 2000.00 | 2.107s |
| PA-234 | 5576.03 | 1393.22 | 13. | -2. | -0.001 | 584.10 | 2.120s |
| EU-152 | 5637.84 | 1408.65 | 13. | 2. | 0.001 | 614.92 | 2.131s |
| K-40 | 5845.61 | 1460.52 | 22. | 303. | 0.169 | 11.82 | 1.947 |
| BI-212 | 6486.71 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.297s |
| BI-214 | 7062.95 | 1764.39 | 3. | 11. | 0.006 | 66.57 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 1.0179E-01 | | | | | |
| | | | 143.76 | 7.384E-02 | ?(P | 3.093E-01 9.67E+01 G | |
| | | | 205.31 | -1.685E-02 | & P | 8.114E-01 1.00E+03 G | |
| | | | 163.35 | 1.642E-01 | &(P | 5.902E-01 8.85E+01 G | |
| RA-226 | | 4.1198E-01 | | | | | |
| | | | 186.21 | 4.120E-01 | ?(P | 9.792E-01 3.85E+01 G K | |
| Ra-228 | | 3.2654E-01 | | | | | |
| | | | 911.07 | 3.057E-01 | ?(P | 2.213E-01 2.47E+01 G | |
| | | | 968.90 | 8.058E-02 | - P | 4.487E-01 1.16E+02 G | |
| | | | 338.40 | 3.494E-01 | *(P | 2.783E-01 2.75E+01 G | |
| | | | 964.60 | 3.868E-01 | ?( | 1.181E+00 8.94E+01 G | |
| Am-241 | T | -2.9516E-03 | | | | | |
| | | | 59.54 | -2.952E-03 | &(P | 1.539E-01 1.73E+02 G K | |
| PB-210 | | 5.1384E-01 | | | | | |
| | | | 46.52 | 5.138E-01 | (P | 1.391E+00 3.23E+01 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| U-238 | 7.6307E-01 | | | | | | |
| | | 63.29 | 3.795E-01 | ?(P | 1.322E+00 | 4.23E+01 | G |
| | | 92.80 | 8.492E-01 | (P | 1.405E+00 | 3.41E+01 | G |
| | | 92.38 | 1.245E+00 | (P | 1.586E+00 | 3.36E+01 | G |
| K-40 | 1.1270E+01 | | | | | | |
| | | 1460.75 | 1.127E+01 | (P | 9.069E-01 | 5.91E+00 | G |
| PB-214 | 2.9939E-01 | | | | | | |
| | | 351.92 | 3.103E-01 | (P | 1.147E-01 | 1.35E+01 | G |
| | | 295.21 | 2.734E-01 | (P | 2.498E-01 | 2.75E+01 | G |
| | | 241.98 | 3.112E-01 | (P | 5.895E-01 | 5.56E+01 | G |
| BI-214 | 2.6447E-01 | | | | | | |
| | | 609.31 | 2.249E-01 | ?(P | 1.286E-01 | 1.86E+01 | G |
| | | 1764.49 | 3.433E-01 | ?(P | 3.446E-01 | 3.33E+01 | G |
| | | 1120.29 | 5.276E-01 | + P | 2.849E-01 | 2.43E+01 | G |
| | | 1238.11 | 3.348E-01 | &(P | 1.355E+00 | 1.01E+02 | G |
| | | 768.36 | 2.960E-01 | (P | 1.159E+00 | 1.08E+02 | G |
| | | 1377.67 | 0.000E+00 | - | 1.731E+00 | 1.00E+03 | G |
| | | 934.06 | -1.077E-02 | % P | 2.163E+00 | 1.32E+03 | G |
| BI-212 | 1.1154E-01 | | | | | | |
| | | 727.17 | 8.283E-02 | ?(P | 4.928E-01 | 1.44E+02 | G |
| | | 1620.56 | 0.000E+00 | - | 1.161E+00 | 1.00E+03 | G |
| | | 785.42 | 2.809E-01 | &( | 2.668E+00 | 2.60E+02 | G |
| PB-212 | 3.4317E-01 | | | | | | |
| | | 238.63 | 3.432E-01 | (P | 7.857E-02 | 1.02E+01 | G |
| | | 300.09 | 7.474E-02 | - | 1.226E+00 | 4.62E+02 | G |
| TL-208 | 1.0847E-01 | | | | | | |
| | | 583.14 | 1.085E-01 | (P | 5.990E-02 | 1.87E+01 | G |
| | | 510.72 | 4.577E-02 | - P | 3.336E-01 | 2.83E+01 | G |
| | | 860.47 | 3.327E-02 | - | 5.251E-01 | 4.32E+02 | G |
| | | 277.36 | 2.632E-01 | & P | 5.450E-01 | 5.94E+01 | G |
| | | 763.30 | -5.764E-01 | - P | 3.666E+00 | 1.82E+02 | G |
| PA-234 | 5.4634E-02 | | | | | | |
| | | 98.44 | -6.053E-03 | &(P | 1.275E-01 | 3.23E+04 | G |
| | | 946.00 | -2.038E-03 | & | 3.186E-01 | 4.18E+03 | G |
| | | 131.28 | 1.951E-02 | ?( | 1.546E-01 | 2.29E+02 | G |
| | | 94.67 | -4.546E-02 | & | 2.696E-01 | 1.74E+02 | G |
| | | 883.24 | -5.604E-02 | + | 4.502E-01 | 2.20E+02 | G |
| | | 926.70 | -1.749E-02 | % P | 8.717E-01 | 1.00E+03 | G |
| | | 569.26 | 1.032E-01 | ?(P | 4.842E-01 | 9.70E+01 | G |
| | | 111.00 | -7.429E-03 | & P | 3.699E-01 | 1.00E+03 | G |

American Radiation Services Spectrum name: ARS06812.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 733.00 | -2.010E-02 | % P | 7.148E-01 | 1.00E+03 | G |
| | | 949.00 | -2.508E-02 | % P | 7.262E-01 | 8.19E+03 | G |
| | | 880.51 | 1.221E-02 | % P | 7.727E-01 | 5.47E+02 | G |
| | | 226.87 | 1.444E-01 | ?( | 4.887E-01 | 9.96E+01 | G |
| | | 831.10 | 1.062E-01 | ?(P | 1.016E+00 | 1.89E+02 | G |
| | | 808.10 | 7.865E-02 | ?( | 1.009E+00 | 3.45E+02 | G |
| | | 99.70 | -1.570E-01 | + P | 6.990E-01 | 1.72E+02 | G |
| | | 699.10 | -2.042E-02 | % P | 1.032E+00 | 1.00E+03 | G |
| | | 898.60 | 2.374E-01 | ?(P | 1.351E+00 | 1.09E+02 | G |
| | | 1394.10 | -1.746E-01 | + | 1.890E+00 | 2.92E+02 | G |
| CS-137 | 6.4861E-03 | | | | | | |
| | | 661.66 | 6.486E-03 | &( | 6.161E-02 | 2.63E+02 | G |
| CO-60 | -2.0491E-04 | | | | | | |
| | | 1173.24 | -1.196E-02 | ?(P | 8.541E-02 | 2.78E+02 | K |
| | | 1332.50 | 1.154E-02 | ?(P | 6.762E-02 | 1.55E+02 | K |
| EU-152 | 4.0065E-02 | | | | | | |
| | | 40.12 | -2.932E-02 | ?(P | 1.982E-01 | 3.37E+02 | G |
| | | 121.78 | 4.246E-02 | (P | 1.034E-01 | 7.26E+01 | G |
| | | 344.30 | -4.253E-03 | & P | 1.881E-01 | 1.00E+03 | G |
| | | 1408.08 | 2.952E-02 | ?(P | 3.576E-01 | 3.07E+02 | G |
| | | 39.52 | -4.721E-02 | + | 3.798E-01 | 2.31E+02 | G |
| | | 964.00 | 1.418E-01 | ?( | 4.472E-01 | 9.21E+01 | G |
| | | 1112.07 | 9.546E-02 | &( | 4.876E-01 | 1.44E+02 | G |
| | | 778.90 | -1.867E-02 | % P | 4.341E-01 | 2.40E+03 | G |
| | | 1085.80 | -9.829E-02 | + | 6.339E-01 | 1.79E+02 | G |
| | | 45.40 | -7.388E-05 | % P | 6.307E-01 | 1.58E+04 | G |
| | | 244.67 | -1.865E-01 | + P | 5.732E-01 | 9.15E+01 | G |
| | | 867.39 | 0.000E+00 | - | 1.444E+00 | 1.00E+03 | G |
| EU-154 | 2.5585E-02 | | | | | | |
| | | 123.10 | -2.755E-03 | &( | 7.719E-02 | 8.00E+02 | G |
| | | 1274.80 | -9.856E-05 | % P | 2.777E-01 | 1.00E+03 | G |
| | | 723.30 | 1.618E-02 | ( | 2.638E-01 | 4.43E+02 | G |
| | | 1004.80 | -9.444E-03 | % P | 3.544E-01 | 1.86E+03 | G |
| | | 43.00 | -2.276E-02 | + | 4.386E-01 | 5.49E+02 | G |
| | | 873.20 | -1.337E-02 | % P | 5.438E-01 | 2.01E+03 | G |
| | | 996.30 | 4.503E-02 | &( | 5.668E-01 | 3.40E+02 | G |
| | | 42.31 | -3.452E-03 | % | 5.996E-01 | 4.79E+03 | G |
| | | 248.04 | -1.276E-02 | % P | 4.711E-01 | 1.25E+03 | G |
| | | 591.70 | 0.000E+00 | - | 1.101E+00 | 1.00E+03 | G |
| | | 48.70 | -2.582E-01 | + | 1.307E+00 | 1.48E+02 | G |
| | | 756.70 | 2.997E-01 | ?( | 1.131E+00 | 1.08E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 1.0179E-01 | 1.6364E-01 | 1.6386E-01 | 0.309E+00 |
| RA-226 #A | 4.1198E-01 | 5.6325E-01 | 5.6434E-01 | 0.979E+00 |
| Ra-228 # | 3.2654E-01 | 1.6944E-01 | 1.7085E-01 | 0.221E+00 |
| Am-241 #B | -2.9516E-03 | 1.0723E-01 | 1.0723E-01 | 0.154E+00 |
| PB-210 #A | 5.1384E-01 | 7.7456E-01 | 7.7621E-01 | 0.139E+01 |
| U-238 #A | 7.6307E-01 | 5.9847E-01 | 6.0144E-01 | 0.132E+01 |
| K-40 | 1.1270E+01 | 1.3950E+00 | 1.5741E+00 | 0.907E+00 |
| PB-214 # | 2.9939E-01 | 8.7958E-02 | 9.2136E-02 | 0.115E+00 |
| BI-214 | 2.6447E-01 | 1.0943E-01 | 1.1065E-01 | 0.129E+00 |
| BI-212 #A | 1.1154E-01 | 3.4499E-01 | 3.4507E-01 | 0.493E+00 |
| PB-212 | 3.4317E-01 | 7.3417E-02 | 7.9961E-02 | 0.786E-01 |
| TL-208 # | 1.0847E-01 | 4.4408E-02 | 4.4957E-02 | 0.599E-01 |
| PA-234 #A | 5.4634E-02 | 1.0878E-01 | 1.0885E-01 | 0.128E+00 |
| CS-137 #A | 6.4861E-03 | 3.4138E-02 | 3.4139E-02 | 0.616E-01 |
| CO-60 #A | -2.0491E-04 | 6.6132E-04 | 6.6138E-04 | 0.854E-01 |
| EU-152 #A | 4.0065E-02 | 5.8641E-02 | 5.8811E-02 | 0.198E+00 |
| EU-154 A | 2.5585E-02 | 5.5202E-02 | 5.5235E-02 | 0.772E-01 |

American Radiation Services  Spectrum name: ARS06812.An1

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 48.7 to 1998.2 keV) | 1.190E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-07 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-003 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 003 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 5.0619E-02 | pCi/g | 4.4590E-02 | 5.6400E-02 | 2.8200E-02 | | | |
| RA-226 | 5.0003E-01 | pCi/g | 7.0127E-01 | 9.7500E-01 | 4.8750E-01 | | | |
| RA-228 | 4.3745E-01 | pCi/g | 1.6235E-01 | 1.6400E-01 | 8.2000E-02 | | | |
| AM-241 | 1.1415E-02 | pCi/g | 6.3780E-02 | 1.1000E-01 | 5.5000E-02 | | | |
| PB-210 | 9.7123E-01 | pCi/g | 8.7052E-01 | 1.2100E+00 | 6.0500E-01 | | | |
| U-238 | 5.3732E-01 | pCi/g | 6.4711E-01 | 1.0300E+00 | 5.1500E-01 | | | |
| K-40 | 1.1849E+01 | pCi/g | 1.5088E+00 | 2.5500E-01 | 1.2750E-01 | | | |
| PB-214 | 3.8668E-01 | pCi/g | 1.0234E-01 | 1.0300E-01 | 5.1500E-02 | | | |
| BI-214 | 2.8368E-01 | pCi/g | 9.1712E-02 | 1.0600E-01 | 5.3000E-02 | | | |
| BI-212 | 1.2907E-01 | pCi/g | 2.0968E-01 | 5.6500E-01 | 2.8250E-01 | | | |
| PB-212 | 3.7908E-01 | pCi/g | 7.7805E-02 | 7.5100E-02 | 3.7550E-02 | | | |
| TL-208 | 1.4586E-01 | pCi/g | 4.7021E-02 | 4.4600E-02 | 2.2300E-02 | | | |
| PA-234 | 1.2280E-01 | pCi/g | 1.4988E-01 | 1.3600E-01 | 6.8000E-02 | | | |
| CS-137 | 2.2119E-02 | pCi/g | 3.0445E-02 | 3.9400E-02 | 1.9700E-02 | | | |
| CO-60 | 1.9214E-02 | pCi/g | 1.5708E-02 | 5.8600E-02 | 2.9300E-02 | | | |
| EU-152 | 1.3795E-01 | pCi/g | 1.5232E-01 | 1.9700E-01 | 9.8500E-02 | | | |
| EU-154 D,0002E+00 | ~~1.1356E-01~~ | pCi/g | 8.6534E-02 | 8.2200E-02 | 4.1100E-02 | | | |
| Total Gamma | 1.6097E+01 | pCi/g | | | | | | |
| Total NORM Activity | 4.5669E+01 | pCi/g | | | | | | |
| | | | | | | | | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

Sample description
Batch ID: 16-00563-07
SDG: ARS1-16-00670-003 Tech: WJS

Spectrum Filename: C:\User\ARS08216.An1

Acquisition information
Start time: 4/19/2016 7:49:49 AM
Live time: 1800
Real time: 1808
Dead time: 0.42 %
Detector ID: 9

Detector system
(ARS08) MCB 129

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration
Created: 12/12/2014 9:34:56 AM
Zero offset: 0.447 keV
Gain: 0.250 keV/channel
Quadratic: -3.417E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2015 10:02:55 AM
Type: Polynomial
Uncertainty: 1.535 %
Coefficients: -0.447430 -4.056056 0.358945
-0.033786 0.001201 -0.000016

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G702W050
Start channel: 100 ( 25.46keV )
Stop channel: 8000 ( 1999.20keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 1
Sample Size: 3.5827E+02 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.5827E+02) =
2.7912E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1668

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.39 | 20. | 54.92 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 1.086E-01 | EU152 |
| | | | | | 40.12 | 30.000 | 1.086E-01 | EU152 |
| | | | | | 39.52 | 16.000 | 2.073E-01 | EU152 |
| 39.77 | 10. | 121.45 | 0.97 | 2.638E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 5.295E-02 | EU152 |
| 43.24 | 5. | 235.93 | 0.97 | 2.866E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 5.953E-02 | EU154 |
| | | | | | 42.31 | 7.300 | 2.753E-02 | EU154 |
| 46.63 | 29. | 44.54 | 0.97 | 3.135E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.44 | 4. | 279.34 | 0.99 | 4.205E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 60.94 | 10. | 126.24 | 0.99 | 4.312E-02 | | | | |
| 62.25 | 5. | 220.22 | 0.99 | 4.403E-02 | 63.29 | 3.900 | 1.252E-01 | U238 |
| 63.52 | 9. | 160.64 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 68.13 | 8. | 100.00 | 0.45 | 4.773E-02 | | | | |
| 75.14 | 61. | 24.28 | 1.01 | 5.142E-02 | | | | |
| 77.13 | 133. | 12.68 | 1.01 | 5.230E-02 | | | | |
| 87.33 | 48. | 28.65 | 1.02 | 5.574E-02 | | | | |
| 89.63 | 24. | 55.20 | 1.02 | 5.629E-02 | | | | |
| 92.81 | 30. | 60.09 | 1.02 | 5.685E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.99 | 27. | 68.24 | 1.03 | 5.693E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 98.73 | 5. | 296.54 | 1.03 | 5.774E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 98.44 | 25.100 | 1.542E-02 | PA234 |
| 99.60 | 6. | 255.77 | 1.03 | 5.787E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 9.246E-02 | PA234 |
| 110.76 | 18. | 63.73 | 0.33 | 5.834E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| | | | | | 111.00 | 8.550 | 1.478E-01 | PA234 |
| 122.30 | 6. | 227.85 | 1.06 | 5.790E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |
| | | | | | 121.78 | 29.240 | 1.527E-02 | EU152 |
| 154.61 | 11. | 67.13 | 0.33 | 5.393E-02 | | | | |
| 163.43 | 5. | 250.41 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.76 | 32. | 43.89 | 1.13 | 4.920E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 7.500E-01 | RA226 |
| | | | | | 185.72 | 57.200 | 4.766E-02 | U235 |
| | | | | | 186.21 | 3.640 | 7.500E-01 | RA226 |
| 186.10 | 21. | 70.06 | 1.13 | 4.912E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 5.000E-01 | RA226 |
| 238.65 | 164. | 9.55 | 1.18 | 4.206E-02 | 238.63 | 43.100 | 3.791E-01 | PB212 |
| 241.36 | 35. | 34.28 | 1.18 | 4.175E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 244.25 | 5. | 230.59 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 6.430E-02 | EU152 |
| 247.85 | 16. | 63.68 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 2.531E-01 | EU154 |
| 263.92 | 19. | 49.31 | 0.31 | 3.928E-02 | | | | |
| 277.25 | 13. | 71.12 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 283.39 | 7. | 55.59 | 0.28 | 3.738E-02 | | | | |
| 294.95 | 58. | 22.61 | 0.92 | 3.634E-02 | 295.21 | 18.500 | 3.618E-01 | PB214 |
| 300.67 | 4. | 268.10 | 1.25 | 3.590E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.81 | 46. | 29.43 | 0.30 | 3.297E-02 | 338.40 | 12.010 | 4.889E-01 | Ra228 |
| 351.73 | 114. | 12.26 | 1.30 | 3.208E-02 | 351.92 | 35.800 | 4.129E-01 | PB214 |
| 398.55 | 14. | 43.57 | 0.44 | 2.936E-02 | | | | |
| 483.68 | 9. | 50.61 | 0.35 | 2.562E-02 | | | | |
| 498.01 | 6. | 73.75 | 0.31 | 2.510E-02 | | | | |
| 511.14 | 96. | 16.87 | 0.87 | 2.465E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.23 | 67. | 15.79 | 0.40 | 2.248E-02 | 583.14 | 86.000 | 1.459E-01 | TL208 |
| 591.53 | 5. | 134.91 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 597.35 | 19. | 33.88 | 0.72 | 2.211E-02 | | | | |
| 609.42 | 70. | 14.88 | 1.56 | 2.181E-02 | 609.31 | 44.791 | 2.897E-01 | BI214 |
| 612.48 | 4. | 231.22 | 1.56 | 2.173E-02 | | | | |
| 655.34 | 2. | 260.34 | 0.19 | 2.073E-02 | | | | |
| 662.48 | 9. | 68.79 | 1.61 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| | | | | | 661.66 | 85.210 | PBC<MDA | CS137 |
| 679.10 | 7. | 49.43 | 0.27 | 2.022E-02 | | | | |
| 756.50 | 9. | 72.26 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 4.906E-01 | EU154 |
| 763.84 | 4. | 163.98 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 785.63 | 10. | 81.16 | 1.72 | 1.826E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| | | | | | 785.42 | 2.000 | 1.090E+00 | BI212 |
| 860.04 | 16. | 48.35 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 867.00 | 4. | 173.63 | 1.80 | 1.702E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | 2.654E-01 | EU152 |
| 873.59 | 9. | 61.72 | 1.80 | 1.694E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| | | | | | 873.20 | 11.300 | PBC<MDA | EU154 |
| 883.06 | 16. | 60.91 | 1.81 | 1.680E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | 3.257E-01 | PA234 |
| 911.34 | 47. | 21.63 | 0.38 | 1.642E-02 | 911.07 | 29.000 | 4.161E-01 | Ra228 |
| 934.27 | 14. | 43.07 | 1.85 | 1.613E-02 | 934.06 | 3.029 | 1.173E+00 | BI214 |
| 946.68 | 8. | 106.71 | 1.86 | 1.598E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| | | | | | 946.00 | 20.000 | 9.833E-02 | PA234 |
| 948.41 | 9. | 81.51 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 963.53 | 11. | 99.43 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 5.387E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | PBC<MDA | EU152 |
| 969.40 | 21. | 29.62 | 0.70 | 1.570E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 996.53 | 15. | 40.46 | 1.91 | 1.538E-02 | 996.30 | 10.700 | 3.776E-01 | EU154 |
| | | | | | 996.30 | 10.700 | 3.776E-01 | EU154 |
| 1004.84 | 17. | 37.94 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | 2.582E-01 | EU154 |
| | | | | | 1004.80 | 17.600 | 2.582E-01 | EU154 |
| 1084.63 | 7. | 106.62 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.46 | 3. | 401.25 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1172.94 | 6. | 129.67 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| | | | | | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1237.65 | 12. | 73.08 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1332.02 | 6. | 40.82 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| | | | | | 1332.50 | 99.982 | 2.051E-02 | CO60 |
| 1461.03 | 344. | 5.39 | 1.45 | 1.134E-02 | 1460.75 | 10.700 | 1.185E+01 | K40 |
| 1606.96 | 10. | 31.62 | 0.37 | 1.042E-02 | | | | |
| 1621.60 | 2. | 385.00 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| | | | | | 1620.56 | 2.750 | 2.212E-01 | BI212 |
| 1762.83 | 1. | 200.00 | 0.20 | 9.544E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |
| 1847.89 | 7. | 37.80 | 0.37 | 9.111E-03 | | | | |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 241.82 | 61.03 | 77. | 16. | 3.677E+02 | 164.51 | 0.990 | W-187 | |
| 247.05 | 62.34 | 66. | 10. | 2.362E+02 | 228.86 | 0.992 | TH-234 | |
| 270.62 | 68.13 | 33. | 8. | 1.718E+02 | 200.00 | 0.445 | GD-153 | |
| 298.62 | 75.18 | 78. | 61. | 1.181E+03 | 48.57 | 1.006 | TH-234 | D |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

| Channel | Energy | Background | Net area | Eff*Area | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 306.58 | 77.17 | 76. | 133. | 2.546E+03 | 25.35 | 1.008 | PB-212 | D |
| 347.37 | 87.33 | 69. | 48. | 8.533E+02 | 57.31 | 1.019 | PB-212 | D |
| 356.56 | 89.63 | 79. | 24. | 4.350E+02 | 110.40 | 1.022 | GD-153 | D |
| 441.06 | 110.76 | 46. | 18. | 3.051E+02 | 127.46 | 0.328 | PA-234M | s |
| 616.41 | 154.61 | 23. | 11. | 2.003E+02 | 134.26 | 0.329 | ND-147 | sc |
| 1053.57 | 263.92 | 23. | 19. | 4.736E+02 | 98.62 | 0.308 | TA-182 | sM |
| 1131.42 | 283.39 | 6. | 7. | 1.980E+02 | 111.17 | 0.284 | - | s |
| 1591.99 | 398.55 | 10. | 14. | 4.905E+02 | 87.14 | 0.437 | ND-147 | s |
| 1932.54 | 483.68 | 5. | 9. | 3.591E+02 | 101.22 | 0.346 | - | s |
| 1989.84 | 498.01 | 6. | 6. | 2.271E+02 | 147.49 | 0.310 | CE-143 | sc |
| 2042.36 | 511.14 | 29. | 96. | 3.903E+03 | 33.73 | 0.867 | NA-22 | l |
| 2387.26 | 597.35 | 7. | 19. | 8.638E+02 | 67.76 | 0.720 | - | s |
| 2448.16 | 612.46 | 32. | 4. | 1.639E+02 | 464.51 | 1.559 | RU-103 | sc |
| 2619.28 | 655.34 | 7. | 2. | 8.682E+01 | 520.68 | 0.187 | - | sc |
| 2714.34 | 679.10 | 3. | 7. | 3.659E+02 | 98.86 | 0.270 | - | sM |
| 6428.67 | 1606.96 | 0. | 10. | 9.601E+02 | 63.25 | 0.375 | - | s |
| 7393.75 | 1847.89 | 0. | 7. | 7.683E+02 | 75.59 | 0.374 | BI-214 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | |
|---|---|---|---|---|---|---|---|---|
| EU-152 | 155.69 | 39.39 | 42. | 20. | 0.011 | 109.84 | 0.967 | s |
| EU-152 | 157.24 | 39.77 | 55. | 10. | 0.006 | 242.90 | 0.967 | s |
| EU-154 | 165.40 | 41.82 | 80. | 0. | 0.000 | 2000.00 | 0.970 | s |
| EU-154 | 171.07 | 43.24 | 57. | 5. | 0.003 | 471.86 | 0.970 | s |
| EU-152 | 183.68 | 46.39 | 99. | 0. | 0.000 | 2000.00 | 0.973 | s |
| PB-210 | 184.63 | 46.63 | 52. | 29. | 0.016 | 89.07 | 0.974 | |
| EU-154 | 190.17 | 48.01 | 86. | 0. | 0.000 | 2000.00 | 0.977 | |
| Am-241 | 236.27 | 59.54 | 63. | 4. | 0.002 | 558.68 | 0.989 | D |
| U-238 | 252.20 | 63.52 | 74. | 9. | 0.005 | 321.28 | 0.993 | s |
| U-238 | 369.29 | 92.81 | 111. | 30. | 0.017 | 120.17 | 1.025 | s |
| U-238 | 370.00 | 92.99 | 118. | 27. | 0.015 | 136.48 | 1.025 | s |
| PA-234 | 372.37 | 93.58 | 139. | -21. | -0.012 | 190.96 | 1.027 | s |
| PA-234 | 392.95 | 98.73 | 91. | 5. | 0.003 | 593.09 | 1.031 | s |
| PA-234 | 396.43 | 99.60 | 85. | 6. | 0.003 | 511.53 | 1.033 | s |
| PA-234 | 442.36 | 111.08 | 63. | 8. | 0.005 | 316.57 | 1.045 | s |
| EU-152 | 487.22 | 122.30 | 71. | 6. | 0.003 | 455.69 | 1.057 | s |
| EU-154 | 487.86 | 122.46 | 86. | 0. | 0.000 | 2000.00 | 1.058 | s |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-235 | 575.14 | 144.29 | 82. | 0. | 0.000 | 2000.00 | 1.081s |
| U-235 | 651.69 | 163.43 | 54. | 5. | 0.003 | 500.82 | 1.102 |
| U-235 | 740.97 | 185.76 | 57. | 32. | 0.018 | 87.79 | 1.126s |
| RA-226 | 742.35 | 186.10 | 70. | 21. | 0.012 | 140.11 | 1.126s |
| U-235 | 815.00 | 204.27 | 93. | 0. | 0.000 | 2000.00 | 1.147s |
| PA-234 | 904.67 | 226.69 | 70. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 41. | 164. | 0.091 | 19.21 | 1.182D |
| PB-214 | 965.81 | 241.98 | 56. | 24. | 0.013 | 97.68 | 1.186D |
| EU-152 | 974.90 | 244.25 | 41. | 5. | 0.003 | 461.18 | 1.188s |
| EU-154 | 989.28 | 247.85 | 32. | 16. | 0.009 | 127.35 | 1.192s |
| TL-208 | 1106.87 | 277.25 | 26. | 13. | 0.007 | 142.24 | 1.223 |
| PB-214 | 1177.66 | 294.95 | 38. | 58. | 0.032 | 45.22 | 0.924s |
| PB-212 | 1200.51 | 300.67 | 46. | 4. | 0.002 | 536.20 | 1.246s |
| Ra-228 | 1349.06 | 337.81 | 41. | 46. | 0.026 | 58.87 | 0.300s |
| EU-152 | 1375.16 | 344.33 | 40. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1404.72 | 351.73 | 30. | 113. | 0.063 | 25.05 | 1.298 |
| TL-208 | 2042.09 | 511.07 | 126. | 0. | 0.000 | 2000.00 | 2.710s |
| PA-234 | 2271.83 | 568.50 | 31. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2330.77 | 583.23 | 15. | 67. | 0.037 | 31.57 | 0.402s |
| EU-154 | 2364.00 | 591.53 | 13. | 5. | 0.003 | 269.81 | 1.539s |
| BI-214 | 2435.12 | 609.31 | 22. | 68. | 0.038 | 31.72 | 1.556D |
| CS-137 | 2647.85 | 662.48 | 9. | 9. | 0.005 | 137.57 | 1.606s |
| PA-234 | 2795.67 | 699.43 | 27. | 0. | 0.000 | 2000.00 | 1.641s |
| EU-154 | 2890.08 | 723.02 | 22. | -2. | -0.001 | 740.81 | 1.664s |
| BI-212 | 2908.52 | 727.63 | 36. | -3. | -0.002 | 778.03 | 1.667s |
| PA-234 | 2929.00 | 732.75 | 41. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3024.05 | 756.50 | 9. | 9. | 0.005 | 144.53 | 1.695s |
| TL-208 | 3053.40 | 763.84 | 14. | 4. | 0.002 | 327.96 | 1.701 |
| BI-214 | 3070.50 | 768.11 | 27. | -5. | -0.003 | 409.68 | 1.705s |
| EU-152 | 3109.07 | 777.75 | 18. | 0. | 0.000 | 2000.00 | 1.715s |
| BI-212 | 3140.61 | 785.63 | 14. | 10. | 0.005 | 162.32 | 1.721s |
| PA-234 | 3228.04 | 807.48 | 32. | -4. | -0.002 | 488.99 | 1.742s |
| TL-208 | 3438.36 | 860.04 | 10. | 16. | 0.009 | 96.69 | 1.789s |
| EU-152 | 3466.22 | 867.00 | 14. | 4. | 0.002 | 347.26 | 1.795s |
| EU-154 | 3492.58 | 873.59 | 7. | 9. | 0.005 | 123.45 | 1.800s |
| PA-234 | 3525.60 | 881.84 | 30. | 0. | 0.000 | 2000.00 | 1.807s |
| PA-234 | 3530.49 | 883.06 | 19. | 16. | 0.009 | 121.82 | 1.809s |
| PA-234 | 3594.00 | 898.93 | 43. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.66 | 911.34 | 12. | 47. | 0.026 | 43.25 | 0.381s |
| PA-234 | 3702.00 | 925.91 | 35. | 0. | 0.000 | 2000.00 | 1.848s |
| BI-214 | 3735.43 | 934.27 | 5. | 14. | 0.008 | 86.13 | 1.854s |
| PA-234 | 3785.12 | 946.68 | 14. | 8. | 0.004 | 213.42 | 1.864s |
| PA-234 | 3792.02 | 948.41 | 11. | 9. | 0.005 | 163.01 | 1.867s |
| EU-152 | 3852.56 | 963.53 | 27. | 11. | 0.006 | 198.86 | 1.880s |
| Ra-228 | 3853.26 | 963.71 | 52. | -13. | -0.007 | 236.58 | 1.881s |
| Ra-228 | 3874.14 | 968.93 | 31. | 8. | 0.004 | 221.69 | 1.884 |
| EU-154 | 3984.62 | 996.53 | 5. | 15. | 0.008 | 80.92 | 1.908s |
| EU-154 | 4017.90 | 1004.84 | 5. | 17. | 0.009 | 75.89 | 1.915s |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 4337.28 | 1084.63 | 11. | 7. | 0.004 | 213.23 | 1.984s |
| EU-152 | 4445.76 | 1111.74 | 22. | -5. | -0.003 | 399.20 | 2.006s |
| BI-214 | 4480.67 | 1120.46 | 33. | 3. | 0.002 | 802.50 | 2.013s |
| CO-60 | 4690.77 | 1172.94 | 12. | 6. | 0.003 | 259.35 | 2.056s |
| BI-214 | 4949.83 | 1237.65 | 16. | 12. | 0.007 | 146.16 | 2.109s |
| EU-154 | 5092.80 | 1273.36 | 18. | 0. | 0.000 | 2000.00 | 2.137s |
| CO-60 | 5327.67 | 1332.02 | 0. | 6. | 0.003 | 81.65 | 2.183s |
| BI-214 | 5512.58 | 1378.20 | 30. | 0. | 0.000 | 2000.00 | 2.217 |
| PA-234 | 5576.08 | 1394.06 | 18. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5627.50 | 1406.90 | 19. | 0. | 0.000 | 2000.00 | 2.240s |
| K-40 | 5844.24 | 1461.03 | 1. | 343. | 0.191 | 10.84 | 1.451s |
| BI-212 | 6487.31 | 1621.60 | 6. | 2. | 0.001 | 769.99 | 2.394s |
| BI-214 | 7059.57 | 1764.47 | 14. | 9. | 0.005 | 186.66 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 5.0619E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 4.766E-02 | ( | 5.643E-02 | 4.39E+01 | 5.72E+01 G K |
| | | | 143.76 | 0.000E+00 | - P | 3.227E-01 | 1.00E+03 | 1.05E+01 G |
| | | | 205.31 | 0.000E+00 | - P | 9.145E-01 | 1.00E+03 | 4.70E+00 G |
| | | | 163.35 | 8.664E-02 | ?(P | 6.258E-01 | 2.50E+02 | 4.70E+00 G |
| RA-226 | | 5.0003E-01 | | | | 5.84E+05 | | |
| | | | 186.21 | 5.000E-01 | ( | 9.752E-01 | 7.01E+01 | 3.64E+00 G K |
| Ra-228 | | 4.3745E-01 | | | | 2.10E+03 | | |
| | | | 911.07 | 4.161E-01 | ( | 1.641E-01 | 2.16E+01 | 2.90E+01 G |
| | | | 968.90 | 1.166E-01 | - P | 4.403E-01 | 1.11E+02 | 1.75E+01 G |
| | | | 338.40 | 4.889E-01 | ( | 3.437E-01 | 2.94E+01 | 1.20E+01 G |
| | | | 964.60 | -6.180E-01 | - | 1.766E+00 | 1.18E+02 | 5.45E+00 G |
| Am-241 | T | 1.1415E-02 | | | | 1.58E+05 | | |
| | | | 59.54 | 1.142E-02 | (P | 1.101E-01 | 2.79E+02 | 3.59E+01 G K |
| PB-210 | | 9.7123E-01 | | | | 7.45E+03 | | |
| | | | 46.52 | 9.712E-01 | ?(P | 1.213E+00 | 4.45E+01 | 4.00E+00 G |
| U-238 | | 5.3732E-01 | | | | 1.63E+12 | | |
| | | | 63.29 | 2.175E-01 | ?(P | 1.029E+00 | 1.61E+02 | 3.90E+00 G |
| | | | 92.80 | 6.691E-01 | (P | 1.307E+00 | 6.82E+01 | 3.00E+00 G |
| | | | 92.38 | 8.689E-01 | &(P | 1.484E+00 | 6.01E+01 | 2.57E+00 G |

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Spectrum name: ARS08216.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.1849E+01 | | | | | 4.68E+11 | |
| | | 1460.75 | 1.185E+01 | (P | 2.545E-01 | 5.42E+00 | 1.07E+01 G |
| PB-214 | 3.8668E-01 | | | | | 5.84E+05 | |
| | | 351.92 | 4.129E-01 | (P | 1.029E-01 | 1.25E+01 | 3.58E+01 G |
| | | 295.21 | 3.618E-01 | ( | 1.961E-01 | 2.26E+01 | 1.85E+01 G |
| | | 241.98 | 3.228E-01 | (P | 5.036E-01 | 4.88E+01 | 7.50E+00 G |
| BI-214 | 2.8368E-01 | | | | | 5.84E+05 | |
| | | 609.31 | 2.897E-01 | (P | 1.064E-01 | 1.59E+01 | 4.48E+01 G |
| | | 1764.49 | 2.660E-01 | &(P | 5.713E-01 | 9.33E+01 | 1.54E+01 G |
| | | 1120.29 | 6.035E-02 | - | 5.930E-01 | 4.01E+02 | 1.48E+01 G |
| | | 1238.11 | 6.869E-01 | + | 1.189E+00 | 7.31E+01 | 5.86E+00 G |
| | | 768.36 | -2.354E-01 | - | 1.268E+00 | 2.05E+02 | 4.80E+00 G |
| | | 1377.67 | 0.000E+00 | - P | 2.548E+00 | 1.00E+03 | 3.92E+00 G |
| | | 934.06 | 1.173E+00 | + P | 1.155E+00 | 4.31E+01 | 3.03E+00 G |
| BI-212 | 1.2907E-01 | | | | | 2.10E+03 | |
| | | 727.17 | -5.526E-02 | ?( | 5.650E-01 | 3.89E+02 | 1.18E+01 G |
| | | 1620.56 | 2.212E-01 | ?( | 2.152E+00 | 3.85E+02 | 2.75E+00 G |
| | | 785.42 | 1.090E+00 | ?( | 2.275E+00 | 8.12E+01 | 2.00E+00 G |
| PB-212 | 3.7908E-01 | | | | | 2.10E+03 | |
| | | 238.63 | 3.791E-01 | (P | 7.506E-02 | 9.60E+00 | 4.31E+01 G |
| | | 300.09 | 1.606E-01 | & | 1.219E+00 | 2.68E+02 | 3.27E+00 G |
| TL-208 | 1.4586E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 1.459E-01 | ( | 4.459E-02 | 1.58E+01 | 8.60E+01 G |
| | | 510.72 | 0.000E+00 | - P | 4.150E-01 | 1.00E+03 | 2.25E+01 G |
| | | 860.47 | 3.168E-01 | + P | 3.630E-01 | 4.83E+01 | 1.20E+01 G |
| | | 277.36 | 2.260E-01 | + P | 4.475E-01 | 7.11E+01 | 6.50E+00 G |
| | | 763.30 | 5.953E-01 | + | 2.623E+00 | 1.64E+02 | 1.70E+00 G |
| PA-234 | 1.2280E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 1.542E-02 | ?( | 1.362E-01 | 2.97E+02 | 2.51E+01 G |
| | | 946.00 | 9.833E-02 | ?( | 2.682E-01 | 1.07E+02 | 2.00E+01 G |
| | | 131.28 | 4.286E-03 | % | 1.541E-01 | 1.19E+03 | 2.00E+01 G |
| | | 94.67 | -9.841E-02 | + | 2.722E-01 | 9.55E+01 | 1.55E+01 G |
| | | 883.24 | 3.257E-01 | ?( | 4.823E-01 | 6.09E+01 | 1.20E+01 G |
| | | 926.70 | 0.000E+00 | - P | 7.094E-01 | 1.00E+03 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | & P | 5.015E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 7.105E-02 | ?(P | 3.324E-01 | 1.58E+02 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | - P | 8.382E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 2.939E-01 | ?(P | 6.186E-01 | 8.15E+01 | 7.80E+00 G |
| | | 880.51 | 0.000E+00 | - P | 1.076E+00 | 1.00E+03 | 6.50E+00 G |
| | | 226.87 | 0.000E+00 | - P | 6.176E-01 | 1.00E+03 | 6.50E+00 G |
| | | 831.10 | -2.133E-02 | % | 8.724E-01 | 1.51E+03 | 5.60E+00 G |

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Spectrum name: ARS08216.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | -2.150E-01 | + | 1.379E+00 | 2.44E+02 | 4.90E+00 G |
| | | 99.70 | 9.246E-02 | ?( | 7.038E-01 | 2.56E+02 | 4.70E+00 G |
| | | 699.10 | 0.000E+00 | & | 1.238E+00 | 1.00E+03 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 2.095E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | & P | 2.042E+00 | 1.00E+03 | 3.90E+00 G |
| CS-137 | 2.2119E-02 | | | | | 1.10E+04 | |
| | | 661.66 | 2.212E-02 | &(P | 3.937E-02 | 6.88E+01 | 8.52E+01 G |
| CO-60 | 1.9214E-02 | | | | | 1.93E+03 | |
| | | 1173.24 | 1.791E-02 | ?(P | 5.864E-02 | 1.30E+02 | 9.99E+01 K |
| | | 1332.50 | 2.051E-02 | ?( | 2.520E-02 | 4.08E+01 | 1.00E+02 K |
| EU-152 | 1.3795E-01 | | | | | 4.64E+03 | |
| | | 40.12 | 5.295E-02 | ?( | 1.973E-01 | 1.21E+02 | 3.00E+01 G |
| | | 121.78 | 1.527E-02 | - | 1.038E-01 | 2.28E+02 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | - P | 1.533E-01 | 1.00E+03 | 2.70E+01 G |
| | | 1408.08 | 0.000E+00 | & P | 3.882E-01 | 1.00E+03 | 2.12E+01 G |
| | | 39.52 | 2.073E-01 | ?( | 3.345E-01 | 5.49E+01 | 1.60E+01 G |
| | | 964.00 | 2.013E-01 | ?(P | 4.906E-01 | 9.94E+01 | 1.46E+01 G |
| | | 1112.07 | -1.090E-01 | + | 5.354E-01 | 2.00E+02 | 1.36E+01 G |
| | | 778.90 | 0.000E+00 | - | 3.948E-01 | 1.00E+03 | 1.30E+01 G |
| | | 1085.80 | 1.910E-01 | &(P | 5.177E-01 | 1.07E+02 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 7.489E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | 6.430E-02 | ?( | 4.338E-01 | 2.31E+02 | 7.62E+00 G |
| | | 867.39 | 2.654E-01 | ?( | 1.206E+00 | 1.74E+02 | 4.18E+00 G |
| EU-154 | 1.1356E-01 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | &(P | 8.215E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 0.000E+00 | ?( | 2.062E-01 | 1.00E+03 | 3.55E+01 G |
| | | 723.30 | -2.748E-02 | & | 2.728E-01 | 3.70E+02 | 1.97E+01 G |
| | | 1004.80 | 2.582E-01 | ?(P | 2.112E-01 | 3.79E+01 | 1.76E+01 G |
| | | 43.00 | 5.953E-02 | &( | 4.218E-01 | 2.36E+02 | 1.31E+01 G |
| | | 873.20 | 2.038E-01 | &(P | 3.233E-01 | 6.17E+01 | 1.13E+01 G |
| | | 996.30 | 3.776E-01 | ?( | 3.387E-01 | 4.05E+01 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | - P | 9.091E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | 2.531E-01 | ?( | 4.483E-01 | 6.37E+01 | 6.60E+00 G |
| | | 591.70 | 2.169E-01 | &(P | 7.907E-01 | 1.35E+02 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | - P | 1.372E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | 4.906E-01 | ?( | 9.099E-01 | 7.23E+01 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

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Spectrum name: ARS08216.An1

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.39 | 42. | 20. | 0.011 | 109.84 | 2.073E-01 | |
| EU-152 | 39.77 | 55. | 10. | 0.006 | 242.90 | 5.295E-02 | |
| EU-154 | 43.24 | 57. | 5. | 0.003 | 471.86 | 5.953E-02 | |
| PB-210 | 46.63 | 52. | 29. | 0.016 | 89.07 | 9.712E-01 | P |
| U-238 | 63.52 | 74. | 9. | 0.005 | 321.28 | 2.175E-01 | P |
| U-238 | 92.81 | 111. | 30. | 0.017 | 120.17 | 8.689E-01 | P |
| U-238 | 92.99 | 118. | 27. | 0.015 | 136.48 | 6.691E-01 | P |
| PA-234 | 93.58 | 139. | -21. | -0.012 | 190.96 | -9.841E-02 | |
| PA-234 | 98.73 | 91. | 5. | 0.003 | 593.09 | 1.542E-02 | |
| PA-234 | 99.60 | 85. | 6. | 0.003 | 511.53 | 9.246E-02 | |
| PA-234 | 111.08 | 63. | 8. | 0.005 | 316.57 | 7.105E-02 | P |
| EU-152 | 122.30 | 71. | 6. | 0.003 | 455.69 | 1.527E-02 | |
| U-235 | 163.43 | 54. | 5. | 0.003 | 500.82 | 8.664E-02 | P |
| U-235 | 185.76 | 57. | 32. | 0.018 | 87.79 | 4.766E-02 | |
| RA-226 | 186.10 | 70. | 21. | 0.012 | 140.11 | 5.000E-01 | |
| EU-152 | 244.25 | 41. | 5. | 0.003 | 461.18 | 6.430E-02 | |
| EU-154 | 247.85 | 32. | 16. | 0.009 | 127.35 | 2.531E-01 | |
| EU-154 | 591.53 | 13. | 5. | 0.003 | 269.81 | 2.169E-01 | P |
| CS-137 | 662.48 | 9. | 9. | 0.005 | 137.57 | 2.212E-02 | P |
| EU-154 | 723.02 | 22. | -2. | -0.001 | 740.81 | -2.748E-02 | |
| BI-212 | 727.63 | 36. | -3. | -0.002 | 778.03 | -5.526E-02 | |
| EU-154 | 756.50 | 9. | 9. | 0.005 | 144.53 | 4.906E-01 | |
| BI-212 | 785.63 | 14. | 10. | 0.005 | 162.32 | 1.090E+00 | |
| PA-234 | 807.48 | 32. | -4. | -0.002 | 488.99 | -2.150E-01 | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | |
|---|---|---|---|---|---|---|---|---|
| EU-152 | 867.00 | 14. | 4. | 0.002 | 347.26 | 2.654E-01 | | |
| EU-154 | 873.59 | 7. | 9. | 0.005 | 123.45 | 2.038E-01 | | P |
| PA-234 | 883.06 | 19. | 16. | 0.009 | 121.82 | 3.257E-01 | | |
| PA-234 | 946.68 | 14. | 8. | 0.004 | 213.42 | 9.833E-02 | | |
| PA-234 | 948.41 | 11. | 9. | 0.005 | 163.01 | 2.939E-01 | | P |
| EU-152 | 963.53 | 27. | 11. | 0.006 | 198.86 | 2.013E-01 | | P |
| EU-154 | 996.53 | 5. | 15. | 0.008 | 80.92 | 3.776E-01 | | |
| EU-154 | 1004.84 | 5. | 17. | 0.009 | 75.89 | 2.582E-01 | | P |
| EU-152 | 1084.63 | 11. | 7. | 0.004 | 213.23 | 1.910E-01 | | P |
| EU-152 | 1111.74 | 22. | -5. | -0.003 | 399.20 | -1.090E-01 | | |
| CO-60 | 1172.94 | 12. | 6. | 0.003 | 259.35 | 1.791E-02 | | P |
| CO-60 | 1332.02 | 0. | 6. | 0.003 | 81.65 | 2.051E-02 | | |
| BI-212 | 1621.60 | 6. | 2. | 0.001 | 769.99 | 2.212E-01 | | |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 5.0619E-02 | 4.4438E-02 | 4.4590E-02 | 0.564E-01 |
| RA-226 | #A | 5.0003E-01 | 7.0061E-01 | 7.0127E-01 | 0.975E+00 |
| Ra-228 | | 4.3745E-01 | 1.5977E-01 | 1.6235E-01 | 0.164E+00 |
| Am-241 | A | 1.1415E-02 | 6.3775E-02 | 6.3780E-02 | 0.110E+00 |
| PB-210 | #A | 9.7123E-01 | 8.6511E-01 | 8.7052E-01 | 0.121E+01 |
| U-238 | #A | 5.3732E-01 | 6.4571E-01 | 6.4711E-01 | 0.103E+01 |
| K-40 | | 1.1849E+01 | 1.2843E+00 | 1.5088E+00 | 0.255E+00 |
| PB-214 | | 3.8668E-01 | 9.6879E-02 | 1.0234E-01 | 0.103E+00 |
| BI-214 | | 2.8368E-01 | 8.9990E-02 | 9.1712E-02 | 0.106E+00 |
| BI-212 | #A | 1.2907E-01 | 2.0951E-01 | 2.0968E-01 | 0.565E+00 |
| PB-212 | | 3.7908E-01 | 7.2812E-02 | 7.7805E-02 | 0.751E-01 |
| TL-208 | | 1.4586E-01 | 4.6050E-02 | 4.7021E-02 | 0.446E-01 |
| PA-234 | #A | 1.2280E-01 | 1.4960E-01 | 1.4988E-01 | 0.136E+00 |
| CS-137 | #A | 2.2119E-02 | 3.0430E-02 | 3.0445E-02 | 0.394E-01 |
| CO-60 | #A | 1.9214E-02 | 1.5688E-02 | 1.5708E-02 | 0.586E-01 |
| EU-152 | #A | 1.3795E-01 | 1.5152E-01 | 1.5232E-01 | 0.197E+00 |
| EU-154 | #C | 1.1356E-01 | 8.6178E-02 | 8.6534E-02 | 0.822E-01 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

ORTEC g v - i (3263) Env32  G702W050  4/19/2016 8:20:04 AM
Spectrum name: ARS08216.An1

---------- S U M M A R Y ----------

Total Activity (  25.5 to  1999.2 keV)  1.348E+01  pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-06 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-004 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 004 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 5.6758E-02 | pCi/g | 1.3898E-01 | 3.0300E-01 | 1.5150E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 0.0000E+00 | 1.1800E+00 | 5.9000E-01 | | | |
| **RA-228** | 3.8706E-01 | pCi/g | 1.3799E-01 | 1.7700E-01 | 8.8500E-02 | | | |
| **AM-241** | -1.0393E-02 | pCi/g | 7.9512E-02 | 1.3600E-01 | 6.8000E-02 | | | |
| **PB-210** | 1.3703E-01 | pCi/g | 1.1946E+00 | 2.0800E+00 | 1.0400E+00 | | | |
| **U-238** | 6.1878E-01 | pCi/g | 5.0477E-01 | 1.1700E+00 | 5.8500E-01 | | | |
| **K-40** | 1.2559E+01 | pCi/g | 1.5310E+00 | 5.5000E-01 | 2.7500E-01 | | | |
| **PB-214** | 3.6740E-01 | pCi/g | 9.0709E-02 | 1.3000E-01 | 6.5000E-02 | | | |
| **BI-214** | 3.8887E-01 | pCi/g | 1.1179E-01 | 1.2000E-01 | 6.0000E-02 | | | |
| **BI-212** | 2.3245E-01 | pCi/g | 2.5731E-01 | 4.6200E-01 | 2.3100E-01 | | | |
| **PB-212** | 2.2422E-01 | pCi/g | 8.0627E-02 | 1.1700E-01 | 5.8500E-02 | | | |
| **TL-208** | 1.3720E-01 | pCi/g | 4.6928E-02 | 6.1800E-02 | 3.0900E-02 | | | |
| **PA-234** | 9.8936E-02 | pCi/g | 1.1866E-01 | 1.4100E-01 | 7.0500E-02 | | | |
| **CS-137** | 1.9454E-02 | pCi/g | 3.3165E-02 | 5.6100E-02 | 2.8050E-02 | | | |
| **CO-60** | 5.5104E-03 | pCi/g | 4.0904E-02 | 7.3700E-02 | 3.6850E-02 | | | |
| **EU-152** | 9.1989E-03 | pCi/g | 8.5734E-02 | 2.8300E-01 | 1.4150E-01 | | | |
| **EU-154** | 5.9846E-02 | pCi/g | 7.1631E-02 | 9.2700E-02 | 4.6350E-02 | | | |
| **Total Gamma** | 1.5302E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.3969E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01318.An1

Sample description
Batch ID: 16-00697-06
SDG: ARS1-16-00670-004 Tech: WJS

Spectrum Filename: C:\User\ARS01318.An1

Acquisition information
Start time: 05-May-2016 07:40:55
Live time: 2700
Real time: 2706
Dead time: 0.22 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.8736E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.8736E+02) =
2.5816E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01318.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1590

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.81 | 3. | 632.87 | 0.90 | 2.184E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 42.80 | 5. | 405.21 | 0.90 | 2.316E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 4.582E-02 | EU154 |
| 42.98 | 11. | 206.47 | 0.90 | 2.358E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 8.853E-02 | EU154 |
| 46.72 | 5. | 66.36 | 0.90 | 2.560E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.25 | 34. | 28.47 | 0.72 | 3.625E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.81 | 60. | 36.02 | 0.65 | 4.216E-02 | | | | |
| 92.43 | 29. | 64.53 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.85 | 34. | 50.47 | 0.94 | 4.684E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 100.15 | 9. | 194.45 | 0.95 | 4.742E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 121.78 | 3. | 684.09 | 0.96 | 4.659E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 143.88 | 13. | 92.51 | 0.98 | 4.380E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 161.70 | 2. | 517.50 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.75 | 45. | 36.58 | 1.02 | 3.768E-02 | 185.72 | 54.000 | PBC<MDA | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 238.76 | 202. | 10.24 | 1.12 | 3.138E-02 | 238.63 | 43.100 | 3.510E-01 | PB212 |
| 240.13 | 5. | 446.46 | 1.06 | 3.106E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 247.39 | 17. | 59.75 | 1.07 | 3.048E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 276.72 | 11. | 91.64 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.51 | 100. | 15.30 | 0.55 | 2.659E-02 | 295.21 | 18.500 | 4.928E-01 | PB214 |
| 300.48 | 28. | 37.42 | 0.50 | 2.625E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.63 | 36. | 30.10 | 1.14 | 2.392E-02 | 338.40 | 12.010 | 3.236E-01 | Ra228 |
| 352.18 | 123. | 13.87 | 0.78 | 2.319E-02 | 351.92 | 35.800 | 3.611E-01 | PB214 |
| 511.31 | 21. | 21.74 | 1.27 | 1.747E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.46 | 72. | 14.95 | 1.32 | 1.583E-02 | 583.14 | 86.000 | 1.362E-01 | TL208 |

0.88 Spectrum name: ARS01318.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 609.53 | 115. | 12.47 | 1.14 | 1.532E-02 | 609.31 | 44.791 | 3.836E-01 | BI214 |
| 662.17 | 9. | 85.21 | 1.38 | 1.442E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 698.64 | 12. | 65.38 | 1.41 | 1.384E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 727.76 | 16. | 52.01 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 756.62 | 8. | 104.09 | 1.45 | 1.306E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.40 | 33. | 28.33 | 1.12 | 1.291E-02 | 768.36 | 4.799 | 1.393E+00 | BI214 |
| 807.83 | 7. | 104.81 | 1.49 | 1.243E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 860.71 | 7. | 84.35 | 1.52 | 1.186E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 876.54 | 1. | 279.21 | 1.53 | 1.173E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 880.38 | 5. | 99.12 | 1.54 | 1.165E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.40 | 53. | 16.43 | 1.56 | 1.135E-02 | 911.07 | 29.000 | 4.133E-01 | Ra228 |
| 934.94 | 11. | 63.00 | 1.57 | 1.114E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 945.24 | 1. | 564.36 | 1.58 | 1.103E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 969.70 | 11. | 56.28 | 1.60 | 1.083E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1120.79 | 23. | 29.96 | 1.70 | 9.654E-03 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1173.99 | 2. | 371.14 | 1.73 | 9.297E-03 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1238.96 | 7. | 102.37 | 1.77 | 8.889E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1378.61 | 3. | 193.19 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1461.30 | 404. | 5.14 | 1.21 | 7.688E-03 | 1460.75 | 10.700 | 1.256E+01 | K40 |
| 1620.30 | 1. | 452.81 | 2.00 | 6.976E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1765.43 | 7. | 43.35 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.21 | 74.81 | 182. | 60. | 0.022 | 72.04 | 0.651 | TH-234 | s |
| 956.00 | 239.21 | 192. | 79. | 0.029 | 54.20 | 1.059 | PB-212 | D |
| 1181.29 | 295.51 | 136. | 13. | 0.005 | 258.67 | 0.550 | PB-214 | c |
| 1201.19 | 300.48 | 40. | 18. | 0.007 | 109.61 | 0.499 | PB-212 | sM |
| 1408.03 | 352.18 | 172. | 7. | 0.003 | 503.36 | 0.777 | CO-57 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI.Lib

0.88 Spectrum name: ARS01318.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 152.55 | 38.41 | 179. | -7. | -0.003 | 534.42 | 0.897s |
| EU-152 | 158.16 | 39.81 | 219. | 3. | 0.001 | 1265.73 | 0.897s |
| EU-154 | 170.10 | 42.80 | 244. | 5. | 0.002 | 810.41 | 0.899s |
| EU-154 | 170.83 | 42.98 | 233. | 11. | 0.004 | 412.95 | 0.899s |
| EU-152 | 174.57 | 43.91 | 197. | -10. | -0.004 | 400.53 | 0.901s |
| PB-210 | 185.78 | 46.72 | 293. | 5. | 0.002 | 132.71 | 0.902s |
| EU-154 | 193.72 | 48.70 | 324. | 0. | 0.000 | 2000.00 | 0.904s |
| Am-241 | 239.61 | 60.17 | 173. | -5. | -0.002 | 765.03 | 0.913 |
| U-238 | 251.94 | 63.25 | 172. | 34. | 0.013 | 56.93 | 0.721s |
| U-238 | 368.51 | 92.38 | 186. | 29. | 0.011 | 129.07 | 0.940D |
| U-238 | 370.20 | 92.80 | 162. | 34. | 0.012 | 100.94 | 0.941D |
| PA-234 | 377.01 | 94.50 | 275. | -37. | -0.014 | 131.01 | 0.942s |
| PA-234 | 392.41 | 98.35 | 178. | -16. | -0.006 | 272.17 | 0.945s |
| PA-234 | 399.60 | 100.15 | 153. | 9. | 0.003 | 388.89 | 0.946s |
| PA-234 | 443.02 | 111.00 | 167. | 0. | 0.000 | 2000.00 | 0.956s |
| EU-152 | 486.16 | 121.78 | 174. | 3. | 0.001 | 1368.17 | 0.964s |
| U-235 | 574.57 | 143.88 | 121. | 13. | 0.005 | 185.02 | 0.982 |
| U-235 | 645.89 | 161.70 | 96. | 2. | 0.001 | 1034.99 | 0.998s |
| U-235 | 742.01 | 185.72 | 147. | 45. | 0.017 | 73.16 | 1.016D |
| RA-226 | 743.53 | 186.10 | 151. | 0. | 0.000 | 2000.00 | 1.017D |
| PA-234 | 902.04 | 225.71 | 73. | -2. | -0.001 | 1388.23 | 1.049s |
| PB-212 | 953.72 | 238.63 | 158. | 116. | 0.043 | 30.45 | 1.059D |
| PB-214 | 959.71 | 240.13 | 216. | 5. | 0.002 | 892.93 | 1.061s |
| EU-152 | 973.70 | 243.62 | 102. | -17. | -0.006 | 174.80 | 1.064s |
| EU-154 | 988.75 | 247.39 | 44. | 17. | 0.006 | 119.50 | 1.066s |
| TL-208 | 1106.11 | 276.72 | 49. | 11. | 0.004 | 183.27 | 1.089s |
| PB-214 | 1181.02 | 295.44 | 69. | 81. | 0.030 | 33.69 | 1.104s |
| PB-212 | 1201.43 | 300.54 | 46. | 9. | 0.003 | 209.32 | 1.107 |
| Ra-228 | 1353.83 | 338.63 | 50. | 36. | 0.013 | 60.20 | 1.138 |
| PB-214 | 1408.17 | 352.22 | 71. | 109. | 0.040 | 26.96 | 1.148s |
| TL-208 | 2044.67 | 511.31 | 75. | 21. | 0.008 | 43.48 | 1.270s |
| PA-234 | 2278.50 | 569.77 | 50. | -9. | -0.003 | 253.62 | 1.314s |
| TL-208 | 2333.29 | 583.46 | 41. | 72. | 0.027 | 29.91 | 1.324 |
| EU-154 | 2373.23 | 593.45 | 33. | -4. | -0.002 | 407.49 | 1.330s |
| BI-214 | 2437.55 | 609.53 | 39. | 102. | 0.038 | 24.95 | 1.136 |
| CS-137 | 2648.13 | 662.17 | 26. | 9. | 0.003 | 170.43 | 1.381s |
| PA-234 | 2794.03 | 698.64 | 27. | 12. | 0.005 | 130.75 | 1.409s |
| EU-154 | 2896.92 | 724.37 | 40. | -5. | -0.002 | 408.25 | 1.426s |
| BI-212 | 2910.48 | 727.76 | 30. | 16. | 0.006 | 104.02 | 1.429 |
| PA-234 | 2926.79 | 731.84 | 28. | -3. | -0.001 | 560.64 | 1.433s |
| EU-154 | 3025.92 | 756.62 | 27. | 8. | 0.003 | 208.19 | 1.450s |
| TL-208 | 3054.51 | 763.77 | 35. | -3. | -0.001 | 522.23 | 1.455s |
| BI-214 | 3073.03 | 768.40 | 16. | 33. | 0.012 | 56.67 | 1.117s |
| EU-152 | 3113.44 | 778.50 | 34. | -5. | -0.002 | 361.71 | 1.466s |

0.88 Spectrum name: ARS01318.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-212 | 3142.65 | 785.80 | 32. | -2. | -0.001 | 1063.65 | 1.470s |
| PA-234 | 3230.75 | 807.83 | 22. | 7. | 0.002 | 209.63 | 1.486s |
| TL-208 | 3442.25 | 860.71 | 17. | 7. | 0.003 | 168.70 | 1.523s |
| EU-152 | 3468.96 | 867.39 | 17. | 0. | 0.000 | 2000.00 | 1.528s |
| EU-154 | 3505.54 | 876.54 | 7. | 1. | 0.001 | 558.42 | 1.532s |
| PA-234 | 3520.91 | 880.38 | 17. | 5. | 0.002 | 198.24 | 1.537s |
| PA-234 | 3596.96 | 899.39 | 22. | -4. | -0.002 | 344.26 | 1.549s |
| Ra-228 | 3644.98 | 911.40 | 18. | 53. | 0.020 | 32.86 | 1.558s |
| BI-214 | 3739.12 | 934.94 | 17. | 11. | 0.004 | 125.99 | 1.573s |
| PA-234 | 3795.35 | 949.00 | 19. | 0. | 0.000 | 2000.00 | 1.584s |
| EU-152 | 3854.29 | 963.74 | 34. | -4. | -0.002 | 390.20 | 1.594s |
| Ra-228 | 3865.91 | 966.64 | 37. | -1. | 0.000 | 1538.83 | 1.594s |
| Ra-228 | 3878.14 | 969.70 | 26. | 11. | 0.004 | 112.56 | 1.597s |
| EU-152 | 4340.80 | 1085.39 | 29. | -3. | -0.001 | 450.99 | 1.675s |
| EU-152 | 4461.13 | 1115.48 | 26. | -8. | -0.003 | 195.46 | 1.693s |
| BI-214 | 4482.35 | 1120.79 | 20. | 23. | 0.009 | 59.91 | 1.698s |
| CO-60 | 4695.08 | 1173.99 | 26. | 2. | 0.001 | 742.29 | 1.732s |
| BI-214 | 4954.88 | 1238.96 | 24. | 7. | 0.003 | 204.74 | 1.773s |
| CO-60 | 5329.50 | 1332.66 | 13. | -1. | 0.000 | 1275.09 | 1.832s |
| BI-214 | 5513.24 | 1378.61 | 12. | 3. | 0.001 | 386.37 | 1.860s |
| PA-234 | 5573.08 | 1393.58 | 14. | -2. | -0.001 | 610.53 | 1.870s |
| EU-152 | 5631.05 | 1408.08 | 15. | 0. | 0.000 | 2000.00 | 1.878s |
| K-40 | 5843.82 | 1461.30 | 10. | 400. | 0.148 | 10.28 | 1.206s |
| BI-212 | 6479.45 | 1620.30 | 9. | 1. | 0.000 | 905.63 | 2.003s |
| BI-214 | 7059.57 | 1765.43 | 6. | 7. | 0.003 | 86.70 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | Peak | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 5.6758E-02 | | | | | | |
| | | | 185.72 | 5.676E-02 } | | 7.507E-02 | 3.66E+01 | G |
| | | | 143.76 | 7.267E-02 | (P | 3.031E-01 | 9.25E+01 | G |
| | | | 205.31 | -5.813E-02 % | P | 7.360E-01 | 1.05E+03 | G |
| | | | 163.35 | 2.120E-02 ?( | P | 6.496E-01 | 5.17E+02 | G |
| RA-226 | | 0.0000E+00 | | | | | | Derived Ave Activity |
| | | | 186.10 | 0.000E+00 } | P | 1.176E+00 | 1.00E+03 | G |
| Ra-228 | | 3.8706E-01 | | | | | | |
| | | | 911.07 | 4.133E-01 | (P | 1.768E-01 | 1.64E+01 | G |
| | | | 968.90 | 1.558E-01 - | P | 3.621E-01 | 5.63E+01 | G |

0.88 Spectrum name: ARS01318.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 338.40 | 3.236E-01 | (P | 3.199E-01 | 3.01E+01 | G |
| | | 964.60 | -4.946E-02 | & | 1.363E+00 | 7.69E+02 | G |
| Am-241 | T -1.0393E-02 | | | | | | |
| | | 59.54 | -1.039E-02 | &( | 1.358E-01 | 3.83E+02 | G K |
| PB-210 | 1.3703E-01 | | | | | | |
| | | 46.52 | 1.370E-01 | (P | 2.080E+00 | 6.64E+01 | G |
| U-238 | 6.1878E-01 | | | | | | |
| | | 63.29 | 6.305E-01 | (P | 1.165E+00 | 2.85E+01 | G |
| | | 92.80 | 6.188E-01 | } P | 1.141E+00 | 5.05E+01 | G |
| | | 92.38 | 6.188E-01 | } P | 1.422E+00 | 6.45E+01 | G |
| K-40 | 1.2559E+01 | | | | | | |
| | | 1460.75 | 1.256E+01 | (P | 5.501E-01 | 5.14E+00 | G |
| PB-214 | 3.6740E-01 | | | | | | |
| | | 351.92 | 3.380E-01 | (P | 1.302E-01 | 1.35E+01 | G |
| | | 295.21 | 4.243E-01 | (P | 2.174E-01 | 1.68E+01 | G |
| | | 241.98 | 5.112E-02 | - P | 7.898E-01 | 4.46E+02 | G |
| BI-214 | 3.8887E-01 | | | | | | |
| | | 609.31 | 3.836E-01 | (P | 1.200E-01 | 1.25E+01 | G |
| | | 1764.49 | 1.902E-01 | - P | 3.587E-01 | 4.33E+01 | G |
| | | 1120.29 | 4.160E-01 | ?(P | 4.259E-01 | 3.00E+01 | G |
| | | 1238.11 | 3.608E-01 | &( | 1.269E+00 | 1.02E+02 | G |
| | | 768.36 | 1.393E+00 | + | 8.809E-01 | 2.83E+01 | G |
| | | 1377.67 | 2.149E-01 | - | 1.517E+00 | 1.93E+02 | G |
| | | 934.06 | 8.211E-01 | & P | 1.700E+00 | 6.30E+01 | G |
| BI-212 | 2.3245E-01 | | | | | | |
| | | 727.17 | 2.559E-01 | ?(P | 4.620E-01 | 5.20E+01 | G |
| | | 1620.56 | 1.320E-01 | ?( | 2.284E+00 | 4.53E+02 | G |
| | | 785.42 | -1.560E-01 | & | 2.978E+00 | 5.32E+02 | G |
| PB-212 | 2.2422E-01 | | | | | | |
| | | 238.63 | 2.214E-01 | (P | 1.171E-01 | 1.52E+01 | G |
| | | 300.09 | 2.620E-01 | (P | 1.032E+00 | 1.05E+02 | G |
| TL-208 | 1.3720E-01 | | | | | | |
| | | 583.14 | 1.362E-01 | (P | 6.183E-02 | 1.50E+01 | G |
| | | 510.72 | 1.380E-01 | (P | 2.831E-01 | 2.17E+01 | G |
| | | 860.47 | 1.317E-01 | ?(P | 4.021E-01 | 8.43E+01 | G |
| | | 277.36 | 1.576E-01 | &(P | 5.032E-01 | 9.16E+01 | G |
| | | 763.30 | -3.944E-01 | - P | 3.561E+00 | 2.61E+02 | G |

0.88 Spectrum name: ARS01318.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PA-234 | 9.8936E-02 | | | | | | |
| | | 98.44 | -3.473E-02 | ?(P | 1.409E-01 | 1.36E+02 | G |
| | | 946.00 | 6.772E-03 | % P | 2.988E-01 | 5.64E+02 | G |
| | | 131.28 | -9.457E-03 | % P | 1.619E-01 | 7.54E+02 | G |
| | | 94.67 | -1.311E-01 | + | 2.835E-01 | 6.55E+01 | G |
| | | 883.24 | -7.723E-04 | % | 4.808E-01 | 1.69E+04 | G |
| | | 926.70 | -2.659E-02 | & P | 4.262E-01 | 1.45E+04 | G |
| | | 569.26 | -1.435E-01 | + P | 5.512E-01 | 1.27E+02 | G |
| | | 111.00 | 0.000E+00 | + | 4.018E-01 | 1.00E+03 | G |
| | | 733.00 | -7.401E-02 | + P | 6.269E-01 | 2.80E+02 | G |
| | | 949.00 | 0.000E+00 | + | 6.867E-01 | 1.00E+03 | G |
| | | 880.51 | 1.833E-01 | ?(P | 7.454E-01 | 9.91E+01 | G |
| | | 226.87 | -2.140E-02 | + | 5.196E-01 | 6.94E+02 | G |
| | | 831.10 | -3.790E-02 | & P | 9.320E-01 | 1.25E+04 | G |
| | | 808.10 | 2.863E-01 | ( | 1.035E+00 | 1.05E+02 | G |
| | | 99.70 | 1.057E-01 | ?( | 6.989E-01 | 1.94E+02 | G |
| | | 699.10 | 5.026E-01 | ( | 1.085E+00 | 6.54E+01 | G |
| | | 898.60 | -2.312E-01 | + P | 1.396E+00 | 1.72E+02 | G |
| | | 1394.10 | -1.460E-01 | + | 1.647E+00 | 3.05E+02 | G |
| CS-137 | 1.9454E-02 | | | | | | |
| | | 661.66 | 1.945E-02 | ?( | 5.609E-02 | 8.52E+01 | G |
| CO-60 | 5.5104E-03 | | | | | | |
| | | 1173.24 | 5.510E-03 | ?( | 7.368E-02 | 3.71E+02 | K |
| | | 1332.50 | -2.553E-03 | + | 6.122E-02 | 6.38E+02 | K |
| EU-152 | 9.1989E-03 | | | | | | |
| | | 40.12 | 1.310E-02 | ?( | 2.829E-01 | 6.33E+02 | G |
| | | 121.78 | 5.195E-03 | ?( | 1.218E-01 | 6.84E+02 | G |
| | | 344.30 | 8.486E-04 | % | 1.028E-01 | 3.29E+03 | G |
| | | 1408.08 | 0.000E+00 | - | 3.186E-01 | 1.00E+03 | G |
| | | 39.52 | -5.382E-02 | + | 4.896E-01 | 2.67E+02 | G |
| | | 964.00 | -7.154E-02 | + | 4.901E-01 | 1.95E+02 | G |
| | | 1112.07 | -1.552E-01 | + | 5.188E-01 | 9.77E+01 | G |
| | | 778.90 | -7.302E-02 | + | 4.629E-01 | 1.81E+02 | G |
| | | 1085.80 | -8.785E-02 | + | 7.027E-01 | 2.25E+02 | G |
| | | 45.40 | -1.152E-01 | + | 7.819E-01 | 2.00E+02 | G |
| | | 244.67 | -1.874E-01 | & | 5.483E-01 | 8.74E+01 | G |
| | | 867.39 | 0.000E+00 | & | 1.152E+00 | 1.00E+03 | G |
| EU-154 | 5.9846E-02 | | | | | | |
| | | 123.10 | -1.885E-03 | %( | 9.266E-02 | 1.43E+03 | G |
| | | 1274.80 | -4.232E-03 | % | 1.709E-01 | 1.07E+03 | G |
| | | 723.30 | -4.396E-02 | + | 3.141E-01 | 2.04E+02 | G |
| | | 1004.80 | 8.874E-03 | % | 3.839E-01 | 1.19E+03 | G |
| | | 43.00 | 8.853E-02 | &( | 6.182E-01 | 2.06E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| | | 873.20 | 2.816E-02 | ?( | 3.002E-01 | 2.79E+02 G |
| | | 996.30 | 2.232E-03 | % | 5.018E-01 | 5.99E+03 G |
| | | 42.31 | 8.370E-02 | &( | 1.153E+00 | 4.05E+02 G |
| | | 248.04 | 2.199E-01 | &( | 4.308E-01 | 5.98E+01 G |
| | | 591.70 | -1.466E-01 | + | 1.052E+00 | 2.04E+02 G |
| | | 48.70 | 0.000E+00 | - | 1.984E+00 | 1.00E+03 G |
| | | 756.70 | 3.646E-01 | ?( | 1.302E+00 | 1.04E+02 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y  O F  N U C L I D E S  I N  S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 5.6758E-02 | 1.3893E-01 | 1.3898E-01 | 0.303E+00 |
| RA-226 | #B | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.118E+01 |
| Ra-228 | # | 3.8706E-01 | 1.3575E-01 | 1.3799E-01 | 0.177E+00 |
| Am-241 | #A | -1.0393E-02 | 7.9509E-02 | 7.9512E-02 | 0.136E+00 |
| PB-210 | #A | 1.3703E-01 | 1.1945E+00 | 1.1946E+00 | 0.208E+01 |
| U-238 | A | 6.1878E-01 | 5.0246E-01 | 5.0477E-01 | 0.117E+01 |
| K-40 | | 1.2559E+01 | 1.3031E+00 | 1.5310E+00 | 0.550E+00 |

0.88 Spectrum name: ARS01318.An1

| | | | | | |
|---|---|---|---|---|---|
| PB-214 | # | 3.6740E-01 | 8.4713E-02 | 9.0709E-02 | 0.130E+00 |
| BI-214 | | 3.8887E-01 | 1.0914E-01 | 1.1179E-01 | 0.120E+00 |
| BI-212 | #A | 2.3245E-01 | 2.5687E-01 | 2.5731E-01 | 0.462E+00 |
| PB-212 | | 2.2422E-01 | 7.8754E-02 | 8.0627E-02 | 0.117E+00 |
| TL-208 | # | 1.3720E-01 | 4.6065E-02 | 4.6928E-02 | 0.618E-01 |
| PA-234 | #A | 9.8936E-02 | 1.1844E-01 | 1.1866E-01 | 0.141E+00 |
| CS-137 | #A | 1.9454E-02 | 3.3154E-02 | 3.3165E-02 | 0.561E-01 |
| CO-60 | #A | 5.5104E-03 | 4.0903E-02 | 4.0904E-02 | 0.737E-01 |
| EU-152 | #A | 9.1989E-03 | 8.5728E-02 | 8.5734E-02 | 0.283E+00 |
| EU-154 | #A | 5.9846E-02 | 7.1516E-02 | 7.1631E-02 | 0.927E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 295.4 to 2000.7 keV) 1.387E+01 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-07 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-005 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 005 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 4.5807E-02 | pCi/g | 1.8800E-01 | 2.5600E-01 | 1.2800E-01 | | | |
| **RA-226** | 2.0940E-01 | pCi/g | 4.9041E-01 | 8.2700E-01 | 4.1350E-01 | | | |
| **RA-228** | 4.1638E-01 | pCi/g | 1.6441E-01 | 1.8500E-01 | 9.2500E-02 | | | |
| **AM-241** | 6.5453E-03 | pCi/g | 5.4688E-02 | 9.3300E-02 | 4.6650E-02 | | | |
| **PB-210** | 0.0000E+00 | pCi/g | 6.3480E-01 | 1.1800E+00 | 5.9000E-01 | | | |
| **U-238** | 4.9385E-01 | pCi/g | 3.9873E-01 | 1.0100E+00 | 5.0500E-01 | | | |
| **K-40** | 1.1606E+01 | pCi/g | 1.2978E+00 | 3.5900E-01 | 1.7950E-01 | | | |
| **PB-214** | 4.3204E-01 | pCi/g | 9.1909E-02 | 8.7100E-02 | 4.3550E-02 | | | |
| **BI-214** | 4.1469E-01 | pCi/g | 8.9648E-02 | 7.4200E-02 | 3.7100E-02 | | | |
| **BI-212** | 6.1325E-01 | pCi/g | 2.4921E-01 | 2.6000E-01 | 1.3000E-01 | | | |
| **PB-212** | 4.7918E-01 | pCi/g | 7.3806E-02 | 6.5800E-02 | 3.2900E-02 | | | |
| **TL-208** | 1.5660E-01 | pCi/g | 4.4568E-02 | 4.0200E-02 | 2.0100E-02 | | | |
| **PA-234** | ~~1.2060E-01~~ 9.96E-3 | pCi/g | 9.0865E-02 | 1.0100E-01 | 5.0500E-02 | | | |
| **CS-137** | 0.0000E+00 | pCi/g | 1.8521E-02 | 4.7300E-02 | 2.3650E-02 | | | |
| **CO-60** | 0.0000E+00 | pCi/g | 3.0095E-02 | 6.2700E-02 | 3.1350E-02 | | | |
| **EU-152** | 5.6803E-02 | pCi/g | 2.9789E-02 | 1.4800E-01 | 7.4000E-02 | | | |
| **EU-154** | 1.7552E-02 | pCi/g | 6.2682E-02 | 6.5800E-02 | 3.2900E-02 | | | |
| **Total Gamma** | 1.5069E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.2001E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  5/5/2016 8:35:36 AM
                                Spectrum name: ARS08322.An1

Sample description
     Batch ID:  16-00697-07
     SDG:  ARS1-16-00670-005  Tech:  WJS

Spectrum Filename: C:\User\ARS08322.An1

Acquisition information
       Start time:                5/5/2016 7:50:15 AM
       Live time:               2700
       Real time:               2713
       Dead time:                 0.47 %
       Detector ID:                  9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G702W050
       Start channel:           100 (    25.46keV )
       Stop channel:           8000 (  1999.20keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   1
       Sample Size:               3.7971E+02 +/- 0.000E+00%
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.7971E+02) =
                                  2.6336E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 8:35:36 AM
Spectrum name: ARS08322.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1624

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 33.63 | 25. | 48.56 | 0.46 | 2.125E-02 | | | | |
| 39.77 | 2. | 688.29 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 6.662E-03 | EU152 |
| | | | | | 40.12 | 30.000 | 6.662E-03 | EU152 |
| | | | | | 39.52 | 16.000 | 1.272E-02 | EU152 |
| 42.27 | 9. | 178.53 | 0.97 | 2.811E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 42.31 | 7.300 | PBC<MDA | EU154 |
| 42.77 | 6. | 252.95 | 0.97 | 2.866E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 50.57 | 11. | 114.97 | 0.98 | 3.509E-02 | | | | |
| 58.08 | 12. | 136.31 | 0.99 | 4.101E-02 | | | | |
| 59.45 | 4. | 374.28 | 0.99 | 4.202E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.24 | 15. | 156.83 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 70.77 | 11. | 116.74 | 0.68 | 4.921E-02 | | | | |
| 74.81 | 89. | 24.40 | 1.01 | 5.122E-02 | | | | |
| 77.27 | 183. | 12.59 | 1.01 | 5.231E-02 | | | | |
| 89.98 | 37. | 44.89 | 1.02 | 5.638E-02 | | | | |
| 92.83 | 55. | 31.40 | 1.03 | 5.694E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 94.67 | 15.500 | 1.646E-01 | PA234 |
| | | | | | 92.80 | 3.000 | 8.189E-01 | U238 |
| | | | | | 92.38 | 2.570 | 9.940E-01 | U238 |
| 110.54 | 15. | 125.75 | 1.05 | 5.834E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| | | | | | 111.00 | 8.550 | PBC<MDA | PA234 |
| 114.05 | 19. | 65.45 | 1.05 | 5.829E-02 | | | | |
| 115.55 | 22. | 64.24 | 1.05 | 5.824E-02 | | | | |
| 131.75 | 5. | 385.85 | 1.07 | 5.703E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |

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Spectrum name: ARS08322.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 131.28 | 20.000 | 1.156E-02 | PA234 |
| 163.05 | 9. | 205.18 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 179.21 | 7. | 166.35 | 1.12 | 5.020E-02 | | | | |
| 180.58 | 10. | 100.67 | 1.12 | 4.999E-02 | | | | |
| 185.66 | 71. | 21.97 | 1.13 | 4.920E-02 | 185.72 | 57.200 | 6.624E-02 | U235 |
| | | | | | 186.21 | 3.640 | 1.043E+00 | RA226 |
| 188.78 | 10. | 118.71 | 1.13 | 4.873E-02 | | | | |
| 205.55 | 8. | 243.99 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 209.49 | 36. | 42.22 | 0.78 | 4.578E-02 | | | | |
| 225.56 | 8. | 95.52 | 0.43 | 4.366E-02 | | | | |
| 238.42 | 304. | 8.89 | 1.08 | 4.209E-02 | 238.63 | 43.100 | 4.419E-01 | PB212 |
| 241.89 | 64. | 23.73 | 1.19 | 4.167E-02 | 241.98 | 7.500 | 5.404E-01 | PB214 |
| 244.69 | 35. | 25.61 | 1.19 | 4.136E-02 | 244.67 | 7.616 | 2.943E-01 | EU152 |
| | | | | | 244.67 | 7.616 | 2.943E-01 | EU152 |
| 247.42 | 3. | 216.15 | 0.42 | 4.105E-02 | 248.04 | 6.600 | 3.119E-02 | EU154 |
| 277.19 | 11. | 132.12 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 292.87 | 14. | 94.13 | 1.24 | 3.651E-02 | | | | |
| 295.13 | 111. | 13.09 | 1.24 | 3.631E-02 | 295.21 | 18.500 | 4.338E-01 | PB214 |
| 299.92 | 10. | 176.37 | 1.25 | 3.590E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 327.48 | 35. | 32.35 | 0.50 | 3.375E-02 | | | | |
| 338.28 | 68. | 19.79 | 1.32 | 3.298E-02 | 338.40 | 12.010 | 4.513E-01 | Ra228 |
| 343.98 | 4. | 435.36 | 1.29 | 3.257E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| | | | | | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.68 | 180. | 10.72 | 1.41 | 3.208E-02 | 351.92 | 35.800 | 4.086E-01 | PB214 |
| 382.65 | 18. | 41.70 | 0.35 | 3.022E-02 | | | | |
| 428.27 | 4. | 131.23 | 0.38 | 2.790E-02 | | | | |
| 479.95 | 7. | 74.38 | 0.31 | 2.576E-02 | | | | |
| 510.97 | 177. | 11.64 | 1.82 | 2.465E-02 | 510.72 | 22.500 | 4.049E-01 | TL208 |
| 583.33 | 113. | 13.85 | 1.20 | 2.248E-02 | 583.14 | 86.000 | 1.540E-01 | TL208 |
| 591.53 | 6. | 191.24 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.46 | 157. | 9.96 | 1.75 | 2.181E-02 | 609.31 | 44.791 | 4.147E-01 | BI214 |
| 653.53 | 21. | 35.56 | 0.34 | 2.077E-02 | | | | |
| 724.16 | 3. | 133.75 | 0.66 | 1.934E-02 | 723.30 | 19.700 | 2.351E-02 | EU154 |
| 727.27 | 55. | 20.05 | 1.67 | 1.928E-02 | 727.17 | 11.800 | 6.373E-01 | BI212 |
| | | | | | 727.17 | 11.800 | 6.373E-01 | BI212 |
| 754.63 | 7. | 82.56 | 0.27 | 1.879E-02 | | | | |
| 763.24 | 1. | 428.63 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.30 | 22. | 32.54 | 1.71 | 1.855E-02 | 768.36 | 4.799 | 6.449E-01 | BI214 |
| 808.11 | 12. | 84.64 | 1.74 | 1.790E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 3.456E-01 | PA234 |
| 830.85 | 9. | 114.94 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 2.370E-01 | PA234 |
| 860.15 | 14. | 78.26 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 867.30 | 2. | 507.94 | 1.80 | 1.702E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | 5.564E-02 | EU152 |
| 873.34 | 4. | 241.13 | 1.80 | 1.694E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| | | | | | 873.20 | 11.300 | PBC<MDA | EU154 |

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Spectrum name: ARS08322.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 880.47 | 21. | 37.49 | 1.81 | 1.684E-02 | 880.51 | 6.500 | 5.138E-01 | PA234 |
| | | | | | 880.51 | 6.500 | 5.138E-01 | PA234 |
| 911.44 | 92. | 12.61 | 0.63 | 1.642E-02 | 911.07 | 29.000 | 5.080E-01 | Ra228 |
| 934.23 | 23. | 44.14 | 1.85 | 1.613E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 949.07 | 13. | 73.76 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 963.41 | 10. | 104.05 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.00 | 14.580 | PBC<MDA | EU152 |
| 964.95 | 12. | 68.77 | 1.88 | 1.576E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 969.18 | 46. | 22.19 | 1.57 | 1.570E-02 | 968.90 | 17.460 | 4.379E-01 | Ra228 |
| 1078.56 | 30. | 26.14 | 0.40 | 1.450E-02 | | | | |
| 1105.16 | 8. | 62.25 | 0.62 | 1.423E-02 | | | | |
| 1119.75 | 37. | 21.80 | 0.32 | 1.409E-02 | 1120.29 | 14.797 | 4.656E-01 | BI214 |
| 1162.86 | 12. | 36.89 | 0.77 | 1.368E-02 | | | | |
| 1238.59 | 36. | 33.60 | 0.71 | 1.301E-02 | 1238.11 | 5.859 | 1.262E+00 | BI214 |
| 1377.35 | 2. | 563.24 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.36 | 10. | 64.98 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.96 | 536. | 4.46 | 2.57 | 1.134E-02 | 1460.75 | 10.700 | 1.161E+01 | K40 |
| 1499.92 | 1. | 192.03 | 0.20 | 1.108E-02 | | | | |
| 1619.90 | 6. | 111.12 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| | | | | | 1620.56 | 2.750 | 5.102E-01 | BI212 |
| 1753.34 | 1. | 369.68 | 0.00 | 9.594E-03 | | | | |
| 1764.29 | 32. | 17.68 | 0.81 | 9.536E-03 | 1764.49 | 15.357 | 5.571E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 132.66 | 33.63 | 58. | 25. | 1.195E+03 | 97.12 | 0.460 | BA-139 | s |
| 200.42 | 50.74 | 73. | 11. | 3.106E+02 | 229.95 | 0.979 | U-237 | sc |
| 230.40 | 58.13 | 121. | 12. | 2.875E+02 | 270.43 | 0.987 | TA-182 | sc |
| 281.18 | 70.77 | 81. | 11. | 2.235E+02 | 233.48 | 0.680 | AU-196 | sc |
| 297.31 | 74.75 | 192. | 89. | 1.740E+03 | 48.80 | 1.005 | TL-208 | D |
| 307.14 | 77.21 | 175. | 183. | 3.504E+03 | 25.18 | 1.008 | PB-212 | D |
| 358.00 | 90.06 | 117. | 37. | 6.508E+02 | 89.77 | 1.022 | AC-228 | D |
| 369.36 | 92.90 | 124. | 55. | 9.730E+02 | 62.79 | 1.025 | TH-234 | D |
| 454.24 | 114.02 | 71. | 19. | 3.322E+02 | 130.89 | 1.048 | U-237 | c |
| 460.22 | 115.51 | 85. | 22. | 3.707E+02 | 128.49 | 1.050 | PU-239 | D |
| 714.77 | 179.09 | 56. | 7. | 1.309E+02 | 332.71 | 1.119 | TA-182 | c |
| 720.27 | 180.47 | 46. | 10. | 2.009E+02 | 201.35 | 1.120 | MO-99 | c |
| 752.63 | 188.81 | 71. | 10. | 2.096E+02 | 241.28 | 1.129 | FE-59 | c |
| 835.86 | 209.49 | 78. | 36. | 7.864E+02 | 84.44 | 0.784 | AC-228 | sM |
| 900.14 | 225.56 | 28. | 8. | 1.832E+02 | 191.05 | 0.427 | NP-239 | sc |
| 987.57 | 247.42 | 25. | 3. | 7.795E+01 | 432.29 | 0.419 | EU-154 | sc |
| 1169.72 | 293.05 | 83. | 14. | 3.968E+02 | 184.98 | 1.239 | CE-143 | sc |

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Spectrum name: ARS08322.An1

| Channel | Energy | Background | Net area | Eff*Area | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 1307.74 | 327.48 | 32. | 35. | 1.025E+03 | 64.71 | 0.500 | AC-228 | s |
| 1528.42 | 382.65 | 17. | 18. | 5.990E+02 | 83.40 | 0.347 | AG-108 | s |
| 1710.90 | 428.27 | 10. | 4. | 1.290E+02 | 262.47 | 0.385 | RH-106 | sc |
| 1917.63 | 479.95 | 10. | 7. | 2.757E+02 | 148.76 | 0.311 | W-187 | sc |
| 2612.05 | 653.53 | 11. | 21. | 9.917E+02 | 71.12 | 0.337 | SR-91 | s |
| 2894.65 | 724.16 | 10. | 3. | 1.758E+02 | 267.50 | 0.658 | ZR-95 | sc |
| 3016.56 | 754.63 | 12. | 7. | 3.726E+02 | 165.12 | 0.272 | - | sc |
| 4312.94 | 1078.56 | 7. | 30. | 2.070E+03 | 52.28 | 0.400 | BI-212 | s |
| 4419.43 | 1105.16 | 7. | 8. | 5.623E+02 | 124.50 | 0.617 | AG-108 | s |
| 4650.41 | 1162.86 | 3. | 12. | 8.553E+02 | 73.78 | 0.767 | - | s |
| 4954.41 | 1238.59 | 25. | 18. | 1.380E+03 | 91.83 | 2.109 | CO-56 | D |
| 6000.00 | 1499.92 | 1. | 1. | 7.220E+01 | 384.06 | 0.200 | - | c |
| 7015.00 | 1753.34 | 2. | 1. | 6.254E+01 | 739.37 | 0.000 | - | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.22 | 39.77 | 75. | 2. | 0.001 | 1376.59 | 0.967s |
| EU-152 | 158.07 | 39.98 | 80. | 0. | 0.000 | 2000.00 | 0.967s |
| EU-154 | 167.21 | 42.27 | 82. | 9. | 0.003 | 357.06 | 0.970s |
| EU-154 | 169.20 | 42.77 | 88. | 6. | 0.002 | 505.90 | 0.970s |
| EU-152 | 183.00 | 46.22 | 118. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 184.52 | 46.60 | 130. | 0. | 0.000 | 2000.00 | 0.974 |
| EU-154 | 192.00 | 48.47 | 128. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 236.27 | 59.54 | 118. | 4. | 0.001 | 835.51 | 0.989D |
| U-238 | 251.08 | 63.24 | 190. | 15. | 0.005 | 313.67 | 0.993s |
| U-238 | 364.82 | 91.69 | 153. | 0. | 0.000 | 2000.00 | 1.025s |
| U-238 | 368.77 | 92.68 | 158. | 55. | 0.020 | 80.35 | 1.025s |
| PA-234 | 373.00 | 93.74 | 176. | -33. | -0.012 | 137.85 | 1.027s |
| PA-234 | 393.76 | 98.93 | 125. | -5. | -0.002 | 791.72 | 1.033s |
| PA-234 | 440.21 | 110.54 | 116. | 15. | 0.005 | 251.50 | 1.045s |
| EU-152 | 485.61 | 121.90 | 147. | -15. | -0.006 | 265.12 | 1.057s |
| EU-154 | 489.37 | 122.84 | 143. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 525.00 | 131.75 | 136. | 5. | 0.002 | 771.70 | 1.067s |
| U-235 | 572.97 | 143.75 | 134. | 0. | 0.000 | 2000.00 | 1.081s |
| U-235 | 650.16 | 163.05 | 124. | 9. | 0.003 | 410.36 | 1.102s |
| U-235 | 740.82 | 185.72 | 97. | 49. | 0.018 | 410.39 | 1.126D |
| RA-226 | 742.78 | 186.21 | 131. | 14. | 0.005 | 234.12 | 0.929D |

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Spectrum name: ARS08322.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-235 | 820.13 | 205.55 | 118. | 8. | 0.003 | 487.97 | 1.147s |
| PB-212 | 952.41 | 238.63 | 83. | 330. | 0.122 | 13.60 | 1.182D |
| PB-214 | 965.81 | 241.98 | 81. | 64. | 0.024 | 47.46 | 1.185D |
| EU-152 | 976.66 | 244.69 | 16. | 35. | 0.013 | 51.21 | 1.188s |
| EU-154 | 991.50 | 248.41 | 82. | -19. | -0.007 | 166.19 | 1.192s |
| TL-208 | 1106.62 | 277.19 | 67. | 11. | 0.004 | 264.23 | 1.223s |
| PB-214 | 1178.70 | 295.21 | 49. | 111. | 0.041 | 26.19 | 1.241D |
| PB-212 | 1197.54 | 299.92 | 88. | 10. | 0.004 | 352.75 | 1.246s |
| Ra-228 | 1350.94 | 338.28 | 43. | 68. | 0.025 | 39.59 | 1.321 |
| EU-152 | 1373.75 | 343.98 | 86. | 4. | 0.001 | 870.73 | 1.292s |
| PB-214 | 1404.55 | 351.68 | 57. | 178. | 0.066 | 21.90 | 1.413 |
| TL-208 | 2041.71 | 510.97 | 137. | 85. | 0.032 | 54.14 | 1.821s |
| PA-234 | 2273.73 | 568.97 | 56. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2331.17 | 583.33 | 33. | 113. | 0.042 | 27.70 | 1.196s |
| EU-154 | 2363.98 | 591.53 | 29. | 6. | 0.002 | 382.48 | 1.539s |
| BI-214 | 2435.71 | 609.46 | 28. | 154. | 0.057 | 20.70 | 1.750 |
| CS-137 | 2644.38 | 661.61 | 38. | 0. | 0.000 | 2000.00 | 1.606s |
| PA-234 | 2792.88 | 698.73 | 58. | 0. | 0.000 | 2000.00 | 1.641s |
| EU-154 | 2891.19 | 723.30 | 81. | 0. | 0.000 | 2000.00 | 1.664s |
| BI-212 | 2907.08 | 727.27 | 18. | 55. | 0.020 | 40.10 | 1.667s |
| PA-234 | 2927.05 | 732.26 | 37. | 0. | 0.000 | 2000.00 | 1.673s |
| TL-208 | 3051.25 | 763.30 | 17. | 1. | 0.001 | 857.26 | 1.701D |
| BI-214 | 3071.48 | 768.36 | 14. | 22. | 0.008 | 65.08 | 1.705D |
| BI-212 | 3143.41 | 786.33 | 45. | -2. | -0.001 | 1298.08 | 1.721s |
| PA-234 | 3230.55 | 808.11 | 22. | 12. | 0.004 | 169.29 | 1.742s |
| PA-234 | 3321.56 | 830.85 | 24. | 9. | 0.003 | 229.88 | 1.762s |
| TL-208 | 3438.79 | 860.15 | 25. | 14. | 0.005 | 156.52 | 1.789s |
| EU-152 | 3467.44 | 867.30 | 14. | 2. | 0.001 | 1015.87 | 1.795s |
| EU-154 | 3491.60 | 873.34 | 22. | 4. | 0.001 | 482.26 | 1.800s |
| PA-234 | 3520.14 | 880.47 | 11. | 21. | 0.008 | 74.98 | 1.807s |
| PA-234 | 3523.86 | 881.40 | 34. | -3. | -0.001 | 819.50 | 1.809s |
| PA-234 | 3593.05 | 898.69 | 40. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3644.10 | 911.45 | 44. | 72. | 0.027 | 42.93 | 1.834s |
| PA-234 | 3704.60 | 926.56 | 45. | 0. | 0.000 | 2000.00 | 1.848s |
| BI-214 | 3735.30 | 934.23 | 20. | 23. | 0.008 | 88.29 | 1.854s |
| PA-234 | 3794.66 | 949.07 | 22. | 13. | 0.005 | 147.51 | 1.867s |
| EU-152 | 3852.06 | 963.41 | 22. | 10. | 0.004 | 208.10 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 30. | 12. | 0.005 | 137.55 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 24. | 45. | 0.017 | 43.84 | 1.885D |
| EU-154 | 3983.40 | 996.22 | 36. | -3. | -0.001 | 777.25 | 1.908s |
| EU-154 | 4013.09 | 1003.64 | 37. | 0. | 0.000 | 2000.00 | 1.915s |
| EU-152 | 4339.81 | 1085.27 | 43. | 0. | 0.000 | 2000.00 | 1.984s |
| EU-152 | 4446.95 | 1112.03 | 55. | -3. | -0.001 | 1031.72 | 2.006s |
| BI-214 | 4480.07 | 1120.31 | 55. | 15. | 0.006 | 211.45 | 2.013s |
| CO-60 | 4693.95 | 1173.73 | 40. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4951.67 | 1238.11 | 34. | 8. | 0.003 | 226.55 | 2.108D |
| EU-154 | 5100.00 | 1275.16 | 52. | 0. | 0.000 | 2000.00 | 2.137s |
| BI-214 | 5509.17 | 1377.35 | 19. | 2. | 0.001 | 1126.47 | 2.217s |

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Spectrum name: ARS08322.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 5575.10 | 1393.82 | 12. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5633.33 | 1408.36 | 8. | 10. | 0.004 | 129.96 | 2.240s |
| K-40 | 5843.96 | 1460.96 | 9. | 534. | 0.198 | 8.97 | 2.569 |
| BI-212 | 6480.48 | 1619.90 | 6. | 6. | 0.002 | 222.24 | 2.394s |
| BI-214 | 7059.06 | 1764.34 | 1. | 31. | 0.011 | 38.23 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 4.5807E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 4.581E-02 | } | 4.559E-02 | 2.05E+02 5.72E+01 | G K |
| | | | 143.76 | 0.000E+00 | &(P | 2.564E-01 | 1.00E+03 1.05E+01 | G |
| | | | 205.31 | 9.354E-02 | &(P | 6.460E-01 | 2.44E+02 4.70E+00 | G |
| | | | 163.35 | 1.004E-01 | &(P | 5.812E-01 | 2.05E+02 4.70E+00 | G |
| RA-226 | | 2.0940E-01 | | | | 5.84E+05 | | |
| | | | | | | Derived Ave Activity | | |
| | | | 186.21 | 2.094E-01 | }( | 8.266E-01 | 1.17E+02 3.64E+00 | G K |
| Ra-228 | | 4.1638E-01 | | | | 2.10E+03 | | |
| | | | 911.07 | 4.012E-01 | ?( | 1.851E-01 | 2.15E+01 2.90E+01 | G |
| | | | 968.90 | 4.296E-01 | (P | 2.470E-01 | 2.19E+01 1.75E+01 | G |
| | | | 338.40 | 4.513E-01 | ( | 2.219E-01 | 1.98E+01 1.20E+01 | G |
| | | | 964.60 | 3.778E-01 | ( | 8.624E-01 | 6.88E+01 5.45E+00 | G |
| Am-241 | T | 6.5453E-03 | | | | 1.58E+05 | | |
| | | | 59.54 | 6.545E-03 | (P | 9.328E-02 | 4.18E+02 3.59E+01 | G K |
| U-238 | | 4.9385E-01 | | | | 1.63E+12 | | |
| | | | 63.29 | 2.229E-01 | (P | 1.013E+00 | 1.57E+02 3.90E+00 | G |
| | | | 92.80 | 8.461E-01 | ?(P | 9.466E-01 | 4.02E+01 3.00E+00 | G |
| | | | 92.38 | 0.000E+00 | - P | 1.090E+00 | 1.00E+03 2.57E+00 | G |
| K-40 | | 1.1606E+01 | | | | 4.68E+11 | | |
| | | | 1460.75 | 1.161E+01 | (P | 3.590E-01 | 4.48E+00 1.07E+01 | G |
| PB-214 | | 4.3204E-01 | | | | 5.84E+05 | | |
| | | | 351.92 | 4.086E-01 | (P | 8.706E-02 | 1.10E+01 3.58E+01 | G |
| | | | 295.21 | 4.336E-01 | ( | 1.393E-01 | 1.31E+01 1.85E+01 | G |
| | | | 241.98 | 5.404E-01 | (P | 3.764E-01 | 2.37E+01 7.50E+00 | G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 8:35:36 AM
Spectrum name: ARS08322.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-214 | 4.1469E-01 | | | | | 5.84E+05 | |
| | | 609.31 | 4.147E-01 | (P | 7.425E-02 | 1.03E+01 | 4.48E+01 G |
| | | 1764.49 | 5.571E-01 | + P | 1.351E-01 | 1.91E+01 | 1.54E+01 G |
| | | 1120.29 | 1.898E-01 | - | 4.716E-01 | 1.06E+02 | 1.48E+01 G |
| | | 1238.11 | 2.665E-01 | - | 1.037E+00 | 1.13E+02 | 5.86E+00 G |
| | | 768.36 | 6.449E-01 | + | 6.007E-01 | 3.25E+01 | 4.80E+00 G |
| | | 1377.67 | 9.252E-02 | - P | 1.310E+00 | 5.63E+02 | 3.92E+00 G |
| | | 934.06 | 1.237E+00 | & P | 1.273E+00 | 4.41E+01 | 3.03E+00 G |
| BI-212 | 6.1325E-01 | | | | | 2.10E+03 | |
| | | 727.17 | 6.373E-01 | ?( | 2.605E-01 | 2.00E+01 | 1.18E+01 G |
| | | 1620.56 | 5.102E-01 | &( | 1.353E+00 | 1.11E+02 | 2.75E+00 G |
| | | 785.42 | -1.443E-01 | & | 2.452E+00 | 6.49E+02 | 2.00E+00 G |
| PB-212 | 4.7918E-01 | | | | | 2.10E+03 | |
| | | 238.63 | 4.792E-01 | (P | 6.584E-02 | 6.80E+00 | 4.31E+01 G |
| | | 300.09 | 2.133E-01 | - | 1.040E+00 | 1.76E+02 | 3.27E+00 G |
| TL-208 | 1.5660E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 1.540E-01 | @( | 4.019E-02 | 1.39E+01 | 8.60E+01 G |
| | | 510.72 | 4.049E-01 | + P | 2.718E-01 | 2.71E+01 | 2.25E+01 G |
| | | 860.47 | 1.749E-01 | &(P | 3.361E-01 | 7.83E+01 | 1.20E+01 G |
| | | 277.36 | 1.171E-01 | - P | 4.368E-01 | 1.32E+02 | 6.50E+00 G |
| | | 763.30 | 1.142E-01 | - | 1.807E+00 | 4.29E+02 | 1.70E+00 G |
| PA-234 | 1.2060E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 9.096E-04 | &( | 1.006E-01 | 3.71E+03 | 2.51E+01 G |
| | | 946.00 | 1.375E-03 | % | 2.459E-01 | 6.90E+03 | 2.00E+01 G |
| | | 131.28 | 1.156E-02 | ?( | 1.319E-01 | 3.86E+02 | 2.00E+01 G |
| | | 94.67 | -9.707E-02 | + | 1.916E-01 | 6.89E+01 | 1.55E+01 G |
| | | 883.24 | -3.705E-02 | + | 3.899E-01 | 4.10E+02 | 1.20E+01 G |
| | | 926.70 | 0.000E+00 | - P | 5.017E-01 | 1.00E+03 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | - P | 4.173E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 7.673E-02 | ?(P | 2.801E-01 | 1.26E+02 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | - P | 5.020E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 2.809E-01 | &(P | 5.181E-01 | 7.38E+01 | 7.80E+00 G |
| | | 880.51 | 5.138E-01 | &(P | 4.320E-01 | 3.75E+01 | 6.50E+00 G |
| | | 226.87 | 6.247E-03 | % P | 4.049E-01 | 2.25E+03 | 6.50E+00 G |
| | | 831.10 | 2.370E-01 | &( | 6.873E-01 | 1.15E+02 | 5.60E+00 G |
| | | 808.10 | 3.456E-01 | ?( | 7.458E-01 | 8.46E+01 | 4.90E+00 G |
| | | 99.70 | -4.523E-02 | + | 5.306E-01 | 3.96E+02 | 4.70E+00 G |
| | | 699.10 | 0.000E+00 | - | 1.109E+00 | 1.00E+03 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 1.277E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | & P | 1.090E+00 | 1.00E+03 | 3.90E+00 G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 8:35:36 AM
Spectrum name: ARS08322.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| EU-152 | 5.6803E-02 | | | | | 4.64E+03 | |
| | | 40.12 | 0.000E+00 | &( | 1.479E-01 | 1.00E+03 | 3.00E+01 G |
| | | 121.78 | -2.388E-02 | + | 9.230E-02 | 1.33E+02 | 2.92E+01 G |
| | | 344.30 | 1.138E-02 | ?(P | 1.378E-01 | 4.35E+02 | 2.70E+01 G |
| | | 1408.08 | 1.062E-01 | ?(P | 1.687E-01 | 6.50E+01 | 2.12E+01 G |
| | | 39.52 | 1.272E-02 | ?( | 2.739E-01 | 6.88E+02 | 1.60E+01 G |
| | | 964.00 | 1.106E-01 | ?(P | 2.838E-01 | 1.04E+02 | 1.46E+01 G |
| | | 1112.07 | -4.113E-02 | + | 5.109E-01 | 5.16E+02 | 1.36E+01 G |
| | | 778.90 | -5.523E-03 | % | 3.188E-01 | 2.16E+03 | 1.30E+01 G |
| | | 1085.80 | 0.000E+00 | - P | 5.890E-01 | 1.00E+03 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | & P | 5.118E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | 2.943E-01 | ?( | 1.778E-01 | 2.56E+01 | 7.62E+00 G |
| | | 867.39 | 5.564E-02 | &( | 7.587E-01 | 5.08E+02 | 4.18E+00 G |
| EU-154 | 1.7552E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | &(P | 6.580E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 0.000E+00 | &( | 2.130E-01 | 1.00E+03 | 3.55E+01 G |
| | | 723.30 | 0.000E+00 | ?( | 3.087E-01 | 1.00E+03 | 1.97E+01 G |
| | | 1004.80 | 0.000E+00 | ?(P | 3.026E-01 | 1.00E+03 | 1.76E+01 G |
| | | 43.00 | 4.330E-02 | ?( | 3.257E-01 | 2.53E+02 | 1.31E+01 G |
| | | 873.20 | 5.340E-02 | ?(P | 3.392E-01 | 2.41E+02 | 1.13E+01 G |
| | | 996.30 | -5.071E-02 | + | 4.922E-01 | 3.89E+02 | 1.07E+01 G |
| | | 42.31 | 1.095E-01 | ?(P | 5.784E-01 | 1.79E+02 | 7.30E+00 G |
| | | 248.04 | -1.884E-01 | + | 4.385E-01 | 8.31E+01 | 6.60E+00 G |
| | | 591.70 | 1.425E-01 | ?(P | 7.211E-01 | 1.91E+02 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | - P | 1.046E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | 1.715E-02 | % | 9.898E-01 | 2.16E+03 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak Codes:

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 8:35:36 AM
Spectrum name: ARS08322.An1

T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.77 | 75. | 2. | 0.001 | 1376.59 | 1.272E-02 | |
| EU-154 | 42.27 | 82. | 9. | 0.003 | 357.06 | 1.095E-01 | P |
| EU-154 | 42.77 | 88. | 6. | 0.002 | 505.90 | 4.330E-02 | |
| U-238 | 63.24 | 190. | 15. | 0.005 | 313.67 | 2.229E-01 | P |
| U-238 | 92.68 | 158. | 55. | 0.020 | 80.35 | 8.461E-01 | P |
| PA-234 | 93.74 | 176. | -33. | -0.012 | 137.85 | -9.707E-02 | |
| PA-234 | 98.93 | 125. | -5. | -0.002 | 791.72 | -4.523E-02 | |
| PA-234 | 110.54 | 116. | 15. | 0.005 | 251.50 | 7.673E-02 | P |
| EU-152 | 121.90 | 147. | -15. | -0.006 | 265.12 | -2.388E-02 | |
| PA-234 | 131.75 | 136. | 5. | 0.002 | 771.70 | 1.156E-02 | |
| EU-152 | 244.69 | 16. | 35. | 0.013 | 51.21 | 2.943E-01 | |
| EU-154 | 248.41 | 82. | -19. | -0.007 | 166.19 | -1.884E-01 | |
| EU-152 | 343.98 | 86. | 4. | 0.001 | 870.73 | 1.138E-02 | P |
| EU-154 | 591.53 | 29. | 6. | 0.002 | 382.48 | 1.425E-01 | P |
| BI-212 | 727.27 | 18. | 55. | 0.020 | 40.10 | 6.373E-01 | |
| BI-212 | 786.33 | 45. | -2. | -0.001 | 1298.08 | -1.443E-01 | |
| PA-234 | 808.11 | 22. | 12. | 0.004 | 169.29 | 3.456E-01 | |
| PA-234 | 830.85 | 24. | 9. | 0.003 | 229.88 | 2.370E-01 | |
| EU-152 | 867.30 | 14. | 2. | 0.001 | 1015.87 | 5.564E-02 | |
| EU-154 | 873.34 | 22. | 4. | 0.001 | 482.26 | 5.340E-02 | P |
| PA-234 | 880.47 | 11. | 21. | 0.008 | 74.98 | 5.138E-01 | P |
| PA-234 | 881.40 | 34. | -3. | -0.001 | 819.50 | -3.705E-02 | |
| PA-234 | 949.07 | 22. | 13. | 0.005 | 147.51 | 2.809E-01 | P |
| EU-152 | 963.41 | 22. | 10. | 0.004 | 208.10 | 1.106E-01 | P |
| EU-154 | 996.22 | 36. | -3. | -0.001 | 777.25 | -5.071E-02 | |
| EU-152 | 1112.03 | 55. | -3. | -0.001 | 1031.72 | -4.113E-02 | |
| EU-152 | 1408.36 | 8. | 10. | 0.004 | 129.96 | 1.062E-01 | P |
| BI-212 | 1619.90 | 6. | 6. | 0.002 | 222.24 | 5.102E-01 | |

P - Peakbackground subtraction

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 8:35:36 AM
Spectrum name: ARS08322.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 4.5807E-02 | 1.8797E-01 | 1.8800E-01 | 0.256E+00 |
| RA-226 | #A | 2.0940E-01 | 4.9025E-01 | 4.9041E-01 | 0.827E+00 |
| Ra-228 | | 4.1638E-01 | 1.6211E-01 | 1.6441E-01 | 0.185E+00 |
| Am-241 | A | 6.5453E-03 | 5.4686E-02 | 5.4688E-02 | 0.933E-01 |
| PB-210 | #A | 0.0000E+00 | 6.3479E-01 | 6.3480E-01 | 0.118E+01 |
| U-238 | #A | 4.9385E-01 | 3.9681E-01 | 3.9873E-01 | 0.101E+01 |
| K-40 | | 1.1606E+01 | 1.0406E+00 | 1.2978E+00 | 0.359E+00 |
| PB-214 | | 4.3204E-01 | 8.4202E-02 | 9.1909E-02 | 0.871E-01 |
| BI-214 | | 4.1469E-01 | 8.5839E-02 | 8.9648E-02 | 0.742E-01 |
| BI-212 | # | 6.1325E-01 | 2.4591E-01 | 2.4921E-01 | 0.260E+00 |
| PB-212 | | 4.7918E-01 | 6.5158E-02 | 7.3806E-02 | 0.658E-01 |
| TL-208 | | 1.5660E-01 | 4.3383E-02 | 4.4568E-02 | 0.402E-01 |
| PA-234 | #C | 1.2060E-01 | 9.0428E-02 | 9.0865E-02 | 0.101E+00 |
| CS-137 | #A | 0.0000E+00 | 1.8521E-02 | 1.8521E-02 | 0.473E-01 |
| CO-60 | #B | 0.0000E+00 | 3.0095E-02 | 3.0095E-02 | 0.627E-01 |
| EU-152 | #A | 5.6803E-02 | 2.9090E-02 | 2.9789E-02 | 0.148E+00 |
| EU-154 | #A | 1.7552E-02 | 6.2671E-02 | 6.2682E-02 | 0.658E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 1.350E+01 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-10 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-006 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 006 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.0345E-01 | pCi/g | 5.5829E-02 | 7.7600E-02 | 3.8800E-02 | | | |
| **RA-226** | 1.2005E+00 | pCi/g | 8.8003E-01 | 1.2800E+00 | 6.4000E-01 | | | |
| **RA-228** | 5.4111E-01 | pCi/g | 1.4965E-01 | 1.8400E-01 | 9.2000E-02 | | | |
| **AM-241** | 2.8666E-02 | pCi/g | 9.6969E-02 | 1.6500E-01 | 8.2500E-02 | | | |
| **PB-210** | 1.8063E-01 | pCi/g | 9.7905E-01 | 1.7800E+00 | 8.9000E-01 | | | |
| **U-238** | 8.2095E-01 | pCi/g | 6.4028E-01 | 1.6700E+00 | 8.3500E-01 | | | |
| **K-40** | 1.3229E+01 | pCi/g | 1.8143E+00 | 7.0300E-01 | 3.5150E-01 | | | |
| **PB-214** | 5.6876E-01 | pCi/g | 1.3715E-01 | 1.1300E-01 | 5.6500E-02 | | | |
| **BI-214** | 4.3978E-01 | pCi/g | 1.3137E-01 | 1.3900E-01 | 6.9500E-02 | | | |
| **BI-212** | 4.1492E-01 | pCi/g | 4.0035E-01 | 6.0000E-01 | 3.0000E-01 | | | |
| **PB-212** | 5.2763E-01 | pCi/g | 1.0900E-01 | 1.1300E-01 | 5.6500E-02 | | | |
| **TL-208** | 1.5934E-01 | pCi/g | 6.1881E-02 | 6.7600E-02 | 3.3800E-02 | | | |
| **PA-234** | 1.0830E-01 | pCi/g | 1.3151E-01 | 1.6600E-01 | 8.3000E-02 | | | |
| **CS-137** | 5.0977E-03 | pCi/g | 3.7123E-02 | 6.8000E-02 | 3.4000E-02 | | | |
| **CO-60** | 0.0000E+00 | pCi/g | 4.2696E-02 | 1.0400E-01 | 5.2000E-02 | | | |
| **EU-152** | 9.4877E-02 | pCi/g | 1.2926E-01 | 2.6000E-01 | 1.3000E-01 | | | |
| **EU-154** | 2.3117E-02 | pCi/g | 5.2522E-02 | 9.8100E-02 | 4.9050E-02 | | | |
| **Total Gamma** | 1.8446E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 5.2230E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01213.An1

Sample description
Batch ID: 16-00563-10
SDG: ARS1-16-00670-006 Tech: WJS

Spectrum Filename: C:\User\ARS01213.An1

Acquisition information
Start time: 19-Apr-2016 08:00:56
Live time: 1800
Real time: 1805
Dead time: 0.29 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 4.0073E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 4.0073E+02) =
2.4954E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01213.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2530

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.33 | 15. | 92.82 | 0.90 | 2.184E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 8.342E-02 | EU152 |
| 40.36 | 19. | 67.89 | 0.90 | 2.148E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 1.066E-01 | EU152 |
| 42.79 | 6. | 216.55 | 0.90 | 2.358E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.50 | 5. | 53.30 | 0.90 | 2.560E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.10 | 9. | 169.10 | 0.91 | 3.389E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.14 | 15. | 46.44 | 0.92 | 3.625E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.51 | 87. | 20.81 | 0.93 | 4.206E-02 | | | | |
| 77.16 | 153. | 11.94 | 0.93 | 4.310E-02 | | | | |
| 93.00 | 43. | 30.78 | 0.94 | 4.684E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 93.07 | 35. | 31.03 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.15 | 15. | 97.72 | 0.95 | 4.735E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 2.475E-01 | PA234 |
| 99.21 | 23. | 60.61 | 0.95 | 4.742E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 3.863E-01 | PA234 |
| 110.46 | 16. | 69.97 | 0.96 | 4.739E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 128.78 | 2. | 445.53 | 0.97 | 4.551E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 165.61 | 13. | 65.75 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.24 | 52. | 26.72 | 1.02 | 3.768E-02 | 185.72 | 54.000 | 9.633E-02 | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 186.40 | 42. | 25.26 | 0.44 | 3.763E-02 | 185.72 | 54.000 | PBC<MDA | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 205.34 | 8. | 120.43 | 1.03 | 3.512E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.86 | 202. | 9.02 | 0.99 | 3.137E-02 | 238.63 | 43.100 | 5.276E-01 | PB212 |
| 241.92 | 44. | 28.37 | 0.39 | 3.106E-02 | 241.98 | 7.500 | 7.134E-01 | PB214 |
| 276.95 | 10. | 96.56 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |

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| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 295.63 | 72. | 15.71 | 1.09 | 2.661E-02 | 295.21 | 18.500 | 5.459E-01 | PB214 |
| 300.55 | 25. | 42.48 | 0.56 | 2.627E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.67 | 55. | 19.82 | 1.01 | 2.392E-02 | 338.40 | 12.010 | 7.166E-01 | Ra228 |
| 352.16 | 122. | 10.81 | 1.26 | 2.320E-02 | 351.92 | 35.800 | 5.503E-01 | PB214 |
| 511.34 | 49. | 20.11 | 0.67 | 1.747E-02 | 510.72 | 22.500 | 4.632E-01 | TL208 |
| 583.40 | 56. | 17.33 | 0.53 | 1.583E-02 | 583.14 | 86.000 | 1.542E-01 | TL208 |
| 591.47 | 4. | 158.38 | 1.33 | 1.566E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.78 | 78. | 13.18 | 1.37 | 1.532E-02 | 609.31 | 44.791 | 4.276E-01 | BI214 |
| 661.41 | 2. | 364.11 | 1.38 | 1.442E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.04 | 11. | 65.82 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 763.65 | 1. | 391.49 | 1.45 | 1.297E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.06 | 5. | 135.52 | 1.46 | 1.291E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 785.14 | 6. | 89.35 | 1.47 | 1.270E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 860.20 | 29. | 20.79 | 0.49 | 1.186E-02 | 860.47 | 12.000 | 7.514E-01 | TL208 |
| 898.55 | 2. | 219.72 | 1.55 | 1.147E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.35 | 44. | 18.19 | 0.41 | 1.135E-02 | 911.07 | 29.000 | 4.966E-01 | Ra228 |
| 926.77 | 4. | 113.76 | 1.57 | 1.121E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.16 | 1. | 464.19 | 1.57 | 1.114E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 948.55 | 1. | 427.93 | 1.58 | 1.100E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 963.10 | 2. | 264.23 | 1.59 | 1.087E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.445E-01 | Ra228 |
| 963.52 | 2. | 283.52 | 1.59 | 1.087E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.450E-01 | Ra228 |
| 969.69 | 25. | 27.28 | 0.33 | 1.083E-02 | 968.90 | 17.460 | 4.943E-01 | Ra228 |
| 1084.37 | 3. | 158.09 | 1.68 | 9.900E-03 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1112.29 | 4. | 143.67 | 1.69 | 9.712E-03 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.54 | 16. | 36.36 | 1.70 | 9.654E-03 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1238.82 | 7. | 86.24 | 1.77 | 8.889E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1378.00 | 4. | 155.98 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.86 | 2. | 270.25 | 1.88 | 7.950E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.41 | 291. | 6.01 | 1.61 | 7.690E-03 | 1460.75 | 10.700 | 1.323E+01 | K40 |
| 1621.09 | 4. | 89.45 | 2.00 | 6.976E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1765.62 | 13. | 31.71 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | 4.766E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide |
|---|---|---|---|---|---|---|---|
| 297.29 | 74.58 | 147. | 80. | 0.044 | 52.01 | 0.804 | TH-234 |
| 307.87 | 77.22 | 130. | 128. | 0.071 | 32.84 | 0.865 | PB-212 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

0.88 Spectrum name: ARS01213.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 160.35 | 40.36 | 71. | 19. | 0.010 | 135.78 | 0.897s |
| EU-152 | 160.24 | 40.33 | 84. | 15. | 0.008 | 185.64 | 0.897s |
| EU-154 | 165.58 | 41.67 | 88. | -2. | -0.001 | 1272.66 | 0.899s |
| EU-154 | 170.07 | 42.79 | 79. | 6. | 0.003 | 433.10 | 0.899s |
| EU-152 | 177.16 | 44.56 | 84. | -15. | -0.008 | 186.25 | 0.901s |
| PB-210 | 184.90 | 46.50 | 97. | 5. | 0.003 | 106.60 | 0.902 |
| EU-154 | 204.38 | 51.36 | 59. | -2. | -0.001 | 999.35 | 0.904s |
| Am-241 | 235.34 | 59.10 | 119. | 9. | 0.005 | 338.21 | 0.913s |
| U-238 | 251.50 | 63.14 | 168. | 15. | 0.008 | 92.87 | 0.916s |
| U-238 | 371.27 | 93.07 | 130. | 35. | 0.020 | 62.07 | 0.940s |
| U-238 | 371.00 | 93.00 | 124. | 43. | 0.024 | 61.56 | 0.941s |
| PA-234 | 378.48 | 94.87 | 157. | -25. | -0.014 | 148.97 | 0.942s |
| PA-234 | 395.60 | 99.15 | 116. | 15. | 0.008 | 195.43 | 0.945s |
| PA-234 | 395.87 | 99.21 | 85. | 23. | 0.013 | 121.22 | 0.946s |
| PA-234 | 440.86 | 110.46 | 57. | 16. | 0.009 | 139.95 | 0.956s |
| EU-152 | 486.16 | 121.78 | 108. | 0. | 0.000 | 2000.00 | 0.964s |
| EU-154 | 491.42 | 123.10 | 100. | -7. | -0.004 | 419.84 | 0.965s |
| PA-234 | 514.16 | 128.78 | 63. | 2. | 0.001 | 891.06 | 0.972s |
| U-235 | 661.54 | 165.61 | 34. | 13. | 0.007 | 131.49 | 0.998s |
| U-235 | 744.08 | 186.24 | 72. | 52. | 0.029 | 53.44 | 1.016s |
| RA-226 | 744.73 | 186.40 | 82. | 42. | 0.023 | 50.52 | 0.436s |
| U-235 | 820.51 | 205.34 | 66. | 8. | 0.005 | 240.85 | 1.032s |
| PA-234 | 904.65 | 226.37 | 50. | -5. | -0.003 | 453.73 | 1.049s |
| PB-212 | 954.64 | 238.86 | 66. | 191. | 0.106 | 18.04 | 0.987 |
| PB-214 | 966.87 | 241.92 | 48. | 44. | 0.025 | 56.74 | 0.393s |
| EU-152 | 974.27 | 243.77 | 91. | -19. | -0.011 | 148.86 | 1.064s |
| EU-154 | 993.71 | 248.63 | 62. | -7. | -0.004 | 331.33 | 1.066s |
| TL-208 | 1107.06 | 276.95 | 43. | 10. | 0.006 | 193.11 | 1.089 |
| PB-214 | 1181.77 | 295.63 | 27. | 72. | 0.040 | 31.43 | 1.089s |
| PB-212 | 1201.46 | 300.55 | 33. | 25. | 0.014 | 84.96 | 0.560s |
| Ra-228 | 1353.98 | 338.67 | 27. | 55. | 0.031 | 39.63 | 1.015 |
| EU-152 | 1376.52 | 344.30 | 38. | -5. | -0.003 | 394.83 | 1.142s |
| PB-214 | 1407.97 | 352.16 | 23. | 122. | 0.068 | 21.62 | 1.264s |
| TL-208 | 2044.78 | 511.34 | 58. | 49. | 0.027 | 40.23 | 0.666s |
| PA-234 | 2265.74 | 566.58 | 34. | -12. | -0.007 | 155.79 | 1.313s |
| TL-208 | 2333.06 | 583.40 | 22. | 56. | 0.031 | 34.65 | 0.528s |
| EU-154 | 2365.32 | 591.47 | 18. | 4. | 0.002 | 316.75 | 1.330s |
| BI-214 | 2438.58 | 609.78 | 24. | 78. | 0.044 | 26.36 | 1.374 |
| CS-137 | 2645.08 | 661.41 | 18. | 2. | 0.001 | 728.22 | 1.381s |
| EU-154 | 2895.98 | 724.13 | 37. | -5. | -0.003 | 330.87 | 1.426s |
| BI-212 | 2907.62 | 727.04 | 24. | 11. | 0.006 | 131.64 | 1.429s |
| PA-234 | 2930.65 | 732.80 | 22. | -2. | -0.001 | 764.89 | 1.433s |
| EU-154 | 3026.58 | 756.78 | 20. | -5. | -0.003 | 276.11 | 1.450s |
| TL-208 | 3054.04 | 763.65 | 16. | 1. | 0.001 | 782.98 | 1.455 |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 3071.67 | 768.06 | 19. | 5. | 0.003 | 271.03 | 1.458s |
| BI-212 | 3140.00 | 785.14 | 11. | 6. | 0.003 | 178.70 | 1.470s |
| PA-234 | 3219.20 | 804.94 | 13. | -1. | 0.000 | 1954.34 | 1.486s |
| PA-234 | 3321.17 | 830.44 | 14. | -3. | -0.002 | 507.86 | 1.502s |
| TL-208 | 3440.23 | 860.20 | 2. | 29. | 0.016 | 41.57 | 0.486s |
| EU-152 | 3468.08 | 867.17 | 18. | -3. | -0.002 | 454.33 | 1.528s |
| EU-154 | 3492.20 | 873.20 | 31. | 0. | 0.000 | 2000.00 | 1.532s |
| PA-234 | 3518.90 | 879.88 | 22. | -5. | -0.003 | 286.86 | 1.537s |
| PA-234 | 3533.18 | 883.45 | 13. | -1. | 0.000 | 1978.95 | 1.539s |
| PA-234 | 3593.59 | 898.55 | 9. | 2. | 0.001 | 439.43 | 1.549s |
| Ra-228 | 3644.79 | 911.35 | 8. | 44. | 0.024 | 36.38 | 0.406s |
| PA-234 | 3706.46 | 926.77 | 12. | 4. | 0.002 | 227.51 | 1.568s |
| BI-214 | 3736.00 | 934.16 | 14. | 1. | 0.001 | 928.38 | 1.573s |
| PA-234 | 3786.00 | 946.66 | 16. | -3. | -0.002 | 492.42 | 1.582s |
| PA-234 | 3793.54 | 948.55 | 14. | 1. | 0.001 | 855.87 | 1.584s |
| EU-152 | 3853.42 | 963.52 | 20. | 2. | 0.001 | 567.03 | 1.594s |
| Ra-228 | 3851.74 | 963.10 | 17. | 2. | 0.001 | 528.46 | 1.594s |
| Ra-228 | 3878.11 | 969.69 | 10. | 25. | 0.014 | 54.55 | 0.330s |
| EU-154 | 3984.52 | 996.30 | 80. | 0. | 0.000 | 2000.00 | 1.616s |
| EU-154 | 4018.43 | 1004.78 | 19. | -3. | -0.002 | 446.28 | 1.621s |
| EU-152 | 4336.72 | 1084.37 | 11. | 3. | 0.002 | 316.18 | 1.675s |
| EU-152 | 4448.37 | 1112.29 | 14. | 4. | 0.002 | 287.35 | 1.692s |
| BI-214 | 4481.34 | 1120.54 | 14. | 16. | 0.009 | 72.72 | 1.698s |
| CO-60 | 4692.07 | 1173.24 | 25. | 0. | 0.000 | 2000.00 | 1.732s |
| BI-214 | 4954.32 | 1238.82 | 15. | 7. | 0.004 | 172.47 | 1.773s |
| EU-154 | 5097.52 | 1274.64 | 14. | -3. | -0.001 | 415.85 | 1.796s |
| CO-60 | 5331.50 | 1333.16 | 17. | -4. | -0.002 | 298.06 | 1.832s |
| BI-214 | 5510.78 | 1378.00 | 15. | 4. | 0.002 | 311.96 | 1.860s |
| PA-234 | 5575.16 | 1394.10 | 0. | 0. | 0.000 | 2000.00 | 1.870s |
| EU-152 | 5634.16 | 1408.86 | 8. | 2. | 0.001 | 540.50 | 1.878s |
| K-40 | 5844.27 | 1461.41 | 7. | 291. | 0.161 | 12.03 | 1.615 |
| BI-212 | 6482.61 | 1621.09 | 4. | 4. | 0.002 | 178.91 | 2.003s |
| BI-214 | 7060.32 | 1765.62 | 4. | 13. | 0.007 | 63.43 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | |
|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | COMMENTS |
| U-235 | | 1.0345E-01 | | | | | |
| | | | 185.72 | 9.633E-02 | &( | 7.756E-02 | 2.67E+01 G |
| | | | 143.76 | -1.132E-02 | % P | 4.273E-01 | 1.07E+03 G |
| | | | 205.31 | 1.852E-01 | ?(P | 9.227E-01 | 1.20E+02 G |
| | | | 163.35 | 2.511E-01 | & P | 5.825E-01 | 6.57E+01 G |

0.88 Spectrum name: ARS01213.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| RA-226 | | 1.2005E+00 | | | | | | |
| | | | 186.10 | 1.201E+00 | (P | 1.276E+00 | 2.53E+01 | G |
| Ra-228 | | 5.4111E-01 | | | | | | |
| | | | 911.07 | 4.966E-01 | (P | 1.842E-01 | 1.82E+01 | G |
| | | | 968.90 | 4.943E-01 | (P | 3.465E-01 | 2.73E+01 | G |
| | | | 338.40 | 7.166E-01 | (P | 3.515E-01 | 1.98E+01 | G |
| | | | 964.60 | 1.445E-01 | - | 1.389E+00 | 2.64E+02 | G |
| Am-241 | T | 2.8666E-02 | | | | | | |
| | | | 59.54 | 2.867E-02 | ?( | 1.650E-01 | 1.69E+02 | G K |
| PB-210 | | 1.8063E-01 | | | | | | |
| | | | 46.52 | 1.806E-01 | ?(P | 1.779E+00 | 5.33E+01 | G |
| U-238 | | 8.2095E-01 | | | | | | |
| | | | 63.29 | 3.849E-01 | (P | 1.672E+00 | 4.64E+01 | G |
| | | | 92.80 | 1.150E+00 | (P | 1.457E+00 | 3.08E+01 | G |
| | | | 92.38 | 1.098E+00 | (P | 1.742E+00 | 3.10E+01 | G |
| K-40 | | 1.3229E+01 | | | | | | |
| | | | 1460.75 | 1.323E+01 | (P | 7.032E-01 | 6.01E+00 | G |
| PB-214 | | 5.6876E-01 | | | | | | |
| | | | 351.92 | 5.503E-01 | @(P | 1.131E-01 | 1.08E+01 | G |
| | | | 295.21 | 5.459E-01 | *(P | 2.058E-01 | 1.57E+01 | G |
| | | | 241.98 | 7.134E-01 | (P | 5.610E-01 | 2.84E+01 | G |
| BI-214 | | 4.3978E-01 | | | | | | |
| | | | 609.31 | 4.276E-01 | (P | 1.386E-01 | 1.32E+01 | G |
| | | | 1764.49 | 4.766E-01 | ?(P | 4.633E-01 | 3.17E+01 | G |
| | | | 1120.29 | 4.106E-01 | ?(P | 5.210E-01 | 3.64E+01 | G |
| | | | 1238.11 | 5.081E-01 | ?( | 1.494E+00 | 8.62E+01 | G |
| | | | 768.36 | 2.940E-01 | - | 1.401E+00 | 1.36E+02 | G |
| | | | 1377.67 | 4.434E-01 | ?( | 2.471E+00 | 1.56E+02 | G |
| | | | 934.06 | 1.276E-01 | - P | 2.224E+00 | 4.64E+02 | G |
| BI-212 | | 4.1492E-01 | | | | | | |
| | | | 727.17 | 2.572E-01 | (P | 6.004E-01 | 6.58E+01 | G |
| | | | 1620.56 | 7.684E-01 | ?( | 2.400E+00 | 8.95E+01 | G |
| | | | 785.42 | 8.592E-01 | ?( | 2.641E+00 | 8.93E+01 | G |
| PB-212 | | 5.2763E-01 | | | | | | |
| | | | 238.63 | 5.276E-01 | (P | 1.127E-01 | 9.02E+00 | G |
| | | | 300.09 | 1.110E+00 | + P | 1.278E+00 | 4.25E+01 | G |

0.88 Spectrum name: ARS01213.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| TL-208 | 1.5934E-01 | | | | | | |
| | | 583.14 | 1.542E-01 | (P | 6.758E-02 | 1.73E+01 | G |
| | | 510.72 | 4.632E-01 | + P | 3.654E-01 | 2.01E+01 | G |
| | | 860.47 | 7.514E-01 | + P | 2.640E-01 | 2.08E+01 | G |
| | | 277.36 | 2.051E-01 | (P | 6.877E-01 | 9.66E+01 | G |
| | | 763.30 | 2.426E-01 | (P | 3.638E+00 | 3.91E+02 | G |
| PA-234 | 1.0830E-01 | | | | | | |
| | | 98.44 | 4.641E-02 | ?(P | 1.665E-01 | 9.77E+01 | G |
| | | 946.00 | -4.711E-02 | + P | 3.615E-01 | 2.46E+02 | G |
| | | 131.28 | 7.305E-03 | - P | 1.640E-01 | 4.46E+02 | G |
| | | 94.67 | -1.270E-01 | + | 3.141E-01 | 7.45E+01 | G |
| | | 883.24 | -1.399E-02 | & | 5.246E-01 | 9.89E+02 | G |
| | | 926.70 | 1.145E-01 | &(P | 5.824E-01 | 1.14E+02 | G |
| | | 569.26 | -2.695E-01 | + P | 6.655E-01 | 7.79E+01 | G |
| | | 111.00 | 1.512E-01 | ?( | 3.512E-01 | 7.00E+01 | G |
| | | 733.00 | -6.882E-02 | - P | 8.029E-01 | 3.82E+02 | G |
| | | 949.00 | 5.601E-02 | &( | 8.911E-01 | 4.28E+02 | G |
| | | 880.51 | -2.678E-01 | + P | 1.221E+00 | 1.43E+02 | G |
| | | 226.87 | -7.955E-02 | + | 6.296E-01 | 2.27E+02 | G |
| | | 831.10 | -1.563E-01 | + P | 1.122E+00 | 2.54E+02 | G |
| | | 808.10 | -3.291E-02 | - | 1.216E+00 | 9.77E+02 | G |
| | | 99.70 | 3.863E-01 | ( | 7.700E-01 | 6.06E+01 | G |
| | | 699.10 | -1.024E-03 | & | 1.388E+00 | 3.64E+04 | G |
| | | 898.60 | 1.630E-01 | ?(P | 1.358E+00 | 2.20E+02 | G |
| | | 1394.10 | 0.000E+00 | & | 8.828E-01 | 1.00E+03 | G |
| CS-137 | 5.0977E-03 | | | | | | |
| | | 661.66 | 5.098E-03 | &( | 6.803E-02 | 3.64E+02 | G |
| CO-60 | 0.0000E+00 | | | | | | |
| | | 1173.24 | 0.000E+00 | ?( | 1.040E-01 | 1.00E+03 | K |
| | | 1332.50 | -1.836E-02 | + | 9.722E-02 | 1.49E+02 | K |
| EU-152 | 9.4877E-02 | | | | | | |
| | | 40.12 | 8.342E-02 | ?( | 2.603E-01 | 9.28E+01 | G |
| | | 121.78 | 0.000E+00 | & | 1.406E-01 | 1.00E+03 | G |
| | | 344.30 | -2.664E-02 | - | 1.843E-01 | 1.97E+02 | G |
| | | 1408.08 | 3.525E-02 | ?( | 3.602E-01 | 2.70E+02 | G |
| | | 39.52 | 2.032E-01 | &( | 4.569E-01 | 6.79E+01 | G |
| | | 964.00 | 5.419E-02 | &( | 5.564E-01 | 2.84E+02 | G |
| | | 1112.07 | 1.121E-01 | ?( | 5.741E-01 | 1.44E+02 | G |
| | | 778.90 | -3.714E-03 | % | 4.619E-01 | 3.28E+03 | G |
| | | 1085.80 | 1.176E-01 | ?( | 6.728E-01 | 1.58E+02 | G |
| | | 45.40 | -2.416E-01 | + | 7.565E-01 | 9.31E+01 | G |
| | | 244.67 | -3.036E-01 | & | 7.517E-01 | 7.44E+01 | G |
| | | 867.39 | -2.089E-01 | + | 1.713E+00 | 2.27E+02 | G |

0.88 Spectrum name: ARS01213.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| EU-154 | 2.3117E-02 | | | | | | |
| | | 123.10 | -1.364E-02 | ?( | 9.815E-02 | 2.10E+02 | G |
| | | 1274.80 | -3.269E-02 | + | 2.471E-01 | 2.08E+02 | G |
| | | 723.30 | -7.629E-02 | + | 4.398E-01 | 1.65E+02 | G |
| | | 1004.80 | -5.865E-02 | + | 4.708E-01 | 2.23E+02 | G |
| | | 43.00 | 7.179E-02 | ?( | 5.358E-01 | 2.17E+02 | G |
| | | 873.20 | 0.000E+00 | - | 8.103E-01 | 1.00E+03 | G |
| | | 996.30 | 0.000E+00 | - | 1.470E+00 | 1.00E+03 | G |
| | | 42.31 | -4.645E-02 | & | 1.028E+00 | 6.36E+02 | G |
| | | 248.04 | -1.285E-01 | & | 7.331E-01 | 1.66E+02 | G |
| | | 591.70 | 2.078E-01 | ?( | 1.170E+00 | 1.58E+02 | G |
| | | 48.70 | -7.290E-02 | & | 1.279E+00 | 5.00E+02 | G |
| | | 756.70 | -3.358E-01 | + | 1.632E+00 | 1.38E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

0.88 Spectrum name: ARS01213.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | # | 1.0345E-01 | 5.5280E-02 | 5.5829E-02 | 0.776E-01 |
| RA-226 | A | 1.2005E+00 | 8.7666E-01 | 8.8003E-01 | 0.128E+01 |
| Ra-228 | | 5.4111E-01 | 1.4559E-01 | 1.4965E-01 | 0.184E+00 |
| Am-241 | #A | 2.8666E-02 | 9.6951E-02 | 9.6969E-02 | 0.165E+00 |
| PB-210 | #A | 1.8063E-01 | 9.7889E-01 | 9.7905E-01 | 0.178E+01 |
| U-238 | #A | 8.2095E-01 | 6.3707E-01 | 6.4028E-01 | 0.167E+01 |
| K-40 | | 1.3229E+01 | 1.6047E+00 | 1.8143E+00 | 0.703E+00 |
| PB-214 | | 5.6876E-01 | 1.2763E-01 | 1.3715E-01 | 0.113E+00 |
| BI-214 | | 4.3978E-01 | 1.2849E-01 | 1.3137E-01 | 0.139E+00 |
| BI-212 | #A | 4.1492E-01 | 3.9945E-01 | 4.0035E-01 | 0.600E+00 |
| PB-212 | | 5.2763E-01 | 1.0113E-01 | 1.0900E-01 | 0.113E+00 |
| TL-208 | | 1.5934E-01 | 6.0999E-02 | 6.1881E-02 | 0.676E-01 |
| PA-234 | #A | 1.0830E-01 | 1.3127E-01 | 1.3151E-01 | 0.166E+00 |
| CS-137 | #A | 5.0977E-03 | 3.7123E-02 | 3.7123E-02 | 0.680E-01 |
| CO-60 | #A | 0.0000E+00 | 4.2696E-02 | 4.2696E-02 | 0.104E+00 |
| EU-152 | #A | 9.4877E-02 | 1.2883E-01 | 1.2926E-01 | 0.260E+00 |
| EU-154 | #A | 2.3117E-02 | 5.2499E-02 | 5.2522E-02 | 0.981E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 2.8 to 2000.7 keV) 1.667E+01 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-11 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-007 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 007 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.9582E-02 | pCi/g | 1.7622E-01 | 2.8100E-01 | 1.4050E-01 | | | |
| **RA-226** | 6.1000E-01 | pCi/g | 5.4344E-01 | 9.0600E-01 | 4.5300E-01 | | | |
| **RA-228** | 4.5682E-01 | pCi/g | 1.2061E-01 | 9.7600E-02 | 4.8800E-02 | | | |
| **AM-241** | -4.2970E-02 | pCi/g | 3.8015E-01 | 1.7500E-01 | 8.7500E-02 | | | |
| **PB-210** | 3.5805E-01 | pCi/g | 9.0215E-01 | 1.5900E+00 | 7.9500E-01 | | | |
| **U-238** | 6.7603E-01 | pCi/g | 4.1859E-01 | 1.6700E+00 | 8.3500E-01 | | | |
| **K-40** | 1.2773E+01 | pCi/g | 1.5964E+00 | 7.8700E-01 | 3.9350E-01 | | | |
| **PB-214** | 3.4794E-01 | pCi/g | 8.4616E-02 | 1.1300E-01 | 5.6500E-02 | | | |
| **BI-214** | 4.4477E-01 | pCi/g | 1.0440E-01 | 8.3100E-02 | 4.1550E-02 | | | |
| **BI-212** | 2.1897E-01 | pCi/g | 2.6426E-01 | 4.3400E-01 | 2.1700E-01 | | | |
| **PB-212** | 3.5884E-01 | pCi/g | 8.5680E-02 | 9.0300E-02 | 4.5150E-02 | | | |
| **TL-208** | 1.1866E-01 | pCi/g | 4.5457E-02 | 6.0100E-02 | 3.0050E-02 | | | |
| **PA-234** | 4.2704E-02 | pCi/g | 8.1581E-02 | 1.4200E-01 | 7.1000E-02 | | | |
| **CS-137** | -5.7210E-03 | pCi/g | 3.5481E-02 | 6.3500E-02 | 3.1750E-02 | | | |
| **CO-60** | -1.7854E-02 | pCi/g | 6.7410E-02 | 8.3400E-02 | 4.1700E-02 | | | |
| **EU-152** | 8.5347E-02 | pCi/g | 7.8337E-02 | 1.9100E-01 | 9.5500E-02 | | | |
| **EU-154** | 1.7206E-02 | pCi/g | 4.5436E-02 | 6.9100E-02 | 3.4550E-02 | | | |
| **Total Gamma** | 1.6608E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.7792E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06813.An1

Sample description
Batch ID: 16-00563-11
SDG: ARS1-16-00670-007 Tech: WJS

Spectrum Filename: C:\User\ARS06813.An1

Acquisition information
Start time: 19-Apr-2016 08:09:06
Live time: 1800
Real time: 1803
Dead time: 0.14 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.8301E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.8301E+02) =
2.6109E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06813.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1528

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.20 | 34. | 33.45 | 0.80 | 6.930E-03 | | | | |
| 39.00 | 9. | 141.64 | 0.93 | 2.738E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | PBC<MDA | EU152 |
| 39.06 | 6. | 139.32 | 0.93 | 2.785E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | PBC<MDA | EU152 |
| 43.25 | 2. | 862.88 | 0.93 | 2.955E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 1.508E-02 | EU154 |
| 46.42 | 32. | 45.44 | 0.93 | 3.195E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.43 | 12. | 46.41 | 0.94 | 3.277E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.88 | 9. | 72.33 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 67.33 | 104. | 21.38 | 0.80 | 4.765E-02 | | | | |
| 74.70 | 109. | 16.42 | 0.96 | 5.131E-02 | | | | |
| 77.28 | 124. | 14.33 | 0.97 | 5.242E-02 | | | | |
| 87.19 | 49. | 32.36 | 0.75 | 5.589E-02 | | | | |
| 93.11 | 59. | 29.26 | 0.40 | 5.737E-02 | | | | |
| 99.49 | 9. | 134.88 | 0.99 | 5.851E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 122.90 | 9. | 131.98 | 1.01 | 5.928E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 143.95 | 8. | 116.42 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.24 | 13. | 78.14 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.60 | 29. | 30.21 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 227.08 | 11. | 95.45 | 1.11 | 4.480E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.41 | 178. | 10.56 | 0.92 | 4.325E-02 | 238.63 | 43.100 | 3.588E-01 | PB212 |
| 276.85 | 18. | 50.94 | 1.16 | 3.866E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.16 | 68. | 16.95 | 1.17 | 3.686E-02 | 295.21 | 18.500 | 3.914E-01 | PB214 |
| 300.49 | 7. | 118.03 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.72 | 51. | 20.35 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 5.062E-01 | Ra228 |
| 351.53 | 117. | 11.94 | 0.80 | 3.218E-02 | | | | |
| 351.53 | 117. | 11.94 | 0.80 | 3.218E-02 | 351.92 | 35.800 | 3.731E-01 | PB214 |
| 510.74 | 8. | 27.14 | 1.37 | 2.413E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 567.88 | 3. | 124.03 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.00 | 57. | 17.49 | 1.44 | 2.185E-02 | 583.14 | 86.000 | 1.185E-01 | TL208 |
| 609.20 | 102. | 10.74 | 0.72 | 2.115E-02 | 609.31 | 44.791 | 4.225E-01 | BI214 |

American Radiation Services Spectrum name: ARS06813.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 726.90 | 12. | 57.23 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 763.11 | 1. | 666.28 | 1.59 | 1.793E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.14 | 4. | 162.57 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 830.67 | 1. | 436.45 | 1.65 | 1.686E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.31 | 11. | 53.61 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.08 | 2. | 211.40 | 1.70 | 1.617E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 910.90 | 49. | 14.81 | 0.92 | 1.577E-02 | 911.07 | 29.000 | 4.159E-01 | Ra228 |
| 934.08 | 6. | 109.01 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 948.84 | 1. | 416.29 | 1.75 | 1.531E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.92 | 14. | 37.10 | 1.77 | 1.513E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 6.489E-01 | Ra228 |
| 969.22 | 29. | 22.68 | 1.77 | 1.508E-02 | 968.90 | 17.460 | 4.308E-01 | Ra228 |
| 1085.46 | 2. | 378.19 | 1.87 | 1.387E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1110.97 | 3. | 251.01 | 1.89 | 1.362E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.51 | 14. | 48.42 | 1.90 | 1.355E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1332.72 | 1. | 412.64 | 2.07 | 1.187E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1378.07 | 6. | 75.87 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.51 | 4. | 157.23 | 2.13 | 1.136E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.45 | 409. | 5.07 | 1.44 | 1.104E-02 | 1460.75 | 10.700 | 1.310E+01 | K40 |
| 1764.56 | 18. | 26.82 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | 4.791E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.03 | 13.20 | 45. | 34. | 0.019 | 66.91 | 0.797 | SE-75 | s |
| 268.59 | 67.33 | 155. | 103. | 0.057 | 39.25 | 0.798 | TA-182 | s |
| 298.14 | 74.72 | 126. | 96. | 0.053 | 40.97 | 0.934 | HG-203 | |
| 308.46 | 77.30 | 120. | 105. | 0.058 | 37.93 | 0.956 | PB-212 | |
| 348.01 | 87.19 | 91. | 49. | 0.027 | 64.73 | 0.749 | PB-212 | s |
| 371.72 | 93.11 | 87. | 71. | 0.040 | 43.89 | 0.396 | AC-228 | s |
| 1405.68 | 351.53 | 129. | 14. | 0.008 | 236.16 | 0.800 | PB-214 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 155.26 | 39.00 | 74. | 9. | 0.005 | 283.28 | 0.929s |
| EU-152 | 155.47 | 39.06 | 66. | 6. | 0.003 | 278.65 | 0.930s |
| EU-154 | 172.25 | 43.25 | 85. | 2. | 0.001 | 1725.75 | 0.932s |
| EU-154 | 171.02 | 42.94 | 102. | -5. | -0.003 | 624.78 | 0.932s |
| EU-152 | 184.95 | 46.42 | 91. | 32. | 0.018 | 90.88 | 0.935s |
| PB-210 | 184.96 | 46.43 | 118. | 12. | 0.007 | 92.82 | 0.936s |
| EU-154 | 194.31 | 48.76 | 115. | -6. | -0.003 | 490.72 | 0.938s |
| Am-241 | 237.94 | 59.67 | 204. | -17. | -0.009 | 559.43 | 0.948s |
| U-238 | 254.78 | 63.88 | 242. | 9. | 0.005 | 144.67 | 0.952s |
| U-238 | 372.07 | 93.20 | 105. | 52. | 0.029 | 53.98 | 0.980s |
| U-238 | 369.35 | 92.52 | 183. | -19. | -0.011 | 872.30 | 0.980s |
| PA-234 | 379.92 | 95.16 | 165. | -21. | -0.012 | 178.41 | 0.982s |
| PA-234 | 397.22 | 99.49 | 111. | 9. | 0.005 | 269.77 | 0.987s |
| PA-234 | 443.50 | 111.06 | 118. | -10. | -0.006 | 327.22 | 0.998s |
| EU-154 | 490.91 | 122.90 | 72. | 9. | 0.005 | 263.96 | 1.009s |
| PA-234 | 524.45 | 131.29 | 107. | -11. | -0.006 | 284.03 | 1.017s |
| U-235 | 575.12 | 143.95 | 75. | 8. | 0.004 | 232.84 | 1.029s |
| U-235 | 652.28 | 163.24 | 64. | 13. | 0.007 | 156.27 | 1.048s |
| RA-226 | 741.73 | 185.60 | 74. | 29. | 0.016 | 60.42 | 1.069 |
| U-235 | 821.59 | 205.56 | 74. | -8. | -0.004 | 344.84 | 1.087s |
| PA-234 | 907.69 | 227.08 | 49. | 11. | 0.006 | 190.90 | 1.108s |
| PB-212 | 953.05 | 238.41 | 74. | 171. | 0.095 | 21.12 | 0.916 |
| PB-214 | 958.80 | 239.85 | 188. | -64. | -0.036 | 65.84 | 1.122s |
| EU-152 | 973.33 | 243.48 | 72. | -18. | -0.010 | 139.51 | 1.124s |
| TL-208 | 1106.84 | 276.85 | 36. | 18. | 0.010 | 101.88 | 1.155 |
| PB-214 | 1180.10 | 295.16 | 41. | 68. | 0.038 | 33.89 | 1.172s |
| PB-212 | 1201.42 | 300.49 | 34. | 7. | 0.004 | 236.05 | 1.176 |
| Ra-228 | 1350.40 | 337.72 | 30. | 51. | 0.029 | 40.69 | 1.212 |
| EU-152 | 1375.17 | 343.91 | 41. | -8. | -0.004 | 264.85 | 1.217s |
| PB-214 | 1405.41 | 351.47 | 43. | 96. | 0.053 | 25.61 | 1.224s |
| TL-208 | 2042.80 | 510.74 | 70. | 8. | 0.005 | 54.29 | 1.370s |
| PA-234 | 2271.49 | 567.88 | 19. | 3. | 0.002 | 248.07 | 1.423s |
| TL-208 | 2332.01 | 583.00 | 31. | 57. | 0.032 | 34.99 | 1.435 |
| EU-154 | 2366.57 | 591.64 | 30. | -2. | -0.001 | 1004.43 | 1.443s |
| BI-214 | 2436.87 | 609.20 | 14. | 102. | 0.057 | 21.49 | 0.725s |
| CS-137 | 2651.60 | 662.85 | 28. | -2. | -0.001 | 620.17 | 1.505s |
| EU-154 | 2894.15 | 723.44 | 30. | -2. | -0.001 | 680.95 | 1.559s |
| BI-212 | 2907.98 | 726.90 | 21. | 12. | 0.007 | 114.46 | 1.563s |
| PA-234 | 2932.04 | 732.91 | 24. | -3. | -0.002 | 529.16 | 1.568s |
| EU-154 | 3027.28 | 756.70 | 39. | 0. | 0.000 | 2000.00 | 1.589s |
| TL-208 | 3052.95 | 763.11 | 24. | 1. | 0.001 | 1332.57 | 1.594s |
| BI-214 | 3073.07 | 768.14 | 25. | 4. | 0.002 | 325.13 | 1.599s |
| BI-212 | 3143.12 | 785.64 | 29. | -2. | -0.001 | 714.70 | 1.614s |
| PA-234 | 3234.23 | 808.40 | 24. | -2. | -0.001 | 675.88 | 1.633s |

American Radiation Services Spectrum name: ARS06813.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| TL-208 | 3442.04 | 860.31 | 13. | 11. | 0.006 | 107.22 | 1.679s |
| PA-234 | 3521.21 | 880.08 | 13. | 2. | 0.001 | 422.80 | 1.696s |
| Ra-228 | 3644.59 | 910.90 | 3. | 49. | 0.027 | 29.61 | 0.920s |
| BI-214 | 3737.38 | 934.08 | 22. | 6. | 0.003 | 218.03 | 1.742 |
| PA-234 | 3796.50 | 948.84 | 25. | 1. | 0.001 | 832.57 | 1.754s |
| Ra-228 | 3859.59 | 964.60 | 6. | 14. | 0.008 | 74.19 | 1.768D |
| Ra-228 | 3876.80 | 968.90 | 10. | 29. | 0.016 | 45.37 | 1.772D |
| EU-154 | 3984.01 | 995.68 | 19. | -1. | -0.001 | 1123.82 | 1.794s |
| EU-152 | 4343.52 | 1085.46 | 24. | 2. | 0.001 | 756.38 | 1.870s |
| EU-152 | 4445.67 | 1110.97 | 20. | 3. | 0.001 | 502.03 | 1.891s |
| BI-214 | 4483.88 | 1120.51 | 21. | 14. | 0.008 | 96.85 | 1.898s |
| CO-60 | 4688.75 | 1171.68 | 29. | -6. | -0.003 | 319.77 | 1.942s |
| CO-60 | 5333.71 | 1332.72 | 14. | 1. | 0.001 | 825.28 | 2.071s |
| BI-214 | 5515.35 | 1378.07 | 8. | 6. | 0.003 | 151.73 | 2.107s |
| PA-234 | 5579.56 | 1394.10 | 48. | 0. | 0.000 | 2000.00 | 2.120s |
| EU-152 | 5637.26 | 1408.51 | 14. | 4. | 0.002 | 314.46 | 2.131s |
| K-40 | 5845.52 | 1460.50 | 20. | 385. | 0.214 | 10.31 | 1.439s |
| BI-212 | 6486.71 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.297s |
| BI-214 | 7063.63 | 1764.56 | 4. | 18. | 0.010 | 53.65 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 9.9582E-02 | | | | | |
| | | | 143.76 | 5.260E-02 | &(P | 2.810E-01 1.16E+02 G | |
| | | | 205.31 | -1.402E-01 | + P | 7.455E-01 1.72E+02 G | |
| | | | 163.35 | 2.045E-01 | (P | 6.118E-01 7.81E+01 G | |
| RA-226 | | 6.1000E-01 | | | | | |
| | | | 186.21 | 6.100E-01 | (P | 9.057E-01 3.02E+01 G K | |
| Ra-228 | | 4.5682E-01 | | | | | |
| | | | 911.07 | 4.159E-01 | (P | 9.765E-02 1.48E+01 G | |
| | | | 968.90 | 4.308E-01 | (P | 2.649E-01 2.27E+01 G | |
| | | | 338.40 | 5.062E-01 | &(P | 2.790E-01 2.03E+01 G | |
| | | | 964.60 | 6.489E-01 | ( | 6.713E-01 3.71E+01 G | |
| Am-241 | T | -4.2970E-02 | | | | | |
| | | | 59.54 | -4.297E-02 | ?(P | 1.753E-01 2.80E+02 G K | |

American Radiation Services Spectrum name: ARS06813.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-210 | 3.5805E-01 | | | | | | |
| | | 46.52 | 3.580E-01 | ?(P | 1.594E+00 | 4.64E+01 | G |
| U-238 | 6.7603E-01 | | | | | | |
| | | 63.29 | 2.093E-01 | &(P | 1.667E+00 | 7.23E+01 | G |
| | | 92.80 | -4.386E-01 | + P | 1.501E+00 | 4.36E+02 | G |
| | | 92.38 | 1.384E+00 | ?(P | 1.344E+00 | 2.70E+01 | G |
| K-40 | 1.2773E+01 | | | | | | |
| | | 1460.75 | 1.277E+01 | (P | 7.867E-01 | 5.15E+00 | G |
| PB-214 | 3.4794E-01 | | | | | | |
| | | 351.92 | 3.255E-01 | (P | 1.132E-01 | 1.28E+01 | G |
| | | 295.21 | 3.914E-01 | (P | 1.874E-01 | 1.69E+01 | G |
| | | 241.98 | -7.874E-01 | - P | 8.144E-01 | 3.29E+01 | G |
| BI-214 | 4.4477E-01 | | | | | | |
| | | 609.31 | 4.225E-01 | (P | 8.312E-02 | 1.07E+01 | G |
| | | 1764.49 | 4.791E-01 | ?(P | 3.385E-01 | 2.68E+01 | G |
| | | 1120.29 | 2.828E-01 | - P | 4.691E-01 | 4.84E+01 | G |
| | | 1238.11 | -3.482E-02 | % P | 1.450E+00 | 5.08E+03 | G |
| | | 768.36 | 1.987E-01 | - P | 1.198E+00 | 1.63E+02 | G |
| | | 1377.67 | 5.294E-01 | &( | 1.354E+00 | 7.59E+01 | G |
| | | 934.06 | 4.901E-01 | (P | 2.054E+00 | 1.09E+02 | G |
| BI-212 | 2.1897E-01 | | | | | | |
| | | 727.17 | 2.190E-01 | ?(P | 4.341E-01 | 5.72E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 1.037E+00 | 1.00E+03 | G |
| | | 785.42 | -2.416E-01 | - | 3.096E+00 | 3.57E+02 | G |
| PB-212 | 3.5884E-01 | | | | | | |
| | | 238.63 | 3.588E-01 | (P | 9.032E-02 | 1.06E+01 | G |
| | | 300.09 | 2.438E-01 | - | 9.904E-01 | 1.18E+02 | G |
| TL-208 | 1.1866E-01 | | | | | | |
| | | 583.14 | 1.185E-01 | (P | 6.006E-02 | 1.75E+01 | G |
| | | 510.72 | 5.855E-02 | - P | 3.009E-01 | 2.71E+01 | G |
| | | 860.47 | 2.239E-01 | + | 3.827E-01 | 5.36E+01 | G |
| | | 277.36 | 2.753E-01 | + P | 4.775E-01 | 5.09E+01 | G |
| | | 763.30 | 1.288E-01 | ?(P | 3.294E+00 | 6.66E+02 | G |
| PA-234 | 4.2704E-02 | | | | | | |
| | | 98.44 | -8.468E-03 | %(P | 1.425E-01 | 1.29E+03 | G |
| | | 946.00 | 6.632E-03 | % | 3.216E-01 | 1.32E+03 | G |
| | | 131.28 | -3.517E-02 | + | 1.697E-01 | 1.42E+02 | G |
| | | 94.67 | -9.208E-02 | + | 2.743E-01 | 8.92E+01 | G |
| | | 883.24 | -5.965E-03 | % | 3.791E-01 | 1.66E+03 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 926.70 | -1.563E-02 | % P | 4.961E-01 | 1.00E+03 | G |
| | | 569.26 | 5.151E-02 | ?(P | 3.870E-01 | 1.24E+02 | G |
| | | 111.00 | -8.023E-02 | + P | 4.112E-01 | 1.64E+02 | G |
| | | 733.00 | -8.441E-02 | + P | 6.398E-01 | 2.65E+02 | G |
| | | 949.00 | 3.588E-02 | ?(P | 8.570E-01 | 4.16E+02 | G |
| | | 880.51 | 7.153E-02 | &(P | 7.338E-01 | 2.11E+02 | G |
| | | 226.87 | 1.471E-01 | &( | 4.752E-01 | 9.54E+01 | G |
| | | 831.10 | 2.473E-02 | % P | 9.857E-01 | 4.36E+02 | G |
| | | 808.10 | -9.818E-02 | + | 1.196E+00 | 3.38E+02 | G |
| | | 99.70 | 1.236E-01 | ?(P | 7.398E-01 | 1.35E+02 | G |
| | | 699.10 | -2.628E-02 | % P | 1.095E+00 | 3.65E+03 | G |
| | | 898.60 | -7.589E-02 | % P | 1.585E+00 | 3.70E+03 | G |
| | | 1394.10 | 0.000E+00 | & | 3.085E+00 | 1.00E+03 | G |
| CS-137 | -5.7210E-03 | | | | | | |
| | | 661.66 | -5.721E-03 | &( | 6.348E-02 | 3.10E+02 | G |
| CO-60 | -1.7854E-02 | | | | | | |
| | | 1173.24 | -1.785E-02 | ?(P | 8.345E-02 | 1.60E+02 | K |
| | | 1332.50 | 3.920E-03 | + P | 6.646E-02 | 4.13E+02 | K |
| EU-152 | 8.5347E-02 | | | | | | |
| | | 40.12 | 2.778E-02 | ?(P | 1.909E-01 | 1.39E+02 | G |
| | | 121.78 | -3.523E-03 | % P | 1.176E-01 | 1.05E+03 | G |
| | | 344.30 | -3.507E-02 | + P | 1.442E-01 | 1.32E+02 | G |
| | | 1408.08 | 5.714E-02 | ?(P | 3.318E-01 | 1.57E+02 | G |
| | | 39.52 | 7.924E-02 | &( | 3.835E-01 | 1.42E+02 | G |
| | | 964.00 | -1.794E-03 | % | 5.105E-01 | 7.83E+03 | G |
| | | 1112.07 | 5.563E-02 | &( | 5.035E-01 | 2.51E+02 | G |
| | | 778.90 | -5.371E-03 | % P | 3.618E-01 | 1.33E+03 | G |
| | | 1085.80 | 5.139E-02 | &( | 7.028E-01 | 3.78E+02 | G |
| | | 45.40 | 4.382E-01 | ?(P | 6.435E-01 | 4.54E+01 | G |
| | | 244.67 | -2.219E-01 | + P | 5.129E-01 | 6.98E+01 | G |
| | | 867.39 | -1.145E-02 | % | 1.095E+00 | 2.50E+03 | G |
| EU-154 | 1.7206E-02 | | | | | | |
| | | 123.10 | 1.534E-02 | ?( | 6.907E-02 | 1.32E+02 | G |
| | | 1274.80 | 2.685E-03 | % P | 2.001E-01 | 1.93E+03 | G |
| | | 723.30 | -2.456E-02 | + | 2.992E-01 | 3.40E+02 | G |
| | | 1004.80 | -2.532E-02 | % P | 4.339E-01 | 9.48E+02 | G |
| | | 43.00 | -4.591E-02 | + | 4.943E-01 | 3.12E+02 | G |
| | | 873.20 | -5.495E-03 | % P | 5.693E-01 | 1.00E+03 | G |
| | | 996.30 | -2.752E-02 | + | 5.694E-01 | 5.62E+02 | G |
| | | 42.31 | 2.755E-02 | ?( | 8.291E-01 | 8.63E+02 | G |
| | | 248.04 | 5.690E-03 | % P | 4.735E-01 | 1.70E+03 | G |
| | | 591.70 | -6.210E-02 | + | 1.121E+00 | 5.02E+02 | G |
| | | 48.70 | -1.669E-01 | + | 1.403E+00 | 2.45E+02 | G |
| | | 756.70 | 0.000E+00 | - | 1.681E+00 | 1.00E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 9.9582E-02 | 1.7602E-01 | 1.7622E-01 | 0.281E+00 |
| RA-226 #A | 6.1000E-01 | 5.4095E-01 | 5.4344E-01 | 0.906E+00 |
| Ra-228 | 4.5682E-01 | 1.1664E-01 | 1.2061E-01 | 0.976E-01 |
| Am-241 #A | -4.2970E-02 | 3.8014E-01 | 3.8015E-01 | 0.175E+00 |
| PB-210 #A | 3.5805E-01 | 9.0145E-01 | 9.0215E-01 | 0.159E+01 |
| U-238 #A | 6.7603E-01 | 4.1522E-01 | 4.1859E-01 | 0.167E+01 |
| K-40 | 1.2773E+01 | 1.3657E+00 | 1.5964E+00 | 0.787E+00 |
| PB-214 # | 3.4794E-01 | 7.8380E-02 | 8.4616E-02 | 0.113E+00 |
| BI-214 | 4.4477E-01 | 1.0072E-01 | 1.0440E-01 | 0.831E-01 |
| BI-212 #A | 2.1897E-01 | 2.6386E-01 | 2.6426E-01 | 0.434E+00 |
| PB-212 | 3.5884E-01 | 7.9017E-02 | 8.5680E-02 | 0.903E-01 |
| TL-208 # | 1.1866E-01 | 4.4807E-02 | 4.5457E-02 | 0.601E-01 |
| PA-234 #A | 4.2704E-02 | 8.1520E-02 | 8.1581E-02 | 0.142E+00 |
| CS-137 #A | -5.7210E-03 | 3.5480E-02 | 3.5481E-02 | 0.635E-01 |
| CO-60 #A | -1.7854E-02 | 6.7405E-02 | 6.7410E-02 | 0.834E-01 |
| EU-152 #A | 8.5347E-02 | 7.7755E-02 | 7.8337E-02 | 0.191E+00 |
| EU-154 #A | 1.7206E-02 | 4.5417E-02 | 4.5436E-02 | 0.691E-01 |

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity ( 1120.0 to  1998.2 keV)     1.403E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-12 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-008 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 008 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.9065E-02 | pCi/g | 1.8768E-01 | 2.4000E-01 | 1.2000E-01 | | | |
| **RA-226** | 2.5801E-02 | pCi/g | 5.2325E-01 | 9.1100E-01 | 4.5550E-01 | | | |
| **RA-228** | 2.3704E-01 | pCi/g | 1.1250E-01 | 2.2600E-01 | 1.1300E-01 | | | |
| **AM-241** | 0.0000E+00 | pCi/g | 2.7801E-02 | 1.0500E-01 | 5.2500E-02 | | | |
| **PB-210** | 2.8223E-01 | pCi/g | 6.9619E-01 | 1.0300E+00 | 5.1500E-01 | | | |
| **U-238** | 2.3972E-01 | pCi/g | 3.7827E-01 | 1.0400E+00 | 5.2000E-01 | | | |
| **K-40** | 1.0495E+01 | pCi/g | 1.2953E+00 | 2.0700E-01 | 1.0350E-01 | | | |
| **PB-214** | 3.2953E-01 | pCi/g | 8.9765E-02 | 8.3900E-02 | 4.1950E-02 | | | |
| **BI-214** | 2.9081E-01 | pCi/g | 1.0191E-01 | 1.0000E-01 | 5.0000E-02 | | | |
| **BI-212** | 4.4106E-01 | pCi/g | 3.0188E-01 | 2.9700E-01 | 1.4850E-01 | | | |
| **PB-212** | 3.4461E-01 | pCi/g | 6.8999E-02 | 6.9200E-02 | 3.4600E-02 | | | |
| **TL-208** | 1.3661E-01 | pCi/g | 3.4868E-02 | 2.2000E-02 | 1.1000E-02 | | | |
| **PA-234** | 1.1947E-01 | pCi/g | 6.9229E-02 | 1.2400E-01 | 6.2000E-02 | | | |
| **CS-137** | 1.7644E-02 | pCi/g | 2.8785E-02 | 3.7700E-02 | 1.8850E-02 | | | |
| **CO-60** | 3.2110E-02 | pCi/g | 4.0024E-02 | 4.7600E-02 | 2.3800E-02 | | | |
| **EU-152** | 7.7423E-02 | pCi/g | 6.9056E-02 | 1.8500E-01 | 9.2500E-02 | | | |
| **EU-154** | 3.8328E-02 | pCi/g | 6.1887E-02 | 6.5700E-02 | 3.2850E-02 | | | |
| **Total Gamma** | 1.3176E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 3.6662E+01 | pCi/g | | | | | | |
| | | | | | | | | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:51:52 AM
Spectrum name: ARS08217.An1

Sample description
Batch ID: 16-00563-12
SDG: ARS1-16-00670-008 Tech: WJS

Spectrum Filename: C:\User\ARS08217.An1

Acquisition information

| | |
|---|---|
| Start time: | 4/19/2016 8:21:36 AM |
| Live time: | 1800 |
| Real time: | 1808 |
| Dead time: | 0.43 % |
| Detector ID: | 9 |

Detector system
(ARS08) MCB 129

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration

| | |
|---|---|
| Created: | 12/12/2014 9:34:56 AM |
| Zero offset: | 0.447 keV |
| Gain: | 0.250 keV/channel |
| Quadratic: | -3.417E-08 keV/channel^2 |

Efficiency Calibration

| | |
|---|---|
| Created: | 1/5/2015 10:02:55 AM |
| Type: | Polynomial |
| Uncertainty: | 1.535 % |
| Coefficients: | -0.447430 -4.056056 0.358945 |
| | -0.033786 0.001201 -0.000016 |

Library Files

| | |
|---|---|
| Main analysis library: | ITSI COUNT.Lib |
| Library Match Width: | 0.500 |
| Peak stripping: | Library based |

Analysis parameters

| | |
|---|---|
| Analysis engine: | Env32 G702W050 |
| Start channel: | 100 ( 25.46keV ) |
| Stop channel: | 8000 ( 1999.20keV ) |
| Peak rejection level: | 1000.000% |
| Peak search sensitivity: | 1 |
| Sample Size: | 4.4106E+02 +/- 0.000E+00% |
| Activity scaling factor: | 1.0000E+06/( 1.0000E+00* 4.4106E+02) = 2.2673E+03 |
| Detection limit method: | Reg. Guide 4.16 Method |
| Random error: | 1.0000000E+00 |
| Systematic error: | 1.0000000E+00 |
| Fraction Limit: | 60.000% |
| Background width: | average of five points. |
| Half lives decay limit: | 12.000 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:51:52 AM
Spectrum name: ARS08217.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1907

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.01 | 2. | 688.29 | 0.97 | 2.638E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 8.602E-03 | EU152 |
| | | | | | 40.12 | 30.000 | 8.602E-03 | EU152 |
| | | | | | 39.52 | 16.000 | 1.643E-02 | EU152 |
| 46.01 | 10. | 123.24 | 0.97 | 3.135E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 47.99 | 13. | 78.97 | 0.63 | 3.269E-02 | | | | |
| 63.53 | 6. | 323.85 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 68.20 | 20. | 66.98 | 0.56 | 4.776E-02 | | | | |
| 75.27 | 60. | 28.91 | 1.01 | 5.142E-02 | | | | |
| 77.06 | 97. | 19.66 | 1.01 | 5.221E-02 | | | | |
| 90.18 | 38. | 32.92 | 0.55 | 5.641E-02 | | | | |
| 92.96 | 8. | 231.57 | 1.02 | 5.685E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 93.07 | 23. | 78.80 | 1.03 | 5.693E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 94.67 | 15.500 | PBC<MDA | PA234 |
| 99.85 | 19. | 57.64 | 1.03 | 5.789E-02 | 99.70 | 4.700 | 2.406E-01 | PA234 |
| | | | | | 99.70 | 4.700 | 2.406E-01 | PA234 |
| 101.42 | 8. | 137.17 | 1.03 | 5.802E-02 | | | | |
| 109.35 | 6. | 110.17 | 0.26 | 5.834E-02 | | | | |
| 118.92 | 6. | 126.64 | 0.24 | 5.809E-02 | | | | |
| 130.84 | 10. | 139.59 | 1.07 | 5.703E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| | | | | | 131.28 | 20.000 | 3.034E-02 | PA234 |

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Spectrum name: ARS08217.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 163.10 | 9. | 135.83 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 169.81 | 1. | 492.18 | 0.44 | 5.162E-02 | | | | |
| 186.06 | 27. | 41.87 | 0.58 | 4.914E-02 | 185.72 | 57.200 | 3.266E-02 | U235 |
| | | | | | 186.21 | 3.640 | 5.141E-01 | RA226 |
| 190.21 | 9. | 107.84 | 1.13 | 4.854E-02 | | | | |
| 191.87 | 15. | 72.95 | 1.13 | 4.830E-02 | | | | |
| 205.30 | 10. | 149.29 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 226.72 | 15. | 88.30 | 1.17 | 4.350E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.54 | 183. | 9.36 | 1.18 | 4.209E-02 | 238.63 | 43.100 | 3.444E-01 | PB212 |
| 241.46 | 35. | 34.02 | 1.18 | 4.175E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 244.32 | 11. | 85.99 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.153E-01 | EU152 |
| 248.20 | 5. | 230.59 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 6.083E-02 | EU154 |
| 277.18 | 7. | 189.22 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.94 | 60. | 21.60 | 0.34 | 3.634E-02 | 295.21 | 18.500 | 3.040E-01 | PB214 |
| 300.01 | 12. | 91.48 | 1.25 | 3.590E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 319.54 | 4. | 118.38 | 0.00 | 3.434E-02 | | | | |
| 338.27 | 59. | 23.50 | 0.37 | 3.297E-02 | 338.40 | 12.010 | 5.037E-01 | Ra228 |
| 351.84 | 115. | 12.67 | 1.62 | 3.207E-02 | 351.92 | 35.800 | 3.375E-01 | PB214 |
| 465.99 | 14. | 44.72 | 0.71 | 2.630E-02 | | | | |
| 511.61 | 93. | 14.58 | 1.71 | 2.463E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 573.15 | 13. | 37.37 | 0.72 | 2.276E-02 | | | | |
| 583.39 | 78. | 12.34 | 1.10 | 2.248E-02 | 583.14 | 86.000 | 1.366E-01 | TL208 |
| 609.37 | 89. | 15.07 | 1.35 | 2.181E-02 | 609.31 | 44.791 | 3.014E-01 | BI214 |
| | | | | | 609.31 | 44.791 | 3.014E-01 | BI214 |
| 661.41 | 9. | 81.54 | 1.61 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| | | | | | 661.66 | 85.210 | PBC<MDA | CS137 |
| 699.20 | 16. | 34.89 | 1.64 | 1.982E-02 | 699.10 | 4.600 | 6.161E-01 | PA234 |
| | | | | | 699.10 | 4.600 | 6.161E-01 | PA234 |
| 702.67 | 9. | 51.31 | 0.66 | 1.975E-02 | | | | |
| 726.90 | 26. | 34.06 | 1.67 | 1.928E-02 | 727.17 | 11.800 | 3.816E-01 | BI212 |
| | | | | | 727.17 | 11.800 | 3.816E-01 | BI212 |
| 762.72 | 5. | 169.23 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.70 | 10. | 87.52 | 1.71 | 1.855E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| | | | | | 768.36 | 4.799 | 3.824E-01 | BI214 |
| 785.46 | 8. | 89.94 | 1.72 | 1.826E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| | | | | | 785.42 | 2.000 | 7.922E-01 | BI212 |
| 880.57 | 14. | 28.74 | 1.81 | 1.684E-02 | 880.51 | 6.500 | 4.458E-01 | PA234 |
| | | | | | 880.51 | 6.500 | 4.458E-01 | PA234 |
| 911.68 | 44. | 20.73 | 0.73 | 1.642E-02 | 911.07 | 29.000 | 3.173E-01 | Ra228 |
| 933.17 | 31. | 21.37 | 0.32 | 1.614E-02 | 934.06 | 3.029 | 2.118E+00 | BI214 |
| 949.54 | 4. | 206.57 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.93 | 16. | 30.91 | 1.88 | 1.576E-02 | 964.60 | 5.452 | 6.490E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 2.259E-01 | EU152 |
| 968.48 | 24. | 23.81 | 0.48 | 1.571E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |

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Spectrum name: ARS08217.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 996.12 | 6. | 122.30 | 1.91 | 1.538E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| | | | | | 996.30 | 10.700 | 1.172E-01 | EU154 |
| 1005.71 | 14. | 30.89 | 0.36 | 1.528E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1040.59 | 17. | 29.06 | 0.74 | 1.489E-02 | | | | |
| 1085.85 | 9. | 64.29 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1112.11 | 4. | 248.24 | 2.01 | 1.416E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| | | | | | 1112.07 | 13.580 | 7.081E-02 | EU152 |
| 1120.16 | 28. | 30.99 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | 4.575E-01 | BI214 |
| | | | | | 1120.29 | 14.797 | 4.575E-01 | BI214 |
| 1172.45 | 13. | 62.29 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | HL>Cutoff | CO60 |
| | | | | | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1238.97 | 19. | 27.81 | 0.49 | 1.301E-02 | 1238.11 | 5.859 | 8.303E-01 | BI214 |
| 1274.79 | 7. | 80.66 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| | | | | | 1274.80 | 35.500 | 5.406E-02 | EU154 |
| 1332.66 | 2. | 317.36 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | HL>Cutoff | CO60 |
| | | | | | 1332.50 | 99.982 | 6.480E-03 | CO60 |
| 1377.99 | 5. | 152.86 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| | | | | | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.33 | 8. | 44.24 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.03 | 375. | 5.16 | 2.30 | 1.134E-02 | 1460.75 | 10.700 | 1.049E+01 | K40 |
| 1729.38 | 1. | 288.48 | 0.00 | 9.722E-03 | | | | |
| 1763.27 | 11. | 62.08 | 2.49 | 9.535E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 190.09 | 47.99 | 44. | 13. | 3.976E+02 | 157.95 | 0.632 | EU-154 | |
| 270.88 | 68.20 | 76. | 20. | 4.271E+02 | 133.97 | 0.558 | GD-153 | s |
| 299.17 | 75.18 | 119. | 60. | 1.162E+03 | 57.83 | 1.006 | TH-234 | D |
| 306.30 | 76.97 | 134. | 97. | 1.861E+03 | 39.32 | 1.008 | TL-208 | D |
| 358.78 | 90.18 | 56. | 38. | 6.719E+02 | 65.85 | 0.552 | AC-228 | s |
| 397.46 | 99.95 | 52. | 19. | 3.321E+02 | 115.27 | 1.033 | PA-234M | D |
| 403.74 | 101.52 | 57. | 8. | 1.387E+02 | 274.34 | 1.035 | U-237 | c |
| 435.42 | 109.35 | 24. | 6. | 1.063E+02 | 220.35 | 0.263 | LA-140 | c |
| 473.71 | 118.82 | 27. | 6. | 9.813E+01 | 253.29 | 0.240 | BA-140 | c |
| 677.21 | 169.81 | 26. | 1. | 2.712E+01 | 984.37 | 0.440 | NP-237 | c |
| 758.62 | 190.11 | 52. | 9. | 1.831E+02 | 239.37 | 1.131 | FE-59 | c |
| 765.27 | 191.77 | 50. | 15. | 3.014E+02 | 147.65 | 1.132 | CS-138 | c |
| 1276.00 | 319.54 | 11. | 4. | 1.223E+02 | 236.76 | 0.000 | - | c |
| 1861.78 | 465.99 | 8. | 14. | 5.134E+02 | 89.44 | 0.711 | - | s |
| 2290.43 | 573.15 | 4. | 13. | 5.624E+02 | 74.74 | 0.721 | SB-126 | s |
| 2435.34 | 609.37 | 24. | 89. | 4.067E+03 | 30.13 | 1.345 | BI-214 | M |
| 2808.64 | 702.67 | 7. | 9. | 4.760E+02 | 102.61 | 0.664 | NB-94 | sM |

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Spectrum name: ARS08217.An1

| Channel | Energy | Background | Net area | Eff*Area | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 3731.02 | 933.17 | 3. | 31. | 1.914E+03 | 42.74 | 0.321 | - | s |
| 3873.67 | 968.48 | 20. | 13. | 8.472E+02 | 109.08 | 1.884 | SB-124 | D |
| 4021.38 | 1005.71 | 2. | 14. | 9.295E+02 | 61.78 | 0.360 | - | s |
| 4160.97 | 1040.59 | 2. | 17. | 1.128E+03 | 58.13 | 0.738 | - | s |
| 4955.11 | 1238.97 | 2. | 19. | 1.430E+03 | 55.62 | 0.488 | CO-56 | s |
| 6919.00 | 1729.38 | 4. | 1. | 1.131E+02 | 576.97 | 0.000 | - | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.29 | 39.54 | 85. | -13. | -0.007 | 231.03 | 0.967s |
| EU-152 | 158.17 | 40.01 | 75. | 2. | 0.001 | 1376.59 | 0.967s |
| EU-154 | 165.85 | 41.93 | 86. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 172.20 | 43.52 | 76. | -10. | -0.006 | 280.62 | 0.970s |
| PB-210 | 182.16 | 46.01 | 58. | 10. | 0.006 | 246.47 | 0.974s |
| EU-154 | 194.50 | 49.09 | 72. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 238.16 | 60.01 | 88. | 0. | 0.000 | 2000.00 | 0.989s |
| U-238 | 252.22 | 63.53 | 116. | 6. | 0.003 | 647.71 | 0.993s |
| U-238 | 369.90 | 92.96 | 122. | 8. | 0.004 | 463.15 | 1.025s |
| U-238 | 370.33 | 93.07 | 112. | 23. | 0.013 | 157.60 | 1.025s |
| PA-234 | 393.00 | 98.74 | 116. | -24. | -0.013 | 152.11 | 1.031s |
| PA-234 | 397.01 | 99.74 | 71. | 3. | 0.002 | 880.63 | 1.033s |
| PA-234 | 442.50 | 111.12 | 85. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-154 | 493.09 | 123.77 | 83. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 521.35 | 130.84 | 71. | 10. | 0.006 | 279.19 | 1.067s |
| U-235 | 650.36 | 163.10 | 51. | 9. | 0.005 | 271.66 | 1.102s |
| U-235 | 740.82 | 185.72 | 40. | 28. | 0.016 | 70.55 | 1.126D |
| U-235 | 819.11 | 205.30 | 77. | 10. | 0.006 | 298.57 | 1.147s |
| PA-234 | 904.77 | 226.72 | 54. | 15. | 0.008 | 176.60 | 1.170s |
| PB-212 | 952.41 | 238.63 | 54. | 183. | 0.102 | 18.67 | 1.182D |
| PB-214 | 965.81 | 241.98 | 45. | 33. | 0.018 | 68.92 | 1.185D |
| EU-152 | 975.16 | 244.32 | 25. | 11. | 0.006 | 171.98 | 1.188s |
| EU-154 | 990.69 | 248.20 | 41. | 5. | 0.003 | 461.18 | 1.192s |
| TL-208 | 1106.59 | 277.18 | 54. | 7. | 0.004 | 378.44 | 1.223 |
| PB-214 | 1177.62 | 294.94 | 36. | 60. | 0.033 | 43.20 | 0.341s |
| PB-212 | 1197.87 | 300.01 | 35. | 12. | 0.007 | 182.95 | 1.246s |
| Ra-228 | 1350.89 | 338.27 | 36. | 59. | 0.033 | 47.00 | 0.374s |
| EU-152 | 1374.00 | 344.04 | 64. | 0. | 0.000 | 2000.00 | 1.292s |

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Spectrum name: ARS08217.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PB-214 | 1405.20 | 351.84 | 30. | 114. | 0.063 | 25.87 | 1.620s |
| TL-208 | 2044.26 | 511.61 | 82. | 31. | 0.017 | 100.78 | 1.710s |
| PA-234 | 2273.25 | 568.85 | 35. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2331.41 | 583.39 | 4. | 78. | 0.043 | 24.68 | 1.104s |
| EU-154 | 2361.55 | 590.92 | 34. | 0. | 0.000 | 2000.00 | 1.539s |
| BI-214 | 2435.35 | 609.37 | 31. | 80. | 0.044 | 34.48 | 1.556 |
| CS-137 | 2643.56 | 661.41 | 13. | 9. | 0.005 | 163.09 | 1.606s |
| PA-234 | 2794.78 | 699.20 | 4. | 16. | 0.009 | 69.79 | 1.641s |
| EU-154 | 2887.73 | 722.43 | 40. | -10. | -0.006 | 241.20 | 1.664s |
| BI-212 | 2905.61 | 726.90 | 14. | 26. | 0.014 | 68.13 | 1.667s |
| PA-234 | 2927.41 | 732.35 | 23. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3023.53 | 756.37 | 18. | -1. | -0.001 | 1644.38 | 1.695s |
| TL-208 | 3048.91 | 762.72 | 18. | 5. | 0.003 | 338.47 | 1.701 |
| BI-214 | 3072.86 | 768.70 | 18. | 10. | 0.006 | 175.04 | 1.705s |
| EU-152 | 3108.00 | 777.48 | 27. | -5. | -0.003 | 409.68 | 1.715s |
| BI-212 | 3139.92 | 785.46 | 14. | 8. | 0.005 | 179.89 | 1.721s |
| TL-208 | 3441.57 | 860.84 | 30. | 0. | 0.000 | 2000.00 | 1.789s |
| EU-154 | 3494.00 | 873.94 | 36. | 0. | 0.000 | 2000.00 | 1.800s |
| PA-234 | 3520.53 | 880.57 | 1. | 14. | 0.008 | 57.48 | 1.807s |
| PA-234 | 3533.89 | 883.91 | 39. | 0. | 0.000 | 2000.00 | 1.809s |
| PA-234 | 3592.67 | 898.60 | 43. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3644.16 | 911.46 | 39. | 15. | 0.009 | 168.12 | 1.834s |
| BI-214 | 3731.72 | 933.34 | 25. | 6. | 0.004 | 319.83 | 1.854s |
| PA-234 | 3781.50 | 945.78 | 29. | 0. | 0.000 | 2000.00 | 1.864s |
| PA-234 | 3796.55 | 949.54 | 16. | 4. | 0.002 | 413.14 | 1.867s |
| EU-152 | 3852.50 | 963.52 | 11. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 5. | 16. | 0.009 | 61.81 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 22. | 11. | 0.006 | 136.16 | 1.885D |
| EU-154 | 3983.00 | 996.12 | 10. | 6. | 0.003 | 244.61 | 1.908s |
| EU-154 | 4019.27 | 1005.19 | 26. | 0. | 0.000 | 2000.00 | 1.915s |
| EU-152 | 4342.15 | 1085.85 | 6. | 9. | 0.005 | 128.59 | 1.984s |
| EU-152 | 4447.26 | 1112.11 | 22. | 4. | 0.002 | 496.49 | 2.006s |
| BI-214 | 4479.49 | 1120.16 | 11. | 28. | 0.016 | 61.98 | 2.013s |
| CO-60 | 4688.81 | 1172.45 | 12. | 13. | 0.007 | 124.58 | 2.056s |
| BI-214 | 4955.00 | 1238.94 | 11. | 12. | 0.007 | 128.34 | 2.108s |
| EU-154 | 5098.54 | 1274.79 | 6. | 7. | 0.004 | 161.32 | 2.137s |
| CO-60 | 5330.22 | 1332.66 | 12. | 2. | 0.001 | 634.71 | 2.183s |
| BI-214 | 5511.71 | 1377.99 | 13. | 5. | 0.003 | 305.71 | 2.217s |
| PA-234 | 5582.38 | 1395.63 | 18. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5633.22 | 1408.33 | 1. | 8. | 0.004 | 88.48 | 2.240s |
| K-40 | 5844.25 | 1461.03 | 1. | 374. | 0.208 | 10.38 | 2.304 |
| BI-212 | 6482.09 | 1620.30 | 13. | 0. | 0.000 | 2000.00 | 2.394s |
| BI-214 | 7054.77 | 1763.27 | 7. | 11. | 0.006 | 124.16 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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Spectrum name: ARS08217.An1

***** SUMMARY OF LIBRARY PEAK USAGE *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| U-235 | | 6.9065E-02 | | | | | 1.39E+09 | | |
| | | | 185.72 | 3.424E-02 | } | 3.895E-02 | 3.53E+01 | 5.72E+01 | G K |
| | | | 143.76 | 1.919E-03 | %(P | 2.398E-01 | 4.12E+03 | 1.05E+01 | G |
| | | | 205.31 | 1.604E-01 | &(P | 6.802E-01 | 1.49E+02 | 4.70E+00 | G |
| | | | 163.35 | 1.277E-01 | &(P | 4.943E-01 | 1.36E+02 | 4.70E+00 | G |
| RA-226 | | 2.5801E-02 | | | | | 5.84E+05 | | |
| | | | | | | | Derived Ave Activity | | |
| | | | 186.21 | 2.580E-02 | }( | 9.106E-01 | 1.01E+03 | 3.64E+00 | G K |
| Ra-228 | | 2.3704E-01 | | | | | 2.10E+03 | | |
| | | | 911.07 | 1.096E-01 | ?( | 2.264E-01 | 8.41E+01 | 2.90E+01 | G |
| | | | 968.90 | 1.366E-01 | (P | 3.050E-01 | 6.81E+01 | 1.75E+01 | G |
| | | | 338.40 | 5.037E-01 | ( | 2.650E-01 | 2.35E+01 | 1.20E+01 | G |
| | | | 964.60 | 6.490E-01 | ( | 5.044E-01 | 3.09E+01 | 5.45E+00 | G |
| PB-210 | | 2.8223E-01 | | | | | 7.45E+03 | | |
| | | | 46.52 | 2.822E-01 | &(P | 1.034E+00 | 1.23E+02 | 4.00E+00 | G |
| U-238 | | 2.3972E-01 | | | | | 1.63E+12 | | |
| | | | 63.29 | 1.083E-01 | &(P | 1.035E+00 | 3.24E+02 | 3.90E+00 | G |
| | | | 92.80 | 4.571E-01 | &(P | 1.037E+00 | 7.88E+01 | 3.00E+00 | G |
| | | | 92.38 | 1.854E-01 | &(P | 1.263E+00 | 2.32E+02 | 2.57E+00 | G |
| K-40 | | 1.0495E+01 | | | | | 4.68E+11 | | |
| | | | 1460.75 | 1.049E+01 | (P | 2.068E-01 | 5.19E+00 | 1.07E+01 | G |
| PB-214 | | 3.2953E-01 | | | | | 5.84E+05 | | |
| | | | 351.92 | 3.375E-01 | *(P | 8.395E-02 | 1.29E+01 | 3.58E+01 | G |
| | | | 295.21 | 3.040E-01 | ( | 1.554E-01 | 2.16E+01 | 1.85E+01 | G |
| | | | 241.98 | 3.545E-01 | (P | 3.717E-01 | 3.45E+01 | 7.50E+00 | G |
| BI-214 | | 2.9081E-01 | | | | | 5.84E+05 | | |
| | | | 609.31 | 2.774E-01 | (P | 1.004E-01 | 1.72E+01 | 4.48E+01 | G |
| | | | 1764.49 | 2.510E-01 | ?(P | 3.538E-01 | 6.21E+01 | 1.54E+01 | G |
| | | | 1120.29 | 4.575E-01 | + | 2.968E-01 | 3.10E+01 | 1.48E+01 | G |
| | | | 1238.11 | 5.357E-01 | + | 8.109E-01 | 6.42E+01 | 5.86E+00 | G |
| | | | 768.36 | 3.824E-01 | ?( | 8.597E-01 | 8.75E+01 | 4.80E+00 | G |
| | | | 1377.67 | 3.711E-01 | ?(P | 1.417E+00 | 1.53E+02 | 3.92E+00 | G |
| | | | 934.06 | 4.416E-01 | ?(P | 1.801E+00 | 1.60E+02 | 3.03E+00 | G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:51:52 AM
Spectrum name: ARS08217.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-212 | 4.4106E-01 | | | | | 2.10E+03 | |
| | | 727.17 | 3.816E-01 | ?( | 2.967E-01 | 3.41E+01 | 1.18E+01 G |
| | | 1620.56 | 0.000E+00 | - | 2.337E+00 | 1.00E+03 | 2.75E+00 G |
| | | 785.42 | 7.922E-01 | ?( | 1.848E+00 | 8.99E+01 | 2.00E+00 G |
| PB-212 | 3.4461E-01 | | | | | 2.10E+03 | |
| | | 238.63 | 3.444E-01 | (P | 6.915E-02 | 9.33E+00 | 4.31E+01 G |
| | | 300.09 | 3.480E-01 | ?( | 8.780E-01 | 9.15E+01 | 3.27E+00 G |
| TL-208 | 1.3661E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 1.366E-01 | ( | 2.198E-02 | 1.23E+01 | 8.60E+01 G |
| | | 510.72 | 1.927E-01 | + P | 2.749E-01 | 5.04E+01 | 2.25E+01 G |
| | | 860.47 | 0.000E+00 | - P | 4.666E-01 | 1.00E+03 | 1.20E+01 G |
| | | 277.36 | 9.388E-02 | - P | 5.109E-01 | 1.89E+02 | 6.50E+00 G |
| | | 763.30 | 5.373E-01 | + | 2.416E+00 | 1.69E+02 | 1.70E+00 G |
| PA-234 | 1.1947E-01 | | | | | 1.65E+12 | |
| | | 98.44 | -5.677E-02 | ?( | 1.244E-01 | 7.61E+01 | 2.51E+01 G |
| | | 946.00 | 0.000E+00 | + | 2.961E-01 | 1.00E+03 | 2.00E+01 G |
| | | 131.28 | 3.034E-02 | & | 1.251E-01 | 1.40E+02 | 2.00E+01 G |
| | | 94.67 | -7.035E-03 | % | 2.211E-01 | 1.06E+03 | 1.55E+01 G |
| | | 883.24 | 0.000E+00 | + | 5.351E-01 | 1.00E+03 | 1.20E+01 G |
| | | 926.70 | 6.454E-03 | & P | 3.419E-01 | 1.90E+03 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | + P | 4.317E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | + P | 3.121E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | & P | 5.247E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 1.065E-01 | & P | 5.861E-01 | 2.07E+02 | 7.80E+00 G |
| | | 880.51 | 4.458E-01 | ?(P | 2.293E-01 | 2.87E+01 | 6.50E+00 G |
| | | 226.87 | 1.800E-01 | ?(P | 4.451E-01 | 8.83E+01 | 6.50E+00 G |
| | | 831.10 | -1.732E-02 | % | 7.087E-01 | 1.51E+03 | 5.60E+00 G |
| | | 808.10 | -1.941E-02 | % | 9.631E-01 | 1.83E+03 | 4.90E+00 G |
| | | 99.70 | 3.964E-02 | ?( | 5.248E-01 | 4.40E+02 | 4.70E+00 G |
| | | 699.10 | 6.161E-01 | ?( | 4.703E-01 | 3.49E+01 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 1.702E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | - P | 1.659E+00 | 1.00E+03 | 3.90E+00 G |
| CS-137 | 1.7644E-02 | | | | | 1.10E+04 | |
| | | 661.66 | 1.764E-02 | ?(P | 3.773E-02 | 8.15E+01 | 8.52E+01 G |
| CO-60 | 3.2110E-02 | | | | | 1.93E+03 | |
| | | 1173.24 | 3.211E-02 | &(P | 4.763E-02 | 6.23E+01 | 9.99E+01 K |
| | | 1332.50 | 6.480E-03 | - | 5.173E-02 | 3.17E+02 | 1.00E+02 K |
| EU-152 | 7.7423E-02 | | | | | 4.64E+03 | |
| | | 40.12 | 8.602E-03 | ?( | 1.852E-01 | 6.88E+02 | 3.00E+01 G |
| | | 121.78 | -3.351E-04 | & | 9.039E-02 | 8.94E+03 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | - P | 1.553E-01 | 1.00E+03 | 2.70E+01 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:51:52 AM
Spectrum name: ARS08217.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1408.08 | 1.036E-01 | ?(P | 1.140E-01 | 4.42E+01 | 2.12E+01 G |
| | | 39.52 | -1.068E-01 | + | 3.751E-01 | 1.16E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | - P | 2.738E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 7.081E-02 | ?( | 4.349E-01 | 2.48E+02 | 1.36E+01 G |
| | | 778.90 | -7.132E-02 | + | 3.841E-01 | 2.05E+02 | 1.30E+01 G |
| | | 1085.80 | 2.048E-01 | &(P | 3.256E-01 | 6.43E+01 | 1.03E+01 G |
| | | 45.40 | 4.704E-03 | % P | 5.251E-01 | 3.63E+03 | 9.00E+00 G |
| | | 244.67 | 1.153E-01 | ?( | 2.827E-01 | 8.60E+01 | 7.62E+00 G |
| | | 867.39 | -1.597E-02 | % | 1.111E+00 | 2.61E+03 | 4.18E+00 G |
| EU-154 | 3.8328E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | ?(P | 6.568E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 5.406E-02 | ?( | 1.053E-01 | 8.07E+01 | 3.55E+01 G |
| | | 723.30 | -9.375E-02 | + | 2.890E-01 | 1.21E+02 | 1.97E+01 G |
| | | 1004.80 | 0.000E+00 | - P | 3.354E-01 | 1.00E+03 | 1.76E+01 G |
| | | 43.00 | -9.521E-02 | + | 3.941E-01 | 1.40E+02 | 1.31E+01 G |
| | | 873.20 | 0.000E+00 | - P | 5.434E-01 | 1.00E+03 | 1.13E+01 G |
| | | 996.30 | 1.172E-01 | ?( | 3.658E-01 | 1.22E+02 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | - P | 7.624E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | 6.083E-02 | ?( | 4.104E-01 | 2.31E+02 | 6.60E+00 G |
| | | 591.70 | 0.000E+00 | - P | 9.873E-01 | 1.00E+03 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | & P | 1.029E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | -4.428E-02 | & | 9.955E-01 | 8.22E+02 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:51:52 AM
Spectrum name: ARS08217.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.54 | 85. | -13. | -0.007 | 231.03 | -1.068E-01 | |
| EU-152 | 40.01 | 75. | 2. | 0.001 | 1376.59 | 8.602E-03 | |
| EU-154 | 43.52 | 76. | -10. | -0.006 | 280.62 | -9.521E-02 | |
| PB-210 | 46.01 | 58. | 10. | 0.006 | 246.47 | 2.822E-01 | P |
| U-238 | 63.53 | 116. | 6. | 0.003 | 647.71 | 1.083E-01 | P |
| U-238 | 92.96 | 122. | 8. | 0.004 | 463.15 | 1.854E-01 | P |
| U-238 | 93.07 | 112. | 23. | 0.013 | 157.60 | 4.571E-01 | P |
| PA-234 | 98.74 | 116. | -24. | -0.013 | 152.11 | -5.677E-02 | |
| PA-234 | 99.74 | 71. | 3. | 0.002 | 880.63 | 3.964E-02 | |
| PA-234 | 130.84 | 71. | 10. | 0.006 | 279.19 | 3.034E-02 | |
| PA-234 | 226.72 | 54. | 15. | 0.008 | 176.60 | 1.800E-01 | P |
| EU-152 | 244.32 | 25. | 11. | 0.006 | 171.98 | 1.153E-01 | |
| EU-154 | 248.20 | 41. | 5. | 0.003 | 461.18 | 6.083E-02 | |
| BI-214 | 609.37 | 31. | 80. | 0.044 | 34.48 | 2.774E-01 | P |
| CS-137 | 661.41 | 13. | 9. | 0.005 | 163.09 | 1.764E-02 | P |
| PA-234 | 699.20 | 4. | 16. | 0.009 | 69.79 | 6.161E-01 | |
| EU-154 | 722.43 | 40. | -10. | -0.006 | 241.20 | -9.375E-02 | |
| BI-212 | 726.90 | 14. | 26. | 0.014 | 68.13 | 3.816E-01 | |
| EU-154 | 756.37 | 18. | -1. | -0.001 | 1644.38 | -4.428E-02 | |
| BI-214 | 768.70 | 18. | 10. | 0.006 | 175.04 | 3.824E-01 | |
| EU-152 | 777.48 | 27. | -5. | -0.003 | 409.68 | -7.132E-02 | |
| BI-212 | 785.46 | 14. | 8. | 0.005 | 179.89 | 7.922E-01 | |
| PA-234 | 880.57 | 1. | 14. | 0.008 | 57.48 | 4.458E-01 | P |
| BI-214 | 933.34 | 25. | 6. | 0.004 | 319.83 | 4.416E-01 | P |
| PA-234 | 949.54 | 16. | 4. | 0.002 | 413.14 | 1.065E-01 | P |
| EU-154 | 996.12 | 10. | 6. | 0.003 | 244.61 | 1.172E-01 | |
| EU-152 | 1085.85 | 6. | 9. | 0.005 | 128.59 | 2.048E-01 | P |
| EU-152 | 1112.11 | 22. | 4. | 0.002 | 496.49 | 7.081E-02 | |
| BI-214 | 1120.16 | 11. | 28. | 0.016 | 61.98 | 4.575E-01 | |
| CO-60 | 1172.45 | 12. | 13. | 0.007 | 124.58 | 3.211E-02 | P |
| BI-214 | 1238.94 | 11. | 12. | 0.007 | 128.34 | 5.357E-01 | |
| EU-154 | 1274.79 | 6. | 7. | 0.004 | 161.32 | 5.406E-02 | |
| CO-60 | 1332.66 | 12. | 2. | 0.001 | 634.71 | 6.480E-03 | |
| BI-214 | 1377.99 | 13. | 5. | 0.003 | 305.71 | 3.711E-01 | P |
| EU-152 | 1408.33 | 1. | 8. | 0.004 | 88.48 | 1.036E-01 | P |
| BI-214 | 1763.27 | 7. | 11. | 0.006 | 124.16 | 2.510E-01 | P |

P - Peakbackground subtraction

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 8:51:52 AM
Spectrum name: ARS08217.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 6.9065E-02 | 1.8762E-01 | 1.8768E-01 | 0.240E+00 |
| RA-226 | A | 2.5801E-02 | 5.2324E-01 | 5.2325E-01 | 0.911E+00 |
| Ra-228 | | 2.3704E-01 | 1.1141E-01 | 1.1250E-01 | 0.226E+00 |
| Am-241 | #A | 0.0000E+00 | 2.7801E-02 | 2.7801E-02 | 0.105E+00 |
| PB-210 | #A | 2.8223E-01 | 6.9562E-01 | 6.9619E-01 | 0.103E+01 |
| U-238 | #A | 2.3972E-01 | 3.7779E-01 | 3.7827E-01 | 0.104E+01 |
| K-40 | | 1.0495E+01 | 1.0890E+00 | 1.2953E+00 | 0.207E+00 |
| PB-214 | | 3.2953E-01 | 8.5254E-02 | 8.9765E-02 | 0.839E-01 |
| BI-214 | # | 2.9081E-01 | 1.0028E-01 | 1.0191E-01 | 0.100E+00 |
| BI-212 | # | 4.4106E-01 | 3.0048E-01 | 3.0188E-01 | 0.297E+00 |
| PB-212 | | 3.4461E-01 | 6.4338E-02 | 6.8999E-02 | 0.692E-01 |
| TL-208 | | 1.3661E-01 | 3.3712E-02 | 3.4868E-02 | 0.220E-01 |
| PA-234 | #A | 1.1947E-01 | 6.8665E-02 | 6.9229E-02 | 0.124E+00 |
| CS-137 | #A | 1.7644E-02 | 2.8775E-02 | 2.8785E-02 | 0.377E-01 |
| CO-60 | #A | 3.2110E-02 | 4.0001E-02 | 4.0024E-02 | 0.476E-01 |
| EU-152 | #A | 7.7423E-02 | 6.8500E-02 | 6.9056E-02 | 0.185E+00 |
| EU-154 | #A | 3.8328E-02 | 6.1831E-02 | 6.1887E-02 | 0.657E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 1.154E+01 pCi/g

The library has energies which are not separable.

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-13 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-009 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-02S |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 009 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.7758E-02 | pCi/g | 7.9685E-02 | 3.7200E-01 | 1.8600E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 6.1534E-01 | 1.1500E+00 | 5.7500E-01 | | | |
| **RA-228** | 2.3157E-01 | pCi/g | 1.3018E-01 | 2.6600E-01 | 1.3300E-01 | | | |
| **AM-241** | -2.4845E-04 | pCi/g | 6.0040E-02 | 1.0700E-01 | 5.3500E-02 | | | |
| **PB-210** | -7.9236E-02 | pCi/g | 8.0376E-01 | 1.2700E+00 | 6.3500E-01 | | | |
| **U-238** | 4.6123E-01 | pCi/g | 4.5517E-01 | 1.2000E+00 | 6.0000E-01 | | | |
| **K-40** | 1.2941E+01 | pCi/g | 1.9833E+00 | 9.7200E-01 | 4.8600E-01 | | | |
| **PB-214** | 3.6418E-01 | pCi/g | 1.1643E-01 | 1.1500E-01 | 5.7500E-02 | | | |
| **BI-214** | 2.9731E-01 | pCi/g | 9.5089E-02 | 9.2100E-02 | 4.6050E-02 | | | |
| **BI-212** | 2.1466E-01 | pCi/g | 3.0847E-01 | 5.1900E-01 | 2.5950E-01 | | | |
| **PB-212** | 2.6299E-01 | pCi/g | 8.5961E-02 | 1.0600E-01 | 5.3000E-02 | | | |
| **TL-208** | 8.7425E-02 | pCi/g | 3.9474E-02 | 5.1800E-02 | 2.5900E-02 | | | |
| **PA-234** | 4.5667E-02 | pCi/g | 7.8634E-02 | 1.2800E-01 | 6.4000E-02 | | | |
| **CS-137** | -3.4684E-03 | pCi/g | 8.9867E-02 | 5.7800E-02 | 2.8900E-02 | | | |
| **CO-60** | 1.9212E-03 | pCi/g | 4.9903E-02 | 9.2600E-02 | 4.6300E-02 | | | |
| **EU-152** | 2.1635E-02 | pCi/g | 4.3950E-02 | 1.8100E-01 | 9.0500E-02 | | | |
| **EU-154** | 5.4770E-02 | pCi/g | 7.8869E-02 | 7.9100E-02 | 3.9550E-02 | | | |
| **Total Gamma** | 1.5082E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.3535E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 09:02:33
American Radiation Services     Spectrum name: ARS05250.An1

Sample description
     Batch ID:  16-00563-13
     SDG:  ARS1-16-00670-009  Tech:  WJS

Spectrum Filename: C:\User\ARS05250.An1

Acquisition information
       Start time:                4/19/2016 08:32:29
       Live time:               1800
       Real time:               1801
       Dead time:                 0.06 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.8611E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.8611E+02) =
                                  2.5899E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:02:33
American Radiation Services Spectrum name: ARS05250.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 10 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1106

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.25 | 10. | 100.18 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.11 | 3. | 322.51 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.43 | -2. | 53.58 | 0.75 | 2.755E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 49.41 | 6. | 157.36 | 0.75 | 2.876E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| 63.11 | 15. | 53.55 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.72 | 66. | 19.98 | 0.79 | 4.753E-02 | | | | |
| 77.14 | 95. | 15.30 | 0.79 | 4.857E-02 | | | | |
| 92.72 | 18. | 54.05 | 0.82 | 5.211E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.75 | 21. | 57.00 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.77 | 12. | 86.01 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 121.35 | 10. | 101.41 | 0.87 | 5.064E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 143.76 | 1. | 529.12 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 161.78 | 20. | 36.29 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.72 | 21. | 59.09 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| 205.22 | 2. | 343.43 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 228.04 | 5. | 169.04 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.64 | 113. | 14.35 | 1.08 | 3.536E-02 | 238.63 | 43.100 | 2.630E-01 | PB212 |
| 241.95 | 32. | 37.97 | 2.01 | 3.505E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 295.34 | 67. | 16.70 | 1.24 | 3.087E-02 | 295.21 | 18.500 | 4.551E-01 | PB214 |
| 299.87 | 17. | 55.40 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.60 | 46. | 23.59 | 0.61 | 2.825E-02 | 338.40 | 12.010 | 5.194E-01 | Ra228 |
| | | | | | 338.40 | 12.010 | 5.194E-01 | Ra228 |
| 351.90 | 83. | 14.53 | 0.89 | 2.755E-02 | 351.92 | 35.800 | 2.936E-01 | PB214 |
| 511.23 | -4. | 39.85 | 1.43 | 2.149E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 569.04 | 2. | 143.19 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.11 | 37. | 20.26 | 1.53 | 1.957E-02 | 583.14 | 86.000 | 8.665E-02 | TL208 |
| 609.51 | 59. | 13.89 | 0.95 | 1.895E-02 | 609.31 | 44.791 | 2.706E-01 | BI214 |

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| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 698.99 | 1. | 568.06 | 1.66 | 1.708E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 727.94 | 11. | 64.40 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 756.40 | 3. | 225.31 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 763.48 | 1. | 804.98 | 1.74 | 1.592E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 775.22 | 3. | 180.56 | 1.75 | 1.566E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 860.69 | 4. | 153.29 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 881.16 | 2. | 237.16 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.43 | 26. | 29.90 | 1.89 | 1.368E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| | | | | | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 926.86 | 1. | 513.58 | 1.90 | 1.347E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.99 | 8. | 80.61 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 965.23 | 1. | 813.20 | 1.94 | 1.298E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 964.60 | 5.452 | 5.460E-02 | Ra228 |
| 969.23 | 12. | 57.13 | 1.94 | 1.292E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| | | | | | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1120.71 | 12. | 67.60 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1172.81 | 1. | 438.65 | 2.12 | 1.065E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1275.45 | 6. | 93.84 | 2.19 | 9.709E-03 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1378.47 | 6. | 84.39 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1461.19 | 311. | 5.96 | 1.74 | 8.221E-03 | 1460.75 | 10.700 | 1.336E+01 | K40 |
| 1765.55 | 10. | 44.22 | 2.43 | 6.316E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.41 | 74.70 | 85. | 46. | 0.026 | 64.68 | 0.695 | TH-234 | M |
| 308.09 | 77.12 | 73. | 81. | 0.045 | 37.20 | 0.798 | PB-212 | M |
| 1354.68 | 338.60 | 41. | 27. | 0.015 | 75.95 | 0.613 | AC-228 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 155.82 | 39.08 | 40. | -1. | -0.001 | 1427.01 | 0.750s |
| EU-154 | 168.52 | 42.25 | 43. | 10. | 0.005 | 200.35 | 0.750s |
| EU-152 | 179.95 | 45.11 | 35. | 3. | 0.001 | 645.01 | 0.750s |
| PB-210 | 185.23 | 46.43 | 51. | -2. | -0.001 | 107.17 | 0.750s |
| EU-154 | 197.16 | 49.41 | 46. | 6. | 0.004 | 314.72 | 0.750s |
| U-238 | 252.02 | 63.11 | 97. | 15. | 0.008 | 107.10 | 0.772s |
| U-238 | 370.63 | 92.75 | 117. | 21. | 0.012 | 114.00 | 0.820s |

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American Radiation Services Spectrum name: ARS05250.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 370.53 | 92.72 | 116. | 18. | 0.010 | 108.11 | 0.821s |
| PA-234 | 378.63 | 94.75 | 104. | -5. | -0.003 | 592.62 | 0.824s |
| PA-234 | 398.75 | 99.77 | 50. | 12. | 0.007 | 172.03 | 0.832s |
| PA-234 | 445.36 | 111.42 | 73. | -6. | -0.003 | 399.51 | 0.850s |
| EU-152 | 485.12 | 121.35 | 47. | 10. | 0.006 | 202.83 | 0.868s |
| EU-154 | 491.35 | 122.91 | 69. | -7. | -0.004 | 343.02 | 0.870s |
| PA-234 | 524.58 | 131.21 | 96. | -6. | -0.003 | 695.14 | 0.883s |
| U-235 | 646.93 | 161.78 | 24. | 20. | 0.011 | 72.58 | 0.934s |
| U-235 | 742.77 | 185.72 | 89. | 21. | 0.011 | 118.17 | 0.969D |
| RA-226 | 744.73 | 186.21 | 80. | 0. | 0.000 | 2000.00 | 0.970D |
| U-235 | 820.83 | 205.22 | 60. | 2. | 0.001 | 686.85 | 1.000s |
| PA-234 | 912.15 | 228.04 | 41. | 5. | 0.003 | 338.08 | 1.033s |
| PB-212 | 954.58 | 238.64 | 70. | 103. | 0.057 | 28.70 | 1.078 |
| PB-214 | 967.84 | 241.95 | 47. | 32. | 0.018 | 75.94 | 2.012s |
| EU-152 | 974.44 | 243.60 | 68. | -13. | -0.007 | 190.37 | 1.060s |
| EU-154 | 992.04 | 248.00 | 41. | -7. | -0.004 | 269.74 | 1.065s |
| TL-208 | 1107.12 | 276.75 | 47. | -6. | -0.003 | 447.65 | 1.109s |
| PB-214 | 1181.52 | 295.34 | 32. | 67. | 0.037 | 33.40 | 1.243 |
| PB-212 | 1199.66 | 299.87 | 41. | 17. | 0.009 | 110.81 | 1.142 |
| Ra-228 | 1355.29 | 338.75 | 26. | 18. | 0.010 | 87.27 | 1.198s |
| EU-152 | 1378.08 | 344.44 | 32. | -3. | -0.002 | 595.04 | 1.206s |
| PB-214 | 1407.92 | 351.90 | 33. | 74. | 0.041 | 29.06 | 0.891s |
| TL-208 | 2045.69 | 511.23 | 71. | -4. | -0.002 | 79.70 | 1.434s |
| PA-234 | 2277.10 | 569.04 | 16. | 2. | 0.001 | 286.38 | 1.509s |
| TL-208 | 2333.41 | 583.11 | 18. | 37. | 0.021 | 40.51 | 1.526s |
| EU-154 | 2367.80 | 591.70 | 26. | 0. | 0.000 | 2000.00 | 1.536s |
| BI-214 | 2439.10 | 609.51 | 14. | 59. | 0.033 | 27.78 | 0.947s |
| PA-234 | 2797.27 | 698.99 | 28. | 1. | 0.001 | 1136.11 | 1.664s |
| BI-212 | 2913.17 | 727.94 | 25. | 11. | 0.006 | 128.81 | 1.696s |
| EU-154 | 3027.09 | 756.40 | 17. | 3. | 0.001 | 450.63 | 1.729s |
| TL-208 | 3055.42 | 763.48 | 21. | 1. | 0.000 | 1609.97 | 1.737s |
| EU-152 | 3102.41 | 775.22 | 10. | 3. | 0.001 | 361.12 | 1.753s |
| BI-212 | 3143.21 | 785.41 | 20. | -3. | -0.002 | 397.66 | 1.761s |
| PA-234 | 3234.03 | 808.10 | 27. | 0. | 0.000 | 2000.00 | 1.785s |
| PA-234 | 3316.07 | 828.59 | 18. | -1. | 0.000 | 1844.27 | 1.809s |
| TL-208 | 3444.57 | 860.69 | 22. | 4. | 0.002 | 306.59 | 1.839s |
| EU-154 | 3491.87 | 872.51 | 24. | -3. | -0.001 | 830.35 | 1.852s |
| PA-234 | 3526.49 | 881.16 | 16. | 2. | 0.001 | 474.33 | 1.860s |
| Ra-228 | 3647.68 | 911.43 | 27. | 26. | 0.015 | 59.80 | 1.890s |
| PA-234 | 3709.43 | 926.86 | 21. | 1. | 0.001 | 1027.16 | 1.905s |
| BI-214 | 3741.97 | 934.99 | 18. | 8. | 0.005 | 161.21 | 1.912s |
| PA-234 | 3782.06 | 945.00 | 23. | -4. | -0.002 | 334.49 | 1.923s |
| PA-234 | 3783.44 | 945.35 | 20. | -7. | -0.004 | 216.43 | 1.926s |
| EU-152 | 3855.14 | 963.26 | 30. | -2. | -0.001 | 1106.96 | 1.940s |
| Ra-228 | 3863.02 | 965.23 | 32. | 1. | 0.001 | 1626.41 | 1.941s |
| Ra-228 | 3879.05 | 969.23 | 22. | 12. | 0.007 | 114.26 | 1.945s |
| EU-154 | 3989.80 | 996.90 | 17. | -1. | -0.001 | 830.88 | 1.970s |
| EU-152 | 4337.34 | 1083.72 | 25. | -6. | -0.003 | 261.39 | 2.048s |

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American Radiation Services Spectrum name: ARS05250.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 4450.24 | 1111.92 | 23. | -4. | -0.002 | 345.62 | 2.070s |
| BI-214 | 4485.44 | 1120.71 | 27. | 12. | 0.007 | 135.20 | 2.077s |
| BI-214 | 4949.02 | 1236.51 | 20. | -2. | -0.001 | 714.45 | 2.167s |
| EU-154 | 5104.90 | 1275.45 | 14. | 6. | 0.004 | 187.69 | 2.192s |
| CO-60 | 5336.47 | 1333.30 | 10. | -2. | -0.001 | 574.27 | 2.231s |
| BI-214 | 5517.33 | 1378.47 | 8. | 6. | 0.003 | 168.78 | 2.259s |
| PA-234 | 5577.48 | 1393.50 | 7. | -1. | -0.001 | 750.52 | 2.268s |
| EU-152 | 5635.85 | 1408.08 | 16. | 0. | 0.000 | 2000.00 | 2.276s |
| K-40 | 5848.76 | 1461.26 | 17. | 293. | 0.163 | 12.36 | 1.731s |
| BI-214 | 7066.94 | 1765.55 | 9. | 10. | 0.005 | 88.43 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 9.7758E-02 | | | | | |
| | | | 185.72 | 3.407E-02 | } P | 7.697E-02 5.91E+01 | G K |
| | | | 143.76 | 5.777E-03 | %(P | 3.716E-01 5.29E+02 | G |
| | | | 205.31 | 3.229E-02 | ?(P | 8.238E-01 3.43E+02 | G |
| | | | 163.35 | 3.687E-01 | &(P | 4.718E-01 3.63E+01 | G |
| RA-226 | | 0.0000E+00 | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 1.152E+00 1.00E+03 | G K |
| Ra-228 | | 2.3157E-01 | | | | | |
| | | | 911.07 | 2.568E-01 | ?(P | 2.658E-01 2.99E+01 | G |
| | | | 968.90 | 2.078E-01 | ?(P | 4.201E-01 5.71E+01 | G |
| | | | 338.40 | 2.051E-01 | ?(P | 3.023E-01 4.36E+01 | G |
| | | | 964.60 | 5.460E-02 | - | 1.601E+00 8.13E+02 | G |
| Am-241 | T | -2.4845E-04 | | | | | |
| | | | 59.54 | -2.485E-04 | %( | 1.067E-01 1.21E+04 | G K |
| PB-210 | | -7.9236E-02 | | | | | |
| | | | 46.52 | -7.924E-02 | ?(P | 1.270E+00 5.36E+01 | G |
| U-238 | | 4.6123E-01 | | | | | |
| | | | 63.29 | 3.602E-01 | *(P | 1.198E+00 5.36E+01 | G |
| | | | 92.80 | 4.595E-01 | (P | 1.317E+00 5.41E+01 | G |
| | | | 92.38 | 6.166E-01 | (P | 1.540E+00 5.70E+01 | G |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:02:33
American Radiation Services Spectrum name: ARS05250.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.2941E+01 | | | | | | |
| | | 1460.75 | 1.294E+01 | (P | 9.724E-01 | 6.18E+00 | G |
| PB-214 | 3.6418E-01 | | | | | | |
| | | 351.92 | 2.936E-01 | (P | 1.154E-01 | 1.45E+01 | G |
| | | 295.21 | 4.551E-01 | (P | 1.984E-01 | 1.67E+01 | G |
| | | 241.98 | 4.767E-01 | (P | 5.116E-01 | 3.80E+01 | G |
| BI-214 | 2.9731E-01 | | | | | | |
| | | 609.31 | 2.706E-01 | (P | 9.211E-02 | 1.39E+01 | G |
| | | 1764.49 | 3.914E-01 | ?(P | 6.587E-01 | 4.42E+01 | G |
| | | 1120.29 | 2.806E-01 | ?( | 6.285E-01 | 6.76E+01 | G |
| | | 1238.11 | -1.490E-01 | - P | 1.565E+00 | 3.57E+02 | G |
| | | 768.36 | -1.420E-02 | % P | 1.856E+00 | 1.00E+03 | G |
| | | 1377.67 | 6.283E-01 | + | 1.816E+00 | 8.44E+01 | G |
| | | 934.06 | 8.000E-01 | & | 2.179E+00 | 8.06E+01 | G |
| BI-212 | 2.1466E-01 | | | | | | |
| | | 727.17 | 2.147E-01 | ?(P | 5.193E-01 | 6.44E+01 | G |
| | | 1620.56 | -1.747E-02 | % P | 1.457E+00 | 1.00E+03 | G |
| | | 785.42 | -4.157E-01 | - P | 2.955E+00 | 1.99E+02 | G |
| PB-212 | 2.6299E-01 | | | | | | |
| | | 238.63 | 2.630E-01 | (P | 1.064E-01 | 1.44E+01 | G |
| | | 300.09 | 6.429E-01 | + P | 1.271E+00 | 5.54E+01 | G |
| TL-208 | 8.7425E-02 | | | | | | |
| | | 583.14 | 8.665E-02 | (P | 5.183E-02 | 2.03E+01 | G |
| | | 510.72 | -2.969E-02 | - P | 3.369E-01 | 3.99E+01 | G |
| | | 860.47 | 8.872E-02 | ?(P | 5.488E-01 | 1.53E+02 | G |
| | | 277.36 | -1.045E-01 | & P | 6.427E-01 | 2.24E+02 | G |
| | | 763.30 | 1.173E-01 | ?( | 3.470E+00 | 8.05E+02 | G |
| PA-234 | 4.5667E-02 | | | | | | |
| | | 98.44 | -3.871E-03 | &(P | 1.275E-01 | 8.51E+03 | G |
| | | 946.00 | -6.277E-02 | + | 3.710E-01 | 1.67E+02 | G |
| | | 131.28 | -2.351E-02 | & P | 1.910E-01 | 3.48E+02 | G |
| | | 94.67 | -2.364E-02 | + | 2.412E-01 | 2.96E+02 | G |
| | | 883.24 | -1.595E-03 | % P | 5.438E-01 | 3.87E+03 | G |
| | | 926.70 | 3.353E-02 | ?( | 6.300E-01 | 5.14E+02 | G |
| | | 569.26 | 4.303E-02 | ?(P | 4.033E-01 | 1.43E+02 | G |
| | | 111.00 | -5.434E-02 | + | 3.741E-01 | 2.00E+02 | G |
| | | 733.00 | 2.087E-03 | % | 2.827E-01 | 3.04E+03 | G |
| | | 949.00 | -2.527E-01 | + P | 8.960E-01 | 1.08E+02 | G |
| | | 880.51 | 1.058E-01 | &(P | 9.142E-01 | 2.37E+02 | G |
| | | 226.87 | 8.492E-02 | &(P | 5.342E-01 | 1.69E+02 | G |
| | | 831.10 | -3.039E-02 | + | 1.042E+00 | 9.22E+02 | G |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:02:33
American Radiation Services Spectrum name: ARS05250.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | 0.000E+00 | - | 1.399E+00 | 1.00E+03 | G |
| | | 99.70 | 1.939E-01 | ?( | 5.611E-01 | 8.60E+01 | G |
| | | 699.10 | 5.912E-02 | ?(P | 1.355E+00 | 5.68E+02 | G |
| | | 898.60 | -3.370E-02 | & P | 1.512E+00 | 2.19E+03 | G |
| | | 1394.10 | -1.218E-01 | + | 1.765E+00 | 3.75E+02 | G |
| CS-137 | -3.4684E-03 | | | | | | |
| | | 661.66 | -3.468E-03 | %(P | 5.785E-02 | 8.68E+02 | G |
| CO-60 | 1.9212E-03 | | | | | | |
| | | 1173.24 | 1.921E-03 | %(P | 9.257E-02 | 4.39E+02 | K |
| | | 1332.50 | -9.549E-03 | + P | 7.514E-02 | 2.87E+02 | K |
| EU-152 | 2.1635E-02 | | | | | | |
| | | 40.12 | -1.981E-03 | &( | 1.807E-01 | 2.54E+03 | G |
| | | 121.78 | 2.631E-02 | &( | 9.065E-02 | 1.01E+02 | G |
| | | 344.30 | -1.406E-02 | + | 1.489E-01 | 2.98E+02 | G |
| | | 1408.08 | 0.000E+00 | - | 4.589E-01 | 1.00E+03 | G |
| | | 39.52 | -1.391E-02 | + | 3.544E-01 | 7.14E+02 | G |
| | | 964.00 | -4.281E-02 | + P | 5.805E-01 | 5.53E+02 | G |
| | | 1112.07 | -1.035E-01 | + | 6.336E-01 | 1.73E+02 | G |
| | | 778.90 | 5.108E-02 | ?( | 3.378E-01 | 1.81E+02 | G |
| | | 1085.80 | -1.870E-01 | + | 8.516E-01 | 1.31E+02 | G |
| | | 45.40 | 4.268E-02 | ?( | 4.891E-01 | 3.23E+02 | G |
| | | 244.67 | -1.877E-01 | + | 6.024E-01 | 9.52E+01 | G |
| | | 867.39 | -7.110E-02 | % P | 1.674E+00 | 1.17E+03 | G |
| EU-154 | 5.4770E-02 | | | | | | |
| | | 123.10 | -1.341E-02 | ?( | 7.910E-02 | 1.72E+02 | G |
| | | 1274.80 | 7.109E-02 | ?( | 2.296E-01 | 9.38E+01 | G |
| | | 723.30 | -2.676E-03 | & | 3.490E-01 | 3.60E+03 | G |
| | | 1004.80 | -6.975E-03 | % P | 3.273E-01 | 1.00E+03 | G |
| | | 43.00 | -6.129E-03 | % | 4.295E-01 | 1.97E+03 | G |
| | | 873.20 | -6.250E-02 | + P | 6.157E-01 | 4.15E+02 | G |
| | | 996.30 | -4.105E-02 | + | 6.287E-01 | 4.15E+02 | G |
| | | 42.31 | 2.145E-01 | ?( | 7.306E-01 | 1.00E+02 | G |
| | | 248.04 | -1.197E-01 | + | 5.568E-01 | 1.35E+02 | G |
| | | 591.70 | 0.000E+00 | - | 1.161E+00 | 1.00E+03 | G |
| | | 48.70 | 2.032E-01 | &( | 1.107E+00 | 1.57E+02 | G |
| | | 756.70 | 1.498E-01 | ?(P | 1.292E+00 | 2.25E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:02:33
American Radiation Services Spectrum name: ARS05250.An1

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 9.7758E-02 | 7.9373E-02 | 7.9685E-02 | 0.372E+00 |
| RA-226 #B | 0.0000E+00 | 6.1534E-01 | 6.1534E-01 | 0.115E+01 |
| Ra-228 #A | 2.3157E-01 | 1.2929E-01 | 1.3018E-01 | 0.266E+00 |
| Am-241 #B | -2.4845E-04 | 6.0040E-02 | 6.0040E-02 | 0.107E+00 |
| PB-210 #A | -7.9236E-02 | 8.0372E-01 | 8.0376E-01 | 0.127E+01 |
| U-238 #A | 4.6123E-01 | 4.5374E-01 | 4.5517E-01 | 0.120E+01 |
| K-40 | 1.2941E+01 | 1.6463E+00 | 1.9833E+00 | 0.972E+00 |
| PB-214 | 3.6418E-01 | 1.1068E-01 | 1.1643E-01 | 0.115E+00 |
| BI-214 | 2.9731E-01 | 9.2577E-02 | 9.5089E-02 | 0.921E-01 |
| BI-212 #A | 2.1466E-01 | 3.0808E-01 | 3.0847E-01 | 0.519E+00 |
| PB-212 | 2.6299E-01 | 8.2766E-02 | 8.5961E-02 | 0.106E+00 |
| TL-208 # | 8.7425E-02 | 3.8905E-02 | 3.9474E-02 | 0.518E-01 |
| PA-234 #A | 4.5667E-02 | 7.8560E-02 | 7.8634E-02 | 0.128E+00 |
| CS-137 #A | -3.4684E-03 | 8.9866E-02 | 8.9867E-02 | 0.578E-01 |
| CO-60 #B | 1.9212E-03 | 4.9903E-02 | 4.9903E-02 | 0.926E-01 |
| EU-152 #A | 2.1635E-02 | 4.3882E-02 | 4.3950E-02 | 0.181E+00 |
| EU-154 #A | 5.4770E-02 | 7.8781E-02 | 7.8869E-02 | 0.791E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 09:02:33
American Radiation Services     Spectrum name: ARS05250.An1

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  205.3 to  1998.6 keV)     1.396E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-08 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-010 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 010 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.3235E-02 | pCi/g | 1.3188E-01 | 2.3000E-01 | 1.1500E-01 | | | |
| **RA-226** | 4.5310E-01 | pCi/g | 4.5086E-01 | 7.6100E-01 | 3.8050E-01 | | | |
| **RA-228** | 4.7880E-01 | pCi/g | 1.1114E-01 | 1.1900E-01 | 5.9500E-02 | | | |
| **AM-241** | -5.3691E-03 | pCi/g | 9.9228E-02 | 1.1400E-01 | 5.7000E-02 | | | |
| **PB-210** | -4.9568E-01 | pCi/g | 5.9400E+00 | 1.2700E+00 | 6.3500E-01 | | | |
| **U-238** | 4.7901E-01 | pCi/g | 2.7587E-01 | 1.1400E+00 | 5.7000E-01 | | | |
| **K-40** | 1.2988E+01 | pCi/g | 1.3995E+00 | 5.8900E-01 | 2.9450E-01 | | | |
| **PB-214** | 3.4906E-01 | pCi/g | 7.7902E-02 | 8.9000E-02 | 4.4500E-02 | | | |
| **BI-214** | 3.8087E-01 | pCi/g | 8.5006E-02 | 6.9700E-02 | 3.4850E-02 | | | |
| **BI-212** | 2.7300E-01 | pCi/g | 2.8637E-01 | 3.1800E-01 | 1.5900E-01 | | | |
| **PB-212** | 3.0523E-01 | pCi/g | 7.0332E-02 | 7.4500E-02 | 3.7250E-02 | | | |
| **TL-208** | 1.1046E-01 | pCi/g | 3.7781E-02 | 4.2900E-02 | 2.1450E-02 | | | |
| **PA-234** | 5.4969E-02 | pCi/g | 1.2473E-01 | 1.0300E-01 | 5.1500E-02 | | | |
| **CS-137** | 8.0954E-04 | pCi/g | 2.6562E-02 | 4.7800E-02 | 2.3900E-02 | | | |
| **CO-60** | -1.6019E-02 | pCi/g | 5.4489E-02 | 6.3600E-02 | 3.1800E-02 | | | |
| **EU-152** | 6.6211E-03 | pCi/g | 2.3347E-02 | 1.6700E-01 | 8.3500E-02 | | | |
| **EU-154** | 3.3318E-02 | pCi/g | 7.4031E-02 | 6.1400E-02 | 3.0700E-02 | | | |
| **Total Gamma** | 1.5926E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.5861E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06939.An1

Sample description
Batch ID: 16-00697-08
SDG: ARS1-16-00670-010 Tech: WJS

Spectrum Filename: C:\User\ARS06939.An1

Acquisition information

| | |
|---|---|
| Start time: | 05-May-2016 08:02:20 |
| Live time: | 2700 |
| Real time: | 2702 |
| Dead time: | 0.08 % |
| Detector ID: | 1 |

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration

| | |
|---|---|
| Created: | 10-Jun-2015 12:26:28 |
| Zero offset: | 0.192 keV |
| Gain: | 0.250 keV/channel |
| Quadratic: | -2.864E-08 keV/channel^2 |

Efficiency Calibration

| | |
|---|---|
| Created: | 10-Jun-2015 12:34:11 |
| Type: | Polynomial |
| Uncertainty: | 1.581 % |
| Coefficients: | -0.368747 -4.257329 0.454276 |
| | -0.047622 0.001987 -0.000031 |

Library Files

| | |
|---|---|
| Main analysis library: | ITSI.Lib |
| Library Match Width: | 0.500 |
| Peak stripping: | Library based |

Analysis parameters

| | |
|---|---|
| Analysis engine: | Env32 G53W4.22 |
| Start channel: | 10 ( 2.69keV ) |
| Stop channel: | 8000 ( 1998.23keV ) |
| Peak rejection level: | 1000.000% |
| Peak search sensitivity: | 3 |
| Sample Size: | 3.7758E+02 |
| Activity scaling factor: | 1.0000E+06/( 1.0000E+00* 3.7758E+02) = 2.6484E+03 |
| Detection limit method: | Reg. Guide 4.16 Method |
| Random error: | 1.0000000E+00 |
| Systematic error: | 1.0000000E+00 |
| Fraction Limit: | 60.000% |
| Background width: | average of five points. |
| Half lives decay limit: | 12.000 |

American Radiation Services Spectrum name: ARS06939.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2023

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.51 | 92. | 18.98 | 0.74 | 7.173E-03 | | | | |
| 39.57 | 9. | 176.22 | 0.93 | 2.738E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | PBC<MDA | EU152 |
| 43.46 | 7. | 210.59 | 0.93 | 3.008E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.25 | -25. | 265.75 | 0.94 | 3.277E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 60.11 | -3. | 161.56 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.29 | -28. | 770.24 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.74 | 119. | 16.18 | 0.96 | 5.130E-02 | | | | |
| 77.22 | 157. | 12.87 | 0.97 | 5.237E-02 | | | | |
| 87.41 | 65. | 28.46 | 0.88 | 5.596E-02 | | | | |
| 92.91 | 61. | 24.95 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.92 | 73. | 24.86 | 0.98 | 5.721E-02 | 92.38 | 2.570 | 1.313E+00 | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.24 | 10. | 129.39 | 0.99 | 5.833E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | PBC<MDA | PA234 |
| 105.38 | 31. | 52.36 | 0.66 | 5.912E-02 | | | | |
| 122.48 | 4. | 384.41 | 1.01 | 5.934E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 143.56 | 3. | 214.36 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.08 | 0. | 695.85 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.51 | 32. | 30.25 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 238.37 | 225. | 10.05 | 0.62 | 4.326E-02 | 238.63 | 43.100 | 3.052E-01 | PB212 |
| 247.38 | 10. | 108.52 | 1.13 | 4.203E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 277.13 | 5. | 207.96 | 1.16 | 3.866E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.75 | 95. | 15.65 | 0.75 | 3.690E-02 | 295.21 | 18.500 | 3.493E-01 | PB214 |
| 299.72 | 19. | 55.30 | 0.55 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.81 | 60. | 24.70 | 0.38 | 3.315E-02 | 338.40 | 12.010 | 3.982E-01 | Ra228 |
| 347.90 | 0. | 438.10 | 1.22 | 3.271E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.44 | 163. | 11.03 | 1.20 | 3.219E-02 | 351.92 | 35.800 | 3.489E-01 | PB214 |
| 510.63 | 72. | 14.27 | 1.65 | 2.413E-02 | 510.72 | 22.500 | 3.500E-01 | TL208 |
| 583.06 | 77. | 15.44 | 1.37 | 2.185E-02 | 583.14 | 86.000 | 1.083E-01 | TL208 |
| 591.35 | 5. | 144.81 | 1.44 | 2.161E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 609.53 | 135. | 10.07 | 1.22 | 2.114E-02 | 609.31 | 44.791 | 3.536E-01 | BI214 |
| 727.01 | 15. | 49.26 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 757.11 | 3. | 185.89 | 1.59 | 1.805E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.60 | 2. | 311.51 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 785.30 | 12. | 61.38 | 1.61 | 1.757E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 829.61 | 6. | 93.99 | 1.65 | 1.686E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.35 | 9. | 73.08 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 911.22 | 84. | 13.36 | 1.93 | 1.577E-02 | 911.07 | 29.000 | 4.897E-01 | Ra228 |
| 934.05 | 7. | 89.34 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 949.75 | 1. | 321.11 | 1.75 | 1.531E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.63 | 10. | 80.16 | 1.77 | 1.513E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 3.300E-01 | Ra228 |
| 968.93 | 51. | 16.45 | 1.77 | 1.508E-02 | 968.90 | 17.460 | 5.161E-01 | Ra228 |
| 1120.76 | 33. | 19.66 | 0.82 | 1.355E-02 | 1120.29 | 14.797 | 4.346E-01 | BI214 |
| 1239.40 | 4. | 177.49 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.89 | 8. | 63.40 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.62 | 3. | 146.09 | 2.12 | 1.146E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1460.61 | 600. | 4.15 | 1.84 | 1.104E-02 | 1460.75 | 10.700 | 1.299E+01 | K40 |
| 1621.46 | 2. | 250.74 | 2.30 | 1.013E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1763.88 | 10. | 46.63 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 53.28 | 13.51 | 88. | 92. | 0.034 | 37.95 | 0.745 | BR-82 | s |
| 298.05 | 74.70 | 146. | 87. | 0.032 | 45.78 | 0.552 | TH-234 | sM |
| 307.98 | 77.18 | 171. | 131. | 0.049 | 35.46 | 1.097 | PB-212 | M |
| 348.92 | 87.41 | 121. | 65. | 0.024 | 56.91 | 0.877 | PB-212 | M |
| 420.81 | 105.38 | 93. | 31. | 0.011 | 104.73 | 0.660 | EU-155 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.53 | 39.57 | 108. | 9. | 0.003 | 352.44 | 0.929s |
| EU-154 | 173.07 | 43.46 | 108. | 7. | 0.003 | 421.18 | 0.932s |
| EU-152 | 180.83 | 45.39 | 159. | -14. | -0.005 | 263.50 | 0.935s |
| PB-210 | 184.26 | 46.25 | 165. | -25. | -0.009 | 531.49 | 0.936s |
| EU-154 | 195.25 | 49.00 | 136. | -4. | -0.001 | 890.79 | 0.938s |
| Am-241 | 239.70 | 60.11 | 186. | -3. | -0.001 | 323.12 | 0.948s |
| U-238 | 370.93 | 92.92 | 185. | 73. | 0.027 | 49.73 | 0.980 |
| U-238 | 370.93 | 92.91 | 197. | 61. | 0.023 | 49.90 | 0.980 |
| PA-234 | 379.90 | 95.16 | 198. | -20. | -0.007 | 204.66 | 0.982s |
| PA-234 | 396.24 | 99.24 | 135. | 10. | 0.004 | 258.77 | 0.986s |
| PA-234 | 439.67 | 110.10 | 122. | -9. | -0.003 | 428.45 | 0.998s |
| EU-152 | 489.22 | 122.48 | 111. | 4. | 0.001 | 768.82 | 1.008s |
| EU-154 | 494.43 | 123.78 | 129. | -2. | -0.001 | 1955.57 | 1.009s |
| PA-234 | 524.42 | 131.28 | 112. | 0. | 0.000 | 2000.00 | 1.017s |
| U-235 | 573.53 | 143.56 | 113. | 3. | 0.001 | 428.72 | 1.029s |
| RA-226 | 741.40 | 185.51 | 117. | 32. | 0.012 | 60.50 | 1.069s |
| U-235 | 820.92 | 205.39 | 115. | -8. | -0.003 | 461.19 | 1.087s |
| PB-212 | 952.89 | 238.37 | 114. | 214. | 0.079 | 20.09 | 0.620s |
| EU-152 | 977.55 | 244.54 | 114. | -15. | -0.005 | 213.18 | 1.124s |
| EU-154 | 988.92 | 247.38 | 52. | 10. | 0.004 | 217.04 | 1.128s |
| TL-208 | 1107.97 | 277.13 | 71. | 5. | 0.002 | 415.92 | 1.155 |
| PB-214 | 1178.46 | 294.75 | 50. | 90. | 0.033 | 31.30 | 0.750s |
| PB-212 | 1198.35 | 299.72 | 42. | 19. | 0.007 | 110.59 | 0.547s |
| Ra-228 | 1350.77 | 337.81 | 53. | 60. | 0.022 | 49.39 | 0.383s |
| PB-214 | 1405.30 | 351.44 | 59. | 152. | 0.056 | 22.06 | 1.197s |
| TL-208 | 2042.34 | 510.63 | 93. | 72. | 0.027 | 28.54 | 1.652s |
| TL-208 | 2332.25 | 583.06 | 35. | 77. | 0.028 | 30.87 | 1.374 |
| EU-154 | 2365.43 | 591.35 | 26. | 5. | 0.002 | 289.62 | 1.443s |
| BI-214 | 2438.19 | 609.53 | 23. | 126. | 0.047 | 20.13 | 1.225 |
| PA-234 | 2796.19 | 698.97 | 35. | -5. | -0.002 | 430.13 | 1.538s |
| EU-154 | 2893.79 | 723.35 | 34. | -3. | -0.001 | 650.98 | 1.559s |
| BI-212 | 2908.42 | 727.01 | 26. | 15. | 0.006 | 98.52 | 1.563s |
| PA-234 | 2930.09 | 732.42 | 30. | -4. | -0.001 | 577.11 | 1.568s |
| EU-154 | 3028.90 | 757.11 | 18. | 3. | 0.001 | 371.78 | 1.589s |
| BI-214 | 3074.92 | 768.60 | 27. | 2. | 0.001 | 623.02 | 1.599s |
| EU-152 | 3112.75 | 778.05 | 31. | -7. | -0.003 | 269.29 | 1.608s |
| BI-212 | 3141.76 | 785.30 | 23. | 12. | 0.005 | 122.75 | 1.614s |
| PA-234 | 3319.13 | 829.61 | 23. | 6. | 0.002 | 187.98 | 1.653s |
| TL-208 | 3442.20 | 860.35 | 19. | 9. | 0.003 | 146.16 | 1.679s |
| EU-152 | 3470.32 | 867.37 | 29. | -2. | -0.001 | 799.90 | 1.685s |
| EU-154 | 3493.55 | 873.17 | 25. | -4. | -0.001 | 443.64 | 1.690s |
| Ra-228 | 3645.85 | 911.22 | 15. | 84. | 0.031 | 26.71 | 1.935 |
| PA-234 | 3712.90 | 927.96 | 29. | -6. | -0.002 | 297.37 | 1.735s |
| BI-214 | 3737.28 | 934.05 | 24. | 7. | 0.003 | 178.68 | 1.742s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3783.41 | 945.58 | 25. | -2. | -0.001 | 788.62 | 1.752s |
| PA-234 | 3800.12 | 949.75 | 25. | 1. | 0.000 | 642.22 | 1.754s |
| EU-152 | 3857.07 | 963.97 | 47. | -2. | -0.001 | 981.16 | 1.767s |
| Ra-228 | 3859.59 | 964.60 | 29. | 10. | 0.004 | 160.32 | 1.768D |
| Ra-228 | 3876.80 | 968.90 | 15. | 51. | 0.019 | 32.89 | 1.771D |
| EU-154 | 3993.25 | 997.98 | 31. | -4. | -0.001 | 426.98 | 1.794s |
| EU-154 | 4023.56 | 1005.56 | 33. | -7. | -0.003 | 280.18 | 1.802s |
| EU-152 | 4347.91 | 1086.56 | 27. | -2. | -0.001 | 947.43 | 1.870s |
| EU-152 | 4460.87 | 1114.77 | 31. | -1. | 0.000 | 1401.52 | 1.891s |
| BI-214 | 4484.86 | 1120.76 | 5. | 33. | 0.012 | 39.33 | 0.819s |
| CO-60 | 4694.53 | 1173.12 | 38. | -8. | -0.003 | 282.44 | 1.942s |
| BI-214 | 4959.95 | 1239.40 | 35. | 4. | 0.001 | 354.98 | 1.995s |
| BI-214 | 5514.64 | 1377.89 | 9. | 8. | 0.003 | 126.79 | 2.107s |
| PA-234 | 5577.62 | 1393.62 | 8. | 3. | 0.001 | 292.17 | 2.120s |
| K-40 | 5845.98 | 1460.61 | 26. | 578. | 0.214 | 8.31 | 1.836 |
| BI-212 | 6490.30 | 1621.46 | 8. | 2. | 0.001 | 501.49 | 2.297s |
| BI-214 | 7060.93 | 1763.88 | 11. | 10. | 0.004 | 93.25 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 1.3235E-02 | | | | | |
| | | | 143.76 | 1.323E-02 | &(P | 2.297E-01 2.14E+02 G | |
| | | | 205.31 | -9.347E-02 | + P | 6.210E-01 2.31E+02 G | |
| | | | 163.35 | -4.693E-03 | % P | 5.476E-01 6.96E+02 G | |
| RA-226 | | 4.5310E-01 | | | | | |
| | | | 186.21 | 4.531E-01 | &(P | 7.615E-01 3.02E+01 G K | |
| Ra-228 | | 4.7880E-01 | | | | | |
| | | | 911.07 | 4.897E-01 | (P | 1.186E-01 1.34E+01 G | |
| | | | 968.90 | 5.161E-01 | (P | 2.074E-01 1.64E+01 G | |
| | | | 338.40 | 3.982E-01 | @(P | 2.444E-01 2.47E+01 G | |
| | | | 964.60 | 3.300E-01 | - | 8.899E-01 8.02E+01 G | |
| Am-241 | T | -5.3691E-03 | | | | | |
| | | | 59.54 | -5.369E-03 | &(P | 1.136E-01 1.62E+02 G K | |
| PB-210 | | -4.9568E-01 | | | | | |
| | | | 46.52 | -4.957E-01 | ?(P | 1.266E+00 2.66E+02 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| U-238 | 4.7901E-01 | | | | | | |
| | | 63.29 | -4.233E-01 | %(P | 1.136E+00 | 7.70E+02 | G |
| | | 92.80 | 9.375E-01 | (P | 1.050E+00 | 2.49E+01 | G |
| | | 92.38 | 1.313E+00 | (P | 1.191E+00 | 2.49E+01 | G |
| K-40 | 1.2988E+01 | | | | | | |
| | | 1460.75 | 1.299E+01 | (P | 5.894E-01 | 4.15E+00 | G |
| PB-214 | 3.4906E-01 | | | | | | |
| | | 351.92 | 3.489E-01 | @(P | 8.902E-02 | 1.10E+01 | G |
| | | 295.21 | 3.493E-01 | (P | 1.389E-01 | 1.56E+01 | G |
| | | 241.98 | -3.121E-02 | % P | 6.004E-01 | 8.37E+02 | G |
| BI-214 | 3.8087E-01 | | | | | | |
| | | 609.31 | 3.536E-01 | (P | 6.966E-02 | 1.01E+01 | G |
| | | 1764.49 | 1.861E-01 | - P | 3.319E-01 | 4.66E+01 | G |
| | | 1120.29 | 4.346E-01 | (P | 1.755E-01 | 1.97E+01 | G |
| | | 1238.11 | 1.295E-01 | - P | 1.090E+00 | 1.77E+02 | G |
| | | 768.36 | 6.469E-02 | - P | 8.385E-01 | 3.12E+02 | G |
| | | 1377.67 | 4.641E-01 | &( | 9.617E-01 | 6.34E+01 | G |
| | | 934.06 | 4.141E-01 | ?(P | 1.432E+00 | 8.93E+01 | G |
| BI-212 | 2.7300E-01 | | | | | | |
| | | 727.17 | 1.874E-01 | ?(P | 3.181E-01 | 4.93E+01 | G |
| | | 1620.56 | 1.565E-01 | ?( | 1.487E+00 | 2.51E+02 | G |
| | | 785.42 | 9.381E-01 | *( | 1.887E+00 | 6.14E+01 | G |
| PB-212 | 3.0523E-01 | | | | | | |
| | | 238.63 | 3.052E-01 | (P | 7.450E-02 | 1.00E+01 | G |
| | | 300.09 | 4.322E-01 | + | 7.299E-01 | 5.53E+01 | G |
| TL-208 | 1.1046E-01 | | | | | | |
| | | 583.14 | 1.083E-01 | (P | 4.286E-02 | 1.54E+01 | G |
| | | 510.72 | 3.500E-01 | + P | 2.331E-01 | 1.43E+01 | G |
| | | 860.47 | 1.260E-01 | ?( | 3.078E-01 | 7.31E+01 | G |
| | | 277.36 | 4.825E-02 | - P | 4.437E-01 | 2.08E+02 | G |
| | | 763.30 | -6.838E-03 | % P | 3.206E+00 | 1.00E+03 | G |
| PA-234 | 5.4969E-02 | | | | | | |
| | | 98.44 | 1.789E-02 | &(P | 1.029E-01 | 1.29E+02 | G |
| | | 946.00 | -1.583E-02 | + | 2.255E-01 | 3.94E+02 | G |
| | | 131.28 | 0.000E+00 | & | 1.173E-01 | 1.00E+03 | G |
| | | 94.67 | -5.908E-02 | + | 2.024E-01 | 1.02E+02 | G |
| | | 883.24 | 1.364E-03 | & | 3.364E-01 | 6.67E+03 | G |
| | | 926.70 | -9.666E-02 | + P | 4.273E-01 | 1.49E+02 | G |
| | | 569.26 | -2.968E-02 | % P | 3.456E-01 | 2.32E+03 | G |
| | | 111.00 | -4.513E-02 | + P | 2.825E-01 | 2.14E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 733.00 | -6.358E-02 | + P | 4.752E-01 | 2.89E+02 | G |
| | | 949.00 | 2.839E-02 | ?(P | 5.775E-01 | 3.21E+02 | G |
| | | 880.51 | -1.386E-02 | % P | 6.703E-01 | 2.25E+03 | G |
| | | 226.87 | -2.601E-03 | & | 3.291E-01 | 3.56E+03 | G |
| | | 831.10 | 1.758E-01 | &(P | 6.997E-01 | 9.40E+01 | G |
| | | 808.10 | 1.285E-02 | % | 8.924E-01 | 1.91E+03 | G |
| | | 99.70 | -5.034E-02 | & P | 6.025E-01 | 1.28E+03 | G |
| | | 699.10 | -1.387E-01 | + P | 9.172E-01 | 2.15E+02 | G |
| | | 898.60 | -7.536E-02 | & P | 1.061E+00 | 2.10E+03 | G |
| | | 1394.10 | 1.733E-01 | &( | 9.251E-01 | 1.46E+02 | G |
| CS-137 | 8.0954E-04 | | | | | | |
| | | 661.66 | 8.095E-04 | &( | 4.784E-02 | 1.64E+03 | G |
| CO-60 | -1.6019E-02 | | | | | | |
| | | 1173.24 | -1.602E-02 | ?(P | 6.365E-02 | 1.41E+02 | K |
| | | 1332.50 | -1.086E-03 | % P | 5.660E-02 | 2.22E+03 | K |
| EU-152 | 6.6211E-03 | | | | | | |
| | | 40.12 | -1.638E-02 | %(P | 1.672E-01 | 1.01E+03 | G |
| | | 121.78 | 5.687E-03 | &(P | 7.931E-02 | 3.84E+02 | G |
| | | 344.30 | 9.407E-04 | & P | 7.805E-02 | 4.38E+02 | G |
| | | 1408.08 | 8.567E-04 | % P | 2.248E-01 | 2.40E+03 | G |
| | | 39.52 | 5.145E-02 | ?( | 3.094E-01 | 1.76E+02 | G |
| | | 964.00 | -2.406E-02 | + | 4.174E-01 | 4.91E+02 | G |
| | | 1112.07 | -1.619E-02 | + | 4.093E-01 | 7.01E+02 | G |
| | | 778.90 | -8.179E-02 | + P | 3.291E-01 | 1.35E+02 | G |
| | | 1085.80 | -2.945E-02 | + | 5.035E-01 | 4.74E+02 | G |
| | | 45.40 | -1.287E-01 | + P | 5.673E-01 | 1.32E+02 | G |
| | | 244.67 | -1.199E-01 | + P | 4.295E-01 | 1.07E+02 | G |
| | | 867.39 | -7.537E-02 | + | 1.082E+00 | 4.00E+02 | G |
| EU-154 | 3.3318E-02 | | | | | | |
| | | 123.10 | -1.820E-03 | &( | 6.145E-02 | 9.78E+02 | G |
| | | 1274.80 | 6.888E-04 | % P | 1.745E-01 | 6.17E+03 | G |
| | | 723.30 | -1.874E-02 | + | 2.169E-01 | 3.25E+02 | G |
| | | 1004.80 | -7.375E-02 | + P | 3.012E-01 | 1.40E+02 | G |
| | | 43.00 | 4.761E-02 | &( | 3.433E-01 | 2.11E+02 | G |
| | | 873.20 | -5.258E-02 | + P | 3.744E-01 | 2.22E+02 | G |
| | | 996.30 | -6.362E-02 | & | 4.799E-01 | 2.13E+02 | G |
| | | 42.31 | -4.515E-03 | % | 6.681E-01 | 4.27E+03 | G |
| | | 248.04 | 9.187E-02 | ?(P | 3.479E-01 | 1.09E+02 | G |
| | | 591.70 | 1.385E-01 | ?( | 7.020E-01 | 1.45E+02 | G |
| | | 48.70 | -6.732E-02 | + | 1.030E+00 | 4.45E+02 | G |
| | | 756.70 | 1.221E-01 | ?( | 8.128E-01 | 1.86E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 1.3235E-02 | 1.3187E-01 | 1.3188E-01 | 0.230E+00 |
| RA-226 A | 4.5310E-01 | 4.4920E-01 | 4.5086E-01 | 0.761E+00 |
| Ra-228 | 4.7880E-01 | 1.0639E-01 | 1.1114E-01 | 0.119E+00 |
| Am-241 #A | -5.3691E-03 | 9.9227E-02 | 9.9228E-02 | 0.114E+00 |
| PB-210 #A | -4.9568E-01 | 5.9398E+00 | 5.9400E+00 | 0.127E+01 |
| U-238 A | 4.7901E-01 | 2.7331E-01 | 2.7587E-01 | 0.114E+01 |
| K-40 | 1.2988E+01 | 1.1189E+00 | 1.3995E+00 | 0.589E+00 |
| PB-214 | 3.4906E-01 | 7.1034E-02 | 7.7902E-02 | 0.890E-01 |
| BI-214 | 3.8087E-01 | 8.1682E-02 | 8.5006E-02 | 0.697E-01 |
| BI-212 #A | 2.7300E-01 | 2.8580E-01 | 2.8637E-01 | 0.318E+00 |
| PB-212 | 3.0523E-01 | 6.4441E-02 | 7.0332E-02 | 0.745E-01 |
| TL-208 | 1.1046E-01 | 3.7102E-02 | 3.7781E-02 | 0.429E-01 |
| PA-234 #A | 5.4969E-02 | 1.2467E-01 | 1.2473E-01 | 0.103E+00 |
| CS-137 #A | 8.0954E-04 | 2.6562E-02 | 2.6562E-02 | 0.478E-01 |
| CO-60 #B | -1.6019E-02 | 5.4485E-02 | 5.4489E-02 | 0.636E-01 |
| EU-152 #A | 6.6211E-03 | 2.3336E-02 | 2.3347E-02 | 0.167E+00 |
| EU-154 #A | 3.3318E-02 | 7.3988E-02 | 7.4031E-02 | 0.614E-01 |

American Radiation Services Spectrum name: ARS06939.An1

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 1120.0 to 1998.2 keV) 1.554E+01 pCi/g

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00563-15 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | ARS1-16-00670-011 | Geometry | 250mL Tuna Can 1748- |
| AnalysisBatch | ARS1-B16-00563 | Fraction | 011 |
| SDG | ARS1-16-00670 | Run | 1 |
| AnalysisCode | GAM-A-025 | Detector ID | 1 |
| Library | ITSI.Lib | Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 8.2110E-02 | pCi/g | 5.5577E-02 | 7.8600E-02 | 3.9300E-02 | | | |
| **RA-226** | 5.3954E-01 | pCi/g | 8.0411E-01 | 1.4100E+00 | 7.0500E-01 | | | |
| **RA-228** | 1.8548E-01 | pCi/g | 1.0708E-01 | 2.9400E-01 | 1.4700E-01 | | | |
| **AM-241** | 4.8419E-02 | pCi/g | 8.4537E-02 | 1.4200E-01 | 7.1000E-02 | | | |
| **PB-210** | 3.8017E-01 | pCi/g | 9.4468E-01 | 1.7200E+00 | 8.6000E-01 | | | |
| **U-238** | 9.0882E-01 | pCi/g | 5.4509E-01 | 1.5800E+00 | 7.9000E-01 | | | |
| **K-40** | 1.1424E+01 | pCi/g | 1.6743E+00 | 4.9300E-01 | 2.4650E-01 | | | |
| **PB-214** | 3.6660E-01 | pCi/g | 1.1899E-01 | 1.5700E-01 | 7.8500E-02 | | | |
| **BI-214** | 1.5596E-01 | pCi/g | 1.1837E-01 | 1.5400E-01 | 7.7000E-02 | | | |
| **BI-212** | 1.0914E-01 | pCi/g | 3.6393E-01 | 5.9300E-01 | 2.9650E-01 | | | |
| **PB-212** | 3.5655E-01 | pCi/g | 9.7975E-02 | 1.1300E-01 | 5.6500E-02 | | | |
| **TL-208** | 8.5680E-02 | pCi/g | 5.6523E-02 | 8.4800E-02 | 4.2400E-02 | | | |
| **PA-234** | 6.4711E-02 | pCi/g | 1.0587E-01 | 1.5400E-01 | 7.7000E-02 | | | |
| **CS-137** | 2.2357E-03 | pCi/g | 3.3114E-02 | 6.2700E-02 | 3.1350E-02 | | | |
| **CO-60** | -1.4754E-02 | pCi/g | 5.4305E-02 | 9.7300E-02 | 4.8650E-02 | | | |
| **EU-152** | 4.5108E-02 | pCi/g | 6.3697E-02 | 2.0800E-01 | 1.0400E-01 | | | |
| **EU-154** | 3.7847E-02 | pCi/g | 6.6041E-02 | 8.9200E-02 | 4.4600E-02 | | | |
| **Total Gamma** | 1.4792E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.3225E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01214.An1

Sample description
Batch ID: 16-00563-15
SDG: ARS1-16-00670-011 Tech: WJS

Spectrum Filename: C:\User\ARS01214.An1

Acquisition information
Start time: 19-Apr-2016 08:33:44
Live time: 1800
Real time: 1808
Dead time: 0.46 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.7141E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.7141E+02) =
2.6924E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01214.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2644

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.09 | 2. | 527.30 | 0.90 | 2.316E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.48 | 10. | 40.13 | 0.90 | 2.560E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.52 | 15. | 87.24 | 0.91 | 3.389E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.32 | 24. | 33.16 | 0.92 | 3.625E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.83 | 52. | 28.68 | 0.93 | 4.214E-02 | | | | |
| 77.14 | 98. | 16.32 | 0.93 | 4.304E-02 | | | | |
| 92.65 | 54. | 28.41 | 0.62 | 4.682E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.87 | 8. | 157.85 | 0.95 | 4.742E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 122.06 | 6. | 185.48 | 0.96 | 4.659E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 163.45 | 8. | 140.22 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.27 | 38. | 33.63 | 1.02 | 3.768E-02 | 185.72 | 54.000 | PBC<MDA | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 186.28 | 18. | 35.97 | 1.02 | 3.763E-02 | 185.72 | 54.000 | PBC<MDA | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 238.82 | 131. | 12.00 | 0.60 | 3.137E-02 | 238.63 | 43.100 | 3.565E-01 | PB212 |
| 245.59 | 3. | 295.08 | 1.06 | 3.080E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| 277.65 | 18. | 48.97 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.55 | 39. | 25.96 | 1.10 | 2.661E-02 | 295.21 | 18.500 | 3.233E-01 | PB214 |
| 300.39 | 5. | 150.33 | 1.11 | 2.627E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.68 | 31. | 27.30 | 1.14 | 2.392E-02 | 338.40 | 12.010 | 4.343E-01 | Ra228 |
| 344.41 | 5. | 154.33 | 1.14 | 2.360E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 352.28 | 80. | 14.76 | 1.15 | 2.320E-02 | 351.92 | 35.800 | 3.890E-01 | PB214 |
| 511.97 | -3. | 47.10 | 1.27 | 1.747E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.62 | 28. | 27.11 | 1.32 | 1.583E-02 | 583.14 | 86.000 | PBC<MDA | TL208 |
| 609.60 | 21. | 26.94 | 1.34 | 1.532E-02 | 609.31 | 44.791 | PBC<MDA | BI214 |
| 661.61 | 1. | 740.55 | 1.38 | 1.442E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 726.72 | 4. | 142.75 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 732.83 | 3. | 191.35 | 1.43 | 1.337E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |

0.88 Spectrum name: ARS01214.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 756.14 | 5. | 87.18 | 1.45 | 1.306E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 762.89 | 1. | 419.96 | 1.45 | 1.297E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 785.21 | 1. | 574.66 | 1.47 | 1.270E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 860.84 | 9. | 58.28 | 1.52 | 1.186E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 883.24 | 3. | 174.56 | 1.54 | 1.163E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 898.25 | 3. | 192.03 | 1.55 | 1.147E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.55 | 1. | 183.89 | 1.56 | 1.135E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 934.68 | 4. | 123.98 | 1.57 | 1.114E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 947.47 | 3. | 185.25 | 1.58 | 1.100E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.76 | 7. | 92.02 | 1.59 | 1.087E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 4.806E-01 | Ra228 |
| 964.78 | 8. | 70.38 | 1.59 | 1.087E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 5.766E-01 | Ra228 |
| 969.31 | 10. | 58.43 | 1.60 | 1.083E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1120.80 | 7. | 64.65 | 1.70 | 9.654E-03 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1378.35 | 0. | 876.90 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.52 | 2. | 244.66 | 1.88 | 7.950E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.42 | 233. | 6.52 | 1.77 | 7.690E-03 | 1460.75 | 10.700 | 1.142E+01 | K40 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.29 | 74.76 | 84. | 52. | 0.029 | 57.35 | 0.926 | TH-234 | D |
| 307.51 | 77.07 | 78. | 98. | 0.054 | 32.64 | 0.928 | PB-212 | D |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.99 | 39.52 | 71. | 0. | 0.000 | 2000.00 | 0.897s |
| EU-154 | 167.28 | 42.09 | 64. | 2. | 0.001 | 1054.59 | 0.899s |
| EU-154 | 171.49 | 43.14 | 72. | -3. | -0.002 | 830.78 | 0.899s |
| EU-152 | 180.52 | 45.40 | 69. | 0. | 0.000 | 2000.00 | 0.901s |
| PB-210 | 184.82 | 46.48 | 77. | 10. | 0.005 | 80.27 | 0.902s |
| EU-154 | 190.89 | 47.99 | 81. | -17. | -0.009 | 158.62 | 0.904s |
| Am-241 | 237.01 | 59.52 | 74. | 15. | 0.008 | 174.47 | 0.913s |
| U-238 | 252.22 | 63.32 | 128. | 24. | 0.013 | 66.32 | 0.916s |
| U-238 | 369.61 | 92.65 | 93. | 31. | 0.017 | 57.44 | 0.940s |

0.88 Spectrum name: ARS01214.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 369.61 | 92.65 | 85. | 38. | 0.021 | 56.65 | 0.941s |
| PA-234 | 377.72 | 94.68 | 124. | -13. | -0.007 | 251.74 | 0.942s |
| PA-234 | 394.58 | 98.89 | 83. | -7. | -0.004 | 438.54 | 0.945s |
| PA-234 | 398.47 | 99.87 | 67. | 8. | 0.004 | 315.70 | 0.946s |
| PA-234 | 445.70 | 111.67 | 66. | -8. | -0.004 | 301.25 | 0.956s |
| EU-152 | 487.28 | 122.06 | 58. | 6. | 0.003 | 370.95 | 0.964s |
| EU-154 | 490.77 | 122.93 | 69. | -1. | -0.001 | 1783.45 | 0.965s |
| U-235 | 652.88 | 163.45 | 64. | 8. | 0.004 | 280.44 | 0.998s |
| U-235 | 744.21 | 186.27 | 63. | 38. | 0.021 | 67.26 | 1.016s |
| RA-226 | 744.24 | 186.28 | 86. | 18. | 0.010 | 71.95 | 1.017s |
| U-235 | 819.20 | 205.01 | 79. | -12. | -0.007 | 253.47 | 1.032s |
| PB-212 | 954.47 | 238.82 | 57. | 119. | 0.066 | 23.99 | 0.599s |
| EU-152 | 981.57 | 245.59 | 50. | 3. | 0.002 | 590.17 | 1.064s |
| TL-208 | 1109.85 | 277.65 | 30. | 18. | 0.010 | 97.95 | 1.090 |
| PB-214 | 1181.47 | 295.55 | 45. | 39. | 0.022 | 51.92 | 1.104s |
| PB-212 | 1200.83 | 300.39 | 33. | 5. | 0.003 | 300.66 | 1.107 |
| Ra-228 | 1354.04 | 338.68 | 25. | 31. | 0.017 | 54.61 | 1.138s |
| EU-152 | 1376.96 | 344.41 | 25. | 5. | 0.003 | 308.65 | 1.142s |
| PB-214 | 1408.45 | 352.28 | 40. | 80. | 0.044 | 29.53 | 1.148s |
| TL-208 | 2047.30 | 511.97 | 51. | -3. | -0.002 | 94.20 | 1.270s |
| TL-208 | 2333.93 | 583.62 | 31. | 28. | 0.015 | 54.22 | 1.324s |
| EU-154 | 2363.58 | 591.03 | 22. | -2. | -0.001 | 566.38 | 1.330s |
| BI-214 | 2437.86 | 609.60 | 25. | 21. | 0.012 | 53.87 | 1.343s |
| CS-137 | 2645.90 | 661.61 | 12. | 1. | 0.000 | 1481.09 | 1.381s |
| PA-234 | 2793.15 | 698.42 | 15. | -2. | -0.001 | 735.71 | 1.409s |
| EU-154 | 2894.55 | 723.78 | 24. | -3. | -0.001 | 528.55 | 1.426s |
| BI-212 | 2906.33 | 726.72 | 19. | 4. | 0.002 | 285.51 | 1.429s |
| PA-234 | 2930.77 | 732.83 | 17. | 3. | 0.002 | 382.71 | 1.433s |
| EU-154 | 3024.02 | 756.14 | 9. | 5. | 0.003 | 174.36 | 1.450s |
| TL-208 | 3051.02 | 762.89 | 15. | 1. | 0.001 | 839.93 | 1.455s |
| BI-214 | 3076.26 | 769.20 | 20. | -1. | -0.001 | 1022.37 | 1.458s |
| EU-152 | 3110.87 | 777.86 | 18. | -3. | -0.002 | 381.66 | 1.466s |
| BI-212 | 3140.29 | 785.21 | 18. | 1. | 0.001 | 1149.32 | 1.470s |
| PA-234 | 3231.83 | 808.10 | 14. | 0. | 0.000 | 2000.00 | 1.486s |
| TL-208 | 3442.77 | 860.84 | 11. | 9. | 0.005 | 116.57 | 1.523s |
| EU-152 | 3468.96 | 867.39 | 0. | 0. | 0.000 | 2000.00 | 1.528s |
| PA-234 | 3522.65 | 880.81 | 15. | -3. | -0.002 | 461.22 | 1.537s |
| PA-234 | 3532.36 | 883.24 | 11. | 3. | 0.002 | 349.12 | 1.539s |
| PA-234 | 3592.39 | 898.25 | 18. | 3. | 0.002 | 384.07 | 1.549s |
| Ra-228 | 3645.58 | 911.55 | 21. | 1. | 0.001 | 367.78 | 1.558s |
| BI-214 | 3738.08 | 934.68 | 10. | 4. | 0.002 | 247.97 | 1.574s |
| PA-234 | 3789.23 | 947.47 | 12. | 3. | 0.002 | 370.50 | 1.584s |
| EU-152 | 3858.48 | 964.78 | 13. | 8. | 0.005 | 140.77 | 1.594s |
| Ra-228 | 3858.37 | 964.76 | 17. | 7. | 0.004 | 184.05 | 1.594s |
| Ra-228 | 3876.60 | 969.31 | 18. | 10. | 0.005 | 116.85 | 1.597s |
| EU-154 | 3984.48 | 996.29 | 12. | -1. | 0.000 | 1123.14 | 1.616s |
| EU-152 | 4340.15 | 1085.23 | 16. | -4. | -0.002 | 322.83 | 1.675s |
| EU-152 | 4446.19 | 1111.75 | 16. | -2. | -0.001 | 652.06 | 1.693s |

0.88 Spectrum name: ARS01214.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 4482.39 | 1120.80 | 13. | 7. | 0.004 | 129.31 | 1.698s |
| CO-60 | 4692.46 | 1173.33 | 18. | -3. | -0.002 | 368.04 | 1.732s |
| EU-154 | 5098.17 | 1274.80 | 13. | 0. | 0.000 | 2000.00 | 1.796s |
| CO-60 | 5330.34 | 1332.87 | 14. | -2. | -0.001 | 550.46 | 1.832s |
| BI-214 | 5512.21 | 1378.35 | 9. | 0. | 0.000 | 1753.81 | 1.860 |
| PA-234 | 5575.16 | 1394.10 | 15. | 0. | 0.000 | 2000.00 | 1.870s |
| EU-152 | 5632.80 | 1408.52 | 7. | 2. | 0.001 | 489.33 | 1.878s |
| K-40 | 5844.31 | 1461.42 | 2. | 233. | 0.129 | 13.05 | 1.770 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 8.2110E-02 | | | | | | |
| | | | 185.72 | 7.542E-02 | ?( | 7.858E-02 | 3.36E+01 | G |
| | | | 143.76 | -2.893E-02 | % P | 3.443E-01 | 2.14E+03 | G |
| | | | 205.31 | -2.876E-01 | - P | 1.079E+00 | 1.27E+02 | G |
| | | | 163.35 | 1.590E-01 | &(P | 8.425E-01 | 1.40E+02 | G |
| RA-226 | | 5.3954E-01 | | | | | | |
| | | | 186.10 | 5.395E-01 | ?(P | 1.411E+00 | 3.60E+01 | G |
| Ra-228 | | 1.8548E-01 | | | | | | |
| | | | 911.07 | 1.339E-02 | ?(P | 2.940E-01 | 1.84E+02 | G |
| | | | 968.90 | 2.080E-01 | ?(P | 4.816E-01 | 5.84E+01 | G |
| | | | 338.40 | 4.343E-01 | (P | 3.629E-01 | 2.73E+01 | G |
| | | | 964.60 | 4.806E-01 | ?( | 1.514E+00 | 9.20E+01 | G |
| Am-241 | T | 4.8419E-02 | | | | | | |
| | | | 59.54 | 4.842E-02 | ?( | 1.418E-01 | 8.72E+01 | G K |
| PB-210 | | 3.8017E-01 | | | | | | |
| | | | 46.52 | 3.802E-01 | *(P | 1.718E+00 | 4.01E+01 | G |
| U-238 | | 9.0882E-01 | | | | | | |
| | | | 63.29 | 6.803E-01 | ?(P | 1.583E+00 | 3.32E+01 | G |
| | | | 92.80 | 1.101E+00 | (P | 1.313E+00 | 2.83E+01 | G |
| | | | 92.38 | 1.031E+00 | (P | 1.604E+00 | 2.87E+01 | G |
| K-40 | | 1.1424E+01 | | | | | | |
| | | | 1460.75 | 1.142E+01 | (P | 4.926E-01 | 6.52E+00 | G |

0.88 Spectrum name: ARS01214.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-214 | 3.6660E-01 | | | | | | |
| | | 351.92 | 3.890E-01 | (P | 1.571E-01 | 1.48E+01 | G |
| | | 295.21 | 3.233E-01 | *(P | 2.797E-01 | 2.60E+01 | G |
| | | 241.98 | 5.142E-03 | % P | 6.809E-01 | 3.23E+03 | G |
| BI-214 | 1.5596E-01 | | | | | | |
| | | 609.31 | 1.237E-01 | ?(P | 1.540E-01 | 2.69E+01 | G |
| | | 1764.49 | -6.812E-02 | % P | 6.905E-01 | 1.37E+03 | G |
| | | 1120.29 | 1.907E-01 | ?(P | 5.570E-01 | 6.47E+01 | G |
| | | 1238.11 | 5.391E-02 | % | 2.033E+00 | 1.03E+03 | G |
| | | 768.36 | -8.217E-02 | & | 1.540E+00 | 5.11E+02 | G |
| | | 1377.67 | 6.181E-02 | - | 2.107E+00 | 8.77E+02 | G |
| | | 934.06 | 4.637E-01 | &(P | 2.056E+00 | 1.24E+02 | G |
| BI-212 | 1.0914E-01 | | | | | | |
| | | 727.17 | 9.925E-02 | ?(P | 5.928E-01 | 1.43E+02 | G |
| | | 1620.56 | 8.416E-03 | % | 2.775E+00 | 7.96E+03 | G |
| | | 785.42 | 1.675E-01 | ?( | 3.557E+00 | 5.75E+02 | G |
| PB-212 | 3.5655E-01 | | | | | | |
| | | 238.63 | 3.565E-01 | (P | 1.129E-01 | 1.20E+01 | G |
| | | 300.09 | 2.348E-01 | - P | 1.378E+00 | 1.50E+02 | G |
| TL-208 | 8.5680E-02 | | | | | | |
| | | 583.14 | 8.268E-02 | (P | 8.481E-02 | 2.71E+01 | G |
| | | 510.72 | -3.453E-02 | - P | 3.712E-01 | 4.71E+01 | G |
| | | 860.47 | 2.615E-01 | + P | 5.112E-01 | 5.83E+01 | G |
| | | 277.36 | 3.939E-01 | + P | 6.257E-01 | 4.90E+01 | G |
| | | 763.30 | 2.375E-01 | &(P | 3.849E+00 | 4.20E+02 | G |
| PA-234 | 6.4711E-02 | | | | | | |
| | | 98.44 | -2.459E-02 | &(P | 1.538E-01 | 2.19E+02 | G |
| | | 946.00 | -7.903E-03 | % P | 3.157E-01 | 1.00E+03 | G |
| | | 131.28 | -3.394E-03 | % P | 2.004E-01 | 1.00E+03 | G |
| | | 94.67 | -7.105E-02 | & | 3.024E-01 | 1.26E+02 | G |
| | | 883.24 | 8.252E-02 | &( | 5.250E-01 | 1.75E+02 | G |
| | | 926.70 | -2.849E-02 | % P | 2.417E-01 | 1.00E+03 | G |
| | | 569.26 | -1.886E-02 | & P | 5.894E-01 | 1.00E+03 | G |
| | | 111.00 | -7.838E-02 | + | 4.050E-01 | 1.51E+02 | G |
| | | 733.00 | 9.835E-02 | ?(P | 7.707E-01 | 1.91E+02 | G |
| | | 949.00 | 1.329E-01 | ?( | 8.956E-01 | 1.85E+02 | G |
| | | 880.51 | -1.588E-01 | + P | 1.097E+00 | 2.31E+02 | G |
| | | 226.87 | -2.173E-03 | % | 6.423E-01 | 8.25E+03 | G |
| | | 831.10 | -4.158E-02 | % P | 1.305E+00 | 1.00E+03 | G |
| | | 808.10 | 0.000E+00 | - | 1.336E+00 | 1.00E+03 | G |
| | | 99.70 | 1.365E-01 | ?( | 7.401E-01 | 1.58E+02 | G |
| | | 699.10 | -9.710E-02 | + | 1.320E+00 | 3.68E+02 | G |

0.88 Spectrum name: ARS01214.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 898.60 | 2.829E-01 | ?(P | 1.970E+00 | 1.92E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 2.705E+00 | 1.00E+03 | G |
| CS-137 | 2.2357E-03 | | | | | | |
| | | 661.66 | 2.236E-03 | ?( | 6.274E-02 | 7.41E+02 | G |
| CO-60 | -1.4754E-02 | | | | | | |
| | | 1173.24 | -1.475E-02 | ?( | 9.728E-02 | 1.84E+02 | K |
| | | 1332.50 | -9.580E-03 | + | 9.706E-02 | 2.75E+02 | K |
| EU-152 | 4.5108E-02 | | | | | | |
| | | 40.12 | 3.637E-03 | %( | 2.076E-01 | 1.60E+03 | G |
| | | 121.78 | 1.767E-02 | ?( | 1.134E-01 | 1.85E+02 | G |
| | | 344.30 | 3.062E-02 | ?( | 1.660E-01 | 1.54E+02 | G |
| | | 1408.08 | 3.779E-02 | ?( | 3.530E-01 | 2.45E+02 | G |
| | | 39.52 | 0.000E+00 | - | 4.946E-01 | 1.00E+03 | G |
| | | 964.00 | 2.155E-01 | ?( | 5.052E-01 | 7.04E+01 | G |
| | | 1112.07 | -5.479E-02 | + | 6.560E-01 | 3.26E+02 | G |
| | | 778.90 | -7.945E-02 | + | 5.441E-01 | 1.91E+02 | G |
| | | 1085.80 | -1.482E-01 | + | 8.541E-01 | 1.61E+02 | G |
| | | 45.40 | 0.000E+00 | - | 7.447E-01 | 1.00E+03 | G |
| | | 244.67 | 5.932E-02 | ?( | 6.138E-01 | 2.95E+02 | G |
| | | 867.39 | 0.000E+00 | - | 6.053E-01 | 1.00E+03 | G |
| EU-154 | 3.7847E-02 | | | | | | |
| | | 123.10 | -2.849E-03 | ?( | 8.915E-02 | 8.92E+02 | G |
| | | 1274.80 | 0.000E+00 | + | 2.567E-01 | 1.00E+03 | G |
| | | 723.30 | -4.064E-02 | + | 3.855E-01 | 2.64E+02 | G |
| | | 1004.80 | 9.434E-03 | % | 4.475E-01 | 1.26E+03 | G |
| | | 43.00 | -3.826E-02 | + | 5.540E-01 | 4.15E+02 | G |
| | | 873.20 | 1.007E-02 | % | 6.227E-01 | 1.64E+03 | G |
| | | 996.30 | -3.179E-02 | + | 6.743E-01 | 5.62E+02 | G |
| | | 42.31 | 5.168E-02 | &( | 9.553E-01 | 5.27E+02 | G |
| | | 248.04 | -4.166E-03 | % | 6.892E-01 | 4.63E+03 | G |
| | | 591.70 | -1.363E-01 | & | 1.390E+00 | 2.83E+02 | G |
| | | 48.70 | -6.031E-01 | & | 1.597E+00 | 7.93E+01 | G |
| | | 756.70 | 4.148E-01 | ?( | 1.244E+00 | 8.72E+01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

0.88 Spectrum name: ARS01214.An1

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | # | 8.2110E-02 | 5.5230E-02 | 5.5577E-02 | 0.786E-01 |
| RA-226 | #A | 5.3954E-01 | 8.0337E-01 | 8.0411E-01 | 0.141E+01 |
| Ra-228 | #A | 1.8548E-01 | 1.0642E-01 | 1.0708E-01 | 0.294E+00 |
| Am-241 | #A | 4.8419E-02 | 8.4477E-02 | 8.4537E-02 | 0.142E+00 |
| PB-210 | #A | 3.8017E-01 | 9.4393E-01 | 9.4468E-01 | 0.172E+01 |
| U-238 | #A | 9.0882E-01 | 5.4046E-01 | 5.4509E-01 | 0.158E+01 |
| K-40 | | 1.1424E+01 | 1.5063E+00 | 1.6743E+00 | 0.493E+00 |
| PB-214 | # | 3.6660E-01 | 1.1450E-01 | 1.1899E-01 | 0.157E+00 |
| BI-214 | | 1.5596E-01 | 1.1798E-01 | 1.1837E-01 | 0.154E+00 |
| BI-212 | #A | 1.0914E-01 | 3.6386E-01 | 3.6393E-01 | 0.593E+00 |
| PB-212 | | 3.5655E-01 | 9.4043E-02 | 9.7975E-02 | 0.113E+00 |
| TL-208 | # | 8.5680E-02 | 5.6245E-02 | 5.6523E-02 | 0.848E-01 |
| PA-234 | #A | 6.4711E-02 | 1.0577E-01 | 1.0587E-01 | 0.154E+00 |
| CS-137 | #A | 2.2357E-03 | 3.3113E-02 | 3.3114E-02 | 0.627E-01 |
| CO-60 | #A | -1.4754E-02 | 5.4302E-02 | 5.4305E-02 | 0.973E-01 |
| EU-152 | #A | 4.5108E-02 | 6.3498E-02 | 6.3697E-02 | 0.208E+00 |
| EU-154 | #A | 3.7847E-02 | 6.5991E-02 | 6.6041E-02 | 0.892E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

0.88 Spectrum name: ARS01214.An1

---------- S U M M A R Y ----------

| | | | |
|---|---|---|---|
| Total Activity ( | 92.5 to | 2000.7 keV) | 1.248E+01 pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-16 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-012 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 012 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 8.4059E-02 | pCi/g | 1.3434E-01 | 2.6000E-01 | 1.3000E-01 | | | |
| **RA-226** | 5.3760E-01 | pCi/g | 5.2514E-01 | 8.8800E-01 | 4.4400E-01 | | | |
| **RA-228** | 3.7310E-01 | pCi/g | 1.2943E-01 | 1.7900E-01 | 8.9500E-02 | | | |
| **AM-241** | -3.1000E-02 | pCi/g | 9.1281E-01 | 1.4100E-01 | 7.0500E-02 | | | |
| **PB-210** | -2.2940E-01 | pCi/g | 1.8959E+00 | 1.6600E+00 | 8.3000E-01 | | | |
| **U-238** | 3.2675E-01 | pCi/g | 5.3750E-01 | 1.3300E+00 | 6.6500E-01 | | | |
| **K-40** | 1.1683E+01 | pCi/g | 1.5040E+00 | 7.0500E-01 | 3.5250E-01 | | | |
| **PB-214** | 3.2024E-01 | pCi/g | 1.0046E-01 | 1.1400E-01 | 5.7000E-02 | | | |
| **BI-214** | 3.5922E-01 | pCi/g | 1.0716E-01 | 9.7200E-02 | 4.8600E-02 | | | |
| **BI-212** | 9.2831E-02 | pCi/g | 3.1633E-01 | 4.7300E-01 | 2.3650E-01 | | | |
| **PB-212** | 3.4450E-01 | pCi/g | 8.1545E-02 | 8.1300E-02 | 4.0650E-02 | | | |
| **TL-208** | 7.6770E-02 | pCi/g | 4.5728E-02 | 5.7800E-02 | 2.8900E-02 | | | |
| **PA-234** | 3.5113E-02 | pCi/g | 6.0844E-02 | 1.2500E-01 | 6.2500E-02 | | | |
| **CS-137** | 5.6198E-03 | pCi/g | 3.2085E-02 | 5.8000E-02 | 2.9000E-02 | | | |
| **CO-60** | 2.8134E-02 | pCi/g | 3.2188E-02 | 5.2800E-02 | 2.6400E-02 | | | |
| **EU-152** | 5.1170E-02 | pCi/g | 1.5813E-01 | 4.0400E-01 | 2.0200E-01 | | | |
| **EU-154** | 1.7458E-02 | pCi/g | 3.5726E-02 | 7.8200E-02 | 3.9100E-02 | | | |
| **Total Gamma** | 1.4336E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.1153E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06814.An1

Sample description
Batch ID: 16-00563-16
SDG: ARS1-16-00670-012 Tech: WJS

Spectrum Filename: C:\User\ARS06814.An1

Acquisition information
Start time: 19-Apr-2016 08:40:40
Live time: 1800
Real time: 1804
Dead time: 0.20 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.6650E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.6650E+02) =
2.7285E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06814.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0908

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.22 | 36. | 29.40 | 0.78 | 6.948E-03 | | | | |
| 29.84 | 52. | 33.73 | 0.58 | 1.986E-02 | | | | |
| 40.14 | 5. | 339.69 | 0.93 | 2.785E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 41.52 | 81. | 24.92 | 0.93 | 2.893E-02 | | | | |
| 45.38 | 4. | 376.62 | 0.93 | 3.195E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.40 | 2. | 648.21 | 0.94 | 3.500E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 48.70 | 4.200 | 4.368E-02 | EU154 |
| 46.72 | -7. | 108.94 | 0.94 | 3.277E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 48.70 | 4.200 | PBC<MDA | EU154 |
| 63.32 | 8. | 57.75 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.20 | 84. | 24.22 | 0.62 | 5.238E-02 | | | | |
| 92.34 | 13. | 60.00 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.35 | 21. | 61.00 | 0.98 | 5.721E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.72 | 13. | 72.75 | 0.99 | 5.851E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 108.76 | 26. | 39.86 | 0.55 | 5.934E-02 | | | | |
| 131.46 | 8. | 139.40 | 1.02 | 5.871E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 144.20 | 14. | 67.18 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 185.92 | 24. | 31.30 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 208.53 | 3. | 201.57 | 1.09 | 4.793E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 226.89 | 5. | 185.21 | 1.11 | 4.480E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.41 | 158. | 10.42 | 1.40 | 4.323E-02 | 238.63 | 43.100 | 3.473E-01 | PB212 |
| 241.73 | 34. | 37.05 | 1.12 | 4.279E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 248.05 | 1. | 955.27 | 1.13 | 4.203E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 277.28 | 10. | 86.04 | 1.16 | 3.866E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.77 | 29. | 31.57 | 1.17 | 3.686E-02 | 295.21 | 18.500 | PBC<MDA | PB214 |
| 299.81 | 9. | 94.34 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.86 | 35. | 28.70 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 3.592E-01 | Ra228 |
| 351.63 | 83. | 13.76 | 1.22 | 3.215E-02 | 351.92 | 35.800 | 2.955E-01 | PB214 |
| 510.81 | 9. | 26.80 | 1.37 | 2.413E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 570.25 | 1. | 168.16 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 582.90 | 30. | 25.71 | 1.44 | 2.185E-02 | 583.14 | 86.000 | 6.474E-02 | TL208 |
| 609.15 | 77. | 13.62 | 0.43 | 2.115E-02 | 609.31 | 44.791 | 3.330E-01 | BI214 |
| 661.92 | 2. | 285.45 | 1.51 | 1.990E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 698.79 | 1. | 661.09 | 1.54 | 1.912E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 727.26 | 4. | 147.49 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 783.29 | 2. | 366.29 | 1.61 | 1.757E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 808.23 | 1. | 687.65 | 1.63 | 1.721E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 860.76 | 6. | 88.16 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 867.03 | 1. | 347.06 | 1.68 | 1.635E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| 873.12 | 6. | 97.69 | 1.69 | 1.627E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 880.35 | 2. | 253.88 | 1.70 | 1.617E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 910.96 | 41. | 19.15 | 1.72 | 1.577E-02 | 911.07 | 29.000 | 3.668E-01 | Ra228 |
| 933.01 | 7. | 94.79 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 963.65 | 5. | 170.33 | 1.77 | 1.513E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.368E-01 | Ra228 |
| 963.85 | 5. | 154.41 | 1.77 | 1.514E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.650E-01 | Ra228 |
| 969.18 | 25. | 34.63 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1120.11 | 11. | 71.30 | 1.90 | 1.355E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1178.05 | 9. | 51.05 | 1.94 | 1.309E-02 | 1173.24 | 99.900 | HL>Cutoff | CO60 |
| 1237.40 | 11. | 66.72 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1275.02 | 2. | 227.60 | 2.02 | 1.228E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1377.46 | 5. | 85.18 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1460.59 | 337. | 5.34 | 2.25 | 1.104E-02 | 1460.75 | 10.700 | 1.168E+01 | K40 |
| 1763.74 | 15. | 28.62 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | 4.116E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.12 | 13.22 | 38. | 36. | 0.020 | 58.79 | 0.775 | SE-75 | sM |
| 118.61 | 29.84 | 115. | 52. | 0.029 | 67.46 | 0.579 | J-131 | sM |
| 165.30 | 41.52 | 133. | 88. | 0.049 | 42.50 | 0.927 | CE-141 | sM |
| 308.05 | 77.20 | 132. | 84. | 0.047 | 48.45 | 0.618 | PB-212 | s |
| 434.31 | 108.76 | 37. | 26. | 0.014 | 79.73 | 0.554 | TH-234 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 159.79 | 40.14 | 292. | 5. | 0.003 | 679.37 | 0.930s |
| EU-154 | 172.21 | 43.24 | 163. | -21. | -0.012 | 178.56 | 0.932s |
| EU-154 | 171.96 | 43.18 | 202. | -27. | -0.015 | 151.66 | 0.932s |
| EU-152 | 180.77 | 45.38 | 99. | 4. | 0.002 | 753.24 | 0.935s |
| PB-210 | 186.11 | 46.72 | 117. | -7. | -0.004 | 217.88 | 0.936s |
| EU-154 | 184.86 | 46.40 | 51. | 2. | 0.001 | 1296.43 | 0.938s |
| U-238 | 252.55 | 63.32 | 139. | 8. | 0.004 | 115.50 | 0.952s |
| U-238 | 368.68 | 92.35 | 137. | 21. | 0.011 | 122.00 | 0.980s |
| U-238 | 368.62 | 92.34 | 143. | 13. | 0.007 | 120.00 | 0.980s |
| PA-234 | 398.17 | 99.72 | 62. | 13. | 0.007 | 145.49 | 0.987s |
| EU-154 | 487.05 | 121.94 | 86. | -11. | -0.006 | 256.59 | 1.009s |
| PA-234 | 525.12 | 131.46 | 62. | 8. | 0.005 | 278.79 | 1.017s |
| U-235 | 576.09 | 144.20 | 58. | 14. | 0.008 | 134.36 | 1.029 |
| RA-226 | 743.01 | 185.92 | 65. | 24. | 0.014 | 62.60 | 1.069s |
| U-235 | 833.50 | 208.53 | 31. | 3. | 0.002 | 403.14 | 1.087s |
| PA-234 | 906.93 | 226.89 | 43. | 5. | 0.003 | 370.41 | 1.108s |
| PB-212 | 953.02 | 238.41 | 54. | 158. | 0.088 | 20.84 | 1.399s |
| PB-214 | 966.30 | 241.73 | 68. | 34. | 0.019 | 74.09 | 1.122s |
| TL-208 | 1108.57 | 277.28 | 35. | 10. | 0.005 | 172.08 | 1.155s |
| PB-214 | 1178.56 | 294.77 | 39. | 29. | 0.016 | 63.13 | 1.172s |
| PB-212 | 1198.70 | 299.81 | 31. | 9. | 0.005 | 188.69 | 1.176s |
| Ra-228 | 1350.98 | 337.86 | 34. | 35. | 0.019 | 57.40 | 1.212s |
| PB-214 | 1406.06 | 351.63 | 40. | 83. | 0.046 | 27.53 | 1.224s |
| TL-208 | 2043.10 | 510.81 | 71. | 9. | 0.005 | 53.61 | 1.370s |
| PA-234 | 2280.97 | 570.25 | 16. | 1. | 0.001 | 336.33 | 1.423s |
| TL-208 | 2331.59 | 582.90 | 26. | 30. | 0.016 | 51.42 | 1.435 |
| EU-154 | 2364.39 | 591.09 | 25. | -4. | -0.002 | 358.81 | 1.443s |
| BI-214 | 2436.68 | 609.15 | 18. | 77. | 0.043 | 27.24 | 0.432s |
| CS-137 | 2647.90 | 661.92 | 21. | 2. | 0.001 | 570.91 | 1.505s |
| EU-154 | 2893.58 | 723.30 | 24. | 0. | 0.000 | 2000.00 | 1.559s |
| BI-212 | 2909.42 | 727.26 | 24. | 4. | 0.002 | 294.99 | 1.563s |
| PA-234 | 2930.86 | 732.61 | 21. | -4. | -0.002 | 401.00 | 1.568s |
| BI-214 | 3073.36 | 768.21 | 30. | -7. | -0.004 | 245.78 | 1.599s |
| BI-212 | 3133.71 | 783.29 | 15. | 2. | 0.001 | 732.58 | 1.614s |
| PA-234 | 3233.54 | 808.23 | 18. | 1. | 0.000 | 1375.30 | 1.633s |
| PA-234 | 3321.73 | 830.25 | 23. | -5. | -0.003 | 327.91 | 1.653s |
| TL-208 | 3443.87 | 860.76 | 13. | 6. | 0.004 | 176.32 | 1.679s |
| EU-152 | 3468.96 | 867.03 | 11. | 1. | 0.001 | 694.11 | 1.685s |
| EU-154 | 3493.33 | 873.12 | 13. | 6. | 0.003 | 195.38 | 1.690s |
| PA-234 | 3522.28 | 880.35 | 14. | 2. | 0.001 | 507.75 | 1.696s |
| Ra-228 | 3644.84 | 910.96 | 14. | 41. | 0.023 | 38.30 | 1.722s |
| BI-214 | 3733.10 | 933.01 | 21. | 7. | 0.004 | 189.58 | 1.742s |
| PA-234 | 3801.05 | 949.98 | 17. | -2. | -0.001 | 686.35 | 1.755s |
| EU-152 | 3856.59 | 963.85 | 31. | 5. | 0.003 | 308.83 | 1.767s |

American Radiation Services Spectrum name: ARS06814.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Ra-228 | 3855.79 | 963.65 | 31. | 5. | 0.003 | 340.66 | 1.768s |
| Ra-228 | 3877.91 | 969.18 | 32. | 25. | 0.014 | 69.25 | 1.771s |
| EU-154 | 3987.60 | 996.57 | 19. | -4. | -0.002 | 328.38 | 1.795s |
| EU-152 | 4339.85 | 1084.55 | 21. | -4. | -0.002 | 361.43 | 1.870s |
| EU-152 | 4458.25 | 1114.11 | 33. | -6. | -0.004 | 265.34 | 1.891s |
| BI-214 | 4482.25 | 1120.11 | 32. | 11. | 0.006 | 142.60 | 1.898s |
| CO-60 | 4714.27 | 1178.05 | 9. | 9. | 0.005 | 102.10 | 1.942s |
| BI-214 | 4951.98 | 1237.40 | 25. | 11. | 0.006 | 133.43 | 1.995s |
| EU-154 | 5102.63 | 1275.02 | 12. | 2. | 0.001 | 455.20 | 2.025s |
| CO-60 | 5331.41 | 1332.15 | 15. | -1. | -0.001 | 1350.53 | 2.071s |
| BI-214 | 5512.90 | 1377.46 | 7. | 5. | 0.003 | 170.37 | 2.107s |
| PA-234 | 5579.56 | 1394.10 | 16. | 0. | 0.000 | 2000.00 | 2.120s |
| K-40 | 5845.89 | 1460.59 | 14. | 337. | 0.187 | 10.68 | 2.248 |
| BI-212 | 6486.71 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.297s |
| BI-214 | 7060.37 | 1763.74 | 3. | 15. | 0.008 | 57.24 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 8.4059E-02 | | | | | |
| | | | 143.76 | 9.612E-02 | &(P | 2.595E-01 6.72E+01 G | |
| | | | 205.31 | 5.712E-02 | ?(P | 5.247E-01 2.02E+02 G | |
| | | | 163.35 | -4.578E-02 | & P | 7.347E-01 1.17E+03 G | |
| RA-226 | | 5.3760E-01 | | | | | |
| | | | 186.21 | 5.376E-01 | (P | 8.878E-01 3.13E+01 G K | |
| Ra-228 | | 3.7310E-01 | | | | | |
| | | | 911.07 | 3.668E-01 | ?(P | 1.786E-01 1.92E+01 G | |
| | | | 968.90 | 3.932E-01 | ?(P | 4.506E-01 3.46E+01 G | |
| | | | 338.40 | 3.592E-01 | &(P | 3.088E-01 2.87E+01 G | |
| | | | 964.60 | 2.368E-01 | & | 1.415E+00 1.70E+02 G | |
| Am-241 | T | -3.1000E-02 | | | | | |
| | | | 59.54 | -3.100E-02 | %(P | 1.412E-01 7.99E+02 G K | |
| PB-210 | | -2.2940E-01 | | | | | |
| | | | 46.52 | -2.294E-01 | ?(P | 1.658E+00 1.09E+02 G | |
| U-238 | | 3.2675E-01 | | | | | |
| | | | 63.29 | 1.743E-01 | ?(P | 1.334E+00 5.77E+01 G | |
| | | | 92.80 | 3.125E-01 | (P | 1.393E+00 6.00E+01 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 92.38 | 5.748E-01 | (P | 1.595E+00 | 6.10E+01 | G |
| K-40 | 1.1683E+01 | | | | | | |
| | | 1460.75 | 1.168E+01 | (P | 7.050E-01 | 5.34E+00 | G |
| PB-214 | 3.2024E-01 | | | | | | |
| | | 351.92 | 2.955E-01 | @(P | 1.142E-01 | 1.38E+01 | G |
| | | 295.21 | 1.735E-01 | - P | 1.918E-01 | 3.16E+01 | G |
| | | 241.98 | 4.384E-01 | ?(P | 5.256E-01 | 3.70E+01 | G |
| BI-214 | 3.5922E-01 | | | | | | |
| | | 609.31 | 3.330E-01 | (P | 9.723E-02 | 1.36E+01 | G |
| | | 1764.49 | 4.116E-01 | ?(P | 3.166E-01 | 2.86E+01 | G |
| | | 1120.29 | 2.284E-01 | - P | 5.932E-01 | 7.13E+01 | G |
| | | 1238.11 | 6.059E-01 | + P | 1.456E+00 | 6.67E+01 | G |
| | | 768.36 | -3.247E-01 | - P | 1.341E+00 | 1.23E+02 | G |
| | | 1377.67 | 4.535E-01 | ?( | 1.329E+00 | 8.52E+01 | G |
| | | 934.06 | 5.917E-01 | + P | 2.110E+00 | 9.48E+01 | G |
| BI-212 | 9.2831E-02 | | | | | | |
| | | 727.17 | 7.800E-02 | ?(P | 4.729E-01 | 1.47E+02 | G |
| | | 1620.56 | 0.000E+00 | - | 1.084E+00 | 1.00E+03 | G |
| | | 785.42 | 1.803E-01 | ?( | 2.439E+00 | 3.66E+02 | G |
| PB-212 | 3.4450E-01 | | | | | | |
| | | 238.63 | 3.473E-01 | *(P | 8.131E-02 | 1.04E+01 | G |
| | | 300.09 | 3.076E-01 | ?( | 9.874E-01 | 9.43E+01 | G |
| TL-208 | 7.6770E-02 | | | | | | |
| | | 583.14 | 6.474E-02 | (P | 5.776E-02 | 2.57E+01 | G |
| | | 510.72 | 6.924E-02 | @(P | 3.167E-01 | 2.68E+01 | G |
| | | 860.47 | 1.343E-01 | ?( | 4.056E-01 | 8.82E+01 | G |
| | | 277.36 | 1.557E-01 | &(P | 4.967E-01 | 8.60E+01 | G |
| | | 763.30 | 4.498E-02 | % P | 3.360E+00 | 1.75E+03 | G |
| PA-234 | 3.5113E-02 | | | | | | |
| | | 98.44 | -3.823E-03 | &(P | 1.250E-01 | 2.04E+03 | G |
| | | 946.00 | -8.451E-04 | % | 2.769E-01 | 8.65E+03 | G |
| | | 131.28 | 2.881E-02 | ?( | 1.376E-01 | 1.39E+02 | G |
| | | 94.67 | 3.495E-03 | & | 2.245E-01 | 1.84E+03 | G |
| | | 883.24 | 3.437E-03 | % | 4.849E-01 | 3.78E+03 | G |
| | | 926.70 | -1.633E-02 | % P | 5.185E-01 | 1.00E+03 | G |
| | | 569.26 | 2.438E-02 | ?(P | 3.780E-01 | 1.68E+02 | G |
| | | 111.00 | -7.719E-03 | % P | 2.867E-01 | 1.02E+04 | G |
| | | 733.00 | -1.057E-01 | + P | 6.327E-01 | 2.01E+02 | G |
| | | 949.00 | -7.965E-02 | + P | 7.484E-01 | 3.43E+02 | G |
| | | 880.51 | 6.000E-02 | ?(P | 7.845E-01 | 2.54E+02 | G |
| | | 226.87 | 7.253E-02 | &( | 4.680E-01 | 1.85E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 831.10 | -2.229E-01 | + P | 1.093E+00 | 1.64E+02 | G |
| | | 808.10 | 4.248E-02 | ?( | 1.083E+00 | 6.88E+02 | G |
| | | 99.70 | 1.998E-01 | ?(P | 5.868E-01 | 7.27E+01 | G |
| | | 699.10 | 2.947E-02 | % P | 1.181E+00 | 6.61E+02 | G |
| | | 898.60 | -1.278E-01 | % P | 1.335E+00 | 9.25E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 1.967E+00 | 1.00E+03 | G |
| CS-137 | 5.6198E-03 | | | | | | |
| | | 661.66 | 5.620E-03 | ?( | 5.799E-02 | 2.85E+02 | G |
| CO-60 | 2.8134E-02 | | | | | | |
| | | 1173.24 | 2.813E-02 | ?(P | 5.283E-02 | 5.11E+01 | K |
| | | 1332.50 | -3.251E-03 | & P | 7.204E-02 | 6.75E+02 | K |
| EU-152 | 5.1170E-02 | | | | | | |
| | | 40.12 | 2.290E-02 | ?(P | 4.038E-01 | 3.40E+02 | G |
| | | 121.78 | -3.351E-03 | & P | 1.040E-01 | 9.75E+02 | G |
| | | 344.30 | -2.910E-03 | & P | 1.098E-01 | 2.73E+03 | G |
| | | 1408.08 | -1.657E-03 | % P | 4.945E-01 | 1.00E+03 | G |
| | | 39.52 | -1.765E-02 | % | 7.597E-01 | 1.26E+03 | G |
| | | 964.00 | 9.906E-02 | ?( | 5.341E-01 | 1.54E+02 | G |
| | | 1112.07 | -1.429E-01 | + | 6.566E-01 | 1.33E+02 | G |
| | | 778.90 | -1.299E-02 | % P | 5.313E-01 | 1.00E+03 | G |
| | | 1085.80 | -1.081E-01 | + | 6.948E-01 | 1.81E+02 | G |
| | | 45.40 | 5.251E-02 | ?(P | 6.983E-01 | 3.77E+02 | G |
| | | 244.67 | 1.442E-03 | & P | 5.257E-01 | 8.61E+03 | G |
| | | 867.39 | 8.415E-02 | ?( | 1.096E+00 | 3.47E+02 | G |
| EU-154 | 1.7458E-02 | | | | | | |
| | | 123.10 | -1.794E-02 | ?( | 7.823E-02 | 1.28E+02 | G |
| | | 1274.80 | 2.111E-02 | ?(P | 1.776E-01 | 2.28E+02 | G |
| | | 723.30 | 0.000E+00 | & | 2.833E-01 | 1.00E+03 | G |
| | | 1004.80 | -1.341E-02 | % P | 4.520E-01 | 1.00E+03 | G |
| | | 43.00 | -2.848E-01 | + | 7.168E-01 | 7.58E+01 | G |
| | | 873.20 | 1.230E-01 | ?(P | 4.390E-01 | 9.77E+01 | G |
| | | 996.30 | -1.013E-01 | + | 5.915E-01 | 1.64E+02 | G |
| | | 42.31 | -3.958E-01 | + | 1.180E+00 | 8.93E+01 | G |
| | | 248.04 | 1.244E-02 | & P | 4.987E-01 | 9.55E+02 | G |
| | | 591.70 | -1.701E-01 | + | 1.079E+00 | 1.79E+02 | G |
| | | 48.70 | 4.368E-02 | ?( | 1.001E+00 | 6.48E+02 | G |
| | | 756.70 | 9.114E-03 | % | 1.070E+00 | 3.07E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 8.4059E-02 | 1.3416E-01 | 1.3434E-01 | 0.260E+00 |
| RA-226 #A | 5.3760E-01 | 5.2314E-01 | 5.2514E-01 | 0.888E+00 |
| Ra-228 # | 3.7310E-01 | 1.2698E-01 | 1.2943E-01 | 0.179E+00 |
| Am-241 #B | -3.1000E-02 | 9.1281E-01 | 9.1281E-01 | 0.141E+00 |
| PB-210 #A | -2.2940E-01 | 1.8958E+00 | 1.8959E+00 | 0.166E+01 |
| U-238 #A | 3.2675E-01 | 5.3689E-01 | 5.3750E-01 | 0.133E+01 |
| K-40 | 1.1683E+01 | 1.3001E+00 | 1.5040E+00 | 0.705E+00 |
| PB-214 # | 3.2024E-01 | 9.6076E-02 | 1.0046E-01 | 0.114E+00 |
| BI-214 | 3.5922E-01 | 1.0484E-01 | 1.0716E-01 | 0.972E-01 |
| BI-212 #A | 9.2831E-02 | 3.1627E-01 | 3.1633E-01 | 0.473E+00 |
| PB-212 # | 3.4450E-01 | 7.5088E-02 | 8.1545E-02 | 0.813E-01 |
| TL-208 # | 7.6770E-02 | 4.5459E-02 | 4.5728E-02 | 0.578E-01 |
| PA-234 #A | 3.5113E-02 | 6.0789E-02 | 6.0844E-02 | 0.125E+00 |
| CS-137 #A | 5.6198E-03 | 3.2084E-02 | 3.2085E-02 | 0.580E-01 |
| CO-60 #A | 2.8134E-02 | 3.2167E-02 | 3.2188E-02 | 0.528E-01 |
| EU-152 #A | 5.1170E-02 | 1.5803E-01 | 1.5813E-01 | 0.404E+00 |
| EU-154 #A | 1.7458E-02 | 3.5702E-02 | 3.5726E-02 | 0.782E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

American Radiation Services     Spectrum name: ARS06814.An1

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | | |
|---|---|---|---|
| Total Activity ( | 2.7 to 1998.2 keV) | 1.239E+01 | pCi/g |

The library has energies which are not separable.

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-17 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-013 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 013 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 4.1161E-02 | pCi/g | 3.8597E-02 | 4.9800E-02 | 2.4900E-02 | | | |
| RA-226 | 4.0537E-01 | pCi/g | 6.1030E-01 | 8.5300E-01 | 4.2650E-01 | | | |
| RA-228 | 4.3803E-01 | pCi/g | 1.1414E-01 | 6.2300E-02 | 3.1150E-02 | | | |
| AM-241 | 0.0000E+00 | pCi/g | 3.3739E-02 | 1.3000E-01 | 6.5000E-02 | | | |
| PB-210 | 0.0000E+00 | pCi/g | 5.2170E-01 | 1.4300E+00 | 7.1500E-01 | | | |
| U-238 | 9.9231E-01 | pCi/g | 4.3929E-01 | 1.0600E+00 | 5.3000E-01 | | | |
| K-40 | 1.1577E+01 | pCi/g | 1.4977E+00 | 4.4000E-01 | 2.2000E-01 | | | |
| PB-214 | 3.6118E-01 | pCi/g | 1.0073E-01 | 9.2200E-02 | 4.6100E-02 | | | |
| BI-214 | 3.4024E-01 | pCi/g | 1.0826E-01 | 1.0300E-01 | 5.1500E-02 | | | |
| BI-212 | 2.0685E-01 | pCi/g | 2.3243E-01 | 5.4300E-01 | 2.7150E-01 | | | |
| PB-212 | 3.9312E-01 | pCi/g | 7.5404E-02 | 6.6200E-02 | 3.3100E-02 | | | |
| TL-208 | 1.1245E-01 | pCi/g | 5.0079E-02 | 5.4200E-02 | 2.7100E-02 | | | |
| PA-234 | ~~2.3454E-01~~ 5.1408-02 | pCi/g | 1.2235E-01 | 1.0700E-01 | 5.3500E-02 | | | |
| CS-137 | 0.0000E+00 | pCi/g | 4.5893E-03 | 6.8300E-02 | 3.4150E-02 | | | |
| CO-60 | 5.4302E-02 | pCi/g | 4.0057E-02 | 4.3800E-02 | 2.1900E-02 | | | |
| EU-152 | 4.4687E-02 | pCi/g | 6.3920E-02 | 2.0100E-01 | 1.0050E-01 | | | |
| EU-154 | ~~8.3605E-02~~ 1.613E-02 | pCi/g | 9.0191E-02 | 5.9100E-02 | 2.9550E-02 | | | |
| Total Gamma | 1.5285E+01 | pCi/g | | | | | | |
| Total NORM Activity | 4.3542E+01 | pCi/g | | | | | | |
| | | | | | | | | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

Sample description
Batch ID: 16-00563-17
SDG: ARS1-16-00670-013 Tech: WJS

Spectrum Filename: C:\User\ARS08218.An1

Acquisition information
Start time: 4/19/2016 8:53:15 AM
Live time: 1800
Real time: 1807
Dead time: 0.41 %
Detector ID: 9

Detector system
(ARS08) MCB 129

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration
Created: 12/12/2014 9:34:56 AM
Zero offset: 0.447 keV
Gain: 0.250 keV/channel
Quadratic: -3.417E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2015 10:02:55 AM
Type: Polynomial
Uncertainty: 1.535 %
Coefficients: -0.447430 -4.056056 0.358945
-0.033786 0.001201 -0.000016

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G702W050
Start channel: 100 ( 25.46keV )
Stop channel: 8000 ( 1999.20keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 1
Sample Size: 3.7288E+02 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.7288E+02) =
2.6818E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.0799

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 41.49 | 10. | 67.67 | 0.34 | 2.747E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 48.14 | 3. | 352.69 | 0.98 | 3.332E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| | | | | | 48.70 | 4.200 | PBC<MDA | EU154 |
| 63.30 | 29. | 56.30 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 72.15 | 13. | 83.52 | 1.00 | 4.992E-02 | | | | |
| 74.94 | 91. | 17.68 | 1.01 | 5.129E-02 | | | | |
| 77.14 | 79. | 19.40 | 1.01 | 5.227E-02 | | | | |
| 87.58 | 43. | 29.68 | 1.02 | 5.580E-02 | | | | |
| 90.04 | 38. | 29.88 | 1.02 | 5.638E-02 | | | | |
| 92.84 | 34. | 45.50 | 1.02 | 5.685E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.85 | 62. | 21.78 | 1.03 | 5.693E-02 | 92.38 | 2.570 | 1.707E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.460E+00 | U238 |
| 98.60 | 18. | 72.35 | 1.03 | 5.774E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 2.739E-01 | PA234 |
| | | | | | 98.44 | 25.100 | 5.140E-02 | PA234 |
| 98.89 | 4. | 335.50 | 1.03 | 5.787E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 6.169E-02 | PA234 |
| | | | | | 99.70 | 4.700 | 6.169E-02 | PA234 |
| 123.04 | 11. | 106.37 | 1.06 | 5.780E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |
| 141.80 | 12. | 61.67 | 0.49 | 5.575E-02 | | | | |
| 144.06 | 8. | 142.43 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.83 | 2. | 771.14 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.58 | 28. | 46.75 | 1.13 | 4.920E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 6.193E-01 | RA226 |
| | | | | | 185.72 | 57.200 | 3.935E-02 | U235 |
| | | | | | 186.21 | 3.640 | 6.193E-01 | RA226 |
| 185.69 | 18. | 75.22 | 1.13 | 4.912E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 4.054E-01 | RA226 |
| 216.30 | 14. | 47.74 | 0.56 | 4.486E-02 | | | | |
| 238.47 | 161. | 10.41 | 0.71 | 4.208E-02 | 238.63 | 43.100 | 3.575E-01 | PB212 |
| 241.84 | 19. | 52.12 | 1.19 | 4.167E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 244.60 | 8. | 152.24 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 9.800E-02 | EU152 |
| 247.71 | 16. | 66.96 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 2.407E-01 | EU154 |
| 277.26 | 1. | 884.63 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.96 | 61. | 23.08 | 1.01 | 3.634E-02 | 295.21 | 18.500 | 3.650E-01 | PB214 |
| 327.14 | 18. | 46.73 | 0.67 | 3.378E-02 | | | | |
| 332.71 | 11. | 61.34 | 0.68 | 3.337E-02 | | | | |
| 338.27 | 44. | 21.03 | 1.19 | 3.298E-02 | 338.40 | 12.010 | 4.474E-01 | Ra228 |
| 351.81 | 104. | 12.97 | 0.73 | 3.208E-02 | 351.92 | 35.800 | 3.592E-01 | PB214 |
| 391.46 | 10. | 56.83 | 0.30 | 2.974E-02 | | | | |
| 508.38 | 3. | 141.42 | 0.26 | 2.474E-02 | | | | |
| 511.07 | 43. | 35.03 | 2.71 | 2.466E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 577.37 | 8. | 63.18 | 0.46 | 2.264E-02 | | | | |
| 583.52 | 58. | 16.53 | 0.46 | 2.248E-02 | 583.14 | 86.000 | 1.199E-01 | TL208 |
| 609.30 | 87. | 14.85 | 1.09 | 2.181E-02 | 609.31 | 44.791 | 3.482E-01 | BI214 |
| 723.16 | 10. | 53.83 | 1.66 | 1.935E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| | | | | | 723.30 | 19.700 | 1.003E-01 | EU154 |
| 756.55 | 5. | 123.77 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 2.619E-01 | EU154 |
| 768.14 | 8. | 107.96 | 1.71 | 1.855E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 785.93 | 12. | 56.09 | 1.72 | 1.826E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| | | | | | 785.42 | 2.000 | 1.323E+00 | BI212 |
| 808.30 | 15. | 25.82 | 1.74 | 1.790E-02 | 808.10 | 4.900 | 6.886E-01 | PA234 |
| | | | | | 808.10 | 4.900 | 6.886E-01 | PA234 |
| 867.53 | 4. | 242.51 | 1.80 | 1.702E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | 2.077E-01 | EU152 |
| 880.09 | 13. | 57.49 | 1.81 | 1.684E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.38 | 54. | 13.61 | 0.37 | 1.642E-02 | 911.07 | 29.000 | 4.565E-01 | Ra228 |
| 926.77 | 10. | 97.09 | 1.85 | 1.622E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| | | | | | 926.70 | 11.000 | PBC<MDA | PA234 |
| 949.00 | 11. | 34.59 | 1.87 | 1.595E-02 | 949.00 | 7.800 | 3.688E-01 | PA234 |
| | | | | | 949.00 | 7.800 | 3.688E-01 | PA234 |
| 964.60 | 2. | 195.52 | 1.88 | 1.576E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 964.00 | 14.580 | 1.608E-02 | EU152 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 968.90 | 27. | 28.34 | 1.88 | 1.570E-02 | 968.90 | 17.460 | 4.010E-01 | Ra228 |
| 996.11 | 5. | 146.96 | 1.91 | 1.538E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| | | | | | 996.30 | 10.700 | 1.142E-01 | EU154 |
| 1085.30 | 8. | 71.30 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.37 | 3. | 329.31 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1172.58 | 18. | 36.83 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | HL>Cutoff | CO60 |
| | | | | | 1173.24 | 99.900 | 5.430E-02 | CO60 |
| 1225.42 | 10. | 34.64 | 0.41 | 1.312E-02 | | | | |
| 1238.51 | 2. | 729.54 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1257.20 | 22. | 24.85 | 0.61 | 1.286E-02 | | | | |
| 1331.80 | 5. | 142.59 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | HL>Cutoff | CO60 |
| | | | | | 1332.50 | 99.982 | 1.752E-02 | CO60 |
| 1377.57 | 6. | 100.10 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1406.80 | 2. | 326.44 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.94 | 350. | 5.51 | 1.93 | 1.134E-02 | 1460.75 | 10.700 | 1.158E+01 | K40 |
| 1764.48 | 21. | 21.82 | 0.33 | 9.535E-03 | 1764.49 | 15.357 | 5.581E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 164.10 | 41.49 | 21. | 10. | 3.714E+02 | 135.34 | 0.341 | GD-153 | |
| 286.68 | 72.11 | 52. | 13. | 2.595E+02 | 167.03 | 1.003 | AU-196 | |
| 297.85 | 74.91 | 83. | 91. | 1.769E+03 | 35.36 | 1.006 | TH-234 | D |
| 306.62 | 77.10 | 78. | 79. | 1.512E+03 | 38.79 | 1.008 | PB-212 | D |
| 348.40 | 87.59 | 61. | 43. | 7.750E+02 | 59.36 | 1.019 | PB-212 | D |
| 358.22 | 90.05 | 45. | 38. | 6.718E+02 | 59.77 | 1.022 | AC-228 | D |
| 565.18 | 141.80 | 26. | 12. | 2.224E+02 | 123.34 | 0.492 | FE-59 | s |
| 863.10 | 216.30 | 15. | 14. | 3.054E+02 | 95.47 | 0.564 | TB-160 | s |
| 1306.38 | 327.14 | 22. | 18. | 5.477E+02 | 93.47 | 0.669 | CS-134 | s |
| 1328.67 | 332.71 | 14. | 11. | 3.176E+02 | 122.69 | 0.685 | PU-239 | s |
| 1563.66 | 391.46 | 8. | 10. | 3.228E+02 | 113.65 | 0.304 | SN-113 | s |
| 2032.73 | 508.38 | 48. | 15. | 5.946E+02 | 143.42 | 1.458 | CS-136 | sc |
| 2307.35 | 577.37 | 6. | 8. | 3.312E+02 | 126.35 | 0.461 | KR-89 | sM |
| 4900.87 | 1225.42 | 1. | 10. | 7.619E+02 | 69.28 | 0.407 | - | s |
| 5028.11 | 1257.20 | 2. | 22. | 1.750E+03 | 49.69 | 0.610 | SB-122 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 154.64 | 39.12 | 65. | -3. | -0.002 | 857.65 | 0.967s |
| EU-152 | 155.00 | 39.21 | 62. | -8. | -0.004 | 341.24 | 0.967s |
| EU-154 | 167.23 | 42.27 | 41. | 5. | 0.003 | 413.17 | 0.970s |
| EU-154 | 170.44 | 43.08 | 62. | -10. | -0.006 | 258.68 | 0.970s |
| EU-152 | 179.67 | 45.38 | 65. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 184.71 | 46.65 | 80. | 0. | 0.000 | 2000.00 | 0.974s |
| EU-154 | 190.68 | 48.14 | 54. | 3. | 0.002 | 705.38 | 0.977s |
| Am-241 | 239.33 | 60.31 | 97. | 0. | 0.000 | 2000.00 | 0.989s |
| U-238 | 251.29 | 63.30 | 85. | 29. | 0.016 | 112.61 | 0.993s |
| U-238 | 369.41 | 92.84 | 77. | 34. | 0.019 | 91.00 | 1.025s |
| U-238 | 369.46 | 92.85 | 44. | 62. | 0.034 | 43.55 | 1.025s |
| PA-234 | 371.61 | 93.39 | 116. | -16. | -0.009 | 224.67 | 1.027s |
| PA-234 | 392.45 | 98.60 | 60. | 18. | 0.010 | 144.70 | 1.031s |
| PA-234 | 393.59 | 98.89 | 71. | 4. | 0.002 | 671.00 | 1.033s |
| PA-234 | 443.00 | 111.24 | 80. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 489.00 | 122.75 | 76. | -16. | -0.009 | 192.28 | 1.057s |
| EU-154 | 490.17 | 123.04 | 46. | 11. | 0.006 | 212.74 | 1.058s |
| PA-234 | 522.50 | 131.12 | 88. | -10. | -0.005 | 319.64 | 1.067 |
| U-235 | 574.21 | 144.06 | 45. | 8. | 0.004 | 284.87 | 1.081s |
| U-235 | 649.30 | 162.83 | 76. | 2. | 0.001 | 1542.29 | 1.102s |
| U-235 | 740.25 | 185.58 | 48. | 28. | 0.015 | 93.49 | 1.126s |
| RA-226 | 740.71 | 185.69 | 57. | 18. | 0.010 | 150.43 | 1.126s |
| U-235 | 819.83 | 205.48 | 64. | 0. | 0.000 | 2000.00 | 1.147s |
| PA-234 | 904.00 | 226.53 | 57. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 34. | 177. | 0.098 | 17.76 | 1.182D |
| PB-214 | 965.81 | 241.98 | 41. | 19. | 0.011 | 104.24 | 1.185D |
| EU-152 | 976.29 | 244.60 | 44. | 8. | 0.004 | 304.48 | 1.188s |
| EU-154 | 988.72 | 247.71 | 35. | 16. | 0.009 | 133.92 | 1.192s |
| TL-208 | 1106.91 | 277.26 | 45. | 1. | 0.001 | 1769.25 | 1.223 |
| PB-214 | 1177.68 | 294.96 | 44. | 61. | 0.034 | 46.17 | 1.012s |
| PB-212 | 1197.53 | 299.92 | 49. | -7. | -0.004 | 360.16 | 1.246s |
| Ra-228 | 1350.91 | 338.27 | 16. | 44. | 0.024 | 42.05 | 1.186 |
| EU-152 | 1372.37 | 343.64 | 36. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1405.05 | 351.81 | 26. | 102. | 0.057 | 26.55 | 0.731s |
| TL-208 | 2040.70 | 510.72 | 90. | 43. | 0.024 | 70.05 | 2.710D |
| PA-234 | 2270.48 | 568.16 | 22. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2331.35 | 583.37 | 25. | 54. | 0.030 | 44.06 | 1.531s |
| EU-154 | 2365.33 | 591.87 | 25. | 0. | 0.000 | 2000.00 | 1.539s |
| BI-214 | 2435.15 | 609.32 | 23. | 82. | 0.046 | 31.20 | 1.087s |
| CS-137 | 2646.86 | 662.23 | 34. | 0. | 0.000 | 2000.00 | 1.606s |
| PA-234 | 2795.12 | 699.29 | 40. | -2. | -0.001 | 1640.33 | 1.641s |
| EU-154 | 2890.64 | 723.16 | 4. | 10. | 0.005 | 107.66 | 1.664s |
| PA-234 | 2933.67 | 733.92 | 28. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3024.23 | 756.55 | 9. | 5. | 0.003 | 247.55 | 1.695s |

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Spectrum name: ARS08218.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 3070.63 | 768.14 | 18. | 8. | 0.004 | 215.93 | 1.705s |
| EU-152 | 3114.51 | 779.11 | 22. | -2. | -0.001 | 740.81 | 1.715s |
| BI-212 | 3141.80 | 785.93 | 9. | 12. | 0.007 | 112.18 | 1.721s |
| PA-234 | 3231.33 | 808.30 | 0. | 15. | 0.008 | 51.64 | 1.742s |
| PA-234 | 3322.00 | 830.96 | 29. | 0. | 0.000 | 2000.00 | 1.762s |
| TL-208 | 3442.58 | 861.09 | 25. | 0. | 0.000 | 2000.00 | 1.789s |
| EU-152 | 3468.32 | 867.53 | 19. | 4. | 0.002 | 485.02 | 1.795s |
| EU-154 | 3493.73 | 873.87 | 21. | 0. | 0.000 | 2000.00 | 1.800s |
| PA-234 | 3518.59 | 880.09 | 10. | 13. | 0.007 | 114.97 | 1.807s |
| PA-234 | 3529.11 | 882.71 | 24. | -3. | -0.002 | 623.37 | 1.809s |
| PA-234 | 3602.00 | 900.93 | 52. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.81 | 911.38 | 0. | 54. | 0.030 | 27.22 | 0.365s |
| PA-234 | 3705.44 | 926.77 | 20. | 10. | 0.005 | 194.19 | 1.848s |
| BI-214 | 3733.00 | 933.66 | 34. | 0. | 0.000 | 2000.00 | 1.854 |
| PA-234 | 3780.46 | 945.52 | 19. | -4. | -0.002 | 412.12 | 1.864s |
| PA-234 | 3794.38 | 949.00 | 2. | 11. | 0.006 | 69.18 | 1.867s |
| EU-152 | 3849.33 | 962.73 | 22. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 7. | 2. | 0.001 | 391.04 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 16. | 27. | 0.015 | 56.67 | 1.884D |
| EU-154 | 3982.93 | 996.11 | 10. | 5. | 0.003 | 293.92 | 1.908s |
| EU-154 | 4012.00 | 1003.37 | 21. | 0. | 0.000 | 2000.00 | 1.915s |
| EU-152 | 4339.95 | 1085.30 | 6. | 8. | 0.004 | 142.59 | 1.984s |
| EU-152 | 4452.25 | 1113.36 | 33. | 0. | 0.000 | 2000.00 | 2.006s |
| BI-214 | 4480.31 | 1120.37 | 22. | 3. | 0.002 | 658.62 | 2.013s |
| CO-60 | 4689.31 | 1172.58 | 7. | 18. | 0.010 | 73.65 | 2.056s |
| BI-214 | 4953.26 | 1238.51 | 28. | 2. | 0.001 | 1459.07 | 2.109s |
| EU-154 | 5098.40 | 1274.76 | 23. | 0. | 0.000 | 2000.00 | 2.137s |
| CO-60 | 5326.80 | 1331.80 | 12. | 5. | 0.003 | 285.18 | 2.183s |
| BI-214 | 5510.07 | 1377.57 | 7. | 6. | 0.003 | 200.20 | 2.217s |
| PA-234 | 5569.29 | 1392.36 | 24. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5627.07 | 1406.80 | 7. | 2. | 0.001 | 652.88 | 2.240s |
| K-40 | 5843.91 | 1460.94 | 5. | 349. | 0.194 | 11.08 | 1.929 |
| BI-212 | 6479.00 | 1619.53 | 13. | 0. | 0.000 | 2000.00 | 2.394s |
| BI-214 | 7063.29 | 1765.40 | 1. | 20. | 0.011 | 46.81 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 4.1161E-02 | | | | 1.39E+09 | |
| | | | 185.72 | 3.935E-02 | @( | 4.984E-02 4.67E+01 5.72E+01 | G K |
| | | | 143.76 | 5.526E-02 | ?(P | 2.348E-01 1.42E+02 1.05E+01 | G |
| | | | 205.31 | 0.000E+00 | - P | 7.395E-01 1.00E+03 4.70E+00 | G |

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Spectrum name: ARS08218.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 163.35 | 3.168E-02 | ?(P | 7.060E-01 | 7.71E+02 | 4.70E+00 G |
| RA-226 | 4.0537E-01 | | | | | | 5.84E+05 |
| | | 186.21 | 4.054E-01 | ?( | 8.534E-01 | 7.52E+01 | 3.64E+00 G K |
| Ra-228 | 4.3803E-01 | | | | | | 2.10E+03 |
| | | 911.07 | 4.565E-01 | ( | 6.230E-02 | 1.36E+01 | 2.90E+01 G |
| | | 968.90 | 4.010E-01 | (P | 3.109E-01 | 2.83E+01 | 1.75E+01 G |
| | | 338.40 | 4.474E-01 | ( | 2.171E-01 | 2.10E+01 | 1.20E+01 G |
| | | 964.60 | 9.577E-02 | - | 7.032E-01 | 1.96E+02 | 5.45E+00 G |
| U-238 | 9.9231E-01 | | | | | | 1.63E+12 |
| | | 63.29 | 6.635E-01 | (P | 1.057E+00 | 5.63E+01 | 3.90E+00 G |
| | | 92.80 | 1.460E+00 | (P | 7.933E-01 | 2.18E+01 | 3.00E+00 G |
| | | 92.38 | 9.451E-01 | &(P | 1.200E+00 | 4.55E+01 | 2.57E+00 G |
| K-40 | 1.1577E+01 | | | | | | 4.68E+11 |
| | | 1460.75 | 1.158E+01 | (P | 4.400E-01 | 5.54E+00 | 1.07E+01 G |
| PB-214 | 3.6118E-01 | | | | | | 5.84E+05 |
| | | 351.92 | 3.592E-01 | (P | 9.217E-02 | 1.33E+01 | 3.58E+01 G |
| | | 295.21 | 3.650E-01 | *( | 2.017E-01 | 2.31E+01 | 1.85E+01 G |
| | | 241.98 | 2.507E-01 | - P | 4.172E-01 | 5.21E+01 | 7.50E+00 G |
| BI-214 | 3.4024E-01 | | | | | | 5.84E+05 |
| | | 609.31 | 3.379E-01 | (P | 1.033E-01 | 1.56E+01 | 4.48E+01 G |
| | | 1764.49 | 5.581E-01 | + P | 2.027E-01 | 2.34E+01 | 1.54E+01 G |
| | | 1120.29 | 5.798E-02 | - | 4.748E-01 | 3.29E+02 | 1.48E+01 G |
| | | 1238.11 | 7.920E-02 | & | 1.433E+00 | 7.30E+02 | 5.86E+00 G |
| | | 768.36 | 3.619E-01 | &( | 1.017E+00 | 1.08E+02 | 4.80E+00 G |
| | | 1377.67 | 5.107E-01 | & P | 1.302E+00 | 1.00E+02 | 3.92E+00 G |
| | | 934.06 | 0.000E+00 | - P | 2.473E+00 | 1.00E+03 | 3.03E+00 G |
| BI-212 | 2.0685E-01 | | | | | | 2.10E+03 |
| | | 727.17 | 1.770E-02 | %( | 5.428E-01 | 1.16E+03 | 1.18E+01 G |
| | | 1620.56 | 0.000E+00 | - | 2.765E+00 | 1.00E+03 | 2.75E+00 G |
| | | 785.42 | 1.323E+00 | ?( | 1.840E+00 | 5.61E+01 | 2.00E+00 G |
| PB-212 | 3.9312E-01 | | | | | | 2.10E+03 |
| | | 238.63 | 3.931E-01 | (P | 6.623E-02 | 8.88E+00 | 4.31E+01 G |
| | | 300.09 | -2.401E-01 | & | 1.212E+00 | 1.80E+02 | 3.27E+00 G |
| TL-208 | 1.1245E-01 | | | | | | 2.10E+03 |
| | | 583.14 | 1.124E-01 | ?( | 5.416E-02 | 2.20E+01 | 8.60E+01 G |
| | | 510.72 | 3.140E-01 | + P | 3.400E-01 | 3.50E+01 | 2.25E+01 G |
| | | 860.47 | 0.000E+00 | & P | 5.096E-01 | 1.00E+03 | 1.20E+01 G |
| | | 277.36 | 2.125E-02 | - P | 5.529E-01 | 8.85E+02 | 6.50E+00 G |
| | | 763.30 | -6.355E-02 | % | 3.154E+00 | 1.83E+03 | 1.70E+00 G |

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Spectrum name: ARS08218.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PA-234 | 2.3454E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 5.140E-02 | ( | 1.074E-01 | 7.23E+01 | 2.51E+01 G |
| | | 946.00 | -5.459E-02 | - | 2.923E-01 | 2.06E+02 | 2.00E+01 G |
| | | 131.28 | -3.471E-02 | & | 1.637E-01 | 1.60E+02 | 2.00E+01 G |
| | | 94.67 | -7.338E-02 | - | 2.403E-01 | 1.12E+02 | 1.55E+01 G |
| | | 883.24 | -6.326E-02 | - | 5.117E-01 | 3.12E+02 | 1.20E+01 G |
| | | 926.70 | 2.182E-01 | &(P | 5.352E-01 | 9.71E+01 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | - P | 4.176E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | - P | 3.574E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | - P | 6.722E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 3.688E-01 | ?(P | 2.792E-01 | 3.46E+01 | 7.80E+00 G |
| | | 880.51 | 4.660E-01 | ?(P | 6.510E-01 | 5.75E+01 | 6.50E+00 G |
| | | 226.87 | 0.000E+00 | & P | 5.406E-01 | 1.00E+03 | 6.50E+00 G |
| | | 831.10 | 0.000E+00 | - | 1.139E+00 | 1.00E+03 | 5.60E+00 G |
| | | 808.10 | 6.886E-01 | ?( | 3.384E-01 | 2.58E+01 | 4.90E+00 G |
| | | 99.70 | 6.169E-02 | - | 6.208E-01 | 3.35E+02 | 4.70E+00 G |
| | | 699.10 | -6.625E-02 | - | 1.430E+00 | 8.20E+02 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 2.211E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | - P | 2.223E+00 | 1.00E+03 | 3.90E+00 G |
| CO-60 | 5.4302E-02 | | | | | 1.93E+03 | |
| | | 1173.24 | 5.430E-02 | ?(P | 4.383E-02 | 3.68E+01 | 9.99E+01 K |
| | | 1332.50 | 1.752E-02 | - | 6.119E-02 | 1.43E+02 | 1.00E+02 K |
| EU-152 | 4.4687E-02 | | | | | 4.64E+03 | |
| | | 40.12 | -3.816E-02 | ?( | 2.012E-01 | 1.71E+02 | 3.00E+01 G |
| | | 121.78 | -3.687E-02 | + | 1.034E-01 | 9.61E+01 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | + P | 1.413E-01 | 1.00E+03 | 2.70E+01 G |
| | | 1408.08 | 2.793E-02 | ?(P | 2.479E-01 | 3.26E+02 | 2.12E+01 G |
| | | 39.52 | -2.914E-02 | & | 3.913E-01 | 4.29E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | + P | 4.286E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 0.000E+00 | + | 6.173E-01 | 1.00E+03 | 1.36E+01 G |
| | | 778.90 | -4.218E-02 | + | 4.187E-01 | 3.70E+02 | 1.30E+01 G |
| | | 1085.80 | 2.151E-01 | ?(P | 3.851E-01 | 7.13E+01 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 5.882E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | 9.800E-02 | &( | 4.312E-01 | 1.52E+02 | 7.62E+00 G |
| | | 867.39 | 2.077E-01 | ?( | 1.314E+00 | 2.43E+02 | 4.18E+00 G |
| EU-154 | 8.3605E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 1.893E-02 | (P | 5.909E-02 | 1.06E+02 | 4.05E+01 G |
| | | 1274.80 | 0.000E+00 | & | 2.250E-01 | 1.00E+03 | 3.55E+01 G |
| | | 723.30 | 1.003E-01 | &( | 1.330E-01 | 5.38E+01 | 1.97E+01 G |
| | | 1004.80 | 0.000E+00 | - P | 3.596E-01 | 1.00E+03 | 1.76E+01 G |
| | | 43.00 | -1.108E-01 | + | 4.237E-01 | 1.29E+02 | 1.31E+01 G |
| | | 873.20 | 0.000E+00 | - P | 5.084E-01 | 1.00E+03 | 1.13E+01 G |
| | | 996.30 | 1.142E-01 | ?( | 4.327E-01 | 1.47E+02 | 1.07E+01 G |
| | | 42.31 | 1.017E-01 | ?(P | 6.373E-01 | 2.07E+02 | 7.30E+00 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | | Comments |
|---|---|---|---|---|---|---|---|
| | | 248.04 | 2.407E-01 | ?( | 4.498E-01 | 6.70E+01 | 6.60E+00 G |
| | | 591.70 | 0.000E+00 | - P | 1.027E+00 | 1.00E+03 | 4.60E+00 G |
| | | 48.70 | 9.801E-02 | ?(P | 1.059E+00 | 3.53E+02 | 4.20E+00 G |
| | | 756.70 | 2.619E-01 | ?( | 8.742E-01 | 1.24E+02 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.12 | 65. | -3. | -0.002 | 857.65 | -2.914E-02 | |
| EU-152 | 39.21 | 62. | -8. | -0.004 | 341.24 | -3.816E-02 | |
| EU-154 | 42.27 | 41. | 5. | 0.003 | 413.17 | 1.017E-01 | P |
| EU-154 | 43.08 | 62. | -10. | -0.006 | 258.68 | -1.108E-01 | |
| EU-154 | 48.14 | 54. | 3. | 0.002 | 705.38 | 9.801E-02 | P |
| U-238 | 63.30 | 85. | 29. | 0.016 | 112.61 | 6.635E-01 | P |
| U-238 | 92.84 | 77. | 34. | 0.019 | 91.00 | 9.451E-01 | P |
| U-238 | 92.85 | 44. | 62. | 0.034 | 43.55 | 1.460E+00 | P |
| PA-234 | 93.39 | 116. | -16. | -0.009 | 224.67 | -7.338E-02 | |
| PA-234 | 98.60 | 60. | 18. | 0.010 | 144.70 | 5.140E-02 | |
| PA-234 | 98.89 | 71. | 4. | 0.002 | 671.00 | 6.169E-02 | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | |
|---|---|---|---|---|---|---|---|---|
| EU-152 | 122.75 | 76. | -16. | -0.009 | 192.28 | -3.687E-02 | | |
| EU-154 | 123.04 | 46. | 11. | 0.006 | 212.74 | 1.893E-02 | | P |
| PA-234 | 131.12 | 88. | -10. | -0.005 | 319.64 | -3.471E-02 | | |
| U-235 | 144.06 | 45. | 8. | 0.004 | 284.87 | 5.526E-02 | | P |
| U-235 | 162.83 | 76. | 2. | 0.001 | 1542.29 | 3.168E-02 | | P |
| U-235 | 185.58 | 48. | 28. | 0.015 | 93.49 | 3.935E-02 | | |
| RA-226 | 185.69 | 57. | 18. | 0.010 | 150.43 | 4.054E-01 | | |
| EU-152 | 244.60 | 44. | 8. | 0.004 | 304.48 | 9.800E-02 | | |
| EU-154 | 247.71 | 35. | 16. | 0.009 | 133.92 | 2.407E-01 | | |
| PA-234 | 699.29 | 40. | -2. | -0.001 | 1640.33 | -6.625E-02 | | |
| EU-154 | 723.16 | 4. | 10. | 0.005 | 107.66 | 1.003E-01 | | |
| EU-154 | 756.55 | 9. | 5. | 0.003 | 247.55 | 2.619E-01 | | |
| EU-152 | 779.11 | 22. | -2. | -0.001 | 740.81 | -4.218E-02 | | |
| BI-212 | 785.93 | 9. | 12. | 0.007 | 112.18 | 1.323E+00 | | |
| PA-234 | 808.30 | 0. | 15. | 0.008 | 51.64 | 6.886E-01 | | |
| EU-152 | 867.53 | 19. | 4. | 0.002 | 485.02 | 2.077E-01 | | |
| PA-234 | 880.09 | 10. | 13. | 0.007 | 114.97 | 4.660E-01 | | P |
| PA-234 | 882.71 | 24. | -3. | -0.002 | 623.37 | -6.326E-02 | | |
| PA-234 | 926.77 | 20. | 10. | 0.005 | 194.19 | 2.182E-01 | | P |
| PA-234 | 945.52 | 19. | -4. | -0.002 | 412.12 | -5.459E-02 | | |
| PA-234 | 949.00 | 2. | 11. | 0.006 | 69.18 | 3.688E-01 | | P |
| EU-154 | 996.11 | 10. | 5. | 0.003 | 293.92 | 1.142E-01 | | |
| EU-152 | 1085.30 | 6. | 8. | 0.004 | 142.59 | 2.151E-01 | | P |
| CO-60 | 1172.58 | 7. | 18. | 0.010 | 73.65 | 5.430E-02 | | P |
| CO-60 | 1331.80 | 12. | 5. | 0.003 | 285.18 | 1.752E-02 | | |
| EU-152 | 1406.80 | 7. | 2. | 0.001 | 652.88 | 2.793E-02 | | P |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 4.1161E-02 | 3.8481E-02 | 3.8597E-02 | 0.498E-01 |
| RA-226 | #A | 4.0537E-01 | 6.0980E-01 | 6.1030E-01 | 0.853E+00 |
| Ra-228 | | 4.3803E-01 | 1.1044E-01 | 1.1414E-01 | 0.623E-01 |
| Am-241 | #A | 0.0000E+00 | 3.3739E-02 | 3.3739E-02 | 0.130E+00 |
| PB-210 | #A | 0.0000E+00 | 5.2169E-01 | 5.2170E-01 | 0.143E+01 |
| U-238 | #A | 9.9231E-01 | 4.3218E-01 | 4.3929E-01 | 0.106E+01 |
| K-40 | | 1.1577E+01 | 1.2824E+00 | 1.4977E+00 | 0.440E+00 |
| PB-214 | | 3.6118E-01 | 9.5904E-02 | 1.0073E-01 | 0.922E-01 |
| BI-214 | | 3.4024E-01 | 1.0616E-01 | 1.0826E-01 | 0.103E+00 |
| BI-212 | #A | 2.0685E-01 | 2.3203E-01 | 2.3243E-01 | 0.543E+00 |
| PB-212 | | 3.9312E-01 | 6.9835E-02 | 7.5404E-02 | 0.662E-01 |
| TL-208 | | 1.1245E-01 | 4.9540E-02 | 5.0079E-02 | 0.542E-01 |
| PA-234 | # | 2.3454E-01 | 1.2111E-01 | 1.2235E-01 | 0.107E+00 |
| CS-137 | #A | 0.0000E+00 | 4.5892E-03 | 4.5893E-03 | 0.683E-01 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 9:23:32 AM
Spectrum name: ARS08218.An1

| | | | | | |
|---|---|---|---|---|---|
| CO-60 | #H | 5.4302E-02 | 3.9994E-02 | 4.0057E-02 | 0.438E-01 |
| EU-152 | #A | 4.4687E-02 | 6.3721E-02 | 6.3920E-02 | 0.201E+00 |
| EU-154 | #C | 8.3605E-02 | 9.0006E-02 | 9.0191E-02 | 0.591E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 1.322E+01 pCi/g

The library has energies which are not separable.

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00563-18 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | ARS1-16-00670-014 | | |
| AnalysisBatch | ARS1-B16-00563 | Geometry | 250mL Tuna Can 1748- |
| SDG | ARS1-16-00670 | Fraction | 014 |
| AnalysisCode | GAM-A-025 | Run | 1 |
| Library | ITSI.Lib | Detector ID | 1 |
| | | Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 3.7924E-02 | pCi/g | 4.0377E-02 | 6.5400E-02 | 3.2700E-02 | | | |
| **RA-226** | 5.7957E-01 | pCi/g | 6.1606E-01 | 1.0400E+00 | 5.2000E-01 | | | |
| **RA-228** | 3.0119E-01 | pCi/g | 1.4320E-01 | 2.5700E-01 | 1.2850E-01 | | | |
| **AM-241** | -9.7222E-03 | pCi/g | 6.9461E-02 | 1.2100E-01 | 6.0500E-02 | | | |
| **PB-210** | 3.3746E-01 | pCi/g | 6.8073E-01 | 1.2800E+00 | 6.4000E-01 | | | |
| **U-238** | 6.3936E-01 | pCi/g | 4.6583E-01 | 1.3100E+00 | 6.5500E-01 | | | |
| **K-40** | 1.3663E+01 | pCi/g | 2.0764E+00 | 1.0800E+00 | 5.4000E-01 | | | |
| **PB-214** | 3.2602E-01 | pCi/g | 1.0233E-01 | 1.1700E-01 | 5.8500E-02 | | | |
| **BI-214** | 2.1997E-01 | pCi/g | 8.9772E-02 | 1.1900E-01 | 5.9500E-02 | | | |
| **BI-212** | 1.1686E-01 | pCi/g | 2.3452E-01 | 4.1900E-01 | 2.0950E-01 | | | |
| **PB-212** | 3.9509E-01 | pCi/g | 9.5021E-02 | 9.9500E-02 | 4.9750E-02 | | | |
| **TL-208** | 1.4705E-01 | pCi/g | 6.2778E-02 | 6.5900E-02 | 3.2950E-02 | | | |
| **PA-234** | 5.3699E-02 | pCi/g | 7.8845E-02 | 1.1000E-01 | 5.5000E-02 | | | |
| **CS-137** | 2.4571E-03 | pCi/g | 3.3556E-02 | 6.2300E-02 | 3.1150E-02 | | | |
| **CO-60** | -3.8972E-03 | pCi/g | 1.5589E-01 | 1.0300E-01 | 5.1500E-02 | | | |
| **EU-152** | 4.0594E-02 | pCi/g | 5.4276E-02 | 2.3500E-01 | 1.1750E-01 | | | |
| **EU-154** | 2.5394E-02 | pCi/g | 4.2622E-02 | 8.2300E-02 | 4.1150E-02 | | | |
| **Total Gamma** | 1.6886E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.9346E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 09:35:21
American Radiation Services     Spectrum name: ARS05251.An1

Sample description
     Batch ID:  16-00563-18
     SDG:  ARS1-16-00670-014  Tech:  WJS

Spectrum Filename: C:\User\ARS05251.An1

Acquisition information
       Start time:                4/19/2016 09:05:19
       Live time:               1800
       Real time:               1801
       Dead time:                  0.06 %
       Detector ID:                   2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.7322E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.7322E+02) =
                                  2.6794E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:35:21
American Radiation Services Spectrum name: ARS05251.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1393

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.80 | 15. | 66.61 | 0.75 | 2.213E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 9.148E-02 | EU152 |
| 42.90 | 11. | 83.85 | 0.75 | 2.481E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.82 | 9. | 32.96 | 0.75 | 2.755E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.42 | 3. | 99.28 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.85 | 62. | 22.87 | 0.79 | 4.760E-02 | | | | |
| 77.12 | 91. | 16.54 | 0.79 | 4.857E-02 | | | | |
| 92.83 | 36. | 28.52 | 0.82 | 5.211E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.86 | 38. | 31.03 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 121.70 | 6. | 199.57 | 0.87 | 5.064E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 163.03 | 12. | 72.65 | 0.34 | 4.445E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | 1.861E-01 | U235 |
| 185.79 | 21. | 34.86 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| | | | | | 185.72 | 57.200 | PBC<MDA | U235 |
| 185.83 | 22. | 36.49 | 0.97 | 4.120E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| 205.37 | 2. | 315.55 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| | | | | | 205.31 | 4.700 | PBC<MDA | U235 |
| 227.35 | 13. | 71.42 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.73 | 160. | 10.49 | 1.05 | 3.535E-02 | 238.63 | 43.100 | 3.951E-01 | PB212 |
| 241.76 | 3. | 412.63 | 1.06 | 3.505E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 248.13 | 3. | 321.68 | 1.06 | 3.450E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 277.51 | 4. | 163.79 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.10 | 52. | 22.27 | 1.07 | 3.087E-02 | 295.21 | 18.500 | 3.651E-01 | PB214 |
| 299.32 | 7. | 101.57 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.54 | 34. | 29.29 | 0.56 | 2.826E-02 | 338.40 | 12.010 | 4.058E-01 | Ra228 |
| 352.03 | 84. | 14.16 | 0.90 | 2.755E-02 | 351.92 | 35.800 | 3.058E-01 | PB214 |
| 510.93 | 43. | 16.95 | 0.67 | 2.149E-02 | 510.72 | 22.500 | 3.572E-01 | TL208 |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:35:21
American Radiation Services Spectrum name: ARS05251.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 583.07 | 62. | 19.81 | 1.23 | 1.957E-02 | 583.14 | 86.000 | 1.470E-01 | TL208 |
| 609.61 | 46. | 17.37 | 1.56 | 1.895E-02 | 609.31 | 44.791 | 2.172E-01 | BI214 |
| 661.97 | 1. | 397.45 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 723.67 | -1. | 786.95 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 757.04 | 2. | 289.30 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 763.04 | 6. | 99.24 | 1.74 | 1.592E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 769.42 | 1. | 315.72 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 785.22 | 7. | 100.25 | 1.76 | 1.556E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 882.80 | 1. | 469.90 | 1.86 | 1.407E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 898.58 | 3. | 191.57 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.61 | 13. | 45.90 | 1.89 | 1.368E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 933.83 | 3. | 286.40 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 964.00 | 0. | 616.44 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 968.90 | 26. | 27.97 | 1.94 | 1.292E-02 | 968.90 | 17.460 | 4.660E-01 | Ra228 |
| 1120.20 | 3. | 226.36 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1333.53 | 0. | 474.25 | 2.23 | 9.218E-03 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1377.86 | 4. | 112.33 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1461.42 | 299. | 6.11 | 1.86 | 8.224E-03 | 1460.75 | 10.700 | 1.366E+01 | K40 |
| 1764.72 | 5. | 58.07 | 2.43 | 6.316E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 299.06 | 74.86 | 81. | 49. | 0.027 | 60.97 | 0.860 | TH-234 | s |
| 308.15 | 77.14 | 73. | 88. | 0.049 | 35.11 | 0.922 | PB-212 | |
| 651.96 | 163.03 | 37. | 7. | 0.004 | 277.48 | 0.338 | U-235 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.71 | 39.80 | 45. | 15. | 0.009 | 133.23 | 0.750 |
| EU-154 | 168.76 | 42.31 | 64. | 0. | 0.000 | 2000.00 | 0.750s |
| EU-154 | 171.11 | 42.90 | 37. | 11. | 0.006 | 167.70 | 0.750s |
| EU-152 | 182.14 | 45.65 | 58. | -7. | -0.004 | 311.12 | 0.750s |
| PB-210 | 186.83 | 46.82 | 48. | 9. | 0.005 | 65.92 | 0.750s |
| EU-154 | 193.48 | 48.49 | 53. | -6. | -0.003 | 348.22 | 0.750s |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:35:21
American Radiation Services Spectrum name: ARS05251.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Am-241 | 238.57 | 59.75 | 66. | -3. | -0.002 | 714.43 | 0.766s |
| U-238 | 253.27 | 63.42 | 109. | 3. | 0.002 | 198.57 | 0.772s |
| U-238 | 371.09 | 92.86 | 80. | 38. | 0.021 | 62.06 | 0.820s |
| U-238 | 370.98 | 92.83 | 75. | 36. | 0.020 | 57.05 | 0.821s |
| EU-152 | 486.53 | 121.70 | 59. | 6. | 0.003 | 399.13 | 0.868s |
| EU-154 | 489.88 | 122.54 | 70. | -12. | -0.007 | 201.02 | 0.870 |
| U-235 | 652.44 | 163.15 | 42. | 3. | 0.002 | 334.87 | 0.934s |
| U-235 | 743.03 | 185.79 | 59. | 21. | 0.012 | 69.72 | 0.969 |
| RA-226 | 743.20 | 185.83 | 60. | 22. | 0.012 | 72.99 | 0.970 |
| U-235 | 821.42 | 205.37 | 53. | 2. | 0.001 | 631.10 | 1.000s |
| PA-234 | 909.39 | 227.35 | 38. | 13. | 0.007 | 142.84 | 1.033s |
| PB-212 | 954.96 | 238.73 | 56. | 150. | 0.083 | 20.98 | 1.048 |
| PB-214 | 967.09 | 241.76 | 125. | 3. | 0.002 | 825.25 | 1.056s |
| EU-154 | 992.59 | 248.13 | 46. | 3. | 0.002 | 643.35 | 1.065s |
| TL-208 | 1110.16 | 277.51 | 30. | 4. | 0.002 | 327.58 | 1.109s |
| PB-214 | 1180.56 | 295.10 | 42. | 52. | 0.029 | 44.54 | 1.075 |
| PB-212 | 1197.47 | 299.32 | 34. | 7. | 0.004 | 203.15 | 1.142 |
| Ra-228 | 1354.44 | 338.54 | 26. | 34. | 0.019 | 58.59 | 0.556s |
| EU-152 | 1378.66 | 344.59 | 43. | -5. | -0.003 | 392.82 | 1.206s |
| PB-214 | 1408.45 | 352.03 | 31. | 75. | 0.042 | 28.32 | 0.895s |
| TL-208 | 2044.49 | 510.93 | 50. | 43. | 0.024 | 33.90 | 0.668s |
| PA-234 | 2282.87 | 570.48 | 26. | -4. | -0.002 | 655.28 | 1.509s |
| TL-208 | 2333.27 | 583.07 | 28. | 62. | 0.034 | 39.63 | 1.233s |
| BI-214 | 2439.49 | 609.61 | 23. | 46. | 0.025 | 34.74 | 1.558s |
| CS-137 | 2649.09 | 661.97 | 20. | 1. | 0.001 | 794.90 | 1.621s |
| PA-234 | 2793.98 | 698.17 | 26. | -4. | -0.002 | 367.01 | 1.664s |
| EU-154 | 2890.98 | 722.40 | 20. | -3. | -0.002 | 402.74 | 1.692s |
| PA-234 | 2933.17 | 732.94 | 27. | -3. | -0.002 | 438.11 | 1.703s |
| EU-154 | 3029.63 | 757.04 | 17. | 2. | 0.001 | 578.60 | 1.729s |
| TL-208 | 3053.67 | 763.04 | 13. | 6. | 0.003 | 198.47 | 1.737 |
| BI-214 | 3079.21 | 769.42 | 15. | 1. | 0.001 | 631.44 | 1.742s |
| BI-212 | 3142.45 | 785.22 | 20. | 7. | 0.004 | 200.49 | 1.760s |
| PA-234 | 3232.61 | 807.74 | 24. | -4. | -0.002 | 329.17 | 1.785s |
| PA-234 | 3324.14 | 830.61 | 20. | -4. | -0.002 | 310.70 | 1.809s |
| EU-154 | 3495.33 | 873.38 | 26. | -5. | -0.003 | 380.83 | 1.852s |
| PA-234 | 3533.08 | 882.80 | 21. | 1. | 0.001 | 939.81 | 1.862s |
| PA-234 | 3596.21 | 898.58 | 24. | 3. | 0.002 | 383.15 | 1.878s |
| Ra-228 | 3648.39 | 911.61 | 24. | 13. | 0.007 | 91.80 | 1.890s |
| PA-234 | 3708.79 | 926.70 | 27. | 0. | 0.000 | 2000.00 | 1.905s |
| BI-214 | 3737.32 | 933.83 | 26. | 3. | 0.001 | 572.79 | 1.912 |
| PA-234 | 3797.38 | 948.83 | 25. | -3. | -0.002 | 536.34 | 1.926s |
| EU-152 | 3858.11 | 964.00 | 88. | 0. | 0.000 | 1232.88 | 1.940D |
| Ra-228 | 3860.51 | 964.60 | 7. | 0. | 0.000 | 282.84 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 16. | 26. | 0.015 | 55.94 | 1.945D |
| EU-152 | 4349.38 | 1086.72 | 21. | -1. | 0.000 | 1639.30 | 2.048s |
| BI-214 | 4483.40 | 1120.20 | 23. | 3. | 0.002 | 452.72 | 2.077s |
| BI-214 | 4950.24 | 1236.82 | 36. | -3. | -0.002 | 609.94 | 2.167 |
| EU-154 | 5102.63 | 1274.88 | 18. | -3. | -0.002 | 387.86 | 2.192s |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:35:21
American Radiation Services Spectrum name: ARS05251.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 5514.85 | 1377.86 | 9. | 4. | 0.002 | 224.66 | 2.259 |
| EU-152 | 5635.85 | 1408.08 | 16. | 0. | 0.000 | 2000.00 | 2.276 |
| K-40 | 5849.40 | 1461.42 | 20. | 299. | 0.166 | 12.22 | 1.865 |
| BI-212 | 6481.92 | 1619.42 | 10. | -3. | -0.001 | 362.06 | 2.381s |
| BI-214 | 7063.62 | 1764.72 | 6. | 5. | 0.003 | 116.15 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 3.7924E-02 | | | | | |
| | | | 185.72 | 3.626E-02 | (P | 6.544E-02 3.49E+01 G K | |
| | | | 143.76 | -9.159E-03 | & P | 2.982E-01 1.48E+03 G | |
| | | | 205.31 | 3.499E-02 | &(P | 8.042E-01 3.16E+02 G | |
| | | | 163.35 | 6.116E-02 | ?(P | 6.365E-01 1.67E+02 G | |
| RA-226 | | 5.7957E-01 | | | | | |
| | | | 186.21 | 5.796E-01 | (P | 1.039E+00 3.65E+01 G K | |
| Ra-228 | | 3.0119E-01 | | | | | |
| | | | 911.07 | 1.336E-01 | ?(P | 2.572E-01 4.59E+01 G | |
| | | | 968.90 | 4.660E-01 | (P | 3.792E-01 2.80E+01 G | |
| | | | 338.40 | 4.058E-01 | (P | 3.125E-01 2.93E+01 G | |
| | | | 964.60 | 0.000E+00 | } | 8.729E-01 1.41E+02 G | |
| Am-241 | T | -9.7222E-03 | | | | | |
| | | | 59.54 | -9.722E-03 | &( | 1.211E-01 3.57E+02 G K | |
| PB-210 | | 3.3746E-01 | | | | | |
| | | | 46.52 | 3.375E-01 | (P | 1.281E+00 3.30E+01 G | |
| U-238 | | 6.3936E-01 | | | | | |
| | | | 63.29 | 7.494E-02 | (P | 1.306E+00 9.93E+01 G | |
| | | | 92.80 | 9.352E-01 | @(P | 1.109E+00 2.85E+01 G | |
| | | | 92.38 | 1.150E+00 | &(P | 1.336E+00 3.10E+01 G | |
| K-40 | | 1.3663E+01 | | | | | |
| | | | 1460.75 | 1.366E+01 | (P | 1.080E+00 6.11E+00 G | |
| PB-214 | | 3.2602E-01 | | | | | |
| | | | 351.92 | 3.058E-01 | (P | 1.169E-01 1.42E+01 G | |
| | | | 295.21 | 3.651E-01 | (P | 2.323E-01 2.23E+01 G | |
| | | | 241.98 | 5.313E-02 | - P | 8.374E-01 4.13E+02 G | |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 09:35:21
American Radiation Services Spectrum name: ARS05251.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-214 | 2.1997E-01 | | | | | | |
| | | 609.31 | 2.172E-01 | ?(P | 1.187E-01 | 1.74E+01 | G |
| | | 1764.49 | 2.209E-01 | ?(P | 5.998E-01 | 5.81E+01 | G |
| | | 1120.29 | 7.454E-02 | & | 6.038E-01 | 2.26E+02 | G |
| | | 1238.11 | -2.235E-01 | - P | 2.093E+00 | 3.05E+02 | G |
| | | 768.36 | 7.857E-02 | - P | 1.095E+00 | 3.16E+02 | G |
| | | 1377.67 | 4.949E-01 | + | 1.967E+00 | 1.12E+02 | G |
| | | 934.06 | 2.560E-01 | ( | 2.627E+00 | 2.86E+02 | G |
| BI-212 | 1.1686E-01 | | | | | | |
| | | 727.17 | -1.183E-02 | %(P | 4.186E-01 | 7.87E+02 | G |
| | | 1620.56 | -5.456E-01 | + P | 3.523E+00 | 1.81E+02 | G |
| | | 785.42 | 8.761E-01 | &(P | 3.025E+00 | 1.00E+02 | G |
| PB-212 | 3.9509E-01 | | | | | | |
| | | 238.63 | 3.951E-01 | (P | 9.949E-02 | 1.05E+01 | G |
| | | 300.09 | 2.854E-01 | - P | 1.197E+00 | 1.02E+02 | G |
| TL-208 | 1.4705E-01 | | | | | | |
| | | 583.14 | 1.470E-01 | (P | 6.594E-02 | 1.98E+01 | G |
| | | 510.72 | 3.572E-01 | + P | 2.969E-01 | 1.70E+01 | G |
| | | 860.47 | -8.604E-03 | % P | 5.569E-01 | 4.37E+03 | G |
| | | 277.36 | 6.842E-02 | - P | 5.432E-01 | 1.64E+02 | G |
| | | 763.30 | 8.533E-01 | + | 2.934E+00 | 9.92E+01 | G |
| PA-234 | 5.3699E-02 | | | | | | |
| | | 98.44 | -1.742E-03 | &(P | 1.104E-01 | 1.68E+03 | G |
| | | 946.00 | 3.370E-03 | % | 3.531E-01 | 2.82E+03 | G |
| | | 131.28 | -1.273E-02 | & P | 1.646E-01 | 9.82E+02 | G |
| | | 94.67 | -2.630E-03 | % | 2.202E-01 | 2.39E+03 | G |
| | | 883.24 | 2.807E-02 | ?(P | 5.793E-01 | 4.70E+02 | G |
| | | 926.70 | 0.000E+00 | & | 7.342E-01 | 1.00E+03 | G |
| | | 569.26 | -7.603E-02 | + P | 5.181E-01 | 3.28E+02 | G |
| | | 111.00 | 4.561E-03 | % | 2.849E-01 | 1.74E+03 | G |
| | | 733.00 | -1.000E-01 | + | 7.779E-01 | 2.19E+02 | G |
| | | 949.00 | -1.210E-01 | + P | 1.014E+00 | 2.68E+02 | G |
| | | 880.51 | -3.139E-04 | % P | 1.191E+00 | 1.00E+03 | G |
| | | 226.87 | 2.165E-01 | ?(P | 5.304E-01 | 7.14E+01 | G |
| | | 831.10 | -2.080E-01 | + | 1.143E+00 | 1.55E+02 | G |
| | | 808.10 | -2.397E-01 | + | 1.391E+00 | 1.65E+02 | G |
| | | 99.70 | -8.247E-03 | % | 5.346E-01 | 1.81E+03 | G |
| | | 699.10 | -2.155E-01 | + P | 1.356E+00 | 1.84E+02 | G |
| | | 898.60 | 2.140E-01 | &(P | 1.847E+00 | 1.92E+02 | G |
| | | 1394.10 | 4.033E-02 | % | 1.667E+00 | 1.03E+03 | G |

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American Radiation Services Spectrum name: ARS05251.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CS-137 | 2.4571E-03 | | | | | | |
| | | 661.66 | 2.457E-03 | ?(P | 6.228E-02 | 3.97E+02 | G |
| CO-60 | -3.8972E-03 | | | | | | |
| | | 1173.24 | -3.897E-03 | %(P | 1.033E-01 | 1.00E+03 | K |
| | | 1332.50 | 1.129E-03 | % P | 7.490E-02 | 4.74E+02 | K |
| EU-152 | 4.0594E-02 | | | | | | |
| | | 40.12 | -6.319E-03 | %( | 2.347E-01 | 1.05E+03 | G |
| | | 121.78 | 1.512E-02 | ?( | 1.045E-01 | 2.00E+02 | G |
| | | 344.30 | -2.578E-02 | + | 1.768E-01 | 1.96E+02 | G |
| | | 1408.08 | 0.000E+00 | - | 4.747E-01 | 1.00E+03 | G |
| | | 39.52 | 1.751E-01 | ( | 3.860E-01 | 6.66E+01 | G |
| | | 964.00 | 0.000E+00 | } P | 9.858E-01 | 6.16E+02 | G |
| | | 1112.07 | 1.125E-03 | % | 6.614E-01 | 1.59E+04 | G |
| | | 778.90 | 3.404E-03 | % | 4.614E-01 | 3.64E+03 | G |
| | | 1085.80 | -2.728E-02 | + | 8.215E-01 | 8.20E+02 | G |
| | | 45.40 | -1.200E-01 | + | 6.426E-01 | 1.56E+02 | G |
| | | 244.67 | -5.317E-03 | % | 4.737E-01 | 2.47E+03 | G |
| | | 867.39 | -7.501E-02 | % P | 1.142E+00 | 6.93E+02 | G |
| EU-154 | 2.5394E-02 | | | | | | |
| | | 123.10 | -2.423E-02 | &( | 8.229E-02 | 1.01E+02 | G |
| | | 1274.80 | -3.799E-02 | + | 2.643E-01 | 1.94E+02 | G |
| | | 723.30 | -4.024E-02 | + | 2.901E-01 | 2.01E+02 | G |
| | | 1004.80 | 9.537E-05 | % P | 4.248E-01 | 1.55E+03 | G |
| | | 43.00 | 1.355E-01 | ( | 3.828E-01 | 8.39E+01 | G |
| | | 873.20 | -1.191E-01 | + P | 6.587E-01 | 1.90E+02 | G |
| | | 996.30 | -4.515E-03 | % | 6.675E-01 | 3.95E+03 | G |
| | | 42.31 | 0.000E+00 | - | 9.103E-01 | 1.00E+03 | G |
| | | 248.04 | 5.377E-02 | &( | 6.087E-01 | 3.22E+02 | G |
| | | 591.70 | -1.570E-02 | % | 1.168E+00 | 2.03E+03 | G |
| | | 48.70 | -2.019E-01 | + | 1.217E+00 | 1.74E+02 | G |
| | | 756.70 | 1.175E-01 | ?(P | 1.334E+00 | 2.89E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 3.7924E-02 | 4.0252E-02 | 4.0377E-02 | 0.654E-01 |
| RA-226 #A | 5.7957E-01 | 6.1459E-01 | 6.1606E-01 | 0.104E+01 |
| Ra-228 | 3.0119E-01 | 1.4182E-01 | 1.4320E-01 | 0.257E+00 |
| Am-241 #A | -9.7222E-03 | 6.9459E-02 | 6.9461E-02 | 0.121E+00 |
| PB-210 #A | 3.3746E-01 | 6.7991E-01 | 6.8073E-01 | 0.128E+01 |
| U-238 #A | 6.3936E-01 | 4.6315E-01 | 4.6583E-01 | 0.131E+01 |
| K-40 | 1.3663E+01 | 1.7170E+00 | 2.0764E+00 | 0.108E+01 |
| PB-214 | 3.2602E-01 | 9.7086E-02 | 1.0233E-01 | 0.117E+00 |
| BI-214 | 2.1997E-01 | 8.8323E-02 | 8.9772E-02 | 0.119E+00 |
| BI-212 #A | 1.1686E-01 | 2.3437E-01 | 2.3452E-01 | 0.419E+00 |
| PB-212 | 3.9509E-01 | 8.8386E-02 | 9.5021E-02 | 0.995E-01 |
| TL-208 | 1.4705E-01 | 6.1765E-02 | 6.2778E-02 | 0.659E-01 |
| PA-234 #A | 5.3699E-02 | 7.8744E-02 | 7.8845E-02 | 0.110E+00 |
| CS-137 #A | 2.4571E-03 | 3.3556E-02 | 3.3556E-02 | 0.623E-01 |
| CO-60 #B | -3.8972E-03 | 1.5589E-01 | 1.5589E-01 | 0.103E+00 |
| EU-152 A | 4.0594E-02 | 5.4082E-02 | 5.4276E-02 | 0.235E+00 |
| EU-154 #A | 2.5394E-02 | 4.2587E-02 | 4.2622E-02 | 0.823E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 09:35:21
American Radiation Services  Spectrum name: ARS05251.An1

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 1085.6 to 1998.6 keV) | 1.509E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00563-19 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-015 |
| AnalysisBatch | ARS1-B16-00563 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | tuna can solid, 250 |
| Fraction | 015 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 4.7127E-02 | pCi/g | 9.5699E-02 | 3.6700E-01 | 1.8350E-01 | | | |
| RA-226 | 9.9070E-01 | pCi/g | 6.4230E-01 | 9.7800E-01 | 4.8900E-01 | | | |
| RA-228 | 2.2355E-01 | pCi/g | 1.4793E-01 | 2.6000E-01 | 1.3000E-01 | | | |
| AM-241 | 7.0426E-02 | pCi/g | 6.1080E-02 | 9.6300E-02 | 4.8150E-02 | | | |
| PB-210 | -3.9269E-01 | pCi/g | 2.2569E+00 | 1.9800E+00 | 9.9000E-01 | | | |
| U-238 | 3.3728E-01 | pCi/g | 5.8820E-01 | 1.4200E+00 | 7.1000E-01 | | | |
| K-40 | 1.1696E+01 | pCi/g | 1.6123E+00 | 4.3000E-01 | 2.1500E-01 | | | |
| PB-214 | 2.5280E-01 | pCi/g | 9.0583E-02 | 1.4600E-01 | 7.3000E-02 | | | |
| BI-214 | 1.9050E-01 | pCi/g | 1.0087E-01 | 1.4800E-01 | 7.4000E-02 | | | |
| BI-212 | 1.3278E-01 | pCi/g | 2.9431E-01 | 5.2200E-01 | 2.6100E-01 | | | |
| PB-212 | 2.7998E-01 | pCi/g | 9.3001E-02 | 1.1600E-01 | 5.8000E-02 | | | |
| TL-208 | 1.0391E-01 | pCi/g | 4.7863E-02 | 7.0800E-02 | 3.5400E-02 | | | |
| PA-234 | 5.3701E-02 | pCi/g | 1.1522E-01 | 1.6200E-01 | 8.1000E-02 | | | |
| CS-137 | 9.7135E-03 | pCi/g | 3.3498E-02 | 6.0900E-02 | 3.0450E-02 | | | |
| CO-60 | -2.6351E-03 | pCi/g | 7.0535E-02 | 8.9000E-02 | 4.4500E-02 | | | |
| EU-152 | 8.7363E-02 | pCi/g | 1.7609E-01 | 2.7100E-01 | 1.3550E-01 | | | |
| EU-154 | 3.334E-02 ~~7.6714E-02~~ | pCi/g | 7.9733E-02 | 6.4200E-02 | 3.2100E-02 | | | |
| Total Gamma | 1.4553E+01 | pCi/g | | | | | | |
| Total NORM Activity | 4.1772E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07855.An1

Sample description
Batch ID: 16-00563-19
SDG: ARS1-16-00670-015 Tech: WJS

Spectrum Filename: C:\User\ARS07855.An1

Acquisition information
Start time: 19-Apr-2016 09:06:02
Live time: 1800
Real time: 1801
Dead time: 0.08 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.7948E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.7948E+02) =
2.6352E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS07855.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1175

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.13 | 13. | 100.21 | 0.90 | 2.099E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 42.34 | 18. | 68.89 | 0.91 | 2.269E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.60 | -17. | 130.24 | 0.91 | 2.508E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.78 | -10. | 77.68 | 0.91 | 2.569E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 57.44 | 23. | 43.25 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 62.90 | 15. | 36.74 | 0.93 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.69 | 42. | 38.14 | 0.39 | 4.339E-02 | | | | |
| 92.97 | 11. | 67.42 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.99 | 8. | 55.36 | 0.95 | 4.753E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 125.78 | 19. | 51.86 | 0.98 | 4.770E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 186.00 | 36. | 32.29 | 1.04 | 3.986E-02 | 186.21 | 3.640 | 9.907E-01 | RA226 |
| 205.60 | 10. | 98.72 | 1.06 | 3.743E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.54 | 103. | 14.90 | 0.63 | 3.368E-02 | 238.63 | 43.100 | 2.800E-01 | PB212 |
| 241.72 | 9. | 114.90 | 1.09 | 3.334E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 295.20 | 38. | 25.07 | 1.14 | 2.872E-02 | 295.21 | 18.500 | 2.807E-01 | PB214 |
| 338.28 | 30. | 29.76 | 1.18 | 2.586E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 341.60 | 0. | 384.67 | 1.18 | 2.552E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.88 | 54. | 19.11 | 1.19 | 2.509E-02 | 351.92 | 35.800 | 2.384E-01 | PB214 |
| 511.20 | 8. | 25.83 | 1.32 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.30 | 41. | 19.55 | 1.38 | 1.715E-02 | 583.14 | 86.000 | 1.087E-01 | TL208 |
| 591.77 | 1. | 741.13 | 1.39 | 1.697E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.41 | 52. | 18.38 | 0.67 | 1.660E-02 | 609.31 | 44.791 | 2.307E-01 | BI214 |
| 661.24 | 3. | 143.68 | 1.45 | 1.563E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.17 | 6. | 85.07 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 732.92 | 6. | 93.27 | 1.51 | 1.451E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 767.99 | 2. | 258.03 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 808.14 | 1. | 492.43 | 1.57 | 1.351E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 860.63 | 5. | 91.92 | 1.61 | 1.291E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.80 | 2. | 223.79 | 1.62 | 1.269E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.49 | 18. | 34.25 | 1.65 | 1.238E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 948.70 | 0. | 775.03 | 1.67 | 1.201E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 969.69 | 8. | 80.05 | 1.69 | 1.182E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1002.09 | 1. | 328.51 | 1.72 | 1.151E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.67 | 3. | 180.04 | 1.78 | 1.085E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1119.86 | 3. | 138.42 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1461.05 | 271. | 6.05 | 2.19 | 8.555E-03 | 1460.75 | 10.700 | 1.170E+01 | K40 |
| 1765.23 | 6. | 52.87 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.45 | 74.69 | 100. | 42. | 0.024 | 76.28 | 0.391 | TH-234 | s |
| 2437.74 | 609.41 | 57. | 8. | 0.005 | 265.42 | 0.666 | BI-214 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.75 | 39.52 | 119. | 0. | 0.000 | 2000.00 | 0.904s |
| EU-152 | 160.20 | 40.13 | 75. | 13. | 0.007 | 200.42 | 0.905s |
| EU-154 | 169.03 | 42.34 | 70. | 18. | 0.010 | 137.79 | 0.907s |
| EU-152 | 182.07 | 45.60 | 113. | -17. | -0.010 | 260.48 | 0.910s |
| PB-210 | 186.81 | 46.78 | 109. | -10. | -0.006 | 155.36 | 0.911s |
| EU-154 | 193.33 | 48.41 | 97. | -3. | -0.002 | 830.61 | 0.913s |
| Am-241 | 229.45 | 57.44 | 39. | 23. | 0.013 | 86.50 | 0.923 |
| U-238 | 251.31 | 62.90 | 121. | 15. | 0.008 | 73.48 | 0.927s |
| U-238 | 371.60 | 92.97 | 137. | 11. | 0.006 | 134.83 | 0.954s |
| U-238 | 371.69 | 92.99 | 133. | 8. | 0.005 | 110.72 | 0.954s |
| PA-234 | 380.56 | 95.21 | 132. | -13. | -0.007 | 250.10 | 0.956s |
| PA-234 | 398.05 | 99.58 | 90. | -16. | -0.009 | 174.78 | 0.960s |
| PA-234 | 444.53 | 111.20 | 74. | -7. | -0.004 | 408.51 | 0.971s |
| EU-152 | 485.74 | 121.50 | 55. | -9. | -0.005 | 248.03 | 0.981s |
| EU-154 | 502.87 | 125.78 | 38. | 19. | 0.010 | 103.72 | 0.982s |
| PA-234 | 526.76 | 131.75 | 91. | -4. | -0.002 | 667.40 | 0.990s |

American Radiation Services Spectrum name: ARS07855.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| RA-226 | 743.82 | 186.00 | 51. | 36. | 0.020 | 64.58 | 1.040 |
| U-235 | 822.21 | 205.60 | 50. | 10. | 0.006 | 197.44 | 1.057s |
| PA-234 | 913.23 | 228.34 | 37. | -5. | -0.003 | 371.57 | 1.077s |
| PB-212 | 954.01 | 238.54 | 73. | 103. | 0.057 | 29.80 | 0.631s |
| PB-214 | 966.72 | 241.72 | 78. | 9. | 0.005 | 229.79 | 1.090s |
| EU-154 | 990.77 | 247.73 | 30. | -2. | -0.001 | 726.91 | 1.096s |
| TL-208 | 1109.58 | 277.42 | 41. | -5. | -0.003 | 375.72 | 1.122s |
| PB-214 | 1180.71 | 295.20 | 37. | 38. | 0.021 | 50.13 | 1.138s |
| Ra-228 | 1353.05 | 338.28 | 37. | 30. | 0.017 | 59.51 | 1.176s |
| PB-214 | 1407.46 | 351.88 | 43. | 54. | 0.030 | 38.23 | 1.188 |
| TL-208 | 2044.84 | 511.20 | 59. | 8. | 0.005 | 51.65 | 1.324s |
| TL-208 | 2333.28 | 583.30 | 26. | 41. | 0.023 | 39.10 | 1.385s |
| EU-154 | 2367.16 | 591.77 | 16. | 1. | 0.000 | 1482.26 | 1.392s |
| BI-214 | 2437.58 | 609.37 | 29. | 35. | 0.019 | 42.51 | 1.406s |
| CS-137 | 2645.06 | 661.24 | 15. | 3. | 0.002 | 287.36 | 1.449s |
| EU-154 | 2894.11 | 723.49 | 31. | -4. | -0.002 | 384.47 | 1.499s |
| BI-212 | 2908.84 | 727.17 | 18. | 6. | 0.003 | 170.14 | 1.502s |
| PA-234 | 2931.83 | 732.92 | 16. | 6. | 0.003 | 186.54 | 1.507s |
| TL-208 | 3054.55 | 763.60 | 21. | -3. | -0.001 | 552.65 | 1.531s |
| BI-214 | 3072.12 | 767.99 | 18. | 2. | 0.001 | 516.07 | 1.535s |
| EU-152 | 3114.44 | 778.57 | 18. | -1. | -0.001 | 1299.96 | 1.543s |
| PA-234 | 3232.71 | 808.14 | 25. | 1. | 0.001 | 984.87 | 1.566s |
| PA-234 | 3326.60 | 831.61 | 14. | -1. | -0.001 | 960.58 | 1.584s |
| TL-208 | 3442.67 | 860.63 | 16. | 5. | 0.003 | 183.85 | 1.607s |
| EU-152 | 3471.39 | 867.80 | 16. | -2. | -0.001 | 712.94 | 1.612s |
| PA-234 | 3523.38 | 880.80 | 17. | 2. | 0.001 | 447.59 | 1.622s |
| PA-234 | 3588.66 | 897.12 | 19. | -3. | -0.002 | 596.20 | 1.636s |
| Ra-228 | 3646.15 | 911.49 | 20. | 18. | 0.010 | 68.50 | 1.646s |
| PA-234 | 3711.00 | 927.71 | 18. | -2. | -0.001 | 554.18 | 1.658s |
| BI-214 | 3733.92 | 933.43 | 20. | -1. | -0.001 | 1232.47 | 1.663s |
| Ra-228 | 3878.95 | 969.69 | 25. | 8. | 0.004 | 160.11 | 1.689s |
| EU-154 | 3995.02 | 998.71 | 14. | -1. | -0.001 | 1118.48 | 1.710s |
| EU-154 | 4008.53 | 1002.09 | 12. | 1. | 0.001 | 657.02 | 1.716s |
| EU-152 | 4342.86 | 1085.67 | 15. | 3. | 0.002 | 360.07 | 1.776s |
| EU-152 | 4448.46 | 1112.07 | 46. | 0. | 0.000 | 2000.00 | 1.795s |
| BI-214 | 4479.62 | 1119.86 | 29. | 3. | 0.002 | 276.83 | 1.801s |
| EU-154 | 5098.04 | 1274.47 | 14. | -1. | -0.001 | 882.34 | 1.909s |
| PA-234 | 5576.50 | 1394.10 | 15. | 0. | 0.000 | 2000.00 | 1.990s |
| EU-152 | 5627.43 | 1406.83 | 15. | -4. | -0.002 | 299.11 | 1.999s |
| K-40 | 5844.29 | 1461.05 | 2. | 271. | 0.150 | 12.10 | 2.195 |
| BI-212 | 6482.22 | 1620.56 | 19. | 0. | 0.000 | 2000.00 | 2.135s |
| BI-214 | 7060.78 | 1765.23 | 13. | 6. | 0.003 | 105.73 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 4.7127E-02 | | | | | |
| | | | 143.76 | -3.555E-02 | &(P | 3.668E-01 1.00E+03 | G |
| | | | 205.31 | 2.318E-01 | ?(P | 7.998E-01 9.87E+01 | G |
| | | | 163.35 | -3.746E-02 | % P | 7.908E-01 2.60E+03 | G |
| RA-226 | | 9.9070E-01 | | | | | |
| | | | 186.21 | 9.907E-01 | ( | 9.782E-01 3.23E+01 | G K |
| Ra-228 | | 2.2355E-01 | | | | | |
| | | | 911.07 | 2.034E-01 | (P | 2.602E-01 3.42E+01 | G |
| | | | 968.90 | 1.442E-01 | &(P | 5.004E-01 8.01E+01 | G |
| | | | 338.40 | 3.876E-01 | (P | 3.938E-01 2.98E+01 | G |
| | | | 964.60 | -1.052E-02 | % | 1.619E+00 4.20E+03 | G |
| Am-241 | T | 7.0426E-02 | | | | | |
| | | | 59.54 | 7.043E-02 | ?( | 9.627E-02 4.32E+01 | G K |
| PB-210 | | -3.9269E-01 | | | | | |
| | | | 46.52 | -3.927E-01 | &(P | 1.981E+00 7.77E+01 | G |
| U-238 | | 3.3728E-01 | | | | | |
| | | | 63.29 | 4.006E-01 | *(P | 1.424E+00 3.67E+01 | G |
| | | | 92.80 | 2.295E-01 | ?(P | 1.564E+00 5.54E+01 | G |
| | | | 92.38 | 3.670E-01 | ?(P | 1.859E+00 6.74E+01 | G |
| K-40 | | 1.1696E+01 | | | | | |
| | | | 1460.75 | 1.170E+01 | (P | 4.300E-01 6.05E+00 | G |
| PB-214 | | 2.5280E-01 | | | | | |
| | | | 351.92 | 2.384E-01 | (P | 1.463E-01 1.91E+01 | G |
| | | | 295.21 | 2.807E-01 | @(P | 2.312E-01 2.51E+01 | G |
| | | | 241.98 | 1.462E-01 | & P | 6.942E-01 1.15E+02 | G |
| BI-214 | | 1.9050E-01 | | | | | |
| | | | 609.31 | 1.865E-01 | (P | 1.483E-01 2.13E+01 | G |
| | | | 1764.49 | 2.021E-01 | ?(P | 7.022E-01 5.29E+01 | G |
| | | | 1120.29 | 8.343E-02 | - P | 7.041E-01 1.38E+02 | G |
| | | | 1238.11 | -1.230E-01 | % P | 1.357E+00 1.00E+03 | G |
| | | | 768.36 | 1.102E-01 | & P | 1.307E+00 2.58E+02 | G |
| | | | 1377.67 | -7.864E-02 | % P | 2.366E+00 1.00E+03 | G |
| | | | 934.06 | -1.129E-01 | - | 2.555E+00 6.16E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-212 | 1.3278E-01 | | | | | | |
| | | 727.17 | 1.328E-01 | ?(P | 5.225E-01 | 8.51E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 4.259E+00 | 1.00E+03 | G |
| | | 785.42 | -4.750E-02 | % | 2.754E+00 | 1.52E+03 | G |
| PB-212 | 2.7998E-01 | | | | | | |
| | | 238.63 | 2.800E-01 | (P | 1.161E-01 | 1.49E+01 | G |
| | | 300.09 | 5.375E-03 | % P | 1.200E+00 | 1.34E+03 | G |
| TL-208 | 1.0391E-01 | | | | | | |
| | | 583.14 | 1.087E-01 | @(P | 7.084E-02 | 1.95E+01 | G |
| | | 510.72 | 7.620E-02 | (P | 3.581E-01 | 2.58E+01 | G |
| | | 860.47 | 1.218E-01 | ?(P | 5.439E-01 | 9.19E+01 | G |
| | | 277.36 | -1.038E-01 | - P | 6.590E-01 | 1.88E+02 | G |
| | | 763.30 | -4.148E-01 | - P | 3.934E+00 | 2.76E+02 | G |
| PA-234 | 5.3701E-02 | | | | | | |
| | | 98.44 | -1.011E-02 | %(P | 1.616E-01 | 1.03E+03 | G |
| | | 946.00 | -1.062E-02 | % P | 2.903E-01 | 1.00E+03 | G |
| | | 131.28 | -1.726E-02 | + | 1.991E-01 | 3.34E+02 | G |
| | | 94.67 | -7.126E-02 | + | 3.010E-01 | 1.25E+02 | G |
| | | 883.24 | 2.609E-04 | % | 5.911E-01 | 6.06E+04 | G |
| | | 926.70 | -6.800E-02 | + P | 6.672E-01 | 2.77E+02 | G |
| | | 569.26 | -2.620E-02 | % P | 5.434E-01 | 1.09E+04 | G |
| | | 111.00 | -6.843E-02 | + P | 4.104E-01 | 2.04E+02 | G |
| | | 733.00 | 1.790E-01 | &(P | 6.759E-01 | 9.33E+01 | G |
| | | 949.00 | 9.092E-03 | & P | 8.123E-01 | 7.75E+02 | G |
| | | 880.51 | 1.109E-01 | ?(P | 1.056E+00 | 2.24E+02 | G |
| | | 226.87 | -8.419E-02 | + P | 5.420E-01 | 1.86E+02 | G |
| | | 831.10 | -6.009E-02 | + | 1.077E+00 | 4.80E+02 | G |
| | | 808.10 | 8.742E-02 | ?( | 1.560E+00 | 4.92E+02 | G |
| | | 99.70 | -2.801E-01 | + | 8.204E-01 | 8.74E+01 | G |
| | | 699.10 | -4.038E-02 | % P | 1.377E+00 | 1.25E+03 | G |
| | | 898.60 | -2.410E-01 | & P | 1.802E+00 | 2.98E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 2.367E+00 | 1.00E+03 | G |
| CS-137 | 9.7135E-03 | | | | | | |
| | | 661.66 | 9.713E-03 | ?(P | 6.092E-02 | 1.44E+02 | G |
| CO-60 | -2.6351E-03 | | | | | | |
| | | 1173.24 | -2.635E-03 | %(P | 8.904E-02 | 1.12E+03 | K |
| | | 1332.50 | -1.595E-03 | % | 8.122E-02 | 1.33E+03 | K |
| EU-152 | 8.7363E-02 | | | | | | |
| | | 40.12 | 8.009E-02 | ( | 2.709E-01 | 1.00E+02 | G |
| | | 121.78 | -2.487E-02 | - | 1.054E-01 | 1.24E+02 | G |
| | | 344.30 | 1.918E-03 | & P | 1.305E-01 | 3.85E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1408.08 | -9.406E-02 | + P | 4.414E-01 | 1.50E+02 | G |
| | | 39.52 | 0.000E+00 | - | 6.447E-01 | 1.00E+03 | G |
| | | 964.00 | -1.736E-02 | % P | 1.010E+00 | 1.00E+03 | G |
| | | 1112.07 | 0.000E+00 | & | 9.416E-01 | 1.00E+03 | G |
| | | 778.90 | -2.999E-02 | - P | 4.953E-01 | 6.50E+02 | G |
| | | 1085.80 | 1.086E-01 | ?(P | 7.448E-01 | 1.80E+02 | G |
| | | 45.40 | -3.060E-01 | + P | 9.168E-01 | 1.30E+02 | G |
| | | 244.67 | 9.113E-03 | % | 5.827E-01 | 1.80E+03 | G |
| | | 867.39 | -1.197E-01 | + | 1.572E+00 | 3.56E+02 | G |
| EU-154 | 7.6714E-02 | | | | | | |
| | | 123.10 | 3.834E-02 | ?( | 6.420E-02 | 5.19E+01 | G |
| | | 1274.80 | -1.443E-02 | - | 2.369E-01 | 4.41E+02 | G |
| | | 723.30 | -5.803E-02 | - | 3.928E-01 | 1.92E+02 | G |
| | | 1004.80 | 2.525E-02 | ?(P | 3.693E-01 | 3.29E+02 | G |
| | | 43.00 | -1.796E-02 | % P | 5.996E-01 | 6.60E+03 | G |
| | | 873.20 | -1.002E-02 | & P | 6.151E-01 | 1.71E+03 | G |
| | | 996.30 | -3.027E-02 | & | 6.349E-01 | 5.59E+02 | G |
| | | 42.31 | 4.369E-01 | ?( | 9.978E-01 | 6.89E+01 | G |
| | | 248.04 | -3.965E-02 | - | 5.161E-01 | 3.63E+02 | G |
| | | 591.70 | 3.949E-02 | ?( | 1.090E+00 | 7.41E+02 | G |
| | | 48.70 | -1.137E-01 | - | 1.633E+00 | 4.15E+02 | G |
| | | 756.70 | -3.193E-02 | % | 1.467E+00 | 1.23E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 4.7127E-02 | 9.5647E-02 | 9.5699E-02 | 0.367E+00 |
| RA-226 | # | 9.9070E-01 | 6.3980E-01 | 6.4230E-01 | 0.978E+00 |
| Ra-228 | #A | 2.2355E-01 | 1.4727E-01 | 1.4793E-01 | 0.260E+00 |
| Am-241 | #A | 7.0426E-02 | 6.0917E-02 | 6.1080E-02 | 0.963E-01 |
| PB-210 | #A | -3.9269E-01 | 2.2561E+00 | 2.2569E+00 | 0.198E+01 |
| U-238 | #A | 3.3728E-01 | 5.8763E-01 | 5.8820E-01 | 0.142E+01 |
| K-40 | | 1.1696E+01 | 1.4283E+00 | 1.6123E+00 | 0.430E+00 |
| PB-214 | # | 2.5280E-01 | 8.8122E-02 | 9.0583E-02 | 0.146E+00 |
| BI-214 | # | 1.9050E-01 | 1.0023E-01 | 1.0087E-01 | 0.148E+00 |
| BI-212 | #A | 1.3278E-01 | 2.9419E-01 | 2.9431E-01 | 0.522E+00 |
| PB-212 | | 2.7998E-01 | 9.0948E-02 | 9.3001E-02 | 0.116E+00 |
| TL-208 | # | 1.0391E-01 | 4.7425E-02 | 4.7863E-02 | 0.708E-01 |
| PA-234 | #A | 5.3701E-02 | 1.1515E-01 | 1.1522E-01 | 0.162E+00 |
| CS-137 | #A | 9.7135E-03 | 3.3496E-02 | 3.3498E-02 | 0.609E-01 |
| CO-60 | #B | -2.6351E-03 | 7.0535E-02 | 7.0535E-02 | 0.890E-01 |
| EU-152 | #A | 8.7363E-02 | 1.7509E-01 | 1.7609E-01 | 0.271E+00 |
| EU-154 | # | 7.6714E-02 | 7.9566E-02 | 7.9733E-02 | 0.642E-01 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity ( 2.6 to 2000.1 keV) 1.198E+01 pCi/g

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00697-09 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | ARS1-16-00670-016 | | |
| AnalysisBatch | ARS1-B16-00697 | Geometry | tuna can solid, 250 |
| SDG | ARS1-16-00670 | Fraction | 016 |
| AnalysisCode | GAM-A-025 | Run | 2 |
| Library | ITSI COUNT.Lib | Detector ID | 1 |
| | | Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.4149E-01 | pCi/g | 1.5173E-01 | 3.0100E-01 | 1.5050E-01 | 1332.50 | 1332.50 | 2.01 |
| **RA-226** | 8.6506E-01 | pCi/g | 6.3290E-01 | 9.9900E-01 | 4.9950E-01 | 1332.50 | 1332.50 | 2.01 |
| **RA-228** | 2.0580E-01 | pCi/g | 1.4695E-01 | 2.3600E-01 | 1.1800E-01 | 1332.50 | 1332.50 | 2.01 |
| **AM-241** | -2.1685E-02 | pCi/g | 7.9548E-02 | 1.3500E-01 | 6.7500E-02 | 1332.50 | 1332.50 | 2.01 |
| **PB-210** | -2.4855E-02 | pCi/g | 9.7984E-01 | 1.7400E+00 | 8.7000E-01 | 1332.50 | 1332.50 | 2.01 |
| **U-238** | 4.7628E-01 | pCi/g | 5.0992E-01 | 1.1600E+00 | 5.8000E-01 | 1332.50 | 1332.50 | 2.01 |
| **K-40** | 1.3606E+01 | pCi/g | 1.6038E+00 | 4.9100E-01 | 2.4550E-01 | 1332.50 | 1332.50 | 2.01 |
| **PB-214** | 4.5219E-01 | pCi/g | 1.0609E-01 | 1.2300E-01 | 6.1500E-02 | 1332.50 | 1332.50 | 2.01 |
| **BI-214** | 3.6345E-01 | pCi/g | 1.0867E-01 | 1.1400E-01 | 5.7000E-02 | 1332.50 | 1332.50 | 2.01 |
| **BI-212** | 1.2454E-01 | pCi/g | 2.0654E-01 | 3.6300E-01 | 1.8150E-01 | 1332.50 | 1332.50 | 2.01 |
| **PB-212** | 3.0826E-01 | pCi/g | 8.7411E-02 | 1.0400E-01 | 5.2000E-02 | 1332.50 | 1332.50 | 2.01 |
| **TL-208** | 6.7392E-02 | pCi/g | 4.1111E-02 | 6.3500E-02 | 3.1750E-02 | 1332.50 | 1332.50 | 2.01 |
| **PA-234** | 1.0035E-01 | pCi/g | 1.1546E-01 | 1.2000E-01 | 6.0000E-02 | 1332.50 | 1332.50 | 2.01 |
| **CS-137** | -2.1361E-03 | pCi/g | 8.5442E-02 | 4.7300E-02 | 2.3650E-02 | 1332.50 | 1332.50 | 2.01 |
| **CO-60** | -2.4716E-03 | pCi/g | 7.4218E-02 | 8.5000E-02 | 4.2500E-02 | 1332.50 | 1332.50 | 2.01 |
| **EU-152** | 6.4064E-02 | pCi/g | 9.4574E-02 | 2.2500E-01 | 1.1250E-01 | 1332.50 | 1332.50 | 2.01 |
| **EU-154** | 1.4608E-02 | pCi/g | 6.1438E-02 | 6.8400E-02 | 3.4200E-02 | 1332.50 | 1332.50 | 2.01 |
| **Total Gamma** | 1.6789E+01 | pCi/g | | | | 1332.50 | 1332.50 | 2.01 |
| **Total NORM Activity** | 4.8431E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07973.An1

Sample description
Batch ID: 16-00697-09
SDG: ARS1-16-00670-016 Tech: WJS

Spectrum Filename: C:\User\ARS07973.An1

Acquisition information
Start time: 05-May-2016 08:27:29
Live time: 2700
Real time: 2702
Dead time: 0.08 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4518E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4518E+02) =
2.8970E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS07973.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0743

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.13 | 17. | 87.66 | 0.90 | 2.099E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 7.680E-02 | EU152 |
| 46.74 | -5. | 41.84 | 0.91 | 2.508E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.77 | -1. | 41.18 | 0.91 | 2.569E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.24 | 24. | 27.72 | 0.84 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.12 | 80. | 25.84 | 0.88 | 4.420E-02 | | | | |
| 92.36 | 20. | 93.09 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.80 | 84. | 26.06 | 0.64 | 4.753E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.98 | 16. | 80.75 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 109.79 | 0. | 718.14 | 0.97 | 4.832E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 121.47 | 4. | 336.83 | 0.98 | 4.770E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | 5.862E-03 | EU154 |
| 121.57 | 8. | 188.96 | 0.98 | 4.779E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | 1.165E-02 | EU154 |
| 143.68 | 5. | 119.07 | 1.00 | 4.553E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 186.24 | 43. | 36.47 | 1.04 | 3.986E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 205.41 | 23. | 52.54 | 1.06 | 3.743E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 226.15 | 12. | 90.33 | 1.08 | 3.493E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.62 | 155. | 12.62 | 1.47 | 3.368E-02 | 238.63 | 43.100 | 3.102E-01 | PB212 |
| 245.41 | 2. | 386.69 | 1.10 | 3.274E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 295.06 | 85. | 16.80 | 1.32 | 2.872E-02 | 295.21 | 18.500 | 4.639E-01 | PB214 |
| 300.65 | 9. | 123.46 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.43 | 29. | 30.42 | 1.18 | 2.586E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 344.70 | 11. | 75.59 | 1.18 | 2.552E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.95 | 148. | 11.86 | 1.22 | 2.509E-02 | 351.92 | 35.800 | 4.462E-01 | PB214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 511.04 | 4. | 24.79 | 1.32 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.16 | 34. | 23.30 | 1.38 | 1.715E-02 | 583.14 | 86.000 | 6.614E-02 | TL208 |
| 609.32 | 89. | 12.86 | 1.85 | 1.661E-02 | 609.31 | 44.791 | 3.489E-01 | BI214 |
| 726.18 | 7. | 61.19 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 733.52 | 4. | 118.63 | 1.51 | 1.451E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 768.54 | 10. | 65.09 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 860.10 | 4. | 105.70 | 1.61 | 1.291E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 872.58 | 2. | 234.50 | 1.62 | 1.277E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 880.70 | 6. | 88.49 | 1.62 | 1.269E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 898.16 | 4. | 126.01 | 1.64 | 1.250E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.06 | 18. | 39.07 | 1.65 | 1.238E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 968.86 | 4. | 219.53 | 1.69 | 1.186E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 969.10 | 20. | 37.34 | 1.69 | 1.182E-02 | 964.60 | 5.452 | 9.001E-01 | Ra228 |
| | | | | | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1004.01 | 1. | 425.15 | 1.72 | 1.151E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.68 | 6. | 109.26 | 1.78 | 1.085E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1119.98 | 37. | 23.48 | 0.57 | 1.059E-02 | 1120.29 | 14.797 | 6.864E-01 | BI214 |
| 1237.98 | 8. | 73.58 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1407.81 | 2. | 165.73 | 2.00 | 8.824E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.14 | 433. | 4.91 | 2.09 | 8.553E-03 | 1460.75 | 10.700 | 1.361E+01 | K40 |
| 1764.09 | 6. | 41.67 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide |
|---|---|---|---|---|---|---|---|
| 308.18 | 77.12 | 160. | 80. | 0.030 | 51.67 | 0.879 | PB-212 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 160.17 | 40.13 | 99. | 17. | 0.006 | 175.32 | 0.905s |
| EU-154 | 169.66 | 42.50 | 95. | -3. | -0.001 | 934.98 | 0.907s |
| EU-154 | 173.86 | 43.55 | 119. | -17. | -0.006 | 211.72 | 0.908s |
| EU-152 | 186.62 | 46.74 | 143. | -5. | -0.002 | 83.68 | 0.910s |
| EU-154 | 193.49 | 48.45 | 166. | -18. | -0.007 | 211.74 | 0.913s |
| Am-241 | 241.13 | 60.36 | 155. | -10. | -0.004 | 366.77 | 0.923s |

American Radiation Services Spectrum name: ARS07973.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 252.65 | 63.24 | 151. | 24. | 0.009 | 55.45 | 0.842 |
| U-238 | 369.24 | 92.38 | 176. | 20. | 0.007 | 186.18 | 0.954D |
| U-238 | 370.92 | 92.80 | 179. | 23. | 0.009 | 130.81 | 0.954D |
| PA-234 | 378.74 | 94.75 | 226. | -14. | -0.005 | 300.15 | 0.956s |
| PA-234 | 395.64 | 98.98 | 103. | 16. | 0.006 | 161.49 | 0.959s |
| PA-234 | 400.21 | 100.12 | 120. | -12. | -0.004 | 274.63 | 0.960s |
| EU-152 | 486.03 | 121.57 | 103. | 8. | 0.003 | 377.92 | 0.981s |
| EU-154 | 485.64 | 121.47 | 84. | 4. | 0.001 | 673.65 | 0.982s |
| U-235 | 574.49 | 143.68 | 101. | 5. | 0.002 | 238.14 | 1.001s |
| U-235 | 653.68 | 163.47 | 117. | -8. | -0.003 | 537.97 | 1.019s |
| RA-226 | 744.76 | 186.24 | 103. | 43. | 0.016 | 72.94 | 1.040s |
| U-235 | 821.47 | 205.41 | 66. | 23. | 0.009 | 105.08 | 1.057s |
| PA-234 | 904.45 | 226.15 | 56. | 12. | 0.005 | 180.66 | 1.077s |
| PB-212 | 954.35 | 238.62 | 113. | 155. | 0.058 | 25.23 | 1.471s |
| EU-152 | 977.89 | 244.51 | 94. | -11. | -0.004 | 250.06 | 1.093s |
| EU-154 | 981.51 | 245.41 | 29. | 2. | 0.001 | 773.37 | 1.096s |
| PB-214 | 1180.13 | 295.06 | 56. | 85. | 0.031 | 33.60 | 1.325s |
| PB-212 | 1202.49 | 300.65 | 68. | 9. | 0.003 | 246.92 | 1.142s |
| Ra-228 | 1353.64 | 338.43 | 41. | 29. | 0.011 | 60.84 | 1.176s |
| EU-152 | 1378.74 | 344.70 | 40. | 11. | 0.004 | 151.18 | 1.181s |
| PB-214 | 1407.74 | 351.95 | 58. | 138. | 0.051 | 23.73 | 1.219 |
| TL-208 | 2044.20 | 511.04 | 93. | 4. | 0.001 | 49.58 | 1.324s |
| PA-234 | 2278.10 | 569.51 | 33. | -4. | -0.002 | 722.07 | 1.373s |
| TL-208 | 2332.73 | 583.16 | 40. | 34. | 0.012 | 46.61 | 1.385s |
| BI-214 | 2437.37 | 609.32 | 33. | 89. | 0.033 | 25.72 | 1.849s |
| EU-154 | 2895.59 | 723.86 | 38. | -9. | -0.003 | 197.09 | 1.499s |
| BI-212 | 2904.86 | 726.18 | 16. | 7. | 0.003 | 122.37 | 1.502s |
| PA-234 | 2934.23 | 733.52 | 19. | 4. | 0.002 | 237.25 | 1.507s |
| BI-214 | 3074.30 | 768.54 | 19. | 10. | 0.004 | 130.17 | 1.535s |
| EU-152 | 3116.23 | 779.02 | 27. | -5. | -0.002 | 356.79 | 1.543s |
| PA-234 | 3230.10 | 807.48 | 36. | -7. | -0.003 | 257.34 | 1.566s |
| PA-234 | 3326.10 | 831.48 | 22. | -6. | -0.002 | 255.56 | 1.584s |
| TL-208 | 3440.55 | 860.10 | 23. | 4. | 0.002 | 211.41 | 1.607s |
| EU-152 | 3469.54 | 867.34 | 22. | -1. | 0.000 | 1232.05 | 1.612s |
| EU-154 | 3490.49 | 872.58 | 20. | 2. | 0.001 | 468.99 | 1.617s |
| PA-234 | 3522.99 | 880.70 | 16. | 6. | 0.002 | 176.98 | 1.622s |
| PA-234 | 3535.40 | 883.81 | 23. | -3. | -0.001 | 470.97 | 1.624s |
| PA-234 | 3592.81 | 898.16 | 19. | 4. | 0.001 | 252.02 | 1.636s |
| Ra-228 | 3644.42 | 911.06 | 32. | 18. | 0.007 | 78.15 | 1.646s |
| PA-234 | 3705.00 | 926.20 | 22. | -2. | -0.001 | 584.30 | 1.658s |
| BI-214 | 3749.22 | 937.26 | 15. | -1. | 0.000 | 1539.41 | 1.663s |
| PA-234 | 3779.91 | 944.93 | 22. | -2. | -0.001 | 1126.25 | 1.672s |
| Ra-228 | 3875.60 | 968.86 | 30. | 4. | 0.001 | 439.06 | 1.686s |
| Ra-228 | 3876.56 | 969.10 | 28. | 20. | 0.007 | 74.69 | 1.689s |
| EU-154 | 4016.22 | 1004.01 | 23. | 1. | 0.000 | 850.29 | 1.716s |
| EU-152 | 4342.90 | 1085.68 | 17. | 6. | 0.002 | 218.52 | 1.776s |
| BI-214 | 4480.09 | 1119.98 | 17. | 37. | 0.014 | 46.97 | 0.568s |
| BI-214 | 4952.09 | 1237.98 | 30. | 8. | 0.003 | 147.15 | 1.884 |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 5576.50 | 1394.10 | 0. | 0. | 0.000 | 2000.00 | 1.990s |
| EU-152 | 5631.32 | 1407.81 | 12. | 2. | 0.001 | 331.45 | 1.999s |
| K-40 | 5844.62 | 1461.14 | 8. | 429. | 0.159 | 9.82 | 2.092 |
| BI-212 | 6482.22 | 1620.56 | 19. | 0. | 0.000 | 2000.00 | 2.135s |
| BI-214 | 7056.24 | 1764.09 | 14. | 6. | 0.002 | 83.34 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 1.4149E-01 | | | | | |
| | | | 143.76 | 3.316E-02 | ?(P | 3.005E-01 1.19E+02 G | |
| | | | 205.31 | 3.835E-01 | (P | 6.691E-01 5.25E+01 G | |
| | | | 163.35 | -1.138E-01 | & P | 7.638E-01 2.69E+02 G | |
| RA-226 | | 8.6506E-01 | | | | | |
| | | | 186.21 | 8.651E-01 | ( | 9.991E-01 3.65E+01 G K | |
| Ra-228 | | 2.0580E-01 | | | | | |
| | | | 911.07 | 1.418E-01 | @(P | 2.356E-01 3.91E+01 G | |
| | | | 968.90 | 2.820E-01 | ?(P | 3.824E-01 3.73E+01 G | |
| | | | 338.40 | 2.694E-01 | ?(P | 3.028E-01 3.04E+01 G | |
| | | | 964.60 | 1.619E-01 | ?( | 1.259E+00 2.20E+02 G | |
| Am-241 | T | -2.1685E-02 | | | | | |
| | | | 59.54 | -2.169E-02 | ?( | 1.351E-01 1.83E+02 G K | |
| PB-210 | | -2.4855E-02 | | | | | |
| | | | 46.52 | -2.486E-02 | %(P | 1.737E+00 4.12E+01 G | |
| U-238 | | 4.7628E-01 | | | | | |
| | | | 63.29 | 4.675E-01 | (P | 1.160E+00 2.77E+01 G | |
| | | | 92.80 | 4.763E-01 | } P | 1.323E+00 6.54E+01 G | |
| | | | 92.38 | 4.763E-01 | } P | 1.535E+00 9.31E+01 G | |
| K-40 | | 1.3606E+01 | | | | | |
| | | | 1460.75 | 1.361E+01 | (P | 4.907E-01 4.91E+00 G | |
| PB-214 | | 4.5219E-01 | | | | | |
| | | | 351.92 | 4.462E-01 | (P | 1.231E-01 1.19E+01 G | |
| | | | 295.21 | 4.639E-01 | (P | 2.052E-01 1.68E+01 G | |
| | | | 241.98 | -2.368E-02 | % P | 7.226E-01 2.29E+03 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-214 | 3.6345E-01 | | | | | | |
| | | 609.31 | 3.489E-01 | (P | 1.142E-01 | 1.29E+01 | G |
| | | 1764.49 | 1.568E-01 | - P | 5.229E-01 | 4.17E+01 | G |
| | | 1120.29 | 6.864E-01 | + P | 4.045E-01 | 2.35E+01 | G |
| | | 1238.11 | 4.228E-01 | (P | 1.430E+00 | 7.36E+01 | G |
| | | 768.36 | 4.266E-01 | &(P | 9.968E-01 | 6.51E+01 | G |
| | | 1377.67 | -8.108E-02 | % P | 1.799E+00 | 8.64E+03 | G |
| | | 934.06 | -5.606E-02 | & | 1.618E+00 | 7.70E+02 | G |
| BI-212 | 1.2454E-01 | | | | | | |
| | | 727.17 | 1.245E-01 | (P | 3.633E-01 | 6.12E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 3.121E+00 | 1.00E+03 | G |
| | | 785.42 | -4.255E-02 | % | 2.726E+00 | 1.75E+03 | G |
| PB-212 | 3.0826E-01 | | | | | | |
| | | 238.63 | 3.102E-01 | (P | 1.042E-01 | 1.26E+01 | G |
| | | 300.09 | 2.828E-01 | ?(P | 1.284E+00 | 1.23E+02 | G |
| TL-208 | 6.7392E-02 | | | | | | |
| | | 583.14 | 6.614E-02 | (P | 6.353E-02 | 2.33E+01 | G |
| | | 510.72 | 2.608E-02 | - P | 3.247E-01 | 2.48E+01 | G |
| | | 860.47 | 7.636E-02 | ?(P | 4.719E-01 | 1.06E+02 | G |
| | | 277.36 | 2.011E-04 | % P | 5.385E-01 | 3.76E+03 | G |
| | | 763.30 | -5.041E-02 | % P | 3.061E+00 | 3.18E+03 | G |
| PA-234 | 1.0035E-01 | | | | | | |
| | | 98.44 | 3.780E-02 | (P | 1.200E-01 | 8.07E+01 | G |
| | | 946.00 | -2.559E-02 | - P | 2.933E-01 | 5.63E+02 | G |
| | | 131.28 | -1.983E-03 | & | 1.340E-01 | 1.93E+03 | G |
| | | 94.67 | -5.638E-02 | & | 2.851E-01 | 1.50E+02 | G |
| | | 883.24 | -5.648E-02 | + | 4.764E-01 | 2.35E+02 | G |
| | | 926.70 | -5.271E-02 | + P | 5.352E-01 | 2.92E+02 | G |
| | | 569.26 | -6.603E-02 | + P | 4.739E-01 | 3.61E+02 | G |
| | | 111.00 | -1.433E-04 | % P | 2.927E-01 | 7.18E+02 | G |
| | | 733.00 | 9.791E-02 | &(P | 5.436E-01 | 1.19E+02 | G |
| | | 949.00 | -1.991E-02 | % P | 8.697E-01 | 1.00E+03 | G |
| | | 880.51 | 2.239E-01 | &(P | 7.494E-01 | 8.85E+01 | G |
| | | 226.87 | 1.570E-01 | &(P | 4.810E-01 | 9.03E+01 | G |
| | | 831.10 | -2.165E-01 | + | 9.658E-01 | 1.28E+02 | G |
| | | 808.10 | -3.024E-01 | + | 1.343E+00 | 1.29E+02 | G |
| | | 99.70 | -1.483E-01 | + | 6.902E-01 | 1.37E+02 | G |
| | | 699.10 | -9.895E-03 | % P | 1.273E+00 | 1.98E+04 | G |
| | | 898.60 | 2.052E-01 | ?(P | 1.340E+00 | 1.26E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 6.159E-01 | 1.00E+03 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CS-137 | -2.1361E-03 | | | | | | |
| | | 661.66 | -2.136E-03 | %(P | 4.734E-02 | 1.00E+03 | G |
| CO-60 | -2.4716E-03 | | | | | | |
| | | 1173.24 | -2.472E-03 | %(P | 8.496E-02 | 1.23E+03 | K |
| | | 1332.50 | 1.497E-03 | % | 7.345E-02 | 1.32E+03 | K |
| EU-152 | 6.4064E-02 | | | | | | |
| | | 40.12 | 7.680E-02 | ?( | 2.255E-01 | 8.77E+01 | G |
| | | 121.78 | 1.609E-02 | - | 1.040E-01 | 1.89E+02 | G |
| | | 344.30 | 4.476E-02 | ?(P | 1.355E-01 | 7.56E+01 | G |
| | | 1408.08 | 3.221E-02 | ?(P | 2.888E-01 | 1.66E+02 | G |
| | | 39.52 | 4.895E-03 | % | 4.443E-01 | 2.61E+03 | G |
| | | 964.00 | -1.908E-02 | & P | 5.224E-01 | 2.50E+06 | G |
| | | 1112.07 | -9.251E-03 | % | 4.893E-01 | 1.43E+03 | G |
| | | 778.90 | -7.869E-02 | + P | 4.336E-01 | 1.78E+02 | G |
| | | 1085.80 | 1.432E-01 | ?(P | 5.719E-01 | 1.09E+02 | G |
| | | 45.40 | -5.970E-02 | - P | 7.515E-01 | 4.18E+01 | G |
| | | 244.67 | -1.298E-01 | & | 5.506E-01 | 1.25E+02 | G |
| | | 867.39 | -5.935E-02 | - | 1.337E+00 | 6.16E+02 | G |
| EU-154 | 1.4608E-02 | | | | | | |
| | | 123.10 | 5.862E-03 | &( | 6.839E-02 | 3.37E+02 | G |
| | | 1274.80 | -6.472E-04 | % | 1.864E-01 | 7.66E+03 | G |
| | | 723.30 | -9.464E-02 | + | 3.172E-01 | 9.85E+01 | G |
| | | 1004.80 | 1.792E-02 | ?(P | 3.576E-01 | 4.25E+02 | G |
| | | 43.00 | -1.645E-01 | + P | 5.105E-01 | 1.06E+02 | G |
| | | 873.20 | 3.364E-02 | ?(P | 4.765E-01 | 2.34E+02 | G |
| | | 996.30 | 2.920E-04 | & | 5.856E-01 | 5.43E+04 | G |
| | | 42.31 | -5.205E-02 | + | 8.430E-01 | 4.67E+02 | G |
| | | 248.04 | 2.682E-02 | &( | 3.723E-01 | 3.87E+02 | G |
| | | 591.70 | -1.752E-02 | % | 1.156E+00 | 1.83E+03 | G |
| | | 48.70 | -4.352E-01 | + | 1.546E+00 | 1.06E+02 | G |
| | | 756.70 | 3.585E-02 | & | 1.361E+00 | 1.04E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 1.4149E-01 | 1.5143E-01 | 1.5173E-01 | 0.301E+00 |
| RA-226 #A | 8.6506E-01 | 6.3097E-01 | 6.3290E-01 | 0.999E+00 |
| Ra-228 #A | 2.0580E-01 | 1.4638E-01 | 1.4695E-01 | 0.236E+00 |
| Am-241 #A | -2.1685E-02 | 7.9536E-02 | 7.9548E-02 | 0.135E+00 |
| PB-210 #A | -2.4855E-02 | 9.7984E-01 | 9.7984E-01 | 0.174E+01 |
| U-238 A | 4.7628E-01 | 5.0860E-01 | 5.0992E-01 | 0.116E+01 |
| K-40 | 1.3606E+01 | 1.3473E+00 | 1.6038E+00 | 0.491E+00 |
| PB-214 | 4.5219E-01 | 9.9235E-02 | 1.0609E-01 | 0.123E+00 |
| BI-214 | 3.6345E-01 | 1.0653E-01 | 1.0867E-01 | 0.114E+00 |
| BI-212 #A | 1.2454E-01 | 2.0639E-01 | 2.0654E-01 | 0.363E+00 |
| PB-212 # | 3.0826E-01 | 8.4751E-02 | 8.7411E-02 | 0.104E+00 |
| TL-208 # | 6.7392E-02 | 4.0898E-02 | 4.1111E-02 | 0.635E-01 |
| PA-234 #A | 1.0035E-01 | 1.1523E-01 | 1.1546E-01 | 0.120E+00 |
| CS-137 #A | -2.1361E-03 | 8.5442E-02 | 8.5442E-02 | 0.473E-01 |
| CO-60 #B | -2.4716E-03 | 7.4218E-02 | 7.4218E-02 | 0.850E-01 |
| EU-152 #A | 6.4064E-02 | 9.3568E-02 | 9.4574E-02 | 0.225E+00 |
| EU-154 #A | 1.4608E-02 | 6.1430E-02 | 6.1438E-02 | 0.684E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

American Radiation Services Spectrum name: ARS07973.An1

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 238.5 to 2000.1 keV) | 1.521E+01 | pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-10 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-021 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 021 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 4.6653E-02 | pCi/g | 4.5636E-02 | 3.3300E-01 | 1.6650E-01 | 1332.50 | 1332.50 | 2.01 |
| **RA-226** | 0.0000E+00 | pCi/g | 6.7552E-01 | 1.1800E+00 | 5.9000E-01 | 1332.50 | 1332.50 | 2.01 |
| **RA-228** | 1.0094E+00 | pCi/g | 1.8739E-01 | 1.3800E-01 | 6.9000E-02 | 1332.50 | 1332.50 | 2.01 |
| **AM-241** | -5.5058E-03 | pCi/g | 7.7469E-02 | 1.3200E-01 | 6.6000E-02 | 1332.50 | 1332.50 | 2.01 |
| **PB-210** | 8.2061E-02 | pCi/g | 8.5262E-01 | 1.5100E+00 | 7.5500E-01 | 1332.50 | 1332.50 | 2.01 |
| **U-238** | 1.1316E+00 | pCi/g | 4.9006E-01 | 1.1000E+00 | 5.5000E-01 | 1332.50 | 1332.50 | 2.01 |
| **K-40** | 1.8945E+01 | pCi/g | 2.1803E+00 | 7.5900E-01 | 3.7950E-01 | 1332.50 | 1332.50 | 2.01 |
| **PB-214** | 7.8064E-01 | pCi/g | 1.2699E-01 | 9.3200E-02 | 4.6600E-02 | 1332.50 | 1332.50 | 2.01 |
| **BI-214** | 6.4403E-01 | pCi/g | 1.1976E-01 | 1.1500E-01 | 5.7500E-02 | 1332.50 | 1332.50 | 2.01 |
| **BI-212** | 5.8475E-01 | pCi/g | 3.1853E-01 | 4.1600E-01 | 2.0800E-01 | 1332.50 | 1332.50 | 2.01 |
| **PB-212** | 9.7460E-01 | pCi/g | 1.3515E-01 | 1.1000E-01 | 5.5000E-02 | 1332.50 | 1332.50 | 2.01 |
| **TL-208** | 3.1915E-01 | pCi/g | 6.1628E-02 | 5.3400E-02 | 2.6700E-02 | 1332.50 | 1332.50 | 2.01 |
| **PA-234** | ~~1.4335E-01~~ 6.232E-02 | pCi/g | 1.5907E-01 | 1.1500E-01 | 5.7500E-02 | 1332.50 | 1332.50 | 2.01 |
| **CS-137** | -1.8542E-02 | pCi/g | 4.6246E-02 | 6.4300E-02 | 3.2150E-02 | 1332.50 | 1332.50 | 2.01 |
| **CO-60** | -2.9590E-03 | pCi/g | 2.4060E-01 | 7.4800E-02 | 3.7400E-02 | 1332.50 | 1332.50 | 2.01 |
| **EU-152** | 4.4536E-02 | pCi/g | 1.0411E-01 | 2.1500E-01 | 1.0750E-01 | 1332.50 | 1332.50 | 2.01 |
| **EU-154** | 4.7613E-02 | pCi/g | 1.0547E-01 | 7.7000E-02 | 3.8500E-02 | 1332.50 | 1332.50 | 2.01 |
| **Total Gamma** | 2.4753E+01 | pCi/g | | | | 1332.50 | 1332.50 | 2.01 |
| **Total NORM Activity** | 6.9944E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 09:30:36
American Radiation Services     Spectrum name: ARS05349.An1

Sample description
     Batch ID:  16-00697-10
     SDG:  ARS1-16-00670-021  Tech:  WJS

Spectrum Filename: C:\User\ARS05349.An1

Acquisition information
       Start time:                5/5/2016 09:15:33
       Live time:               3600
       Real time:               3603
       Dead time:                 0.08 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.4738E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.4738E+02) =
                                  2.8787E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 09:30:36
American Radiation Services Spectrum name: ARS05349.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 28 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2223

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.38 | 11. | 75.30 | 0.00 | 7.349E-03 | | | | |
| 39.76 | 14. | 142.75 | 0.75 | 2.213E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 4.478E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 4.478E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 8.571E-02 | EU152 |
| 40.10 | 12. | 164.46 | 0.75 | 2.259E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 3.871E-02 | EU152 |
| 42.31 | 2. | 574.87 | 0.74 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 43.00 | 8. | 190.71 | 0.74 | 2.481E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 45.40 | 4. | 472.19 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | 3.834E-02 | EU152 |
| 46.41 | 63. | 31.34 | 0.53 | 2.745E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 48.81 | 5. | 410.40 | 0.75 | 2.876E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| 54.51 | 98. | 25.27 | 0.61 | 3.325E-02 | | | | |
| 63.33 | 102. | 25.21 | 0.78 | 4.054E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.75 | 260. | 11.15 | 0.79 | 4.754E-02 | | | | |
| 77.07 | 451. | 6.84 | 0.79 | 4.854E-02 | | | | |
| 87.16 | 180. | 13.32 | 0.81 | 5.139E-02 | | | | |
| 89.89 | 70. | 32.16 | 0.82 | 5.181E-02 | | | | |
| 92.42 | 29. | 86.20 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.95 | 129. | 20.55 | 1.02 | 5.213E-02 | 92.80 | 3.000 | 1.497E+00 | U238 |
| 98.49 | 38. | 52.96 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 98.44 | 25.100 | PBC<MDA | PA234 |
| 99.40 | 38. | 55.36 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 3.308E-01 | PA234 |
| 121.55 | 14. | 150.68 | 0.87 | 5.064E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 121.78 | 29.240 | 2.000E-02 | EU152 |
| 123.64 | 16. | 136.90 | 0.87 | 5.046E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 131.18 | 7. | 209.11 | 0.88 | 4.930E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| | | | | | 131.28 | 20.000 | PBC<MDA | PA234 |
| 143.76 | 17. | 107.95 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 186.00 | 114. | 22.80 | 0.65 | 4.123E-02 | 185.72 | 57.200 | 8.367E-02 | U235 |
| | | | | | 186.21 | 3.640 | 1.355E+00 | RA226 |
| 226.72 | 6. | 252.81 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.53 | 765. | 4.25 | 1.05 | 3.537E-02 | 238.63 | 43.100 | 1.056E+00 | PB212 |
| 241.70 | 136. | 14.95 | 1.06 | 3.508E-02 | 241.98 | 7.500 | 1.115E+00 | PB214 |
| 255.38 | 5. | 197.38 | 0.22 | 3.387E-02 | | | | |
| 269.74 | 58. | 33.86 | 0.58 | 3.271E-02 | | | | |
| 277.23 | 12. | 108.88 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 294.98 | 209. | 10.41 | 0.97 | 3.088E-02 | 295.21 | 18.500 | 7.397E-01 | PB214 |
| 300.38 | 45. | 32.63 | 0.64 | 3.054E-02 | 300.09 | 3.270 | 9.769E-01 | PB212 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 09:30:36
American Radiation Services Spectrum name: ARS05349.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 338.16 | 177. | 11.53 | 1.04 | 2.828E-02 | 338.40 | 12.010 | 1.115E+00 | Ra228 |
| 351.76 | 369. | 6.15 | 1.32 | 2.756E-02 | 351.92 | 35.800 | 7.711E-01 | PB214 |
| 510.33 | 140. | 11.05 | 1.87 | 2.149E-02 | 510.72 | 22.500 | 6.278E-01 | TL208 |
| 582.84 | 256. | 8.61 | 1.37 | 1.958E-02 | 583.14 | 86.000 | 3.192E-01 | TL208 |
| 588.86 | 1. | 821.27 | 1.54 | 1.936E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 608.99 | 277. | 8.11 | 1.45 | 1.896E-02 | 609.31 | 44.791 | 6.689E-01 | BI214 |
| 727.25 | 46. | 25.63 | 1.70 | 1.656E-02 | 727.17 | 11.800 | 5.120E-01 | BI212 |
| 756.16 | 10. | 107.93 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 763.37 | 8. | 146.16 | 1.74 | 1.592E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 767.90 | 33. | 31.95 | 0.31 | 1.584E-02 | 768.36 | 4.799 | 9.509E-01 | BI214 |
| 785.53 | 12. | 78.48 | 1.76 | 1.556E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 860.54 | 49. | 24.90 | 0.57 | 1.439E-02 | 860.47 | 12.000 | 6.128E-01 | TL208 |
| 879.18 | 7. | 139.89 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 899.31 | 8. | 102.98 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| | | | | | 898.60 | 4.000 | PBC<MDA | PA234 |
| 910.76 | 184. | 8.38 | 1.46 | 1.368E-02 | 911.07 | 29.000 | 1.000E+00 | Ra228 |
| 933.82 | 24. | 43.17 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 948.25 | 13. | 70.99 | 1.93 | 1.318E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.43 | 29. | 37.66 | 1.94 | 1.298E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 964.00 | 14.580 | 3.151E-01 | EU152 |
| 968.73 | 103. | 11.99 | 1.94 | 1.292E-02 | 968.90 | 17.460 | 9.906E-01 | Ra228 |
| 1091.56 | 4. | 218.22 | 2.05 | 1.156E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | 7.262E-02 | EU152 |
| 1120.26 | 44. | 28.98 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | 5.688E-01 | BI214 |
| 1237.75 | 9. | 111.48 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.09 | 3. | 246.62 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1460.15 | 796. | 3.80 | 2.08 | 8.229E-03 | 1460.75 | 10.700 | 1.913E+01 | K40 |
| 1619.95 | 7. | 98.73 | 2.38 | 7.151E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1763.96 | 46. | 17.02 | 0.66 | 6.316E-03 | 1764.49 | 15.357 | 1.027E+00 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 81.00 | 20.38 | 36. | 11. | 0.003 | 150.59 | 0.000 | - | |
| 217.59 | 54.51 | 244. | 98. | 0.027 | 50.53 | 0.607 | LU-177 | |
| 298.56 | 74.74 | 336. | 210. | 0.058 | 28.86 | 0.713 | TH-234 | |
| 307.84 | 77.06 | 320. | 414. | 0.115 | 16.17 | 0.889 | PB-212 | |
| 348.29 | 87.17 | 198. | 195. | 0.054 | 25.76 | 1.175 | TL-208 | s |
| 359.23 | 89.90 | 222. | 78. | 0.022 | 61.02 | 0.715 | AC-228 | sM |
| 1021.58 | 255.38 | 47. | 5. | 0.001 | 394.76 | 0.221 | SN-113 | sc |
| 1079.09 | 269.74 | 117. | 58. | 0.016 | 67.71 | 0.581 | AC-228 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI.Lib

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 09:30:36
American Radiation Services Spectrum name: ARS05349.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.55 | 39.76 | 194. | 14. | 0.004 | 285.51 | 0.750s |
| EU-152 | 159.91 | 40.10 | 193. | 12. | 0.003 | 328.91 | 0.750s |
| EU-154 | 168.76 | 42.31 | 91. | 2. | 0.001 | 1149.75 | 0.737D |
| EU-154 | 171.52 | 43.00 | 106. | 8. | 0.002 | 381.42 | 0.738D |
| EU-152 | 181.13 | 45.40 | 200. | 4. | 0.001 | 944.38 | 0.750s |
| PB-210 | 186.13 | 46.65 | 253. | 4. | 0.001 | 103.02 | 0.750s |
| EU-154 | 194.79 | 48.81 | 239. | 5. | 0.001 | 820.80 | 0.750s |
| Am-241 | 240.02 | 60.11 | 290. | -3. | -0.001 | 1407.04 | 0.766s |
| U-238 | 252.90 | 63.33 | 276. | 79. | 0.022 | 50.43 | 0.776 |
| U-238 | 369.17 | 92.38 | 316. | 29. | 0.008 | 172.40 | 0.820D |
| U-238 | 370.85 | 92.80 | 251. | 82. | 0.023 | 46.62 | 0.821D |
| PA-234 | 375.74 | 94.02 | 376. | -18. | -0.005 | 312.74 | 0.824s |
| PA-234 | 393.61 | 98.49 | 209. | 38. | 0.011 | 105.93 | 0.830s |
| PA-234 | 397.27 | 99.40 | 199. | 38. | 0.010 | 110.71 | 0.832s |
| EU-152 | 485.94 | 121.55 | 206. | 14. | 0.004 | 301.37 | 0.868s |
| EU-154 | 494.31 | 123.64 | 226. | 16. | 0.004 | 273.80 | 0.870s |
| PA-234 | 524.47 | 131.18 | 265. | 7. | 0.002 | 418.22 | 0.883s |
| U-235 | 574.82 | 143.76 | 252. | 17. | 0.005 | 215.90 | 0.903s |
| U-235 | 652.08 | 163.06 | 242. | -23. | -0.006 | 243.18 | 0.934s |
| U-235 | 742.77 | 185.72 | 231. | 51. | 0.014 | 97.76 | 0.969D |
| RA-226 | 744.73 | 186.21 | 286. | 0. | 0.000 | 296.31 | 0.970D |
| PA-234 | 906.86 | 226.72 | 151. | 6. | 0.002 | 505.62 | 1.033s |
| PB-212 | 953.86 | 238.46 | 258. | 687. | 0.191 | 10.39 | 0.948 |
| PB-214 | 966.54 | 241.63 | 170. | 113. | 0.031 | 40.84 | 0.752s |
| EU-152 | 972.85 | 243.20 | 225. | -48. | -0.013 | 93.14 | 1.060s |
| TL-208 | 1109.03 | 277.23 | 125. | 12. | 0.003 | 217.77 | 1.109s |
| PB-214 | 1180.09 | 294.98 | 113. | 195. | 0.054 | 20.83 | 0.975 |
| PB-212 | 1201.72 | 300.38 | 78. | 45. | 0.013 | 65.27 | 0.643s |
| Ra-228 | 1352.94 | 338.16 | 80. | 175. | 0.049 | 23.07 | 1.037 |
| EU-152 | 1380.49 | 345.04 | 120. | -3. | -0.001 | 1184.84 | 1.206s |
| PB-214 | 1407.39 | 351.76 | 73. | 352. | 0.098 | 12.30 | 1.322 |
| TL-208 | 2042.09 | 510.33 | 132. | 140. | 0.039 | 22.09 | 1.873s |
| TL-208 | 2332.33 | 582.84 | 69. | 249. | 0.069 | 17.22 | 1.373 |
| EU-154 | 2356.43 | 588.86 | 52. | 1. | 0.000 | 1642.55 | 1.536s |
| BI-214 | 2437.02 | 608.99 | 83. | 263. | 0.073 | 16.22 | 1.447 |
| CS-137 | 2648.93 | 661.93 | 83. | -13. | -0.004 | 226.22 | 1.621s |
| PA-234 | 2785.52 | 696.05 | 53. | -11. | -0.003 | 205.49 | 1.664s |
| EU-154 | 2896.00 | 723.65 | 97. | -13. | -0.004 | 220.85 | 1.692 |
| BI-212 | 2910.41 | 727.25 | 56. | 46. | 0.013 | 51.27 | 1.696s |
| PA-234 | 2934.48 | 733.27 | 65. | -7. | -0.002 | 324.47 | 1.703s |
| EU-154 | 3026.13 | 756.16 | 62. | 10. | 0.003 | 215.86 | 1.729 |
| TL-208 | 3054.98 | 763.37 | 65. | 8. | 0.002 | 292.33 | 1.737 |
| BI-214 | 3073.12 | 767.90 | 29. | 33. | 0.009 | 63.90 | 0.307s |
| BI-212 | 3143.67 | 785.53 | 37. | 12. | 0.003 | 156.96 | 1.760 |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3236.40 | 808.69 | 52. | -6. | -0.002 | 356.78 | 1.785s |
| PA-234 | 3325.79 | 831.02 | 54. | -9. | -0.002 | 250.80 | 1.809s |
| TL-208 | 3443.96 | 860.54 | 31. | 49. | 0.014 | 49.80 | 0.569s |
| EU-152 | 3464.09 | 865.57 | 40. | -3. | -0.001 | 1021.07 | 1.846s |
| EU-154 | 3491.26 | 872.36 | 52. | -11. | -0.003 | 223.59 | 1.852 |
| PA-234 | 3518.58 | 879.18 | 42. | 7. | 0.002 | 279.77 | 1.860s |
| PA-234 | 3534.96 | 883.28 | 57. | -7. | -0.002 | 334.38 | 1.862s |
| PA-234 | 3599.16 | 899.31 | 40. | 8. | 0.002 | 205.96 | 1.878s |
| Ra-228 | 3644.99 | 910.76 | 23. | 184. | 0.051 | 16.76 | 1.458s |
| BI-214 | 3737.28 | 933.82 | 41. | 24. | 0.007 | 86.34 | 1.912s |
| PA-234 | 3784.67 | 945.65 | 54. | -2. | -0.001 | 865.10 | 1.923s |
| PA-234 | 3795.08 | 948.25 | 42. | 13. | 0.004 | 141.97 | 1.926s |
| EU-152 | 3867.31 | 966.30 | 138. | -24. | -0.007 | 149.53 | 1.940s |
| Ra-228 | 3860.51 | 964.60 | 45. | 29. | 0.008 | 75.32 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 29. | 103. | 0.029 | 23.98 | 1.945D |
| EU-154 | 3988.51 | 996.58 | 44. | -4. | -0.001 | 504.14 | 1.970s |
| EU-152 | 4368.73 | 1091.56 | 36. | 4. | 0.001 | 436.44 | 2.048s |
| EU-152 | 4449.38 | 1111.70 | 61. | -5. | -0.001 | 421.33 | 2.070s |
| BI-214 | 4483.64 | 1120.26 | 58. | 44. | 0.012 | 57.96 | 2.077s |
| BI-214 | 4953.98 | 1237.75 | 58. | 9. | 0.003 | 222.96 | 2.167s |
| CO-60 | 5343.33 | 1335.01 | 33. | -4. | -0.001 | 621.04 | 2.231s |
| BI-214 | 5511.80 | 1377.09 | 30. | 3. | 0.001 | 493.23 | 2.259s |
| PA-234 | 5580.18 | 1394.17 | 22. | -3. | -0.001 | 474.67 | 2.268s |
| K-40 | 5844.23 | 1460.13 | 37. | 771. | 0.214 | 7.54 | 2.077 |
| BI-212 | 6484.04 | 1619.95 | 19. | 7. | 0.002 | 197.45 | 2.381s |
| BI-214 | 7060.61 | 1763.96 | 9. | 46. | 0.013 | 34.04 | 0.664s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 4.6653E-02 | | | | | |
| | | | 185.72 | 4.665E-02 | } P | 6.732E-02 | 4.89E+01 G K |
| | | | 143.76 | 7.567E-02 | ?(P | 3.330E-01 | 1.08E+02 G |
| | | | 205.31 | -7.057E-02 | & P | 7.799E-01 | 7.22E+02 G |
| | | | 163.35 | -2.375E-01 | + P | 7.782E-01 | 1.22E+02 G |
| RA-226 | | 0.0000E+00 | | | | | |
| | | | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 1.175E+00 | 1.48E+02 G K |

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American Radiation Services Spectrum name: ARS05349.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Ra-228 | | 1.0094E+00 | | | | | | |
| | | | 911.07 | 1.000E+00 | (P | 1.375E-01 | 8.38E+00 | G |
| | | | 968.90 | 9.906E-01 | (P | 2.646E-01 | 1.20E+01 | G |
| | | | 338.40 | 1.115E+00 | (P | 2.823E-01 | 1.15E+01 | G |
| | | | 964.60 | 8.850E-01 | ( | 1.038E+00 | 3.77E+01 | G |
| Am-241 | T | -5.5058E-03 | | | | | | |
| | | | 59.54 | -5.506E-03 | ?( | 1.316E-01 | 7.04E+02 | G K |
| PB-210 | | 8.2061E-02 | | | | | | |
| | | | 46.52 | 8.206E-02 | ?(P | 1.507E+00 | 5.15E+01 | G |
| U-238 | | 1.1316E+00 | | | | | | |
| | | | 63.29 | 1.075E+00 | (P | 1.097E+00 | 2.52E+01 | G |
| | | | 92.80 | 1.132E+00 | } P | 1.058E+00 | 2.33E+01 | G |
| | | | 92.38 | 4.617E-01 | } P | 1.381E+00 | 8.62E+01 | G |
| K-40 | | 1.8945E+01 | | | | | | |
| | | | 1460.75 | 1.894E+01 | (P | 7.588E-01 | 3.77E+00 | G |
| PB-214 | | 7.8064E-01 | | | | | | |
| | | | 351.92 | 7.711E-01 | (P | 9.319E-02 | 6.15E+00 | G |
| | | | 295.21 | 7.397E-01 | (P | 1.973E-01 | 1.04E+01 | G |
| | | | 241.98 | 9.270E-01 | (P | 5.222E-01 | 2.04E+01 | G |
| BI-214 | | 6.4403E-01 | | | | | | |
| | | | 609.31 | 6.689E-01 | (P | 1.152E-01 | 8.11E+00 | G |
| | | | 1764.49 | 1.027E+00 | + P | 3.700E-01 | 1.70E+01 | G |
| | | | 1120.29 | 5.688E-01 | ?( | 4.985E-01 | 2.90E+01 | G |
| | | | 1238.11 | 3.324E-01 | - P | 1.398E+00 | 1.11E+02 | G |
| | | | 768.36 | 9.509E-01 | + P | 7.851E-01 | 3.19E+01 | G |
| | | | 1377.67 | 2.014E-01 | - | 1.763E+00 | 2.47E+02 | G |
| | | | 934.06 | 1.269E+00 | + | 1.733E+00 | 4.32E+01 | G |
| BI-212 | | 5.8475E-01 | | | | | | |
| | | | 727.17 | 5.120E-01 | ?(P | 4.164E-01 | 2.56E+01 | G |
| | | | 1620.56 | 7.292E-01 | ?(P | 2.552E+00 | 9.87E+01 | G |
| | | | 785.42 | 8.152E-01 | (P | 2.146E+00 | 7.85E+01 | G |
| PB-212 | | 9.7460E-01 | | | | | | |
| | | | 238.63 | 9.744E-01 | (P | 1.100E-01 | 5.20E+00 | G |
| | | | 300.09 | 9.769E-01 | (P | 9.483E-01 | 3.26E+01 | G |
| TL-208 | | 3.1915E-01 | | | | | | |
| | | | 583.14 | 3.192E-01 | (P | 5.336E-02 | 8.61E+00 | G |
| | | | 510.72 | 6.278E-01 | + P | 2.510E-01 | 1.10E+01 | G |
| | | | 860.47 | 6.128E-01 | + P | 3.587E-01 | 2.49E+01 | G |

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American Radiation Services Spectrum name: ARS05349.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 277.36 | 1.274E-01 | - P | 5.681E-01 | 1.09E+02 | G |
| | | 763.30 | 6.414E-01 | + | 3.214E+00 | 1.46E+02 | G |
| PA-234 | 1.4335E-01 | | | | | | |
| | | 98.44 | 6.232E-02 | (P | 1.153E-01 | 5.30E+01 | G |
| | | 946.00 | -1.978E-02 | - | 3.010E-01 | 4.33E+02 | G |
| | | 131.28 | 1.558E-02 | - P | 1.722E-01 | 2.09E+02 | G |
| | | 94.67 | -4.733E-02 | - | 2.483E-01 | 1.56E+02 | G |
| | | 883.24 | -8.992E-02 | - P | 4.863E-01 | 1.67E+02 | G |
| | | 926.70 | 1.079E-02 | & | 4.820E-01 | 1.25E+03 | G |
| | | 569.26 | -3.193E-02 | % P | 4.413E-01 | 3.07E+03 | G |
| | | 111.00 | 3.792E-03 | & | 3.751E-01 | 2.90E+03 | G |
| | | 733.00 | -1.115E-01 | - | 6.222E-01 | 1.62E+02 | G |
| | | 949.00 | 2.730E-01 | &(P | 6.923E-01 | 7.10E+01 | G |
| | | 880.51 | 1.593E-01 | &(P | 7.716E-01 | 1.40E+02 | G |
| | | 226.87 | 5.700E-02 | &(P | 5.463E-01 | 2.53E+02 | G |
| | | 831.10 | -2.246E-01 | - | 9.636E-01 | 1.25E+02 | G |
| | | 808.10 | -1.701E-01 | - | 1.051E+00 | 1.78E+02 | G |
| | | 99.70 | 3.308E-01 | &( | 6.005E-01 | 5.54E+01 | G |
| | | 699.10 | -2.945E-01 | & P | 1.004E+00 | 1.03E+02 | G |
| | | 898.60 | 2.931E-01 | &(P | 1.252E+00 | 1.03E+02 | G |
| | | 1394.10 | -1.841E-01 | - | 1.567E+00 | 2.37E+02 | G |
| CS-137 | -1.8542E-02 | | | | | | |
| | | 661.66 | -1.854E-02 | ?(P | 6.428E-02 | 1.13E+02 | G |
| CO-60 | -2.9590E-03 | | | | | | |
| | | 1173.24 | -2.959E-03 | %(P | 7.477E-02 | 1.68E+03 | K |
| | | 1332.50 | -9.221E-03 | + P | 6.922E-02 | 3.11E+02 | K |
| EU-152 | 4.4536E-02 | | | | | | |
| | | 40.12 | 3.871E-02 | ( | 2.152E-01 | 1.64E+02 | G |
| | | 121.78 | 2.000E-02 | ?( | 1.017E-01 | 1.51E+02 | G |
| | | 344.30 | -7.535E-03 | - | 1.541E-01 | 5.92E+02 | G |
| | | 1408.08 | 9.030E-03 | & | 3.279E-01 | 1.00E+03 | G |
| | | 39.52 | 8.571E-02 | &( | 4.126E-01 | 1.43E+02 | G |
| | | 964.00 | -2.787E-01 | & P | 6.565E-01 | 7.48E+01 | G |
| | | 1112.07 | -7.539E-02 | + | 5.504E-01 | 2.11E+02 | G |
| | | 778.90 | 5.538E-04 | & | 3.810E-01 | 1.93E+04 | G |
| | | 1085.80 | 7.262E-02 | ?( | 5.576E-01 | 2.18E+02 | G |
| | | 45.40 | 3.834E-02 | ?( | 6.178E-01 | 4.72E+02 | G |
| | | 244.67 | -3.908E-01 | + | 5.922E-01 | 4.66E+01 | G |
| | | 867.39 | -9.925E-02 | + P | 1.165E+00 | 5.11E+02 | G |
| EU-154 | 4.7613E-02 | | | | | | |
| | | 123.10 | 1.671E-02 | ?( | 7.698E-02 | 1.37E+02 | G |
| | | 1274.80 | -2.790E-03 | % | 2.134E-01 | 2.14E+03 | G |
| | | 723.30 | -8.595E-02 | + | 3.206E-01 | 1.10E+02 | G |

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American Radiation Services Spectrum name: ARS05349.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| | | 1004.80 | -1.779E-02 | & P | 3.012E-01 | 8.27E+02 G |
| | | 43.00 | 5.174E-02 | ( | 3.373E-01 | 1.91E+02 G |
| | | 873.20 | -1.514E-01 | + P | 4.904E-01 | 1.12E+02 G |
| | | 996.30 | -6.097E-02 | + | 5.393E-01 | 2.52E+02 G |
| | | 42.31 | 2.874E-02 | ( | 5.740E-01 | 5.75E+02 G |
| | | 248.04 | -1.052E-02 | % | 5.331E-01 | 1.47E+03 G |
| | | 591.70 | 3.027E-02 | ?( | 8.801E-01 | 8.21E+02 G |
| | | 48.70 | 9.584E-02 | ?( | 1.337E+00 | 4.10E+02 G |
| | | 756.70 | 3.430E-01 | (P | 1.292E+00 | 1.08E+02 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 4.6653E-02 | 4.5512E-02 | 4.5636E-02 | 0.333E+00 |
| RA-226 #B | 0.0000E+00 | 6.7552E-01 | 6.7552E-01 | 0.118E+01 |
| Ra-228 | 1.0094E+00 | 1.7525E-01 | 1.8739E-01 | 0.138E+00 |
| Am-241 #A | -5.5058E-03 | 7.7468E-02 | 7.7469E-02 | 0.132E+00 |
| PB-210 #A | 8.2061E-02 | 8.5259E-01 | 8.5262E-01 | 0.151E+01 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 09:30:36
American Radiation Services Spectrum name: ARS05349.An1

| | | | | |
|---|---|---|---|---|
| U-238 | 1.1316E+00 | 4.8205E-01 | 4.9006E-01 | 0.110E+01 |
| K-40 | 1.8945E+01 | 1.4604E+00 | 2.1803E+00 | 0.759E+00 |
| PB-214 | 7.8064E-01 | 1.0063E-01 | 1.2699E-01 | 0.932E-01 |
| BI-214 | 6.4403E-01 | 1.1014E-01 | 1.1976E-01 | 0.115E+00 |
| BI-212 | 5.8475E-01 | 3.1575E-01 | 3.1853E-01 | 0.416E+00 |
| PB-212 | 9.7460E-01 | 1.0421E-01 | 1.3515E-01 | 0.110E+00 |
| TL-208 | 3.1915E-01 | 5.6603E-02 | 6.1628E-02 | 0.534E-01 |
| PA-234 # | 1.4335E-01 | 1.5871E-01 | 1.5907E-01 | 0.115E+00 |
| CS-137 #A | -1.8542E-02 | 4.6234E-02 | 4.6246E-02 | 0.643E-01 |
| CO-60 #B | -2.9590E-03 | 2.4060E-01 | 2.4060E-01 | 0.748E-01 |
| EU-152 #A | 4.4536E-02 | 1.0398E-01 | 1.0411E-01 | 0.215E+00 |
| EU-154 A | 4.7613E-02 | 1.0542E-01 | 1.0547E-01 | 0.770E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 996.2 to 1998.6 keV) 2.457E+01 pCi/g

INTERNATIONAL

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00697-11 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | ARS1-16-00670-022 | | |
| AnalysisBatch | ARS1-B16-00697 | Geometry | 250mL Tuna Can 1748- |
| SDG | ARS1-16-00670 | Fraction | 022 |
| AnalysisCode | GAM-A-025 | Run | 2 |
| Library | ITSI.Lib | Detector ID | 1 |
| | | Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 8.6879E-02 | pCi/g | 4.2679E-02 | 6.3800E-02 | 3.1900E-02 | 1332.50 | 1332.50 | 2.01 |
| RA-226 | 1.1542E+00 | pCi/g | 7.2011E-01 | 1.0500E+00 | 5.2500E-01 | 1332.50 | 1332.50 | 2.01 |
| RA-228 | 4.9045E-01 | pCi/g | 1.2541E-01 | 1.9400E-01 | 9.7000E-02 | 1332.50 | 1332.50 | 2.01 |
| AM-241 | 3.0334E-02 | pCi/g | 8.6100E-02 | 1.4500E-01 | 7.2500E-02 | 1332.50 | 1332.50 | 2.01 |
| PB-210 | 4.1337E-01 | pCi/g | 1.0042E+00 | 1.6500E+00 | 8.2500E-01 | 1332.50 | 1332.50 | 2.01 |
| U-238 | 7.5269E-01 | pCi/g | 4.7302E-01 | 1.2400E+00 | 6.2000E-01 | 1332.50 | 1332.50 | 2.01 |
| K-40 | 9.9612E+00 | pCi/g | 1.3047E+00 | 4.9100E-01 | 2.4550E-01 | 1332.50 | 1332.50 | 2.01 |
| PB-214 | 6.7580E-01 | pCi/g | 1.3495E-01 | 1.1800E-01 | 5.9000E-02 | 1332.50 | 1332.50 | 2.01 |
| BI-214 | 5.7848E-01 | pCi/g | 1.2757E-01 | 1.2600E-01 | 6.3000E-02 | 1332.50 | 1332.50 | 2.01 |
| BI-212 | 3.3218E-01 | pCi/g | 3.8195E-01 | 4.8800E-01 | 2.2400E-01 | 1332.50 | 1332.50 | 2.01 |
| PB-212 | 5.0676E-01 | pCi/g | 1.0857E-01 | 1.2000E-01 | 6.0000E-02 | 1332.50 | 1332.50 | 2.01 |
| TL-208 | 2.2933E-01 | pCi/g | 5.8022E-02 | 5.5200E-02 | 2.7600E-02 | 1332.50 | 1332.50 | 2.01 |
| PA-234 | 4.8703E-02 | pCi/g | 9.9264E-02 | 1.3600E-01 | 6.8000E-02 | 1332.50 | 1332.50 | 2.01 |
| CS-137 | -3.0452E-03 | pCi/g | 3.4728E-02 | 6.2200E-02 | 3.1100E-02 | 1332.50 | 1332.50 | 2.01 |
| CO-60 | -1.1817E-02 | pCi/g | 4.4040E-02 | 7.7500E-02 | 3.8750E-02 | 1332.50 | 1332.50 | 2.01 |
| EU-152 | 7.8429E-02 | pCi/g | 1.1378E-01 | 2.3400E-01 | 1.1700E-01 | 1332.50 | 1332.50 | 2.01 |
| EU-154 7.164E-02 ~~6.0477E-02~~ | | pCi/g | 8.4268E-02 | 5.9400E-02 | 2.9700E-02 | 1332.50 | 1332.50 | 2.01 |
| Total Gamma | 1.5399E+01 | pCi/g | | | | 1332.50 | 1332.50 | 2.01 |
| Total NORM Activity | 4.3157E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01319.An1

Sample description
Batch ID: 16-00697-11
SDG: ARS1-16-00670-022 Tech: WJS

Spectrum Filename: C:\User\ARS01319.An1

Acquisition information
Start time: 05-May-2016 09:16:05
Live time: 3600
Real time: 3607
Dead time: 0.21 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 2.9581E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 2.9581E+02) =
3.3805E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01319.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2341

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.11 | 13. | 134.92 | 0.90 | 2.184E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 5.132E-02 | EU152 |
| 43.00 | 3. | 739.95 | 0.90 | 2.358E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 2.099E-02 | EU154 |
| 46.70 | 17. | 35.51 | 0.52 | 2.560E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.44 | 15. | 141.88 | 0.91 | 3.389E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.04 | 68. | 32.14 | 0.59 | 3.609E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.86 | 154. | 14.23 | 0.93 | 4.216E-02 | | | | |
| 77.13 | 243. | 10.16 | 0.93 | 4.305E-02 | | | | |
| 92.39 | 36. | 59.11 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 93.01 | 172. | 13.64 | 1.20 | 4.686E-02 | 92.80 | 3.000 | 2.693E+00 | U238 |
| 111.14 | 4. | 417.79 | 0.96 | 4.739E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 121.19 | 5. | 240.12 | 0.97 | 4.645E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 143.77 | 10. | 115.61 | 0.98 | 4.380E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.53 | 16. | 91.36 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.31 | 98. | 19.06 | 0.90 | 3.760E-02 | 185.72 | 54.000 | 1.216E-01 | U235 |
| | | | | | 186.10 | 3.500 | 1.154E+00 | RA226 |
| 205.32 | 12. | 83.03 | 1.03 | 3.512E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 226.85 | 13. | 101.84 | 1.05 | 3.262E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.86 | 294. | 9.19 | 0.87 | 3.137E-02 | 238.63 | 43.100 | 5.068E-01 | PB212 |
| 277.01 | 21. | 54.42 | 0.28 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.28 | 103. | 14.47 | 1.27 | 2.661E-02 | 295.21 | 18.500 | 5.312E-01 | PB214 |
| 300.45 | 12. | 87.23 | 1.11 | 2.627E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.50 | 58. | 20.30 | 0.42 | 2.392E-02 | 338.40 | 12.010 | 5.096E-01 | Ra228 |
| 352.30 | 230. | 8.60 | 1.21 | 2.318E-02 | 351.92 | 35.800 | 6.758E-01 | PB214 |
| 511.09 | 78. | 12.77 | 1.07 | 1.747E-02 | 510.72 | 22.500 | 5.048E-01 | TL208 |
| 583.56 | 130. | 11.12 | 1.23 | 1.582E-02 | 583.14 | 86.000 | 2.212E-01 | TL208 |
| 609.57 | 157. | 9.55 | 1.52 | 1.532E-02 | 609.31 | 44.791 | 5.822E-01 | BI214 |

0.88 Spectrum name: ARS01319.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 727.15 | 14. | 54.88 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 733.14 | 5. | 144.24 | 1.43 | 1.337E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 755.24 | 10. | 69.59 | 1.45 | 1.306E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 769.04 | 5. | 158.52 | 1.46 | 1.291E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 785.14 | 7. | 109.00 | 1.47 | 1.270E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 860.94 | 14. | 50.91 | 0.52 | 1.186E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 874.27 | 6. | 111.78 | 1.53 | 1.173E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 883.71 | 5. | 110.66 | 1.54 | 1.163E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 898.24 | 3. | 197.63 | 1.55 | 1.147E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.54 | 74. | 13.47 | 0.81 | 1.135E-02 | 911.07 | 29.000 | 5.378E-01 | Ra228 |
| 929.62 | -1. | 772.52 | 1.57 | 1.121E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.16 | 7. | 104.25 | 1.57 | 1.114E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 945.67 | 1. | 295.47 | 1.58 | 1.103E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 969.13 | 39. | 23.32 | 1.60 | 1.083E-02 | 968.90 | 17.460 | 5.196E-01 | Ra228 |
| 995.18 | 5. | 138.27 | 1.62 | 1.060E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1120.73 | 22. | 35.43 | 1.70 | 9.654E-03 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1238.33 | 7. | 94.80 | 1.77 | 8.889E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.59 | 3. | 164.58 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.43 | 8. | 72.32 | 1.88 | 7.950E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.39 | 323. | 5.63 | 1.86 | 7.690E-03 | 1460.75 | 10.700 | 9.961E+00 | K40 |
| 1621.36 | 4. | 119.07 | 2.00 | 6.976E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.89 | 12. | 35.65 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.40 | 74.82 | 165. | 154. | 0.043 | 28.47 | 0.926 | TH-234 | D |
| 307.50 | 77.09 | 184. | 243. | 0.068 | 20.32 | 0.928 | PB-212 | D |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 159.35 | 40.11 | 153. | 13. | 0.004 | 269.84 | 0.897s |
| EU-154 | 169.35 | 42.61 | 188. | -14. | -0.004 | 275.08 | 0.899s |
| EU-154 | 170.91 | 43.00 | 177. | 3. | 0.001 | 1479.90 | 0.899s |
| EU-152 | 180.95 | 45.51 | 212. | -6. | -0.002 | 649.38 | 0.901s |
| PB-210 | 185.72 | 46.70 | 187. | 17. | 0.005 | 71.03 | 0.523s |

0.88 Spectrum name: ARS01319.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 196.13 | 49.30 | 218. | -7. | -0.002 | 583.15 | 0.904s |
| Am-241 | 236.70 | 59.44 | 206. | 15. | 0.004 | 283.77 | 0.913s |
| U-238 | 251.75 | 63.20 | 203. | 23. | 0.006 | 58.37 | 0.593s |
| U-238 | 368.51 | 92.38 | 252. | 36. | 0.010 | 118.23 | 0.940D |
| U-238 | 370.20 | 92.80 | 188. | 42. | 0.012 | 94.09 | 0.941D |
| PA-234 | 380.64 | 95.41 | 258. | -24. | -0.007 | 191.92 | 0.942s |
| PA-234 | 443.57 | 111.14 | 142. | 4. | 0.001 | 835.57 | 0.956s |
| EU-152 | 486.50 | 121.87 | 128. | -9. | -0.002 | 370.78 | 0.964s |
| EU-154 | 483.79 | 121.19 | 78. | 5. | 0.001 | 480.24 | 0.965s |
| PA-234 | 523.08 | 131.01 | 124. | -9. | -0.003 | 425.06 | 0.972s |
| U-235 | 574.16 | 143.77 | 165. | 10. | 0.003 | 231.22 | 0.982s |
| U-235 | 649.23 | 162.53 | 124. | 16. | 0.005 | 182.72 | 0.998s |
| U-235 | 743.46 | 186.08 | 108. | 70. | 0.019 | 48.54 | 1.016s |
| RA-226 | 744.36 | 186.31 | 123. | 60. | 0.017 | 38.13 | 0.897s |
| U-235 | 820.43 | 205.32 | 79. | 12. | 0.003 | 166.06 | 1.032s |
| PA-234 | 906.57 | 226.85 | 83. | 13. | 0.004 | 203.69 | 1.049s |
| PB-212 | 954.65 | 238.86 | 174. | 270. | 0.075 | 18.38 | 0.874 |
| PB-214 | 960.31 | 240.28 | 437. | -116. | -0.032 | 54.26 | 1.061s |
| EU-152 | 977.04 | 244.46 | 107. | -2. | -0.001 | 1324.78 | 1.064s |
| EU-154 | 990.70 | 247.87 | 68. | -5. | -0.001 | 500.01 | 1.066s |
| TL-208 | 1107.29 | 277.01 | 48. | 21. | 0.006 | 108.85 | 0.276s |
| PB-214 | 1180.36 | 295.28 | 60. | 103. | 0.029 | 28.93 | 1.271 |
| PB-212 | 1201.07 | 300.45 | 61. | 12. | 0.003 | 174.47 | 1.107s |
| Ra-228 | 1353.30 | 338.50 | 38. | 58. | 0.016 | 40.60 | 0.417s |
| PB-214 | 1408.52 | 352.30 | 60. | 221. | 0.061 | 17.19 | 1.212 |
| TL-208 | 2043.76 | 511.09 | 81. | 78. | 0.022 | 25.55 | 1.075 |
| PA-234 | 2264.96 | 566.38 | 42. | -10. | -0.003 | 216.73 | 1.314s |
| TL-208 | 2333.66 | 583.56 | 33. | 119. | 0.033 | 22.24 | 1.229s |
| EU-154 | 2366.04 | 591.65 | 26. | -2. | -0.001 | 742.09 | 1.330s |
| BI-214 | 2437.73 | 609.57 | 46. | 157. | 0.044 | 19.10 | 1.522 |
| CS-137 | 2647.17 | 661.93 | 35. | -1. | 0.000 | 1140.44 | 1.381s |
| EU-154 | 2896.37 | 724.23 | 49. | -9. | -0.003 | 227.13 | 1.426s |
| BI-212 | 2908.05 | 727.15 | 30. | 14. | 0.004 | 109.77 | 1.429s |
| PA-234 | 2932.01 | 733.14 | 29. | 5. | 0.001 | 288.48 | 1.433s |
| EU-154 | 3020.40 | 755.24 | 17. | 10. | 0.003 | 139.18 | 1.450s |
| TL-208 | 3048.44 | 762.25 | 32. | -2. | -0.001 | 902.64 | 1.455s |
| BI-214 | 3075.59 | 769.04 | 31. | 5. | 0.001 | 317.04 | 1.458s |
| EU-152 | 3107.49 | 777.01 | 20. | -3. | -0.001 | 419.25 | 1.466s |
| BI-212 | 3140.00 | 785.14 | 27. | 7. | 0.002 | 217.99 | 1.470s |
| PA-234 | 3231.83 | 808.10 | 29. | 0. | 0.000 | 2000.00 | 1.486s |
| TL-208 | 3443.16 | 860.94 | 16. | 14. | 0.004 | 101.82 | 0.517s |
| EU-152 | 3468.96 | 867.39 | 22. | 0. | 0.000 | 2000.00 | 1.528s |
| EU-154 | 3496.49 | 874.27 | 17. | 6. | 0.002 | 223.55 | 1.532s |
| PA-234 | 3534.22 | 883.71 | 15. | 5. | 0.001 | 221.32 | 1.539s |
| PA-234 | 3592.34 | 898.24 | 18. | 3. | 0.001 | 395.26 | 1.549s |
| Ra-228 | 3645.97 | 911.65 | 23. | 60. | 0.017 | 31.05 | 1.558s |
| BI-214 | 3736.02 | 934.16 | 23. | 7. | 0.002 | 208.50 | 1.573s |
| PA-234 | 3782.05 | 945.67 | 20. | 1. | 0.000 | 590.94 | 1.582s |

0.88 Spectrum name: ARS01319.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3791.02 | 947.92 | 23. | -4. | -0.001 | 390.10 | 1.584s |
| EU-152 | 3864.94 | 966.40 | 33. | -2. | -0.001 | 660.03 | 1.594s |
| Ra-228 | 3857.74 | 964.60 | 232. | 0. | 0.000 | 2000.00 | 1.594s |
| Ra-228 | 3875.88 | 969.13 | 30. | 39. | 0.011 | 46.64 | 1.597 |
| EU-154 | 3980.03 | 995.18 | 20. | 5. | 0.001 | 276.55 | 1.616s |
| EU-154 | 4010.62 | 1002.83 | 22. | -1. | 0.000 | 911.39 | 1.621s |
| EU-152 | 4342.43 | 1085.80 | 55. | 0. | 0.000 | 2000.00 | 1.675s |
| BI-214 | 4482.12 | 1120.73 | 33. | 22. | 0.006 | 70.87 | 1.698s |
| CO-60 | 4691.06 | 1172.99 | 30. | -4. | -0.001 | 372.65 | 1.732s |
| BI-214 | 4952.37 | 1238.33 | 21. | 7. | 0.002 | 189.59 | 1.773s |
| EU-154 | 5098.17 | 1274.80 | 26. | 0. | 0.000 | 2000.00 | 1.796s |
| CO-60 | 5328.88 | 1332.50 | 14. | 0. | 0.000 | 2000.00 | 1.832s |
| BI-214 | 5509.13 | 1377.59 | 15. | 3. | 0.001 | 329.17 | 1.860s |
| EU-152 | 5632.47 | 1408.43 | 12. | 8. | 0.002 | 144.65 | 1.878s |
| K-40 | 5844.19 | 1461.39 | 8. | 323. | 0.090 | 11.26 | 1.860 |
| BI-212 | 6483.70 | 1621.36 | 9. | 4. | 0.001 | 238.14 | 2.003s |
| BI-214 | 7057.41 | 1764.89 | 9. | 12. | 0.003 | 71.30 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 8.6879E-02 | | | | | | |
| | | | 185.72 | 8.688E-02 | ( | 6.380E-02 | 2.43E+01 G | |
| | | | 143.76 | 5.657E-02 | - P | 3.452E-01 | 1.16E+02 G | |
| | | | 205.31 | 1.887E-01 | & P | 6.772E-01 | 8.30E+01 G | |
| | | | 163.35 | 2.145E-01 | + P | 7.196E-01 | 9.14E+01 G | |
| RA-226 | | 1.1542E+00 | | | | | | |
| | | | 186.10 | 1.154E+00 | (P | 1.049E+00 | 1.91E+01 G | |
| Ra-228 | | 4.9045E-01 | | | | | | |
| | | | 911.07 | 4.650E-01 | ?(P | 1.938E-01 | 1.55E+01 G | |
| | | | 968.90 | 5.196E-01 | ?(P | 3.808E-01 | 2.33E+01 G | |
| | | | 338.40 | 5.096E-01 | (P | 2.788E-01 | 2.03E+01 G | |
| | | | 964.60 | 0.000E+00 | - | 3.159E+00 | 1.00E+03 G | |
| Am-241 | T | 3.0334E-02 | | | | | | |
| | | | 59.54 | 3.033E-02 | *( | 1.450E-01 | 1.42E+02 G | K |
| PB-210 | | 4.1337E-01 | | | | | | |
| | | | 46.52 | 4.134E-01 | (P | 1.648E+00 | 3.55E+01 G | |

0.88 Spectrum name: ARS01319.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| U-238 | 7.5269E-01 | | | | | | |
| | | 63.29 | 4.187E-01 | @(P | 1.240E+00 | 2.92E+01 | G |
| | | 92.80 | 7.527E-01 | } P | 1.204E+00 | 4.70E+01 | G |
| | | 92.38 | 7.527E-01 | } P | 1.618E+00 | 5.91E+01 | G |
| K-40 | 9.9612E+00 | | | | | | |
| | | 1460.75 | 9.961E+00 | (P | 4.909E-01 | 5.63E+00 | G |
| PB-214 | 6.7580E-01 | | | | | | |
| | | 351.92 | 6.758E-01 | (P | 1.184E-01 | 8.60E+00 | G |
| | | 295.21 | 5.312E-01 | - P | 2.000E-01 | 1.45E+01 | G |
| | | 241.98 | -1.264E+00 | - P | 1.090E+00 | 2.71E+01 | G |
| BI-214 | 5.7848E-01 | | | | | | |
| | | 609.31 | 5.822E-01 | (P | 1.263E-01 | 9.55E+00 | G |
| | | 1764.49 | 3.125E-01 | - P | 4.370E-01 | 3.57E+01 | G |
| | | 1120.29 | 3.946E-01 | - P | 5.267E-01 | 3.54E+01 | G |
| | | 1238.11 | 3.612E-01 | & | 1.172E+00 | 9.48E+01 | G |
| | | 768.36 | 2.107E-01 | - | 1.168E+00 | 1.59E+02 | G |
| | | 1377.67 | 2.772E-01 | - | 1.638E+00 | 1.65E+02 | G |
| | | 934.06 | 5.240E-01 | ?(P | 1.885E+00 | 1.04E+02 | G |
| BI-212 | 3.3218E-01 | | | | | | |
| | | 727.17 | 2.263E-01 | ?(P | 4.485E-01 | 5.49E+01 | G |
| | | 1620.56 | 5.074E-01 | ?( | 2.157E+00 | 1.19E+02 | G |
| | | 785.42 | 7.161E-01 | ?( | 2.687E+00 | 1.09E+02 | G |
| PB-212 | 5.0676E-01 | | | | | | |
| | | 238.63 | 5.068E-01 | (P | 1.203E-01 | 9.19E+00 | G |
| | | 300.09 | 3.591E-01 | - P | 1.159E+00 | 8.72E+01 | G |
| TL-208 | 2.2933E-01 | | | | | | |
| | | 583.14 | 2.212E-01 | (P | 5.522E-02 | 1.11E+01 | G |
| | | 510.72 | 5.048E-01 | + P | 2.881E-01 | 1.28E+01 | G |
| | | 860.47 | 2.528E-01 | (P | 3.790E-01 | 5.09E+01 | G |
| | | 277.36 | 2.931E-01 | (P | 4.891E-01 | 5.44E+01 | G |
| | | 763.30 | -2.197E-01 | - P | 3.362E+00 | 4.51E+02 | G |
| PA-234 | 4.8703E-02 | | | | | | |
| | | 98.44 | -6.136E-03 | &(P | 1.361E-01 | 6.06E+03 | G |
| | | 946.00 | 1.506E-02 | &(P | 2.731E-01 | 2.95E+02 | G |
| | | 131.28 | -2.515E-02 | + P | 1.526E-01 | 2.13E+02 | G |
| | | 94.67 | -8.429E-02 | + | 2.699E-01 | 9.60E+01 | G |
| | | 883.24 | 9.650E-02 | &( | 3.730E-01 | 1.11E+02 | G |
| | | 926.70 | -2.248E-02 | % P | 4.131E-01 | 7.73E+02 | G |
| | | 569.26 | -1.557E-01 | & P | 4.973E-01 | 1.08E+02 | G |
| | | 111.00 | 2.549E-02 | ?( | 3.654E-01 | 4.18E+02 | G |

0.88 Spectrum name: ARS01319.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 733.00 | 1.060E-01 | ?(P | 6.193E-01 | 1.44E+02 | G |
| | | 949.00 | -1.059E-01 | + | 7.355E-01 | 1.95E+02 | G |
| | | 880.51 | -5.297E-02 | % P | 7.942E-01 | 1.46E+03 | G |
| | | 226.87 | 1.571E-01 | ?( | 5.398E-01 | 1.02E+02 | G |
| | | 831.10 | -5.407E-02 | % P | 9.223E-01 | 1.30E+04 | G |
| | | 808.10 | 0.000E+00 | & | 1.159E+00 | 1.00E+03 | G |
| | | 99.70 | 2.617E-03 | % | 6.932E-01 | 7.68E+03 | G |
| | | 699.10 | -1.680E-02 | % | 1.082E+00 | 1.77E+03 | G |
| | | 898.60 | 1.694E-01 | ?(P | 1.229E+00 | 1.98E+02 | G |
| | | 1394.10 | -8.243E-03 | % | 1.441E+00 | 4.51E+03 | G |
| CS-137 | -3.0452E-03 | | | | | | |
| | | 661.66 | -3.045E-03 | ?( | 6.221E-02 | 5.70E+02 | G |
| CO-60 | -1.1817E-02 | | | | | | |
| | | 1173.24 | -1.182E-02 | ?( | 7.750E-02 | 1.86E+02 | K |
| | | 1332.50 | 0.000E+00 | + | 6.166E-02 | 1.00E+03 | K |
| EU-152 | 7.8429E-02 | | | | | | |
| | | 40.12 | 5.132E-02 | &( | 2.339E-01 | 1.35E+02 | G |
| | | 121.78 | -1.633E-02 | - | 1.031E-01 | 1.85E+02 | G |
| | | 344.30 | 1.763E-03 | & | 1.414E-01 | 2.25E+03 | G |
| | | 1408.08 | 1.168E-01 | ?( | 2.824E-01 | 7.23E+01 | G |
| | | 39.52 | 2.692E-03 | % | 4.573E-01 | 4.93E+03 | G |
| | | 964.00 | -4.002E-02 | - | 4.706E-01 | 3.30E+02 | G |
| | | 1112.07 | 7.200E-04 | % | 4.894E-01 | 1.84E+04 | G |
| | | 778.90 | -4.748E-02 | + | 3.572E-01 | 2.10E+02 | G |
| | | 1085.80 | 0.000E+00 | - | 9.278E-01 | 1.00E+03 | G |
| | | 45.40 | -7.200E-02 | & | 7.951E-01 | 3.25E+02 | G |
| | | 244.67 | -2.405E-02 | - | 5.515E-01 | 6.62E+02 | G |
| | | 867.39 | 0.000E+00 | & | 1.279E+00 | 1.00E+03 | G |
| EU-154 | 6.0477E-02 | | | | | | |
| | | 123.10 | 7.164E-03 | &( | 5.941E-02 | 2.40E+02 | G |
| | | 1274.80 | 0.000E+00 | - | 2.186E-01 | 1.00E+03 | G |
| | | 723.30 | -8.724E-02 | + | 3.382E-01 | 1.14E+02 | G |
| | | 1004.80 | -2.044E-02 | & | 3.391E-01 | 4.56E+02 | G |
| | | 43.00 | 2.099E-02 | &( | 5.321E-01 | 7.40E+02 | G |
| | | 873.20 | 1.092E-01 | &( | 4.248E-01 | 1.12E+02 | G |
| | | 996.30 | 1.094E-01 | ?( | 5.316E-01 | 1.38E+02 | G |
| | | 42.31 | -2.156E-01 | + | 9.995E-01 | 1.38E+02 | G |
| | | 248.04 | -5.994E-02 | + | 5.196E-01 | 2.50E+02 | G |
| | | 591.70 | -7.033E-02 | + | 9.395E-01 | 3.71E+02 | G |
| | | 48.70 | -1.624E-01 | + | 1.609E+00 | 2.92E+02 | G |
| | | 756.70 | 4.508E-01 | &( | 1.043E+00 | 6.96E+01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 # | 8.6879E-02 | 4.2171E-02 | 4.2679E-02 | 0.638E-01 |
| RA-226 # | 1.1542E+00 | 7.1630E-01 | 7.2011E-01 | 0.105E+01 |
| Ra-228 | 4.9045E-01 | 1.2141E-01 | 1.2541E-01 | 0.194E+00 |
| Am-241 #A | 3.0334E-02 | 8.6077E-02 | 8.6100E-02 | 0.145E+00 |
| PB-210 A | 4.1337E-01 | 1.0034E+00 | 1.0042E+00 | 0.165E+01 |
| U-238 A | 7.5269E-01 | 4.6937E-01 | 4.7302E-01 | 0.124E+01 |
| K-40 | 9.9612E+00 | 1.1384E+00 | 1.3047E+00 | 0.491E+00 |
| PB-214 | 6.7580E-01 | 1.2105E-01 | 1.3495E-01 | 0.118E+00 |
| BI-214 | 5.7848E-01 | 1.2239E-01 | 1.2757E-01 | 0.126E+00 |
| BI-212 #A | 3.3218E-01 | 3.8134E-01 | 3.8195E-01 | 0.448E+00 |
| PB-212 | 5.0676E-01 | 1.0130E-01 | 1.0857E-01 | 0.120E+00 |
| TL-208 | 2.2933E-01 | 5.6056E-02 | 5.8022E-02 | 0.552E-01 |
| PA-234 #A | 4.8703E-02 | 9.9201E-02 | 9.9264E-02 | 0.136E+00 |
| CS-137 #A | -3.0452E-03 | 3.4728E-02 | 3.4728E-02 | 0.622E-01 |
| CO-60 #A | -1.1817E-02 | 4.4038E-02 | 4.4040E-02 | 0.775E-01 |
| EU-152 #A | 7.8429E-02 | 1.1345E-01 | 1.1378E-01 | 0.234E+00 |
| EU-154 #C | 6.0477E-02 | 8.4169E-02 | 8.4268E-02 | 0.594E-01 |

0.88 Spectrum name: ARS01319.An1

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 186.0 to 2000.7 keV) 1.476E+01 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-12 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-023 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 023 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 5.6369E-02 | pCi/g | 4.0109E-02 | 4.3700E-02 | 2.1850E-02 | 1332.50 | 1332.50 | 2.01 |
| RA-226 | 5.6260E-01 | pCi/g | 5.4261E-01 | 7.3800E-01 | 3.6900E-01 | 1332.50 | 1332.50 | 2.01 |
| RA-228 | 3.2198E-01 | pCi/g | 9.6361E-02 | 8.5600E-02 | 4.2800E-02 | 1332.50 | 1332.50 | 2.01 |
| AM-241 | 6.6619E-03 | pCi/g | 6.3378E-02 | 9.3400E-02 | 4.6700E-02 | 1332.50 | 1332.50 | 2.01 |
| PB-210 | 2.4089E-01 | pCi/g | 5.5860E-01 | 8.2500E-01 | 4.1250E-01 | 1332.50 | 1332.50 | 2.01 |
| U-238 | 1.5248E-01 | pCi/g | 5.9883E-01 | 8.7200E-01 | 4.3600E-01 | 1332.50 | 1332.50 | 2.01 |
| K-40 | 1.2189E+01 | pCi/g | 1.3532E+00 | 4.8700E-01 | 2.4350E-01 | 1332.50 | 1332.50 | 2.01 |
| PB-214 | 3.9802E-01 | pCi/g | 8.8766E-02 | 7.5000E-02 | 3.7500E-02 | 1332.50 | 1332.50 | 2.01 |
| BI-214 | 3.6493E-01 | pCi/g | 9.4818E-02 | 8.2600E-02 | 4.1300E-02 | 1332.50 | 1332.50 | 2.01 |
| BI-212 | 1.9869E-01 | pCi/g | 3.2192E-01 | 3.9200E-01 | 1.9600E-01 | 1332.50 | 1332.50 | 2.01 |
| PB-212 | 3.0909E-01 | pCi/g | 5.8531E-02 | 6.0100E-02 | 3.0050E-02 | 1332.50 | 1332.50 | 2.01 |
| TL-208 | 1.2927E-01 | pCi/g | 3.8352E-02 | 3.4200E-02 | 1.7100E-02 | 1332.50 | 1332.50 | 2.01 |
| PA-234 | 8.3444E-02 | pCi/g | 1.2518E-01 | 9.2900E-02 | 4.6450E-02 | 1332.50 | 1332.50 | 2.01 |
| CS-137 | 0.0000E+00 | pCi/g | 2.2201E-02 | 4.9400E-02 | 2.4700E-02 | 1332.50 | 1332.50 | 2.01 |
| CO-60 | 7.7835E-03 | pCi/g | 4.5712E-02 | 5.6000E-02 | 2.8000E-02 | 1332.50 | 1332.50 | 2.01 |
| EU-152 | 5.7928E-02 | pCi/g | 4.4308E-02 | 1.4100E-01 | 7.0500E-02 | 1332.50 | 1332.50 | 2.01 |
| EU-154 0.0006 U | ~~9.0186E-02~~ | pCi/g | 4.0810E-02 | 6.0300E-02 | 3.0150E-02 | 1332.50 | 1332.50 | 2.01 |
| Total Gamma | 1.5169E+01 | pCi/g | | | | 1332.50 | 1332.50 | 2.01 |
| Total NORM Activity | 4.2990E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  5/5/2016 9:22:22 AM
                                Spectrum name: ARS08323.An1

Sample description
     Batch ID:  16-00697-12
     SDG:  ARS1-16-00670-023  Tech:  WJS

Spectrum Filename: C:\User\ARS08323.An1

Acquisition information
       Start time:                5/5/2016 8:37:01 AM
       Live time:               2700
       Real time:               2712
       Dead time:                 0.46 %
       Detector ID:                  9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G702W050
       Start channel:            100 (    25.46keV )
       Stop channel:            8000 (  1999.20keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    1
       Sample Size:                3.9803E+02 +/- 0.000E+00%
       Activity scaling factor:    1.0000E+06/(  1.0000E+00*  3.9803E+02) =
                                   2.5124E+03
       Detection limit method:     Reg. Guide 4.16 Method
       Random error:               1.0000000E+00
       Systematic error:           1.0000000E+00
       Fraction Limit:            60.000%
       Background width:           average of five points.
       Half lives decay limit:    12.000
```

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 9:22:22 AM
Spectrum name: ARS08323.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1865

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.28 | 9. | 177.51 | 0.97 | 2.811E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 42.31 | 7.300 | PBC<MDA | EU154 |
| 42.71 | 20. | 73.50 | 0.97 | 2.866E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 1.373E-01 | EU154 |
| 46.40 | 12. | 115.84 | 0.97 | 3.135E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 48.72 | 3. | 192.33 | 0.98 | 3.334E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| | | | | | 48.70 | 4.200 | 5.409E-02 | EU154 |
| 60.15 | 4. | 475.66 | 0.99 | 4.205E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| | | | | | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.34 | 11. | 196.32 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.74 | 83. | 21.57 | 1.01 | 5.121E-02 | | | | |
| 77.30 | 143. | 13.95 | 1.01 | 5.235E-02 | | | | |
| 93.32 | 32. | 54.20 | 0.57 | 5.702E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 94.67 | 15.500 | 9.071E-02 | PA234 |
| | | | | | 92.80 | 3.000 | 4.366E-01 | U238 |
| 99.15 | 9. | 185.59 | 1.03 | 5.787E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 8.630E-02 | PA234 |
| 104.41 | 30. | 56.92 | 0.42 | 5.821E-02 | | | | |
| 121.49 | 5. | 341.59 | 1.06 | 5.790E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 121.78 | 29.240 | 7.180E-03 | EU152 |
| 143.82 | 20. | 79.90 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 9:22:22 AM
Spectrum name: ARS08323.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.39 | 11. | 161.44 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.82 | 52. | 35.39 | 1.13 | 4.920E-02 | 185.72 | 57.200 | 4.632E-02 | U235 |
| | | | | | 186.21 | 3.640 | 7.290E-01 | RA226 |
| | | | | | 185.72 | 57.200 | 4.632E-02 | U235 |
| | | | | | 186.21 | 3.640 | 7.290E-01 | RA226 |
| 185.87 | 40. | 48.13 | 1.13 | 4.912E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 5.626E-01 | RA226 |
| 197.98 | 18. | 65.09 | 0.29 | 4.739E-02 | | | | |
| 204.49 | 6. | 126.64 | 0.41 | 4.647E-02 | | | | |
| 238.49 | 223. | 8.71 | 1.18 | 4.208E-02 | 238.63 | 43.100 | 3.091E-01 | PB212 |
| 241.62 | 61. | 23.17 | 1.19 | 4.172E-02 | 241.98 | 7.500 | 4.842E-01 | PB214 |
| 244.79 | 4. | 312.18 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 3.592E-02 | EU152 |
| 248.00 | 10. | 157.35 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 9.143E-02 | EU154 |
| 262.37 | 17. | 67.22 | 0.41 | 3.944E-02 | | | | |
| 295.14 | 80. | 18.29 | 0.64 | 3.633E-02 | 295.21 | 18.500 | 2.987E-01 | PB214 |
| 299.98 | 11. | 88.79 | 1.25 | 3.590E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 303.55 | 5. | 118.15 | 0.26 | 3.561E-02 | | | | |
| 331.65 | 5. | 122.90 | 0.47 | 3.345E-02 | | | | |
| 337.81 | 54. | 26.39 | 0.69 | 3.302E-02 | 338.40 | 12.010 | 3.416E-01 | Ra228 |
| 351.80 | 178. | 10.07 | 1.45 | 3.208E-02 | 351.92 | 35.800 | 3.860E-01 | PB214 |
| 440.47 | 6. | 73.75 | 0.66 | 2.736E-02 | | | | |
| 477.89 | 13. | 42.83 | 0.44 | 2.584E-02 | | | | |
| 511.06 | 155. | 10.39 | 2.71 | 2.464E-02 | 510.72 | 22.500 | 2.883E-01 | TL208 |
| 515.07 | 10. | 72.76 | 1.46 | 2.451E-02 | | | | |
| 561.97 | 4. | 125.90 | 0.24 | 2.307E-02 | | | | |
| 569.93 | 14. | 74.92 | 1.52 | 2.287E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| | | | | | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.57 | 89. | 14.19 | 1.17 | 2.247E-02 | 583.14 | 86.000 | 1.157E-01 | TL208 |
| 590.86 | 10. | 94.61 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.59 | 135. | 12.11 | 1.20 | 2.180E-02 | 609.31 | 44.791 | 3.379E-01 | BI214 |
| 698.53 | 12. | 100.42 | 1.64 | 1.982E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| | | | | | 699.10 | 4.600 | 3.310E-01 | PA234 |
| 727.51 | 50. | 22.33 | 0.47 | 1.927E-02 | 727.17 | 11.800 | 5.571E-01 | BI212 |
| 830.69 | 11. | 86.97 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 2.730E-01 | PA234 |
| 836.25 | 27. | 26.76 | 0.36 | 1.747E-02 | | | | |
| 848.76 | 20. | 31.79 | 0.71 | 1.729E-02 | | | | |
| 880.03 | 7. | 139.99 | 1.81 | 1.684E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.23 | 64. | 15.37 | 0.36 | 1.642E-02 | 911.07 | 29.000 | 3.358E-01 | Ra228 |
| 945.45 | 3. | 359.17 | 1.86 | 1.598E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| | | | | | 946.00 | 20.000 | 2.360E-02 | PA234 |
| 964.73 | 20. | 35.34 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |

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Spectrum name: ARS08323.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 964.60 | 5.452 | 5.857E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 2.004E-01 | EU152 |
| 969.03 | 31. | 31.38 | 1.88 | 1.570E-02 | 968.90 | 17.460 | 2.855E-01 | Ra228 |
| 996.07 | 20. | 22.36 | 1.91 | 1.538E-02 | 996.30 | 10.700 | 3.055E-01 | EU154 |
| | | | | | 996.30 | 10.700 | 3.055E-01 | EU154 |
| 1004.28 | 9. | 110.24 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| | | | | | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.91 | 17. | 37.82 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | 2.962E-01 | EU152 |
| | | | | | 1085.80 | 10.290 | 2.962E-01 | EU152 |
| 1112.06 | 4. | 246.21 | 2.01 | 1.416E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| | | | | | 1112.07 | 13.580 | 5.885E-02 | EU152 |
| 1119.89 | 51. | 14.00 | 0.34 | 1.408E-02 | 1120.29 | 14.797 | 6.156E-01 | BI214 |
| 1172.50 | 4. | 293.64 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| | | | | | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1220.10 | 24. | 34.51 | 0.65 | 1.317E-02 | | | | |
| 1377.78 | 19. | 25.64 | 0.49 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1407.72 | 8. | 79.28 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.08 | 610. | 4.05 | 2.14 | 1.134E-02 | 1460.75 | 10.700 | 1.261E+01 | K40 |
| 1621.54 | 2. | 234.44 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.74 | 10. | 88.65 | 2.49 | 9.535E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 193.00 | 48.72 | 25. | 3. | 1.020E+02 | 384.65 | 0.000 | - | |
| 297.05 | 74.74 | 117. | 83. | 1.613E+03 | 43.15 | 1.005 | TL-208 | D |
| 307.28 | 77.30 | 127. | 143. | 2.729E+03 | 27.90 | 1.008 | PB-212 | D |
| 371.32 | 93.32 | 112. | 32. | 5.612E+02 | 108.40 | 0.572 | AC-228 | s |
| 415.68 | 104.41 | 99. | 30. | 5.120E+02 | 113.84 | 0.420 | PU-240 | s |
| 789.86 | 197.98 | 49. | 18. | 3.714E+02 | 130.17 | 0.289 | KR-89 | s |
| 815.89 | 204.49 | 27. | 6. | 1.227E+02 | 253.29 | 0.410 | SB-125 | sc |
| 1047.34 | 262.37 | 45. | 17. | 4.361E+02 | 134.44 | 0.410 | RA-226 | s |
| 1211.61 | 303.55 | 29. | 7. | 2.000E+02 | 225.85 | 1.250 | SE-75 | sc |
| 1324.43 | 331.65 | 14. | 5. | 1.375E+02 | 245.80 | 0.465 | U-237 | sc |
| 1759.68 | 440.47 | 6. | 6. | 2.083E+02 | 147.49 | 0.659 | ND-147 | sc |
| 1909.38 | 477.89 | 9. | 13. | 5.032E+02 | 85.66 | 0.445 | BE-7 | s |
| 2060.31 | 515.30 | 22. | 7. | 2.694E+02 | 217.13 | 1.465 | RU-103 | sc |
| 2245.70 | 561.97 | 11. | 4. | 1.820E+02 | 251.80 | 0.243 | NB-95 | sc |
| 2908.03 | 727.51 | 19. | 50. | 2.615E+03 | 44.66 | 0.475 | TE-131 | s |
| 3343.17 | 836.25 | 9. | 27. | 1.546E+03 | 53.52 | 0.364 | AC-228 | s |
| 3393.22 | 848.76 | 6. | 20. | 1.140E+03 | 63.59 | 0.712 | - | s |
| 4879.58 | 1220.10 | 14. | 24. | 1.838E+03 | 69.02 | 0.649 | RB-89 | s |
| 5510.91 | 1377.78 | 2. | 19. | 1.610E+03 | 51.29 | 0.492 | BI-214 | s |
| 5844.43 | 1461.08 | 0. | 610. | 5.380E+04 | 8.10 | 2.141 | K-40 | |

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s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 155.00 | 39.21 | 75. | -5. | -0.002 | 554.98 | 0.967s |
| EU-152 | 156.00 | 39.46 | 80. | -11. | -0.004 | 264.11 | 0.967s |
| EU-154 | 167.25 | 42.28 | 88. | 9. | 0.003 | 355.03 | 0.970s |
| EU-154 | 168.98 | 42.71 | 76. | 20. | 0.008 | 147.01 | 0.970s |
| EU-152 | 183.00 | 46.22 | 102. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 183.74 | 46.40 | 68. | 12. | 0.004 | 231.68 | 0.974s |
| EU-154 | 192.93 | 48.70 | 94. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 238.70 | 60.15 | 131. | 4. | 0.001 | 951.33 | 0.989s |
| U-238 | 251.48 | 63.34 | 153. | 11. | 0.004 | 392.63 | 0.993 |
| U-238 | 368.33 | 92.57 | 182. | 0. | 0.000 | 2000.00 | 1.025s |
| U-238 | 368.15 | 92.52 | 167. | 0. | 0.000 | 2000.00 | 1.025s |
| PA-234 | 375.00 | 94.24 | 153. | -33. | -0.012 | 128.01 | 1.027s |
| PA-234 | 394.65 | 99.15 | 108. | 9. | 0.003 | 371.17 | 1.033s |
| PA-234 | 443.30 | 111.32 | 111. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 483.99 | 121.49 | 99. | 5. | 0.002 | 683.18 | 1.057s |
| EU-154 | 493.00 | 123.75 | 131. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 525.16 | 131.79 | 125. | -3. | -0.001 | 1381.44 | 1.067s |
| U-235 | 573.28 | 143.82 | 89. | 20. | 0.007 | 159.80 | 1.081s |
| U-235 | 651.51 | 163.39 | 98. | 11. | 0.004 | 322.88 | 1.102s |
| U-235 | 741.23 | 185.82 | 98. | 52. | 0.019 | 70.78 | 1.126s |
| RA-226 | 741.42 | 185.87 | 114. | 40. | 0.015 | 96.25 | 1.126s |
| U-235 | 820.66 | 205.68 | 83. | 0. | 0.000 | 2000.00 | 1.147s |
| PA-234 | 906.26 | 227.09 | 92. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 76. | 223. | 0.083 | 17.50 | 1.182D |
| PB-214 | 965.81 | 241.98 | 74. | 57. | 0.021 | 51.30 | 1.185D |
| EU-152 | 977.03 | 244.79 | 66. | 4. | 0.002 | 624.36 | 1.188s |
| EU-154 | 989.89 | 248.00 | 79. | 10. | 0.004 | 314.71 | 1.192s |
| TL-208 | 1107.84 | 277.50 | 83. | 0. | 0.000 | 2000.00 | 1.223s |
| PB-214 | 1178.42 | 295.14 | 51. | 80. | 0.030 | 36.57 | 0.640s |
| PB-212 | 1198.20 | 300.09 | 41. | 11. | 0.004 | 177.59 | 1.246D |
| Ra-228 | 1349.05 | 337.81 | 46. | 54. | 0.020 | 52.79 | 0.695s |
| EU-152 | 1379.50 | 345.42 | 86. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1405.03 | 351.80 | 46. | 176. | 0.065 | 20.61 | 1.448 |
| TL-208 | 2040.70 | 510.72 | 136. | 64. | 0.024 | 58.94 | 2.710D |
| PA-234 | 2277.56 | 569.93 | 27. | 14. | 0.005 | 149.84 | 1.517s |
| TL-208 | 2331.77 | 583.48 | 26. | 99. | 0.037 | 28.94 | 1.230 |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 2361.30 | 590.86 | 21. | 10. | 0.004 | 189.23 | 1.539s |
| BI-214 | 2436.22 | 609.59 | 40. | 131. | 0.049 | 25.22 | 1.200s |
| CS-137 | 2645.47 | 661.89 | 46. | 0. | 0.000 | 2000.00 | 1.606s |
| PA-234 | 2792.08 | 698.53 | 36. | 12. | 0.004 | 200.83 | 1.641s |
| EU-154 | 2896.33 | 724.58 | 54. | -14. | -0.005 | 208.88 | 1.664s |
| BI-212 | 2907.88 | 727.47 | 50. | 18. | 0.006 | 161.89 | 1.667 |
| PA-234 | 2931.30 | 733.32 | 37. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3026.10 | 757.02 | 40. | -10. | -0.004 | 265.76 | 1.695s |
| TL-208 | 3053.67 | 763.90 | 45. | 0. | 0.000 | 2000.00 | 1.701 |
| BI-214 | 3074.84 | 769.20 | 58. | -14. | -0.005 | 224.65 | 1.705s |
| EU-152 | 3114.29 | 779.05 | 36. | -9. | -0.003 | 264.99 | 1.715s |
| BI-212 | 3137.50 | 784.86 | 50. | -14. | -0.005 | 207.75 | 1.721s |
| PA-234 | 3227.33 | 807.30 | 45. | 0. | 0.000 | 2000.00 | 1.742s |
| PA-234 | 3320.91 | 830.69 | 19. | 11. | 0.004 | 173.95 | 1.762s |
| TL-208 | 3440.87 | 860.67 | 50. | 0. | 0.000 | 2000.00 | 1.789s |
| EU-152 | 3468.67 | 867.61 | 58. | 0. | 0.000 | 2000.00 | 1.795s |
| EU-154 | 3495.18 | 874.24 | 51. | 0. | 0.000 | 2000.00 | 1.800s |
| PA-234 | 3518.37 | 880.03 | 20. | 7. | 0.002 | 279.99 | 1.807s |
| PA-234 | 3526.38 | 882.03 | 24. | -2. | -0.001 | 906.39 | 1.809s |
| PA-234 | 3591.33 | 898.26 | 35. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.24 | 911.23 | 8. | 64. | 0.024 | 30.73 | 0.358s |
| PA-234 | 3702.87 | 926.13 | 40. | 0. | 0.000 | 2000.00 | 1.848s |
| BI-214 | 3734.89 | 934.13 | 39. | 0. | 0.000 | 2000.00 | 1.854s |
| PA-234 | 3780.20 | 945.45 | 29. | 3. | 0.001 | 718.33 | 1.864s |
| PA-234 | 3797.62 | 949.81 | 46. | 0. | 0.000 | 2000.00 | 1.867s |
| EU-152 | 3860.67 | 965.56 | 33. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 15. | 20. | 0.007 | 70.69 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 31. | 31. | 0.012 | 62.77 | 1.885D |
| EU-154 | 3982.80 | 996.07 | 0. | 20. | 0.007 | 44.72 | 1.908s |
| EU-154 | 4015.63 | 1004.28 | 21. | 9. | 0.003 | 220.48 | 1.915s |
| EU-152 | 4342.38 | 1085.91 | 7. | 17. | 0.006 | 75.65 | 1.984s |
| EU-152 | 4447.04 | 1112.06 | 28. | 4. | 0.002 | 492.41 | 2.006s |
| BI-214 | 4478.74 | 1119.97 | 11. | 37. | 0.014 | 49.63 | 2.013s |
| CO-60 | 4689.00 | 1172.50 | 35. | 4. | 0.002 | 587.28 | 2.056s |
| BI-214 | 4954.02 | 1238.70 | 72. | 0. | 0.000 | 2000.00 | 2.109s |
| EU-154 | 5096.77 | 1274.35 | 52. | -12. | -0.005 | 252.35 | 2.137s |
| CO-60 | 5329.54 | 1332.49 | 18. | -2. | -0.001 | 1194.43 | 2.183s |
| BI-214 | 5512.90 | 1378.28 | 31. | 0. | 0.000 | 2000.00 | 2.217 |
| PA-234 | 5577.22 | 1394.35 | 24. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5630.79 | 1407.72 | 8. | 8. | 0.003 | 158.56 | 2.240s |
| K-40 | 5844.33 | 1461.05 | 20. | 588. | 0.218 | 8.87 | 2.279 |
| BI-212 | 6487.07 | 1621.54 | 6. | 2. | 0.001 | 468.87 | 2.394s |
| BI-214 | 7060.65 | 1764.74 | 14. | 10. | 0.004 | 177.29 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 5.6369E-02 | | | | | 1.39E+09 | |
| | | | 185.72 | 4.632E-02 | ( | 4.369E-02 | 3.54E+01 5.72E+01 | G K |
| | | | 143.76 | 8.738E-02 | (P | 2.012E-01 | 7.99E+01 1.05E+01 | G |
| | | | 205.31 | 0.000E+00 | & P | 5.226E-01 | 1.00E+03 4.70E+00 | G |
| | | | 163.35 | 1.093E-01 | ?(P | 4.974E-01 | 1.61E+02 4.70E+00 | G |
| RA-226 | | 5.6260E-01 | | | | | 5.84E+05 | |
| | | | 186.21 | 5.626E-01 | ( | 7.379E-01 | 4.81E+01 3.64E+00 | G K |
| Ra-228 | | 3.2198E-01 | | | | | 2.10E+03 | |
| | | | 911.07 | 3.358E-01 | ( | 8.561E-02 | 1.54E+01 2.90E+01 | G |
| | | | 968.90 | 2.855E-01 | (P | 2.623E-01 | 3.14E+01 1.75E+01 | G |
| | | | 338.40 | 3.416E-01 | ( | 2.184E-01 | 2.64E+01 1.20E+01 | G |
| | | | 964.60 | 5.857E-01 | + | 6.076E-01 | 3.53E+01 5.45E+00 | G |
| Am-241 | T | 6.6619E-03 | | | | | 1.58E+05 | |
| | | | 59.54 | 6.662E-03 | ?(P | 9.336E-02 | 4.76E+02 3.59E+01 | G K |
| PB-210 | | 2.4089E-01 | | | | | 7.45E+03 | |
| | | | 46.52 | 2.409E-01 | (P | 8.248E-01 | 1.16E+02 4.00E+00 | G |
| U-238 | | 1.5248E-01 | | | | | 1.63E+12 | |
| | | | 63.29 | 1.525E-01 | (P | 8.722E-01 | 1.96E+02 3.90E+00 | G |
| | | | 92.80 | 0.000E+00 | - P | 9.259E-01 | 1.00E+03 3.00E+00 | G |
| | | | 92.38 | 0.000E+00 | & P | 1.128E+00 | 1.00E+03 2.57E+00 | G |
| K-40 | | 1.2189E+01 | | | | | 4.68E+11 | |
| | | | 1460.75 | 1.219E+01 | (P | 4.869E-01 | 4.43E+00 1.07E+01 | G |
| PB-214 | | 3.9802E-01 | | | | | 5.84E+05 | |
| | | | 351.92 | 3.860E-01 | (P | 7.500E-02 | 1.03E+01 3.58E+01 | G |
| | | | 295.21 | 2.987E-01 | - | 1.349E-01 | 1.83E+01 1.85E+01 | G |
| | | | 241.98 | 4.553E-01 | (P | 3.453E-01 | 2.57E+01 7.50E+00 | G |
| BI-214 | | 3.6493E-01 | | | | | 5.84E+05 | |
| | | | 609.31 | 3.379E-01 | @(P | 8.259E-02 | 1.26E+01 4.48E+01 | G |
| | | | 1764.49 | 1.708E-01 | & P | 3.466E-01 | 8.86E+01 1.54E+01 | G |
| | | | 1120.29 | 4.466E-01 | ?( | 2.193E-01 | 2.48E+01 1.48E+01 | G |
| | | | 1238.11 | 0.000E+00 | - | 1.389E+00 | 1.00E+03 5.86E+00 | G |
| | | | 768.36 | -3.814E-01 | - | 1.083E+00 | 1.12E+02 4.80E+00 | G |
| | | | 1377.67 | 0.000E+00 | - P | 1.543E+00 | 1.00E+03 3.92E+00 | G |
| | | | 934.06 | 0.000E+00 | - P | 1.645E+00 | 1.00E+03 3.03E+00 | G |

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Spectrum name: ARS08323.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-212 | 1.9869E-01 | | | | | 2.10E+03 | |
| | | 727.17 | 1.934E-01 | ( | 3.924E-01 | 8.09E+01 | 1.18E+01 G |
| | | 1620.56 | 2.212E-01 | ?( | 1.291E+00 | 2.34E+02 | 2.75E+00 G |
| | | 785.42 | -9.294E-01 | + | 2.444E+00 | 1.04E+02 | 2.00E+00 G |
| PB-212 | 3.0909E-01 | | | | | 2.10E+03 | |
| | | 238.63 | 3.091E-01 | (P | 6.007E-02 | 8.75E+00 | 4.31E+01 G |
| | | 300.09 | 2.328E-01 | - | 6.982E-01 | 8.88E+01 | 3.27E+00 G |
| TL-208 | 1.2927E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 1.293E-01 | ( | 3.419E-02 | 1.45E+01 | 8.60E+01 G |
| | | 510.72 | 2.886E-01 | + P | 2.589E-01 | 2.95E+01 | 2.25E+01 G |
| | | 860.47 | 0.000E+00 | & P | 4.348E-01 | 1.00E+03 | 1.20E+01 G |
| | | 277.36 | 0.000E+00 | - P | 4.602E-01 | 1.00E+03 | 6.50E+00 G |
| | | 763.30 | 0.000E+00 | - | 2.697E+00 | 1.00E+03 | 1.70E+00 G |
| PA-234 | 8.3444E-02 | | | | | 1.65E+12 | |
| | | 98.44 | -1.735E-03 | %( | 9.292E-02 | 1.80E+03 | 2.51E+01 G |
| | | 946.00 | 2.360E-02 | ?( | 2.188E-01 | 3.59E+02 | 2.00E+01 G |
| | | 131.28 | -5.879E-03 | + | 1.207E-01 | 6.91E+02 | 2.00E+01 G |
| | | 94.67 | -9.354E-02 | + | 1.711E-01 | 6.40E+01 | 1.55E+01 G |
| | | 883.24 | -2.703E-02 | + | 3.196E-01 | 4.53E+02 | 1.20E+01 G |
| | | 926.70 | 0.000E+00 | & P | 4.543E-01 | 1.00E+03 | 1.10E+01 G |
| | | 569.26 | 1.477E-01 | &(P | 2.849E-01 | 7.49E+01 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | - P | 2.610E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | - P | 4.789E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 0.000E+00 | - P | 6.933E-01 | 1.00E+03 | 7.80E+00 G |
| | | 880.51 | 1.531E-01 | ?(P | 5.452E-01 | 1.40E+02 | 6.50E+00 G |
| | | 226.87 | 0.000E+00 | & P | 4.220E-01 | 1.00E+03 | 6.50E+00 G |
| | | 831.10 | 2.730E-01 | &( | 5.938E-01 | 8.70E+01 | 5.60E+00 G |
| | | 808.10 | 0.000E+00 | - | 9.740E-01 | 1.00E+03 | 4.90E+00 G |
| | | 99.70 | 8.630E-02 | ?( | 4.722E-01 | 1.86E+02 | 4.70E+00 G |
| | | 699.10 | 3.310E-01 | ?( | 8.460E-01 | 1.00E+02 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 1.149E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | - P | 1.394E+00 | 1.00E+03 | 3.90E+00 G |
| CO-60 | 7.7835E-03 | | | | | 1.93E+03 | |
| | | 1173.24 | 7.784E-03 | ?(P | 5.597E-02 | 2.94E+02 | 9.99E+01 K |
| | | 1332.50 | -3.077E-03 | & | 4.556E-02 | 5.97E+02 | 1.00E+02 K |
| EU-152 | 5.7928E-02 | | | | | 4.64E+03 | |
| | | 40.12 | -3.495E-02 | ?( | 1.410E-01 | 1.32E+02 | 3.00E+01 G |
| | | 121.78 | 7.180E-03 | & | 7.296E-02 | 3.42E+02 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | + P | 1.315E-01 | 1.00E+03 | 2.70E+01 G |
| | | 1408.08 | 8.103E-02 | ?(P | 1.610E-01 | 7.93E+01 | 2.12E+01 G |
| | | 39.52 | -3.033E-02 | + | 2.613E-01 | 2.77E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | - P | 3.212E-01 | 1.00E+03 | 1.46E+01 G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 9:22:22 AM
Spectrum name: ARS08323.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1112.07 | 5.885E-02 | &( | 3.550E-01 | 2.46E+02 | 1.36E+01 G |
| | | 778.90 | -9.484E-02 | + | 3.232E-01 | 1.32E+02 | 1.30E+01 G |
| | | 1085.80 | 2.962E-01 | ?(P | 2.476E-01 | 3.78E+01 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 4.557E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | 3.592E-02 | ?( | 3.250E-01 | 3.12E+02 | 7.62E+00 G |
| | | 867.39 | 0.000E+00 | - | 1.352E+00 | 1.00E+03 | 4.18E+00 G |
| EU-154 | 9.0186E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | ?(P | 6.034E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | -6.965E-02 | + | 2.032E-01 | 1.26E+02 | 3.55E+01 G |
| | | 723.30 | -9.235E-02 | + | 2.438E-01 | 1.04E+02 | 1.97E+01 G |
| | | 1004.80 | 8.366E-02 | ?(P | 2.252E-01 | 1.10E+02 | 1.76E+01 G |
| | | 43.00 | 1.373E-01 | ?( | 2.912E-01 | 7.35E+01 | 1.31E+01 G |
| | | 873.20 | 0.000E+00 | - P | 4.734E-01 | 1.00E+03 | 1.13E+01 G |
| | | 996.30 | 3.055E-01 | ?( | 1.126E-01 | 2.24E+01 | 1.07E+01 G |
| | | 42.31 | 1.085E-01 | (P | 5.693E-01 | 1.78E+02 | 7.30E+00 G |
| | | 248.04 | 9.143E-02 | &( | 4.107E-01 | 1.57E+02 | 6.60E+00 G |
| | | 591.70 | 2.423E-01 | ?(P | 5.927E-01 | 9.46E+01 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | - P | 8.593E-01 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | -3.108E-01 | + | 1.059E+00 | 1.33E+02 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 9:22:22 AM
Spectrum name: ARS08323.An1

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.21 | 75. | -5. | -0.002 | 554.98 | -3.033E-02 | |
| EU-152 | 39.46 | 80. | -11. | -0.004 | 264.11 | -3.495E-02 | |
| EU-154 | 42.28 | 88. | 9. | 0.003 | 355.03 | 1.085E-01 | P |
| EU-154 | 42.71 | 76. | 20. | 0.008 | 147.01 | 1.373E-01 | |
| PB-210 | 46.40 | 68. | 12. | 0.004 | 231.68 | 2.409E-01 | P |
| Am-241 | 60.15 | 131. | 4. | 0.001 | 951.33 | 6.662E-03 | P |
| U-238 | 63.34 | 153. | 11. | 0.004 | 392.63 | 1.525E-01 | P |
| PA-234 | 94.24 | 153. | -33. | -0.012 | 128.01 | -9.354E-02 | |
| PA-234 | 99.15 | 108. | 9. | 0.003 | 371.17 | 8.630E-02 | |
| EU-152 | 121.49 | 99. | 5. | 0.002 | 683.18 | 7.180E-03 | |
| PA-234 | 131.79 | 125. | -3. | -0.001 | 1381.44 | -5.879E-03 | |
| U-235 | 143.82 | 89. | 20. | 0.007 | 159.80 | 8.738E-02 | P |
| U-235 | 163.39 | 98. | 11. | 0.004 | 322.88 | 1.093E-01 | P |
| U-235 | 185.82 | 98. | 52. | 0.019 | 70.78 | 4.632E-02 | |
| RA-226 | 185.87 | 114. | 40. | 0.015 | 96.25 | 5.626E-01 | |
| EU-152 | 244.79 | 66. | 4. | 0.002 | 624.36 | 3.592E-02 | |
| EU-154 | 248.00 | 79. | 10. | 0.004 | 314.71 | 9.143E-02 | |
| PA-234 | 569.93 | 27. | 14. | 0.005 | 149.84 | 1.477E-01 | P |
| EU-154 | 590.86 | 21. | 10. | 0.004 | 189.23 | 2.423E-01 | P |
| PA-234 | 698.53 | 36. | 12. | 0.004 | 200.83 | 3.310E-01 | |
| EU-154 | 724.58 | 54. | -14. | -0.005 | 208.88 | -9.235E-02 | |
| EU-154 | 757.02 | 40. | -10. | -0.004 | 265.76 | -3.108E-01 | |
| EU-152 | 779.05 | 36. | -9. | -0.003 | 264.99 | -9.484E-02 | |
| PA-234 | 830.69 | 19. | 11. | 0.004 | 173.95 | 2.730E-01 | |
| PA-234 | 880.03 | 20. | 7. | 0.002 | 279.99 | 1.531E-01 | P |
| PA-234 | 882.03 | 24. | -2. | -0.001 | 906.39 | -2.703E-02 | |
| PA-234 | 945.45 | 29. | 3. | 0.001 | 718.33 | 2.360E-02 | |
| EU-154 | 996.07 | 0. | 20. | 0.007 | 44.72 | 3.055E-01 | |
| EU-154 | 1004.28 | 21. | 9. | 0.003 | 220.48 | 8.366E-02 | P |
| EU-152 | 1085.91 | 7. | 17. | 0.006 | 75.65 | 2.962E-01 | P |
| EU-152 | 1112.06 | 28. | 4. | 0.002 | 492.41 | 5.885E-02 | |
| CO-60 | 1172.50 | 35. | 4. | 0.002 | 587.28 | 7.784E-03 | P |
| EU-154 | 1274.35 | 52. | -12. | -0.005 | 252.35 | -6.965E-02 | |
| CO-60 | 1332.49 | 18. | -2. | -0.001 | 1194.43 | -3.077E-03 | |
| EU-152 | 1407.72 | 8. | 8. | 0.003 | 158.56 | 8.103E-02 | P |

P - Peakbackground subtraction

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 9:22:22 AM
Spectrum name: ARS08323.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | # | 5.6369E-02 | 3.9900E-02 | 4.0109E-02 | 0.437E-01 |
| RA-226 | #A | 5.6260E-01 | 5.4153E-01 | 5.4261E-01 | 0.738E+00 |
| Ra-228 | | 3.2198E-01 | 9.3999E-02 | 9.6361E-02 | 0.856E-01 |
| Am-241 | #A | 6.6619E-03 | 6.3377E-02 | 6.3378E-02 | 0.934E-01 |
| PB-210 | #A | 2.4089E-01 | 5.5808E-01 | 5.5860E-01 | 0.825E+00 |
| U-238 | #A | 1.5248E-01 | 5.9871E-01 | 5.9883E-01 | 0.872E+00 |
| K-40 | # | 1.2189E+01 | 1.0806E+00 | 1.3532E+00 | 0.487E+00 |
| PB-214 | | 3.9802E-01 | 8.2021E-02 | 8.8766E-02 | 0.750E-01 |
| BI-214 | # | 3.6493E-01 | 9.2049E-02 | 9.4818E-02 | 0.826E-01 |
| BI-212 | #A | 1.9869E-01 | 3.2165E-01 | 3.2192E-01 | 0.392E+00 |
| PB-212 | | 3.0909E-01 | 5.4092E-02 | 5.8531E-02 | 0.601E-01 |
| TL-208 | | 1.2927E-01 | 3.7415E-02 | 3.8352E-02 | 0.342E-01 |
| PA-234 | #A | 8.3444E-02 | 1.2503E-01 | 1.2518E-01 | 0.929E-01 |
| CS-137 | #A | 0.0000E+00 | 2.2201E-02 | 2.2201E-02 | 0.494E-01 |
| CO-60 | #A | 7.7835E-03 | 4.5711E-02 | 4.5712E-02 | 0.560E-01 |
| EU-152 | #A | 5.7928E-02 | 4.3822E-02 | 4.4308E-02 | 0.141E+00 |
| EU-154 | #C | 9.0186E-02 | 4.0332E-02 | 4.0810E-02 | 0.603E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 1.391E+01 pCi/g

ARS INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-08 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-024 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 024 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.8257E-02 | pCi/g | 1.1096E-01 | 2.0000E-01 | 1.0000E-01 | | | |
| **RA-226** | 3.9456E-01 | pCi/g | 5.0054E-01 | 8.6500E-01 | 4.3250E-01 | | | |
| **RA-228** | 2.2021E-01 | pCi/g | 1.1639E-01 | 1.9900E-01 | 9.9500E-02 | | | |
| **AM-241** | -1.9333E-02 | pCi/g | 4.8456E-01 | 1.1700E-01 | 5.8500E-02 | | | |
| **PB-210** | 2.4093E-01 | pCi/g | 7.5637E-01 | 1.3800E+00 | 6.9000E-01 | | | |
| **U-238** | 5.1085E-01 | pCi/g | 1.8516E-01 | 1.1900E+00 | 5.9500E-01 | | | |
| **K-40** | 1.2657E+01 | pCi/g | 1.5862E+00 | 7.5600E-01 | 3.7800E-01 | | | |
| **PB-214** | 3.1124E-01 | pCi/g | 8.2370E-02 | 1.0100E-01 | 5.0500E-02 | | | |
| **BI-214** | 2.6960E-01 | pCi/g | 1.1151E-01 | 1.1700E-01 | 5.8500E-02 | | | |
| **BI-212** | 1.6234E-01 | pCi/g | 2.5163E-01 | 4.2600E-01 | 2.1300E-01 | | | |
| **PB-212** | 1.7241E-01 | pCi/g | 6.3708E-02 | 8.7700E-02 | 4.3850E-02 | | | |
| **TL-208** | 1.0219E-01 | pCi/g | 3.9872E-02 | 5.5000E-02 | 2.7500E-02 | | | |
| **PA-234** | 4.2382E-02 | pCi/g | 5.3895E-02 | 1.4600E-01 | 7.3000E-02 | | | |
| **CS-137** | 1.8400E-02 | pCi/g | 3.1662E-02 | 5.3800E-02 | 2.6900E-02 | | | |
| **CO-60** | -2.2278E-03 | pCi/g | 2.1792E-01 | 7.6300E-02 | 3.8150E-02 | | | |
| **EU-152** | 8.7303E-03 | pCi/g | 2.2955E-02 | 1.6100E-01 | 8.0500E-02 | | | |
| **EU-154** | 2.0002E-02 | pCi/g | 9.2833E-02 | 6.3900E-02 | 3.1950E-02 | | | |
| **Total Gamma** | 1.5199E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.4382E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06817.An1

Sample description
Batch ID: 16-00564-08
SDG: ARS1-16-00670-024 Tech: WJS

Spectrum Filename: C:\User\ARS06817.An1

Acquisition information
Start time: 19-Apr-2016 10:15:12
Live time: 1800
Real time: 1803
Dead time: 0.17 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.8051E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.8051E+02) =
2.6281E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06817.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0597

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.32 | 46. | 25.91 | 0.43 | 7.022E-03 | | | | |
| 36.93 | 1. | 613.20 | 0.93 | 2.738E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| 42.83 | 5. | 232.03 | 0.93 | 3.008E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 4.568E-02 | EU154 |
| 42.98 | 3. | 352.01 | 0.93 | 2.955E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 2.904E-02 | EU154 |
| 43.72 | 1. | 743.76 | 0.93 | 3.195E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.99 | 8. | 44.05 | 0.94 | 3.277E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 57.99 | -8. | 544.72 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.35 | -8. | 112.04 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.16 | 76. | 21.40 | 0.94 | 5.237E-02 | | | | |
| 89.67 | 64. | 15.91 | 0.98 | 5.721E-02 | 92.38 | 2.570 | 1.714E+00 | U238 |
| 92.75 | 16. | 50.21 | 0.98 | 5.730E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 101.38 | 16. | 54.95 | 0.99 | 5.851E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 111.15 | 7. | 172.63 | 1.00 | 5.943E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 124.35 | 2. | 640.99 | 1.01 | 5.928E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 131.81 | 3. | 458.91 | 1.02 | 5.871E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 163.48 | 7. | 124.80 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.87 | 19. | 36.63 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 205.57 | 13. | 76.02 | 1.09 | 4.793E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.50 | 98. | 13.51 | 0.76 | 4.324E-02 | 238.63 | 43.100 | 1.926E-01 | PB212 |
| 239.23 | 5. | 228.20 | 1.12 | 4.279E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 294.87 | 52. | 19.68 | 1.17 | 3.686E-02 | 295.21 | 18.500 | 3.014E-01 | PB214 |
| 299.38 | 12. | 64.95 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.93 | 40. | 25.92 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 3.997E-01 | Ra228 |
| 351.73 | 121. | 11.60 | 1.46 | 3.217E-02 | | | | |
| 351.73 | 121. | 11.60 | 1.46 | 3.217E-02 | 351.92 | 35.800 | 3.892E-01 | PB214 |
| 510.43 | 11. | 25.04 | 1.37 | 2.413E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.00 | 51. | 17.69 | 1.44 | 2.185E-02 | 583.14 | 86.000 | 1.079E-01 | TL208 |
| 609.27 | 67. | 18.76 | 0.86 | 2.115E-02 | 609.31 | 44.791 | 2.549E-01 | BI214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 661.18 | 8. | 86.01 | 1.51 | 1.990E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.88 | 9. | 72.25 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 757.43 | 1. | 639.53 | 1.59 | 1.805E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 763.56 | 2. | 321.86 | 1.59 | 1.793E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 880.63 | 3. | 181.11 | 1.70 | 1.617E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 882.79 | 3. | 240.89 | 1.70 | 1.613E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.17 | 23. | 31.43 | 1.72 | 1.577E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 926.68 | 1. | 344.52 | 1.74 | 1.558E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.11 | 5. | 123.31 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 949.89 | 1. | 451.99 | 1.75 | 1.531E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 968.94 | 9. | 67.58 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1237.73 | 6. | 97.87 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1376.08 | 7. | 66.60 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1394.10 | 3. | 172.97 | 2.12 | 1.146E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1407.63 | 3. | 127.39 | 2.13 | 1.136E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.55 | 379. | 5.17 | 2.02 | 1.104E-02 | 1460.75 | 10.700 | 1.266E+01 | K40 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.50 | 13.32 | 43. | 46. | 0.025 | 51.82 | 0.427 | BR-82 | s |
| 307.91 | 77.16 | 85. | 76. | 0.042 | 42.81 | 0.936 | PB-212 | |
| 1406.48 | 351.73 | 123. | 21. | 0.012 | 153.67 | 1.460 | PB-214 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 146.95 | 36.93 | 21. | 1. | 0.001 | 1226.40 | 0.929s |
| EU-152 | 167.81 | 42.14 | 46. | -5. | -0.003 | 703.47 | 0.930s |
| EU-154 | 171.16 | 42.98 | 51. | 3. | 0.002 | 704.02 | 0.932s |
| EU-154 | 170.58 | 42.83 | 54. | 5. | 0.003 | 464.07 | 0.932s |
| EU-152 | 174.14 | 43.72 | 45. | 1. | 0.001 | 1487.51 | 0.935s |
| PB-210 | 187.22 | 46.99 | 85. | 8. | 0.004 | 88.11 | 0.936s |
| EU-154 | 192.60 | 48.34 | 103. | -10. | -0.005 | 301.57 | 0.938s |
| U-238 | 252.64 | 63.35 | 118. | -8. | -0.004 | 224.08 | 0.952s |
| U-238 | 357.94 | 89.67 | 35. | 64. | 0.035 | 31.82 | 0.980s |
| U-238 | 370.28 | 92.75 | 122. | 16. | 0.009 | 100.43 | 0.980s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 377.54 | 94.57 | 140. | -12. | -0.007 | 274.54 | 0.982s |
| PA-234 | 404.79 | 101.38 | 47. | 16. | 0.009 | 109.89 | 0.987s |
| PA-234 | 443.88 | 111.15 | 83. | 7. | 0.004 | 345.27 | 0.998s |
| EU-154 | 496.70 | 124.35 | 60. | 2. | 0.001 | 1281.97 | 1.009s |
| PA-234 | 526.53 | 131.81 | 76. | 3. | 0.002 | 917.81 | 1.017s |
| U-235 | 653.23 | 163.48 | 55. | 7. | 0.004 | 249.60 | 1.048s |
| RA-226 | 742.82 | 185.87 | 66. | 19. | 0.010 | 73.26 | 1.069 |
| U-235 | 821.64 | 205.57 | 48. | 13. | 0.007 | 152.03 | 1.087s |
| PA-234 | 906.98 | 226.90 | 53. | -7. | -0.004 | 308.85 | 1.108s |
| PB-212 | 953.27 | 238.47 | 69. | 81. | 0.045 | 32.84 | 1.119s |
| PB-214 | 956.30 | 239.23 | 76. | 5. | 0.003 | 456.39 | 1.122s |
| EU-152 | 971.05 | 242.91 | 51. | -11. | -0.006 | 194.68 | 1.124s |
| EU-154 | 990.19 | 247.70 | 56. | -7. | -0.004 | 298.92 | 1.128s |
| TL-208 | 1109.58 | 277.53 | 34. | -5. | -0.003 | 380.78 | 1.155s |
| PB-214 | 1178.94 | 294.87 | 35. | 52. | 0.029 | 39.35 | 1.172 |
| PB-212 | 1196.97 | 299.38 | 26. | 12. | 0.007 | 129.90 | 1.176 |
| Ra-228 | 1351.24 | 337.93 | 36. | 40. | 0.022 | 51.83 | 1.212 |
| EU-152 | 1369.52 | 342.50 | 21. | -3. | -0.002 | 596.49 | 1.217s |
| PB-214 | 1406.28 | 351.68 | 33. | 92. | 0.051 | 24.58 | 1.224s |
| TL-208 | 2041.57 | 510.43 | 67. | 11. | 0.006 | 50.08 | 1.370s |
| TL-208 | 2332.00 | 583.00 | 25. | 51. | 0.029 | 35.38 | 1.435 |
| EU-154 | 2366.82 | 591.70 | 23. | 0. | 0.000 | 2000.00 | 1.443s |
| BI-214 | 2437.16 | 609.27 | 30. | 61. | 0.034 | 37.52 | 0.856s |
| CS-137 | 2644.94 | 661.18 | 19. | 8. | 0.004 | 172.02 | 1.505s |
| EU-154 | 2896.93 | 724.14 | 37. | -4. | -0.002 | 446.68 | 1.559s |
| BI-212 | 2911.90 | 727.88 | 20. | 9. | 0.005 | 144.50 | 1.563s |
| EU-154 | 3030.19 | 757.43 | 16. | 1. | 0.001 | 1279.06 | 1.589s |
| TL-208 | 3054.72 | 763.56 | 15. | 2. | 0.001 | 643.73 | 1.594s |
| BI-214 | 3071.92 | 767.85 | 19. | -1. | -0.001 | 983.97 | 1.599s |
| EU-152 | 3117.72 | 779.29 | 21. | -3. | -0.001 | 716.87 | 1.608s |
| BI-212 | 3138.70 | 784.54 | 28. | -3. | -0.002 | 531.32 | 1.614s |
| TL-208 | 3442.69 | 860.47 | 7. | 0. | 0.000 | 2000.00 | 1.679s |
| EU-152 | 3484.71 | 870.97 | 11. | -2. | -0.001 | 479.61 | 1.685s |
| EU-154 | 3493.00 | 873.04 | 17. | -3. | -0.002 | 398.37 | 1.690s |
| PA-234 | 3523.40 | 880.63 | 15. | 3. | 0.001 | 362.23 | 1.696s |
| PA-234 | 3532.05 | 882.79 | 17. | 3. | 0.001 | 481.78 | 1.698s |
| Ra-228 | 3645.68 | 911.17 | 19. | 23. | 0.013 | 62.86 | 1.722s |
| PA-234 | 3707.76 | 926.68 | 20. | 1. | 0.001 | 689.05 | 1.735s |
| BI-214 | 3737.50 | 934.11 | 20. | 5. | 0.003 | 246.61 | 1.742 |
| PA-234 | 3800.68 | 949.89 | 20. | 1. | 0.000 | 903.97 | 1.754s |
| EU-152 | 3864.25 | 965.76 | 31. | -6. | -0.003 | 293.57 | 1.767s |
| Ra-228 | 3876.97 | 968.94 | 22. | 9. | 0.005 | 135.17 | 1.771s |
| EU-154 | 3987.08 | 996.44 | 21. | -3. | -0.002 | 438.20 | 1.794s |
| EU-152 | 4339.01 | 1084.34 | 15. | -4. | -0.002 | 316.94 | 1.870s |
| EU-152 | 4450.06 | 1112.07 | 12. | 0. | 0.000 | 2000.00 | 1.891s |
| BI-214 | 4953.29 | 1237.73 | 19. | 6. | 0.003 | 195.73 | 1.995s |
| EU-154 | 5120.66 | 1279.52 | 11. | -1. | -0.001 | 791.63 | 2.025s |
| CO-60 | 5333.80 | 1332.74 | 20. | -5. | -0.003 | 299.21 | 2.071s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 5507.36 | 1376.08 | 7. | 7. | 0.004 | 133.19 | 2.107s |
| PA-234 | 5579.56 | 1394.10 | 9. | 3. | 0.001 | 345.94 | 2.120s |
| EU-152 | 5633.74 | 1407.63 | 7. | 3. | 0.002 | 254.78 | 2.131s |
| K-40 | 5845.71 | 1460.55 | 18. | 379. | 0.210 | 10.34 | 2.023 |
| BI-212 | 6486.71 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.297s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 6.8257E-02 | | | | | |
| | | | 143.76 | -1.769E-02 | &(P | 2.003E-01 1.76E+04 G | |
| | | | 205.31 | 2.234E-01 | ?(P | 6.109E-01 7.60E+01 G | |
| | | | 163.35 | 1.051E-01 | ?(P | 5.730E-01 1.25E+02 G | |
| RA-226 | | 3.9456E-01 | | | | | |
| | | | 186.21 | 3.946E-01 | (P | 8.653E-01 3.66E+01 G K | |
| Ra-228 | | 2.2021E-01 | | | | | |
| | | | 911.07 | 1.970E-01 | (P | 1.990E-01 3.14E+01 G | |
| | | | 968.90 | 1.353E-01 | (P | 3.717E-01 6.76E+01 G | |
| | | | 338.40 | 3.997E-01 | (P | 3.038E-01 2.59E+01 G | |
| | | | 964.60 | -2.803E-02 | & | 1.316E+00 1.29E+03 G | |
| Am-241 | T | -1.9333E-02 | | | | | |
| | | | 59.54 | -1.933E-02 | %(P | 1.170E-01 5.45E+02 G K | |
| PB-210 | | 2.4093E-01 | | | | | |
| | | | 46.52 | 2.409E-01 | ?(P | 1.376E+00 4.41E+01 G | |
| U-238 | | 5.1085E-01 | | | | | |
| | | | 63.29 | -1.739E-01 | ?(P | 1.188E+00 1.12E+02 G | |
| | | | 92.80 | 3.705E-01 | (P | 1.242E+00 5.02E+01 G | |
| | | | 92.38 | 1.714E+00 | (P | 8.177E-01 1.59E+01 G | |
| K-40 | | 1.2657E+01 | | | | | |
| | | | 1460.75 | 1.266E+01 | (P | 7.564E-01 5.17E+00 G | |
| PB-214 | | 3.1124E-01 | | | | | |
| | | | 351.92 | 3.163E-01 | @(P | 1.007E-01 1.23E+01 G | |
| | | | 295.21 | 3.014E-01 | (P | 1.760E-01 1.97E+01 G | |
| | | | 241.98 | 5.703E-02 | & P | 5.324E-01 2.28E+02 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-214 | 2.6960E-01 | | | | | | |
| | | 609.31 | 2.549E-01 | (P | 1.173E-01 | 1.88E+01 | G |
| | | 1764.49 | -3.020E-02 | % P | 2.077E-01 | 1.00E+03 | G |
| | | 1120.29 | -1.757E-02 | % P | 6.981E-01 | 1.00E+03 | G |
| | | 1238.11 | 3.142E-01 | &(P | 1.226E+00 | 9.79E+01 | G |
| | | 768.36 | -6.792E-02 | - P | 1.055E+00 | 4.92E+02 | G |
| | | 1377.67 | 5.817E-01 | & | 1.275E+00 | 6.66E+01 | G |
| | | 934.06 | 4.003E-01 | (P | 1.962E+00 | 1.23E+02 | G |
| BI-212 | 1.6234E-01 | | | | | | |
| | | 727.17 | 1.623E-01 | &(P | 4.258E-01 | 7.22E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 1.044E+00 | 1.00E+03 | G |
| | | 785.42 | -3.242E-01 | + | 3.072E+00 | 2.66E+02 | G |
| PB-212 | 1.7241E-01 | | | | | | |
| | | 238.63 | 1.724E-01 | ?(P | 8.771E-02 | 1.64E+01 | G |
| | | 300.09 | 4.084E-01 | + | 8.752E-01 | 6.50E+01 | G |
| TL-208 | 1.0219E-01 | | | | | | |
| | | 583.14 | 1.079E-01 | (P | 5.505E-02 | 1.77E+01 | G |
| | | 510.72 | 8.027E-02 | (P | 2.977E-01 | 2.50E+01 | G |
| | | 860.47 | 0.000E+00 | - | 3.022E-01 | 1.00E+03 | G |
| | | 277.36 | -8.199E-02 | - P | 4.672E-01 | 1.90E+02 | G |
| | | 763.30 | 2.176E-01 | + P | 2.668E+00 | 3.22E+02 | G |
| PA-234 | 4.2382E-02 | | | | | | |
| | | 98.44 | -5.345E-03 | %(P | 1.456E-01 | 1.00E+03 | G |
| | | 946.00 | -2.256E-03 | & | 2.624E-01 | 3.07E+03 | G |
| | | 131.28 | 9.127E-03 | ?( | 1.459E-01 | 4.59E+02 | G |
| | | 94.67 | -5.491E-02 | & | 2.550E-01 | 1.37E+02 | G |
| | | 883.24 | 5.118E-02 | ?( | 4.473E-01 | 2.41E+02 | G |
| | | 926.70 | 2.642E-02 | &(P | 5.381E-01 | 3.45E+02 | G |
| | | 569.26 | -2.749E-02 | % P | 4.137E-01 | 1.82E+03 | G |
| | | 111.00 | 5.241E-02 | ?(P | 3.514E-01 | 1.73E+02 | G |
| | | 733.00 | -1.975E-02 | % P | 6.217E-01 | 9.92E+03 | G |
| | | 949.00 | 2.564E-02 | ?(P | 7.756E-01 | 4.52E+02 | G |
| | | 880.51 | 9.562E-02 | ?(P | 7.801E-01 | 1.81E+02 | G |
| | | 226.87 | -9.336E-02 | + | 4.971E-01 | 1.54E+02 | G |
| | | 831.10 | -2.215E-02 | % P | 1.080E+00 | 2.08E+03 | G |
| | | 808.10 | 1.119E-02 | % | 1.172E+00 | 2.84E+03 | G |
| | | 99.70 | 2.355E-01 | ?(P | 4.988E-01 | 5.49E+01 | G |
| | | 699.10 | -5.655E-02 | % P | 1.091E+00 | 7.71E+02 | G |
| | | 898.60 | -8.778E-02 | % P | 1.989E+00 | 1.00E+03 | G |
| | | 1394.10 | 2.281E-01 | ?( | 1.453E+00 | 1.73E+02 | G |

American Radiation Services Spectrum name: ARS06817.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CS-137 | 1.8400E-02 | | | | | | |
| | | 661.66 | 1.840E-02 | ( | 5.379E-02 | 8.60E+01 | G |
| CO-60 | -2.2278E-03 | | | | | | |
| | | 1173.24 | -2.228E-03 | %(P | 7.634E-02 | 1.99E+03 | K |
| | | 1332.50 | -1.512E-02 | + P | 7.808E-02 | 1.50E+02 | K |
| EU-152 | 8.7303E-03 | | | | | | |
| | | 40.12 | -2.427E-02 | &(P | 1.614E-01 | 3.52E+02 | G |
| | | 121.78 | 2.006E-04 | & P | 9.457E-02 | 5.45E+03 | G |
| | | 344.30 | -1.353E-02 | + P | 1.070E-01 | 2.98E+02 | G |
| | | 1408.08 | 5.140E-02 | ?(P | 2.459E-01 | 1.27E+02 | G |
| | | 39.52 | 9.624E-03 | ?( | 2.164E-01 | 6.13E+02 | G |
| | | 964.00 | -1.008E-01 | + | 5.156E-01 | 1.47E+02 | G |
| | | 1112.07 | 0.000E+00 | & | 3.980E-01 | 1.00E+03 | G |
| | | 778.90 | -4.360E-02 | & P | 4.122E-01 | 3.58E+02 | G |
| | | 1085.80 | -1.006E-01 | + | 5.705E-01 | 1.58E+02 | G |
| | | 45.40 | 1.658E-02 | ?(P | 4.676E-01 | 7.44E+02 | G |
| | | 244.67 | -1.336E-01 | & P | 4.396E-01 | 9.73E+01 | G |
| | | 867.39 | -1.202E-01 | + | 1.066E+00 | 2.40E+02 | G |
| EU-154 | 2.0002E-02 | | | | | | |
| | | 123.10 | 2.834E-03 | ?( | 6.389E-02 | 6.41E+02 | G |
| | | 1274.80 | -1.089E-02 | + P | 1.616E-01 | 3.96E+02 | G |
| | | 723.30 | -4.260E-02 | + | 3.346E-01 | 2.23E+02 | G |
| | | 1004.80 | -1.291E-02 | & P | 4.674E-01 | 1.00E+03 | G |
| | | 43.00 | 4.568E-02 | ?( | 3.692E-01 | 2.32E+02 | G |
| | | 873.20 | -7.126E-02 | + P | 4.745E-01 | 1.99E+02 | G |
| | | 996.30 | -7.723E-02 | + | 6.061E-01 | 2.19E+02 | G |
| | | 42.31 | 5.305E-02 | ?( | 6.563E-01 | 3.52E+02 | G |
| | | 248.04 | -1.060E-01 | + P | 5.349E-01 | 1.49E+02 | G |
| | | 591.70 | 0.000E+00 | - | 9.903E-01 | 1.00E+03 | G |
| | | 48.70 | -2.612E-01 | + | 1.341E+00 | 1.51E+02 | G |
| | | 756.70 | 4.852E-02 | &( | 1.153E+00 | 6.40E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 6.8257E-02 | 1.1081E-01 | 1.1096E-01 | 0.200E+00 |
| RA-226 #A | 3.9456E-01 | 4.9940E-01 | 5.0054E-01 | 0.865E+00 |
| Ra-228 # | 2.2021E-01 | 1.1545E-01 | 1.1639E-01 | 0.199E+00 |
| Am-241 #B | -1.9333E-02 | 4.8456E-01 | 4.8456E-01 | 0.117E+00 |
| PB-210 #A | 2.4093E-01 | 7.5600E-01 | 7.5637E-01 | 0.138E+01 |
| U-238 #A | 5.1085E-01 | 1.8079E-01 | 1.8516E-01 | 0.119E+01 |
| K-40 | 1.2657E+01 | 1.3583E+00 | 1.5862E+00 | 0.756E+00 |
| PB-214 # | 3.1124E-01 | 7.7276E-02 | 8.2370E-02 | 0.101E+00 |
| BI-214 | 2.6960E-01 | 1.1026E-01 | 1.1151E-01 | 0.117E+00 |
| BI-212 #A | 1.6234E-01 | 2.5140E-01 | 2.5163E-01 | 0.426E+00 |
| PB-212 | 1.7241E-01 | 6.1687E-02 | 6.3708E-02 | 0.877E-01 |
| TL-208 # | 1.0219E-01 | 3.9322E-02 | 3.9872E-02 | 0.550E-01 |
| PA-234 #A | 4.2382E-02 | 5.3805E-02 | 5.3895E-02 | 0.146E+00 |
| CS-137 #A | 1.8400E-02 | 3.1651E-02 | 3.1662E-02 | 0.538E-01 |
| CO-60 #B | -2.2278E-03 | 2.1792E-01 | 2.1792E-01 | 0.763E-01 |
| EU-152 #A | 8.7303E-03 | 2.2934E-02 | 2.2955E-02 | 0.161E+00 |
| EU-154 #A | 2.0002E-02 | 9.2821E-02 | 9.2833E-02 | 0.639E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

American Radiation Services Spectrum name: ARS06817.An1

---------- S U M M A R Y ----------

| | | | |
|---|---|---|---|
| Total Activity ( | 2.7 to 1998.2 keV) | 1.310E+01 | pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-13 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-025 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 025 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 5.6388E-02 | pCi/g | 1.8178E-01 | 3.3000E-01 | 1.6500E-01 | 1332.50 | 1332.50 | 2.01 |
| **RA-226** | 1.6014E+00 | pCi/g | 6.4420E-01 | 8.3300E-01 | 4.1650E-01 | 1332.50 | 1332.50 | 2.01 |
| **RA-228** | 5.0087E-01 | pCi/g | 1.5642E-01 | 2.0300E-01 | 1.0150E-01 | 1332.50 | 1332.50 | 2.01 |
| **AM-241** | 1.2297E-03 | pCi/g | 7.9031E-02 | 1.3700E-01 | 6.8500E-02 | 1332.50 | 1332.50 | 2.01 |
| **PB-210** | 8.2965E-01 | pCi/g | 8.2937E-01 | 1.3300E+00 | 6.6500E-01 | 1332.50 | 1332.50 | 2.01 |
| **U-238** | 8.7331E-01 | pCi/g | 4.9419E-01 | 1.1800E+00 | 5.9000E-01 | 1332.50 | 1332.50 | 2.01 |
| **K-40** | 2.0700E+01 | pCi/g | 2.0089E+00 | 7.3500E-01 | 3.6750E-01 | 1332.50 | 1332.50 | 2.01 |
| **PB-214** | 6.1757E-01 | pCi/g | 1.0250E-01 | 1.2700E-01 | 6.3500E-02 | 1332.50 | 1332.50 | 2.01 |
| **BI-214** | 6.1569E-01 | pCi/g | 1.1273E-01 | 9.8500E-02 | 4.9250E-02 | 1332.50 | 1332.50 | 2.01 |
| **BI-212** | 7.4157E-01 | pCi/g | 2.5776E-01 | 2.6100E-01 | 1.3050E-01 | 1332.50 | 1332.50 | 2.01 |
| **PB-212** | 5.4604E-01 | pCi/g | 9.6658E-02 | 9.0000E-02 | 4.5000E-02 | 1332.50 | 1332.50 | 2.01 |
| **TL-208** | 1.8744E-01 | pCi/g | 5.4819E-02 | 5.8000E-02 | 2.9000E-02 | 1332.50 | 1332.50 | 2.01 |
| **PA-234** | 6.7537E-02 | pCi/g | 9.8159E-02 | 1.2500E-01 | 6.2500E-02 | 1332.50 | 1332.50 | 2.01 |
| **CS-137** | -1.1563E-02 | pCi/g | 3.2878E-02 | 5.6800E-02 | 2.8400E-02 | 1332.50 | 1332.50 | 2.01 |
| **CO-60** | 2.4051E-02 | pCi/g | 3.9968E-02 | 6.8000E-02 | 3.4000E-02 | 1332.50 | 1332.50 | 2.01 |
| **EU-152** | 4.7093E-02 | pCi/g | 9.6745E-02 | 2.0000E-01 | 1.0000E-01 | 1332.50 | 1332.50 | 2.01 |
| **EU-154** | 5.0021E-02 | pCi/g | 8.3709E-02 | 7.1600E-02 | 3.5800E-02 | 1332.50 | 1332.50 | 2.01 |
| **Total Gamma** | 2.7460E+01 | pCi/g | | | | 1332.50 | 1332.50 | 2.01 |
| **Total NORM Activity** | 7.8766E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06940.An1

Sample description
Batch ID: 16-00697-13
SDG: ARS1-16-00670-025 Tech: WJS

Spectrum Filename: C:\User\ARS06940.An1

Acquisition information
Start time: 05-May-2016 08:48:51
Live time: 2700
Real time: 2703
Dead time: 0.13 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4746E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4746E+02) =
2.8780E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06940.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 28 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1049

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.27 | 49. | 30.49 | 0.46 | 6.989E-03 | | | | |
| 40.35 | 13. | 102.77 | 0.93 | 2.785E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | PBC<MDA | EU152 |
| 43.23 | 20. | 86.71 | 0.93 | 3.008E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 1.453E-01 | EU154 |
| 43.29 | 12. | 140.10 | 0.93 | 2.955E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 8.650E-02 | EU154 |
| 46.73 | 82. | 26.65 | 0.60 | 3.301E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 60.13 | 1. | 137.37 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.45 | 34. | 35.16 | 0.38 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.80 | 169. | 15.00 | 0.96 | 5.134E-02 | | | | |
| 77.08 | 247. | 11.00 | 0.97 | 5.233E-02 | | | | |
| 92.43 | 43. | 50.34 | 0.98 | 5.721E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.85 | 52. | 33.23 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.56 | 19. | 83.45 | 0.99 | 5.851E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | PBC<MDA | PA234 |
| 99.63 | 16. | 97.12 | 0.99 | 5.833E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | PBC<MDA | PA234 |
| 110.19 | 25. | 69.03 | 1.00 | 5.943E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 144.05 | 6. | 202.38 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.59 | 11. | 128.94 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.91 | 103. | 16.43 | 1.16 | 5.089E-02 | 186.21 | 3.640 | 1.601E+00 | RA226 |
| 226.72 | 13. | 130.04 | 1.11 | 4.480E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.40 | 366. | 7.33 | 1.21 | 4.326E-02 | 238.63 | 43.100 | 5.493E-01 | PB212 |
| 244.45 | 11. | 113.52 | 1.12 | 4.279E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 247.07 | 6. | 215.94 | 1.13 | 4.203E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 274.08 | 0. | 572.01 | 1.16 | 3.866E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.85 | 188. | 10.20 | 0.90 | 3.689E-02 | | | | |
| 294.85 | 188. | 10.20 | 0.90 | 3.689E-02 | 295.21 | 18.500 | 7.725E-01 | PB214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 300.04 | 21. | 60.61 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.37 | 90. | 18.82 | 1.25 | 3.315E-02 | 338.40 | 12.010 | 6.527E-01 | Ra228 |
| 344.18 | 2. | 351.04 | 1.22 | 3.271E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.53 | 259. | 8.98 | 1.02 | 3.218E-02 | | | | |
| 351.53 | 259. | 8.98 | 1.02 | 3.218E-02 | 351.92 | 35.800 | 6.202E-01 | PB214 |
| 510.87 | 70. | 14.45 | 1.28 | 2.413E-02 | 510.72 | 22.500 | 3.724E-01 | TL208 |
| 583.13 | 129. | 13.52 | 0.85 | 2.185E-02 | 583.14 | 86.000 | 1.874E-01 | TL208 |
| 609.24 | 211. | 8.28 | 1.65 | 2.115E-02 | 609.31 | 44.791 | 6.157E-01 | BI214 |
| 727.11 | 56. | 16.77 | 0.34 | 1.858E-02 | 727.17 | 11.800 | 7.416E-01 | BI212 |
| 755.29 | 10. | 83.59 | 1.59 | 1.805E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 763.29 | 8. | 118.61 | 1.59 | 1.793E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.52 | 10. | 91.65 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 806.56 | 4. | 207.17 | 1.63 | 1.721E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 829.96 | 2. | 256.74 | 1.65 | 1.686E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 859.99 | 3. | 271.32 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 883.27 | 2. | 430.26 | 1.70 | 1.613E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.27 | 76. | 19.17 | 0.93 | 1.577E-02 | 911.07 | 29.000 | 4.774E-01 | Ra228 |
| 933.88 | 6. | 120.86 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 945.45 | 4. | 201.64 | 1.75 | 1.535E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 964.82 | 14. | 49.98 | 1.77 | 1.513E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 969.12 | 40. | 20.43 | 1.77 | 1.508E-02 | 968.90 | 17.460 | 4.378E-01 | Ra228 |
| 1120.37 | 65. | 20.88 | 0.59 | 1.355E-02 | 1120.29 | 14.797 | 9.306E-01 | BI214 |
| 1173.11 | 11. | 72.37 | 1.94 | 1.309E-02 | 1173.24 | 99.900 | HL>Cutoff | CO60 |
| 1237.92 | 6. | 124.71 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1275.10 | 2. | 477.17 | 2.02 | 1.228E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1377.79 | 5. | 148.98 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1407.37 | 4. | 151.74 | 2.13 | 1.136E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.67 | 870. | 3.53 | 2.13 | 1.104E-02 | 1460.75 | 10.700 | 2.070E+01 | K40 |
| 1619.80 | 5. | 102.01 | 2.30 | 1.013E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.05 | 44. | 14.74 | 0.65 | 9.415E-03 | 1764.49 | 15.357 | 8.835E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.33 | 13.27 | 81. | 49. | 0.018 | 60.97 | 0.463 | BR-82 | s |
| 298.44 | 74.79 | 238. | 169. | 0.063 | 29.99 | 0.963 | HG-203 | D |
| 307.59 | 77.07 | 245. | 247. | 0.091 | 22.00 | 0.965 | PB-212 | D |
| 1178.87 | 294.85 | 227. | 21. | 0.008 | 208.55 | 0.900 | RU-103 | c |
| 1405.68 | 351.53 | 332. | 15. | 0.005 | 351.39 | 1.024 | PB-214 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 160.66 | 40.35 | 141. | 13. | 0.005 | 205.53 | 0.930s |
| EU-154 | 172.42 | 43.29 | 131. | 12. | 0.004 | 280.19 | 0.932s |
| EU-154 | 172.18 | 43.23 | 139. | 20. | 0.007 | 173.43 | 0.932s |
| PB-210 | 185.65 | 46.60 | 154. | 38. | 0.014 | 54.82 | 0.582s |
| EU-154 | 194.33 | 48.77 | 226. | -23. | -0.008 | 191.22 | 0.938s |
| U-238 | 253.05 | 63.45 | 223. | 34. | 0.013 | 70.32 | 0.378s |
| U-238 | 368.79 | 92.38 | 253. | 43. | 0.016 | 100.69 | 0.980D |
| U-238 | 370.47 | 92.80 | 203. | 52. | 0.019 | 66.47 | 0.980D |
| PA-234 | 379.64 | 95.09 | 304. | -30. | -0.011 | 166.36 | 0.982s |
| PA-234 | 397.80 | 99.63 | 169. | 16. | 0.006 | 194.23 | 0.986 |
| PA-234 | 397.51 | 99.56 | 181. | 19. | 0.007 | 166.89 | 0.987s |
| PA-234 | 440.06 | 110.19 | 155. | 25. | 0.009 | 138.07 | 0.998 |
| EU-152 | 482.83 | 120.89 | 139. | -3. | -0.001 | 1094.10 | 1.008s |
| EU-154 | 487.30 | 122.00 | 149. | -2. | -0.001 | 1992.73 | 1.009s |
| PA-234 | 522.29 | 130.75 | 217. | -30. | -0.011 | 144.47 | 1.017s |
| U-235 | 575.52 | 144.05 | 202. | 6. | 0.002 | 404.75 | 1.029s |
| U-235 | 649.68 | 162.59 | 140. | 11. | 0.004 | 257.87 | 1.048s |
| RA-226 | 742.99 | 185.91 | 119. | 103. | 0.038 | 32.86 | 1.156s |
| PA-234 | 906.28 | 226.72 | 135. | 13. | 0.005 | 260.08 | 1.108s |
| PB-212 | 953.00 | 238.40 | 142. | 355. | 0.132 | 14.65 | 1.206 |
| PB-214 | 977.19 | 244.45 | 94. | 11. | 0.004 | 227.04 | 1.122 |
| EU-152 | 979.73 | 245.08 | 153. | -15. | -0.006 | 239.09 | 1.124s |
| EU-154 | 987.70 | 247.07 | 78. | 6. | 0.002 | 431.89 | 1.128s |
| PB-214 | 1179.39 | 294.98 | 68. | 162. | 0.060 | 20.48 | 1.172 |
| PB-212 | 1199.64 | 300.04 | 69. | 21. | 0.008 | 121.21 | 1.176s |
| Ra-228 | 1353.00 | 338.37 | 66. | 90. | 0.033 | 37.64 | 1.249 |
| EU-152 | 1376.25 | 344.18 | 64. | 2. | 0.001 | 702.07 | 1.217s |
| PB-214 | 1406.00 | 351.61 | 106. | 233. | 0.086 | 17.06 | 1.224 |
| TL-208 | 2043.33 | 510.87 | 98. | 70. | 0.026 | 28.91 | 1.281s |
| TL-208 | 2332.54 | 583.13 | 57. | 122. | 0.045 | 27.03 | 0.849s |
| BI-214 | 2437.02 | 609.24 | 41. | 202. | 0.075 | 16.56 | 1.649 |
| CS-137 | 2649.54 | 662.33 | 43. | -7. | -0.003 | 284.32 | 1.505s |
| PA-234 | 2794.81 | 698.63 | 46. | -6. | -0.002 | 381.67 | 1.538s |
| EU-154 | 2898.35 | 724.49 | 85. | -20. | -0.007 | 136.08 | 1.559s |
| BI-212 | 2908.82 | 727.11 | 14. | 56. | 0.021 | 33.54 | 0.343s |
| EU-154 | 3021.64 | 755.29 | 28. | 10. | 0.004 | 167.18 | 1.589s |
| TL-208 | 3053.65 | 763.29 | 38. | 8. | 0.003 | 237.23 | 1.594s |
| BI-214 | 3074.58 | 768.52 | 38. | 10. | 0.004 | 183.31 | 1.599s |
| BI-212 | 3148.21 | 786.91 | 53. | -6. | -0.002 | 342.43 | 1.614s |
| PA-234 | 3226.89 | 806.56 | 34. | 4. | 0.002 | 414.34 | 1.633s |
| PA-234 | 3320.56 | 829.96 | 33. | 2. | 0.001 | 513.48 | 1.653s |
| TL-208 | 3440.76 | 859.99 | 37. | 3. | 0.001 | 542.64 | 1.679s |
| EU-152 | 3469.20 | 867.09 | 35. | -3. | -0.001 | 613.11 | 1.685s |
| EU-154 | 3496.50 | 873.91 | 41. | -8. | -0.003 | 262.18 | 1.690s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3533.97 | 883.27 | 24. | 2. | 0.001 | 860.52 | 1.698s |
| PA-234 | 3596.26 | 898.83 | 42. | -7. | -0.003 | 350.80 | 1.711s |
| Ra-228 | 3646.08 | 911.27 | 40. | 76. | 0.028 | 38.34 | 0.928s |
| PA-234 | 3707.63 | 926.65 | 42. | -4. | -0.002 | 579.44 | 1.735s |
| BI-214 | 3736.57 | 933.88 | 35. | 6. | 0.002 | 241.73 | 1.742s |
| PA-234 | 3782.91 | 945.45 | 34. | 4. | 0.002 | 403.28 | 1.752s |
| PA-234 | 3796.05 | 948.73 | 48. | -5. | -0.002 | 483.64 | 1.754s |
| EU-152 | 3855.46 | 963.57 | 43. | -1. | -0.001 | 1355.29 | 1.767s |
| Ra-228 | 3859.59 | 964.60 | 18. | 14. | 0.005 | 99.95 | 1.768D |
| Ra-228 | 3876.80 | 968.90 | 19. | 40. | 0.015 | 40.86 | 1.771D |
| EU-152 | 4344.87 | 1085.80 | 37. | 0. | 0.000 | 2000.00 | 1.870s |
| EU-152 | 4450.21 | 1112.11 | 47. | -6. | -0.002 | 320.19 | 1.891s |
| BI-214 | 4483.29 | 1120.37 | 33. | 65. | 0.024 | 41.76 | 0.588s |
| CO-60 | 4694.48 | 1173.11 | 36. | 11. | 0.004 | 144.73 | 1.942s |
| BI-214 | 4954.04 | 1237.92 | 43. | 6. | 0.002 | 249.41 | 1.995s |
| EU-154 | 5102.93 | 1275.10 | 41. | 2. | 0.001 | 954.34 | 2.025s |
| CO-60 | 5334.02 | 1332.80 | 26. | -4. | -0.002 | 345.80 | 2.071s |
| BI-214 | 5514.22 | 1377.79 | 26. | 5. | 0.002 | 297.95 | 2.107s |
| PA-234 | 5589.68 | 1396.63 | 19. | -4. | -0.002 | 304.41 | 2.120s |
| EU-152 | 5632.69 | 1407.37 | 20. | 4. | 0.002 | 303.47 | 2.131s |
| K-40 | 5846.19 | 1460.67 | 35. | 848. | 0.314 | 7.05 | 2.128 |
| BI-212 | 6483.65 | 1619.80 | 9. | 5. | 0.002 | 204.01 | 2.297s |
| BI-214 | 7061.61 | 1764.05 | 2. | 44. | 0.016 | 29.49 | 0.649s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 5.6388E-02 | | | | | |
| | | | 143.76 | 2.863E-02 | ?(P | 3.301E-01 2.02E+02 | G |
| | | | 205.31 | -1.660E-02 | % P | 8.012E-01 1.00E+03 | G |
| | | | 163.35 | 1.184E-01 | &(P | 6.504E-01 1.29E+02 | G |
| RA-226 | | 1.6014E+00 | | | | | |
| | | | 186.21 | 1.601E+00 | (P | 8.327E-01 1.64E+01 | G K |
| Ra-228 | | 5.0087E-01 | | | | | |
| | | | 911.07 | 4.774E-01 | (P | 2.032E-01 1.92E+01 | G |
| | | | 968.90 | 4.378E-01 | (P | 2.518E-01 2.04E+01 | G |
| | | | 338.40 | 6.527E-01 | (P | 2.931E-01 1.88E+01 | G |
| | | | 964.60 | 4.935E-01 | ( | 7.826E-01 5.00E+01 | G |

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Am-241 | T | 1.2297E-03 | | | | | | |
| | | | 59.54 | 1.230E-03 | %(P | 1.373E-01 | 1.37E+02 | G K |
| PB-210 | | 8.2965E-01 | | | | | | |
| | | | 46.52 | 8.297E-01 | (P | 1.332E+00 | 2.74E+01 | G |
| U-238 | | 8.7331E-01 | | | | | | |
| | | | 63.29 | 5.574E-01 | (P | 1.176E+00 | 3.52E+01 | G |
| | | | 92.80 | 8.733E-01 | } P | 1.159E+00 | 3.32E+01 | G |
| | | | 92.38 | 8.343E-01 | } P | 1.504E+00 | 5.03E+01 | G |
| K-40 | | 2.0700E+01 | | | | | | |
| | | | 1460.75 | 2.070E+01 | (P | 7.351E-01 | 3.53E+00 | G |
| PB-214 | | 6.1757E-01 | | | | | | |
| | | | 351.92 | 5.831E-01 | (P | 1.268E-01 | 8.53E+00 | G |
| | | | 295.21 | 6.843E-01 | (P | 1.738E-01 | 1.02E+01 | G |
| | | | 241.98 | 9.987E-02 | - P | 4.290E-01 | 1.14E+02 | G |
| BI-214 | | 6.1569E-01 | | | | | | |
| | | | 609.31 | 6.157E-01 | (P | 9.849E-02 | 8.28E+00 | G |
| | | | 1764.49 | 8.835E-01 | + P | 1.736E-01 | 1.47E+01 | G |
| | | | 1120.29 | 9.306E-01 | + P | 4.250E-01 | 2.09E+01 | G |
| | | | 1238.11 | 2.525E-01 | - P | 1.300E+00 | 1.25E+02 | G |
| | | | 768.36 | 3.269E-01 | - P | 1.053E+00 | 9.17E+01 | G |
| | | | 1377.67 | 3.208E-01 | - | 1.675E+00 | 1.49E+02 | G |
| | | | 934.06 | 3.865E-01 | - P | 1.853E+00 | 1.21E+02 | G |
| BI-212 | | 7.4157E-01 | | | | | | |
| | | | 727.17 | 7.416E-01 | (P | 2.612E-01 | 1.68E+01 | G |
| | | | 1620.56 | 4.898E-01 | - | 1.750E+00 | 1.02E+02 | G |
| | | | 785.42 | -5.062E-01 | - | 2.998E+00 | 1.71E+02 | G |
| PB-212 | | 5.4604E-01 | | | | | | |
| | | | 238.63 | 5.493E-01 | (P | 9.000E-02 | 7.33E+00 | G |
| | | | 300.09 | 5.036E-01 | ?( | 1.003E+00 | 6.06E+01 | G |
| TL-208 | | 1.8744E-01 | | | | | | |
| | | | 583.14 | 1.874E-01 | (P | 5.798E-02 | 1.35E+01 | G |
| | | | 510.72 | 3.724E-01 | + P | 2.589E-01 | 1.45E+01 | G |
| | | | 860.47 | 4.716E-02 | - | 4.522E-01 | 2.71E+02 | G |
| | | | 277.36 | 5.285E-03 | % P | 3.992E-01 | 5.72E+02 | G |
| | | | 763.30 | 7.192E-01 | + P | 2.965E+00 | 1.19E+02 | G |
| PA-234 | | 6.7537E-02 | | | | | | |
| | | | 98.44 | 3.213E-02 | ?(P | 1.246E-01 | 9.71E+01 | G |
| | | | 946.00 | 3.964E-02 | &( | 2.811E-01 | 2.02E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 131.28 | -7.320E-02 | & | 1.752E-01 | 7.22E+01 | G |
| | | 94.67 | -9.790E-02 | & | 2.706E-01 | 8.32E+01 | G |
| | | 883.24 | 2.413E-02 | ?( | 3.767E-01 | 4.30E+02 | G |
| | | 926.70 | -7.045E-02 | + P | 5.503E-01 | 2.90E+02 | G |
| | | 569.26 | -4.903E-02 | % P | 4.580E-01 | 1.01E+03 | G |
| | | 111.00 | 1.426E-01 | &(P | 3.439E-01 | 6.90E+01 | G |
| | | 733.00 | -3.956E-02 | & P | 5.530E-01 | 7.67E+02 | G |
| | | 949.00 | -1.217E-01 | + P | 8.470E-01 | 2.42E+02 | G |
| | | 880.51 | -1.457E-02 | % P | 8.315E-01 | 2.47E+03 | G |
| | | 226.87 | 1.278E-01 | ?( | 5.617E-01 | 1.30E+02 | G |
| | | 831.10 | 5.696E-02 | ?(P | 8.947E-01 | 2.57E+02 | G |
| | | 808.10 | 1.397E-01 | ?( | 1.019E+00 | 2.07E+02 | G |
| | | 99.70 | 2.036E-01 | ?(P | 6.843E-01 | 8.34E+01 | G |
| | | 699.10 | -1.887E-01 | & P | 1.127E+00 | 1.91E+02 | G |
| | | 898.60 | -3.329E-01 | + P | 1.483E+00 | 1.75E+02 | G |
| | | 1394.10 | -2.776E-01 | & | 1.495E+00 | 1.52E+02 | G |
| CS-137 | -1.1563E-02 | | | | | | |
| | | 661.66 | -1.156E-02 | ?( | 5.676E-02 | 1.42E+02 | G |
| CO-60 | 2.4051E-02 | | | | | | |
| | | 1173.24 | 2.405E-02 | ?(P | 6.796E-02 | 7.24E+01 | K |
| | | 1332.50 | -1.092E-02 | - P | 6.419E-02 | 1.73E+02 | K |
| EU-152 | 4.7093E-02 | | | | | | |
| | | 40.12 | 4.461E-02 | &(P | 2.003E-01 | 1.03E+02 | G |
| | | 121.78 | -5.410E-03 | - P | 9.583E-02 | 5.47E+02 | G |
| | | 344.30 | 6.361E-03 | & P | 1.306E-01 | 3.51E+02 | G |
| | | 1408.08 | 5.061E-02 | ?(P | 2.818E-01 | 1.52E+02 | G |
| | | 39.52 | -3.270E-03 | & | 3.900E-01 | 3.46E+03 | G |
| | | 964.00 | -1.797E-02 | - | 4.335E-01 | 6.78E+02 | G |
| | | 1112.07 | -9.702E-02 | + | 5.378E-01 | 1.60E+02 | G |
| | | 778.90 | -1.788E-02 | & P | 4.211E-01 | 2.78E+03 | G |
| | | 1085.80 | 0.000E+00 | - | 6.270E-01 | 1.00E+03 | G |
| | | 45.40 | -1.435E-02 | % P | 7.119E-01 | 1.58E+03 | G |
| | | 244.67 | -1.339E-01 | + P | 5.380E-01 | 1.20E+02 | G |
| | | 867.39 | -1.176E-01 | + | 1.279E+00 | 3.07E+02 | G |
| EU-154 | 5.0021E-02 | | | | | | |
| | | 123.10 | -2.088E-03 | ?( | 7.160E-02 | 9.96E+02 | G |
| | | 1274.80 | 1.254E-02 | ?(P | 2.144E-01 | 4.77E+02 | G |
| | | 723.30 | -1.586E-01 | & | 3.574E-01 | 6.80E+01 | G |
| | | 1004.80 | -2.351E-02 | % P | 3.372E-01 | 9.82E+02 | G |
| | | 43.00 | 1.453E-01 | &( | 4.210E-01 | 8.67E+01 | G |
| | | 873.20 | -1.189E-01 | + P | 5.119E-01 | 1.31E+02 | G |
| | | 996.30 | 8.215E-04 | & | 5.433E-01 | 1.83E+04 | G |
| | | 42.31 | 1.580E-01 | ?( | 7.499E-01 | 1.40E+02 | G |
| | | 248.04 | 5.885E-02 | &(P | 4.560E-01 | 2.16E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 591.70 | -3.078E-03 | & | 8.604E-01 | 7.71E+03 | G |
| | | 48.70 | -4.463E-01 | + | 1.425E+00 | 9.56E+01 | G |
| | | 756.70 | 3.777E-01 | &( | 1.066E+00 | 8.36E+01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 5.6388E-02 | 1.8172E-01 | 1.8178E-01 | 0.330E+00 |
| RA-226 # | 1.6014E+00 | 6.2955E-01 | 6.4420E-01 | 0.833E+00 |
| Ra-228 | 5.0087E-01 | 1.5276E-01 | 1.5642E-01 | 0.203E+00 |
| Am-241 #B | 1.2297E-03 | 7.9031E-02 | 7.9031E-02 | 0.137E+00 |
| PB-210 A | 8.2965E-01 | 8.2532E-01 | 8.2937E-01 | 0.133E+01 |
| U-238 A | 8.7331E-01 | 4.8944E-01 | 4.9419E-01 | 0.118E+01 |
| K-40 | 2.0700E+01 | 1.4970E+00 | 2.0089E+00 | 0.735E+00 |
| PB-214 # | 6.1757E-01 | 8.5466E-02 | 1.0250E-01 | 0.127E+00 |
| BI-214 | 6.1569E-01 | 1.0612E-01 | 1.1273E-01 | 0.985E-01 |
| BI-212 | 7.4157E-01 | 2.5303E-01 | 2.5776E-01 | 0.261E+00 |
| PB-212 | 5.4604E-01 | 8.2473E-02 | 9.6658E-02 | 0.900E-01 |

| | | | | |
|---|---|---|---|---|
| TL-208 | 1.8744E-01 | 5.3467E-02 | 5.4819E-02 | 0.580E-01 |
| PA-234 #A | 6.7537E-02 | 9.8033E-02 | 9.8159E-02 | 0.125E+00 |
| CS-137 #A | -1.1563E-02 | 3.2874E-02 | 3.2878E-02 | 0.568E-01 |
| CO-60 #A | 2.4051E-02 | 3.9955E-02 | 3.9968E-02 | 0.680E-01 |
| EU-152 #A | 4.7093E-02 | 9.6601E-02 | 9.6745E-02 | 0.200E+00 |
| EU-154 #A | 5.0021E-02 | 8.3625E-02 | 8.3709E-02 | 0.716E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 1120.0 to 1998.2 keV) 2.660E+01 pCi/g

The library has energies which are not separable.

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-10 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-026 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | tuna can solid, 250 |
| Fraction | 026 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | -7.8543E-02 | pCi/g | 5.6840E-01 | 4.0300E-01 | 2.0150E-01 | | | |
| **RA-226** | 1.2803E+00 | pCi/g | 6.9058E-01 | 8.8200E-01 | 4.4100E-01 | | | |
| **RA-228** | 2.7031E-01 | pCi/g | 1.3908E-01 | 2.5600E-01 | 1.2800E-01 | | | |
| **AM-241** | 8.4401E-03 | pCi/g | 7.8994E-02 | 1.3700E-01 | 6.8500E-02 | | | |
| **PB-210** | 4.7026E-01 | pCi/g | 9.0117E-01 | 1.6400E+00 | 8.2000E-01 | | | |
| **U-238** | 5.0508E-01 | pCi/g | 4.4434E-01 | 1.3200E+00 | 6.6000E-01 | | | |
| **K-40** | 1.1788E+01 | pCi/g | 1.6026E+00 | 5.4800E-01 | 2.7400E-01 | | | |
| **PB-214** | 3.2499E-01 | pCi/g | 9.9914E-02 | 1.2000E-01 | 6.0000E-02 | | | |
| **BI-214** | 2.7550E-01 | pCi/g | 9.4827E-02 | 1.1600E-01 | 5.8000E-02 | | | |
| **BI-212** | 1.4287E-01 | pCi/g | 2.7626E-01 | 5.7000E-01 | 2.8500E-01 | | | |
| **PB-212** | 3.5566E-01 | pCi/g | 9.9591E-02 | 1.1400E-01 | 5.7000E-02 | | | |
| **TL-208** | 1.2659E-01 | pCi/g | 5.0217E-02 | 5.4100E-02 | 2.7050E-02 | | | |
| **PA-234** | 7.4298E-02 | pCi/g | 1.0807E-01 | 1.2100E-01 | 6.0500E-02 | | | |
| **CS-137** | 1.0442E-02 | pCi/g | 3.6660E-02 | 6.5700E-02 | 3.2850E-02 | | | |
| **CO-60** | -3.5206E-03 | pCi/g | 6.1677E-02 | 8.6900E-02 | 4.3450E-02 | | | |
| **EU-152** | 7.2187E-02 | pCi/g | 1.1757E-01 | 1.6000E-01 | 8.0000E-02 | | | |
| **EU-154** | 7.8299E-02 | pCi/g | 9.9609E-02 | 8.2900E-02 | 4.1450E-02 | | | |
| **Total Gamma** | 1.5783E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.5584E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07858.An1

Sample description
Batch ID: 16-00564-10
SDG: ARS1-16-00670-026 Tech: WJS

Spectrum Filename: C:\User\ARS07858.An1

Acquisition information
Start time: 19-Apr-2016 10:46:35
Live time: 1800
Real time: 1802
Dead time: 0.09 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 4.0574E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 4.0574E+02) =
2.4646E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS07858.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1577

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 37.78 | 2. | 339.12 | 0.90 | 2.099E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 42.43 | 10. | 125.38 | 0.91 | 2.269E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 43.33 | 12. | 80.64 | 0.91 | 2.322E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.66 | 13. | 30.74 | 0.91 | 2.569E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.43 | 3. | 467.96 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.05 | 6. | 46.18 | 0.93 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.18 | 88. | 20.26 | 0.93 | 4.421E-02 | | | | |
| 92.53 | 48. | 31.79 | 0.93 | 4.749E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.06 | 14. | 73.23 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 185.75 | 50. | 26.82 | 0.69 | 3.986E-02 | 186.21 | 3.640 | 1.280E+00 | RA226 |
| 225.76 | 12. | 72.35 | 1.08 | 3.493E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.66 | 140. | 12.72 | 1.65 | 3.368E-02 | 238.63 | 43.100 | 3.557E-01 | PB212 |
| 246.45 | 10. | 80.72 | 1.09 | 3.308E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| 295.31 | 33. | 26.51 | 1.14 | 2.872E-02 | 295.21 | 18.500 | 2.325E-01 | PB214 |
| 300.06 | 6. | 137.65 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.19 | 24. | 34.95 | 1.18 | 2.586E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 344.14 | 0. | 567.34 | 1.18 | 2.552E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 352.19 | 100. | 13.80 | 1.13 | 2.508E-02 | 351.92 | 35.800 | 3.875E-01 | PB214 |
| 510.97 | 41. | 17.73 | 0.85 | 1.892E-02 | 510.72 | 22.500 | 3.579E-01 | TL208 |
| 570.49 | 5. | 109.58 | 1.37 | 1.746E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.45 | 48. | 17.15 | 0.57 | 1.715E-02 | 583.14 | 86.000 | 1.195E-01 | TL208 |
| 609.48 | 55. | 14.71 | 1.41 | 1.661E-02 | 609.31 | 44.791 | 2.714E-01 | BI214 |
| 660.94 | 4. | 149.51 | 1.45 | 1.563E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 698.84 | 2. | 433.62 | 1.48 | 1.502E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 726.64 | 2. | 220.00 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 756.85 | 4. | 158.98 | 1.53 | 1.418E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.09 | 5. | 118.45 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 779.36 | 7. | 78.27 | 1.54 | 1.388E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 786.83 | 6. | 96.63 | 1.55 | 1.380E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 861.40 | 7. | 60.26 | 1.61 | 1.291E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 874.35 | 0. | 993.93 | 1.62 | 1.277E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 880.45 | 3. | 133.80 | 1.62 | 1.269E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.15 | 25. | 28.53 | 1.65 | 1.238E-02 | 911.07 | 29.000 | 2.623E-01 | Ra228 |
| 926.54 | 1. | 823.36 | 1.66 | 1.222E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 950.15 | 0. | 649.22 | 1.67 | 1.201E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 968.69 | 7. | 75.29 | 1.69 | 1.182E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 996.21 | 2. | 352.63 | 1.71 | 1.158E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1006.90 | 7. | 61.46 | 1.72 | 1.151E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1087.00 | 2. | 253.57 | 1.78 | 1.085E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.39 | 13. | 50.63 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1240.08 | 7. | 68.75 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.99 | 2. | 181.52 | 1.98 | 8.985E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1461.08 | 292. | 5.95 | 2.17 | 8.555E-03 | 1460.75 | 10.700 | 1.179E+01 | K40 |
| 1765.15 | 5. | 38.64 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 308.41 | 77.18 | 106. | 88. | 0.049 | 40.52 | 0.928 | PB-212 | |
| 1408.71 | 352.19 | 114. | 15. | 0.008 | 205.25 | 1.133 | CO-57 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.58 | 39.48 | 55. | 7. | 0.004 | 306.26 | 0.904s |
| EU-152 | 150.78 | 37.78 | 28. | 2. | 0.001 | 678.24 | 0.905s |
| EU-154 | 169.37 | 42.43 | 66. | 10. | 0.005 | 250.77 | 0.907s |
| EU-154 | 172.99 | 43.33 | 56. | 12. | 0.007 | 161.29 | 0.908s |
| EU-152 | 180.63 | 45.24 | 134. | -43. | -0.024 | 200.21 | 0.910s |
| PB-210 | 186.32 | 46.66 | 85. | 13. | 0.007 | 61.49 | 0.911s |
| EU-154 | 194.50 | 48.71 | 108. | -14. | -0.008 | 210.92 | 0.913s |
| Am-241 | 237.41 | 59.43 | 95. | 3. | 0.002 | 935.91 | 0.923s |
| U-238 | 251.89 | 63.05 | 119. | 6. | 0.003 | 92.37 | 0.927 |
| U-238 | 369.24 | 92.38 | 90. | 17. | 0.009 | 87.77 | 0.929D |

American Radiation Services Spectrum name: ARS07858.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 370.92 | 92.80 | 84. | 19. | 0.011 | 87.77 | 0.954D |
| PA-234 | 379.33 | 94.90 | 122. | -15. | -0.008 | 218.47 | 0.956s |
| PA-234 | 395.96 | 99.06 | 62. | 14. | 0.008 | 146.47 | 0.959s |
| PA-234 | 398.53 | 99.70 | 98. | 0. | 0.000 | 2000.00 | 0.960s |
| PA-234 | 444.34 | 111.15 | 102. | -6. | -0.004 | 535.26 | 0.971s |
| EU-152 | 491.01 | 122.81 | 74. | -2. | -0.001 | 1293.82 | 0.981s |
| U-235 | 576.99 | 144.30 | 112. | -10. | -0.006 | 508.43 | 1.001s |
| U-235 | 653.17 | 163.35 | 86. | -11. | -0.006 | 278.21 | 1.019s |
| RA-226 | 742.82 | 185.75 | 47. | 50. | 0.028 | 53.64 | 0.689s |
| U-235 | 815.50 | 203.92 | 44. | -4. | -0.002 | 590.15 | 1.057s |
| PA-234 | 902.87 | 225.76 | 34. | 12. | 0.007 | 144.70 | 1.077s |
| PB-212 | 954.50 | 238.66 | 81. | 140. | 0.078 | 25.44 | 1.654s |
| EU-152 | 985.67 | 246.45 | 30. | 10. | 0.006 | 161.45 | 1.093s |
| EU-154 | 992.24 | 248.09 | 58. | -3. | -0.002 | 778.87 | 1.096s |
| TL-208 | 1109.19 | 277.32 | 30. | -2. | -0.001 | 687.58 | 1.122 |
| PB-214 | 1181.14 | 295.31 | 34. | 33. | 0.019 | 53.02 | 1.138 |
| PB-212 | 1200.15 | 300.06 | 33. | 6. | 0.003 | 275.30 | 1.142 |
| Ra-228 | 1352.72 | 338.19 | 36. | 24. | 0.014 | 69.90 | 1.176 |
| PB-214 | 1407.80 | 351.96 | 32. | 79. | 0.044 | 27.41 | 1.188s |
| TL-208 | 2043.94 | 510.97 | 55. | 41. | 0.023 | 35.46 | 0.853s |
| PA-234 | 2282.05 | 570.49 | 18. | 5. | 0.003 | 219.16 | 1.373s |
| TL-208 | 2333.88 | 583.45 | 16. | 48. | 0.026 | 34.30 | 0.570s |
| EU-154 | 2366.89 | 591.70 | 12. | 0. | 0.000 | 2000.00 | 1.392s |
| BI-214 | 2438.02 | 609.48 | 20. | 55. | 0.030 | 29.41 | 1.406s |
| CS-137 | 2643.87 | 660.94 | 20. | 4. | 0.002 | 299.03 | 1.449s |
| PA-234 | 2795.47 | 698.84 | 28. | 2. | 0.001 | 867.23 | 1.479s |
| BI-212 | 2906.71 | 726.64 | 26. | 2. | 0.001 | 440.00 | 1.502s |
| EU-154 | 3027.57 | 756.85 | 16. | 4. | 0.002 | 317.96 | 1.526s |
| TL-208 | 3055.07 | 763.73 | 22. | -3. | -0.002 | 421.04 | 1.531s |
| BI-214 | 3072.51 | 768.09 | 18. | 5. | 0.003 | 236.90 | 1.535s |
| EU-152 | 3117.59 | 779.36 | 14. | 7. | 0.004 | 156.53 | 1.543s |
| BI-212 | 3147.47 | 786.83 | 13. | 6. | 0.003 | 193.27 | 1.548s |
| PA-234 | 3229.78 | 807.41 | 21. | -4. | -0.002 | 356.16 | 1.566s |
| PA-234 | 3338.68 | 834.63 | 9. | -1. | 0.000 | 1082.58 | 1.584s |
| TL-208 | 3445.76 | 861.40 | 12. | 7. | 0.004 | 120.53 | 1.607s |
| EU-152 | 3464.64 | 866.12 | 10. | -2. | -0.001 | 584.30 | 1.612s |
| PA-234 | 3521.96 | 880.45 | 8. | 3. | 0.002 | 267.59 | 1.622s |
| PA-234 | 3533.14 | 883.24 | 28. | 0. | 0.000 | 2000.00 | 1.624s |
| PA-234 | 3588.89 | 897.18 | 15. | -2. | -0.001 | 742.47 | 1.636s |
| Ra-228 | 3644.77 | 911.15 | 22. | 25. | 0.014 | 57.07 | 1.646s |
| PA-234 | 3706.33 | 926.54 | 17. | 1. | 0.000 | 1646.72 | 1.658s |
| BI-214 | 3738.22 | 934.51 | 21. | -1. | 0.000 | 1753.16 | 1.663s |
| PA-234 | 3788.86 | 947.17 | 20. | -5. | -0.003 | 305.83 | 1.672s |
| EU-152 | 3858.41 | 964.56 | 28. | -7. | -0.004 | 266.23 | 1.686s |
| Ra-228 | 3866.53 | 966.59 | 30. | -6. | -0.003 | 271.11 | 1.686s |
| Ra-228 | 3874.96 | 968.69 | 22. | 7. | 0.004 | 150.57 | 1.689s |
| EU-154 | 3985.01 | 996.21 | 18. | 2. | 0.001 | 705.27 | 1.710s |
| EU-154 | 4027.79 | 1006.90 | 7. | 7. | 0.004 | 122.92 | 1.716s |

American Radiation Services Spectrum name: ARS07858.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 4348.19 | 1087.00 | 20. | 2. | 0.001 | 507.13 | 1.776s |
| EU-152 | 4447.19 | 1111.75 | 20. | -4. | -0.002 | 346.58 | 1.795s |
| BI-214 | 4481.74 | 1120.39 | 24. | 13. | 0.007 | 101.27 | 1.801s |
| CO-60 | 4693.42 | 1173.31 | 21. | -1. | -0.001 | 1544.64 | 1.839s |
| BI-214 | 4960.47 | 1240.08 | 16. | 7. | 0.004 | 137.49 | 1.884s |
| EU-154 | 5097.36 | 1274.30 | 21. | -4. | -0.002 | 310.44 | 1.909s |
| CO-60 | 5326.97 | 1331.71 | 17. | -3. | -0.002 | 398.86 | 1.949s |
| BI-214 | 5512.07 | 1377.99 | 13. | 2. | 0.001 | 363.05 | 1.979s |
| PA-234 | 5576.50 | 1394.10 | 15. | 0. | 0.000 | 2000.00 | 1.990s |
| K-40 | 5844.39 | 1461.08 | 5. | 292. | 0.162 | 11.90 | 2.172 |
| BI-212 | 6482.22 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.135s |
| BI-214 | 7060.47 | 1765.15 | 6. | 5. | 0.003 | 77.29 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | -7.8543E-02 | | | | | | |
| | | | 143.76 | -7.854E-02 | &(P | 4.028E-01 | 2.54E+02 G | |
| | | | 205.31 | -7.398E-02 | & P | 7.078E-01 | 2.95E+02 G | |
| | | | 163.35 | -2.034E-01 | & P | 8.427E-01 | 1.39E+02 G | |
| RA-226 | | 1.2803E+00 | | | | | | |
| | | | 186.21 | 1.280E+00 | *( | 8.822E-01 | 2.68E+01 G | K |
| Ra-228 | | 2.7031E-01 | | | | | | |
| | | | 911.07 | 2.623E-01 | (P | 2.558E-01 | 2.85E+01 G | |
| | | | 968.90 | 1.333E-01 | - P | 4.365E-01 | 7.53E+01 G | |
| | | | 338.40 | 2.896E-01 | ?(P | 3.648E-01 | 3.50E+01 G | |
| | | | 964.60 | -3.445E-01 | - | 1.623E+00 | 1.36E+02 G | |
| Am-241 | T | 8.4401E-03 | | | | | | |
| | | | 59.54 | 8.440E-03 | ?( | 1.368E-01 | 4.68E+02 G | K |
| PB-210 | | 4.7026E-01 | | | | | | |
| | | | 46.52 | 4.703E-01 | (P | 1.645E+00 | 3.07E+01 G | |
| U-238 | | 5.0508E-01 | | | | | | |
| | | | 63.29 | 1.419E-01 | ?(P | 1.321E+00 | 4.62E+01 G | |
| | | | 92.80 | 5.051E-01 | } P | 1.180E+00 | 4.39E+01 G | |
| | | | 92.38 | 5.051E-01 | } P | 1.424E+00 | 4.39E+01 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.1788E+01 | | | | | | |
| | | 1460.75 | 1.179E+01 | (P | 5.479E-01 | 5.95E+00 | G |
| PB-214 | 3.2499E-01 | | | | | | |
| | | 351.92 | 3.250E-01 | *(P | 1.196E-01 | 1.37E+01 | G |
| | | 295.21 | 2.325E-01 | - P | 2.071E-01 | 2.65E+01 | G |
| | | 241.98 | -1.567E-02 | % P | 8.151E-01 | 1.91E+03 | G |
| BI-214 | 2.7550E-01 | | | | | | |
| | | 609.31 | 2.714E-01 | (P | 1.163E-01 | 1.47E+01 | G |
| | | 1764.49 | 1.723E-01 | - P | 4.806E-01 | 3.86E+01 | G |
| | | 1120.29 | 3.022E-01 | (P | 6.010E-01 | 5.06E+01 | G |
| | | 1238.11 | 4.524E-01 | & P | 1.365E+00 | 6.87E+01 | G |
| | | 768.36 | 2.710E-01 | ?(P | 1.242E+00 | 1.18E+02 | G |
| | | 1377.67 | 2.272E-01 | &(P | 2.034E+00 | 1.82E+02 | G |
| | | 934.06 | -7.566E-02 | - | 2.439E+00 | 8.77E+02 | G |
| BI-212 | 1.4287E-01 | | | | | | |
| | | 727.17 | 3.297E-02 | ?(P | 5.703E-01 | 2.20E+02 | G |
| | | 1620.56 | 0.000E+00 | & | 1.269E+00 | 1.00E+03 | G |
| | | 785.42 | 7.913E-01 | ?( | 2.643E+00 | 9.66E+01 | G |
| PB-212 | 3.5566E-01 | | | | | | |
| | | 238.63 | 3.557E-01 | (P | 1.141E-01 | 1.27E+01 | G |
| | | 300.09 | 2.280E-01 | - P | 1.182E+00 | 1.38E+02 | G |
| TL-208 | 1.2659E-01 | | | | | | |
| | | 583.14 | 1.195E-01 | @(P | 5.412E-02 | 1.71E+01 | G |
| | | 510.72 | 3.579E-01 | + P | 3.236E-01 | 1.77E+01 | G |
| | | 860.47 | 1.774E-01 | &(P | 4.521E-01 | 6.03E+01 | G |
| | | 277.36 | -4.644E-02 | - P | 5.327E-01 | 3.44E+02 | G |
| | | 763.30 | -5.279E-01 | - P | 3.824E+00 | 2.11E+02 | G |
| PA-234 | 7.4298E-02 | | | | | | |
| | | 98.44 | 4.367E-02 | ?(P | 1.209E-01 | 7.32E+01 | G |
| | | 946.00 | -7.620E-02 | + P | 3.637E-01 | 1.53E+02 | G |
| | | 131.28 | 5.536E-03 | % | 2.009E-01 | 1.05E+03 | G |
| | | 94.67 | -7.358E-02 | + | 2.707E-01 | 1.09E+02 | G |
| | | 883.24 | 0.000E+00 | - | 6.659E-01 | 1.00E+03 | G |
| | | 926.70 | 1.795E-02 | &(P | 6.034E-01 | 8.23E+02 | G |
| | | 569.26 | 9.202E-02 | ?(P | 4.628E-01 | 1.10E+02 | G |
| | | 111.00 | -5.819E-02 | - P | 4.468E-01 | 2.68E+02 | G |
| | | 733.00 | -7.386E-03 | & P | 6.748E-01 | 1.01E+03 | G |
| | | 949.00 | 1.790E-02 | % P | 8.522E-01 | 6.49E+02 | G |
| | | 880.51 | 1.263E-01 | &(P | 7.096E-01 | 1.34E+02 | G |
| | | 226.87 | 2.004E-01 | ?(P | 4.855E-01 | 7.24E+01 | G |
| | | 831.10 | -4.032E-02 | - | 8.391E-01 | 5.41E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | -2.137E-01 | + | 1.352E+00 | 1.78E+02 | G |
| | | 99.70 | 0.000E+00 | - | 7.985E-01 | 1.00E+03 | G |
| | | 699.10 | 8.446E-02 | ?(P | 1.478E+00 | 4.34E+02 | G |
| | | 898.60 | -1.828E-01 | + P | 1.541E+00 | 3.71E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 2.214E+00 | 1.00E+03 | G |
| CS-137 | 1.0442E-02 | | | | | | |
| | | 661.66 | 1.044E-02 | &(P | 6.573E-02 | 1.50E+02 | G |
| CO-60 | -3.5206E-03 | | | | | | |
| | | 1173.24 | -3.521E-03 | &(P | 8.686E-02 | 7.72E+02 | K |
| | | 1332.50 | -1.216E-02 | + | 8.736E-02 | 1.99E+02 | K |
| EU-152 | 7.2187E-02 | | | | | | |
| | | 40.12 | 1.314E-02 | &( | 1.599E-01 | 3.39E+02 | G |
| | | 121.78 | -5.022E-03 | + | 1.136E-01 | 6.47E+02 | G |
| | | 344.30 | 2.628E-04 | % P | 1.440E-01 | 5.67E+02 | G |
| | | 1408.08 | -9.291E-03 | % P | 4.048E-01 | 3.87E+03 | G |
| | | 39.52 | 7.972E-02 | ?( | 4.205E-01 | 1.53E+02 | G |
| | | 964.00 | -1.405E-01 | + P | 5.830E-01 | 1.33E+02 | G |
| | | 1112.07 | -9.736E-02 | + | 6.004E-01 | 1.73E+02 | G |
| | | 778.90 | 1.465E-01 | (P | 4.165E-01 | 7.83E+01 | G |
| | | 1085.80 | 7.899E-02 | &(P | 7.761E-01 | 2.54E+02 | G |
| | | 45.40 | -7.025E-01 | + P | 9.283E-01 | 1.00E+02 | G |
| | | 244.67 | 1.530E-01 | &( | 4.155E-01 | 8.07E+01 | G |
| | | 867.39 | -1.085E-01 | + | 1.192E+00 | 2.92E+02 | G |
| EU-154 | 7.8299E-02 | | | | | | |
| | | 123.10 | 7.180E-05 | &( | 8.289E-02 | 3.28E+04 | G |
| | | 1274.80 | -4.789E-02 | + | 2.626E-01 | 1.55E+02 | G |
| | | 723.30 | -1.391E-03 | % | 3.444E-01 | 6.76E+03 | G |
| | | 1004.80 | 1.285E-01 | ?(P | 2.679E-01 | 6.15E+01 | G |
| | | 43.00 | 1.481E-01 | &(P | 4.579E-01 | 8.06E+01 | G |
| | | 873.20 | -6.518E-03 | % P | 4.608E-01 | 9.94E+02 | G |
| | | 996.30 | 5.175E-02 | ?( | 6.682E-01 | 3.53E+02 | G |
| | | 42.31 | 2.123E-01 | ?( | 9.077E-01 | 1.25E+02 | G |
| | | 248.04 | -4.776E-02 | + | 6.519E-01 | 3.89E+02 | G |
| | | 591.70 | 0.000E+00 | - | 8.806E-01 | 1.00E+03 | G |
| | | 48.70 | -4.525E-01 | + | 1.608E+00 | 1.05E+02 | G |
| | | 756.70 | 2.427E-01 | &( | 1.376E+00 | 1.59E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | -7.8543E-02 | 5.6837E-01 | 5.6840E-01 | 0.403E+00 |
| RA-226 # | 1.2803E+00 | 6.8670E-01 | 6.9058E-01 | 0.882E+00 |
| Ra-228 # | 2.7031E-01 | 1.3804E-01 | 1.3908E-01 | 0.256E+00 |
| Am-241 #A | 8.4401E-03 | 7.8992E-02 | 7.8994E-02 | 0.137E+00 |
| PB-210 #A | 4.7026E-01 | 8.9841E-01 | 9.0117E-01 | 0.164E+01 |
| U-238 A | 5.0508E-01 | 4.4264E-01 | 4.4434E-01 | 0.132E+01 |
| K-40 | 1.1788E+01 | 1.4143E+00 | 1.6026E+00 | 0.548E+00 |
| PB-214 # | 3.2499E-01 | 9.6208E-02 | 9.9914E-02 | 0.120E+00 |
| BI-214 # | 2.7550E-01 | 9.3417E-02 | 9.4827E-02 | 0.116E+00 |
| BI-212 #A | 1.4287E-01 | 2.7612E-01 | 2.7626E-01 | 0.570E+00 |
| PB-212 | 3.5566E-01 | 9.6482E-02 | 9.9591E-02 | 0.114E+00 |
| TL-208 # | 1.2659E-01 | 4.9598E-02 | 5.0217E-02 | 0.541E-01 |
| PA-234 #A | 7.4298E-02 | 1.0794E-01 | 1.0807E-01 | 0.121E+00 |
| CS-137 #A | 1.0442E-02 | 3.6658E-02 | 3.6660E-02 | 0.657E-01 |
| CO-60 #A | -3.5206E-03 | 6.1676E-02 | 6.1677E-02 | 0.869E-01 |
| EU-152 #A | 7.2187E-02 | 1.1654E-01 | 1.1757E-01 | 0.160E+00 |
| EU-154 #A | 7.8299E-02 | 9.9470E-02 | 9.9609E-02 | 0.829E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

American Radiation Services Spectrum name: ARS07858.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.0 to 2000.1 keV) | 1.406E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-11 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-027 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 027 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 4.1680E-02 | pCi/g | 5.0119E-02 | 6.8200E-02 | 3.4100E-02 | | | |
| RA-226 | 5.4108E-01 | pCi/g | 5.6905E-01 | 9.5900E-01 | 4.7950E-01 | | | |
| RA-228 | 2.8144E-01 | pCi/g | 1.1041E-01 | 1.0600E-01 | 5.3000E-02 | | | |
| AM-241 | 4.0825E-02 | pCi/g | 5.2754E-02 | 8.6900E-02 | 4.3450E-02 | | | |
| PB-210 | -6.4826E-01 | pCi/g | 2.5931E+01 | 2.0100E+00 | 1.0050E+00 | | | |
| U-238 | 3.6927E-01 | pCi/g | 4.9446E-01 | 1.1200E+00 | 5.6000E-01 | | | |
| K-40 | 1.0977E+01 | pCi/g | 1.7518E+00 | 1.1300E+00 | 5.6500E-01 | | | |
| PB-214 | 2.6838E-01 | pCi/g | 9.0082E-02 | 1.0300E-01 | 5.1500E-02 | | | |
| BI-214 | 2.8962E-01 | pCi/g | 9.7228E-02 | 1.0600E-01 | 5.3000E-02 | | | |
| BI-212 | 1.5387E-01 | pCi/g | 3.3602E-01 | 5.0200E-01 | 2.5100E-01 | | | |
| PB-212 | 3.2077E-01 | pCi/g | 8.8040E-02 | 1.0000E-01 | 5.0000E-02 | | | |
| TL-208 | 1.2188E-01 | pCi/g | 4.1215E-02 | 3.8900E-02 | 1.9450E-02 | | | |
| PA-234 | 5.1605E-02 | pCi/g | 9.8256E-02 | 9.4400E-02 | 4.7200E-02 | | | |
| CS-137 | 6.9948E-03 | pCi/g | 3.5509E-02 | 6.4000E-02 | 3.2000E-02 | | | |
| CO-60 | -9.2679E-03 | pCi/g | 1.0248E-01 | 8.3600E-02 | 4.1800E-02 | | | |
| EU-152 | 2.0259E-02 | pCi/g | 5.0179E-02 | 2.9500E-01 | 1.4750E-01 | | | |
| EU-154 -7.5832E-04 ~~-3.6990E-01~~ | | pCi/g | 1.0127E-01 | 7.2800E-02 | 3.6400E-02 | | | |
| Total Gamma | 1.3855E+01 | pCi/g | | | | | | |
| Total NORM Activity | 3.8886E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 11:17:18
American Radiation Services     Spectrum name: ARS05254.An1

Sample description
     Batch ID:  16-00564-11
     SDG:  ARS1-16-00670-027  Tech:  WJS

Spectrum Filename: C:\User\ARS05254.An1

Acquisition information
       Start time:                4/19/2016 10:47:15
       Live time:               1800
       Real time:               1801
       Dead time:                  0.06 %
       Detector ID:                   2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.9949E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.9949E+02) =
                                  2.5032E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:17:18
American Radiation Services Spectrum name: ARS05254.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1402

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.95 | 18. | 101.88 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 2.110E-01 | EU154 |
| | | | | | 42.31 | 7.300 | 3.870E-01 | EU154 |
| 43.73 | 158. | 12.99 | 0.74 | 2.537E-02 | 43.00 | 13.100 | 1.825E+00 | EU154 |
| 48.60 | 6. | 175.02 | 0.75 | 2.876E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| | | | | | 48.70 | 4.200 | 1.996E-01 | EU154 |
| 59.45 | 15. | 64.53 | 0.77 | 3.751E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.27 | 10. | 60.59 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.93 | 62. | 23.10 | 0.79 | 4.763E-02 | | | | |
| 77.09 | 89. | 16.38 | 0.79 | 4.856E-02 | | | | |
| 92.33 | 13. | 66.89 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.75 | 10. | 119.65 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.53 | 6. | 127.39 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 99.30 | 6. | 168.04 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 143.82 | 12. | 77.68 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| | | | | | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.57 | 8. | 103.24 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.40 | 15. | 47.65 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| | | | | | 185.72 | 57.200 | PBC<MDA | U235 |
| 186.48 | 22. | 36.10 | 0.97 | 4.120E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| 226.18 | 3. | 274.94 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.63 | 140. | 12.07 | 1.03 | 3.536E-02 | 238.63 | 43.100 | 3.208E-01 | PB212 |
| 241.99 | 35. | 32.50 | 0.72 | 3.505E-02 | 241.98 | 7.500 | 4.979E-01 | PB214 |
| 277.26 | 9. | 75.72 | 0.52 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.35 | 43. | 23.66 | 0.85 | 3.087E-02 | 295.21 | 18.500 | 2.806E-01 | PB214 |
| 300.72 | 3. | 184.58 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.02 | 43. | 24.48 | 0.27 | 2.826E-02 | 338.40 | 12.010 | 4.754E-01 | Ra228 |
| 344.60 | 2. | 360.92 | 1.21 | 2.795E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.98 | 69. | 14.62 | 1.09 | 2.755E-02 | 351.92 | 35.800 | 2.621E-01 | PB214 |
| 511.01 | 38. | 16.81 | 0.38 | 2.149E-02 | 510.72 | 22.500 | 2.933E-01 | TL208 |
| 569.55 | 2. | 154.75 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:17:18
American Radiation Services Spectrum name: ARS05254.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 583.36 | 53. | 15.40 | 0.55 | 1.957E-02 | 583.14 | 86.000 | 1.184E-01 | TL208 |
| 609.53 | 68. | 14.84 | 1.09 | 1.895E-02 | 609.31 | 44.791 | 3.027E-01 | BI214 |
| 661.50 | 3. | 205.41 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 699.74 | 3. | 226.82 | 1.66 | 1.708E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 726.57 | 5. | 118.28 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 756.70 | 3. | 201.46 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.81 | 7. | 98.53 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 778.87 | 5. | 123.72 | 1.75 | 1.566E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 831.69 | 2. | 336.44 | 1.81 | 1.483E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.54 | 2. | 287.94 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.37 | 1. | 506.07 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 884.20 | 3. | 232.26 | 1.86 | 1.407E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 897.61 | 0. | 831.18 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.67 | 30. | 17.41 | 0.90 | 1.368E-02 | 911.07 | 29.000 | 2.814E-01 | Ra228 |
| 934.82 | 5. | 113.84 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 946.93 | 4. | 146.91 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 963.91 | 3. | 225.71 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.607E-01 | Ra228 |
| 964.22 | 2. | 326.92 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 969.20 | 7. | 103.04 | 1.94 | 1.292E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1085.35 | 3. | 233.93 | 2.05 | 1.156E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.14 | 10. | 72.66 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1239.59 | 1. | 481.02 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1461.46 | 257. | 6.52 | 2.31 | 8.224E-03 | 1460.75 | 10.700 | 1.098E+01 | K40 |
| 1621.20 | 2. | 154.41 | 2.38 | 7.151E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 174.43 | 43.73 | 215. | 52. | 0.029 | 85.14 | 0.735 | EU-154 | s |
| 299.34 | 74.94 | 84. | 41. | 0.023 | 71.16 | 0.902 | TH-234 | |
| 308.00 | 77.10 | 90. | 72. | 0.040 | 45.64 | 0.726 | PB-212 | |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:17:18
American Radiation Services Spectrum name: ARS05254.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.07 | 39.64 | 110. | -2. | -0.001 | 1479.02 | 0.750s |
| EU-152 | 159.40 | 39.97 | 118. | -5. | -0.003 | 678.44 | 0.750s |
| EU-154 | 171.33 | 42.95 | 164. | 18. | 0.010 | 203.76 | 0.750s |
| EU-154 | 175.01 | 43.87 | 103. | 140. | 0.078 | 26.52 | 0.750s |
| EU-152 | 179.04 | 44.88 | 183. | -35. | -0.019 | 114.19 | 0.750s |
| EU-154 | 193.94 | 48.60 | 60. | 6. | 0.004 | 350.04 | 0.750s |
| Am-241 | 237.38 | 59.45 | 37. | 15. | 0.008 | 129.05 | 0.766s |
| U-238 | 252.67 | 63.27 | 90. | 10. | 0.006 | 121.18 | 0.772s |
| U-238 | 369.17 | 92.38 | 79. | 13. | 0.007 | 133.78 | 0.820D |
| U-238 | 370.85 | 92.80 | 105. | 10. | 0.005 | 239.31 | 0.821D |
| PA-234 | 393.79 | 98.53 | 42. | 6. | 0.003 | 254.77 | 0.830s |
| PA-234 | 396.87 | 99.30 | 40. | 6. | 0.003 | 336.07 | 0.832s |
| PA-234 | 446.65 | 111.74 | 64. | -11. | -0.006 | 213.97 | 0.850s |
| EU-152 | 486.84 | 121.78 | 95. | 0. | 0.000 | 2000.00 | 0.868s |
| PA-234 | 524.13 | 131.10 | 67. | -6. | -0.003 | 561.01 | 0.883s |
| U-235 | 575.07 | 143.82 | 53. | 12. | 0.007 | 155.36 | 0.903s |
| U-235 | 654.09 | 163.57 | 59. | 8. | 0.005 | 206.49 | 0.934s |
| U-235 | 745.50 | 186.40 | 74. | 15. | 0.008 | 95.31 | 0.969s |
| RA-226 | 745.79 | 186.48 | 58. | 22. | 0.012 | 72.19 | 0.970s |
| PA-234 | 904.70 | 226.18 | 51. | 3. | 0.002 | 549.88 | 1.033s |
| PB-212 | 954.56 | 238.63 | 66. | 130. | 0.072 | 24.14 | 1.026 |
| PB-214 | 967.99 | 241.99 | 37. | 35. | 0.019 | 65.00 | 0.717s |
| EU-152 | 976.34 | 244.07 | 56. | -13. | -0.007 | 166.37 | 1.060s |
| EU-154 | 994.30 | 248.56 | 40. | -5. | -0.003 | 404.22 | 1.065s |
| TL-208 | 1109.19 | 277.26 | 25. | 9. | 0.005 | 151.44 | 0.525s |
| PB-214 | 1181.58 | 295.35 | 37. | 43. | 0.024 | 47.33 | 0.849s |
| PB-212 | 1203.07 | 300.72 | 29. | 3. | 0.002 | 369.16 | 1.142s |
| Ra-228 | 1352.36 | 338.02 | 25. | 43. | 0.024 | 48.96 | 0.271s |
| EU-152 | 1378.72 | 344.60 | 26. | 2. | 0.001 | 721.83 | 1.206s |
| PB-214 | 1408.23 | 351.98 | 27. | 69. | 0.038 | 29.25 | 1.093 |
| TL-208 | 2044.80 | 511.01 | 47. | 38. | 0.021 | 33.62 | 0.379s |
| PA-234 | 2279.13 | 569.55 | 18. | 2. | 0.001 | 309.51 | 1.509s |
| TL-208 | 2334.40 | 583.36 | 10. | 53. | 0.029 | 30.80 | 0.547s |
| EU-154 | 2367.02 | 591.51 | 19. | -2. | -0.001 | 579.19 | 1.536s |
| BI-214 | 2439.19 | 609.53 | 21. | 68. | 0.038 | 29.67 | 1.090s |
| CS-137 | 2647.20 | 661.50 | 25. | 3. | 0.002 | 410.81 | 1.621s |
| PA-234 | 2800.26 | 699.74 | 18. | 3. | 0.001 | 453.64 | 1.664s |
| EU-154 | 2894.58 | 723.30 | 64. | 0. | 0.000 | 2000.00 | 1.692s |
| BI-212 | 2907.68 | 726.57 | 25. | 5. | 0.003 | 236.57 | 1.696s |
| EU-154 | 3028.27 | 756.70 | 17. | 3. | 0.002 | 402.93 | 1.729s |
| TL-208 | 3056.81 | 763.83 | 27. | -5. | -0.003 | 304.87 | 1.737s |
| BI-214 | 3076.74 | 768.81 | 21. | 7. | 0.004 | 197.05 | 1.742s |
| EU-152 | 3117.04 | 778.87 | 13. | 5. | 0.003 | 247.43 | 1.753s |
| PA-234 | 3229.67 | 807.01 | 20. | -3. | -0.002 | 383.36 | 1.785s |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:17:18
American Radiation Services Spectrum name: ARS05254.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3328.46 | 831.69 | 23. | 2. | 0.001 | 672.87 | 1.809s |
| TL-208 | 3443.96 | 860.54 | 21. | 2. | 0.001 | 575.88 | 1.839s |
| EU-152 | 3469.45 | 866.91 | 27. | -5. | -0.003 | 336.73 | 1.846s |
| EU-154 | 3495.78 | 873.49 | 26. | -2. | -0.001 | 1010.08 | 1.852s |
| PA-234 | 3523.33 | 880.37 | 22. | 1. | 0.001 | 1012.13 | 1.860s |
| PA-234 | 3538.65 | 884.20 | 20. | 3. | 0.001 | 464.53 | 1.862s |
| Ra-228 | 3648.64 | 911.67 | 3. | 30. | 0.017 | 34.82 | 0.899s |
| BI-214 | 3741.30 | 934.82 | 15. | 5. | 0.003 | 227.67 | 1.912s |
| PA-234 | 3789.76 | 946.93 | 16. | 4. | 0.002 | 293.82 | 1.923s |
| EU-152 | 3858.99 | 964.22 | 26. | 2. | 0.001 | 653.85 | 1.940s |
| Ra-228 | 3857.75 | 963.91 | 22. | 3. | 0.002 | 451.42 | 1.941 |
| Ra-228 | 3878.93 | 969.20 | 27. | 7. | 0.004 | 206.09 | 1.945s |
| EU-154 | 3987.41 | 996.30 | 44. | 0. | 0.000 | 2000.00 | 1.970s |
| EU-154 | 4035.37 | 1008.28 | 18. | -2. | -0.001 | 625.43 | 1.978s |
| EU-152 | 4343.90 | 1085.35 | 18. | 3. | 0.001 | 467.86 | 2.048s |
| BI-214 | 4483.14 | 1120.14 | 23. | 10. | 0.006 | 145.33 | 2.077s |
| CO-60 | 4709.51 | 1176.69 | 20. | -3. | -0.001 | 793.86 | 2.119s |
| BI-214 | 4961.35 | 1239.59 | 29. | 1. | 0.001 | 962.05 | 2.167s |
| EU-154 | 5102.29 | 1274.80 | 59. | 0. | 0.000 | 2000.00 | 2.192s |
| EU-152 | 5628.32 | 1406.20 | 18. | -6. | -0.003 | 213.71 | 2.276s |
| K-40 | 5849.53 | 1461.46 | 26. | 257. | 0.143 | 13.04 | 2.306 |
| BI-212 | 6489.04 | 1621.20 | 5. | 2. | 0.001 | 308.81 | 2.381s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | Peak | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 4.1680E-02 | | | | | | |
| | | | 185.72 | 2.351E-02 | &(P | 6.824E-02 | 4.77E+01 G | K |
| | | | 143.76 | 9.121E-02 | ?(P | 2.771E-01 | 7.77E+01 G | |
| | | | 205.31 | -2.609E-02 | & P | 6.275E-01 | 2.10E+03 G | |
| | | | 163.35 | 1.521E-01 | ?(P | 6.938E-01 | 1.03E+02 G | |
| RA-226 | | 5.4108E-01 | | | | | | |
| | | | 186.21 | 5.411E-01 | (P | 9.591E-01 | 3.61E+01 G | K |
| Ra-228 | | 2.8144E-01 | | | | | | |
| | | | 911.07 | 2.814E-01 | (P | 1.058E-01 | 1.74E+01 G | |
| | | | 968.90 | 1.099E-01 | - P | 4.456E-01 | 1.03E+02 G | |
| | | | 338.40 | 4.754E-01 | + P | 2.883E-01 | 2.45E+01 G | |
| | | | 964.60 | 1.607E-01 | - | 1.300E+00 | 2.26E+02 G | |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:17:18
American Radiation Services Spectrum name: ARS05254.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Am-241 | T | 4.0825E-02 | | | | | | |
| | | | 59.54 | 4.082E-02 | &( | 8.692E-02 | 6.45E+01 | G K |
| PB-210 | | -6.4826E-01 | | | | | | |
| | | | 46.52 | -6.483E-01 | %(P | 2.005E+00 | 1.00E+03 | G |
| U-238 | | 3.6927E-01 | | | | | | |
| | | | 63.29 | 2.495E-01 | ?(P | 1.117E+00 | 6.06E+01 | G |
| | | | 92.80 | 2.312E-01 | } P | 1.214E+00 | 1.20E+02 | G |
| | | | 92.38 | 3.693E-01 | } P | 1.242E+00 | 6.69E+01 | G |
| K-40 | | 1.0977E+01 | | | | | | |
| | | | 1460.75 | 1.098E+01 | (P | 1.126E+00 | 6.52E+00 | G |
| PB-214 | | 2.6838E-01 | | | | | | |
| | | | 351.92 | 2.621E-01 | (P | 1.030E-01 | 1.46E+01 | G |
| | | | 295.21 | 2.806E-01 | (P | 2.053E-01 | 2.37E+01 | G |
| | | | 241.98 | 4.979E-01 | + P | 4.450E-01 | 3.25E+01 | G |
| BI-214 | | 2.8962E-01 | | | | | | |
| | | | 609.31 | 3.027E-01 | *(P | 1.057E-01 | 1.48E+01 | G |
| | | | 1764.49 | -6.382E-02 | % P | 9.909E-01 | 1.00E+03 | G |
| | | | 1120.29 | 2.340E-01 | ?( | 5.676E-01 | 7.27E+01 | G |
| | | | 1238.11 | 7.333E-02 | & P | 1.787E+00 | 4.81E+02 | G |
| | | | 768.36 | 3.393E-01 | ?(P | 1.201E+00 | 9.85E+01 | G |
| | | | 1377.67 | -1.799E-02 | % | 1.965E+00 | 2.83E+03 | G |
| | | | 934.06 | 4.869E-01 | + | 1.938E+00 | 1.14E+02 | G |
| BI-212 | | 1.5387E-01 | | | | | | |
| | | | 727.17 | 9.599E-02 | ?(P | 5.022E-01 | 1.18E+02 | G |
| | | | 1620.56 | 4.022E-01 | ?(P | 2.454E+00 | 1.54E+02 | G |
| | | | 785.42 | -2.585E-04 | % P | 4.044E+00 | 1.00E+03 | G |
| PB-212 | | 3.2077E-01 | | | | | | |
| | | | 238.63 | 3.208E-01 | (P | 1.000E-01 | 1.21E+01 | G |
| | | | 300.09 | 1.071E-01 | & P | 1.044E+00 | 1.85E+02 | G |
| TL-208 | | 1.2188E-01 | | | | | | |
| | | | 583.14 | 1.184E-01 | (P | 3.895E-02 | 1.54E+01 | G |
| | | | 510.72 | 2.933E-01 | + P | 2.701E-01 | 1.68E+01 | G |
| | | | 860.47 | 3.800E-02 | - P | 5.191E-01 | 2.88E+02 | G |
| | | | 277.36 | 1.681E-01 | (P | 4.653E-01 | 7.57E+01 | G |
| | | | 763.30 | -7.057E-01 | - | 3.768E+00 | 1.52E+02 | G |
| PA-234 | | 5.1605E-02 | | | | | | |
| | | | 98.44 | 1.793E-02 | &(P | 9.440E-02 | 1.27E+02 | G |
| | | | 946.00 | 5.885E-02 | ?( | 3.070E-01 | 1.47E+02 | G |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:17:18
American Radiation Services Spectrum name: ARS05254.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 131.28 | -2.324E-02 | + P | 1.557E-01 | 2.81E+02 | G |
| | | 94.67 | 2.616E-05 | % | 2.276E-01 | 2.49E+05 | G |
| | | 883.24 | 5.772E-02 | ?(P | 5.283E-01 | 2.32E+02 | G |
| | | 926.70 | 2.740E-03 | % | 5.583E-01 | 5.43E+03 | G |
| | | 569.26 | 4.010E-02 | &(P | 4.106E-01 | 1.55E+02 | G |
| | | 111.00 | -9.336E-02 | + | 3.388E-01 | 1.07E+02 | G |
| | | 733.00 | -4.756E-03 | % | 6.593E-01 | 3.75E+03 | G |
| | | 949.00 | -1.527E-02 | & P | 8.974E-01 | 1.00E+03 | G |
| | | 880.51 | 5.467E-02 | ?(P | 1.014E+00 | 5.06E+02 | G |
| | | 226.87 | 5.392E-02 | ?(P | 5.723E-01 | 2.75E+02 | G |
| | | 831.10 | 9.279E-02 | &( | 1.129E+00 | 3.36E+02 | G |
| | | 808.10 | -1.741E-01 | + | 1.192E+00 | 1.92E+02 | G |
| | | 99.70 | 8.439E-02 | ?( | 4.934E-01 | 1.68E+02 | G |
| | | 699.10 | 1.227E-01 | &(P | 1.063E+00 | 2.27E+02 | G |
| | | 898.60 | 2.264E-03 | & P | 1.625E+00 | 8.31E+02 | G |
| | | 1394.10 | -1.254E-02 | % | 1.658E+00 | 3.30E+03 | G |
| CS-137 | 6.9948E-03 | | | | | | |
| | | 661.66 | 6.995E-03 | ?(P | 6.397E-02 | 2.05E+02 | G |
| CO-60 | -9.2679E-03 | | | | | | |
| | | 1173.24 | -9.268E-03 | ?(P | 8.360E-02 | 3.97E+02 | K |
| | | 1332.50 | -2.307E-03 | % P | 8.788E-02 | 6.19E+03 | K |
| EU-152 | 2.0259E-02 | | | | | | |
| | | 40.12 | -2.533E-02 | ?( | 2.954E-01 | 3.39E+02 | G |
| | | 121.78 | 0.000E+00 | + | 1.224E-01 | 1.00E+03 | G |
| | | 344.30 | 1.022E-02 | &( | 1.327E-01 | 3.61E+02 | G |
| | | 1408.08 | -1.249E-01 | + | 4.626E-01 | 1.07E+02 | G |
| | | 39.52 | -2.142E-02 | + | 5.483E-01 | 7.40E+02 | G |
| | | 964.00 | 3.084E-02 | &(P | 5.282E-01 | 3.27E+02 | G |
| | | 1112.07 | -1.226E-02 | % | 5.566E-01 | 1.22E+03 | G |
| | | 778.90 | 8.351E-02 | ?( | 3.649E-01 | 1.24E+02 | G |
| | | 1085.80 | 8.466E-02 | &( | 7.156E-01 | 2.34E+02 | G |
| | | 45.40 | -5.494E-01 | + | 1.030E+00 | 5.71E+01 | G |
| | | 244.67 | -1.913E-01 | + | 5.340E-01 | 8.32E+01 | G |
| | | 867.39 | -3.136E-01 | + P | 1.689E+00 | 1.68E+02 | G |
| EU-154 | 3.6990E-01 | | | | | | |
| | | 123.10 | -7.588E-04 | &( | 7.280E-02 | 2.72E+03 | G |
| | | 1274.80 | 0.000E+00 | + | 4.183E-01 | 1.00E+03 | G |
| | | 723.30 | 0.000E+00 | + | 4.573E-01 | 1.00E+03 | G |
| | | 1004.80 | -4.011E-02 | + P | 3.848E-01 | 3.13E+02 | G |
| | | 43.00 | 1.624E+00 | ?( | 5.787E-01 | 1.33E+01 | G |
| | | 873.20 | -5.505E-02 | + P | 6.219E-01 | 5.05E+02 | G |
| | | 996.30 | 0.000E+00 | - | 9.382E-01 | 1.00E+03 | G |
| | | 42.31 | 3.870E-01 | ?( | 1.322E+00 | 1.02E+02 | G |
| | | 248.04 | -7.496E-02 | + | 5.303E-01 | 2.02E+02 | G |

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American Radiation Services Spectrum name: ARS05254.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 591.70 | -9.229E-02 | + | 9.707E-01 | 2.90E+02 | G |
| | | 48.70 | 1.996E-01 | ?( | 1.206E+00 | 1.75E+02 | G |
| | | 756.70 | 1.647E-01 | &(P | 1.255E+00 | 2.01E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 4.1680E-02 | 4.9998E-02 | 5.0119E-02 | 0.682E-01 |
| RA-226 #A | 5.4108E-01 | 5.6765E-01 | 5.6905E-01 | 0.959E+00 |
| Ra-228 | 2.8144E-01 | 1.0885E-01 | 1.1041E-01 | 0.106E+00 |
| Am-241 #A | 4.0825E-02 | 5.2686E-02 | 5.2754E-02 | 0.869E-01 |
| PB-210 #A | -6.4826E-01 | 2.5931E+01 | 2.5931E+01 | 0.201E+01 |
| U-238 A | 3.6927E-01 | 4.9362E-01 | 4.9446E-01 | 0.112E+01 |
| K-40 # | 1.0977E+01 | 1.4794E+00 | 1.7518E+00 | 0.113E+01 |
| PB-214 | 2.6838E-01 | 8.6056E-02 | 9.0082E-02 | 0.103E+00 |
| BI-214 # | 2.8962E-01 | 9.4900E-02 | 9.7228E-02 | 0.106E+00 |
| BI-212 #A | 1.5387E-01 | 3.3584E-01 | 3.3602E-01 | 0.502E+00 |
| PB-212 | 3.2077E-01 | 8.3360E-02 | 8.8040E-02 | 0.100E+00 |

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| | | | | | |
|---|---|---|---|---|---|
| TL-208 | | 1.2188E-01 | 4.0150E-02 | 4.1215E-02 | 0.389E-01 |
| PA-234 | #A | 5.1605E-02 | 9.8181E-02 | 9.8256E-02 | 0.944E-01 |
| CS-137 | #A | 6.9948E-03 | 3.5507E-02 | 3.5509E-02 | 0.640E-01 |
| CO-60 | #B | -9.2679E-03 | 1.0248E-01 | 1.0248E-01 | 0.836E-01 |
| EU-152 | #A | 2.0259E-02 | 5.0127E-02 | 5.0179E-02 | 0.295E+00 |
| EU-154 | #C | 3.6990E-01 | 9.8100E-02 | 1.0127E-01 | 0.728E-01 |

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  238.5 to  1998.6 keV)  1.805E+00  pCi/g

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 11:28:19
American Radiation Services Spectrum name: ARS05254.An1

Sample description
Batch ID: 16-00564-11
SDG: ARS1-16-00670-027 Tech: WJS

Spectrum Filename: C:\User\ARS05254.An1

Acquisition information
Start time: 4/19/2016 10:47:15
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 2

Detector system
GAMASPEC_ARS05 MCB 340

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 POLY WJS 2-26-16

Energy Calibration
Created: 2/26/2016 07:19:00
Zero offset: 0.147 keV
Gain: 0.250 keV/channel
Quadratic: -4.502E-09 keV/channel^2

Efficiency Calibration
Created: 2/26/2016 07:21:00
Type: Polynomial
Uncertainty: 0.909 %
Coefficients: -0.806225 -3.736517 0.169918
-0.005635 -0.000425 0.000016

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.24
Start channel: 10 ( 2.65keV )
Stop channel: 8000 ( 1998.60keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.9949E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.9949E+02) =
2.5032E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 11:28:19
American Radiation Services Spectrum name: ARS05254.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | NO | |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1402

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 42.95 | 18. | 101.88 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 2.110E-01 | EU154 |
| | | | | | 42.31 | 7.300 | 3.870E-01 | EU154 |
| 43.73 | 158. | 12.99 | 0.74 | 2.537E-02 | 43.00 | 13.100 | 1.825E+00 | EU154 |
| 48.60 | 6. | 175.02 | 0.75 | 2.876E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| | | | | | 48.70 | 4.200 | 1.996E-01 | EU154 |
| 59.45 | 15. | 64.53 | 0.77 | 3.751E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.27 | 22. | 60.59 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.93 | 62. | 23.10 | 0.79 | 4.763E-02 | | | | |
| 77.09 | 89. | 16.38 | 0.79 | 4.856E-02 | | | | |
| 92.33 | 22. | 39.50 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.75 | 6. | 198.74 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.53 | 7. | 127.39 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 99.30 | 6. | 168.04 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 143.82 | 14. | 77.68 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| | | | | | 143.76 | 10.500 | 1.050E-01 | U235 |
| 163.57 | 11. | 103.24 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| | | | | | 163.35 | 4.700 | 1.944E-01 | U235 |
| 186.40 | 26. | 47.65 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 6.485E-01 | RA226 |
| | | | | | 185.72 | 57.200 | 4.120E-02 | U235 |
| 186.48 | 31. | 36.10 | 0.97 | 4.120E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 7.863E-01 | RA226 |
| 226.18 | 4. | 274.94 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.63 | 140. | 12.07 | 1.03 | 3.536E-02 | 238.63 | 43.100 | 3.453E-01 | PB212 |
| 241.99 | 35. | 32.50 | 0.72 | 3.505E-02 | 241.98 | 7.500 | 5.033E-01 | PB214 |
| 277.26 | 11. | 75.72 | 0.52 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.35 | 50. | 23.66 | 0.85 | 3.087E-02 | 295.21 | 18.500 | 3.265E-01 | PB214 |
| 300.72 | 4. | 184.58 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.02 | 44. | 24.48 | 0.27 | 2.826E-02 | 338.40 | 12.010 | 4.872E-01 | Ra228 |
| 344.60 | 2. | 360.92 | 1.21 | 2.795E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.98 | 77. | 14.62 | 1.09 | 2.755E-02 | 351.92 | 35.800 | 2.945E-01 | PB214 |
| 511.01 | 68. | 16.81 | 0.38 | 2.149E-02 | 510.72 | 22.500 | 5.247E-01 | TL208 |
| 569.55 | 4. | 154.75 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.36 | 57. | 15.40 | 0.55 | 1.957E-02 | 583.14 | 86.000 | 1.266E-01 | TL208 |

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American Radiation Services Spectrum name: ARS05254.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 609.53 | 76. | 14.84 | 1.09 | 1.895E-02 | 609.31 | 44.791 | 3.343E-01 | BI214 |
| 661.50 | 3. | 205.41 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 699.74 | 3. | 226.82 | 1.66 | 1.708E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 726.57 | 6. | 118.28 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 756.70 | 3. | 201.46 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 1.723E-01 | EU154 |
| 768.81 | 7. | 98.53 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 778.87 | 5. | 123.72 | 1.75 | 1.566E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 831.69 | 2. | 336.44 | 1.81 | 1.483E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.54 | 2. | 287.94 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.37 | 1. | 506.07 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 884.20 | 3. | 232.26 | 1.86 | 1.407E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 897.61 | 1. | 831.18 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.67 | 33. | 17.41 | 0.90 | 1.368E-02 | 911.07 | 29.000 | 3.127E-01 | Ra228 |
| 934.82 | 5. | 113.84 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 946.93 | 4. | 146.91 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 963.91 | 3. | 225.71 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.607E-01 | Ra228 |
| 964.22 | 2. | 326.92 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.188E-01 | Ra228 |
| 969.20 | 7. | 103.04 | 1.94 | 1.292E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1085.35 | 3. | 233.93 | 2.05 | 1.156E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.14 | 10. | 72.66 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1239.59 | 2. | 481.02 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1461.46 | 266. | 6.52 | 2.31 | 8.224E-03 | 1460.75 | 10.700 | 1.134E+01 | K40 |
| 1621.20 | 2. | 154.41 | 2.38 | 7.151E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 174.43 | 43.73 | 215. | 52. | 0.029 | 85.14 | 0.735 | EU-154 | s |
| 299.34 | 74.94 | 84. | 41. | 0.023 | 71.16 | 0.902 | TH-234 | |
| 308.00 | 77.10 | 90. | 72. | 0.040 | 45.64 | 0.726 | PB-212 | |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 11:28:19
American Radiation Services Spectrum name: ARS05254.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.07 | 39.64 | 110. | -2. | -0.001 | 1479.02 | 0.750s |
| EU-152 | 159.40 | 39.97 | 118. | -5. | -0.003 | 678.44 | 0.750s |
| EU-154 | 171.33 | 42.95 | 164. | 18. | 0.010 | 203.76 | 0.750s |
| EU-154 | 175.01 | 43.87 | 103. | 140. | 0.078 | 26.52 | 0.750s |
| EU-152 | 179.04 | 44.88 | 183. | -35. | -0.019 | 114.19 | 0.750s |
| PB-210 | 185.61 | 46.52 | 126. | 0. | 0.000 | 2000.00 | 0.750s |
| EU-154 | 193.94 | 48.60 | 60. | 6. | 0.004 | 350.04 | 0.750s |
| Am-241 | 237.38 | 59.45 | 37. | 15. | 0.008 | 129.05 | 0.766s |
| U-238 | 252.67 | 63.27 | 79. | 22. | 0.012 | 121.18 | 0.772s |
| U-238 | 369.17 | 92.38 | 73. | 22. | 0.012 | 79.00 | 0.820D |
| U-238 | 370.85 | 92.80 | 95. | 6. | 0.003 | 397.48 | 0.821D |
| PA-234 | 393.79 | 98.53 | 41. | 7. | 0.004 | 254.77 | 0.830s |
| PA-234 | 396.87 | 99.30 | 40. | 6. | 0.003 | 336.07 | 0.832s |
| PA-234 | 446.65 | 111.74 | 64. | -11. | -0.006 | 213.97 | 0.850s |
| EU-152 | 486.84 | 121.78 | 95. | 0. | 0.000 | 2000.00 | 0.868s |
| PA-234 | 524.13 | 131.10 | 65. | -4. | -0.002 | 561.01 | 0.883s |
| U-235 | 575.07 | 143.82 | 51. | 14. | 0.008 | 155.36 | 0.903s |
| U-235 | 654.09 | 163.57 | 57. | 11. | 0.006 | 206.49 | 0.934s |
| U-235 | 745.50 | 186.40 | 63. | 26. | 0.014 | 95.31 | 0.969s |
| RA-226 | 745.79 | 186.48 | 48. | 31. | 0.017 | 72.19 | 0.970s |
| PA-234 | 904.70 | 226.18 | 51. | 4. | 0.002 | 549.88 | 1.033s |
| PB-212 | 954.56 | 238.63 | 56. | 140. | 0.078 | 24.14 | 1.026 |
| PB-214 | 967.99 | 241.99 | 37. | 35. | 0.020 | 65.00 | 0.717s |
| EU-152 | 976.34 | 244.07 | 56. | -13. | -0.007 | 166.37 | 1.060s |
| EU-154 | 994.30 | 248.56 | 40. | -5. | -0.003 | 404.22 | 1.065s |
| TL-208 | 1109.19 | 277.26 | 23. | 11. | 0.006 | 151.44 | 0.525s |
| PB-214 | 1181.58 | 295.35 | 30. | 50. | 0.028 | 47.33 | 0.849s |
| PB-212 | 1203.07 | 300.72 | 28. | 4. | 0.002 | 369.16 | 1.142s |
| Ra-228 | 1352.36 | 338.02 | 24. | 44. | 0.024 | 48.96 | 0.271s |
| EU-152 | 1378.72 | 344.60 | 26. | 2. | 0.001 | 721.83 | 1.206s |
| PB-214 | 1408.23 | 351.98 | 19. | 77. | 0.043 | 29.25 | 1.093 |
| TL-208 | 2044.80 | 511.01 | 18. | 68. | 0.038 | 33.62 | 0.379s |
| PA-234 | 2279.13 | 569.55 | 17. | 4. | 0.002 | 309.51 | 1.509s |
| TL-208 | 2334.40 | 583.36 | 6. | 57. | 0.032 | 30.80 | 0.547s |
| EU-154 | 2367.02 | 591.51 | 19. | -2. | -0.001 | 579.19 | 1.536s |
| BI-214 | 2439.19 | 609.53 | 14. | 76. | 0.042 | 29.67 | 1.090s |
| CS-137 | 2647.20 | 661.50 | 24. | 3. | 0.002 | 410.81 | 1.621s |
| PA-234 | 2800.26 | 699.74 | 17. | 3. | 0.002 | 453.64 | 1.664s |
| EU-154 | 2894.58 | 723.30 | 64. | 0. | 0.000 | 2000.00 | 1.692s |
| BI-212 | 2907.68 | 726.57 | 24. | 6. | 0.003 | 236.57 | 1.696s |
| EU-154 | 3028.27 | 756.70 | 17. | 3. | 0.002 | 402.93 | 1.729s |
| TL-208 | 3056.81 | 763.83 | 27. | -5. | -0.003 | 304.87 | 1.737s |
| BI-214 | 3076.74 | 768.81 | 21. | 7. | 0.004 | 197.05 | 1.742s |
| EU-152 | 3117.04 | 778.87 | 13. | 5. | 0.003 | 247.43 | 1.753s |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-212 | 3143.25 | 785.42 | 44. | 0. | 0.000 | 2000.00 | 1.761s |
| PA-234 | 3229.67 | 807.01 | 20. | -3. | -0.002 | 383.36 | 1.785s |
| PA-234 | 3328.46 | 831.69 | 23. | 2. | 0.001 | 672.87 | 1.809s |
| TL-208 | 3443.96 | 860.54 | 20. | 2. | 0.001 | 575.88 | 1.839s |
| EU-152 | 3469.45 | 866.91 | 26. | -4. | -0.002 | 336.73 | 1.846s |
| EU-154 | 3495.78 | 873.49 | 25. | -1. | -0.001 | 1010.08 | 1.852s |
| PA-234 | 3523.33 | 880.37 | 22. | 1. | 0.001 | 1012.13 | 1.860s |
| PA-234 | 3538.65 | 884.20 | 20. | 3. | 0.002 | 464.53 | 1.862s |
| PA-234 | 3592.34 | 897.61 | 20. | 1. | 0.000 | 1662.37 | 1.878s |
| Ra-228 | 3648.64 | 911.67 | 0. | 33. | 0.018 | 34.82 | 0.899s |
| BI-214 | 3741.30 | 934.82 | 15. | 5. | 0.003 | 227.67 | 1.912s |
| PA-234 | 3789.76 | 946.93 | 16. | 4. | 0.002 | 293.82 | 1.923s |
| PA-234 | 3798.06 | 949.00 | 22. | 0. | 0.000 | 2000.00 | 1.926s |
| EU-152 | 3858.99 | 964.22 | 26. | 2. | 0.001 | 653.85 | 1.940s |
| Ra-228 | 3857.75 | 963.91 | 22. | 3. | 0.002 | 451.42 | 1.941 |
| Ra-228 | 3878.93 | 969.20 | 26. | 7. | 0.004 | 206.09 | 1.945s |
| EU-154 | 3987.41 | 996.30 | 44. | 0. | 0.000 | 2000.00 | 1.970s |
| EU-154 | 4035.37 | 1008.28 | 18. | -2. | -0.001 | 625.43 | 1.978s |
| EU-152 | 4343.90 | 1085.35 | 18. | 3. | 0.001 | 467.86 | 2.048s |
| BI-214 | 4483.14 | 1120.14 | 23. | 10. | 0.006 | 145.33 | 2.077s |
| CO-60 | 4709.51 | 1176.69 | 19. | -2. | -0.001 | 793.86 | 2.119s |
| BI-214 | 4961.35 | 1239.59 | 29. | 2. | 0.001 | 962.05 | 2.167s |
| EU-154 | 5102.29 | 1274.80 | 59. | 0. | 0.000 | 2000.00 | 2.192s |
| EU-152 | 5628.32 | 1406.20 | 18. | -6. | -0.003 | 213.71 | 2.276s |
| K-40 | 5849.53 | 1461.46 | 17. | 266. | 0.148 | 13.04 | 2.306 |
| BI-212 | 6489.04 | 1621.20 | 5. | 2. | 0.001 | 308.81 | 2.381s |
| BI-214 | 7062.73 | 1764.49 | 22. | 0. | 0.000 | 2000.00 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 6.0402E-02 | | | | | | |
| | | | 185.72 | 4.120E-02 | &( | 6.326E-02 | 4.77E+01 | G K |
| | | | 143.76 | 1.050E-01 | ?( | 2.727E-01 | 7.77E+01 | G |
| | | | 205.31 | 8.085E-03 | & | 6.140E-01 | 2.10E+03 | G |
| | | | 163.35 | 1.944E-01 | ?( | 6.808E-01 | 1.03E+02 | G |
| RA-226 | | 7.8629E-01 | | | | | | |
| | | | 186.21 | 7.863E-01 | ( | 8.808E-01 | 3.61E+01 | G K |

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| Nuclide | | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|---|
| Ra-228 | | 3.6377E-01 | | | | | |
| | | | 911.07 | 3.127E-01 | ( | 6.983E-02 1.74E+01 | G |
| | | | 968.90 | 1.241E-01 | - | 4.391E-01 1.03E+02 | G |
| | | | 338.40 | 4.872E-01 | ( | 2.828E-01 2.45E+01 | G |
| | | | 964.60 | 1.607E-01 | - | 1.300E+00 2.26E+02 | G |
| Am-241 | T | 4.0825E-02 | | | | | |
| | | | 59.54 | 4.082E-02 | &( | 8.692E-02 6.45E+01 | G K |
| PB-210 | | 0.0000E+00 | | | | | |
| | | | 46.52 | 0.000E+00 | ?( | 1.875E+00 1.00E+03 | G |
| U-238 | | 6.0714E-01 | | | | | |
| | | | 63.29 | 5.257E-01 | ?( | 1.047E+00 6.06E+01 | G |
| | | | 92.80 | 1.411E-01 | } | 1.157E+00 1.99E+02 | G |
| | | | 92.38 | 6.071E-01 | } | 1.194E+00 3.95E+01 | G |
| K-40 | | 1.1342E+01 | | | | | |
| | | | 1460.75 | 1.134E+01 | ( | 9.412E-01 6.52E+00 | G |
| PB-214 | | 3.0541E-01 | | | | | |
| | | | 351.92 | 2.945E-01 | ( | 8.711E-02 1.46E+01 | G |
| | | | 295.21 | 3.265E-01 | ( | 1.869E-01 2.37E+01 | G |
| | | | 241.98 | 5.033E-01 | + | 4.430E-01 3.25E+01 | G |
| BI-214 | | 3.4478E-01 | | | | | |
| | | | 609.31 | 3.343E-01 | *( | 8.781E-02 1.48E+01 | G |
| | | | 1764.49 | 0.000E+00 | - | 9.601E-01 1.00E+03 | G |
| | | | 1120.29 | 2.340E-01 | - | 5.676E-01 7.27E+01 | G |
| | | | 1238.11 | 1.024E-01 | & | 1.774E+00 4.81E+02 | G |
| | | | 768.36 | 3.530E-01 | ?( | 1.194E+00 9.85E+01 | G |
| | | | 1377.67 | -1.799E-02 | % | 1.965E+00 2.83E+03 | G |
| | | | 934.06 | 4.869E-01 | ?( | 1.938E+00 1.14E+02 | G |
| BI-212 | | 1.7628E-01 | | | | | |
| | | | 727.17 | 1.197E-01 | ?( | 4.910E-01 1.18E+02 | G |
| | | | 1620.56 | 4.191E-01 | ?( | 2.436E+00 1.54E+02 | G |
| | | | 785.42 | 0.000E+00 | - | 4.044E+00 1.00E+03 | G |
| PB-212 | | 3.4528E-01 | | | | | |
| | | | 238.63 | 3.453E-01 | ( | 9.269E-02 1.21E+01 | G |
| | | | 300.09 | 1.570E-01 | & | 1.023E+00 1.85E+02 | G |
| TL-208 | | 1.2664E-01 | | | | | |
| | | | 583.14 | 1.266E-01 | ( | 3.218E-02 1.54E+01 | G |
| | | | 510.72 | 5.247E-01 | + | 1.726E-01 1.68E+01 | G |
| | | | 860.47 | 4.921E-02 | - | 5.133E-01 2.88E+02 | G |

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| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| | | 277.36 | 1.908E-01 + | | 4.545E-01 7.57E+01 | G |
| | | 763.30 | -7.057E-01 - | | 3.768E+00 1.52E+02 | G |
| PA-234 | 5.7034E-02 | | | | | |
| | | 98.44 | 2.126E-02 &( | | 9.320E-02 1.27E+02 | G |
| | | 946.00 | 5.885E-02 ?( | | 3.070E-01 1.47E+02 | G |
| | | 131.28 | -1.574E-02 - | | 1.535E-01 2.81E+02 | G |
| | | 94.67 | 2.616E-05 % | | 2.276E-01 2.49E+05 | G |
| | | 883.24 | 6.289E-02 ?( | | 5.256E-01 2.32E+02 | G |
| | | 926.70 | 2.740E-03 % | | 5.583E-01 5.43E+03 | G |
| | | 569.26 | 7.134E-02 &( | | 3.931E-01 1.55E+02 | G |
| | | 111.00 | -9.336E-02 + | | 3.388E-01 1.07E+02 | G |
| | | 733.00 | -4.756E-03 % | | 6.593E-01 3.75E+03 | G |
| | | 949.00 | 0.000E+00 & | | 8.897E-01 1.00E+03 | G |
| | | 880.51 | 5.497E-02 ?( | | 1.014E+00 5.06E+02 | G |
| | | 226.87 | 5.930E-02 ?( | | 5.706E-01 2.75E+02 | G |
| | | 831.10 | 9.279E-02 &( | | 1.129E+00 3.36E+02 | G |
| | | 808.10 | -1.741E-01 + | | 1.192E+00 1.92E+02 | G |
| | | 99.70 | 8.439E-02 ?( | | 4.934E-01 1.68E+02 | G |
| | | 699.10 | 1.292E-01 &( | | 1.060E+00 2.27E+02 | G |
| | | 898.60 | 5.218E-02 &( | | 1.599E+00 8.31E+02 | G |
| | | 1394.10 | -1.254E-02 % | | 1.658E+00 3.30E+03 | G |
| CS-137 | 8.6431E-03 | | | | | |
| | | 661.66 | 8.643E-03 ?( | | 6.319E-02 2.05E+02 | G |
| CO-60 | -5.6269E-03 | | | | | |
| | | 1173.24 | -5.627E-03 ?( | | 8.169E-02 3.97E+02 | K |
| | | 1332.50 | 3.693E-04 % | | 8.632E-02 6.19E+03 | K |
| EU-152 | 2.2343E-02 | | | | | |
| | | 40.12 | -2.533E-02 ?( | | 2.954E-01 3.39E+02 | G |
| | | 121.78 | 0.000E+00 + | | 1.224E-01 1.00E+03 | G |
| | | 344.30 | 1.022E-02 &( | | 1.327E-01 3.61E+02 | G |
| | | 1408.08 | -1.249E-01 + | | 4.626E-01 1.07E+02 | G |
| | | 39.52 | -2.142E-02 + | | 5.483E-01 7.40E+02 | G |
| | | 964.00 | 4.440E-02 &( | | 5.220E-01 3.27E+02 | G |
| | | 1112.07 | -1.226E-02 % | | 5.566E-01 1.22E+03 | G |
| | | 778.90 | 8.351E-02 ?( | | 3.649E-01 1.24E+02 | G |
| | | 1085.80 | 8.466E-02 &( | | 7.156E-01 2.34E+02 | G |
| | | 45.40 | -5.494E-01 + | | 1.030E+00 5.71E+01 | G |
| | | 244.67 | -1.913E-01 + | | 5.340E-01 8.32E+01 | G |
| | | 867.39 | -2.824E-01 + | | 1.674E+00 1.68E+02 | G |
| EU-154 | 3.7035E-01 | | | | | |
| | | 123.10 | -7.588E-04 &( | | 7.280E-02 2.72E+03 | G |
| | | 1274.80 | 0.000E+00 + | | 4.183E-01 1.00E+03 | G |
| | | 723.30 | 0.000E+00 + | | 4.573E-01 1.00E+03 | G |

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| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| | | 1004.80 | -3.337E-02 | + | 3.811E-01 | 3.13E+02 G |
| | | 43.00 | 1.624E+00 | ?( | 5.787E-01 | 1.33E+01 G |
| | | 873.20 | -3.343E-02 | + | 6.120E-01 | 5.05E+02 G |
| | | 996.30 | 0.000E+00 | - | 9.382E-01 | 1.00E+03 G |
| | | 42.31 | 3.870E-01 | ?( | 1.322E+00 | 1.02E+02 G |
| | | 248.04 | -7.496E-02 | + | 5.303E-01 | 2.02E+02 G |
| | | 591.70 | -9.229E-02 | + | 9.707E-01 | 2.90E+02 G |
| | | 48.70 | 1.996E-01 | ?( | 1.206E+00 | 1.75E+02 G |
| | | 756.70 | 1.723E-01 | &( | 1.251E+00 | 2.01E+02 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 6.0402E-02 | 5.5453E-02 | 5.5683E-02 | 0.633E-01 |
| RA-226 #A | 7.8629E-01 | 5.6765E-01 | 5.7059E-01 | 0.881E+00 |
| Ra-228 | 3.6377E-01 | 1.0927E-01 | 1.1185E-01 | 0.698E-01 |
| Am-241 #A | 4.0825E-02 | 5.2686E-02 | 5.2754E-02 | 0.869E-01 |
| PB-210 #A | 0.0000E+00 | 6.8899E-01 | 6.8900E-01 | 0.188E+01 |

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| | | | | | |
|---|---|---|---|---|---|
| U-238 | A | 6.0714E-01 | 4.7849E-01 | 4.8083E-01 | 0.105E+01 |
| K-40 | # | 1.1342E+01 | 1.4794E+00 | 1.7687E+00 | 0.941E+00 |
| PB-214 | | 3.0541E-01 | 8.4959E-02 | 9.0202E-02 | 0.871E-01 |
| BI-214 | # | 3.4478E-01 | 1.0230E-01 | 1.0535E-01 | 0.878E-01 |
| BI-212 | #A | 1.7628E-01 | 3.4288E-01 | 3.4312E-01 | 0.491E+00 |
| PB-212 | | 3.4528E-01 | 8.3360E-02 | 8.8760E-02 | 0.927E-01 |
| TL-208 | | 1.2664E-01 | 3.9000E-02 | 4.0181E-02 | 0.322E-01 |
| PA-234 | #A | 5.7034E-02 | 1.3160E-01 | 1.3167E-01 | 0.932E-01 |
| CS-137 | #A | 8.6431E-03 | 3.5507E-02 | 3.5510E-02 | 0.632E-01 |
| CO-60 | #B | -5.6269E-03 | 4.4670E-02 | 4.4670E-02 | 0.817E-01 |
| EU-152 | #A | 2.2343E-02 | 5.5283E-02 | 5.5341E-02 | 0.295E+00 |
| EU-154 | #C | 3.7035E-01 | 9.8220E-02 | 1.0139E-01 | 0.728E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 238.5 to 1998.6 keV) 2.269E+00 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-14 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-028 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | tuna can solid, 250 |
| Fraction | 028 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | -6.2453E-02 | pCi/g | 1.5676E-01 | 3.2500E-01 | 1.6250E-01 | | | |
| **RA-226** | 1.4570E+00 | pCi/g | 7.0859E-01 | 9.3000E-01 | 4.6500E-01 | | | |
| **RA-228** | 1.8108E-01 | pCi/g | 1.0822E-01 | 2.3000E-01 | 1.1500E-01 | | | |
| **AM-241** | 3.6526E-02 | pCi/g | 8.2130E-02 | 1.3800E-01 | 6.9000E-02 | | | |
| **PB-210** | -5.5306E-02 | pCi/g | 1.0175E+00 | 1.7000E+00 | 8.5000E-01 | | | |
| **U-238** | 8.8533E-01 | pCi/g | 7.8021E-01 | 1.2100E+00 | 6.0500E-01 | | | |
| **K-40** | 2.3925E+01 | pCi/g | 2.2930E+00 | 3.5100E-01 | 1.7550E-01 | | | |
| **PB-214** | 2.7575E-01 | pCi/g | 8.4988E-02 | 1.1500E-01 | 5.7500E-02 | | | |
| **BI-214** | 2.1167E-01 | pCi/g | 8.6355E-02 | 1.1800E-01 | 5.9000E-02 | | | |
| **BI-212** | 1.7068E-01 | pCi/g | 2.8077E-01 | 4.8100E-01 | 2.4050E-01 | | | |
| **PB-212** | 2.9964E-01 | pCi/g | 7.9246E-02 | 9.6700E-02 | 4.8350E-02 | | | |
| **TL-208** | 7.0162E-02 | pCi/g | 4.2389E-02 | 6.5200E-02 | 3.2600E-02 | | | |
| **PA-234** | 5.9679E-02 | pCi/g | 1.1196E-01 | 1.3400E-01 | 6.7000E-02 | | | |
| **CS-137** | -3.9596E-04 | pCi/g | 4.6697E-02 | 5.8200E-02 | 2.9100E-02 | | | |
| **CO-60** | 6.0588E-03 | pCi/g | 3.1136E-02 | 8.6700E-02 | 4.3350E-02 | | | |
| **EU-152** | 1.5143E-01 | pCi/g | 1.4077E-01 | 2.4400E-01 | 1.2200E-01 | | | |
| **EU-154** | 3.4390E-02 | pCi/g | 1.0238E-01 | 8.2000E-02 | 4.1000E-02 | | | |
| **Total Gamma** | 2.7764E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 8.1989E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07974.An1

Sample description
Batch ID: 16-00697-14
SDG: ARS1-16-00670-028 Tech: WJS

Spectrum Filename: C:\User\ARS07974.An1

Acquisition information
Start time: 05-May-2016 09:17:13
Live time: 2700
Real time: 2702
Dead time: 0.09 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.6033E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.6033E+02) =
2.7752E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1618

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.37 | 28. | 59.03 | 0.90 | 2.099E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 1.256E-01 | EU152 |
| 40.41 | 24. | 68.53 | 0.90 | 2.053E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 1.042E-01 | EU152 |
| 42.71 | 12. | 123.63 | 0.91 | 2.322E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.37 | -2. | 43.44 | 0.91 | 2.569E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.14 | 17. | 112.38 | 0.92 | 3.630E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.06 | 87. | 24.10 | 1.02 | 3.830E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.23 | 72. | 28.01 | 0.93 | 4.423E-02 | | | | |
| 92.40 | 17. | 119.85 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.82 | 36. | 43.85 | 0.95 | 4.753E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.20 | 10. | 137.24 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 121.88 | 13. | 123.31 | 0.98 | 4.779E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 185.84 | 76. | 24.15 | 1.23 | 3.986E-02 | 186.21 | 3.640 | 1.457E+00 | RA226 |
| 205.01 | 6. | 204.24 | 1.06 | 3.743E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.70 | 170. | 11.72 | 1.32 | 3.368E-02 | 238.63 | 43.100 | 2.996E-01 | PB212 |
| 244.19 | 5. | 274.69 | 1.09 | 3.308E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| | | | | | 244.67 | 7.616 | 5.576E-02 | EU152 |
| 275.84 | 9. | 89.58 | 0.74 | 3.024E-02 | | | | |
| 295.24 | 56. | 22.83 | 1.14 | 2.872E-02 | 295.21 | 18.500 | 2.949E-01 | PB214 |
| 300.50 | 17. | 61.76 | 1.14 | 2.836E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.64 | 23. | 42.86 | 1.18 | 2.586E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 352.13 | 86. | 14.27 | 1.19 | 2.509E-02 | 351.92 | 35.800 | 2.659E-01 | PB214 |
| 510.76 | -6. | 29.16 | 1.32 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.41 | 36. | 23.50 | 1.38 | 1.715E-02 | 583.14 | 86.000 | 6.868E-02 | TL208 |
| 609.39 | 54. | 16.39 | 1.41 | 1.661E-02 | 609.31 | 44.791 | 2.019E-01 | BI214 |
| 662.97 | 0. | 956.05 | 1.45 | 1.563E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 727.34 | 11. | 65.88 | 1.50 | 1.460E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 732.09 | 4. | 149.00 | 1.51 | 1.451E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 760.05 | 8. | 79.70 | 1.53 | 1.409E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 767.86 | 3. | 239.06 | 1.53 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 779.05 | 2. | 337.92 | 1.54 | 1.388E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 859.57 | 5. | 117.89 | 1.61 | 1.291E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 872.25 | 5. | 124.74 | 1.62 | 1.277E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 883.76 | 6. | 135.67 | 1.62 | 1.266E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.26 | 19. | 37.78 | 1.65 | 1.238E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 926.57 | 3. | 224.75 | 1.66 | 1.222E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.33 | 5. | 151.63 | 1.66 | 1.215E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 963.75 | 3. | 210.80 | 1.69 | 1.187E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| 969.30 | 16. | 46.85 | 1.69 | 1.182E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1121.09 | 14. | 48.83 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1173.62 | 2. | 352.81 | 1.84 | 1.022E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1238.11 | 9. | 75.10 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1331.02 | 2. | 343.51 | 1.95 | 9.235E-03 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1377.81 | 8. | 64.25 | 1.98 | 8.985E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1409.75 | 1. | 264.01 | 2.00 | 8.824E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.11 | 792. | 3.55 | 1.75 | 8.553E-03 | 1460.75 | 10.700 | 2.393E+01 | K40 |
| 1764.16 | -1. | 81.22 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 308.61 | 77.23 | 151. | 72. | 0.027 | 56.02 | 0.931 | PB-212 | |
| 1103.26 | 275.84 | 28. | 9. | 0.003 | 173.69 | 0.738 | ND-147 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 161.32 | 40.41 | 119. | 24. | 0.009 | 137.06 | 0.904s |
| EU-152 | 161.14 | 40.37 | 127. | 28. | 0.011 | 118.05 | 0.905s |
| EU-154 | 170.51 | 42.71 | 145. | 12. | 0.004 | 247.27 | 0.908s |
| EU-152 | 180.20 | 45.13 | 228. | -58. | -0.022 | 238.31 | 0.910s |
| PB-210 | 185.16 | 46.37 | 167. | -2. | -0.001 | 86.88 | 0.911 |
| EU-154 | 191.30 | 47.91 | 162. | -24. | -0.009 | 157.66 | 0.913s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Am-241 | 236.27 | 59.14 | 177. | 17. | 0.006 | 224.77 | 0.923s |
| U-238 | 251.94 | 63.06 | 180. | 48. | 0.018 | 48.19 | 1.019 |
| U-238 | 369.24 | 92.38 | 190. | 17. | 0.006 | 239.71 | 0.954D |
| U-238 | 370.92 | 92.80 | 203. | 36. | 0.013 | 87.71 | 0.954D |
| PA-234 | 376.80 | 94.27 | 246. | -33. | -0.012 | 139.98 | 0.956s |
| PA-234 | 392.51 | 98.20 | 143. | 10. | 0.004 | 274.48 | 0.959s |
| PA-234 | 448.07 | 112.08 | 144. | -18. | -0.007 | 210.04 | 0.971s |
| EU-152 | 487.25 | 121.88 | 128. | 13. | 0.005 | 246.63 | 0.981s |
| EU-154 | 497.93 | 124.54 | 136. | -3. | -0.001 | 1051.38 | 0.982s |
| PA-234 | 521.21 | 130.36 | 138. | -3. | -0.001 | 1185.90 | 0.990s |
| U-235 | 579.25 | 144.87 | 130. | -23. | -0.009 | 196.04 | 1.001s |
| U-235 | 654.60 | 163.70 | 135. | -5. | -0.002 | 1066.08 | 1.019s |
| RA-226 | 743.18 | 185.84 | 97. | 76. | 0.028 | 48.30 | 1.226s |
| U-235 | 819.88 | 205.01 | 87. | 6. | 0.002 | 408.47 | 1.057s |
| PA-234 | 907.59 | 226.94 | 115. | -14. | -0.005 | 229.05 | 1.077s |
| PB-212 | 954.65 | 238.70 | 105. | 157. | 0.058 | 23.44 | 1.318s |
| EU-152 | 976.64 | 244.19 | 94. | 5. | 0.002 | 549.38 | 1.093s |
| TL-208 | 1109.33 | 277.36 | 68. | -2. | -0.001 | 1475.31 | 1.122s |
| PB-214 | 1180.87 | 295.24 | 75. | 56. | 0.021 | 45.66 | 1.138 |
| PB-212 | 1201.93 | 300.50 | 54. | 17. | 0.006 | 123.52 | 1.142 |
| Ra-228 | 1354.49 | 338.64 | 64. | 23. | 0.009 | 85.71 | 1.176s |
| EU-152 | 1376.06 | 344.03 | 49. | -9. | -0.003 | 280.40 | 1.181s |
| PB-214 | 1408.45 | 352.13 | 55. | 86. | 0.032 | 28.54 | 1.188s |
| TL-208 | 2043.10 | 510.76 | 90. | -6. | -0.002 | 58.32 | 1.324s |
| TL-208 | 2333.71 | 583.41 | 47. | 36. | 0.014 | 47.00 | 1.385s |
| EU-154 | 2367.15 | 591.76 | 33. | -4. | -0.001 | 421.74 | 1.392s |
| BI-214 | 2437.67 | 609.39 | 39. | 54. | 0.020 | 32.78 | 1.406 |
| BI-212 | 2909.49 | 727.34 | 34. | 11. | 0.004 | 131.76 | 1.502s |
| PA-234 | 2928.50 | 732.09 | 28. | 4. | 0.001 | 298.00 | 1.507s |
| TL-208 | 3040.36 | 760.05 | 17. | 8. | 0.003 | 159.41 | 1.531s |
| BI-214 | 3071.58 | 767.86 | 29. | 3. | 0.001 | 478.12 | 1.535s |
| EU-152 | 3116.37 | 779.05 | 27. | 2. | 0.001 | 675.85 | 1.543s |
| BI-212 | 3149.71 | 787.39 | 24. | -1. | 0.000 | 1923.21 | 1.548s |
| PA-234 | 3321.28 | 830.28 | 22. | -1. | 0.000 | 1390.69 | 1.584s |
| TL-208 | 3438.43 | 859.57 | 33. | 5. | 0.002 | 235.78 | 1.607s |
| EU-152 | 3469.18 | 867.25 | 36. | -5. | -0.002 | 321.92 | 1.612s |
| EU-154 | 3489.19 | 872.25 | 24. | 5. | 0.002 | 249.49 | 1.617s |
| PA-234 | 3535.20 | 883.76 | 30. | 6. | 0.002 | 271.34 | 1.624s |
| Ra-228 | 3645.23 | 911.26 | 34. | 19. | 0.007 | 75.56 | 1.646 |
| PA-234 | 3706.46 | 926.57 | 27. | 3. | 0.001 | 449.51 | 1.658s |
| BI-214 | 3737.49 | 934.33 | 26. | 5. | 0.002 | 303.27 | 1.663s |
| PA-234 | 3786.14 | 946.49 | 45. | -6. | -0.002 | 395.14 | 1.672s |
| EU-152 | 3855.19 | 963.75 | 42. | 3. | 0.001 | 421.59 | 1.686s |
| Ra-228 | 3858.58 | 964.60 | 100. | 0. | 0.000 | 2000.00 | 1.686s |
| Ra-228 | 3877.38 | 969.30 | 33. | 16. | 0.006 | 93.70 | 1.689s |
| EU-154 | 3985.38 | 996.30 | 80. | 0. | 0.000 | 2000.00 | 1.710s |
| EU-154 | 4019.76 | 1004.89 | 37. | -3. | -0.001 | 589.49 | 1.716s |
| EU-152 | 4345.86 | 1086.42 | 37. | -2. | -0.001 | 1342.33 | 1.776s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 4447.50 | 1111.83 | 31. | -4. | -0.001 | 416.24 | 1.795s |
| BI-214 | 4484.55 | 1121.09 | 29. | 14. | 0.005 | 97.67 | 1.801s |
| CO-60 | 4694.65 | 1173.62 | 39. | 2. | 0.001 | 705.63 | 1.839s |
| BI-214 | 4952.58 | 1238.11 | 34. | 9. | 0.003 | 150.20 | 1.884s |
| CO-60 | 5324.22 | 1331.02 | 20. | 2. | 0.001 | 687.03 | 1.949s |
| BI-214 | 5511.35 | 1377.81 | 13. | 8. | 0.003 | 128.50 | 1.979s |
| PA-234 | 5582.64 | 1395.63 | 13. | -4. | -0.001 | 298.95 | 1.990s |
| EU-152 | 5639.09 | 1409.75 | 12. | 1. | 0.000 | 528.02 | 1.999s |
| K-40 | 5844.51 | 1461.11 | 4. | 788. | 0.292 | 7.11 | 1.746 |
| BI-212 | 6473.46 | 1618.37 | 9. | -3. | -0.001 | 312.54 | 2.135s |
| BI-214 | 7056.50 | 1764.16 | 14. | -1. | 0.000 | 162.44 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | -6.2453E-02 | | | | | |
| | | | 143.76 | -1.337E-01 | ?(P | 3.246E-01 9.80E+01 | G |
| | | | 205.31 | 9.680E-02 | ?(P | 7.290E-01 2.04E+02 | G |
| | | | 163.35 | -7.281E-02 | + P | 7.829E-01 5.33E+02 | G |
| RA-226 | | 1.4570E+00 | | | | | |
| | | | 186.21 | 1.457E+00 | ( | 9.301E-01 2.41E+01 | G K |
| Ra-228 | | 1.8108E-01 | | | | | |
| | | | 911.07 | 1.468E-01 | ?(P | 2.302E-01 3.78E+01 | G |
| | | | 968.90 | 2.189E-01 | ?(P | 3.965E-01 4.69E+01 | G |
| | | | 338.40 | 2.089E-01 | (P | 3.576E-01 4.29E+01 | G |
| | | | 964.60 | 0.000E+00 | & | 2.114E+00 1.00E+03 | G |
| Am-241 | T | 3.6526E-02 | | | | | |
| | | | 59.54 | 3.653E-02 | &( | 1.379E-01 1.12E+02 | G K |
| PB-210 | | -5.5306E-02 | | | | | |
| | | | 46.52 | -5.531E-02 | (P | 1.700E+00 4.34E+01 | G |
| U-238 | | 8.8533E-01 | | | | | |
| | | | 63.29 | 8.853E-01 | (P | 1.210E+00 2.41E+01 | G |
| | | | 92.80 | 6.945E-01 | } P | 1.345E+00 4.39E+01 | G |
| | | | 92.38 | 3.843E-01 | } P | 1.524E+00 1.20E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 2.3925E+01 | | | | | | |
| | | 1460.75 | 2.393E+01 | (P | 3.513E-01 | 3.55E+00 | G |
| PB-214 | 2.7575E-01 | | | | | | |
| | | 351.92 | 2.659E-01 | *(P | 1.148E-01 | 1.43E+01 | G |
| | | 295.21 | 2.949E-01 | (P | 2.249E-01 | 2.28E+01 | G |
| | | 241.98 | -3.512E-02 | % P | 5.506E-01 | 4.19E+03 | G |
| BI-214 | 2.1167E-01 | | | | | | |
| | | 609.31 | 2.019E-01 | (P | 1.184E-01 | 1.64E+01 | G |
| | | 1764.49 | -2.578E-02 | - P | 4.978E-01 | 8.12E+01 | G |
| | | 1120.29 | 2.413E-01 | ?(P | 4.959E-01 | 4.88E+01 | G |
| | | 1238.11 | 4.240E-01 | + P | 1.444E+00 | 7.51E+01 | G |
| | | 768.36 | 1.054E-01 | & P | 1.154E+00 | 2.39E+02 | G |
| | | 1377.67 | 6.179E-01 | + P | 1.534E+00 | 6.42E+01 | G |
| | | 934.06 | 3.791E-01 | + | 2.015E+00 | 1.52E+02 | G |
| BI-212 | 1.7068E-01 | | | | | | |
| | | 727.17 | 1.707E-01 | ?(P | 4.810E-01 | 6.59E+01 | G |
| | | 1620.56 | -3.716E-01 | + | 2.122E+00 | 1.56E+02 | G |
| | | 785.42 | -7.332E-02 | & | 2.579E+00 | 9.62E+02 | G |
| PB-212 | 2.9964E-01 | | | | | | |
| | | 238.63 | 2.996E-01 | (P | 9.673E-02 | 1.17E+01 | G |
| | | 300.09 | 5.202E-01 | + P | 1.104E+00 | 6.18E+01 | G |
| TL-208 | 7.0162E-02 | | | | | | |
| | | 583.14 | 6.868E-02 | (P | 6.519E-02 | 2.35E+01 | G |
| | | 510.72 | -3.724E-02 | - P | 3.064E-01 | 2.92E+01 | G |
| | | 860.47 | 8.081E-02 | ?(P | 5.287E-01 | 1.18E+02 | G |
| | | 277.36 | -2.626E-02 | - P | 5.857E-01 | 7.38E+02 | G |
| | | 763.30 | 9.269E-01 | + P | 2.571E+00 | 7.97E+01 | G |
| PA-234 | 5.9679E-02 | | | | | | |
| | | 98.44 | 2.274E-02 | ?(P | 1.343E-01 | 1.37E+02 | G |
| | | 946.00 | -6.763E-02 | + P | 3.929E-01 | 1.98E+02 | G |
| | | 131.28 | -8.331E-03 | - | 1.700E-01 | 5.93E+02 | G |
| | | 94.67 | -1.229E-01 | + | 2.847E-01 | 7.00E+01 | G |
| | | 883.24 | 1.101E-01 | ?( | 5.191E-01 | 1.36E+02 | G |
| | | 926.70 | 6.719E-02 | ?(P | 5.534E-01 | 2.25E+02 | G |
| | | 569.26 | -3.541E-02 | & P | 4.625E-01 | 1.94E+03 | G |
| | | 111.00 | -1.221E-01 | + P | 3.937E-01 | 1.05E+02 | G |
| | | 733.00 | 8.784E-02 | ?(P | 6.177E-01 | 1.49E+02 | G |
| | | 949.00 | -1.908E-02 | & P | 1.256E+00 | 1.00E+03 | G |
| | | 880.51 | -6.547E-03 | & P | 1.087E+00 | 2.38E+03 | G |
| | | 226.87 | -1.672E-01 | + P | 6.432E-01 | 1.15E+02 | G |
| | | 831.10 | -3.616E-02 | + | 9.211E-01 | 6.95E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | 3.979E-03 % | | 1.212E+00 | 8.38E+03 | G |
| | | 99.70 | 1.246E-02 % | | 7.337E-01 | 1.71E+03 | G |
| | | 699.10 | -1.565E-02 % | P | 9.275E-01 | 5.52E+03 | G |
| | | 898.60 | -9.827E-02 % | P | 1.590E+00 | 2.89E+03 | G |
| | | 1394.10 | -2.947E-01 + | | 1.577E+00 | 1.49E+02 | G |
| CS-137 | -3.9596E-04 | | | | | | |
| | | 661.66 | -3.960E-04 %( | P | 5.817E-02 | 9.56E+02 | G |
| CO-60 | 6.0588E-03 | | | | | | |
| | | 1173.24 | 6.386E-03 ?( | P | 8.672E-02 | 3.53E+02 | K |
| | | 1332.50 | 5.732E-03 ?( | | 7.157E-02 | 3.44E+02 | K |
| EU-152 | 1.5143E-01 | | | | | | |
| | | 40.12 | 1.256E-01 ?( | | 2.436E-01 | 5.90E+01 | G |
| | | 121.78 | 2.641E-02 - | | 1.100E-01 | 1.23E+02 | G |
| | | 344.30 | -3.642E-02 - | P | 1.426E-01 | 1.40E+02 | G |
| | | 1408.08 | 1.440E-02 - | P | 2.827E-01 | 2.64E+02 | G |
| | | 39.52 | 1.998E-01 &( | | 4.534E-01 | 6.85E+01 | G |
| | | 964.00 | 5.237E-02 - | P | 5.282E-01 | 2.11E+02 | G |
| | | 1112.07 | -7.493E-02 - | | 5.504E-01 | 2.08E+02 | G |
| | | 778.90 | 2.388E-02 - | P | 4.175E-01 | 3.38E+02 | G |
| | | 1085.80 | -3.814E-02 - | P | 7.719E-01 | 6.71E+02 | G |
| | | 45.40 | -7.167E-01 - | P | 8.989E-01 | 1.19E+02 | G |
| | | 244.67 | 5.576E-02 & | | 5.279E-01 | 2.75E+02 | G |
| | | 867.39 | -2.833E-01 - | | 1.589E+00 | 1.61E+02 | G |
| EU-154 | 3.4390E-02 | | | | | | |
| | | 123.10 | -4.536E-03 &( | | 8.203E-02 | 5.26E+02 | G |
| | | 1274.80 | 4.531E-03 % | | 2.015E-01 | 1.21E+03 | G |
| | | 723.30 | 2.388E-03 % | | 2.969E-01 | 3.45E+03 | G |
| | | 1004.80 | -4.525E-02 + | P | 4.237E-01 | 2.95E+02 | G |
| | | 43.00 | 1.062E-01 ?( | P | 5.374E-01 | 1.24E+02 | G |
| | | 873.20 | 9.052E-02 ?( | P | 4.921E-01 | 1.25E+02 | G |
| | | 996.30 | 0.000E+00 - | | 9.980E-01 | 1.00E+03 | G |
| | | 42.31 | 9.588E-03 % | | 9.292E-01 | 2.80E+03 | G |
| | | 248.04 | -3.358E-03 % | | 5.442E-01 | 4.61E+03 | G |
| | | 591.70 | -1.418E-01 + | | 1.053E+00 | 2.11E+02 | G |
| | | 48.70 | -5.590E-01 & | | 1.466E+00 | 7.88E+01 | G |
| | | 756.70 | -4.004E-03 % | | 1.622E+00 | 1.13E+04 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | -6.2453E-02 | 1.5670E-01 | 1.5676E-01 | 0.325E+00 |
| RA-226 # | 1.4570E+00 | 7.0369E-01 | 7.0859E-01 | 0.930E+00 |
| Ra-228 #A | 1.8108E-01 | 1.0762E-01 | 1.0822E-01 | 0.230E+00 |
| Am-241 #A | 3.6526E-02 | 8.2098E-02 | 8.2130E-02 | 0.138E+00 |
| PB-210 #A | -5.5306E-02 | 1.0174E+00 | 1.0175E+00 | 0.170E+01 |
| U-238 A | 8.8533E-01 | 7.7723E-01 | 7.8021E-01 | 0.121E+01 |
| K-40 | 2.3925E+01 | 1.7081E+00 | 2.2930E+00 | 0.351E+00 |
| PB-214 # | 2.7575E-01 | 8.1851E-02 | 8.4988E-02 | 0.115E+00 |
| BI-214 # | 2.1167E-01 | 8.5443E-02 | 8.6355E-02 | 0.118E+00 |
| BI-212 #A | 1.7068E-01 | 2.8057E-01 | 2.8077E-01 | 0.481E+00 |
| PB-212 | 2.9964E-01 | 7.6467E-02 | 7.9246E-02 | 0.967E-01 |
| TL-208 # | 7.0162E-02 | 4.2165E-02 | 4.2389E-02 | 0.652E-01 |
| PA-234 #A | 5.9679E-02 | 1.1187E-01 | 1.1196E-01 | 0.134E+00 |
| CS-137 #A | -3.9596E-04 | 4.6697E-02 | 4.6697E-02 | 0.582E-01 |
| CO-60 #A | 6.0588E-03 | 3.1135E-02 | 3.1136E-02 | 0.867E-01 |
| EU-152 #A | 1.5143E-01 | 1.3697E-01 | 1.4077E-01 | 0.244E+00 |
| EU-154 #A | 3.4390E-02 | 1.0235E-01 | 1.0238E-01 | 0.820E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

American Radiation Services Spectrum name: ARS07974.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.0 to 2000.1 keV) | 2.674E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-13 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-029 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 029 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 8.3500E-02 | pCi/g | 1.6555E-01 | 2.7400E-01 | 1.3700E-01 | | | |
| **RA-226** | 1.7206E+00 | pCi/g | 6.9314E-01 | 8.6700E-01 | 4.3350E-01 | | | |
| **RA-228** | 3.0564E-01 | pCi/g | 1.2010E-01 | 1.9300E-01 | 9.6500E-02 | | | |
| **AM-241** | -2.0871E-03 | pCi/g | 8.9721E-02 | 1.3700E-01 | 6.8500E-02 | | | |
| **PB-210** | -1.8343E-01 | pCi/g | 1.3815E+00 | 1.4800E+00 | 7.4000E-01 | | | |
| **U-238** | 3.7332E-01 | pCi/g | 5.4097E-01 | 1.2700E+00 | 6.3500E-01 | | | |
| **K-40** | 8.4979E+00 | pCi/g | 1.2612E+00 | 7.2600E-01 | 3.6300E-01 | | | |
| **PB-214** | 4.4882E-01 | pCi/g | 1.0934E-01 | 1.0800E-01 | 5.4000E-02 | | | |
| **BI-214** | 3.7455E-01 | pCi/g | 1.0626E-01 | 1.3300E-01 | 6.6500E-02 | | | |
| **BI-212** | 1.9844E-01 | pCi/g | 2.6859E-01 | 4.4800E-01 | 2.2400E-01 | | | |
| **PB-212** | 4.0199E-01 | pCi/g | 9.6723E-02 | 9.9100E-02 | 4.9550E-02 | | | |
| **TL-208** | 1.7723E-01 | pCi/g | 4.4797E-02 | 3.4400E-02 | 1.7200E-02 | | | |
| **PA-234** | 6.3760E-02 | pCi/g | 1.1819E-01 | 1.1200E-01 | 5.6000E-02 | | | |
| **CS-137** | 9.4945E-03 | pCi/g | 3.3446E-02 | 5.9500E-02 | 2.9750E-02 | | | |
| **CO-60** | -3.4730E-03 | pCi/g | 1.3892E-01 | 3.0400E-02 | 1.5200E-02 | | | |
| **EU-152** | 5.5108E-02 | pCi/g | 1.1746E-01 | 2.2200E-01 | 1.1100E-01 | | | |
| **EU-154** | 2.6948E-02 | pCi/g | 7.0519E-02 | 7.8400E-02 | 3.9200E-02 | | | |
| **Total Gamma** | 1.2737E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 3.5985E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06818.An1

Sample description
Batch ID: 16-00564-13
SDG: ARS1-16-00670-029 Tech: WJS

Spectrum Filename: C:\User\ARS06818.An1

Acquisition information
Start time: 19-Apr-2016 10:48:26
Live time: 1800
Real time: 1803
Dead time: 0.18 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.5573E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.5573E+02) =
2.8111E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1772

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.17 | 19. | 50.21 | 0.57 | 6.904E-03 | | | | |
| 39.43 | 6. | 210.74 | 0.93 | 2.738E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| 40.17 | 1. | 327.96 | 0.93 | 2.785E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 41.00 | 2. | 416.46 | 0.93 | 2.955E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.54 | -6. | 81.88 | 0.94 | 3.277E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.57 | -1. | 154.78 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.28 | 10. | 48.65 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.18 | 118. | 15.23 | 0.63 | 5.237E-02 | | | | |
| 90.06 | 15. | 67.40 | 0.41 | 5.666E-02 | | | | |
| 92.32 | 13. | 119.88 | 0.98 | 5.721E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.74 | 15. | 90.85 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.43 | 12. | 79.77 | 0.99 | 5.833E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 143.33 | 12. | 80.53 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.86 | 1. | 451.32 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.74 | 76. | 16.70 | 0.93 | 5.089E-02 | 186.21 | 3.640 | 1.721E+00 | RA226 |
| 207.08 | 5. | 177.09 | 1.09 | 4.793E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.35 | 185. | 10.67 | 1.04 | 4.326E-02 | 238.63 | 43.100 | 4.020E-01 | PB212 |
| 241.65 | 36. | 34.60 | 1.12 | 4.279E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 295.11 | 70. | 16.07 | 1.14 | 3.687E-02 | 295.21 | 18.500 | 4.133E-01 | PB214 |
| 300.26 | 18. | 48.65 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.97 | 39. | 27.64 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 4.148E-01 | Ra228 |
| 351.51 | 126. | 10.66 | 1.37 | 3.215E-02 | 351.92 | 35.800 | 4.622E-01 | PB214 |
| 510.75 | 41. | 16.96 | 1.42 | 2.413E-02 | 510.72 | 22.500 | 3.178E-01 | TL208 |
| 569.54 | 1. | 264.07 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.19 | 80. | 11.57 | 1.15 | 2.185E-02 | 583.14 | 86.000 | 1.790E-01 | TL208 |
| 609.16 | 104. | 11.95 | 0.69 | 2.115E-02 | | | | |
| 609.16 | 104. | 11.95 | 0.69 | 2.115E-02 | 609.31 | 44.791 | 4.389E-01 | BI214 |
| 661.45 | 4. | 176.12 | 1.51 | 1.990E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.06 | 10. | 63.60 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |

American Radiation Services Spectrum name: ARS06818.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 768.49 | 8. | 73.31 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 830.43 | 4. | 128.76 | 1.65 | 1.686E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 859.90 | 8. | 85.52 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 867.31 | 2. | 248.14 | 1.68 | 1.635E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| 873.31 | 4. | 137.17 | 1.69 | 1.627E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 898.95 | 0. | 338.57 | 1.71 | 1.593E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.26 | 28. | 25.28 | 1.72 | 1.577E-02 | 911.07 | 29.000 | 2.604E-01 | Ra228 |
| 949.16 | 2. | 217.01 | 1.75 | 1.531E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 968.57 | 10. | 59.75 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 996.02 | 3. | 153.18 | 1.79 | 1.478E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1086.21 | 5. | 106.43 | 1.87 | 1.387E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1112.67 | 3. | 187.01 | 1.89 | 1.362E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.25 | 16. | 43.36 | 1.90 | 1.355E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1238.24 | 8. | 81.00 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.74 | 3. | 150.31 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1460.42 | 238. | 6.30 | 2.07 | 1.104E-02 | 1460.75 | 10.700 | 8.498E+00 | K40 |
| 1763.90 | 11. | 36.55 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 51.89 | 13.17 | 40. | 19. | 0.011 | 100.41 | 0.568 | BR-82 | s |
| 307.97 | 77.18 | 98. | 118. | 0.066 | 30.47 | 0.628 | PB-212 | s |
| 359.27 | 90.06 | 55. | 27. | 0.015 | 87.25 | 0.978 | AC-228 | D |
| 2436.72 | 609.16 | 112. | 10. | 0.005 | 310.33 | 0.686 | BI-214 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.97 | 39.43 | 73. | 6. | 0.003 | 421.48 | 0.929s |
| EU-152 | 159.91 | 40.17 | 78. | 1. | 0.001 | 655.92 | 0.930s |
| EU-154 | 163.23 | 41.00 | 51. | 2. | 0.001 | 832.92 | 0.932s |
| EU-154 | 174.11 | 43.71 | 55. | -6. | -0.004 | 337.49 | 0.932s |
| EU-152 | 181.93 | 45.67 | 66. | -5. | -0.003 | 469.18 | 0.935s |
| PB-210 | 185.42 | 46.54 | 87. | -6. | -0.003 | 163.76 | 0.936 |
| EU-154 | 194.05 | 48.70 | 104. | 0. | 0.000 | 2000.00 | 0.938s |
| U-238 | 252.37 | 63.28 | 117. | 10. | 0.006 | 97.30 | 0.952s |

American Radiation Services Spectrum name: ARS06818.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 368.79 | 92.38 | 131. | 13. | 0.007 | 239.76 | 0.980D |
| U-238 | 370.47 | 92.80 | 125. | 15. | 0.008 | 181.71 | 0.980D |
| PA-234 | 396.98 | 99.43 | 60. | 12. | 0.007 | 159.53 | 0.986s |
| PA-234 | 404.30 | 101.26 | 77. | -13. | -0.007 | 231.27 | 0.987s |
| EU-152 | 486.98 | 121.92 | 55. | -3. | -0.002 | 745.93 | 1.008s |
| EU-154 | 494.98 | 123.92 | 81. | -5. | -0.003 | 470.50 | 1.009s |
| U-235 | 572.63 | 143.33 | 61. | 12. | 0.006 | 161.05 | 1.029s |
| RA-226 | 742.29 | 185.74 | 57. | 76. | 0.042 | 33.41 | 0.928s |
| U-235 | 827.70 | 207.08 | 48. | 5. | 0.003 | 354.17 | 1.087s |
| PA-234 | 904.20 | 226.21 | 71. | -13. | -0.007 | 190.14 | 1.108s |
| PB-212 | 952.80 | 238.35 | 78. | 177. | 0.099 | 21.35 | 1.044 |
| PB-214 | 966.02 | 241.65 | 63. | 36. | 0.020 | 69.20 | 1.122 |
| EU-152 | 976.74 | 244.34 | 66. | -10. | -0.006 | 228.10 | 1.124s |
| PB-214 | 1179.92 | 295.11 | 27. | 67. | 0.037 | 32.15 | 1.135 |
| PB-212 | 1200.53 | 300.26 | 29. | 18. | 0.010 | 97.30 | 1.176 |
| Ra-228 | 1351.41 | 337.97 | 41. | 39. | 0.022 | 55.28 | 1.212 |
| EU-152 | 1376.27 | 344.18 | 48. | -4. | -0.002 | 674.42 | 1.217s |
| PB-214 | 1405.60 | 351.51 | 33. | 126. | 0.070 | 21.31 | 1.370 |
| TL-208 | 2042.85 | 510.75 | 54. | 41. | 0.023 | 33.93 | 1.422s |
| TL-208 | 2332.75 | 583.19 | 7. | 80. | 0.044 | 23.13 | 1.151 |
| EU-154 | 2366.82 | 591.70 | 23. | 0. | 0.000 | 2000.00 | 1.443s |
| BI-214 | 2436.81 | 609.19 | 34. | 89. | 0.049 | 26.07 | 1.458s |
| CS-137 | 2645.99 | 661.45 | 21. | 4. | 0.002 | 352.24 | 1.505s |
| PA-234 | 2796.66 | 699.09 | 24. | -2. | -0.001 | 829.92 | 1.538s |
| EU-154 | 2893.58 | 723.30 | 75. | 0. | 0.000 | 2000.00 | 1.559s |
| BI-212 | 2908.63 | 727.06 | 19. | 10. | 0.006 | 127.21 | 1.563s |
| EU-154 | 3028.04 | 756.89 | 21. | -4. | -0.002 | 366.57 | 1.589s |
| BI-214 | 3074.46 | 768.49 | 15. | 8. | 0.005 | 146.62 | 1.599s |
| EU-152 | 3112.75 | 778.05 | 20. | -3. | -0.001 | 659.74 | 1.608s |
| BI-212 | 3142.24 | 785.42 | 16. | 0. | 0.000 | 2000.00 | 1.614s |
| PA-234 | 3229.15 | 807.13 | 18. | -1. | 0.000 | 1739.60 | 1.633s |
| PA-234 | 3322.43 | 830.43 | 18. | 4. | 0.002 | 257.53 | 1.653s |
| TL-208 | 3440.41 | 859.90 | 18. | 8. | 0.004 | 171.04 | 1.679s |
| EU-152 | 3470.06 | 867.31 | 15. | 2. | 0.001 | 496.29 | 1.685s |
| EU-154 | 3494.08 | 873.31 | 14. | 4. | 0.002 | 274.34 | 1.690s |
| PA-234 | 3535.51 | 883.66 | 22. | -5. | -0.003 | 297.00 | 1.698s |
| Ra-228 | 3646.03 | 911.26 | 15. | 28. | 0.016 | 50.55 | 1.722s |
| PA-234 | 3710.20 | 927.29 | 21. | -3. | -0.002 | 476.80 | 1.735s |
| BI-214 | 3736.78 | 933.93 | 21. | -3. | -0.002 | 479.29 | 1.742s |
| PA-234 | 3797.77 | 949.16 | 15. | 2. | 0.001 | 434.01 | 1.754s |
| EU-152 | 3857.18 | 964.00 | 51. | 0. | 0.000 | 2000.00 | 1.767s |
| Ra-228 | 3860.20 | 964.75 | 32. | -6. | -0.003 | 280.66 | 1.768s |
| Ra-228 | 3875.47 | 968.57 | 19. | 10. | 0.005 | 119.50 | 1.771s |
| EU-154 | 3985.40 | 996.02 | 11. | 3. | 0.002 | 306.35 | 1.795s |
| EU-152 | 4346.50 | 1086.21 | 10. | 5. | 0.003 | 212.86 | 1.870s |
| EU-152 | 4452.49 | 1112.67 | 14. | 3. | 0.002 | 374.01 | 1.891s |
| BI-214 | 4482.81 | 1120.25 | 18. | 16. | 0.009 | 86.72 | 1.898s |
| BI-214 | 4955.33 | 1238.24 | 23. | 8. | 0.005 | 162.00 | 1.995s |

American Radiation Services Spectrum name: ARS06818.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 5103.22 | 1275.17 | 20. | -3. | -0.002 | 439.53 | 2.025s |
| CO-60 | 5332.75 | 1332.48 | 18. | -4. | -0.002 | 346.83 | 2.071s |
| BI-214 | 5514.04 | 1377.74 | 8. | 3. | 0.002 | 300.62 | 2.107s |
| PA-234 | 5579.56 | 1394.10 | 32. | 0. | 0.000 | 2000.00 | 2.120s |
| EU-152 | 5633.07 | 1407.46 | 20. | -4. | -0.002 | 308.39 | 2.131s |
| K-40 | 5845.22 | 1460.42 | 14. | 238. | 0.132 | 12.60 | 2.073 |
| BI-212 | 6486.71 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.297s |
| BI-214 | 7061.00 | 1763.90 | 5. | 11. | 0.006 | 73.10 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 8.3500E-02 | | | | | |
| | | | 143.76 | 8.090E-02 | &(P | 2.739E-01 8.05E+01 G | |
| | | | 205.31 | 8.932E-02 | &(P | 6.543E-01 1.77E+02 G | |
| | | | 163.35 | 1.408E-02 | & P | 6.856E-01 4.51E+02 G | |
| RA-226 | | 1.7206E+00 | | | | | |
| | | | 186.21 | 1.721E+00 | *(P | 8.667E-01 1.67E+01 G K | |
| Ra-228 | | 3.0564E-01 | | | | | |
| | | | 911.07 | 2.604E-01 | ?(P | 1.931E-01 2.53E+01 G | |
| | | | 968.90 | 1.532E-01 | - P | 3.655E-01 5.98E+01 G | |
| | | | 338.40 | 4.148E-01 | ?(P | 3.433E-01 2.76E+01 G | |
| | | | 964.60 | -3.069E-01 | - | 1.497E+00 1.40E+02 G | |
| Am-241 | T | -2.0871E-03 | | | | | |
| | | | 59.54 | -2.087E-03 | &(P | 1.373E-01 1.55E+02 G K | |
| PB-210 | | -1.8343E-01 | | | | | |
| | | | 46.52 | -1.834E-01 | ?(P | 1.483E+00 8.19E+01 G | |
| U-238 | | 3.7332E-01 | | | | | |
| | | | 63.29 | 2.418E-01 | ?(P | 1.269E+00 4.86E+01 G | |
| | | | 92.80 | 3.733E-01 | } P | 1.346E+00 9.09E+01 G | |
| | | | 92.38 | 3.733E-01 | } P | 1.610E+00 1.20E+02 G | |
| K-40 | | 8.4979E+00 | | | | | |
| | | | 1460.75 | 8.498E+00 | (P | 7.264E-01 6.30E+00 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-214 | 4.4882E-01 | | | | | | |
| | | 351.92 | 4.622E-01 | (P | 1.080E-01 | 1.07E+01 | G |
| | | 295.21 | 4.133E-01 | (P | 1.673E-01 | 1.61E+01 | G |
| | | 241.98 | 4.729E-01 | ?(P | 5.237E-01 | 3.46E+01 | G |
| BI-214 | 3.7455E-01 | | | | | | |
| | | 609.31 | 3.950E-01 | (P | 1.327E-01 | 1.30E+01 | G |
| | | 1764.49 | 3.123E-01 | ?(P | 3.680E-01 | 3.66E+01 | G |
| | | 1120.29 | 3.300E-01 | ?(P | 4.780E-01 | 4.34E+01 | G |
| | | 1238.11 | 4.710E-01 | ?(P | 1.435E+00 | 8.10E+01 | G |
| | | 768.36 | 4.022E-01 | ?(P | 1.020E+00 | 7.33E+01 | G |
| | | 1377.67 | 2.738E-01 | - | 1.502E+00 | 1.50E+02 | G |
| | | 934.06 | -2.995E-01 | - P | 2.161E+00 | 2.40E+02 | G |
| BI-212 | 1.9844E-01 | | | | | | |
| | | 727.17 | 1.984E-01 | ?(P | 4.477E-01 | 6.36E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 1.117E+00 | 1.00E+03 | G |
| | | 785.42 | 0.000E+00 | & | 2.563E+00 | 1.00E+03 | G |
| PB-212 | 4.0199E-01 | | | | | | |
| | | 238.63 | 4.020E-01 | (P | 9.913E-02 | 1.07E+01 | G |
| | | 300.09 | 6.379E-01 | + | 9.905E-01 | 4.86E+01 | G |
| TL-208 | 1.7723E-01 | | | | | | |
| | | 583.14 | 1.790E-01 | (P | 3.437E-02 | 1.16E+01 | G |
| | | 510.72 | 3.178E-01 | + P | 2.876E-01 | 1.70E+01 | G |
| | | 860.47 | 1.642E-01 | ?( | 4.776E-01 | 8.55E+01 | G |
| | | 277.36 | -1.384E-02 | & P | 7.176E-01 | 1.00E+03 | G |
| | | 763.30 | -7.258E-03 | % P | 4.384E+00 | 1.00E+03 | G |
| PA-234 | 6.3760E-02 | | | | | | |
| | | 98.44 | 3.551E-02 | ?(P | 1.118E-01 | 7.98E+01 | G |
| | | 946.00 | 7.440E-03 | % | 2.950E-01 | 1.06E+03 | G |
| | | 131.28 | 1.832E-03 | % | 1.641E-01 | 2.56E+03 | G |
| | | 94.67 | 8.382E-04 | % | 2.456E-01 | 8.43E+03 | G |
| | | 883.24 | -1.026E-01 | + | 5.366E-01 | 1.48E+02 | G |
| | | 926.70 | -8.466E-02 | + P | 5.909E-01 | 2.38E+02 | G |
| | | 569.26 | 1.173E-02 | % P | 4.677E-01 | 2.64E+02 | G |
| | | 111.00 | -7.148E-03 | % P | 4.340E-01 | 1.00E+03 | G |
| | | 733.00 | -6.062E-03 | % P | 6.733E-01 | 1.36E+03 | G |
| | | 949.00 | 7.055E-02 | ?(P | 7.429E-01 | 2.17E+02 | G |
| | | 880.51 | -3.964E-02 | % P | 8.148E-01 | 1.29E+03 | G |
| | | 226.87 | -1.902E-01 | & | 6.095E-01 | 9.51E+01 | G |
| | | 831.10 | 1.809E-01 | &(P | 1.014E+00 | 1.29E+02 | G |
| | | 808.10 | -3.448E-02 | - | 1.114E+00 | 8.70E+02 | G |
| | | 99.70 | -2.066E-01 | + P | 6.682E-01 | 1.16E+02 | G |
| | | 699.10 | -1.011E-01 | + P | 1.233E+00 | 4.15E+02 | G |

American Radiation Services Spectrum name: ARS06818.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 898.60 | 2.270E-02 | & P | 1.500E+00 | 3.39E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 2.759E+00 | 1.00E+03 | G |
| CS-137 | 9.4945E-03 | | | | | | |
| | | 661.66 | 9.494E-03 | ?( | 5.947E-02 | 1.76E+02 | G |
| CO-60 | -3.4730E-03 | | | | | | |
| | | 1173.24 | -3.473E-03 | %(P | 3.042E-02 | 1.00E+03 | K |
| | | 1332.50 | -1.329E-02 | + P | 7.996E-02 | 1.73E+02 | K |
| EU-152 | 5.5108E-02 | | | | | | |
| | | 40.12 | 6.800E-03 | &(P | 2.221E-01 | 3.28E+02 | G |
| | | 121.78 | -7.254E-03 | + P | 9.093E-02 | 3.73E+02 | G |
| | | 344.30 | -1.807E-02 | + P | 1.673E-01 | 3.37E+02 | G |
| | | 1408.08 | -7.633E-02 | + P | 4.083E-01 | 1.54E+02 | G |
| | | 39.52 | 5.625E-02 | ?( | 4.091E-01 | 2.11E+02 | G |
| | | 964.00 | 0.000E+00 | - | 6.874E-01 | 1.00E+03 | G |
| | | 1112.07 | 6.845E-02 | &( | 4.630E-01 | 1.87E+02 | G |
| | | 778.90 | -4.875E-02 | + P | 4.320E-01 | 3.30E+02 | G |
| | | 1085.80 | 1.410E-01 | ?( | 5.265E-01 | 1.06E+02 | G |
| | | 45.40 | -7.455E-02 | + P | 5.970E-01 | 2.35E+02 | G |
| | | 244.67 | -1.370E-01 | + P | 5.299E-01 | 1.14E+02 | G |
| | | 867.39 | 1.428E-01 | &( | 1.293E+00 | 2.48E+02 | G |
| EU-154 | 2.6948E-02 | | | | | | |
| | | 123.10 | -9.659E-03 | ?( | 7.840E-02 | 2.35E+02 | G |
| | | 1274.80 | -2.898E-02 | + P | 2.280E-01 | 2.20E+02 | G |
| | | 723.30 | 0.000E+00 | + | 4.938E-01 | 1.00E+03 | G |
| | | 1004.80 | -1.381E-02 | & P | 4.308E-01 | 1.00E+03 | G |
| | | 43.00 | -6.868E-02 | & | 4.003E-01 | 1.69E+02 | G |
| | | 873.20 | 8.737E-02 | ?(P | 4.590E-01 | 1.37E+02 | G |
| | | 996.30 | 8.723E-02 | ?( | 4.829E-01 | 1.53E+02 | G |
| | | 42.31 | 4.795E-02 | ?( | 7.033E-01 | 4.16E+02 | G |
| | | 248.04 | 4.265E-03 | % P | 4.427E-01 | 1.87E+03 | G |
| | | 591.70 | 0.000E+00 | - | 1.059E+00 | 1.00E+03 | G |
| | | 48.70 | 0.000E+00 | - | 1.445E+00 | 1.00E+03 | G |
| | | 756.70 | -2.126E-01 | + | 1.386E+00 | 1.83E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 8.3500E-02 | 1.6540E-01 | 1.6555E-01 | 0.274E+00 |
| RA-226 # | 1.7206E+00 | 6.7742E-01 | 6.9314E-01 | 0.867E+00 |
| Ra-228 # | 3.0564E-01 | 1.1834E-01 | 1.2010E-01 | 0.193E+00 |
| Am-241 #B | -2.0871E-03 | 8.9721E-02 | 8.9721E-02 | 0.137E+00 |
| PB-210 #A | -1.8343E-01 | 1.3813E+00 | 1.3815E+00 | 0.148E+01 |
| U-238 A | 3.7332E-01 | 5.4018E-01 | 5.4097E-01 | 0.127E+01 |
| K-40 | 8.4979E+00 | 1.1349E+00 | 1.2612E+00 | 0.726E+00 |
| PB-214 | 4.4882E-01 | 1.0131E-01 | 1.0934E-01 | 0.108E+00 |
| BI-214 # | 3.7455E-01 | 1.0371E-01 | 1.0626E-01 | 0.133E+00 |
| BI-212 #A | 1.9844E-01 | 2.6827E-01 | 2.6859E-01 | 0.448E+00 |
| PB-212 | 4.0199E-01 | 8.9321E-02 | 9.6723E-02 | 0.991E-01 |
| TL-208 | 1.7723E-01 | 4.3311E-02 | 4.4797E-02 | 0.344E-01 |
| PA-234 #A | 6.3760E-02 | 1.1809E-01 | 1.1819E-01 | 0.112E+00 |
| CS-137 #A | 9.4945E-03 | 3.3444E-02 | 3.3446E-02 | 0.595E-01 |
| CO-60 #B | -3.4730E-03 | 1.3892E-01 | 1.3892E-01 | 0.304E-01 |
| EU-152 #A | 5.5108E-02 | 1.1730E-01 | 1.1746E-01 | 0.222E+00 |
| EU-154 #A | 2.6948E-02 | 7.0490E-02 | 7.0519E-02 | 0.784E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

American Radiation Services Spectrum name: ARS06818.An1

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.2 to 1998.2 keV) | 1.182E+01 | pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-14 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-030 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 030 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 5.2981E-02 | pCi/g | 4.6509E-02 | 5.5700E-02 | 2.7850E-02 | | | |
| **RA-226** | 6.3623E-01 | pCi/g | 6.6269E-01 | 9.0400E-01 | 4.5200E-01 | | | |
| **RA-228** | 3.9595E-01 | pCi/g | 1.2576E-01 | 1.0500E-01 | 5.2500E-02 | | | |
| **AM-241** | 2.6312E-02 | pCi/g | 7.5157E-02 | 1.1100E-01 | 5.5500E-02 | | | |
| **PB-210** | 0.0000E+00 | pCi/g | 5.0222E-01 | 1.5300E+00 | 7.6500E-01 | | | |
| **U-238** | 3.4314E-01 | pCi/g | 6.7746E-01 | 9.8600E-01 | 4.9300E-01 | | | |
| **K-40** | 7.0054E+00 | pCi/g | 1.1432E+00 | 2.8200E-01 | 1.4100E-01 | | | |
| **PB-214** | 3.0811E-01 | pCi/g | 9.1749E-02 | 1.0200E-01 | 5.1000E-02 | | | |
| **BI-214** | 2.5194E-01 | pCi/g | 9.1305E-02 | 8.9000E-02 | 4.4500E-02 | | | |
| **BI-212** | 2.3715E-01 | pCi/g | 2.1269E-01 | 4.5900E-01 | 2.2950E-01 | | | |
| **PB-212** | 2.3041E-01 | pCi/g | 6.1701E-02 | 6.1700E-02 | 3.0850E-02 | | | |
| **TL-208** | 8.2108E-02 | pCi/g | 5.4887E-02 | 6.2500E-02 | 3.1250E-02 | | | |
| **PA-234** 2.470E-03 ~~1.3846E-01~~ | | pCi/g | 1.2045E-01 | 1.1200E-01 | 5.6000E-02 | | | |
| **CS-137** | 0.0000E+00 | pCi/g | 7.4839E-03 | 5.1500E-02 | 2.5750E-02 | | | |
| **CO-60** | 0.0000E+00 | pCi/g | 6.8433E-03 | 7.6400E-02 | 3.8200E-02 | | | |
| **EU-152** | 5.1289E-02 | pCi/g | 1.0742E-01 | 1.5300E-01 | 7.6500E-02 | | | |
| **EU-154** 0.000E+00 ~~8.5927E-02~~ | | pCi/g | 5.4668E-02 | 7.3700E-02 | 3.6850E-02 | | | |
| **Total Gamma** | 9.8454E+00 | pCi/g | | | | | | |
| **Total NORM Activity** | 2.7189E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  4/19/2016 11:50:17 AM
                                Spectrum name: ARS08223.An1

Sample description
     Batch ID:  16-00564-14
     SDG:  ARS1-16-00670-030  Tech:  WJS

Spectrum Filename: C:\User\ARS08223.An1

Acquisition information
       Start time:                4/19/2016 11:20:02 AM
       Live time:               1800
       Real time:               1807
       Dead time:                  0.41 %
       Detector ID:                   9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:             Env32   G702W050
       Start channel:             100 (    25.46keV )
       Stop channel:             8000 (  1999.20keV )
       Peak rejection level:     1000.000%
       Peak search sensitivity:     1
       Sample Size:                 3.2337E+02 +/- 0.000E+00%
       Activity scaling factor:     1.0000E+06/(  1.0000E+00*  3.2337E+02) =
                                    3.0924E+03
       Detection limit method:      Reg. Guide 4.16 Method
       Random error:                1.0000000E+00
       Systematic error:            1.0000000E+00
       Fraction Limit:             60.000%
       Background width:            average of five points.
       Half lives decay limit:     12.000
```

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1530

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 24.13 | 21. | 38.17 | 0.67 | 1.374E-02 | | | | |
| 40.12 | 6. | 137.94 | 0.97 | 2.638E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 3.520E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 3.520E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 6.721E-02 | EU152 |
| 45.48 | 5. | 203.10 | 0.97 | 3.056E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | PBC<MDA | EU152 |
| 59.38 | 9. | 142.78 | 0.99 | 4.205E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| | | | | | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.25 | 13. | 98.64 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.77 | 41. | 26.31 | 1.01 | 5.126E-02 | | | | |
| 77.31 | 65. | 19.33 | 1.01 | 5.239E-02 | | | | |
| 92.30 | 22. | 45.80 | 1.02 | 5.682E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | 5.567E-01 | U238 |
| | | | | | 92.38 | 2.570 | 6.940E-01 | U238 |
| 93.79 | 21. | 50.81 | 1.03 | 5.709E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 94.67 | 15.500 | 1.122E-01 | PA234 |
| | | | | | 94.67 | 15.500 | 1.122E-01 | PA234 |
| 105.09 | 19. | 42.04 | 0.47 | 5.824E-02 | | | | |
| 111.22 | 22. | 48.10 | 1.05 | 5.834E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| | | | | | 111.00 | 8.550 | PBC<MDA | PA234 |
| 132.41 | 14. | 49.82 | 0.41 | 5.691E-02 | | | | |
| 143.66 | 6. | 187.84 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| | | | | | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.42 | 7. | 138.58 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.70 | 29. | 43.74 | 1.13 | 4.920E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 7.444E-01 | RA226 |
| | | | | | 185.72 | 57.200 | 4.730E-02 | U235 |
| | | | | | 186.21 | 3.640 | 7.444E-01 | RA226 |
| 185.91 | 24. | 51.99 | 1.13 | 4.912E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 6.362E-01 | RA226 |
| 238.50 | 90. | 12.77 | 1.18 | 4.209E-02 | 238.63 | 43.100 | 2.304E-01 | PB212 |
| 241.85 | 13. | 67.21 | 1.19 | 4.170E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 244.68 | 9. | 104.57 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.277E-01 | EU152 |
| 248.41 | 13. | 73.27 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 2.174E-01 | EU154 |
| 295.04 | 51. | 23.28 | 0.51 | 3.632E-02 | 295.21 | 18.500 | 3.524E-01 | PB214 |
| 316.79 | 5. | 94.02 | 0.00 | 3.455E-02 | | | | |
| 338.04 | 42. | 26.47 | 0.45 | 3.297E-02 | 338.40 | 12.010 | 4.924E-01 | Ra228 |
| 351.66 | 72. | 15.95 | 0.86 | 3.209E-02 | 351.92 | 35.800 | 2.852E-01 | PB214 |
| 505.01 | 4. | 163.74 | 1.45 | 2.487E-02 | | | | |
| 511.22 | 75. | 14.51 | 2.71 | 2.466E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 534.32 | 4. | 81.37 | 0.52 | 2.390E-02 | | | | |
| 569.47 | 11. | 78.24 | 1.52 | 2.287E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| | | | | | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.29 | 43. | 22.73 | 0.34 | 2.248E-02 | 583.14 | 86.000 | 1.032E-01 | TL208 |
| 591.84 | 5. | 110.83 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.35 | 56. | 16.73 | 1.32 | 2.181E-02 | 609.31 | 44.791 | 2.575E-01 | BI214 |
| 699.24 | 3. | 200.83 | 1.64 | 1.982E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| | | | | | 699.10 | 4.600 | 1.528E-01 | PA234 |
| 726.85 | 5. | 169.23 | 1.67 | 1.928E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| | | | | | 727.17 | 11.800 | 1.020E-01 | BI212 |
| 731.88 | 5. | 119.65 | 1.67 | 1.917E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| | | | | | 733.00 | 8.500 | PBC<MDA | PA234 |
| 756.26 | 5. | 123.77 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 3.020E-01 | EU154 |
| 763.30 | 1. | 303.63 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.36 | 6. | 73.13 | 1.71 | 1.855E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 829.90 | 1. | 468.58 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 6.301E-02 | PA234 |
| 872.71 | 2. | 271.27 | 1.80 | 1.694E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| | | | | | 873.20 | 11.300 | PBC<MDA | EU154 |
| 883.43 | 8. | 63.65 | 1.81 | 1.680E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | 1.881E-01 | PA234 |
| 911.19 | 40. | 18.03 | 1.07 | 1.643E-02 | 911.07 | 29.000 | 3.899E-01 | Ra228 |
| 933.45 | 7. | 45.22 | 1.85 | 1.613E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 949.13 | 3. | 197.66 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.93 | 7. | 47.44 | 1.88 | 1.576E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 964.00 | 14.580 | 1.281E-01 | EU152 |

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Spectrum name: ARS08223.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 969.34 | 21. | 26.98 | 0.67 | 1.570E-02 | 968.90 | 17.460 | 3.510E-01 | Ra228 |
| 996.10 | 6. | 89.10 | 1.91 | 1.538E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| | | | | | 996.30 | 10.700 | 1.645E-01 | EU154 |
| 1005.01 | 4. | 158.00 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| | | | | | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1119.93 | 10. | 94.41 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1273.98 | 10. | 31.62 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | 1.029E-01 | EU154 |
| | | | | | 1274.80 | 35.500 | 1.029E-01 | EU154 |
| 1394.04 | 7. | 43.34 | 2.23 | 1.180E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| | | | | | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1408.24 | 2. | 326.44 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.10 | 184. | 7.37 | 1.68 | 1.134E-02 | 1460.75 | 10.700 | 7.005E+00 | K40 |
| 1621.12 | 5. | 44.72 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| | | | | | 1620.56 | 2.750 | 8.169E-01 | BI212 |
| 1766.61 | 4. | 79.06 | 0.40 | 9.524E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 94.70 | 24.13 | 19. | 21. | 1.514E+03 | 76.34 | 0.671 | RH-106 | s |
| 297.17 | 74.85 | 38. | 41. | 8.016E+02 | 52.62 | 1.005 | HG-203 | D |
| 307.31 | 77.38 | 46. | 65. | 1.238E+03 | 38.67 | 1.008 | PB-212 | D |
| 367.24 | 92.22 | 40. | 22. | 3.880E+02 | 91.60 | 1.025 | BR-82 | D |
| 373.23 | 93.72 | 49. | 21. | 3.754E+02 | 101.61 | 1.026 | TH-227 | D |
| 418.39 | 105.09 | 18. | 19. | 3.228E+02 | 84.09 | 0.473 | AC-228 | s |
| 527.63 | 132.41 | 14. | 14. | 2.407E+02 | 99.65 | 0.408 | BA-140 | s |
| 1265.00 | 316.79 | 9. | 5. | 1.447E+02 | 188.04 | 0.000 | - | sc |
| 2016.61 | 504.70 | 18. | 5. | 1.879E+02 | 273.90 | 1.454 | J-132 | sc |
| 2135.09 | 534.32 | 3. | 4. | 1.590E+02 | 162.73 | 0.522 | PB-214 | sc |
| 7067.70 | 1766.61 | 14. | 5. | 5.701E+02 | 210.21 | 2.493 | RH-106 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.36 | 40.05 | 35. | -1. | -0.001 | 1881.49 | 0.967s |
| EU-152 | 158.63 | 40.12 | 25. | 6. | 0.003 | 275.88 | 0.967s |
| EU-154 | 167.27 | 42.28 | 46. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 168.15 | 42.50 | 48. | -11. | -0.006 | 212.84 | 0.970s |
| EU-152 | 180.04 | 45.48 | 38. | 5. | 0.003 | 406.19 | 0.973s |
| PB-210 | 183.00 | 46.22 | 69. | 0. | 0.000 | 2000.00 | 0.974s |
| Am-241 | 235.62 | 59.38 | 51. | 9. | 0.005 | 285.56 | 0.989s |
| U-238 | 251.09 | 63.25 | 54. | 13. | 0.007 | 197.27 | 0.993s |
| U-238 | 366.53 | 92.12 | 65. | 2. | 0.001 | 1653.72 | 1.025s |
| U-238 | 369.50 | 92.86 | 38. | 0. | 0.000 | 2000.00 | 1.025s |
| PA-234 | 373.00 | 93.74 | 74. | 0. | 0.000 | 2000.00 | 1.027s |
| PA-234 | 398.67 | 100.16 | 51. | -6. | -0.003 | 399.58 | 1.033s |
| PA-234 | 442.92 | 111.22 | 31. | 22. | 0.012 | 96.21 | 1.045s |
| EU-152 | 487.33 | 122.33 | 60. | -8. | -0.004 | 345.79 | 1.057s |
| EU-154 | 490.49 | 123.12 | 55. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 520.50 | 130.62 | 23. | -4. | -0.002 | 439.31 | 1.067s |
| U-235 | 572.64 | 143.66 | 42. | 6. | 0.003 | 375.69 | 1.081s |
| U-235 | 651.63 | 163.42 | 32. | 7. | 0.004 | 277.15 | 1.102s |
| U-235 | 740.75 | 185.70 | 44. | 29. | 0.016 | 87.48 | 1.126s |
| RA-226 | 741.58 | 185.91 | 48. | 24. | 0.014 | 103.98 | 1.126s |
| U-235 | 817.00 | 204.77 | 55. | 0. | 0.000 | 2000.00 | 1.147s |
| PA-234 | 908.62 | 227.68 | 41. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 21. | 90. | 0.050 | 25.78 | 1.182D |
| PB-214 | 965.81 | 241.98 | 32. | 13. | 0.007 | 142.34 | 1.185D |
| EU-152 | 976.59 | 244.68 | 25. | 9. | 0.005 | 209.14 | 1.188s |
| EU-154 | 991.50 | 248.41 | 25. | 13. | 0.007 | 146.54 | 1.192s |
| PB-214 | 1177.99 | 295.04 | 30. | 51. | 0.028 | 46.57 | 0.512s |
| PB-212 | 1197.36 | 299.88 | 32. | -2. | -0.001 | 800.60 | 1.246 |
| Ra-228 | 1350.00 | 338.04 | 24. | 42. | 0.023 | 52.94 | 0.446s |
| PB-214 | 1404.44 | 351.66 | 23. | 71. | 0.039 | 32.98 | 0.856s |
| TL-208 | 2040.70 | 510.72 | 88. | 10. | 0.006 | 265.86 | 2.710D |
| PA-234 | 2275.73 | 569.47 | 18. | 11. | 0.006 | 156.49 | 1.517s |
| TL-208 | 2330.83 | 583.24 | 25. | 33. | 0.018 | 66.53 | 1.531s |
| EU-154 | 2365.24 | 591.84 | 9. | 5. | 0.003 | 221.65 | 1.539s |
| BI-214 | 2435.28 | 609.35 | 12. | 54. | 0.030 | 35.70 | 1.316 |
| CS-137 | 2644.00 | 661.52 | 13. | 0. | 0.000 | 2000.00 | 1.606s |
| PA-234 | 2794.91 | 699.24 | 9. | 3. | 0.002 | 401.66 | 1.641s |
| EU-154 | 2891.12 | 723.28 | 22. | -2. | -0.001 | 1227.46 | 1.664s |
| BI-212 | 2905.40 | 726.85 | 18. | 5. | 0.003 | 338.47 | 1.667s |
| PA-234 | 2925.53 | 731.88 | 10. | 5. | 0.003 | 239.31 | 1.673s |
| EU-154 | 3023.07 | 756.26 | 9. | 5. | 0.003 | 247.55 | 1.695s |
| TL-208 | 3051.25 | 763.30 | 5. | 1. | 0.001 | 607.26 | 1.701D |
| BI-214 | 3071.48 | 768.36 | 7. | 6. | 0.003 | 146.27 | 1.705D |
| EU-152 | 3112.71 | 778.66 | 27. | -2. | -0.001 | 1009.46 | 1.715s |

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Spectrum name: ARS08223.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-212 | 3132.00 | 783.48 | 27. | 0. | 0.000 | 2000.00 | 1.721s |
| PA-234 | 3224.00 | 806.47 | 27. | 0. | 0.000 | 2000.00 | 1.742s |
| PA-234 | 3317.75 | 829.90 | 10. | 1. | 0.001 | 937.15 | 1.762s |
| TL-208 | 3444.81 | 861.65 | 35. | 0. | 0.000 | 2000.00 | 1.789s |
| EU-152 | 3470.43 | 868.05 | 10. | -1. | 0.000 | 1858.22 | 1.795s |
| EU-154 | 3489.08 | 872.71 | 12. | 2. | 0.001 | 542.53 | 1.800s |
| PA-234 | 3517.14 | 879.72 | 15. | 0. | 0.000 | 2000.00 | 1.807s |
| PA-234 | 3531.98 | 883.43 | 5. | 8. | 0.005 | 127.29 | 1.809s |
| PA-234 | 3593.75 | 898.87 | 33. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.06 | 911.19 | 3. | 40. | 0.022 | 36.06 | 1.073s |
| PA-234 | 3707.33 | 927.25 | 15. | 0. | 0.000 | 2000.00 | 1.848s |
| BI-214 | 3732.14 | 933.45 | 0. | 7. | 0.004 | 90.43 | 1.854s |
| PA-234 | 3783.90 | 946.38 | 19. | 0. | 0.000 | 2000.00 | 1.864s |
| PA-234 | 3794.93 | 949.13 | 6. | 3. | 0.001 | 395.32 | 1.867s |
| EU-152 | 3852.00 | 963.39 | 11. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 3. | 7. | 0.004 | 94.87 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 1. | 20. | 0.011 | 48.40 | 1.885D |
| EU-154 | 3982.92 | 996.10 | 5. | 6. | 0.003 | 178.21 | 1.908s |
| EU-154 | 4018.57 | 1005.01 | 11. | 4. | 0.002 | 316.00 | 1.915s |
| EU-152 | 4343.68 | 1086.24 | 11. | 0. | 0.000 | 2000.00 | 1.984s |
| EU-152 | 4441.00 | 1110.55 | 38. | 0. | 0.000 | 2000.00 | 2.006s |
| BI-214 | 4478.58 | 1119.93 | 16. | 10. | 0.005 | 188.83 | 2.013s |
| CO-60 | 4692.50 | 1173.37 | 18. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4945.00 | 1236.44 | 33. | 0. | 0.000 | 2000.00 | 2.109s |
| EU-154 | 5095.30 | 1273.98 | 0. | 10. | 0.006 | 63.25 | 2.137s |
| CO-60 | 5326.54 | 1331.74 | 12. | 0. | 0.000 | 2000.00 | 2.183s |
| BI-214 | 5510.19 | 1377.61 | 7. | 0. | 0.000 | 2000.00 | 2.217s |
| PA-234 | 5576.00 | 1394.04 | 0. | 7. | 0.004 | 86.68 | 2.230s |
| EU-152 | 5632.87 | 1408.24 | 7. | 2. | 0.001 | 652.88 | 2.240s |
| K-40 | 5844.52 | 1461.10 | 1. | 183. | 0.102 | 14.89 | 1.680s |
| BI-212 | 6485.40 | 1621.12 | 0. | 5. | 0.003 | 89.44 | 2.394s |
| BI-214 | 7059.67 | 1764.49 | 5. | 14. | 0.008 | 73.13 | 2.492D |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 5.2981E-02 | | | | 1.39E+09 | |
| | | | 185.72 | 4.730E-02 | ( | 5.567E-02 4.37E+01 5.72E+01 | G K |
| | | | 143.76 | 4.645E-02 | &(P | 2.628E-01 1.88E+02 1.05E+01 | G |
| | | | 205.31 | 0.000E+00 | - P | 7.914E-01 1.00E+03 4.70E+00 | G |
| | | | 163.35 | 1.367E-01 | ?(P | 5.438E-01 1.39E+02 4.70E+00 | G |

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Spectrum name: ARS08223.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| RA-226 | | 6.3623E-01 | | | | | 5.84E+05 | |
| | | | 186.21 | 6.362E-01 | ( | 9.044E-01 | 5.20E+01 | 3.64E+00 G K |
| Ra-228 | | 3.9595E-01 | | | | | 2.10E+03 | |
| | | | 911.07 | 3.899E-01 | ( | 1.051E-01 | 1.80E+01 | 2.90E+01 G |
| | | | 968.90 | 3.373E-01 | (P | 1.279E-01 | 2.42E+01 | 1.75E+01 G |
| | | | 338.40 | 4.924E-01 | ( | 2.994E-01 | 2.65E+01 | 1.20E+01 G |
| | | | 964.60 | 4.035E-01 | ( | 5.476E-01 | 4.74E+01 | 5.45E+00 G |
| Am-241 | T | 2.6312E-02 | | | | | 1.58E+05 | |
| | | | 59.54 | 2.631E-02 | &(P | 1.111E-01 | 1.43E+02 | 3.59E+01 G K |
| U-238 | | 3.4314E-01 | | | | | 1.63E+12 | |
| | | | 63.29 | 3.431E-01 | ?(P | 9.858E-01 | 9.86E+01 | 3.90E+00 G |
| | | | 92.80 | 0.000E+00 | & P | 8.589E-01 | 1.00E+03 | 3.00E+00 G |
| | | | 92.38 | 5.159E-02 | & P | 1.284E+00 | 8.27E+02 | 2.57E+00 G |
| K-40 | | 7.0054E+00 | | | | | 4.68E+11 | |
| | | | 1460.75 | 7.005E+00 | (P | 2.820E-01 | 7.44E+00 | 1.07E+01 G |
| PB-214 | | 3.0811E-01 | | | | | 5.84E+05 | |
| | | | 351.92 | 2.852E-01 | (P | 1.023E-01 | 1.65E+01 | 3.58E+01 G |
| | | | 295.21 | 3.524E-01 | ( | 1.951E-01 | 2.33E+01 | 1.85E+01 G |
| | | | 241.98 | 1.864E-01 | - P | 4.346E-01 | 7.12E+01 | 7.50E+00 G |
| BI-214 | | 2.5194E-01 | | | | | 5.84E+05 | |
| | | | 609.31 | 2.575E-01 | (P | 8.903E-02 | 1.79E+01 | 4.48E+01 G |
| | | | 1764.49 | 4.348E-01 | + P | 4.257E-01 | 3.66E+01 | 1.54E+01 G |
| | | | 1120.29 | 2.117E-01 | &( | 4.823E-01 | 9.44E+01 | 1.48E+01 G |
| | | | 1238.11 | 0.000E+00 | & | 1.795E+00 | 1.00E+03 | 5.86E+00 G |
| | | | 768.36 | 3.238E-01 | ( | 7.936E-01 | 7.31E+01 | 4.80E+00 G |
| | | | 1377.67 | 0.000E+00 | - P | 1.501E+00 | 1.00E+03 | 3.92E+00 G |
| | | | 934.06 | 6.182E-01 | + P | 7.003E-01 | 4.52E+01 | 3.03E+00 G |
| BI-212 | | 2.3715E-01 | | | | | 2.10E+03 | |
| | | | 727.17 | 1.020E-01 | ?( | 4.588E-01 | 1.69E+02 | 1.18E+01 G |
| | | | 1620.56 | 8.169E-01 | ?( | 1.204E+00 | 4.47E+01 | 2.75E+00 G |
| | | | 785.42 | 0.000E+00 | - | 3.422E+00 | 1.00E+03 | 2.00E+00 G |
| PB-212 | | 2.3041E-01 | | | | | 2.10E+03 | |
| | | | 238.63 | 2.304E-01 | (P | 6.167E-02 | 1.29E+01 | 4.31E+01 G |
| | | | 300.09 | -9.887E-02 | - | 1.142E+00 | 4.00E+02 | 3.27E+00 G |
| TL-208 | | 8.2108E-02 | | | | | 2.10E+03 | |
| | | | 583.14 | 7.924E-02 | ?( | 6.245E-02 | 3.33E+01 | 8.60E+01 G |
| | | | 510.72 | 8.736E-02 | (P | 3.876E-01 | 1.33E+02 | 2.25E+01 G |
| | | | 860.47 | 0.000E+00 | & P | 6.812E-01 | 1.00E+03 | 1.20E+01 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 277.36 | 1.509E-02 | % P | 5.715E-01 | 1.28E+03 | 6.50E+00 G |
| | | 763.30 | 1.577E-01 | ( | 1.894E+00 | 3.04E+02 | 1.70E+00 G |
| PA-234 | 1.3846E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 2.670E-03 | %( | 1.123E-01 | 1.37E+03 | 2.51E+01 G |
| | | 946.00 | 0.000E+00 | - | 3.370E-01 | 1.00E+03 | 2.00E+01 G |
| | | 131.28 | -1.493E-02 | + | 1.013E-01 | 2.20E+02 | 2.00E+01 G |
| | | 94.67 | 0.000E+00 | - | 2.235E-01 | 1.00E+03 | 1.55E+01 G |
| | | 883.24 | 1.881E-01 | ?( | 2.984E-01 | 6.36E+01 | 1.20E+01 G |
| | | 926.70 | 0.000E+00 | - P | 5.477E-01 | 1.00E+03 | 1.10E+01 G |
| | | 569.26 | 2.144E-01 | ?(P | 4.392E-01 | 7.82E+01 | 1.04E+01 G |
| | | 111.00 | 2.013E-01 | (P | 2.682E-01 | 4.81E+01 | 8.55E+00 G |
| | | 733.00 | 1.530E-01 | ?(P | 4.892E-01 | 1.20E+02 | 8.50E+00 G |
| | | 949.00 | 9.545E-02 | ?(P | 5.428E-01 | 1.98E+02 | 7.80E+00 G |
| | | 880.51 | 0.000E+00 | - P | 8.851E-01 | 1.00E+03 | 6.50E+00 G |
| | | 226.87 | 0.000E+00 | - P | 5.368E-01 | 1.00E+03 | 6.50E+00 G |
| | | 831.10 | 6.301E-02 | ?( | 8.127E-01 | 4.69E+02 | 5.60E+00 G |
| | | 808.10 | 0.000E+00 | - | 1.425E+00 | 1.00E+03 | 4.90E+00 G |
| | | 99.70 | -1.024E-01 | + | 6.144E-01 | 2.00E+02 | 4.70E+00 G |
| | | 699.10 | 1.528E-01 | ?( | 8.500E-01 | 2.01E+02 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 2.065E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 6.652E-01 | ?(P | 7.433E-01 | 4.33E+01 | 3.90E+00 G |
| EU-152 | 5.1289E-02 | | | | | 4.64E+03 | |
| | | 40.12 | 3.520E-02 | ?( | 1.526E-01 | 1.38E+02 | 3.00E+01 G |
| | | 121.78 | -2.057E-02 | + | 1.060E-01 | 1.73E+02 | 2.92E+01 G |
| | | 344.30 | 1.584E-04 | & P | 1.397E-01 | 3.00E+04 | 2.70E+01 G |
| | | 1408.08 | 3.220E-02 | &(P | 2.858E-01 | 3.26E+02 | 2.12E+01 G |
| | | 39.52 | -1.120E-02 | - | 3.392E-01 | 9.41E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | & P | 3.734E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 0.000E+00 | & | 7.636E-01 | 1.00E+03 | 1.36E+01 G |
| | | 778.90 | -3.891E-02 | + | 5.238E-01 | 5.05E+02 | 1.30E+01 G |
| | | 1085.80 | 0.000E+00 | - P | 5.736E-01 | 1.00E+03 | 1.03E+01 G |
| | | 45.40 | 8.521E-02 | &(P | 5.305E-01 | 2.03E+02 | 9.00E+00 G |
| | | 244.67 | 1.277E-01 | ?( | 3.856E-01 | 1.05E+02 | 7.62E+00 G |
| | | 867.39 | -4.356E-02 | & | 1.124E+00 | 9.29E+02 | 4.18E+00 G |
| EU-154 | 8.5927E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | ?(P | 7.369E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 1.029E-01 | &( | 7.582E-02 | 3.16E+01 | 3.55E+01 G |
| | | 723.30 | -1.827E-02 | + | 3.022E-01 | 6.14E+02 | 1.97E+01 G |
| | | 1004.80 | 7.613E-02 | ?(P | 3.084E-01 | 1.58E+02 | 1.76E+01 G |
| | | 43.00 | -1.381E-01 | & | 4.335E-01 | 1.06E+02 | 1.31E+01 G |
| | | 873.20 | 6.000E-02 | ?(P | 4.496E-01 | 2.71E+02 | 1.13E+01 G |
| | | 996.30 | 1.645E-01 | ?( | 3.752E-01 | 8.91E+01 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | - P | 7.801E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | 2.174E-01 | ?( | 4.492E-01 | 7.33E+01 | 6.60E+00 G |
| | | 591.70 | 2.479E-01 | ?(P | 7.402E-01 | 1.11E+02 | 4.60E+00 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 48.70 | 2.433E-03 % | P | 1.103E+00 | 1.45E+04 | 4.20E+00 G |
| | | 756.70 | 3.020E-01 ?( | | 1.008E+00 | 1.24E+02 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 40.05 | 35. | -1. | -0.001 | 1881.49 | -1.120E-02 | |
| EU-152 | 40.12 | 25. | 6. | 0.003 | 275.88 | 3.520E-02 | |
| EU-154 | 42.50 | 48. | -11. | -0.006 | 212.84 | -1.381E-01 | |
| EU-152 | 45.48 | 38. | 5. | 0.003 | 406.19 | 8.521E-02 | P |
| Am-241 | 59.38 | 51. | 9. | 0.005 | 285.56 | 2.631E-02 | P |
| U-238 | 63.25 | 54. | 13. | 0.007 | 197.27 | 3.431E-01 | P |
| U-238 | 92.12 | 65. | 2. | 0.001 | 1653.72 | 5.159E-02 | P |
| PA-234 | 100.16 | 51. | -6. | -0.003 | 399.58 | -1.024E-01 | |
| PA-234 | 111.22 | 31. | 22. | 0.012 | 96.21 | 2.013E-01 | P |
| EU-152 | 122.33 | 60. | -8. | -0.004 | 345.79 | -2.057E-02 | |
| PA-234 | 130.62 | 23. | -4. | -0.002 | 439.31 | -1.493E-02 | |
| U-235 | 143.66 | 42. | 6. | 0.003 | 375.69 | 4.645E-02 | P |
| U-235 | 163.42 | 32. | 7. | 0.004 | 277.15 | 1.367E-01 | P |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | |
|---|---|---|---|---|---|---|---|---|
| U-235 | 185.70 | 44. | 29. | 0.016 | 87.48 | 4.730E-02 | | |
| RA-226 | 185.91 | 48. | 24. | 0.014 | 103.98 | 6.362E-01 | | |
| EU-152 | 244.68 | 25. | 9. | 0.005 | 209.14 | 1.277E-01 | | |
| EU-154 | 248.41 | 25. | 13. | 0.007 | 146.54 | 2.174E-01 | | |
| PA-234 | 569.47 | 18. | 11. | 0.006 | 156.49 | 2.144E-01 | P | |
| EU-154 | 591.84 | 9. | 5. | 0.003 | 221.65 | 2.479E-01 | P | |
| PA-234 | 699.24 | 9. | 3. | 0.002 | 401.66 | 1.528E-01 | | |
| EU-154 | 723.28 | 22. | -2. | -0.001 | 1227.46 | -1.827E-02 | | |
| BI-212 | 726.85 | 18. | 5. | 0.003 | 338.47 | 1.020E-01 | | |
| PA-234 | 731.88 | 10. | 5. | 0.003 | 239.31 | 1.530E-01 | P | |
| EU-154 | 756.26 | 9. | 5. | 0.003 | 247.55 | 3.020E-01 | | |
| EU-152 | 778.66 | 27. | -2. | -0.001 | 1009.46 | -3.891E-02 | | |
| PA-234 | 829.90 | 10. | 1. | 0.001 | 937.15 | 6.301E-02 | | |
| EU-152 | 868.05 | 10. | -1. | 0.000 | 1858.22 | -4.356E-02 | | |
| EU-154 | 872.71 | 12. | 2. | 0.001 | 542.53 | 6.000E-02 | P | |
| PA-234 | 883.43 | 5. | 8. | 0.005 | 127.29 | 1.881E-01 | | |
| PA-234 | 949.13 | 6. | 3. | 0.001 | 395.32 | 9.545E-02 | P | |
| EU-154 | 996.10 | 5. | 6. | 0.003 | 178.21 | 1.645E-01 | | |
| EU-154 | 1005.01 | 11. | 4. | 0.002 | 316.00 | 7.613E-02 | P | |
| EU-154 | 1273.98 | 0. | 10. | 0.006 | 63.25 | 1.029E-01 | | |
| PA-234 | 1394.04 | 0. | 7. | 0.004 | 86.68 | 6.652E-01 | P | |
| EU-152 | 1408.24 | 7. | 2. | 0.001 | 652.88 | 3.220E-02 | P | |
| BI-212 | 1621.12 | 0. | 5. | 0.003 | 89.44 | 8.169E-01 | | |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 5.2981E-02 | 4.6350E-02 | 4.6509E-02 | 0.557E-01 |
| RA-226 | #A | 6.3623E-01 | 6.6156E-01 | 6.6269E-01 | 0.904E+00 |
| Ra-228 | | 3.9595E-01 | 1.2302E-01 | 1.2576E-01 | 0.105E+00 |
| Am-241 | #A | 2.6312E-02 | 7.5137E-02 | 7.5157E-02 | 0.111E+00 |
| PB-210 | #A | 0.0000E+00 | 5.0221E-01 | 5.0222E-01 | 0.153E+01 |
| U-238 | #A | 3.4314E-01 | 6.7692E-01 | 6.7746E-01 | 0.986E+00 |
| K-40 | | 7.0054E+00 | 1.0429E+00 | 1.1432E+00 | 0.282E+00 |
| PB-214 | | 3.0811E-01 | 8.7907E-02 | 9.1749E-02 | 0.102E+00 |
| BI-214 | | 2.5194E-01 | 8.9944E-02 | 9.1305E-02 | 0.890E-01 |
| BI-212 | #A | 2.3715E-01 | 2.1211E-01 | 2.1269E-01 | 0.459E+00 |
| PB-212 | | 2.3041E-01 | 5.9407E-02 | 6.1701E-02 | 0.617E-01 |
| TL-208 | | 8.2108E-02 | 5.4625E-02 | 5.4887E-02 | 0.625E-01 |
| PA-234 | #C | 1.3846E-01 | 1.2002E-01 | 1.2045E-01 | 0.112E+00 |
| CS-137 | #A | 0.0000E+00 | 7.4839E-03 | 7.4839E-03 | 0.515E-01 |
| CO-60 | #A | 0.0000E+00 | 6.8433E-03 | 6.8433E-03 | 0.764E-01 |
| EU-152 | #A | 5.1289E-02 | 1.0727E-01 | 1.0742E-01 | 0.153E+00 |
| EU-154 | #C | 8.5927E-02 | 5.4345E-02 | 5.4668E-02 | 0.737E-01 |

ORTEC g v - i (3263) Env32  G702W050  4/19/2016 11:50:17 AM
Spectrum name: ARS08223.An1

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | | |
|---|---|---|---|
| Total Activity ( | 25.5 to 1999.2 keV) | 8.274E+00 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00697-15 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-031 |
| AnalysisBatch | ARS1-B16-00697 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 031 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 7.0305E-02 | pCi/g | 1.3779E-01 | 2.3200E-01 | 1.1600E-01 | | | |
| RA-226 | 0.0000E+00 | pCi/g | 4.6583E-01 | 8.1400E-01 | 4.0700E-01 | | | |
| RA-228 | 2.5676E-01 | pCi/g | 9.5046E-02 | 8.1300E-02 | 4.0650E-02 | | | |
| AM-241 | 3.7651E-02 | pCi/g | 5.9279E-02 | 8.4900E-02 | 4.2450E-02 | | | |
| PB-210 | 6.0923E-02 | pCi/g | 5.1283E-01 | 8.9400E-01 | 4.4700E-01 | | | |
| U-238 | 3.6116E-01 | pCi/g | 3.4316E-01 | 8.2700E-01 | 4.1350E-01 | | | |
| K-40 | 8.0390E+00 | pCi/g | 1.0593E+00 | 2.1000E-01 | 1.0500E-01 | | | |
| PB-214 | 2.9970E-01 | pCi/g | 7.6794E-02 | 7.7600E-02 | 3.8800E-02 | | | |
| BI-214 | 2.8981E-01 | pCi/g | 8.1901E-02 | 8.2300E-02 | 4.1150E-02 | | | |
| BI-212 | 2.5212E-01 | pCi/g | 2.2611E-01 | 2.7000E-01 | 1.3500E-01 | | | |
| PB-212 | 3.1694E-01 | pCi/g | 5.9557E-02 | 5.0900E-02 | 2.5450E-02 | | | |
| TL-208 | 1.2453E-01 | pCi/g | 4.5159E-02 | 4.0800E-02 | 2.0400E-02 | | | |
| PA-234 2.045E-02 | ~~4.6019E-01~~ | pCi/g | 1.5049E-01 | 9.4600E-02 | 4.7300E-02 | | | |
| CS-137 | 3.6620E-02 | pCi/g | 3.2295E-02 | 3.9000E-02 | 1.9500E-02 | | | |
| CO-60 | 1.6870E-03 | pCi/g | 1.8567E-02 | 6.3800E-02 | 3.1900E-02 | | | |
| EU-152 | 2.6338E-02 | pCi/g | 3.2344E-02 | 1.5800E-01 | 7.9000E-02 | | | |
| EU-154 1.546E-02 | ~~1.1850E-01~~ | pCi/g | 9.0579E-02 | 5.2800E-02 | 2.6400E-02 | | | |
| Total Gamma | 1.0452E+01 | pCi/g | | | | | | |
| Total NORM Activity | 2.8739E+01 | pCi/g | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  5/5/2016 10:09:09 AM
                                Spectrum name: ARS08324.An1

Sample description
     Batch ID:  16-00697-15
     SDG:  ARS1-16-00670-031  Tech:  WJS

Spectrum Filename: C:\User\ARS08324.An1

Acquisition information
       Start time:                 5/5/2016 9:23:48 AM
       Live time:                2700
       Real time:                2713
       Dead time:                   0.47 %
       Detector ID:                    9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                   250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:               12/12/2014 9:34:56 AM
            Zero offset:           0.447 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:               1/5/2015 10:02:55 AM
            Type:                  Polynomial
            Uncertainty:           1.535 %
            Coefficients:         -0.447430  -4.056056   0.358945
                                  -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:      ITSI COUNT.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:              Env32   G702W050
       Start channel:              100 (    25.46keV )
       Stop channel:              8000 (  1999.20keV )
       Peak rejection level:     1000.000%
       Peak search sensitivity:     1
       Sample Size:                 3.2284E+02 +/- 0.000E+00%
       Activity scaling factor:     1.0000E+06/(  1.0000E+00*  3.2284E+02) =
                                    3.0975E+03
       Detection limit method:      Reg. Guide 4.16 Method
       Random error:                1.0000000E+00
       Systematic error:            1.0000000E+00
       Fraction Limit:             60.000%
       Background width:            average of five points.
       Half lives decay limit:     12.000
```

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:09:09 AM
Spectrum name: ARS08324.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1301

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 45.26 | 17. | 61.14 | 0.97 | 3.056E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | PBC<MDA | EU152 |
| 46.61 | 9. | 106.69 | 0.97 | 3.136E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 49.81 | 19. | 55.75 | 0.98 | 3.412E-02 | 48.70 | 4.200 | 4.137E-01 | EU154 |
| 59.45 | 18. | 78.65 | 0.99 | 4.205E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| | | | | | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.72 | 12. | 136.22 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.80 | 75. | 19.68 | 1.01 | 5.125E-02 | | | | |
| 77.27 | 155. | 10.98 | 1.01 | 5.234E-02 | | | | |
| 79.47 | 9. | 136.28 | 1.01 | 5.323E-02 | | | | |
| 92.38 | 12. | 157.02 | 1.02 | 5.685E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.50 | 36. | 47.34 | 1.03 | 5.693E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.15 | 10. | 154.78 | 1.03 | 5.774E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 98.44 | 25.100 | 2.068E-02 | PA234 |
| 117.07 | 11. | 94.97 | 1.05 | 5.818E-02 | | | | |
| 118.35 | 6. | 178.44 | 1.05 | 5.811E-02 | | | | |
| 120.95 | 12. | 82.55 | 1.06 | 5.796E-02 | 121.78 | 29.240 | 2.278E-02 | EU152 |
| 122.21 | 4. | 366.06 | 1.06 | 5.790E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 123.06 | 12. | 117.16 | 1.06 | 5.780E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |
| 143.95 | 6. | 213.96 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 146.06 | 10. | 88.98 | 0.34 | 5.517E-02 | | | | |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:09:09 AM
Spectrum name: ARS08324.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 154.02 | 20. | 53.74 | 1.09 | 5.403E-02 | | | | |
| 157.76 | 18. | 61.70 | 1.10 | 5.348E-02 | | | | |
| 163.29 | 15. | 97.94 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.55 | 30. | 39.15 | 1.13 | 4.919E-02 | 185.72 | 57.200 | 3.285E-02 | U235 |
| | | | | | 186.21 | 3.640 | 5.170E-01 | RA226 |
| 186.83 | 14. | 77.04 | 1.13 | 4.900E-02 | 186.21 | 3.640 | 2.464E-01 | RA226 |
| 205.36 | 2. | 449.55 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 207.22 | 12. | 73.45 | 0.56 | 4.609E-02 | | | | |
| 238.33 | 168. | 10.95 | 1.12 | 4.210E-02 | 238.63 | 43.100 | 2.874E-01 | PB212 |
| 241.81 | 39. | 28.69 | 1.19 | 4.167E-02 | 241.98 | 7.500 | 3.883E-01 | PB214 |
| 244.60 | 3. | 429.59 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 2.625E-02 | EU152 |
| 248.06 | 6. | 184.78 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 7.451E-02 | EU154 |
| 256.19 | 9. | 106.69 | 0.56 | 4.009E-02 | | | | |
| 295.13 | 73. | 17.75 | 1.07 | 3.633E-02 | 295.21 | 18.500 | 3.378E-01 | PB214 |
| 338.26 | 43. | 27.99 | 1.00 | 3.298E-02 | 338.40 | 12.010 | 3.398E-01 | Ra228 |
| 351.81 | 95. | 13.42 | 1.30 | 3.207E-02 | 351.92 | 35.800 | 2.500E-01 | PB214 |
| 354.10 | 9. | 93.75 | 1.30 | 3.192E-02 | | | | |
| 371.89 | 3. | 191.49 | 0.25 | 3.084E-02 | | | | |
| 469.62 | 12. | 45.31 | 0.43 | 2.615E-02 | | | | |
| 511.45 | 151. | 12.83 | 2.40 | 2.464E-02 | 510.72 | 22.500 | 3.287E-01 | TL208 |
| 555.83 | 17. | 49.35 | 0.28 | 2.325E-02 | | | | |
| 583.35 | 75. | 17.84 | 0.73 | 2.248E-02 | 583.14 | 86.000 | 1.206E-01 | TL208 |
| 603.96 | 17. | 41.71 | 0.32 | 2.194E-02 | | | | |
| 609.42 | 94. | 14.57 | 1.36 | 2.181E-02 | 609.31 | 44.791 | 2.878E-01 | BI214 |
| 661.33 | 21. | 44.04 | 1.61 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| | | | | | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.27 | 18. | 44.72 | 1.67 | 1.928E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| | | | | | 727.17 | 11.800 | 2.521E-01 | BI212 |
| 756.75 | 19. | 38.06 | 1.69 | 1.875E-02 | 756.70 | 4.100 | 7.663E-01 | EU154 |
| | | | | | 756.70 | 4.100 | 7.663E-01 | EU154 |
| 763.32 | 3. | 111.03 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.38 | 16. | 33.34 | 1.71 | 1.855E-02 | 768.36 | 4.799 | 5.626E-01 | BI214 |
| 778.70 | 2. | 370.41 | 1.71 | 1.837E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| | | | | | 778.90 | 12.990 | 3.248E-02 | EU152 |
| 794.36 | 23. | 33.17 | 0.95 | 1.812E-02 | | | | |
| 807.48 | 2. | 370.41 | 1.74 | 1.790E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 8.838E-02 | PA234 |
| 831.02 | 12. | 71.73 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 3.629E-01 | PA234 |
| 860.25 | 10. | 72.35 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 873.95 | 8. | 96.83 | 1.80 | 1.694E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| | | | | | 873.20 | 11.300 | PBC<MDA | EU154 |
| 883.00 | 18. | 46.83 | 1.81 | 1.680E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | 2.845E-01 | PA234 |
| 911.17 | 41. | 18.21 | 0.72 | 1.643E-02 | 911.07 | 29.000 | 2.643E-01 | Ra228 |
| 949.32 | 7. | 118.52 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |

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Spectrum name: ARS08324.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.41 | 17. | 33.60 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 6.164E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 2.076E-01 | EU152 |
| 968.71 | 18. | 46.90 | 1.88 | 1.570E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 996.62 | 14. | 42.78 | 1.91 | 1.538E-02 | 996.30 | 10.700 | 2.606E-01 | EU154 |
| | | | | | 996.30 | 10.700 | 2.606E-01 | EU154 |
| 1238.66 | 5. | 242.40 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1332.05 | 1. | 550.28 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| | | | | | 1332.50 | 99.982 | 3.373E-03 | CO60 |
| 1377.40 | 10. | 62.50 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1394.05 | 7. | 91.15 | 2.23 | 1.180E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| | | | | | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1461.16 | 313. | 5.77 | 1.78 | 1.134E-02 | 1460.75 | 10.700 | 7.957E+00 | K40 |
| 1554.11 | 1. | 100.00 | 0.25 | 1.074E-02 | | | | |
| 1764.44 | 16. | 28.04 | 2.49 | 9.535E-03 | 1764.49 | 15.357 | 3.376E-01 | BI214 |
| 1808.06 | 0. | 223.61 | 0.21 | 9.310E-03 | | | | |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 197.22 | 49.61 | 47. | 19. | 5.498E+02 | 113.44 | 0.978 | EU-154 | D |
| 297.29 | 74.82 | 72. | 75. | 1.467E+03 | 39.35 | 1.005 | HG-203 | D |
| 307.14 | 77.28 | 68. | 155. | 2.967E+03 | 21.96 | 1.008 | PB-212 | D |
| 315.94 | 79.48 | 63. | 9. | 1.604E+02 | 272.56 | 1.011 | BA-133 | c |
| 466.30 | 117.02 | 50. | 11. | 1.906E+02 | 189.94 | 1.052 | NP-239 | c |
| 471.44 | 118.31 | 58. | 6. | 1.064E+02 | 356.89 | 1.053 | GD-153 | c |
| 481.80 | 120.90 | 46. | 12. | 2.146E+02 | 165.10 | 1.056 | SE-75 | c |
| 582.98 | 146.06 | 57. | 14. | 2.559E+02 | 160.88 | 1.083 | EU-155 | c |
| 614.05 | 153.90 | 46. | 20. | 3.638E+02 | 107.48 | 1.092 | XE-138 | D |
| 628.99 | 157.64 | 55. | 18. | 3.447E+02 | 123.39 | 1.096 | MO-99 | D |
| 745.37 | 187.03 | 53. | 14. | 2.957E+02 | 150.93 | 1.127 | CS-136 | c |
| 826.98 | 207.22 | 45. | 16. | 3.420E+02 | 129.95 | 1.149 | U-237 | D |
| 1022.62 | 256.19 | 32. | 9. | 2.245E+02 | 213.38 | 0.558 | TH-227 | c |
| 1414.33 | 354.27 | 34. | 10. | 3.090E+02 | 179.26 | 1.302 | AU-196 | c |
| 1485.37 | 371.89 | 15. | 3. | 9.729E+01 | 382.97 | 0.248 | - | c |
| 1876.30 | 469.62 | 7. | 12. | 4.665E+02 | 90.62 | 0.427 | - | s |
| 2221.17 | 555.83 | 18. | 17. | 7.484E+02 | 98.69 | 0.284 | - | s |
| 2414.96 | 603.96 | 30. | 4. | 1.626E+02 | 449.87 | 1.551 | CS-134 | sc |
| 3175.54 | 794.36 | 11. | 23. | 1.269E+03 | 66.34 | 0.953 | AC-228 | s |
| 6217.00 | 1554.11 | 0. | 1. | 9.314E+01 | 200.00 | 0.250 | - | sc |
| 7234.18 | 1808.06 | 0. | 0. | 5.370E+01 | 447.21 | 0.213 | - | sc |

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s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 155.09 | 39.24 | 72. | -6. | -0.002 | 496.93 | 0.967s |
| EU-152 | 159.57 | 40.36 | 65. | -2. | -0.001 | 1282.58 | 0.967s |
| EU-154 | 165.89 | 41.94 | 74. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 172.11 | 43.49 | 76. | -8. | -0.003 | 345.05 | 0.970s |
| EU-152 | 179.17 | 45.26 | 36. | 17. | 0.006 | 122.28 | 0.973s |
| PB-210 | 184.21 | 46.52 | 52. | 2. | 0.001 | 841.71 | 0.974D |
| EU-154 | 193.00 | 48.72 | 27. | 8. | 0.003 | 228.05 | 0.977s |
| Am-241 | 235.90 | 59.45 | 69. | 18. | 0.007 | 157.30 | 0.989s |
| U-238 | 252.97 | 63.72 | 88. | 12. | 0.004 | 272.45 | 0.993s |
| U-238 | 367.58 | 92.38 | 122. | 12. | 0.004 | 314.05 | 1.025s |
| U-238 | 368.06 | 92.50 | 93. | 36. | 0.013 | 94.69 | 1.025s |
| PA-234 | 373.17 | 93.78 | 125. | -16. | -0.006 | 239.60 | 1.027s |
| PA-234 | 390.65 | 98.15 | 79. | 10. | 0.004 | 309.56 | 1.031s |
| PA-234 | 396.19 | 99.54 | 105. | -11. | -0.004 | 316.49 | 1.033s |
| PA-234 | 442.91 | 111.22 | 97. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 486.85 | 122.21 | 60. | 4. | 0.001 | 732.12 | 1.057s |
| EU-154 | 490.24 | 123.06 | 63. | 12. | 0.004 | 234.32 | 1.058s |
| PA-234 | 519.75 | 130.44 | 82. | -4. | -0.002 | 721.63 | 1.067s |
| U-235 | 573.03 | 143.76 | 77. | 6. | 0.002 | 427.92 | 1.081D |
| U-235 | 651.12 | 163.29 | 70. | 15. | 0.006 | 195.87 | 1.102s |
| U-235 | 740.82 | 185.72 | 56. | 28. | 0.010 | 81.83 | 1.126D |
| RA-226 | 742.78 | 186.21 | 90. | 0. | 0.000 | 2000.00 | 0.366D |
| U-235 | 819.16 | 205.31 | 58. | 2. | 0.001 | 899.10 | 1.147D |
| PA-234 | 907.48 | 227.40 | 60. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 34. | 185. | 0.069 | 17.34 | 1.182D |
| PB-214 | 965.81 | 241.98 | 41. | 39. | 0.014 | 57.38 | 1.185D |
| EU-152 | 976.28 | 244.60 | 44. | 3. | 0.001 | 859.18 | 1.188s |
| EU-154 | 990.10 | 248.06 | 48. | 6. | 0.002 | 369.55 | 1.192s |
| TL-208 | 1106.25 | 277.10 | 73. | 0. | 0.000 | 2000.00 | 1.223s |
| PB-214 | 1178.36 | 295.13 | 37. | 73. | 0.027 | 35.51 | 1.072 |
| PB-212 | 1197.86 | 300.01 | 80. | -16. | -0.006 | 197.71 | 1.246 |
| Ra-228 | 1350.66 | 338.21 | 35. | 41. | 0.015 | 59.64 | 1.286 |
| EU-152 | 1375.82 | 344.50 | 62. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1405.50 | 351.92 | 31. | 97. | 0.036 | 26.48 | 1.300D |
| TL-208 | 2042.57 | 511.19 | 142. | 38. | 0.014 | 117.91 | 2.710 |
| PA-234 | 2272.61 | 568.69 | 40. | 0. | 0.000 | 2000.00 | 1.517s |

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Spectrum name: ARS08324.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| TL-208 | 2331.26 | 583.35 | 24. | 75. | 0.028 | 35.67 | 0.732s |
| EU-154 | 2360.91 | 590.76 | 34. | 0. | 0.000 | 2000.00 | 1.539s |
| BI-214 | 2435.12 | 609.31 | 25. | 86. | 0.032 | 27.56 | 1.556D |
| CS-137 | 2643.23 | 661.33 | 17. | 21. | 0.008 | 88.08 | 1.606s |
| PA-234 | 2795.83 | 699.47 | 45. | -5. | -0.002 | 523.83 | 1.641s |
| EU-154 | 2889.82 | 722.96 | 36. | 0. | 0.000 | 2000.00 | 1.664s |
| BI-212 | 2907.07 | 727.27 | 14. | 18. | 0.007 | 89.44 | 1.667s |
| PA-234 | 2926.43 | 732.11 | 28. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3025.03 | 756.75 | 9. | 19. | 0.007 | 76.12 | 1.695s |
| TL-208 | 3051.25 | 763.30 | 6. | 3. | 0.001 | 222.07 | 1.701D |
| BI-214 | 3071.48 | 768.36 | 6. | 16. | 0.006 | 66.67 | 1.705D |
| EU-152 | 3112.88 | 778.70 | 22. | 2. | 0.001 | 740.81 | 1.715s |
| BI-212 | 3142.20 | 786.03 | 36. | -8. | -0.003 | 297.07 | 1.721s |
| PA-234 | 3228.05 | 807.48 | 22. | 2. | 0.001 | 740.81 | 1.742s |
| PA-234 | 3322.25 | 831.02 | 14. | 12. | 0.004 | 143.47 | 1.762s |
| TL-208 | 3439.21 | 860.25 | 11. | 10. | 0.004 | 144.69 | 1.789s |
| EU-154 | 3494.05 | 873.95 | 12. | 8. | 0.003 | 193.65 | 1.800s |
| PA-234 | 3524.74 | 881.62 | 35. | 0. | 0.000 | 2000.00 | 1.807s |
| PA-234 | 3530.27 | 883.00 | 14. | 18. | 0.007 | 93.66 | 1.809s |
| PA-234 | 3595.59 | 899.33 | 30. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.00 | 911.17 | 4. | 41. | 0.015 | 36.43 | 0.720s |
| PA-234 | 3703.65 | 926.33 | 26. | 0. | 0.000 | 2000.00 | 1.848s |
| BI-214 | 3735.25 | 934.22 | 30. | 0. | 0.000 | 2000.00 | 1.854s |
| PA-234 | 3786.50 | 947.03 | 29. | -5. | -0.002 | 434.70 | 1.864s |
| PA-234 | 3795.67 | 949.32 | 17. | 7. | 0.003 | 237.04 | 1.867s |
| EU-152 | 3854.57 | 964.04 | 28. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 8. | 17. | 0.006 | 67.20 | 1.880D |
| Ra-228 | 3874.04 | 968.90 | 24. | 18. | 0.007 | 93.81 | 1.884D |
| EU-154 | 3984.98 | 996.62 | 5. | 14. | 0.005 | 85.55 | 1.908s |
| EU-154 | 4017.35 | 1004.71 | 16. | 0. | 0.000 | 2000.00 | 1.915s |
| EU-152 | 4341.55 | 1085.70 | 27. | 0. | 0.000 | 2000.00 | 1.984s |
| EU-152 | 4451.50 | 1113.17 | 44. | 0. | 0.000 | 2000.00 | 2.006s |
| BI-214 | 4481.37 | 1120.63 | 38. | -4. | -0.001 | 742.97 | 2.013s |
| CO-60 | 4690.83 | 1172.95 | 29. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4953.88 | 1238.66 | 33. | 5. | 0.002 | 484.81 | 2.108 |
| EU-154 | 5093.78 | 1273.61 | 29. | -7. | -0.003 | 328.33 | 2.137s |
| CO-60 | 5327.79 | 1332.05 | 12. | 1. | 0.000 | 1100.57 | 2.183s |
| BI-214 | 5509.36 | 1377.40 | 8. | 10. | 0.004 | 124.99 | 2.217s |
| PA-234 | 5576.05 | 1394.05 | 6. | 7. | 0.002 | 182.31 | 2.230s |
| EU-152 | 5633.89 | 1408.50 | 20. | 0. | 0.000 | 2000.00 | 2.240s |
| K-40 | 5844.69 | 1461.14 | 1. | 315. | 0.117 | 11.36 | 2.279s |
| BI-212 | 6489.50 | 1622.15 | 13. | 0. | 0.000 | 2000.00 | 2.394s |
| BI-214 | 7059.47 | 1764.44 | 1. | 16. | 0.006 | 56.08 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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Spectrum name: ARS08324.An1

***** SUMMARY OF LIBRARY PEAK USAGE *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 7.0305E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 3.114E-02 | } | 4.142E-02 | 4.09E+01 | 5.72E+01 G K |
| | | | 143.76 | 3.189E-02 | (P | 2.321E-01 | 2.14E+02 | 1.05E+01 G |
| | | | 205.31 | 3.519E-02 | (P | 5.416E-01 | 4.50E+02 | 4.70E+00 G |
| | | | 163.35 | 1.912E-01 | &(P | 5.220E-01 | 9.79E+01 | 4.70E+00 G |
| Ra-228 | | 2.5676E-01 | | | | 2.10E+03 | | |
| | | | 911.07 | 2.643E-01 | ( | 8.126E-02 | 1.82E+01 | 2.90E+01 G |
| | | | 968.90 | 2.001E-01 | (P | 2.904E-01 | 4.69E+01 | 1.75E+01 G |
| | | | 338.40 | 3.210E-01 | ?( | 2.371E-01 | 2.98E+01 | 1.20E+01 G |
| | | | 964.60 | 6.164E-01 | + | 5.712E-01 | 3.36E+01 | 5.45E+00 G |
| Am-241 | T | 3.7651E-02 | | | | 1.58E+05 | | |
| | | | 59.54 | 3.765E-02 | ?(P | 8.487E-02 | 7.87E+01 | 3.59E+01 G K |
| PB-210 | | 6.0923E-02 | | | | 7.45E+03 | | |
| | | | 46.52 | 6.092E-02 | (P | 8.941E-01 | 4.21E+02 | 4.00E+00 G |
| U-238 | | 3.6116E-01 | | | | 1.63E+12 | | |
| | | | 63.29 | 2.088E-01 | ?(P | 8.273E-01 | 1.36E+02 | 3.90E+00 G |
| | | | 92.80 | 6.532E-01 | (P | 8.652E-01 | 4.73E+01 | 3.00E+00 G |
| | | | 92.38 | 2.515E-01 | (P | 1.151E+00 | 1.57E+02 | 2.57E+00 G |
| K-40 | | 8.0390E+00 | | | | 4.68E+11 | | |
| | | | 1460.75 | 8.039E+00 | ?(P | 2.095E-01 | 5.68E+00 | 1.07E+01 G |
| PB-214 | | 2.9970E-01 | | | | 5.84E+05 | | |
| | | | 351.92 | 2.615E-01 | (P | 7.760E-02 | 1.32E+01 | 3.58E+01 G |
| | | | 295.21 | 3.378E-01 | ( | 1.430E-01 | 1.78E+01 | 1.85E+01 G |
| | | | 241.98 | 3.883E-01 | (P | 3.224E-01 | 2.87E+01 | 7.50E+00 G |
| BI-214 | | 2.8981E-01 | | | | 5.84E+05 | | |
| | | | 609.31 | 2.734E-01 | (P | 8.233E-02 | 1.38E+01 | 4.48E+01 G |
| | | | 1764.49 | 3.376E-01 | ?(P | 1.589E-01 | 2.80E+01 | 1.54E+01 G |
| | | | 1120.29 | -5.209E-02 | & | 4.706E-01 | 3.71E+02 | 1.48E+01 G |
| | | | 1238.11 | 2.033E-01 | - | 1.199E+00 | 2.42E+02 | 5.86E+00 G |
| | | | 768.36 | 5.626E-01 | + | 5.057E-01 | 3.33E+01 | 4.80E+00 G |
| | | | 1377.67 | 6.839E-01 | & P | 1.037E+00 | 6.25E+01 | 3.92E+00 G |
| | | | 934.06 | 0.000E+00 | - P | 1.785E+00 | 1.00E+03 | 3.03E+00 G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:09:09 AM
Spectrum name: ARS08324.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| BI-212 | 2.5212E-01 | | | | 2.10E+03 | |
| | | 727.17 | 2.521E-01 | ( | 2.703E-01 4.47E+01 1.18E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 2.129E+00 1.00E+03 2.75E+00 | G |
| | | 785.42 | -6.790E-01 | - | 2.603E+00 1.49E+02 2.00E+00 | G |
| PB-212 | 3.1694E-01 | | | | 2.10E+03 | |
| | | 238.63 | 3.169E-01 | (P | 5.088E-02 8.67E+00 4.31E+01 | G |
| | | 300.09 | -4.358E-01 | - | 1.176E+00 9.89E+01 3.27E+00 | G |
| TL-208 | 1.2453E-01 | | | | 2.10E+03 | |
| | | 583.14 | 1.206E-01 | ( | 4.080E-02 1.78E+01 8.60E+01 | G |
| | | 510.72 | 2.126E-01 | + P | 3.254E-01 5.90E+01 2.25E+01 | G |
| | | 860.47 | 1.529E-01 | ?(P | 2.729E-01 7.23E+01 1.20E+01 | G |
| | | 277.36 | 0.000E+00 | - P | 5.359E-01 1.00E+03 6.50E+00 | G |
| | | 763.30 | 3.364E-01 | + | 1.341E+00 1.11E+02 1.70E+00 | G |
| PA-234 | 1.6019E-01 | | | | 1.65E+12 | |
| | | 98.44 | 2.068E-02 | ?( | 9.460E-02 1.55E+02 2.51E+01 | G |
| | | 946.00 | -4.850E-02 | + | 2.697E-01 2.17E+02 2.00E+01 | G |
| | | 131.28 | -1.133E-02 | + | 1.222E-01 3.61E+02 2.00E+01 | G |
| | | 94.67 | -5.475E-02 | + | 1.913E-01 1.20E+02 1.55E+01 | G |
| | | 883.24 | 2.845E-01 | ?( | 3.146E-01 4.68E+01 1.20E+01 | G |
| | | 926.70 | 0.000E+00 | - P | 4.572E-01 1.00E+03 1.10E+01 | G |
| | | 569.26 | 0.000E+00 | & P | 4.174E-01 1.00E+03 1.04E+01 | G |
| | | 111.00 | 0.000E+00 | & P | 3.016E-01 1.00E+03 8.55E+00 | G |
| | | 733.00 | 0.000E+00 | - P | 5.202E-01 1.00E+03 8.50E+00 | G |
| | | 949.00 | 1.766E-01 | ?(P | 5.453E-01 1.19E+02 7.80E+00 | G |
| | | 880.51 | 0.000E+00 | - P | 8.561E-01 1.00E+03 6.50E+00 | G |
| | | 226.87 | 0.000E+00 | - P | 4.272E-01 1.00E+03 6.50E+00 | G |
| | | 831.10 | 3.629E-01 | &( | 6.454E-01 7.17E+01 5.60E+00 | G |
| | | 808.10 | 8.838E-02 | ?( | 8.772E-01 3.70E+02 4.90E+00 | G |
| | | 99.70 | -1.235E-01 | + | 5.748E-01 1.58E+02 4.70E+00 | G |
| | | 699.10 | -1.700E-01 | & | 1.155E+00 2.62E+02 4.60E+00 | G |
| | | 898.60 | 0.000E+00 | - P | 1.324E+00 1.00E+03 4.00E+00 | G |
| | | 1394.10 | 4.418E-01 | ?(P | 9.790E-01 9.12E+01 3.90E+00 | G |
| CS-137 | 3.6620E-02 | | | | 1.10E+04 | |
| | | 661.66 | 3.662E-02 | &(P | 3.901E-02 4.40E+01 8.52E+01 | G |
| CO-60 | 1.6870E-03 | | | | 1.93E+03 | |
| | | 1173.24 | 0.000E+00 | &(P | 6.383E-02 1.00E+03 9.99E+01 | K |
| | | 1332.50 | 3.373E-03 | ?( | 4.712E-02 5.50E+02 1.00E+02 | K |
| EU-152 | 2.6338E-02 | | | | 4.64E+03 | |
| | | 40.12 | -7.835E-03 | &( | 1.578E-01 6.41E+02 3.00E+01 | G |
| | | 121.78 | 6.410E-03 | &( | 7.080E-02 3.66E+02 2.92E+01 | G |
| | | 344.30 | 0.000E+00 | + P | 1.386E-01 1.00E+03 2.70E+01 | G |

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Spectrum name: ARS08324.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1408.08 | 0.000E+00 | + P | 2.920E-01 | 1.00E+03 | 2.12E+01 G |
| | | 39.52 | -4.114E-02 | + | 3.171E-01 | 2.48E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | + P | 3.664E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 0.000E+00 | + | 5.421E-01 | 1.00E+03 | 1.36E+01 G |
| | | 778.90 | 3.248E-02 | ?( | 3.224E-01 | 3.70E+02 | 1.30E+01 G |
| | | 1085.80 | 0.000E+00 | - P | 5.643E-01 | 1.00E+03 | 1.03E+01 G |
| | | 45.40 | 1.962E-01 | &(P | 3.440E-01 | 6.11E+01 | 9.00E+00 G |
| | | 244.67 | 2.625E-02 | &( | 3.321E-01 | 4.30E+02 | 7.62E+00 G |
| | | 867.39 | -2.181E-02 | % | 8.924E-01 | 1.51E+03 | 4.18E+00 G |
| EU-154 | 1.1850E-01 | | | | | 3.10E+03 | |
| | | 123.10 | 1.546E-02 | ?(P | 5.276E-02 | 1.17E+02 | 4.05E+01 G |
| | | 1274.80 | -4.923E-02 | & | 1.915E-01 | 1.64E+02 | 3.55E+01 G |
| | | 723.30 | 0.000E+00 | - | 2.494E-01 | 1.00E+03 | 1.97E+01 G |
| | | 1004.80 | 0.000E+00 | - P | 2.452E-01 | 1.00E+03 | 1.76E+01 G |
| | | 43.00 | -7.020E-02 | + | 3.590E-01 | 1.73E+02 | 1.31E+01 G |
| | | 873.20 | 1.222E-01 | &(P | 3.103E-01 | 9.68E+01 | 1.13E+01 G |
| | | 996.30 | 2.606E-01 | ?( | 2.506E-01 | 4.28E+01 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | - P | 6.465E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | 7.451E-02 | &( | 3.992E-01 | 1.85E+02 | 6.60E+00 G |
| | | 591.70 | 0.000E+00 | - P | 9.004E-01 | 1.00E+03 | 4.60E+00 G |
| | | 48.70 | 1.760E-01 | ?(P | 5.970E-01 | 1.14E+02 | 4.20E+00 G |
| | | 756.70 | 7.663E-01 | ?( | 6.732E-01 | 3.81E+01 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |

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Spectrum name: ARS08324.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*************** D I S C A R D E D I S O T O P E P E A K S ***************

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.24 | 72. | -6. | -0.002 | 496.93 | -4.114E-02 | |
| EU-152 | 40.36 | 65. | -2. | -0.001 | 1282.58 | -7.835E-03 | |
| EU-154 | 43.49 | 76. | -8. | -0.003 | 345.05 | -7.020E-02 | |
| EU-152 | 45.26 | 36. | 17. | 0.006 | 122.28 | 1.962E-01 | P |
| EU-154 | 48.72 | 27. | 8. | 0.003 | 228.05 | 1.760E-01 | P |
| Am-241 | 59.45 | 69. | 18. | 0.007 | 157.30 | 3.765E-02 | P |
| U-238 | 63.72 | 88. | 12. | 0.004 | 272.45 | 2.088E-01 | P |
| U-238 | 92.38 | 122. | 12. | 0.004 | 314.05 | 2.515E-01 | P |
| U-238 | 92.50 | 93. | 36. | 0.013 | 94.69 | 6.532E-01 | P |
| PA-234 | 93.78 | 125. | -16. | -0.006 | 239.60 | -5.475E-02 | |
| PA-234 | 98.15 | 79. | 10. | 0.004 | 309.56 | 2.068E-02 | |
| PA-234 | 99.54 | 105. | -11. | -0.004 | 316.49 | -1.235E-01 | |
| EU-152 | 122.21 | 60. | 4. | 0.001 | 732.12 | 6.410E-03 | |
| EU-154 | 123.06 | 63. | 12. | 0.004 | 234.32 | 1.546E-02 | P |
| PA-234 | 130.44 | 82. | -4. | -0.002 | 721.63 | -1.133E-02 | |
| EU-152 | 244.60 | 44. | 3. | 0.001 | 859.18 | 2.625E-02 | |
| EU-154 | 248.06 | 48. | 6. | 0.002 | 369.55 | 7.451E-02 | |
| CS-137 | 661.33 | 17. | 21. | 0.008 | 88.08 | 3.662E-02 | P |
| PA-234 | 699.47 | 45. | -5. | -0.002 | 523.83 | -1.700E-01 | |
| BI-212 | 727.27 | 14. | 18. | 0.007 | 89.44 | 2.521E-01 | |
| EU-154 | 756.75 | 9. | 19. | 0.007 | 76.12 | 7.663E-01 | |
| EU-152 | 778.70 | 22. | 2. | 0.001 | 740.81 | 3.248E-02 | |
| BI-212 | 786.03 | 36. | -8. | -0.003 | 297.07 | -6.790E-01 | |
| PA-234 | 807.48 | 22. | 2. | 0.001 | 740.81 | 8.838E-02 | |
| PA-234 | 831.02 | 14. | 12. | 0.004 | 143.47 | 3.629E-01 | |
| EU-154 | 873.95 | 12. | 8. | 0.003 | 193.65 | 1.222E-01 | P |
| PA-234 | 883.00 | 14. | 18. | 0.007 | 93.66 | 2.845E-01 | |
| PA-234 | 947.03 | 29. | -5. | -0.002 | 434.70 | -4.850E-02 | |
| PA-234 | 949.32 | 17. | 7. | 0.003 | 237.04 | 1.766E-01 | P |
| EU-154 | 996.62 | 5. | 14. | 0.005 | 85.55 | 2.606E-01 | |
| EU-154 | 1273.61 | 29. | -7. | -0.003 | 328.33 | -4.923E-02 | |
| CO-60 | 1332.05 | 12. | 1. | 0.000 | 1100.57 | 3.373E-03 | |
| PA-234 | 1394.05 | 6. | 7. | 0.002 | 182.31 | 4.418E-01 | P |

P - Peakbackground subtraction

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Spectrum name: ARS08324.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 7.0305E-02 | 1.3771E-01 | 1.3779E-01 | 0.232E+00 |
| RA-226 | #B | 0.0000E+00 | 4.6583E-01 | 4.6583E-01 | 0.814E+00 |
| Ra-228 | | 2.5676E-01 | 9.3530E-02 | 9.5046E-02 | 0.813E-01 |
| Am-241 | #A | 3.7651E-02 | 5.9225E-02 | 5.9279E-02 | 0.849E-01 |
| PB-210 | A | 6.0923E-02 | 5.1279E-01 | 5.1283E-01 | 0.894E+00 |
| U-238 | #A | 3.6116E-01 | 3.4197E-01 | 3.4316E-01 | 0.827E+00 |
| K-40 | # | 8.0390E+00 | 9.1297E-01 | 1.0593E+00 | 0.210E+00 |
| PB-214 | | 2.9970E-01 | 7.2417E-02 | 7.6794E-02 | 0.776E-01 |
| BI-214 | | 2.8981E-01 | 7.9883E-02 | 8.1901E-02 | 0.823E-01 |
| BI-212 | #A | 2.5212E-01 | 2.2550E-01 | 2.2611E-01 | 0.270E+00 |
| PB-212 | | 3.1694E-01 | 5.4966E-02 | 5.9557E-02 | 0.509E-01 |
| TL-208 | | 1.2453E-01 | 4.4424E-02 | 4.5159E-02 | 0.408E-01 |
| PA-234 | #C | 1.6019E-01 | 1.5003E-01 | 1.5049E-01 | 0.946E-01 |
| CS-137 | #A | 3.6620E-02 | 3.2254E-02 | 3.2295E-02 | 0.390E-01 |
| CO-60 | #A | 1.6870E-03 | 1.8567E-02 | 1.8567E-02 | 0.638E-01 |
| EU-152 | #A | 2.6338E-02 | 3.2207E-02 | 3.2344E-02 | 0.158E+00 |
| EU-154 | #C | 1.1850E-01 | 9.0209E-02 | 9.0579E-02 | 0.528E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 1.288E+00 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-16 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00670-032 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00670 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 032 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 4.4076E-02 | pCi/g | 3.3110E-02 | 2.6800E-01 | 1.3400E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 5.4931E-01 | 1.0800E+00 | 5.4000E-01 | | | |
| **RA-228** | 1.5716E-01 | pCi/g | 1.3580E-01 | 2.3300E-01 | 1.1650E-01 | | | |
| **AM-241** | 5.2120E-02 | pCi/g | 5.8795E-02 | 9.5500E-02 | 4.7750E-02 | | | |
| **PB-210** | -7.5331E-01 | pCi/g | 3.0133E+01 | 1.5900E+00 | 7.9500E-01 | | | |
| **U-238** | 3.7161E-01 | pCi/g | 4.4541E-01 | 1.1500E+00 | 5.7500E-01 | | | |
| **K-40** | 4.4220E+00 | pCi/g | 1.1500E+00 | 1.1600E+00 | 5.8000E-01 | | | |
| **PB-214** | 2.8462E-01 | pCi/g | 1.0782E-01 | 1.2100E-01 | 6.0500E-02 | | | |
| **BI-214** | 2.6769E-01 | pCi/g | 1.1387E-01 | 1.1500E-01 | 5.7500E-02 | | | |
| **BI-212** | 1.3205E-01 | pCi/g | 2.4905E-01 | 4.3800E-01 | 2.1900E-01 | | | |
| **PB-212** | 1.7957E-01 | pCi/g | 7.5333E-02 | 1.1000E-01 | 5.5000E-02 | | | |
| **TL-208** | 6.5156E-02 | pCi/g | 4.2502E-02 | 5.8200E-02 | 2.9100E-02 | | | |
| **PA-234** | 4.8071E-02 | pCi/g | 4.7948E-02 | 1.2700E-01 | 6.3500E-02 | | | |
| **CS-137** | 1.0529E-02 | pCi/g | 2.8855E-02 | 5.2400E-02 | 2.6200E-02 | | | |
| **CO-60** | -4.2310E-03 | pCi/g | 1.6924E-01 | 3.0500E-02 | 1.5250E-02 | | | |
| **EU-152** | 1.5881E-02 | pCi/g | 3.0552E-02 | 2.1400E-01 | 1.0700E-01 | | | |
| **EU-154** | 4.3243E-02 | pCi/g | 6.7949E-02 | 6.6300E-02 | 3.3150E-02 | | | |
| **Total Gamma** | 6.0938E+00 | pCi/g | | | | | | |
| **Total NORM Activity** | 1.6888E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 11:51:21
American Radiation Services     Spectrum name: ARS05255.An1

Sample description
     Batch ID:  16-00564-16
     SDG:  ARS1-16-00670-032  Tech:  WJS

Spectrum Filename: C:\User\ARS05255.An1

Acquisition information
       Start time:                4/19/2016 11:21:18
       Live time:               1800
       Real time:               1801
       Dead time:                  0.06 %
       Detector ID:                   2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.4378E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.4378E+02) =
                                  2.9088E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 11:51:21
American Radiation Services Spectrum name: ARS05255.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0974

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 41.05 | 8. | 78.49 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.43 | 3. | 299.52 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | 5.799E-02 | EU152 |
| 59.05 | 16. | 56.31 | 0.77 | 3.751E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.42 | 9. | 57.19 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.76 | 50. | 24.34 | 0.79 | 4.754E-02 | | | | |
| 77.13 | 67. | 18.36 | 0.79 | 4.856E-02 | | | | |
| 92.38 | 11. | 107.05 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.80 | 13. | 71.59 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.68 | 16. | 58.44 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 111.42 | 17. | 49.73 | 0.85 | 5.184E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 123.69 | 7. | 127.63 | 0.87 | 5.046E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 129.52 | 11. | 65.91 | 0.88 | 4.930E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 144.36 | 0. | 436.10 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 160.80 | 0. | 258.43 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.18 | 24. | 37.52 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| 226.83 | 7. | 116.07 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.75 | 69. | 19.56 | 0.86 | 3.535E-02 | 238.63 | 43.100 | 1.687E-01 | PB212 |
| 245.98 | 7. | 121.92 | 1.06 | 3.480E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.078E-01 | EU152 |
| 277.71 | 2. | 242.74 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.53 | 21. | 37.02 | 0.82 | 3.087E-02 | 295.21 | 18.500 | PBC<MDA | PB214 |
| 300.29 | 3. | 178.26 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.52 | 9. | 80.80 | 1.20 | 2.826E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 351.86 | 64. | 16.14 | 0.73 | 2.755E-02 | 351.92 | 35.800 | 2.846E-01 | PB214 |
| 511.05 | 31. | 18.49 | 1.55 | 2.149E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.42 | 23. | 27.89 | 1.53 | 1.957E-02 | 583.14 | 86.000 | 5.939E-02 | TL208 |
| 592.19 | 1. | 723.59 | 1.54 | 1.936E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.29 | 46. | 18.14 | 0.71 | 1.895E-02 | 609.31 | 44.791 | 2.370E-01 | BI214 |

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| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 660.42 | 4. | 115.91 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.68 | 6. | 77.97 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 767.07 | 7. | 74.36 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 860.52 | 5. | 105.38 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.83 | 1. | 806.01 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.74 | 15. | 35.45 | 1.89 | 1.368E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 946.54 | 2. | 277.99 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 965.23 | 4. | 159.01 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.595E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 8.124E-02 | EU152 |
| 965.28 | 4. | 145.47 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 969.47 | 7. | 79.28 | 1.94 | 1.292E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1120.79 | 12. | 46.36 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1237.97 | 3. | 159.19 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1461.39 | 89. | 11.21 | 2.31 | 8.224E-03 | 1460.75 | 10.700 | 4.422E+00 | K40 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.56 | 74.74 | 55. | 46. | 0.025 | 56.47 | 0.382 | PB-212 | s |
| 308.04 | 77.11 | 50. | 64. | 0.036 | 40.24 | 0.428 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 160.34 | 40.21 | 38. | -5. | -0.003 | 349.98 | 0.750s |
| EU-152 | 160.08 | 40.14 | 43. | -8. | -0.005 | 231.01 | 0.750s |
| EU-154 | 163.71 | 41.05 | 16. | 8. | 0.004 | 156.99 | 0.750s |
| EU-154 | 171.46 | 42.98 | 45. | -4. | -0.002 | 538.89 | 0.750s |
| EU-152 | 181.26 | 45.43 | 44. | 3. | 0.002 | 599.05 | 0.750s |
| EU-154 | 194.33 | 48.70 | 68. | 0. | 0.000 | 2000.00 | 0.750s |
| Am-241 | 235.78 | 59.05 | 33. | 16. | 0.009 | 112.62 | 0.766s |
| U-238 | 253.26 | 63.42 | 69. | 9. | 0.005 | 114.39 | 0.772s |
| U-238 | 369.17 | 92.38 | 79. | 11. | 0.006 | 214.10 | 0.820D |
| U-238 | 370.85 | 92.80 | 63. | 13. | 0.007 | 143.19 | 0.821D |
| PA-234 | 379.95 | 95.07 | 61. | -5. | -0.003 | 422.71 | 0.824s |
| PA-234 | 392.51 | 98.21 | 58. | -10. | -0.005 | 259.93 | 0.830s |

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American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 398.37 | 99.68 | 34. | 16. | 0.009 | 116.87 | 0.832s |
| PA-234 | 445.36 | 111.42 | 26. | 17. | 0.009 | 99.47 | 0.850 |
| EU-152 | 486.79 | 121.77 | 51. | -6. | -0.003 | 335.71 | 0.868s |
| EU-154 | 494.49 | 123.69 | 37. | 7. | 0.004 | 255.27 | 0.870s |
| PA-234 | 517.82 | 129.52 | 31. | 11. | 0.006 | 131.83 | 0.883s |
| U-235 | 742.77 | 185.72 | 47. | 24. | 0.013 | 75.04 | 0.969D |
| RA-226 | 744.73 | 186.21 | 54. | 0. | 0.000 | 2000.00 | 0.970D |
| U-235 | 820.02 | 205.02 | 54. | -8. | -0.004 | 336.63 | 1.000s |
| PA-234 | 907.32 | 226.83 | 31. | 7. | 0.004 | 232.15 | 1.033s |
| PB-212 | 955.05 | 238.75 | 59. | 64. | 0.035 | 35.48 | 1.051 |
| PB-214 | 960.71 | 240.17 | 74. | -10. | -0.006 | 259.12 | 1.056s |
| EU-152 | 983.98 | 245.98 | 29. | 7. | 0.004 | 243.84 | 1.060s |
| EU-154 | 988.96 | 247.23 | 32. | -4. | -0.002 | 400.62 | 1.065s |
| TL-208 | 1110.98 | 277.71 | 32. | 2. | 0.001 | 485.47 | 1.109 |
| PB-214 | 1182.31 | 295.53 | 32. | 21. | 0.012 | 74.04 | 0.824s |
| PB-212 | 1201.34 | 300.29 | 31. | 3. | 0.002 | 356.52 | 1.142s |
| Ra-228 | 1354.37 | 338.52 | 30. | 9. | 0.005 | 161.60 | 1.198 |
| EU-152 | 1372.03 | 342.93 | 28. | -7. | -0.004 | 214.96 | 1.206s |
| PB-214 | 1407.77 | 351.86 | 28. | 64. | 0.036 | 32.28 | 0.729s |
| TL-208 | 2044.98 | 511.05 | 48. | 31. | 0.017 | 36.97 | 1.545 |
| PA-234 | 2280.11 | 569.79 | 19. | -3. | -0.002 | 1007.90 | 1.509s |
| TL-208 | 2334.67 | 583.42 | 18. | 23. | 0.013 | 55.78 | 1.526s |
| EU-154 | 2369.78 | 592.19 | 24. | 1. | 0.001 | 1447.18 | 1.536s |
| BI-214 | 2438.23 | 609.29 | 18. | 46. | 0.026 | 36.29 | 0.713s |
| CS-137 | 2642.88 | 660.42 | 11. | 4. | 0.002 | 231.82 | 1.621s |
| PA-234 | 2792.20 | 697.72 | 26. | -5. | -0.003 | 304.76 | 1.664s |
| EU-154 | 2894.58 | 723.30 | 38. | 0. | 0.000 | 2000.00 | 1.692s |
| BI-212 | 2912.11 | 727.68 | 13. | 6. | 0.003 | 155.93 | 1.696s |
| PA-234 | 2934.65 | 733.31 | 18. | -3. | -0.002 | 374.01 | 1.703s |
| EU-154 | 3032.37 | 757.72 | 20. | -6. | -0.003 | 246.71 | 1.729s |
| TL-208 | 3054.70 | 763.30 | 25. | 0. | 0.000 | 2000.00 | 1.737 |
| BI-214 | 3069.81 | 767.07 | 13. | 7. | 0.004 | 148.71 | 1.742 |
| EU-152 | 3117.15 | 778.90 | 9. | 0. | 0.000 | 2000.00 | 1.753s |
| PA-234 | 3232.02 | 807.60 | 19. | -2. | -0.001 | 597.60 | 1.785s |
| PA-234 | 3324.25 | 830.64 | 25. | -5. | -0.003 | 281.19 | 1.809s |
| TL-208 | 3443.87 | 860.52 | 13. | 5. | 0.003 | 210.76 | 1.839s |
| EU-154 | 3492.24 | 872.60 | 19. | -5. | -0.003 | 321.15 | 1.852s |
| PA-234 | 3525.17 | 880.83 | 11. | 1. | 0.000 | 1612.03 | 1.860s |
| Ra-228 | 3648.90 | 911.74 | 16. | 15. | 0.008 | 70.89 | 1.890s |
| BI-214 | 3737.98 | 933.99 | 16. | -1. | -0.001 | 1254.08 | 1.912s |
| PA-234 | 3788.21 | 946.54 | 10. | 2. | 0.001 | 555.98 | 1.923s |
| EU-152 | 3863.23 | 965.28 | 19. | 4. | 0.002 | 290.95 | 1.940s |
| Ra-228 | 3863.02 | 965.23 | 20. | 4. | 0.002 | 318.02 | 1.941s |
| Ra-228 | 3880.02 | 969.47 | 16. | 7. | 0.004 | 158.57 | 1.945 |
| EU-154 | 3987.91 | 996.42 | 20. | -3. | -0.002 | 451.69 | 1.970s |
| EU-154 | 4020.76 | 1004.63 | 19. | -3. | -0.002 | 412.78 | 1.978s |
| EU-152 | 4345.68 | 1085.80 | 0. | 0. | 0.000 | 2000.00 | 2.048s |
| EU-152 | 4450.85 | 1112.07 | 0. | 0. | 0.000 | 2000.00 | 2.070s |

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American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 4485.77 | 1120.79 | 10. | 12. | 0.007 | 92.71 | 2.077s |
| BI-214 | 4954.86 | 1237.97 | 16. | 3. | 0.002 | 318.38 | 2.167 |
| EU-154 | 5096.11 | 1273.26 | 14. | -4. | -0.002 | 284.94 | 2.192s |
| CO-60 | 5336.57 | 1333.32 | 11. | -2. | -0.001 | 506.41 | 2.231s |
| BI-214 | 5514.10 | 1377.67 | 33. | 0. | 0.000 | 2000.00 | 2.259 |
| K-40 | 5849.28 | 1461.39 | 20. | 89. | 0.049 | 22.41 | 2.306s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 4.4076E-02 | | | | | |
| | | | 185.72 | 4.408E-02 | } P | 6.397E-02 3.75E+01 G K | |
| | | | 143.76 | 7.581E-04 | %(P | 2.679E-01 4.36E+02 G | |
| | | | 205.31 | -1.895E-01 | + P | 8.846E-01 1.68E+02 G | |
| | | | 163.35 | 1.538E-03 | & P | 5.005E-01 2.58E+02 G | |
| RA-226 | | 0.0000E+00 | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 1.079E+00 1.00E+03 G K | |
| Ra-228 | | 1.5716E-01 | | | | | |
| | | | 911.07 | 1.684E-01 | ?(P | 2.333E-01 3.54E+01 G | |
| | | | 968.90 | 1.336E-01 | (P | 4.121E-01 7.93E+01 G | |
| | | | 338.40 | 1.176E-01 | (P | 3.630E-01 8.08E+01 G | |
| | | | 964.60 | 2.595E-01 | ?( | 1.462E+00 1.59E+02 G | |
| Am-241 | T | 5.2120E-02 | | | | | |
| | | | 59.54 | 5.212E-02 | ?( | 9.549E-02 5.63E+01 G K | |
| PB-210 | | -7.5331E-01 | | | | | |
| | | | 46.52 | -7.533E-01 | &(P | 1.585E+00 1.00E+03 G | |
| U-238 | | 3.7161E-01 | | | | | |
| | | | 63.29 | 2.409E-01 | ?(P | 1.145E+00 5.72E+01 G | |
| | | | 92.80 | 3.716E-01 | } P | 1.106E+00 7.16E+01 G | |
| | | | 92.38 | 3.716E-01 | } P | 1.437E+00 1.07E+02 G | |
| K-40 | | 4.4220E+00 | | | | | |
| | | | 1460.75 | 4.422E+00 | (P | 1.158E+00 1.12E+01 G | |

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American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-214 | 2.8462E-01 | | | | | | |
| | | 351.92 | 2.846E-01 | (P | 1.206E-01 | 1.61E+01 | G |
| | | 295.21 | 1.593E-01 | - P | 2.229E-01 | 3.70E+01 | G |
| | | 241.98 | -1.673E-01 | - P | 7.128E-01 | 1.30E+02 | G |
| BI-214 | 2.6769E-01 | | | | | | |
| | | 609.31 | 2.370E-01 | (P | 1.155E-01 | 1.81E+01 | G |
| | | 1764.49 | -7.416E-02 | % P | 3.913E-01 | 1.00E+03 | G |
| | | 1120.29 | 3.206E-01 | ?( | 4.563E-01 | 4.64E+01 | G |
| | | 1238.11 | 2.411E-01 | (P | 1.584E+00 | 1.59E+02 | G |
| | | 768.36 | 4.235E-01 | (P | 1.107E+00 | 7.44E+01 | G |
| | | 1377.67 | 0.000E+00 | - | 3.688E+00 | 1.00E+03 | G |
| | | 934.06 | -9.991E-02 | - | 2.328E+00 | 6.27E+02 | G |
| BI-212 | 1.3205E-01 | | | | | | |
| | | 727.17 | 1.321E-01 | ?(P | 4.384E-01 | 7.80E+01 | G |
| | | 1620.56 | -1.963E-02 | % P | 1.637E+00 | 1.00E+03 | G |
| | | 785.42 | -1.288E-02 | % P | 3.263E+00 | 6.96E+03 | G |
| PB-212 | 1.7957E-01 | | | | | | |
| | | 238.63 | 1.828E-01 | ?(P | 1.100E-01 | 1.77E+01 | G |
| | | 300.09 | 1.370E-01 | &(P | 1.247E+00 | 1.78E+02 | G |
| TL-208 | 6.5156E-02 | | | | | | |
| | | 583.14 | 5.939E-02 | ?(P | 5.816E-02 | 2.79E+01 | G |
| | | 510.72 | 2.803E-01 | + P | 3.160E-01 | 1.85E+01 | G |
| | | 860.47 | 1.187E-01 | ?(P | 4.932E-01 | 1.05E+02 | G |
| | | 277.36 | 4.256E-02 | (P | 6.045E-01 | 2.43E+02 | G |
| | | 763.30 | 0.000E+00 | - | 4.180E+00 | 1.00E+03 | G |
| PA-234 | 4.8071E-02 | | | | | | |
| | | 98.44 | -3.209E-02 | ?(P | 1.268E-01 | 1.30E+02 | G |
| | | 946.00 | 2.720E-02 | ?( | 2.839E-01 | 2.78E+02 | G |
| | | 131.28 | 4.750E-02 | ?(P | 1.262E-01 | 6.59E+01 | G |
| | | 94.67 | -2.876E-02 | + | 2.106E-01 | 2.11E+02 | G |
| | | 883.24 | -6.012E-03 | % P | 1.907E-01 | 1.00E+03 | G |
| | | 926.70 | 7.456E-03 | % | 5.088E-01 | 1.76E+03 | G |
| | | 569.26 | -6.158E-02 | & P | 4.897E-01 | 5.04E+02 | G |
| | | 111.00 | 1.644E-01 | ?( | 2.612E-01 | 4.97E+01 | G |
| | | 733.00 | -1.039E-01 | + | 6.965E-01 | 1.87E+02 | G |
| | | 949.00 | -1.774E-02 | % P | 3.132E-01 | 1.00E+03 | G |
| | | 880.51 | 2.811E-02 | ?(P | 8.751E-01 | 8.06E+02 | G |
| | | 226.87 | 1.255E-01 | (P | 5.295E-01 | 1.16E+02 | G |
| | | 831.10 | -2.780E-01 | + | 1.367E+00 | 1.41E+02 | G |
| | | 808.10 | -1.243E-01 | + | 1.350E+00 | 2.99E+02 | G |
| | | 99.70 | 2.763E-01 | ( | 5.276E-01 | 5.84E+01 | G |
| | | 699.10 | -2.818E-01 | + P | 1.470E+00 | 1.52E+02 | G |

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American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 898.60 | -5.801E-02 | % P | 1.406E+00 | 1.00E+03 | G |
| | | 1394.10 | 1.464E-02 | % | 2.134E+00 | 3.71E+03 | G |
| CS-137 | 1.0529E-02 | | | | | | |
| | | 661.66 | 1.053E-02 | ?(P | 5.241E-02 | 1.16E+02 | G |
| CO-60 | -4.2310E-03 | | | | | | |
| | | 1173.24 | -4.231E-03 | %(P | 3.054E-02 | 1.00E+03 | K |
| | | 1332.50 | -1.181E-02 | + P | 8.451E-02 | 2.53E+02 | K |
| EU-152 | 1.5881E-02 | | | | | | |
| | | 40.12 | -5.423E-02 | ?( | 2.144E-01 | 1.16E+02 | G |
| | | 121.78 | -1.825E-02 | + | 1.060E-01 | 1.68E+02 | G |
| | | 344.30 | -4.274E-02 | + | 1.579E-01 | 1.07E+02 | G |
| | | 1408.08 | 6.015E-03 | % | 3.599E-01 | 1.50E+03 | G |
| | | 39.52 | -6.343E-02 | + | 3.874E-01 | 1.75E+02 | G |
| | | 964.00 | 8.613E-02 | ?(P | 5.325E-01 | 1.45E+02 | G |
| | | 1112.07 | 0.000E+00 | + | 2.102E-01 | 1.00E+03 | G |
| | | 778.90 | 0.000E+00 | + | 3.527E-01 | 1.00E+03 | G |
| | | 1085.80 | 0.000E+00 | + | 2.707E-01 | 1.00E+03 | G |
| | | 45.40 | 5.799E-02 | ?( | 6.115E-01 | 3.00E+02 | G |
| | | 244.67 | 1.078E-01 | ?( | 4.549E-01 | 1.22E+02 | G |
| | | 867.39 | -3.630E-02 | % P | 5.393E-01 | 1.00E+03 | G |
| EU-154 | 4.3243E-02 | | | | | | |
| | | 123.10 | 1.507E-02 | &( | 6.633E-02 | 1.28E+02 | G |
| | | 1274.80 | -5.026E-02 | + | 2.552E-01 | 1.42E+02 | G |
| | | 723.30 | 0.000E+00 | - | 4.200E-01 | 1.00E+03 | G |
| | | 1004.80 | -6.947E-02 | + P | 4.611E-01 | 2.06E+02 | G |
| | | 43.00 | -4.805E-02 | + | 4.547E-01 | 2.69E+02 | G |
| | | 873.20 | -1.330E-01 | + P | 6.295E-01 | 1.61E+02 | G |
| | | 996.30 | -9.519E-02 | + | 7.722E-01 | 2.26E+02 | G |
| | | 42.31 | 1.971E-01 | ?( | 5.219E-01 | 7.85E+01 | G |
| | | 248.04 | -7.911E-02 | + | 5.581E-01 | 2.00E+02 | G |
| | | 591.70 | 4.696E-02 | &( | 1.241E+00 | 7.24E+02 | G |
| | | 48.70 | 0.000E+00 | - | 1.483E+00 | 1.00E+03 | G |
| | | 756.70 | -3.729E-01 | + P | 1.572E+00 | 1.23E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

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+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 4.4076E-02 | 3.2957E-02 | 3.3110E-02 | 0.268E+00 |
| RA-226 | #B | 0.0000E+00 | 5.4931E-01 | 5.4931E-01 | 0.108E+01 |
| Ra-228 | A | 1.5716E-01 | 1.3541E-01 | 1.3580E-01 | 0.233E+00 |
| Am-241 | #A | 5.2120E-02 | 5.8695E-02 | 5.8795E-02 | 0.955E-01 |
| PB-210 | #A | -7.5331E-01 | 3.0133E+01 | 3.0133E+01 | 0.159E+01 |
| U-238 | A | 3.7161E-01 | 4.4446E-01 | 4.4541E-01 | 0.115E+01 |
| K-40 | # | 4.4220E+00 | 1.0861E+00 | 1.1500E+00 | 0.116E+01 |
| PB-214 | | 2.8462E-01 | 1.0406E-01 | 1.0782E-01 | 0.121E+00 |
| BI-214 | | 2.6769E-01 | 1.1218E-01 | 1.1387E-01 | 0.115E+00 |
| BI-212 | #A | 1.3205E-01 | 2.4887E-01 | 2.4905E-01 | 0.438E+00 |
| PB-212 | # | 1.7957E-01 | 7.3645E-02 | 7.5333E-02 | 0.110E+00 |
| TL-208 | | 6.5156E-02 | 4.2210E-02 | 4.2502E-02 | 0.582E-01 |
| PA-234 | #A | 4.8071E-02 | 4.7814E-02 | 4.7948E-02 | 0.127E+00 |
| CS-137 | #A | 1.0529E-02 | 2.8849E-02 | 2.8855E-02 | 0.524E-01 |
| CO-60 | #B | -4.2310E-03 | 1.6924E-01 | 1.6924E-01 | 0.305E-01 |
| EU-152 | #A | 1.5881E-02 | 3.0499E-02 | 3.0552E-02 | 0.214E+00 |
| EU-154 | #A | 4.3243E-02 | 6.7885E-02 | 6.7949E-02 | 0.663E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 11:51:21
American Radiation Services     Spectrum name: ARS05255.An1

----------------------------   S U M M A R Y   ----------------------------
Total Activity (  186.0 to  1998.6 keV)     1.370E+00  pCi/g
```

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 12:22:17
American Radiation Services Spectrum name: ARS05255.An1

Sample description
Batch ID: 16-00564-16
SDG: ARS1-16-00670-032 Tech: WJS

Nv PBL

Spectrum Filename: C:\User\ARS05255.An1

Acquisition information
Start time: 4/19/2016 11:21:18
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 2

Detector system
GAMASPEC_ARS05 MCB 340

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 POLY WJS 2-26-16

Energy Calibration
Created: 2/26/2016 07:19:00
Zero offset: 0.147 keV
Gain: 0.250 keV/channel
Quadratic: -4.502E-09 keV/channel^2

Efficiency Calibration
Created: 2/26/2016 07:21:00
Type: Polynomial
Uncertainty: 0.909 %
Coefficients: -0.806225 -3.736517 0.169918
-0.005635 -0.000425 0.000016

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.24
Start channel: 10 ( 2.65keV )
Stop channel: 8000 ( 1998.60keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4378E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4378E+02) =
2.9088E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 12:22:17
American Radiation Services Spectrum name: ARS05255.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | NO | |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0974

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 41.05 | 8. | 78.49 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.43 | 3. | 299.52 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | 5.799E-02 | EU152 |
| 59.05 | 16. | 56.31 | 0.77 | 3.751E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.42 | 20. | 57.19 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.76 | 50. | 24.34 | 0.79 | 4.754E-02 | | | | |
| 77.13 | 67. | 18.36 | 0.79 | 4.856E-02 | | | | |
| 92.38 | 11. | 115.90 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.80 | 24. | 36.85 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.68 | 16. | 58.44 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 111.42 | 17. | 49.73 | 0.85 | 5.184E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 123.69 | 7. | 127.63 | 0.87 | 5.046E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 129.52 | 13. | 65.91 | 0.88 | 4.930E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 144.36 | 2. | 436.10 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 160.80 | 2. | 258.43 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.17 | 9. | 98.12 | 0.97 | 4.120E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 2.628E-01 | RA226 |
| 186.18 | 34. | 26.98 | 0.97 | 4.126E-02 | 185.72 | 57.200 | 6.307E-02 | U235 |
| | | | | | 186.21 | 3.640 | 9.927E-01 | RA226 |
| 226.83 | 7. | 116.07 | 1.03 | 3.650E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.75 | 69. | 19.56 | 0.86 | 3.535E-02 | 238.63 | 43.100 | 1.972E-01 | PB212 |
| 245.98 | 7. | 121.92 | 1.06 | 3.480E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.078E-01 | EU152 |
| 277.71 | 3. | 242.74 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.53 | 28. | 37.02 | 0.82 | 3.087E-02 | 295.21 | 18.500 | 2.126E-01 | PB214 |
| 300.29 | 4. | 178.26 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.52 | 10. | 80.80 | 1.20 | 2.826E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 351.86 | 73. | 16.14 | 0.73 | 2.755E-02 | 351.92 | 35.800 | 3.223E-01 | PB214 |
| 511.05 | 61. | 18.49 | 1.55 | 2.149E-02 | 510.72 | 22.500 | 5.492E-01 | TL208 |
| 583.42 | 27. | 27.89 | 1.53 | 1.957E-02 | 583.14 | 86.000 | 6.897E-02 | TL208 |
| 592.19 | 1. | 723.59 | 1.54 | 1.936E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 12:22:17
American Radiation Services Spectrum name: ARS05255.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 609.29 | 53. | 18.14 | 0.71 | 1.895E-02 | 609.31 | 44.791 | 2.737E-01 | BI214 |
| 660.42 | 4. | 115.91 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.68 | 7. | 77.97 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 767.07 | 8. | 74.36 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 860.52 | 5. | 105.38 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.83 | 1. | 806.01 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.74 | 19. | 35.45 | 1.89 | 1.368E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 946.54 | 2. | 277.99 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 965.23 | 4. | 159.01 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.595E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 9.699E-02 | EU152 |
| 965.28 | 4. | 145.47 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.726E-01 | Ra228 |
| 969.47 | 8. | 79.28 | 1.94 | 1.292E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1120.79 | 12. | 46.36 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1237.97 | 4. | 159.19 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1461.39 | 98. | 11.21 | 2.31 | 8.224E-03 | 1460.75 | 10.700 | 4.846E+00 | K40 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.56 | 74.74 | 55. | 46. | 0.025 | 56.47 | 0.382 | PB-212 | s |
| 308.04 | 77.11 | 50. | 64. | 0.036 | 40.24 | 0.428 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 160.34 | 40.21 | 38. | -5. | -0.003 | 349.98 | 0.750s |
| EU-152 | 160.08 | 40.14 | 43. | -8. | -0.005 | 231.01 | 0.750s |
| EU-154 | 163.71 | 41.05 | 16. | 8. | 0.004 | 156.99 | 0.750s |
| EU-154 | 171.46 | 42.98 | 45. | -4. | -0.002 | 538.89 | 0.750s |
| EU-152 | 181.26 | 45.43 | 44. | 3. | 0.002 | 599.05 | 0.750s |
| PB-210 | 185.61 | 46.52 | 45. | 0. | 0.000 | 2000.00 | 0.750s |
| EU-154 | 194.33 | 48.70 | 68. | 0. | 0.000 | 2000.00 | 0.750s |
| Am-241 | 235.78 | 59.05 | 33. | 16. | 0.009 | 112.62 | 0.766s |
| U-238 | 253.26 | 63.42 | 57. | 20. | 0.011 | 114.39 | 0.772s |
| U-238 | 369.17 | 92.38 | 72. | 11. | 0.006 | 231.81 | 0.820D |
| U-238 | 370.85 | 92.80 | 52. | 24. | 0.013 | 73.69 | 0.821D |

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 12:22:17
American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 379.95 | 95.07 | 61. | -5. | -0.003 | 422.71 | 0.824s |
| PA-234 | 392.51 | 98.21 | 57. | -8. | -0.005 | 259.93 | 0.830s |
| PA-234 | 398.37 | 99.68 | 34. | 16. | 0.009 | 116.87 | 0.832s |
| PA-234 | 445.36 | 111.42 | 26. | 17. | 0.009 | 99.47 | 0.850 |
| EU-152 | 486.79 | 121.77 | 51. | -6. | -0.003 | 335.71 | 0.868s |
| EU-154 | 494.49 | 123.69 | 37. | 7. | 0.004 | 255.27 | 0.870s |
| PA-234 | 517.82 | 129.52 | 29. | 13. | 0.007 | 131.83 | 0.883s |
| U-235 | 577.21 | 144.36 | 34. | 2. | 0.001 | 872.20 | 0.903 |
| U-235 | 643.03 | 160.80 | 18. | 2. | 0.001 | 516.86 | 0.934s |
| U-235 | 742.77 | 185.72 | 36. | 34. | 0.019 | 53.96 | 0.969D |
| RA-226 | 744.73 | 186.21 | 35. | 9. | 0.005 | 196.24 | 0.970D |
| U-235 | 820.02 | 205.02 | 52. | -6. | -0.003 | 336.63 | 1.000s |
| PA-234 | 907.32 | 226.83 | 31. | 7. | 0.004 | 232.15 | 1.033s |
| PB-212 | 955.05 | 238.75 | 49. | 74. | 0.041 | 35.48 | 1.051 |
| PB-214 | 960.71 | 240.17 | 74. | -10. | -0.005 | 259.12 | 1.056s |
| EU-152 | 983.98 | 245.98 | 29. | 7. | 0.004 | 243.84 | 1.060s |
| EU-154 | 988.96 | 247.23 | 32. | -4. | -0.002 | 400.62 | 1.065s |
| TL-208 | 1110.98 | 277.71 | 30. | 3. | 0.002 | 485.47 | 1.109 |
| PB-214 | 1182.31 | 295.53 | 25. | 28. | 0.015 | 74.04 | 0.824s |
| PB-212 | 1201.34 | 300.29 | 29. | 4. | 0.002 | 356.52 | 1.142s |
| Ra-228 | 1354.37 | 338.52 | 29. | 10. | 0.006 | 161.60 | 1.198 |
| EU-152 | 1372.03 | 342.93 | 28. | -7. | -0.004 | 214.96 | 1.206s |
| PB-214 | 1407.77 | 351.86 | 19. | 73. | 0.040 | 32.28 | 0.729s |
| TL-208 | 2044.98 | 511.05 | 18. | 61. | 0.034 | 36.97 | 1.545 |
| PA-234 | 2280.11 | 569.79 | 18. | -1. | -0.001 | 1007.90 | 1.509s |
| TL-208 | 2334.67 | 583.42 | 14. | 27. | 0.015 | 55.78 | 1.526s |
| EU-154 | 2369.78 | 592.19 | 24. | 1. | 0.001 | 1447.18 | 1.536s |
| BI-214 | 2438.23 | 609.29 | 11. | 53. | 0.030 | 36.29 | 0.713s |
| CS-137 | 2642.88 | 660.42 | 10. | 4. | 0.002 | 231.82 | 1.621s |
| PA-234 | 2792.20 | 697.72 | 26. | -5. | -0.003 | 304.76 | 1.664s |
| EU-154 | 2894.58 | 723.30 | 38. | 0. | 0.000 | 2000.00 | 1.692s |
| BI-212 | 2912.11 | 727.68 | 12. | 7. | 0.004 | 155.93 | 1.696s |
| PA-234 | 2934.65 | 733.31 | 18. | -3. | -0.002 | 374.01 | 1.703s |
| EU-154 | 3032.37 | 757.72 | 20. | -5. | -0.003 | 246.71 | 1.729s |
| TL-208 | 3054.70 | 763.30 | 25. | 0. | 0.000 | 2000.00 | 1.737 |
| BI-214 | 3069.81 | 767.07 | 12. | 8. | 0.004 | 148.71 | 1.742 |
| EU-152 | 3117.15 | 778.90 | 9. | 0. | 0.000 | 2000.00 | 1.753s |
| PA-234 | 3232.02 | 807.60 | 19. | -2. | -0.001 | 597.60 | 1.785s |
| PA-234 | 3324.25 | 830.64 | 25. | -5. | -0.003 | 281.19 | 1.809s |
| TL-208 | 3443.87 | 860.52 | 12. | 5. | 0.003 | 210.76 | 1.839s |
| EU-152 | 3471.37 | 867.39 | 0. | 0. | 0.000 | 2000.00 | 1.846s |
| EU-154 | 3492.24 | 872.60 | 18. | -4. | -0.002 | 321.15 | 1.852s |
| PA-234 | 3525.17 | 880.83 | 11. | 1. | 0.000 | 1612.03 | 1.860s |
| PA-234 | 3534.82 | 883.24 | 0. | 0. | 0.000 | 2000.00 | 1.862s |
| PA-234 | 3596.31 | 898.60 | 10. | 0. | 0.000 | 2000.00 | 1.878s |
| Ra-228 | 3648.90 | 911.74 | 12. | 19. | 0.010 | 70.89 | 1.890s |
| BI-214 | 3737.98 | 933.99 | 16. | -1. | -0.001 | 1254.08 | 1.912s |
| PA-234 | 3788.21 | 946.54 | 10. | 2. | 0.001 | 555.98 | 1.923s |

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 12:22:17
American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3798.06 | 949.00 | 0. | 0. | 0.000 | 2000.00 | 1.926s |
| EU-152 | 3863.23 | 965.28 | 18. | 4. | 0.002 | 290.95 | 1.940s |
| Ra-228 | 3863.02 | 965.23 | 20. | 4. | 0.002 | 318.02 | 1.941s |
| Ra-228 | 3880.02 | 969.47 | 15. | 8. | 0.004 | 158.57 | 1.945 |
| EU-154 | 3987.91 | 996.42 | 20. | -3. | -0.002 | 451.69 | 1.970s |
| EU-154 | 4020.76 | 1004.63 | 19. | -3. | -0.002 | 412.78 | 1.978s |
| EU-152 | 4345.68 | 1085.80 | 0. | 0. | 0.000 | 2000.00 | 2.048s |
| EU-152 | 4450.85 | 1112.07 | 0. | 0. | 0.000 | 2000.00 | 2.070s |
| BI-214 | 4485.77 | 1120.79 | 10. | 12. | 0.007 | 92.71 | 2.077s |
| CO-60 | 4695.71 | 1173.24 | 0. | 0. | 0.000 | 2000.00 | 2.118s |
| BI-214 | 4954.86 | 1237.97 | 16. | 4. | 0.002 | 318.38 | 2.167 |
| EU-154 | 5096.11 | 1273.26 | 14. | -4. | -0.002 | 284.94 | 2.192s |
| CO-60 | 5336.57 | 1333.32 | 10. | -2. | -0.001 | 506.41 | 2.231s |
| BI-214 | 5514.10 | 1377.67 | 33. | 0. | 0.000 | 2000.00 | 2.259 |
| K-40 | 5849.28 | 1461.39 | 11. | 98. | 0.054 | 22.41 | 2.306s |
| BI-212 | 6486.49 | 1620.56 | 0. | 0. | 0.000 | 2000.00 | 2.381s |
| BI-214 | 7062.73 | 1764.49 | 0. | 0. | 0.000 | 2000.00 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 6.3070E-02 | | | | | | |
| | | | 185.72 | 6.307E-02 | } | 5.649E-02 | 2.70E+01 G K | |
| | | | 143.76 | 1.678E-02 | ( | 2.616E-01 | 4.36E+02 G | |
| | | | 205.31 | -1.498E-01 | + | 8.719E-01 | 1.68E+02 G | |
| | | | 163.35 | 5.066E-02 | &( | 4.746E-01 | 2.58E+02 G | |
| RA-226 | | 2.6280E-01 | | | | | | |
| | | | | | | | | Derived Ave Activity |
| | | | 186.21 | 2.628E-01 | }( | 8.782E-01 | 9.81E+01 G K | |
| Ra-228 | | 1.8071E-01 | | | | | | |
| | | | 911.07 | 2.047E-01 | ?( | 2.107E-01 | 3.54E+01 G | |
| | | | 968.90 | 1.502E-01 | ( | 4.023E-01 | 7.93E+01 G | |
| | | | 338.40 | 1.313E-01 | ( | 3.572E-01 | 8.08E+01 G | |
| | | | 964.60 | 2.595E-01 | ?( | 1.462E+00 | 1.59E+02 G | |
| Am-241 | T | 5.2120E-02 | | | | | | |
| | | | 59.54 | 5.212E-02 | ?( | 9.549E-02 | 5.63E+01 G K | |

ORTEC g v - i (3135) Env32 G53W4.24 4/19/2016 12:22:17
American Radiation Services Spectrum name: ARS05255.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-210 | 0.0000E+00 | | | | | | |
| | | 46.52 | 0.000E+00 | &( | 1.347E+00 | 1.00E+03 | G |
| U-238 | 6.7712E-01 | | | | | | |
| | | 63.29 | 5.619E-01 | ?( | 1.051E+00 | 5.72E+01 | G |
| | | 92.80 | 6.771E-01 | } | 1.018E+00 | 3.68E+01 | G |
| | | 92.38 | 3.442E-01 | } | 1.381E+00 | 1.16E+02 | G |
| K-40 | 4.8461E+00 | | | | | | |
| | | 1460.75 | 4.846E+00 | ( | 9.029E-01 | 1.12E+01 | G |
| PB-214 | 3.2234E-01 | | | | | | |
| | | 351.92 | 3.223E-01 | ( | 1.024E-01 | 1.61E+01 | G |
| | | 295.21 | 2.126E-01 | - | 1.996E-01 | 3.70E+01 | G |
| | | 241.98 | -1.611E-01 | - | 7.111E-01 | 1.30E+02 | G |
| BI-214 | 2.9501E-01 | | | | | | |
| | | 609.31 | 2.737E-01 | ( | 9.274E-02 | 1.81E+01 | G |
| | | 1764.49 | 0.000E+00 | - | 3.319E-01 | 1.00E+03 | G |
| | | 1120.29 | 3.206E-01 | ?( | 4.563E-01 | 4.64E+01 | G |
| | | 1238.11 | 2.748E-01 | ( | 1.564E+00 | 1.59E+02 | G |
| | | 768.36 | 4.394E-01 | ( | 1.096E+00 | 7.44E+01 | G |
| | | 1377.67 | 0.000E+00 | - | 3.688E+00 | 1.00E+03 | G |
| | | 934.06 | -9.991E-02 | - | 2.328E+00 | 6.27E+02 | G |
| BI-212 | 1.5960E-01 | | | | | | |
| | | 727.17 | 1.596E-01 | ?( | 4.203E-01 | 7.80E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 1.637E+00 | 1.00E+03 | G |
| | | 785.42 | -1.258E-02 | % | 3.263E+00 | 6.96E+03 | G |
| PB-212 | 2.1014E-01 | | | | | | |
| | | 238.63 | 2.113E-01 | ?( | 1.009E-01 | 1.77E+01 | G |
| | | 300.09 | 1.950E-01 | &( | 1.223E+00 | 1.78E+02 | G |
| TL-208 | 7.6175E-02 | | | | | | |
| | | 583.14 | 6.897E-02 | ?( | 5.258E-02 | 2.79E+01 | G |
| | | 510.72 | 5.492E-01 | + | 2.040E-01 | 1.85E+01 | G |
| | | 860.47 | 1.318E-01 | ?( | 4.846E-01 | 1.05E+02 | G |
| | | 277.36 | 6.891E-02 | ( | 5.935E-01 | 2.43E+02 | G |
| | | 763.30 | 0.000E+00 | - | 4.180E+00 | 1.00E+03 | G |
| PA-234 | 5.1513E-02 | | | | | | |
| | | 98.44 | -2.822E-02 | ?( | 1.256E-01 | 1.30E+02 | G |
| | | 946.00 | 2.720E-02 | ?( | 2.839E-01 | 2.78E+02 | G |
| | | 131.28 | 5.622E-02 | ?( | 1.225E-01 | 6.59E+01 | G |
| | | 94.67 | -2.876E-02 | + | 2.106E-01 | 2.11E+02 | G |
| | | 883.24 | 0.000E+00 | - | 1.907E-01 | 1.00E+03 | G |

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| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 926.70 | 7.456E-03 | % | 5.088E-01 | 1.76E+03 | G |
| | | 569.26 | -2.528E-02 | & | 4.701E-01 | 5.04E+02 | G |
| | | 111.00 | 1.644E-01 | ?( | 2.612E-01 | 4.97E+01 | G |
| | | 733.00 | -1.039E-01 | + | 6.965E-01 | 1.87E+02 | G |
| | | 949.00 | 0.000E+00 | - | 3.132E-01 | 1.00E+03 | G |
| | | 880.51 | 2.845E-02 | ?( | 8.748E-01 | 8.06E+02 | G |
| | | 226.87 | 1.317E-01 | ( | 5.269E-01 | 1.16E+02 | G |
| | | 831.10 | -2.780E-01 | + | 1.367E+00 | 1.41E+02 | G |
| | | 808.10 | -1.243E-01 | + | 1.350E+00 | 2.99E+02 | G |
| | | 99.70 | 2.763E-01 | ( | 5.276E-01 | 5.84E+01 | G |
| | | 699.10 | -2.743E-01 | + | 1.466E+00 | 1.52E+02 | G |
| | | 898.60 | 0.000E+00 | - | 1.363E+00 | 1.00E+03 | G |
| | | 1394.10 | 1.464E-02 | % | 2.134E+00 | 3.71E+03 | G |
| CS-137 | 1.2445E-02 | | | | | | |
| | | 661.66 | 1.244E-02 | ?( | 5.104E-02 | 1.16E+02 | G |
| CO-60 | 0.0000E+00 | | | | | | |
| | | 1173.24 | 0.000E+00 | ?( | 3.025E-02 | 1.00E+03 | K |
| | | 1332.50 | -8.695E-03 | + | 8.224E-02 | 2.53E+02 | K |
| EU-152 | 1.9635E-02 | | | | | | |
| | | 40.12 | -5.423E-02 | ?( | 2.144E-01 | 1.16E+02 | G |
| | | 121.78 | -1.825E-02 | + | 1.060E-01 | 1.68E+02 | G |
| | | 344.30 | -4.274E-02 | + | 1.579E-01 | 1.07E+02 | G |
| | | 1408.08 | 6.015E-03 | % | 3.599E-01 | 1.50E+03 | G |
| | | 39.52 | -6.343E-02 | + | 3.874E-01 | 1.75E+02 | G |
| | | 964.00 | 1.019E-01 | ?( | 5.240E-01 | 1.45E+02 | G |
| | | 1112.07 | 0.000E+00 | + | 2.102E-01 | 1.00E+03 | G |
| | | 778.90 | 0.000E+00 | + | 3.527E-01 | 1.00E+03 | G |
| | | 1085.80 | 0.000E+00 | + | 2.707E-01 | 1.00E+03 | G |
| | | 45.40 | 5.799E-02 | ?( | 6.115E-01 | 3.00E+02 | G |
| | | 244.67 | 1.078E-01 | ?( | 4.549E-01 | 1.22E+02 | G |
| | | 867.39 | 0.000E+00 | - | 5.393E-01 | 1.00E+03 | G |
| EU-154 | 4.3243E-02 | | | | | | |
| | | 123.10 | 1.507E-02 | &( | 6.633E-02 | 1.28E+02 | G |
| | | 1274.80 | -5.026E-02 | + | 2.552E-01 | 1.42E+02 | G |
| | | 723.30 | 0.000E+00 | - | 4.200E-01 | 1.00E+03 | G |
| | | 1004.80 | -6.164E-02 | + | 4.569E-01 | 2.06E+02 | G |
| | | 43.00 | -4.805E-02 | + | 4.547E-01 | 2.69E+02 | G |
| | | 873.20 | -1.079E-01 | + | 6.160E-01 | 1.61E+02 | G |
| | | 996.30 | -9.519E-02 | + | 7.722E-01 | 2.26E+02 | G |
| | | 42.31 | 1.971E-01 | ?( | 5.219E-01 | 7.85E+01 | G |
| | | 248.04 | -7.911E-02 | + | 5.581E-01 | 2.00E+02 | G |
| | | 591.70 | 4.696E-02 | &( | 1.241E+00 | 7.24E+02 | G |
| | | 48.70 | 0.000E+00 | - | 1.483E+00 | 1.00E+03 | G |
| | | 756.70 | -3.640E-01 | + | 1.568E+00 | 1.23E+02 | G |

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( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 6.3070E-02 | 3.3802E-02 | 3.4106E-02 | 0.262E+00 |
| RA-226 #A | 2.6280E-01 | 5.1572E-01 | 5.1608E-01 | 0.878E+00 |
| Ra-228 A | 1.8071E-01 | 1.2811E-01 | 1.2866E-01 | 0.211E+00 |
| Am-241 #A | 5.2120E-02 | 5.8695E-02 | 5.8795E-02 | 0.955E-01 |
| PB-210 #A | 0.0000E+00 | 7.5207E-01 | 7.5208E-01 | 0.135E+01 |
| U-238 A | 6.7712E-01 | 4.6936E-01 | 4.7232E-01 | 0.105E+01 |
| K-40 # | 4.8461E+00 | 1.0861E+00 | 1.1624E+00 | 0.903E+00 |
| PB-214 | 3.2234E-01 | 1.0406E-01 | 1.0886E-01 | 0.102E+00 |
| BI-214 | 2.9501E-01 | 1.0705E-01 | 1.0919E-01 | 0.927E-01 |
| BI-212 #A | 1.5960E-01 | 2.4887E-01 | 2.4913E-01 | 0.420E+00 |
| PB-212 # | 2.1014E-01 | 7.4562E-02 | 7.6836E-02 | 0.101E+00 |
| TL-208 | 7.6175E-02 | 4.2494E-02 | 4.2890E-02 | 0.526E-01 |
| PA-234 #A | 5.1513E-02 | 5.1238E-02 | 5.1381E-02 | 0.126E+00 |
| CS-137 #A | 1.2445E-02 | 2.8849E-02 | 2.8858E-02 | 0.510E-01 |
| CO-60 #A | 0.0000E+00 | 1.6416E-02 | 1.6416E-02 | 0.302E-01 |
| EU-152 #A | 1.9635E-02 | 3.6612E-02 | 3.6679E-02 | 0.214E+00 |
| EU-154 #A | 4.3243E-02 | 6.7885E-02 | 6.7949E-02 | 0.663E-01 |

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  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  186.0 to  1998.6 keV)     2.087E+00  pCi/g
```

# SDG **ARS1-16-00670**

| Fraction | Container | Client ID | Aliquot | Units | Geometry | Prep Type | Origin | Origin2 | ICOC ID |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 1 | 04-PD-RO-01-01 | 1711.0000 | g | | ORIG | SCI | | 229510 |
| 001 | 1 | 04-PD-RO-01-01 | 1012.3500 | g | | DRYF | PRP | | 229598 |
| 001 | 1 | 04-PD-RO-01-01 | 365.8400 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229678 |
| 001 | 1 | 04-PD-RO-01-01 | 78.5000 | g | | DRAD | ALI | Manual | 229712 |
| 002 | 1 | 04-PD-RO-02-01 | 2039.0000 | g | | ORIG | SCI | | 229511 |
| 002 | 1 | 04-PD-RO-02-01 | 864.2600 | g | | DRYF | PRP | | 229599 |
| 002 | 1 | 04-PD-RO-02-01 | 342.2500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229679 |
| 002 | 1 | 04-PD-RO-02-01 | 78.5000 | g | | DRAD | ALI | Manual | 229713 |
| 003 | 1 | 04-PD-RO-03-01 | 812.0000 | g | | ORIG | SCI | | 229512 |
| 003 | 1 | 04-PD-RO-03-01 | 804.5100 | g | | DRYF | PRP | | 229600 |
| 003 | 1 | 04-PD-RO-03-01 | 358.2700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229680 |
| 003 | 1 | 04-PD-RO-03-01 | 78.5000 | g | | DRAD | ALI | Manual | 229714 |
| 004 | 1 | 04-PD-RO-03-02 | 974.0000 | g | | ORIG | SCI | | 229513 |
| 004 | 1 | 04-PD-RO-03-02 | 745.0400 | g | | DRYF | PRP | | 229601 |
| 004 | 1 | 04-PD-RO-03-02 | 387.3600 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229681 |
| 004 | 1 | 04-PD-RO-03-02 | 78.5000 | g | | DRAD | ALI | Manual | 229715 |
| 005 | 1 | 04-PD-RO-03-03 | 985.0000 | g | | ORIG | SCI | | 229514 |
| 005 | 1 | 04-PD-RO-03-03 | 817.7200 | g | | DRYF | PRP | | 229602 |
| 005 | 1 | 04-PD-RO-03-03 | 379.7100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229682 |
| 005 | 1 | 04-PD-RO-03-03 | 78.5000 | g | | DRAD | ALI | Manual | 229716 |
| 006 | 1 | 04-PD-RO-03-04 | 951.0000 | g | | ORIG | SCI | | 229515 |
| 006 | 1 | 04-PD-RO-03-04 | 823.8800 | g | | DRYF | PRP | | 229603 |
| 006 | 1 | 04-PD-RO-03-04 | 400.7300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229683 |
| 006 | 1 | 04-PD-RO-03-04 | 78.5000 | g | | DRAD | ALI | Manual | 229717 |
| 007 | 1 | 04-PD-RO-03-05 | 1137.0000 | g | | ORIG | SCI | | 229516 |
| 007 | 1 | 04-PD-RO-03-05 | 837.1800 | g | | DRYF | PRP | | 229604 |
| 007 | 1 | 04-PD-RO-03-05 | 383.0100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229684 |
| 007 | 1 | 04-PD-RO-03-05 | 78.5000 | g | | DRAD | ALI | Manual | 229718 |
| 008 | 1 | 04-PD-RO-04-01 | 1015.0000 | g | | ORIG | SCI | | 229517 |
| 008 | 1 | 04-PD-RO-04-01 | 833.1400 | g | | DRYF | PRP | | 229605 |
| 008 | 1 | 04-PD-RO-04-01 | 441.0600 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229685 |
| 008 | 1 | 04-PD-RO-04-01 | 78.5000 | g | | DRAD | ALI | Manual | 229719 |
| 009 | 1 | 04-PD-RO-05-01 | 948.0000 | g | | ORIG | SCI | | 229518 |
| 009 | 1 | 04-PD-RO-05-01 | 713.1000 | g | | DRYF | PRP | | 229606 |
| 009 | 1 | 04-PD-RO-05-01 | 386.1100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229686 |
| 009 | 1 | 04-PD-RO-05-01 | 78.5000 | g | | DRAD | ALI | Manual | 229720 |
| 010 | 1 | 04-PD-RO-05-02 | 951.0000 | g | | ORIG | SCI | | 229519 |
| 010 | 1 | 04-PD-RO-05-02 | 761.6000 | g | | DRYF | PRP | | 229607 |
| 010 | 1 | 04-PD-RO-05-02 | 377.5800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229687 |
| 010 | 1 | 04-PD-RO-05-02 | 78.5000 | g | | DRAD | ALI | Manual | 229721 |
| 011 | 1 | 04-PD-RO-05-03 | 1094.0000 | g | | ORIG | SCI | | 229520 |
| 011 | 1 | 04-PD-RO-05-03 | 773.3300 | g | | DRYF | PRP | | 229609 |
| 011 | 1 | 04-PD-RO-05-03 | 371.4100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229688 |
| 011 | 1 | 04-PD-RO-05-03 | 78.5000 | g | | DRAD | ALI | Manual | 229722 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 012 | 1 | 04-PD-RO-05-04 | 966.0000 | g | | ORIG | SCI | | 229521 |
| 012 | 1 | 04-PD-RO-05-04 | 950.9900 | g | | DRYF | PRP | | 229610 |
| 012 | 1 | 04-PD-RO-05-04 | 366.5000 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229689 |
| 012 | 1 | 04-PD-RO-05-04 | 370.2500 | g | 250 mL (8oz.) Tuna Can | DGAM | ALI | Manual | 229690 |
| 012 | 1 | 04-PD-RO-05-04 | 78.5000 | g | | DRAD | ALI | Manual | 229723 |
| 012 | 1 | 04-PD-RO-05-04 | 78.5000 | g | | DRAD | ALI | Manual | 229724 |
| 013 | 1 | 04-PD-RO-05-05 | 986.0000 | g | | ORIG | SCI | | 229522 |
| 013 | 1 | 04-PD-RO-05-05 | 758.7100 | g | | DRYF | PRP | | 229612 |
| 013 | 1 | 04-PD-RO-05-05 | 372.8800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229691 |
| 013 | 1 | 04-PD-RO-05-05 | 78.5000 | g | | DRAD | ALI | Manual | 229725 |
| 014 | 1 | 04-PD-RO-06-01 | 1007.0000 | g | | ORIG | SCI | | 229523 |
| 014 | 1 | 04-PD-RO-06-01 | 708.2100 | g | | DRYF | PRP | | 229613 |
| 014 | 1 | 04-PD-RO-06-01 | 373.2200 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229692 |
| 014 | 1 | 04-PD-RO-06-01 | 78.5000 | g | | DRAD | ALI | Manual | 229726 |
| 015 | 1 | 04-PD-RO-07-01 | 1026.0000 | g | | ORIG | SCI | | 229524 |
| 015 | 1 | 04-PD-RO-07-01 | 795.0400 | g | | DRYF | PRP | | 229616 |
| 015 | 1 | 04-PD-RO-07-01 | 379.4800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229693 |
| 015 | 1 | 04-PD-RO-07-01 | 78.5000 | g | | DRAD | ALI | Manual | 229727 |
| 016 | 1 | 04-PD-RO-08-01 | 1401.0000 | g | | ORIG | SCI | | 229525 |
| 016 | 1 | 04-PD-RO-08-01 | 1068.8800 | g | | DRYF | PRP | | 229617 |
| 016 | 1 | 04-PD-RO-08-01 | 345.1800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229694 |
| 016 | 1 | 04-PD-RO-08-01 | 78.5000 | g | | DRAD | ALI | Manual | 229728 |
| 016 | 1 | 04-PD-RO-08-01 | 78.5000 | g | | DRAD | ALI | Manual | 229822 |
| 017 | 1 | 04-PD-RO-08-02 | 1188.0000 | g | | ORIG | SCI | | 229526 |
| 017 | 1 | 04-PD-RO-08-02 | 881.8000 | g | | DRYF | PRP | | 229619 |
| 017 | 1 | 04-PD-RO-08-02 | 342.2000 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229695 |
| 017 | 1 | 04-PD-RO-08-02 | 78.5000 | g | | DRAD | ALI | Manual | 229729 |
| 018 | 1 | 04-PD-RO-08-03 | 1605.0000 | g | | ORIG | SCI | | 229527 |
| 018 | 1 | 04-PD-RO-08-03 | 831.2900 | g | | DRYF | PRP | | 229620 |
| 018 | 1 | 04-PD-RO-08-03 | 352.9300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229696 |
| 018 | 1 | 04-PD-RO-08-03 | 78.5000 | g | | DRAD | ALI | Manual | 229730 |
| 019 | 1 | 04-PD-RO-08-04 | 1384.0000 | g | | ORIG | SCI | | 229528 |
| 019 | 1 | 04-PD-RO-08-04 | 949.3200 | g | | DRYF | PRP | | 229621 |
| 019 | 1 | 04-PD-RO-08-04 | 370.8100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229697 |
| 019 | 1 | 04-PD-RO-08-04 | 78.5000 | g | | DRAD | ALI | Manual | 229731 |
| 020 | 1 | 04-PD-RO-08-05 | 1194.0000 | g | | ORIG | SCI | | 229529 |
| 020 | 1 | 04-PD-RO-08-05 | 1031.8200 | g | | DRYF | PRP | | 229622 |
| 020 | 1 | 04-PD-RO-08-05 | 339.7500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229698 |
| 020 | 1 | 04-PD-RO-08-05 | 78.5000 | g | | DRAD | ALI | Manual | 229732 |
| 021 | 1 | 04-PD-RO-09-01 | 2252.0000 | g | | ORIG | SCI | | 229530 |
| 021 | 1 | 04-PD-RO-09-01 | 1325.2900 | g | | DRYF | PRP | | 229623 |
| 021 | 1 | 04-PD-RO-09-01 | 347.3800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229699 |
| 021 | 1 | 04-PD-RO-09-01 | 357.2400 | g | 250 mL (8oz.) Tuna Can | DGAM | ALI | Manual | 229700 |
| 021 | 1 | 04-PD-RO-09-01 | 78.5000 | g | | DRAD | ALI | Manual | 229733 |
| 021 | 1 | 04-PD-RO-09-01 | 78.5000 | g | | DRAD | ALI | Manual | 229734 |
| 022 | 1 | 04-PD-RO-10-01 | 1653.0000 | g | | ORIG | SCI | | 229531 |
| 022 | 1 | 04-PD-RO-10-01 | 964.4400 | g | | DRYF | PRP | | 229624 |
| 022 | 1 | 04-PD-RO-10-01 | 295.8100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229701 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 022 | 1 | 04-PD-RO-10-01 | 78.5000 | g | | DRAD | ALI | Manual | 229735 |
| 023 | 1 | 04-PD-RO-11-01 | 2228.0000 | g | | ORIG | SCI | | 229532 |
| 023 | 1 | 04-PD-RO-11-01 | 1305.9900 | g | | DRYF | PRP | | 229625 |
| 023 | 1 | 04-PD-RO-11-01 | 398.0300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229702 |
| 023 | 1 | 04-PD-RO-11-01 | 78.5000 | g | | DRAD | ALI | Manual | 229736 |
| 024 | 1 | 04-PD-RO-11-02 | 1656.0000 | g | | ORIG | SCI | | 229533 |
| 024 | 1 | 04-PD-RO-11-02 | 882.9300 | g | | DRYF | PRP | | 229626 |
| 024 | 1 | 04-PD-RO-11-02 | 380.5100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229703 |
| 024 | 1 | 04-PD-RO-11-02 | 78.5000 | g | | DRAD | ALI | Manual | 229737 |
| 025 | 1 | 04-PD-RO-11-03 | 1757.0000 | g | | ORIG | SCI | | 229534 |
| 025 | 1 | 04-PD-RO-11-03 | 1026.6800 | g | | DRYF | PRP | | 229627 |
| 025 | 1 | 04-PD-RO-11-03 | 347.4600 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229704 |
| 025 | 1 | 04-PD-RO-11-03 | 78.5000 | g | | DRAD | ALI | Manual | 229738 |
| 026 | 1 | 04-PD-RO-11-04 | 1522.0000 | g | | ORIG | SCI | | 229535 |
| 026 | 1 | 04-PD-RO-11-04 | 1016.0100 | g | | DRYF | PRP | | 229628 |
| 026 | 1 | 04-PD-RO-11-04 | 405.7400 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229705 |
| 026 | 1 | 04-PD-RO-11-04 | 78.5000 | g | | DRAD | ALI | Manual | 229739 |
| 027 | 1 | 04-PD-RO-11-05 | 1842.0000 | g | | ORIG | SCI | | 229536 |
| 027 | 1 | 04-PD-RO-11-05 | 1037.5300 | g | | DRYF | PRP | | 229629 |
| 027 | 1 | 04-PD-RO-11-05 | 399.4900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229706 |
| 027 | 1 | 04-PD-RO-11-05 | 78.5000 | g | | DRAD | ALI | Manual | 229740 |
| 028 | 1 | 04-PD-RO-12-01 | 1203.0000 | g | | ORIG | SCI | | 229537 |
| 028 | 1 | 04-PD-RO-12-01 | 856.3100 | g | | DRYF | PRP | | 229630 |
| 028 | 1 | 04-PD-RO-12-01 | 360.3300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229707 |
| 028 | 1 | 04-PD-RO-12-01 | 78.5000 | g | | DRAD | ALI | Manual | 229741 |
| 029 | 1 | 04-PD-RO-13-01 | 1158.0000 | g | | ORIG | SCI | | 229538 |
| 029 | 1 | 04-PD-RO-13-01 | 890.6000 | g | | DRYF | PRP | | 229631 |
| 029 | 1 | 04-PD-RO-13-01 | 355.7300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229708 |
| 029 | 1 | 04-PD-RO-13-01 | 78.5000 | g | | DRAD | ALI | Manual | 229742 |
| 030 | 1 | 04-PD-RO-14-01 | 1175.0000 | g | | ORIG | SCI | | 229539 |
| 030 | 1 | 04-PD-RO-14-01 | 1139.8700 | g | | DRYF | PRP | | 229632 |
| 030 | 1 | 04-PD-RO-14-01 | 323.3700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229709 |
| 030 | 1 | 04-PD-RO-14-01 | 78.5000 | g | | DRAD | ALI | Manual | 229743 |
| 031 | 1 | 04-PD-RO-15-01 | 1737.0000 | g | | ORIG | SCI | | 229540 |
| 031 | 1 | 04-PD-RO-15-01 | 929.1000 | g | | DRYF | PRP | | 229633 |
| 031 | 1 | 04-PD-RO-15-01 | 322.8400 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229710 |
| 031 | 1 | 04-PD-RO-15-01 | 78.5000 | g | | DRAD | ALI | Manual | 229744 |
| 031 | 1 | 04-PD-RO-15-01 | 78.5000 | g | | DRAD | ALI | Manual | 229823 |
| 032 | 1 | 04-PD-RO-16-01 | 1691.0000 | g | | ORIG | SCI | | 229541 |
| 032 | 1 | 04-PD-RO-16-01 | 962.9800 | g | | DRYF | PRP | | 229634 |
| 032 | 1 | 04-PD-RO-16-01 | 343.7800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229711 |
| 032 | 1 | 04-PD-RO-16-01 | 78.5000 | g | | DRAD | ALI | Manual | 229745 |

# Prep Batch Report



DCN: ITSI-0808-0004-0076, 8 May 2019

**Prep Batch ID** PB1-16-00328
**Matrix** SO
**Prep Group** SOLID

| PBatch Sample ID | Gamma | Wet | Rad | Basis | SDG | FR | Storage | Client ID | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|
| PB1-16-00328-01 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 001 | WO4 | 04-PD-RO-01-01 | 04/22/16 |
| PB1-16-00328-02 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 002 | WO4 | 04-PD-RO-02-01 | 04/22/16 |
| PB1-16-00328-03 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 003 | WO4 | 04-PD-RO-03-01 | 04/22/16 |
| PB1-16-00328-04 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 004 | WO4 | 04-PD-RO-03-02 | 04/22/16 |
| PB1-16-00328-05 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 005 | WO4 | 04-PD-RO-03-03 | 04/22/16 |
| PB1-16-00328-06 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 006 | WO4 | 04-PD-RO-03-04 | 04/22/16 |
| PB1-16-00328-07 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 007 | WO4 | 04-PD-RO-03-05 | 04/22/16 |
| PB1-16-00328-08 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 008 | WO4 | 04-PD-RO-04-01 | 04/22/16 |
| PB1-16-00328-09 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 009 | WO4 | 04-PD-RO-05-01 | 04/22/16 |
| PB1-16-00328-10 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 010 | WO4 | 04-PD-RO-05-02 | 04/22/16 |
| PB1-16-00328-11 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 011 | WO4 | 04-PD-RO-05-03 | 04/22/16 |
| PB1-16-00328-12 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 012 | WO4 | 04-PD-RO-05-04 | 04/22/16 |
| PB1-16-00328-13 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 013 | WO4 | 04-PD-RO-05-05 | 04/22/16 |
| PB1-16-00328-14 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 014 | WO4 | 04-PD-RO-06-01 | 04/22/16 |
| PB1-16-00328-15 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 015 | WO4 | 04-PD-RO-07-01 | 04/22/16 |
| PB1-16-00328-16 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 016 | WO4 | 04-PD-RO-08-01 | 04/22/16 |
| PB1-16-00328-17 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 017 | WO4 | 04-PD-RO-08-02 | 04/22/16 |
| PB1-16-00328-18 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 018 | WO4 | 04-PD-RO-08-03 | 04/22/16 |
| PB1-16-00328-19 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 019 | WO4 | 04-PD-RO-08-04 | 04/22/16 |
| PB1-16-00328-20 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 020 | WO4 | 04-PD-RO-08-05 | 04/22/16 |

# Prep Batch Report



DCN: ITSI-0808-0004-0076, 8 May 2019

**Prep Batch ID** PB1-16-00329
**Matrix** SO
**Prep Group** SOLID

| PBatch Sample ID | Gamma | Wet | Rad | Basis | SDG | FR | Storage | Client ID | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|
| PB1-16-00329-01 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 021 | WO4 | 04-PD-RO-09-01 | 04/22/16 |
| PB1-16-00329-02 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 022 | WO4 | 04-PD-RO-10-01 | 04/22/16 |
| PB1-16-00329-03 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 023 | WO4 | 04-PD-RO-11-01 | 04/22/16 |
| PB1-16-00329-04 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 024 | WO4 | 04-PD-RO-11-02 | 04/22/16 |
| PB1-16-00329-05 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 025 | WO4 | 04-PD-RO-11-03 | 04/22/16 |
| PB1-16-00329-06 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 026 | WO4 | 04-PD-RO-11-04 | 04/22/16 |
| PB1-16-00329-07 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 027 | WO4 | 04-PD-RO-11-05 | 04/22/16 |
| PB1-16-00329-08 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 028 | WO4 | 04-PD-RO-12-01 | 04/22/16 |
| PB1-16-00329-09 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 029 | WO4 | 04-PD-RO-13-01 | 04/22/16 |
| PB1-16-00329-10 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 030 | WO4 | 04-PD-RO-14-01 | 04/22/16 |
| PB1-16-00329-11 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 031 | WO4 | 04-PD-RO-15-01 | 04/22/16 |
| PB1-16-00329-12 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 032 | WO4 | 04-PD-RO-16-01 | 04/22/16 |
| PB1-16-00329-13 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 001 | WO4 | 04-PD-STK-01-01 | 04/22/16 |
| PB1-16-00329-14 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 002 | WO4 | 04-PD-STK-01-02 | 04/22/16 |
| PB1-16-00329-15 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 003 | WO4 | 04-PD-STK-01-03 | 04/22/16 |
| PB1-16-00329-16 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 004 | WO4 | 04-PD-STK-01-04 | 04/22/16 |
| PB1-16-00329-17 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 005 | WO4 | 04-PD-STK-01-05 | 04/22/16 |
| PB1-16-00329-18 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 006 | WO4 | 04-PD-STK-01-06 | 04/22/16 |
| PB1-16-00329-19 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 007 | WO4 | 04-PD-STK-01-07 | 04/22/16 |
| PB1-16-00329-20 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 008 | WO4 | 04-PD-STK-01-08 | 04/22/16 |

DCN: ITSI-0808-0004-0076, 8 May 2019

## Prep Batch Report - Gamma Spec Aliquot

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Type | Geometry | Tare g | Cont+Sample g | Net Sample g |
|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00328-01** | ARS1-16-00670 | 001 | 229678 | 229510 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.82 | 413.66 | 365.84 |
| **PB1-16-00328-02** | ARS1-16-00670 | 002 | 229679 | 229511 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.68 | 389.93 | 342.25 |
| **PB1-16-00328-03** | ARS1-16-00670 | 003 | 229680 | 229512 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.70 | 405.97 | 358.27 |
| **PB1-16-00328-04** | ARS1-16-00670 | 004 | 229681 | 229513 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 48.04 | 435.40 | 387.36 |
| **PB1-16-00328-05** | ARS1-16-00670 | 005 | 229682 | 229514 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.82 | 427.53 | 379.71 |
| **PB1-16-00328-06** | ARS1-16-00670 | 006 | 229683 | 229515 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.63 | 448.36 | 400.73 |
| **PB1-16-00328-07** | ARS1-16-00670 | 007 | 229684 | 229516 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.96 | 430.97 | 383.01 |
| **PB1-16-00328-08** | ARS1-16-00670 | 008 | 229685 | 229517 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.76 | 488.82 | 441.06 |
| **PB1-16-00328-09** | ARS1-16-00670 | 009 | 229686 | 229518 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.38 | 433.49 | 386.11 |
| **PB1-16-00328-10** | ARS1-16-00670 | 010 | 229687 | 229519 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.94 | 425.52 | 377.58 |
| **PB1-16-00328-11** | ARS1-16-00670 | 011 | 229688 | 229520 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.46 | 418.87 | 371.41 |
| **PB1-16-00328-12** | ARS1-16-00670 | 012 | 229689 | 229521 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.88 | 414.38 | 366.50 |
| **PB1-16-00328-13** | ARS1-16-00670 | 013 | 229691 | 229522 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.59 | 420.47 | 372.88 |
| **PB1-16-00328-14** | ARS1-16-00670 | 014 | 229692 | 229523 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.49 | 420.71 | 373.22 |
| **PB1-16-00328-15** | ARS1-16-00670 | 015 | 229693 | 229524 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.83 | 427.31 | 379.48 |
| **PB1-16-00328-16** | ARS1-16-00670 | 016 | 229694 | 229525 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.79 | 392.97 | 345.18 |
| **PB1-16-00328-17** | ARS1-16-00670 | 017 | 229695 | 229526 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.77 | 389.97 | 342.20 |
| **PB1-16-00328-18** | ARS1-16-00670 | 018 | 229696 | 229527 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.96 | 400.89 | 352.93 |
| **PB1-16-00328-19** | ARS1-16-00670 | 019 | 229697 | 229528 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.92 | 418.73 | 370.81 |
| **PB1-16-00328-20** | ARS1-16-00670 | 020 | 229698 | 229529 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 48.04 | 387.79 | 339.75 |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Prep Batch Report - Percent Moisture

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Tare g | Cont+Sample g | Net Sample g | Oven ID | Oven Temp C | Start Time | Stop Time | Cont+Sample g | Net Sample g | % Solid | % Moisure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00328-01** | ARS1-16-00670 | 001 | 229598 | 229510 | 6.70 | 1019.05 | 1012.35 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 893.43 | 886.73 | 87.59% | 12.41% |
| **PB1-16-00328-02** | ARS1-16-00670 | 002 | 229599 | 229511 | 6.68 | 870.94 | 864.26 | | | | | 769.67 | 762.99 | 88.28% | 11.72% |
| **PB1-16-00328-03** | ARS1-16-00670 | 003 | 229600 | 229512 | 6.69 | 811.20 | 804.51 | | | | | 780.06 | 773.37 | 96.13% | 3.87% |
| **PB1-16-00328-04** | ARS1-16-00670 | 004 | 229601 | 229513 | 6.69 | 751.73 | 745.04 | | | | | 719.92 | 713.23 | 95.73% | 4.27% |
| **PB1-16-00328-05** | ARS1-16-00670 | 005 | 229602 | 229514 | 6.67 | 824.39 | 817.72 | | | | | 788.84 | 782.17 | 95.65% | 4.35% |
| **PB1-16-00328-06** | ARS1-16-00670 | 006 | 229603 | 229515 | 6.72 | 830.60 | 823.88 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 794.40 | 787.68 | 95.61% | 4.39% |
| **PB1-16-00328-07** | ARS1-16-00670 | 007 | 229604 | 229516 | 6.65 | 843.83 | 837.18 | | | | | 811.91 | 805.26 | 96.19% | 3.81% |
| **PB1-16-00328-08** | ARS1-16-00670 | 008 | 229605 | 229517 | 6.71 | 839.85 | 833.14 | | | | | 817.64 | 810.93 | 97.33% | 2.67% |
| **PB1-16-00328-09** | ARS1-16-00670 | 009 | 229606 | 229518 | 6.64 | 719.74 | 713.10 | | | | | 691.82 | 685.18 | 96.08% | 3.92% |
| **PB1-16-00328-10** | ARS1-16-00670 | 010 | 229607 | 229519 | 6.63 | 768.23 | 761.60 | | | | | 737.81 | 731.18 | 96.01% | 3.99% |
| **PB1-16-00328-11** | ARS1-16-00670 | 011 | 229609 | 229520 | 6.68 | 780.01 | 773.33 | | | | | 747.12 | 740.44 | 95.75% | 4.25% |
| **PB1-16-00328-12** | ARS1-16-00670 | 012 | 229610 | 229521 | 14.19 | 965.18 | 950.99 | | | | | 914.13 | 899.94 | 94.63% | 5.37% |
| **PB1-16-00328-13** | ARS1-16-00670 | 013 | 229612 | 229522 | 6.71 | 765.42 | 758.71 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 733.50 | 726.79 | 95.79% | 4.21% |
| **PB1-16-00328-14** | ARS1-16-00670 | 014 | 229613 | 229523 | 6.73 | 714.94 | 708.21 | | | | | 671.41 | 664.68 | 93.85% | 6.15% |
| **PB1-16-00328-15** | ARS1-16-00670 | 015 | 229616 | 229524 | 6.74 | 801.78 | 795.04 | | | | | 770.23 | 763.49 | 96.03% | 3.97% |
| **PB1-16-00328-16** | ARS1-16-00670 | 016 | 229617 | 229525 | 6.65 | 1075.53 | 1068.88 | | | | | 993.81 | 987.16 | 92.35% | 7.65% |
| **PB1-16-00328-17** | ARS1-16-00670 | 017 | 229619 | 229526 | 6.71 | 888.51 | 881.80 | | | | | 812.93 | 806.22 | 91.43% | 8.57% |
| **PB1-16-00328-18** | ARS1-16-00670 | 018 | 229620 | 229527 | 6.73 | 838.02 | 831.29 | | | | | 783.17 | 776.44 | 93.40% | 6.60% |
| **PB1-16-00328-19** | ARS1-16-00670 | 019 | 229621 | 229528 | 6.63 | 955.95 | 949.32 | | | | | 891.69 | 885.06 | 93.23% | 6.77% |
| **PB1-16-00328-20** | ARS1-16-00670 | 020 | 229622 | 229529 | 6.62 | 1038.44 | 1031.82 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 958.65 | 952.03 | 92.27% | 7.73% |

N-519

DCN: ITSI-0808-0004-0076, 8 May 2019

## Prep Batch Report - Gamma Spec Aliquot

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Type | Geometry | Tare g | Cont+Sample g | Net Sample g |
|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00329-01** | ARS1-16-00670 | 021 | 229699 | 229530 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.92 | 395.30 | 347.38 |
| **PB1-16-00329-02** | ARS1-16-00670 | 022 | 229701 | 229531 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.74 | 343.55 | 295.81 |
| **PB1-16-00329-03** | ARS1-16-00670 | 023 | 229702 | 229532 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.95 | 445.98 | 398.03 |
| **PB1-16-00329-04** | ARS1-16-00670 | 024 | 229703 | 229533 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.84 | 428.35 | 380.51 |
| **PB1-16-00329-05** | ARS1-16-00670 | 025 | 229704 | 229534 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.84 | 395.30 | 347.46 |
| **PB1-16-00329-06** | ARS1-16-00670 | 026 | 229705 | 229535 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.70 | 453.44 | 405.74 |
| **PB1-16-00329-07** | ARS1-16-00670 | 027 | 229706 | 229536 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.96 | 447.45 | 399.49 |
| **PB1-16-00329-08** | ARS1-16-00670 | 028 | 229707 | 229537 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.70 | 408.03 | 360.33 |
| **PB1-16-00329-09** | ARS1-16-00670 | 029 | 229708 | 229538 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.78 | 403.51 | 355.73 |
| **PB1-16-00329-10** | ARS1-16-00670 | 030 | 229709 | 229539 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.78 | 371.15 | 323.37 |
| **PB1-16-00329-11** | ARS1-16-00670 | 031 | 229710 | 229540 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.83 | 370.67 | 322.84 |
| **PB1-16-00329-12** | ARS1-16-00670 | 032 | 229711 | 229541 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.90 | 391.68 | 343.78 |
| **PB1-16-00329-13** | ARS1-16-00671 | 001 | 229746 | 229542 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.74 | 405.77 | 358.03 |
| **PB1-16-00329-14** | ARS1-16-00671 | 002 | 229747 | 229543 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.57 | 411.06 | 363.49 |
| **PB1-16-00329-15** | ARS1-16-00671 | 003 | 229748 | 229544 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.76 | 373.71 | 325.95 |
| **PB1-16-00329-16** | ARS1-16-00671 | 004 | 229749 | 229545 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.76 | 413.99 | 366.23 |
| **PB1-16-00329-17** | ARS1-16-00671 | 005 | 229750 | 229546 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.57 | 397.52 | 349.95 |
| **PB1-16-00329-18** | ARS1-16-00671 | 006 | 229751 | 229547 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.18 | 451.31 | 404.13 |
| **PB1-16-00329-19** | ARS1-16-00671 | 007 | 229752 | 229548 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.62 | 385.07 | 337.45 |
| **PB1-16-00329-20** | ARS1-16-00671 | 008 | 229753 | 229549 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.71 | 359.59 | 311.88 |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Prep Batch Report - Percent Moisture

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Tare g | Cont+Sample g | Net Sample g | Oven ID | Oven Temp C | Start Time | Stop Time | Cont+Sample g | Net Sample g | % Solid | % Moisure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00329-01** | ARS1-16-00670 | 021 | 229623 | 229530 | 14.21 | 1339.50 | 1325.29 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 1173.33 | 1159.12 | 87.46% | 12.54% |
| **PB1-16-00329-02** | ARS1-16-00670 | 022 | 229624 | 229531 | 6.60 | 971.04 | 964.44 | | | | | 858.45 | 851.85 | 88.33% | 11.67% |
| **PB1-16-00329-03** | ARS1-16-00670 | 023 | 229625 | 229532 | 14.23 | 1320.22 | 1305.99 | | | | | 1082.89 | 1068.66 | 81.83% | 18.17% |
| **PB1-16-00329-04** | ARS1-16-00670 | 024 | 229626 | 229533 | 6.62 | 889.55 | 882.93 | | | | | 778.44 | 771.82 | 87.42% | 12.58% |
| **PB1-16-00329-05** | ARS1-16-00670 | 025 | 229627 | 229534 | 6.65 | 1033.33 | 1026.68 | | | | | 911.67 | 905.02 | 88.15% | 11.85% |
| **PB1-16-00329-06** | ARS1-16-00670 | 026 | 229628 | 229535 | 6.65 | 1022.66 | 1016.01 | | | | | 895.82 | 889.17 | 87.52% | 12.48% |
| **PB1-16-00329-07** | ARS1-16-00670 | 027 | 229629 | 229536 | 6.67 | 1044.20 | 1037.53 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 882.47 | 875.80 | 84.41% | 15.59% |
| **PB1-16-00329-08** | ARS1-16-00670 | 028 | 229630 | 229537 | 6.67 | 862.98 | 856.31 | | | | | 804.70 | 798.03 | 93.19% | 6.81% |
| **PB1-16-00329-09** | ARS1-16-00670 | 029 | 229631 | 229538 | 6.65 | 897.25 | 890.60 | | | | | 759.18 | 752.53 | 84.50% | 15.50% |
| **PB1-16-00329-10** | ARS1-16-00670 | 030 | 229632 | 229539 | 6.64 | 1146.51 | 1139.87 | | | | | 1014.63 | 1007.99 | 88.43% | 11.57% |
| **PB1-16-00329-11** | ARS1-16-00670 | 031 | 229633 | 229540 | 6.65 | 935.75 | 929.10 | | | | | 821.18 | 814.53 | 87.67% | 12.33% |
| **PB1-16-00329-12** | ARS1-16-00670 | 032 | 229634 | 229541 | 6.65 | 969.63 | 962.98 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 846.58 | 839.93 | 87.22% | 12.78% |
| **PB1-16-00329-13** | ARS1-16-00671 | 001 | 229635 | 229542 | 6.67 | 955.75 | 949.08 | | | | | 862.03 | 855.36 | 90.13% | 9.87% |
| **PB1-16-00329-14** | ARS1-16-00671 | 002 | 229636 | 229543 | 6.64 | 650.01 | 643.37 | | | | | 593.59 | 586.95 | 91.23% | 8.77% |
| **PB1-16-00329-15** | ARS1-16-00671 | 003 | 229637 | 229544 | 6.61 | 693.53 | 686.92 | | | | | 653.42 | 646.81 | 94.16% | 5.84% |
| **PB1-16-00329-16** | ARS1-16-00671 | 004 | 229638 | 229545 | 6.63 | 810.22 | 803.59 | | | | | 726.28 | 719.65 | 89.55% | 10.45% |
| **PB1-16-00329-17** | ARS1-16-00671 | 005 | 229639 | 229546 | 6.62 | 772.33 | 765.71 | | | | | 715.54 | 708.92 | 92.58% | 7.42% |
| **PB1-16-00329-18** | ARS1-16-00671 | 006 | 229640 | 229547 | 6.65 | 696.18 | 689.53 | | | | | 659.00 | 652.35 | 94.61% | 5.39% |
| **PB1-16-00329-19** | ARS1-16-00671 | 007 | 229641 | 229548 | 6.68 | 707.58 | 700.90 | | | | | 645.52 | 638.84 | 91.15% | 8.85% |
| **PB1-16-00329-20** | ARS1-16-00671 | 008 | 229642 | 229549 | 6.69 | 734.26 | 727.57 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 654.88 | 648.19 | 89.09% | 10.91% |

# Preanalytical
# Sample Preparation Review Checklist

**Prep Batch/SDG:** ARS1-16-00670 **Sample Matrix:** SO

☐ Check if sample(s) are re-prepped

**SAMPLE PREPARATION**

| (All "No" Responses Require a Comment) | Prep. Tech. Review | |
|---|---|---|
| 1) Sample IDs Correspond to LIMS SDG Information? | Yes No N/A | |
| 2) Drying Oven Temperature Check is within Tolerance? | Yes No N/A | |
| 3) Balance checks are current and balance is in tolerance? | Yes No N/A | |
| 4) Cleanliness of preparation equipment has been verified? (Including grinders, mortar & pestle, spatulas, etc...) | Yes No N/A | |
| 5) Samples Dried? | Yes No N/A | |
| 6) 100% of Manual Transcriptions/Calculations Verified? | Yes No N/A | |
| 7) Samples ground/pulverized? (*if YES, a PrepBlank is required*) | Yes No N/A | |
| a) If PrepBlank Required, Enter the PrepBlank SDG Here → | ARS1- | |
| 8) Samples ground with Mortar & Pestle? (*PrepBlank is not required*) | Yes No N/A | |
| 9) Samples crushed with hammer? (*PrepBlank is not required*) | Yes No N/A | |
| 10) Visual Inspection Verifies Homogenization Method(s) Effective? | Yes No N/A | |
| 11) Preparation area is clean and decontaminated? | Yes No N/A | |
| 12) Sample Prep Anomaly? ☐ No ☐ Yes (See Tech Notes) NCR # (If initiated): | | |

3-29-16 1230
Preanalytical Prep Technician Signature Date/Time

Lot# of sand blank (if PrepBlank required)

**BATCH QC VALIDATION** (***Section below must be completed ONLY if a PrepBlank is required***)

| (All "No" Responses Require a Comment) | Proj. Mgr. Review | QA Review |
|---|---|---|
| 1) Preparation Blank criteria met. | Yes No N/A | Yes No N/A |
| 2) Prep Batch Blank Anomaly? ☐ No ☐ Yes (See Tech Notes) NCR # (If initiated): | | |

Project Manager Signature Date

QA Signature Date

**COMMENTS**

ARS1-16-00670-022 is bias low

DCN: ITSI-0808-0004-0076, 8 May 2019

## ARS01 Calibration Polynomial

250 mL Thin Can

**STD#** **1748-90-1** **Cal Date** 1/19/2016

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.2133 | 213300 | 222540 | 11.49% | 9240 | 4.33% | **PASS** |
| Am241 | 0.02113 | 21130 | 22065 | 5.49% | 935 | 4.42% | **PASS** |
| Cd109 | 0.2039 | 203900 | 224130 | 10.00% | 20230 | 9.92% | **PASS** |
| Co57 | 0.007394 | 7394 | 7581.1 | 10.00% | 187.1 | 2.53% | **PASS** |
| Te123m | 0.01066 | 10660 | 11400 | 10.00% | 740 | 6.94% | **PASS** |
| Cr51 | 0.2517 | 251700 | | 10.00% | 251700 | 100.00% | **NOT MEASURED** |
| Sn113 | 0.03574 | 35740 | | 10.00% | 35740 | 100.00% | **NOT MEASURED** |
| Sr85 | 0.04568 | 45680 | 46171 | 5.49% | 491 | 1.07% | **PASS** |
| Cs137 | 0.03171 | 31710 | 32969 | 10.00% | 1259 | 3.97% | **PASS** |
| Co60 | 0.03965 | 39650 | 38797 | 5.49% | 853 | 2.15% | **PASS** |
| Y88 | 0.07337 | 73370 | 75939 | 5.49% | 2569 | 3.50% | **PASS** |

WJS 1-19-16

1-19-16

0.88 Spectrum name: ARS01751.An1

Sample description
Batch ID: CALVER
SDG: 1748-90-1 250 mL Tuna Can Polynomial Tech: WJS

Spectrum Filename: C:\User\ARS01751.An1

Acquisition information
Start time: 19-Jan-2016 08:27:55
Live time: 600
Real time: 611
Dead time: 1.82 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 0 ( 0.29keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01751.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Oct-2014 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0726

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 29.27 | 122. | 18.10 | 0.89 | 1.531E-02 | | | | |
| 32.09 | 313. | 12.24 | 0.89 | 1.701E-02 | | | | |
| 36.38 | 219. | 23.29 | 0.65 | 1.959E-02 | | | | |
| 46.44 | 4848. | 2.38 | 0.88 | 2.565E-02 | 46.52 | 4.000 | 2.225E+05 | PB210 |
| 59.46 | 6014. | 1.87 | 0.90 | 3.384E-02 | 59.54 | 36.300 | 2.206E+04 | AM241 |
| 88.00 | 3892. | 2.28 | 0.93 | 4.608E-02 | 88.03 | 3.610 | 2.241E+05 | CD109 |
| 122.05 | 2004. | 3.37 | 0.95 | 4.656E-02 | 122.07 | 85.600 | 7.581E+03 | CO57 |
| 136.22 | 319. | 15.30 | 1.01 | 4.486E-02 | | | | |
| 159.06 | 562. | 8.53 | 1.15 | 4.154E-02 | 159.00 | 83.500 | 1.140E+04 | TE123M |
| 391.76 | 727. | 8.58 | 1.08 | 2.135E-02 | 391.69 | 64.160 | 4.170E+04 | SN113 |
| 514.14 | 99. | 28.38 | 1.27 | 1.738E-02 | 513.99 | 99.280 | 4.184E+04 | SR85 |
| 661.66 | 8728. | 1.20 | 1.42 | 1.442E-02 | 661.66 | 85.210 | 3.297E+04 | CS137 |
| 736.14 | 98. | 25.33 | 0.87 | 1.332E-02 | | | | |
| 897.75 | 981. | 6.13 | 1.58 | 1.148E-02 | 898.02 | 95.000 | 8.864E+04 | Y88 |
| 1173.09 | 6726. | 1.29 | 1.69 | 9.298E-03 | 1173.24 | 99.900 | 3.870E+04 | CO60 |
| 1332.36 | 6073. | 1.31 | 1.80 | 8.348E-03 | 1332.50 | 99.982 | 3.889E+04 | CO60 |
| 1836.02 | 471. | 4.61 | 1.60 | 6.152E-03 | 1836.01 | 99.350 | 7.594E+04 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 115.98 | 29.28 | 181. | 122. | 0.203 | 36.21 | 0.888 | TE-131 | lD |
| 127.29 | 32.10 | 633. | 313. | 0.522 | 30.72 | 1.094 | XE-138 | s |
| 144.40 | 36.38 | 794. | 219. | 0.365 | 46.58 | 0.653 | CE-141 | s |
| 543.94 | 136.22 | 621. | 319. | 0.532 | 30.61 | 1.014 | HF-181 | s |
| 2943.99 | 736.14 | 134. | 98. | 0.163 | 50.66 | 0.873 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.70 | 46.44 | 2225. | 4841. | 8.068 | 4.77 | 0.882 |
| AM-241 | 236.76 | 59.46 | 1665. | 6014. | 10.023 | 3.74 | 0.896 |
| CD-109 | 350.97 | 88.00 | 1233. | 3892. | 6.487 | 4.57 | 0.930 |
| CO-57 | 487.22 | 122.05 | 849. | 2004. | 3.340 | 6.73 | 0.953 |
| TE-123M | 635.31 | 159.06 | 547. | 562. | 0.936 | 17.06 | 1.148 |
| SN-113 | 1566.40 | 391.76 | 632. | 727. | 1.212 | 17.15 | 1.080s |
| SR-85 | 2056.71 | 514.32 | 309. | 110. | 0.183 | 56.55 | 0.835s |
| CS-137 | 2646.08 | 661.66 | 446. | 8728. | 14.546 | 2.39 | 1.417 |
| Y-88 | 3590.39 | 897.75 | 310. | 981. | 1.635 | 12.26 | 1.582s |
| CO-60 | 4691.49 | 1173.09 | 146. | 6726. | 11.210 | 2.57 | 1.687 |
| CO-60 | 5328.32 | 1332.36 | 36. | 6073. | 10.121 | 2.61 | 1.801 |
| Y-88 | 7341.72 | 1836.02 | 0. | 471. | 0.785 | 9.22 | 1.596s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| PB-210 | | 2.2254E+05 | | | | | | |
| | | | 46.52 | 2.225E+05 | (P | 1.023E+04 | 2.38E+00 G | |
| AM-241 | | 2.2065E+04 | | | | | | |
| | | | 59.54 | 2.206E+04 | ( | 7.076E+02 | 1.87E+00 G | |
| CD-109 | | 2.2413E+05 | | | | | | |
| | | | 88.03 | 2.241E+05 | ( | 9.579E+03 | 2.28E+00 G | |
| CO-57 | | 7.5811E+03 | | | | | | |
| | | | 122.07 | 7.581E+03 | ( | 5.239E+02 | 3.37E+00 G | |
| TE-123M | | 1.1400E+04 | | | | | | |
| | | | 159.00 | 1.140E+04 | ( | 2.268E+03 | 8.53E+00 G | |
| CR-51 | | 0.0000E+00 | | | | | | |
| | | | 320.07 | 0.000E+00 | &( | 0.000E+00 | 8.41E+02 G | |

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| SN-113 | 4.1704E+04 | | | | | |
| | | 391.69 | 4.170E+04 | ( | 6.876E+03 | 8.58E+00 G |
| SR-85 | 4.6171E+04 | | | | | |
| | | 513.99 | 4.617E+04 | ( | 3.567E+04 | 2.83E+01 G |
| CS-137 | 3.2969E+04 | | | | | |
| | | 661.66 | 3.297E+04 | ( | 3.822E+02 | 1.20E+00 G |
| CO-60 | 3.8797E+04 | | | | | |
| | | 1173.24 | 3.870E+04 | ( | 3.394E+02 | 1.29E+00 G |
| | | 1332.50 | 3.889E+04 | ( | 1.968E+02 | 1.31E+00 G |
| Y-88 | 7.5939E+04 | | | | | |
| | | 1836.01 | 7.594E+04 | ( | 1.188E+03 | 4.61E+00 G |
| | | 898.02 | 8.864E+04 | + | 7.658E+03 | 6.13E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

\- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

0.88 Spectrum name: ARS01751.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1292E+05 | 2.2254E+05 | 1.0624E+04 | 2.4401E+04 | 1.023E+04 |
| AM-241 | 2.2019E+04 | 2.2065E+04 | 8.2608E+02 | 1.9942E+03 | 7.076E+02 |
| CD-109 | 1.0537E+05 | 2.2413E+05 | 1.0236E+04 | 2.0411E+04 | 9.579E+03 |
| CO-57 | 2.2650E+03 | 7.5811E+03 | 5.1043E+02 | 7.2396E+02 | 5.239E+02 |
| TE-123M | 7.2934E+02 | 1.1400E+04 | 1.9445E+03 | 2.1097E+03 | 2.268E+03 |
| CR-51 #A | -8.7744E+01 | >12 Halflives | 1.4764E+03 | 1.4765E+03 | 2.479E+03 |
| SN-113 # | 2.3898E+03 | 4.1704E+04 | 7.1528E+03 | 7.8421E+03 | 6.876E+03 |
| SR-85 | 2.8604E+02 | 4.6171E+04 | 2.6111E+04 | 2.6287E+04 | 3.567E+04 |
| CS-137 | 3.2000E+04 | 3.2969E+04 | 7.8893E+02 | 1.6427E+03 | 3.822E+02 |
| CO-60 | 3.2701E+04 | 3.8797E+04 | 7.1120E+02 | 1.6107E+03 | 3.394E+02 |
| Y-88 | 3.4714E+03 | 7.5939E+04 | 6.9982E+03 | 8.2911E+03 | 1.188E+03 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 0.3 to 2000.7 keV) 4.141E+05 pCi/g
Total Decayed Activity ( 0.3 to 2000.7 keV) 7.2329388E+05 pCi/g

DCN: ITSI-0808-0004-0076, 8 May 2019

## ARS01 Calibration Verification Polynomial

250 mL Thru 6a

**STD#** **1595-98-4** **Cal Date** 1/19/2016

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.232 | 232000 | 245910 | 11.49% | 13910 | 6.00% | **PASS** |
| Am241 | 0.02273 | 22730 | 23337 | 5.49% | 607 | 2.67% | **PASS** |
| Cd109 | 0.2223 | 222300 | | 10.00% | 222300 | 100.00% | **NOT MEASURED** |
| Co57 | 0.008038 | 8038 | | 10.00% | 8038 | 100.00% | **NOT MEASURED** |
| Te123m | 0.01098 | 10980 | | 10.00% | 10980 | 100.00% | **NOT MEASURED** |
| Cr51 | 0.2766 | 276600 | | 10.00% | 276600 | 100.00% | **NOT MEASURED** |
| Sn113 | 0.04358 | 43580 | | 10.00% | 43580 | 100.00% | **NOT MEASURED** |
| Sr85 | 0.05122 | 51220 | | 5.49% | 51220 | 100.00% | **NOT MEASURED** |
| Cs137 | 0.03546 | 35460 | 35609 | 10.00% | 149 | 0.42% | **PASS** |
| Co60 | 0.04279 | 42790 | 41468 | 5.49% | 1322 | 3.09% | **PASS** |
| Y88 | 0.07866 | 78660 | | 5.49% | 78660 | 100.00% | **NOT MEASURED** |

WTS 1-19-16

0.88 Spectrum name: ARS01752.An1

Sample description
Batch ID: Calibration Verification
SDG: 1595-98-4 250 mL Tuna Can Polynomial Tech: WJS

Spectrum Filename: C:\User\ARS01752.An1

Acquisition information
Start time: 19-Jan-2016 08:41:35
Live time: 600
Real time: 610
Dead time: 1.60 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 0 ( 0.29keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01752.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Jul-2012 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 7 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0741

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 29.59 | 133. | 17.39 | 0.89 | 1.544E-02 | | | | |
| 32.06 | 352. | 10.20 | 0.89 | 1.693E-02 | | | | |
| 36.39 | 177. | 27.07 | 1.06 | 1.960E-02 | | | | |
| 46.44 | 4962. | 2.32 | 0.90 | 2.565E-02 | 46.52 | 4.000 | 2.459E+05 | PB210 |
| 59.44 | 6338. | 1.75 | 0.91 | 3.383E-02 | 59.54 | 36.300 | 2.334E+04 | AM241 |
| 87.92 | 1246. | 6.61 | 0.89 | 4.607E-02 | 88.03 | 3.610 | 2.652E+05 | CD109 |
| 122.11 | 284. | 21.07 | 0.95 | 4.655E-02 | 122.07 | 85.600 | 8.686E+03 | CO57 |
| 393.86 | 68. | 35.63 | 0.90 | 2.127E-02 | | | | |
| 661.66 | 8951. | 1.13 | 1.39 | 1.442E-02 | 661.66 | 85.210 | 3.561E+04 | CS137 |
| 1173.09 | 5314. | 1.47 | 1.73 | 9.298E-03 | 1173.24 | 99.900 | 4.111E+04 | CO60 |
| 1332.37 | 4859. | 1.46 | 1.70 | 8.348E-03 | 1332.50 | 99.982 | 4.183E+04 | CO60 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 117.25 | 29.50 | 200. | 133. | 0.221 | 34.78 | 0.888 | TE-131 | lD |
| 126.76 | 31.97 | 560. | 347. | 0.578 | 27.12 | 1.083 | XE-138 | s |
| 144.46 | 36.39 | 706. | 177. | 0.295 | 54.13 | 1.058 | XE-138 | |
| 1574.80 | 393.86 | 197. | 68. | 0.114 | 62.85 | 0.900 | AU-196 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

0.88 Spectrum name: ARS01752.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.67 | 46.44 | 2169. | 4955. | 8.259 | 4.64 | 0.905 |
| AM-241 | 236.72 | 59.44 | 1491. | 6338. | 10.563 | 3.50 | 0.905 |
| CD-109 | 350.67 | 87.92 | 886. | 1246. | 2.078 | 13.21 | 0.894 |
| CO-57 | 487.49 | 122.11 | 788. | 284. | 0.472 | 42.14 | 0.952 |
| CS-137 | 2646.08 | 661.66 | 331. | 8951. | 14.919 | 2.26 | 1.394 |
| CO-60 | 4691.48 | 1173.09 | 110. | 5314. | 8.856 | 2.95 | 1.727 |
| CO-60 | 5328.35 | 1332.37 | 25. | 4859. | 8.098 | 2.92 | 1.696 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| Nuclide Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| PB-210 | | 2.4591E+05 | | | | | | |
| | | | 46.52 | 2.459E+05 | (P | 1.090E+04 | 2.32E+00 | G |
| AM-241 | | 2.3337E+04 | | | | | | |
| | | | 59.54 | 2.334E+04 | ( | 6.725E+02 | 1.75E+00 | G |
| CD-109 | | 2.6519E+05 | | | | | | |
| | | | 88.03 | 2.652E+05 | ( | 3.008E+04 | 6.61E+00 | G |
| CO-57 | | 8.6857E+03 | | | | | | |
| | | | 122.07 | 8.686E+03 | ( | 4.092E+03 | 2.11E+01 | G |
| TE-123M | | 6.7614E+04 | | | | | | |
| | | | 159.00 | 6.761E+04 | %( | 3.033E+05 | 1.35E+02 | G |
| CR-51 | | 0.0000E+00 | | | | | | |
| | | | 320.07 | 0.000E+00 | &( | 0.000E+00 | 2.52E+02 | G |
| SN-113 | | -1.3577E+05 | | | | | | |
| | | | 391.69 | -1.358E+05 | %( | 9.296E+05 | 2.04E+02 | G |
| SR-85 | | 0.0000E+00 | | | | | | |
| | | | 513.99 | 0.000E+00 | &( | 0.000E+00 | 2.64E+02 | G |
| CS-137 | | 3.5609E+04 | | | | | | |
| | | | 661.66 | 3.561E+04 | ( | 3.478E+02 | 1.13E+00 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| CO-60 | 4.1468E+04 | | | | | |
| | | 1173.24 | 4.111E+04 | ( | 3.999E+02 | 1.47E+00 G |
| | | 1332.50 | 4.183E+04 | ( | 2.253E+02 | 1.46E+00 G |
| Y-88 | 0.0000E+00 | | | | | |
| | | 1836.01 | 0.000E+00 | %( | 0.000E+00 | 5.36E+01 G |
| | | 898.02 | 0.000E+00 | % | 0.000E+00 | 4.30E+02 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1797E+05 | 2.4591E+05 | 1.1424E+04 | 2.6828E+04 | 1.090E+04 |
| AM-241 | 2.3205E+04 | 2.3337E+04 | 8.1681E+02 | 2.0863E+03 | 6.725E+02 |
| CD-109 | 3.3746E+04 | 2.6519E+05 | 3.5038E+04 | 4.0795E+04 | 3.008E+04 |
| CO-57 | 3.2043E+02 | 8.6857E+03 | 3.6606E+03 | 3.7076E+03 | 4.092E+03 |
| TE-123M#A | 3.7051E+01 | 6.7614E+04 | 1.8196E+05 | 1.8202E+05 | 3.033E+05 |
| CR-51 #A | -2.5002E+02 | >12 Halflives | 1.2580E+03 | 1.2582E+03 | 2.110E+03 |

0.88 Spectrum name: ARS01752.An1

| | | | | | | |
|---|---|---|---|---|---|---|
| SN-113 | #A | -5.5075E+01 | -1.3577E+05 | 5.5490E+05 | 5.5500E+05 | 9.296E+05 |
| SR-85 | #A | 2.5131E+01 | >12 Halflives | 1.3255E+02 | 1.3256E+02 | 2.238E+02 |
| CS-137 | | 3.2820E+04 | 3.5609E+04 | 8.0513E+02 | 1.7522E+03 | 3.478E+02 |
| CO-60 | | 2.5998E+04 | 4.1468E+04 | 8.6114E+02 | 1.7685E+03 | 3.999E+02 |
| Y-88 | #A | 6.7366E+01 | >12 Halflives | 7.2157E+01 | 7.2265E+01 | 1.135E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 0.3 to 2000.7 keV) 3.341E+05 pCi/g
Total Decayed Activity ( 0.3 to 2000.7 keV) 6.2020769E+05 pCi/g

Calibration Data from file: 250 Tuna Can 1748-90-1 calib POLY.Clb
Energy Calibration Date: 01/19/16 Time: 08:23:39
Efficiency Calibration Date: 01/19/16 Time: 08:26:21

Calibration Description:
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration Fit
Energy = 0.2903 +0.249886*Channel +2.10078e-008*Channel**2
FWHM (ch) = 3.4569 +0.000837*Channel -2.07953e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 184.69 | 46.52 | 46.44 | 0.17% | 0.91 | 0.90 | 1.27% |
| 236.77 | 59.54 | 59.46 | 0.14% | 0.91 | 0.91 | 0.15% |
| 350.97 | 88.03 | 88.00 | 0.04% | 0.93 | 0.94 | -0.30% |
| 487.27 | 122.07 | 122.06 | 0.01% | 0.98 | 0.96 | 1.28% |
| 635.18 | 159.00 | 159.02 | -0.01% | 0.96 | 0.99 | -3.30% |
| 1566.83 | 391.69 | 391.87 | -0.05% | 1.13 | 1.18 | -4.68% |
| 2056.17 | 513.99 | 514.19 | -0.04% | 1.34 | 1.27 | 4.81% |
| 2646.09 | 661.66 | 661.66 | 0.00% | 1.40 | 1.38 | 1.15% |
| 3591.31 | 898.02 | 897.98 | 0.00% | 1.56 | 1.55 | 0.87% |
| 4691.54 | 1173.24 | 1173.10 | 0.01% | 1.70 | 1.73 | -1.67% |
| 5328.39 | 1332.50 | 1332.38 | 0.01% | 1.82 | 1.83 | -0.85% |
| 7342.10 | 1836.01 | 1836.11 | -0.01% | 2.13 | 2.12 | 0.56% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.3461 %
Coefficients:
-0.471012 -4.418322 0.369091 -0.030686 0.000871 -0.000008

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.5701E-002 | 2.5602E-002 | 0.38% |
| 59.54 | 3.3547E-002 | 3.3893E-002 | -1.03% |
| 88.03 | 4.7257E-002 | 4.6090E-002 | 2.47% |
| 122.07 | 4.6407E-002 | 4.6558E-002 | -0.32% |
| 159.00 | 4.0136E-002 | 4.1547E-002 | -3.52% |
| 391.69 | 2.2020E-002 | 2.1358E-002 | 3.01% |
| 661.66 | 1.4958E-002 | 1.4418E-002 | 3.61% |
| 898.02 | 1.1325E-002 | 1.1480E-002 | -1.37% |
| 1173.24 | 8.9467E-003 | 9.2967E-003 | -3.91% |
| 1332.50 | 8.1109E-003 | 8.3468E-003 | -2.91% |
| 1836.01 | 6.3719E-003 | 6.1516E-003 | 3.46% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/01/14 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/01/14 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/01/14 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/01/14 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/01/14 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/01/14 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/01/14 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/01/14 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/01/14 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/01/14 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/01/14 14:00:00 |

DCN: ITSI-0808-0004-0076, 8 May 2019

## ARS05 Polynomial ✓

**STD#** **1748-90-1** **Cal Date** 11/25/2014

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.2133 | 213300 | 222590 | 11.49% | 9290 | 4.36% | **PASS** |
| Am241 | 0.02113 | 21130 | 21512 | 5.49% | 382 | 1.81% | **PASS** |
| Cd109 | 0.2039 | 203900 | 206210 | 10.00% | 2310 | 1.13% | **PASS** |
| Co57 | 0.007394 | 7394 | 7441.8 | 10.00% | 47.8 | 0.65% | **PASS** |
| Te123m | 0.01066 | 10660 | 9919.7 | 10.00% | 740.3 | 6.94% | **PASS** |
| Cr51 | 0.2517 | 251700 | 243540 | 10.00% | 8160 | 3.24% | **PASS** |
| Sn113 | 0.03574 | 35740 | 36409 | 10.00% | 669 | 1.87% | **PASS** |
| Sr85 | 0.04568 | 45680 | 46133 | 5.49% | 453 | 0.99% | **PASS** |
| Cs137 | 0.03171 | 31710 | 33908 | 10.00% | 2198 | 6.93% | **PASS** |
| Co60 | 0.03965 | 39650 | 39140 | 5.49% | 510 | 1.29% | **PASS** |
| Y88 | 0.07337 | 73370 | 74234 | 5.49% | 864 | 1.18% | **PASS** |

WJS 6-10-15

250 mL Tube Can

6/10-15

N-536

Calibration Data from file: 250mL Tuna Can ITSI.Clb
Energy Calibration Date: 11/25/2014 Time: 08:56:23
Efficiency Calibration Date: 11/25/2014 Time: 10:50:52

Calibration Description:
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 11-25-14

Energy Calibration Fit
Energy = 0.2556 +0.249791*Channel -1.33478e-009*Channel**2
FWHM (ch) = 2.9125 +0.001134*Channel -3.2178e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.16 | 46.52 | 46.51 | 0.03% | 0.78 | 0.78 | -0.31% |
| 237.33 | 59.54 | 59.54 | 0.00% | 0.79 | 0.79 | -1.02% |
| 351.46 | 88.03 | 88.05 | -0.01% | 0.83 | 0.83 | 0.85% |
| 487.76 | 122.07 | 122.09 | -0.02% | 0.85 | 0.86 | -1.73% |
| 635.50 | 159.00 | 159.00 | 0.00% | 0.93 | 0.90 | 2.41% |
| 1280.35 | 320.07 | 320.07 | -0.00% | 1.11 | 1.08 | 2.57% |
| 1567.04 | 391.69 | 391.68 | 0.00% | 1.14 | 1.15 | -1.22% |
| 2056.57 | 513.99 | 513.96 | 0.01% | 1.26 | 1.28 | -0.96% |
| 2647.79 | 661.66 | 661.64 | 0.00% | 1.41 | 1.42 | -0.77% |
| 3594.27 | 898.02 | 898.05 | -0.00% | 1.62 | 1.64 | -1.41% |
| 4696.02 | 1173.24 | 1173.25 | -0.00% | 1.89 | 1.88 | 0.48% |
| 5333.58 | 1332.50 | 1332.50 | 0.00% | 2.04 | 2.01 | 1.46% |
| 7349.45 | 1836.01 | 1836.01 | 0.00% | 2.36 | 2.38 | -0.50% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.5201 %
Coefficients:
-0.306766 -4.512900 0.474502 -0.050620 0.002132 -0.000033

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.7277E-002 | 2.7230E-002 | 0.17% |
| 59.54 | 3.4153E-002 | 3.4317E-002 | -0.48% |
| 88.03 | 4.5357E-002 | 4.4717E-002 | 1.41% |
| 122.07 | 4.7290E-002 | 4.7970E-002 | -1.44% |
| 320.07 | 2.8227E-002 | 2.8415E-002 | -0.66% |
| 391.69 | 2.4573E-002 | 2.4295E-002 | 1.13% |
| 513.99 | 1.9414E-002 | 1.9766E-002 | -1.81% |
| 661.66 | 1.7460E-002 | 1.6454E-002 | 5.76% |
| 898.02 | 1.2982E-002 | 1.3302E-002 | -2.46% |
| 1173.24 | 1.0871E-002 | 1.1066E-002 | -1.80% |
| 1332.50 | 9.9745E-003 | 1.0121E-002 | -1.46% |
| 1836.01 | 8.1120E-003 | 7.9677E-003 | 1.78% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/1/2014 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/1/2014 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/1/2014 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/1/2014 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/1/2014 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/1/2014 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/1/2014 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/1/2014 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/1/2014 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/1/2014 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/1/2014 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/1/2014 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/1/2014 14:00:00 |

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

Sample description
250mL Tuna Can 1748-90-1

Spectrum Filename: C:\User\ARCHIVES\4-21-14 TO 1-2-15\ARS05302.An1

Acquisition information

| | |
|---|---|
| Start time: | 11/25/2014 12:06:19 |
| Live time: | 600 |
| Real time: | 618 |
| Dead time: | 2.84 % |
| Detector ID: | 37 |

Detector system
(ARS05) MCB 338

Calibration

| | |
|---|---|
| Filename: | 250mL Tuna Can ITSI.Clb |

250mL Tuna Can 1.5g/cc 1748-90-1 BZF 11-25-14

Energy Calibration

| | |
|---|---|
| Created: | 11/25/2014 08:56:23 |
| Zero offset: | 0.256 keV |
| Gain: | 0.250 keV/channel |
| Quadratic: | -1.335E-09 keV/channel^2 |

Efficiency Calibration

| | |
|---|---|
| Created: | 11/25/2014 10:50:52 |
| Type: | Polynomial |
| Uncertainty: | 1.520 % |
| Coefficients: | -0.306766 -4.512900 0.474502 |
| | -0.050620 0.002132 -0.000033 |

Library Files

| | |
|---|---|
| Main analysis library: | northamericancal.Lib |
| Library Match Width: | 0.500 |
| Peak stripping: | Library based |

Analysis parameters

| | |
|---|---|
| Analysis engine: | Env32 G53W4.24 |
| Start channel: | 0 ( 0.26keV ) |
| Stop channel: | 8000 ( 1998.49keV ) |
| Peak rejection level: | 40.000% |
| Peak search sensitivity: | 3 |
| Sample Size: | 1.0000E+00 |
| Activity scaling factor: | 1.0000E+06/( 1.0000E+00* 1.0000E+00) = 1.0000E+06 |
| Detection limit method: | Reg. Guide 4.16 Method |
| Random error: | 1.0000000E+00 |
| Systematic error: | 1.0000000E+00 |
| Fraction Limit: | 60.000% |
| Background width: | best method (based on spectrum). |
| Half lives decay limit: | 12.000 |

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 10/1/2014 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc northamericancal.Pbc 11/25/2014 07:43:45 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0192

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.57 | 400. | 7.97 | 0.75 | 1.354E-02 | | | | |
| 22.16 | 1224. | 4.32 | 0.75 | 1.438E-02 | | | | |
| 24.89 | 936. | 6.28 | 0.76 | 1.583E-02 | | | | |
| 27.55 | 401. | 12.74 | 0.76 | 1.723E-02 | | | | |
| 31.82 | 248. | 27.73 | 0.63 | 1.951E-02 | | | | |
| 46.49 | 5368. | 2.29 | 0.76 | 2.726E-02 | 46.52 | 4.000 | 2.226E+05 | PB210 |
| 59.52 | 5948. | 2.21 | 0.75 | 3.431E-02 | 59.54 | 36.300 | 2.151E+04 | AM241 |
| 88.04 | 6773. | 1.96 | 0.81 | 4.472E-02 | 88.03 | 3.610 | 2.062E+05 | CD109 |
| 122.10 | 5899. | 2.41 | 0.86 | 4.797E-02 | 122.07 | 85.600 | 7.442E+03 | CO57 |
| 136.51 | 741. | 11.36 | 0.97 | 4.725E-02 | | | | |
| 158.99 | 6021. | 2.14 | 0.92 | 4.500E-02 | 159.00 | 83.500 | 9.920E+03 | TE123M |
| 184.88 | 179. | 39.49 | 0.52 | 4.180E-02 | | | | |
| 255.21 | 486. | 15.75 | 1.24 | 3.375E-02 | | | | |
| 320.10 | 3810. | 3.03 | 1.10 | 2.841E-02 | 320.07 | 9.830 | 2.429E+05 | CR51 |
| 391.70 | 9051. | 1.31 | 1.12 | 2.429E-02 | 391.69 | 64.160 | 3.641E+04 | SN113 |
| 513.98 | 11162. | 1.22 | 1.23 | 1.977E-02 | 513.99 | 99.280 | 4.613E+04 | SR85 |
| 519.30 | 152. | 25.40 | 0.38 | 1.962E-02 | | | | |
| 661.67 | 10518. | 1.16 | 1.39 | 1.645E-02 | 661.66 | 85.210 | 3.391E+04 | CS137 |
| 898.09 | 14005. | 0.96 | 1.63 | 1.330E-02 | 898.02 | 95.000 | 7.133E+04 | Y88 |
| 1173.26 | 9482. | 1.16 | 1.92 | 1.107E-02 | 1173.24 | 99.900 | 3.941E+04 | CO60 |
| 1332.54 | 8562. | 1.29 | 2.01 | 1.012E-02 | 1332.50 | 99.982 | 3.887E+04 | CO60 |
| 1836.03 | 9130. | 1.07 | 2.56 | 7.968E-03 | 1836.01 | 99.350 | 7.423E+04 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 81.26 | 20.52 | 406. | 304. | 0.507 | 21.94 | 0.750 | MO-99 | D |
| 87.61 | 22.10 | 1061. | 950. | 1.584 | 11.66 | 0.752 | RH-106 | D |
| 98.41 | 24.84 | 1743. | 945. | 1.575 | 17.39 | 1.344 | AG-110M | s |
| 109.05 | 27.50 | 1160. | 350. | 0.583 | 33.53 | 0.655 | SB-124 | |
| 126.36 | 31.82 | 1494. | 248. | 0.413 | 55.46 | 0.628 | XE-138 | s |
| 545.46 | 136.51 | 2004. | 741. | 1.235 | 22.73 | 0.970 | CO-57 | |
| 739.12 | 184.88 | 1606. | 179. | 0.298 | 78.98 | 0.521 | TH-234 | s |

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

| Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 1020.68 | 255.21 | 1532. | 486. | 0.809 | 31.51 | 1.243 | SN-113 | s |
| 2077.94 | 519.30 | 424. | 152. | 0.254 | 50.80 | 0.383 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.10 | 46.49 | 2778. | 5355. | 8.925 | 4.57 | 0.760s |
| AM-241 | 237.24 | 59.52 | 2972. | 5948. | 9.913 | 4.43 | 0.748 |
| CD-109 | 351.44 | 88.04 | 2937. | 6772. | 11.287 | 3.91 | 0.811 |
| CO-57 | 487.80 | 122.10 | 3320. | 5899. | 9.832 | 4.83 | 0.862 |
| TE-123M | 635.47 | 158.99 | 2640. | 6021. | 10.035 | 4.28 | 0.916 |
| CR-51 | 1280.47 | 320.10 | 2132. | 3821. | 6.368 | 6.22 | 1.102 |
| SN-113 | 1567.12 | 391.70 | 1287. | 9051. | 15.085 | 2.62 | 1.121 |
| SR-85 | 2056.63 | 513.98 | 1588. | 11162. | 18.603 | 2.44 | 1.229 |
| CS-137 | 2647.90 | 661.67 | 1061. | 10518. | 17.530 | 2.32 | 1.393 |
| Y-88 | 3594.41 | 898.09 | 819. | 14004. | 23.341 | 1.92 | 1.631 |
| CO-60 | 4696.06 | 1173.26 | 533. | 9482. | 15.803 | 2.33 | 1.918 |
| CO-60 | 5333.77 | 1332.54 | 425. | 8562. | 14.269 | 2.57 | 2.011 |
| Y-88 | 7349.55 | 1836.03 | 51. | 9130. | 15.216 | 2.14 | 2.560 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| PB-210 | | 2.2259E+05 | | | | | |
| | | | 46.52 | 2.226E+05 | @(P | 1.032E+04 2.29E+00 G | |
| AM-241 | | 2.1512E+04 | | | | | |
| | | | 59.54 | 2.151E+04 | (P | 9.287E+02 2.21E+00 G | |
| CD-109 | | 2.0621E+05 | | | | | |
| | | | 88.03 | 2.062E+05 | (P | 7.772E+03 1.96E+00 G | |

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CO-57 | 7.4418E+03 | | | | | | |
| | | 122.07 | 7.442E+03 | (P | 3.421E+02 | 2.41E+00 | G |
| TE-123M | 9.9197E+03 | | | | | | |
| | | 159.00 | 9.920E+03 | (P | 3.990E+02 | 2.14E+00 | G |
| CR-51 | 2.4354E+05 | | | | | | |
| | | 320.07 | 2.435E+05 | (P | 1.389E+04 | 3.11E+00 | G |
| SN-113 | 3.6409E+04 | | | | | | |
| | | 391.69 | 3.641E+04 | ( | 6.835E+02 | 1.31E+00 | G |
| SR-85 | 4.6133E+04 | | | | | | |
| | | 513.99 | 4.613E+04 | ( | 7.788E+02 | 1.22E+00 | G |
| CS-137 | 3.3908E+04 | | | | | | |
| | | 661.66 | 3.391E+04 | (P | 4.981E+02 | 1.16E+00 | G |
| CO-60 | 3.9140E+04 | | | | | | |
| | | 1173.24 | 3.941E+04 | (P | 4.585E+02 | 1.16E+00 | G |
| | | 1332.50 | 3.887E+04 | ( | 4.487E+02 | 1.29E+00 | G |
| Y-88 | 7.4234E+04 | | | | | | |
| | | 1836.01 | 7.423E+04 | (P | 2.937E+02 | 1.07E+00 | G |
| | | 898.02 | 7.133E+04 | - P | 6.930E+02 | 9.58E-01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 # | 2.2145E+05 | 2.2259E+05 | 1.0197E+04 | 2.4221E+04 | 1.032E+04 |
| AM-241 | 2.1506E+04 | 2.1512E+04 | 9.5257E+02 | 2.0080E+03 | 9.287E+02 |
| CD-109 | 1.8897E+05 | 2.0621E+05 | 8.0651E+03 | 1.7904E+04 | 7.772E+03 |
| CO-57 | 6.4712E+03 | 7.4418E+03 | 3.5935E+02 | 6.4654E+02 | 3.421E+02 |
| TE-123M | 7.2174E+03 | 9.9197E+03 | 4.2431E+02 | 8.7406E+02 | 3.990E+02 |
| CR-51 | 6.1619E+04 | 2.4354E+05 | 1.5151E+04 | 2.2584E+04 | 1.389E+04 |
| SN-113 | 2.6155E+04 | 3.6409E+04 | 9.5328E+02 | 2.8215E+03 | 6.835E+02 |
| SR-85 | 2.5621E+04 | 4.6133E+04 | 1.1245E+03 | 3.0677E+03 | 7.788E+02 |
| CS-137 | 3.3791E+04 | 3.3908E+04 | 7.8689E+02 | 1.5809E+03 | 4.981E+02 |
| CO-60 | 3.8373E+04 | 3.9140E+04 | 6.7889E+02 | 1.6118E+03 | 4.585E+02 |
| Y-88 | 5.1951E+04 | 7.4234E+04 | 1.5898E+03 | 4.6469E+03 | 2.937E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 24.7 to 1998.5 keV) 6.831E+05 pCi/g
Total Decayed Activity ( 24.7 to 1998.5 keV) 9.4103131E+05 pCi/g

DCN: ITSI-0808-0004-0076, 8 May 2019

# ARS05 Calibration Verification

| **STD#** | **1595-98-4** | | | **Cal Date** | 2/25/2016 | | |
|---|---|---|---|---|---|---|---|
| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
| Pb210 | 0.232 | 232000 | 246130 | 11.49% | 14130 | 6.09% | **PASS** |
| Am241 | 0.02273 | 22730 | 21828 | 5.49% | 902 | 3.97% | **PASS** |
| Cd109 | 0.2223 | 222300 | | 10.00% | 222300 | 100.00% | **NOT MEASURED** |
| Co57 | 0.008038 | 8038 | | 10.00% | 8038 | 100.00% | **NOT MEASURED** |
| Te123m | 0.01098 | 10980 | | 10.00% | 10980 | 100.00% | **NOT MEASURED** |
| Cr51 | 0.2766 | 276600 | | 10.00% | 276600 | 100.00% | **NOT MEASURED** |
| Sn113 | 0.04358 | 43580 | | 10.00% | 43580 | 100.00% | **NOT MEASURED** |
| Sr85 | 0.05122 | 51220 | | 5.49% | 51220 | 100.00% | **NOT MEASURED** |
| Cs137 | 0.03546 | 35460 | 34555 | 10.00% | 905 | 2.55% | **PASS** |
| Co60 | 0.04279 | 42790 | 40509 | 5.49% | 2281 | 5.33% | **PASS** |
| Y88 | 0.07866 | 78660 | | 5.49% | 78660 | 100.00% | **NOT MEASURED** |

250 mL Tank Cal
WJS 2-25-16

N-543

```
     ORTEC g v - i (3263) Env32  G53W4.24  2/25/2016 14:01:22
American Radiation Services     Spectrum name: ARS05007.An1

Sample description
     Batch ID: Calibration Verification
     SDG:  250mL Tuna Can 1595-98-4  Tech:  WJS

Spectrum Filename: C:\User\ARS05007.An1

Acquisition information
       Start time:                 2/25/2016 13:45:47
       Live time:                600
       Real time:                607
       Dead time:                  1.14 %
       Detector ID:                   1

Detector system
     (ARS05) MCB 338


Calibration
       Filename:                   250mL Tuna Can 1748-90-1 calib.Clb
     250mL Tuna Can 1748-90-1 WJS 2-25-16


       Energy Calibration
            Created:               2/25/2016 13:15:16
            Zero offset:           0.140 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.281E-09 keV/channel^2

       Efficiency Calibration
            Created:               2/25/2016 13:58:16
            Knee Energy:          120.00 keV
            Above the Knee:        Quadratic        Uncertainty =   0.78 %
            Log(Eff):             -2.736460E+00 + ( 3.545026E-01*Log(E) ) +
                                   ( -8.534827E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.20 %
            Log(Eff):             -2.516609E+01 + ( 9.580051E+00*Log(E) ) +
                                   ( -1.033453E+00*Log(E)^2 )

Library Files
       Main analysis library:      northamericancal.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.24
       Start channel:              0 (     0.14keV )
       Stop channel:            8000 (  1999.09keV )
       Peak rejection level:      40.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+06/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+06
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.24 2/25/2016 14:01:22
American Radiation Services Spectrum name: ARS05007.An1

| | |
|---|---|
| Random error: | 1.0000000E+00 |
| Systematic error: | 1.0000000E+00 |
| Fraction Limit: | 60.000% |
| Background width: | best method (based on spectrum). |
| Half lives decay limit: | 12.000 |
| Activity range factor: | 2.000 |
| Min. step backg. energy | 0.000 |
| Multiplet shift channel | 2.000 |

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 7/1/2012 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc DOE.Pbc 2/25/2016 06:12:51 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 9 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0267

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.31 | 104. | 15.39 | 0.72 | 3.353E-03 | | | | |
| 22.26 | 184. | 15.57 | 0.73 | 4.523E-03 | | | | |
| 32.09 | 295. | 14.48 | 0.90 | 1.265E-02 | | | | |
| 36.56 | 230. | 22.51 | 1.20 | 1.702E-02 | | | | |
| 46.51 | 5182. | 2.05 | 0.77 | 2.683E-02 | 46.52 | 4.000 | 2.461E+05 | PB210 |
| 59.51 | 6612. | 1.74 | 0.76 | 3.779E-02 | 59.54 | 36.300 | 2.183E+04 | AM241 |
| 88.05 | 1245. | 4.75 | 0.85 | 5.029E-02 | 88.03 | 3.610 | 2.575E+05 | CD109 |
| 122.14 | 248. | 19.98 | 0.84 | 4.961E-02 | 122.07 | 85.600 | 7.827E+03 | CO57 |
| 322.45 | 57. | 37.89 | 0.60 | 2.912E-02 | | | | |
| 661.70 | 10639. | 1.19 | 1.57 | 1.770E-02 | 661.66 | 85.210 | 3.455E+04 | CS137 |
| 1173.27 | 6222. | 1.40 | 2.13 | 1.117E-02 | 1173.24 | 99.900 | 4.058E+04 | CO60 |
| 1332.51 | 5559. | 1.45 | 2.29 | 1.001E-02 | 1332.50 | 99.982 | 4.043E+04 | CO60 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 80.73 | 20.26 | 76. | 104. | 0.173 | 30.77 | 0.725 | RU-103 | lD |
| 88.29 | 22.20 | 457. | 153. | 0.255 | 52.35 | 0.805 | RH-106 | s |
| 127.87 | 32.09 | 510. | 295. | 0.492 | 28.96 | 0.895 | XE-138 | s |
| 145.75 | 36.56 | 771. | 230. | 0.383 | 45.02 | 1.195 | XE-138 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

ORTEC g v - i (3263) Env32 G53W4.24 2/25/2016 14:01:22
American Radiation Services Spectrum name: ARS05007.An1

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This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.55 | 46.51 | 1834. | 5182. | 8.637 | 4.10 | 0.771 |
| AM-241 | 237.58 | 59.51 | 1638. | 6612. | 11.020 | 3.47 | 0.760 |
| CD-109 | 351.77 | 88.05 | 674. | 1245. | 2.074 | 9.50 | 0.847 |
| CO-57 | 488.19 | 122.14 | 660. | 248. | 0.413 | 39.96 | 0.842 |
| CS-137 | 2647.45 | 661.70 | 613. | 10639. | 17.731 | 2.39 | 1.569 |
| CO-60 | 4694.76 | 1173.27 | 199. | 6221. | 10.369 | 2.79 | 2.125 |
| CO-60 | 5332.10 | 1332.51 | 117. | 5559. | 9.264 | 2.91 | 2.292 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| PB-210 | | 2.4613E+05 | 46.52 | 2.461E+05 | ( | 9.607E+03 2.05E+00 | G |
| AM-241 | | 2.1828E+04 | 59.54 | 2.183E+04 | ( | 6.316E+02 1.74E+00 | G |
| CD-109 | | 2.5749E+05 | 88.03 | 2.575E+05 | (P | 2.560E+04 4.75E+00 | G |
| CO-57 | | 7.8271E+03 | 122.07 | 7.827E+03 | ( | 3.870E+03 2.00E+01 | G |
| TE-123M | | 1.0350E+05 | 159.00 | 1.035E+05 | &(P | 3.497E+05 1.01E+02 | G |
| CR-51 | | 6.2042E+02 | 320.07 | 6.204E+02 | %( | 1.824E+03 8.86E+01 | G |
| SN-113 | | 1.4082E+04 | 391.69 | 1.408E+04 | %(P | 1.111E+06 2.28E+03 | G |
| SR-85 | | -6.6768E+01 | 513.99 | -6.677E+01 | %(P | 2.341E+02 1.25E+02 | G |

ORTEC g v - i (3263) Env32 G53W4.24 2/25/2016 14:01:22
American Radiation Services Spectrum name: ARS05007.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CS-137 | 3.4555E+04 | | | | | | |
| | | 661.66 | 3.455E+04 | (P | 3.837E+02 | 1.19E+00 | G |
| CO-60 | 4.0509E+04 | | | | | | |
| | | 1173.24 | 4.058E+04 | (P | 4.460E+02 | 1.40E+00 | G |
| | | 1332.50 | 4.043E+04 | (P | 3.870E+02 | 1.45E+00 | G |
| Y-88 | -6.3896E+00 | | | | | | |
| | | 1836.01 | -6.390E+00 | %( | 1.551E+02 | 6.66E+02 | G |
| | | 898.02 | 9.937E+00 | & | 3.247E+02 | 9.65E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

ORTEC g v - i (3263) Env32 G53W4.24 2/25/2016 14:01:22
American Radiation Services Spectrum name: ARS05007.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1740E+05 | 2.4613E+05 | 1.0096E+04 | 2.5048E+04 | 9.607E+03 |
| AM-241 | 2.1700E+04 | 2.1828E+04 | 7.5752E+02 | 1.7409E+03 | 6.316E+02 |
| CD-109 | 3.0883E+04 | 2.5749E+05 | 2.4452E+04 | 3.1528E+04 | 2.560E+04 |
| CO-57 | 2.6267E+02 | 7.8271E+03 | 3.1278E+03 | 3.1825E+03 | 3.870E+03 |
| TE-123M A | 4.5723E+01 | 1.0350E+05 | 2.1039E+05 | 2.1051E+05 | 3.497E+05 |
| CR-51 A | 6.2042E+02 | >12 Halflives | 1.0991E+03 | 1.0999E+03 | 1.824E+03 |
| SN-113 #A | 4.5654E+00 | 1.4082E+04 | 6.6096E+05 | 6.6096E+05 | 1.111E+06 |
| SR-85 #A | -6.6768E+01 | >12 Halflives | 1.9284E+02 | 1.9290E+02 | 2.341E+02 |
| CS-137 | 3.1774E+04 | 3.4555E+04 | 8.2577E+02 | 1.7275E+03 | 3.837E+02 |
| CO-60 | 2.5059E+04 | 4.0509E+04 | 8.1668E+02 | 1.8862E+03 | 4.460E+02 |
| Y-88 #A | -6.3896E+00 | >12 Halflives | 8.5118E+01 | 8.5120E+01 | 1.551E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 0.1 to 1999.1 keV) 3.271E+05 pCi/g
Total Decayed Activity ( 0.1 to 1999.1 keV) 6.0833219E+05 pCi/g

Calibration Data from file: 250mL Tuna Can 1748-90-1 calib.Clb
Energy Calibration Date: 2/25/2016 Time: 13:15:16
Efficiency Calibration Date: 2/25/2016 Time: 13:58:16

Calibration Description:
250mL Tuna Can 1748-90-1 WJS 2-25-16

Energy Calibration Fit
Energy = 0.1400 +0.249895*Channel -3.2815e-009*Channel**2
FWHM (ch) = 2.7929 +0.001338*Channel -1.67703e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.56 | 46.52 | 46.51 | 0.02% | 0.78 | 0.76 | 2.10% |
| 237.55 | 59.54 | 59.50 | 0.06% | 0.78 | 0.78 | 0.41% |
| 351.64 | 88.03 | 88.01 | 0.03% | 0.82 | 0.82 | 0.74% |
| 488.01 | 122.07 | 122.09 | -0.02% | 0.87 | 0.86 | 0.94% |
| 635.80 | 159.00 | 159.02 | -0.01% | 0.87 | 0.91 | -4.98% |
| 1567.10 | 391.69 | 391.74 | -0.01% | 1.21 | 1.21 | -0.39% |
| 2647.19 | 661.66 | 661.64 | 0.00% | 1.56 | 1.55 | 0.36% |
| 3593.37 | 898.02 | 898.06 | -0.00% | 1.88 | 1.85 | 1.65% |
| 4694.50 | 1173.24 | 1173.20 | 0.00% | 2.17 | 2.18 | -0.32% |
| 5331.92 | 1332.50 | 1332.47 | 0.00% | 2.34 | 2.36 | -0.97% |
| 7347.36 | 1836.01 | 1836.03 | -0.00% | 2.94 | 2.93 | 0.24% |

Efficiency Calibration Fit
Knee Energy = 120.00 keV
Above the Knee: Quadratic Uncertainty = 0.7805 %
Ln(Eff) = -2.7365 +0.354503*Ln(Eng) -0.0853483*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2015 %
Ln(Eff) = -25.1661 +9.580051*Ln(Eng) -1.03345*(Ln(Eng))**2

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.7299E-002 | 2.6843E-002 | 1.67% |
| 59.54 | 3.7016E-002 | 3.7811E-002 | -2.15% |
| 88.03 | 5.1231E-002 | 5.0287E-002 | 1.84% |
| 120.00 | ========== Knee ========== | | |
| 122.07 | 5.0406E-002 | 4.9618E-002 | 1.56% |
| 159.00 | 4.2856E-002 | 4.3611E-002 | -1.76% |
| 391.69 | 2.5372E-002 | 2.5674E-002 | -1.19% |
| 661.66 | 1.7813E-002 | 1.7700E-002 | 0.64% |
| 898.02 | 1.4363E-002 | 1.3947E-002 | 2.90% |
| 1173.24 | 1.1015E-002 | 1.1174E-002 | -1.45% |
| 1332.50 | 9.9365E-003 | 1.0012E-002 | -0.76% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 8247.50 | 329.90 | 4.10% | 10/1/2014 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 775.48 | 281.50 | 3.10% | 10/1/2014 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 7587.30 | 273.90 | 3.10% | 10/1/2014 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 273.60 | 234.20 | 3.10% | 10/1/2014 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 396.77 | 331.30 | 3.10% | 10/1/2014 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 9341.80 | 918.30 | 3.00% | 10/1/2014 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 1337.60 | 858.20 | 3.00% | 10/1/2014 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 1675.10 | 1663.00 | 3.00% | 10/1/2014 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 1171.80 | 998.50 | 3.10% | 10/1/2014 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 2686.30 | 2552.00 | 3.00% | 10/1/2014 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 1466.50 | 1465.00 | 3.00% | 10/1/2014 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 1467.30 | 1467.00 | 3.00% | 10/1/2014 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 2715.70 | 2698.00 | 3.00% | 10/1/2014 14:00:00 |

DCN: ITSI-0808-0004-0076, 8 May 2019

## ARS06 Polynomial

| STD# | 1748-90-1 | | | Cal Date | 6/10/2015 | | |
|---|---|---|---|---|---|---|---|
| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
| Pb210 | 0.2133 | 213300 | 211350 | 11.49% | 1950 | 0.91% | PASS |
| Am241 | 0.02113 | 21130 | 20195 | 5.49% | 935 | 4.42% | PASS |
| Cd109 | 0.2039 | 203900 | 196910 | 10.00% | 6990 | 3.43% | PASS |
| Co57 | 0.007394 | 7394 | 7116 | 10.00% | 278 | 3.76% | PASS |
| Te123m | 0.01066 | 10660 | 10475 | 10.00% | 185 | 1.74% | PASS |
| Cr51 | 0.2517 | 251700 | | 10.00% | 251700 | 100.00% | NOT MEASURED |
| Sn113 | 0.03574 | 35740 | 34470 | 10.00% | 1270 | 3.55% | PASS |
| Sr85 | 0.04568 | 45680 | | 5.49% | 45680 | 100.00% | NOT MEASURED |
| Cs137 | 0.03171 | 31710 | 32434 | 10.00% | 724 | 2.28% | PASS |
| Co60 | 0.03965 | 39650 | 38408 | 5.49% | 1242 | 3.13% | PASS |
| Y88 | 0.07337 | 73370 | 75865 | 5.49% | 2495 | 3.40% | PASS |

250 mL Tuna Can

WJS 6-10-15

6-10-15

N-550

Calibration Data from file: 250mL Tuna Can 1748-90-1 calib poly.Clb
Energy Calibration Date: 06/10/15 Time: 12:26:28
Efficiency Calibration Date: 06/10/15 Time: 12:34:11

Calibration Description:
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration Fit
Energy = 0.1924 +0.249984*Channel -2.86432e-008*Channel**2
FWHM (ch) = 3.5645 +0.000971*Channel -1.57333e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.55 | 46.52 | 46.58 | -0.12% | 0.92 | 0.94 | -2.16% |
| 237.55 | 59.54 | 59.57 | -0.06% | 0.95 | 0.95 | -0.06% |
| 351.53 | 88.03 | 88.07 | -0.04% | 1.00 | 0.98 | 1.96% |
| 487.63 | 122.07 | 122.08 | -0.01% | 1.00 | 1.01 | -0.72% |
| 635.30 | 159.00 | 159.00 | 0.00% | 1.07 | 1.04 | 2.11% |
| 1565.65 | 391.69 | 391.51 | 0.05% | 1.27 | 1.26 | 0.91% |
| 2055.47 | 513.99 | 513.91 | 0.02% | 1.33 | 1.37 | -2.94% |
| 2646.92 | 661.66 | 661.68 | -0.00% | 1.50 | 1.51 | -0.63% |
| 3593.17 | 898.02 | 898.06 | -0.00% | 1.73 | 1.71 | 1.24% |
| 4695.26 | 1173.24 | 1173.30 | -0.01% | 1.94 | 1.94 | 0.11% |
| 5333.13 | 1332.50 | 1332.57 | -0.01% | 2.07 | 2.07 | 0.13% |
| 7349.69 | 1836.01 | 1835.95 | 0.00% | 2.45 | 2.46 | -0.16% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.5812 %
Coefficients:
-0.368747 -4.257329 0.454276 -0.047622 0.001987 -0.000031

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 3.2817E-002 | 3.2771E-002 | 0.14% |
| 59.54 | 4.2932E-002 | 4.3099E-002 | -0.39% |
| 88.03 | 5.6756E-002 | 5.6130E-002 | 1.10% |
| 122.07 | 5.8706E-002 | 5.9331E-002 | -1.06% |
| 391.69 | 2.9253E-002 | 2.9580E-002 | -1.12% |
| 513.99 | 2.4000E-002 | 2.4014E-002 | -0.06% |
| 661.66 | 2.0913E-002 | 1.9904E-002 | 4.82% |
| 1173.24 | 1.2688E-002 | 1.3087E-002 | -3.14% |
| 1332.50 | 1.1566E-002 | 1.1870E-002 | -2.63% |
| 1836.01 | 9.3161E-003 | 9.0886E-003 | 2.44% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/01/14 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/01/14 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/01/14 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/01/14 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/01/14 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/01/14 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/01/14 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/01/14 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/01/14 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/01/14 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/01/14 14:00:00 |

American Radiation Services Spectrum name: ARS06665.An1

Sample description
Batch ID: 250 mL Tuna Can Polynomial CalVer
SDG: 1748-90-1 Tech: WJS

Spectrum Filename: C:\User\ARS06665.An1

Acquisition information

| | |
|---|---|
| Start time: | 10-Jun-2015 12:36:35 |
| Live time: | 600 |
| Real time: | 618 |
| Dead time: | 2.94 % |
| Detector ID: | 1 |

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration

| | |
|---|---|
| Created: | 10-Jun-2015 12:26:28 |
| Zero offset: | 0.192 keV |
| Gain: | 0.250 keV/channel |
| Quadratic: | -2.864E-08 keV/channel^2 |

Efficiency Calibration

| | |
|---|---|
| Created: | 10-Jun-2015 12:34:11 |
| Type: | Polynomial |
| Uncertainty: | 1.581 % |
| Coefficients: | -0.368747 -4.257329 0.454276 |
| | -0.047622 0.001987 -0.000031 |

Library Files

| | |
|---|---|
| Main analysis library: | northamericancal.Lib |
| Library Match Width: | 0.500 |
| Peak stripping: | Library based |

Analysis parameters

| | |
|---|---|
| Analysis engine: | Env32 G53W4.22 |
| Start channel: | 10 ( 2.69keV ) |
| Stop channel: | 8000 ( 1998.23keV ) |
| Peak rejection level: | 40.000% |
| Peak search sensitivity: | 3 |
| Sample Size: | 1.0000E+00 |
| Activity scaling factor: | 1.0000E+06/( 1.0000E+00* 1.0000E+00) = 1.0000E+06 |
| Detection limit method: | Reg. Guide 4.16 Method |
| Random error: | 1.0000000E+00 |
| Systematic error: | 1.0000000E+00 |
| Fraction Limit: | 60.000% |
| Background width: | best method (based on spectrum). |
| Half lives decay limit: | 12.000 |

American Radiation Services Spectrum name: ARS06665.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Oct-2014 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc DOE.Pbc 11-Aug-2014 08:00:33 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0427

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.32 | 219. | 15.97 | 0.96 | 7.026E-03 | | | | |
| 22.23 | 665. | 7.23 | 0.91 | 1.392E-02 | | | | |
| 25.03 | 666. | 7.60 | 0.92 | 1.610E-02 | | | | |
| 32.12 | 427. | 15.77 | 1.22 | 2.163E-02 | | | | |
| 36.53 | 268. | 25.92 | 1.17 | 2.505E-02 | | | | |
| 46.58 | 6015. | 2.03 | 0.92 | 3.284E-02 | 46.52 | 4.000 | 2.113E+05 | PB210 |
| 59.59 | 7010. | 2.16 | 0.95 | 4.313E-02 | 59.54 | 36.300 | 2.020E+04 | AM241 |
| 88.05 | 5934. | 2.14 | 0.98 | 5.613E-02 | 88.03 | 3.610 | 1.969E+05 | CD109 |
| 122.05 | 4226. | 2.44 | 1.04 | 5.933E-02 | 122.07 | 85.600 | 7.116E+03 | CO57 |
| 136.55 | 610. | 11.08 | 1.08 | 5.819E-02 | | | | |
| 159.00 | 2491. | 3.57 | 1.01 | 5.519E-02 | 159.00 | 83.500 | 1.048E+04 | TE123M |
| 254.62 | 184. | 31.51 | 0.81 | 4.123E-02 | | | | |
| 391.43 | 3185. | 3.11 | 1.34 | 2.960E-02 | 391.69 | 64.160 | 3.447E+04 | SN113 |
| 514.01 | 1478. | 5.26 | 1.46 | 2.401E-02 | 513.99 | 99.280 | 4.146E+04 | SR85 |
| 527.26 | 133. | 30.35 | 0.75 | 2.356E-02 | | | | |
| 583.20 | 66. | 35.65 | 1.07 | 2.185E-02 | | | | |
| 622.46 | 111. | 37.66 | 0.53 | 2.082E-02 | | | | |
| 661.68 | 12020. | 1.14 | 1.50 | 1.990E-02 | 661.66 | 85.210 | 3.243E+04 | CS137 |
| 898.08 | 4708. | 2.28 | 1.69 | 1.594E-02 | 898.02 | 95.000 | 7.200E+04 | Y88 |
| 1173.26 | 10239. | 1.14 | 1.94 | 1.309E-02 | 1173.24 | 99.900 | 3.863E+04 | CO60 |
| 1332.59 | 9189. | 1.13 | 2.03 | 1.187E-02 | 1332.50 | 99.982 | 3.819E+04 | CO60 |
| 1835.93 | 2927. | 2.00 | 2.53 | 9.089E-03 | 1836.01 | 99.350 | 7.507E+04 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.52 | 13.32 | 356. | 219. | 0.366 | 31.94 | 0.957 | SE-75 | |
| 88.01 | 22.19 | 842. | 641. | 1.068 | 17.56 | 0.888 | RH-106 | |
| 99.24 | 25.00 | 947. | 752. | 1.254 | 16.28 | 1.048 | RH-106 | s |
| 127.71 | 32.12 | 1120. | 427. | 0.712 | 31.54 | 1.220 | J-131 | s |
| 145.36 | 36.53 | 1308. | 268. | 0.447 | 51.85 | 1.165 | XE-138 | s |
| 545.50 | 136.55 | 1132. | 610. | 1.018 | 22.16 | 1.083 | CO-57 | |
| 1017.90 | 254.62 | 902. | 184. | 0.306 | 63.01 | 0.814 | TH-227 | s |
| 2108.93 | 527.26 | 315. | 133. | 0.222 | 60.70 | 0.748 | - | s |
| 2332.79 | 583.20 | 195. | 66. | 0.110 | 71.29 | 1.070 | TL-208 | s |

| Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | Suspected |
|---|---|---|---|---|---|---|---|
| 2489.95 | 622.46 | 325. | 111. | 0.184 | 75.33 | 0.528 | RH-106 s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.57 | 46.58 | 2857. | 6008. | 10.013 | 4.06 | 0.925 |
| AM-241 | 237.61 | 59.59 | 2784. | 7006. | 11.677 | 4.33 | 0.946 |
| CD-109 | 351.47 | 88.05 | 2438. | 5934. | 9.891 | 4.28 | 0.979 |
| CO-57 | 487.47 | 122.05 | 1661. | 4226. | 7.043 | 4.87 | 1.040 |
| TE-123M | 635.31 | 159.00 | 1300. | 2491. | 4.152 | 7.14 | 1.007 |
| SN-113 | 1565.34 | 391.43 | 1240. | 3185. | 5.308 | 6.22 | 1.339 |
| SR-85 | 2055.87 | 514.01 | 912. | 1478. | 2.463 | 10.51 | 1.463 |
| CS-137 | 2646.93 | 661.68 | 1027. | 12020. | 20.034 | 2.29 | 1.498 |
| Y-88 | 3593.24 | 898.08 | 887. | 4708. | 7.846 | 4.56 | 1.692 |
| CO-60 | 4695.10 | 1173.26 | 392. | 10239. | 17.065 | 2.29 | 1.939 |
| CO-60 | 5333.18 | 1332.59 | 205. | 9189. | 15.315 | 2.26 | 2.034 |
| Y-88 | 7349.53 | 1835.91 | 54. | 2958. | 4.930 | 4.00 | 2.537 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| PB-210 | | 2.1135E+05 | | | | | |
| | | | 46.52 | 2.113E+05 | (P | 8.858E+03 2.03E+00 | G |
| AM-241 | | 2.0195E+04 | | | | | |
| | | | 59.54 | 2.020E+04 | (P | 7.165E+02 2.16E+00 | G |
| CD-109 | | 1.9691E+05 | | | | | |
| | | | 88.03 | 1.969E+05 | ( | 7.724E+03 2.14E+00 | G |
| CO-57 | | 7.1160E+03 | | | | | |
| | | | 122.07 | 7.116E+03 | (P | 3.244E+02 2.44E+00 | G |

American Radiation Services Spectrum name: ARS06665.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| TE-123M | 1.0475E+04 | | | | | | |
| | | 159.00 | 1.048E+04 | ( | 7.177E+02 | 3.57E+00 | G |
| CR-51 | 1.6155E+05 | | | | | | |
| | | 320.07 | 1.615E+05 | %(P | 1.234E+06 | 2.28E+02 | G |
| SN-113 | 3.4470E+04 | | | | | | |
| | | 391.69 | 3.447E+04 | ( | 1.806E+03 | 3.11E+00 | G |
| SR-85 | 4.1463E+04 | | | | | | |
| | | 513.99 | 4.146E+04 | ( | 4.024E+03 | 5.26E+00 | G |
| CS-137 | 3.2434E+04 | | | | | | |
| | | 661.66 | 3.243E+04 | ( | 4.102E+02 | 1.14E+00 | G |
| CO-60 | 3.8408E+04 | | | | | | |
| | | 1173.24 | 3.863E+04 | (P | 3.583E+02 | 1.14E+00 | G |
| | | 1332.50 | 3.819E+04 | (P | 2.886E+02 | 1.13E+00 | G |
| Y-88 | 7.5865E+04 | | | | | | |
| | | 1836.01 | 7.586E+04 | (P | 9.480E+02 | 2.00E+00 | G |
| | | 898.02 | 7.200E+04 | - P | 2.164E+03 | 2.28E+00 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.0645E+05 | 2.1135E+05 | 8.5945E+03 | 2.2564E+04 | 8.858E+03 |
| AM-241 | 2.0173E+04 | 2.0195E+04 | 8.7421E+02 | 1.8778E+03 | 7.165E+02 |
| CD-109 | 1.3192E+05 | 1.9691E+05 | 8.4182E+03 | 1.7703E+04 | 7.724E+03 |
| CO-57 | 3.7481E+03 | 7.1160E+03 | 3.4662E+02 | 6.3628E+02 | 3.244E+02 |
| TE-123M | 2.4353E+03 | 1.0475E+04 | 7.4772E+02 | 1.1946E+03 | 7.177E+02 |
| CR-51 #A | 2.9533E+02 | 1.6155E+05 | 7.4048E+05 | 7.4059E+05 | 1.234E+06 |
| SN-113 | 7.5589E+03 | 3.4470E+04 | 2.1428E+03 | 3.4517E+03 | 1.806E+03 |
| SR-85 | 2.7925E+03 | 4.1463E+04 | 4.3598E+03 | 5.1155E+03 | 4.024E+03 |
| CS-137 | 3.1925E+04 | 3.2434E+04 | 7.4124E+02 | 1.6159E+03 | 4.102E+02 |
| CO-60 | 3.5078E+04 | 3.8408E+04 | 6.1754E+02 | 1.7161E+03 | 3.583E+02 |
| Y-88 | 1.4756E+04 | 7.5865E+04 | 3.0338E+03 | 5.4257E+03 | 9.480E+02 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 2.7 to 1998.2 keV) 4.568E+05 pCi/g
Total Decayed Activity ( 2.7 to 1998.2 keV) 6.6868012E+05 pCi/g

DCN: ITSI-0808-0004-0076, 8 May 2019

## ARS07 Polynomial ✓

| STD# | 1559-72-6 | | | Cal Date | 1/7/2014 | | |
|---|---|---|---|---|---|---|---|
| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
| Pb210 | 0.5834 | 583400 | 619070 | 11.49% | 35670 | 6.11% | **PASS** |
| Am241 | 0.05866 | 58660 | 56345 | 5.49% | 2315 | 3.95% | **PASS** |
| Cd109 | 0.5346 | 534600 | 523300 | 10.00% | 11300 | 2.11% | **PASS** |
| Co57 | 0.02013 | 20130 | 20176 | 10.00% | 46 | 0.23% | **PASS** |
| Te123m | 0.02758 | 27580 | 26545 | 10.00% | 1035 | 3.75% | **PASS** |
| Cr51 | 0.6881 | 688100 | 669880 | 10.00% | 18220 | 2.65% | **PASS** |
| Sn113 | 0.1048 | 104800 | 106150 | 10.00% | 1350 | 1.29% | **PASS** |
| Sr85 | 0.1282 | 128200 | 127610 | 5.49% | 590 | 0.46% | **PASS** |
| Cs137 | 0.08881 | 88810 | 90439 | 10.00% | 1629 | 1.83% | **PASS** |
| Co60 | 0.1077 | 107700 | 105220 | 5.49% | 2480 | 2.30% | **PASS** |
| Y88 | 0.2068 | 206800 | 215320 | 5.49% | 8520 | 4.12% | **PASS** |

WJS 6-10-15
250 mL Tuna Can

6-10-15

Calibration Data from file: **POLYTuna Can 250mL 1559-72-6 calib.Clb**
Energy Calibration Date: 3-12-2012 Time: 13:33:38
Efficiency Calibration Date: **1-7-2014** Time: 11:11:14

Calibration Description:
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration Fit
Energy = 0.0938 +0.249931*Channel +8.60329e-009*Channel**2
FWHM (ch) = 3.4696 +0.000947*Channel -2.53949e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.68 | 46.52 | 46.50 | 0.04% | 0.87 | 0.91 | -4.86% |
| 237.66 | 59.54 | 59.49 | 0.08% | 0.92 | 0.92 | -0.56% |
| 351.80 | 88.03 | 88.02 | 0.02% | 0.93 | 0.95 | -1.94% |
| 488.36 | 122.07 | 122.15 | -0.07% | 0.99 | 0.98 | 0.70% |
| 635.73 | 159.00 | 158.99 | 0.01% | 1.05 | 1.02 | 3.01% |
| 1280.24 | 320.07 | 320.08 | -0.00% | 1.20 | 1.16 | 3.72% |
| 1566.84 | 391.69 | 391.72 | -0.01% | 1.21 | 1.22 | -0.93% |
| 2055.94 | 513.99 | 513.97 | 0.00% | 1.33 | 1.33 | 0.09% |
| 2646.75 | 661.66 | 661.66 | 0.00% | 1.48 | 1.45 | 1.86% |
| 3592.32 | 898.02 | 898.04 | -0.00% | 1.62 | 1.64 | -1.07% |
| 4693.06 | 1173.24 | 1173.22 | 0.00% | 1.86 | 1.84 | 1.26% |
| 5330.04 | 1332.50 | 1332.48 | 0.00% | 1.88 | 1.95 | -3.49% |
| 7344.09 | 1836.06 | 1836.07 | -0.00% | 2.29 | 2.26 | 1.07% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.3972 %
Coefficients:
-0.410791 -4.427717 0.416964 -0.041400 0.001670 -0.000026

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.5942E-002 | 2.5694E-002 | 0.96% |
| 59.54 | 3.6012E-002 | 3.6299E-002 | -0.80% |
| 88.03 | 4.7581E-002 | 4.6824E-002 | 1.59% |
| 122.07 | 4.8791E-002 | 4.7773E-002 | 2.09% |
| 159.00 | 4.1160E-002 | 4.3538E-002 | -5.78% |
| 320.07 | 2.7927E-002 | 2.6993E-002 | 3.34% |
| 391.69 | 2.3263E-002 | 2.3115E-002 | 0.63% |
| 513.99 | 1.8747E-002 | 1.8828E-002 | -0.43% |
| 661.66 | 1.6136E-002 | 1.5634E-002 | 3.11% |
| 898.02 | 1.2269E-002 | 1.2508E-002 | -1.95% |
| 1173.24 | 9.9659E-003 | 1.0221E-002 | -2.56% |
| 1332.50 | 9.0123E-003 | 9.2346E-003 | -2.47% |
| 1836.01 | 7.1689E-003 | 6.9651E-003 | 2.84% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.18 | 8.14E+003 | 0.58 | 902.29 | 7.00% | 2-1-2012 14:00:00 |
| Am-241 | 59.54 | 36.00 | 1.58E+005 | 0.06 | 781.35 | 3.00% | 2-1-2012 14:00:00 |
| Cd-109 | 88.03 | 3.63 | 4.63E+002 | 0.53 | 717.89 | 3.10% | 2-1-2012 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.02 | 637.56 | 3.10% | 2-1-2012 14:00:00 |
| Te-123M | 159.00 | 84.00 | 1.20E+002 | 0.03 | 857.19 | 3.00% | 2-1-2012 14:00:00 |
| Cr-51 | 320.07 | 9.86 | 2.71E+001 | 0.69 | 2510.33 | 3.00% | 2-1-2012 14:00:00 |
| Sn-113 | 391.69 | 64.90 | 1.15E+002 | 0.10 | 2516.56 | 3.00% | 2-1-2012 14:00:00 |
| Sr-85 | 513.99 | 98.40 | 6.48E+001 | 0.13 | 4667.51 | 3.00% | 2-1-2012 14:00:00 |
| Cs-137 | 661.66 | 85.10 | 1.10E+004 | 0.09 | 2796.36 | 3.00% | 2-1-2012 14:00:00 |
| Y-88 | 898.02 | 94.00 | 1.07E+002 | 0.21 | 7192.50 | 3.00% | 2-1-2012 14:00:00 |
| Co-60 | 1173.24 | 99.86 | 1.92E+003 | 0.11 | 3979.32 | 3.00% | 2-1-2012 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.92E+003 | 0.11 | 3984.10 | 3.00% | 2-1-2012 14:00:00 |
| Y-88 | 1836.01 | 99.40 | 1.07E+002 | 0.21 | 7605.69 | 3.00% | 2-1-2012 14:00:00 |

American Radiation Services Spectrum name: ARS07834.An1

Sample description
Batch ID: Calibration Verification
SDG: 1559-72-6 Tech: WWW

Spectrum Filename: C:\User\ARS07834.An1

Acquisition information
Start time: 12-Mar-2012 13:41:08
Live time: 600
Real time: 669
Dead time: 10.28 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS07834.An1

| | |
|---|---|
| Activity range factor: | 2.000 |
| Min. step backg. energy | 0.000 |
| Multiplet shift channel | 2.000 |

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Feb-2012 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | NO | |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.0117

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 38.43 | 225. | 27.27 | 0.91 | 1.968E-02 | | | | |
| 46.48 | 14073. | 1.65 | 0.93 | 2.591E-02 | 46.52 | 4.000 | 6.191E+05 | PB210 |
| 59.52 | 16479. | 1.62 | 0.93 | 3.629E-02 | 59.54 | 36.300 | 5.635E+04 | AM241 |
| 88.03 | 18428. | 1.67 | 0.96 | 4.682E-02 | 88.03 | 3.610 | 5.233E+05 | CD109 |
| 122.04 | 16545. | 1.51 | 0.99 | 4.778E-02 | 122.07 | 85.600 | 2.018E+04 | CO57 |
| 136.52 | 2173. | 8.21 | 1.01 | 4.639E-02 | | | | |
| 158.99 | 16996. | 1.44 | 1.02 | 4.354E-02 | 159.00 | 83.500 | 2.655E+04 | TE123M |
| 208.16 | 324. | 36.69 | 1.00 | 3.709E-02 | | | | |
| 255.16 | 1312. | 11.81 | 1.10 | 3.206E-02 | | | | |
| 320.08 | 14508. | 1.29 | 1.21 | 2.699E-02 | 320.07 | 9.830 | 6.699E+05 | CR51 |
| 391.71 | 27468. | 0.99 | 1.23 | 2.311E-02 | 391.69 | 64.160 | 1.061E+05 | SN113 |
| 513.97 | 34509. | 0.76 | 1.33 | 1.883E-02 | 513.99 | 99.280 | 1.276E+05 | SR85 |
| 661.65 | 26680. | 0.85 | 1.46 | 1.563E-02 | 661.66 | 85.210 | 9.044E+04 | CS137 |
| 744.36 | 168. | 36.95 | 0.43 | 1.435E-02 | | | | |
| 814.13 | 585. | 17.35 | 1.25 | 1.344E-02 | | | | |
| 898.03 | 40206. | 0.60 | 1.63 | 1.251E-02 | 898.02 | 95.000 | 1.976E+05 | Y88 |
| 1173.22 | 23611. | 0.79 | 1.81 | 1.022E-02 | 1173.24 | 99.900 | 1.057E+05 | CO60 |
| 1332.49 | 21167. | 0.82 | 1.95 | 9.235E-03 | 1332.50 | 99.982 | 1.048E+05 | CO60 |
| 1836.00 | 25508. | 0.66 | 2.26 | 6.965E-03 | 1836.01 | 99.350 | 2.153E+05 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 153.38 | 38.43 | 1637. | 225. | 0.375 | 54.55 | 0.905 | BA-139 | s |
| 545.85 | 136.52 | 8099. | 2173. | 3.622 | 16.43 | 1.014 | CO-57 | s |
| 832.49 | 208.16 | 4873. | 324. | 0.540 | 73.38 | 1.002 | SB-125 | |
| 1020.52 | 255.16 | 5922. | 1312. | 2.187 | 23.62 | 1.097 | SN-113 | |
| 2977.60 | 744.36 | 1103. | 168. | 0.280 | 73.91 | 0.432 | AG-110M | s |
| 3256.69 | 814.13 | 1879. | 585. | 0.975 | 34.70 | 1.249 | PR-144 | |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.60 | 46.48 | 10398. | 14073. | 23.454 | 3.30 | 0.925s |
| AM-241 | 237.76 | 59.52 | 12257. | 16479. | 27.465 | 3.25 | 0.929 |
| CD-109 | 351.84 | 88.03 | 12633. | 18428. | 30.713 | 3.33 | 0.959 |
| CO-57 | 487.90 | 122.04 | 12332. | 16545. | 27.574 | 3.03 | 0.992 |
| TE-123M | 635.75 | 158.99 | 11441. | 16996. | 28.326 | 2.88 | 1.025 |
| CR-51 | 1280.24 | 320.08 | 6373. | 14508. | 24.179 | 2.58 | 1.208 |
| SN-113 | 1566.81 | 391.71 | 5650. | 27468. | 45.780 | 1.98 | 1.225 |
| SR-85 | 2055.94 | 513.97 | 5415. | 34509. | 57.516 | 1.51 | 1.333 |
| CS-137 | 2646.73 | 661.65 | 4240. | 26680. | 44.467 | 1.70 | 1.459 |
| Y-88 | 3592.30 | 898.03 | 3216. | 40206. | 67.010 | 1.20 | 1.626 |
| CO-60 | 4693.03 | 1173.22 | 1585. | 23611. | 39.352 | 1.58 | 1.812 |
| CO-60 | 5330.08 | 1332.49 | 1230. | 21167. | 35.278 | 1.63 | 1.948 |
| Y-88 | 7343.82 | 1836.00 | 392. | 25508. | 42.514 | 1.32 | 2.259 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| PB-210 | | 6.1907E+05 | | | | | | |
| | | | 46.52 | 6.191E+05 | @( | 2.102E+04 | 1.65E+00 | G |
| AM-241 | | 5.6345E+04 | | | | | | |
| | | | 59.54 | 5.635E+04 | ( | 1.773E+03 | 1.62E+00 | G |
| CD-109 | | 5.2330E+05 | | | | | | |
| | | | 88.03 | 5.233E+05 | ( | 1.495E+04 | 1.67E+00 | G |
| CO-57 | | 2.0176E+04 | | | | | | |
| | | | 122.07 | 2.018E+04 | ( | 6.344E+02 | 1.51E+00 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| TE-123M | 2.6545E+04 | | | | | | |
| | | 159.00 | 2.655E+04 | ( | 7.828E+02 | 1.44E+00 | G |
| CR-51 | 6.6988E+05 | | | | | | |
| | | 320.07 | 6.699E+05 | ( | 1.730E+04 | 1.29E+00 | G |
| SN-113 | 1.0615E+05 | | | | | | |
| | | 391.69 | 1.061E+05 | ( | 1.364E+03 | 9.91E-01 | G |
| SR-85 | 1.2761E+05 | | | | | | |
| | | 513.99 | 1.276E+05 | ( | 1.278E+03 | 7.55E-01 | G |
| CS-137 | 9.0439E+04 | | | | | | |
| | | 661.66 | 9.044E+04 | ( | 1.038E+03 | 8.50E-01 | G |
| CO-60 | 1.0522E+05 | | | | | | |
| | | 1173.24 | 1.057E+05 | ( | 8.424E+02 | 7.92E-01 | G |
| | | 1332.50 | 1.048E+05 | ( | 8.223E+02 | 8.15E-01 | G |
| Y-88 | 2.1532E+05 | | | | | | |
| | | 1836.01 | 2.153E+05 | ( | 8.014E+02 | 6.60E-01 | G |
| | | 898.02 | 1.976E+05 | - | 1.312E+03 | 5.98E-01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 # | 6.1677E+05 | 6.1907E+05 | 2.0433E+04 | 9.5050E+04 | 2.102E+04 |
| AM-241 | 5.6335E+04 | 5.6345E+04 | 1.8303E+03 | 4.9011E+03 | 1.773E+03 |
| CD-109 | 4.9107E+05 | 5.2330E+05 | 1.7434E+04 | 4.4113E+04 | 1.495E+04 |
| CO-57 | 1.8224E+04 | 2.0176E+04 | 6.1116E+02 | 1.4902E+03 | 6.344E+02 |
| TE-123M | 2.1058E+04 | 2.6545E+04 | 7.6453E+02 | 1.9631E+03 | 7.828E+02 |
| CR-51 | 2.4629E+05 | 6.6988E+05 | 1.7253E+04 | 4.7004E+04 | 1.730E+04 |
| SN-113 | 8.3428E+04 | 1.0615E+05 | 2.1036E+03 | 7.9025E+03 | 1.364E+03 |
| SR-85 | 8.3161E+04 | 1.2761E+05 | 1.9271E+03 | 8.1123E+03 | 1.278E+03 |
| CS-137 | 9.0212E+04 | 9.0439E+04 | 1.5372E+03 | 3.9206E+03 | 1.038E+03 |
| CO-60 | 1.0372E+05 | 1.0522E+05 | 1.1959E+03 | 4.0196E+03 | 8.424E+02 |
| Y-88 | 1.6605E+05 | 2.1532E+05 | 2.8425E+03 | 1.2798E+04 | 8.014E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 2.6 to 2000.1 keV) 1.976E+06 pCi/g
Total Decayed Activity ( 2.6 to 2000.1 keV) 2.5600600E+06 pCi/g

DCN: ITSI-0808-0004-0076, 8 May 2019

## ARS08 Polynomial ✓

| STD# | 1748-90-1 | | | Cal Date | 1/5/2015 | | |
|---|---|---|---|---|---|---|---|
| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
| Pb210 | 0.2133 | 213300 | 215390 | 11.49% | 2090 | 0.98% | **PASS** |
| Am241 | 0.02113 | 21130 | 21657 | 5.49% | 527 | 2.49% | **PASS** |
| Cd109 | 0.2039 | 203900 | 213680 | 10.00% | 9780 | 4.80% | **PASS** |
| Co57 | 0.007394 | 7394 | 7847.9 | 10.00% | 453.9 | 6.14% | **PASS** |
| Te123m | 0.01066 | 10660 | 10499 | 10.00% | 161 | 1.51% | **PASS** |
| Cr51 | 0.2517 | 251700 | 249420 | 10.00% | 2280 | 0.91% | **PASS** |
| Sn113 | 0.03574 | 35740 | 36693 | 10.00% | 953 | 2.67% | **PASS** |
| Sr85 | 0.04568 | 45680 | 46388 | 5.49% | 708 | 1.55% | **PASS** |
| Cs137 | 0.03171 | 31710 | 33132 | 10.00% | 1422 | 4.48% | **PASS** |
| Co60 | 0.03965 | 39650 | 40518 | 5.49% | 868 | 2.19% | **PASS** |
| Y88 | 0.07337 | 73370 | 79548 | 5.49% | 6178 | 8.42% | **FAIL** |

6-10-15

WJS 6-10-15

250 mL Tuna Can

N-564

Calibration Data from file: 250mL Tuna Can 1748-90-1 calib POLY.Clb
Energy Calibration Date: 12/12/2014 Time: 9:34:56 AM
Efficiency Calibration Date: 1/5/2015 Time: 10:02:55 AM

Calibration Description:
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration Fit
Energy = 0.4474 +0.250118*Channel -3.41661e-008*Channel**2
FWHM (ch) = 3.6903 +0.001119*Channel -3.2281e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 184.55 | 46.52 | 46.60 | -0.18% | 0.97 | 0.97 | -0.91% |
| 236.51 | 59.54 | 59.60 | -0.10% | 0.96 | 0.99 | -2.52% |
| 350.47 | 88.03 | 88.10 | -0.08% | 1.02 | 1.02 | -0.36% |
| 486.49 | 122.07 | 122.12 | -0.04% | 1.05 | 1.06 | -0.62% |
| 633.95 | 159.00 | 159.00 | 0.00% | 1.10 | 1.10 | 0.27% |
| 1277.18 | 320.07 | 319.84 | 0.07% | 1.32 | 1.27 | 3.79% |
| 1563.84 | 391.69 | 391.51 | 0.05% | 1.35 | 1.34 | 0.96% |
| 2053.61 | 513.99 | 513.95 | 0.01% | 1.45 | 1.46 | -0.63% |
| 2644.77 | 661.66 | 661.71 | -0.01% | 1.62 | 1.61 | 0.90% |
| 3590.58 | 898.02 | 898.07 | -0.01% | 1.82 | 1.82 | -0.12% |
| 4692.32 | 1173.24 | 1173.33 | -0.01% | 2.02 | 2.06 | -1.94% |
| 5329.92 | 1332.50 | 1332.58 | -0.01% | 2.18 | 2.18 | -0.00% |
| 7345.84 | 1836.01 | 1835.93 | 0.00% | 2.55 | 2.54 | 0.52% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.5350 %
Coefficients:
-0.447430 -4.056056 0.358945 -0.033786 0.001201 -0.000016

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 3.1443E-002 | 3.1354E-002 | 0.28% |
| 59.54 | 4.1739E-002 | 4.2053E-002 | -0.75% |
| 88.03 | 5.6876E-002 | 5.5915E-002 | 1.69% |
| 122.07 | 5.8546E-002 | 5.7878E-002 | 1.14% |
| 159.00 | 5.0933E-002 | 5.3270E-002 | -4.59% |
| 320.07 | 3.5084E-002 | 3.4304E-002 | 2.22% |
| 391.69 | 3.0162E-002 | 2.9723E-002 | 1.45% |
| 513.99 | 2.4362E-002 | 2.4552E-002 | -0.78% |
| 661.66 | 2.1528E-002 | 2.0595E-002 | 4.34% |
| 898.02 | 1.6102E-002 | 1.6599E-002 | -3.08% |
| 1173.24 | 1.3562E-002 | 1.3584E-002 | -0.16% |
| 1332.50 | 1.1773E-002 | 1.2260E-002 | -4.14% |
| 1836.01 | 9.4403E-003 | 9.1695E-003 | 2.87% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/1/2014 2:00:00 PM |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/1/2014 2:00:00 PM |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/1/2014 2:00:00 PM |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/1/2014 2:00:00 PM |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/1/2014 2:00:00 PM |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/1/2014 2:00:00 PM |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/1/2014 2:00:00 PM |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/1/2014 2:00:00 PM |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/1/2014 2:00:00 PM |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/1/2014 2:00:00 PM |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/1/2014 2:00:00 PM |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/1/2014 2:00:00 PM |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/1/2014 2:00:00 PM |

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Sample description
Batch ID: CALVERIFICATION
SDG: 1748-90-1 Tech: BZF

Spectrum Filename: C:\User\Archive\12-15-14 TO\ARS08001.An1

Acquisition information
Start time: 12/15/2014 1:59:23 PM
Live time: 600
Real time: 622
Dead time: 3.59 %
Detector ID: 8

Detector system
(ARS08) MCB 129

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration
Created: 12/12/2014 9:34:56 AM
Zero offset: 0.447 keV
Gain: 0.250 keV/channel
Quadratic: -3.417E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2015 10:02:55 AM
Type: Polynomial
Uncertainty: 1.535 %
Coefficients: -0.447430 -4.056056 0.358945
-0.033786 0.001201 -0.000016

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G702W050
Start channel: 120 ( 30.46keV )
Stop channel: 8144 ( 2035.14keV )
Peak rejection level: 30.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 0.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

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| | |
|---|---|
| Activity range factor: | 2.000 |
| Min. step backg. energy | 0.000 |
| Multiplet shift channel | 2.000 |

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 10/1/2014 2:00:00 PM |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc NORM.Pbc 12/22/2014 7:46:07 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %

Energy Calibration
Normalized diff: 0.0644

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 32.10 | 497. | 17.99 | 0.92 | 2.004E-02 | | | | |
| 46.64 | 5956. | 1.82 | 0.97 | 3.140E-02 | 46.52 | 4.000 | 2.154E+05 | PB210 |
| 59.62 | 7337. | 1.99 | 0.98 | 4.211E-02 | 59.54 | 36.300 | 2.166E+04 | AM241 |
| 84.76 | 264. | 29.18 | 1.02 | 5.500E-02 | | | | |
| 88.12 | 8499. | 1.36 | 1.02 | 5.593E-02 | 88.03 | 3.610 | 2.137E+05 | CD109 |
| 122.09 | 7132. | 2.06 | 1.05 | 5.788E-02 | 122.07 | 85.600 | 7.848E+03 | CO57 |
| 136.60 | 848. | 8.66 | 1.07 | 5.643E-02 | | | | |
| 159.01 | 6715. | 1.56 | 1.10 | 5.328E-02 | 159.00 | 83.500 | 1.050E+04 | TE123M |
| 254.85 | 490. | 16.58 | 0.96 | 4.023E-02 | | | | |
| 319.86 | 2858. | 3.55 | 1.18 | 3.432E-02 | 320.07 | 9.830 | 2.494E+05 | CR51 |
| 391.54 | 9889. | 1.13 | 1.34 | 2.974E-02 | 391.69 | 64.160 | 3.669E+04 | SN113 |
| 513.95 | 11244. | 1.25 | 1.44 | 2.455E-02 | 513.99 | 99.280 | 4.639E+04 | SR85 |
| 661.79 | 12847. | 0.96 | 1.61 | 2.059E-02 | 661.66 | 85.210 | 3.313E+04 | CS137 |
| 813.53 | 254. | 22.46 | 0.44 | 1.782E-02 | | | | |
| 898.09 | 15345. | 0.97 | 1.82 | 1.660E-02 | 898.02 | 95.000 | 7.136E+04 | Y88 |
| 1113.78 | 246. | 19.54 | 0.57 | 1.414E-02 | | | | |
| 1173.33 | 11881. | 1.10 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | 4.052E+04 | CO60 |
| 1325.03 | 153. | 22.25 | 2.18 | 1.232E-02 | | | | |
| 1332.77 | 10012. | 1.07 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | 3.780E+04 | CO60 |
| 1646.75 | 123. | 27.47 | 0.33 | 1.018E-02 | | | | |
| 1835.84 | 9882. | 1.11 | 2.48 | 9.170E-03 | 1836.01 | 99.350 | 7.955E+04 | Y88 |
| 1882.06 | 33. | 27.52 | 0.53 | 8.944E-03 | | | | |

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********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 126.54 | 32.10 | 1958. | 497. | 2.481E+04 | 35.99 | 0.916 | XE-138 | s |
| 337.10 | 84.67 | 2838. | 264. | 4.802E+03 | 58.36 | 1.016 | TA-182 | D |
| 544.40 | 136.53 | 2274. | 848. | 1.504E+04 | 17.31 | 1.073 | CO-57 | D |
| 1017.26 | 254.85 | 1742. | 490. | 1.217E+04 | 33.16 | 0.955 | TH-227 | |
| 3252.24 | 813.53 | 500. | 254. | 1.426E+04 | 44.92 | 0.441 | PR-144 | s |
| 4453.96 | 1113.78 | 428. | 246. | 1.741E+04 | 39.08 | 0.567 | XE-138 | s |
| 5299.66 | 1324.70 | 502. | 153. | 1.241E+04 | 44.51 | 2.177 | KR-89 | D |
| 6588.04 | 1646.75 | 179. | 123. | 1.206E+04 | 54.95 | 0.328 | - | s |
| 7530.66 | 1882.06 | 9. | 33. | 3.690E+03 | 55.05 | 0.533 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.21 | 46.52 | 2921. | 5955. | 9.925 | 3.65 | 0.974D |
| AM-241 | 236.57 | 59.62 | 3507. | 7337. | 12.228 | 3.98 | 0.984 |
| CD-109 | 350.20 | 88.03 | 2462. | 8499. | 14.165 | 2.73 | 1.020D |
| CO-57 | 486.37 | 122.09 | 3350. | 7132. | 11.887 | 4.13 | 1.053 |
| TE-123M | 633.97 | 159.00 | 2152. | 6715. | 11.192 | 3.13 | 1.097D |
| CR-51 | 1277.27 | 319.86 | 2050. | 2858. | 4.764 | 7.10 | 1.184 |
| SN-113 | 1564.56 | 391.69 | 1266. | 9889. | 16.481 | 2.25 | 1.341D |
| SR-85 | 2053.61 | 513.95 | 2016. | 11244. | 18.740 | 2.50 | 1.441 |
| CS-137 | 2644.56 | 661.66 | 1303. | 12847. | 21.412 | 1.94 | 1.606D |
| Y-88 | 3590.63 | 898.09 | 1388. | 15345. | 25.575 | 1.95 | 1.823 |
| CO-60 | 4692.32 | 1173.33 | 746. | 11881. | 19.802 | 2.20 | 2.061 |
| CO-60 | 5329.59 | 1332.50 | 750. | 10012. | 16.686 | 2.14 | 2.183D |
| Y-88 | 7345.50 | 1835.84 | 206. | 9882. | 16.469 | 2.23 | 2.482 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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***** SUMMARY OF LIBRARY PEAK USAGE *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| PB-210 | | 2.1539E+05 | | | | | 7.45E+03 | |
| | | | 46.52 | 2.154E+05 | (P | 9.207E+03 | 1.82E+00 4.00E+00 | G |
| AM-241 | | 2.1657E+04 | | | | | 1.58E+05 | |
| | | | 59.54 | 2.166E+04 | ( | 8.226E+02 | 1.99E+00 3.63E+01 | G |
| CD-109 | | 2.1368E+05 | | | | | 4.36E+02 | |
| | | | 88.03 | 2.137E+05 | ( | 5.882E+03 | 1.36E+00 3.61E+00 | G |
| CO-57 | | 7.8479E+03 | | | | | 2.72E+02 | |
| | | | 122.07 | 7.848E+03 | ( | 2.998E+02 | 2.06E+00 8.56E+01 | G |
| TE-123M | | 1.0499E+04 | | | | | 1.20E+02 | |
| | | | 159.00 | 1.050E+04 | ( | 3.422E+02 | 1.56E+00 8.35E+01 | G |
| CR-51 | | 2.4942E+05 | | | | | 2.77E+01 | |
| | | | 320.07 | 2.494E+05 | ( | 1.865E+04 | 3.55E+00 9.83E+00 | G |
| SN-113 | | 3.6693E+04 | | | | | 1.15E+02 | |
| | | | 391.69 | 3.669E+04 | ( | 6.254E+02 | 1.13E+00 6.42E+01 | G |
| SR-85 | | 4.6388E+04 | | | | | 6.47E+01 | |
| | | | 513.99 | 4.639E+04 | ( | 8.744E+02 | 1.25E+00 9.93E+01 | G |
| CS-137 | | 3.3132E+04 | | | | | 1.10E+04 | |
| | | | 661.66 | 3.313E+04 | ( | 4.408E+02 | 9.68E-01 8.52E+01 | G |
| CO-60 | | 4.0518E+04 | | | | | 1.93E+03 | |
| | | | 1173.24 | 4.052E+04 | ( | 4.432E+02 | 1.10E+00 9.99E+01 | G |
| | | | 1332.50 | 3.780E+04 | - | 4.921E+02 | 1.07E+00 1.00E+02 | G |
| Y-88 | | 7.9548E+04 | | | | | 1.07E+02 | |
| | | | 1836.01 | 7.955E+04 | ( | 5.609E+02 | 1.11E+00 9.93E+01 | G |
| | | | 898.02 | 7.136E+04 | - | 8.200E+02 | 9.73E-01 9.50E+01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

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% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
) - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*************** D I S C A R D E D I S O T O P E P E A K S ***************

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity |
|---|---|---|---|---|---|---|

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1389E+05 | 2.1539E+05 | 7.8569E+03 | 2.2662E+04 | 9.207E+03 |
| AM-241 | 2.1650E+04 | 2.1657E+04 | 8.6292E+02 | 1.9761E+03 | 8.226E+02 |
| CD-109 | 1.8966E+05 | 2.1368E+05 | 5.8257E+03 | 1.7539E+04 | 5.882E+03 |
| CO-57 | 6.4845E+03 | 7.8479E+03 | 3.2381E+02 | 6.2110E+02 | 2.998E+02 |
| TE-123M | 6.8004E+03 | 1.0499E+04 | 3.2824E+02 | 7.9015E+02 | 3.422E+02 |
| CR-51 | 3.8184E+04 | 2.4942E+05 | 1.7702E+04 | 2.4072E+04 | 1.865E+04 |
| SN-113 | 2.3357E+04 | 3.6693E+04 | 8.2712E+02 | 2.7625E+03 | 6.254E+02 |
| SR-85 | 2.0779E+04 | 4.6388E+04 | 1.1584E+03 | 3.0935E+03 | 8.744E+02 |
| CS-137 | 3.2976E+04 | 3.3132E+04 | 6.4119E+02 | 1.4743E+03 | 4.408E+02 |
| CO-60 | 3.9439E+04 | 4.0518E+04 | 8.9190E+02 | 1.7298E+03 | 4.432E+02 |
| Y-88 | 4.8860E+04 | 7.9548E+04 | 1.7724E+03 | 4.9427E+03 | 5.609E+02 |

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

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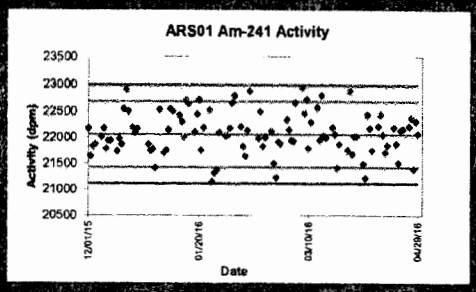
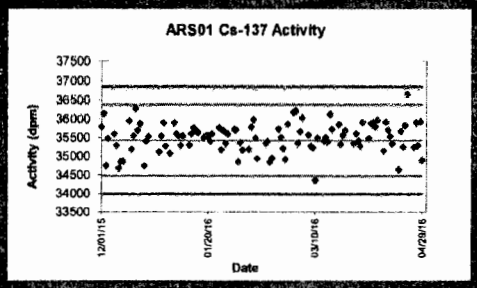
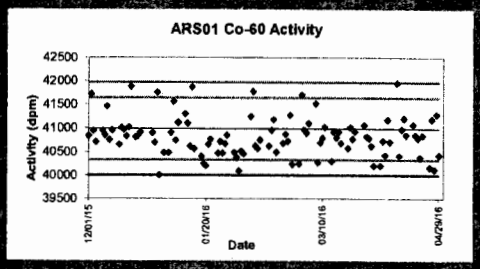
---------- S U M M A R Y ----------

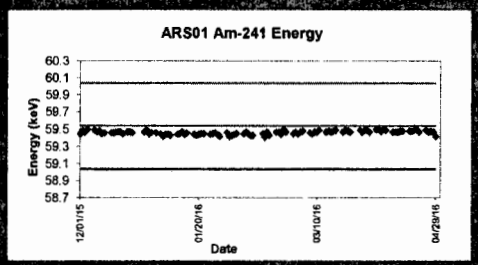
Total Activity ( 30.5 to 2035.1 keV) 6.421E+05 pCi/g
Total Decayed Activity ( 30.5 to 2035.1 keV) 9.5476956E+05 pCi/g

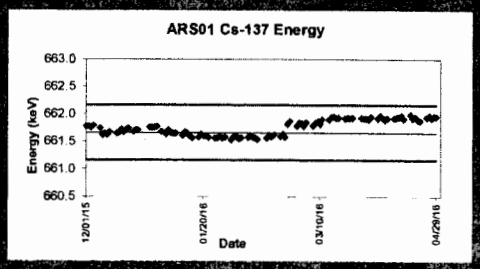
# ARS01 GAMMA SPECTROMETER CONTROL CHARTS

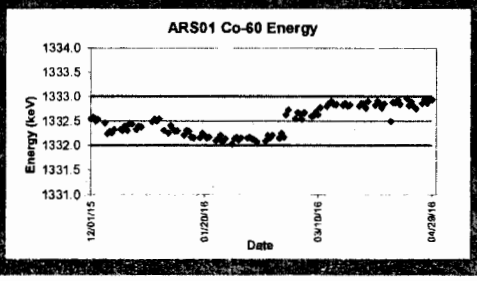


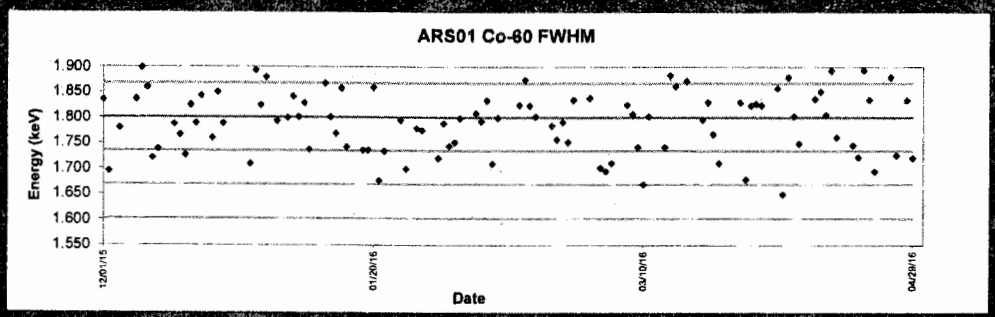



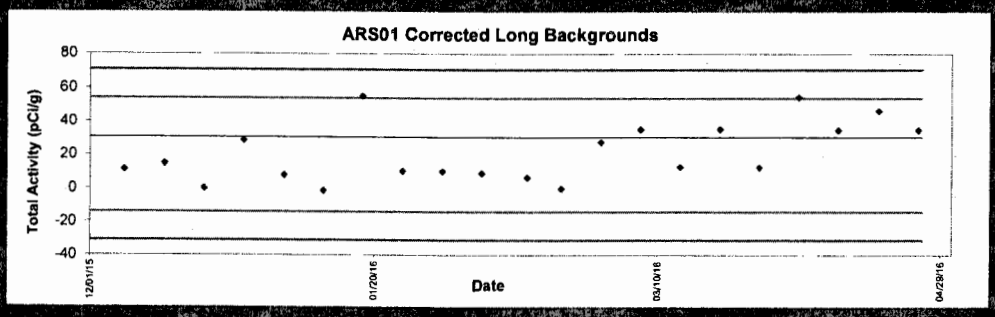



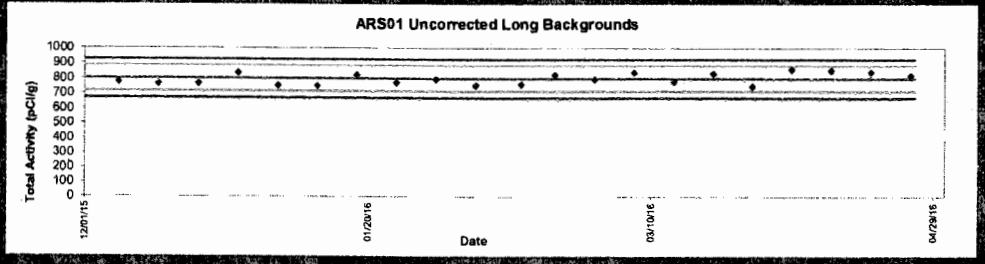



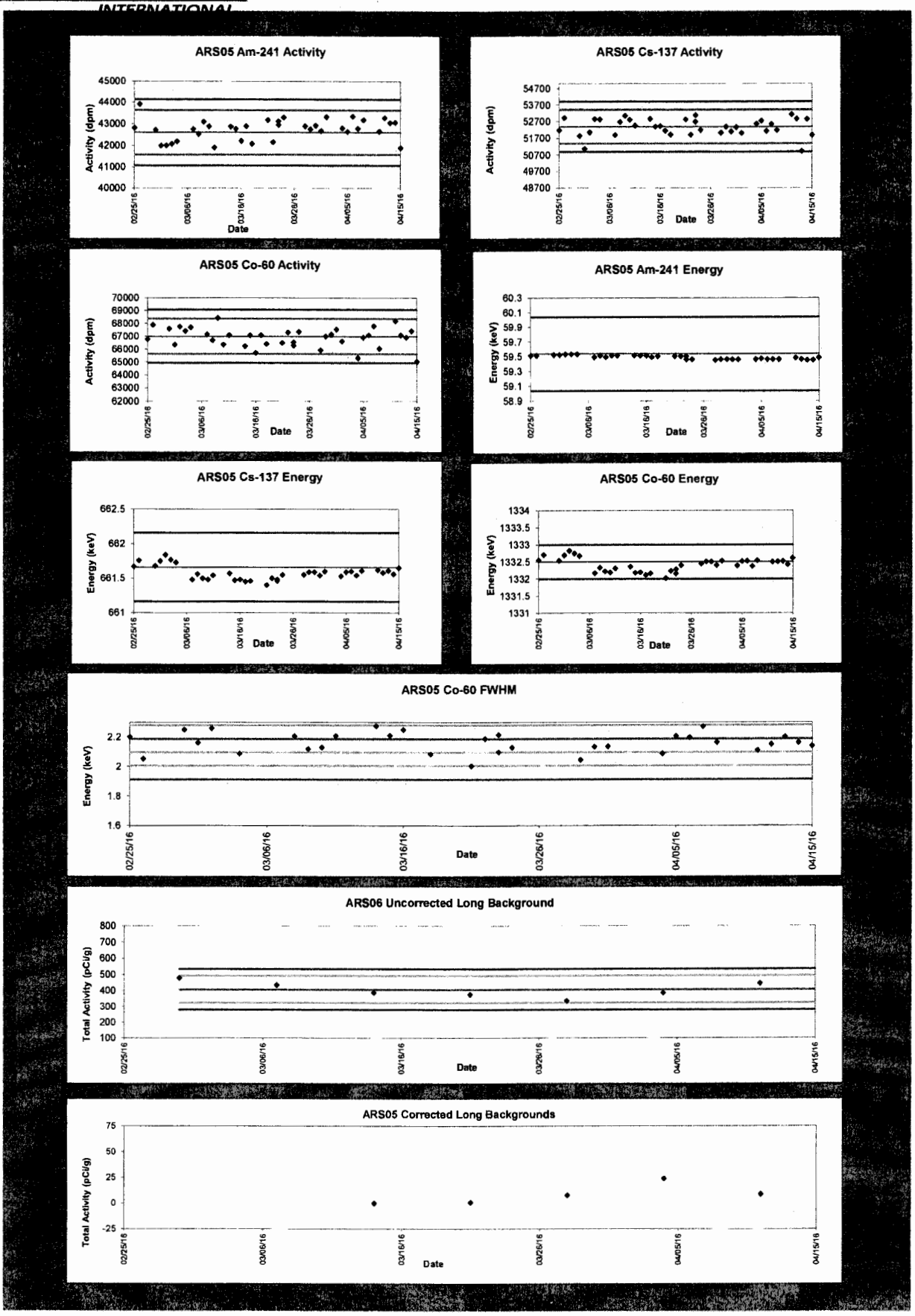



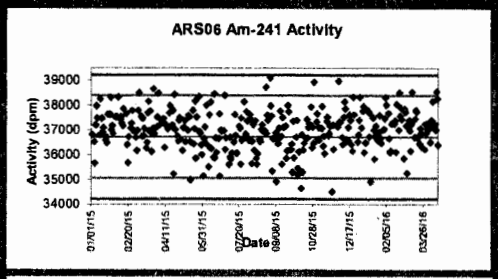



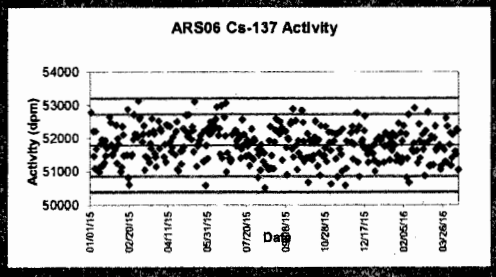
# ARS05 GAMMA SPECTROMETER CONTROL CHARTS

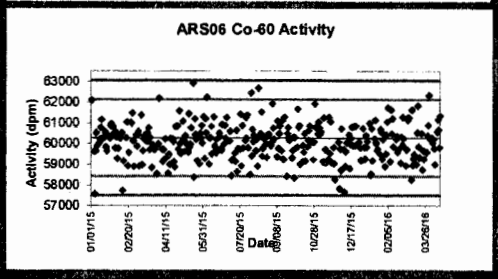


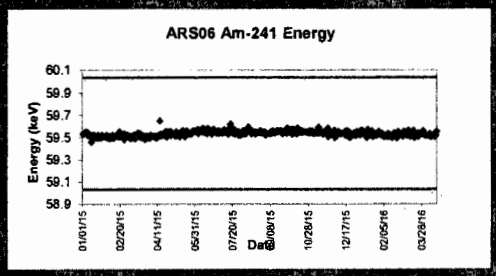
INTERNATIONAL

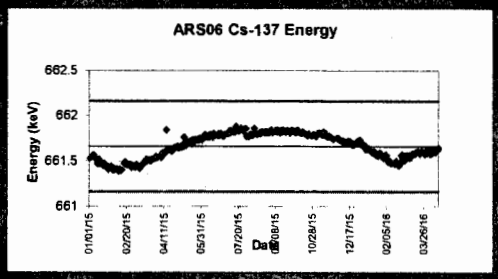
# ARS06 GAMMA SPECTROMETER CONTROL CHARTS

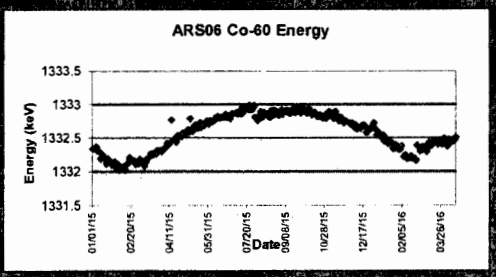


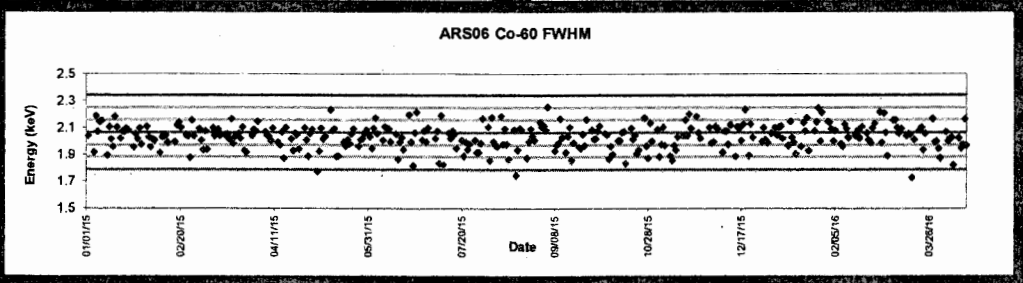



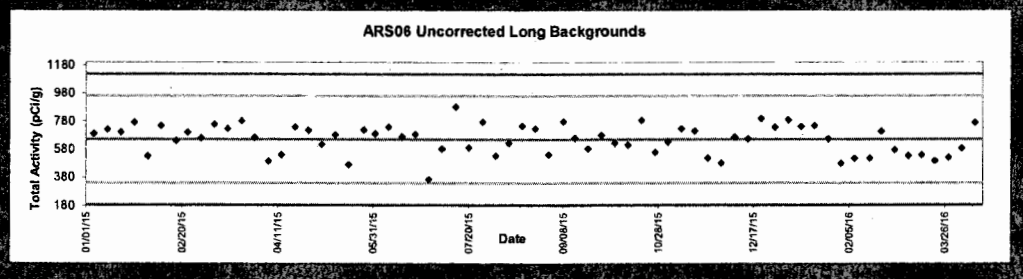



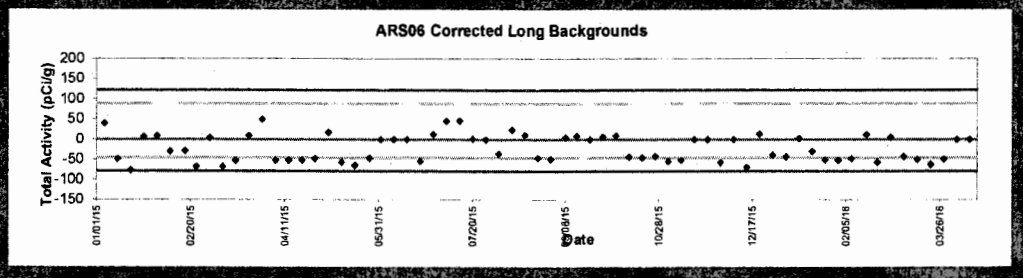



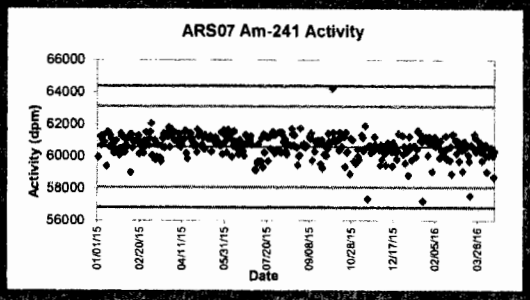



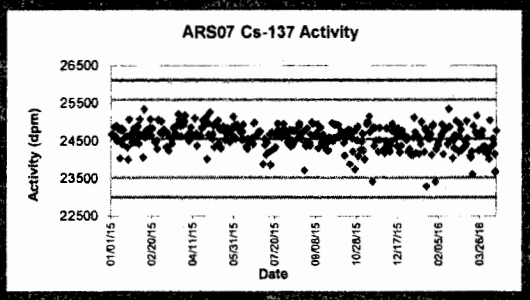



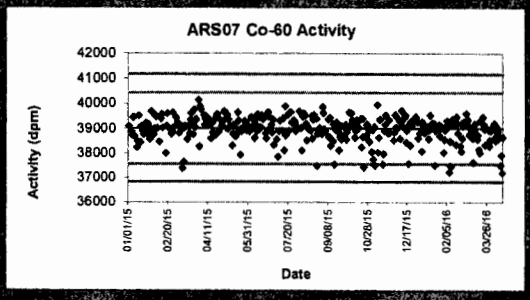



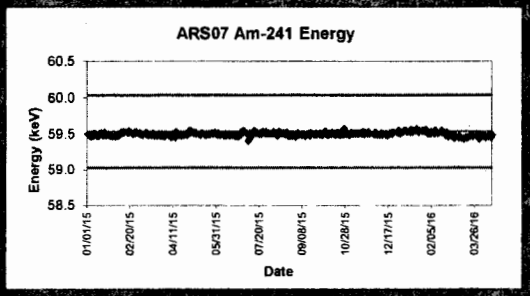



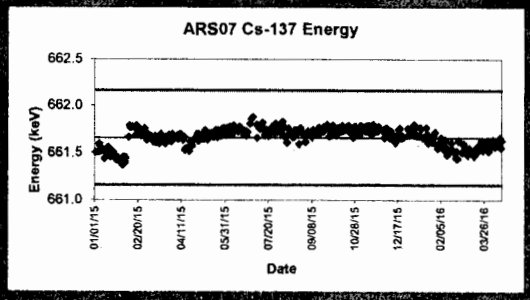
# ARS07 GAMMA SPECTROMETER CONTROL CHARTS

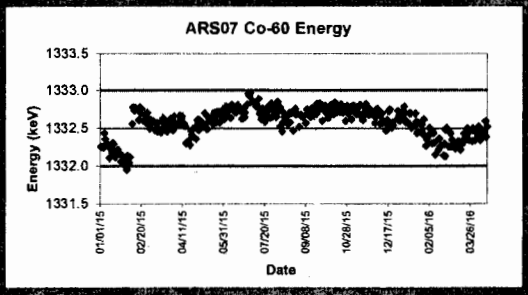


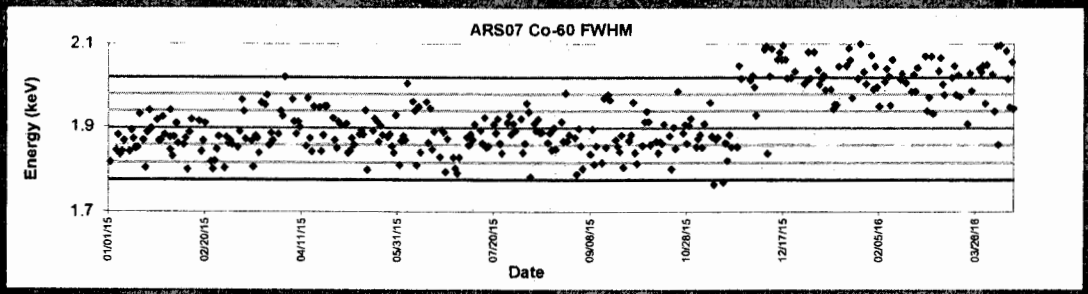



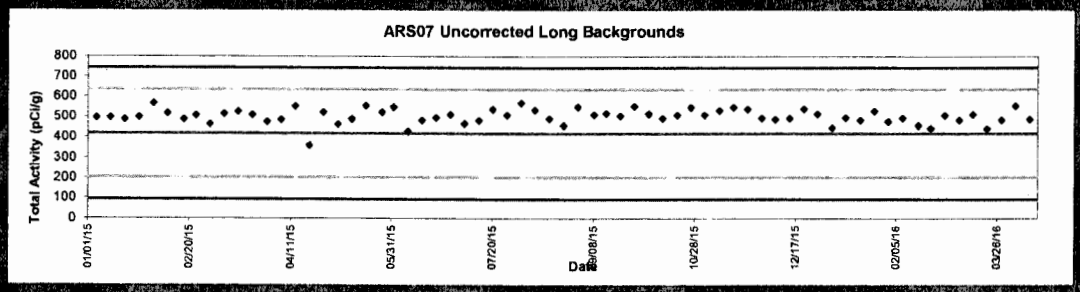



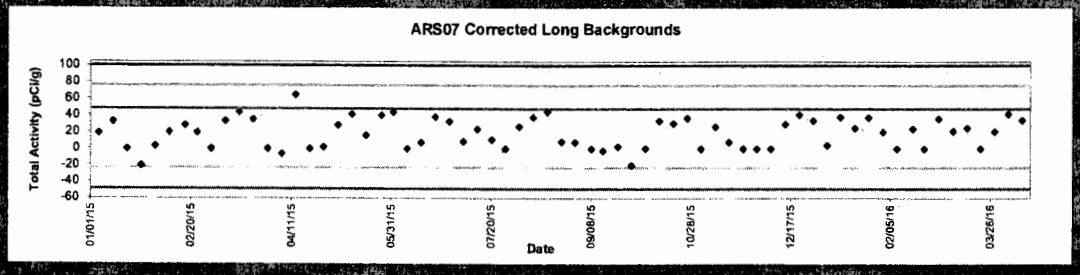



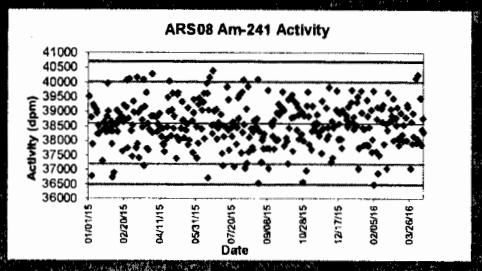



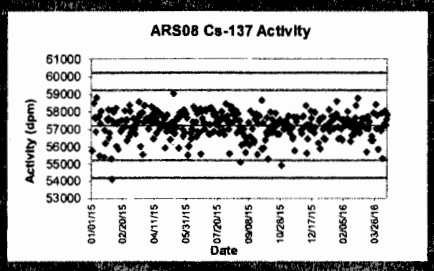



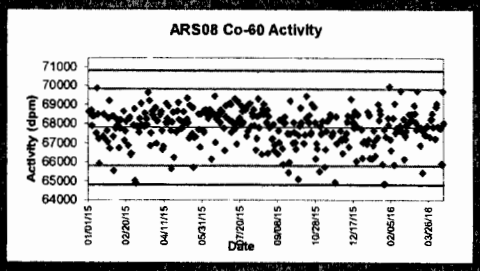



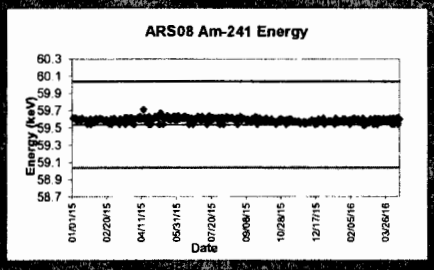



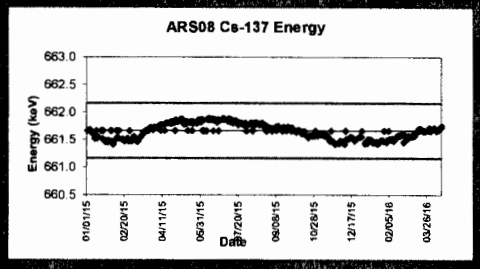
# ARS08 GAMMA SPECTROMETER CONTROL CHARTS

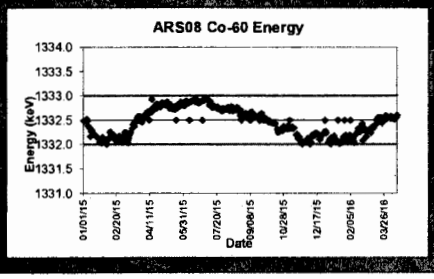


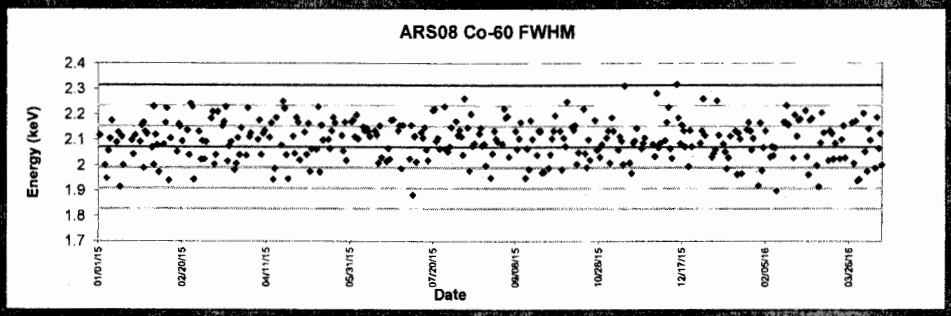



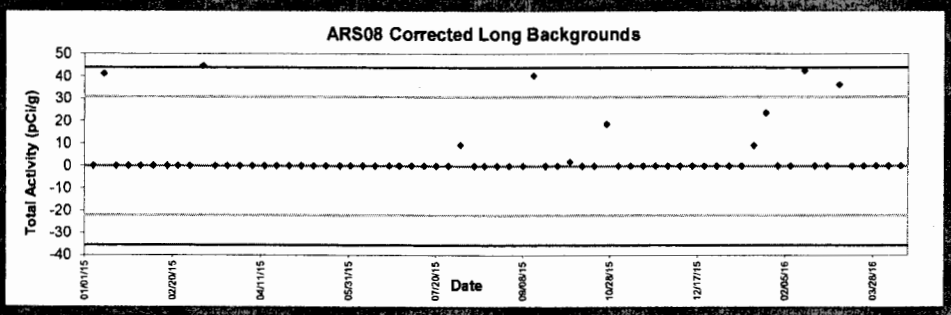



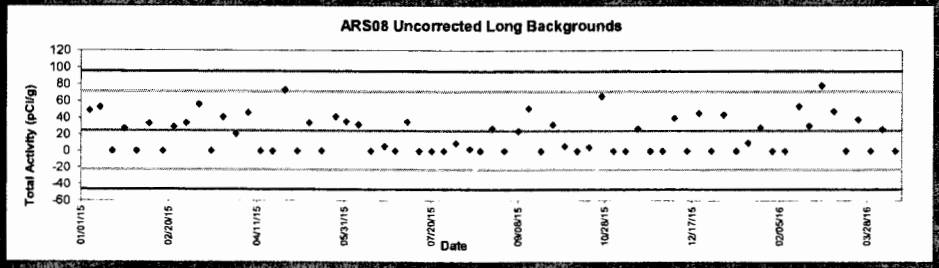



# SDG **ARS1-16-00670**

| Fraction | Container | Client ID | Aliquot | Units | Geometry | Prep Type | Origin | Origin2 | ICOC ID |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 1 | 04-PD-RO-01-01 | 1711.0000 | g | | ORIG | SCI | | 229510 |
| 001 | 1 | 04-PD-RO-01-01 | 1012.3500 | g | | DRYF | PRP | | 229598 |
| 001 | 1 | 04-PD-RO-01-01 | 365.8400 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229678 |
| 001 | 1 | 04-PD-RO-01-01 | 78.5000 | g | | DRAD | ALI | Manual | 229712 |
| 001 | 1 | 04-PD-RO-01-01 | 2.1048 | g | | DRAD | PRO | ARS-032 | 230512 |
| 002 | 1 | 04-PD-RO-02-01 | 2039.0000 | g | | ORIG | SCI | | 229511 |
| 002 | 1 | 04-PD-RO-02-01 | 864.2600 | g | | DRYF | PRP | | 229599 |
| 002 | 1 | 04-PD-RO-02-01 | 342.2500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229679 |
| 002 | 1 | 04-PD-RO-02-01 | 78.5000 | g | | DRAD | ALI | Manual | 229713 |
| 003 | 1 | 04-PD-RO-03-01 | 812.0000 | g | | ORIG | SCI | | 229512 |
| 003 | 1 | 04-PD-RO-03-01 | 804.5100 | g | | DRYF | PRP | | 229600 |
| 003 | 1 | 04-PD-RO-03-01 | 358.2700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229680 |
| 003 | 1 | 04-PD-RO-03-01 | 78.5000 | g | | DRAD | ALI | Manual | 229714 |
| 003 | 1 | 04-PD-RO-03-01 | 2.1043 | g | | DRAD | PRO | ARS-032 | 230514 |
| 004 | 1 | 04-PD-RO-03-02 | 974.0000 | g | | ORIG | SCI | | 229513 |
| 004 | 1 | 04-PD-RO-03-02 | 745.0400 | g | | DRYF | PRP | | 229601 |
| 004 | 1 | 04-PD-RO-03-02 | 387.3600 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229681 |
| 004 | 1 | 04-PD-RO-03-02 | 78.5000 | g | | DRAD | ALI | Manual | 229715 |
| 005 | 1 | 04-PD-RO-03-03 | 985.0000 | g | | ORIG | SCI | | 229514 |
| 005 | 1 | 04-PD-RO-03-03 | 817.7200 | g | | DRYF | PRP | | 229602 |
| 005 | 1 | 04-PD-RO-03-03 | 379.7100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229682 |
| 005 | 1 | 04-PD-RO-03-03 | 78.5000 | g | | DRAD | ALI | Manual | 229716 |
| 006 | 1 | 04-PD-RO-03-04 | 951.0000 | g | | ORIG | SCI | | 229515 |
| 006 | 1 | 04-PD-RO-03-04 | 823.8800 | g | | DRYF | PRP | | 229603 |
| 006 | 1 | 04-PD-RO-03-04 | 400.7300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229683 |
| 006 | 1 | 04-PD-RO-03-04 | 78.5000 | g | | DRAD | ALI | Manual | 229717 |
| 007 | 1 | 04-PD-RO-03-05 | 1137.0000 | g | | ORIG | SCI | | 229516 |
| 007 | 1 | 04-PD-RO-03-05 | 837.1800 | g | | DRYF | PRP | | 229604 |
| 007 | 1 | 04-PD-RO-03-05 | 383.0100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229684 |
| 007 | 1 | 04-PD-RO-03-05 | 78.5000 | g | | DRAD | ALI | Manual | 229718 |
| 008 | 1 | 04-PD-RO-04-01 | 1015.0000 | g | | ORIG | SCI | | 229517 |
| 008 | 1 | 04-PD-RO-04-01 | 833.1400 | g | | DRYF | PRP | | 229605 |
| 008 | 1 | 04-PD-RO-04-01 | 441.0600 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229685 |
| 008 | 1 | 04-PD-RO-04-01 | 78.5000 | g | | DRAD | ALI | Manual | 229719 |
| 009 | 1 | 04-PD-RO-05-01 | 948.0000 | g | | ORIG | SCI | | 229518 |
| 009 | 1 | 04-PD-RO-05-01 | 713.1000 | g | | DRYF | PRP | | 229606 |
| 009 | 1 | 04-PD-RO-05-01 | 386.1100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229686 |
| 009 | 1 | 04-PD-RO-05-01 | 78.5000 | g | | DRAD | ALI | Manual | 229720 |
| 010 | 1 | 04-PD-RO-05-02 | 951.0000 | g | | ORIG | SCI | | 229519 |
| 010 | 1 | 04-PD-RO-05-02 | 761.6000 | g | | DRYF | PRP | | 229607 |
| 010 | 1 | 04-PD-RO-05-02 | 377.5800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229687 |
| 010 | 1 | 04-PD-RO-05-02 | 78.5000 | g | | DRAD | ALI | Manual | 229721 |
| 011 | 1 | 04-PD-RO-05-03 | 1094.0000 | g | | ORIG | SCI | | 229520 |
| 011 | 1 | 04-PD-RO-05-03 | 773.3300 | g | | DRYF | PRP | | 229609 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 011 | 1 | 04-PD-RO-05-03 | 371.4100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229688 |
| 011 | 1 | 04-PD-RO-05-03 | 78.5000 | g | | DRAD | ALI | Manual | 229722 |
| 012 | 1 | 04-PD-RO-05-04 | 966.0000 | g | | ORIG | SCI | | 229521 |
| 012 | 1 | 04-PD-RO-05-04 | 950.9900 | g | | DRYF | PRP | | 229610 |
| 012 | 1 | 04-PD-RO-05-04 | 366.5000 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229689 |
| 012 | 1 | 04-PD-RO-05-04 | 370.2500 | g | 250 mL (8oz.) Tuna Can | DGAM | ALI | Manual | 229690 |
| 012 | 1 | 04-PD-RO-05-04 | 78.5000 | g | | DRAD | ALI | Manual | 229723 |
| 012 | 1 | 04-PD-RO-05-04 | 78.5000 | g | | DRAD | ALI | Manual | 229724 |
| 013 | 1 | 04-PD-RO-05-05 | 986.0000 | g | | ORIG | SCI | | 229522 |
| 013 | 1 | 04-PD-RO-05-05 | 758.7100 | g | | DRYF | PRP | | 229612 |
| 013 | 1 | 04-PD-RO-05-05 | 372.8800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229691 |
| 013 | 1 | 04-PD-RO-05-05 | 78.5000 | g | | DRAD | ALI | Manual | 229725 |
| 014 | 1 | 04-PD-RO-06-01 | 1007.0000 | g | | ORIG | SCI | | 229523 |
| 014 | 1 | 04-PD-RO-06-01 | 708.2100 | g | | DRYF | PRP | | 229613 |
| 014 | 1 | 04-PD-RO-06-01 | 373.2200 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229692 |
| 014 | 1 | 04-PD-RO-06-01 | 78.5000 | g | | DRAD | ALI | Manual | 229726 |
| 015 | 1 | 04-PD-RO-07-01 | 1026.0000 | g | | ORIG | SCI | | 229524 |
| 015 | 1 | 04-PD-RO-07-01 | 795.0400 | g | | DRYF | PRP | | 229616 |
| 015 | 1 | 04-PD-RO-07-01 | 379.4800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229693 |
| 015 | 1 | 04-PD-RO-07-01 | 78.5000 | g | | DRAD | ALI | Manual | 229727 |
| 016 | 1 | 04-PD-RO-08-01 | 1401.0000 | g | | ORIG | SCI | | 229525 |
| 016 | 1 | 04-PD-RO-08-01 | 1068.8800 | g | | DRYF | PRP | | 229617 |
| 016 | 1 | 04-PD-RO-08-01 | 345.1800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229694 |
| 016 | 1 | 04-PD-RO-08-01 | 78.5000 | g | | DRAD | ALI | Manual | 229728 |
| 016 | 1 | 04-PD-RO-08-01 | 78.5000 | g | | DRAD | ALI | Manual | 229822 |
| 016 | 1 | 04-PD-RO-08-01 | 2.1030 | g | | DRAD | PRO | ARS-032 | 230515 |
| 017 | 1 | 04-PD-RO-08-02 | 1188.0000 | g | | ORIG | SCI | | 229526 |
| 017 | 1 | 04-PD-RO-08-02 | 881.8000 | g | | DRYF | PRP | | 229619 |
| 017 | 1 | 04-PD-RO-08-02 | 342.2000 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229695 |
| 017 | 1 | 04-PD-RO-08-02 | 78.5000 | g | | DRAD | ALI | Manual | 229729 |
| 018 | 1 | 04-PD-RO-08-03 | 1605.0000 | g | | ORIG | SCI | | 229527 |
| 018 | 1 | 04-PD-RO-08-03 | 831.2900 | g | | DRYF | PRP | | 229620 |
| 018 | 1 | 04-PD-RO-08-03 | 352.9300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229696 |
| 018 | 1 | 04-PD-RO-08-03 | 78.5000 | g | | DRAD | ALI | Manual | 229730 |
| 019 | 1 | 04-PD-RO-08-04 | 1384.0000 | g | | ORIG | SCI | | 229528 |
| 019 | 1 | 04-PD-RO-08-04 | 949.3200 | g | | DRYF | PRP | | 229621 |
| 019 | 1 | 04-PD-RO-08-04 | 370.8100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229697 |
| 019 | 1 | 04-PD-RO-08-04 | 78.5000 | g | | DRAD | ALI | Manual | 229731 |
| 020 | 1 | 04-PD-RO-08-05 | 1194.0000 | g | | ORIG | SCI | | 229529 |
| 020 | 1 | 04-PD-RO-08-05 | 1031.8200 | g | | DRYF | PRP | | 229622 |
| 020 | 1 | 04-PD-RO-08-05 | 339.7500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229698 |
| 020 | 1 | 04-PD-RO-08-05 | 78.5000 | g | | DRAD | ALI | Manual | 229732 |
| 021 | 1 | 04-PD-RO-09-01 | 2252.0000 | g | | ORIG | SCI | | 229530 |
| 021 | 1 | 04-PD-RO-09-01 | 1325.2900 | g | | DRYF | PRP | | 229623 |
| 021 | 1 | 04-PD-RO-09-01 | 347.3800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229699 |
| 021 | 1 | 04-PD-RO-09-01 | 357.2400 | g | 250 mL (8oz.) Tuna Can | DGAM | ALI | Manual | 229700 |
| 021 | 1 | 04-PD-RO-09-01 | 78.5000 | g | | DRAD | ALI | Manual | 229733 |
| 021 | 1 | 04-PD-RO-09-01 | 78.5000 | g | | DRAD | ALI | Manual | 229734 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 022 | 1 | 04-PD-RO-10-01 | 1653.0000 | g | | ORIG | SCI | | 229531 |
| 022 | 1 | 04-PD-RO-10-01 | 964.4400 | g | | DRYF | PRP | | 229624 |
| 022 | 1 | 04-PD-RO-10-01 | 295.8100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229701 |
| 022 | 1 | 04-PD-RO-10-01 | 78.5000 | g | | DRAD | ALI | Manual | 229735 |
| 023 | 1 | 04-PD-RO-11-01 | 2228.0000 | g | | ORIG | SCI | | 229532 |
| 023 | 1 | 04-PD-RO-11-01 | 1305.9900 | g | | DRYF | PRP | | 229625 |
| 023 | 1 | 04-PD-RO-11-01 | 398.0300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229702 |
| 023 | 1 | 04-PD-RO-11-01 | 78.5000 | g | | DRAD | ALI | Manual | 229736 |
| 024 | 1 | 04-PD-RO-11-02 | 1656.0000 | g | | ORIG | SCI | | 229533 |
| 024 | 1 | 04-PD-RO-11-02 | 882.9300 | g | | DRYF | PRP | | 229626 |
| 024 | 1 | 04-PD-RO-11-02 | 380.5100 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229703 |
| 024 | 1 | 04-PD-RO-11-02 | 78.5000 | g | | DRAD | ALI | Manual | 229737 |
| 025 | 1 | 04-PD-RO-11-03 | 1757.0000 | g | | ORIG | SCI | | 229534 |
| 025 | 1 | 04-PD-RO-11-03 | 1026.6800 | g | | DRYF | PRP | | 229627 |
| 025 | 1 | 04-PD-RO-11-03 | 347.4600 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229704 |
| 025 | 1 | 04-PD-RO-11-03 | 78.5000 | g | | DRAD | ALI | Manual | 229738 |
| 026 | 1 | 04-PD-RO-11-04 | 1522.0000 | g | | ORIG | SCI | | 229535 |
| 026 | 1 | 04-PD-RO-11-04 | 1016.0100 | g | | DRYF | PRP | | 229628 |
| 026 | 1 | 04-PD-RO-11-04 | 405.7400 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229705 |
| 026 | 1 | 04-PD-RO-11-04 | 78.5000 | g | | DRAD | ALI | Manual | 229739 |
| 027 | 1 | 04-PD-RO-11-05 | 1842.0000 | g | | ORIG | SCI | | 229536 |
| 027 | 1 | 04-PD-RO-11-05 | 1037.5300 | g | | DRYF | PRP | | 229629 |
| 027 | 1 | 04-PD-RO-11-05 | 399.4900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229706 |
| 027 | 1 | 04-PD-RO-11-05 | 78.5000 | g | | DRAD | ALI | Manual | 229740 |
| 028 | 1 | 04-PD-RO-12-01 | 1203.0000 | g | | ORIG | SCI | | 229537 |
| 028 | 1 | 04-PD-RO-12-01 | 856.3100 | g | | DRYF | PRP | | 229630 |
| 028 | 1 | 04-PD-RO-12-01 | 360.3300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229707 |
| 028 | 1 | 04-PD-RO-12-01 | 78.5000 | g | | DRAD | ALI | Manual | 229741 |
| 029 | 1 | 04-PD-RO-13-01 | 1158.0000 | g | | ORIG | SCI | | 229538 |
| 029 | 1 | 04-PD-RO-13-01 | 890.6000 | g | | DRYF | PRP | | 229631 |
| 029 | 1 | 04-PD-RO-13-01 | 355.7300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229708 |
| 029 | 1 | 04-PD-RO-13-01 | 78.5000 | g | | DRAD | ALI | Manual | 229742 |
| 030 | 1 | 04-PD-RO-14-01 | 1175.0000 | g | | ORIG | SCI | | 229539 |
| 030 | 1 | 04-PD-RO-14-01 | 1139.8700 | g | | DRYF | PRP | | 229632 |
| 030 | 1 | 04-PD-RO-14-01 | 323.3700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229709 |
| 030 | 1 | 04-PD-RO-14-01 | 78.5000 | g | | DRAD | ALI | Manual | 229743 |
| 031 | 1 | 04-PD-RO-15-01 | 1737.0000 | g | | ORIG | SCI | | 229540 |
| 031 | 1 | 04-PD-RO-15-01 | 929.1000 | g | | DRYF | PRP | | 229633 |
| 031 | 1 | 04-PD-RO-15-01 | 322.8400 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229710 |
| 031 | 1 | 04-PD-RO-15-01 | 78.5000 | g | | DRAD | ALI | Manual | 229744 |
| 031 | 1 | 04-PD-RO-15-01 | 78.5000 | g | | DRAD | ALI | Manual | 229823 |
| 031 | 1 | 04-PD-RO-15-01 | 2.1020 | g | | DRAD | PRO | ARS-032 | 230516 |
| 032 | 1 | 04-PD-RO-16-01 | 1691.0000 | g | | ORIG | SCI | | 229541 |
| 032 | 1 | 04-PD-RO-16-01 | 962.9800 | g | | DRYF | PRP | | 229634 |
| 032 | 1 | 04-PD-RO-16-01 | 343.7800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229711 |
| 032 | 1 | 04-PD-RO-16-01 | 78.5000 | g | | DRAD | ALI | Manual | 229745 |

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Radiological Analysis

## EPA 905.0/SRW-01

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

DCN: ITSI-0808-0004-0076, 8 May 2019

**Analysis Batch ID** **ARS1-B16-00514**

**Method** **ARS-032** **Analysis** **GPC-A-012** **Matrix** **SO**

**Description** **Strontium-90 (Soil, Sludge, Biota, Sediment)**

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | LCS | B-21091 | | | | | | | | |
| ARS1-B16-00514-02 | LCSD | B-21092 | | | | | | | | |
| ARS1-B16-00514-03 | MBL | | | | | | | | | |
| ARS1-B16-00514-04 | DUP | | | | | | | | | |
| ARS1-B16-00514-05 | DO | | | | **ARS1-16-00645** | 021 | 1 | 07-PE-0068-21 | STD | 04/17/16 |
| ARS1-B16-00514-06 | TRG | | | | **ARS1-16-00645** | 022 | 1 | 07-PE-0068-22 | STD | 04/17/16 |
| ARS1-B16-00514-07 | TRG | | | | **ARS1-16-00645** | 023 | 1 | 07-PE-0068-23 | STD | 04/17/16 |
| ARS1-B16-00514-08 | TRG | | | | **ARS1-16-00646** | 001 | 1 | 07-E2-T5EX1-598 | STD | 04/17/16 |
| ARS1-B16-00514-09 | TRG | | | | **ARS1-16-00646** | 002 | 1 | 07-E2-T5EX1-599 | STD | 04/17/16 |
| ARS1-B16-00514-10 | TRG | | | | **ARS1-16-00646** | 003 | 1 | 07-E2-T5EX1-600 | STD | 04/17/16 |
| ARS1-B16-00514-11 | TRG | | | | **ARS1-16-00646** | 004 | 1 | 07-E2-T5EX1-601 | STD | 04/17/16 |
| ARS1-B16-00514-12 | TRG | | | | **ARS1-16-00670** | 001 | 1 | 04-PD-RO-01-01 | STD | 04/22/16 |
| ARS1-B16-00514-13 | TRG | | | | **ARS1-16-00670** | 003 | 1 | 04-PD-RO-03-01 | STD | 04/22/16 |
| ARS1-B16-00514-14 | TRG | | | | **ARS1-16-00670** | 016 | 1 | 04-PD-RO-08-01 | STD | 04/22/16 |
| ARS1-B16-00514-15 | TRG | | | | **ARS1-16-00670** | 031 | 1 | 04-PD-RO-15-01 | STD | 04/22/16 |
| ARS1-B16-00514-16 | TRG | | | | **ARS1-16-00671** | 001 | 1 | 04-PD-STK-01-01 | STD | 04/22/16 |
| ARS1-B16-00514-17 | TRG | | | | **ARS1-16-00671** | 011 | 1 | 04-PD-STK-01-11 | STD | 04/22/16 |
| ARS1-B16-00514-18 | TRG | | | | **ARS1-16-00749** | 001 | 1 | 07-PE-0069-01 | STD | 05/03/16 |
| ARS1-B16-00514-19 | TRG | | | | **ARS1-16-00749** | 002 | 1 | 07-PE-0069-02 | STD | 05/03/16 |
| ARS1-B16-00514-20 | TRG | | | | **ARS1-16-00749** | 003 | 1 | 07-PE-0069-03 | STD | 05/03/16 |
| ARS1-B16-00514-21 | TRG | | | | **ARS1-16-00749** | 004 | 1 | 07-PE-0069-04 | STD | 05/03/16 |
| ARS1-B16-00514-22 | TRG | | | | **ARS1-16-00749** | 005 | 1 | 07-PE-0069-05 | STD | 05/03/16 |
| ARS1-B16-00514-23 | TRG | | | | **ARS1-16-00749** | 006 | 1 | 07-PE-0069-06 | STD | 05/03/16 |
| ARS1-B16-00514-24 | TRG | | | | **ARS1-16-00749** | 007 | 1 | 07-PE-0069-07 | STD | 05/03/16 |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Total Strontium (Sr-90) EPA 905.0

*Procedures* ARS-060 ARS-032

*ARS File ID Number* ARS1-16-00645; 646; 670; 671; 749

*ARS Batch Number* ARS1-B16-00514

| | |
|---|---|
| Carrier ID | R15-00145 |
| Carrier Concentration (mg Sr/mL) | 5 |
| Carrier volume (mL) | 1 |
| Carrier added (mg) | 5 |
| grav. Factor (mg Sr / mg Sr(NO3)2 | 0.4141 |
| Carrier expected mass (mg) | 12.07 |

| | |
|---|---|
| *systematic error* | 7.43% |
| *CF* | 2 |

Instrument Used: C

| | ID | Aliquot | Aliquot Units | Desired reporting units | Start of Y-90 ingrowth | Planchet tare (g) | Planchet + ppt (g) | net mass of Sr(NO3)2 (mg) | chemical yield | Chemical Yield for calculations | Beta Gross (counts) | Count duration (min) | Beta Bkg counts | Beta bkg count duration (min) | Count Finish Date and Time | Det. ID | Total Sr (Sr/Y-90) Beta Efficiency | Activity | Counting Uncert. (2s) | CSU (2s) | MDA | Lc | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 2 | B16-00514-02 | 1 | g | pCi | 4/13/2016 17:23 | 7.8401 | 7.8519 | 11.8 | 98% | 98% | 2796 | 120 | 852 | 900 | 4/14/2016 13:38 | A1 | 0.3695 | 23.470 | 0.928 | 3.609 | 0.350 | 0.163 | pCi/g |
| 3 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 4 | B16-00514-04 | 2.1029 | g | pCi | 4/13/2016 17:25 | 7.8389 | 7.8508 | 11.9 | 99% | 99% | 119 | 120 | 854 | 900 | 4/14/2016 13:38 | A2 | 0.3454 | 0.023 | 0.102 | 0.102 | 0.177 | 0.082 | pCi/g |
| 5 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 6 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 7 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 8 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 9 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 10 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 11 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 12 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 13 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 14 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 15 | B16-00514-15 | 2.102 | g | pCi | 4/13/2016 17:23 | 7.8239 | 7.8354 | 11.5 | 95% | 95% | 90 | 120 | 750 | 900 | 4/14/2016 13:38 | A3 | 0.3702 | -0.043 | 0.087 | 0.087 | 0.161 | 0.075 | pCi/g |
| 16 | B16-00514-16 | 2.1106 | g | pCi | 4/13/2016 17:33 | 7.8047 | 7.8161 | 11.4 | 94% | 94% | 106 | 120 | 869 | 900 | 4/14/2016 13:38 | A4 | 0.3447 | -0.045 | 0.101 | 0.102 | 0.186 | 0.087 | pCi/g |
| 17 | B16-00514-17 | 2.1077 | g | pCi | 4/13/2016 17:24 | 7.8464 | 7.8582 | 11.8 | 98% | 98% | 97 | 120 | 673 | 900 | 4/14/2016 13:38 | B1 | 0.3680 | 0.030 | 0.087 | 0.087 | 0.150 | 0.069 | pCi/g |
| 18 | B16-00514-18 | 2.1089 | g | pCi | 4/13/2016 17:22 | 7.8748 | 7.8867 | 11.9 | 99% | 99% | 105 | 120 | 751 | 900 | 4/14/2016 13:38 | B2 | 0.3376 | 0.022 | 0.098 | 0.098 | 0.170 | 0.079 | pCi/g |
| 19 | B16-00514-19 | 2.105 | g | pCi | 4/13/2016 17:22 | 7.8243 | 7.8364 | 12.1 | 100% | 100% | 94 | 120 | 741 | 900 | 4/14/2016 13:38 | B4 | 0.3389 | -0.021 | 0.092 | 0.092 | 0.166 | 0.077 | pCi/g |
| 20 | B16-00514-20 | 2.1063 | g | pCi | 4/13/2016 17:26 | 7.7830 | 7.7952 | 12.2 | 101% | 100% | 118 | 120 | 760 | 900 | 4/14/2016 13:38 | C1 | 0.3652 | 0.068 | 0.094 | 0.095 | 0.156 | 0.072 | pCi/g |
| 21 | B16-00514-21 | 2.1069 | g | pCi | 4/13/2016 17:23 | 7.8288 | 7.8413 | 12.5 | 104% | 100% | 105 | 120 | 1258 | 900 | 4/14/2016 13:38 | C2 | 0.3385 | -0.278 | 0.100 | 0.108 | 0.213 | 0.100 | pCi/g |
| 22 | B16-00514-22 | 2.1066 | g | pCi | 4/13/2016 17:23 | 7.8352 | 7.8472 | 12.0 | 99% | 99% | 105 | 120 | 783 | 900 | 4/14/2016 13:38 | C3 | 0.3649 | 0.002 | 0.090 | 0.090 | 0.159 | 0.074 | pCi/g |
| 23 | B16-00514-23 | 2.1068 | g | pCi | 4/13/2016 17:26 | 7.8541 | 7.8654 | 11.3 | 94% | 94% | 118 | 120 | 946 | 900 | 4/14/2016 13:38 | C4 | 0.3434 | -0.038 | 0.108 | 0.109 | 0.196 | 0.092 | pCi/g |
| 24 | B16-00514-24 | 2.1054 | g | pCi | 4/13/2016 17:23 | 7.7827 | 7.7943 | 11.6 | 96% | 96% | 98 | 120 | 711 | 900 | 4/14/2016 13:38 | D1 | 0.3667 | 0.014 | 0.090 | 0.090 | 0.157 | 0.073 | pCi/g |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Total Strontium (Sr-90) EPA 905.0

**Procedures** ARS-060 ARS-032

**ARS File ID Number** ARS1-16-00645; 646; 670; 671 & 749

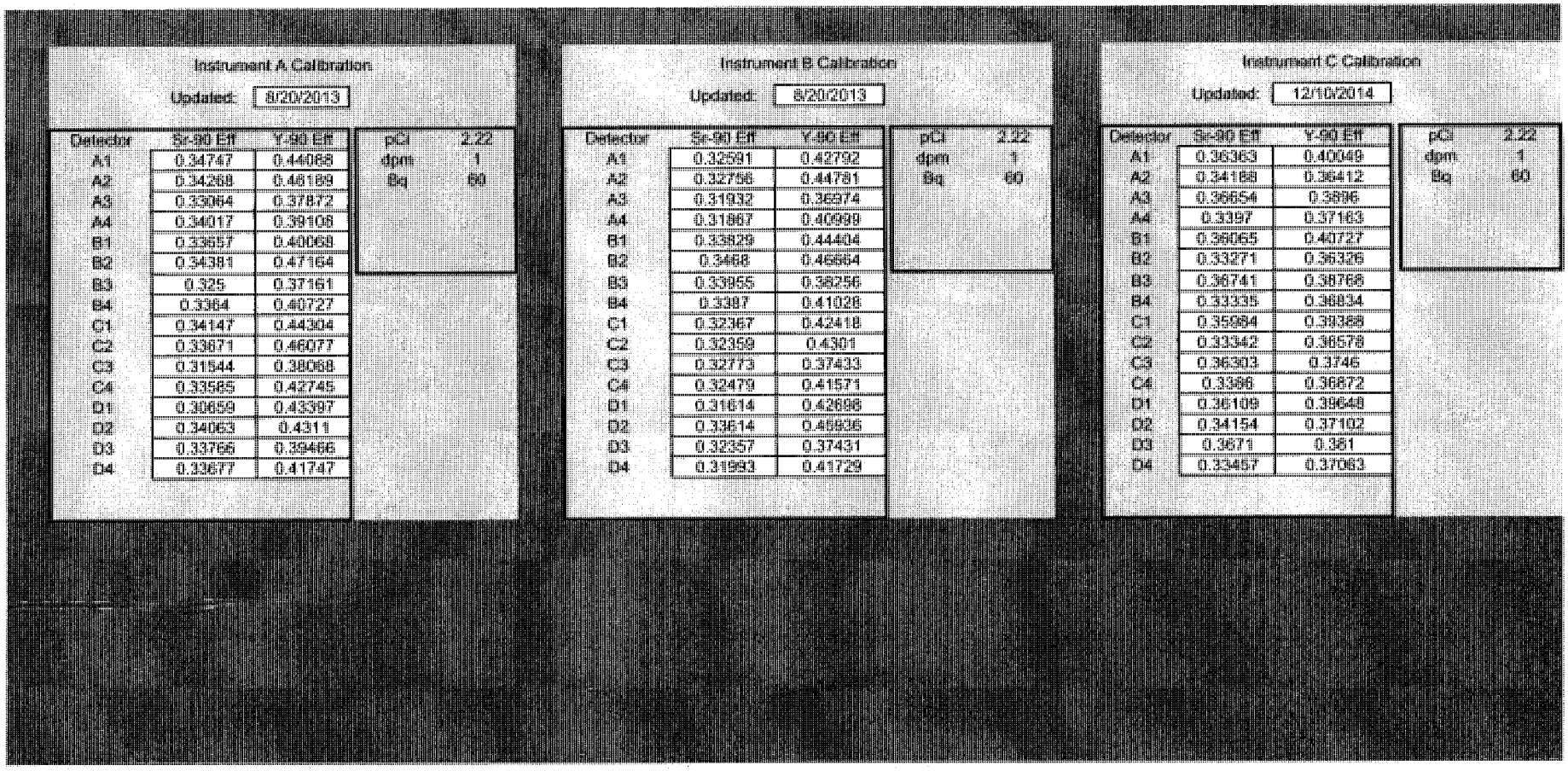
**ARS Batch Number** ARS1-B16-00514

| | |
|---|---|
| Carrier ID | R15-00145 |
| Carrier Concentration (mg Sr/mL) | 5 |
| Carrier volume (mL) | 1 |
| Carrier added (mg) | 5 |
| grav. Factor (mg Sr / mg Sr(NO3)2 | 0.4141 |
| Carrier expected mass (mg) | 12.07 |

| | |
|---|---|
| *systematic error* | 7.43% |
| *CF* | 2 |

Instrument Used: A

| | ID | Aliquot | Aliquot Units | Desired reporting units | Start of Y-90 ingrowth | Planchet tare (g) | Planchet + ppt (g) | net mass of Sr(NO3)2 (mg) | chemical yield | Chemical Yield for calculations | Beta Gross (counts) | Count duration (min) | Beta Bkg counts | Beta bkg count duration (min) | Count Finish Date and Time | Det. ID | Total Sr (Sr/Y-90) Beta Efficiency | Activity | Counting Uncert. (2s) | CSU (2s) | MDA | Lc | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B16-00514-01 | 1 | g | pCi | 4/13/2016 17:24 | 7.8606 | 7.8724 | 11.8 | 98% | 98% | 2733 | 120 | 1176 | 900 | 4/14/2016 13:36 | A2 | 0.3615 | 23.045 | 0.939 | 3.551 | 0.417 | 0.196 | pCi/g |
| 2 | | # | g | pCi | M/DD/YYYY HH:MM | | | #VALUE! | #VALUE! | #VALUE! | | 120 | | 900 | | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 3 | B16-00514-03 | 1 | g | pCi | 4/13/2016 17:24 | 7.8577 | 7.8695 | 11.8 | 98% | 98% | 129 | 120 | 958 | 900 | 4/14/2016 13:36 | A3 | 0.3382 | 0.012 | 0.231 | 0.231 | 0.404 | 0.189 | pCi/g |
| 4 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 5 | B16-00514-05 | 2.1095 | g | pCi | 4/13/2016 17:22 | 7.8479 | 7.8599 | 12.0 | 99% | 99% | 120 | 120 | 1021 | 900 | 4/14/2016 13:36 | A4 | 0.3482 | -0.070 | 0.102 | 0.102 | 0.189 | 0.088 | pCi/g |
| 6 | B16-00514-06 | 2.106 | g | pCi | 4/13/2016 17:24 | 7.8789 | 7.8904 | 11.5 | 95% | 95% | 95 | 120 | 745 | 900 | 4/14/2016 13:36 | B1 | 0.3467 | -0.020 | 0.095 | 0.095 | 0.171 | 0.079 | pCi/g |
| 7 | B16-00514-07 | 2.1022 | g | pCi | 4/13/2016 17:26 | 7.7860 | 7.7980 | 12.0 | 99% | 99% | 82 | 120 | 703 | 900 | 4/14/2016 13:36 | B2 | 0.3640 | -0.049 | 0.081 | 0.081 | 0.152 | 0.070 | pCi/g |
| 8 | B16-00514-08 | 2.1086 | g | pCi | 4/13/2016 17:27 | 7.8351 | 7.8472 | 12.1 | 100% | 100% | 114 | 120 | 751 | 900 | 4/14/2016 13:36 | B3 | 0.3324 | 0.063 | 0.102 | 0.102 | 0.170 | 0.079 | pCi/g |
| 9 | B16-00514-09 | 2.1055 | g | pCi | 4/13/2016 17:44 | 7.8208 | 7.8334 | 12.6 | 104% | 100% | 120 | 120 | 879 | 900 | 4/14/2016 13:36 | B4 | 0.3475 | 0.012 | 0.101 | 0.101 | 0.176 | 0.082 | pCi/g |
| 10 | B16-00514-10 | 2.1042 | g | pCi | 4/13/2016 17:25 | 7.7793 | 7.7909 | 11.6 | 96% | 96% | 107 | 120 | 803 | 900 | 4/14/2016 13:36 | C1 | 0.3575 | 0.000 | 0.096 | 0.096 | 0.170 | 0.079 | pCi/g |
| 11 | B16-00514-11 | 2.1048 | g | pCi | 4/13/2016 17:25 | 7.8388 | 7.8507 | 11.9 | 99% | 99% | 123 | 120 | 806 | 900 | 4/14/2016 13:36 | C2 | 0.3563 | 0.066 | 0.100 | 0.101 | 0.167 | 0.078 | pCi/g |
| 12 | B16-00514-12 | 2.1048 | g | pCi | 4/13/2016 17:27 | 7.8522 | 7.8640 | 11.8 | 98% | 98% | 103 | 120 | 688 | 900 | 4/14/2016 13:36 | C4 | 0.3503 | 0.049 | 0.094 | 0.094 | 0.159 | 0.074 | pCi/g |
| 13 | B16-00514-13 | 2.1043 | g | pCi | 4/13/2016 17:23 | 7.7873 | 7.7981 | 10.8 | 89% | 89% | 122 | 120 | 754 | 900 | 4/14/2016 13:36 | D1 | 0.3267 | 0.110 | 0.120 | 0.121 | 0.194 | 0.090 | pCi/g |
| 14 | B16-00514-14 | 2.103 | g | pCi | 4/13/2016 17:28 | 7.8364 | 7.8484 | 12.0 | 99% | 99% | 106 | 120 | 746 | 900 | 4/14/2016 13:36 | D3 | 0.3466 | 0.029 | 0.095 | 0.095 | 0.164 | 0.076 | pCi/g |
| 15 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 16 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 17 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 18 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 19 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 20 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 21 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 22 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 23 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 24 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |



Instrument A Calibration

Updated: 8/20/2013

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.34747 | 0.44088 |
| A2 | 0.34268 | 0.46189 |
| A3 | 0.33084 | 0.37872 |
| A4 | 0.34017 | 0.39108 |
| B1 | 0.33657 | 0.40068 |
| B2 | 0.34381 | 0.47164 |
| B3 | 0.325 | 0.37161 |
| B4 | 0.3364 | 0.40727 |
| C1 | 0.34147 | 0.44304 |
| C2 | 0.33671 | 0.46077 |
| C3 | 0.31544 | 0.38068 |
| C4 | 0.33585 | 0.42745 |
| D1 | 0.30659 | 0.43397 |
| D2 | 0.34063 | 0.4311 |
| D3 | 0.33766 | 0.39466 |
| D4 | 0.33677 | 0.41747 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

Instrument B Calibration

Updated: 8/20/2013

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.32581 | 0.42792 |
| A2 | 0.32756 | 0.44781 |
| A3 | 0.31932 | 0.36974 |
| A4 | 0.31887 | 0.40989 |
| B1 | 0.33829 | 0.44404 |
| B2 | 0.3468 | 0.46864 |
| B3 | 0.33955 | 0.38256 |
| B4 | 0.3397 | 0.41028 |
| C1 | 0.32367 | 0.42418 |
| C2 | 0.32359 | 0.4301 |
| C3 | 0.32773 | 0.37433 |
| C4 | 0.32479 | 0.41571 |
| D1 | 0.31614 | 0.42696 |
| D2 | 0.33614 | 0.45926 |
| D3 | 0.32357 | 0.37431 |
| D4 | 0.31993 | 0.41729 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

Instrument C Calibration

Updated: 12/10/2014

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.36363 | 0.40049 |
| A2 | 0.34188 | 0.36412 |
| A3 | 0.36654 | 0.3896 |
| A4 | 0.3397 | 0.37163 |
| B1 | 0.36065 | 0.40727 |
| B2 | 0.33271 | 0.36329 |
| B3 | 0.36741 | 0.38768 |
| B4 | 0.33335 | 0.36834 |
| C1 | 0.35984 | 0.39368 |
| C2 | 0.33342 | 0.36578 |
| C3 | 0.36303 | 0.3746 |
| C4 | 0.3386 | 0.36872 |
| D1 | 0.36109 | 0.39648 |
| D2 | 0.34154 | 0.37102 |
| D3 | 0.3671 | 0.361 |
| D4 | 0.33457 | 0.37063 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

ARS International
Baton Rouge Laboratory

# LCS Report
## Analytical Batch: ARS1-B16-00514



| Blind ID | ABatch Sample ID | Blind Group | Std ID | Isotope | Exp Addition | Expected Value | Empty Wt | Gross Wt | Net Wt | Expected Value CT | Mid Point Count Date | Known Value | User ID | Mod Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B-21091 | ARS1-B16-00514-01 | B-Sr90 | S-0300 | Sr-90 | 1 | 21.05020 | 17.36 | 18.3604 | 1.0004 | | | | AMRAD\JBYRD | 03/30/2016 |
| B-21092 | ARS1-B16-00514-02 | B-Sr90 | S-0300 | Sr-90 | 1 | 21.05020 | 17.3561 | 18.3595 | 1.0034 | | | | AMRAD\JBYRD | 03/30/2016 |

DCN: ITSI-0808-0004-0076, 8 May 2019

DCN: ITSI-0808-0004-0076, 8 May 2019

# Carrier Pipette Verification

Chemist: Arielle Nabatilan

Date/Time: 4/12/2016

Batch: B16-00514

| Balance ID | Balance Calibration Date | Pipette ID | Nominal Weight (gms) | Measurement 1 (gms) | Measurement 2 (gms) | Measurement 3 (gms) | MEAN | Acceptance Limits ±2% Mean | STDEV | RSD% | Acceptance Limits <1% RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12332539 | 6/9/15 | FJ15820 | 1.00 | 0.993 | 0.992 | 0.994 | 0.99 | Pass | 0.001 | 0.097 | Pass |

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Sr Yield Calculation Sheet
B16-00514

| | Empty | Filled | Yield(mg) | |
|---|---|---|---|---|
| 1 | 7.8606 | 7.8724 | 11.8 | Pass |
| 2 | 7.8401 | 7.8519 | 11.8 | Pass |
| 3 | 7.8577 | 7.8695 | 11.8 | Pass |
| 4 | 7.8389 | 7.8508 | 11.9 | Pass |
| 5 | 7.8479 | 7.8599 | 12 | Pass |
| 6 | 7.8789 | 7.8904 | 11.5 | Pass |
| 7 | 7.786 | 7.798 | 12 | Pass |
| 8 | 7.8351 | 7.8472 | 12.1 | Pass |
| 9 | 7.8208 | 7.8334 | 12.6 | Pass |
| 10 | 7.7793 | 7.7909 | 11.6 | Pass |
| 11 | 7.8388 | 7.8507 | 11.9 | Pass |
| 12 | 7.8522 | 7.864 | 11.8 | Pass |
| 13 | 7.7873 | 7.7981 | 10.8 | Pass |
| 14 | 7.8364 | 7.8484 | 12 | Pass |
| 15 | 7.8239 | 7.8354 | 11.5 | Pass |
| 16 | 7.8047 | 7.8161 | 11.4 | Pass |
| 17 | 7.8464 | 7.8582 | 11.8 | Pass |
| 18 | 7.8748 | 7.8867 | 11.9 | Pass |
| 19 | 7.8243 | 7.8364 | 12.1 | Pass |
| 20 | 7.783 | 7.7952 | 12.2 | Pass |
| 21 | 7.8288 | 7.8413 | 12.5 | Pass |
| 22 | 7.8352 | 7.8472 | 12 | Pass |
| 23 | 7.8541 | 7.8654 | 11.3 | Pass |
| 24 | 7.7827 | 7.7943 | 11.6 | Pass |

DCN: ITSI-0808-0004-0076, 8 May 2019

## Reagent Amounts

| ABatch Sample ID | Client ID | 14.1.4 - Add Carrier 1 - Strontium Carrier 5mg/mL (mL) | 14.3.1 - Select Sr column - SR Resin (SR-R50-S) 2 mL Cartridges (mL) | 14.3.4 - Pre-load rinse - Nitric Acid 8N (mL) | 14.4.1 - Dissolve PPT - Nitric Acid 8N (mL) | 14.4.3 - Beaker rinse - Nitric Acid 8N (mL) | 14.4.4 - Interferent Rinse 1 - Nitric Acid Oxalic Acid 3M/0.05M (mL) | 14.4.5 - Rinse of Interferent Rinse 1 - Nitric Acid 8N (mL) | 14.4.8 - Elute Sr - Nitric Acid 0.05N (mL) | 14.6.6 - Elution vessel rinse - Nitric Acid 0.05N (mL) | User ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-02 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-03 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-04 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-05 | 07-PE-0068-21 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-06 | 07-PE-0068-22 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-07 | 07-PE-0068-23 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-08 | 07-E2-T5EX1-598 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-09 | 07-E2-T5EX1-599 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-10 | 07-E2-T5EX1-600 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-11 | 07-E2-T5EX1-601 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-12 | 04-PD-RO-01-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-13 | 04-PD-RO-03-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-14 | 04-PD-RO-08-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-15 | 04-PD-RO-15-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-16 | 04-PD-STK-01-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-17 | 04-PD-STK-01-11 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-18 | 07-PE-0069-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-19 | 07-PE-0069-02 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-20 | 07-PE-0069-03 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-21 | 07-PE-0069-04 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-22 | 07-PE-0069-05 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-23 | 07-PE-0069-06 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-24 | 07-PE-0069-07 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |

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DCN: ITSI-0808-0004-0076, 8 May 2019

## Reagent Tracking

| Procedure Section | Reagent ID |
|---|---|
| 14.1.4 - Add Carrier 1 | R15-00145 |
| 14.3.1 - Select Sr column | R15-00877 |
| 14.3.4 - Pre-load rinse | R15-00700 |
| 14.4.1 - Dissolve PPT | R15-00700 |
| 14.4.3 - Beaker rinse | R15-00700 |
| 14.4.4 - Interferent Rinse 1 | R15-00974 |
| 14.4.5 - Rinse of Interferent Rinse 1 | R15-00700 |
| 14.4.8 - Elute Sr | R15-00949 |
| 14.6.6 - Elution vessel rinse | R15-00949 |

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## Procedure Data

| ABatch Sample ID | Client ID | ICOC ID | Aliquot Vol/Wt | Aliquot Units | Strontium Carrier (5mg/ml) | Y Ingrowth Date 1 | Disk Wt (g) | Disk Wt 2 (g) | Y Ingrowth Date 2 | User ID |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | | | 1.0000 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8606 | 7.8724 | | ANABATILAN |
| ARS1-B16-00514-02 | | | 1.0000 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8401 | 7.8519 | | ANABATILAN |
| ARS1-B16-00514-03 | | | 1.0000 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8577 | 7.8695 | | ANABATILAN |
| ARS1-B16-00514-04 | | | 2.1029 | g | R15-00145 | 4/13/2016 5:25:00 PM | 7.8389 | 7.8508 | | ANABATILAN |
| ARS1-B16-00514-05 | 07-PE-0068-21 | 230486 | 2.1095 | g | R15-00145 | 4/13/2016 5:22:00 PM | 7.8479 | 7.8599 | | ANABATILAN |
| ARS1-B16-00514-06 | 07-PE-0068-22 | 230488 | 2.1060 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8789 | 7.8904 | | ANABATILAN |
| ARS1-B16-00514-07 | 07-PE-0068-23 | 230487 | 2.1022 | g | R15-00145 | 4/13/2016 5:26:00 PM | 7.786 | 7.798 | | ANABATILAN |
| ARS1-B16-00514-08 | 07-E2-T5EX1-598 | 230501 | 2.1086 | g | R15-00145 | 4/13/2016 5:27:00 PM | 7.8351 | 7.8472 | | ANABATILAN |
| ARS1-B16-00514-09 | 07-E2-T5EX1-599 | 230502 | 2.1055 | g | R15-00145 | 4/13/2016 5:44:00 PM | 7.8208 | 7.8334 | | ANABATILAN |
| ARS1-B16-00514-10 | 07-E2-T5EX1-600 | 230503 | 2.1042 | g | R15-00145 | 4/13/2016 5:25:00 PM | 7.7793 | 7.7909 | | ANABATILAN |
| ARS1-B16-00514-11 | 07-E2-T5EX1-601 | 230505 | 2.1048 | g | R15-00145 | 4/13/2016 5:25:00 PM | 7.8388 | 7.8507 | | ANABATILAN |
| ARS1-B16-00514-12 | 04-PD-RO-01-01 | 230512 | 2.1048 | g | R15-00145 | 4/13/2016 5:27:00 PM | 7.8522 | 7.864 | | ANABATILAN |
| ARS1-B16-00514-13 | 04-PD-RO-03-01 | 230514 | 2.1043 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.7873 | 7.7981 | | ANABATILAN |
| ARS1-B16-00514-14 | 04-PD-RO-08-01 | 230515 | 2.1030 | g | R15-00145 | 4/13/2016 5:28:00 PM | 7.8364 | 7.8484 | | ANABATILAN |
| ARS1-B16-00514-15 | 04-PD-RO-15-01 | 230516 | 2.1020 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8239 | 7.8354 | | ANABATILAN |
| ARS1-B16-00514-16 | 04-PD-STK-01-01 | 230506 | 2.1106 | g | R15-00145 | 4/13/2016 5:33:00 PM | 7.8047 | 7.8161 | | ANABATILAN |
| ARS1-B16-00514-17 | 04-PD-STK-01-11 | 230508 | 2.1077 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8464 | 7.8582 | | ANABATILAN |
| ARS1-B16-00514-18 | 07-PE-0069-01 | 230517 | 2.1089 | g | R15-00145 | 4/13/2016 5:22:00 PM | 7.8748 | 7.8867 | | ANABATILAN |
| ARS1-B16-00514-19 | 07-PE-0069-02 | 230518 | 2.1050 | g | R15-00145 | 4/13/2016 5:22:00 PM | 7.8243 | 7.8364 | | ANABATILAN |
| ARS1-B16-00514-20 | 07-PE-0069-03 | 230519 | 2.1063 | g | R15-00145 | 4/13/2016 5:26:00 PM | 7.783 | 7.7952 | | ANABATILAN |
| ARS1-B16-00514-21 | 07-PE-0069-04 | 230520 | 2.1069 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8288 | 7.8413 | | ANABATILAN |
| ARS1-B16-00514-22 | 07-PE-0069-05 | 230521 | 2.1066 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8352 | 7.8472 | | ANABATILAN |
| ARS1-B16-00514-23 | 07-PE-0069-06 | 230523 | 2.1068 | g | R15-00145 | 4/13/2016 5:26:00 PM | 7.8541 | 7.8654 | | ANABATILAN |
| ARS1-B16-00514-24 | 07-PE-0069-07 | 230524 | 2.1054 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.7827 | 7.7943 | | ANABATILAN |

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DCN: ITSI-0808-0004-0076, 8 May 2019

| | LB4100-A | \\lb4100\LB4100\LB4100\ORANGE\DATA\GENER167.XLD | |
|---|---|---|---|
| | Batch Sample ID | Samples Transferred | Samples Eligible To Save |
| | ARS1-B16-00514 | 12 | 12 |

| LIMS Batch Sample ID | Detector ID | LB4110 Sample ID | Alpha Counts | Beta Counts | Count Mins | LB4110 Voltage | LB4110 Count Date | Analysis Batch | LIMS SDG | LIMS Run | LIMS Fraction | LIMS Analysis |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-10 | C1 | 16-00514-10 | 15.00 | 107.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 003 | GPC-A-012 |
| ARS1-B16-00514-11 | C2 | 16-00514-11 | 13.00 | 123.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 004 | GPC-A-012 |
| ARS1-B16-00514-12 | C4 | 16-00514-12 | 11.00 | 103.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-01 | A2 | 16-00514-01 | 19.00 | 2733.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-03 | A3 | 16-00514-03 | 9.00 | 129.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-13 | D1 | 16-00514-13 | 6.00 | 122.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 003 | GPC-A-012 |
| ARS1-B16-00514-05 | A4 | 16-00514-05 | 5.00 | 120.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00645 | 1 | 021 | GPC-A-012 |
| ARS1-B16-00514-14 | D3 | 16-00514-14 | 6.00 | 106.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 016 | GPC-A-012 |
| ARS1-B16-00514-06 | B1 | 16-00514-06 | 4.00 | 95.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00645 | 1 | 022 | GPC-A-012 |
| ARS1-B16-00514-07 | B2 | 16-00514-07 | 6.00 | 82.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00645 | 1 | 023 | GPC-A-012 |
| ARS1-B16-00514-08 | B3 | 16-00514-08 | 8.00 | 114.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-09 | B4 | 16-00514-09 | 24.00 | 120.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 002 | GPC-A-012 |

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| | LB4100-C | | | | | \\Ars-f52mv91\LB4100\LB4100\GRAY\DATA\GENER957.XLD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Batch Sample ID | | | | | Samples Transferred | | | Samples Eligible To Save | | |
| | ARS1-B16-00514 | | | | | 12 | | | 12 | | |
| LIMS Batch Sample ID | Detector ID | LB4110 Sample ID | Alpha Counts | Beta Counts | Count Mins | LB4110 Voltage | LB4110 Count Date | Analysis Batch | LIMS SDG | LIMS Run | LIMS Fraction | LIMS Analysis |
| ARS1-B16-00514-20 | C1 | 16-00514-20 | 6.00 | 118.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 003 | GPC-A-012 |
| ARS1-B16-00514-21 | C2 | 16-00514-21 | 6.00 | 105.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 004 | GPC-A-012 |
| ARS1-B16-00514-22 | C3 | 16-00514-22 | 9.00 | 105.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 005 | GPC-A-012 |
| ARS1-B16-00514-02 | A1 | 16-00514-02 | 10.00 | 2796.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-23 | C4 | 16-00514-23 | 15.00 | 118.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 006 | GPC-A-012 |
| ARS1-B16-00514-04 | A2 | 16-00514-04 | 3.00 | 119.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-15 | A3 | 16-00514-15 | 5.00 | 90.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 031 | GPC-A-012 |
| ARS1-B16-00514-16 | A4 | 16-00514-16 | 4.00 | 106.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00671 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-24 | D1 | 16-00514-24 | 5.00 | 98.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 007 | GPC-A-012 |
| ARS1-B16-00514-17 | B1 | 16-00514-17 | 4.00 | 97.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00671 | 1 | 011 | GPC-A-012 |
| ARS1-B16-00514-1B | B2 | 16-00514-18 | 6.00 | 105.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-19 | B4 | 16-00514-19 | 6.00 | 94.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 002 | GPC-A-012 |

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GEN 167
A 35723
Sr
WJS

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | 16-00514-10 | 15 | 107 | 120 | 1402.5 | 4/14/16 13:36 |
| C2 | 16-00514-11 | 13 | 123 | 120 | 1402.5 | 4/14/16 13:36 |
| C4 | 16-00514-12 | 11 | 103 | 120 | 1402.5 | 4/14/16 13:36 |
| A2 | 16-00514-01 | 19 | 2733 | 120 | 1402.5 | 4/14/16 13:36 |
| A3 | 16-00514-03 | 9 | 129 | 120 | 1402.5 | 4/14/16 13:36 |
| D1 | 16-00514-13 | 6 | 122 | 120 | 1402.5 | 4/14/16 13:36 |
| A4 | 16-00514-05 | 5 | 120 | 120 | 1402.5 | 4/14/16 13:36 |
| D3 | 16-00514-14 | 6 | 106 | 120 | 1402.5 | 4/14/16 13:36 |
| B1 | 16-00514-06 | 4 | 95 | 120 | 1402.5 | 4/14/16 13:36 |
| B2 | 16-00514-07 | 6 | 82 | 120 | 1402.5 | 4/14/16 13:36 |
| B3 | 16-00514-08 | 8 | 114 | 120 | 1402.5 | 4/14/16 13:36 |
| B4 | 16-00514-09 | 24 | 120 | 120 | 1402.5 | 4/14/16 13:36 |

N-593

GEN 957
C 11160
Sr
WJS

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | 16-00514-20 | 6 | 118 | 120 | 1410 | 4/14/16 13:38 |
| C2 | 16-00514-21 | 6 | 105 | 120 | 1410 | 4/14/16 13:38 |
| C3 | 16-00514-22 | 9 | 105 | 120 | 1410 | 4/14/16 13:38 |
| A1 | 16-00514-02 | 10 | 2796 | 120 | 1410 | 4/14/16 13:38 |
| C4 | 16-00514-23 | 15 | 118 | 120 | 1410 | 4/14/16 13:38 |
| A2 | 16-00514-04 | 3 | 119 | 120 | 1410 | 4/14/16 13:38 |
| A3 | 16-00514-15 | 5 | 90 | 120 | 1410 | 4/14/16 13:38 |
| A4 | 16-00514-16 | 4 | 106 | 120 | 1410 | 4/14/16 13:38 |
| D1 | 16-00514-24 | 5 | 98 | 120 | 1410 | 4/14/16 13:38 |
| B1 | 16-00514-17 | 4 | 97 | 120 | 1410 | 4/14/16 13:38 |
| B2 | 16-00514-18 | 6 | 105 | 120 | 1410 | 4/14/16 13:38 |
| B4 | 16-00514-19 | 6 | 94 | 120 | 1410 | 4/14/16 13:38 |

N-594

GEN 155
A 35723
LONG BKG
WJS

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 83 | 1310 | 900 | 1402.5 | 4/9/16 6:00 |
| A2 | A2-01 | 128 | 1176 | 900 | 1402.5 | 4/9/16 6:00 |
| A3 | A3-01 | 105 | 958 | 900 | 1402.5 | 4/9/16 6:00 |
| A4 | A4-01 | 107 | 1021 | 900 | 1402.5 | 4/9/16 6:00 |
| C1 | C1-01 | 79 | 803 | 900 | 1402.5 | 4/9/16 6:00 |
| C2 | C2-01 | 132 | 806 | 900 | 1402.5 | 4/9/16 6:00 |
| C3 | C3-01 | 31 | 1074 | 900 | 1402.5 | 4/9/16 6:00 |
| C4 | C4-01 | 65 | 688 | 900 | 1402.5 | 4/9/16 6:00 |
| B1 | B1-01 | 45 | 745 | 900 | 1402.5 | 4/9/16 6:01 |
| B2 | B2-01 | 43 | 703 | 900 | 1402.5 | 4/9/16 6:01 |
| B3 | B3-01 | 82 | 751 | 900 | 1402.5 | 4/9/16 6:01 |
| B4 | B4-01 | 115 | 879 | 900 | 1402.5 | 4/9/16 6:01 |
| D1 | D1-01 | 41 | 754 | 900 | 1402.5 | 4/9/16 6:01 |
| D2 | D2-01 | 59 | 1340 | 900 | 1402.5 | 4/9/16 6:01 |
| D3 | D3-01 | 41 | 746 | 900 | 1402.5 | 4/9/16 6:01 |
| D4 | D4-01 | 56 | 1354 | 900 | 1402.5 | 4/9/16 6:01 |

DCN: ITSI-0808-0004-0076, 8 May 2019

N-595

GEN 945
C 11160
LONG BKG
WJS

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 78 | 852 | 900 | 1410 | 4/9/16 6:03 |
| A2 | A2-01 | 49 | 854 | 900 | 1410 | 4/9/16 6:03 |
| A3 | A3-01 | 42 | 750 | 900 | 1410 | 4/9/16 6:03 |
| A4 | A4-01 | 66 | 869 | 900 | 1410 | 4/9/16 6:03 |
| C1 | C1-01 | 73 | 760 | 900 | 1410 | 4/9/16 6:04 |
| C2 | C2-01 | 119 | 1258 | 900 | 1410 | 4/9/16 6:04 |
| C3 | C3-01 | 117 | 783 | 900 | 1410 | 4/9/16 6:04 |
| C4 | C4-01 | 90 | 946 | 900 | 1410 | 4/9/16 6:04 |
| D1 | D1-01 | 46 | 711 | 900 | 1410 | 4/9/16 6:04 |
| D2 | D2-01 | 50 | 799 | 900 | 1410 | 4/9/16 6:04 |
| D3 | D3-01 | 34 | 689 | 900 | 1410 | 4/9/16 6:04 |
| D4 | D4-01 | 42 | 737 | 900 | 1410 | 4/9/16 6:04 |
| B1 | B1-01 | 50 | 673 | 900 | 1410 | 4/9/16 6:04 |
| B2 | B2-01 | 48 | 751 | 900 | 1410 | 4/9/16 6:04 |
| B3 | B3-01 | 47 | 3374 | 900 | 1410 | 4/9/16 6:04 |
| B4 | B4-01 | 54 | 741 | 900 | 1410 | 4/9/16 6:04 |

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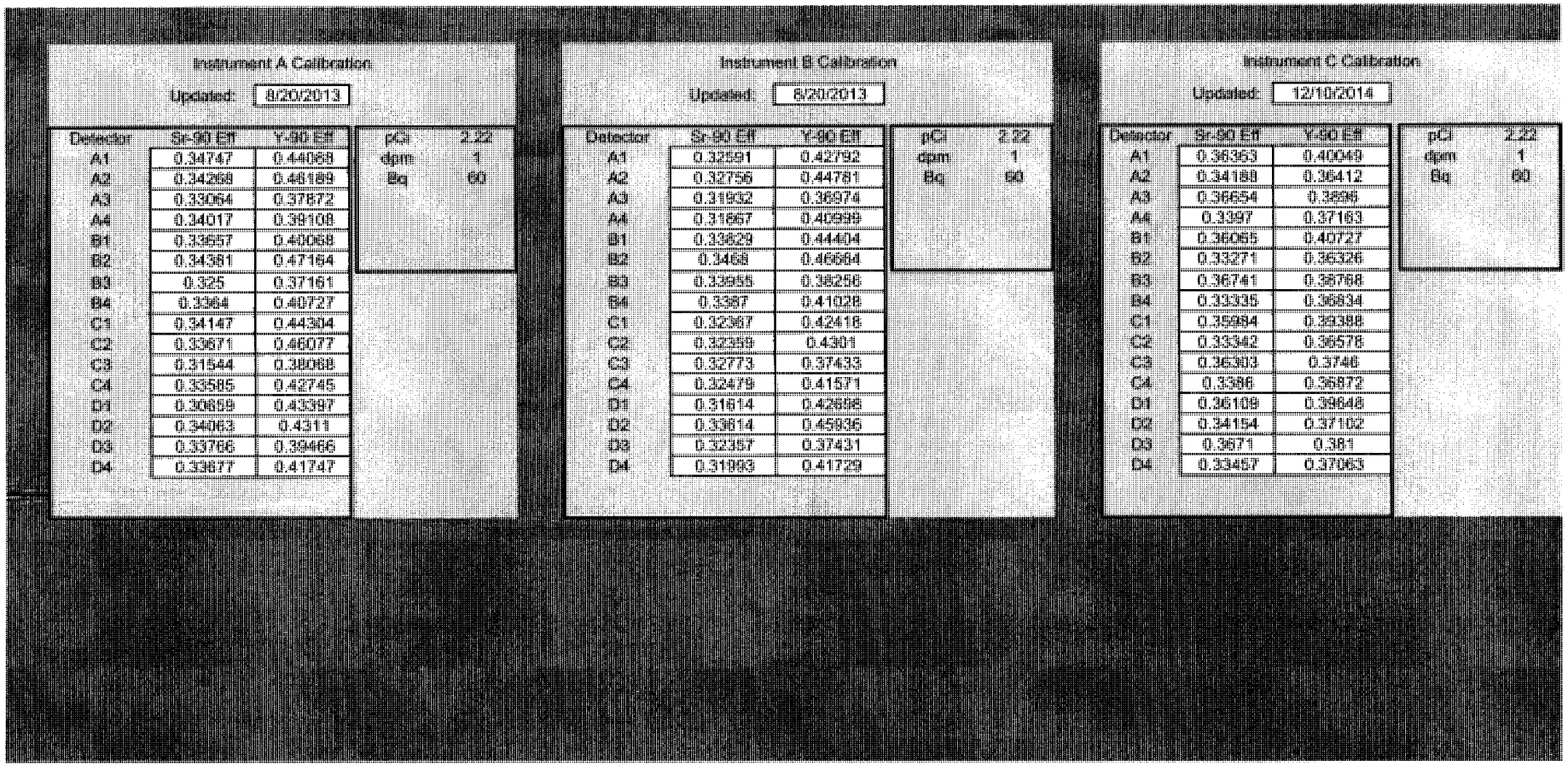
N-596

DCN: ITSI-0808-0004-0076, 8 May 2019



Instrument A Calibration

Updated: 8/20/2013

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.34747 | 0.44068 |
| A2 | 0.34268 | 0.44189 |
| A3 | 0.33064 | 0.37872 |
| A4 | 0.34017 | 0.39108 |
| B1 | 0.33657 | 0.40068 |
| B2 | 0.34381 | 0.47164 |
| B3 | 0.325 | 0.37161 |
| B4 | 0.3364 | 0.40727 |
| C1 | 0.34147 | 0.44304 |
| C2 | 0.33671 | 0.46077 |
| C3 | 0.31544 | 0.38068 |
| C4 | 0.33585 | 0.42745 |
| D1 | 0.30659 | 0.43397 |
| D2 | 0.34063 | 0.4311 |
| D3 | 0.33766 | 0.39466 |
| D4 | 0.33677 | 0.41747 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

Instrument B Calibration

Updated: 8/20/2013

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.32591 | 0.42792 |
| A2 | 0.32756 | 0.44781 |
| A3 | 0.31932 | 0.36974 |
| A4 | 0.31867 | 0.40999 |
| B1 | 0.33629 | 0.44404 |
| B2 | 0.3468 | 0.46664 |
| B3 | 0.33955 | 0.38256 |
| B4 | 0.3387 | 0.41028 |
| C1 | 0.32367 | 0.42418 |
| C2 | 0.32359 | 0.4301 |
| C3 | 0.32773 | 0.37433 |
| C4 | 0.32479 | 0.41571 |
| D1 | 0.31614 | 0.42698 |
| D2 | 0.33614 | 0.45936 |
| D3 | 0.32357 | 0.37431 |
| D4 | 0.31993 | 0.41729 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

Instrument C Calibration

Updated: 12/10/2014

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.36353 | 0.40049 |
| A2 | 0.34188 | 0.38412 |
| A3 | 0.36654 | 0.3896 |
| A4 | 0.3397 | 0.37163 |
| B1 | 0.36055 | 0.40727 |
| B2 | 0.33271 | 0.36326 |
| B3 | 0.36741 | 0.38768 |
| B4 | 0.33935 | 0.36834 |
| C1 | 0.35084 | 0.39388 |
| C2 | 0.33342 | 0.36578 |
| C3 | 0.36303 | 0.3746 |
| C4 | 0.3386 | 0.36872 |
| D1 | 0.36109 | 0.39648 |
| D2 | 0.34154 | 0.37102 |
| D3 | 0.3671 | 0.381 |
| D4 | 0.33457 | 0.37063 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

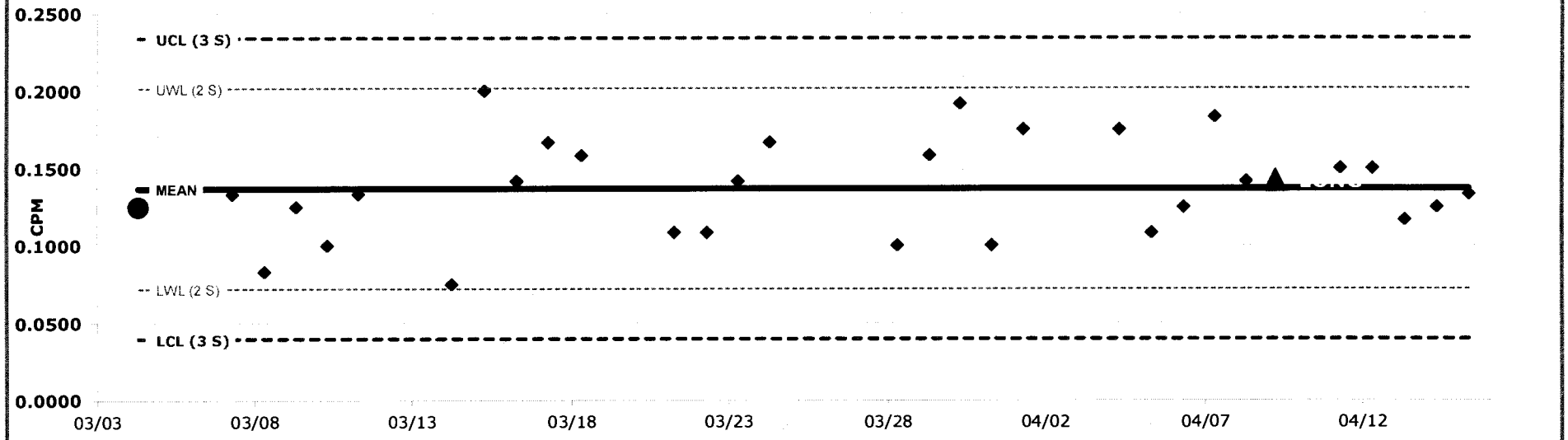
# LB4100-A - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.2495 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.1368 | Long B CPM | 0.1422 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0324 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2340 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.0396 | CPM | 0.1333 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

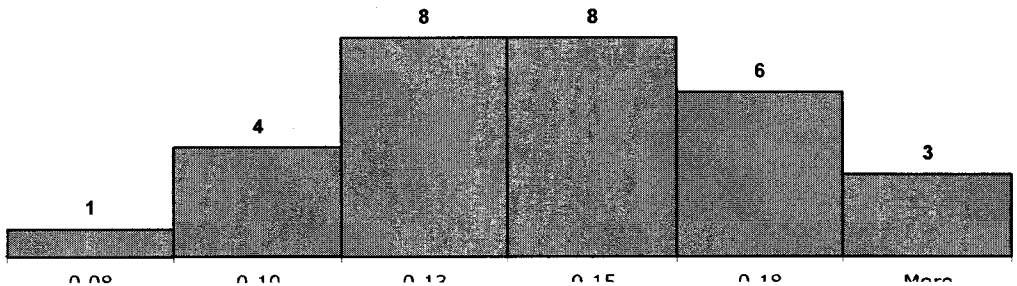



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.08 | 1 |
| 0.10 | 4 |
| 0.13 | 8 |
| 0.15 | 8 |
| 0.18 | 6 |
| More | 3 |




DCN: ITSI-0808-0004-0076, 8 May 2019

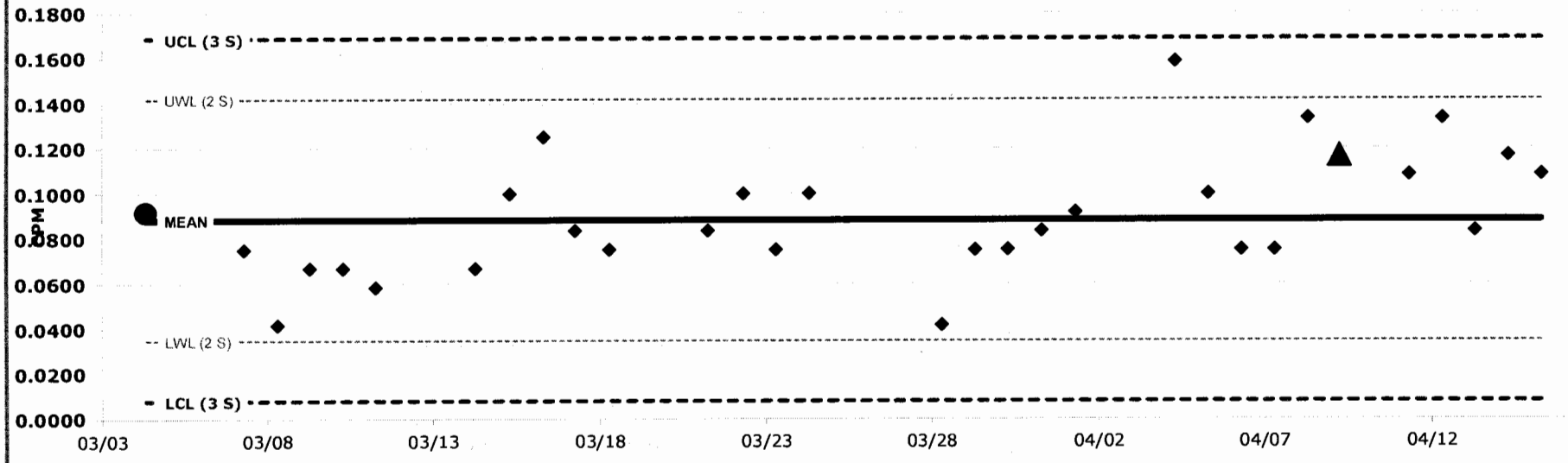
# LB4100-A - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.2594 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0882 | Long B CPM | 0.1167 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0268 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1685 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.0079 | CPM | 0.1083 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

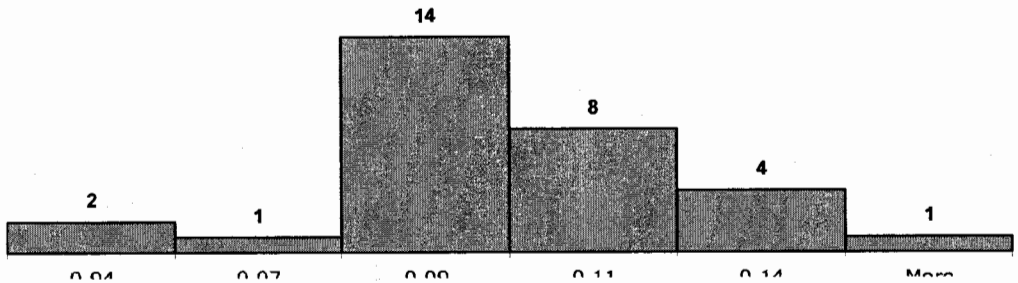



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.04 | 2 |
| 0.07 | 1 |
| 0.09 | 14 |
| 0.11 | 8 |
| 0.14 | 4 |
| More | 1 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-A - Alpha Daily BKG Check

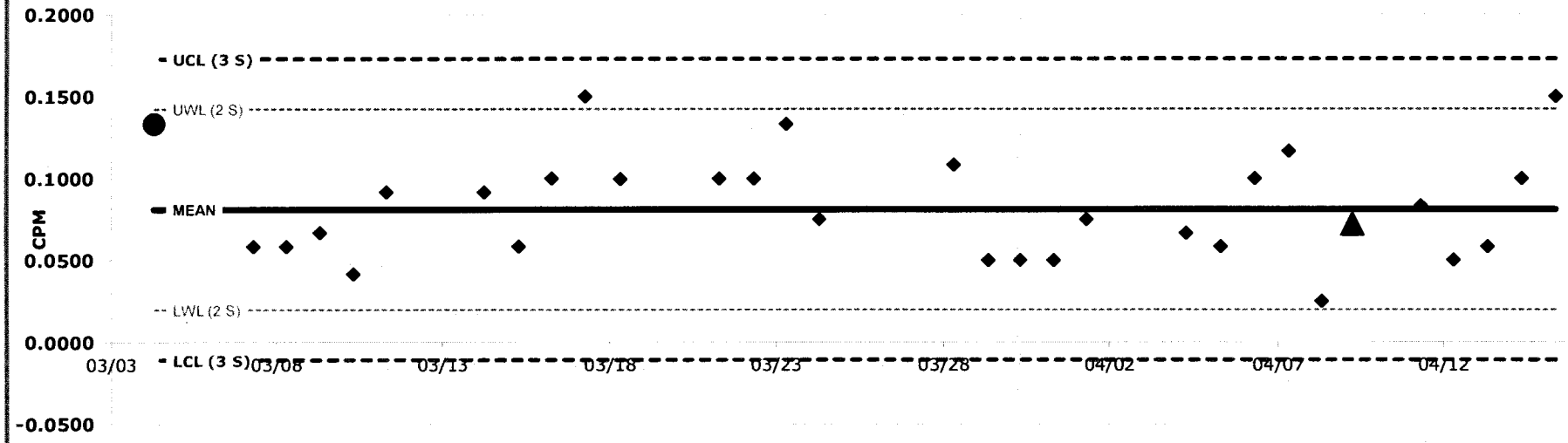


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 2.1325 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0810 | Long B CPM | 0.0722 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0306 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1729 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0108 | CPM | 0.1500 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR C4

Process Date Range: 03/04/16 - 04/15/16

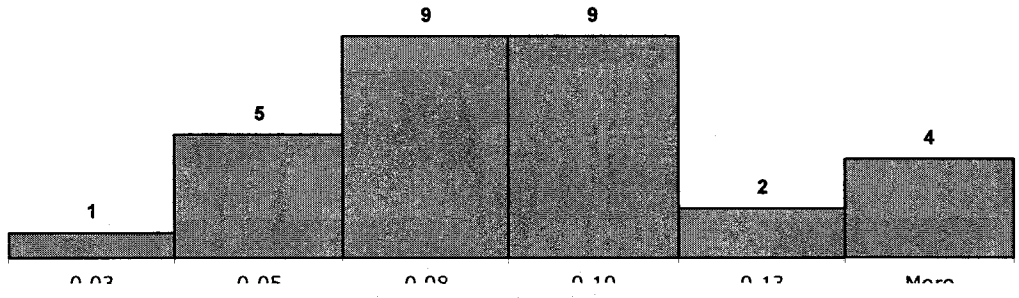



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.03 | 1 |
| 0.05 | 5 |
| 0.08 | 9 |
| 0.10 | 9 |
| 0.13 | 2 |
| More | 4 |

**Population Frequency Distribution (Histogram)**



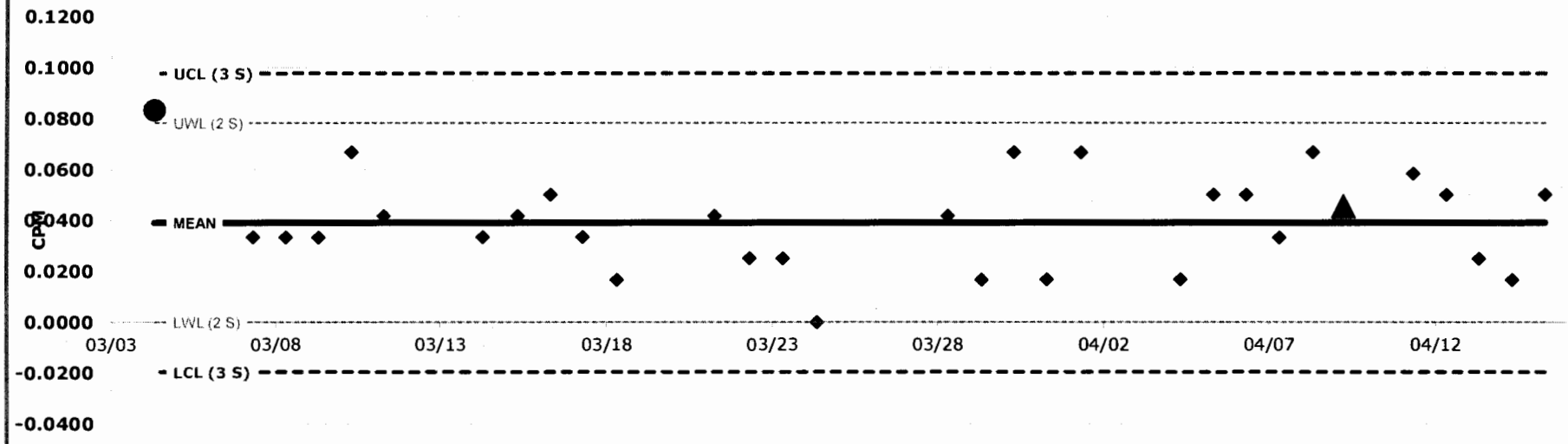
# LB4100-A - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.2056 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0391 | Long B CPM | 0.0456 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0196 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.0978 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0196 | CPM | 0.0500 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR D1

Process Date Range: 03/04/16 - 04/15/16

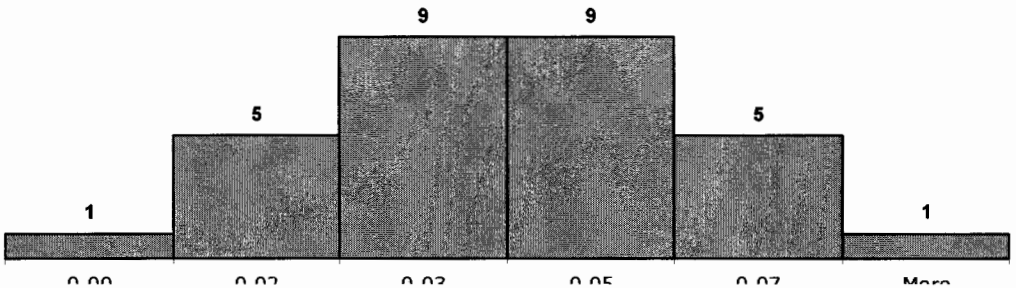



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.00 | 1 |
| 0.02 | 5 |
| 0.03 | 9 |
| 0.05 | 9 |
| 0.07 | 5 |
| More | 1 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

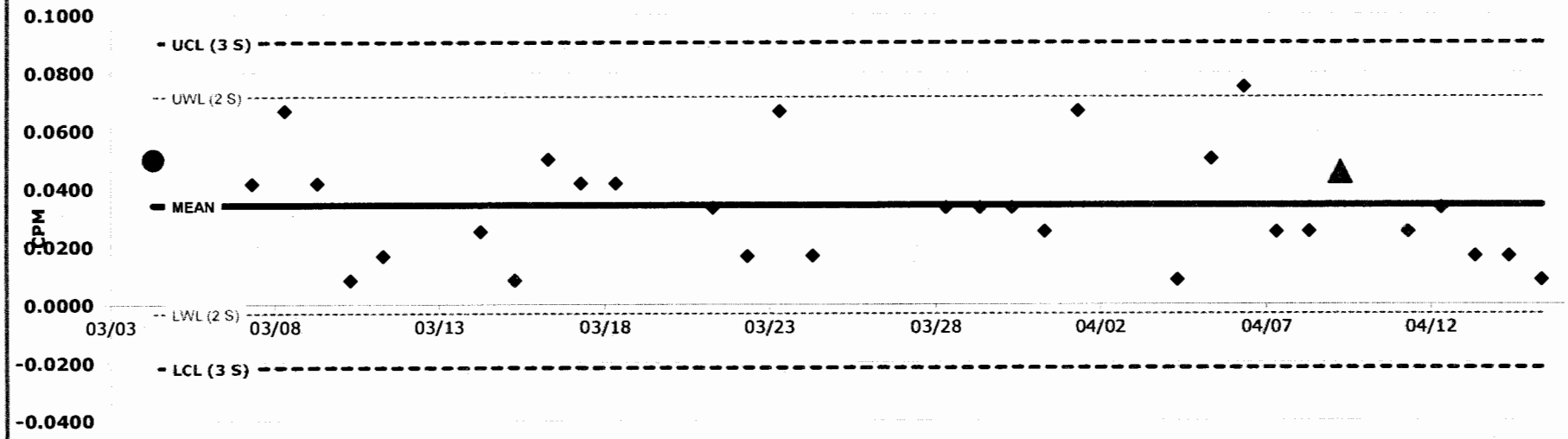
# LB4100-A - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | INVESTIGATE | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 3.3970 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0342 | Long B CPM | 0.0456 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0187 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.0902 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0218 | CPM | 0.0083 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR D3

Process Date Range: 03/04/16 - 04/15/16

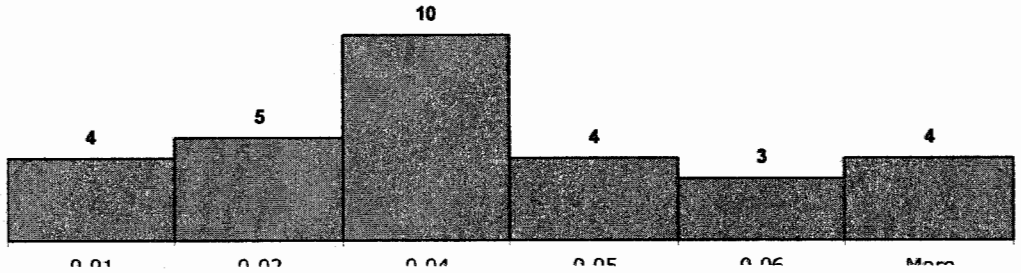



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.01 | 4 |
| 0.02 | 5 |
| 0.04 | 10 |
| 0.05 | 4 |
| 0.06 | 3 |
| More | 4 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis



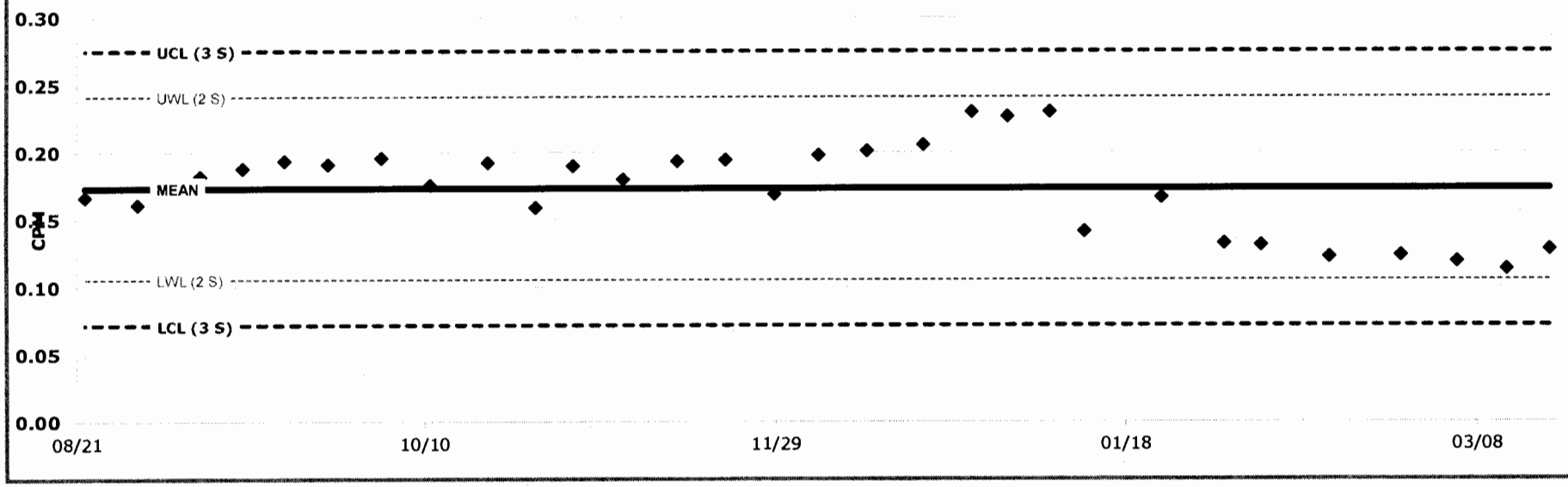
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1733 |
| Standard Deviation | 0.0340 |
| + 3-sigma value | 0.2752 |
| - 3-sigma value | 0.0714 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | INVESTIGATE |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR A2

Process Date Range: 08/22/15 - 03/18/16

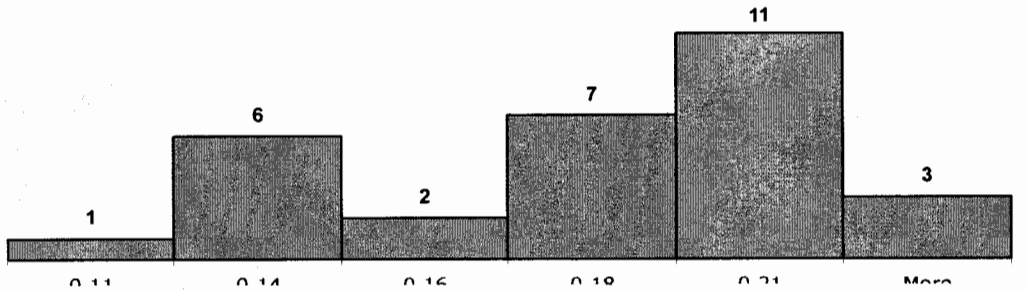



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.11 | 1 |
| 0.14 | 6 |
| 0.16 | 2 |
| 0.18 | 7 |
| 0.21 | 11 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




N-603

# Instrument Background Analysis



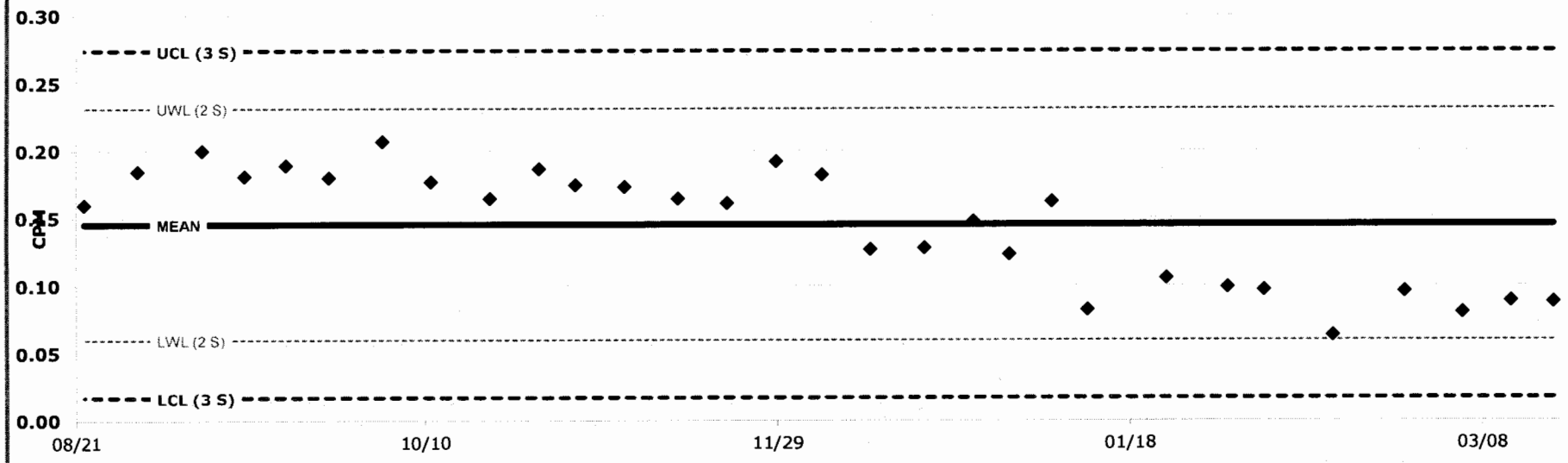
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1454 |
| Standard Deviation | 0.0428 |
| + 3-sigma value | 0.2740 |
| - 3-sigma value | 0.0169 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | INVESTIGATE |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR A3

Process Date Range: 08/22/15 - 03/18/16

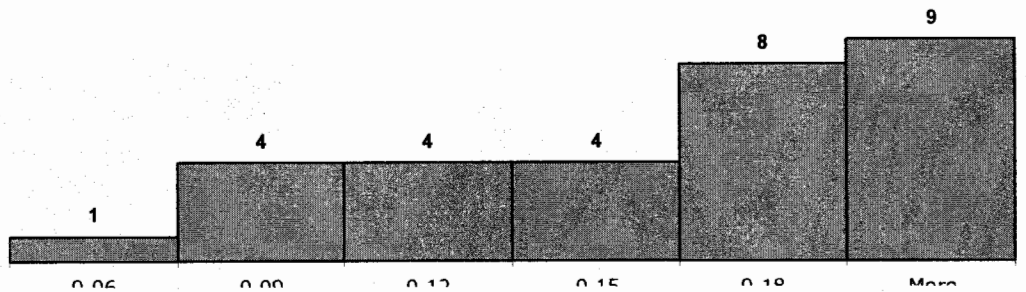



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.06 | 1 |
| 0.09 | 4 |
| 0.12 | 4 |
| 0.15 | 4 |
| 0.18 | 8 |
| More | 9 |

**Population Frequency Distribution (Histogram)**




N-604

# Instrument Background Analysis

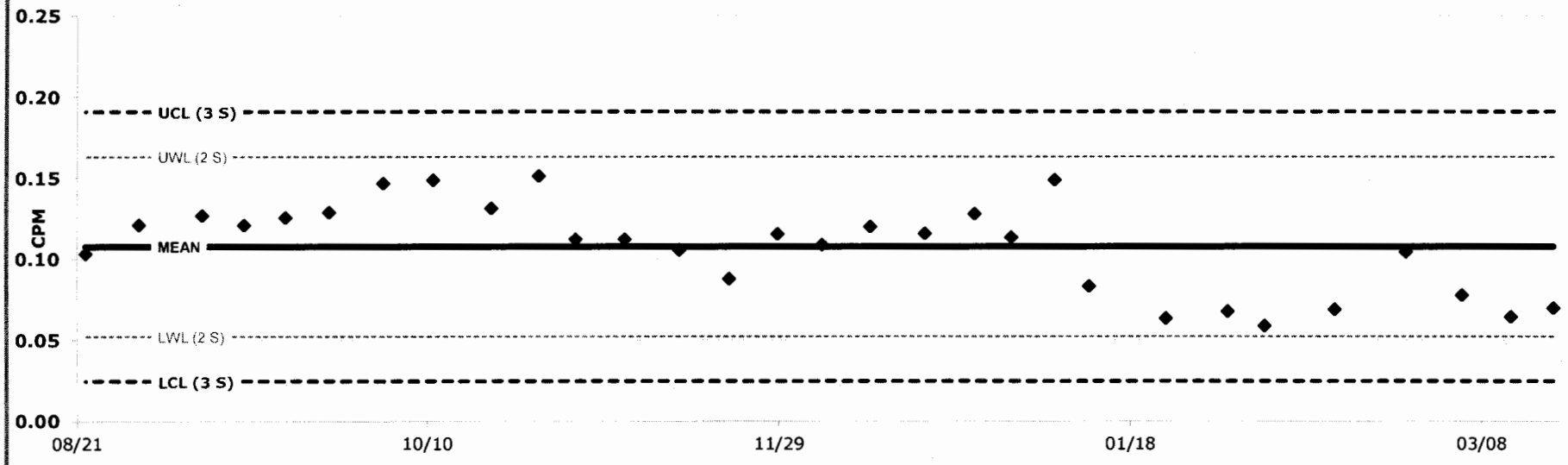


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1077 |
| Standard Deviation | 0.0277 |
| + 3-sigma value | 0.1908 |
| - 3-sigma value | 0.0246 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | INVESTIGATE |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR C4

Process Date Range: 08/22/15 - 03/18/16

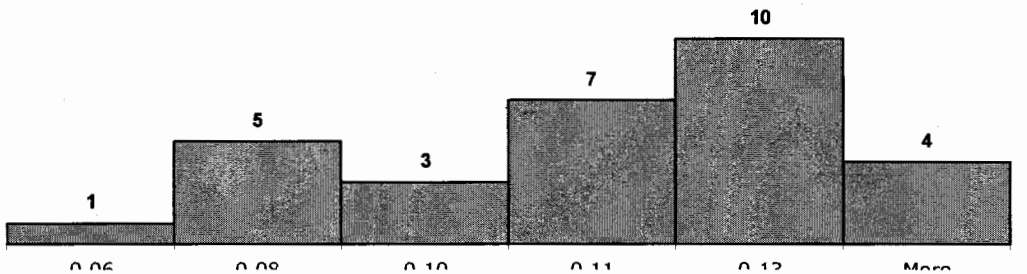



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.06 | 1 |
| 0.08 | 5 |
| 0.10 | 3 |
| 0.11 | 7 |
| 0.13 | 10 |
| More | 4 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

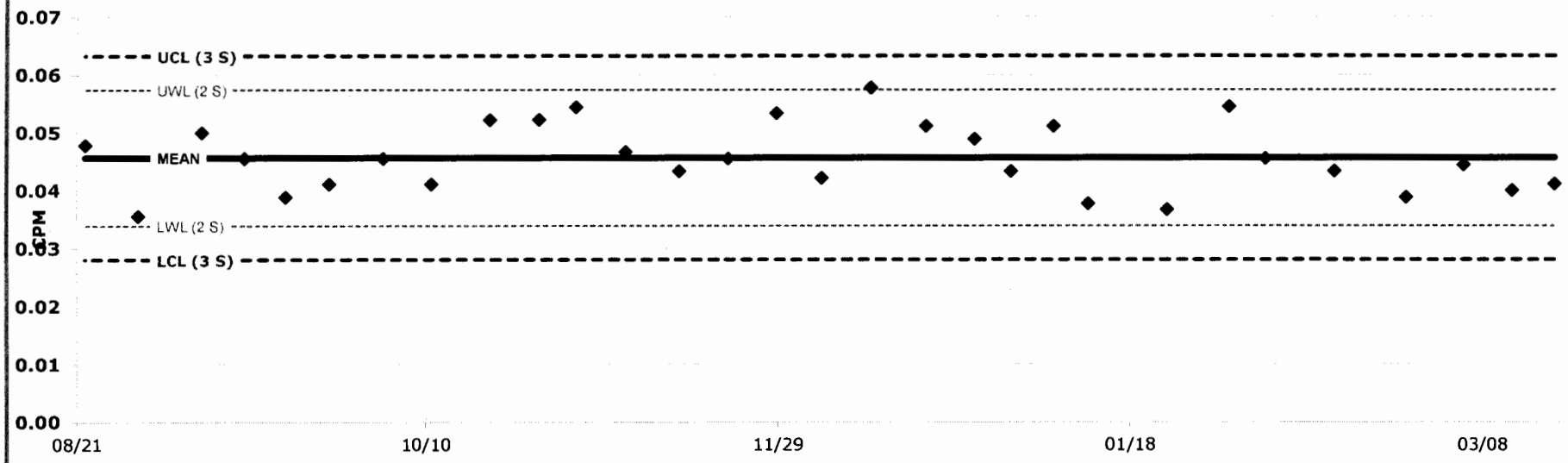


| Population Statistics | |
|---|---|
| Population Size | **30** |
| Average | 0.0457 |
| Standard Deviation | 0.0059 |
| + 3-sigma value | 0.0633 |
| - 3-sigma value | 0.0280 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | **OK** |
| 8 consecutive most recent points on one side of the mean. | **OK** |
| 2 of 3 most recent points above 2 sigma. | **OK** |
| 4 of 5 most recents points beyond the 1-sigma. | **OK** |
| 7 trending most recent points in a row. | **OK** |
| 15 most recent points inside 1 sigma. | **OK** |
| 8 most recent points outside 1 sigma. | **OK** |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR D1

Process Date Range: 08/22/15 - 03/18/16

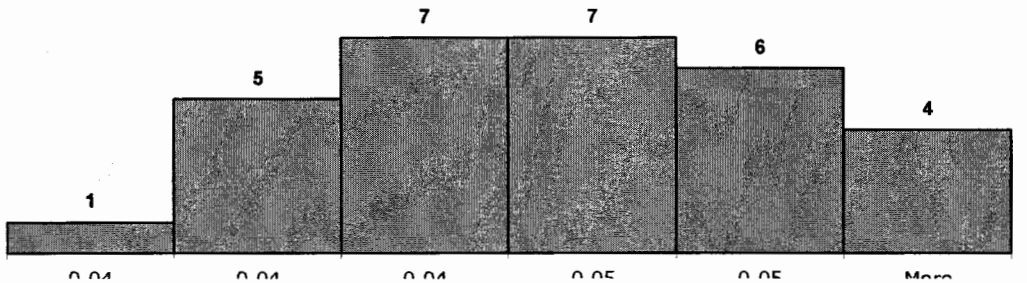



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 1 |
| 0.04 | 5 |
| 0.04 | 7 |
| 0.05 | 7 |
| 0.05 | 6 |
| More | 4 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

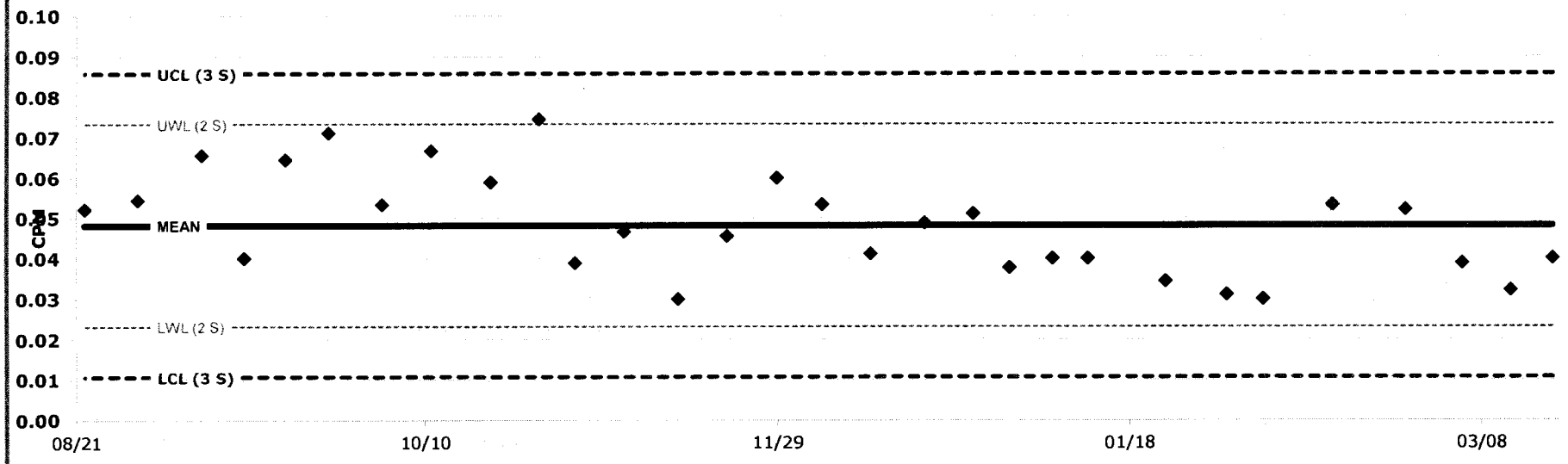


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.0482 |
| Standard Deviation | 0.0125 |
| + 3-sigma value | 0.0858 |
| - 3-sigma value | 0.0107 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR D3

Process Date Range: 08/22/15 - 03/18/16

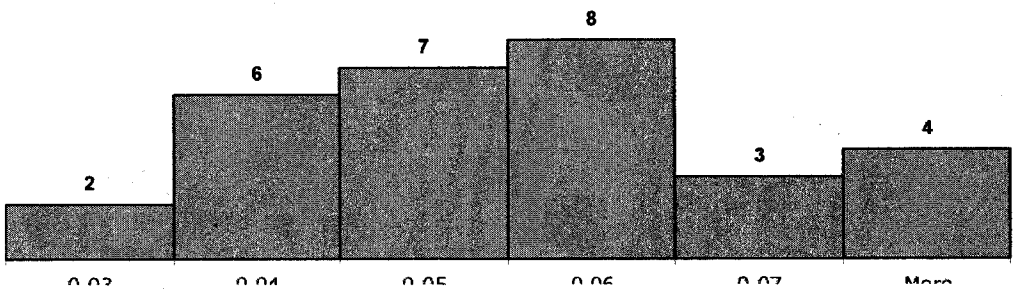



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.03 | 2 |
| 0.04 | 6 |
| 0.05 | 7 |
| 0.06 | 8 |
| 0.07 | 3 |
| More | 4 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-A - ALPHA EFFICIENCY

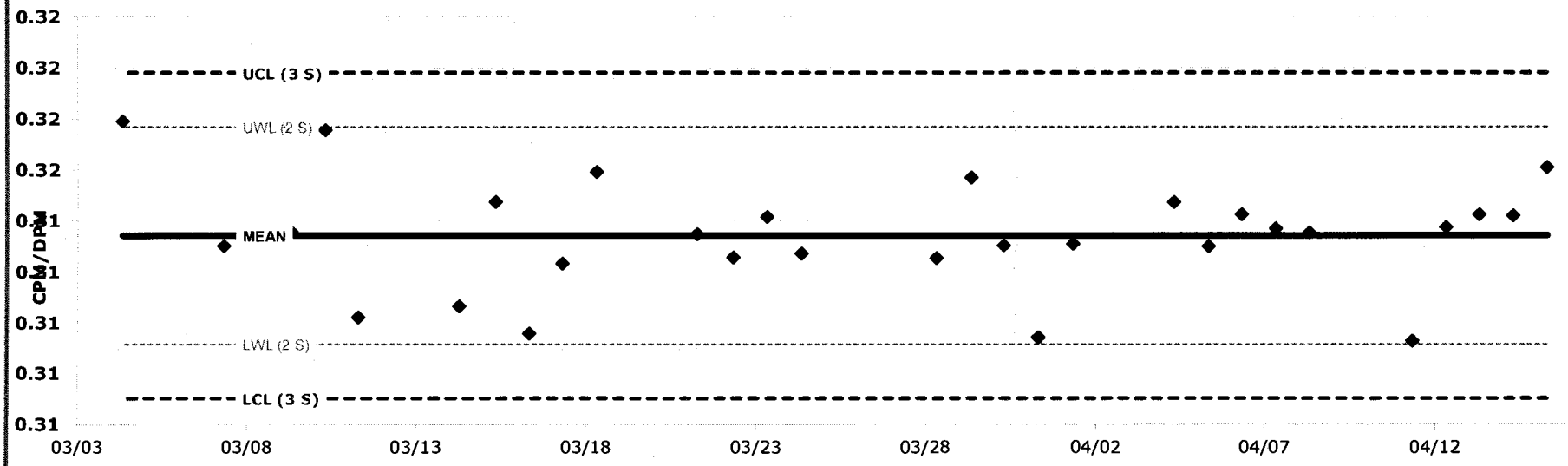


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3134 | CPM/DPM | 0.3161 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0021 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3198 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3070 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

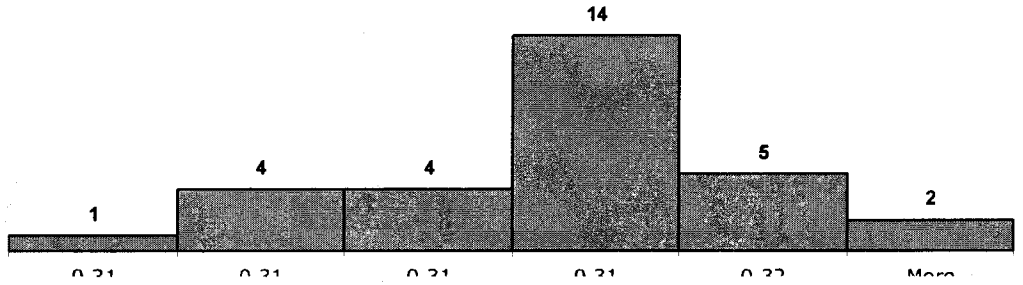



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.31 | 1 |
| 0.31 | 4 |
| 0.31 | 4 |
| 0.31 | 14 |
| 0.32 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



# LB4100-A - ALPHA EFFICIENCY

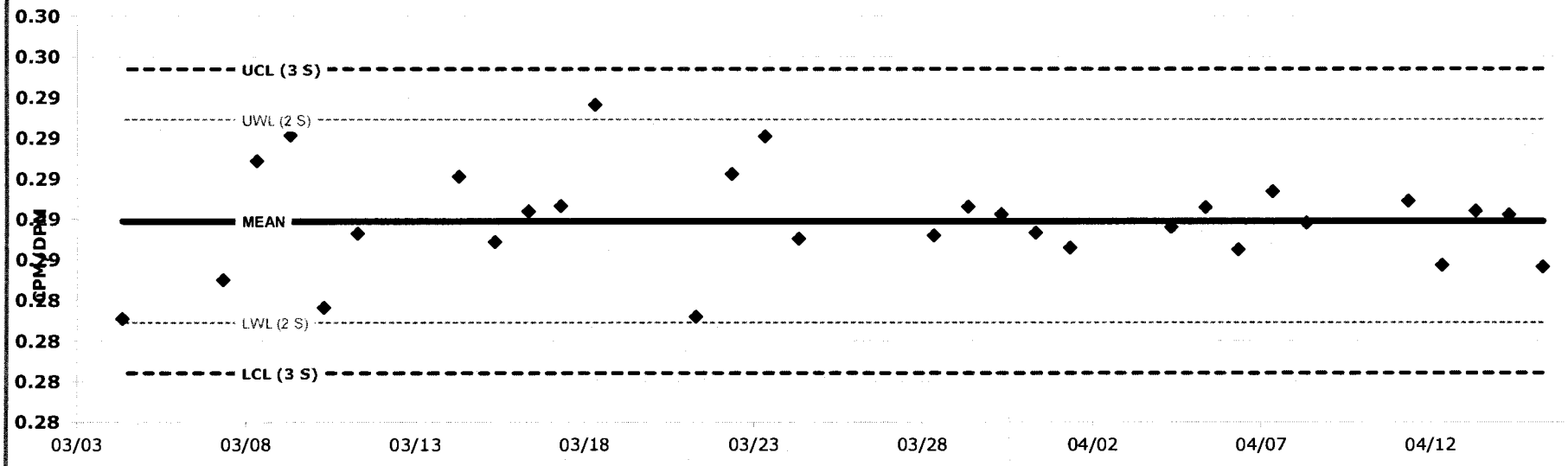


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2879 | CPM/DPM | 0.2856 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0025 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2954 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2804 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR A3

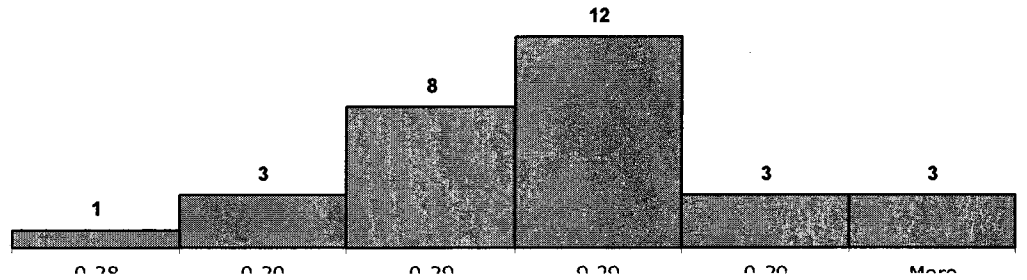
Process Date Range: 03/04/16 - 04/15/16




Statistical Process Control

| Bin | Frequency |
|---|---|
| 0.28 | 1 |
| 0.29 | 3 |
| 0.29 | 8 |
| 0.29 | 12 |
| 0.29 | 3 |
| More | 3 |

Population Frequency Distribution (Histogram)



# LB4100-A - ALPHA EFFICIENCY

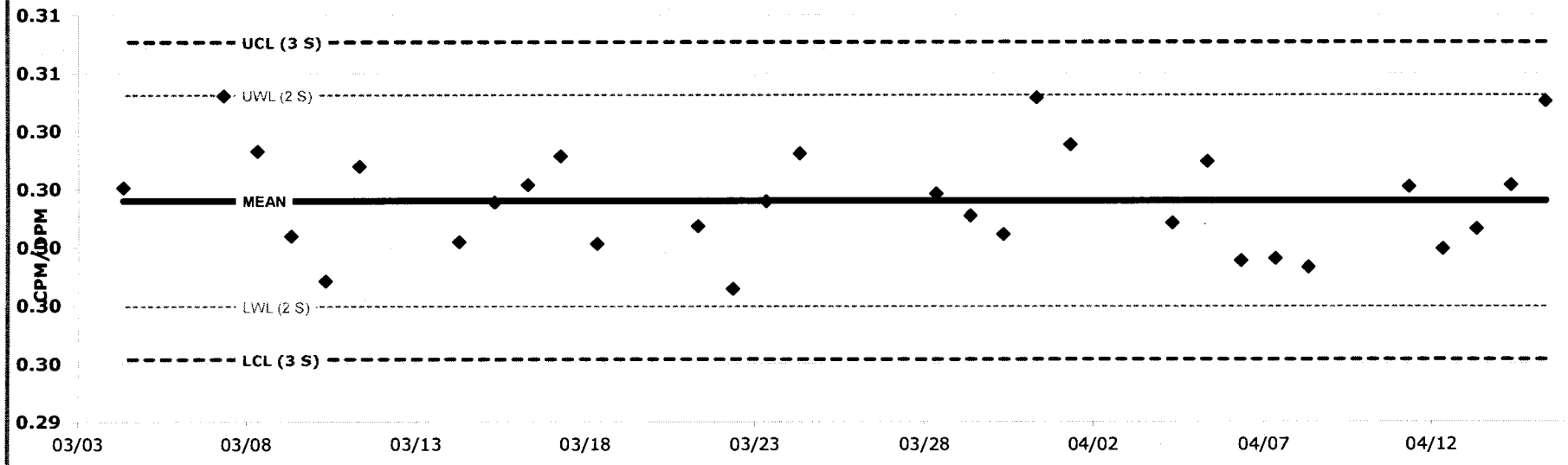


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3016 | CPM/DPM | 0.3050 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0018 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3071 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2961 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR C4

Process Date Range: 03/04/16 - 04/15/16

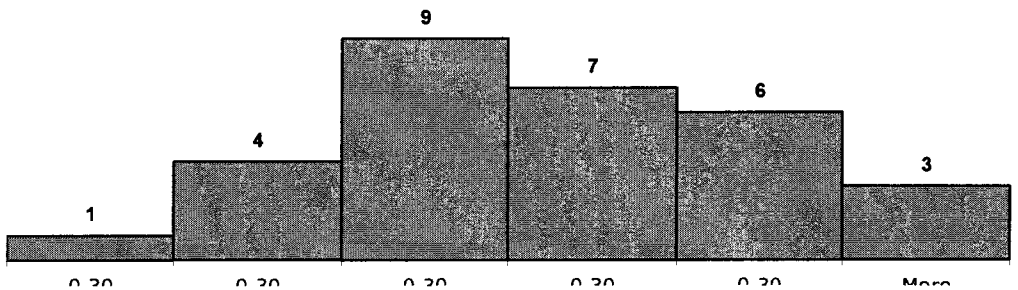



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.30 | 1 |
| 0.30 | 4 |
| 0.30 | 9 |
| 0.30 | 7 |
| 0.30 | 6 |
| More | 3 |

**Population Frequency Distribution (Histogram)**



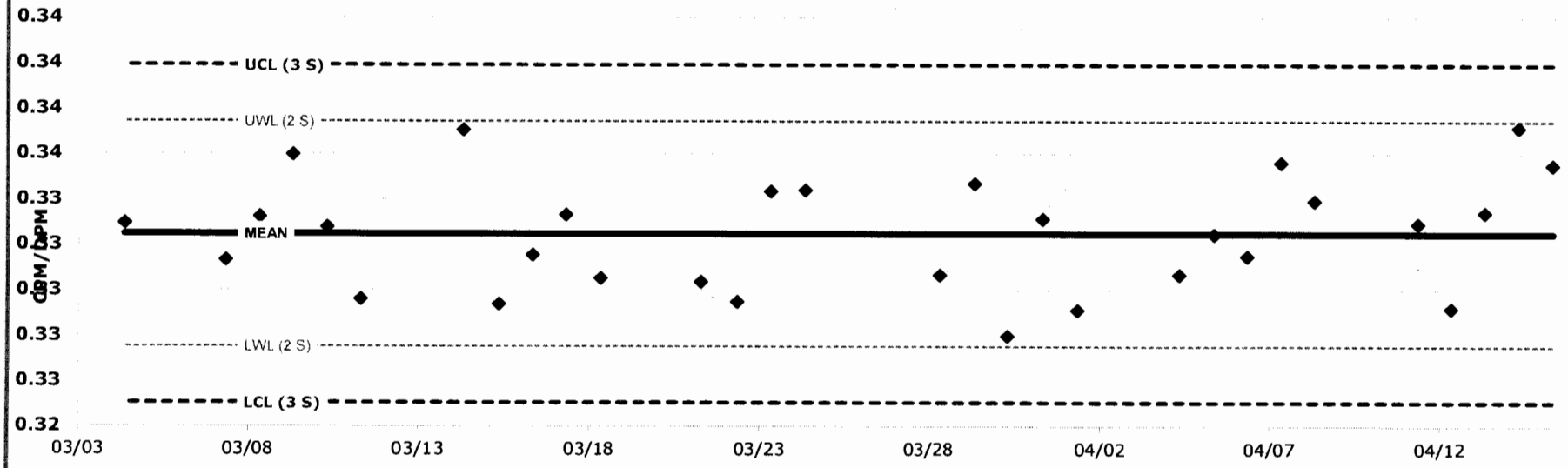
# LB4100-A - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3325 | CPM/DPM | 0.3355 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0025 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3399 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3250 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR D1

Process Date Range: 03/04/16 - 04/15/16

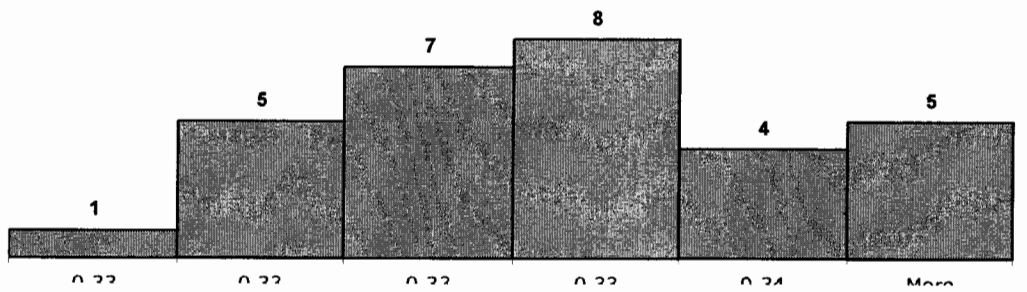



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.33 | 1 |
| 0.33 | 5 |
| 0.33 | 7 |
| 0.33 | 8 |
| 0.34 | 4 |
| More | 5 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

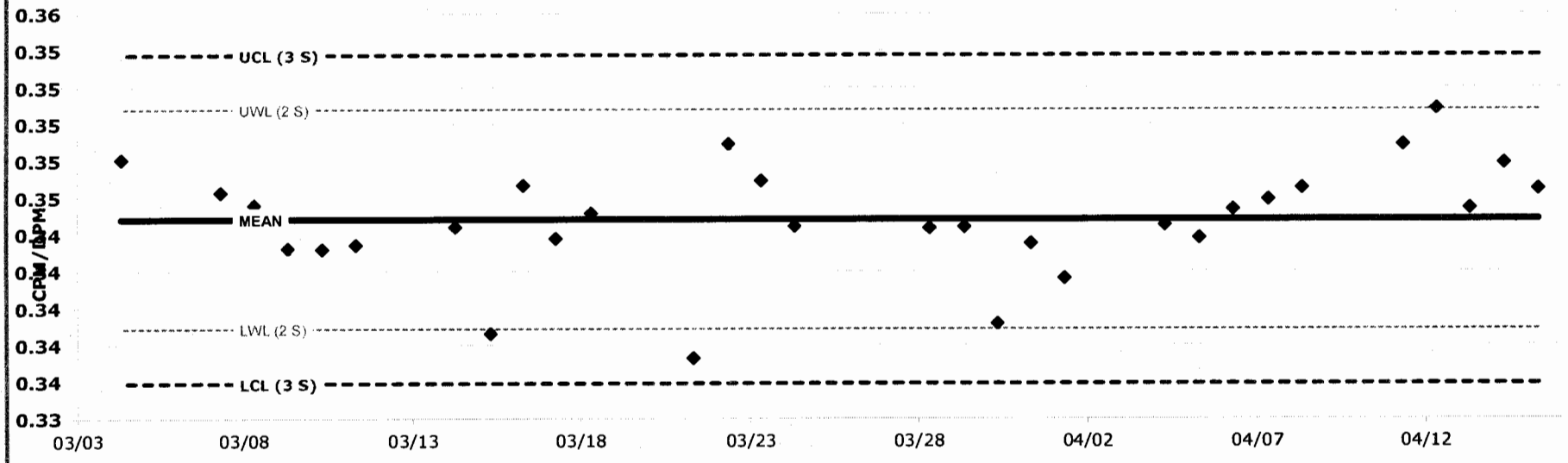
# LB4100-A - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| Average | 0.3448 | CPM/DPM | 0.3465 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0030 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3537 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3359 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR D3

Process Date Range: 03/04/16 - 04/15/16

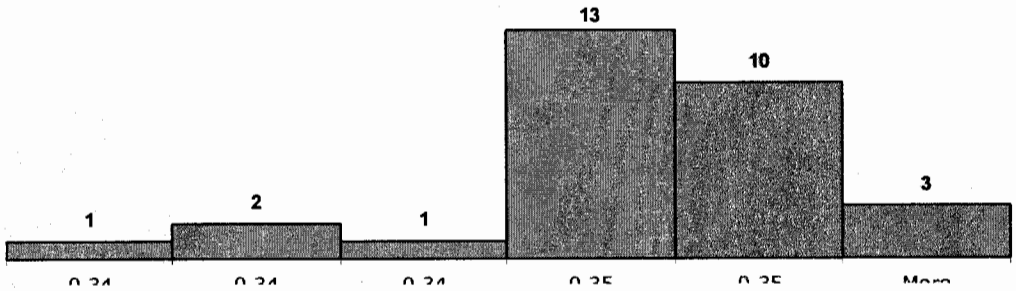



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.34 | 1 |
| 0.34 | 2 |
| 0.34 | 1 |
| 0.35 | 13 |
| 0.35 | 10 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - Alpha Daily BKG Check

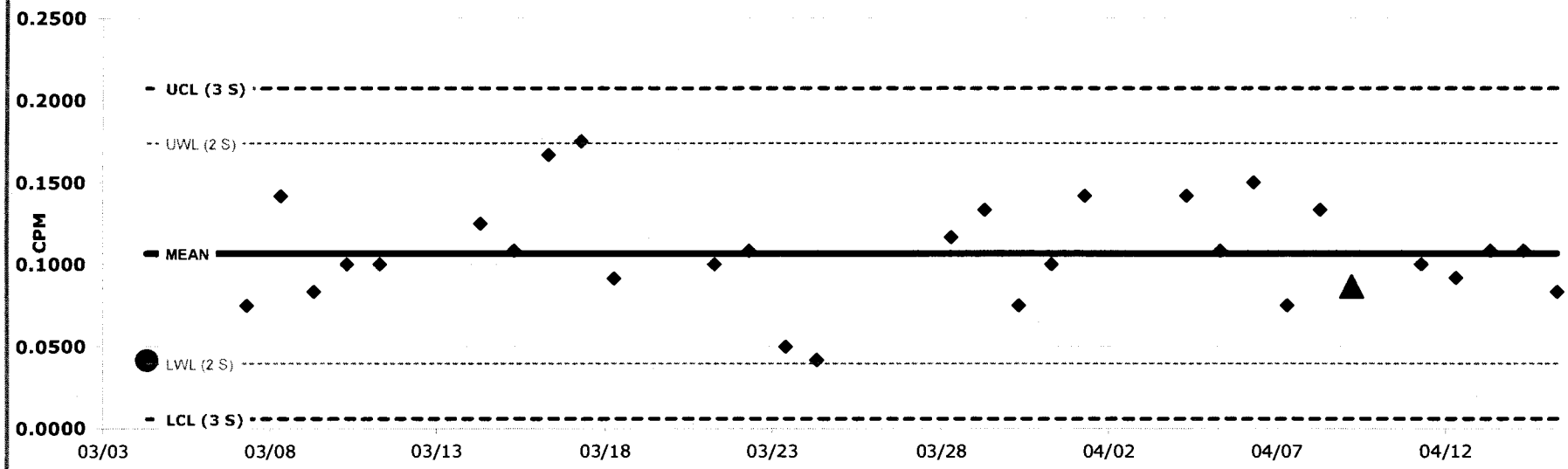


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.1185 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.1066 | Long B CPM | 0.0867 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0336 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2074 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.0059 | CPM | 0.0833 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

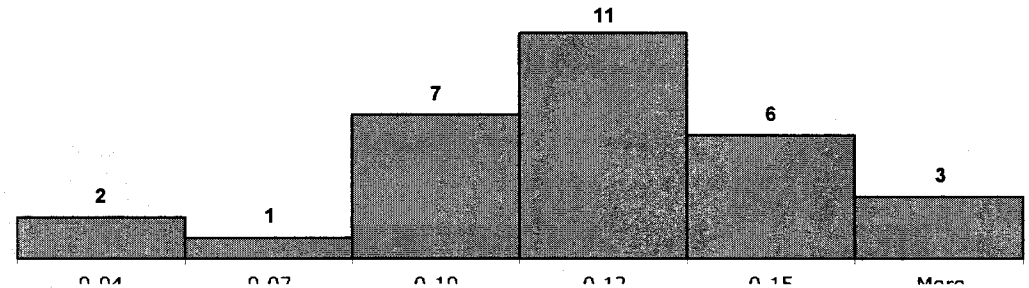



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 2 |
| 0.07 | 1 |
| 0.10 | 7 |
| 0.12 | 11 |
| 0.15 | 6 |
| More | 3 |

**Population Frequency Distribution (Histogram)**



# LB4100-C - Alpha Daily BKG Check

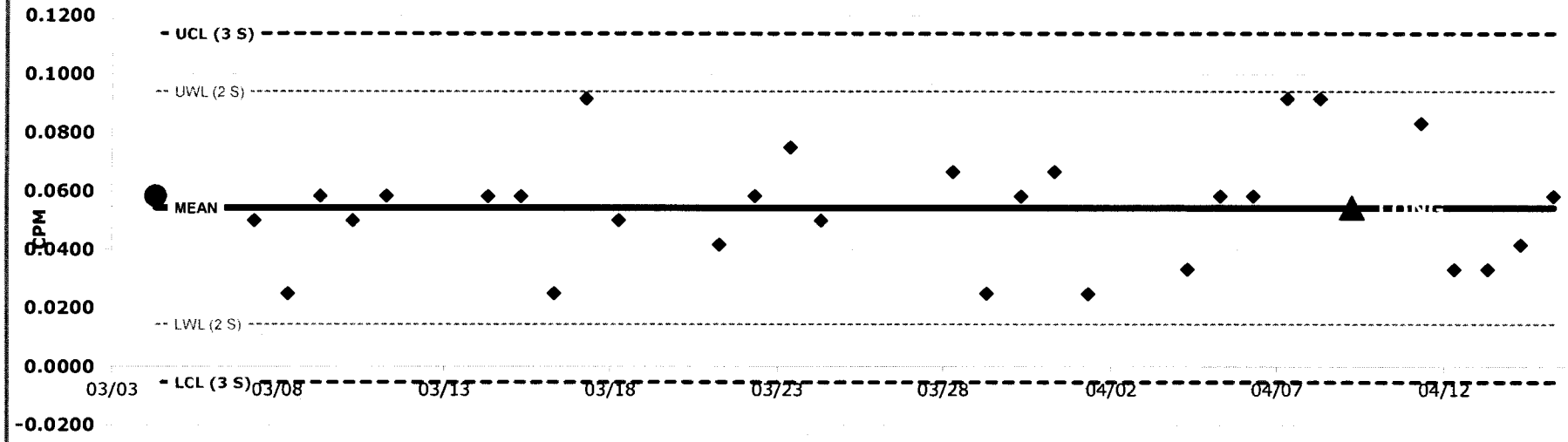


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.1663 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0543 | Long B CPM | 0.0544 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0199 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1139 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0053 | CPM | 0.0583 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

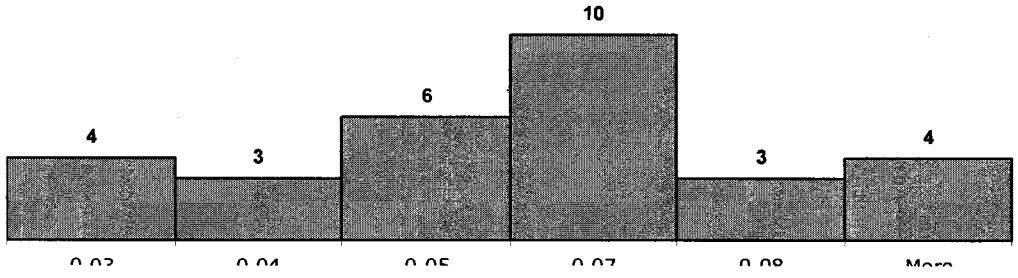



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.03 | 4 |
| 0.04 | 3 |
| 0.05 | 6 |
| 0.07 | 10 |
| 0.08 | 3 |
| More | 4 |

**Population Frequency Distribution (Histogram)**



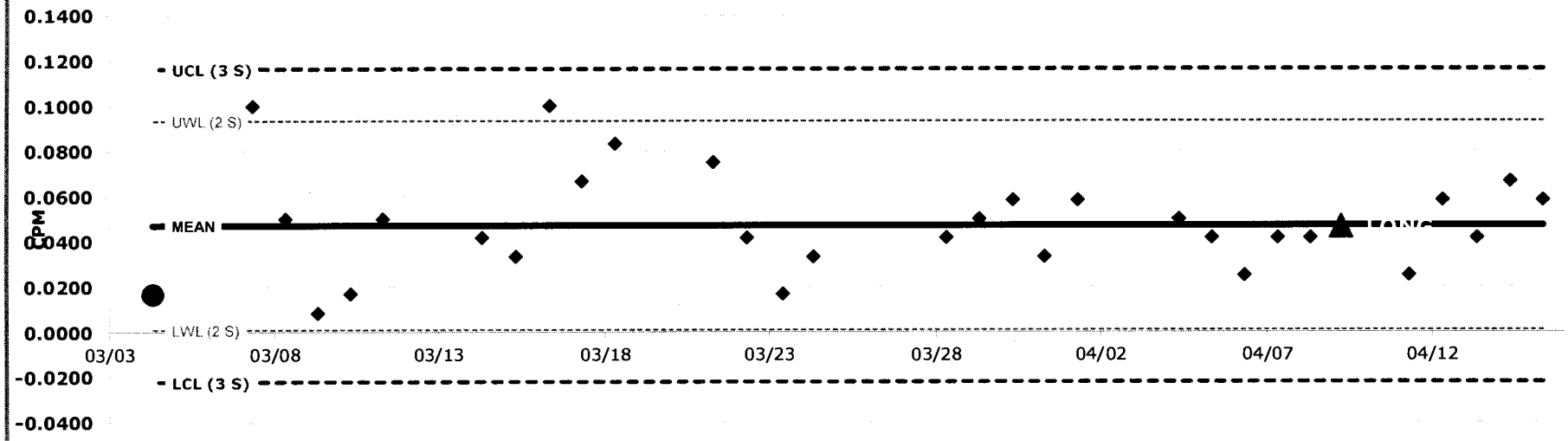
# LB4100-C - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.5030 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0471 | Long B CPM | 0.0467 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0231 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1163 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0221 | CPM | 0.0583 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

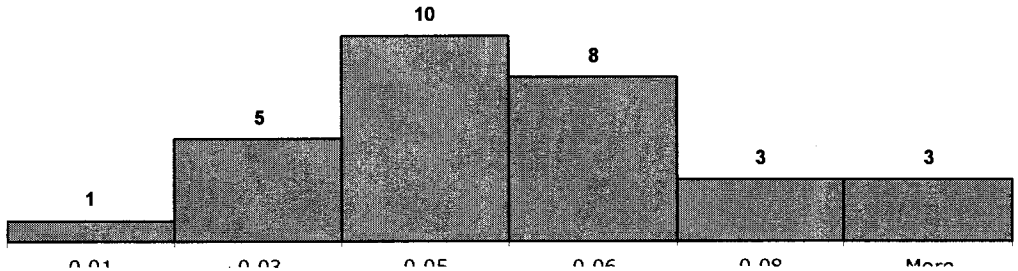



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.01 | 1 |
| 0.03 | 5 |
| 0.05 | 10 |
| 0.06 | 8 |
| 0.08 | 3 |
| More | 3 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis



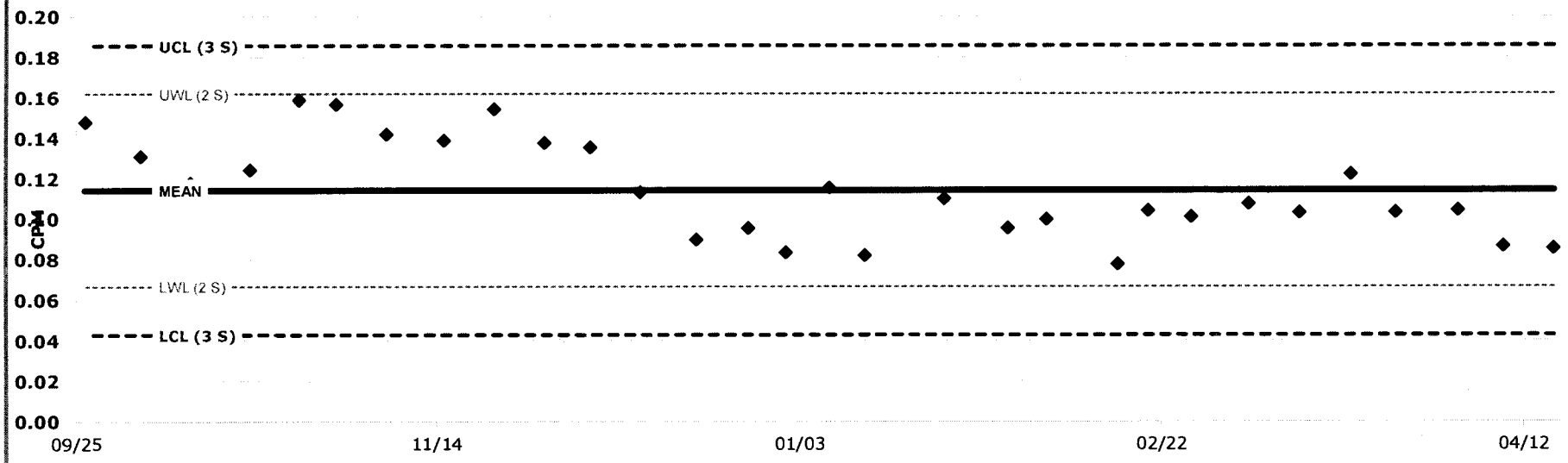
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1143 |
| Standard Deviation | 0.0238 |
| + 3-sigma value | 0.1857 |
| - 3-sigma value | 0.0428 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR A1

Process Date Range: 09/26/15 - 04/16/16

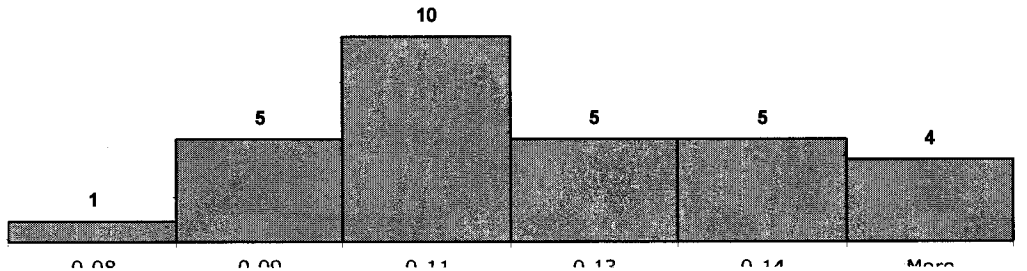



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.08 | 1 |
| 0.09 | 5 |
| 0.11 | 10 |
| 0.13 | 5 |
| 0.14 | 5 |
| More | 4 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis



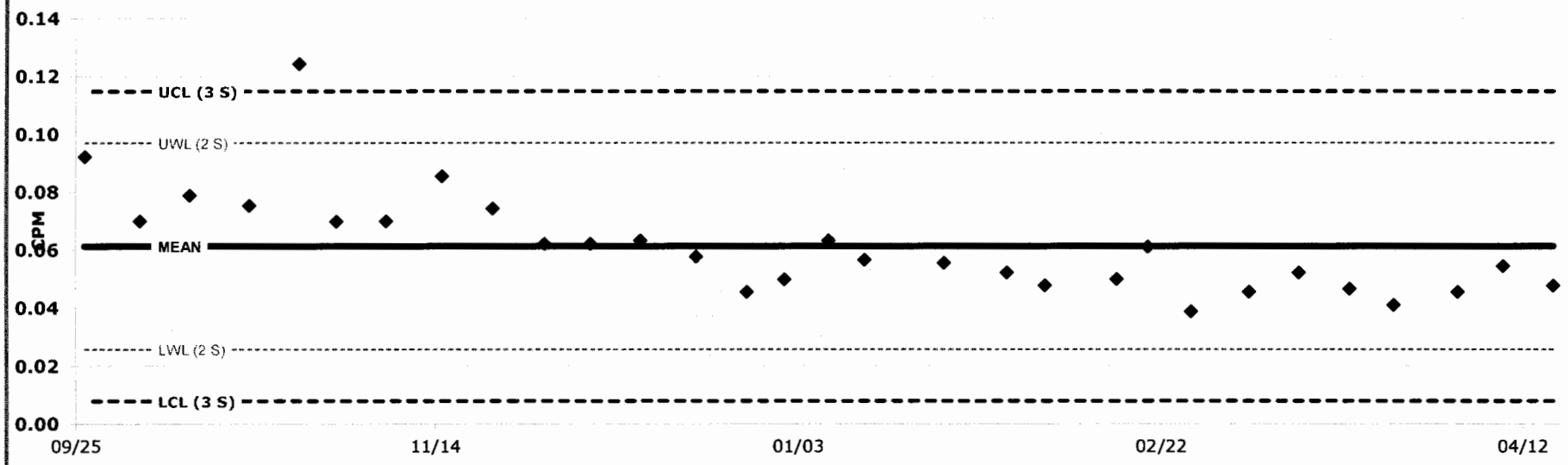
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.0614 |
| Standard Deviation | 0.0178 |
| + 3-sigma value | 0.1149 |
| - 3-sigma value | 0.0079 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR A2

Process Date Range: 09/26/15 - 04/16/16

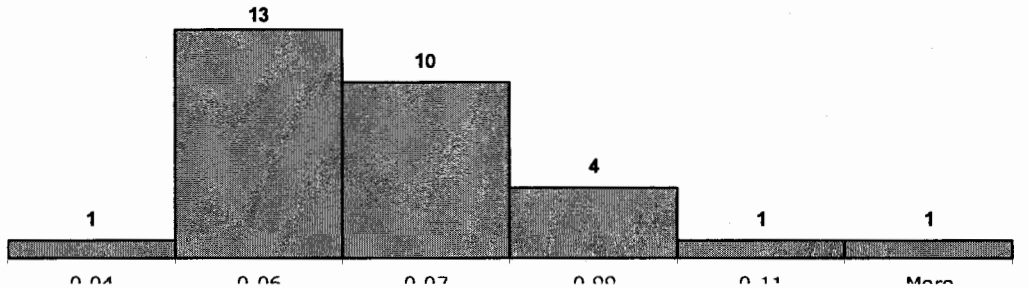



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 1 |
| 0.06 | 13 |
| 0.07 | 10 |
| 0.09 | 4 |
| 0.11 | 1 |
| More | 1 |

**Population Frequency Distribution (Histogram)**




N-617

# Instrument Background Analysis



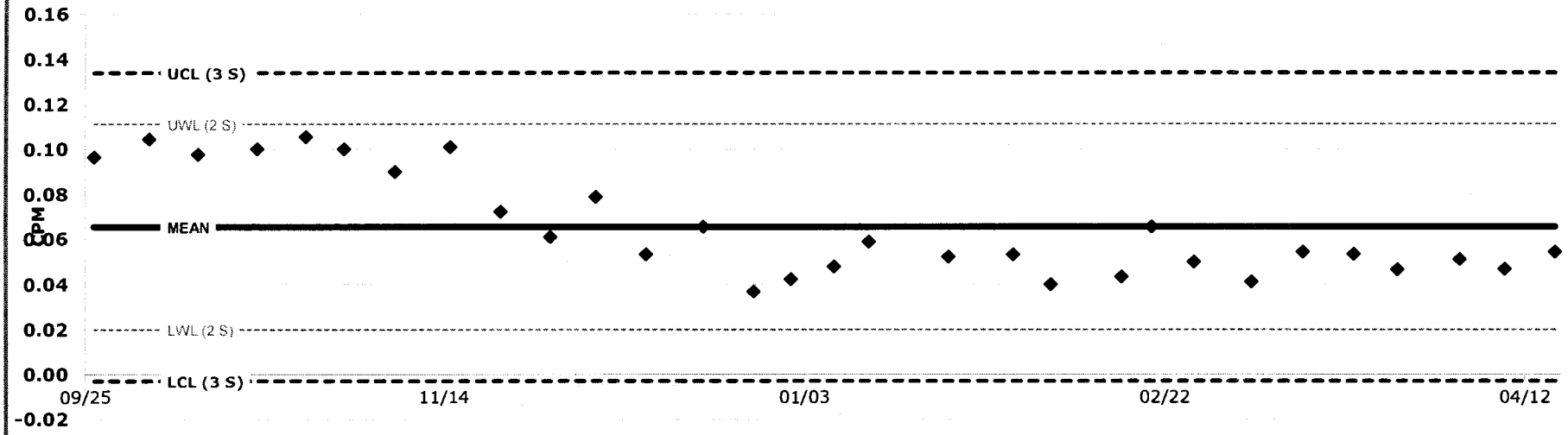
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.0655 |
| Standard Deviation | 0.0228 |
| + 3-sigma value | 0.1340 |
| - 3-sigma value | -0.0030 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR A3

Process Date Range: 09/26/15 - 04/16/16

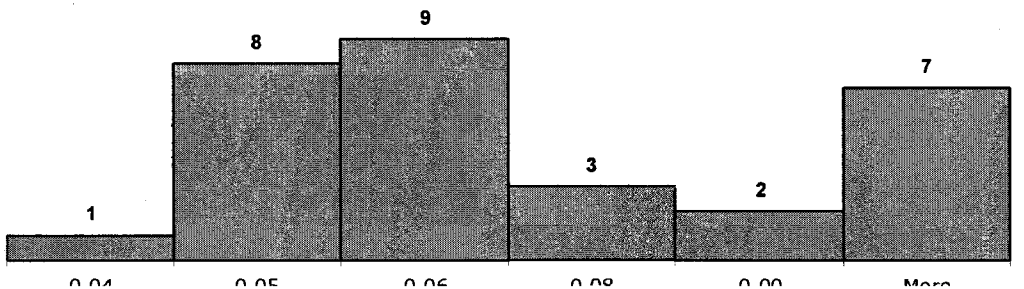



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 1 |
| 0.05 | 8 |
| 0.06 | 9 |
| 0.08 | 3 |
| 0.09 | 2 |
| More | 7 |

**Population Frequency Distribution (Histogram)**



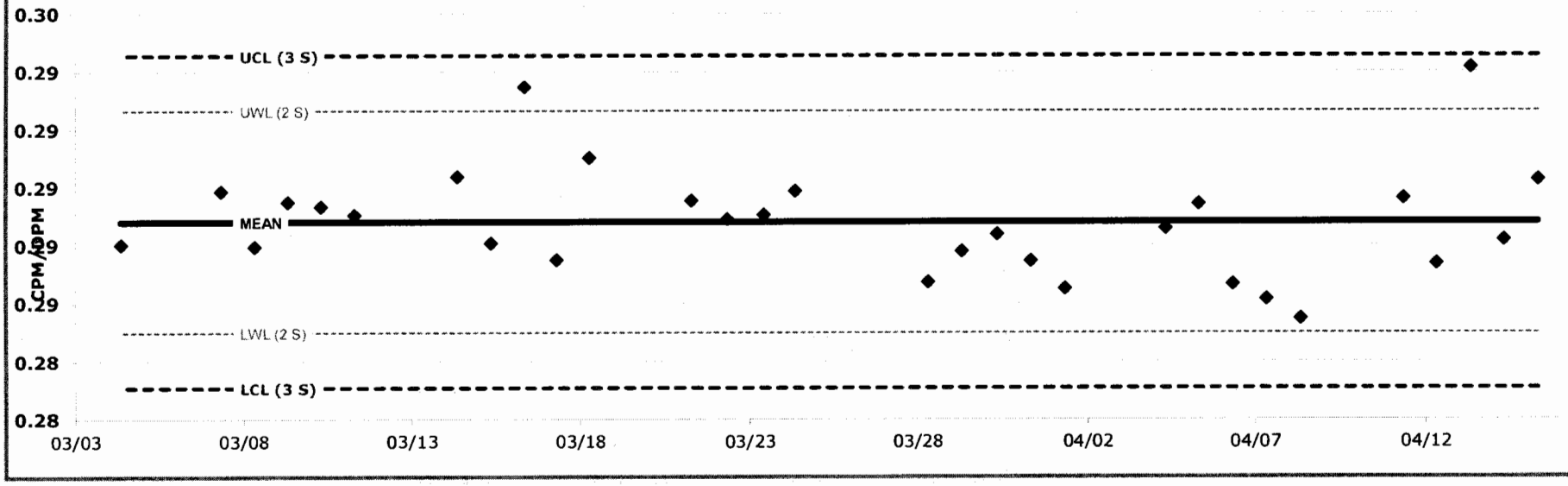
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2888 | CPM/DPM | 0.2903 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0019 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2946 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2831 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

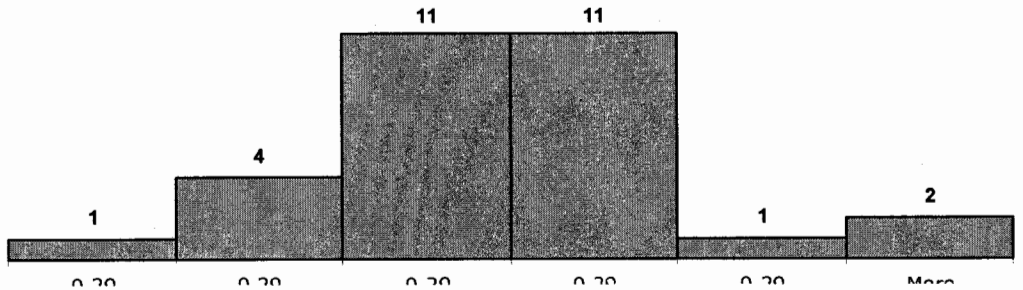



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.29 | 1 |
| 0.29 | 4 |
| 0.29 | 11 |
| 0.29 | 11 |
| 0.29 | 1 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - ALPHA EFFICIENCY

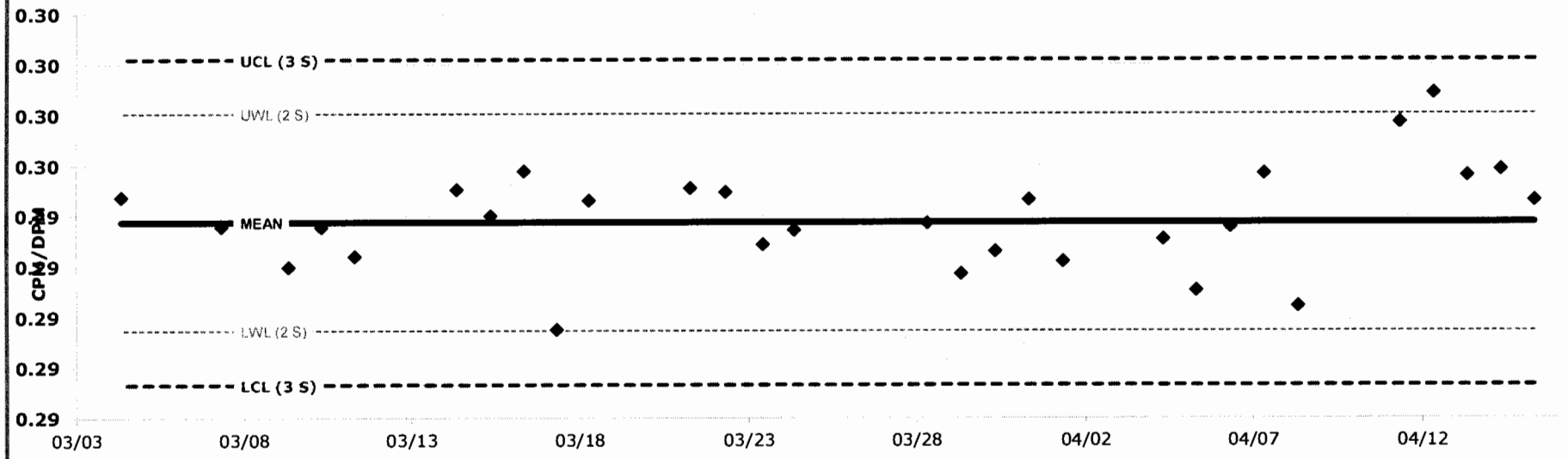


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2938 | CPM/DPM | 0.2946 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0021 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3002 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2873 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

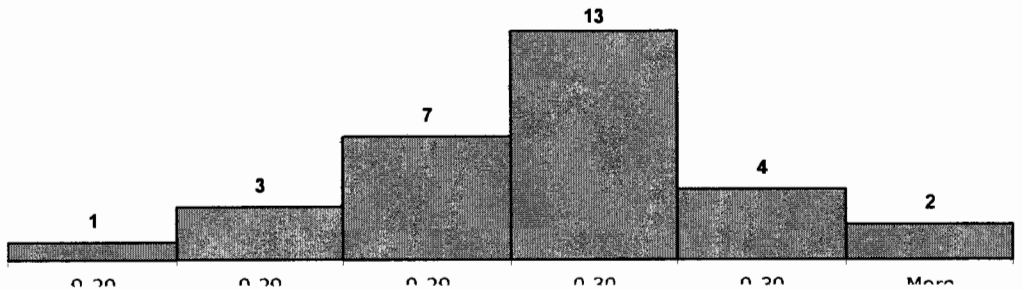



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.29 | 1 |
| 0.29 | 3 |
| 0.29 | 7 |
| 0.30 | 13 |
| 0.30 | 4 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



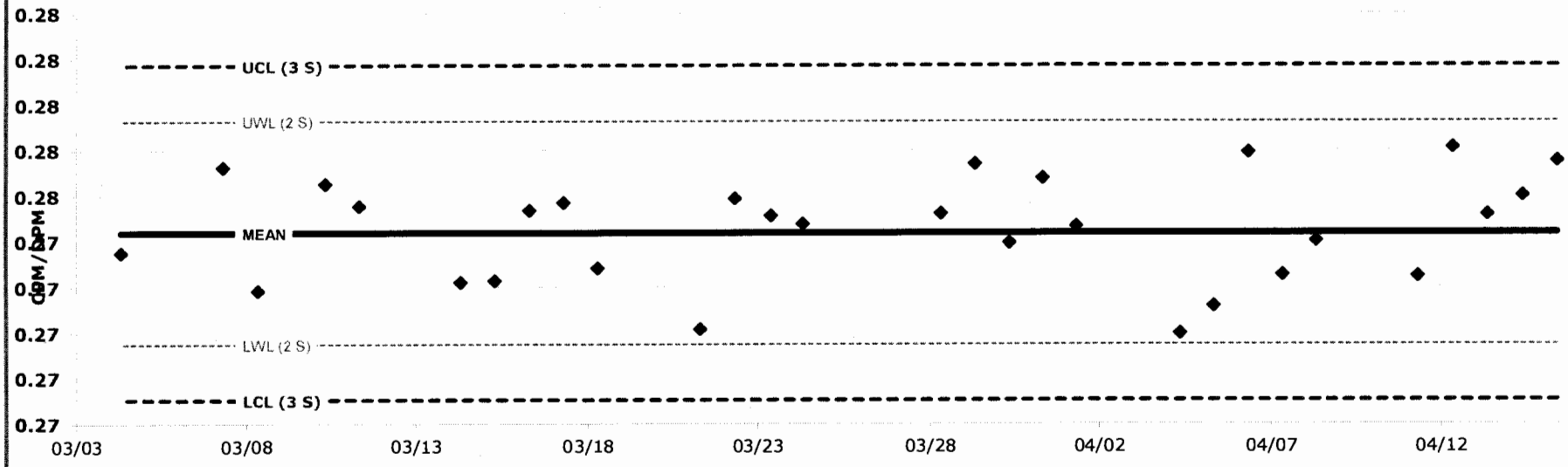
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2744 | CPM/DPM | 0.2775 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0024 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2817 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2670 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR A3

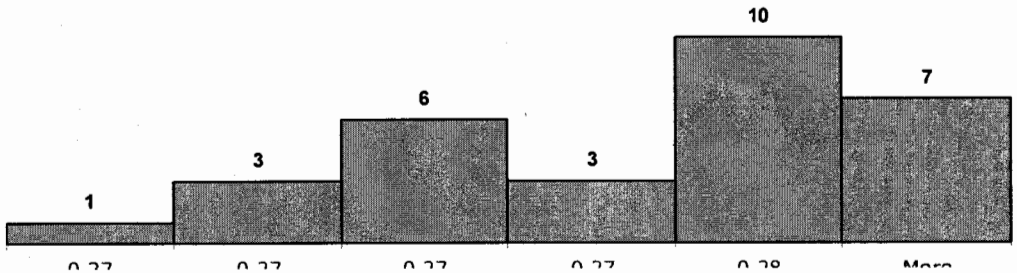
Process Date Range: 03/04/16 - 04/15/16




Statistical Process Control

| Bin | Frequency |
|---|---|
| 0.27 | 1 |
| 0.27 | 3 |
| 0.27 | 6 |
| 0.27 | 3 |
| 0.28 | 10 |
| More | 7 |

Population Frequency Distribution (Histogram)




DCN: ITSI-0808-0004-0076, 8 May 2019

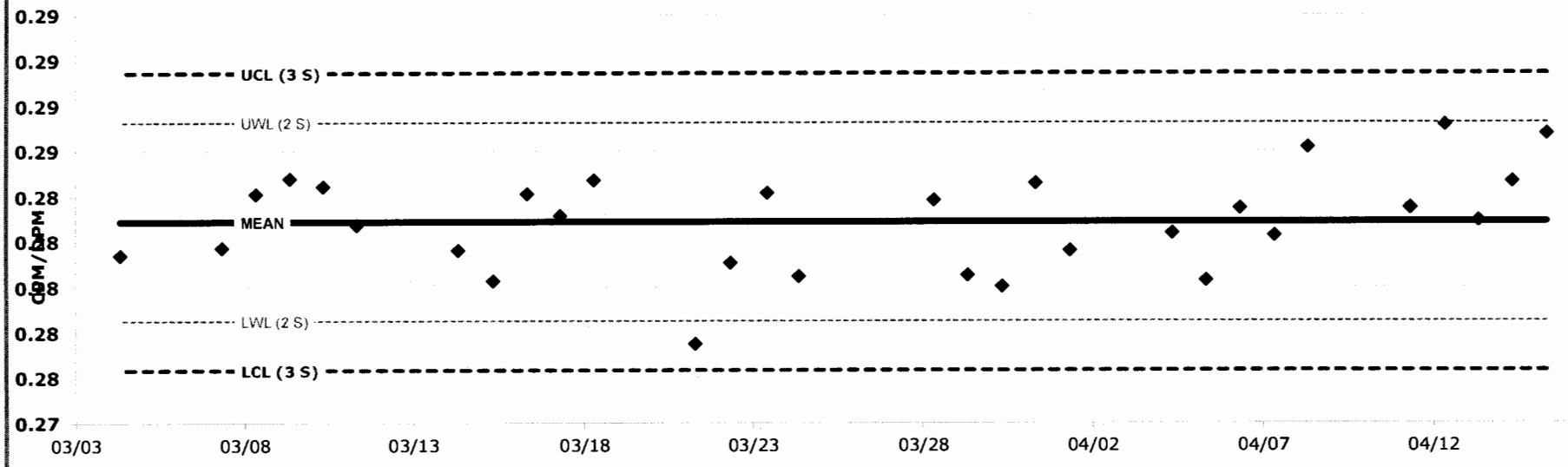
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2829 | CPM/DPM | 0.2868 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0022 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2894 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2763 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR C4

Process Date Range: 03/04/16 - 04/15/16

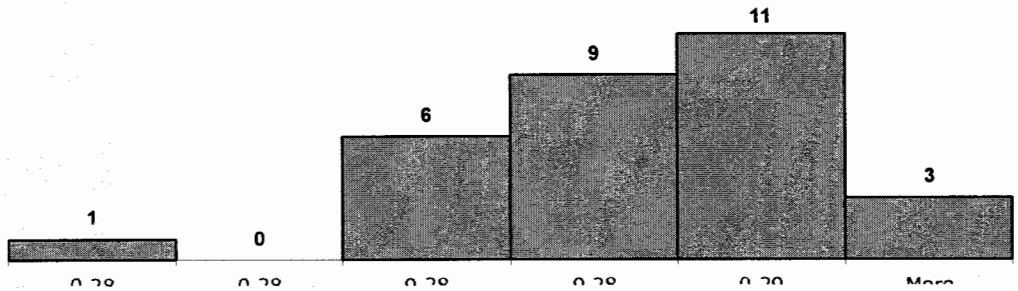



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.28 | 1 |
| 0.28 | 0 |
| 0.28 | 6 |
| 0.28 | 9 |
| 0.29 | 11 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

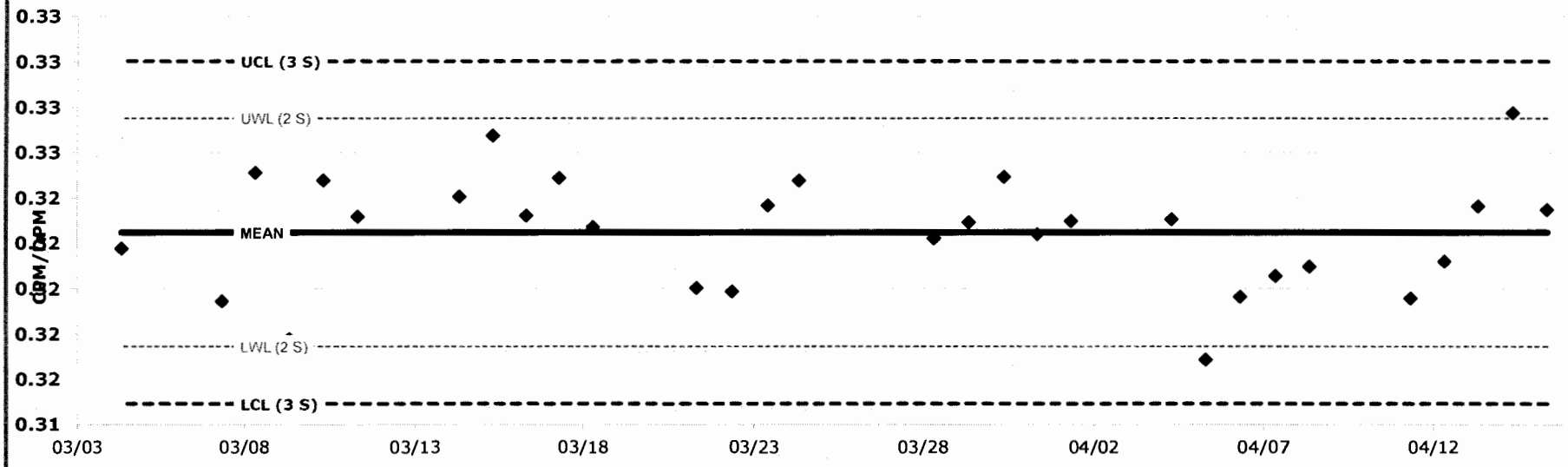
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3225 | CPM/DPM | 0.3235 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0025 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3300 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3149 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR D1

Process Date Range: 03/04/16 - 04/15/16

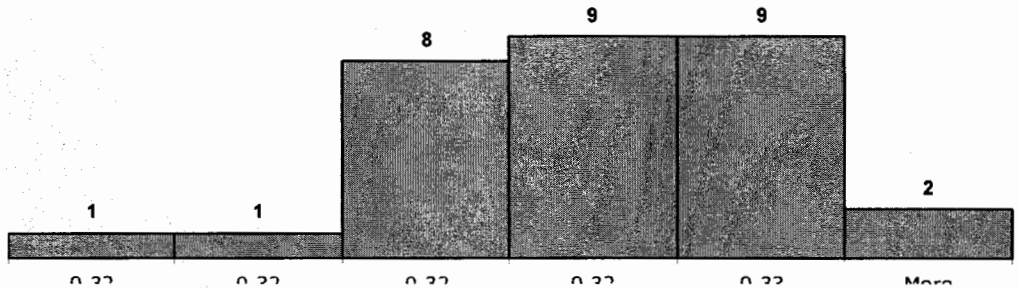



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.32 | 1 |
| 0.32 | 1 |
| 0.32 | 8 |
| 0.32 | 9 |
| 0.33 | 9 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - ALPHA EFFICIENCY

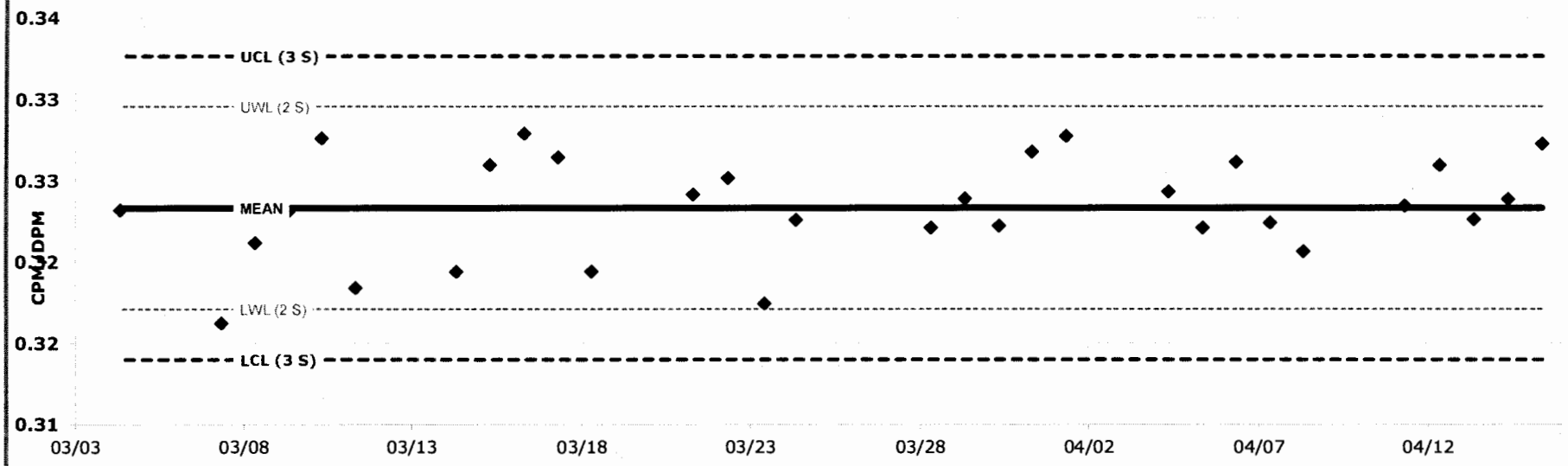


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3233 | CPM/DPM | 0.3273 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0031 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3327 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3140 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR D2

Process Date Range: 03/04/16 - 04/15/16

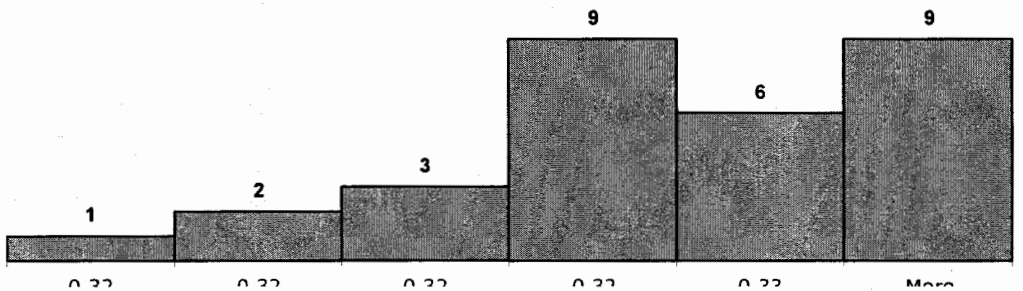



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.32 | 1 |
| 0.32 | 2 |
| 0.32 | 3 |
| 0.32 | 9 |
| 0.33 | 6 |
| More | 9 |

**Population Frequency Distribution (Histogram)**



# LB4100-A - Beta Daily BKG Check

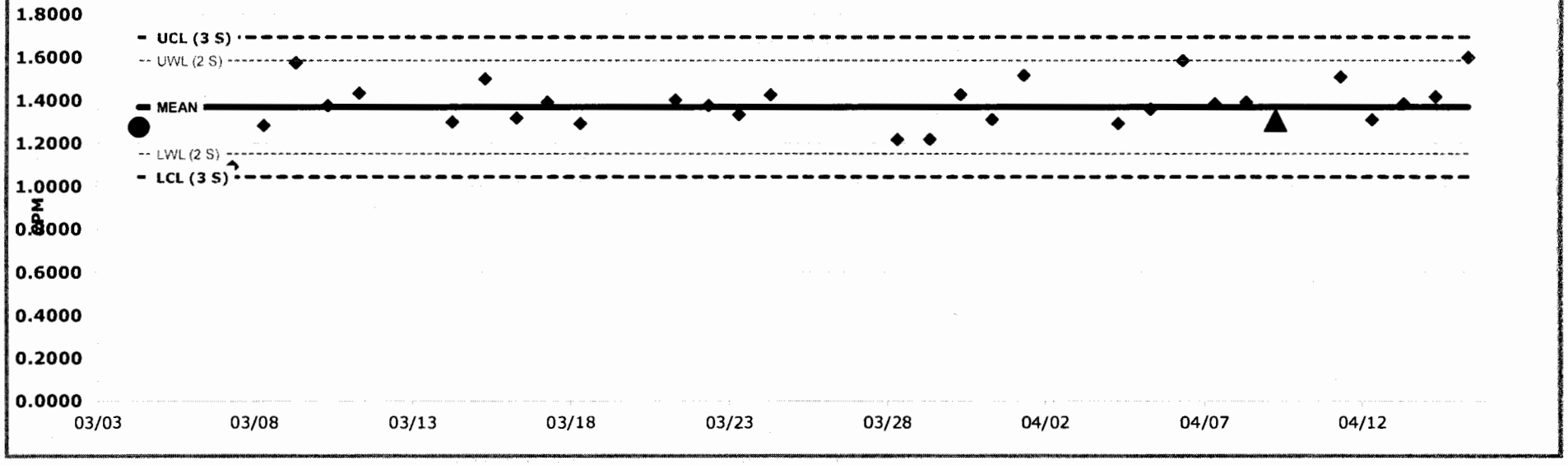


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 2.4124 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 1.3681 | Long B CPM | 1.3067 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.1085 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.6936 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 1.0426 | CPM | 1.6000 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

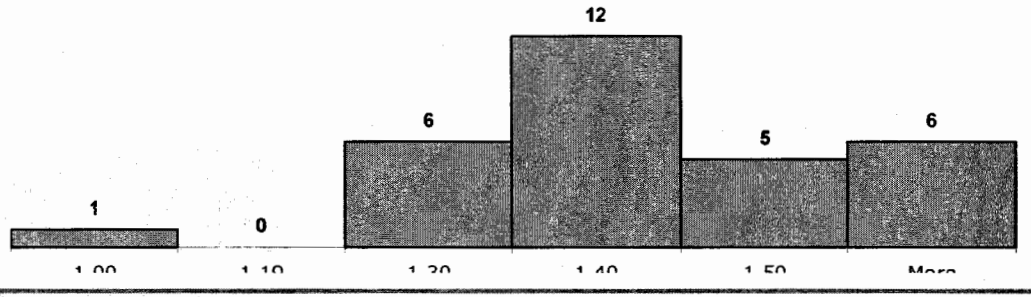



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 1.09 | 1 |
| 1.19 | 0 |
| 1.30 | 6 |
| 1.40 | 12 |
| 1.50 | 5 |
| More | 6 |




N-625

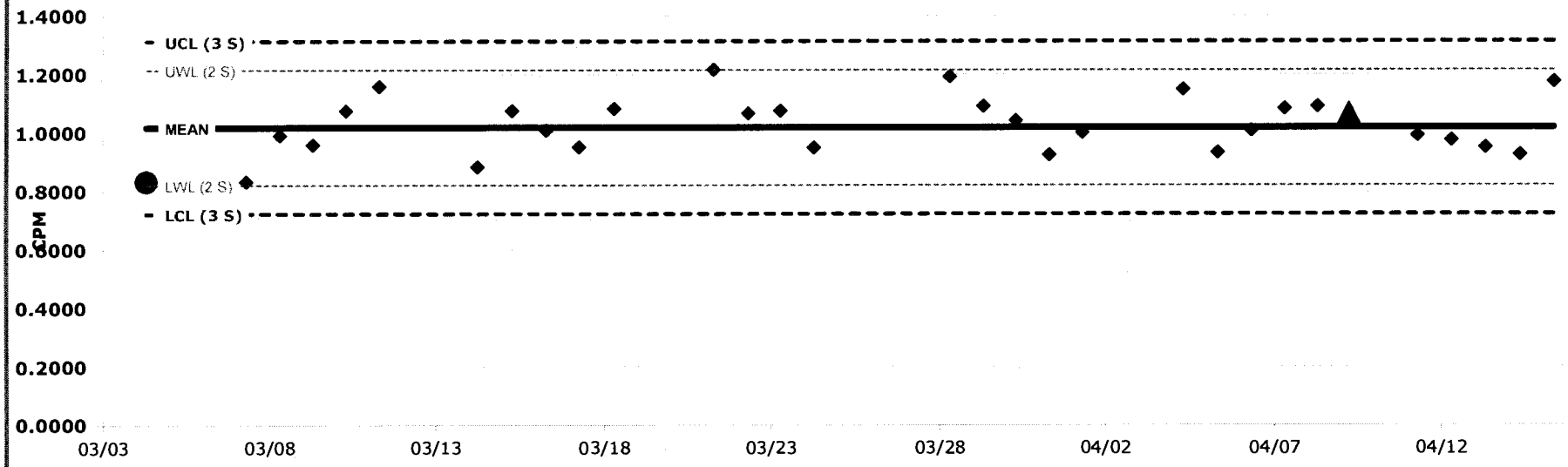
# LB4100-A - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 1.0553 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 1.0178 | Long B CPM | 1.0644 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0983 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.3128 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.7228 | CPM | 1.1750 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA BACKGROUND - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

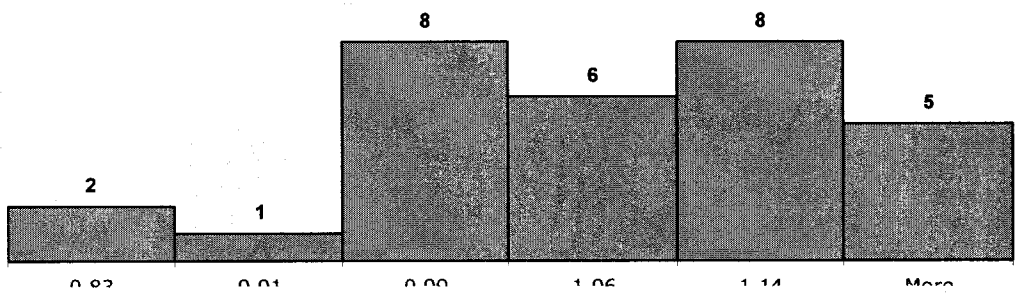



INTERNATIONAL

**Statistical Process Control**

### Population Frequency Distribution (Histogram)

| Bin | Frequency |
|---|---|
| 0.83 | 2 |
| 0.91 | 1 |
| 0.99 | 8 |
| 1.06 | 6 |
| 1.14 | 8 |
| More | 5 |




DCN: ITSI-0808-0004-0076, 8 May 2019

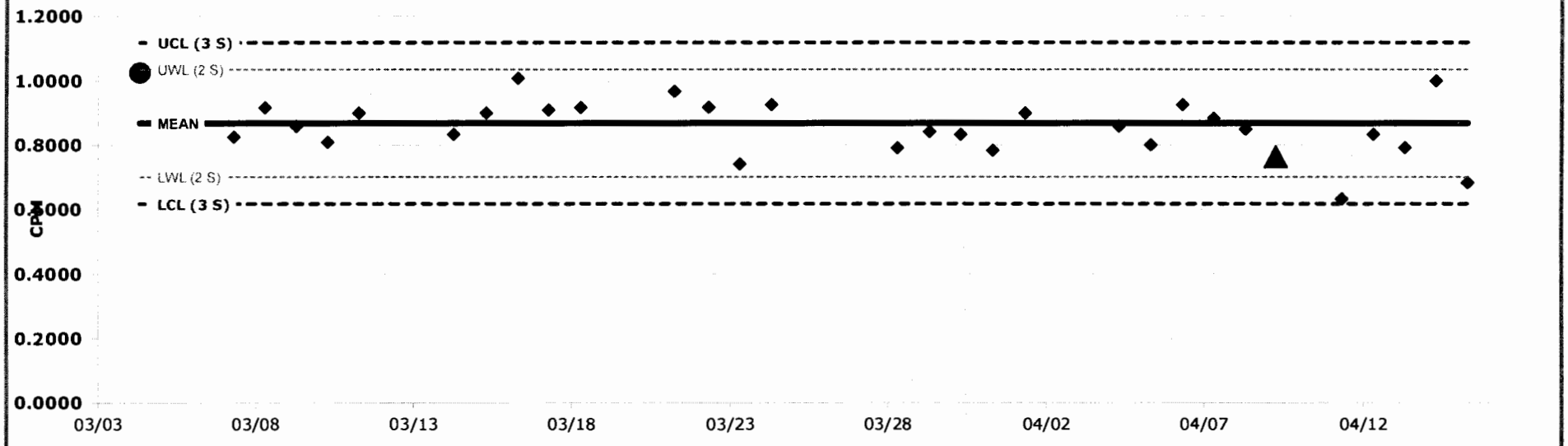
# LB4100-A - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 1.0027 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.8681 | Long B CPM | 0.7644 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0834 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.1183 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6179 | CPM | 0.6833 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA BACKGROUND - DETECTOR C4

Process Date Range: 03/04/16 - 04/15/16

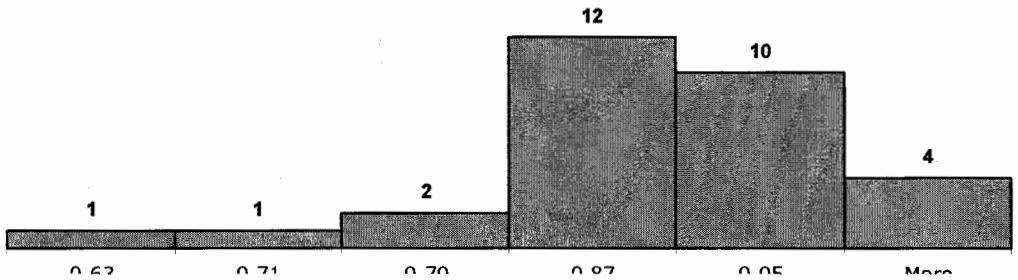



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.63 | 1 |
| 0.71 | 1 |
| 0.79 | 2 |
| 0.87 | 12 |
| 0.95 | 10 |
| More | 4 |



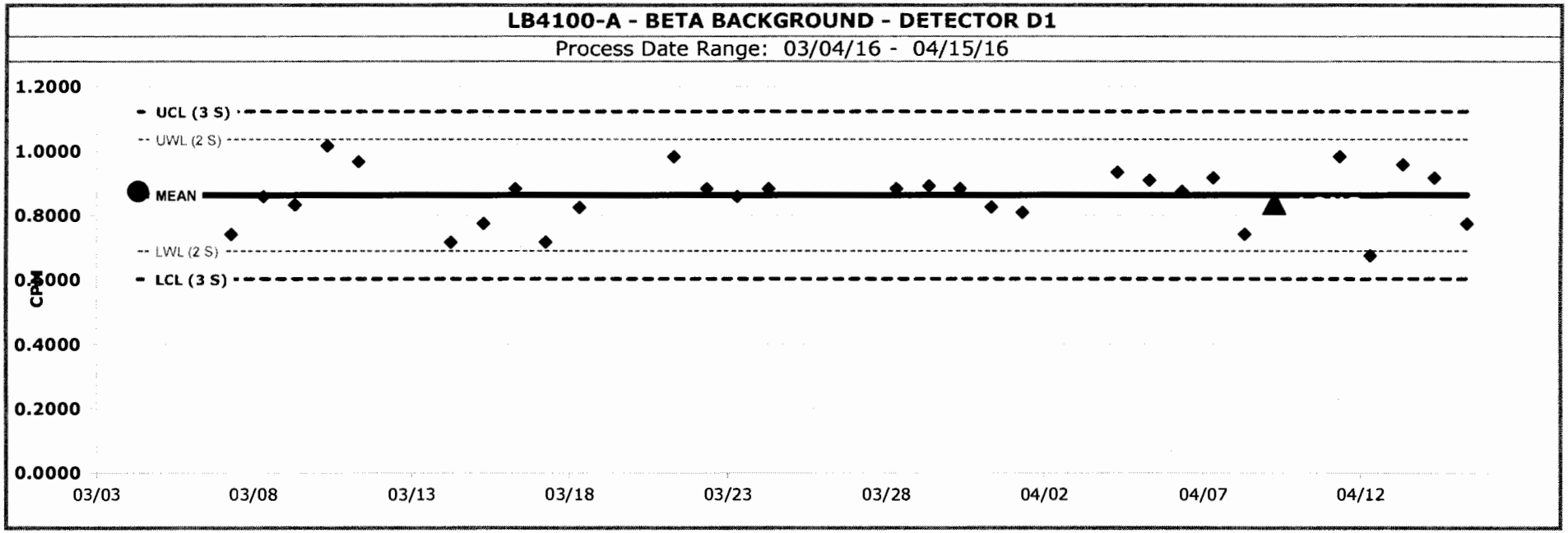

DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-A - Beta Daily BKG Check



DCN: ITSI-0808-0004-0076, 8 May 2019

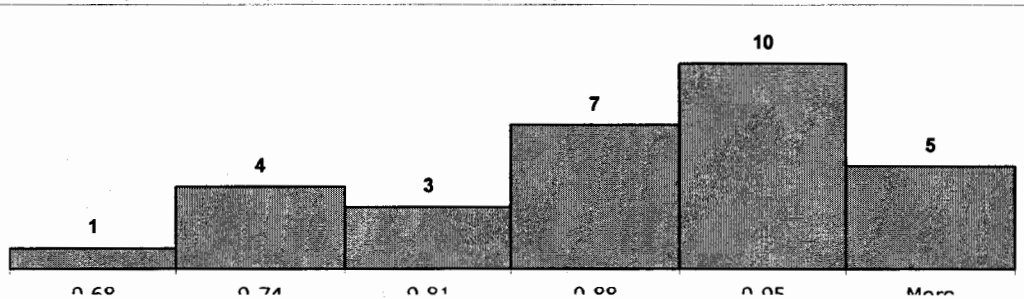
| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.7303 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.8626 | Long B CPM | 0.8378 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0867 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.1228 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6025 | CPM | 0.7750 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |




INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.68 | 1 |
| 0.74 | 4 |
| 0.81 | 3 |
| 0.88 | 7 |
| 0.95 | 10 |
| More | 5 |



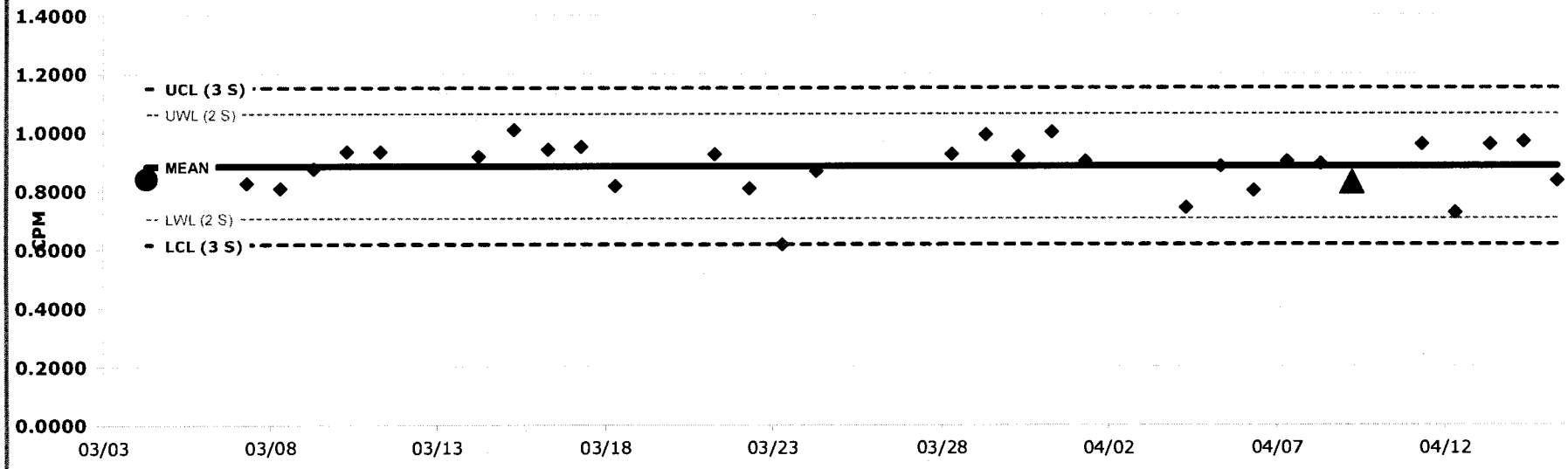
# LB4100-A - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.0501 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.8836 | Long B CPM | 0.8289 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0892 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.1512 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6161 | CPM | 0.8333 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA BACKGROUND - DETECTOR D3

Process Date Range: 03/04/16 - 04/15/16

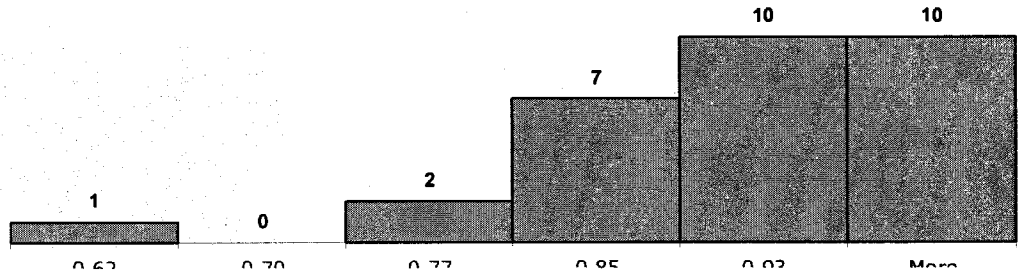



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.62 | 1 |
| 0.70 | 0 |
| 0.77 | 2 |
| 0.85 | 7 |
| 0.93 | 10 |
| More | 10 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

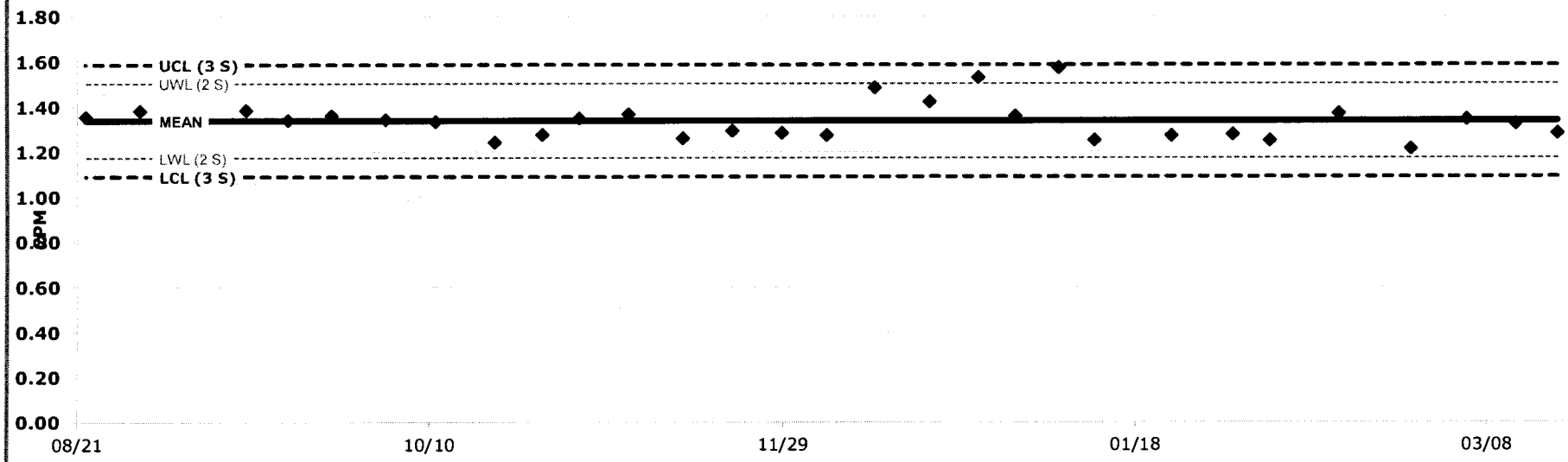


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 1.3381 |
| Standard Deviation | 0.0828 |
| + 3-sigma value | 1.5866 |
| - 3-sigma value | 1.0896 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR A2

Process Date Range: 08/22/15 - 03/18/16

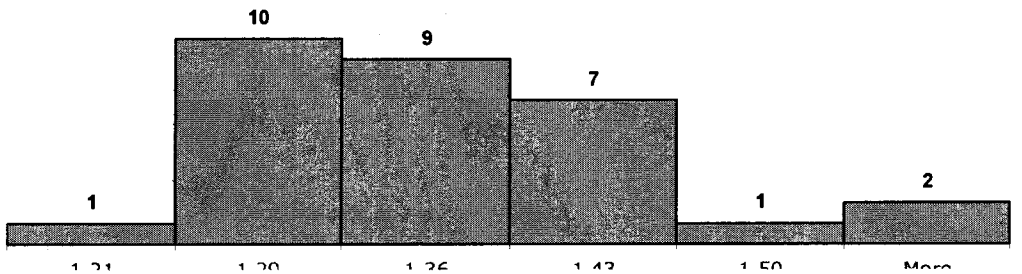



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 1.21 | 1 |
| 1.29 | 10 |
| 1.36 | 9 |
| 1.43 | 7 |
| 1.50 | 1 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

American Radiation Services
Baton Rouge Laboratory

# Instrument Background Analysis

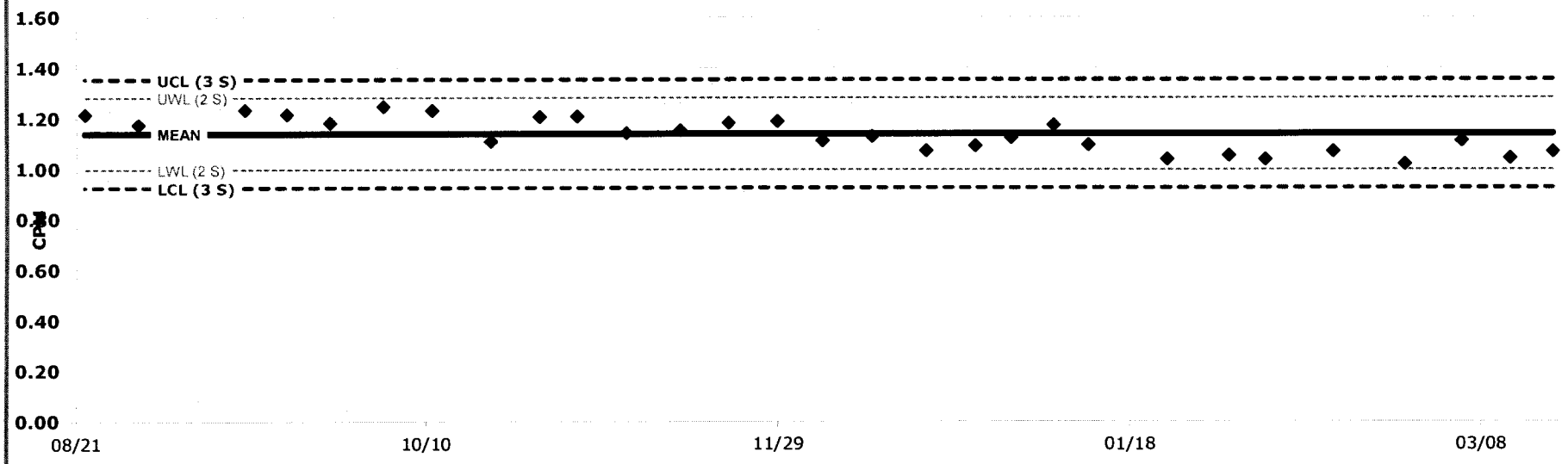


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 1.1391 |
| Standard Deviation | 0.0714 |
| + 3-sigma value | 1.3534 |
| - 3-sigma value | 0.9249 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR A3

Process Date Range: 08/22/15 - 03/18/16

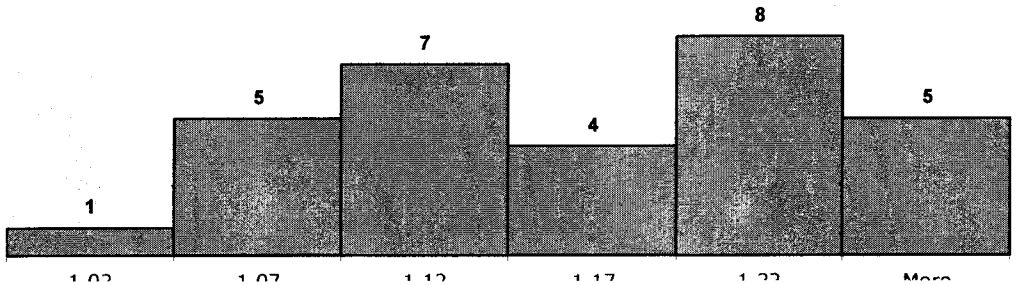



INTERNATIONAL

Statistical Process Control

| Bin | Frequency |
|---|---|
| 1.02 | 1 |
| 1.07 | 5 |
| 1.12 | 7 |
| 1.17 | 4 |
| 1.22 | 8 |
| More | 5 |

Population Frequency Distribution (Histogram)



# Instrument Background Analysis

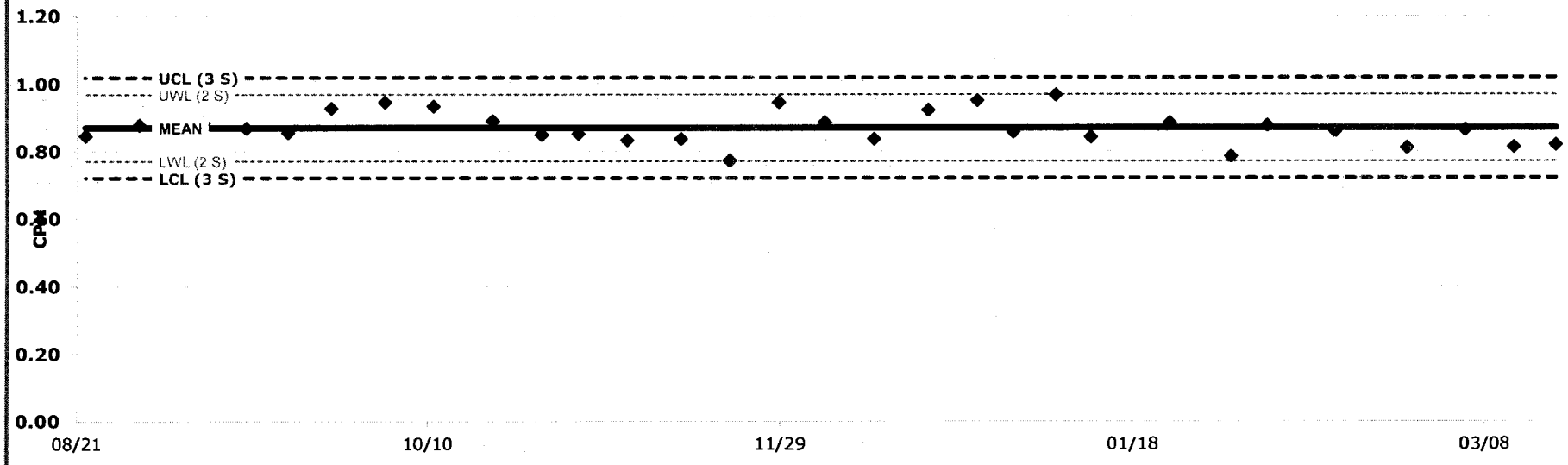


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.8697 |
| Standard Deviation | 0.0496 |
| + 3-sigma value | 1.0184 |
| - 3-sigma value | 0.7210 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR C4

Process Date Range: 08/22/15 - 03/18/16

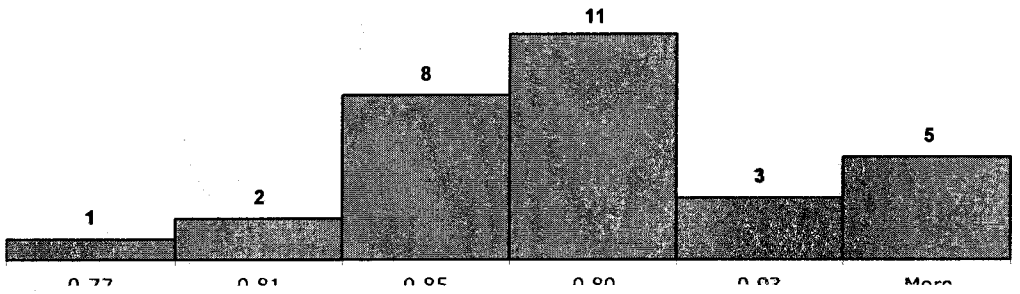



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.77 | 1 |
| 0.81 | 2 |
| 0.85 | 8 |
| 0.89 | 11 |
| 0.93 | 3 |
| More | 5 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

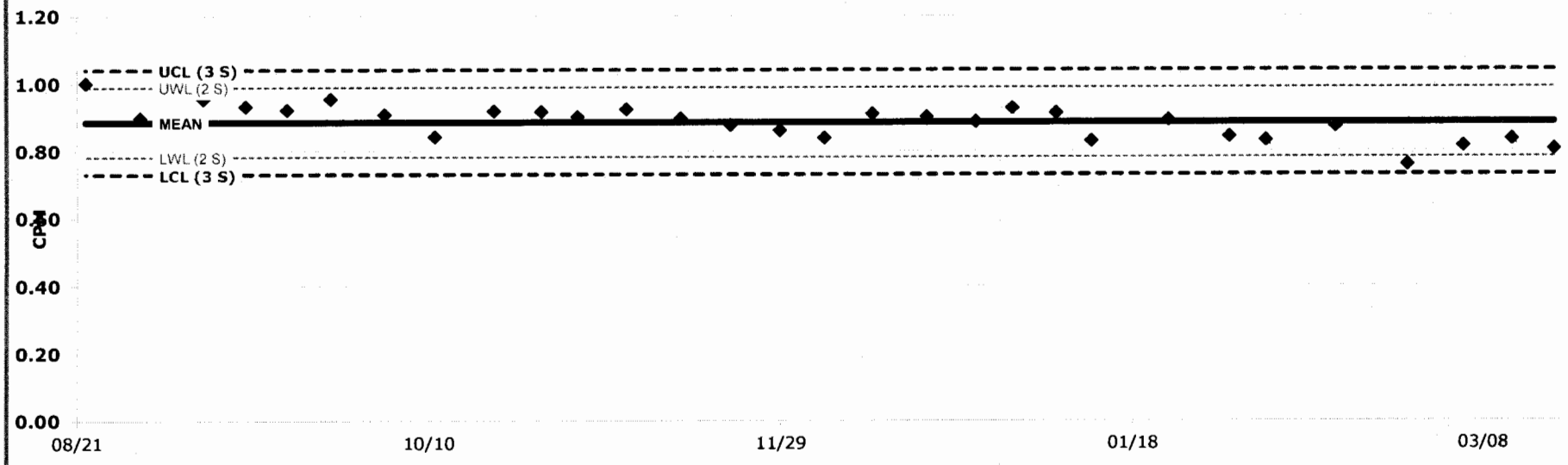


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.8854 |
| Standard Deviation | 0.0518 |
| + 3-sigma value | 1.0408 |
| - 3-sigma value | 0.7301 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | INVESTIGATE |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR D1

Process Date Range: 08/22/15 - 03/18/16

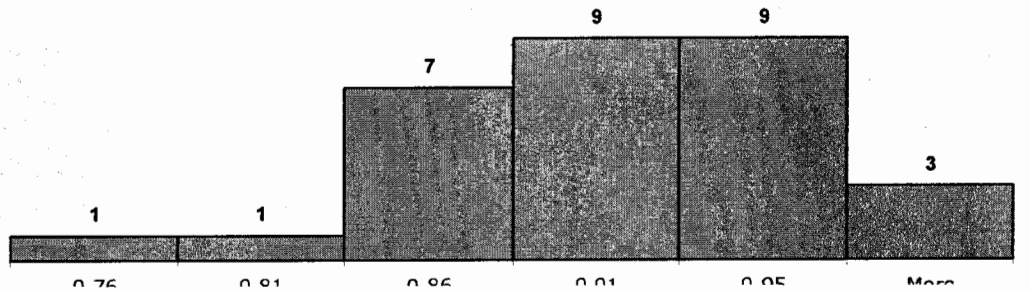



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.76 | 1 |
| 0.81 | 1 |
| 0.86 | 7 |
| 0.91 | 9 |
| 0.95 | 9 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

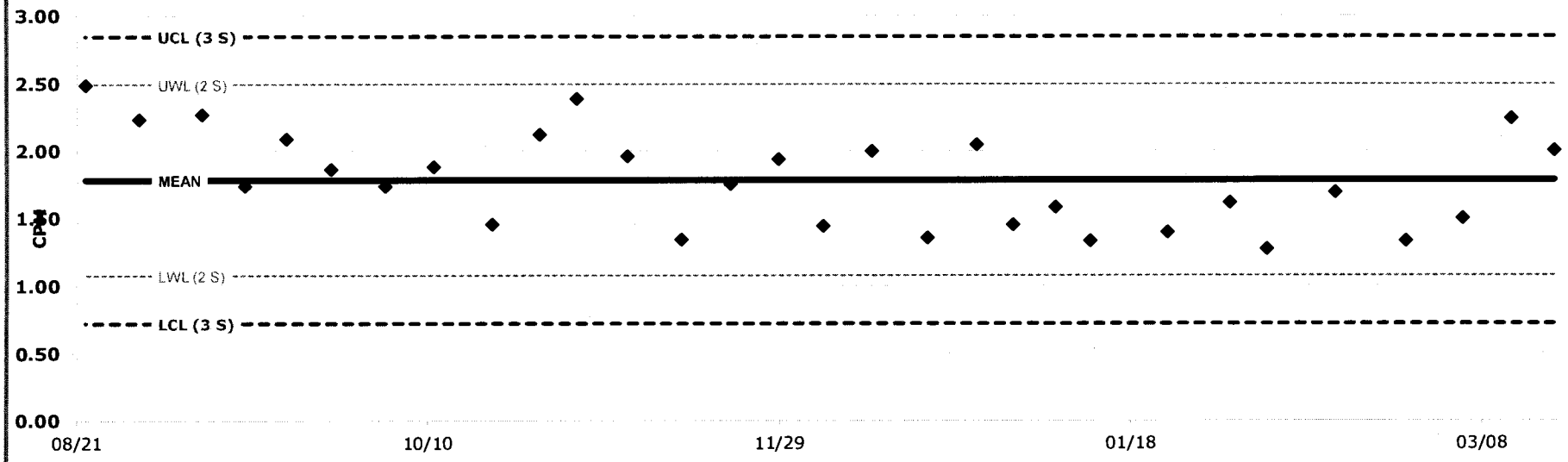


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 1.7836 |
| Standard Deviation | 0.3545 |
| + 3-sigma value | 2.8470 |
| - 3-sigma value | 0.7201 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR D2

Process Date Range: 08/22/15 - 03/18/16

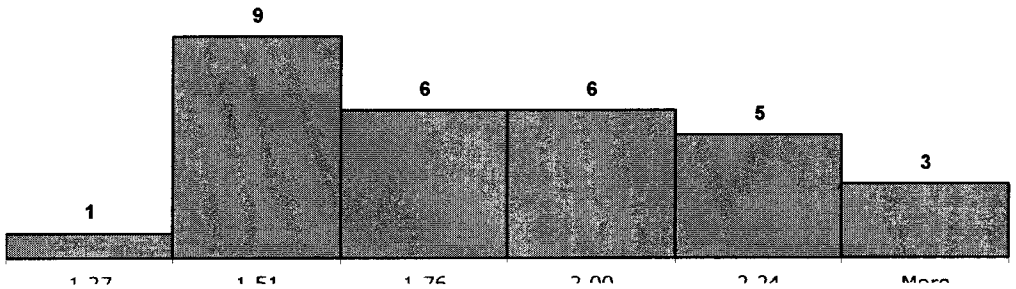



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 1.27 | 1 |
| 1.51 | 9 |
| 1.76 | 6 |
| 2.00 | 6 |
| 2.24 | 5 |
| More | 3 |




DCN: ITS1-0808-0004-0076, 8 May 2019

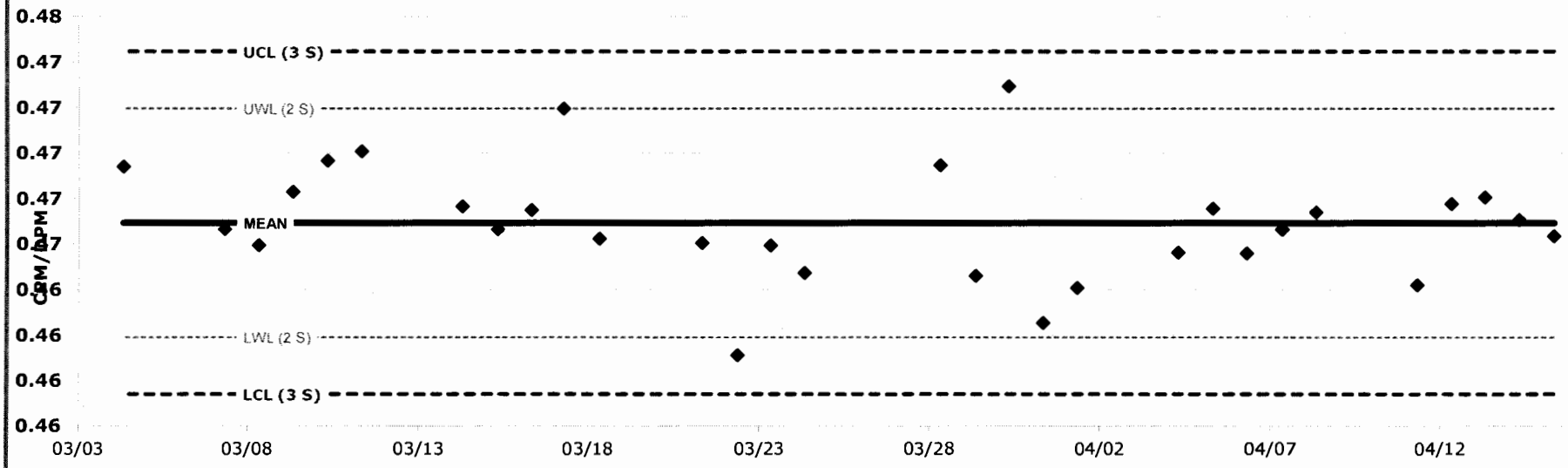
# LB4100-A - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4669 | CPM/DPM | 0.4663 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0025 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4745 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4594 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

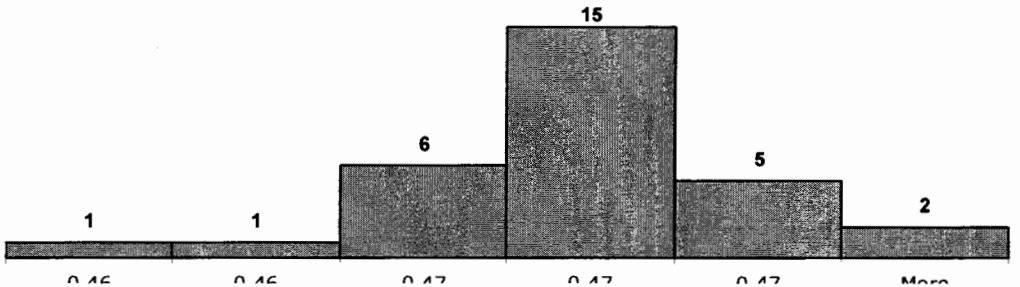



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.46 | 1 |
| 0.46 | 1 |
| 0.47 | 6 |
| 0.47 | 15 |
| 0.47 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

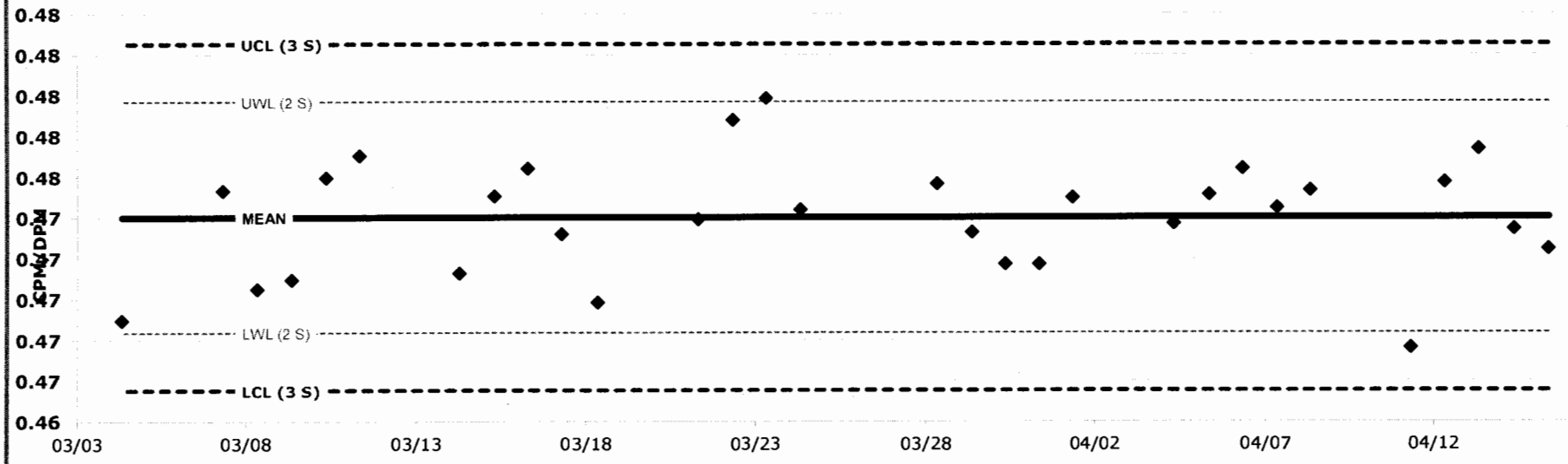
# LB4100-A - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4740 | CPM/DPM | 0.4725 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0028 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4825 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4655 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

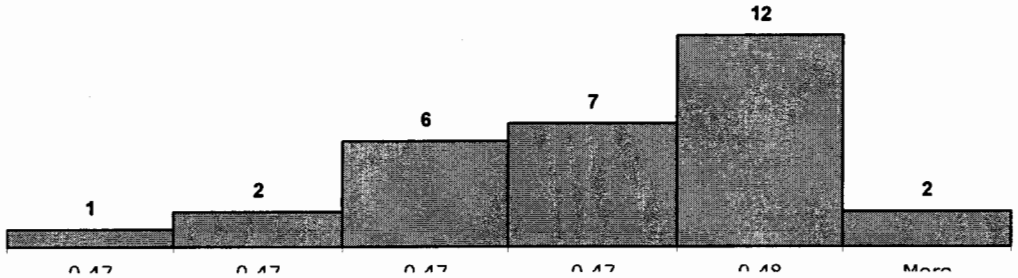



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.47 | 2 |
| 0.47 | 6 |
| 0.47 | 7 |
| 0.48 | 12 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

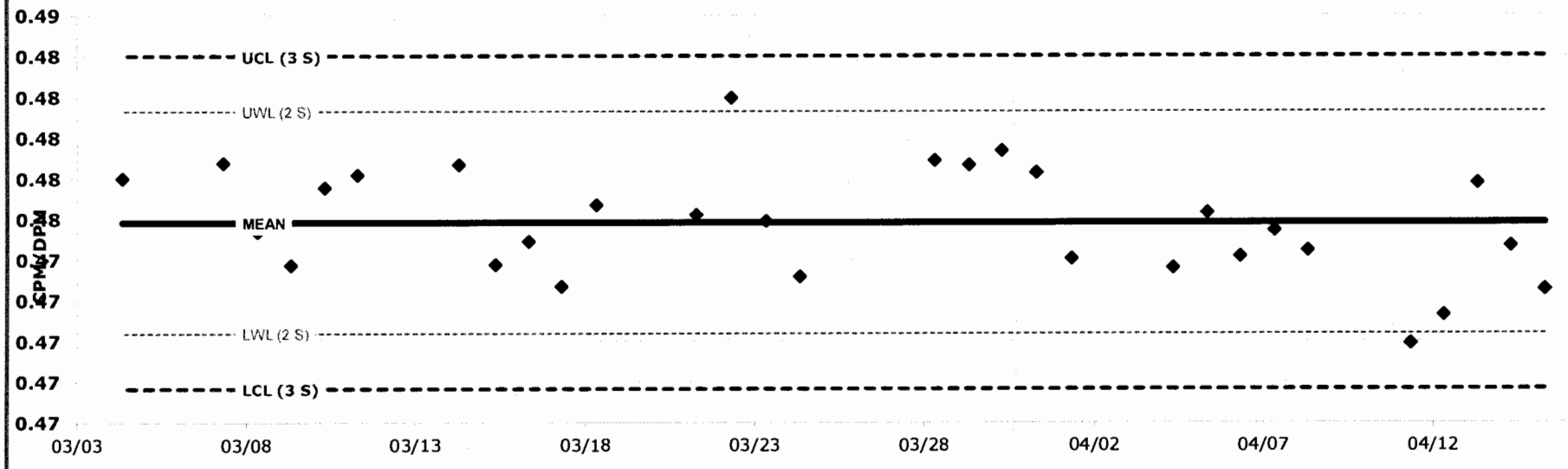
# LB4100-A - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4758 | CPM/DPM | 0.4725 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0027 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4840 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4676 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR C4

Process Date Range: 03/04/16 - 04/15/16

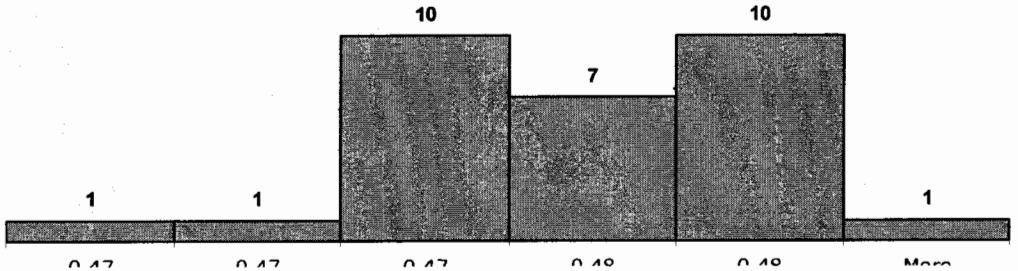



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.47 | 1 |
| 0.47 | 10 |
| 0.48 | 7 |
| 0.48 | 10 |
| More | 1 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-A - BETA EFFICIENCY

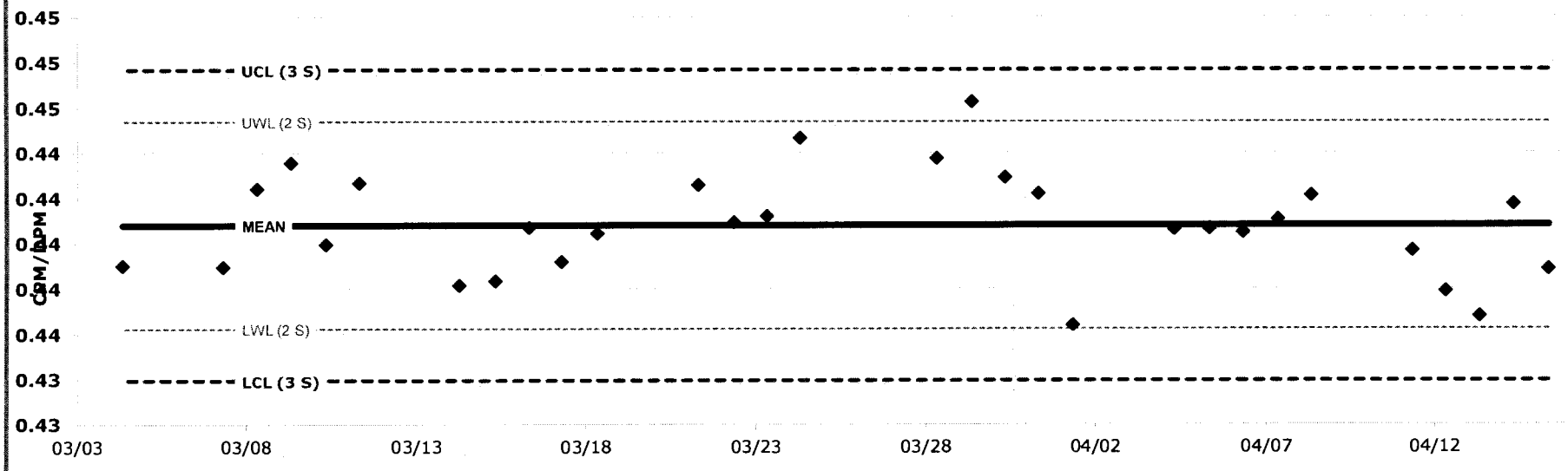


| Population Statistics | | | |
|---|---|---|---|
| Population Size | 30 | | |
| | | Date | 04/15/16 |
| Average | 0.4408 | CPM/DPM | 0.4389 |
| Standard Deviation | 0.0023 | | |
| + 3-sigma value | 0.4477 | Date | |
| - 3-sigma value | 0.4339 | CPM | |
| | | Count Mins | |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR D1

Process Date Range: 03/04/16 - 04/15/16

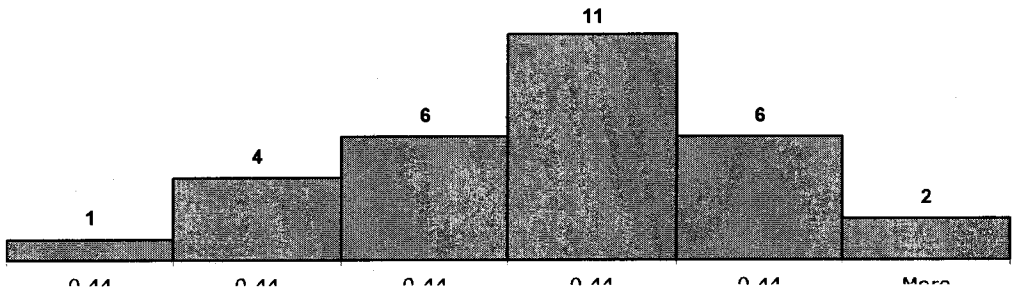



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.44 | 1 |
| 0.44 | 4 |
| 0.44 | 6 |
| 0.44 | 11 |
| 0.44 | 6 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

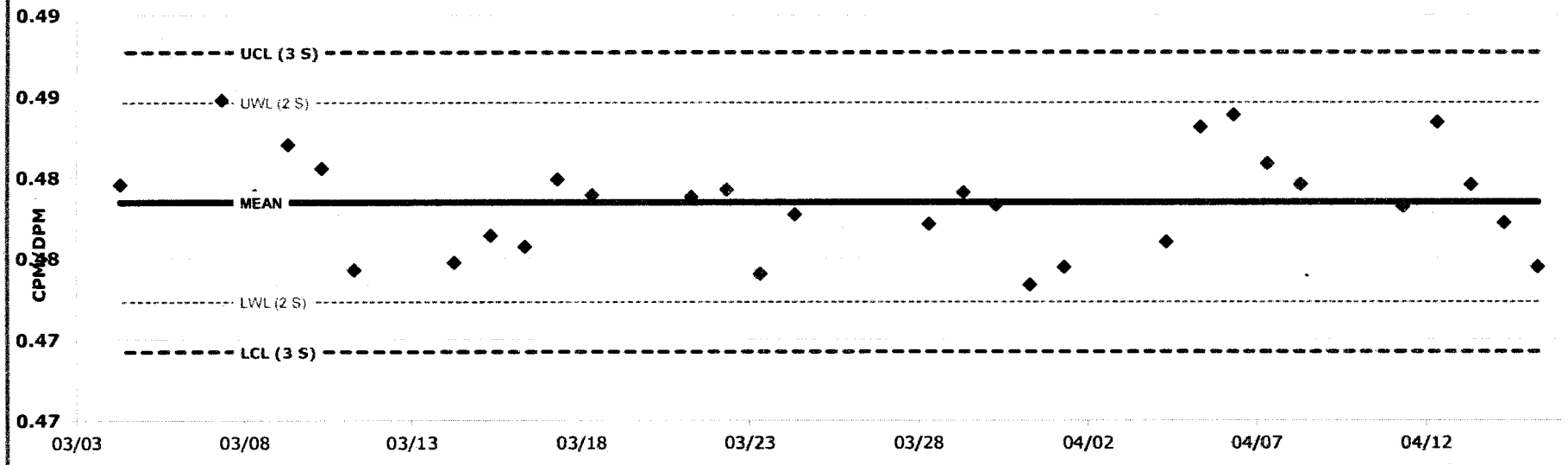
# LB4100-A - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4785 | CPM/DPM | 0.4745 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0031 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4877 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4692 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR D3

Process Date Range: 03/04/16 - 04/15/16

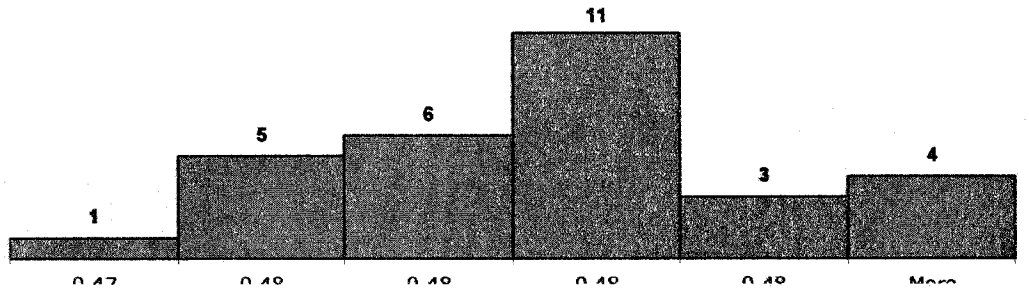



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.48 | 5 |
| 0.48 | 6 |
| 0.48 | 11 |
| 0.48 | 3 |
| More | 4 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

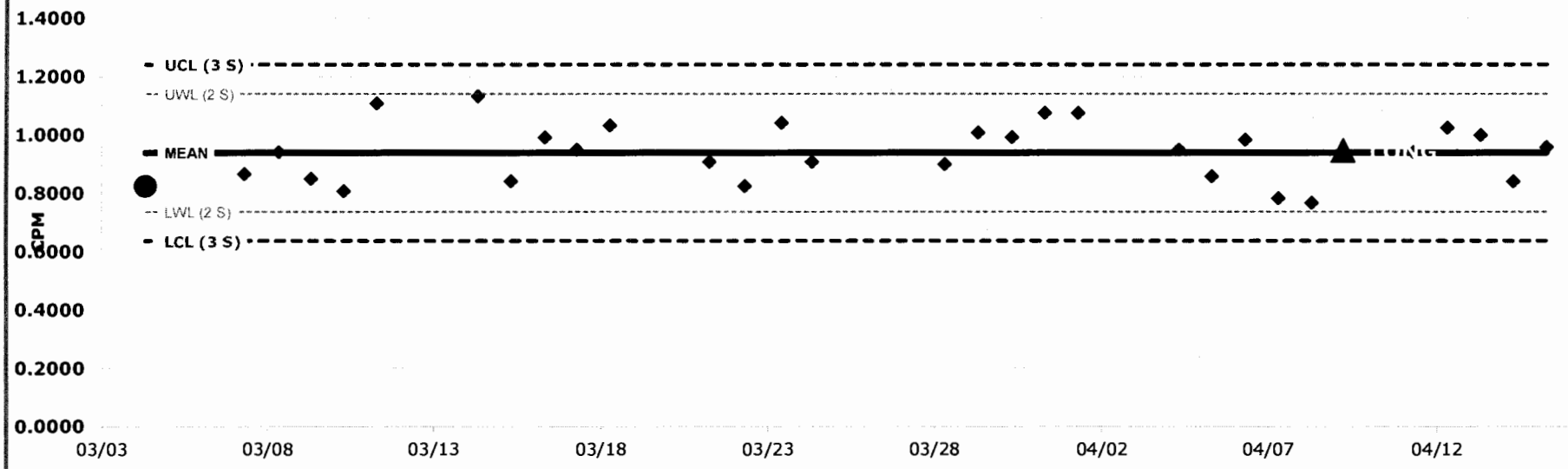
# LB4100-C - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.1227 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.9391 | Long B CPM | 0.9467 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.1010 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.2420 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6361 | CPM | 0.9583 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

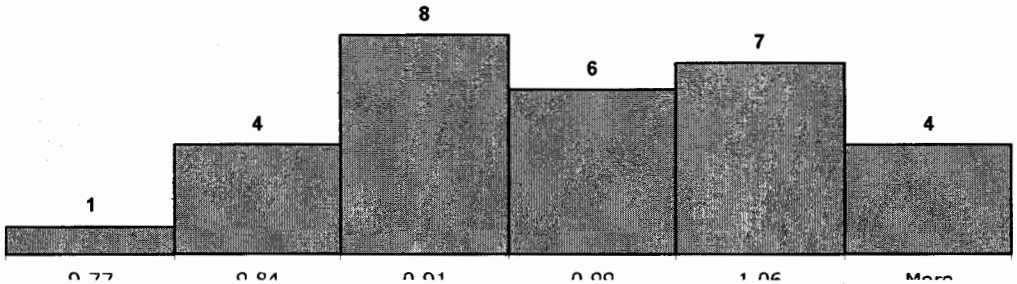



INTERNATIONAL

Statistical Process Control

| Bin | Frequency |
|---|---|
| 0.77 | 1 |
| 0.84 | 4 |
| 0.91 | 8 |
| 0.99 | 6 |
| 1.06 | 7 |
| More | 4 |

Population Frequency Distribution (Histogram)




DCN: ITSI-0808-0004-0076, 8 May 2019

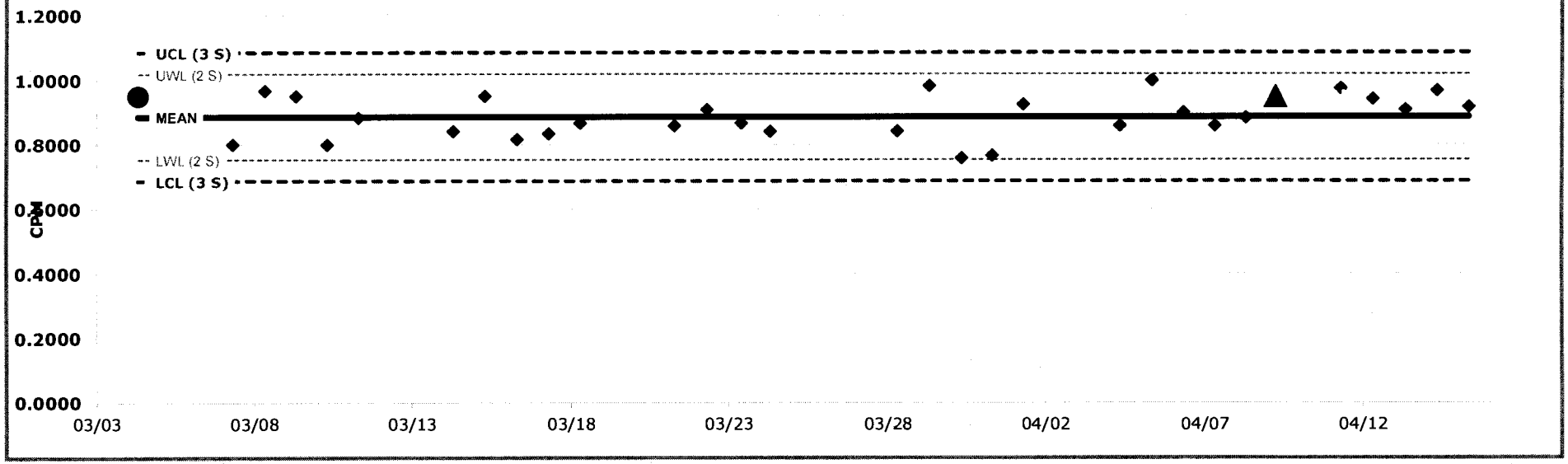
# LB4100-C - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.3456 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.8862 | Long B CPM | 0.9489 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0664 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.0853 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6871 | CPM | 0.9167 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

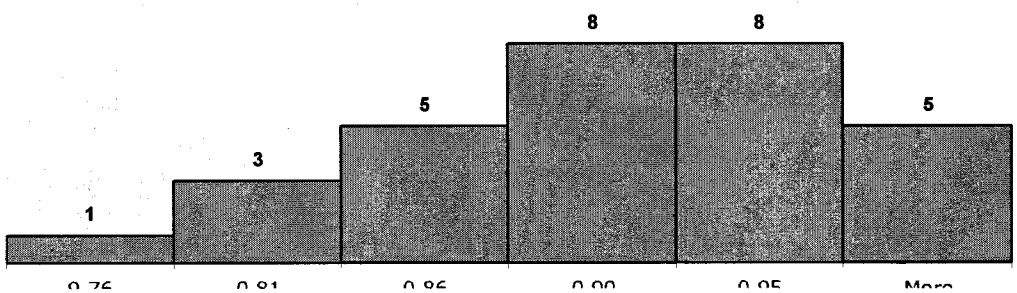



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.76 | 1 |
| 0.81 | 3 |
| 0.86 | 5 |
| 0.90 | 8 |
| 0.95 | 8 |
| More | 5 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - Beta Daily BKG Check

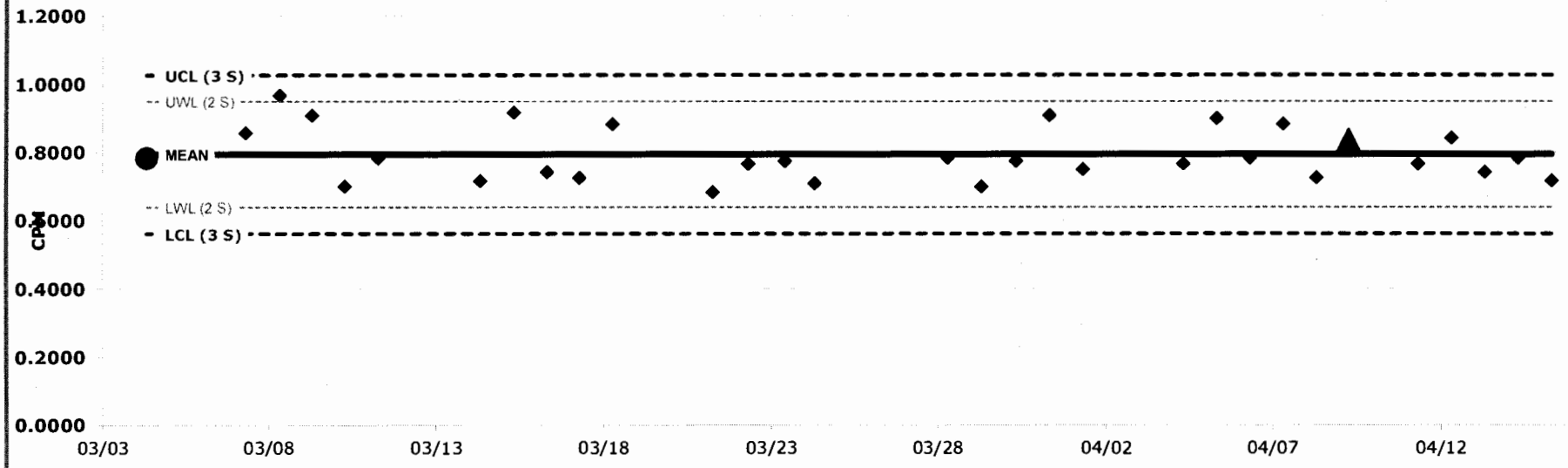


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 1.4047 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.7940 | Long B CPM | 0.8333 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0775 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.0266 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.5614 | CPM | 0.7167 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

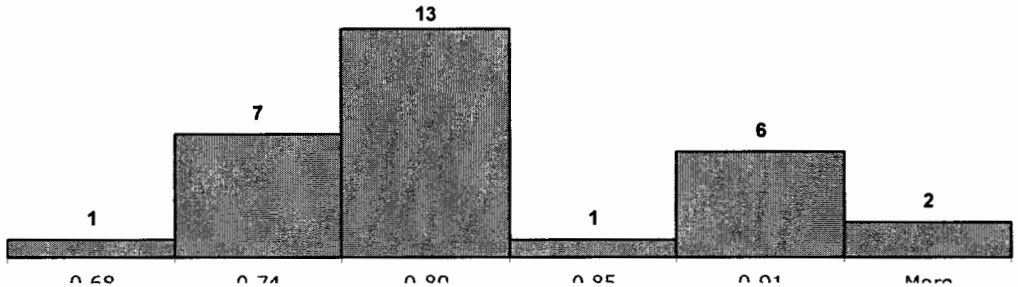



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.68 | 1 |
| 0.74 | 7 |
| 0.80 | 13 |
| 0.85 | 1 |
| 0.91 | 6 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis

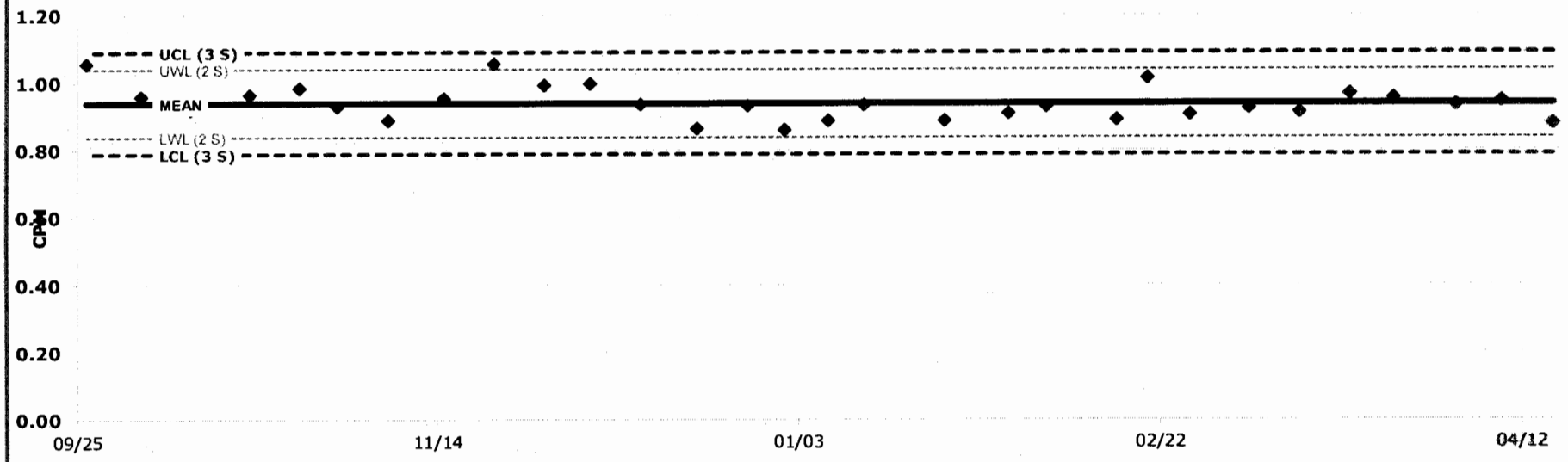


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.9388 |
| Standard Deviation | 0.0504 |
| + 3-sigma value | 1.0900 |
| - 3-sigma value | 0.7876 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR A1

Process Date Range: 09/26/15 - 04/16/16

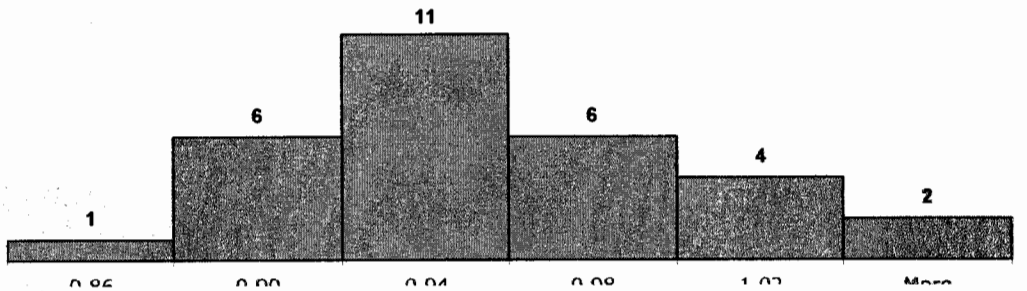



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.86 | 1 |
| 0.90 | 6 |
| 0.94 | 11 |
| 0.98 | 6 |
| 1.02 | 4 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

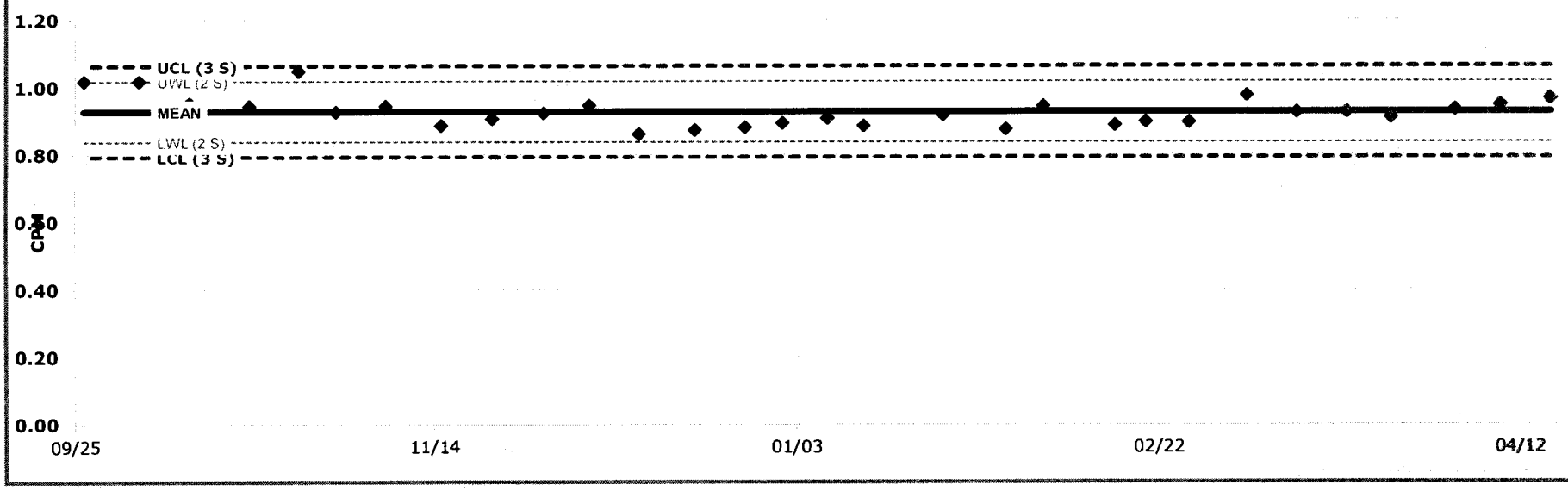


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.9275 |
| Standard Deviation | 0.0450 |
| + 3-sigma value | 1.0626 |
| - 3-sigma value | 0.7924 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR A2

Process Date Range: 09/26/15 - 04/16/16

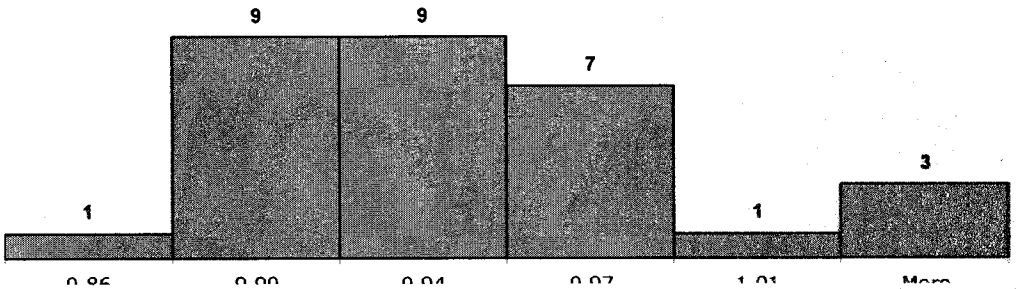



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.86 | 1 |
| 0.90 | 9 |
| 0.94 | 9 |
| 0.97 | 7 |
| 1.01 | 1 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

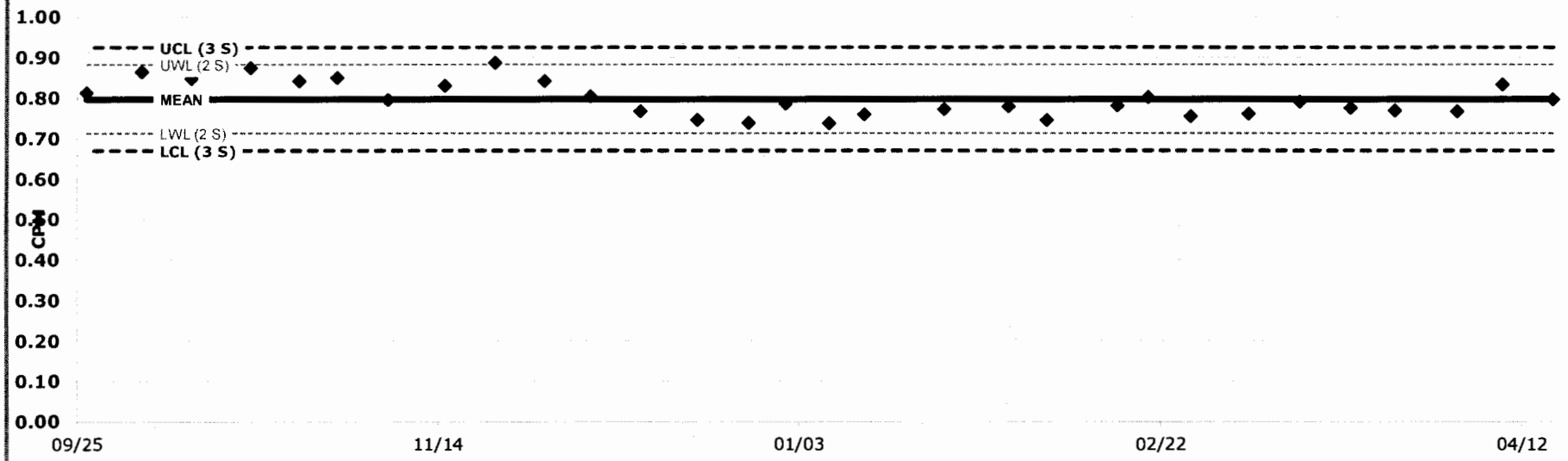


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.7970 |
| Standard Deviation | 0.0425 |
| + 3-sigma value | 0.9244 |
| - 3-sigma value | 0.6696 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR A3

Process Date Range: 09/26/15 - 04/16/16

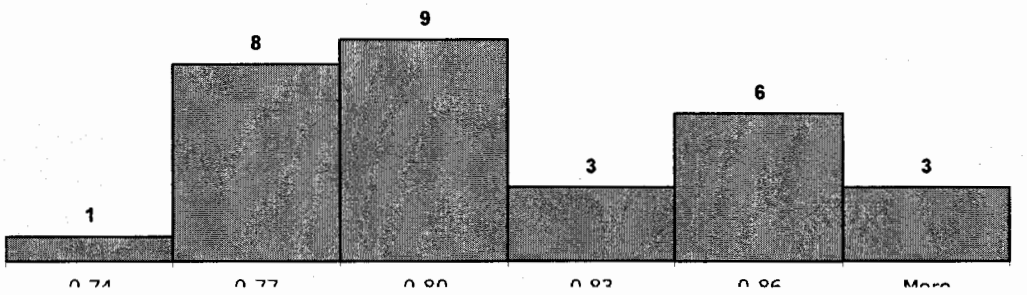



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.74 | 1 |
| 0.77 | 8 |
| 0.80 | 9 |
| 0.83 | 3 |
| 0.86 | 6 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - BETA EFFICIENCY

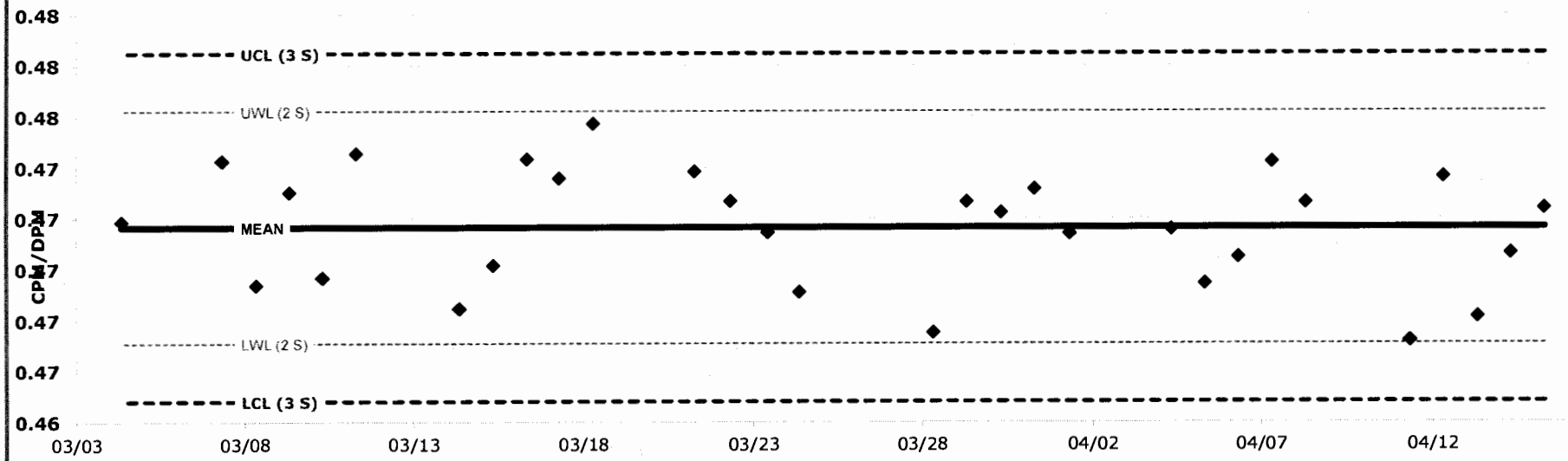


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4716 | CPM/DPM | 0.4724 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0023 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4785 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4648 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

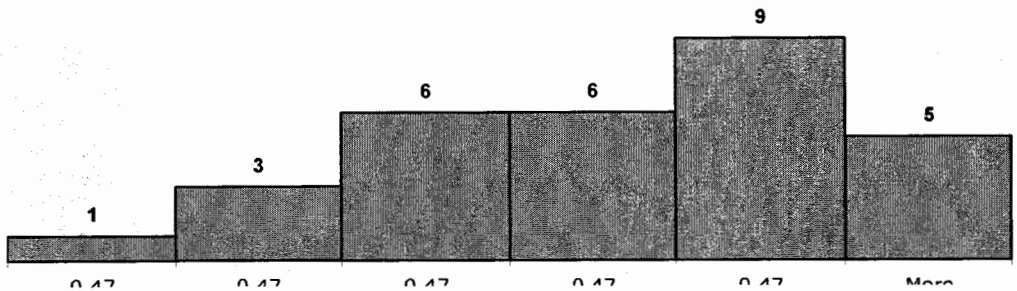



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.47 | 3 |
| 0.47 | 6 |
| 0.47 | 6 |
| 0.47 | 9 |
| More | 5 |

**Population Frequency Distribution (Histogram)**



# LB4100-C - BETA EFFICIENCY

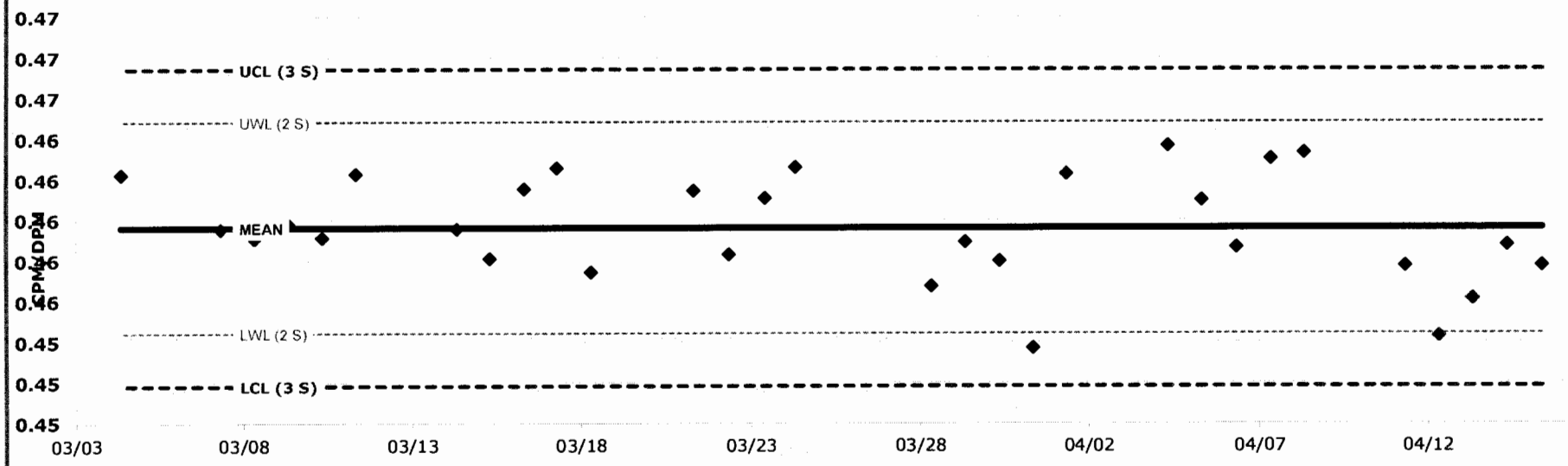


| Population Statistics | | | |
|---|---|---|---|
| Population Size | 30 | | |
| | | Date | 04/15/16 |
| Average | 0.4596 | CPM/DPM | 0.4578 |
| Standard Deviation | 0.0026 | | |
| + 3-sigma value | 0.4674 | Date | |
| - 3-sigma value | 0.4518 | CPM | |
| | | Count Mins | |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

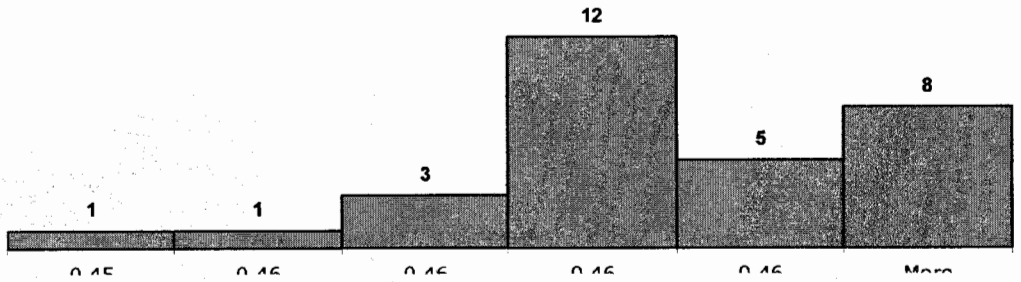



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.45 | 1 |
| 0.46 | 1 |
| 0.46 | 3 |
| 0.46 | 12 |
| 0.46 | 5 |
| More | 8 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - BETA EFFICIENCY

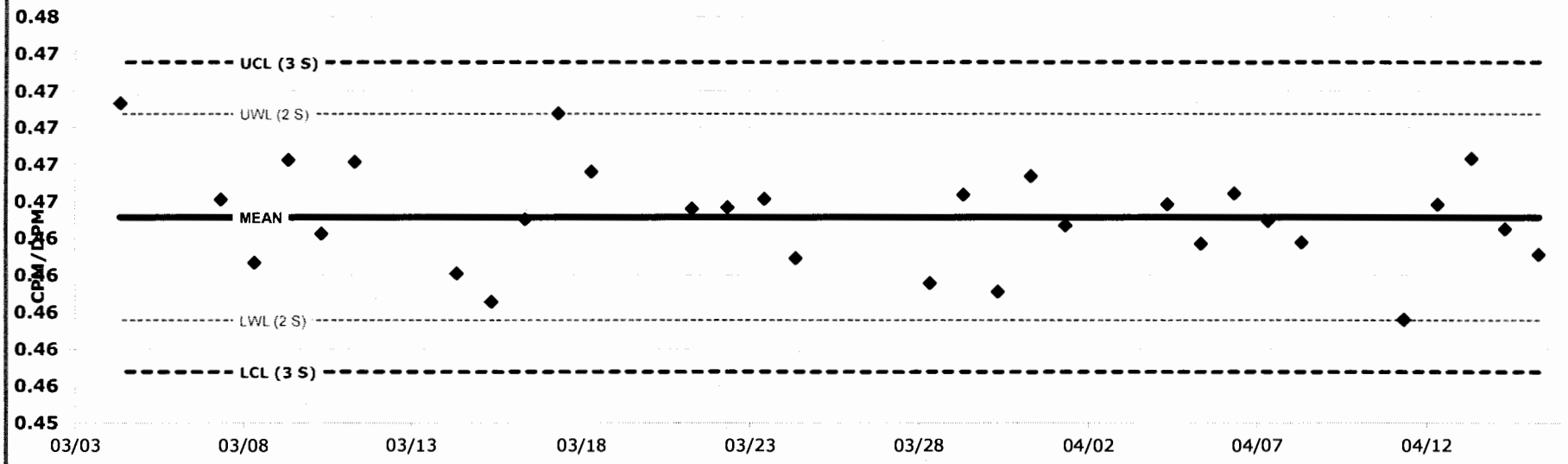


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4651 | CPM/DPM | 0.4631 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0028 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4735 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4568 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

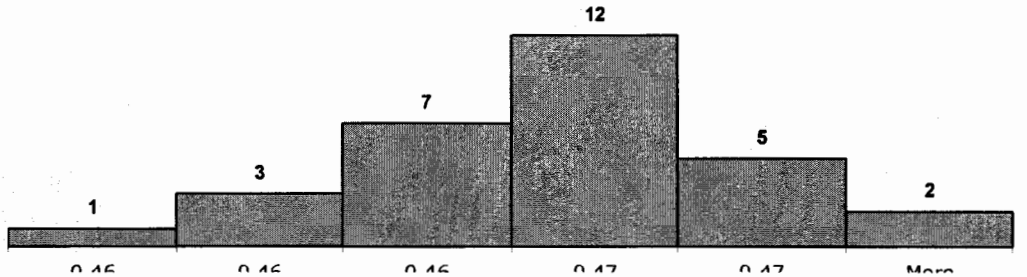



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.46 | 1 |
| 0.46 | 3 |
| 0.46 | 7 |
| 0.47 | 12 |
| 0.47 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



C 11160

Sr-90/Y90 Efficiency Calibrations 12/8/14

Tech: B Steffens
Pipet # FJ40469
Scale ID H113112173560P
Standard # S-0121

| Sample ID | Std weight g. | Sep. Date: 12/8/14 |
|---|---|---|
| Sr_Y_Cal_1B | 1.0114 | 12:12 |
| Sr_Y_Cal_2B | 1.0121 | 12:19 |
| Sr_Y_Cal_3B | 1.0063 | 12:17 |
| Sr_Y_Cal_4B | 1.0122 | 12:12 |
| Sr_Y_Cal_5B | 1.0127 | 12:16 |

Performed By: B Steffens

| Sr. Planchett Weigts | Empty | Full |
|---|---|---|
| Sr_Cal_1B | 7.591 | 7.603 |
| Sr_Cal_2B | 7.592 | 7.604 |
| Sr_Cal_3B | 7.594 | 7.606 |
| Sr_Cal_4B | 7.603 | 7.615 |
| Sr_Cal_5B | 7.599 | 7.611 |

Approved
JDT 12-10-14

DCN: ITSI-0808-0004-0076, 8 May 2019

Calibration

Updated: 12/10/2014

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.36363 | 0.40049 |
| A2 | 0.34188 | 0.36412 |
| A3 | 0.36654 | 0.3896 |
| A4 | 0.3397 | 0.37163 |
| B1 | 0.36065 | 0.40727 |
| B2 | 0.33271 | 0.36326 |
| B3 | 0.36741 | 0.38768 |
| B4 | 0.33335 | 0.36834 |
| C1 | 0.35984 | 0.39388 |
| C2 | 0.33342 | 0.36578 |
| C3 | 0.36303 | 0.3746 |
| C4 | 0.3386 | 0.36872 |
| D1 | 0.36109 | 0.39648 |
| D2 | 0.34154 | 0.37102 |
| D3 | 0.3671 | 0.381 |
| D4 | 0.33457 | 0.37063 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

C1160 Calibrations

DCN: ITSI-0808-0004-0076, 8 May 2019

**Sr-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | reference date | Mass added (g) | Total Activtiy Added (Sr-90 in DPM) on reference date | carrier added (mg as Sr) | g SrNO3/ g Sr | carrier expected (mg SrNO3) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Chemical Yield | separation date/time | count date/time | count midpoint | Sr-90 half-life days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| | | | | | 11425.18 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 |
| | | | | | 11425.18 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 |

**Sr-90**

| ID | Sr-90 decay days to count midpoint | Sr decay correction to count midpoint | Sr-90 activtiy at count midpoint (DPM) | Y-90 half-life days | Y-90 ingrowth days to count midpoint | Y-90 ingrowth | Y-90 Eff (from below) | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Sr-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1B | 3174.59 | 0.81119 | 9197.4 | 2.667 | 0.0781 | 0.02010 | 0.40049 | 17097 | 5.0 | 826 | 900.0 | 3418.4822 | A1 | 0.36363 |
| Sr Cal 2B | 3174.59 | 0.81119 | 9203.7 | 2.667 | 0.0733 | 0.01886 | 0.36412 | 16054 | 5.0 | 889 | 900.0 | 3209.8122 | A2 | 0.34188 |
| Sr Cal 4B | 3174.59 | 0.81119 | 9204.6 | 2.667 | 0.0781 | 0.02010 | 0.38960 | 17234 | 5.0 | 748 | 900.0 | 3445.9689 | A3 | 0.36654 |
| Sr Cal 5B | 3174.59 | 0.81119 | 9209.2 | 2.667 | 0.0753 | 0.01939 | 0.37163 | 15979 | 5.0 | 952 | 900.0 | 3194.7422 | A4 | 0.33970 |
| Sr Cal 1B | 3174.59 | 0.81119 | 9197.4 | 2.667 | 0.0830 | 0.02134 | 0.40727 | 16989 | 5.0 | 664 | 900.0 | 3397.0622 | B1 | 0.36065 |
| Sr Cal 2B | 3174.59 | 0.81119 | 9203.7 | 2.667 | 0.0781 | 0.02010 | 0.36326 | 15651 | 5.0 | 755 | 900.0 | 3129.3611 | B2 | 0.33271 |
| Sr Cal 4B | 3174.59 | 0.81119 | 9204.6 | 2.667 | 0.0830 | 0.02134 | 0.38768 | 17309 | 5.0 | 3442 | 900.0 | 3457.9756 | B3 | 0.36741 |
| Sr Cal 5B | 3174.59 | 0.81119 | 9209.2 | 2.667 | 0.0802 | 0.02063 | 0.36834 | 15703 | 5.0 | 713 | 900.0 | 3139.8078 | B4 | 0.33335 |
| Sr Cal 1B | 3174.60 | 0.81119 | 9197.4 | 2.667 | 0.0892 | 0.02293 | 0.39388 | 16968 | 5.0 | 833 | 900.0 | 3392.6744 | C1 | 0.35984 |
| Sr Cal 2B | 3174.60 | 0.81119 | 9203.7 | 2.667 | 0.0844 | 0.02169 | 0.36578 | 15714 | 5.0 | 922 | 900.0 | 3141.7756 | C2 | 0.33342 |
| Sr Cal 4B | 3174.60 | 0.81119 | 9204.6 | 2.667 | 0.0892 | 0.02293 | 0.37460 | 17107 | 5.0 | 793 | 900.0 | 3420.5189 | C3 | 0.36303 |
| Sr Cal 5B | 3174.60 | 0.81119 | 9209.2 | 2.667 | 0.0865 | 0.02222 | 0.36872 | 15973 | 5.0 | 852 | 900.0 | 3193.6533 | C4 | 0.33860 |
| Sr Cal 1B | 3174.60 | 0.81118 | 9197.3 | 2.667 | 0.0941 | 0.02416 | 0.39648 | 17050 | 5.0 | 703 | 900.0 | 3409.2189 | D1 | 0.36109 |
| Sr Cal 2B | 3174.60 | 0.81118 | 9203.7 | 2.667 | 0.0892 | 0.02293 | 0.37102 | 16113 | 5.0 | 715 | 900.0 | 3221.8056 | D2 | 0.34154 |
| Sr Cal 4B | 3174.60 | 0.81118 | 9204.6 | 2.667 | 0.0941 | 0.02416 | 0.38100 | 17322 | 5.0 | 647 | 900.0 | 3463.6811 | D3 | 0.36710 |
| Sr Cal 5B | 3174.60 | 0.81118 | 9209.2 | 2.667 | 0.0913 | 0.02346 | 0.37063 | 15810 | 5.0 | 780 | 900.0 | 3161.1333 | D4 | 0.33457 |
| | 0.00 | 1.00000 | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.38100 | | | | | #DIV/0! | | #DIV/0! |
| | 0.00 | 1.00000 | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.37063 | | | | | #DIV/0! | | #DIV/0! |

Sr-90

| ID | Standard ID | Standard Specific Activity (dpm/g) | reference date | Mass added (g) | Total Activtiy Added (Sr-90 in DPM) on reference date | carrier added (mg as Sr) | g SrNO3/ g Sr | carrier expected (mg SrNO3) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Chemical Yield | separation date/time | count date/time | count midpoint | Sr-90 half-life days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Y-90

| ID | Standard ID | Standard Specific Activity (dpm/g) | collection date | Mass added (g) | Total Activtiy Added (Sr-90 in DPM) | carrier added (mg) | g SrNO3/ g Sr | carrier expected (mg) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Yield | separation date | count date | Sr-90 half-life days | Sr-90 decay days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.415 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.415 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.415 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:35 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:35 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:35 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:35 | 10515.51 | 3174.51 |

**Sr-90**

| ID | Sr-90 decay days to count midpoint | Sr decay correction to count midpoint | Sr-90 activtiy at count midpoint (DPM) | Y-90 half-life days | Y-90 ingrowth days to count midpoint | Y-90 ingrowth | Y-90 Eff (from below) | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Sr-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Y-90**

| ID | Sr decay correction to separation | count midpoint | Sr-90 activtiy at count separation (DPM) | Y-90 decay days | Y-90 half-life days | Y-90 Decay | Y-90 Activity | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Y-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1B | 0.81119 | 12/8/14 3:15 PM | 9197.4 | 0.1274 | 2.667 | 0.967420 | 10968.760 | 21969 | 5.0 | 826 | 900.0 | 4392.8822 | A1 | 0.40049 |
| Y Cal 2B | 0.81119 | 12/8/14 3:15 PM | 9203.8 | 0.1226 | 2.667 | 0.968643 | 10990.230 | 20014 | 5.0 | 889 | 900.0 | 4001.8122 | A2 | 0.36412 |
| Y Cal 4B | 0.81119 | 12/8/14 3:15 PM | 9204.7 | 0.1274 | 2.667 | 0.967420 | 10977.437 | 21388 | 5.0 | 748 | 900.0 | 4276.7689 | A3 | 0.38960 |
| Y Cal 5B | 0.81119 | 12/8/14 3:15 PM | 9209.2 | 0.1247 | 2.667 | 0.968118 | 10990.792 | 20428 | 5.0 | 952 | 900.0 | 4084.5422 | A4 | 0.37163 |
| Y Cal 1B | 0.81119 | 12/8/14 3:21 PM | 9197.4 | 0.1316 | 2.667 | 0.966372 | 10956.887 | 22316 | 5.0 | 664 | 900.0 | 4462.4622 | B1 | 0.40727 |
| Y Cal 2B | 0.81119 | 12/8/14 3:21 PM | 9203.8 | 0.1267 | 2.667 | 0.967594 | 10978.333 | 19944 | 5.0 | 755 | 900.0 | 3987.9611 | B2 | 0.36326 |
| Y Cal 4B | 0.81119 | 12/8/14 3:21 PM | 9204.7 | 0.1316 | 2.667 | 0.966372 | 10965.554 | 21275 | 5.0 | 3442 | 900.0 | 4251.1756 | B3 | 0.38768 |
| Y Cal 5B | 0.81119 | 12/8/14 3:21 PM | 9209.2 | 0.1288 | 2.667 | 0.967070 | 10978.895 | 20224 | 5.0 | 713 | 900.0 | 4044.0078 | B4 | 0.36834 |
| Y Cal 1B | 0.81119 | 12/8/14 3:31 PM | 9197.4 | 0.1385 | 2.667 | 0.964630 | 10937.127 | 21544 | 5.0 | 833 | 900.0 | 4307.8744 | C1 | 0.39388 |
| Y Cal 2B | 0.81119 | 12/8/14 3:31 PM | 9203.8 | 0.1337 | 2.667 | 0.965849 | 10958.535 | 20047 | 5.0 | 922 | 900.0 | 4008.3756 | C2 | 0.36578 |
| Y Cal 4B | 0.81119 | 12/8/14 3:31 PM | 9204.7 | 0.1385 | 2.667 | 0.964630 | 10945.778 | 20506 | 5.0 | 793 | 900.0 | 4100.3189 | C3 | 0.37460 |
| Y Cal 5B | 0.81119 | 12/8/14 3:31 PM | 9209.2 | 0.1358 | 2.667 | 0.965326 | 10959.095 | 20209 | 5.0 | 852 | 900.0 | 4040.8533 | C4 | 0.36872 |
| Y Cal 1B | 0.81119 | 12/8/14 3:37 PM | 9197.4 | 0.1427 | 2.667 | 0.963585 | 10925.288 | 21662 | 5.0 | 703 | 900.0 | 4331.6189 | D1 | 0.39648 |
| Y Cal 2B | 0.81119 | 12/8/14 3:37 PM | 9203.8 | 0.1378 | 2.667 | 0.964804 | 10946.673 | 20311 | 5.0 | 715 | 900.0 | 4061.4056 | D2 | 0.37102 |
| Y Cal 4B | 0.81119 | 12/8/14 3:37 PM | 9204.7 | 0.1427 | 2.667 | 0.963585 | 10933.930 | 20833 | 5.0 | 647 | 900.0 | 4165.8811 | D3 | 0.38100 |
| Y Cal 5B | 0.81119 | 12/8/14 3:37 PM | 9209.2 | 0.1399 | 2.667 | 0.964281 | 10947.232 | 20291 | 5.0 | 780 | 900.0 | 4057.3333 | D4 | 0.37063 |

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 686
C 11160
Sr
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | SR_CAL_1B | 2 | 17097 | 5 | 1410 | 12/8/14 14:02 |
| A2 | SR_CAL_2B | 3 | 16054 | 5 | 1410 | 12/8/14 14:02 |
| A3 | SR_CAL_4B | 4 | 17234 | 5 | 1410 | 12/8/14 14:02 |
| A4 | SR_CAL_5B | 6 | 15979 | 5 | 1410 | 12/8/14 14:02 |

N-655

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 687
C 11160
Sr
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | SR_CAL_1B | 18 | 16989 | 5 | 1410 | 12/8/14 14:09 |
| B2 | SR_CAL_2B | 13 | 15651 | 5 | 1410 | 12/8/14 14:09 |
| B3 | SR_CAL_4B | 9 | 17309 | 5 | 1410 | 12/8/14 14:09 |
| B4 | SR_CAL_5B | 10 | 15703 | 5 | 1410 | 12/8/14 14:09 |

N-656

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 688
C 11160
Sr
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | SR_CAL_1B | 4 | 16968 | 5 | 1410 | 12/8/14 14:18 |
| C2 | SR_CAL_2B | 8 | 15714 | 5 | 1410 | 12/8/14 14:18 |
| C3 | SR_CAL_4B | 5 | 17107 | 5 | 1410 | 12/8/14 14:18 |
| C4 | SR_CAL_5B | 3 | 15973 | 5 | 1410 | 12/8/14 14:18 |

N-657

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 689
C 11160
Sr
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | SR_CAL_1B | 4 | 17050 | 5 | 1410 | 12/8/14 14:25 |
| D2 | SR_CAL_2B | 8 | 16113 | 5 | 1410 | 12/8/14 14:25 |
| D3 | SR_CAL_4B | 5 | 17322 | 5 | 1410 | 12/8/14 14:25 |
| D4 | SR_CAL_5B | 8 | 15810 | 5 | 1410 | 12/8/14 14:25 |

N-658

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 690
C 11160
Y
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | Y_CAL_1B | 2 | 21969 | 5 | 1410 | 12/8/14 15:13 |
| A2 | Y_CAL_2B | 3 | 20014 | 5 | 1410 | 12/8/14 15:13 |
| A3 | Y_CAL_4B | 4 | 21388 | 5 | 1410 | 12/8/14 15:13 |
| A4 | Y_CAL_5B | 5 | 20428 | 5 | 1410 | 12/8/14 15:13 |

N-659

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 691
C 11160
Y
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | Y_CAL_1B | 9 | 22316 | 5 | 1410 | 12/8/14 15:19 |
| B2 | Y_CAL_2B | 5 | 19944 | 5 | 1410 | 12/8/14 15:19 |
| B3 | Y_CAL_4B | 3 | 21275 | 5 | 1410 | 12/8/14 15:19 |
| B4 | Y_CAL_5B | 6 | 20224 | 5 | 1410 | 12/8/14 15:19 |

N-660

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 692
C 11160
Y
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | Y_CAL_1B | 4 | 21544 | 5 | 1410 | 12/8/14 15:29 |
| C2 | Y_CAL_2B | 1 | 20047 | 5 | 1410 | 12/8/14 15:29 |
| C3 | Y_CAL_4B | 2 | 20506 | 5 | 1410 | 12/8/14 15:29 |
| C4 | Y_CAL_5B | 4 | 20209 | 5 | 1410 | 12/8/14 15:29 |

N-661

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 693
C 11160
Y
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | Y_CAL_1B | 3 | 21662 | 5 | 1410 | 12/8/14 15:35 |
| D2 | Y_CAL_2B | 4 | 20311 | 5 | 1410 | 12/8/14 15:35 |
| D3 | Y_CAL_4B | 2 | 20833 | 5 | 1410 | 12/8/14 15:35 |
| D4 | Y_CAL_5B | 5 | 20291 | 5 | 1410 | 12/8/14 15:35 |

N-662

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 683
C 11160
LONG BKG
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 135 | 826 | 900 | 1410 | 12/6/14 7:15 |
| A2 | A2-01 | 116 | 889 | 900 | 1410 | 12/6/14 7:15 |
| A3 | A3-01 | 60 | 748 | 900 | 1410 | 12/6/14 7:15 |
| A4 | A4-01 | 126 | 952 | 900 | 1410 | 12/6/14 7:15 |
| C1 | C1-01 | 93 | 833 | 900 | 1410 | 12/6/14 7:15 |
| C2 | C2-01 | 123 | 922 | 900 | 1410 | 12/6/14 7:15 |
| C3 | C3-01 | 126 | 793 | 900 | 1410 | 12/6/14 7:15 |
| C4 | C4-01 | 182 | 852 | 900 | 1410 | 12/6/14 7:15 |
| D1 | D1-01 | 55 | 703 | 900 | 1410 | 12/6/14 7:15 |
| D2 | D2-01 | 59 | 715 | 900 | 1410 | 12/6/14 7:15 |
| D3 | D3-01 | 53 | 647 | 900 | 1410 | 12/6/14 7:15 |
| D4 | D4-01 | 63 | 780 | 900 | 1410 | 12/6/14 7:15 |
| B1 | B1-01 | 55 | 664 | 900 | 1410 | 12/6/14 7:16 |
| B2 | B2-01 | 63 | 755 | 900 | 1410 | 12/6/14 7:16 |
| B3 | B3-01 | 82 | 3442 | 900 | 1410 | 12/6/14 7:16 |
| B4 | B4-01 | 61 | 713 | 900 | 1410 | 12/6/14 7:16 |

N-663

Sr-90/Y90 Efficiency Calibrations

Tech: B Steffens
Pipet # FJ40469
Scale ID H113112173560P
Standard # S-0121

| Sample ID | Std weight g. | Sep. Date: 12-8-14 |
|---|---|---|
| Sr_Y_Cal_1B | 1.0114 | 12:12 |
| Sr_Y_Cal_2B | 1.0121 | 12:19 |
| Sr_Y_Cal_3B | 1.0063 | 12:17 |
| Sr_Y_Cal_4B | 1.0122 | 12:12 |
| Sr_Y_Cal_5B | 1.0127 | 12:16 |

Performed By: B Steffens

| Sr Planchett Weigts | Empty | Full |
|---|---|---|
| Sr_Cal_1B | 7.591g | 7.603 |
| Sr_Cal_2B | 7.592g | 7.604 |
| Sr_Cal_3B | 7.594g | 7.606 |
| Sr_Cal_4B | 7.603g | 7.615 |
| Sr_Cal_5B | 7.589g | 7.611 |

DCN: ITSI-0808-0004-0076, 8 May 2019

ARS INTERNATIONAL

# Carrier Pipette Calibration Sheet

Chemist: Van Vu

Date/Time: 12-8-14 9:00

| Balance ID | Balance Calibration Date | Pipette ID | Nominal Weight | Weight #1 | Weight#2 | Weight#3 | MEAN | Acceptance Limits ±2% Mean | STDEV | RSD% | Acceptance Limits <1% RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12332539 | 6/2/14 | FJ40469 | 1.00 | 1.000 | 1.004 | 1.007 | 1.00 | Pass | 0.004 | 0.350 | Pass |

N-665

ARS INTERNATIONAL

## QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

# ANNUAL ACTIVITY VERIFICATION

VERIFICATION DATE: 1/5/2016 16:31 *date counted*
STANDARD REFERENCE #: S-0300

| Principal Radionuclide | | Half Life, Years | | Half Life, Days |
|---|---|---|---|---|
| Sr-90 | *ENTER -->* | 2.880E+01 | *OR -->* | 1.0520E+04 |
| | | 2.880E+01 | | 1.0520E+04 |

Radionuclide: Sr-90 Dilution Reference Date: 12/11/2014 12:05

Dilution Activity: 21.73 pCi per gram ===> dpm/g: 48.23
Verif. Date Decay Corrected: 21.18 pCi per gram ===> dpm/g: 47.01

*Minimum of 3 Required*

| Trial ID | Sample Counts | Count Time (min) | Detector | Efficiency | Bkg. (cpm) | Net Weight | Decay Corrected Activity Result (dpm/g) | Decay Corrected Activity Result (pCi/g) |
|---|---|---|---|---|---|---|---|---|
| S-0300-V1A | 2534.50 | 120 | B1 | 0.4103 | 0.68 | 1.023 | 48.68 | 21.93 |
| S-0300-V2A | 2411.50 | 120 | B2 | 0.4015 | 0.78 | 0.994 | 48.41 | 21.81 |
| S-0300-V3A | 2451.00 | 120 | B4 | 0.4004 | 0.79 | 1.001 | 49.00 | 22.07 |
| S-0300-V4A | 2469.50 | 120 | C1 | 0.4068 | 0.87 | 1.005 | 48.23 | 21.72 |
| S-0300-V5A | 2442.00 | 120 | C2 | 0.4025 | 1.32 | 1.012 | 46.73 | 21.05 |

| | | | |
|---|---|---|---|
| | | Average | 48.21 / 21.72 |
| | | Two Sigma Uncertainty | 1.72 / 0.77 |
| *10% Max* | *PASS* | Standard Deviation percent of known concentration | 1.86% / 1.86% |
| | | Target Activity | 47.01 / 21.18 |
| *5% Max* | *PASS* | % Diff | 2.55% / 2.55% |

Verification Expiration Date: January 4, 2017

Prepared & Counted By: _____ Date: 1/5/2016 16:31
Verified & Approved By: _____ Date: 1-6-16
QC Approval: _____ Date: 1-6-16

**S-0300**
**Sr-90**
SL
Manufacturer: Analytics
Sol Matrix: .1M HCL with 30 ug/g
Ref No: 75186-526
Tech: BSteffens
Parent ID: S-0160
Verified 1/5/16
Expires 1/5/17
ARS INTERNATIONAL
RADIOACTIVE STANDARDS – BATON ROUGE LABORATORY

S:\QA\Brian\1-QA_Files\New Reference Standards 10-2005\Sr-90\S-0300 verification data 1-5-16 ARS-038

Sr-90 Verification 1/5/2016

Tech: J Byrd
Pipet # MU02055
Scale ID 12332539
Standard # S-0300

| Sample ID | Std weight g. |
|---|---|
| S-0300-V1A | 1.0234 |
| S-0300-V2A | 0.9938 |
| S-0300-V3A | 1.0008 |
| S-0300-V4A | 1.0046 |
| S-0300-V5A | 1.0117 |

Performed By: J Byrd

Sr-90 Verification 1/5/2016

Tech: JPB JB ~~B Steffens~~ 1-5-16
Pipet # MU02055
Scale ID 12332539
Standard # S-0300

| Sample ID | Std weight g. |
|---|---|
| S-0300-V1A | 1.0234g |
| S-0300-V2A | 0.9938g |
| S-0300-V3A | 1.0008g |
| S-0300-V4A | 1.0046g |
| S-0300-V5A | 1.0117g |

Performed By: ~~B Steffens~~
J. Byrd JB 1-5-16

GEN 710
C 11160
Sr
WJS

| | Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|---|
| 2469.5 | C1 | S-0300-V4A | 9 | 4939 | 120 | 1410 | 1/5/16 16:31 |
| 2442 | C2 | S-0300-V5A | 13 | 4884 | 120 | 1410 | 1/5/16 16:31 |
| 2534.5 | B1 | S-0300-V1A | 8 | 5069 | 120 | 1410 | 1/5/16 16:34 |
| 2411.5 | B2 | S-0300-V2A | 12 | 4823 | 120 | 1410 | 1/5/16 16:34 |
| 2451 | B4 | S-0300-V3A | 9 | 4902 | 120 | 1410 | 1/5/16 16:34 |

DCN: ITSI-0808-0004-0076, 8 May 2019

N-669

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 704
C 11160
LONG BKG
WJS

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | C1-01 | 68 | 784 .87 | 900 | 1410 | 1/1/16 4:03 |
| C2 | C2-01 | 85 | 1191.32 | 900 | 1410 | 1/1/16 4:03 |
| C3 | C3-01 | 78 | 788 | 900 | 1410 | 1/1/16 4:03 |
| C4 | C4-01 | 99 | 902 | 900 | 1410 | 1/1/16 4:03 |
| D1 | D1-01 | 47 | 690 | 900 | 1410 | 1/1/16 4:03 |
| D2 | D2-01 | 43 | 747 | 900 | 1410 | 1/1/16 4:03 |
| D3 | D3-01 | 7 | 689 | 900 | 1410 | 1/1/16 4:03 |
| D4 | D4-01 | 29 | 725 | 900 | 1410 | 1/1/16 4:03 |
| A1 | A1-01 | 75 | 773 | 900 | 1410 | 1/1/16 4:06 |
| A2 | A2-01 | 45 | 804 | 900 | 1410 | 1/1/16 4:06 |
| A3 | A3-01 | 38 | 707 | 900 | 1410 | 1/1/16 4:06 |
| A4 | A4-01 | 56 | 743 | 900 | 1410 | 1/1/16 4:06 |
| B1 | B1-01 | 38 | 610 .68 | 900 | 1410 | 1/1/16 4:06 |
| B2 | B2-01 | 30 | 705 .78 | 900 | 1410 | 1/1/16 4:06 |
| B3 | B3-01 | 49 | 3102 | 900 | 1410 | 1/1/16 4:06 |
| B4 | B4-01 | 29 | 713 .79 | 900 | 1410 | 1/1/16 4:06 |

N-670

LB4100 "A" 35723

DCN: ITSI-0808-0004-0076, 8 May 2019

## Sr-90 (Sr-90, Y-90) Calibration Verification

**Sr-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | reference date | Mass added (g) | Total Activtiy Added (Sr 90 in DPM) on reference date | carrier added (mg as Sr) | g SrNO3/ g Sr | carrier expected (mg SrNO3) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Chemical Yield | separation date/time | count date/time | count midpoint | Sr-90 half-life days | Sr-90 decay days to count midpoint | Sr decay correction to count midpoint |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| | | | | | 11333.79 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 | 0.00 | 1.00000 |
| | | | | | 11333.79 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 | 0.00 | 1.00000 |

**Y-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | collection date | Mass added (g) | Total Activtiy Added (Sr 90 in DPM) | carrier added (mg) | g SrNO3/ g Sr | carrier expected (mg) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Yield | separation date | count date | Sr-90 half-life days | Sr-90 decay days | Sr decay correction to separation | count midpoint |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.415 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.415 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.415 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |

N-671

DCN: ITSI-0808-0004-0076, 8 May 2019

## Sr-90 (Sr-

**Sr-90**

| ID | Sr-90 activtiy at count midpoint (DPM) | Y-90 half-life days | Y-90 ingrowth days to count midpoint | Y-90 ingrowth | Y-90 Eff (from below) | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Sr-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1A | 9013.3 | 2.667 | 0.1476 | 0.03763 | 0.44088 | 16417 | 5.0 | 1065 | 900.0 | 3282.2167 | A1 | 0.34747 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1476 | 0.03763 | 0.46189 | 15668 | 5.0 | 1019 | 900.0 | 3132.4678 | A2 | 0.34268 |
| Sr Cal 3A | 9447.4 | 2.667 | 0.1476 | 0.03763 | 0.37872 | 16297 | 5.0 | 895 | 900.0 | 3258.4056 | A3 | 0.33064 |
| Sr Cal 5A | 9348.2 | 2.667 | 0.1448 | 0.03694 | 0.39108 | 16583 | 5.0 | 990 | 900.0 | 3315.5000 | A4 | 0.34017 |
| Sr Cal 1A | 9013.3 | 2.667 | 0.1524 | 0.03885 | 0.40068 | 15904 | 5.0 | 974 | 900.0 | 3179.7178 | B1 | 0.33657 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1524 | 0.03885 | 0.47164 | 15795 | 5.0 | 938 | 900.0 | 3157.9578 | B2 | 0.34381 |
| Sr Cal 3A | 9447.4 | 2.667 | 0.1524 | 0.03885 | 0.37161 | 15981 | 5.0 | 821 | 900.0 | 3195.2878 | B3 | 0.32500 |
| Sr Cal 5A | 9348.2 | 2.667 | 0.1497 | 0.03815 | 0.40727 | 16402 | 5.0 | 1100 | 900.0 | 3279.1778 | B4 | 0.33640 |
| Sr Cal 1A | 9013.3 | 2.667 | 0.1573 | 0.04006 | 0.44304 | 16232 | 5.0 | 763 | 900.0 | 3245.5522 | C1 | 0.34147 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1573 | 0.04006 | 0.46077 | 15521 | 5.0 | 760 | 900.0 | 3103.3556 | C2 | 0.33671 |
| Sr Cal 3A | 9447.3 | 2.667 | 0.1573 | 0.04006 | 0.38068 | 15613 | 5.0 | 3858 | 900.0 | 3118.3133 | C3 | 0.31544 |
| Sr Cal 5A | 9348.1 | 2.667 | 0.1545 | 0.03937 | 0.42745 | 16430 | 5.0 | 700 | 900.0 | 3285.2222 | C4 | 0.33585 |
| Sr Cal 1A | 9013.3 | 2.667 | 0.1615 | 0.04110 | 0.43397 | 14664 | 5.0 | 706 | 900.0 | 2932.0156 | D1 | 0.30659 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1615 | 0.04110 | 0.43110 | 15667 | 5.0 | 2550 | 900.0 | 3130.5667 | D2 | 0.34061 |
| Sr Cal 3A | 9447.3 | 2.667 | 0.1615 | 0.04110 | 0.39466 | 16691 | 5.0 | 1118 | 900.0 | 3336.9578 | D3 | 0.33766 |
| Sr Cal 5A | 9348.1 | 2.667 | 0.1587 | 0.04041 | 0.41747 | 16475 | 5.0 | 782 | 900.0 | 3294.1311 | D4 | 0.33677 |
| | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.39466 | | | | | #DIV/0! | | #DIV/0! |
| | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.41747 | | | | | #DIV/0! | | #DIV/0! |

**Y-90**

| ID | Sr-90 activtiy at count separation (DPM) | Y-90 decay days | Y-90 half-life days | Y-90 Decay | Y-90 Activity | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Y-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1A | 9063.3 | 0.1885 | 2.667 | 0.952174 | 10309.852 | 22733 | 5.0 | 1065 | 900.0 | 4545.4167 | A1 | 0.44088 |
| Y Cal 2A | 8654.1 | 0.1885 | 2.667 | 0.952174 | 9844.385 | 22741 | 5.0 | 1019 | 900.0 | 4547.0678 | A2 | 0.46189 |
| Y Cal 3A | 9453.1 | 0.1885 | 2.667 | 0.952174 | 10753.205 | 20367 | 5.0 | 895 | 900.0 | 4072.4056 | A3 | 0.37872 |
| Y Cal 5A | 9385.5 | 0.1858 | 2.667 | 0.952862 | 10684.009 | 20897 | 5.0 | 990 | 900.0 | 4178.3000 | A4 | 0.39108 |
| Y Cal 1A | 9063.3 | 0.1927 | 2.667 | 0.951143 | 10298.692 | 20638 | 5.0 | 974 | 900.0 | 4126.5178 | B1 | 0.40068 |
| Y Cal 2A | 8654.1 | 0.1927 | 2.667 | 0.951143 | 9833.729 | 23195 | 5.0 | 938 | 900.0 | 4637.9578 | B2 | 0.47164 |
| Y Cal 3A | 9453.1 | 0.1927 | 2.667 | 0.951143 | 10741.566 | 19963 | 5.0 | 821 | 900.0 | 3991.6878 | B3 | 0.37161 |
| Y Cal 5A | 9385.5 | 0.1899 | 2.667 | 0.951830 | 10672.444 | 21739 | 5.0 | 1100 | 900.0 | 4346.5778 | B4 | 0.40727 |
| Y Cal 1A | 9063.3 | 0.1976 | 2.667 | 0.949942 | 10285.687 | 22789 | 5.0 | 763 | 900.0 | 4556.9522 | C1 | 0.44304 |
| Y Cal 2A | 8654.1 | 0.1976 | 2.667 | 0.949942 | 9821.311 | 22631 | 5.0 | 760 | 900.0 | 4525.3556 | C2 | 0.46077 |
| Y Cal 3A | 9453.1 | 0.1976 | 2.667 | 0.949942 | 10728.002 | 20441 | 5.0 | 3858 | 900.0 | 4083.9133 | C3 | 0.38068 |
| Y Cal 5A | 9385.5 | 0.1948 | 2.667 | 0.950628 | 10658.967 | 22785 | 5.0 | 700 | 900.0 | 4556.2222 | C4 | 0.42745 |
| Y Cal 1A | 9063.3 | 0.2017 | 2.667 | 0.948914 | 10274.553 | 22298 | 5.0 | 706 | 900.0 | 4458.8156 | D1 | 0.43397 |
| Y Cal 2A | 8654.1 | 0.2017 | 2.667 | 0.948914 | 9810.680 | 21161 | 5.0 | 2550 | 900.0 | 4229.3667 | D2 | 0.43110 |
| Y Cal 3A | 9453.1 | 0.2017 | 2.667 | 0.948914 | 10716.389 | 21153 | 5.0 | 1118 | 900.0 | 4229.3578 | D3 | 0.39466 |
| Y Cal 5A | 9385.5 | 0.1990 | 2.667 | 0.949599 | 10647.430 | 22229 | 5.0 | 782 | 900.0 | 4444.9311 | D4 | 0.41747 |

N-672

Sr-90/Y90 Efficiency Calibrations 8/19/2013

Tech: B Steffens
Pipet # FJ40469
Scale ID H113112173560P
Standard # S-0121

| Sample ID | Std weight g. | Sep. Date: 8/19/13 |
|---|---|---|
| Sr_Y_Cal_1A | 1.0111 | 10:14 |
| Sr_Y_Cal_2A | 1.0117 | 10:14 |
| Sr_Y_Cal_3A | 1.0068 | 10:14 |
| * Sr_Y_Cal_4A | 1.0077 | 10:14 |
| Sr_Y_Cal_5A | 1.0046 | 10:18 |

Performed By: B Steffens

| Sr. Planchett Weigts | Empty | Full |
|---|---|---|
| Sr_Cal_1A | 7.6259 | 7.6373 |
| Sr_Cal_2A | 7.58 | 7.591 |
| Sr_Cal_3A | 7.5961 | 7.6081 |
| Sr_Cal_4A | 7.6157 | 7.6276 |
| Sr_Cal_5A | 7.6487 | 7.6606 |

Not used JK 8-19-13

GEN 766
A 35723
Sr Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | Sr-Cal-1A | 2 | 16417 | 5 | 1402.5 | 8/19/13 13:44 |
| A2 | Sr-Cal-2A | 4 | 15668 | 5 | 1402.5 | 8/19/13 13:44 |
| A3 | Sr-Cal-3A | 20 | 16297 | 5 | 1402.5 | 8/19/13 13:44 |
| A4 | Sr-Cal-5A | 5 | 16583 | 5 | 1402.5 | 8/19/13 13:44 |

DCN: ITSI-0808-0004-0076, 8 May 2019

N-674

GEN 767
A 35723
Sr Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | Sr-Cal-1A | 0 | 15904 | 5 | 1402.5 | 8/19/13 13:51 |
| B2 | Sr-Cal-2A | 30 | 15795 | 5 | 1402.5 | 8/19/13 13:51 |
| B3 | Sr-Cal-3A | 87 | 15981 | 5 | 1402.5 | 8/19/13 13:51 |
| B4 | Sr-Cal-5A | 8 | 16402 | 5 | 1402.5 | 8/19/13 13:51 |

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 768
A 35723
Sr Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | Sr-Cal-1A | 12 | 16232 | 5 | 1402.5 | 8/19/13 13:58 |
| C2 | Sr-Cal-2A | 59 | 15521 | 5 | 1402.5 | 8/19/13 13:58 |
| C3 | Sr-Cal-3A | 48 | 15613 | 5 | 1402.5 | 8/19/13 13:58 |
| C4 | Sr-Cal-5A | 50 | 16430 | 5 | 1402.5 | 8/19/13 13:58 |

DCN: ITSI-0808-0004-0076, 8 May 2019

N-676

GEN 769
A 35723
Sr Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | Sr-Cal-1A | 114 | 14664 | 5 | 1402.5 | 8/19/13 14:04 |
| D2 | Sr-Cal-2A | 16 | 15667 | 5 | 1402.5 | 8/19/13 14:04 |
| D3 | Sr-Cal-3A | 38 | 16691 | 5 | 1402.5 | 8/19/13 14:04 |
| D4 | Sr-Cal-5A | 18 | 16475 | 5 | 1402.5 | 8/19/13 14:04 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-677

GEN 770
A 35723
Y Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | Y-Cal-1A | 1 | 22733 | 5 | 1402.5 | 8/19/13 14:43 |
| A2 | Y-Cal-2A | 10 | 22741 | 5 | 1402.5 | 8/19/13 14:43 |
| A3 | Y-Cal-3A | 20 | 20367 | 5 | 1402.5 | 8/19/13 14:43 |
| A4 | Y-Cal-5A | 4 | 20897 | 5 | 1402.5 | 8/19/13 14:43 |

DCN: ITSI-0808-0004-0076, 8 May 2019

N-678

GEN 771
A 35723
Y Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | Y-Cal-1A | 0 | 20638 | 5 | 1402.5 | 8/19/13 14:49 |
| B2 | Y-Cal-2A | 19 | 23195 | 5 | 1402.5 | 8/19/13 14:49 |
| B3 | Y-Cal-3A | 40 | 19963 | 5 | 1402.5 | 8/19/13 14:49 |
| B4 | Y-Cal-5A | 5 | 21739 | 5 | 1402.5 | 8/19/13 14:49 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-679

GEN 772
A 35723
Y Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | Y-Cal-1A | 20 | 22789 | 5 | 1402.5 | 8/19/13 14:56 |
| C2 | Y-Cal-2A | 28 | 22631 | 5 | 1402.5 | 8/19/13 14:56 |
| C3 | Y-Cal-3A | 19 | 20441 | 5 | 1402.5 | 8/19/13 14:56 |
| C4 | Y-Cal-5A | 32 | 22785 | 5 | 1402.5 | 8/19/13 14:56 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-680

GEN 773
A 35723
Y Cal
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | Y-Cal-1A | 67 | 22298 | 5 | 1402.5 | 8/19/13 15:02 |
| D2 | Y-Cal-2A | 6 | 21161 | 5 | 1402.5 | 8/19/13 15:02 |
| D3 | Y-Cal-3A | 20 | 21153 | 5 | 1402.5 | 8/19/13 15:02 |
| D4 | Y-Cal-5A | 18 | 22229 | 5 | 1402.5 | 8/19/13 15:02 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-681

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 763
A 35723
LONG BKG
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 138 | 1065 | 900 | 1402.5 | 8/17/13 5:31 |
| A2 | A2-01 | 90 | 1019 | 900 | 1402.5 | 8/17/13 5:31 |
| A3 | A3-01 | 92 | 895 | 900 | 1402.5 | 8/17/13 5:31 |
| A4 | A4-01 | 114 | 990 | 900 | 1402.5 | 8/17/13 5:31 |
| C1 | C1-01 | 106 | 763 | 900 | 1402.5 | 8/17/13 5:31 |
| C2 | C2-01 | 95 | 760 | 900 | 1402.5 | 8/17/13 5:31 |
| C3 | C3-01 | 73 | 3858 | 900 | 1402.5 | 8/17/13 5:31 |
| C4 | C4-01 | 82 | 700 | 900 | 1402.5 | 8/17/13 5:31 |
| B1 | B1-01 | 65 | 974 | 900 | 1402.5 | 8/17/13 5:31 |
| B2 | B2-01 | 92 | 938 | 900 | 1402.5 | 8/17/13 5:31 |
| B3 | B3-01 | 145 | 821 | 900 | 1402.5 | 8/17/13 5:31 |
| B4 | B4-01 | 126 | 1100 | 900 | 1402.5 | 8/17/13 5:31 |
| D1 | D1-01 | 53 | 706 | 900 | 1402.5 | 8/17/13 5:32 |
| D2 | D2-01 | 87 | 2550 | 900 | 1402.5 | 8/17/13 5:32 |
| D3 | D3-01 | 61 | 1118 | 900 | 1402.5 | 8/17/13 5:32 |
| D4 | D4-01 | 60 | 782 | 900 | 1402.5 | 8/17/13 5:32 |

N-682

# LB4100-C Instrument EFF

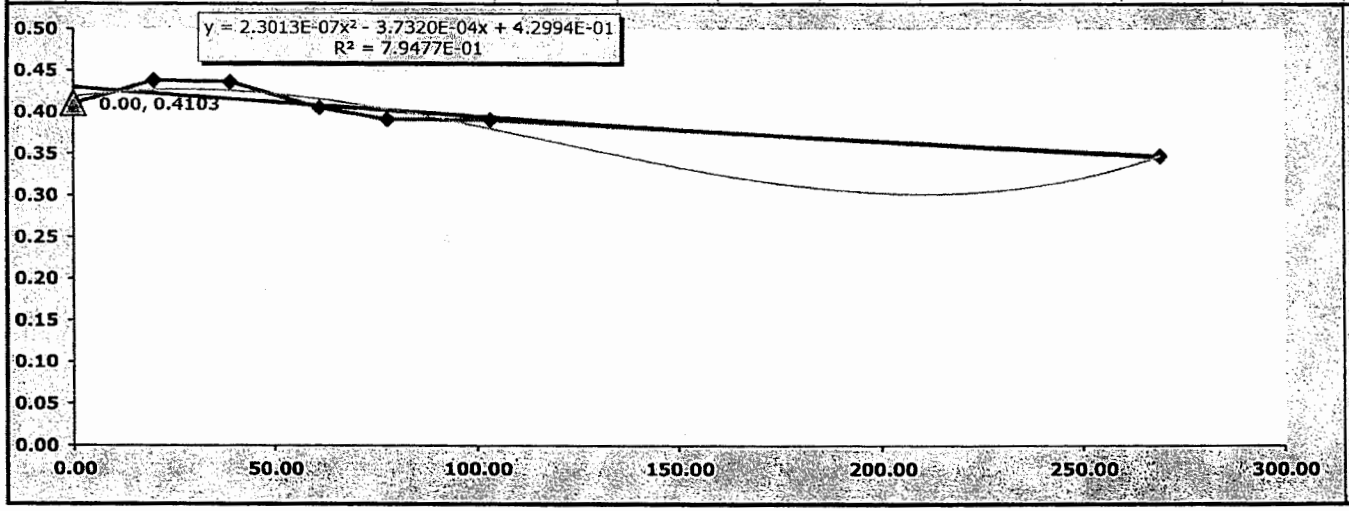
DCN: ITSI-0808-0004-0076, 8 May 2019

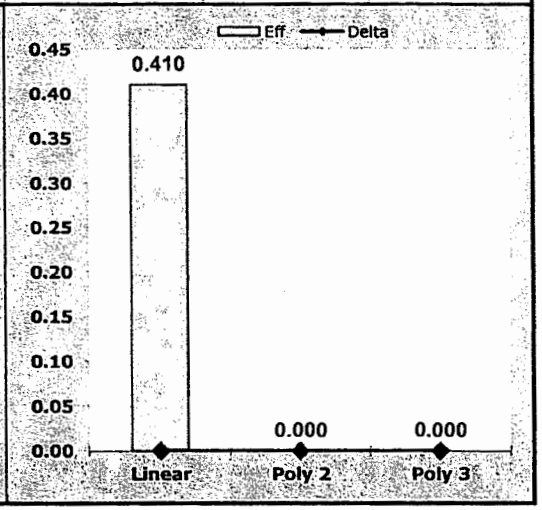
INTERNATIONAL

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Instrument | LB4100-C | Detector | B1 |
| | | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | | Intercept | | Eff | 0.4103 |
| | | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 31 | 51 | 59642 | 853 | 5.00 | 900 | 5963.73 | 12/30/2014 | 14534.81 | **0.4103** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 46 | 51 | 71138 | 853 | 5.00 | 900 | 7113.33 | 12/30/2014 | 16237.50 | **0.4381** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 36 | 51 | 66836 | 853 | 5.00 | 900 | 6683.13 | 12/30/2014 | 15320.03 | **0.4362** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 26 | 51 | 59885 | 853 | 5.00 | 900 | 5988.03 | 12/30/2014 | 14795.17 | **0.4047** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 43 | 51 | 64332 | 853 | 5.00 | 900 | 6432.73 | 12/30/2014 | 16452.40 | **0.3910** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 31 | 51 | 62242 | 853 | 5.00 | 900 | 6223.73 | 12/30/2014 | 15931.67 | **0.3907** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 25 | 51 | 53692 | 853 | 5.00 | 900 | 5368.73 | 12/30/2014 | 15460.54 | **0.3473** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-683

# LB4100-C Instrument EFF

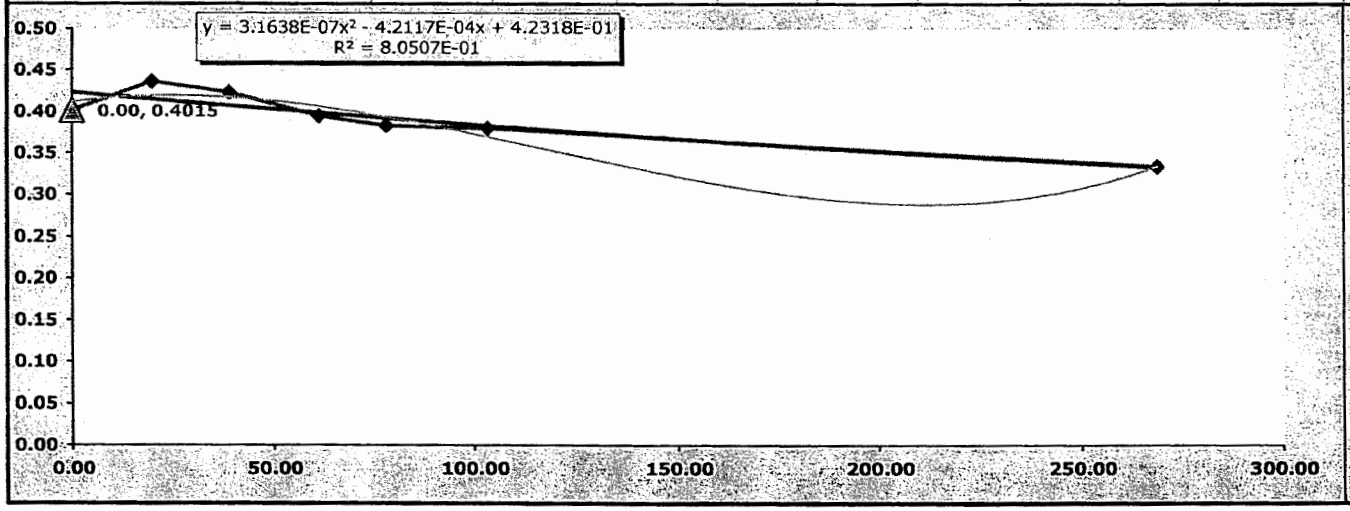
DCN: ITSI-0808-0004-0076, 8 May 2019

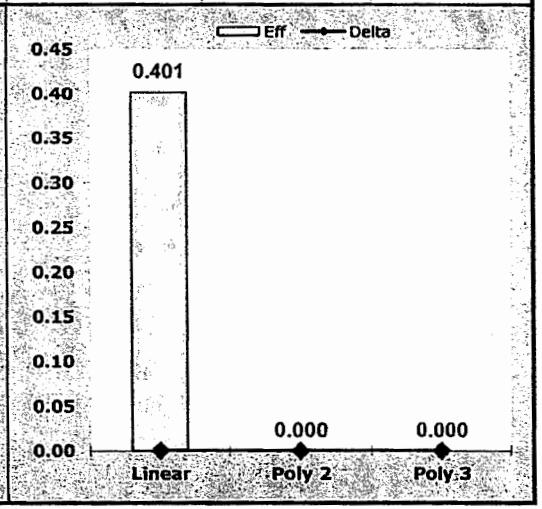
INTERNATIONAL

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | B2 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4015 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | )589 | 21102.00 | 9/1/1999 | 0.10 | 21 | 68 | 58361 | 732 | 5.00 | 900 | 5835.69 | 12/30/2014 | 14534.81 | **0.4015** |
| 2 | )590 | 23574.00 | 9/1/1999 | 19.90 | 25 | 68 | 70834 | 732 | 5.00 | 900 | 7082.99 | 12/30/2014 | 16237.50 | **0.4362** |
| 3 | )591 | 22242.00 | 9/1/1999 | 39.00 | 18 | 68 | 64854 | 732 | 5.00 | 900 | 6484.99 | 12/30/2014 | 15320.03 | **0.4233** |
| 4 | )592 | 21480.00 | 9/1/1999 | 61.40 | 16 | 68 | 58370 | 732 | 5.00 | 900 | 5836.59 | 12/30/2014 | 14795.17 | **0.3945** |
| 5 | )593 | 23886.00 | 9/1/1999 | 78.20 | 29 | 68 | 62994 | 732 | 5.00 | 900 | 6298.99 | 12/30/2014 | 16452.40 | **0.3829** |
| 6 | )594 | 23130.00 | 9/1/1999 | 103.60 | 26 | 68 | 60466 | 732 | 5.00 | 900 | 6046.19 | 12/30/2014 | 15931.67 | **0.3795** |
| 7 | )595 | 22446.00 | 9/1/1999 | 269.00 | 18 | 68 | 51616 | 732 | 5.00 | 900 | 5161.19 | 12/30/2014 | 15460.54 | **0.3338** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |



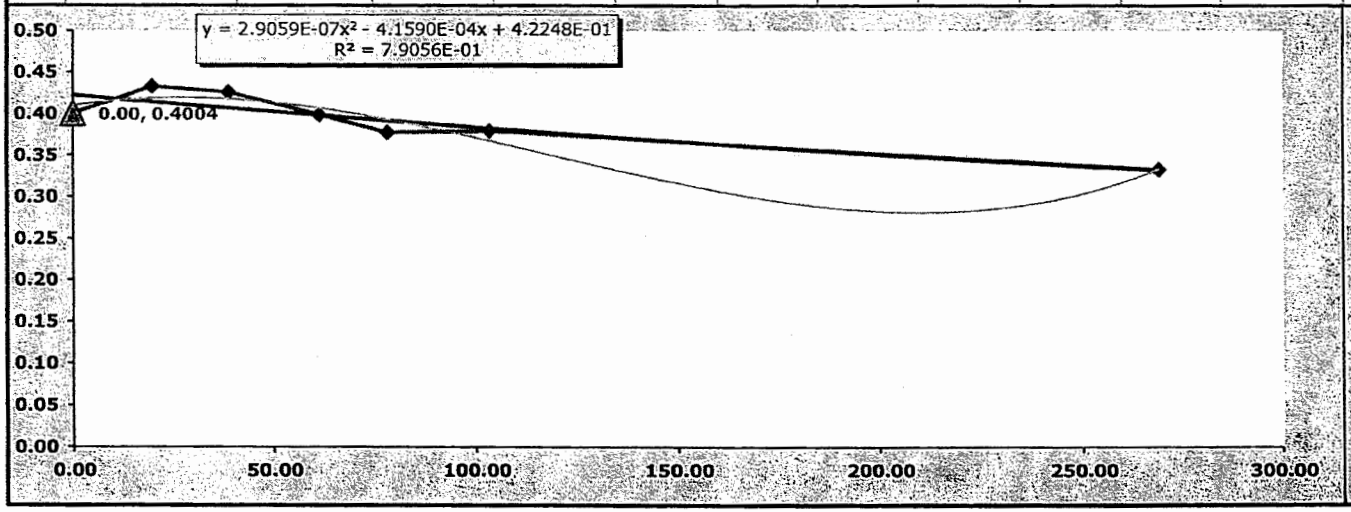
# LB4100-C Instrument EFF

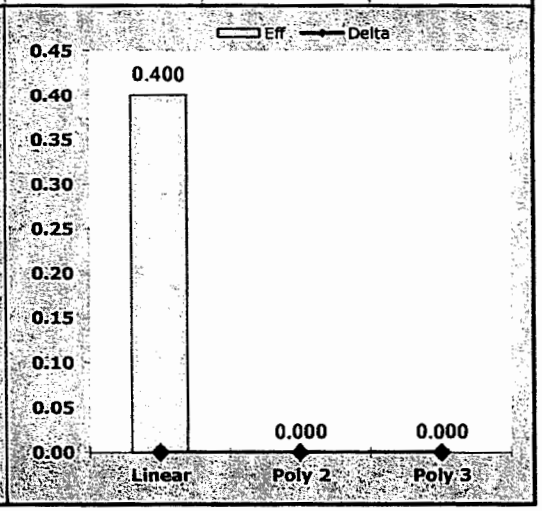
DCN: ITSI-0808-0004-0076, 8 May 2019

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | B4 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4004 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 26 | 58 | 58199 | 791 | 5.00 | 900 | 5819.46 | 12/30/2014 | 14534.81 | **0.4004** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 26 | 58 | 70333 | 791 | 5.00 | 900 | 7032.86 | 12/30/2014 | 16237.50 | **0.4331** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 19 | 58 | 65271 | 791 | 5.00 | 900 | 6526.66 | 12/30/2014 | 15320.03 | **0.4260** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 25 | 58 | 58965 | 791 | 5.00 | 900 | 5896.06 | 12/30/2014 | 14795.17 | **0.3985** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 26 | 58 | 62087 | 791 | 5.00 | 900 | 6208.26 | 12/30/2014 | 16452.40 | **0.3773** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 21 | 58 | 60410 | 791 | 5.00 | 900 | 6040.56 | 12/30/2014 | 15931.67 | **0.3792** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 9 | 58 | 51458 | 791 | 5.00 | 900 | 5145.36 | 12/30/2014 | 15460.54 | **0.3328** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-685

# LB4100-C Instrument EFF



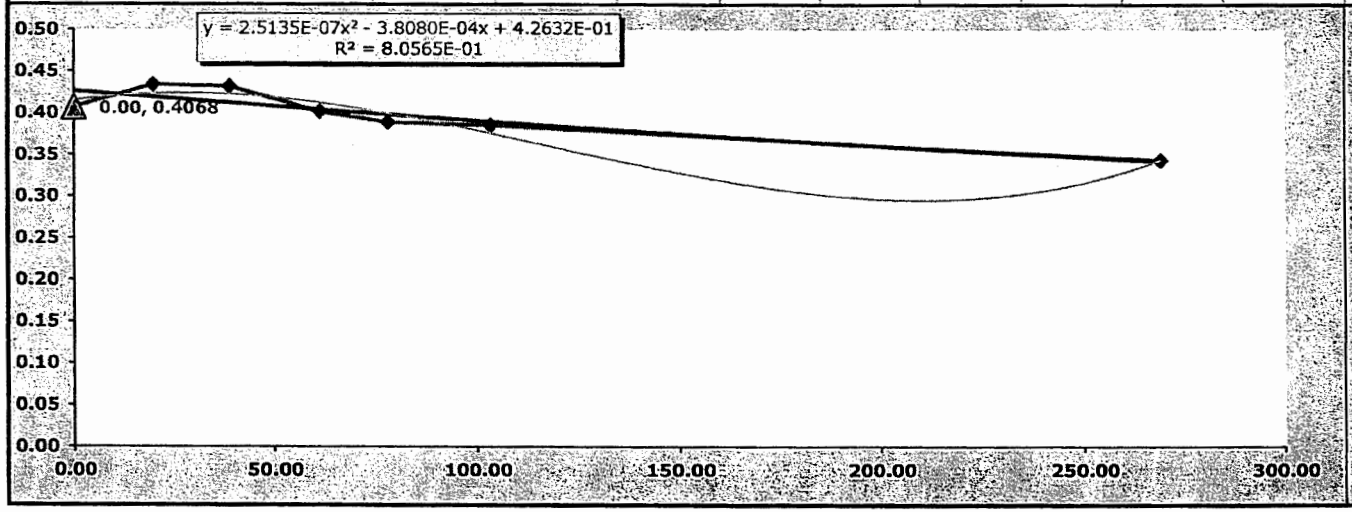
DCN: ITSI-0808-0004-0076, 8 May 2019

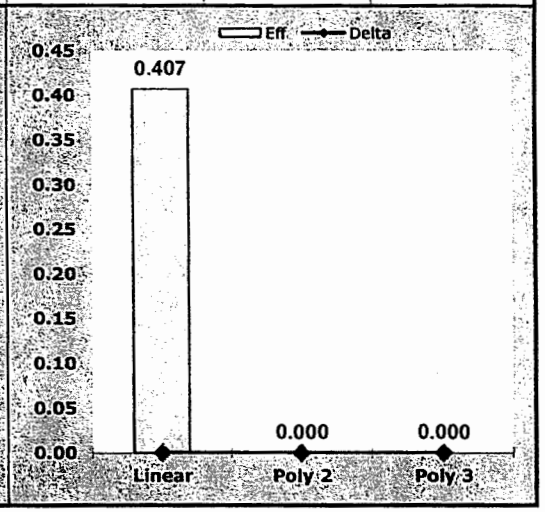
INTERNATIONAL

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | C1 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4068 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 24 | 85 | 59129 | 938 | 5.00 | 900 | 5912.38 | 12/30/2014 | 14534.81 | **0.4068** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 21 | 85 | 70471 | 938 | 5.00 | 900 | 7046.58 | 12/30/2014 | 16237.50 | **0.4340** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 25 | 85 | 66149 | 938 | 5.00 | 900 | 6614.38 | 12/30/2014 | 15320.03 | **0.4317** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 16 | 85 | 59377 | 938 | 5.00 | 900 | 5937.18 | 12/30/2014 | 14795.17 | **0.4013** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 23 | 85 | 63951 | 938 | 5.00 | 900 | 6394.58 | 12/30/2014 | 16452.40 | **0.3887** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 16 | 85 | 61329 | 938 | 5.00 | 900 | 6132.38 | 12/30/2014 | 15931.67 | **0.3849** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 15 | 85 | 53064 | 938 | 5.00 | 900 | 5305.88 | 12/30/2014 | 15460.54 | **0.3432** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-686

# LB4100-C Instrument EFF

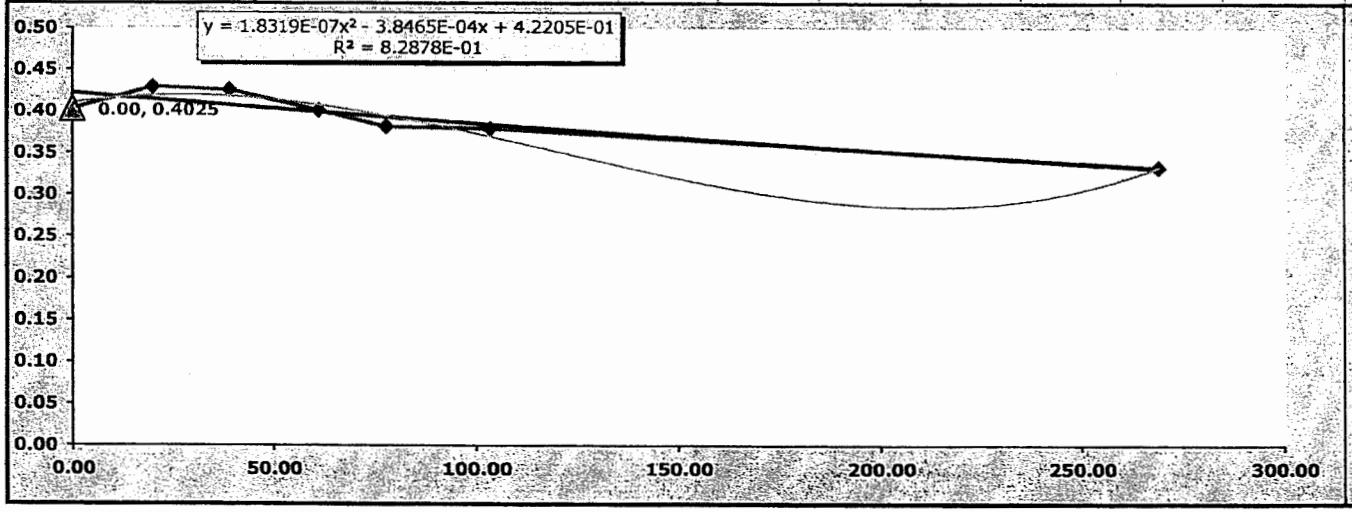


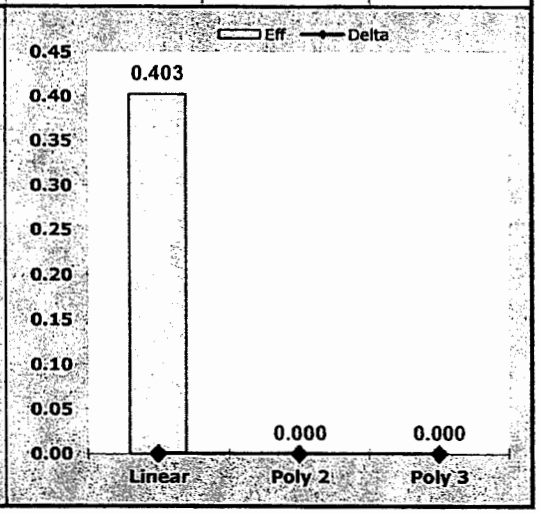
DCN: ITSI-0808-0004-0076, 8 May 2019

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | C2 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4025 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 16 | 121 | 58511 | 890 | 5.00 | 900 | 5850.61 | 12/30/2014 | 14534.81 | 0.4025 |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 18 | 121 | 69706 | 890 | 5.00 | 900 | 6970.11 | 12/30/2014 | 16237.50 | 0.4293 |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 9 | 121 | 65244 | 890 | 5.00 | 900 | 6523.91 | 12/30/2014 | 15320.03 | 0.4258 |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 8 | 121 | 59320 | 890 | 5.00 | 900 | 5931.51 | 12/30/2014 | 14795.17 | 0.4009 |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 13 | 121 | 62756 | 890 | 5.00 | 900 | 6275.11 | 12/30/2014 | 16452.40 | 0.3814 |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 12 | 121 | 60398 | 890 | 5.00 | 900 | 6039.31 | 12/30/2014 | 15931.67 | 0.3791 |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 10 | 121 | 51491 | 890 | 5.00 | 900 | 5148.61 | 12/30/2014 | 15460.54 | 0.3330 |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |

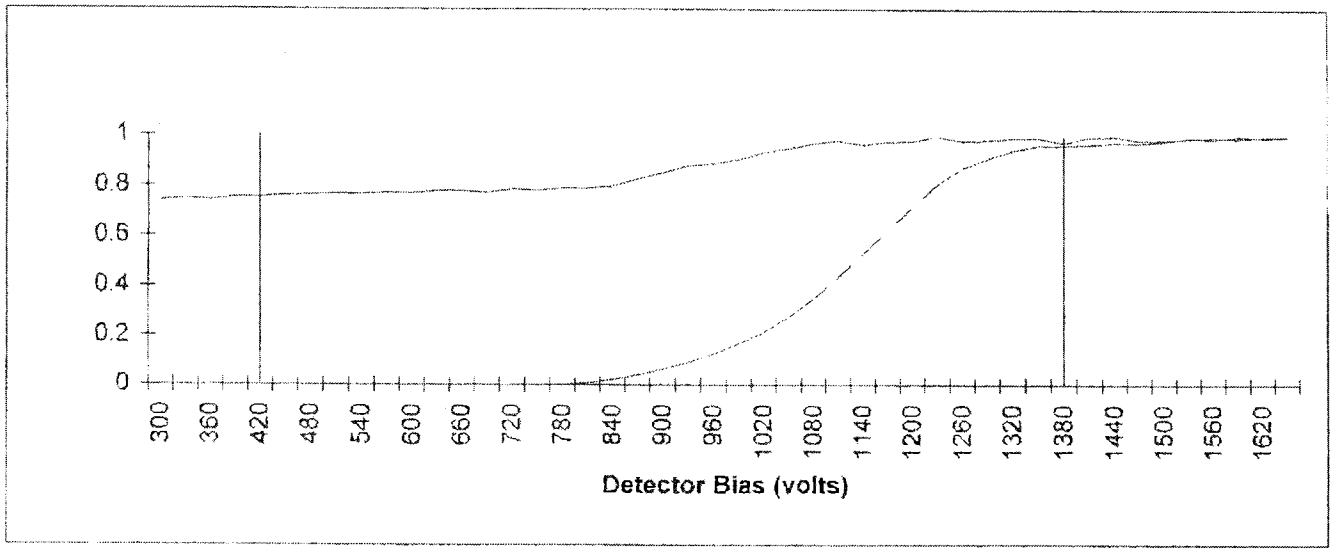


DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1380

**Optimum alpha only operating voltage:** 420

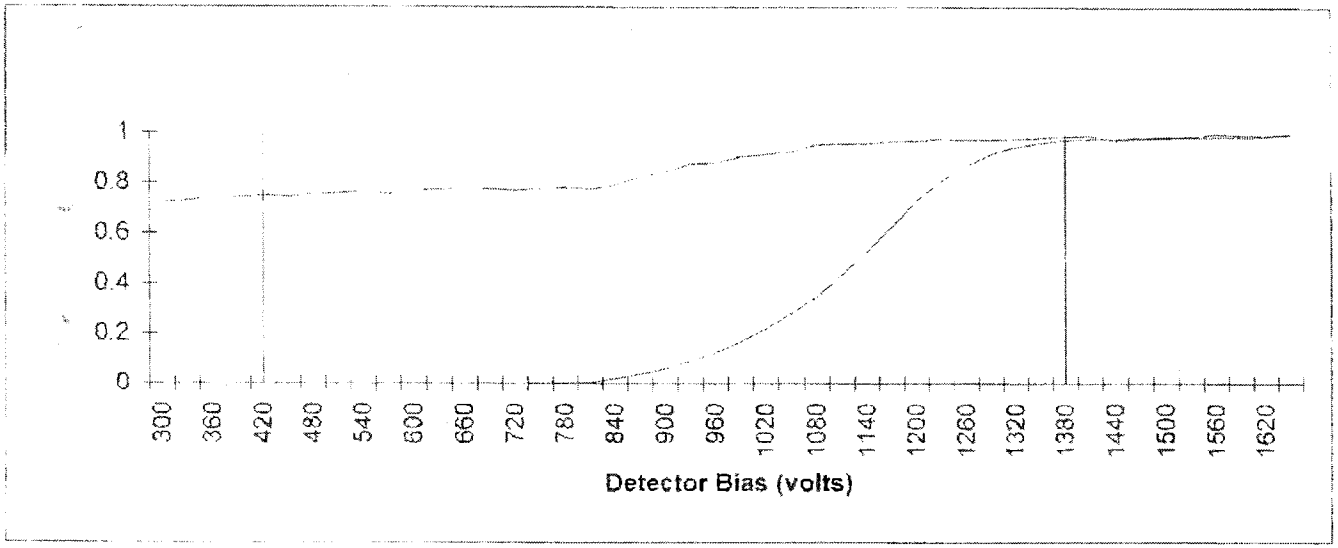
| | A1 |
|---|---|
| Beta slope at beta voltage | 1.59% |
| Alpha slope at beta voltage | 0.37% |
| Alpha slope at alpha voltage | 1.35% |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

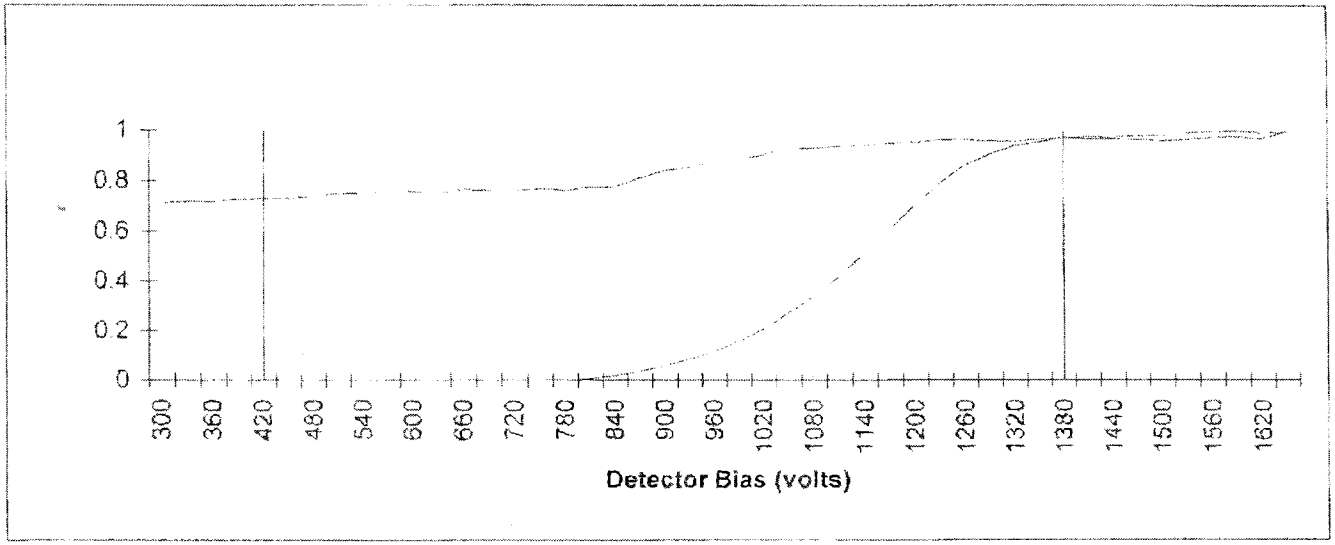
| | A2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

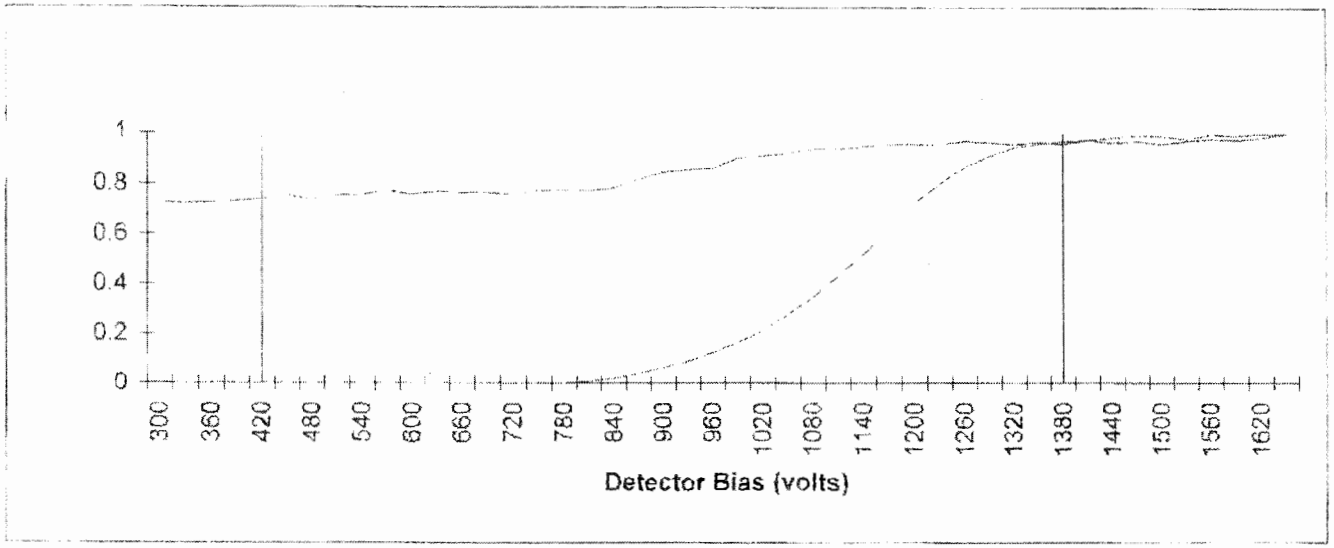
| | A3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1380

**Optimum alpha only operating voltage:** 420

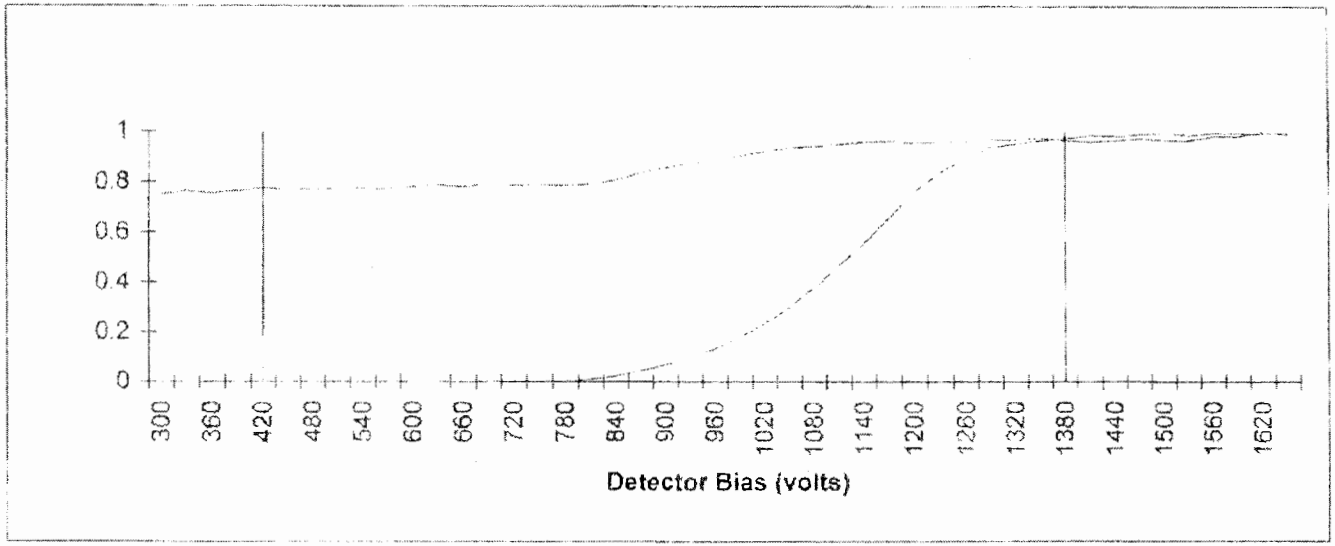
| | A4 |
|---|---|
| Beta slope at beta voltage | 3.25% |
| Alpha slope at beta voltage | 1.19% |
| Alpha slope at alpha voltage | 0.55% |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1380

**Optimum alpha only operating voltage:** 420

| | B1 |
|---|---|
| Beta slope at beta voltage | 1.59% |
| Alpha slope at beta voltage | 0.37% |
| Alpha slope at alpha voltage | 1.35% |

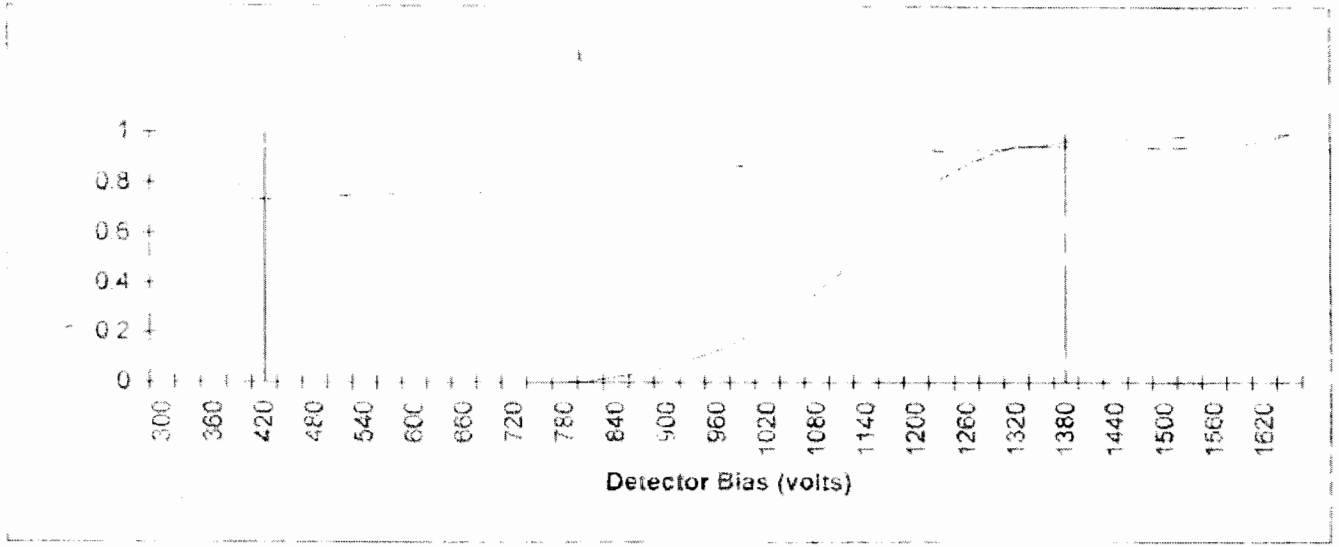
Printed 12/30/2011 09:35

N-692

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1380

**Optimum alpha only operating voltage:** 420

| | B2 |
|---|---|
| Beta slope at beta voltage | 2.37% |
| Alpha slope at beta voltage | -0.90% |
| Alpha slope at alpha voltage | 1.90% |

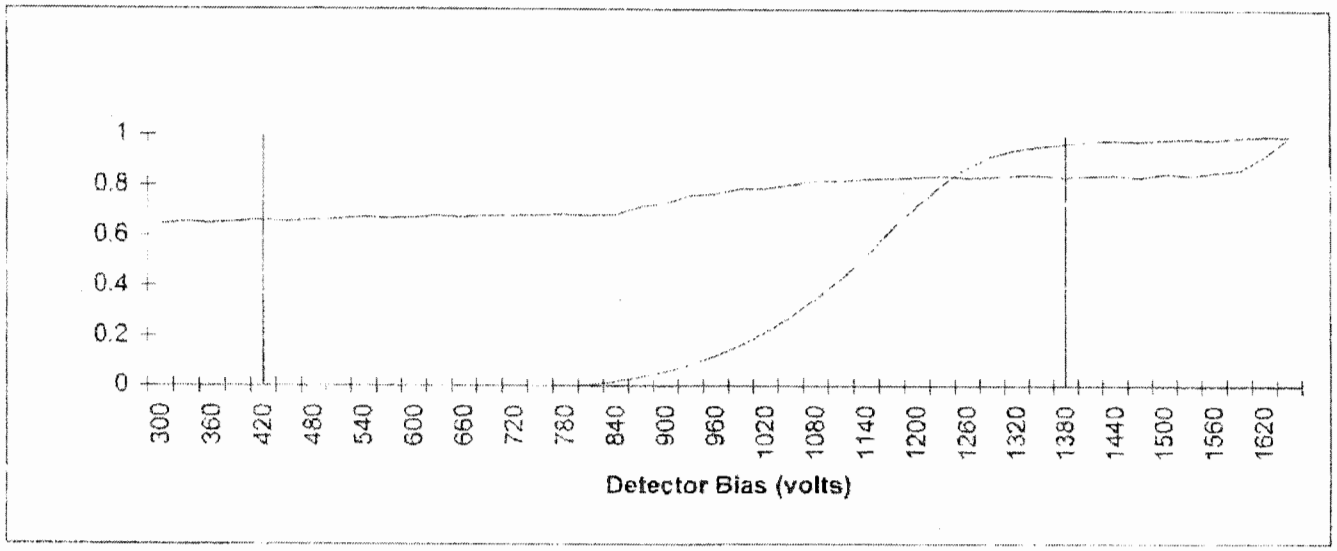
Printed 12/30/2011 09:35

N-693

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1380

**Optimum alpha only operating voltage:** 420

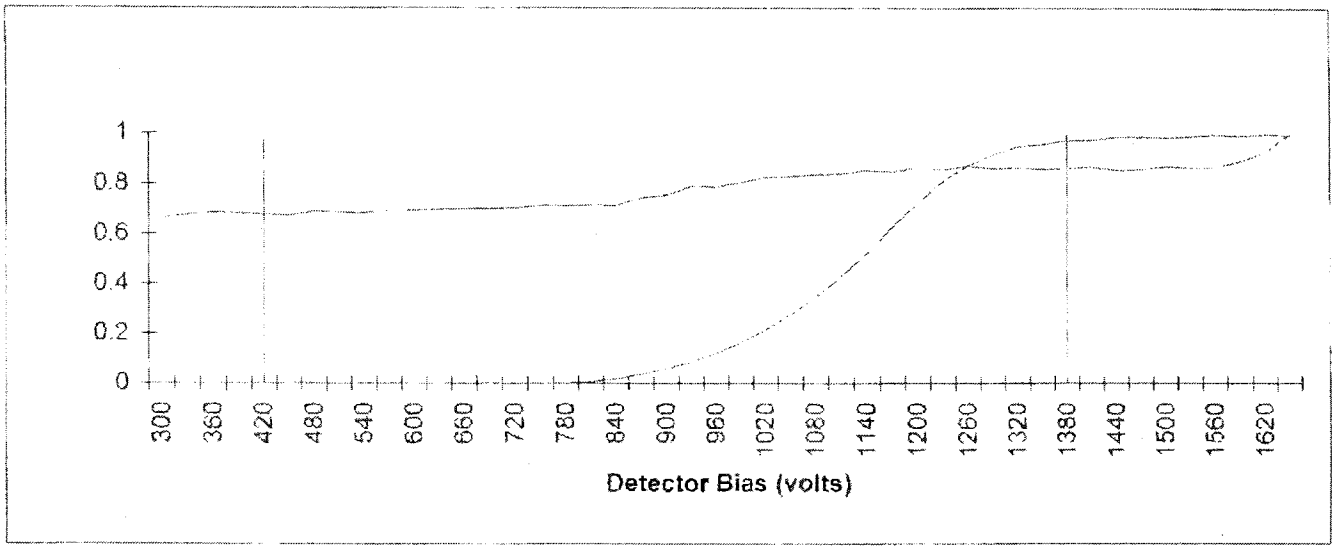
| | B3 |
|---|---|
| Beta slope at beta voltage | 2.85% |
| Alpha slope at beta voltage | 1.23% |
| Alpha slope at alpha voltage | 0.98% |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

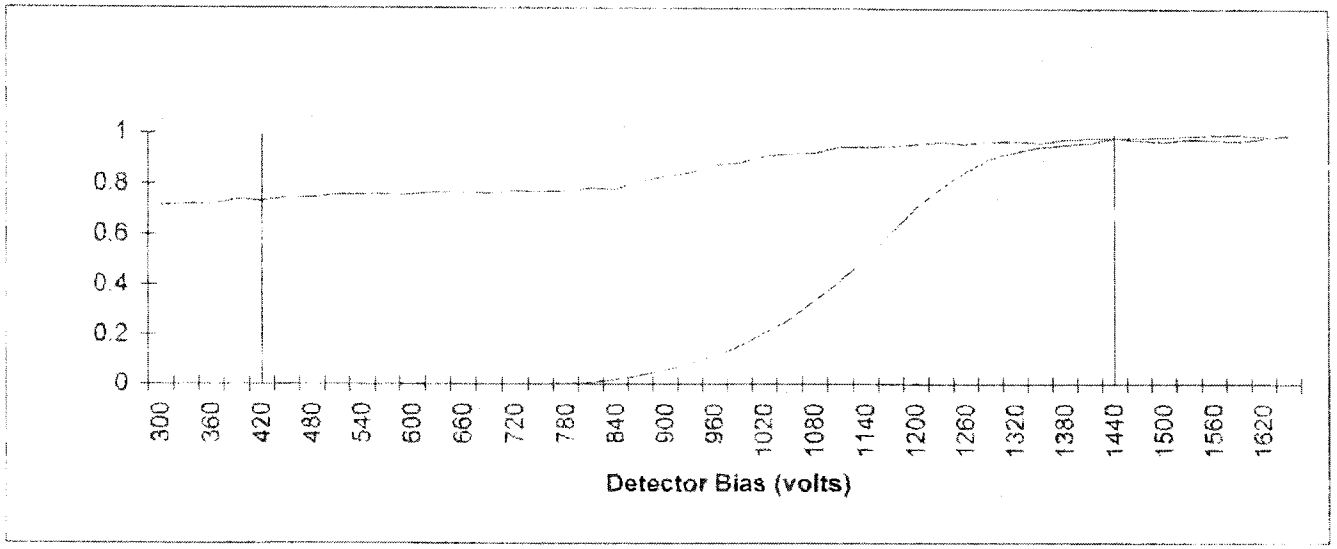
| | B4 |
|---|---|
| **Beta slope at beta voltage** | **3.25%** |
| **Alpha slope at beta voltage** | **1.19%** |
| **Alpha slope at alpha voltage** | **0.55%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

**Optimum alpha only operating voltage: 420**

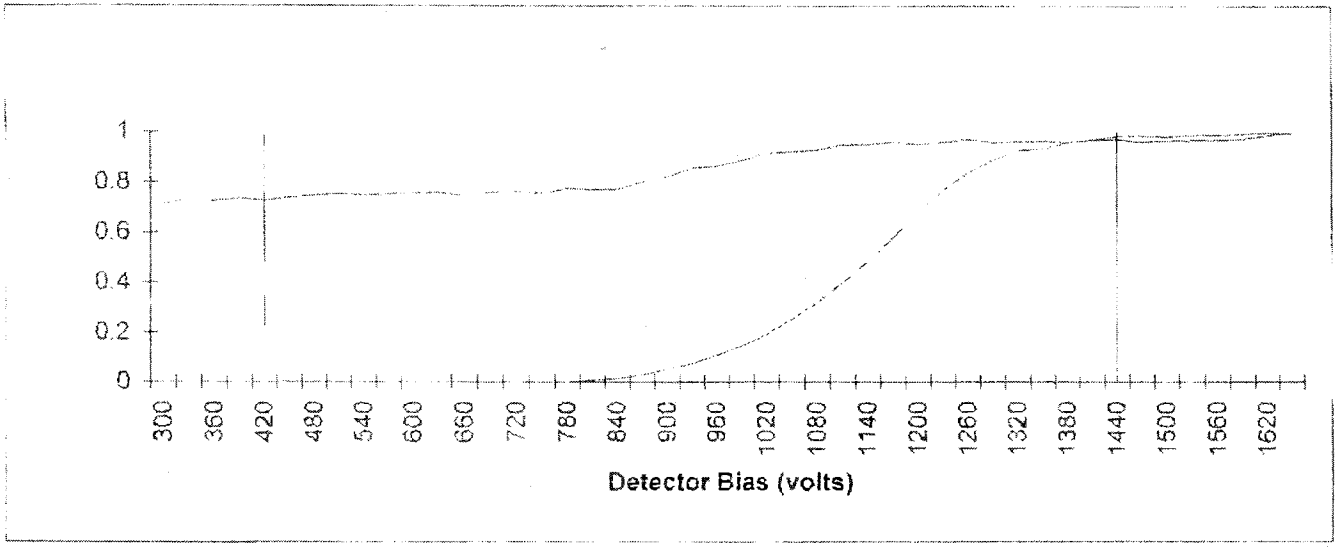
| | C1 |
|---|---|
| **Beta slope at beta voltage** | **1.59%** |
| **Alpha slope at beta voltage** | **0.37%** |
| **Alpha slope at alpha voltage** | **1.35%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

**Optimum alpha only operating voltage: 420**

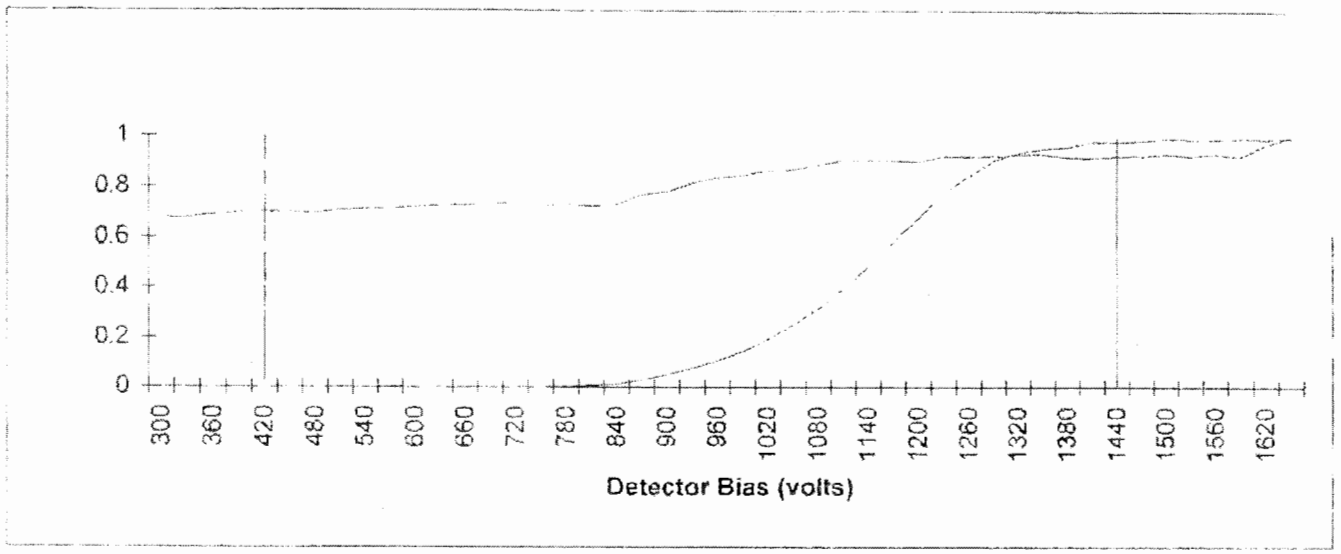
| | C2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

**Optimum alpha only operating voltage: 420**

| | C3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

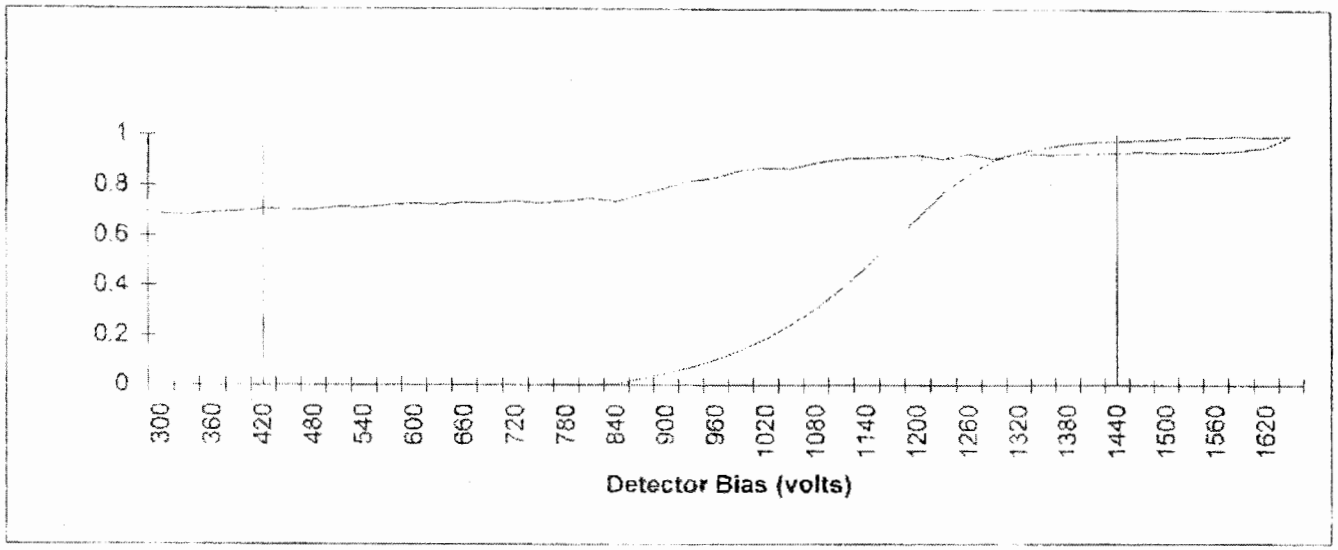
Printed 12/30/2011 09:35

N-698

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

**Optimum alpha only operating voltage: 420**

| | C4 |
|---|---|
| **Beta slope at beta voltage** | **3.25%** |
| **Alpha slope at beta voltage** | **1.19%** |
| **Alpha slope at alpha voltage** | **0.55%** |

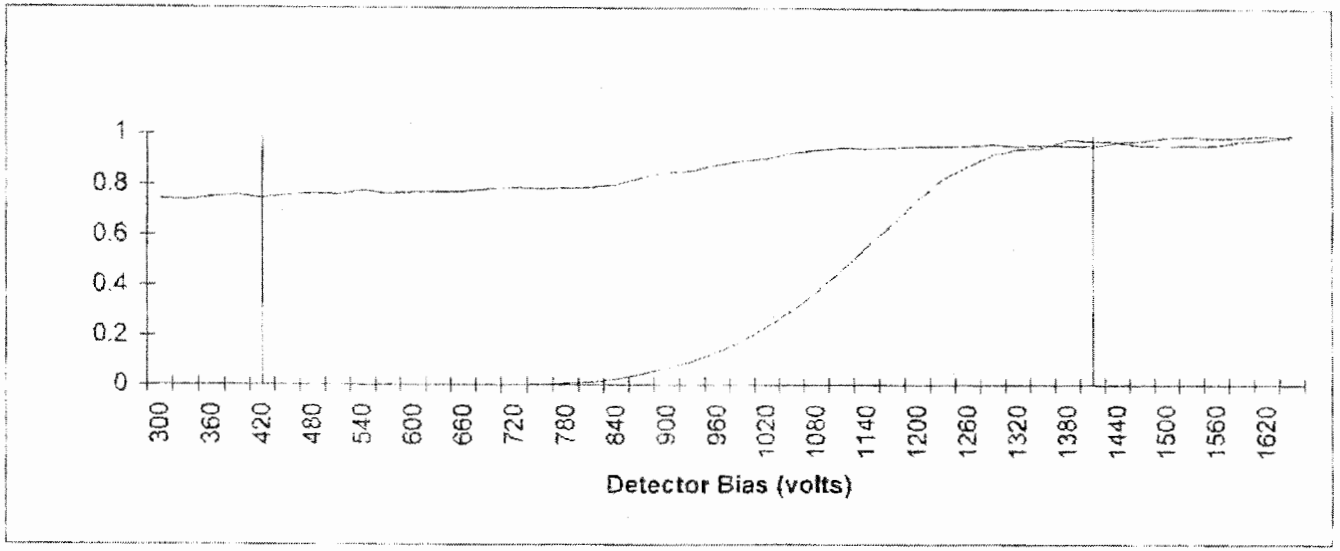
Printed 12/30/2011 09:35

N-699

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

**Optimum alpha only operating voltage: 420**

| | D1 |
|---|---|
| **Beta slope at beta voltage** | **1.59%** |
| **Alpha slope at beta voltage** | **0.37%** |
| **Alpha slope at alpha voltage** | **1.35%** |

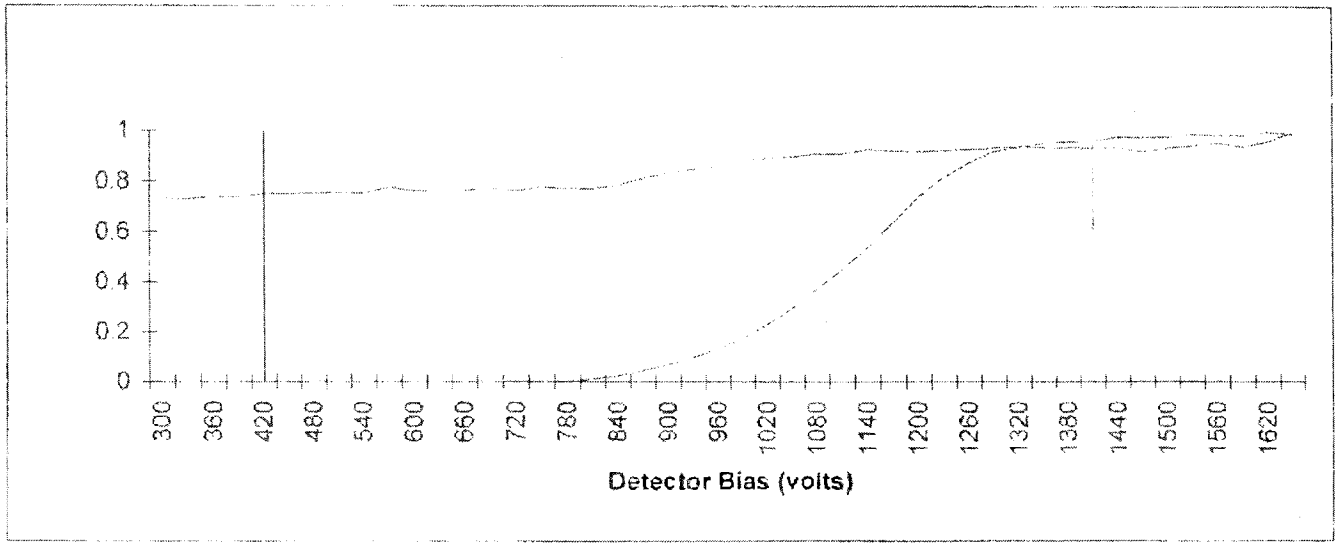
Printed 12/30/2011 09:35

N-700

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

**Optimum alpha only operating voltage: 420**

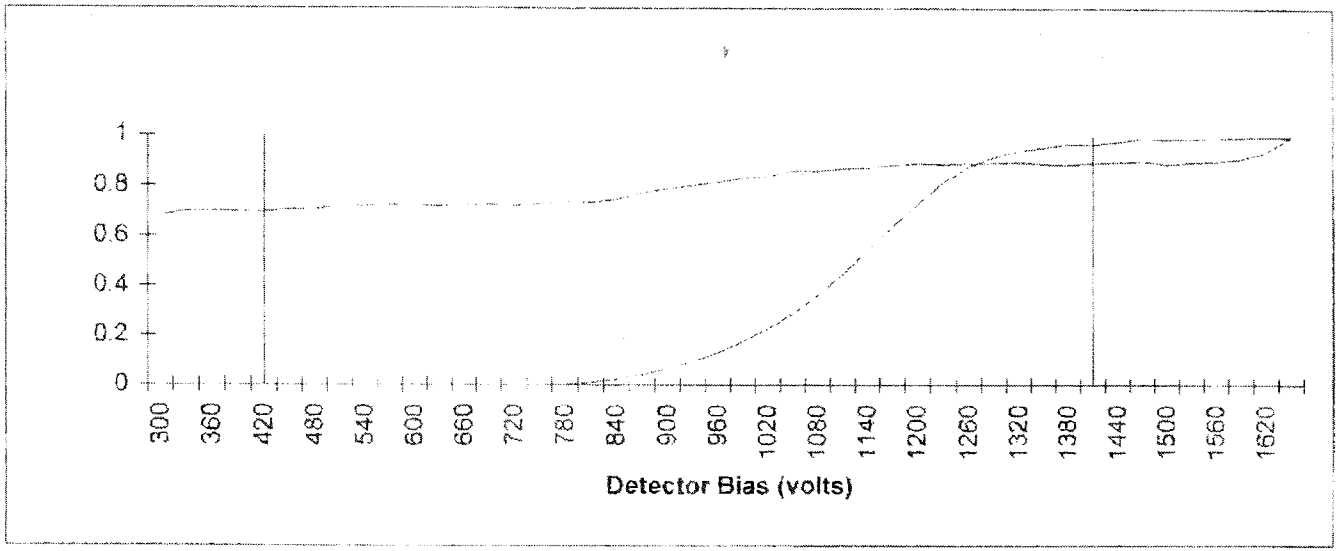
| | D2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

N-701

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

**Optimum alpha only operating voltage: 420**

| | D3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

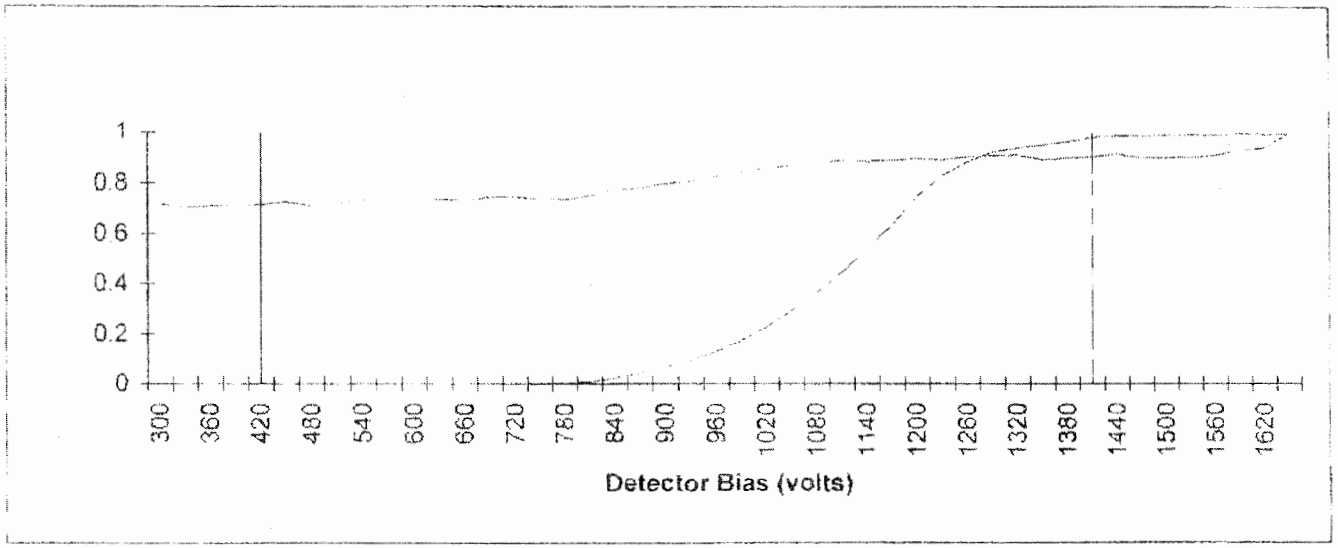
Printed 12/30/2011 09:35

N-702

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1410

**Optimum alpha only operating voltage:** 420

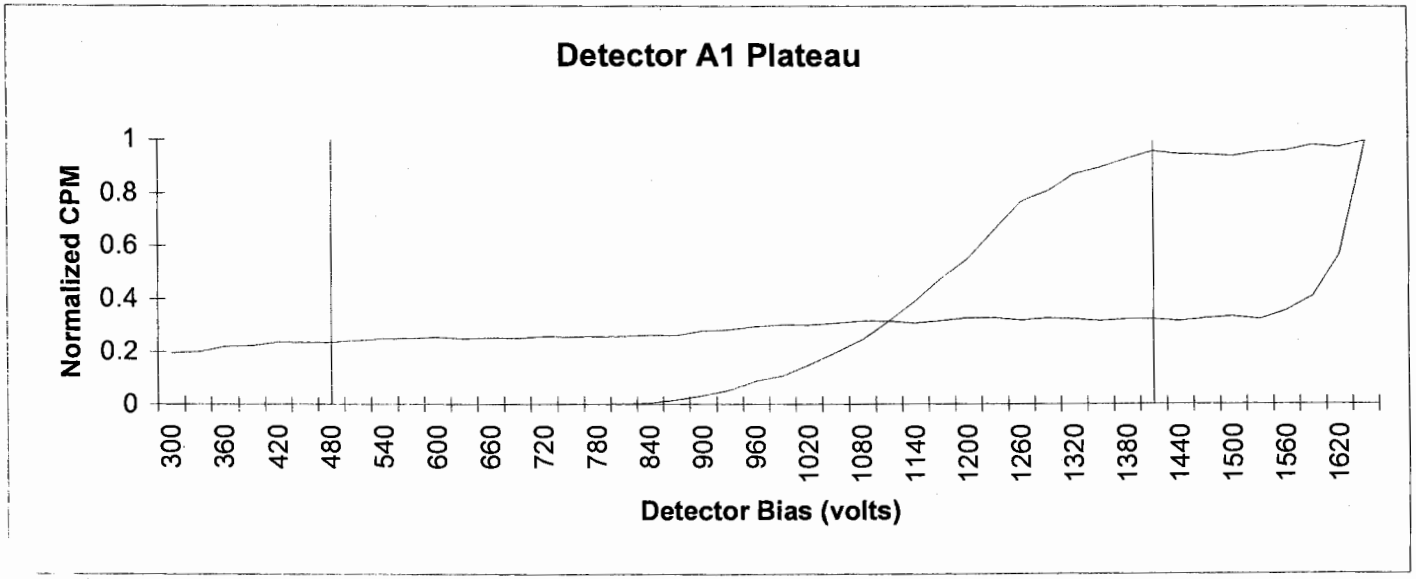
| | D4 |
|---|---|
| Beta slope at beta voltage | 3.25% |
| Alpha slope at beta voltage | 1.19% |
| Alpha slope at alpha voltage | 0.55% |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

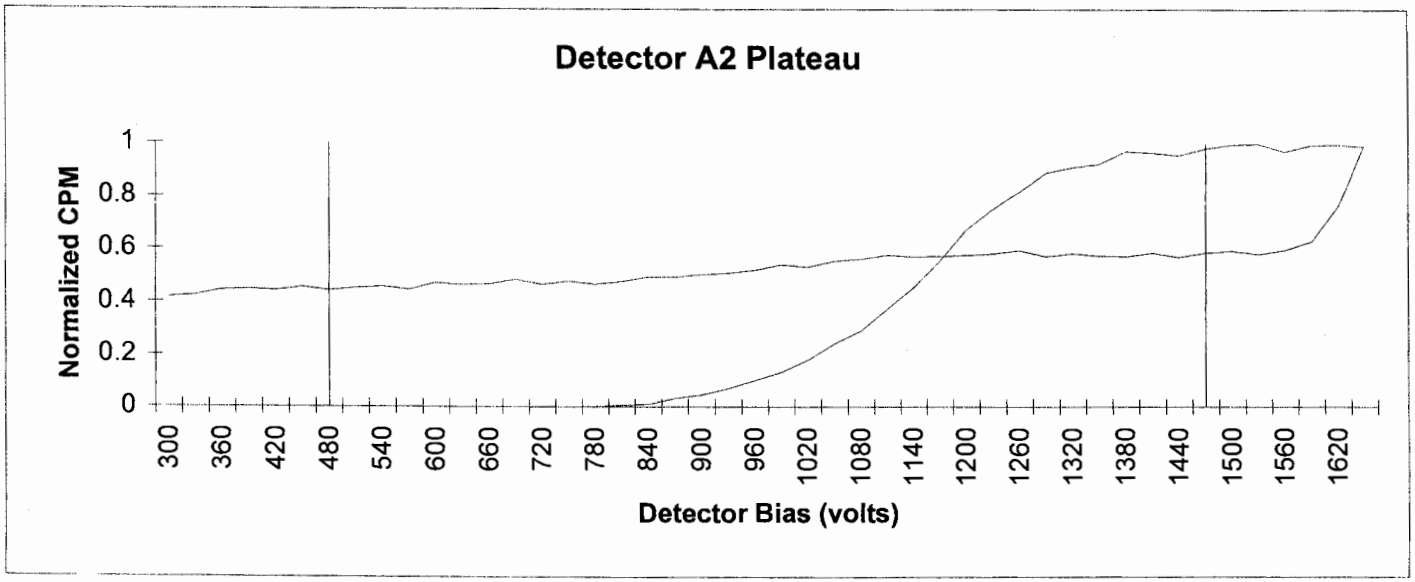
| | A1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

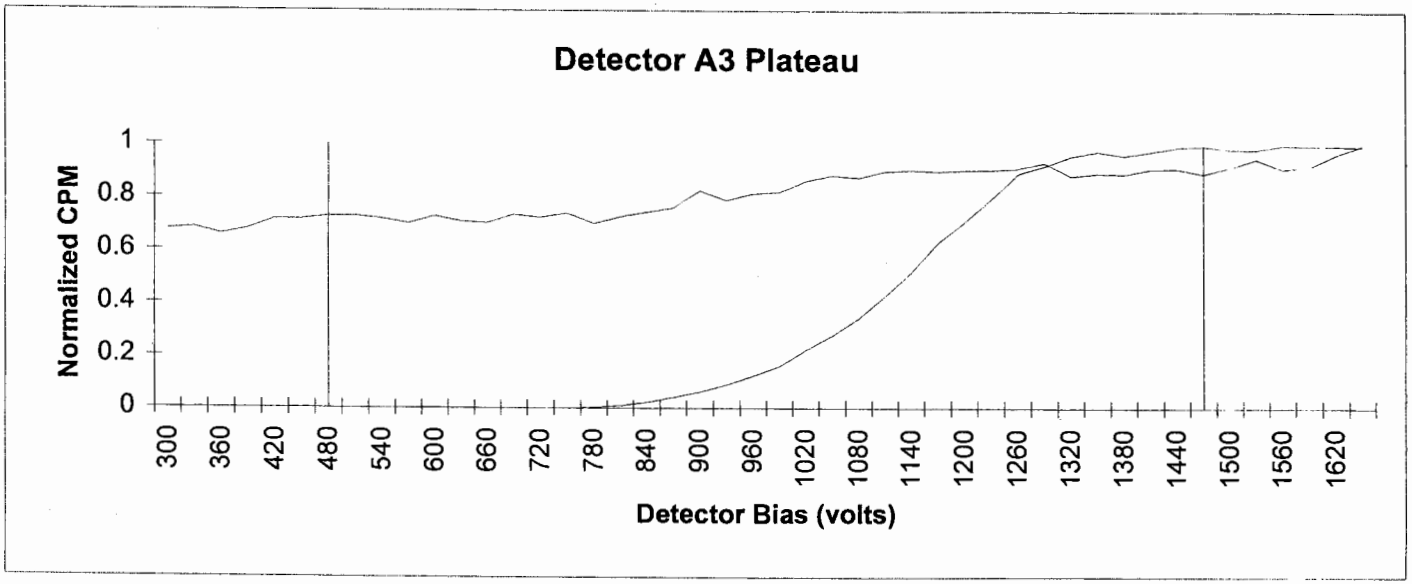
Optimum alpha only operating voltage: 480

| | A2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

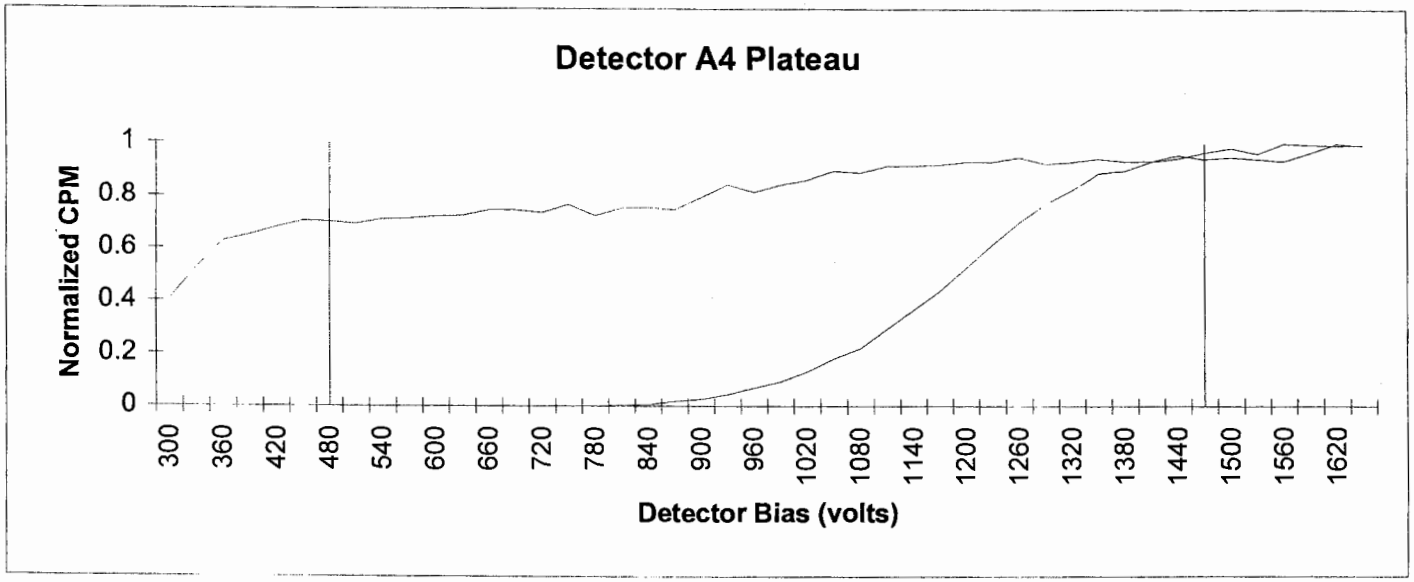
| | A3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

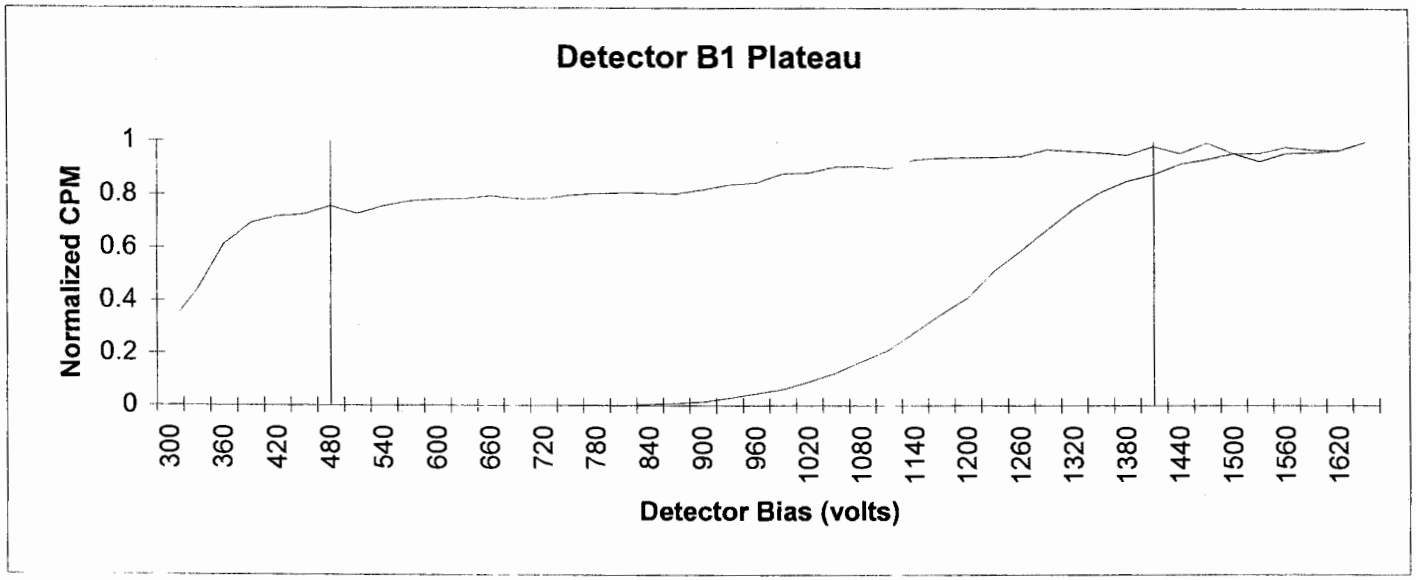
| | A4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

N-707

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

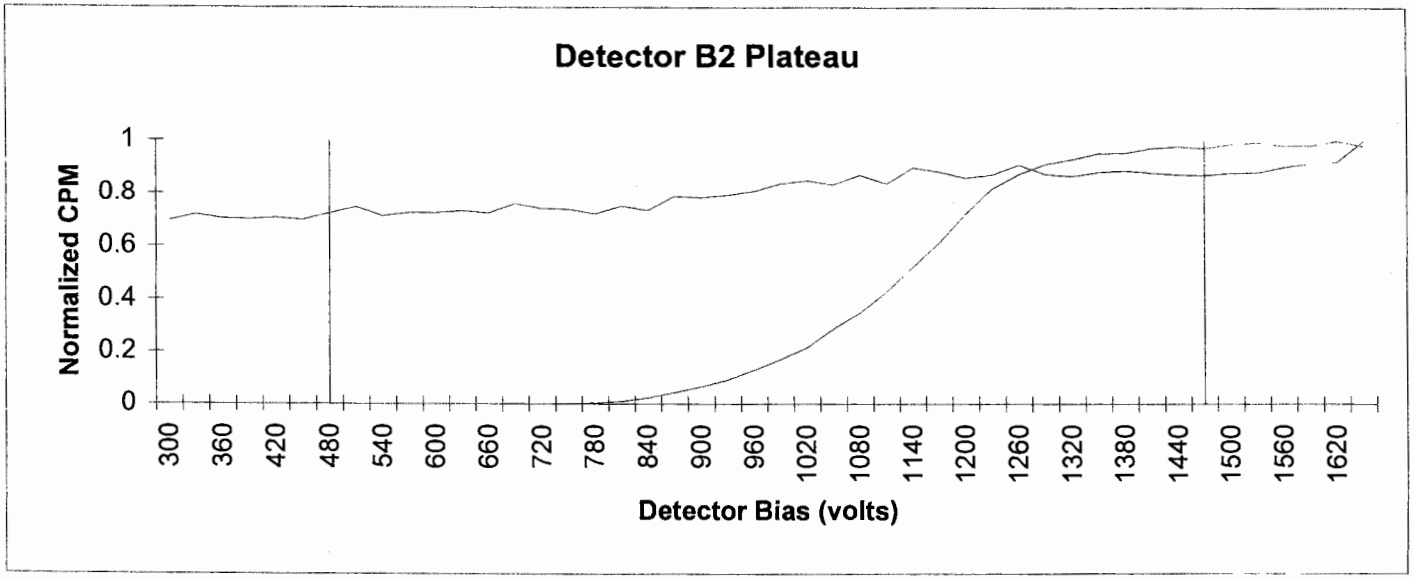
| | B1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

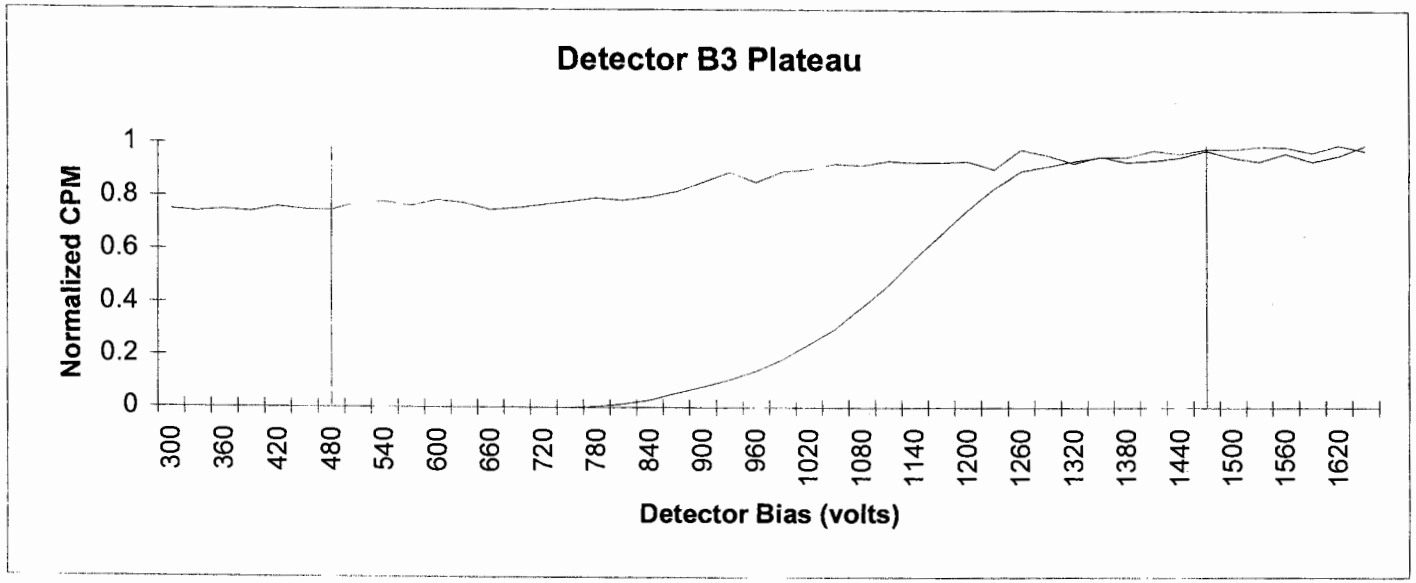
Optimum alpha only operating voltage: 480

| | B2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

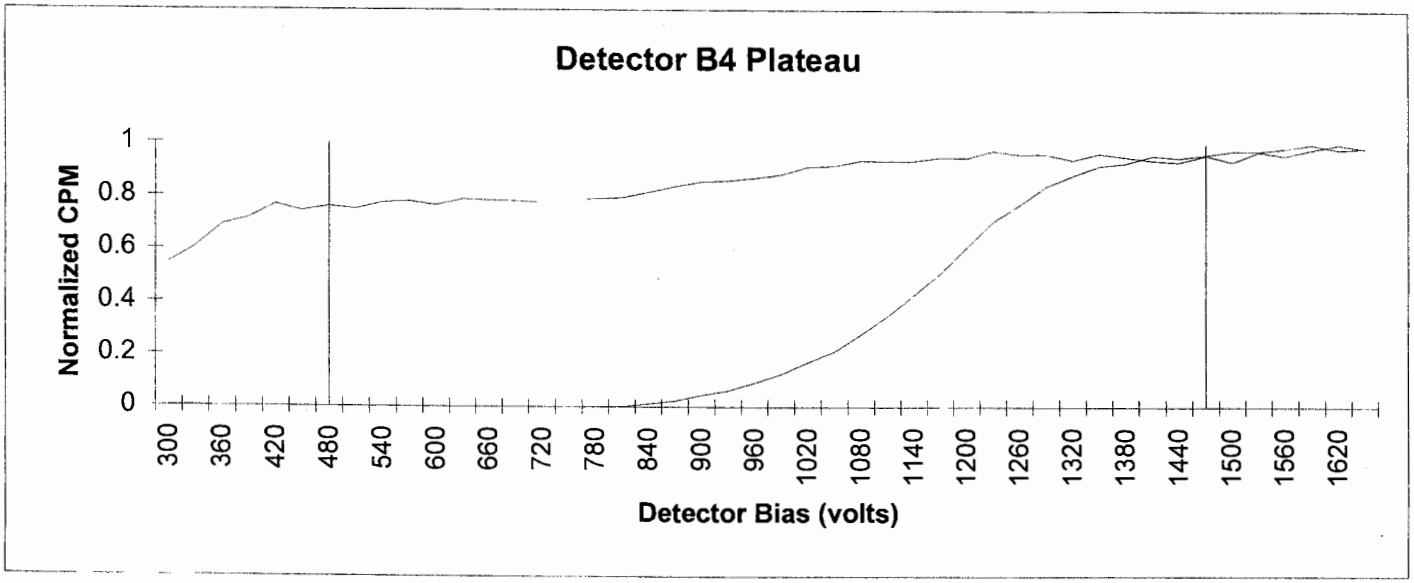
| | B3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

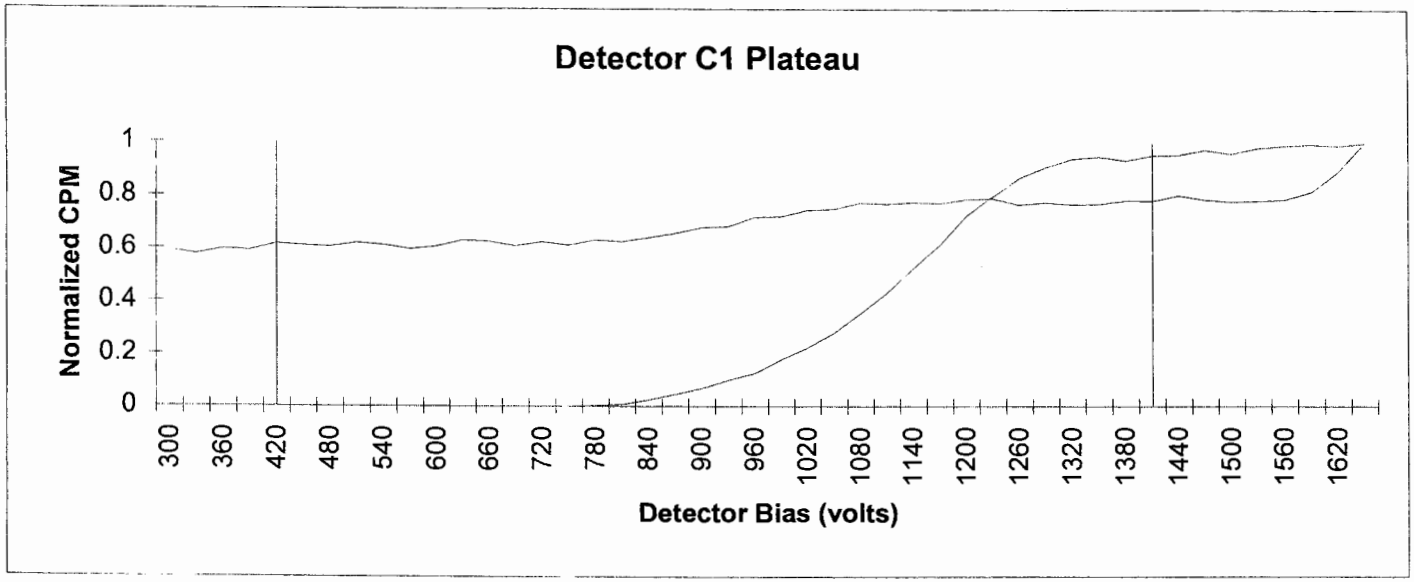
| | B4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

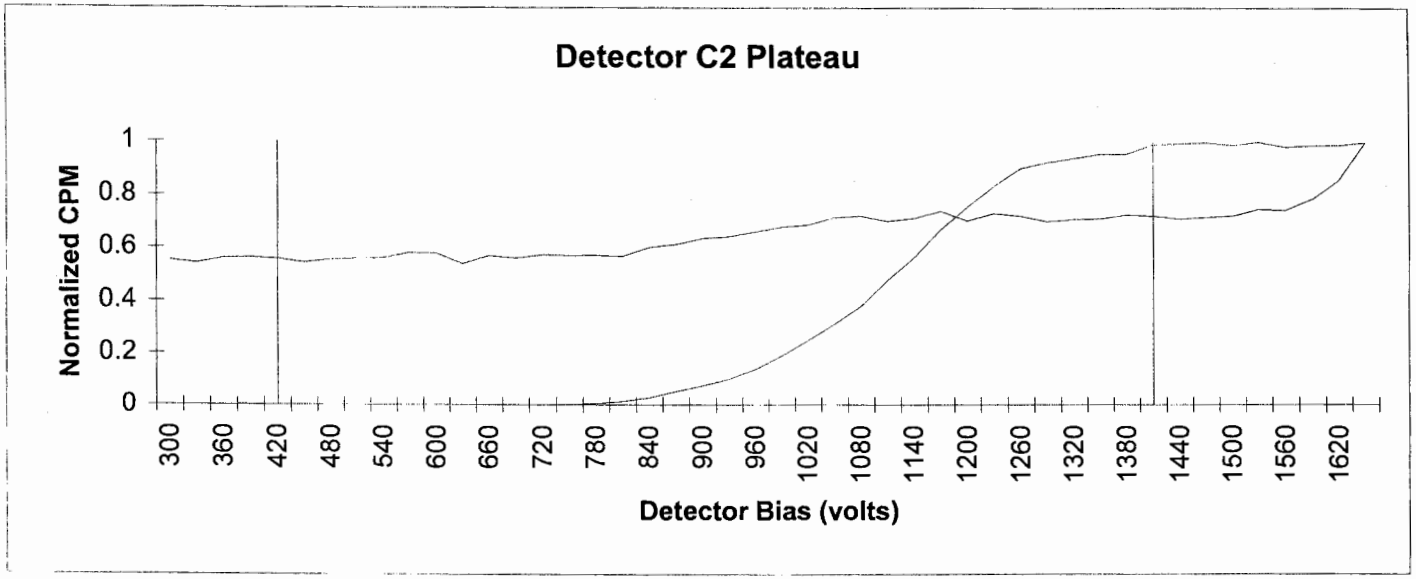
Optimum alpha only operating voltage: 420

| | C1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1402.5

**Optimum alpha only operating voltage:** 420

| | C2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

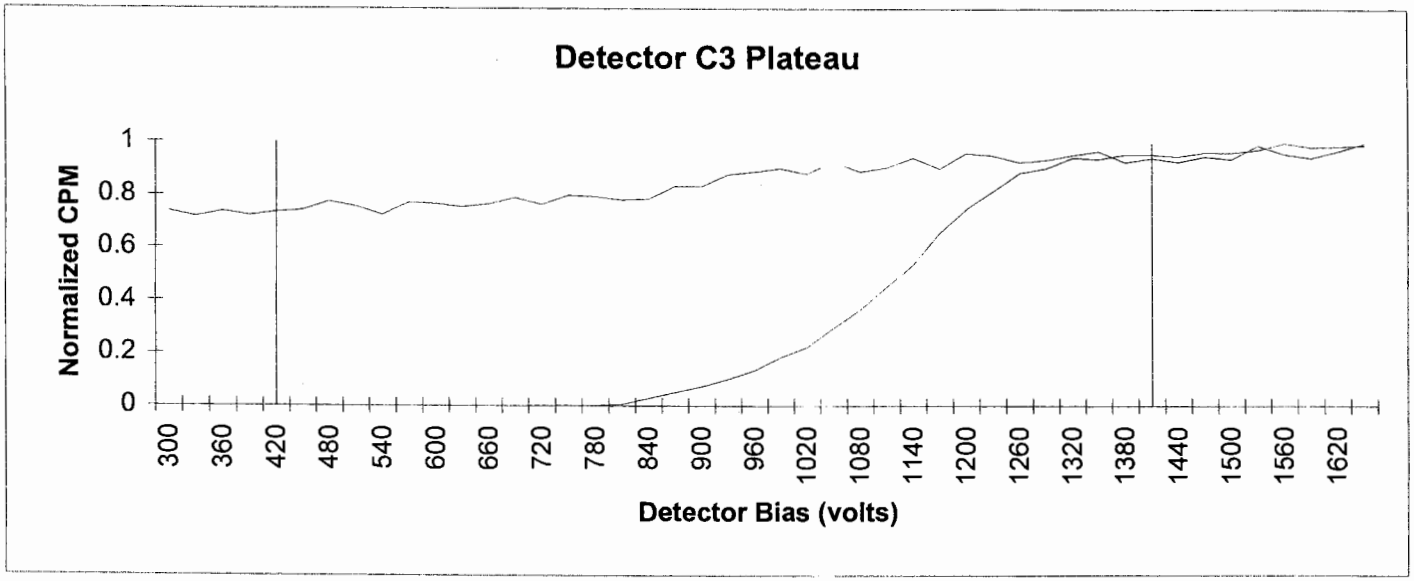


Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 420

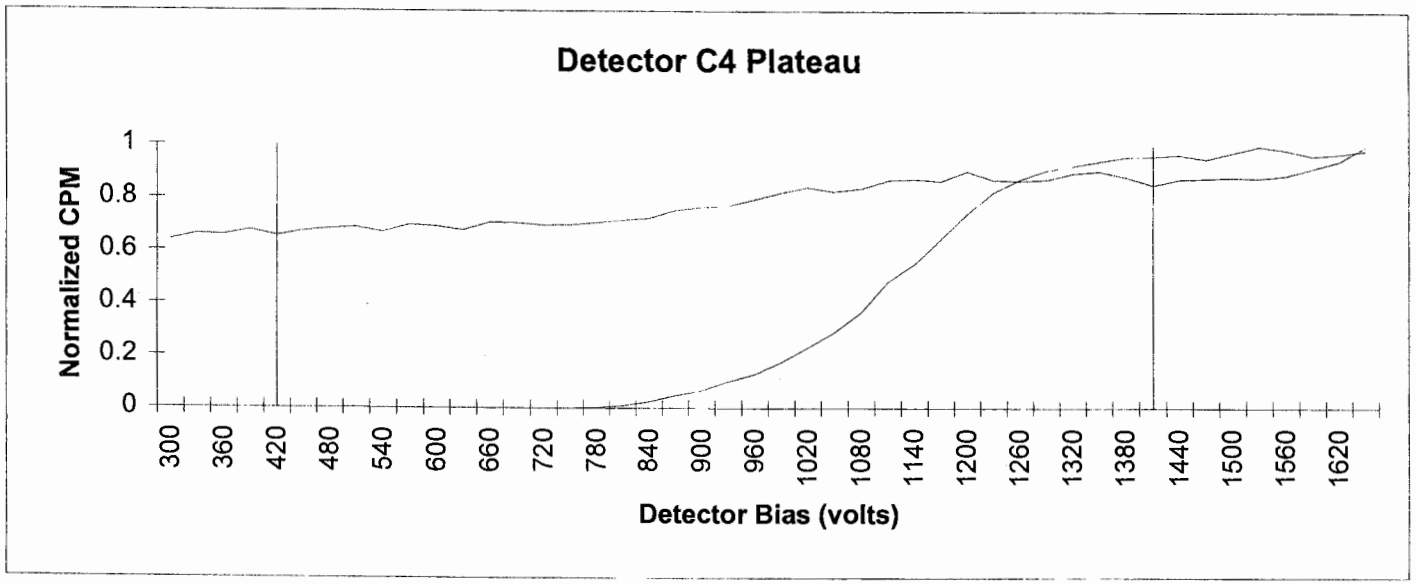
| | C3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 420

| | C4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

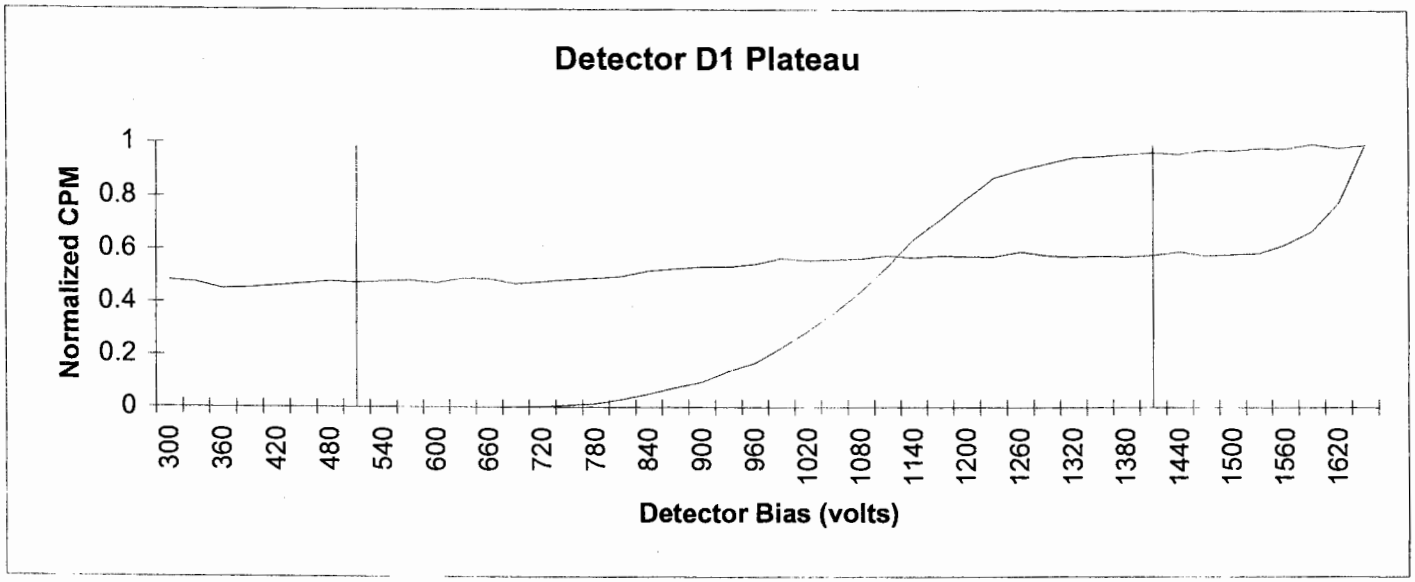


Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1402.5

**Optimum alpha only operating voltage:** 510

| | D1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

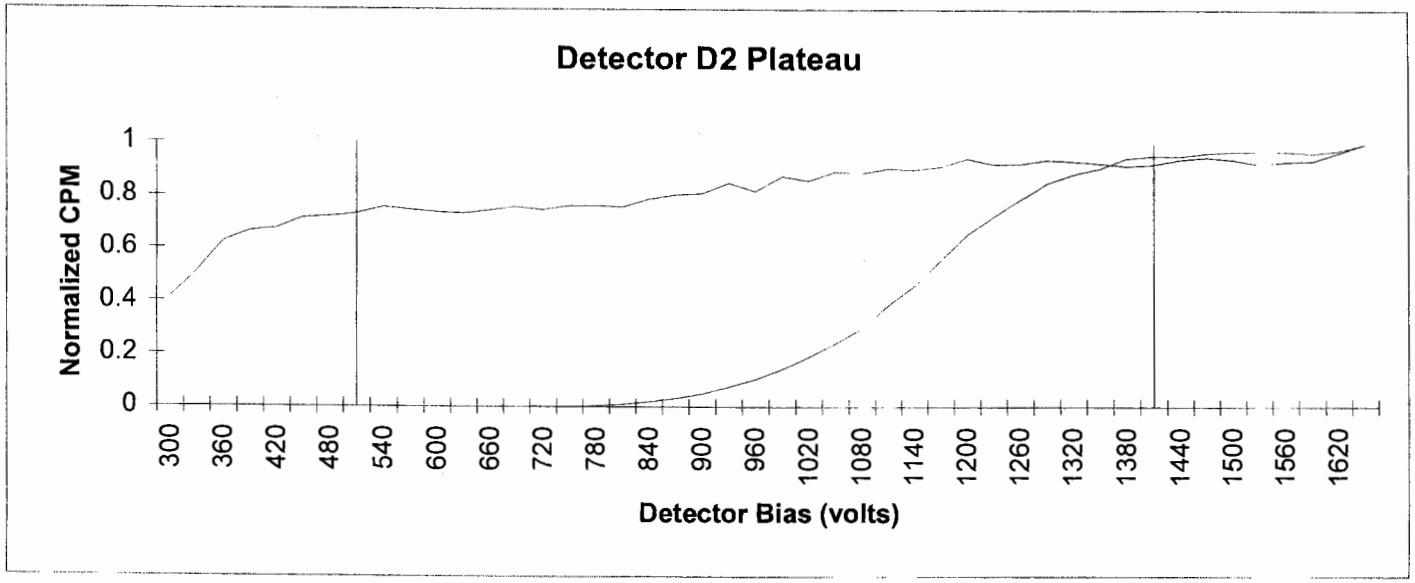


Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1402.5

**Optimum alpha only operating voltage:** 510

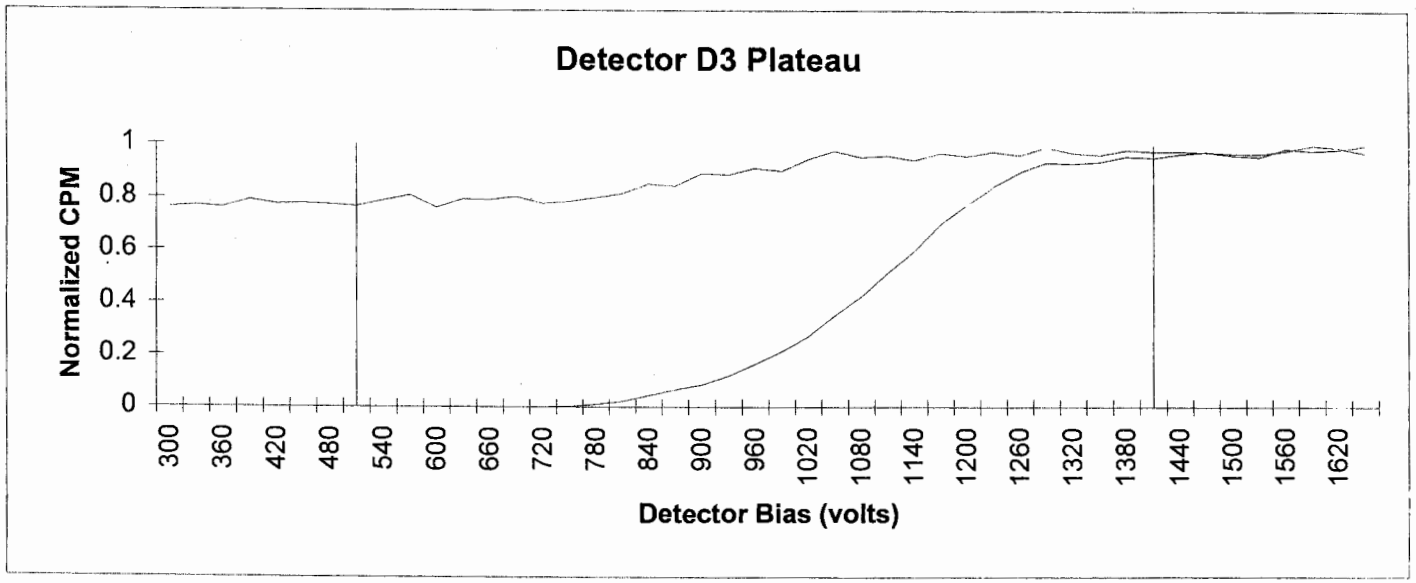
| | D2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1402.5

**Optimum alpha only operating voltage:** 510

| | D3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

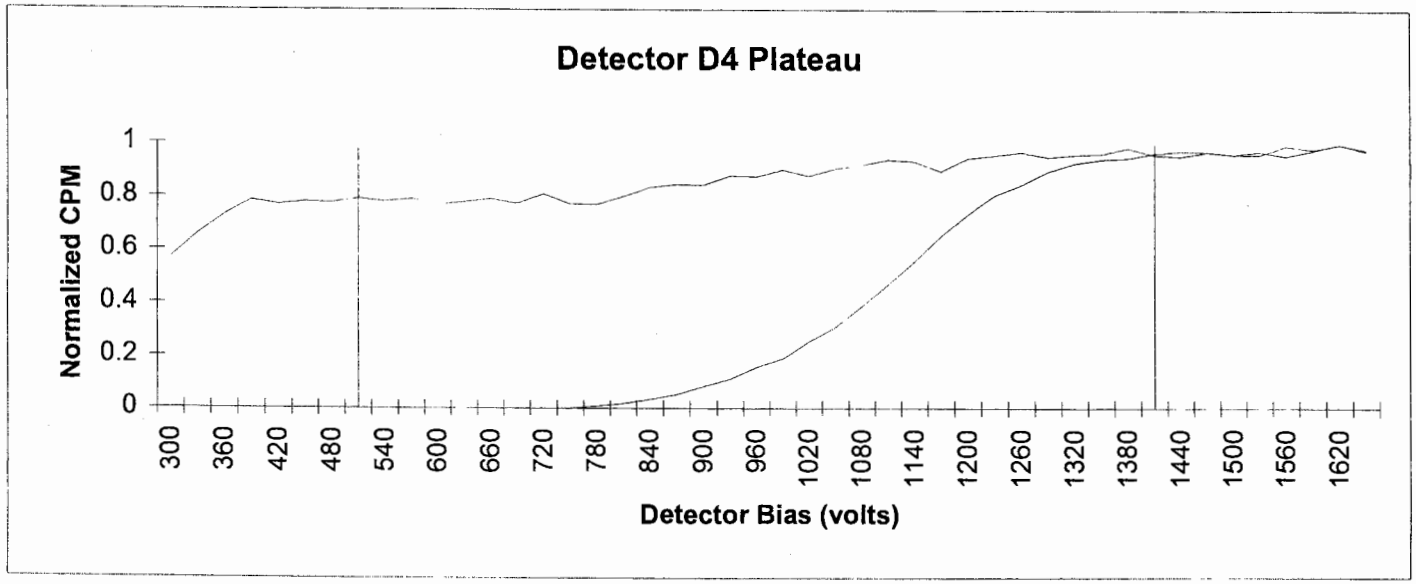


Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 510

| | D4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

Printed 05/21/13 09:40

ARS INTERNATIONAL

## QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

# ANNUAL ACTIVITY VERIFICATION

VERIFICATION DATE: 1/5/2016 16:31 *date counted*
STANDARD REFERENCE #: S-0300

| Principal Radionuclide | | Half Life, Years | | Half Life, Days |
|---|---|---|---|---|
| Sr-90 | *ENTER -->* | 2.880E+01 | *OR -->* | 1.0520E+04 |
| | | 2.880E+01 | | 1.0520E+04 |

Radionuclide: Sr-90 Dilution Reference Date: 12/11/2014 12:05

| | | | |
|---|---|---|---|
| Dilution Activity | 21.73 pCi per gram ===> dpm/g | 48.23 |
| Verif. Date Decay Corrected | 21.18 pCi per gram ===> dpm/g | 47.01 |

*Minimum of 3 Required*

| Trial ID | Sample Counts | Count Time (min) | Detector | Efficiency | Bkg. (cpm) | Net Weight | Decay Corrected Activity Result (dpm/g) | Decay Corrected Activity Result (pCi/g) |
|---|---|---|---|---|---|---|---|---|
| S-0300-V1A | 2534.50 | 120 | B1 | 0.4103 | 0.68 | 1.023 | 48.68 | 21.93 |
| S-0300-V2A | 2411.50 | 120 | B2 | 0.4015 | 0.78 | 0.994 | 48.41 | 21.81 |
| S-0300-V3A | 2451.00 | 120 | B4 | 0.4004 | 0.79 | 1.001 | 49.00 | 22.07 |
| S-0300-V4A | 2469.50 | 120 | C1 | 0.4068 | 0.87 | 1.005 | 48.23 | 21.72 |
| S-0300-V5A | 2442.00 | 120 | C2 | 0.4025 | 1.32 | 1.012 | 46.73 | 21.05 |

| | | | |
|---|---|---|---|
| | Average | 48.21 | 21.72 |
| | Two Sigma Uncertainty | 1.72 | 0.77 |
| *10% Max* *PASS* | Standard Deviation percent of known concentration | 1.86% | 1.86% |
| | Target Activity | 47.01 | 21.18 |
| *5% Max* *PASS* | % Diff | 2.55% | 2.55% |

**Verification Expiration Date:** January 4, 2017

Prepared & Counted By: [signature] Date: 1/5/2016 16:31

Verified & Approved By: [signature] Date: 1-6-16

QC Approval: [signature] Date: 1-6-16

| | |
|---|---|
| **S-0300** | |
| **Sr-90** | Verified 1/5/16 |
| SL | **Expires** **1/5/17** |
| **Manufactuer** | **Analytics** |
| **Sol Matrix** | .1M HCL with 30 ug/g |
| **Ref No** | 75186-526 |
| **Tech** | BSteffens |
| **Parent ID** | S-0160 |

ARS INTERNATIONAL
RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

Sr-90 Verification 1/5/2016

Tech: J Byrd
Pipet # MU02055
Scale ID 12332539
Standard # S-0300

| Sample ID | Std weight g. |
|---|---|
| S-0300-V1A | 1.0234 |
| S-0300-V2A | 0.9938 |
| S-0300-V3A | 1.0008 |
| S-0300-V4A | 1.0046 |
| S-0300-V5A | 1.0117 |

Performed By: J Byrd

Sr-90 Verification 1/5/2016

Tech: JPB JB ~~B Steffens~~ 1-5-16
Pipet # MU02055
Scale ID 12332539
Standard # S-0300

| Sample ID | Std weight g. |
|---|---|
| S-0300-V1A | 1.0234g |
| S-0300-V2A | 0.9938g |
| S-0300-V3A | 1.0008g |
| S-0300-V4A | 1.0046g |
| S-0300-V5A | 1.0117g |

Performed By: ~~B Steffens~~
J. Byrd
JB
1-5-16

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 710
C 11160
Sr
WJS

| | Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|---|
| 2469.5 | C1 | S-0300-V4A | 9 | 4939 | 120 | 1410 | 1/5/16 16:31 |
| 2442 | C2 | S-0300-V5A | 13 | 4884 | 120 | 1410 | 1/5/16 16:31 |
| 2534.5 | B1 | S-0300-V1A | 8 | 5069 | 120 | 1410 | 1/5/16 16:34 |
| 2411.5 | B2 | S-0300-V2A | 12 | 4823 | 120 | 1410 | 1/5/16 16:34 |
| 2451 | B4 | S-0300-V3A | 9 | 4902 | 120 | 1410 | 1/5/16 16:34 |

N-723

DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 704
C 11160
LONG BKG
WJS

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | C1-01 | 68 | 784 .87 | 900 | 1410 | 1/1/16 4:03 |
| C2 | C2-01 | 85 | 1191 .32 | 900 | 1410 | 1/1/16 4:03 |
| C3 | C3-01 | 78 | 788 | 900 | 1410 | 1/1/16 4:03 |
| C4 | C4-01 | 99 | 902 | 900 | 1410 | 1/1/16 4:03 |
| D1 | D1-01 | 47 | 690 | 900 | 1410 | 1/1/16 4:03 |
| D2 | D2-01 | 43 | 747 | 900 | 1410 | 1/1/16 4:03 |
| D3 | D3-01 | 7 | 689 | 900 | 1410 | 1/1/16 4:03 |
| D4 | D4-01 | 29 | 725 | 900 | 1410 | 1/1/16 4:03 |
| A1 | A1-01 | 75 | 773 | 900 | 1410 | 1/1/16 4:06 |
| A2 | A2-01 | 45 | 804 | 900 | 1410 | 1/1/16 4:06 |
| A3 | A3-01 | 38 | 707 | 900 | 1410 | 1/1/16 4:06 |
| A4 | A4-01 | 56 | 743 | 900 | 1410 | 1/1/16 4:06 |
| B1 | B1-01 | 38 | 610 .68 | 900 | 1410 | 1/1/16 4:06 |
| B2 | B2-01 | 30 | 705 .78 | 900 | 1410 | 1/1/16 4:06 |
| B3 | B3-01 | 49 | 3102 | 900 | 1410 | 1/1/16 4:06 |
| B4 | B4-01 | 29 | 713 .79 | 900 | 1410 | 1/1/16 4:06 |

N-724

# LB4100-C Instrument EFF



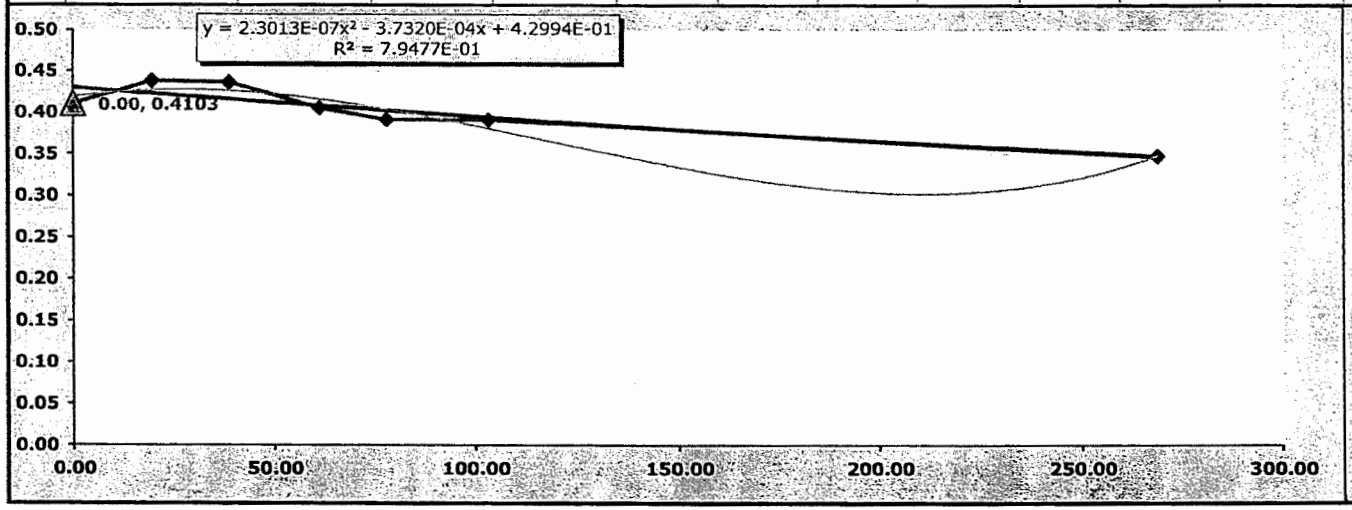
DCN: ITSI-0808-0004-0076, 8 May 2019

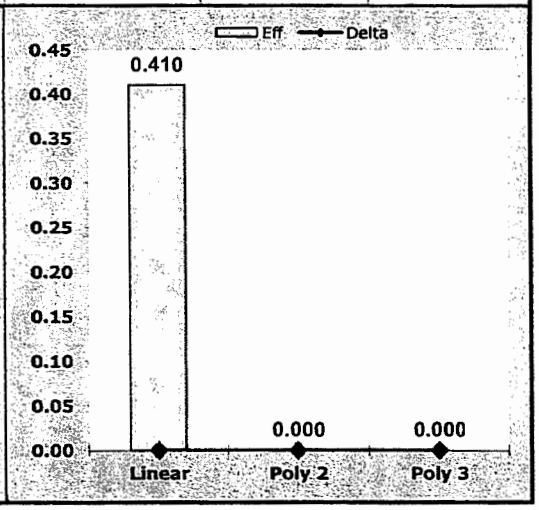
INTERNATIONAL

**LB Eff Calculation Report**

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | B1 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4103 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 31 | 51 | 59642 | 853 | 5.00 | 900 | 5963.73 | 12/30/2014 | 14534.81 | **0.4103** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 46 | 51 | 71138 | 853 | 5.00 | 900 | 7113.33 | 12/30/2014 | 16237.50 | **0.4381** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 36 | 51 | 66836 | 853 | 5.00 | 900 | 6683.13 | 12/30/2014 | 15320.03 | **0.4362** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 26 | 51 | 59885 | 853 | 5.00 | 900 | 5988.03 | 12/30/2014 | 14795.17 | **0.4047** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 43 | 51 | 64332 | 853 | 5.00 | 900 | 6432.73 | 12/30/2014 | 16452.40 | **0.3910** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 31 | 51 | 62242 | 853 | 5.00 | 900 | 6223.73 | 12/30/2014 | 15931.67 | **0.3907** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 25 | 51 | 53692 | 853 | 5.00 | 900 | 5368.73 | 12/30/2014 | 15460.54 | **0.3473** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-725

# LB4100-C Instrument EFF

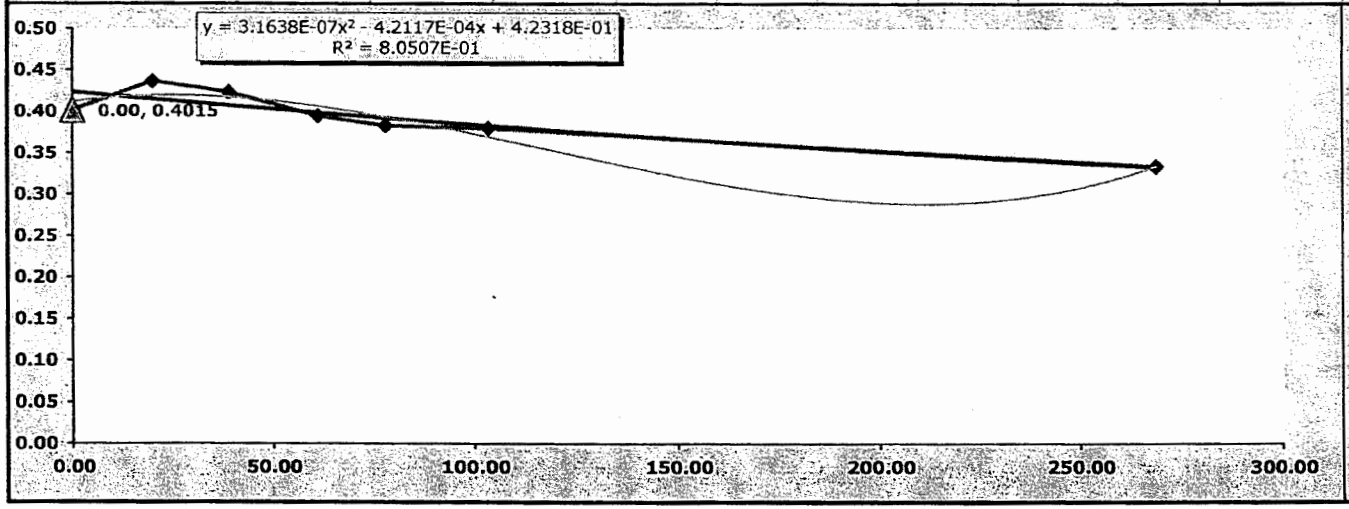


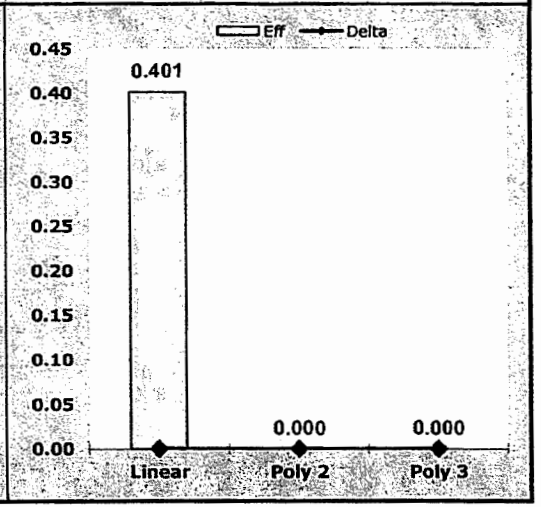
DCN: ITSI-0808-0004-0076, 8 May 2019

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | B2 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4015 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 21 | 68 | 58361 | 732 | 5.00 | 900 | 5835.69 | 12/30/2014 | 14534.81 | **0.4015** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 25 | 68 | 70834 | 732 | 5.00 | 900 | 7082.99 | 12/30/2014 | 16237.50 | **0.4362** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 18 | 68 | 64854 | 732 | 5.00 | 900 | 6484.99 | 12/30/2014 | 15320.03 | **0.4233** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 16 | 68 | 58370 | 732 | 5.00 | 900 | 5836.59 | 12/30/2014 | 14795.17 | **0.3945** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 29 | 68 | 62994 | 732 | 5.00 | 900 | 6298.99 | 12/30/2014 | 16452.40 | **0.3829** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 26 | 68 | 60466 | 732 | 5.00 | 900 | 6046.19 | 12/30/2014 | 15931.67 | **0.3795** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 18 | 68 | 51616 | 732 | 5.00 | 900 | 5161.19 | 12/30/2014 | 15460.54 | **0.3338** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-726

# LB4100-C Instrument EFF

DCN: ITSI-0808-0004-0076, 8 May 2019

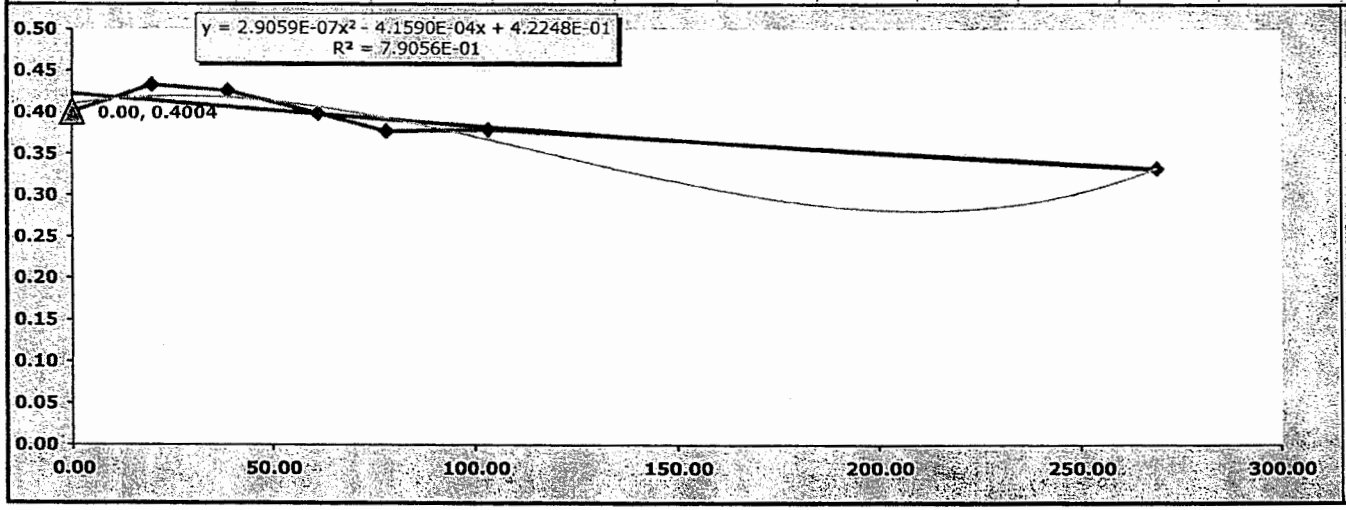
INTERNATIONAL

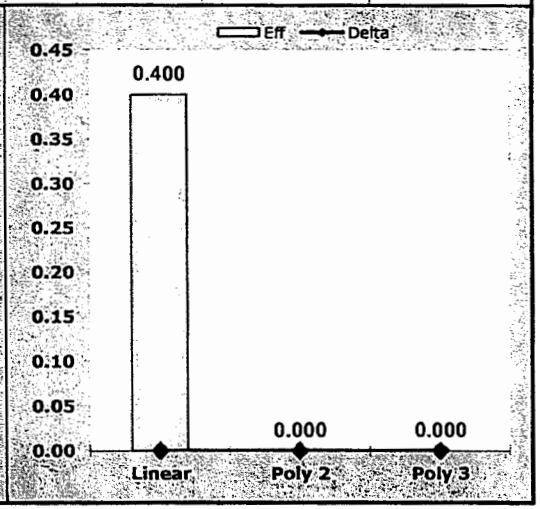
## LB Eff Calculation Report

## SR-90

| | | | |
|---|---|---|---|
| Instrument | LB4100-C | Detector | B4 |
| Slope | | Current Wt. | |
| Intercept | | Eff | 0.4004 |
| Eff Poly 2nd | | Δ 2 | |
| Eff Poly 3rd | | Δ 3 | |

| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 26 | 58 | 58199 | 791 | 5.00 | 900 | 5819.46 | 12/30/2014 | 14534.81 | **0.4004** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 26 | 58 | 70333 | 791 | 5.00 | 900 | 7032.86 | 12/30/2014 | 16237.50 | **0.4331** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 19 | 58 | 65271 | 791 | 5.00 | 900 | 6526.66 | 12/30/2014 | 15320.03 | **0.4260** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 25 | 58 | 58965 | 791 | 5.00 | 900 | 5896.06 | 12/30/2014 | 14795.17 | **0.3985** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 26 | 58 | 62087 | 791 | 5.00 | 900 | 6208.26 | 12/30/2014 | 16452.40 | **0.3773** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 21 | 58 | 60410 | 791 | 5.00 | 900 | 6040.56 | 12/30/2014 | 15931.67 | **0.3792** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 9 | 58 | 51458 | 791 | 5.00 | 900 | 5145.36 | 12/30/2014 | 15460.54 | **0.3328** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-727

# LB4100-C Instrument EFF

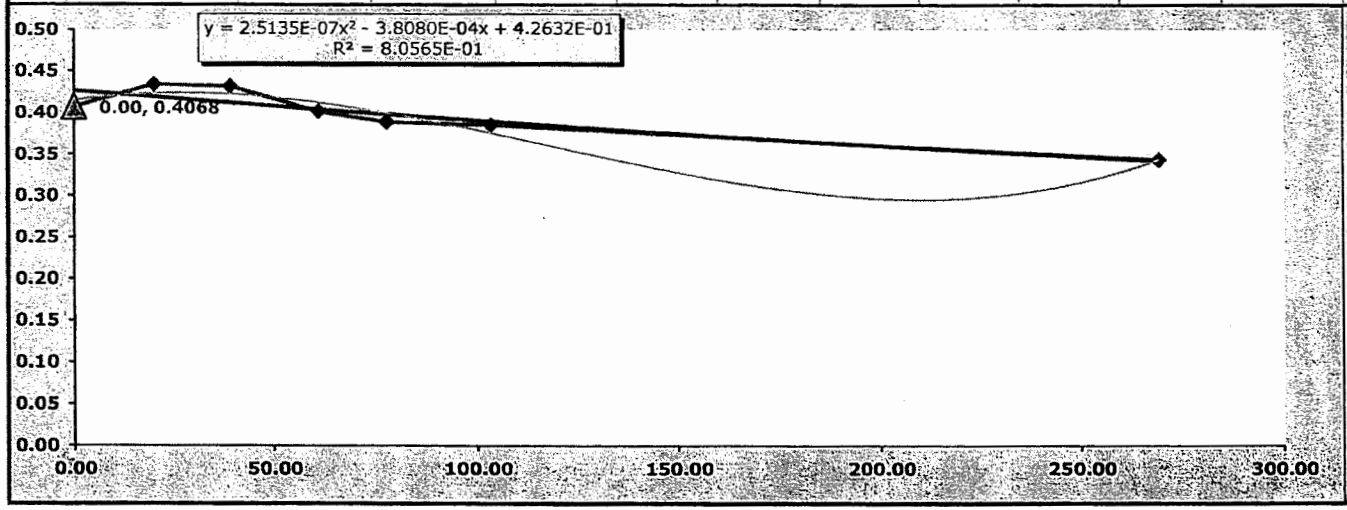


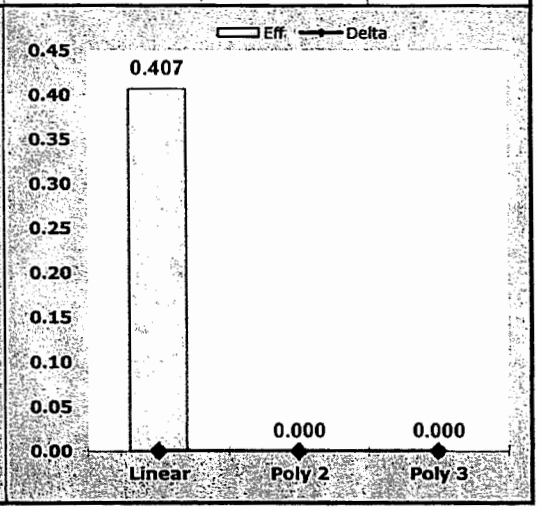
DCN: ITSI-0808-0004-0076, 8 May 2019

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | C1 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4068 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 24 | 85 | 59129 | 938 | 5.00 | 900 | 5912.38 | 12/30/2014 | 14534.81 | **0.4068** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 21 | 85 | 70471 | 938 | 5.00 | 900 | 7046.58 | 12/30/2014 | 16237.50 | **0.4340** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 25 | 85 | 66149 | 938 | 5.00 | 900 | 6614.38 | 12/30/2014 | 15320.03 | **0.4317** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 16 | 85 | 59377 | 938 | 5.00 | 900 | 5937.18 | 12/30/2014 | 14795.17 | **0.4013** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 23 | 85 | 63951 | 938 | 5.00 | 900 | 6394.58 | 12/30/2014 | 16452.40 | **0.3887** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 16 | 85 | 61329 | 938 | 5.00 | 900 | 6132.38 | 12/30/2014 | 15931.67 | **0.3849** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 15 | 85 | 53064 | 938 | 5.00 | 900 | 5305.88 | 12/30/2014 | 15460.54 | **0.3432** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-728

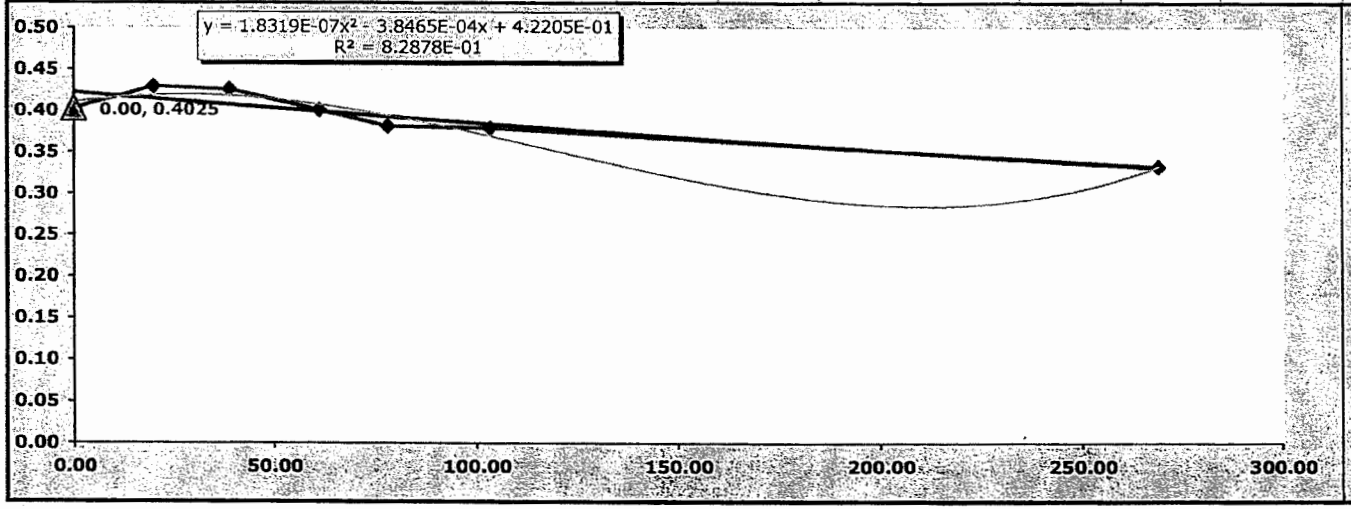
# LB4100-C Instrument EFF

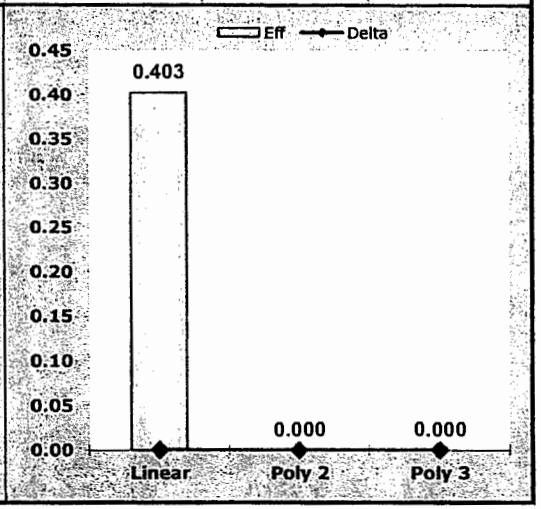
DCN: ITSI-0808-0004-0076, 8 May 2019

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | C2 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4025 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 16 | 121 | 58511 | 890 | 5.00 | 900 | 5850.61 | 12/30/2014 | 14534.81 | **0.4025** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 18 | 121 | 69706 | 890 | 5.00 | 900 | 6970.11 | 12/30/2014 | 16237.50 | **0.4293** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 9 | 121 | 65244 | 890 | 5.00 | 900 | 6523.91 | 12/30/2014 | 15320.03 | **0.4258** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 8 | 121 | 59320 | 890 | 5.00 | 900 | 5931.51 | 12/30/2014 | 14795.17 | **0.4009** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 13 | 121 | 62756 | 890 | 5.00 | 900 | 6275.11 | 12/30/2014 | 16452.40 | **0.3814** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 12 | 121 | 60398 | 890 | 5.00 | 900 | 6039.31 | 12/30/2014 | 15931.67 | **0.3791** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 10 | 121 | 51491 | 890 | 5.00 | 900 | 5148.61 | 12/30/2014 | 15460.54 | **0.3330** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-729

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Standard Information

***SDG# ARS1-16-00670***

***COC# HPSE2-284***

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

COPY

# CERTIFICATE OF CALIBRATION
# MULTINUCLIDE STANDARD SOURCE

| | | | |
|---|---|---|---|
| **Customer:** | AMERICAN RADIATION SERVICE | **Source No.:** | 1559-72-6 |
| **P.O. No.:** | 11-0530 | **Reference Date:** | 1-Feb-12 12:00 PST |
| **Catalog No.:** | EG-ML | **Contained Radioactivity:** | 2.549 µCi 94.31 kBq |

**Physical Description:**

| | | |
|---|---|---|
| A. | Capsule type: | Customer supplied tuna can |
| B. | Nature of active deposit: | Multinuclide distributed in 1.5 g/cc epoxy matrix |
| C. | Active diameter/volume: | Approximately 250mL (375.2 grams) |
| D. | Backing: | Steel |
| E. | Cover: | Steel |

returned to MS.

| Gamma-Ray Energy (keV) | Nuclide | Half-life | Branching Ratio (%) | Activity (µCi) | Gammas per second | Total Uncert. |
|---|---|---|---|---|---|---|
| 47 | Pb-210 | 22.3 ± 0.2 years | 4.18 | 0.5834 | 902.3 | 7.0 % |
| 60 | Am-241 | 432.17 ± 0.66 years | 36.0 | 0.05866 | 781.4 | 3.0 % |
| 88 | Cd-109 | 462.6 ± 0.7 days | 3.63 | 0.5345 | 717.9 | 3.1 % |
| 122 | Co-57 | 271.79 ± 0.09 days | 85.6 | 0.02013 | 637.6 | 3.1 % |
| 159 | Te-123m | 119.7 ± 0.1 days | 84.0 | 0.02758 | 857.2 | 3.0 % |
| 320 | Cr-51 | 27.706 ± 0.007 days | 9.86 | 0.6881 | 2510 | 3.0 % |
| 392 | Sn-113 | 115.09 ± 0.04 days | 64.9 | 0.1048 | 2517 | 3.0 % |
| 514 | Sr-85 | 64.849 ± 0.004 days | 98.4 | 0.1282 | 4668 | 3.0 % |
| 662 | Cs-137 | 30.17 ± 0.16 years | 85.1 | 0.08881 | 2796 | 3.0 % |
| 898 | Y-88 | 106.630 ± 0.025 days | 94.0 | 0.2068 | 7193 | 3.0 % |
| 1173 | Co-60 | 5.272 ± 0.001 years | 99.86 | 0.1077 | 3979 | 3.0 % |
| 1333 | Co-60 | 5.272 ± 0.001 years | 99.98 | 0.1077 | 3984 | 3.0 % |
| 1836 | Y-88 | 106.630 ± 0.025 days | 99.4 | 0.2068 | 7606 | 3.0 % |

**Method of Calibration:**

This source was prepared from weighed aliquots of solutions whose concentrations in µCi/g were determined by gamma spectrometry.

**Notes:**

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- Overall uncertainty is calculated at the 99% confidence level.
- This source has a working life of 1 year.

David James Van Dalsem
Quality Control

5-Jan-12
Date

EZIP Ref. No.: 1559-72

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

# CERTIFICATE OF CALIBRATION
# MULTINUCLIDE STANDARD SOURCE

| | | | |
|---|---|---|---|
| **Customer:** | AMERICAN RADIATION SERVICE | **Source No.:** | 1748-90-1 |
| **P.O. No.:** | 14-0236 | **Reference Date:** | 1-Oct-14 12:00 PST |
| **Catalog No.:** | EG-ML | **Contained Radioactivity:** | 0.9342 µCi 34.57 kBq |

**Physical Description:**

A. Capsule type: Customer supplied tuna can
B. Nature of active deposit: Multinuclide distributed in 1.5 g/cc epoxy matrix
C. Active diameter/volume: Approximately 250mL (377.6 grams)
D. Backing: Steel
E. Cover: Steel

| Gamma-Ray Energy (keV) | Nuclide | Half-life | Branching Ratio (%) | Activity (µCi) | Gammas per second | Total Uncert. |
|---|---|---|---|---|---|---|
| 47 | Pb-210 | 22.3 ± 0.2 years | 4.18 | 0.2133 | 329.9 | 4.1 % |
| 60 | Am-241 | 432.17 ± 0.66 years | 36.0 | 0.02113 | 281.5 | 3.1 % |
| 88 | Cd-109 | 462.6 ± 0.7 days | 3.63 | 0.2039 | 273.9 | 3.1 % |
| 122 | Co-57 | 271.79 ± 0.09 days | 85.6 | 0.007394 | 234.2 | 3.1 % |
| 159 | Te-123m | 119.7 ± 0.1 days | 84.0 | 0.01066 | 331.3 | 3.1 % |
| 320 | Cr-51 | 27.706 ± 0.007 days | 9.86 | 0.2517 | 918.3 | 3.0 % |
| 392 | Sn-113 | 115.09 ± 0.04 days | 64.9 | 0.03574 | 858.2 | 3.0 % |
| 514 | Sr-85 | 64.849 ± 0.004 days | 98.4 | 0.04568 | 1663 | 3.0 % |
| 662 | Cs-137 | 30.17 ± 0.16 years | 85.1 | 0.03171 | 998.5 | 3.1 % |
| 898 | Y-88 | 106.630 ± 0.025 days | 94.0 | 0.07337 | 2552 | 3.0 % |
| 1173 | Co-60 | 5.272 ± 0.001 years | 99.86 | 0.03965 | 1465 | 3.0 % |
| 1333 | Co-60 | 5.272 ± 0.001 years | 99.98 | 0.03965 | 1467 | 3.0 % |
| 1836 | Y-88 | 106.630 ± 0.025 days | 99.4 | 0.07337 | 2698 | 3.0 % |

**Method of Calibration:**

This source was prepared from weighed aliquots of solutions whose concentrations in µCi/g were determined by gamma spectrometry.

**Notes:**

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- Overall uncertainty is calculated at the 99% confidence level.
- This source has a working life of 1 year.

Daniel James Van Dalsem
Quality Control

18-Sep-14
Date

EZIP Ref. No.: 1748-90

E&Z 1748-90-1 250ml Tuna Can 1.5g/cc

| Nuclide | Energy | GPS | BRatio | Bq | DPM | pCi |
|---|---|---|---|---|---|---|
| PB-210 | 47 | 329.9 | 0.0418 | 7892.344 | 473540.7 | 213306.4 |
| AM-241 | 60 | 281.5 | 0.36 | 781.9444 | 46916.67 | 21133.61 |
| CD-109 | 88 | 273.9 | 0.0363 | 7545.455 | 452727.3 | 203931 |
| CO-57 | 122 | 234.2 | 0.856 | 273.5981 | 16415.89 | 7394.537 |
| TE-123m | 159 | 331.3 | 0.84 | 394.4048 | 23664.29 | 10659.58 |
| CR-51 | 320 | 918.3 | 0.0986 | 9313.387 | 558803.2 | 251712.9 |
| SN-113 | 392 | 858.2 | 0.649 | 1322.342 | 79340.52 | 35738.94 |
| SR-85 | 514 | 1663 | 0.984 | 1690.041 | 101402.4 | 45676.73 |
| CS-137 | 662 | 998.5 | 0.851 | 1173.325 | 70399.53 | 31711.47 |
| Y-88 | 898 | 2552 | 0.94 | 2714.894 | 162893.6 | 73375.43 |
| CO-60 | 1173 | 1465 | 0.9986 | 1467.054 | 88023.23 | 39650.07 |
| CO-60 | 1333 | 1467 | 0.9998 | 1467.293 | 88037.61 | 39656.54 |
| Y-88 | 1836 | 2698 | 0.994 | 2714.286 | 162857.1 | 73359 |

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

Recieved JDT
7-11-12

# CERTIFICATE OF CALIBRATION
# MULTINUCLIDE STANDARD SOURCE

| | | | |
|---|---|---|---|
| **Customer:** | AMERICAN RADIATION SERVICE | **Source No.:** | 1595-98-4 |
| **P.O. No.:** | 12-0210 / R5197 | **Reference Date:** | 1-Jul-12 12:00 PST |
| **Catalog No.:** | EG-ML | **Contained Radioactivity:** | 1.024 µCi 37.89 kBq |

**Physical Description:**

| | | |
|---|---|---|
| A. | Capsule type: | Customer supplied tuna can |
| B. | Nature of active deposit: | Multinuclide distributed in 1.5 g/cc epoxy matrix |
| C. | Active diameter/volume: | Approximately 250mL (376.2 grams) |
| D. | Backing: | Plastic |
| E. | Cover: | Plastic |

| Gamma-Ray Energy (keV) | Nuclide | Half-life | Branching Ratio (%) | Activity (µCi) | Gammas per second | Total Uncert. |
|---|---|---|---|---|---|---|
| 47 | Pb-210 | 22.3 ± 0.2 years | 4.18 | 0.2320 | 358.8 | 7.0 % |
| 60 | Am-241 | 432.17 ± 0.66 years | 36.0 | 0.02273 | 302.8 | 3.0 % |
| 88 | Cd-109 | 462.6 ± 0.7 days | 3.63 | 0.2223 | 298.6 | 3.2 % |
| 122 | Co-57 | 271.79 ± 0.09 days | 85.6 | 0.008038 | 254.6 | 3.1 % |
| 159 | Te-123m | 119.7 ± 0.1 days | 84.0 | 0.01098 | 341.3 | 3.1 % |
| 320 | Cr-51 | 27.706 ± 0.007 days | 9.86 | 0.2766 | 1009 | 3.0 % |
| 392 | Sn-113 | 115.09 ± 0.04 days | 64.9 | 0.04358 | 1046 | 3.0 % |
| 514 | Sr-85 | 64.849 ± 0.004 days | 98.4 | 0.05122 | 1865 | 3.0 % |
| 662 | Cs-137 | 30.17 ± 0.16 years | 85.1 | 0.03546 | 1117 | 3.0 % |
| 898 | Y-88 | 106.630 ± 0.025 days | 94.0 | 0.07866 | 2736 | 3.0 % |
| 1173 | Co-60 | 5.272 ± 0.001 years | 99.86 | 0.04279 | 1581 | 3.0 % |
| 1333 | Co-60 | 5.272 ± 0.001 years | 99.98 | 0.04279 | 1583 | 3.0 % |
| 1836 | Y-88 | 106.630 ± 0.025 days | 99.4 | 0.07866 | 2893 | 3.0 % |

**Method of Calibration:**

This source was prepared from weighed aliquots of solutions whose concentrations in µCi/g were determined by gamma spectrometry.

**Notes:**

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- Overall uncertainty is calculated at the 99% confidence level.
- This source has a working life of 1 year.

Daniel James Van Dalsen
Quality Control

5-Jul-12
Date

EZIP Ref. No.: 1595-98

**1595-98-4 - Tuna Can 1.5g/cc - 7-1-12**

| Nuclide | Energy | GPS | BRatio | Bq | DPM | pCi |
|---|---|---|---|---|---|---|
| PB-210 | 47 | 358.8 | 0.0418 | 8583.73 | 515023.92 | 231992.53 |
| AM-241 | 60 | 302.8 | 0.36 | 841.11 | 50466.67 | 22732.71 |
| CD-109 | 88 | 298.6 | 0.0363 | 8225.90 | 493553.72 | 222321.27 |
| CO-57 | 122 | 254.6 | 0.856 | 297.43 | 17845.79 | 8038.64 |
| TE-123M | 159 | 341.3 | 0.84 | 406.31 | 24378.57 | 10981.33 |
| CR-51 | 320 | 1009 | 0.0986 | 10233.27 | 613995.94 | 276574.47 |
| SN-113 | 392 | 1046 | 0.649 | 1611.71 | 96702.62 | 43559.69 |
| SR-85 | 514 | 1865 | 0.984 | 1895.33 | 113719.51 | 51224.95 |
| CS-137 | 662 | 1117 | 0.851 | 1312.57 | 78754.41 | 35474.92 |
| Y-88 | 898 | 2736 | 0.94 | 2910.64 | 174638.30 | 78665.82 |
| CO-60 | 1173 | 1581 | 0.9986 | 1583.22 | 94992.99 | 42789.59 |
| CO-60 | 1333 | 1583 | 0.9998 | 1583.32 | 94999.00 | 42792.30 |
| Y-88 | 1836 | 2893 | 0.994 | 2910.46 | 174627.77 | 78661.08 |

# Certificate of Analysis

## STRONTIUM CARRIER 5MG/ML

**Certificate Registration Number: 01937-2000-AQ-HOU-RAB**

| | |
|---|---|
| LaMarKa Code: 7923 | Customer Code: AMR-132 |
| Lot Number: 79233021510TR | Reported Value: N/A |
| Preparation Date: 10-Feb-15 | Tolerance +-: 0.01 GPL |
| Expiration Date: 09-Aug-15 | |

All glassware used in the manufacture of this product is of the Class A type. All Volumetric glassware has been calibrated in accordance with ASTM E 542 and is traceable to NIST.

All balances used in the manufacture of this product are calibrated on a daily basis with NIST traceable weights. The balances are maintained and serviced on a regular basis by certified balance specialist.

All chemicals used in the manufacture of this product are ACS reagent grade chemicals unless specified by the customer.

A Quality Management Program governs each and every step of the manufacturing process for this product. Traceability from LaMarKa lot numbers to original manufacturer lot numbers is maintained and available.

Michael Ballard

Quality Assurance

*La-Mar-Ka, Inc.*

10272 South Perdue Baton Rouge, Louisiana 70814
(225) 272-8125

ISO 9001:2008

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

COPY

# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

73518-526

Th-230 47 mm Diameter x 0.9 mm Thick Stainless Steel Disk in Stainless Steel Planchet

This standard radionuclide source was prepared by electro-deposition of Th-230 onto a stainless steel disk. Th-230 activity was determined with a ZnS scintillation detector. The calibration was checked by alpha spectroscopy after source preparation.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

| | |
|---|---|
| ISOTOPE: | Th-230 |
| ACTIVITY (dps): | 1.888 E2 |
| HALF-LIFE: | 7.538 E4 years |
| CALIBRATION DATE: | September 11, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.0% |

Diameter of Active Area: 33 mm. Low Ringed Bottom Planchet.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

P O NUMBER 06-0431, Item 1

SOURCE CALIBRATED BY: Daniel M. Montgomery, Radiochemist

Q A APPROVED: 09-12-2006

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# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

73519-526

Th-230 47 mm Diameter x 0.9 mm Thick Stainless Steel Disk in Stainless Steel Planchet

This standard radionuclide source was prepared by electro-deposition of Th-230 onto a stainless steel disk. Th-230 activity was determined with a ZnS scintillation detector. The calibration was checked by alpha spectroscopy after source preparation.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

| | |
|---|---|
| ISOTOPE: | Th-230 |
| ACTIVITY (dps): | 1.851 E2 |
| HALF-LIFE: | 7.538 E4 years |
| CALIBRATION DATE: | September 11, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.0% |

Diameter of Active Area: 33 mm. Low Ringed Bottom Planchet.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

P O NUMBER 06-0431, Item 1

SOURCE CALIBRATED BY: _____
Daniel M. Montgomery, Radiochemist

Q A APPROVED: _____ 09-11-2006

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An Isotope Products Laboratories Company

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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

73520-526

Th-230 47 mm Diameter x 0.9 mm Thick Stainless Steel Disk in Stainless Steel Planchet

This standard radionuclide source was prepared by electro-deposition of Th-230 onto a stainless steel disk. Th-230 activity was determined with a ZnS scintillation detector. The calibration was checked by alpha spectroscopy after source preparation.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

| | |
|---|---|
| ISOTOPE: | Th-230 |
| ACTIVITY (dps): | 1.907 E2 |
| HALF-LIFE: | 7.538 E4 years |
| CALIBRATION DATE: | September 11, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.0% |

Diameter of Active Area: 33 mm. Low Ringed Bottom Planchet.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

P O NUMBER 06-0431, Item 1

SOURCE CALIBRATED BY: _____
Daniel M. Montgomery, Radiochemist

Q A APPROVED: _____ 09-11-2006

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# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

73521-526

Th-230 47 mm Diameter x 0.9 mm Thick Stainless Steel Disk in Stainless Steel Planchet

This standard radionuclide source was prepared by electro-deposition of Th-230 onto a stainless steel disk. Th-230 activity was determined with a ZnS scintillation detector. The calibration was checked by alpha spectroscopy after source preparation.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

| | |
|---|---|
| ISOTOPE: | Th-230 |
| ACTIVITY (dps): | 1.916 E2 |
| HALF-LIFE: | 7.538 E4 years |
| CALIBRATION DATE: | September 11, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.0% |

Diameter of Active Area: 33 mm. Low Ringed Bottom Planchet.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

P O NUMBER 06-0431, Item 1

SOURCE CALIBRATED BY: DM. Mont
Daniel M. Montgomery, Radiochemist

Q A APPROVED: 09-11-2006

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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

73522-526

Sr-90 in Aluminized Mylar on 47 mm Diameter Aluminum Ring

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. The calibration was checked by beta counting after source preparation.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| ISOTOPE: | Sr-90 |
| ACTIVITY (dps): | 1.826 E2 |
| HALF-LIFE: | 28.79 years |
| CALIBRATION DATE: | October 9, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.3% |

Impurities: $\gamma$-impurities <0.1%

Diameter of active area: 33 mm. 0.8 mg/cm$^2$ aluminized mylar.

No expiration date has been given for this source due to the fragile nature of the mylar covering. This source should be carefully tested for leakage at least every six months. If leakage is detected this source should be disposed of by approved radioactive waste disposal procedures.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta activity for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

P O NUMBER 06-0422, Item 1

SOURCE PREPARED BY: M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED: 10-10-06

ANALYTICS
An Isotope Products Laboratories Company

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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

73523-526

Sr-90 in Aluminized Mylar on 47 mm Diameter Aluminum Ring

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. The calibration was checked by beta counting after source preparation.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| ISOTOPE: | Sr-90 |
| ACTIVITY (dps): | 1.837 E2 |
| HALF-LIFE: | 28.79 years |
| CALIBRATION DATE: | October 9, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.3% |

Impurities: $\gamma$-impurities <0.1%

Diameter of active area: 33 mm. 0.8 mg/cm$^2$ aluminized mylar.

No expiration date has been given for this source due to the fragile nature of the mylar covering. This source should be carefully tested for leakage at least every six months. If leakage is detected this source should be disposed of by approved radioactive waste disposal procedures.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta activity for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

P O NUMBER 06-0422, Item 1

SOURCE PREPARED BY: N. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED: 10-10-06

ANALYTICS
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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

73524-526

Sr-90 in Aluminized Mylar on 47 mm Diameter Aluminum Ring

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. The calibration was checked by beta counting after source preparation.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| ISOTOPE: | Sr-90 |
| ACTIVITY (dps): | 1.833 E2 |
| HALF-LIFE: | 28.79 years |
| CALIBRATION DATE: | October 9, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.3% |

Impurities: γ-impurities <0.1%

Diameter of active area: 33 mm. 0.8 mg/cm$^2$ aluminized mylar.

No expiration date has been given for this source due to the fragile nature of the mylar covering. This source should be carefully tested for leakage at least every six months. If leakage is detected this source should be disposed of by approved radioactive waste disposal procedures.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta activity for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

P O NUMBER 06-0422, Item 1

SOURCE PREPARED BY: M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED: 10-10-06

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# CERTIFICATE OF CALIBRATION
## Standard Radionuclide Source

73525-526

**Sr-90 in Aluminized Mylar on 47 mm Diameter Aluminum Ring**

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. The calibration was checked by beta counting after source preparation.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|---|
| ISOTOPE: | Sr-90 |
| ACTIVITY (dps): | 1.811 E2 |
| HALF-LIFE: | 28.79 years |
| CALIBRATION DATE: | October 9, 2006 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.3% |

Impurities: γ-impurities <0.1%

Diameter of active area: 33 mm. 0.8 mg/cm$^2$ aluminized mylar.

No expiration date has been given for this source due to the fragile nature of the mylar covering. This source should be carefully tested for leakage at least every six months. If leakage is detected this source should be disposed of by approved radioactive waste disposal procedures.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta activity for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

P O NUMBER 06-0422, Item 1

SOURCE PREPARED BY: M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED: 10-10-06

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Log Book Pages

## EPA 901.1

***SDG# ARS1-16-00670***

***COC# HPSD1-284***

# Gamma Spectroscopy Log Book
## Detector Serial Number ~~50-TN22856A~~ 48-TN50418A

WM 4-14-16

| Tech. Initials | | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| WM | 4-14-16 | 1117 | 16-00548 | C2 | 1 | 05225 | 2525 | WM |
| WM | 〃 | 1234 | 16-00524 | C2 | 1 | 05226 | 1L 15 | WM |
| WM | 〃 | 1457 | 〃 | C4 | 1.00 | 05227 | 〃 | WM |
| WM | 4-15-16 | 0559 | Cal | GA | 121682 | 05228 | 〃 | WM |
| WM | 〃 | 0626 | 16-00552 | C2 | 1 | 05229 | R1L | WM |
| WM | 〃 | 0639 | 〃 | C5 | 856.3 | 05230 | 〃 | WM |
| WM | 〃 | 1036 | 16-00554 | C3 | N/A | 05231 | 2525 | WM |
| WM | 〃 | 1134 | 〃 | C7 | 263.49 | 05232 | 〃 | WM |
| WM | 〃 | 1230 | 16-00555 | C2 | 1 | 05233 | 〃 | WM |
| WM | 〃 | 1243 | 〃 | C4 | 317.49 | 05234 | 〃 | WM |
| WM | 〃 | 1307 | Long Alg | GA | N/A | 05235 | Long | WM |
| WM | 4-18-16 | 0708 | Cal | GA | 121682 | 05236 | 1L 15 | WM |
| WM | 〃 | 1257 | 16-00562 | C2 | 1 | 05237 | 2525 | WM |
| WM | 〃 | 1347 | 〃 | C6 | 144.47 | 05238 | 〃 | WM |
| WM | 〃 | 1430 | 16-00566 | C1 | 1 | 05239 | 1L 15 | WM |
| WM | 〃 | 1442 | 16-00562 | C2 | 252.55 | 05240 | 2525 | WM |
| WM | 〃 | 1514 | 16-00566 | C3 | N/A | 05241 | 1L 15 | WM |
| WM | 4-14-16 | 0520 | Cal | GA | 121682 | 05242 | 1L 15 | WM |
| WM | 〃 | 0534 | 〃 | 〃 | 〃 | 05243 | 〃 | WM |
| WM | 〃 | 0547 | 16-00567 | C1 | 1 | 05244 | 2525 | WM |
| WM | 〃 | 0607 | 16-00563 | C1 | 1 | 05245 | Ra | WM |
| WM | 〃 | 0619 | 16-00567 | C4 | 239.57 | 05246 | 2525 | WM |
| WM | 〃 | 0657 | 16-00562 | C2 | 252.99 | 05247 | 〃 | WM |
| WM | 〃 | 0725 | 16-00559 | C4 | 359.79 | 05248 | 〃 | WM |
| WM | 〃 | 0759 | 16-00563 | C2 | 357.36 | 05249 | Ra | WM |



Reviewed By: [signature] Date: 4-29-16
Initials

DCN: ITSI-0808-0004-0076, 8 May 2019

# Gamma Spectroscopy Log Book
## Detector Serial Number ~~50-TN22856A~~ WJ 4-19-16
48-TN50418 A

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initial |
|---|---|---|---|---|---|---|---|
| 4-19-16 | 0831 | 16-00563 | 13 | 386.19 | 05250 | R | WJ |
| 〃 | 0909 | 〃 | 18 | 373.22 | 05251 | 〃 | WJ |
| 〃 | 0937 | 〃 | 23 | 370.81 | 05252 | 〃 | WJ |
| 〃 | 1002 | 16-00564 | 06 | 295.81 | 05253 | 〃 | WJ |
| 〃 | 1040 | 〃 | 11 | 399.49 | 05254 | 〃 | WJ |
| 〃 | 1121 | 〃 | 18 | 343.73 | 05255 | 〃 | WJ |
| 〃 | 1158 | 〃 | 21 | 349.95 | 05256 | 〃 | WJ |
| 〃 | 1227 | 16-00565 | 03 | N/A | 05257 | 〃 | WJ |
| 〃 | 1300 | 〃 | 08 | 357.08 | 05258 | 〃 | WJ |
| 〃 | 1334 | 16-00567 | 05 | 283.02 | 05259 | 2L/A | WJ |
| 〃 | 1458 | 16-00571 | 03 | N/A | 05260 | 1L/A | WJ |
| 4-20-16 | 0801 | Cal | GA | 1216.12 | 05261 | 〃 | WJ |
| 〃 | 0817 | 〃 WJ 4-20-16 | 〃 | 〃 | 05262 | 〃 | WJ |
| 〃 | 0920 | 16-00578 | 01 | 〃 | 05263 | 2L/A | WJ |
| 〃 | 0946 | 16-00578 | 04 | 422.12 | 05264 | 〃 | WJ |
| 4-21-16 | 0857 | Cal | GA | 1216.12 | 05265 | 1L/A | WJ |
| 〃 | 0718 | 16-00587 | 02 | 〃 | 05266 | 2L/A | WJ |
| 〃 | 0731 | 〃 | 06 | 443.14 | 05267 | 〃 | WJ |
| 〃 | 0825 | 〃 | 11 | 191.62 | 05268 | 〃 | WJ |
| 〃 | 1209 | 16-00598 | 03 | N/A | 05269 | 〃 | WJ |
| 〃 | 1241 | 〃 | 04 | 203.58 | 05270 | 〃 | WJ |
| 〃 | 1319 | 16-00586 | 11 | 60.66 | 05271 | 〃 | WJ |
| 4-22-16 | 0851 | Cal | GA | 1216.12 | 05272 | 1L/A | WJ |
| 〃 | 0937 | 16-00602 | 03 | N/A | 05273 | FLL | WJ |
| 〃 | 1506 | 16-00607 | 03 | 〃 | 05274 | 2L/A | WJ |



Reviewed By: [signature] Date: 4-29-16
Initials

# Gamma Spectroscopy Log Book
# Detector Serial Number 35TN30943A

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|
| 4-18-16 | 1344 | 16-00524 | 01 | 1 | 00101 | LLM | [illegible] |
| 〃 | 1349 | 16-00582 | 01 | 334.46 | 00102 | 1/2 | 〃 |
| 〃 | 1421 | 〃 | 02 | 341.69 | 00103 | 〃 | 〃 |
| 〃 | 1453 | 〃 | 04 | 1193.2 | 00104 | 〃 | 〃 |
| 〃 | 1527 | 16-00529 | 03 | N/A | 00105 | 1/4 | 〃 |
| 4-19-16 | 0532 | 〃 | 04 | 4-19-16 | 00106 | 〃 | 〃 |
| 〃 | 0539 | 〃 | 1 | 1 | 00107 | 〃 | 〃 |
| 〃 | 0555 | 〃 | 1 4-19-16 | 1 | 00108 | 〃 | 〃 |
| 〃 | 0606 | 16-00537 | 01+2 | 1 | 00109 | 1/2 | 〃 |
| 〃 | 0621 | 16-00582 | 19 | 334.44 | 00110 | 〃 | 〃 |
| 〃 | 0638 | 16-00533 | 06 | 334.77 | 00111 | 〃 | 〃 |
| 〃 | 0727 | 16-00583 | 05 | 365.84 | 00112 | 〃 | 〃 |
| 〃 | 0821 | 〃 | 11 | 400.73 | 00113 | 〃 | 〃 |
| 〃 | 0833 | 〃 | 15 | 371.91 | 00114 | 〃 | 〃 |
| 〃 | 0946 | 〃 | 14 4-19-16 | 345.15 | 00115 | 〃 | 〃 |
| 〃 | 0931 | 16-00584 | 01 | 1 | 00116 | 〃 | 〃 |
| 〃 | 1015 | 〃 | 07 | 298.03 | 00117 | 〃 | 〃 |
| 〃 | 1043 | 〃 | 12 | 320.33 | 00118 | 〃 | 〃 |
| 〃 | 1121 | 〃 | 17 | 353.63 | 00119 | 〃 | 〃 |
| 〃 | 1153 | 〃 | 22 | 402.13 | 00120 | 〃 | 〃 |
| 〃 | 1231 | 16-00571 | 01 | 1 | 00121 | LLM | 〃 |
| 〃 | 1247 | 16-00585 | 02 | 1 | 00122 | 1/2 | 〃 |
| 〃 | 1257 | 〃 | 05 | 357.49 | 00123 | 〃 | 〃 |
| 〃 | 1330 | 〃 | 12 | 341.57 | 00124 | 〃 | 〃 |
| 〃 | 1405 | 16-00567 | 07 | 399.72 | 00125 | 1/4 | 〃 |



Reviewed By: JB Initials Date: 4-20-16

# Gamma Spectroscopy Log Book
# Detector Serial Number 35TN30943A

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|
| 4-19-16 | 1459 | 16-00571 | 04 | 1.02 | 01226 | 1L19 | WJ |
| 4-20-16 | 0600 | Cal | GA | 1595-98-4 | 01227 | Th | WJ |
| S | 0932 | 16-00578 | 02 | 1 | 01228 | 2L20 | WJ |
| 4-21-16 | 0641 | Cal | GA | 1595-98-4 | 01229 | Th | WJ |
| S | 0655 | 16-00587 | 03 | N/A | 01230 | 2L20 | WJ |
| S | 0736 | S | 05 | 306.41 | 01231 | S | WJ |
| S | 0824 | S | 09 | 241.88 | 01232 | S | WJ |
| S | 0904 | S | 12 | 434.09 | 01233 | S | WJ |
| S | 1237 | 16-00596 | 05 | 329.85 | 01234 | S | WJ |
| S | 1323 | 16-00586 | 07 | 391.52 | 01235 | S | WJ |
| S | 1355 | S | 08 | 333.97 | 01236 | S | WJ |
| 4-22-16 | 0550 | Cal | GA | 1595-98-4 | 01237 | Th | WJ |
| S | 0952 | 16-00602 | 02 | 1 | 01238 | RCC | WJ |
| S | 1003 | S | 05 | 855.4 | 01239 | S | WJ |
| S | 1441 | 16-00606 | 07 | 361.61 | 01240 | 2L20 | WJ |
| S | 1514 | 16-00607 | 04 | 0.992 | 01241 | 1L19 | WJ |
| 4-23-16 | 0746 | Long Bkg | GA | N/A | 01242 | Bkgts | WJ |
| 4-25-16 | 0710 | Cal | S | 1595-98-4 | 01243 | Th | WJ |
| S | 1112 | 16-00613 | 02 | 1 | 01244 | 1L19 | WJ |
| S | 1503 | S | 05 | 1.02 | 01245 | S | WJ |
| 4-26-16 | 0548 | Cal | GA | 1595-98-4 | 01246 | Th | WJ |
| S | 0601 | 16-00619 | 03 | N/A | 01247 | 2L25 | WJ |
| S | 0633 | S | 04 | 391.74 | 01248 | S | WJ |
| S | 0720 | S | 10 | 442.26 | 01249 | S | WJ |
| S | 0932 | 16-00620 | 02 | 1 | 01250 | S | WJ |



Reviewed By: [signature] Initials Date: 4-29-16

# Gamma Spectroscopy Log Book
# Detector Serial Number 38TN31960BR

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech Initia |
|---|---|---|---|---|---|---|---|
| 4-14-16 | 1643 | 16-00548 | 03 | N/A | 07832 | 2LV5 | MS |
| 〃 | 1226 | 16-00549 | 01 | 1 | 07833 | SBWHS | MS |
| 〃 | 1459 | 16-00549 | 03 | N/A | 07834 | 〃 | MS |
| 4-15-16 | 0800 | Calc | QA | Sample Vol | 07835 | FILL | MS |
| 〃 | 0614 | 16-00552 | 01 | 1 | 07836 | 〃 | MS |
| 〃 | 0627 | 〃 | 04 | 859.3 | 07837 | 〃 | MS |
| 〃 | 1135 | 16-00554 | 03 | 357.11 | 07838 | 2LV0 | MS |
| 〃 | 1246 | 16-00555 | 04 | 304.6 | 07839 | 〃 | MS |
| 〃 | 1314 | 16-00556 | 03 | N/A | 07840 | 〃 | MS |
| 〃 | 1307 | Long Bkg | QA | N/A | 07841 | Empty | MS |
| 4-18-16 | 0708 | Calc | QA | Sample Vol | 07842 | FILL | MS |
| 〃 | 0935 | 16-00559 | 03 | N/A | 07843 | 2LV5 | MS |
| 〃 | 1343 | 16-00562 | 01 | 251.13 | 07844 | 1 | MS |
| 〃 | 1442 | 16-00566 | 02 | 1 | 07845 | 1L M | MS |
| 〃 | 1454 | 16-00567 | 15 | 242.91 | 07846 | 2LV5 | MS |
| 〃 | 1524 | 16-00566 | 04 | 1.01 | 07847 | 1LA | MS |
| 4-19-16 | 0731 | Calc | QA | Sample Vol | 07848 | FILL | MS |
| 〃 | 0546 | 16-00563 | 03 | N/A | 07849 | Calc | MS |
| 〃 | 0611 | 16-00567 | 18 | 251.81 | 07850 | 2LV5 | MS |
| 〃 | 0654 | 〃 | 23 | 246.16 | 07851 | 〃 | MS |
| 〃 | 0726 | 16-00573 | 04 | 370.28 | 07852 | Calc | MS |
| 〃 | 0900 | 〃 | 09 | 374.71 | 07853 | 〃 | MS |
| 〃 | 0937 | 〃 | 14 | 372.38 | 07854 | 〃 | MS |
| 〃 | 0945 | 〃 | 19 | 374.48 | 07855 | 〃 | MS |
| 〃 | 0936 | 〃 | 24 | 338.74 | 07856 | 〃 | MS |



Reviewed By: _____ Date: 4-29-16
Initials

# Gamma Spectroscopy Log Book
# Detector Serial Number 38TN31960BR

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|
| 4-19-16 | 1011 | 16-00569 | 05 | 347.38 | 07857 | [illegible] | [illegible] |
| " | 1046 | " | 10 | 405.74 | 07858 | " | [illegible] |
| " | 1120 | " | 15 | 322.84 | 07859 | " | [illegible] |
| " | 1154 | " | 20 | 366.23 | 07860 | " | [illegible] |
| " | 1231 | 16-00565 | 01 | 1 | 07861 | " | [illegible] |
| " | 1243 | 16-00571 | 02 | 1 | 07862 | 1L [illegible] | [illegible] |
| " | 1256 | 16-00565 | 04 | 397.12 | 07863 | [illegible] | [illegible] |
| " | 1329 | " | 11 | 389.19 | 07864 | " | [illegible] |
| " | 1404 | 16-00567 | 06 | 384.95 | 07865 | [illegible] | [illegible] |
| " | 1501 | 16-00571 | 06 | 1.02 | 07866 | 1L [illegible] | [illegible] |
| 4-20-16 | 0602 | [illegible] | [illegible] | [illegible] | 07867 | [illegible] | [illegible] |
| " | 0746 | 16-00569 | 03 | N/A | 07868 | 47mm AF | [illegible] |
| " | 0842 | " [illegible] 4-20-16 | 02 | 1 | 07869 | " | [illegible] |
| " | 0858 | " | 05 | 1 | 07870 | " | [illegible] |
| " | 1002 | 16-00578 | 03 | N/A | 07871 | [illegible] | [illegible] |
| " [illegible] | ~~13~~ 1034 | 16-00579 | 08 | 1 | 07872 | 47mm AF | [illegible] |
| " | 1136 | 16-00578 | 06 | 48.96 | 07873 | 90mm P | [illegible] |
| " | 1305 | 16-00582 | 02 | 1 | 07874 | " | [illegible] |
| 4-21-16 | 0642 | [illegible] | [illegible] | [illegible] | 07875 | [illegible] | [illegible] |
| " | 0658 | 16-00586 | 01 | 1 | 07876 | 90mm P | [illegible] |
| " | 0731 | 16-00587 | 03 | 411.41 | 07877 | [illegible] | [illegible] |
| " | 0805 | " | 11 | 333.08 | 07878 | " | [illegible] |
| " | 0903 | 16-00586 | 06 | 78.22 | 07879 [illegible] | 90mm P | [illegible] |
| " | 1204 | 16-00582 | 01 | 1 | 078~~8~~80 | " | [illegible] |
| " | 1222 | 16-00596 | 02 | 1 | 07881 | [illegible] | [illegible] |



Reviewed By: [signature] Date: 4-29-16
Initials

# Gamma Spectroscopy Log Book
# Detector Serial Number 54-N33188A

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|
| 4-14-16 | 1131 | 16-00598 | 04 | 336.88 | 08194 | 2828 | WJ |
| " | 1329 | 16-00550 | 01 | " | 08195 | " | " |
| " | 1353 | " | 04 | 197.49 | 08196 | " | " |
| 4-15-16 | 0556 | Calc | 04 | 119600 | 08197 | " | WJ |
| " | 1038 | 16-00554 | 01 | " | 08198 | " | WJ |
| " | 1131 | " | 04 | 238.04 | 08199 | " | WJ |
| " | 1204 | " | 09 | 371.52 | 08200 | " | WJ |
| " | 1246 | 16-00555 | 07 | 243.37 | 08201 | " | WJ |
| " | 1320 | 16-00556 | 01 | " | 08202 | " | WJ |
| " | 1345 | " | 05 | 295.35 | 08203 | " | " |
| " | 1458 | Long Bkg | CA | [illegible] | 08204 | Bkg | WJ |
| 4-18-16 | 0705 | Calc | 04 | 119600 | 08205 | 2828 | WJ |
| " | 0948 | 16-00559 | 02 | " | 08206 | " | WJ |
| " | 1066 | " | 04 | 379.91 | 08207 | " | WJ |
| " | 1345 | 16-00562 | 03 | 249.37 | 08208 | " | WJ |
| " | 1419 | " | 01 | 210.09 | 08209 | " | " |
| " | 1451 | " | 13 | 268.28 | 08210 | " | " |
| 4-19-16 | 0578 | Calc | 04 | 119600 | 08211 | " | " |
| " | 0840 | 16-00562 | 06 | 379.85 | 08212 | " | WJ |
| " | 0613 | " | 17 | 238.88 | 08213 | " | " |
| " | 0644 | " | 21 | 253.62 | 08214 | " | WJ |
| " | 0716 | 16-00559 | 08 | 396.36 | 08215 | " | WJ |
| " | 0749 | 16-00563 | 07 | 358.27 | 08216 | [illegible] | WJ |
| " | 0821 | " | 12 | 441.06 | 08217 | " | WJ |
| " | 0852 | " | 17 | 372.88 | 08218 | " | " |



Reviewed By: JB Date: 4-20-16
Initials

CE-22

Revision: 0
Revision Date: 121114

# Gamma Spectroscopy Log Book
# Detector Serial Number 54-N33188A

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|
| 4-11-16 | 0928 | 16-00563 | 22 | 352.91 | 18214 9 | MMA | MM |
| " | 0932 | 16-00564 | 02 | 1 | 04214 20 | 4-14-16 " | " |
| " | 1016 | " | 04 | 350.29 | 04221 | " | MM |
| " | 1044 | " | 19 | 349.49 | 04222 | " | MM |
| " | 1113 | " | 14 | 323.31 | 04223 | " | MM |
| " | 1153 | " | 14 | 325.95 | 04224 | " | MM |
| " | 1226 | " | 24 | 311.85 | 04225 | " | MM |
| " | 1307 | 16-00565 | 07 | 348.61 | 04226 | " | MM |
| " | 1332 | " | 14 | 313.92 | 04227 | " | MM |
| " | 1417 | 16-00567 | 14 | 77.09 | 04228 | 4mmAP | MM |
| 4-12-16 | 0537 | Calib | BA | 11466 | 04229 | MMA | MM |
| " | 0541 | 16-00569 | 02 | 1 | 04230 | 4mmAP | MM |
| " | 0814 | " | 01 | 1 | 04231 | " | MM |
| " | 0857 | 16-00569 | 04 | 1 | 04232 | " | MM |
| " | 1016 | 16-00569 | 07 | 1 | 04233 | " | MM |
| " | 1116 | 16-00570 | 04 | 60.32 | 04234 | 4mmAP | MM |
| " | 1135 | " | 07 | 59.69 | 04235 | " | MM |
| " | 1224 | 16-00572 | 01 | 1 | 04236 | " | MM |
| " | 1253 | " | 02 | 1 | 04237 | " | MM |
| 4-11-16 | 0634 | Calib | BA | 11466 | 04238 | MMA | MM |
| " | 0651 | " | " | " | 04239 | " | MM |
| " | 0735 | " | " | " | 04240 | " | MM |
| " | 1126 | 16-00586 | 03 | 11466 | 04241 | 4mmAP | MM |
| " | 0902 | " | 04 | 92.79 | 04242 | " | MM |
| " | 1115 | Calib | BA | 11466 | 04243 | MMA | MM |

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Reviewed By: _____ Date: 4-29-16
Initials

CE-22

Revision: 0
Revision Date: 121114

# Gamma Spectroscopy Log Book
# Detector Serial Number 47TN41777A

| Date | Time | ARS Batch ID | ARS Batch Fraction | Weight (g) or Volume (L) | Spectrum File Number | Geometry | Tech. Initials |
|---|---|---|---|---|---|---|---|
| 4-19-16 | 0751 | Lab | 04 | 69155 | 060107 | 2710 | LH |
| 1 | 0941 | 16-0557 | 03 | NM | 060108 | 1 | LH |
| 1 | 0602 | 16-0558 | 02 | 1 | 060109 | Rm | LH |
| 1 | 0633 | 16-0560 | 06 | 252.91 | 060110 | 2710 | LH |
| 1 | 0705 | 16-0559 | 07 | 247.36 | 060111 | 1 | LH |
| 1 | 0736 | 16-0562 | 06 | 349.14 | 060112 | Rm | LH |
| 1 | 0805 | 1 | 11 | 353.01 | 060113 | 1 | LH |
| 1 | 0841 | 1 | 16 | 366.58 | 060114 | 1 | LH |
| 1 | 0911 | 1 | 21 | 342.26 | 060115 | 1 | LH |
| 1 | 0943 | 16-0563 | 03 | NM | 060116 | 1 | LH |
| 1 | 1014 | 1 | 08 | 358.37 | 060117 | 1 | LH |
| 1 | 1049 | 1 | 13 | 355.73 | 060118 | 1 | LH |
| 1 | 1123 | 1 | 18 | 363.94 | 060119 | 1 | LH |
| 1 | 1157 | 1 | 23 | 337.45 | 060120 | 1 | LH |
| 1 | 1258 | 16-0565 | 06 | 317.42 | 060121 | 1 | LH |
| 1 | 1331 | 1 | 09 | 332.17 | 060122 | 1 | LH |
| 1 | 1406 | 16-0567 | 04 | 303.39 | 060123 | 2710 | LH |
| 1 | 1521 | 16-0571 | 05 | 1.02 | 060124 | 1L | LH |
| 4-21-16 | 0859 | Lab | 01 | 69155 | 060125 | 2710 | LH |
| 1 | 0947 | 16-0570 | 01 | 1 | 060126 | 1L Marinelli | LH |
| 1 | 1027 | 1 | 02 | 1 | 060127 | 1 | LH |
| 1 | 1058 | 1 | 03 | NM | 060128 | 1 | LH |
| 1 | 1129 | 16-0572 | 06 | 1 | 060129 | 1 | LH |
| 1 | 1204 | 1 | 04 | 1 | 060130 | 1 | LH |
| 1 | 1237 | 16-0573 | 08 | 66.33 | 060131 | 1L Marinelli | LH |

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
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# Log Book Pages

## EPA 905.0/SRW-01

*SDG# ARS1-16-00670*

*COC# HPSD1-284*

# Tennelec LB4100W Low Background α/β Counter 35723 (Instrument A)

| Date | Time | ARS Batch Number | Batch Fraction | Type of Analysis | GEN Number | Detector | Analyst Initials |
|---|---|---|---|---|---|---|---|
| 4-8-16 | 1650 | 16-00467 | C4 | Sr | 154 | B3 | [illegible] |
| 4-8-16 | 1958 | Long Bleg | GA | RA | 155 | A1 | [illegible] |
| 4-11-16 | 0536 | Daily | GA | Bleg | 156 | A1 | [illegible] |
| 4-11-16 | 0742 | Daily | GA | Eff | 157 | A1 | [illegible] |
| 4-11-16 | 1235 | 16-00498 | C1 | 904/Ra228 | 158 | A2 | [illegible] |
| | | | C2 | | | B3 | [illegible] |
| | | | C3 | | | B4 | [illegible] |
| | | | C4 | | | B2 | [illegible] |
| | | | C5 | | | B3 | [illegible] |
| | | | C6 | | | B4 | [illegible] |
| | | | C7 | | | C1 | [illegible] |
| | | | C8 | | | C2 | [illegible] |
| | | | C9 | | | D1 | [illegible] |
| 4-12-16 | 0538 | Daily | GA | Bleg | 159 | A1 | [illegible] |
| 4-12-16 | 0743 | Daily | GA | Eff | 160 | A1 | [illegible] |
| 4-12-16 | 1119 | 16-00518 | C1 | GAGB | 161 | B1 | [illegible] |
| | | | C3 | | | B2 | [illegible] |
| | | | C4 | | | B3 | [illegible] |
| | | | C5 | | | B4 | [illegible] |
| 4-13-16 | 0538 | Daily | GA | Bleg | 162 | A1 | [illegible] |
| 4-13-16 | 0744 | Daily | GA | Eff | 163 | A1 | [illegible] |
| 4-14-16 | 0542 | Daily | GA | Bleg | 164 | A1 | [illegible] |
| 4-14-16 | 0747 | Daily | GA | Eff | 165 | A1 | [illegible] |
| 4-14-16 | 0814 | 16-00403 | C1 | 903/Ra226 | 166 | A2 | [illegible] |
| | | | C2 | | | B3 | [illegible] |
| | | | C3 | | | B4 | [illegible] |
| | | | C4 | | | B1 | [illegible] |
| | | | C5 | | | B2 | [illegible] |



Reviewed [illegible] Date 4-22-16
Initials

# Tennelec LB4100W Low Background α/β Counter 35723 (Instrument A)

| Date | Time | ARS Batch Number | Batch Fraction | Type of Analysis | GEN Number | Detector | Analyst Initials |
|---|---|---|---|---|---|---|---|
| 4-14-16 | 1137 | 16-00514 | C1 | Sr | 167 | A2 | [illegible] |
| | | | C3 | | | A3 | [illegible] |
| | | | C5 | | | A4 | [illegible] |
| | | | C6 | | | B1 | [illegible] |
| | | | C7 | | | B2 | [illegible] |
| | | | C8 | | | B3 | [illegible] |
| | | | C9 | | | B4 | [illegible] |
| | | | C10 | | | C1 | [illegible] |
| | | | C11 | | | C2 | [illegible] |
| | | | C12 | | | C4 | [illegible] |
| | | | C13 | | | D1 | [illegible] |
| | | | C14 | | | D3 | [illegible] |
| 4-15-16 | 0541 | Daily | GA | Bkg | 168 | A4 | [illegible] |
| 4-15-16 | 0861 | Daily | GA | Bkg | 169 | A4 | [illegible] |
| 4-15-16 | 1457 | Long Bkg | GA | Bkg | 170 | A4 | [illegible] |
| 4-18-16 | 0535 | Daily | GA | Bkg | 171 | A4 | [illegible] |
| 4-18-16 | 0743 | Daily | GA | Bkg | 172 | A4 | [illegible] |
| 4-18-16 | 0813 | 16-00414 | C1 | 903/Ra226 | 173 | A2 | [illegible] |
| | | | C2 | | | A3 | [illegible] |
| | | | C3 | | | A4 | [illegible] |
| | | | C4 | | | B1 | [illegible] |
| | | | C5 | | | B2 | [illegible] |
| | | | C6 | | | B3 | [illegible] |
| | | | C7 | | | B4 | [illegible] |
| | | | C8 | | | C1 | [illegible] |
| | | | C9 | | | C2 | [illegible] |
| | | | C10 | | | C4 | [illegible] |
| | | | C11 | | | D1 | [illegible] |



Reviewed [illegible] Date 4-22-16
Initials

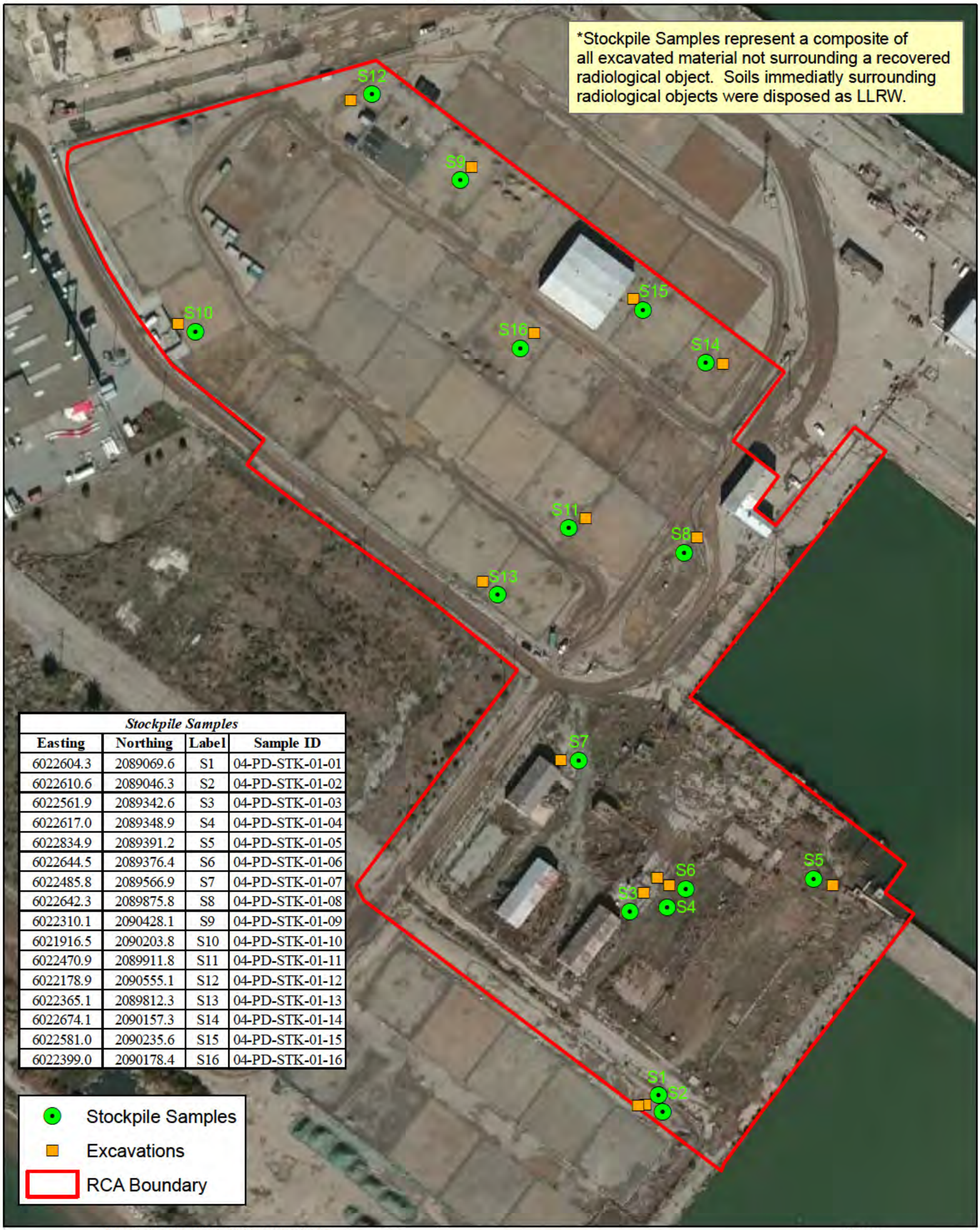
# Tennelec LB41-PF4 Low Background α/β Counter (Instrument C)

| Date | Time | ARS Batch Number | Batch Fraction | Type of Analysis | GEN Number | Detector | Analyst Initials |
|---|---|---|---|---|---|---|---|
| 4-11-16 | 0347 | 16-00506 | C4 | GA | 949 | C1 | [illegible] |
| ↓ | ↓ | ↓ | C5 | ↓ | ↓ | C2 | [illegible] |
| ↓ | ↓ | ↓ | C6 | ↓ | ↓ | C3 | [illegible] |
| 4-12-16 | 0537 | Daily | GA | Bkg | 950 | A0 | [illegible] |
| 4-12-16 | 0801 | Daily | GA | Bkg | 951 | A0 | [illegible] |
| 4-13-16 | 0539 | Daily | GA | Bkg | 952 | A0 | [illegible] |
| 4-13-16 | 0802 | Daily | GA | Bkg | 953 | A0 | [illegible] |
| 4-14-16 | 0542 | Daily | GA | Bkg | 954 | A0 | [illegible] |
| 4-14-16 | 0801 | Daily | GA | Bkg | 955 | A0 | [illegible] |
| 4-14-16 | 0540 | 16-00543 | C1 | GA2B | 956 | A1 | [illegible] |
| ↓ | ↓ | ↓ | C3 | ↓ | ↓ | A2 | [illegible] |
| ↓ | ↓ | ↓ | C4 | ↓ | ↓ | A3 | [illegible] |
| ↓ | ↓ | ↓ | C5 | ↓ | ↓ | A4 | [illegible] |
| 4-14-16 | 1138 | 16-00514 | C2 | Sr | 957 | A1 | [illegible] |
| ↓ | ↓ | ↓ | C4 | ↓ | ↓ | A2 | [illegible] |
| ↓ | ↓ | ↓ | C5 | ↓ | ↓ | A3 | [illegible] |
| ↓ | ↓ | ↓ | C6 | ↓ | ↓ | A4 | [illegible] |
| ↓ | ↓ | ↓ | C7 | ↓ | ↓ | B1 | [illegible] |
| ↓ | ↓ | ↓ | C8 | ↓ | ↓ | B2 | [illegible] |
| ↓ | ↓ | ↓ | C9 | ↓ | ↓ | B4 | [illegible] |
| ↓ | ↓ | ↓ | C0 | ↓ | ↓ | C1 | [illegible] |
| ↓ | ↓ | ↓ | C1 | ↓ | ↓ | C2 | [illegible] |
| ↓ | ↓ | ↓ | C2 | ↓ | ↓ | C3 | [illegible] |
| ↓ | ↓ | ↓ | C3 | ↓ | ↓ | C4 | [illegible] |
| ↓ | ↓ | ↓ | C4 | ↓ | ↓ | D1 | [illegible] |
| 4-15-16 | 0540 | Daily | GA | Bkg | 958 | A0 | [illegible] |
| 4-15-16 | 0821 | Daily | GA | Bkg | 959 | A0 | [illegible] |



Reviewed [illegible] Initials Date 4-22-16

HPNS Parcel D1 Device Removal & Investigation Excvations
Stockpile Sample Locations




| *Stockpile Samples* | | | |
|---|---|---|---|
| **Easting** | **Northing** | **Label** | **Sample ID** |
| 6022604.3 | 2089069.6 | S1 | 04-PD-STK-01-01 |
| 6022610.6 | 2089046.3 | S2 | 04-PD-STK-01-02 |
| 6022561.9 | 2089342.6 | S3 | 04-PD-STK-01-03 |
| 6022617.0 | 2089348.9 | S4 | 04-PD-STK-01-04 |
| 6022834.9 | 2089391.2 | S5 | 04-PD-STK-01-05 |
| 6022644.5 | 2089376.4 | S6 | 04-PD-STK-01-06 |
| 6022485.8 | 2089566.9 | S7 | 04-PD-STK-01-07 |
| 6022642.3 | 2089875.8 | S8 | 04-PD-STK-01-08 |
| 6022310.1 | 2090428.1 | S9 | 04-PD-STK-01-09 |
| 6021916.5 | 2090203.8 | S10 | 04-PD-STK-01-10 |
| 6022470.9 | 2089911.8 | S11 | 04-PD-STK-01-11 |
| 6022178.9 | 2090555.1 | S12 | 04-PD-STK-01-12 |
| 6022365.1 | 2089812.3 | S13 | 04-PD-STK-01-13 |
| 6022674.1 | 2090157.3 | S14 | 04-PD-STK-01-14 |
| 6022581.0 | 2090235.6 | S15 | 04-PD-STK-01-15 |
| 6022399.0 | 2090178.4 | S16 | 04-PD-STK-01-16 |

**Stockpile Sampling**
**Summary of Definitive Laboratory Results for SDG 16-00671.txt**

| Sample ID | Analysis Code | Nuclide | Activity | Flag | Activity Units | Release Limit | Exceeds Release Limit |
|---|---|---|---|---|---|---|---|
| 04-PD-STK-01-01 | E901.1 | Radium 226 | 0.380 | | PCI/G | 1.00 | N |
| | | Cesium 137 | 0.00 | U | PCI/G | 0.0700 | N |
| 04-PD-STK-01-02 | E901.1 | Cesium 137 | -0.00900 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.315 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-03 | E901.1 | Cesium 137 | 0.0510 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.709 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-04 | E901.1 | Cesium 137 | 0.0160 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.387 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-05 | E901.1 | Radium 226 | 0.512 | | PCI/G | 1.00 | N |
| | | Cesium 137 | -0.00500 | U | PCI/G | 0.0700 | N |
| 04-PD-STK-01-06 | E901.1 | Cesium 137 | -0.0100 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.342 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-07 | E901.1 | Cesium 137 | 0.0460 | | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.734 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-08 | E901.1 | Cesium 137 | -0.0140 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.442 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-09 | E901.1 | Cesium 137 | -0.00200 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.613 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-10 | E901.1 | Radium 226 | 0.547 | | PCI/G | 1.00 | N |
| | | Cesium 137 | 0.00100 | U | PCI/G | 0.0700 | N |
| 04-PD-STK-01-11 | E901.1 | Radium 226 | 0.251 | | PCI/G | 1.00 | N |
| | | Cesium 137 | 0.00800 | U | PCI/G | 0.0700 | N |
| 04-PD-STK-01-12 | E901.1 | Cesium 137 | 0.00700 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.484 | | PCI/G | 1.00 | N |

**Stockpile Sampling**
**Summary of Definitive Laboratory Results for SDG 16-00671.txt**

| Sample ID | Analysis Code | Nuclide | Activity | Flag | Activity Units | Release Limit | Exceeds Release Limit |
|---|---|---|---|---|---|---|---|
| 04-PD-STK-01-13 | E901.1 | Cesium 137 | 0.0330 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.700 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-14 | E901.1 | Cesium 137 | 0.00600 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.209 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-15 | E901.1 | Cesium 137 | 0.00100 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.904 | | PCI/G | 1.00 | N |
| 04-PD-STK-01-16 | E901.1 | Cesium 137 | 0.00100 | U | PCI/G | 0.0700 | N |
| | | Radium 226 | 0.154 | | PCI/G | 1.00 | N |

U = The associated value is not detected.

Additional Footnotes

In cases where the result is considered non-detect and the MDA of the result exceeded the screening criteria, the reported activity for the affected isotope has been replaced with the reported MDA.

2609 North River Road, Port Allen, Louisiana 70767

(800) 401-4277 -- FAX (225) 381-2996

# ARS International, LLC

## Laboratory Analysis Report

## ARS1-16-00671 RECOUNT
## COC # HPSD1-285

***Prepared for:***

## ITSI Gilbane

**Ed Palser**
**1655 Grant Street, Floor 12**
**Concord, CA 94520**

**epalser@gilbaneco.com; j.hess@gilbaneco.com**
**kcarlyon@gilbaneco.com; bwomack@gilbaneco.com**

**Phone: (505) 400-4076**
**Fax:**

**Project Manager Review**

**Management Review**

Notes: ARS International, LLC assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

**Contact Person: Questions regarding this analytical report should be addressed to:**

**Project Manager**

**ProjectManagers@amrad.com**

**Phone: 225.381.2991**
**Fax: 225.381.2996**

ACCREDITED DoD ELAP

**LELAP Cert# 01949**

INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Case Narrative

## *SDG# ARS1-16-00671*

## *COC# HPSD1-285*

INTERNATIONAL

# CASE NARRATIVE

| | |
|---|---|
| **Client:** | ITSI Gilbane |
| **Project:** | 07204.0007 |
| **COC ID:** | HPSD1-285 |
| **SDG Number:** | ARS1-16-00671 |
| **Received Date:** | 03/28/2016 |
| **Report Date:** | 05/09/2016 |

## SAMPLE RECEIPT

The samples were received in good condition. The samples were screened for radioactive contamination as per procedure **ARS-062 "Sample Receiving"**.

## ANALYTICAL DATA

This data package contains sample and QC results for sixteen (16) soil samples requested for the above referenced project on 03/28/16.

The analysis for gamma spectroscopy were performed using **SOP ARS-007/EPA 901.1M.** A 21-day ingrowth period was performed on these samples. The Ra-226 results were taken from the Bi-214 activity, the Th-232 results were taken from the Ra-228 activity and the Th-234 results were taken from the U-238 activity.

The analysis for Strontium was performed using **SOP ARS-032/Eichrom SRW-01.**

The following analytical batches are associated with these samples: ARS1-B16-00564 and ARS1-B16-00565 for EPA 901.1M and ARS1-B16-00514 for Strontium.

For Gamma Spec batch ARS1-B16-00564, sample 04-PD-RO-09-01 (ARS1-16-00670-021) was used as the sample duplicate and for batch ARS1-B16-00565, sample 04-PD-STK-01-11 (ARS1-16-00671-011) was designated as the sample duplicate. Lastly, for Strontium batch ARS1-B16-00514 the sample used for the sample duplicate was 07-PE-0068-21 (ARS1-16-00645-021).

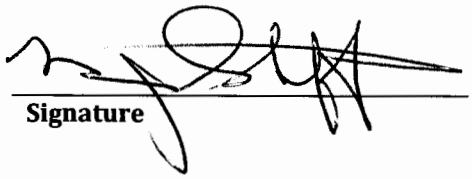
The result data that are flagged with "U" indicate that the activity is below the MDC.

Sample results are being reported on "dry weight" basis.

On May 5, 2016, the following samples were recounted to meet the detection limit for Cs-137. The samples are ARS1-16-00671-001, 003, 004, 007, 008, 009, 010, 012, 013 and 025. The respective ITSI Gilbane identifications are 04-PD-STK-01-01, 03, 04, 07, 08, 09, 10, 12, 13 and 15. Sample ARS1-16-00671-015 (04-PD-STK-01-15) was recounted on May 5, 2016 to also meet the detection limit for Ra-226.

**American Radiation Services Project Manager/Laboratory Director's Comments:**

*"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. I certify that this electronic image and all hardcopies produced from this image accurately represent the data and is in compliance with the company specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager/Technical Director or the Manager's designee."*



| Signature | Laboratory Manager, ARS International | 5-9-16 |
|---|---|---|
| | **Title** | **Date** |

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# Notes (Case Narrative):

## Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.
2.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
3.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
4.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).
5.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).
9.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).
10.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.
11.0) ACLASS DOD and ISO 17025 certification applies only to the following analytes and methods: Gross Alpha and Gross Beta (EPA 900, SM7110B&C, SW846 9310); Radium 226 (EPA 903, EPA 903.1, SM 7500 Ra-B, SW846 9315); Radium 228 (EPA 904, SM 7500 Ra-B SW846 9320); Iodine-131(EPA 901.1); Uranium by ICPMS (EPA 200.8); Strontium 89/90 (EPA 905, Eichrom SRW01, HASL 300 Sr-03-RC); Tritium (EPA 906, EPA 906M); Gamma Emitters (EPA 901.1, SM7120B, HASL 300 Ga-01-R); Americium-241, Curium 242/244, Plutonium 239/240 and 241, Thorium 228/230/232, Uranium 234/233 and 238 (Eichrom ACW03 VBS); Lead 210 (HASL 300 Pb-01-RC, Eichrom OTW01); Polonium 210 (HASL 300 Po-01-RC, HASL 300 Po-02-RC); Technetium-99 (Eichrom TCW02, Eichrom TCS01M).

## Method References:

1.0) **EPA 600/4-80-032**; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.
2.0) **Standard Methods for the Examination of Water and Wastewater** (On-Line Edition)
3.0) **EPA SW-846**; Test Methods for Evaluating Solid Waste, (On-Line edition)
4.0) **EPA 600/4/79-020**; Methods for Chemical Analysis of Water and Waste, March 1983.
5.0) **HASL 300;** The Procedures Manual of the Environmental Measurements Laboratory, Volume I, 28th Edition February, 1997.

## Definitions:

| | |
|---|---|
| **CRDL** | Contract Required Detection Limit |
| **CSU** | Combined Standard Uncertainty |
| **DLC** | Decision Level Concentration (ANSI N42.23) or critical level |
| **DO** | Duplicate Original |
| **DUP** | Method Duplicate |
| **LCS/LCSD** | Laboratory Control Sample/Laboratory Control Sample Duplicate |
| **MDA** | Minimum Detectable Activity |
| **MDC** | (Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis |
| **MBL** | Method Blank |
| **MS/MSD** | Matrix Spike/Matrix Spike Duplicate |
| **N/A** | Not Applicable |
| **NP** | Not Provided |
| **NR** | Not Referenced |

## Data Qualifiers:

| | |
|---|---|
| **B** | The analyte is found in both the associated method blank and the sample. This flag indicates probable blank contamination. |
| **D** | Sample analysis accomplished through dilution. |
| **J** | Reported result is approximated as it falls outside instrument calibration limits. |
| **Q** | One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery). |
| **S** | Spike |
| ***SC** | Subcontracted out to another qualified laboratory |
| **U** | Activity is below the MDC or MDL |

***LELAP Cert# 01949*** ***NELAP Cert# E87558***

*ARS-059-010*
*Revision: 7*
*Revision Date: 04-06-16*

INTERNATIONAL

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# Sample Identification

## Cross Reference

***SDG# ARS1-16-00671***

***COC# HPSD1-285***

ARS INTERNATIONAL

## SAMPLE IDENTIFICATION CROSS-REFERENCE

| ITSI Gilbane SAMPLE ID NUMBER(s) | ARS SAMPLE ID NUMBER(s) |
|---|---|
| 04-PD-STK-01-01 | ARS1-16-00671-001 |
| 04-PD-STK-01-02 | ARS1-16-00671-002 |
| 04-PD-STK-01-03 | ARS1-16-00671-003 |
| 04-PD-STK-01-04 | ARS1-16-00671-004 |
| 04-PD-STK-01-05 | ARS1-16-00671-005 |
| 04-PD-STK-01-06 | ARS1-16-00671-006 |
| 04-PD-STK-01-07 | ARS1-16-00671-007 |
| 04-PD-STK-01-08 | ARS1-16-00671-008 |
| 04-PD-STK-01-09 | ARS1-16-00671-009 |
| 04-PD-STK-01-10 | ARS1-16-00671-010 |
| 04-PD-STK-01-11 | ARS1-16-00671-011 |
| 04-PD-STK-01-12 | ARS1-16-00671-012 |
| 04-PD-STK-01-13 | ARS1-16-00671-013 |
| 04-PD-STK-01-14 | ARS1-16-00671-014 |
| 04-PD-STK-01-15 | ARS1-16-00671-015 |
| 04-PD-STK-01-16 | ARS1-16-00671-016 |

INTERNATIONAL

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# Chain of Custody
## and Supporting Documentation

***SDG# ARS1-16-00671***

***COC# HPSD1-285***

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palset
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-285**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| **SO** | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Stockpile Sampling

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PD-STK-01-01 | SO | 2/25/2016 | 0950 | DB | X | X | 04-PD-STK-01-01 | N1 | 0.00 | 0.50 |
| 2 | 04-PD-STK-01-02 | SO | 2/25/2016 | 0952 | | X | | 04-PD-STK-01-02 | N1 | 0.00 | 0.50 |
| 3 | 04-PD-STK-01-03 | SO | 2/25/2016 | 0956 | | X | | 04-PD-STK-01-03 | N1 | 0.00 | 0.50 |
| 4 | 04-PD-STK-01-04 | SO | 2/25/2016 | 1002 | | X | | 04-PD-STK-01-04 | N1 | 0.00 | 0.50 |
| 5 | 04-PD-STK-01-05 | SO | 2/25/2016 | 1006 | | X | | 04-PD-STK-01-05 | N1 | 0.00 | 0.50 |
| 6 | 04-PD-STK-01-06 | SO | 2/25/2016 | 1009 | | X | | 04-PD-STK-01-06 | N1 | 0.00 | 0.50 |
| 7 | 04-PD-STK-01-07 | SO | 2/25/2016 | 1014 | | X | | 04-PD-STK-01-07 | N1 | 0.00 | 0.50 |
| 8 | 04-PD-STK-01-08 | SO | 2/25/2016 | 1019 | | X | | 04-PD-STK-01-08 | N1 | 0.00 | 0.50 |
| 9 | 04-PD-STK-01-09 | SO | 2/25/2016 | 1025 | | X | | 04-PD-STK-01-09 | N1 | 0.00 | 0.50 |
| 10 | 04-PD-STK-01-10 | SO | 2/25/2016 | 1027 | DB | X | | 04-PD-STK-01-10 | N1 | 0.00 | 0.50 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED - EX | 03.23.2016 | 1600 |
| | 3-28-16 | 1021 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| 3/23/16 \| Fedex \| 7759 4635 9357 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| |

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palset
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-285**

Gilbane

DCN: ITSI-0808-0004-0076, 8 May 2019

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

| Code | Matrix |
|---|---|
| **SO** | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Stockpile Sampling

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **11** | 04-PD-STK-01-11 | SO | 2/25/2016 | 1032 | DB | X | X | 04-PD-STK-01-11 | N1 | 0.00 | 0.50 |
| **12** | 04-PD-STK-01-12 | SO | 2/25/2016 | 1038 | | X | | 04-PD-STK-01-12 | N1 | 0.00 | 0.50 |
| **13** | 04-PD-STK-01-13 | SO | 2/25/2016 | 1041 | | X | | 04-PD-STK-01-13 | N1 | 0.00 | 0.50 |
| **14** | 04-PD-STK-01-14 | SO | 2/25/2016 | 1046 | | X | | 04-PD-STK-01-14 | N1 | 0.00 | 0.50 |
| **15** | 04-PD-STK-01-15 | SO | 2/25/2016 | 1058 | | X | | 04-PD-STK-01-15 | N1 | 0.00 | 0.50 |
| **16** | 04-PD-STK-01-16 | SO | 2/25/2016 | 1100 | DB | X | | 04-PD-STK-01-16 | N1 | 0.00 | 0.50 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| **Relinquished by: *(Signature)*** | **Date** | **Time** |
|---|---|---|
| [signature] | 03-23-2016 | 1600 |
| | | |
| | | |
| | | |

| **Received by: *(Signature)*** | **Date** | **Time** |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| [signature] | 3-28-16 | 1021 |
| | | |
| | | |

**Shipping Date / Carrier / Airbill Number**

3/23/16 / Fedex / 7759 4635 9357

**Recevied by Laboratory:** *(Signature, Date, Time)* **& condition**

# DQO Report for SDG

ARS1-16-00671



DCN: ITSI-0808-0004-0076, 8 May 2019

| Analysis Code | Prep Type | Units | Aliquot | Procedure | Count Time | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GAM-A-025 | DGAM | pCi | g | ARS-007 | | | | | | | | |
| | **Group** | **Isotope** | | **RDL** | **LCS LL/UL** | **MS LL/UL** | **RadY LL/UL** | **GravY LL/UL** | **RER** | **RPD** | **LOD/LOQ** | **Surr LL/UL** |
| | Gilbane | Ac-228 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Am-241 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Bi-212 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Bi-214 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Co-60 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Cs-137 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Eu-152 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Eu-154 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | K-40 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pa-234 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-210 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-212 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-214 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Ra-226 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Ra-228 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Th-234 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Tl-208 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | U-235 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | U-238 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| GPC-A-012 | DRAD | pCi | g | ARS-032 | | | | | | | | |
| | **Group** | **Isotope** | | **RDL** | **LCS LL/UL** | **MS LL/UL** | **RadY LL/UL** | **GravY LL/UL** | **RER** | **RPD** | **LOD/LOQ** | **Surr LL/UL** |
| | STD | Sr-90 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |

User: RVARNELL Last Modified: 3/28/2016 1:23:50 PM

DCN: ITSI-0808-0004-0076, 8 May 2019

| Analysis Code | Fraction | Units | Aliquot |
|---|---|---|---|
| GAM-A-025 | 001 | pCi | g |
| | 002 | pCi | g |
| | 003 | pCi | g |
| | 004 | pCi | g |
| | 005 | pCi | g |
| | 006 | pCi | g |
| | 007 | pCi | g |
| | 008 | pCi | g |
| | 009 | pCi | g |
| | 010 | pCi | g |
| | 011 | pCi | g |
| | 012 | pCi | g |
| | 013 | pCi | g |
| | 014 | pCi | g |
| | 015 | pCi | g |
| | 016 | pCi | g |
| GPC-A-012 | 001 | pCi | g |
| | 011 | pCi | g |

DCN: ITSI-0808-0004-0076, 8 May 2019

# SDG Report - Samples and Containers

## SDG Specific Data

| | | | | | |
|---|---|---|---|---|---|
| SDG | ARS1-16-00671 | TAT Days | 28 | Project Type | Environmental |
| Sample Count | 16 Rpt Level 2 | Date Received | 3/28/2016 | COC Number | HPSD1-285 |
| Client | ITSI Gilbane | Client Deadline | 4/25/2016 | PO Number | |
| Client Code | 848 | Internal Deadline | 4/24/2016 | Job Number | |
| Profile Number | PN-00831 | Lab Deadline | 4/22/2016 | Job Location | |
| Temperature (C) | | Comments | | | |

## Samples and Containers Checked In Thus Far

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 04-PD-STK-01-01 | SO | 2/25/2016 9:50 AM | 2/25/2016 9:50 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229542 | 1 | 1362.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 002 | 04-PD-STK-01-02 | SO | 2/25/2016 9:52 AM | 2/25/2016 9:52 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229543 | 1 | 1072.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 003 | 04-PD-STK-01-03 | SO | 2/25/2016 9:56 AM | 2/25/2016 9:56 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229544 | 1 | 917.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 004 | 04-PD-STK-01-04 | SO | 2/25/2016 10:02 AM | 2/25/2016 10:02 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229545 | 1 | 1056.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 005 | 04-PD-STK-01-05 | SO | 2/25/2016 10:06 AM | 2/25/2016 10:06 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229546 | 1 | 957.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 006 | 04-PD-STK-01-06 | SO | 2/25/2016 10:09 AM | 2/25/2016 10:09 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229547 | 1 | 1132.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 007 | 04-PD-STK-01-07 | SO | 2/25/2016 10:14 AM | 2/25/2016 10:14 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229548 | 1 | 1058.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 008 | 04-PD-STK-01-08 | SO | 2/25/2016 10:19 AM | 2/25/2016 10:19 AM | H | 30 | 5 | WO4 | |

| IC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229549 | 1 | 995.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

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| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **009** | 04-PD-STK-01-09 | SO | 2/25/2016 10:25 AM | 2/25/2016 10:25 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229550 | 1 | 1229.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **010** | 04-PD-STK-01-10 | SO | 2/25/2016 10:27 AM | 2/25/2016 10:27 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229551 | 1 | 1182.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **011** | 04-PD-STK-01-11 | SO | 2/25/2016 10:32 AM | 2/25/2016 10:32 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229552 | 1 | 2002.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **012** | 04-PD-STK-01-12 | SO | 2/25/2016 10:38 AM | 2/25/2016 10:38 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229553 | 1 | 1109.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **013** | 04-PD-STK-01-13 | SO | 2/25/2016 10:41 AM | 2/25/2016 10:41 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229554 | 1 | 1155.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **014** | 04-PD-STK-01-14 | SO | 2/25/2016 10:46 AM | 2/25/2016 10:46 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229555 | 1 | 1043.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **015** | 04-PD-STK-01-15 | SO | 2/25/2016 10:58 AM | 2/25/2016 10:58 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229556 | 1 | 1294.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |
| **016** | 04-PD-STK-01-16 | SO | 2/25/2016 11:00 AM | 2/25/2016 11:00 AM | H | 30 | 5 | WO4 | | | | | | | | |
| | **IC_ID** | **Cnt** | **Wt (g)** | **Container Type** | **pH Orig** | **pH Final** | **CPM** | **uR Hr** | **Stor** | **VOA** | **Head** | **AF Units** | **AF Rate** | **AF Mins** | **AF Vol** | |
| | 229557 | 1 | 1237.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | |

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# SDG Report - Analysis Assignments

| SDG | ARS1-16-00671 | Sample Count | 16 |
|---|---|---|---|
| Client | ITSI Gilbane | Analysis Count | 2-32 |

**Sample Count Totals Per Analysis**

| Analysis Code | Analysis Description | Samples Count |
|---|---|---|
| GAM-A-025 | Gamma Spec - 21 Day Ingrowth in (Soil, Sludge, Waste, Sediment,Biota [SO, BI, VG]) | 16 |
| GPC-A-012 | Strontium-90 in (Soil, Sludge, Biota, Sediment [SO, BI, VG]) | 16 |

**Analyses Assigned Per Fraction**

| Fraction | Analysis Code | X = Assigned |
|---|---|---|
| 001 | GPC-A-012 | X |
| 001 | GAM-A-025 | X |
| 002 | GPC-A-012 | X |
| 002 | GAM-A-025 | X |
| 003 | GPC-A-012 | X |
| 003 | GAM-A-025 | X |
| 004 | GPC-A-012 | X |
| 004 | GAM-A-025 | X |
| 005 | GPC-A-012 | X |
| 005 | GAM-A-025 | X |
| 006 | GPC-A-012 | X |
| 006 | GAM-A-025 | X |
| 007 | GPC-A-012 | X |
| 007 | GAM-A-025 | X |
| 008 | GPC-A-012 | X |
| 008 | GAM-A-025 | X |
| 009 | GPC-A-012 | X |
| 009 | GAM-A-025 | X |
| 010 | GPC-A-012 | X |
| 010 | GAM-A-025 | X |
| 011 | GPC-A-012 | X |
| 011 | GAM-A-025 | X |
| 012 | GPC-A-012 | X |
| 012 | GAM-A-025 | X |
| 013 | GPC-A-012 | X |
| 013 | GAM-A-025 | X |
| 014 | GPC-A-012 | X |

| | | |
|---|---|---|
| 014 | GAM-A-025 | X |
| 015 | GPC-A-012 | X |
| 015 | GAM-A-025 | X |
| 016 | GPC-A-012 | X |
| 016 | GAM-A-025 | X |

ORIGIN ID:JCCA (415) 671-0773
HENRY NG
GILBANE
ITSI GILBANE TRAILER HUNTERS POINT
FISHER AVE @ SPEAR AVE BLDG 241
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 23MAR16
ACTWGT: 70.00 LB
CAD: 102700259/INET3730
DIMS: 19x13x14 IN
BILL THIRD PARTY

TO CAROLYN DICHARRY
ARS INC.
2609 NORTH RIVER ROAD
PORT ALLEN LA 70767
(225) 381-2991 REF: J204000700
INV:
PO: DEPT:

540J1/CF34/727F

FedEx Express
J161016020501uv

THU - 24 MAR 10:30A
PRIORITY OVERNIGHT

2 of 3
MPS# 0263 7759 4635 8626
Mstr# 7759 4635 9357 0201

XH OPLA

70767
LA-US MSY

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## Rodney Varnell

**From:** Rodney Varnell
**Sent:** Wednesday, March 30, 2016 11:23 AM
**To:** 'Carlyon Peyton, Kristen'
**Cc:** Project Managers
**Subject:** Sample receipt Package for CoC HPSD1-285
**Attachments:** ARS1-16-00671 Sample Rcpt Pkg Corrected DQO.pdf

Please see the attached sample receipt package for CoC # HPSD1-285 (SDG ARS1-00671 with corrected DQO received on 03282016.

Thank you,

**Rodney J. Varnell**
Project Manager
rvarnell@amrad.com

INTERNATIONAL

ARS International, LLC
2609 North River Road
Port Allen, LA 70767-3469

225.381.2991 Office
225.381.2996 FAX
www.amrad.com

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# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palset
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-285**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

**Analytical Test Method**

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Stockpile Sampling

| | Sample ID | Matrix | Date | Time | Samp Init. | E901.1 - Solid Ra-226 and CS-137 | E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04-PD-STK-01-01 | SO | 2/25/2016 | 0950 | DB | X | X | 04-PD-STK-01-01 | N1 | 0.00 | 0.50 |
| 2 | 04-PD-STK-01-02 | SO | 2/25/2016 | 0952 | | X | | 04-PD-STK-01-02 | N1 | 0.00 | 0.50 |
| 3 | 04-PD-STK-01-03 | SO | 2/25/2016 | 0956 | | X | | 04-PD-STK-01-03 | N1 | 0.00 | 0.50 |
| 4 | 04-PD-STK-01-04 | SO | 2/25/2016 | 1002 | | X | | 04-PD-STK-01-04 | N1 | 0.00 | 0.50 |
| 5 | 04-PD-STK-01-05 | SO | 2/25/2016 | 1006 | | X | | 04-PD-STK-01-05 | N1 | 0.00 | 0.50 |
| 6 | 04-PD-STK-01-06 | SO | 2/25/2016 | 1009 | | X | | 04-PD-STK-01-06 | N1 | 0.00 | 0.50 |
| 7 | 04-PD-STK-01-07 | SO | 2/25/2016 | 1014 | | X | | 04-PD-STK-01-07 | N1 | 0.00 | 0.50 |
| 8 | 04-PD-STK-01-08 | SO | 2/25/2016 | 1019 | | X | | 04-PD-STK-01-08 | N1 | 0.00 | 0.50 |
| 9 | 04-PD-STK-01-09 | SO | 2/25/2016 | 1025 | | X | | 04-PD-STK-01-09 | N1 | 0.00 | 0.50 |
| 10 | 04-PD-STK-01-10 | SO | 2/25/2016 | 1027 | DB | X | | 04-PD-STK-01-10 | N1 | 0.00 | 0.50 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03-23-2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED - EX | 03-23-2016 | 1600 |
| [signature] | 3-28-16 | 1021 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| 3/23/16 \| Fedex \| 7759 4635 9357 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| |



DCN: ITSI-0808-0004-0076, 8 May 2019

# CHAIN-OF-CUSTODY RECORD

Gilbane
Ed Palset
Walnut Creek
(505) 400-4076, add extension epalser@gilbaneco.com

**COC # HPSD1-285**

Gilbane

| | |
|---|---|
| **Project Name: HPSD1** | Laboratory: AMERICAN RADIATION SERVICES (ARS), INC., PORT ALLEN, L |
| **Project Number: 07204.0004** | Point of contact: Please insert point of contact, insert laboratory phone number, |
| **WBS Code: Please add WBS Code** | Ship to: Please add laboratory address |

**Comments:**

**Equipment:**

| Code | Matrix |
|---|---|
| SO | SOIL |

| Code | Container/Preservative |
|---|---|
| | 1* 1 Gallon Ziploc Bag, |

Event: Stockpile Sampling

| | Sample ID | Matrix | Date | Time | Samp Init. | Analytical Test Method: E901.1 - Solid Ra-226 and CS-137 | Analytical Test Method: E905.0 - Solid Sr-90 and Sr-T | Location ID | Sample Type | Depth (ft bgs) Top | Depth (ft bgs) Bottom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 04-PD-STK-01-11 | SO | 2/25/2016 | 1032 | DB | X | X | 04-PD-STK-01-11 | N1 | 0.00 | 0.50 |
| 12 | 04-PD-STK-01-12 | SO | 2/25/2016 | 1038 | | X | | 04-PD-STK-01-12 | N1 | 0.00 | 0.50 |
| 13 | 04-PD-STK-01-13 | SO | 2/25/2016 | 1041 | | X | | 04-PD-STK-01-13 | N1 | 0.00 | 0.50 |
| 14 | 04-PD-STK-01-14 | SO | 2/25/2016 | 1046 | | X | | 04-PD-STK-01-14 | N1 | 0.00 | 0.50 |
| 15 | 04-PD-STK-01-15 | SO | 2/25/2016 | 1058 | | X | | 04-PD-STK-01-15 | N1 | 0.00 | 0.50 |
| 16 | 04-PD-STK-01-16 | SO | 2/25/2016 | 1100 | DB | X | | 04-PD-STK-01-16 | N1 | 0.00 | 0.50 |
| **Cooler # 1** | | **Turnaround Time: 0 Days** | | | | | | | | | |

| Relinquished by: *(Signature)* | Date | Time |
|---|---|---|
| [signature] | 03.23.2016 | 1600 |
| | | |
| | | |
| | | |

| Received by: *(Signature)* | Date | Time |
|---|---|---|
| FED-EX | 03.23.2016 | 1600 |
| [signature] | 3-28-16 | 1621 |
| | | |
| | | |

| Shipping Date / Carrier / Airbill Number |
|---|
| 3/23/16 / Fedex / 7759 4635 9357 |

| Recevied by Laboratory: *(Signature, Date, Time)* & condition |
|---|
| |



DCN: ITSI-0808-0004-0076, 8 May 2019

# SDG Report - Samples and Containers

DCN: ITSI-0808-0004-0076, 8 May 2019



## SDG Specific Data

| | | | | | |
|---|---|---|---|---|---|
| SDG | ARS1-16-00671 | TAT Days | 28 | Project Type | Environmental |
| Sample Count | Rpt Level 2 | Date Received | 3/28/2016 | COC Number | HPSD1-285 |
| Client | ITSI Gilbane | Client Deadline | 4/25/2016 | PO Number | |
| Client Code | 848 | Internal Deadline | 4/24/2016 | Job Number | |
| Profile Number | PN-00831 | Lab Deadline | 4/22/2016 | Job Location | |
| Temperature (C) | | Comments | | | |

## Samples and Containers Checked In Thus Far

| FR | Name | Matrix | Start Date | End Date | Disp | Hold | Arch | Storage | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 04-PD-STK-01-01 | SO | 2/25/2016 9:50 AM | 2/25/2016 9:50 AM | H | 30 | 5 | WO4 | |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229542 | 1 | 1362.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 002 | 04-PD-STK-01-02 | SO | 2/25/2016 9:52 AM | 2/25/2016 9:52 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229543 | 1 | 1072.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 003 | 04-PD-STK-01-03 | SO | 2/25/2016 9:56 AM | 2/25/2016 9:56 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229544 | 1 | 917.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 004 | 04-PD-STK-01-04 | SO | 2/25/2016 10:02 AM | 2/25/2016 10:02 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229545 | 1 | 1056.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 005 | 04-PD-STK-01-05 | SO | 2/25/2016 10:06 AM | 2/25/2016 10:06 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229546 | 1 | 957.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 006 | 04-PD-STK-01-06 | SO | 2/25/2016 10:09 AM | 2/25/2016 10:09 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229547 | 1 | 1132.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 007 | 04-PD-STK-01-07 | SO | 2/25/2016 10:14 AM | 2/25/2016 10:14 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229548 | 1 | 1058.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 008 | 04-PD-STK-01-08 | SO | 2/25/2016 10:19 AM | 2/25/2016 10:19 AM | H | 30 | 5 | WO4 |

| TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229549 | 1 | 995.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **009** | 04-PD-STK-01-09 | SO | 2/25/2016 10:25 AM | 2/25/2016 10:25 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229550 | 1 | 1229.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **010** | 04-PD-STK-01-10 | SO | 2/25/2016 10:27 AM | 2/25/2016 10:27 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229551 | 1 | 1182.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **011** | 04-PD-STK-01-11 | SO | 2/25/2016 10:32 AM | 2/25/2016 10:32 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229552 | 1 | 2002.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **012** | 04-PD-STK-01-12 | SO | 2/25/2016 10:38 AM | 2/25/2016 10:38 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229553 | 1 | 1109.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **013** | 04-PD-STK-01-13 | SO | 2/25/2016 10:41 AM | 2/25/2016 10:41 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229554 | 1 | 1155.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **014** | 04-PD-STK-01-14 | SO | 2/25/2016 10:46 AM | 2/25/2016 10:46 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229555 | 1 | 1043.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **015** | 04-PD-STK-01-15 | SO | 2/25/2016 10:58 AM | 2/25/2016 10:58 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229556 | 1 | 1294.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |
| **016** | 04-PD-STK-01-16 | SO | 2/25/2016 11:00 AM | 2/25/2016 11:00 AM | H | 30 | 5 | WO4 | | | | | | | | | | |
| | TC_ID | Cnt | Wt (g) | Container Type | pH Orig | pH Final | CPM | uR Hr | Stor | VOA | Head | AF Units | AF Rate | AF Mins | AF Vol | | | |
| | 229557 | 1 | 1237.00 | Ziploc Bag | | | 80 | 24 | | N | N/A | | | | | | | |



DCN: ITSI-0808-0004-0076, 8 May 2019

# SDG Report - Analysis Assignments

| | | | |
|---|---|---|---|
| SDG | ARS1-16-00671 | Sample Count | |
| Client | ITSI Gilbane | Analysis Count | 2-32 |

**Sample Count Totals Per Analysis**

| Analysis Code | Analysis Description | Samples Count |
|---|---|---|
| GAM-A-025 | Gamma Spec - 21 Day Ingrowth in (Soil, Sludge, Waste, Sediment,Biota [SO, BI, VG]) | 16 |
| GPC-A-012 | Strontium-90 in (Soil, Sludge, Biota, Sediment [SO, BI, VG]) | 16 |

**Analyses Assigned Per Fraction**

| Fraction | Analysis Code | X = Assigned |
|---|---|---|
| 001 | GPC-A-012 | X |
| 001 | GAM-A-025 | X |
| 002 | GPC-A-012 | X |
| 002 | GAM-A-025 | X |
| 003 | GPC-A-012 | X |
| 003 | GAM-A-025 | X |
| 004 | GPC-A-012 | X |
| 004 | GAM-A-025 | X |
| 005 | GPC-A-012 | X |
| 005 | GAM-A-025 | X |
| 006 | GPC-A-012 | X |
| 006 | GAM-A-025 | X |
| 007 | GPC-A-012 | X |
| 007 | GAM-A-025 | X |
| 008 | GPC-A-012 | X |
| 008 | GAM-A-025 | X |
| 009 | GPC-A-012 | X |
| 009 | GAM-A-025 | X |
| 010 | GPC-A-012 | X |
| 010 | GAM-A-025 | X |
| 011 | GPC-A-012 | X |
| 011 | GAM-A-025 | X |
| 012 | GPC-A-012 | X |
| 012 | GAM-A-025 | X |
| 013 | GPC-A-012 | X |
| 013 | GAM-A-025 | X |
| 014 | GPC-A-012 | X |



DCN: ITSI-0808-0004-0076, 8 May 2019

| | | |
|---|---|---|
| 014 | GAM-A-025 | X |
| 015 | GPC-A-012 | X |
| 015 | GAM-A-025 | X |
| 016 | GPC-A-012 | X |
| 016 | GAM-A-025 | X |

# DQO Report for SDG

ARS1-16-00671



DCN: ITSI-0808-0004-0076, 8 May 2019



| Analysis Code | Prep Type | Units | Aliquot | Procedure | Count Time | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GAM-A-025 | DGAM | pCi | g | ARS-007 | | | | | | | | |
| | Group | Isotope | | RDL | LCS LL/UL | MS LL/UL | RadY LL/UL | GraVY LL/UL | RER | RPD | LOD/LOQ | Surr LL/UL |
| | Gilbane | Ac-228 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Am-241 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Bi-212 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Bi-214 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Co-60 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Cs-137 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Eu-152 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Eu-154 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | K-40 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pa-234 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-210 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-212 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Pb-214 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Ra-226 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Ra-228 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Th-234 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | Tl-208 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | U-235 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| | Gilbane | U-238 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |
| GPC-A-012 | DRAD | pCi | g | ARS-032 | | | | | | | | |
| | Group | Isotope | | RDL | LCS LL/UL | MS LL/UL | RadY LL/UL | GraVY LL/UL | RER | RPD | LOD/LOQ | Surr LL/UL |
| | STD | Sr-90 | | 0.00E+000 | 75/125 | 60/140 | 30/110 | 40/110 | 1 | 25 | 0/0 | N/A |

User: RVARNELL Last Modified: 3/28/2016 1:23:50 PM

| Analysis Code | Fraction | Units | Aliquot |
|---|---|---|---|
| GAM-A-025 | 001 | pCi | g |
| | 002 | pCi | g |
| | 003 | pCi | g |
| | 004 | pCi | g |
| | 005 | pCi | g |
| | 006 | pCi | g |
| | 007 | pCi | g |
| | 008 | pCi | g |
| | 009 | pCi | g |
| | 010 | pCi | g |
| | 011 | pCi | g |
| | 012 | pCi | g |
| | 013 | pCi | g |
| | 014 | pCi | g |
| | 015 | pCi | g |
| | 016 | pCi | g |
| GPC-A-012 | 001 | pCi | g |
| | 011 | pCi | g |



DCN: ITSI-0808-0004-0076, 8 May 2019

# ARS FILE TRACKING SHEET

**SDG:** ARS1-16-00671

| Task | Date / Time | Initials |
|---|---|---|
| Date & Time Samples Received | 03-28-16 10:21 | JRN |
| ICOC Initiated/Storage Location: WO4 | 03-28-16 11:32 | JRN |
| Technical Checks Performed | | |
| Report Written / EDD Generated ____/____\|____ | | |
| Quality Assurance Checks Performed on Report | | |
| Management Checks Performed on Report | | |
| *Preliminary Report Scan* | | |
| Report E-mailed/Faxed | | |
| Invoice Completed Invoice #:_____ | | |
| Requires Report Mailed Yes / No | | |
| Requires Original COC mailed Yes / No | | |
| Report Reviewed and Imaged | | |

**SPECIAL REQUIREMENTS**

| Requirement | Yes | No |
|---|---|---|
| 3 Hour Rush | ☐ | ☑ |
| 24 Hour Rush | ☐ | ☑ |
| 48 Hour Rush | ☐ | ☑ |
| 3 Day Rush | ☐ | ☑ |
| 5 Day Rush | ☐ | ☑ |
| 10 Day Rush | ☐ | ☑ |
| Standard Oil/Gas Client (5 Day) | ☐ | ☑ |
| Standard Turnaround | ☑ | ☐ |

**NOTES** Sample receipt PKG sent 3-30-16 @ 0856 RM
Level 3 pkg - email from K Calhoun 3-30-16 @ 10:05
all samples logged for St-T, only 2 samples requested St-T, will correct log-in
+ QC + resend corrected Sample receipt package. 3-30-16 RM

COMPANY NAME: Gilbane SDG: 1851-16-00671

**SHIPPING CONTAINER**

| | | |
|---|---|---|
| Good Condition | ☑ Yes | ☐ No |
| Radioactive | ☐ Yes | ☑ No |
| UN2910 | ☐ Yes | ☑ No |
| Sec. Seals | ☐ Yes | ☑ No |
| Seals Intact | ☐ Yes ☐ No | ☑ N/A |
| Air Bill | ☐ Yes | ☑ No |

**COC PRESENT WITH SAMPLES**

| | | |
|---|---|---|
| COC | ☑ Yes | ☐ No |

**SAMPLE CONTAINER(S)**

| | | |
|---|---|---|
| Good Condition | ☑ Yes | ☐ No |
| Sec. Seals | ☐ Yes | ☑ No |
| Seal Intact | ☐ Yes ☐ No | ☐ N/A |
| Marked Radioactive | ☐ Yes | ☑ No |

# Samples Rcv 16

Matrix [ AF , AQ , BI , FE , LT , SI , SO , UR , VG ]

**External and Internal Surveys**

| | | | | | |
|---|---|---|---|---|---|
| Exposure Rate Meter: | M3 124334 | Serial No.: | RN 17782 | Calibration Due Date: | 1/25/17 |
| Count Rate Meter: | M3 237983 | Serial No.: | PR 165363 | Calibration Due Date: | 2/3/17 |

| | | | |
|---|---|---|---|
| Background Exposure Rate (µR/hr) | 22 | Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) | 24 µR/hr |
| Background Count Rate (cpm) | 70 | Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) | 80 cpm |
| | | Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd) | 80 cpm |

| Sample Label/Comments/Notes | pH Orig (pH ≤ 2 is Acceptable) | pH Final | Mark if Preserve | Acid Lot # | Weight(g) / Volume(mL) | µR/hr (Acceptance Limits <500 µR/hr) | cpm (Acceptance Limits <100 cpm/cm²) |
|---|---|---|---|---|---|---|---|
| 64-PD-SK-01-01 | | | ☐ | | 1362 | 24 | 80 |
| -02 | | | ☐ | | 1072 | 24 | 80 |
| -03 | | | ☐ | LW | 917 | 24 | 80 |
| -04 | | | ☐ | 3-28-16 | 1056 | 24 | 80 |
| -05 | | | ☐ | | 957 | 24 | 80 |
| -06 | | | ☐ | | 1132 | 24 | 80 |
| -07 | | | ☐ | | 1058 | 24 | 80 |
| -08 | | | ☐ | | 995 | 24 | 80 |
| -09 | | | ☐ | | 1229 | 24 | 80 |
| -10 | | | ☐ | | 1182 | 24 | 80 |
| -11 | | | ☐ | | 2002 | 24 | 80 |
| -12 | | | ☐ | | 1109 | 24 | 80 |
| -13 | | | ☐ | | 1155 | 24 | 80 |
| -14 | | | ☐ | | 1043 | 24 | 80 |
| -15 | | | ☐ | | 1294 | 24 | 80 |
| -16 | | | ☐ | | 1237 | 24 | 80 |
| | | | ☐ | | | | |
| | | | ☐ | | | | |
| | | | ☐ | | | | |

Surveyors' Name: _____ Date/Time Surveyed: 3-28-16 1021

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INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

# Analytical Results

## Sample Data Summary

***SDG# ARS1-16-00671***

***COC# HPSD1-285***

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-01
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-001
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.002 | 0.076 | 0.131 | 0.066 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Bi-212 | 0.206 | 0.291 | 0.488 | 0.244 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Bi-214 | 0.380 | 0.110 | 0.142 | 0.071 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Co-60 | -0.004 | 0.043 | 0.078 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Cs-137 | 0.000 | 0.042 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Eu-152 | 0.175 | 0.136 | 0.180 | 0.090 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Eu-154 | 0.030 | 0.071 | 0.067 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| K-40 | 14.654 | 1.699 | 0.397 | 0.199 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Pa-234 | 0.093 | 0.093 | 0.129 | 0.065 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Pb-210 | 0.513 | 1.001 | 1.750 | 0.875 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Pb-212 | 0.461 | 0.102 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Pb-214 | 0.519 | 0.130 | 0.119 | 0.060 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Ra-226 | 0.380 | 0.110 | 0.142 | 0.071 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Sr-T | -0.045 | 0.102 | 0.186 | 0.087 | U | pCi/g | ARS_032/Eichrom SRW-1 | 04/14/16 13:38 | AN | 94% |
| Th-232 | 0.332 | 0.136 | 0.256 | 0.128 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Th-234 | 0.610 | 0.513 | 1.250 | 0.625 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| Tl-208 | 0.150 | 0.065 | 0.075 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |
| U-235 | 0.081 | 0.049 | 0.069 | 0.035 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:22 | WJS | NA |

**NOTES: RECOUNT**

Project Manager Review

***Notes:*** *ARS International, LLC assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of ARS International, LLC. The results in this report pertain only to the samples tested and are intended solely for the use of the client.*

LELAP Certificate# 01949

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-02
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-002
**Date Received:** 03/28/16
**Report Date:** 04/28/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.021 | 0.066 | 0.116 | 0.058 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Bi-212 | 0.174 | 0.358 | 0.469 | 0.235 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Bi-214 | 0.315 | 0.103 | 0.131 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Co-60 | -0.002 | 0.199 | 0.080 | 0.040 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Cs-137 | -0.009 | 0.034 | 0.061 | 0.031 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Eu-152 | 0.020 | 0.065 | 0.228 | 0.114 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Eu-154 | 0.031 | 0.078 | 0.063 | 0.032 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| K-40 | 12.410 | 1.566 | 0.711 | 0.356 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Pa-234 | 0.083 | 0.108 | 0.124 | 0.062 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Pb-210 | 1.421 | 0.918 | 1.360 | 0.680 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Pb-212 | 0.247 | 0.072 | 0.084 | 0.042 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Pb-214 | 0.295 | 0.085 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Ra-226 | 0.315 | 0.103 | 0.131 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Th-232 | 0.228 | 0.105 | 0.211 | 0.106 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Th-234 | 0.324 | 0.285 | 1.320 | 0.660 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| Tl-208 | 0.083 | 0.039 | 0.056 | 0.028 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| U-235 | 0.102 | 0.168 | 0.274 | 0.137 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:23 | WJS | NA |
| | | | | | | | | | | |

**NOTES:**

Project Manager Review

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LELAP Certificate# 01949

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-03
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-003
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.002 | 0.087 | 0.149 | 0.075 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Bi-212 | 0.414 | 0.358 | 0.447 | 0.224 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Bi-214 | 0.709 | 0.149 | 0.132 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Co-60 | -0.012 | 0.050 | 0.088 | 0.044 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Cs-137 | 0.051 | 0.043 | 0.067 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Eu-152 | 0.115 | 0.141 | 0.226 | 0.113 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Eu-154 | 0.025 | 0.064 | 0.095 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| K-40 | 20.463 | 2.189 | 0.436 | 0.218 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Pa-234 | 0.114 | 0.152 | 0.138 | 0.069 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Pb-210 | 0.341 | 0.860 | 1.510 | 0.755 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Pb-212 | 0.494 | 0.113 | 0.127 | 0.064 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Pb-214 | 0.627 | 0.130 | 0.135 | 0.068 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Ra-226 | 0.709 | 0.149 | 0.132 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Th-232 | 0.479 | 0.145 | 0.208 | 0.104 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Th-234 | 1.030 | 0.617 | 1.380 | 0.690 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| Tl-208 | 0.218 | 0.064 | 0.066 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |
| U-235 | 0.129 | 0.048 | 0.066 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 09:34 | WJS | NA |

**NOTES: RECOUNT**

Project Manager Review

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1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-04
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-004
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.003 | 0.089 | 0.153 | 0.077 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Bi-212 | 0.185 | 0.286 | 0.487 | 0.244 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Bi-214 | 0.387 | 0.116 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Co-60 | -0.010 | 0.051 | 0.082 | 0.041 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Cs-137 | 0.016 | 0.030 | 0.051 | 0.026 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Eu-152 | 0.051 | 0.103 | 0.211 | 0.106 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Eu-154 | 0.037 | 0.079 | 0.081 | 0.040 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| K-40 | 13.209 | 1.518 | 0.346 | 0.173 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Pa-234 | 0.051 | 0.090 | 0.130 | 0.065 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Pb-210 | -0.330 | 1.593 | 1.620 | 0.810 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Pb-212 | 0.322 | 0.077 | 0.089 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Pb-214 | 0.347 | 0.082 | 0.126 | 0.063 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Ra-226 | 0.387 | 0.116 | 0.115 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Th-232 | 0.361 | 0.127 | 0.171 | 0.086 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Th-234 | 0.407 | 0.500 | 1.170 | 0.585 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| Tl-208 | 0.089 | 0.043 | 0.063 | 0.032 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |
| U-235 | 0.086 | 0.087 | 0.339 | 0.170 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:04 | WJS | NA |

**NOTES: RECOUNT**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-05
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-005
**Date Received:** 03/28/16
**Report Date:** 04/28/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.016 | 0.081 | 0.141 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Bi-212 | 0.398 | 0.295 | 0.440 | 0.220 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Bi-214 | 0.512 | 0.144 | 0.129 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Co-60 | -0.018 | 0.097 | 0.108 | 0.054 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Cs-137 | -0.005 | 0.045 | 0.043 | 0.022 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Eu-152 | 0.081 | 0.096 | 0.236 | 0.118 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Eu-154 | 0.075 | 0.088 | 0.072 | 0.036 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| K-40 | 13.859 | 2.148 | 1.120 | 0.560 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pa-234 | 0.066 | 0.077 | 0.125 | 0.063 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pb-210 | -0.117 | 0.970 | 1.410 | 0.705 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pb-212 | 0.435 | 0.108 | 0.111 | 0.056 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pb-214 | 0.439 | 0.124 | 0.131 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Ra-226 | 0.512 | 0.144 | 0.129 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Th-232 | 0.410 | 0.123 | 0.223 | 0.112 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Th-234 | 1.096 | 0.522 | 1.330 | 0.665 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Tl-208 | 0.103 | 0.056 | 0.073 | 0.036 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| U-235 | 0.040 | 0.073 | 0.339 | 0.170 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |

**NOTES:**

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-06
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-006
**Date Received:** 03/28/16
**Report Date:** 04/28/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.033 | 0.085 | 0.144 | 0.072 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Bi-212 | 0.038 | 0.150 | 0.440 | 0.220 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Bi-214 | 0.342 | 0.122 | 0.138 | 0.069 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Co-60 | 0.003 | 0.036 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Cs-137 | -0.010 | 0.038 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Eu-152 | 0.045 | 0.092 | 0.233 | 0.117 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Eu-154 | 0.039 | 0.077 | 0.077 | 0.039 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| K-40 | 10.906 | 1.574 | 0.453 | 0.227 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pa-234 | 0.023 | 0.066 | 0.127 | 0.064 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pb-210 | 0.083 | 0.987 | 1.800 | 0.900 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pb-212 | 0.291 | 0.091 | 0.109 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Pb-214 | 0.257 | 0.086 | 0.116 | 0.058 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Ra-226 | 0.342 | 0.122 | 0.138 | 0.069 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Th-232 | 0.232 | 0.135 | 0.222 | 0.111 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Th-234 | 0.764 | 0.547 | 1.280 | 0.640 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| Tl-208 | 0.156 | 0.059 | 0.065 | 0.033 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |
| U-235 | 0.092 | 0.042 | 0.058 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 11:56 | WJS | NA |

**NOTES:**

Project Manager Review

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2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-07
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-007
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.016 | 0.097 | 0.141 | 0.071 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Bi-212 | 0.081 | 0.415 | 0.558 | 0.279 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Bi-214 | 0.734 | 0.135 | 0.102 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Co-60 | 0.020 | 0.023 | 0.075 | 0.037 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Cs-137 | 0.046 | 0.037 | 0.044 | 0.022 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Eu-152 | 0.065 | 0.077 | 0.201 | 0.101 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Eu-154 | 0.075 | 0.122 | 0.077 | 0.038 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| K-40 | 18.931 | 1.931 | 0.583 | 0.292 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Pa-234 | 0.037 | 0.093 | 0.131 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Pb-210 | 0.843 | 0.821 | 1.320 | 0.660 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Pb-212 | 0.758 | 0.102 | 0.085 | 0.043 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Pb-214 | 0.751 | 0.136 | 0.110 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Ra-226 | 0.734 | 0.135 | 0.102 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Th-232 | 0.876 | 0.205 | 0.160 | 0.080 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Th-234 | 0.941 | 0.452 | 1.320 | 0.660 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| Tl-208 | 0.296 | 0.060 | 0.051 | 0.025 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |
| U-235 | 0.007 | 0.091 | 0.324 | 0.162 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:11 | WJS | NA |

**NOTES: RECOUNT**

Project Manager Review

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1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-08
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-008
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.033 | 0.059 | 0.099 | 0.050 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Bi-212 | 0.109 | 0.226 | 0.545 | 0.273 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Bi-214 | 0.442 | 0.111 | 0.105 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Co-60 | 0.002 | 0.050 | 0.091 | 0.046 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Cs-137 | -0.014 | 0.054 | 0.070 | 0.035 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Eu-152 | 0.030 | 0.060 | 0.217 | 0.109 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Eu-154 | -0.003 | 0.019 | 0.070 | 0.035 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| K-40 | 14.100 | 1.942 | 0.867 | 0.434 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Pa-234 | 0.036 | 0.116 | 0.101 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Pb-210 | 0.405 | 0.729 | 1.290 | 0.645 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Pb-212 | 0.337 | 0.082 | 0.090 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Pb-214 | 0.423 | 0.113 | 0.118 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Ra-226 | 0.442 | 0.111 | 0.105 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Th-232 | 0.425 | 0.130 | 0.148 | 0.074 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Th-234 | 0.455 | 0.474 | 1.120 | 0.560 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| Tl-208 | 0.070 | 0.041 | 0.057 | 0.028 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |
| U-235 | 0.047 | 0.054 | 0.067 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 10:21 | WJS | NA |

**NOTES: RECOUNT**

Project Manager Review

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2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-09
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-009
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000 | 0.061 | 0.149 | 0.075 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Bi-212 | 0.435 | 0.288 | 0.458 | 0.229 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Bi-214 | 0.613 | 0.129 | 0.118 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Co-60 | -0.010 | 0.122 | 0.093 | 0.046 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Cs-137 | -0.002 | 0.075 | 0.068 | 0.034 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Eu-152 | 0.075 | 0.147 | 0.229 | 0.115 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Eu-154 | 0.082 | 0.137 | 0.082 | 0.041 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| K-40 | 19.634 | 2.392 | 0.861 | 0.431 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Pa-234 | 0.038 | 0.054 | 0.121 | 0.061 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Pb-210 | 0.157 | 0.892 | 1.560 | 0.780 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Pb-212 | 0.826 | 0.139 | 0.127 | 0.064 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Pb-214 | 0.720 | 0.144 | 0.131 | 0.066 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Ra-226 | 0.613 | 0.129 | 0.118 | 0.059 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Th-232 | 0.739 | 0.191 | 0.214 | 0.107 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Th-234 | 0.717 | 0.479 | 1.160 | 0.580 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| Tl-208 | 0.292 | 0.072 | 0.069 | 0.035 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |
| U-235 | 0.030 | 0.066 | 0.360 | 0.180 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:09 | WJS | NA |

**NOTES: RECOUNT**

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**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-10
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-010
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.044 | 0.076 | 0.127 | 0.064 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Bi-212 | 0.235 | 0.343 | 0.448 | 0.224 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Bi-214 | 0.547 | 0.111 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Co-60 | 0.000 | 0.039 | 0.071 | 0.035 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Cs-137 | 0.001 | 0.030 | 0.055 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Eu-152 | 0.131 | 0.068 | 0.181 | 0.091 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Eu-154 | 0.035 | 0.055 | 0.074 | 0.037 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| K-40 | 9.795 | 1.265 | 0.527 | 0.264 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Pa-234 | 0.082 | 0.138 | 0.132 | 0.066 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Pb-210 | 0.630 | 0.781 | 1.330 | 0.665 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Pb-212 | 0.390 | 0.088 | 0.102 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Pb-214 | 0.671 | 0.129 | 0.110 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Ra-226 | 0.547 | 0.111 | 0.100 | 0.050 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Th-232 | 0.632 | 0.194 | 0.196 | 0.098 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Th-234 | 1.066 | 0.777 | 1.180 | 0.590 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| Tl-208 | 0.180 | 0.049 | 0.051 | 0.025 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |
| U-235 | 0.098 | 0.042 | 0.062 | 0.031 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:56 | WJS | NA |

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**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-11
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-011
**Date Received:** 03/28/16
**Report Date:** 04/28/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000 | 0.035 | 0.129 | 0.065 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Bi-212 | 0.000 | 0.218 | 0.446 | 0.223 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Bi-214 | 0.251 | 0.091 | 0.086 | 0.043 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Co-60 | 0.008 | 0.023 | 0.077 | 0.038 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Cs-137 | 0.008 | 0.038 | 0.052 | 0.026 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Eu-152 | 0.121 | 0.107 | 0.166 | 0.083 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Eu-154 | 0.000 | 0.036 | 0.064 | 0.032 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| K-40 | 12.223 | 1.500 | 0.381 | 0.191 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Pa-234 | -0.022 | 0.093 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Pb-210 | 0.237 | 0.817 | 1.220 | 0.610 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Pb-212 | 0.261 | 0.065 | 0.074 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Pb-214 | 0.338 | 0.103 | 0.090 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Ra-226 | 0.251 | 0.091 | 0.086 | 0.043 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Sr-T | 0.030 | 0.087 | 0.150 | 0.069 | U | pCi/g | ARS-032/Eichrom SRW-1 | 04/14/16 13:38 | AN | 98% |
| Th-232 | 0.412 | 0.126 | 0.110 | 0.055 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Th-234 | 0.398 | 0.423 | 1.150 | 0.575 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| Tl-208 | 0.127 | 0.046 | 0.040 | 0.020 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |
| U-235 | 0.048 | 0.135 | 0.270 | 0.135 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:00 | WJS | NA |

**NOTES:**

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**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-12
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-012
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.022 | 0.089 | 0.152 | 0.076 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Bi-212 | 0.254 | 0.319 | 0.382 | 0.191 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Bi-214 | 0.484 | 0.096 | 0.090 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Co-60 | -0.001 | 0.063 | 0.077 | 0.038 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Cs-137 | 0.007 | 0.028 | 0.049 | 0.024 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Eu-152 | 0.037 | 0.089 | 0.195 | 0.098 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Eu-154 | 0.016 | 0.046 | 0.076 | 0.038 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| K-40 | 22.516 | 2.104 | 0.677 | 0.339 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Pa-234 | 0.086 | 0.102 | 0.128 | 0.064 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Pb-210 | 0.448 | 0.870 | 1.510 | 0.755 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Pb-212 | 0.373 | 0.079 | 0.084 | 0.042 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Pb-214 | 0.612 | 0.122 | 0.107 | 0.054 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Ra-226 | 0.484 | 0.096 | 0.090 | 0.045 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Th-232 | 0.405 | 0.142 | 0.154 | 0.077 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Th-234 | 0.637 | 0.223 | 1.090 | 0.545 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| Tl-208 | 0.158 | 0.055 | 0.059 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |
| U-235 | 0.075 | 0.166 | 0.276 | 0.138 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:10 | WJS | NA |

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**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-13
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-013
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.055 | 0.072 | 0.102 | 0.051 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Bi-212 | 0.720 | 0.416 | 0.406 | 0.203 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Bi-214 | 0.700 | 0.140 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Co-60 | 0.000 | 0.028 | 0.091 | 0.046 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Cs-137 | 0.033 | 0.036 | 0.045 | 0.023 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Eu-152 | 0.148 | 0.108 | 0.151 | 0.076 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Eu-154 | 0.018 | 0.064 | 0.074 | 0.037 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| K-40 | 20.275 | 1.979 | 0.341 | 0.171 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Pa-234 | 0.138 | 0.099 | 0.140 | 0.070 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Pb-210 | 0.140 | 0.972 | 1.440 | 0.720 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Pb-212 | 0.667 | 0.094 | 0.077 | 0.039 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Pb-214 | 0.690 | 0.126 | 0.105 | 0.053 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Ra-226 | 0.700 | 0.140 | 0.113 | 0.057 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Th-232 | 0.720 | 0.185 | 0.157 | 0.079 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Th-234 | 1.138 | 0.620 | 0.936 | 0.468 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| Tl-208 | 0.216 | 0.058 | 0.053 | 0.026 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |
| U-235 | 0.061 | 0.112 | 0.290 | 0.145 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:14 | WJS | NA |

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Project Manager Review

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ARS INTERNATIONAL

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-14
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-014
**Date Received:** 03/28/16
**Report Date:** 04/28/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.016 | 0.070 | 0.105 | 0.053 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Bi-212 | 0.515 | 0.289 | 0.351 | 0.176 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Bi-214 | 0.209 | 0.137 | 0.149 | 0.075 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Co-60 | 0.020 | 0.053 | 0.067 | 0.033 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Cs-137 | 0.006 | 0.032 | 0.045 | 0.022 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Eu-152 | 0.049 | 0.038 | 0.210 | 0.105 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Eu-154 | 0.075 | 0.051 | 0.081 | 0.041 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| K-40 | 7.138 | 1.170 | 0.291 | 0.146 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Pa-234 | 0.140 | 0.157 | 0.102 | 0.051 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Pb-210 | 0.000 | 0.539 | 1.310 | 0.655 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Pb-212 | 0.255 | 0.068 | 0.073 | 0.036 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Pb-214 | 0.365 | 0.089 | 0.057 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Ra-226 | 0.209 | 0.137 | 0.149 | 0.075 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Th-232 | 0.296 | 0.158 | 0.173 | 0.087 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Th-234 | 0.291 | 0.352 | 1.170 | 0.585 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| Tl-208 | 0.085 | 0.064 | 0.064 | 0.032 | | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |
| U-235 | 0.049 | 0.067 | 0.057 | 0.029 | U | pCi/g | ARS-007/EPA 901.1M | 04/19/16 13:33 | WJS | NA |

**NOTES:**

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1 (800) 401-4277 FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-15
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-015
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.001 | 0.088 | 0.150 | 0.075 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Bi-212 | 0.850 | 0.412 | 0.452 | 0.226 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Bi-214 | 0.904 | 0.164 | 0.129 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Co-60 | 0.002 | 0.008 | 0.094 | 0.047 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Cs-137 | 0.001 | 0.034 | 0.060 | 0.030 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Eu-152 | 0.060 | 0.091 | 0.229 | 0.115 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Eu-154 | 0.054 | 0.053 | 0.072 | 0.036 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| K-40 | 11.422 | 1.582 | 0.716 | 0.358 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Pa-234 | 0.061 | 0.068 | 0.119 | 0.060 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Pb-210 | 0.506 | 0.797 | 1.370 | 0.685 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Pb-212 | 0.944 | 0.145 | 0.128 | 0.064 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Pb-214 | 1.059 | 0.167 | 0.135 | 0.068 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Ra-226 | 0.904 | 0.164 | 0.129 | 0.065 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Th-232 | 1.041 | 0.172 | 0.189 | 0.095 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Th-234 | 0.881 | 0.533 | 1.210 | 0.605 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| Tl-208 | 0.370 | 0.070 | 0.057 | 0.029 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |
| U-235 | 0.059 | 0.043 | 0.370 | 0.185 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:57 | WJS | NA |

**NOTES: RECOUNT**

Project Manager Review

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**ARS Sample Delivery Group:** ARS1-16-00671
**Client Sample ID:** 04-PD-STK-01-16
**Sample Collection Date:** 02/25/16
**Sample Matrix:** Soil/Solid/Sludge

**Request or PO Number:** 07204.0004
**ARS Sample ID:** ARS1-16-00671-016
**Date Received:** 03/28/16
**Report Date:** 05/06/16

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | -0.024 | 0.665 | 0.104 | 0.052 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Bi-212 | 0.111 | 0.171 | 0.291 | 0.146 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Bi-214 | 0.154 | 0.069 | 0.103 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Co-60 | -0.001 | 0.051 | 0.055 | 0.028 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Cs-137 | 0.001 | 0.029 | 0.053 | 0.026 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Eu-152 | 0.030 | 0.074 | 0.131 | 0.066 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Eu-154 | 0.034 | 0.037 | 0.048 | 0.024 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| K-40 | 6.189 | 0.909 | 0.602 | 0.301 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Pa-234 | 0.033 | 0.050 | 0.098 | 0.049 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Pb-210 | 0.287 | 0.642 | 1.070 | 0.535 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Pb-212 | 0.239 | 0.069 | 0.078 | 0.039 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Pb-214 | 0.259 | 0.066 | 0.095 | 0.047 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Ra-226 | 0.154 | 0.069 | 0.103 | 0.052 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Th-232 | 0.247 | 0.097 | 0.148 | 0.074 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Th-234 | 0.180 | 0.232 | 0.989 | 0.495 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| Tl-208 | 0.082 | 0.034 | 0.040 | 0.020 | | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |
| U-235 | 0.067 | 0.111 | 0.197 | 0.099 | U | pCi/g | ARS-007/EPA 901.1M | 05/05/16 11:58 | WJS | NA |

**NOTES: RECOUNT**

Project Manager Review

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# Radiological Analysis
## Quality Control Results

***SDG# ARS1-16-00671***

***COC# HPSD1-285***

| | |
|---|---|
| Analytical Batch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| Analysis | Gamma Spec (Solid) |
| Analysis Test Method | ARS-007/EPA 901.1M |
| Analysis Code | GAM-A-025 |
| Report Units | pCi/g |

# QC Results per Analytical Batch

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| Laboratory Control Sample | Recovery (%): | > 75 | < 125 |
| Matrix Spike | Recovery (%): | > 60 | < 140 |
| Duplicate | Replicate Error Ratio (RER): | | < 1 |
| | Duplicate Error Ratio (DER): | | < 3 |
| | Relative Percent Difference (RPD %): | | ≤ 25 |

## Laboratory Control Sample

Analysis Date: 05/05/16 07:26 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B16-00698-01 | LCS | AM-241 | 21998.000 | 1723.500 | 22747.748 | 96.7 | 557.200 |
| ARS1-B16-00698-01 | LCS | CO-60 | 40988.000 | 1912.900 | 42792.793 | 95.8 | 499.500 |
| ARS1-B16-00698-01 | LCS | CS-137 | 34735.000 | 1703.200 | 35450.450 | 98.0 | 371.700 |

## Duplicate RER/DER/RPD

Analysis Date: 05/05/16 07:37 | Analysis Technician: WJS

| Analyte | Result LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 21998.000 | 1723.500 | 22623.000 | 1760.500 | 0.179 | 0.497 | 2.8 |
| CO-60 | 40988.000 | 1912.900 | 41844.000 | 1834.300 | 0.228 | 0.633 | 2.1 |
| CS-137 | 34735.000 | 1703.200 | 36652.000 | 1727.800 | 0.559 | 1.549 | 5.4 |

## Duplicate RER/DER/RPD (Dup Sample)

Analysis Date: 05/05/16 09:33 | Analysis Technician: WJS

| Analyte | Result DO | CSU DO (2s) | Results DUP | CSU DUP (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| BI-214 | 0.380 | 0.110 | 0.497 | 0.111 | 0.527 | 1.460 | |
| CO-60 | -0.004 | 0.043 | -0.006 | 0.284 | 0.004 | 0.009 | |
| CS-137 | 0.000 | 0.042 | 0.003 | 0.029 | 0.037 | 0.101 | |

## Method Blank

Analysis Date: 05/05/16 12:23 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B16-00698-03 | MBL | AM-241 | -0.140 | 12.386 | 21.900 | U |
| ARS1-B16-00698-03 | MBL | CO-60 | 0.000 | 1.645 | 6.060 | U |
| ARS1-B16-00698-03 | MBL | CS-137 | -0.771 | 254.040 | 14.700 | U |

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# QC Results per Analytical Batch

| Analytical Batch | ARS1-B16-00564 |
|---|---|
| SDG | ARS1-16-00671 |
| Analysis | Gamma Spec (Solid) |
| Analysis Test Method | ARS-007/EPA 901.1M |
| Analysis Code | GAM-A-025 |
| Report Units | pCi/g |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| Laboratory Control Sample | Recovery (%): | > 75 | < 125 |
| Matrix Spike | Recovery (%): | > 60 | < 140 |
| Duplicate | Replicate Error Ratio (RER): | | < 1 |
| | Duplicate Error Ratio (DER): | | < 3 |
| | Relative Percent Difference (RPD %): | | ≤ 25 |

## Laboratory Control Sample

Analysis Date: 04/19/16 09:39 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B16-00564-01 | LCS | AM-241 | 21600 | 1700 | 22748 | 95 | 710 |
| ARS1-B16-00564-01 | LCS | CO-60 | 40300 | 1600 | 42793 | 94 | 410 |
| ARS1-B16-00564-01 | LCS | CS-137 | 35700 | 1600 | 35450 | 101 | 290 |

## Duplicate RER/DER/RPD

Analysis Date: 04/19/16 09:57 | Analysis Technician: WJS

| Analyte | Result LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 21640 | 1690 | 22480 | 1733 | 0.25 | 0.68 | 3.8 |
| CO-60 | 40310 | 1618 | 41870 | 1828 | 0.45 | 1.25 | 3.8 |
| CS-137 | 35720 | 1596 | 36470 | 1716 | 0.23 | 0.63 | 2.1 |

## Duplicate RER/DER/RPD (Dup Sample)

Analysis Date: | Analysis Technician:

| Analyte | Result DO | CSU DO (2s) | Results DUP | CSU DUP (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| RA-226 | 0.90249 | 0.18186 | 1.0129 | 0.18521 | 0.30 | 0.83 | 11.5 |
| CO-60 | -0.00055164 | 0.022066 | 0 | 0.015173 | 0.01 | 0.04 | 200.0 |
| CS-137 | -0.013959 | 0.068818 | 0.02817 | 0.044655 | 0.37 | 1.01 | 592.9 |

## Method Blank

Analysis Date: 04/19/16 09:43 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B16-00564-03 | MBL | AM-241 | -15 | 74 | 31 | U |
| ARS1-B16-00564-03 | MBL | CO-60 | -2 | 11 | 19 | U |
| ARS1-B16-00564-03 | MBL | CS-137 | 0 | 13 | 24 | U |

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# QC Results per Analytical Batch

| Analytical Batch | ARS1-B16-00565 |
|---|---|
| SDG | ARS1-16-00671 |
| Analysis | Gamma Spec (Solid) |
| Analysis Test Method | ARS-007/EPA 901.1M |
| Analysis Code | GAM-A-025 |
| Report Units | pCi/g |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| Laboratory Control Sample | Recovery (%): | > 75 | < 125 |
| Matrix Spike | Recovery (%): | > 60 | < 140 |
| Duplicate | Replicate Error Ratio (RER): | | < 1 |
| | Duplicate Error Ratio (DER): | | < 3 |
| | Relative Percent Difference (RPD %): | | ≤ 25 |

## Laboratory Control Sample

Analysis Date: 04/19/16 12:31 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B16-00565-01 | LCS | AM-241 | 22800 | 1800 | 22748 | 100 | 620 |
| ARS1-B16-00565-01 | LCS | CO-60 | 42200 | 1700 | 42793 | 99 | 450 |
| ARS1-B16-00565-01 | LCS | CS-137 | 36400 | 1600 | 35450 | 103 | 280 |

## Duplicate RER/DER/RPD

Analysis Date: 04/19/16 12:43 | Analysis Technician: WJS

| Analyte | Result LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 22840 | 1839 | 22160 | 1753 | 0.19 | 0.53 | 3.0 |
| CO-60 | 42180 | 1699 | 41320 | 1648 | 0.26 | 0.71 | 2.1 |
| CS-137 | 36410 | 1596 | 36550 | 1632 | 0.04 | 0.12 | 0.4 |

## Duplicate RER/DER/RPD (Dup Sample)

Analysis Date: | Analysis Technician:

| Analyte | Result DO | CSU DO (2s) | Results DUP | CSU DUP (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| RA-226 | 0.25133 | 0.091162 | 0.3732 | 0.11715 | 0.59 | 1.61 | 39.0 |
| CO-60 | 0.0081978 | 0.023381 | 0.015531 | 0.045113 | 0.11 | 0.28 | 61.8 |
| CS-137 | 0.0080742 | 0.038119 | -0.0027498 | 0.15706 | 0.06 | 0.13 | 406.6 |

## Method Blank

Analysis Date: 04/19/16 12:28 | Analysis Technician: WJS

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B16-00565-03 | MBL | AM-241 | -3 | 14 | 25 | U |
| ARS1-B16-00565-03 | MBL | CO-60 | -1 | 39 | 33 | U |
| ARS1-B16-00565-03 | MBL | CS-137 | -5 | 14 | 21 | U |

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# QC Results Report

**Sample Delivery Group:** ARS1-16-00645, 00646, 00670, 00671, 00749

## Laboratory Control Sample Evaluation

| Analysis Batch | QC Type | Analyte | Analysis Results | CSU 1 (2s) | MDC | Expected Value | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | Percent Recovery (%) | LCS Acceptance Range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | LCS | Sr-T | 23.045 | 3.551 | 0.417 | 21.050 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 109 | 75%-125% |

## Blank Evaluation

| Analysis Batch | QC Type | Analyte | Analysis Results | CSU 1 (2s) | MDC | Expected Value | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | MBL | Sr-T | 0.012 | 0.231 | 0.404 | NA | U | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN |

## RER Duplicate Evaluation

| Analysis Batch | QC Type | Analysis Description | Result 1 | CSU 1 (2s) | Result 2 | CSU 2 (2s) | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | RER | RER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | LCSD | Sr-T | 23.045 | 3.551 | 23.470 | 3.609 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 0.06 | < 1 |

## DER Duplicate Evaluation

| Analysis Batch | QC Type | Analysis Description | Result 1 | CSU 1 (2s) | Result 2 | CSU 2 (2s) | Qual | Analysis Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | DER | DER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | LCSD | Sr-T | 23.045 | 3.551 | 23.470 | 3.609 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 0.17 | < 3 |

## Sample RER Duplicate Evaluation

| Analysis Batch | QC Type | Analyte | DUP Original Result | CSU 1 (2s) | DUP Result | CSU 2 (2s) | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | RER | RER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | DUP | Sr-T | -0.070 | 0.102 | 0.023 | 0.10 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 0.46 | < 1 |

## Sample DER Duplicate Evaluation

| Analysis Batch | QC Type | Analyte | DUP Original Result | CSU 1 (2s) | DUP Result | CSU 2 (2s) | Qual | Report Units | Analysis Test Method | Analysis Date/Time | Analysis Technician | DER | DER AcceptanceRange |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514 | DUP | Sr-T | -0.070 | 0.102 | 0.023 | 0.10 | | pCi/g | ARS-032/EPA 905.0 | 4/14/16 13:36 | AN | 1.29 | < 3 |

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# Radiological Analysis

## EPA 901.1M

***SDG# ARS1-16-00671***

***COC# HPSD1-285***

DCN: ITSI-0808-0004-0076, 8 May 2019



**Analysis Batch ID** **ARS1-B16-00564**

| Method | ARS-007 | Analysis | GAM-A-025 | Matrix | SO |
|---|---|---|---|---|---|

**Description** **Gamma Spec (Solid)**

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00564-01 | LCS | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00564-02 | LCSD | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00564-03 | MBL | | | | | | | | | |
| ARS1-B16-00564-04 | DUP | | | | | | | | | |
| ARS1-B16-00564-05 | DO | | | | **ARS1-16-00670** | 021 | 1 | 04-PD-RO-09-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-06 | TRG | | | | **ARS1-16-00670** | 022 | 1 | 04-PD-RO-10-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-07 | TRG | | | | **ARS1-16-00670** | 023 | 1 | 04-PD-RO-11-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-08 | TRG | | | | **ARS1-16-00670** | 024 | 1 | 04-PD-RO-11-02 | Gilbane | 04/22/16 |
| ARS1-B16-00564-09 | TRG | | | | **ARS1-16-00670** | 025 | 1 | 04-PD-RO-11-03 | Gilbane | 04/22/16 |
| ARS1-B16-00564-10 | TRG | | | | **ARS1-16-00670** | 026 | 1 | 04-PD-RO-11-04 | Gilbane | 04/22/16 |
| ARS1-B16-00564-11 | TRG | | | | **ARS1-16-00670** | 027 | 1 | 04-PD-RO-11-05 | Gilbane | 04/22/16 |
| ARS1-B16-00564-12 | TRG | | | | **ARS1-16-00670** | 028 | 1 | 04-PD-RO-12-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-13 | TRG | | | | **ARS1-16-00670** | 029 | 1 | 04-PD-RO-13-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-14 | TRG | | | | **ARS1-16-00670** | 030 | 1 | 04-PD-RO-14-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-15 | TRG | | | | **ARS1-16-00670** | 031 | 1 | 04-PD-RO-15-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-16 | TRG | | | | **ARS1-16-00670** | 032 | 1 | 04-PD-RO-16-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-17 | TRG | | | | **ARS1-16-00671** | 001 | 1 | 04-PD-STK-01-01 | Gilbane | 04/22/16 |
| ARS1-B16-00564-18 | TRG | | | | **ARS1-16-00671** | 002 | 1 | 04-PD-STK-01-02 | Gilbane | 04/22/16 |
| ARS1-B16-00564-19 | TRG | | | | **ARS1-16-00671** | 003 | 1 | 04-PD-STK-01-03 | Gilbane | 04/22/16 |
| ARS1-B16-00564-20 | TRG | | | | **ARS1-16-00671** | 004 | 1 | 04-PD-STK-01-04 | Gilbane | 04/22/16 |
| ARS1-B16-00564-21 | TRG | | | | **ARS1-16-00671** | 005 | 1 | 04-PD-STK-01-05 | Gilbane | 04/22/16 |
| ARS1-B16-00564-22 | TRG | | | | **ARS1-16-00671** | 006 | 1 | 04-PD-STK-01-06 | Gilbane | 04/22/16 |
| ARS1-B16-00564-23 | TRG | | | | **ARS1-16-00671** | 007 | 1 | 04-PD-STK-01-07 | Gilbane | 04/22/16 |
| ARS1-B16-00564-24 | TRG | | | | **ARS1-16-00671** | 008 | 1 | 04-PD-STK-01-08 | Gilbane | 04/22/16 |

# Analytical Batch Report

DCN: ITSI-0808-0004-0076, 8 May 2019



**Analysis Batch ID** **ARS1-B16-00565**

| Method | ARS-007 | Analysis | GAM-A-025 | Matrix | SO |
|---|---|---|---|---|---|

**Description** **Gamma Spec (Solid)**

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00565-01 | LCS | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00565-02 | LCSD | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00565-03 | MBL | | | | | | | | | |
| ARS1-B16-00565-04 | DUP | | | | | | | | | |
| ARS1-B16-00565-05 | TRG | | | | **ARS1-16-00671** | 009 | 1 | 04-PD-STK-01-09 | Gilbane | 04/22/16 |
| ARS1-B16-00565-06 | TRG | | | | **ARS1-16-00671** | 010 | 1 | 04-PD-STK-01-10 | Gilbane | 04/22/16 |
| ARS1-B16-00565-07 | DO | | | | **ARS1-16-00671** | 011 | 1 | 04-PD-STK-01-11 | Gilbane | 04/22/16 |
| ARS1-B16-00565-08 | TRG | | | | **ARS1-16-00671** | 012 | 1 | 04-PD-STK-01-12 | Gilbane | 04/22/16 |
| ARS1-B16-00565-09 | TRG | | | | **ARS1-16-00671** | 013 | 1 | 04-PD-STK-01-13 | Gilbane | 04/22/16 |
| ARS1-B16-00565-10 | TRG | | | | **ARS1-16-00671** | 014 | 1 | 04-PD-STK-01-14 | Gilbane | 04/22/16 |
| ARS1-B16-00565-11 | TRG | | | | **ARS1-16-00671** | 015 | 1 | 04-PD-STK-01-15 | Gilbane | 04/22/16 |
| ARS1-B16-00565-12 | TRG | | | | **ARS1-16-00671** | 016 | 1 | 04-PD-STK-01-16 | Gilbane | 04/22/16 |

DCN: ITSI-0808-0004-0076, 8 May 2019



**Analysis Batch ID** **ARS1-B16-00698**

| Method | ARS-007 | Analysis | GAM-A-025 | Matrix | SO |
|---|---|---|---|---|---|

**Description** **Gamma Spec (Solid)**

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00698-01 | LCS | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00698-02 | LCSD | 1595-98-4 | | | 1595-98-4 - GAMMA GEOMETRY: 250 mL (8oz.) Tuna Can | | | | | |
| ARS1-B16-00698-03 | MBL | | | | | | | | | |
| ARS1-B16-00698-04 | DUP | | | | | | | | | |
| ARS1-B16-00698-05 | DO | | | | **ARS1-16-00671** | 001 | 2 | 04-PD-STK-01-01 | Gilbane | 04/22/16 |
| ARS1-B16-00698-06 | TRG | | | | **ARS1-16-00671** | 003 | 2 | 04-PD-STK-01-03 | Gilbane | 04/22/16 |
| ARS1-B16-00698-07 | TRG | | | | **ARS1-16-00671** | 004 | 2 | 04-PD-STK-01-04 | Gilbane | 04/22/16 |
| ARS1-B16-00698-08 | TRG | | | | **ARS1-16-00671** | 007 | 2 | 04-PD-STK-01-07 | Gilbane | 04/22/16 |
| ARS1-B16-00698-09 | TRG | | | | **ARS1-16-00671** | 008 | 2 | 04-PD-STK-01-08 | Gilbane | 04/22/16 |
| ARS1-B16-00698-10 | TRG | | | | **ARS1-16-00671** | 009 | 2 | 04-PD-STK-01-09 | Gilbane | 04/22/16 |
| ARS1-B16-00698-11 | TRG | | | | **ARS1-16-00671** | 010 | 2 | 04-PD-STK-01-10 | Gilbane | 04/22/16 |
| ARS1-B16-00698-12 | TRG | | | | **ARS1-16-00671** | 012 | 2 | 04-PD-STK-01-12 | Gilbane | 04/22/16 |
| ARS1-B16-00698-13 | TRG | | | | **ARS1-16-00671** | 013 | 2 | 04-PD-STK-01-13 | Gilbane | 04/22/16 |
| ARS1-B16-00698-14 | TRG | | | | **ARS1-16-00671** | 015 | 2 | 04-PD-STK-01-15 | Gilbane | 04/22/16 |
| ARS1-B16-00698-15 | TRG | | | | **ARS1-16-00671** | 016 | 2 | 04-PD-STK-01-16 | Gilbane | 04/22/16 |

N-816

# Ortec Gamma

| | | | |
|---|---|---|---|
| Batch Sample ID | ARS1-B16-00698-04 | | |
| Sample Setup | | | |
| Description | ORTEC GAMMA | | |
| InternalID | - | | |
| AnalysisBatch | ARS1-B16-00698 | Geometry | 250mL Tuna Can 1748- |
| SDG | | Fraction | |
| AnalysisCode | | Run | 0 |
| Library | ITSI.Lib | Detector ID | 1 |
| | | Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 3.5140E-02 | pCi/g | 2.7599E-02 | 3.0600E-01 | 1.5300E-01 | | | |
| RA-226 | 0.0000E+00 | pCi/g | 6.7388E-01 | 1.2100E+00 | 6.0500E-01 | | | |
| RA-228 | 5.0178E-01 | pCi/g | 1.1846E-01 | 1.5600E-01 | 7.8000E-02 | | | |
| AM-241 | -2.7389E-02 | pCi/g | 7.6219E-02 | 1.2900E-01 | 6.4500E-02 | | | |
| PB-210 | 2.6450E-01 | pCi/g | 7.5407E-01 | 1.3600E+00 | 6.8000E-01 | | | |
| U-238 | 6.8306E-01 | pCi/g | 4.6772E-01 | 9.8600E-01 | 4.9300E-01 | | | |
| K-40 | 1.8201E+01 | pCi/g | 2.2222E+00 | 7.8200E-01 | 3.9100E-01 | | | |
| PB-214 | 4.3607E-01 | pCi/g | 1.0778E-01 | 1.2300E-01 | 6.1500E-02 | | | |
| BI-214 | 4.9691E-01 | pCi/g | 1.1147E-01 | 9.4500E-02 | 4.7250E-02 | | | |
| BI-212 | 6.9057E-02 | pCi/g | 2.4163E-01 | 4.2800E-01 | 2.1400E-01 | | | |
| PB-212 | 4.1809E-01 | pCi/g | 8.7793E-02 | 9.4700E-02 | 4.7350E-02 | | | |
| TL-208 | 1.7452E-01 | pCi/g | 4.6542E-02 | 4.1100E-02 | 2.0550E-02 | | | |
| PA-234 | 3.6121E-02 | pCi/g | 4.7213E-02 | 8.6000E-02 | 4.3000E-02 | | | |
| CS-137 | 2.6565E-03 | pCi/g | 2.9421E-02 | 5.3300E-02 | 2.6650E-02 | | | |
| CO-60 | -5.7547E-03 | pCi/g | 2.8442E-01 | 8.9000E-02 | 4.4500E-02 | | | |
| EU-152 | 1.0871E-01 | pCi/g | 9.2641E-02 | 1.8100E-01 | 9.0500E-02 | | | |
| EU-154 | ~~9.3615E-02~~ 1.5796E-02 | pCi/g | 6.5391E-02 | 6.0900E-02 | 3.0450E-02 | | | |
| Total Gamma | 2.1521E+01 | pCi/g | | | | | | |
| Total NORM Activity | 6.2424E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 10:18:31
American Radiation Services     Spectrum name: ARS05350.An1

Sample description
     Batch ID:  16-00698-04
     SDG:  DUP  Tech:  WJS

Spectrum Filename: C:\User\ARS05350.An1

Acquisition information
       Start time:                5/5/2016 09:33:28
       Live time:              2700
       Real time:              2702
       Dead time:                 0.07 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.5803E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.5803E+02) =
                                  2.7931E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1953

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.63 | 10. | 145.99 | 0.75 | 2.213E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 3.989E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 3.989E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 7.636E-02 | EU152 |
| 39.64 | 15. | 86.41 | 0.75 | 2.259E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 6.242E-02 | EU152 |
| 43.30 | 14. | 94.99 | 0.75 | 2.481E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.42 | 34. | 42.23 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 45.40 | 9.000 | 4.012E-01 | EU152 |
| 46.46 | 10. | 38.14 | 0.75 | 2.755E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.45 | 27. | 37.21 | 0.58 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.78 | 118. | 16.80 | 0.79 | 4.759E-02 | | | | |
| 77.03 | 155. | 12.90 | 0.79 | 4.856E-02 | | | | |
| 87.18 | 82. | 20.35 | 0.81 | 5.138E-02 | | | | |
| 89.85 | 44. | 34.81 | 0.82 | 5.179E-02 | | | | |
| 92.48 | 30. | 62.68 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.90 | 38. | 39.17 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 94.77 | 3. | 610.45 | 0.82 | 5.225E-02 | 94.67 | 15.500 | PBC<MDA | PA234 |
| 98.58 | 10. | 114.92 | 0.51 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 99.70 | 9. | 133.09 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 122.28 | 14. | 96.18 | 0.87 | 5.046E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | 1.879E-02 | EU154 |
| 146.91 | 6. | 194.36 | 0.38 | 4.690E-02 | | | | |
| 163.13 | 9. | 118.22 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.57 | 30. | 39.23 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| 238.44 | 243. | 8.94 | 0.83 | 3.538E-02 | 238.63 | 43.100 | 4.181E-01 | PB212 |
| 241.64 | 65. | 22.72 | 0.83 | 3.505E-02 | 241.98 | 7.500 | 6.896E-01 | PB214 |
| 246.98 | 30. | 34.76 | 1.06 | 3.450E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 295.15 | 94. | 16.94 | 0.82 | 3.087E-02 | 295.21 | 18.500 | 4.110E-01 | PB214 |
| 300.01 | 9. | 103.28 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.52 | 59. | 20.80 | 1.06 | 2.826E-02 | 338.40 | 12.010 | 4.877E-01 | Ra228 |
| 351.71 | 171. | 11.32 | 0.97 | 2.756E-02 | 351.92 | 35.800 | 4.490E-01 | PB214 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 510.67 | 112. | 14.03 | 0.73 | 2.149E-02 | 510.72 | 22.500 | 3.906E-01 | TL208 |
| 569.86 | 4. | 128.15 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 582.74 | 103. | 12.12 | 1.01 | 1.957E-02 | 583.14 | 86.000 | 1.706E-01 | TL208 |
| 592.07 | 11. | 74.22 | 1.54 | 1.936E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 608.98 | 149. | 9.89 | 1.70 | 1.895E-02 | 609.31 | 44.791 | 4.904E-01 | BI214 |
| 661.01 | 1. | 327.22 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.00 | 5. | 126.48 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 729.28 | 1. | 749.39 | 1.70 | 1.645E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 755.64 | 3. | 252.83 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 767.99 | 14. | 57.02 | 1.74 | 1.584E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 860.16 | 13. | 57.93 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 873.61 | 3. | 154.36 | 1.85 | 1.421E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 880.51 | 1. | 807.81 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 883.24 | 2. | 325.21 | 1.86 | 1.407E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 899.47 | 0. | 809.75 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.16 | 71. | 14.46 | 1.20 | 1.368E-02 | 911.07 | 29.000 | 4.973E-01 | Ra228 |
| 934.59 | 5. | 171.47 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 946.65 | 2. | 338.73 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 964.59 | 4. | 154.88 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.650E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 4.654E-02 | EU152 |
| 968.89 | 42. | 20.83 | 1.94 | 1.292E-02 | 968.90 | 17.460 | 5.190E-01 | Ra228 |
| 1119.95 | 20. | 50.81 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1239.32 | 5. | 162.38 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1378.29 | 7. | 97.96 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.21 | 5. | 109.95 | 2.28 | 8.617E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | 7.448E-02 | EU152 |
| 1460.30 | 586. | 4.26 | 2.15 | 8.228E-03 | 1460.75 | 10.700 | 1.820E+01 | K40 |
| 1764.04 | 13. | 41.04 | 2.43 | 6.316E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.99 | 74.85 | 180. | 86. | 0.032 | 50.35 | 0.534 | TH-234 | s |
| 307.99 | 77.10 | 165. | 119. | 0.044 | 36.26 | 0.922 | PB-212 | |
| 348.03 | 87.10 | 108. | 91. | 0.034 | 39.84 | 0.479 | TH-234 | s |
| 358.71 | 89.77 | 98. | 40. | 0.015 | 78.18 | 0.768 | AC-228 | sM |
| 587.42 | 146.91 | 59. | 6. | 0.002 | 388.71 | 0.383 | - | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI.Lib

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.02 | 39.63 | 95. | 10. | 0.004 | 291.98 | 0.750s |
| EU-152 | 158.07 | 39.64 | 78. | 15. | 0.006 | 172.82 | 0.750s |
| EU-154 | 172.70 | 43.30 | 78. | 14. | 0.005 | 189.98 | 0.750 |
| EU-152 | 185.20 | 46.42 | 89. | 34. | 0.013 | 84.47 | 0.750s |
| PB-210 | 185.37 | 46.46 | 119. | 10. | 0.004 | 76.29 | 0.750s |
| EU-154 | 191.56 | 48.01 | 100. | -11. | -0.004 | 260.83 | 0.750s |
| Am-241 | 238.06 | 59.63 | 162. | -13. | -0.005 | 278.20 | 0.766s |
| U-238 | 253.39 | 63.45 | 129. | 27. | 0.010 | 74.41 | 0.581 |
| U-238 | 369.17 | 92.38 | 189. | 30. | 0.011 | 125.35 | 0.820D |
| U-238 | 370.85 | 92.80 | 147. | 38. | 0.014 | 78.33 | 0.821D |
| PA-234 | 378.33 | 94.67 | 123. | 3. | 0.001 | 1220.91 | 0.824D |
| PA-234 | 393.42 | 98.44 | 65. | 19. | 0.007 | 119.31 | 0.830D |
| PA-234 | 398.47 | 99.70 | 73. | 9. | 0.003 | 266.18 | 0.832D |
| PA-234 | 443.15 | 110.87 | 146. | -5. | -0.002 | 653.21 | 0.850s |
| EU-154 | 488.84 | 122.28 | 80. | 14. | 0.005 | 192.36 | 0.870s |
| U-235 | 573.24 | 143.37 | 123. | -14. | -0.005 | 277.25 | 0.903s |
| U-235 | 652.35 | 163.13 | 112. | 9. | 0.003 | 236.44 | 0.934s |
| U-235 | 742.77 | 185.72 | 118. | 30. | 0.011 | 78.46 | 0.969D |
| U-235 | 817.15 | 204.30 | 83. | -14. | -0.005 | 223.16 | 1.000s |
| PA-234 | 904.88 | 226.22 | 84. | -3. | -0.001 | 993.93 | 1.033s |
| PB-212 | 953.78 | 238.44 | 110. | 228. | 0.084 | 17.88 | 0.829 |
| PB-214 | 966.60 | 241.64 | 68. | 65. | 0.024 | 45.45 | 0.829 |
| EU-152 | 979.86 | 244.95 | 106. | -17. | -0.006 | 173.62 | 1.060s |
| EU-154 | 987.95 | 246.98 | 40. | 30. | 0.011 | 69.52 | 1.065s |
| PB-214 | 1180.79 | 295.15 | 68. | 84. | 0.031 | 33.88 | 0.819s |
| PB-212 | 1200.23 | 300.01 | 56. | 9. | 0.003 | 206.56 | 1.142s |
| Ra-228 | 1354.37 | 338.52 | 36. | 59. | 0.022 | 41.61 | 1.064 |
| PB-214 | 1407.16 | 351.71 | 77. | 158. | 0.059 | 22.63 | 0.968 |
| TL-208 | 2043.45 | 510.67 | 79. | 68. | 0.025 | 28.07 | 0.730s |
| PA-234 | 2280.38 | 569.86 | 37. | 4. | 0.002 | 256.30 | 1.509 |
| TL-208 | 2331.93 | 582.74 | 22. | 103. | 0.038 | 24.24 | 1.008s |
| EU-154 | 2369.30 | 592.07 | 26. | 11. | 0.004 | 148.43 | 1.536s |
| BI-214 | 2436.95 | 608.98 | 31. | 149. | 0.055 | 19.79 | 1.698s |
| CS-137 | 2645.22 | 661.01 | 32. | 1. | 0.001 | 654.44 | 1.621s |
| EU-154 | 2894.46 | 723.27 | 39. | -5. | -0.002 | 389.16 | 1.692s |
| BI-212 | 2909.39 | 727.00 | 34. | 5. | 0.002 | 252.96 | 1.696s |
| PA-234 | 2918.51 | 729.28 | 18. | 1. | 0.000 | 1498.78 | 1.703s |
| EU-154 | 3024.03 | 755.64 | 33. | 3. | 0.001 | 505.65 | 1.729s |
| TL-208 | 3058.67 | 764.29 | 52. | -11. | -0.004 | 192.81 | 1.737s |
| BI-214 | 3073.49 | 767.99 | 28. | 14. | 0.005 | 114.04 | 1.742s |
| EU-152 | 3115.53 | 778.50 | 28. | -1. | 0.000 | 1873.65 | 1.753s |
| BI-212 | 3142.96 | 785.35 | 31. | -1. | 0.000 | 1718.32 | 1.761s |
| PA-234 | 3232.54 | 807.73 | 36. | -3. | -0.001 | 653.39 | 1.785s |
| TL-208 | 3442.44 | 860.16 | 24. | 13. | 0.005 | 115.86 | 1.839s |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 3496.27 | 873.61 | 27. | 3. | 0.001 | 308.73 | 1.852s |
| PA-234 | 3523.89 | 880.51 | 15. | 1. | 0.000 | 1615.63 | 1.860D |
| PA-234 | 3534.82 | 883.24 | 21. | 2. | 0.001 | 650.41 | 1.862D |
| Ra-228 | 3646.59 | 911.16 | 17. | 71. | 0.026 | 28.93 | 1.202s |
| PA-234 | 3711.18 | 927.30 | 39. | -4. | -0.002 | 445.90 | 1.905s |
| BI-214 | 3740.37 | 934.59 | 31. | 5. | 0.002 | 342.95 | 1.912 |
| PA-234 | 3788.65 | 946.65 | 26. | 2. | 0.001 | 677.46 | 1.923s |
| PA-234 | 3795.82 | 948.44 | 23. | -6. | -0.002 | 263.47 | 1.926 |
| EU-152 | 3861.21 | 964.78 | 59. | -6. | -0.002 | 468.55 | 1.940s |
| Ra-228 | 3860.51 | 964.60 | 19. | 4. | 0.002 | 309.76 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 20. | 42. | 0.016 | 41.66 | 1.945D |
| EU-154 | 3979.48 | 994.32 | 28. | -1. | 0.000 | 1134.79 | 1.970s |
| EU-154 | 4018.33 | 1004.02 | 31. | -3. | -0.001 | 817.68 | 1.978s |
| EU-152 | 4342.79 | 1085.08 | 44. | -6. | -0.002 | 310.81 | 2.048s |
| BI-214 | 4482.40 | 1119.95 | 41. | 20. | 0.007 | 101.62 | 2.077s |
| BI-214 | 4960.26 | 1239.32 | 37. | 5. | 0.002 | 324.77 | 2.167s |
| EU-154 | 5106.84 | 1275.94 | 30. | -2. | -0.001 | 1039.10 | 2.192s |
| BI-214 | 5516.59 | 1378.29 | 18. | 7. | 0.002 | 195.92 | 2.259s |
| PA-234 | 5581.98 | 1394.62 | 18. | -2. | -0.001 | 615.23 | 2.268s |
| EU-152 | 5636.36 | 1408.21 | 12. | 5. | 0.002 | 219.91 | 2.276s |
| K-40 | 5844.90 | 1460.30 | 22. | 573. | 0.212 | 8.53 | 2.155 |
| BI-214 | 7060.89 | 1764.04 | 15. | 13. | 0.005 | 82.08 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 3.5140E-02 | | | | | | |
| | | | 185.72 | 3.514E-02 | } P | 6.311E-02 | 3.92E+01 G K | |
| | | | 143.76 | -7.979E-02 | ?(P | 3.059E-01 | 1.39E+02 G | |
| | | | 205.31 | -2.185E-01 | & P | 6.914E-01 | 1.12E+02 G | |
| | | | 163.35 | 1.250E-01 | &(P | 6.984E-01 | 1.18E+02 G | |
| RA-226 | | 0.0000E+00 | | | | | | |
| | | | | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 1.207E+00 | 1.14E+03 G K | |
| Ra-228 | | 5.0178E-01 | | | | | | |
| | | | 911.07 | 4.973E-01 | (P | 1.563E-01 | 1.45E+01 G | |
| | | | 968.90 | 5.190E-01 | (P | 2.926E-01 | 2.08E+01 G | |
| | | | 338.40 | 4.877E-01 | (P | 2.520E-01 | 2.08E+01 G | |
| | | | 964.60 | 1.650E-01 | - | 9.060E-01 | 1.55E+02 G | |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| Am-241 | T -2.7389E-02 | | | | | | |
| | | 59.54 | -2.739E-02 | ?( | 1.287E-01 | 1.39E+02 | G K |
| PB-210 | 2.6450E-01 | | | | | | |
| | | 46.52 | 2.645E-01 | ?(P | 1.360E+00 | 3.81E+01 | G |
| U-238 | 6.8306E-01 | | | | | | |
| | | 63.29 | 4.705E-01 | (P | 9.861E-01 | 3.72E+01 | G |
| | | 92.80 | 6.831E-01 | } P | 1.060E+00 | 3.92E+01 | G |
| | | 92.38 | 6.338E-01 | } P | 1.395E+00 | 6.27E+01 | G |
| K-40 | 1.8201E+01 | | | | | | |
| | | 1460.75 | 1.820E+01 | (P | 7.824E-01 | 4.26E+00 | G |
| PB-214 | 4.3607E-01 | | | | | | |
| | | 351.92 | 4.490E-01 | (P | 1.233E-01 | 1.13E+01 | G |
| | | 295.21 | 4.110E-01 | (P | 2.015E-01 | 1.69E+01 | G |
| | | 241.98 | 6.896E-01 | + P | 4.380E-01 | 2.27E+01 | G |
| BI-214 | 4.9691E-01 | | | | | | |
| | | 609.31 | 4.904E-01 | @(P | 9.452E-02 | 9.89E+00 | G |
| | | 1764.49 | 3.736E-01 | - P | 5.950E-01 | 4.10E+01 | G |
| | | 1120.29 | 3.369E-01 | - | 5.520E-01 | 5.08E+01 | G |
| | | 1238.11 | 2.278E-01 | - P | 1.485E+00 | 1.62E+02 | G |
| | | 768.36 | 5.236E-01 | &(P | 1.006E+00 | 5.70E+01 | G |
| | | 1377.67 | 5.387E-01 | ?( | 1.816E+00 | 9.80E+01 | G |
| | | 934.06 | 3.288E-01 | - | 1.977E+00 | 1.71E+02 | G |
| BI-212 | 6.9057E-02 | | | | | | |
| | | 727.17 | 6.906E-02 | ?(P | 4.284E-01 | 1.26E+02 | G |
| | | 1620.56 | -9.683E-02 | % P | 2.653E+00 | 8.88E+02 | G |
| | | 785.42 | -8.374E-02 | & P | 2.589E+00 | 8.59E+02 | G |
| PB-212 | 4.1809E-01 | | | | | | |
| | | 238.63 | 4.181E-01 | (P | 9.468E-02 | 8.94E+00 | G |
| | | 300.09 | 2.402E-01 | - P | 1.055E+00 | 1.03E+02 | G |
| TL-208 | 1.7452E-01 | | | | | | |
| | | 583.14 | 1.706E-01 | (P | 4.109E-02 | 1.21E+01 | G |
| | | 510.72 | 3.906E-01 | + P | 2.558E-01 | 1.40E+01 | G |
| | | 860.47 | 2.029E-01 | ?(P | 4.120E-01 | 5.79E+01 | G |
| | | 277.36 | -2.414E-02 | % P | 4.555E-01 | 1.07E+04 | G |
| | | 763.30 | -1.149E+00 | - | 3.750E+00 | 9.64E+01 | G |
| PA-234 | 3.6121E-02 | | | | | | |
| | | 98.44 | 3.963E-02 | (P | 8.596E-02 | 5.97E+01 | G |
| | | 946.00 | 2.310E-02 | &( | 2.813E-01 | 3.39E+02 | G |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 131.28 | -7.647E-03 | % P | 1.669E-01 | 6.61E+03 | G |
| | | 94.67 | 8.931E-03 | - | 1.881E-01 | 6.10E+02 | G |
| | | 883.24 | 2.800E-02 | (P | 4.012E-01 | 3.25E+02 | G |
| | | 926.70 | -7.646E-02 | - | 5.987E-01 | 2.23E+02 | G |
| | | 569.26 | 5.619E-02 | (P | 4.170E-01 | 1.28E+02 | G |
| | | 111.00 | -3.331E-02 | - | 3.723E-01 | 3.27E+02 | G |
| | | 733.00 | 1.636E-02 | ?( | 4.539E-01 | 7.49E+02 | G |
| | | 949.00 | -1.639E-01 | + P | 6.845E-01 | 1.32E+02 | G |
| | | 880.51 | 2.072E-02 | (P | 6.369E-01 | 8.08E+02 | G |
| | | 226.87 | -3.695E-02 | & P | 5.363E-01 | 4.97E+02 | G |
| | | 831.10 | 9.130E-03 | % | 9.645E-01 | 2.91E+03 | G |
| | | 808.10 | -9.918E-02 | - | 1.150E+00 | 3.27E+02 | G |
| | | 99.70 | 1.061E-01 | ( | 4.818E-01 | 1.33E+02 | G |
| | | 699.10 | -2.788E-03 | % P | 9.840E-01 | 6.03E+03 | G |
| | | 898.60 | -1.070E-02 | % P | 1.352E+00 | 8.10E+02 | G |
| | | 1394.10 | -1.665E-01 | + | 1.866E+00 | 3.08E+02 | G |
| CS-137 | 2.6565E-03 | | | | | | |
| | | 661.66 | 2.656E-03 | ?(P | 5.329E-02 | 3.27E+02 | G |
| CO-60 | -5.7547E-03 | | | | | | |
| | | 1173.24 | -5.755E-03 | &(P | 8.902E-02 | 1.45E+03 | K |
| | | 1332.50 | -2.986E-03 | % P | 1.211E-01 | 1.00E+03 | K |
| EU-152 | 1.0871E-01 | | | | | | |
| | | 40.12 | 6.242E-02 | &( | 1.809E-01 | 8.64E+01 | G |
| | | 121.78 | -9.031E-04 | % | 9.802E-02 | 3.13E+03 | G |
| | | 344.30 | -1.751E-03 | & | 1.200E-01 | 1.91E+03 | G |
| | | 1408.08 | 7.448E-02 | &( | 2.873E-01 | 1.10E+02 | G |
| | | 39.52 | 7.636E-02 | ( | 3.797E-01 | 1.46E+02 | G |
| | | 964.00 | -8.417E-02 | - P | 5.672E-01 | 2.34E+02 | G |
| | | 1112.07 | 9.855E-03 | & | 5.976E-01 | 1.69E+03 | G |
| | | 778.90 | -1.106E-02 | - | 3.763E-01 | 9.37E+02 | G |
| | | 1085.80 | -1.474E-01 | + | 7.933E-01 | 1.55E+02 | G |
| | | 45.40 | 4.012E-01 | ?( | 5.425E-01 | 4.22E+01 | G |
| | | 244.67 | -1.839E-01 | + | 5.342E-01 | 8.68E+01 | G |
| | | 867.39 | -4.591E-02 | % P | 1.063E+00 | 2.53E+03 | G |
| EU-154 | 9.3615E-02 | | | | | | |
| | | 123.10 | 1.879E-02 | ?( | 6.086E-02 | 9.62E+01 | G |
| | | 1274.80 | -1.230E-02 | - | 2.299E-01 | 5.20E+02 | G |
| | | 723.30 | -3.999E-02 | + | 2.722E-01 | 1.95E+02 | G |
| | | 1004.80 | -3.236E-02 | + P | 3.671E-01 | 4.09E+02 | G |
| | | 43.00 | 1.183E-01 | ?( | 3.784E-01 | 9.50E+01 | G |
| | | 873.20 | 6.061E-02 | ?(P | 4.701E-01 | 1.54E+02 | G |
| | | 996.30 | -2.763E-02 | - | 5.668E-01 | 5.67E+02 | G |
| | | 42.31 | 5.416E-03 | % | 7.149E-01 | 3.77E+03 | G |
| | | 248.04 | 3.698E-01 | ?( | 3.940E-01 | 3.48E+01 | G |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 10:18:31
American Radiation Services Spectrum name: ARS05350.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 591.70 | 3.321E-01 | ?( | 8.243E-01 | 7.42E+01 | G |
| | | 48.70 | -2.576E-01 | + | 1.140E+00 | 1.30E+02 | G |
| | | 756.70 | 1.319E-01 | &(P | 1.261E+00 | 2.53E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 3.5140E-02 | 2.7482E-02 | 2.7599E-02 | 0.306E+00 |
| RA-226 #B | 0.0000E+00 | 6.7388E-01 | 6.7388E-01 | 0.121E+01 |
| Ra-228 | 5.0178E-01 | 1.1377E-01 | 1.1846E-01 | 0.156E+00 |
| Am-241 #A | -2.7389E-02 | 7.6197E-02 | 7.6219E-02 | 0.129E+00 |
| PB-210 #A | 2.6450E-01 | 7.5361E-01 | 7.5407E-01 | 0.136E+01 |
| U-238 A | 6.8306E-01 | 4.6468E-01 | 4.6772E-01 | 0.986E+00 |
| K-40 | 1.8201E+01 | 1.5871E+00 | 2.2222E+00 | 0.782E+00 |
| PB-214 | 4.3607E-01 | 9.8709E-02 | 1.0778E-01 | 0.123E+00 |
| BI-214 | 4.9691E-01 | 1.0540E-01 | 1.1147E-01 | 0.945E-01 |
| BI-212 #A | 6.9057E-02 | 2.4158E-01 | 2.4163E-01 | 0.428E+00 |
| PB-212 | 4.1809E-01 | 7.9655E-02 | 8.7793E-02 | 0.947E-01 |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 10:18:31
American Radiation Services     Spectrum name: ARS05350.An1

TL-208       1.7452E-01   4.4593E-02    4.6542E-02  0.411E-01
PA-234  A    3.6121E-02   4.7136E-02    4.7213E-02  0.860E-01
CS-137 #A    2.6565E-03   2.9421E-02    2.9421E-02  0.533E-01
CO-60  #B   -5.7547E-03   2.8442E-01    2.8442E-01  0.890E-01
EU-152 #A    1.0871E-01   9.1827E-02    9.2641E-02  0.181E+00
EU-154 #C    9.3615E-02   6.5081E-02    6.5391E-02  0.609E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity ( 1120.1 to  1998.6 keV)     2.125E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-05 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-001 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 001 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 8.1163E-02 | pCi/g | 4.9123E-02 | 6.9300E-02 | 3.4650E-02 | | | |
| RA-226 | 5.6890E-01 | pCi/g | 6.5845E-01 | 1.0700E+00 | 5.3500E-01 | | | |
| RA-228 | 3.3173E-01 | pCi/g | 1.3608E-01 | 2.5600E-01 | 1.2800E-01 | | | |
| AM-241 | 2.3483E-03 | pCi/g | 7.5740E-02 | 1.3100E-01 | 6.5500E-02 | | | |
| PB-210 | 5.1286E-01 | pCi/g | 1.0013E+00 | 1.7500E+00 | 8.7500E-01 | | | |
| U-238 | 6.0958E-01 | pCi/g | 5.1267E-01 | 1.2500E+00 | 6.2500E-01 | | | |
| K-40 | 1.4654E+01 | pCi/g | 1.6994E+00 | 3.9700E-01 | 1.9850E-01 | | | |
| PB-214 | 5.1854E-01 | pCi/g | 1.2969E-01 | 1.1900E-01 | 5.9500E-02 | | | |
| BI-214 | 3.8013E-01 | pCi/g | 1.1030E-01 | 1.4200E-01 | 7.1000E-02 | | | |
| BI-212 | 2.0561E-01 | pCi/g | 2.9130E-01 | 4.8800E-01 | 2.4400E-01 | | | |
| PB-212 | 4.6081E-01 | pCi/g | 1.0224E-01 | 1.1300E-01 | 5.6500E-02 | | | |
| TL-208 | 1.5008E-01 | pCi/g | 6.5161E-02 | 7.4600E-02 | 3.7300E-02 | | | |
| PA-234 | 9.2834E-02 | pCi/g | 9.3289E-02 | 1.2900E-01 | 6.4500E-02 | | | |
| CS-137 | 0.0000E+00 | pCi/g | 4.2208E-02 | 6.7500E-02 | 3.3750E-02 | | | |
| CO-60 | -4.3951E-03 | pCi/g | 4.2974E-02 | 7.7900E-02 | 3.8950E-02 | | | |
| EU-152 | 1.7465E-01 | pCi/g | 1.3625E-01 | 1.8000E-01 | 9.0000E-02 | | | |
| EU-154 | 2.9623E-02 | pCi/g | 7.1245E-02 | 6.6700E-02 | 3.3350E-02 | | | |
| Total Gamma | 1.8773E+01 | pCi/g | | | | | | |
| Total NORM Activity | 5.3732E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01321.An1

Sample description
Batch ID: 16-00698-05
SDG: ARS1-16-00671-001 Tech: WJS

Spectrum Filename: C:\User\ARS01321.An1

Acquisition information
Start time: 05-May-2016 10:21:40
Live time: 2700
Real time: 2706
Dead time: 0.21 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.5803E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.5803E+02) =
2.7931E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01321.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1738

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.16 | 22. | 58.16 | 0.90 | 2.184E-02 | 39.52 | 16.000 | 1.798E-01 | EU152 |
| | | | | | 40.12 | 30.000 | 9.429E-02 | EU152 |
| 42.96 | 10. | 151.55 | 0.90 | 2.358E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.53 | 19. | 37.36 | 0.90 | 2.560E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.54 | 46. | 38.61 | 0.90 | 2.503E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.28 | 69. | 28.03 | 0.54 | 3.624E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.70 | 79. | 26.29 | 0.93 | 4.210E-02 | | | | |
| 77.11 | 167. | 13.49 | 0.93 | 4.305E-02 | | | | |
| 92.41 | 26. | 65.38 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.83 | 31. | 46.09 | 0.94 | 4.684E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.71 | 29. | 50.11 | 0.95 | 4.742E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 3.649E-01 | PA234 |
| 98.76 | 23. | 65.06 | 0.95 | 4.735E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 2.927E-01 | PA234 |
| 104.50 | 6. | 146.21 | 0.00 | 4.753E-02 | | | | |
| 111.40 | 3. | 490.50 | 0.96 | 4.739E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 121.35 | 7. | 186.63 | 0.97 | 4.645E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 143.84 | 17. | 73.97 | 0.98 | 4.380E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 185.99 | 27. | 28.16 | 1.17 | 3.763E-02 | 185.72 | 54.000 | PBC<MDA | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 186.14 | 54. | 30.03 | 1.02 | 3.768E-02 | 185.72 | 54.000 | 7.431E-02 | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 205.35 | 6. | 159.81 | 1.03 | 3.512E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.80 | 241. | 9.63 | 1.04 | 3.138E-02 | 238.63 | 43.100 | 4.608E-01 | PB212 |
| 242.07 | 53. | 28.80 | 1.06 | 3.106E-02 | 241.98 | 7.500 | 6.352E-01 | PB214 |
| 277.56 | 15. | 69.73 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |

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| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 295.32 | 100. | 18.57 | 0.57 | 2.660E-02 | 295.21 | 18.500 | 5.349E-01 | PB214 |
| 300.48 | 14. | 70.71 | 0.27 | 2.627E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.62 | 59. | 20.95 | 1.14 | 2.392E-02 | 338.40 | 12.010 | 5.713E-01 | Ra228 |
| 352.14 | 151. | 11.16 | 1.28 | 2.319E-02 | 351.92 | 35.800 | 4.856E-01 | PB214 |
| 511.26 | 67. | 15.25 | 1.44 | 1.747E-02 | 510.72 | 22.500 | 4.736E-01 | TL208 |
| 583.39 | 70. | 19.06 | 1.27 | 1.583E-02 | 583.14 | 86.000 | 1.438E-01 | TL208 |
| 609.55 | 94. | 12.48 | 1.34 | 1.532E-02 | 609.31 | 44.791 | 3.819E-01 | BI214 |
| 727.65 | 12. | 65.28 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 733.33 | 0. | 783.66 | 1.43 | 1.337E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 768.76 | 3. | 282.31 | 1.46 | 1.291E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 830.54 | 4. | 141.67 | 1.50 | 1.217E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 879.55 | 3. | 177.46 | 1.54 | 1.165E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.60 | 30. | 29.20 | 1.56 | 1.135E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 934.04 | 4. | 157.13 | 1.57 | 1.114E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 945.28 | 4. | 148.76 | 1.58 | 1.103E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 968.94 | 20. | 41.28 | 1.60 | 1.083E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1113.07 | 4. | 165.58 | 1.69 | 9.712E-03 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.58 | 14. | 45.54 | 1.70 | 9.654E-03 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1238.10 | 5. | 198.78 | 1.77 | 8.889E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.88 | 11. | 38.37 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1392.76 | 2. | 187.08 | 1.87 | 8.021E-03 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1461.27 | 435. | 4.79 | 1.47 | 7.688E-03 | 1460.75 | 10.700 | 1.465E+01 | K40 |
| 1765.41 | 6. | 51.97 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 297.64 | 74.67 | 183. | 52. | 0.019 | 79.68 | 0.556 | TH-234 | s |
| 307.31 | 77.08 | 190. | 141. | 0.052 | 34.05 | 1.144 | PB-212 | s |
| 417.00 | 104.50 | 38. | 6. | 0.002 | 292.42 | 0.000 | - | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

0.88 Spectrum name: ARS01321.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.99 | 39.52 | 132. | 0. | 0.000 | 2000.00 | 0.897s |
| EU-152 | 155.56 | 39.16 | 72. | 22. | 0.008 | 116.32 | 0.897s |
| EU-154 | 170.76 | 42.96 | 106. | 10. | 0.004 | 303.10 | 0.899s |
| EU-152 | 185.06 | 46.54 | 135. | 46. | 0.017 | 77.21 | 0.901s |
| PB-210 | 185.03 | 46.53 | 173. | 19. | 0.007 | 74.71 | 0.902s |
| EU-154 | 193.21 | 48.57 | 186. | -7. | -0.003 | 538.05 | 0.904s |
| U-238 | 252.08 | 63.28 | 168. | 32. | 0.012 | 56.05 | 0.543s |
| U-238 | 368.51 | 92.38 | 162. | 26. | 0.010 | 130.76 | 0.940D |
| U-238 | 370.20 | 92.80 | 137. | 31. | 0.011 | 92.17 | 0.941D |
| PA-234 | 375.47 | 94.12 | 220. | -23. | -0.009 | 185.97 | 0.942s |
| PA-234 | 394.03 | 98.76 | 124. | 23. | 0.009 | 130.11 | 0.945 |
| PA-234 | 393.84 | 98.71 | 92. | 29. | 0.011 | 100.22 | 0.946 |
| PA-234 | 444.63 | 111.40 | 135. | 3. | 0.001 | 981.01 | 0.956s |
| EU-152 | 486.96 | 121.98 | 117. | -9. | -0.003 | 352.59 | 0.964s |
| EU-154 | 484.46 | 121.35 | 82. | 7. | 0.003 | 373.27 | 0.965 |
| U-235 | 574.44 | 143.84 | 119. | 17. | 0.006 | 147.94 | 0.982s |
| U-235 | 743.68 | 186.14 | 105. | 54. | 0.020 | 60.05 | 1.016 |
| RA-226 | 743.08 | 185.99 | 105. | 27. | 0.010 | 56.31 | 1.168 |
| U-235 | 820.55 | 205.35 | 96. | 6. | 0.002 | 319.62 | 1.032s |
| PA-234 | 908.89 | 227.43 | 79. | -5. | -0.002 | 557.92 | 1.049s |
| PB-212 | 954.41 | 238.80 | 124. | 223. | 0.083 | 19.27 | 1.036 |
| PB-214 | 967.47 | 242.07 | 72. | 53. | 0.020 | 57.60 | 1.060 |
| EU-152 | 974.47 | 243.82 | 110. | -15. | -0.006 | 202.67 | 1.064s |
| EU-154 | 998.59 | 249.84 | 43. | -1. | 0.000 | 1548.87 | 1.066s |
| TL-208 | 1109.49 | 277.56 | 51. | 15. | 0.006 | 139.47 | 1.090 |
| PB-214 | 1180.54 | 295.32 | 76. | 94. | 0.035 | 37.15 | 0.572s |
| PB-212 | 1201.17 | 300.48 | 40. | 14. | 0.005 | 141.42 | 0.268s |
| Ra-228 | 1353.77 | 338.62 | 54. | 59. | 0.022 | 41.91 | 1.138 |
| PB-214 | 1407.89 | 352.14 | 49. | 144. | 0.053 | 22.33 | 1.279 |
| TL-208 | 2044.47 | 511.26 | 69. | 67. | 0.025 | 30.50 | 1.445s |
| PA-234 | 2274.38 | 568.74 | 38. | -5. | -0.002 | 507.55 | 1.314s |
| TL-208 | 2333.00 | 583.39 | 52. | 70. | 0.026 | 38.13 | 1.266 |
| EU-154 | 2366.24 | 591.70 | 64. | 0. | 0.000 | 2000.00 | 1.330s |
| BI-214 | 2437.63 | 609.55 | 48. | 94. | 0.035 | 24.95 | 1.343s |
| CS-137 | 2646.09 | 661.66 | 33. | 0. | 0.000 | 2000.00 | 1.381s |
| PA-234 | 2793.36 | 698.48 | 30. | -3. | -0.001 | 583.12 | 1.409s |
| EU-154 | 2903.55 | 726.02 | 32. | -3. | -0.001 | 557.89 | 1.426s |
| BI-212 | 2910.06 | 727.65 | 29. | 12. | 0.004 | 130.56 | 1.429s |
| TL-208 | 3050.65 | 762.80 | 23. | -2. | -0.001 | 923.23 | 1.455 |
| BI-214 | 3074.49 | 768.76 | 31. | 3. | 0.001 | 564.62 | 1.458s |
| EU-152 | 3117.54 | 779.53 | 25. | -1. | 0.000 | 1487.80 | 1.466s |
| PA-234 | 3231.67 | 808.06 | 21. | -2. | -0.001 | 549.73 | 1.486s |
| PA-234 | 3321.57 | 830.54 | 27. | 4. | 0.002 | 283.34 | 1.502s |
| EU-152 | 3469.68 | 867.57 | 25. | -5. | -0.002 | 281.47 | 1.528s |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 3492.20 | 873.20 | 27. | 0. | 0.000 | 2000.00 | 1.532s |
| PA-234 | 3517.60 | 879.55 | 23. | 3. | 0.001 | 354.92 | 1.537s |
| PA-234 | 3591.23 | 897.96 | 27. | -5. | -0.002 | 337.00 | 1.549s |
| Ra-228 | 3645.79 | 911.60 | 35. | 30. | 0.011 | 58.40 | 1.558s |
| PA-234 | 3696.36 | 924.25 | 17. | -3. | -0.001 | 714.92 | 1.568s |
| BI-214 | 3735.52 | 934.04 | 21. | 4. | 0.002 | 314.26 | 1.574s |
| PA-234 | 3780.47 | 945.28 | 24. | 4. | 0.002 | 297.52 | 1.582s |
| PA-234 | 3790.67 | 947.83 | 31. | -1. | 0.000 | 1345.72 | 1.584s |
| EU-152 | 3842.32 | 960.74 | 19. | -1. | 0.000 | 1941.84 | 1.594s |
| Ra-228 | 3875.10 | 968.94 | 34. | 20. | 0.007 | 82.55 | 1.597s |
| EU-154 | 3983.41 | 996.02 | 25. | -2. | -0.001 | 736.25 | 1.616s |
| EU-154 | 4020.59 | 1005.32 | 25. | -2. | -0.001 | 624.51 | 1.621s |
| EU-152 | 4451.49 | 1113.07 | 22. | 4. | 0.002 | 331.17 | 1.692s |
| BI-214 | 4481.52 | 1120.58 | 25. | 14. | 0.005 | 91.09 | 1.698s |
| CO-60 | 4692.27 | 1173.29 | 25. | -1. | -0.001 | 977.75 | 1.732s |
| BI-214 | 4951.44 | 1238.10 | 38. | 5. | 0.002 | 397.55 | 1.773s |
| BI-214 | 5510.32 | 1377.88 | 4. | 11. | 0.004 | 76.74 | 1.860s |
| PA-234 | 5569.80 | 1392.76 | 9. | 2. | 0.001 | 374.17 | 1.870s |
| EU-152 | 5631.05 | 1408.08 | 0. | 0. | 0.000 | 2000.00 | 1.878s |
| K-40 | 5843.71 | 1461.27 | 4. | 431. | 0.160 | 9.59 | 1.469s |
| BI-212 | 6473.39 | 1618.78 | 9. | -2. | -0.001 | 514.81 | 2.003s |
| BI-214 | 7059.51 | 1765.41 | 7. | 6. | 0.002 | 103.94 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | |
|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | COMMENTS |
| U-235 | | 8.1163E-02 | | | | | |
| | | | 185.72 | 7.431E-02 | ( | 6.928E-02 3.00E+01 | G |
| | | | 143.76 | 1.050E-01 | &(P | 3.259E-01 7.40E+01 | G |
| | | | 205.31 | 1.067E-01 | ?(P | 8.182E-01 1.60E+02 | G |
| | | | 163.35 | -1.601E-02 | % P | 7.376E-01 1.00E+03 | G |
| RA-226 | | 5.6890E-01 | | | | | |
| | | | 186.10 | 5.689E-01 | (P | 1.072E+00 2.82E+01 | G |
| Ra-228 | | 3.3173E-01 | | | | | |
| | | | 911.07 | 2.543E-01 | (P | 2.558E-01 2.92E+01 | G |
| | | | 968.90 | 2.955E-01 | (P | 4.433E-01 4.13E+01 | G |
| | | | 338.40 | 5.713E-01 | (P | 3.585E-01 2.10E+01 | G |
| | | | 964.60 | 2.398E-02 | % | 1.909E+00 2.26E+03 | G |

0.88 Spectrum name: ARS01321.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Am-241 | T | 2.3483E-03 | | | | | | |
| | | | 59.54 | 2.348E-03 | &( | 1.308E-01 | 1.61E+03 | G K |
| PB-210 | | 5.1286E-01 | | | | | | |
| | | | 46.52 | 5.129E-01 | (P | 1.749E+00 | 3.74E+01 | G |
| U-238 | | 6.0958E-01 | | | | | | |
| | | | 63.29 | 6.366E-01 | (P | 1.247E+00 | 2.80E+01 | G |
| | | | 92.80 | 6.096E-01 | } P | 1.140E+00 | 4.61E+01 | G |
| | | | 92.38 | 6.096E-01 | } P | 1.441E+00 | 6.54E+01 | G |
| K-40 | | 1.4654E+01 | | | | | | |
| | | | 1460.75 | 1.465E+01 | (P | 3.965E-01 | 4.79E+00 | G |
| PB-214 | | 5.1854E-01 | | | | | | |
| | | | 351.92 | 4.856E-01 | (P | 1.186E-01 | 1.12E+01 | G |
| | | | 295.21 | 5.349E-01 | (P | 2.458E-01 | 1.86E+01 | G |
| | | | 241.98 | 6.352E-01 | (P | 5.073E-01 | 2.88E+01 | G |
| BI-214 | | 3.8013E-01 | | | | | | |
| | | | 609.31 | 3.819E-01 | @(P | 1.422E-01 | 1.25E+01 | G |
| | | | 1764.49 | 1.710E-01 | - P | 4.225E-01 | 5.20E+01 | G |
| | | | 1120.29 | 2.807E-01 | - P | 5.093E-01 | 4.55E+01 | G |
| | | | 1238.11 | 2.428E-01 | - | 1.691E+00 | 1.99E+02 | G |
| | | | 768.36 | 1.292E-01 | & | 1.297E+00 | 2.82E+02 | G |
| | | | 1377.67 | 9.929E-01 | + | 1.030E+00 | 3.84E+01 | G |
| | | | 934.06 | 3.544E-01 | ?(P | 1.975E+00 | 1.57E+02 | G |
| BI-212 | | 2.0561E-01 | | | | | | |
| | | | 727.17 | 2.056E-01 | ?(P | 4.880E-01 | 6.53E+01 | G |
| | | | 1620.56 | -2.496E-01 | - | 2.417E+00 | 2.57E+02 | G |
| | | | 785.42 | 6.374E-02 | & | 2.487E+00 | 1.05E+03 | G |
| PB-212 | | 4.6081E-01 | | | | | | |
| | | | 238.63 | 4.608E-01 | (P | 1.128E-01 | 9.63E+00 | G |
| | | | 300.09 | 4.610E-01 | (P | 1.045E+00 | 7.07E+01 | G |
| TL-208 | | 1.5008E-01 | | | | | | |
| | | | 583.14 | 1.438E-01 | (P | 7.459E-02 | 1.91E+01 | G |
| | | | 510.72 | 4.736E-01 | + P | 2.955E-01 | 1.52E+01 | G |
| | | | 860.47 | -7.792E-03 | % P | 4.888E-01 | 1.00E+03 | G |
| | | | 277.36 | 2.336E-01 | (P | 5.535E-01 | 6.97E+01 | G |
| | | | 763.30 | -1.971E-01 | - P | 3.149E+00 | 4.62E+02 | G |
| PA-234 | | 9.2834E-02 | | | | | | |
| | | | 98.44 | 5.489E-02 | ?(P | 1.286E-01 | 6.51E+01 | G |
| | | | 946.00 | 5.305E-02 | &(P | 3.241E-01 | 1.49E+02 | G |

0.88 Spectrum name: ARS01321.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 131.28 | -4.410E-03 | & P | 1.560E-01 | 5.01E+03 | G |
| | | 94.67 | -8.877E-02 | & | 2.755E-01 | 9.30E+01 | G |
| | | 883.24 | 1.881E-03 | % | 5.471E-01 | 7.96E+03 | G |
| | | 926.70 | -6.628E-02 | - P | 5.003E-01 | 3.57E+02 | G |
| | | 569.26 | -7.721E-02 | - P | 5.237E-01 | 2.54E+02 | G |
| | | 111.00 | 2.330E-02 | ?( | 3.930E-01 | 4.91E+02 | G |
| | | 733.00 | 1.172E-02 | & P | 7.025E-01 | 7.84E+02 | G |
| | | 949.00 | -3.863E-02 | & | 9.367E-01 | 6.73E+02 | G |
| | | 880.51 | 1.110E-01 | &(P | 9.172E-01 | 1.77E+02 | G |
| | | 226.87 | -6.039E-02 | - | 5.830E-01 | 2.79E+02 | G |
| | | 831.10 | 1.763E-01 | ?(P | 1.106E+00 | 1.42E+02 | G |
| | | 808.10 | -1.110E-01 | - | 1.102E+00 | 2.75E+02 | G |
| | | 99.70 | 3.649E-01 | &( | 5.938E-01 | 5.01E+01 | G |
| | | 699.10 | -1.185E-01 | - | 1.232E+00 | 2.92E+02 | G |
| | | 898.60 | -2.808E-01 | + P | 1.650E+00 | 1.69E+02 | G |
| | | 1394.10 | 2.154E-01 | ?( | 1.489E+00 | 1.87E+02 | G |
| CS-137 | 0.0000E+00 | | | | | | |
| | | 661.66 | 0.000E+00 | &( | 6.752E-02 | 1.00E+03 | G |
| CO-60 | -4.3951E-03 | | | | | | |
| | | 1173.24 | -4.395E-03 | ?( | 7.794E-02 | 4.89E+02 | K |
| | | 1332.50 | 7.529E-04 | % | 7.910E-02 | 2.83E+03 | K |
| EU-152 | 1.7465E-01 | | | | | | |
| | | 40.12 | 9.429E-02 | &( | 1.797E-01 | 5.82E+01 | G |
| | | 121.78 | -1.816E-02 | - | 1.091E-01 | 1.76E+02 | G |
| | | 344.30 | -1.660E-03 | % | 1.615E-01 | 2.74E+03 | G |
| | | 1408.08 | 0.000E+00 | - | 1.222E-01 | 1.00E+03 | G |
| | | 39.52 | 0.000E+00 | - | 4.575E-01 | 1.00E+03 | G |
| | | 964.00 | -1.126E-02 | - | 4.051E-01 | 9.71E+02 | G |
| | | 1112.07 | 8.930E-02 | ?( | 5.231E-01 | 1.66E+02 | G |
| | | 778.90 | -1.613E-02 | - | 4.373E-01 | 7.44E+02 | G |
| | | 1085.80 | -1.170E-02 | % | 6.951E-01 | 1.62E+03 | G |
| | | 45.40 | 5.713E-01 | ?( | 7.053E-01 | 3.86E+01 | G |
| | | 244.67 | -1.802E-01 | - | 6.142E-01 | 1.01E+02 | G |
| | | 867.39 | -3.009E-01 | - | 1.481E+00 | 1.41E+02 | G |
| EU-154 | 2.9623E-02 | | | | | | |
| | | 123.10 | 1.041E-02 | ?( | 6.675E-02 | 1.87E+02 | G |
| | | 1274.80 | -2.276E-04 | % | 2.404E-01 | 2.88E+04 | G |
| | | 723.30 | -3.089E-02 | & | 3.062E-01 | 2.79E+02 | G |
| | | 1004.80 | -3.465E-02 | + | 3.893E-01 | 3.12E+02 | G |
| | | 43.00 | 8.895E-02 | ?( | 4.588E-01 | 1.52E+02 | G |
| | | 873.20 | 0.000E+00 | - | 5.644E-01 | 1.00E+03 | G |
| | | 996.30 | -4.852E-02 | + | 6.443E-01 | 3.68E+02 | G |
| | | 42.31 | -2.144E-02 | % | 7.804E-01 | 1.04E+03 | G |
| | | 248.04 | -1.680E-02 | + | 4.635E-01 | 7.74E+02 | G |

0.88 Spectrum name: ARS01321.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| | | 591.70 | 0.000E+00 | & | 1.553E+00 | 1.00E+03 G |
| | | 48.70 | -1.797E-01 | + | 1.645E+00 | 2.69E+02 G |
| | | 756.70 | 1.322E-02 | % | 1.459E+00 | 3.03E+03 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 # | 8.1163E-02 | 4.8739E-02 | 4.9123E-02 | 0.693E-01 |
| RA-226 A | 5.6890E-01 | 6.5744E-01 | 6.5845E-01 | 0.107E+01 |
| Ra-228 # | 3.3173E-01 | 1.3441E-01 | 1.3608E-01 | 0.256E+00 |
| Am-241 #B | 2.3483E-03 | 7.5740E-02 | 7.5740E-02 | 0.131E+00 |
| PB-210 #A | 5.1286E-01 | 1.0000E+00 | 1.0013E+00 | 0.175E+01 |
| U-238 A | 6.0958E-01 | 5.1047E-01 | 5.1267E-01 | 0.125E+01 |
| K-40 | 1.4654E+01 | 1.4173E+00 | 1.6994E+00 | 0.397E+00 |
| PB-214 | 5.1854E-01 | 1.2134E-01 | 1.2969E-01 | 0.119E+00 |
| BI-214 # | 3.8013E-01 | 1.0774E-01 | 1.1030E-01 | 0.142E+00 |
| BI-212 #A | 2.0561E-01 | 2.9099E-01 | 2.9130E-01 | 0.488E+00 |
| PB-212 | 4.6081E-01 | 9.5872E-02 | 1.0224E-01 | 0.113E+00 |

0.88 Spectrum name: ARS01321.An1

| | | | | |
|---|---|---|---|---|
| TL-208 | 1.5008E-01 | 6.4420E-02 | 6.5161E-02 | 0.746E-01 |
| PA-234 #A | 9.2834E-02 | 9.3042E-02 | 9.3289E-02 | 0.129E+00 |
| CS-137 #A | 0.0000E+00 | 4.2208E-02 | 4.2208E-02 | 0.675E-01 |
| CO-60 #B | -4.3951E-03 | 4.2973E-02 | 4.2974E-02 | 0.779E-01 |
| EU-152 #A | 1.7465E-01 | 1.3485E-01 | 1.3625E-01 | 0.180E+00 |
| EU-154 #A | 2.9623E-02 | 7.1217E-02 | 7.1245E-02 | 0.667E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 104.2 to 2000.7 keV) 1.696E+01 pCi/g

# Ortec Gamma

| | | | | | |
|---|---|---|---|---|---|
| Batch Sample ID | ARS1-B16-00564-18 | | | | |
| Sample Setup | | | | | |
| Description | ORTEC GAMMA | | | | |
| InternalID | ARS1-16-00671-002 | | Geometry | 250mL Tuna Can 1748- | |
| AnalysisBatch | ARS1-B16-00564 | | Fraction | 002 | |
| SDG | ARS1-16-00671 | | Run | 1 | |
| AnalysisCode | GAM-A-025 | | Detector ID | 1 | |
| Library | ITSI.Lib | | Detector Name | (ARS06) | |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.0170E-01 | pCi/g | 1.6799E-01 | 2.7400E-01 | 1.3700E-01 | | | |
| **RA-226** | 2.2159E-01 | pCi/g | 4.8590E-01 | 8.7200E-01 | 4.3600E-01 | | | |
| **RA-228** | 2.2819E-01 | pCi/g | 1.0461E-01 | 2.1100E-01 | 1.0550E-01 | | | |
| **AM-241** | 2.0978E-02 | pCi/g | 6.5801E-02 | 1.1600E-01 | 5.8000E-02 | | | |
| **PB-210** | 1.4212E+00 | pCi/g | 9.1765E-01 | 1.3600E+00 | 6.8000E-01 | | | |
| **U-238** | 3.2418E-01 | pCi/g | 2.8495E-01 | 1.3200E+00 | 6.6000E-01 | | | |
| **K-40** | 1.2410E+01 | pCi/g | 1.5657E+00 | 7.1100E-01 | 3.5550E-01 | | | |
| **PB-214** | 2.9533E-01 | pCi/g | 8.5164E-02 | 1.0000E-01 | 5.0000E-02 | | | |
| **BI-214** | 3.1539E-01 | pCi/g | 1.0329E-01 | 1.3100E-01 | 6.5500E-02 | | | |
| **BI-212** | 1.7394E-01 | pCi/g | 3.5830E-01 | 4.6900E-01 | 2.3450E-01 | | | |
| **PB-212** | 2.4748E-01 | pCi/g | 7.2036E-02 | 8.3900E-02 | 4.1950E-02 | | | |
| **TL-208** | 8.2600E-02 | pCi/g | 3.9402E-02 | 5.6000E-02 | 2.8000E-02 | | | |
| **PA-234** | 8.2515E-02 | pCi/g | 1.0844E-01 | 1.2400E-01 | 6.2000E-02 | | | |
| **CS-137** | -8.6878E-03 | pCi/g | 3.4453E-02 | 6.1300E-02 | 3.0650E-02 | | | |
| **CO-60** | -2.1956E-03 | pCi/g | 1.9852E-01 | 8.0300E-02 | 4.0150E-02 | | | |
| **EU-152** | 1.9971E-02 | pCi/g | 6.5074E-02 | 2.2800E-01 | 1.1400E-01 | | | |
| **EU-154** | 3.1350E-02 | pCi/g | 7.7950E-02 | 6.3100E-02 | 3.1550E-02 | | | |
| **Total Gamma** | 1.5976E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.6133E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06819.An1

Sample description
Batch ID: 16-00564-18
SDG: ARS1-16-00671-002 Tech: WJS

Spectrum Filename: C:\User\ARS06819.An1

Acquisition information
Start time: 19-Apr-2016 11:22:37
Live time: 1800
Real time: 1805
Dead time: 0.28 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.6349E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.6349E+02) =
2.7511E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06819.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2006

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 43.23 | 9. | 124.27 | 0.93 | 3.008E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.69 | 66. | 21.93 | 0.81 | 3.296E-02 | 46.52 | 4.000 | 1.421E+00 | PB210 |
| 59.19 | 8. | 69.54 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.34 | -3. | 86.41 | 0.95 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.12 | 84. | 22.16 | 0.64 | 5.235E-02 | | | | |
| 92.38 | -3. | 438.35 | 0.98 | 5.721E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.75 | 34. | 30.44 | 0.98 | 5.730E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 93.03 | 53. | 30.52 | 0.49 | 5.735E-02 | | | | |
| 98.66 | 6. | 160.90 | 0.99 | 5.833E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 99.89 | 10. | 97.20 | 0.99 | 5.851E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 143.83 | 12. | 78.92 | 1.03 | 5.734E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 185.67 | 10. | 46.49 | 1.07 | 5.089E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 205.15 | 8. | 120.62 | 1.09 | 4.793E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 227.58 | 11. | 97.68 | 1.11 | 4.480E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.30 | 120. | 12.97 | 1.12 | 4.327E-02 | 238.63 | 43.100 | 2.511E-01 | PB212 |
| 243.61 | 1. | 584.82 | 1.12 | 4.245E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| 294.91 | 45. | 23.64 | 1.17 | 3.686E-02 | 295.21 | 18.500 | 2.726E-01 | PB214 |
| 300.12 | 6. | 160.08 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.90 | 25. | 39.84 | 1.21 | 3.315E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| 351.58 | 105. | 11.53 | 1.16 | 3.218E-02 | | | | |
| 351.58 | 105. | 11.53 | 1.16 | 3.218E-02 | 351.92 | 35.800 | 3.500E-01 | PB214 |
| 510.63 | 9. | 28.50 | 1.37 | 2.413E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 569.21 | 4. | 111.77 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.20 | 38. | 21.14 | 1.44 | 2.185E-02 | 583.14 | 86.000 | 8.387E-02 | TL208 |
| 609.08 | 72. | 14.94 | 1.46 | 2.115E-02 | 609.31 | 44.791 | 3.154E-01 | BI214 |
| 726.76 | 7. | 96.16 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 757.09 | 1. | 445.57 | 1.59 | 1.805E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.72 | 4. | 136.92 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 785.11 | 4. | 176.92 | 1.61 | 1.757E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 860.33 | 5. | 119.87 | 1.68 | 1.644E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.00 | 6. | 88.13 | 1.70 | 1.617E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.17 | 23. | 32.07 | 1.72 | 1.577E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 932.04 | 0. | 826.11 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 964.87 | 2. | 418.20 | 1.77 | 1.513E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 8.708E-02 | Ra228 |
| 969.47 | 16. | 38.27 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 997.44 | 2. | 304.42 | 1.79 | 1.478E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1112.76 | 2. | 316.23 | 1.89 | 1.362E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.67 | 10. | 62.41 | 1.90 | 1.355E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1407.05 | 3. | 157.82 | 2.13 | 1.136E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1460.48 | 369. | 5.21 | 1.76 | 1.104E-02 | 1460.75 | 10.700 | 1.241E+01 | K40 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 307.75 | 77.12 | 104. | 84. | 0.046 | 44.31 | 0.636 | PB-212 | s |
| 371.38 | 93.03 | 130. | 5. | 0.003 | 680.41 | 0.494 | TH-234 | sc |
| 1405.87 | 351.58 | 109. | 12. | 0.007 | 253.01 | 1.165 | PB-214 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-154 | 172.16 | 43.23 | 56. | 9. | 0.005 | 248.53 | 0.932s |
| EU-152 | 191.91 | 48.16 | 43. | -3. | -0.002 | 554.78 | 0.935s |
| PB-210 | 186.02 | 46.69 | 75. | 45. | 0.025 | 43.87 | 0.808 |
| EU-154 | 192.88 | 48.41 | 96. | -16. | -0.009 | 179.20 | 0.938s |
| Am-241 | 236.01 | 59.19 | 77. | 8. | 0.004 | 139.08 | 0.948 |
| U-238 | 252.63 | 63.34 | 134. | -3. | -0.001 | 172.83 | 0.952s |
| U-238 | 370.25 | 92.75 | 103. | 34. | 0.019 | 60.88 | 0.980s |
| PA-234 | 393.91 | 98.66 | 78. | 6. | 0.003 | 321.79 | 0.986s |
| PA-234 | 398.82 | 99.89 | 76. | 10. | 0.006 | 194.40 | 0.987s |
| PA-234 | 442.87 | 110.90 | 92. | -17. | -0.009 | 177.22 | 0.998s |
| EU-152 | 483.44 | 121.04 | 72. | -12. | -0.006 | 215.90 | 1.008s |
| U-235 | 574.63 | 143.83 | 64. | 12. | 0.007 | 157.83 | 1.029s |
| RA-226 | 742.01 | 185.67 | 61. | 10. | 0.006 | 92.98 | 1.069s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-235 | 819.98 | 205.15 | 50. | 8. | 0.004 | 241.24 | 1.087s |
| PA-234 | 909.69 | 227.58 | 50. | 11. | 0.006 | 195.35 | 1.108s |
| PB-212 | 952.61 | 238.30 | 57. | 113. | 0.063 | 25.94 | 1.120 |
| PB-214 | 966.12 | 241.68 | 88. | -7. | -0.004 | 442.39 | 1.122s |
| EU-152 | 973.85 | 243.61 | 34. | 1. | 0.001 | 1169.64 | 1.124s |
| EU-154 | 988.46 | 247.26 | 25. | -2. | -0.001 | 884.70 | 1.128s |
| PB-214 | 1179.10 | 294.91 | 45. | 45. | 0.025 | 47.28 | 1.172s |
| PB-212 | 1199.96 | 300.12 | 40. | 6. | 0.003 | 320.16 | 1.176 |
| Ra-228 | 1351.13 | 337.90 | 40. | 25. | 0.014 | 79.69 | 1.212s |
| PB-214 | 1406.21 | 351.67 | 29. | 86. | 0.048 | 25.15 | 1.224 |
| TL-208 | 2042.35 | 510.63 | 77. | 9. | 0.005 | 57.00 | 1.370s |
| PA-234 | 2276.83 | 569.21 | 21. | 4. | 0.002 | 223.54 | 1.423s |
| TL-208 | 2332.80 | 583.20 | 24. | 38. | 0.021 | 42.28 | 1.435s |
| BI-214 | 2436.38 | 609.08 | 34. | 72. | 0.040 | 29.89 | 1.458 |
| CS-137 | 2643.21 | 660.75 | 23. | -4. | -0.002 | 396.54 | 1.505s |
| PA-234 | 2795.34 | 698.76 | 23. | -1. | -0.001 | 1267.80 | 1.538s |
| BI-212 | 2907.44 | 726.76 | 23. | 7. | 0.004 | 192.32 | 1.563s |
| PA-234 | 2930.40 | 732.50 | 24. | -2. | -0.001 | 1052.77 | 1.568s |
| EU-154 | 3028.83 | 757.09 | 17. | 1. | 0.001 | 891.13 | 1.589s |
| BI-214 | 3075.41 | 768.72 | 16. | 4. | 0.002 | 273.84 | 1.599s |
| BI-212 | 3141.00 | 785.11 | 20. | 4. | 0.002 | 353.84 | 1.614s |
| PA-234 | 3230.04 | 807.35 | 25. | -5. | -0.003 | 325.77 | 1.633s |
| TL-208 | 3442.13 | 860.33 | 16. | 5. | 0.003 | 239.74 | 1.679s |
| EU-152 | 3466.74 | 866.48 | 15. | -3. | -0.001 | 443.74 | 1.685s |
| EU-154 | 3495.76 | 873.73 | 14. | -3. | -0.001 | 464.61 | 1.690s |
| PA-234 | 3520.89 | 880.00 | 14. | 6. | 0.003 | 176.26 | 1.696s |
| PA-234 | 3530.89 | 882.50 | 21. | -3. | -0.002 | 437.56 | 1.698s |
| Ra-228 | 3645.66 | 911.17 | 20. | 23. | 0.013 | 64.14 | 1.722s |
| PA-234 | 3785.12 | 946.00 | 25. | 0. | 0.000 | 2000.00 | 1.752s |
| EU-152 | 3857.18 | 964.00 | 86. | 0. | 0.000 | 2000.00 | 1.767s |
| Ra-228 | 3860.67 | 964.87 | 26. | 2. | 0.001 | 836.39 | 1.768s |
| Ra-228 | 3879.07 | 969.47 | 15. | 16. | 0.009 | 76.55 | 1.771s |
| EU-154 | 3991.08 | 997.44 | 20. | 2. | 0.001 | 608.84 | 1.794s |
| EU-152 | 4344.53 | 1085.71 | 20. | -3. | -0.002 | 472.53 | 1.870s |
| EU-152 | 4452.81 | 1112.76 | 16. | 2. | 0.001 | 632.46 | 1.891s |
| BI-214 | 4484.48 | 1120.67 | 20. | 10. | 0.006 | 124.81 | 1.898s |
| EU-154 | 5102.98 | 1275.11 | 18. | -3. | -0.002 | 462.68 | 2.025s |
| CO-60 | 5327.91 | 1331.27 | 11. | -3. | -0.002 | 324.61 | 2.071s |
| BI-214 | 5513.74 | 1377.67 | 15. | 0. | 0.000 | 2000.00 | 2.107s |
| PA-234 | 5586.06 | 1395.72 | 11. | -3. | -0.002 | 339.13 | 2.120s |
| EU-152 | 5631.44 | 1407.05 | 11. | 3. | 0.002 | 315.65 | 2.131s |
| K-40 | 5845.44 | 1460.48 | 14. | 355. | 0.197 | 10.41 | 1.760 |
| BI-212 | 6465.94 | 1615.38 | 8. | -4. | -0.002 | 225.78 | 2.297s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 1.0170E-01 | | | | | | |
| | | | 143.76 | 8.381E-02 | ?(P | 2.745E-01 | 7.89E+01 | G |
| | | | 205.31 | 1.417E-01 | ?(P | 6.555E-01 | 1.21E+02 | G |
| | | | 163.35 | -2.141E-02 | % P | 5.844E-01 | 2.36E+03 | G |
| RA-226 | | 2.2159E-01 | | | | | | |
| | | | 186.21 | 2.216E-01 | &(P | 8.722E-01 | 4.65E+01 | G K |
| Ra-228 | | 2.2819E-01 | | | | | | |
| | | | 911.07 | 2.034E-01 | (P | 2.112E-01 | 3.21E+01 | G |
| | | | 968.90 | 2.462E-01 | (P | 3.265E-01 | 3.83E+01 | G |
| | | | 338.40 | 2.618E-01 | ?(P | 3.340E-01 | 3.98E+01 | G |
| | | | 964.60 | 8.708E-02 | - | 1.316E+00 | 4.18E+02 | G |
| Am-241 | T | 2.0978E-02 | | | | | | |
| | | | 59.54 | 2.098E-02 | ?(P | 1.163E-01 | 6.95E+01 | G K |
| PB-210 | | 1.4212E+00 | | | | | | |
| | | | 46.52 | 1.421E+00 | (P | 1.356E+00 | 2.19E+01 | G |
| U-238 | | 3.2418E-01 | | | | | | |
| | | | 63.29 | -5.905E-02 | &(P | 1.323E+00 | 8.64E+01 | G |
| | | | 92.80 | 8.224E-01 | (P | 1.199E+00 | 3.04E+01 | G |
| | | | 92.38 | -8.374E-02 | & P | 1.795E+00 | 4.38E+02 | G |
| K-40 | | 1.2410E+01 | | | | | | |
| | | | 1460.75 | 1.241E+01 | (P | 7.109E-01 | 5.21E+00 | G |
| PB-214 | | 2.9533E-01 | | | | | | |
| | | | 351.92 | 3.071E-01 | (P | 1.004E-01 | 1.26E+01 | G |
| | | | 295.21 | 2.726E-01 | (P | 2.053E-01 | 2.36E+01 | G |
| | | | 241.98 | -8.893E-02 | & P | 5.984E-01 | 2.21E+02 | G |
| BI-214 | | 3.1539E-01 | | | | | | |
| | | | 609.31 | 3.154E-01 | (P | 1.307E-01 | 1.49E+01 | G |
| | | | 1764.49 | -3.161E-02 | % P | 9.674E-01 | 1.00E+03 | G |
| | | | 1120.29 | 2.126E-01 | - P | 4.827E-01 | 6.24E+01 | G |
| | | | 1238.11 | -4.094E-02 | % P | 1.270E+00 | 8.62E+03 | G |
| | | | 768.36 | 2.033E-01 | & P | 1.041E+00 | 1.37E+02 | G |
| | | | 1377.67 | 0.000E+00 | - | 1.903E+00 | 1.00E+03 | G |
| | | | 934.06 | 9.232E-03 | % P | 1.889E+00 | 8.26E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-212 | 1.7394E-01 | | | | | | |
| | | 727.17 | 1.283E-01 | ?(P | 4.687E-01 | 9.62E+01 | G |
| | | 1620.56 | -6.013E-01 | + | 2.411E+00 | 1.13E+02 | G |
| | | 785.42 | 4.431E-01 | ?( | 2.790E+00 | 1.77E+02 | G |
| PB-212 | 2.4748E-01 | | | | | | |
| | | 238.63 | 2.511E-01 | (P | 8.386E-02 | 1.30E+01 | G |
| | | 300.09 | 2.003E-01 | ( | 1.114E+00 | 1.60E+02 | G |
| TL-208 | 8.2600E-02 | | | | | | |
| | | 583.14 | 8.387E-02 | @(P | 5.595E-02 | 2.11E+01 | G |
| | | 510.72 | 6.511E-02 | (P | 3.319E-01 | 2.85E+01 | G |
| | | 860.47 | 1.063E-01 | ?( | 4.467E-01 | 1.20E+02 | G |
| | | 277.36 | -1.067E-03 | % P | 4.906E-01 | 1.08E+03 | G |
| | | 763.30 | -1.890E-02 | % P | 2.782E+00 | 6.21E+03 | G |
| PA-234 | 8.2515E-02 | | | | | | |
| | | 98.44 | 1.659E-02 | &(P | 1.238E-01 | 1.61E+02 | G |
| | | 946.00 | 0.000E+00 | - | 3.500E-01 | 1.00E+03 | G |
| | | 131.28 | 1.341E-03 | % | 1.577E-01 | 3.36E+03 | G |
| | | 94.67 | -2.787E-03 | % | 2.274E-01 | 2.34E+03 | G |
| | | 883.24 | -6.556E-02 | + | 5.141E-01 | 2.19E+02 | G |
| | | 926.70 | -1.647E-02 | % P | 6.396E-01 | 1.00E+03 | G |
| | | 569.26 | 7.104E-02 | ?(P | 4.296E-01 | 1.12E+02 | G |
| | | 111.00 | -1.365E-01 | + P | 3.863E-01 | 8.86E+01 | G |
| | | 733.00 | -5.372E-02 | + P | 6.755E-01 | 5.26E+02 | G |
| | | 949.00 | -4.195E-02 | % P | 8.335E-01 | 1.09E+03 | G |
| | | 880.51 | 2.319E-01 | &(P | 7.830E-01 | 8.81E+01 | G |
| | | 226.87 | 1.523E-01 | &( | 5.041E-01 | 9.77E+01 | G |
| | | 831.10 | -3.771E-02 | % P | 1.336E+00 | 1.00E+03 | G |
| | | 808.10 | -2.239E-01 | + | 1.284E+00 | 1.63E+02 | G |
| | | 99.70 | 1.568E-01 | ?(P | 6.498E-01 | 9.72E+01 | G |
| | | 699.10 | -6.977E-02 | & P | 1.180E+00 | 6.34E+02 | G |
| | | 898.60 | -9.306E-02 | & P | 1.488E+00 | 3.28E+04 | G |
| | | 1394.10 | -2.762E-01 | + | 1.701E+00 | 1.70E+02 | G |
| CS-137 | -8.6878E-03 | | | | | | |
| | | 661.66 | -8.688E-03 | ?( | 6.130E-02 | 1.98E+02 | G |
| CO-60 | -2.1956E-03 | | | | | | |
| | | 1173.24 | -2.196E-03 | &(P | 8.026E-02 | 1.77E+03 | K |
| | | 1332.50 | -1.107E-02 | + P | 6.307E-02 | 1.62E+02 | K |
| EU-152 | 1.9971E-02 | | | | | | |
| | | 40.12 | -1.215E-02 | %(P | 2.284E-01 | 1.00E+03 | G |
| | | 121.78 | -2.773E-02 | & P | 1.004E-01 | 1.08E+02 | G |
| | | 344.30 | -6.773E-03 | & P | 1.179E-01 | 1.14E+03 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1408.08 | 5.271E-02 | ?(P | 3.119E-01 | 1.58E+02 | G |
| | | 39.52 | -9.398E-03 | % | 3.945E-01 | 1.20E+03 | G |
| | | 964.00 | 0.000E+00 | - | 8.589E-01 | 1.00E+03 | G |
| | | 1112.07 | 4.089E-02 | ?( | 4.748E-01 | 3.16E+02 | G |
| | | 778.90 | -8.658E-03 | % P | 4.880E-01 | 2.97E+03 | G |
| | | 1085.80 | -8.064E-02 | + | 6.857E-01 | 2.36E+02 | G |
| | | 45.40 | -5.007E-02 | + P | 4.780E-01 | 2.77E+02 | G |
| | | 244.67 | 1.802E-02 | ?(P | 3.840E-01 | 5.85E+02 | G |
| | | 867.39 | -1.534E-01 | + | 1.239E+00 | 2.22E+02 | G |
| EU-154 | 3.1350E-02 | | | | | | |
| | | 123.10 | 7.398E-04 | &( | 6.307E-02 | 2.40E+03 | G |
| | | 1274.80 | -2.569E-02 | + P | 2.140E-01 | 2.31E+02 | G |
| | | 723.30 | -6.171E-03 | & | 2.777E-01 | 1.22E+03 | G |
| | | 1004.80 | -1.605E-02 | & P | 3.649E-01 | 3.77E+03 | G |
| | | 43.00 | 9.251E-02 | ?( | 3.930E-01 | 1.24E+02 | G |
| | | 873.20 | -5.924E-02 | + P | 4.573E-01 | 2.32E+02 | G |
| | | 996.30 | 5.553E-02 | &( | 6.135E-01 | 3.04E+02 | G |
| | | 42.31 | -8.783E-04 | % | 7.210E-01 | 2.31E+04 | G |
| | | 248.04 | -2.618E-02 | & P | 3.851E-01 | 4.42E+02 | G |
| | | 591.70 | 7.775E-04 | % | 9.519E-01 | 3.28E+04 | G |
| | | 48.70 | -4.527E-01 | + | 1.360E+00 | 8.96E+01 | G |
| | | 756.70 | 7.490E-02 | ?( | 1.230E+00 | 4.46E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

American Radiation Services Spectrum name: ARS06819.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 1.0170E-01 | 1.6778E-01 | 1.6799E-01 | 0.274E+00 |
| RA-226 | #A | 2.2159E-01 | 4.8554E-01 | 4.8590E-01 | 0.872E+00 |
| Ra-228 | # | 2.2819E-01 | 1.0348E-01 | 1.0461E-01 | 0.211E+00 |
| Am-241 | #A | 2.0978E-02 | 6.5786E-02 | 6.5801E-02 | 0.116E+00 |
| PB-210 | | 1.4212E+00 | 9.0686E-01 | 9.1765E-01 | 0.136E+01 |
| U-238 | #A | 3.2418E-01 | 2.8382E-01 | 2.8495E-01 | 0.132E+01 |
| K-40 | | 1.2410E+01 | 1.3441E+00 | 1.5657E+00 | 0.711E+00 |
| PB-214 | # | 2.9533E-01 | 8.0751E-02 | 8.5164E-02 | 0.100E+00 |
| BI-214 | # | 3.1539E-01 | 1.0144E-01 | 1.0329E-01 | 0.131E+00 |
| BI-212 | #A | 1.7394E-01 | 3.5812E-01 | 3.5830E-01 | 0.469E+00 |
| PB-212 | | 2.4748E-01 | 6.8317E-02 | 7.2036E-02 | 0.839E-01 |
| TL-208 | # | 8.2600E-02 | 3.9040E-02 | 3.9402E-02 | 0.560E-01 |
| PA-234 | #A | 8.2515E-02 | 1.0827E-01 | 1.0844E-01 | 0.124E+00 |
| CS-137 | #A | -8.6878E-03 | 3.4450E-02 | 3.4453E-02 | 0.613E-01 |
| CO-60 | #B | -2.1956E-03 | 1.9852E-01 | 1.9852E-01 | 0.803E-01 |
| EU-152 | #A | 1.9971E-02 | 6.5036E-02 | 6.5074E-02 | 0.228E+00 |
| EU-154 | #A | 3.1350E-02 | 7.7915E-02 | 7.7950E-02 | 0.631E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 2.7 to 1998.2 keV) 1.408E+01 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-06 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-003 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 003 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 1.2853E-01 | pCi/g | 4.7777E-02 | 6.6000E-02 | 3.3000E-02 | | | |
| **RA-226** | 1.4760E+00 | pCi/g | 8.1063E-01 | 1.1800E+00 | 5.9000E-01 | | | |
| **RA-228** | 4.7945E-01 | pCi/g | 1.4517E-01 | 2.0800E-01 | 1.0400E-01 | | | |
| **AM-241** | 1.5985E-03 | pCi/g | 8.6538E-02 | 1.4900E-01 | 7.4500E-02 | | | |
| **PB-210** | 3.4066E-01 | pCi/g | 8.5996E-01 | 1.5100E+00 | 7.5500E-01 | | | |
| **U-238** | 1.0295E+00 | pCi/g | 6.1697E-01 | 1.3800E+00 | 6.9000E-01 | | | |
| **K-40** | 2.0463E+01 | pCi/g | 2.1886E+00 | 4.3600E-01 | 2.1800E-01 | | | |
| **PB-214** | 6.2712E-01 | pCi/g | 1.3017E-01 | 1.3500E-01 | 6.7500E-02 | | | |
| **BI-214** | 7.0924E-01 | pCi/g | 1.4923E-01 | 1.3200E-01 | 6.6000E-02 | | | |
| **BI-212** | 4.1402E-01 | pCi/g | 3.5793E-01 | 4.4700E-01 | 2.2350E-01 | | | |
| **PB-212** | 4.9434E-01 | pCi/g | 1.1335E-01 | 1.2700E-01 | 6.3500E-02 | | | |
| **TL-208** | 2.1838E-01 | pCi/g | 6.3785E-02 | 6.5800E-02 | 3.2900E-02 | | | |
| **PA-234** | 1.1376E-01 | pCi/g | 1.5249E-01 | 1.3800E-01 | 6.9000E-02 | | | |
| **CS-137** | 5.0994E-02 | pCi/g | 4.2919E-02 | 6.6800E-02 | 3.3400E-02 | | | |
| **CO-60** | -1.2037E-02 | pCi/g | 4.9717E-02 | 8.8200E-02 | 4.4100E-02 | | | |
| **EU-152** | 1.1453E-01 | pCi/g | 1.4084E-01 | 2.2600E-01 | 1.1300E-01 | | | |
| **EU-154** | 2.5410E-02 | pCi/g | 6.4445E-02 | 9.4700E-02 | 4.7350E-02 | | | |
| **Total Gamma** | 2.6687E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 7.6727E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01320.An1

Sample description
Batch ID: 16-00698-06
SDG: ARS1-16-00671-003 Tech: WJS

Spectrum Filename: C:\User\ARS01320.An1

Acquisition information
Start time: 05-May-2016 09:34:17
Live time: 2700
Real time: 2706
Dead time: 0.21 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.2595E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.2595E+02) =
3.0680E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01320.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2422

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 40.01 | 12. | 119.97 | 0.90 | 2.184E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 42.88 | 3. | 606.52 | 0.90 | 2.358E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.19 | 11. | 34.44 | 0.39 | 2.560E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.45 | 74. | 27.12 | 0.89 | 3.634E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.20 | 118. | 21.54 | 0.62 | 4.309E-02 | | | | |
| 92.35 | 24. | 77.26 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.88 | 88. | 22.27 | 0.79 | 4.685E-02 | 92.80 | 3.000 | 1.546E+00 | U238 |
| 99.22 | 23. | 66.93 | 0.95 | 4.742E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 3.160E-01 | PA234 |
| 99.28 | 18. | 78.14 | 0.95 | 4.735E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 2.532E-01 | PA234 |
| 121.87 | 3. | 622.03 | 0.96 | 4.659E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 142.79 | 8. | 139.39 | 0.98 | 4.380E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.85 | 21. | 63.83 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 186.10 | 92. | 18.87 | 1.15 | 3.763E-02 | 185.72 | 54.000 | 1.381E-01 | U235 |
| | | | | | 186.10 | 3.500 | 1.476E+00 | RA226 |
| 227.30 | 13. | 94.76 | 1.05 | 3.262E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.89 | 236. | 9.98 | 1.07 | 3.137E-02 | 238.63 | 43.100 | 4.943E-01 | PB212 |
| 277.26 | 20. | 57.82 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.52 | 107. | 14.63 | 0.90 | 2.659E-02 | 295.21 | 18.500 | 6.312E-01 | PB214 |
| 300.49 | 22. | 46.20 | 1.11 | 2.627E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.60 | 62. | 21.01 | 1.14 | 2.392E-02 | 338.40 | 12.010 | 6.617E-01 | Ra228 |
| 352.21 | 171. | 10.28 | 1.13 | 2.319E-02 | 351.92 | 35.800 | 6.067E-01 | PB214 |
| 511.31 | 47. | 19.66 | 0.83 | 1.747E-02 | 510.72 | 22.500 | 3.686E-01 | TL208 |
| 568.87 | 2. | 284.95 | 1.31 | 1.611E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.53 | 97. | 13.05 | 1.22 | 1.583E-02 | 583.14 | 86.000 | 2.184E-01 | TL208 |
| 609.62 | 170. | 9.30 | 1.05 | 1.532E-02 | 609.31 | 44.791 | 7.024E-01 | BI214 |

0.88 Spectrum name: ARS01320.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 661.66 | 20. | 42.03 | 1.38 | 1.442E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 700.17 | 4. | 187.72 | 1.41 | 1.384E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 727.95 | 17. | 40.77 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 731.97 | 1. | 483.66 | 1.43 | 1.337E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 765.65 | 5. | 135.45 | 1.46 | 1.291E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 860.88 | 5. | 122.96 | 1.52 | 1.186E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 875.13 | 3. | 221.41 | 1.53 | 1.173E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 911.53 | 43. | 18.49 | 1.56 | 1.135E-02 | 911.07 | 29.000 | 4.039E-01 | Ra228 |
| 935.13 | 9. | 73.24 | 1.57 | 1.114E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 969.46 | 17. | 39.78 | 1.60 | 1.083E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1005.73 | 6. | 126.77 | 1.62 | 1.053E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.30 | 5. | 115.75 | 1.68 | 9.900E-03 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.98 | 23. | 33.21 | 1.70 | 9.654E-03 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1238.30 | 8. | 95.15 | 1.77 | 8.889E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1274.43 | 2. | 371.94 | 1.80 | 8.672E-03 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1377.52 | 2. | 342.29 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1394.34 | 5. | 83.48 | 1.87 | 8.021E-03 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1461.28 | 552. | 4.26 | 2.04 | 7.688E-03 | 1460.75 | 10.700 | 2.046E+01 | K40 |
| 1621.40 | 5. | 83.35 | 2.00 | 6.976E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1765.10 | 17. | 26.92 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | 5.384E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 307.75 | 77.20 | 218. | 118. | 0.044 | 43.08 | 0.623 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.95 | 40.01 | 95. | 12. | 0.004 | 239.93 | 0.897s |
| EU-154 | 166.95 | 42.01 | 133. | -3. | -0.001 | 1183.85 | 0.899s |
| EU-154 | 170.44 | 42.88 | 131. | 3. | 0.001 | 1213.04 | 0.899s |
| EU-152 | 176.98 | 44.52 | 119. | -7. | -0.003 | 451.81 | 0.901s |
| PB-210 | 183.70 | 46.19 | 105. | 11. | 0.004 | 68.88 | 0.385s |
| EU-154 | 189.21 | 47.57 | 148. | -22. | -0.008 | 162.55 | 0.904s |
| U-238 | 252.74 | 63.45 | 170. | 38. | 0.014 | 54.24 | 0.885 |
| U-238 | 368.51 | 92.38 | 209. | 24. | 0.009 | 154.52 | 0.940D |

0.88 Spectrum name: ARS01320.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 370.20 | 92.80 | 134. | 47. | 0.017 | 65.07 | 0.941D |
| PA-234 | 377.21 | 94.55 | 239. | -17. | -0.006 | 259.55 | 0.942s |
| PA-234 | 396.11 | 99.28 | 118. | 18. | 0.007 | 156.28 | 0.945s |
| PA-234 | 395.89 | 99.22 | 106. | 23. | 0.008 | 133.86 | 0.946s |
| PA-234 | 442.42 | 110.85 | 130. | -15. | -0.006 | 221.01 | 0.956s |
| EU-152 | 486.52 | 121.87 | 133. | 3. | 0.001 | 1244.06 | 0.964s |
| EU-154 | 492.24 | 123.30 | 141. | -6. | -0.002 | 560.97 | 0.965s |
| U-235 | 570.25 | 142.79 | 135. | 8. | 0.003 | 278.79 | 0.982s |
| U-235 | 650.49 | 162.85 | 87. | 21. | 0.008 | 127.65 | 0.998s |
| U-235 | 743.65 | 186.13 | 78. | 85. | 0.032 | 36.40 | 1.016s |
| RA-226 | 743.52 | 186.10 | 105. | 63. | 0.023 | 37.74 | 1.146s |
| U-235 | 820.35 | 205.30 | 125. | -14. | -0.005 | 267.55 | 1.032s |
| PA-234 | 908.38 | 227.30 | 68. | 13. | 0.005 | 189.53 | 1.049s |
| PB-212 | 954.76 | 238.89 | 131. | 218. | 0.081 | 19.96 | 1.068 |
| PB-214 | 959.85 | 240.16 | 312. | -85. | -0.032 | 62.45 | 1.061s |
| EU-154 | 986.51 | 246.83 | 64. | -16. | -0.006 | 152.57 | 1.066s |
| TL-208 | 1108.29 | 277.26 | 59. | 20. | 0.007 | 115.63 | 1.089 |
| PB-214 | 1181.11 | 295.46 | 54. | 107. | 0.040 | 29.27 | 0.903s |
| PB-212 | 1201.23 | 300.49 | 46. | 22. | 0.008 | 92.41 | 1.107s |
| Ra-228 | 1353.71 | 338.60 | 61. | 62. | 0.023 | 42.03 | 1.137 |
| PB-214 | 1408.17 | 352.21 | 53. | 164. | 0.061 | 20.56 | 1.131 |
| TL-208 | 2044.67 | 511.31 | 80. | 47. | 0.017 | 39.33 | 0.828s |
| PA-234 | 2274.90 | 568.87 | 35. | 2. | 0.001 | 569.90 | 1.314s |
| TL-208 | 2333.57 | 583.53 | 32. | 97. | 0.036 | 26.10 | 1.217 |
| EU-154 | 2364.85 | 591.35 | 33. | -7. | -0.002 | 255.12 | 1.330s |
| BI-214 | 2437.95 | 609.62 | 33. | 157. | 0.058 | 18.59 | 1.049s |
| CS-137 | 2646.09 | 661.66 | 27. | 20. | 0.008 | 84.05 | 1.381s |
| PA-234 | 2800.14 | 700.17 | 32. | 4. | 0.002 | 375.44 | 1.409s |
| EU-154 | 2899.43 | 724.99 | 31. | -6. | -0.002 | 281.64 | 1.426s |
| BI-212 | 2911.24 | 727.95 | 19. | 17. | 0.006 | 81.54 | 1.429s |
| PA-234 | 2927.32 | 731.97 | 24. | 1. | 0.000 | 967.33 | 1.433s |
| TL-208 | 3056.76 | 764.33 | 36. | -5. | -0.002 | 392.73 | 1.455s |
| BI-214 | 3062.03 | 765.65 | 18. | 5. | 0.002 | 270.89 | 1.458s |
| BI-212 | 3141.12 | 785.42 | 37. | 0. | 0.000 | 2000.00 | 1.470s |
| PA-234 | 3324.39 | 831.24 | 30. | -2. | -0.001 | 1296.73 | 1.502s |
| TL-208 | 3442.92 | 860.88 | 22. | 5. | 0.002 | 245.93 | 1.523s |
| EU-154 | 3499.92 | 875.13 | 19. | 3. | 0.001 | 442.81 | 1.532s |
| PA-234 | 3532.36 | 883.24 | 35. | 0. | 0.000 | 2000.00 | 1.539s |
| PA-234 | 3596.09 | 899.18 | 29. | -5. | -0.002 | 342.54 | 1.549s |
| Ra-228 | 3645.51 | 911.53 | 18. | 43. | 0.016 | 36.99 | 1.558 |
| BI-214 | 3739.89 | 935.13 | 17. | 9. | 0.003 | 146.48 | 1.574s |
| PA-234 | 3782.23 | 945.72 | 32. | -4. | -0.002 | 464.78 | 1.582s |
| PA-234 | 3810.61 | 952.81 | 16. | -1. | 0.000 | 920.84 | 1.584s |
| EU-152 | 3854.75 | 963.85 | 29. | 11. | 0.004 | 154.31 | 1.594s |
| Ra-228 | 3877.20 | 969.46 | 24. | 17. | 0.006 | 79.56 | 1.597s |
| EU-154 | 3976.53 | 994.30 | 30. | -3. | -0.001 | 595.04 | 1.616s |
| EU-154 | 4022.21 | 1005.73 | 22. | 6. | 0.002 | 253.53 | 1.621s |
| EU-152 | 4340.42 | 1085.30 | 14. | 5. | 0.002 | 231.50 | 1.675s |

0.88 Spectrum name: ARS01320.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 4483.10 | 1120.98 | 28. | 23. | 0.009 | 66.42 | 1.698s |
| CO-60 | 4694.20 | 1173.77 | 26. | -4. | -0.001 | 413.03 | 1.732s |
| BI-214 | 4952.22 | 1238.30 | 28. | 8. | 0.003 | 190.30 | 1.773s |
| EU-154 | 5096.71 | 1274.43 | 23. | 2. | 0.001 | 743.88 | 1.796s |
| CO-60 | 5326.68 | 1331.95 | 22. | -4. | -0.001 | 376.94 | 1.832s |
| BI-214 | 5508.86 | 1377.52 | 17. | 2. | 0.001 | 684.58 | 1.860s |
| PA-234 | 5576.14 | 1394.34 | 6. | 5. | 0.002 | 166.95 | 1.870s |
| EU-152 | 5631.05 | 1408.08 | 60. | 0. | 0.000 | 2000.00 | 1.878s |
| K-40 | 5843.75 | 1461.28 | 4. | 548. | 0.203 | 8.51 | 2.036 |
| BI-212 | 6483.83 | 1621.40 | 6. | 5. | 0.002 | 166.70 | 2.003s |
| BI-214 | 7058.27 | 1765.10 | 6. | 17. | 0.006 | 53.84 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 1.2853E-01 | | | | | | |
| | | | 185.72 | 1.285E-01 | *( | 6.601E-02 | 1.82E+01 G | |
| | | | 143.76 | 5.139E-02 | & P | 3.799E-01 | 1.39E+02 G | |
| | | | 205.31 | -2.683E-01 | - P | 1.019E+00 | 1.34E+02 G | |
| | | | 163.35 | 3.314E-01 | & P | 7.392E-01 | 6.38E+01 G | |
| RA-226 | | 1.4760E+00 | | | | | | |
| | | | 186.10 | 1.476E+00 | *(P | 1.175E+00 | 1.89E+01 G | |
| Ra-228 | | 4.7945E-01 | | | | | | |
| | | | 911.07 | 4.039E-01 | (P | 2.079E-01 | 1.85E+01 G | |
| | | | 968.90 | 2.831E-01 | - P | 4.139E-01 | 3.98E+01 G | |
| | | | 338.40 | 6.617E-01 | (P | 4.191E-01 | 2.10E+01 G | |
| | | | 964.60 | 9.047E-03 | & | 1.319E+00 | 3.96E+03 G | |
| Am-241 | T | 1.5985E-03 | | | | | | |
| | | | 59.54 | 1.599E-03 | &( | 1.493E-01 | 2.71E+03 G | K |
| PB-210 | | 3.4066E-01 | | | | | | |
| | | | 46.52 | 3.407E-01 | (P | 1.511E+00 | 3.44E+01 G | |
| U-238 | | 1.0295E+00 | | | | | | |
| | | | 63.29 | 8.253E-01 | (P | 1.379E+00 | 2.71E+01 G | |
| | | | 92.80 | 1.030E+00 | } P | 1.237E+00 | 3.25E+01 G | |
| | | | 92.38 | 6.149E-01 | } P | 1.791E+00 | 7.73E+01 G | |

0.88 Spectrum name: ARS01320.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 2.0463E+01 | | | | | | |
| | | 1460.75 | 2.046E+01 | (P | 4.356E-01 | 4.26E+00 | G |
| PB-214 | 6.2712E-01 | | | | | | |
| | | 351.92 | 6.067E-01 | (P | 1.354E-01 | 1.03E+01 | G |
| | | 295.21 | 6.667E-01 | @(P | 2.307E-01 | 1.46E+01 | G |
| | | 241.98 | -1.126E+00 | - P | 1.122E+00 | 3.12E+01 | G |
| BI-214 | 7.0924E-01 | | | | | | |
| | | 609.31 | 7.024E-01 | *(P | 1.320E-01 | 9.30E+00 | G |
| | | 1764.49 | 5.384E-01 | - P | 4.380E-01 | 2.69E+01 | G |
| | | 1120.29 | 5.012E-01 | & P | 5.848E-01 | 3.32E+01 | G |
| | | 1238.11 | 4.943E-01 | - | 1.604E+00 | 9.51E+01 | G |
| | | 768.36 | 2.327E-01 | - | 1.111E+00 | 1.35E+02 | G |
| | | 1377.67 | 1.690E-01 | & | 2.121E+00 | 3.42E+02 | G |
| | | 934.06 | 8.105E-01 | &(P | 1.988E+00 | 7.32E+01 | G |
| BI-212 | 4.1402E-01 | | | | | | |
| | | 727.17 | 3.315E-01 | &(P | 4.474E-01 | 4.08E+01 | G |
| | | 1620.56 | 7.681E-01 | &( | 2.199E+00 | 8.34E+01 | G |
| | | 785.42 | 0.000E+00 | - | 3.739E+00 | 1.00E+03 | G |
| PB-212 | 4.9434E-01 | | | | | | |
| | | 238.63 | 4.943E-01 | (P | 1.273E-01 | 9.98E+00 | G |
| | | 300.09 | 7.902E-01 | + P | 1.221E+00 | 4.62E+01 | G |
| TL-208 | 2.1838E-01 | | | | | | |
| | | 583.14 | 2.184E-01 | (P | 6.577E-02 | 1.30E+01 | G |
| | | 510.72 | 3.686E-01 | + P | 3.465E-01 | 1.97E+01 | G |
| | | 860.47 | 1.134E-01 | & P | 5.273E-01 | 1.23E+02 | G |
| | | 277.36 | 3.386E-01 | + P | 6.526E-01 | 5.78E+01 | G |
| | | 763.30 | -6.285E-01 | - P | 4.259E+00 | 1.96E+02 | G |
| PA-234 | 1.1376E-01 | | | | | | |
| | | 98.44 | 4.748E-02 | &(P | 1.376E-01 | 7.81E+01 | G |
| | | 946.00 | -5.753E-02 | - P | 4.030E-01 | 2.32E+02 | G |
| | | 131.28 | -7.961E-03 | % P | 1.917E-01 | 1.35E+03 | G |
| | | 94.67 | -7.223E-02 | & | 3.149E-01 | 1.30E+02 | G |
| | | 883.24 | 0.000E+00 | - | 6.676E-01 | 1.00E+03 | G |
| | | 926.70 | -3.298E-02 | % P | 6.446E-01 | 3.33E+04 | G |
| | | 569.26 | 3.264E-02 | &(P | 5.557E-01 | 2.85E+02 | G |
| | | 111.00 | -1.138E-01 | + | 4.236E-01 | 1.11E+02 | G |
| | | 733.00 | 2.437E-02 | &(P | 6.848E-01 | 4.84E+02 | G |
| | | 949.00 | -4.510E-02 | - | 7.683E-01 | 4.60E+02 | G |
| | | 880.51 | -7.292E-02 | % P | 1.121E+00 | 8.07E+02 | G |
| | | 226.87 | 1.868E-01 | ?( | 5.967E-01 | 9.48E+01 | G |
| | | 831.10 | -1.012E-01 | & P | 1.280E+00 | 6.48E+02 | G |

0.88 Spectrum name: ARS01320.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | -1.948E-02 | % | 1.271E+00 | 1.77E+03 | G |
| | | 99.70 | 3.160E-01 | ( | 6.995E-01 | 6.69E+01 | G |
| | | 699.10 | 2.140E-01 | &( | 1.411E+00 | 1.88E+02 | G |
| | | 898.60 | -3.112E-01 | + P | 1.856E+00 | 1.71E+02 | G |
| | | 1394.10 | 4.678E-01 | &( | 1.342E+00 | 8.35E+01 | G |
| CS-137 | 5.0994E-02 | | | | | | |
| | | 661.66 | 5.099E-02 | ( | 6.680E-02 | 4.20E+01 | G |
| CO-60 | -1.2037E-02 | | | | | | |
| | | 1173.24 | -1.204E-02 | ?( | 8.819E-02 | 2.07E+02 | K |
| | | 1332.50 | -1.351E-02 | + | 9.060E-02 | 1.88E+02 | K |
| EU-152 | 1.1453E-01 | | | | | | |
| | | 40.12 | 5.559E-02 | &( | 2.259E-01 | 1.20E+02 | G |
| | | 121.78 | 5.942E-03 | & | 1.273E-01 | 6.22E+02 | G |
| | | 344.30 | -7.996E-04 | % | 1.579E-01 | 5.50E+03 | G |
| | | 1408.08 | 0.000E+00 | - | 7.080E-01 | 1.00E+03 | G |
| | | 39.52 | 5.335E-03 | & | 3.799E-01 | 2.03E+03 | G |
| | | 964.00 | 2.096E-01 | ?( | 5.424E-01 | 7.72E+01 | G |
| | | 1112.07 | 5.442E-03 | % | 6.344E-01 | 3.19E+03 | G |
| | | 778.90 | -9.243E-04 | & | 5.245E-01 | 1.56E+04 | G |
| | | 1085.80 | 1.516E-01 | &( | 6.154E-01 | 1.16E+02 | G |
| | | 45.40 | -9.455E-02 | & | 7.308E-01 | 2.26E+02 | G |
| | | 244.67 | 4.145E-03 | & | 6.172E-01 | 4.26E+03 | G |
| | | 867.39 | -1.103E-02 | % | 1.380E+00 | 3.34E+03 | G |
| EU-154 | 2.5410E-02 | | | | | | |
| | | 123.10 | -9.875E-03 | ?( | 9.473E-02 | 2.80E+02 | G |
| | | 1274.80 | 1.875E-02 | &( | 2.524E-01 | 3.72E+02 | G |
| | | 723.30 | -6.753E-02 | & | 3.308E-01 | 1.41E+02 | G |
| | | 1004.80 | 9.284E-02 | &( | 4.105E-01 | 1.27E+02 | G |
| | | 43.00 | 2.671E-02 | &( | 5.581E-01 | 6.07E+02 | G |
| | | 873.20 | 6.614E-02 | ?( | 5.277E-01 | 2.21E+02 | G |
| | | 996.30 | -7.168E-02 | + | 7.609E-01 | 2.98E+02 | G |
| | | 42.31 | -5.025E-02 | + | 1.024E+00 | 5.92E+02 | G |
| | | 248.04 | -2.405E-01 | + | 6.120E-01 | 7.63E+01 | G |
| | | 591.70 | -2.863E-01 | + | 1.263E+00 | 1.28E+02 | G |
| | | 48.70 | -5.973E-01 | + | 1.617E+00 | 8.13E+01 | G |
| | | 756.70 | 1.822E-02 | % | 1.372E+00 | 2.03E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

0.88 Spectrum name: ARS01320.An1

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 # | 1.2853E-01 | 4.6780E-02 | 4.7777E-02 | 0.660E-01 |
| RA-226 # | 1.4760E+00 | 8.0510E-01 | 8.1063E-01 | 0.118E+01 |
| Ra-228 # | 4.7945E-01 | 1.4189E-01 | 1.4517E-01 | 0.208E+00 |
| Am-241 #B | 1.5985E-03 | 8.6538E-02 | 8.6538E-02 | 0.149E+00 |
| PB-210 A | 3.4066E-01 | 8.5930E-01 | 8.5996E-01 | 0.151E+01 |
| U-238 A | 1.0295E+00 | 6.1173E-01 | 6.1697E-01 | 0.138E+01 |
| K-40 | 2.0463E+01 | 1.7537E+00 | 2.1886E+00 | 0.436E+00 |
| PB-214 | 6.2712E-01 | 1.1781E-01 | 1.3017E-01 | 0.135E+00 |
| BI-214 | 7.0924E-01 | 1.4256E-01 | 1.4923E-01 | 0.132E+00 |
| BI-212 #A | 4.1402E-01 | 3.5692E-01 | 3.5793E-01 | 0.447E+00 |
| PB-212 | 4.9434E-01 | 1.0676E-01 | 1.1335E-01 | 0.127E+00 |
| TL-208 | 2.1838E-01 | 6.2170E-02 | 6.3785E-02 | 0.658E-01 |
| PA-234 #A | 1.1376E-01 | 1.5227E-01 | 1.5249E-01 | 0.138E+00 |
| CS-137 #A | 5.0994E-02 | 4.2861E-02 | 4.2919E-02 | 0.668E-01 |
| CO-60 #A | -1.2037E-02 | 4.9715E-02 | 4.9717E-02 | 0.882E-01 |
| EU-152 #A | 1.1453E-01 | 1.4026E-01 | 1.4084E-01 | 0.226E+00 |
| EU-154 #A | 2.5410E-02 | 6.4422E-02 | 6.4445E-02 | 0.947E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

0.88 Spectrum name: ARS01320.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.0 to 2000.7 keV) | 2.536E+01 | pCi/g |

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-07 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-004 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | tuna can solid, 250 |
| Fraction | 004 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS07) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 8.6374E-02 | pCi/g | 8.6564E-02 | 3.3900E-01 | 1.6950E-01 | | | |
| **RA-226** | 1.6106E+00 | pCi/g | 6.3345E-01 | 8.1900E-01 | 4.0950E-01 | | | |
| **RA-228** | 3.6071E-01 | pCi/g | 1.2711E-01 | 1.7100E-01 | 8.5500E-02 | | | |
| **AM-241** | -2.7487E-03 | pCi/g | 8.9262E-02 | 1.5300E-01 | 7.6500E-02 | | | |
| **PB-210** | -3.2990E-01 | pCi/g | 1.5925E+00 | 1.6200E+00 | 8.1000E-01 | | | |
| **U-238** | 4.0679E-01 | pCi/g | 4.9950E-01 | 1.1700E+00 | 5.8500E-01 | | | |
| **K-40** | 1.3209E+01 | pCi/g | 1.5178E+00 | 3.4600E-01 | 1.7300E-01 | | | |
| **PB-214** | 3.4690E-01 | pCi/g | 8.2441E-02 | 1.2600E-01 | 6.3000E-02 | | | |
| **BI-214** | 3.8743E-01 | pCi/g | 1.1574E-01 | 1.1500E-01 | 5.7500E-02 | | | |
| **BI-212** | 1.8451E-01 | pCi/g | 2.8624E-01 | 4.8700E-01 | 2.4350E-01 | | | |
| **PB-212** | 3.2211E-01 | pCi/g | 7.6730E-02 | 8.9200E-02 | 4.4600E-02 | | | |
| **TL-208** | 8.9090E-02 | pCi/g | 4.2509E-02 | 6.3400E-02 | 3.1700E-02 | | | |
| **PA-234** | 5.1146E-02 | pCi/g | 8.9860E-02 | 1.3000E-01 | 6.5000E-02 | | | |
| **CS-137** | 1.5834E-02 | pCi/g | 2.9687E-02 | 5.1200E-02 | 2.5600E-02 | | | |
| **CO-60** | -1.0317E-02 | pCi/g | 5.1417E-02 | 8.2100E-02 | 4.1050E-02 | | | |
| **EU-152** | 5.1215E-02 | pCi/g | 1.0315E-01 | 2.1100E-01 | 1.0550E-01 | | | |
| **EU-154** | 3.7205E-02 | pCi/g | 7.9420E-02 | 8.0900E-02 | 4.0450E-02 | | | |
| **Total Gamma** | 1.7159E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.9439E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS07975.An1

Sample description
Batch ID: 16-00698-07
SDG: ARS1-16-00671-004 Tech: WJS

Spectrum Filename: C:\User\ARS07975.An1

Acquisition information
Start time: 05-May-2016 10:03:56
Live time: 2700
Real time: 2702
Dead time: 0.08 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.6623E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.6623E+02) =
2.7305E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 21-May-2014 08:45:26 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1201

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 27.21 | 25. | 38.16 | 0.57 | 1.101E-02 | | | | |
| 39.38 | 4. | 364.57 | 0.90 | 2.053E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| 40.23 | 10. | 149.89 | 0.90 | 2.099E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| 42.17 | 7. | 207.35 | 0.91 | 2.269E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.25 | -12. | 55.75 | 0.91 | 2.569E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.26 | -11. | 51.73 | 0.91 | 2.508E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 48.73 | 3. | 566.98 | 0.91 | 2.800E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| 63.42 | 12. | 37.44 | 1.19 | 3.843E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.32 | 70. | 33.09 | 0.51 | 4.426E-02 | | | | |
| 92.39 | 18. | 61.32 | 0.95 | 4.747E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.81 | 21. | 76.68 | 0.95 | 4.753E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.30 | 11. | 123.46 | 0.96 | 4.806E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 111.42 | 15. | 97.75 | 0.97 | 4.832E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 131.31 | 6. | 304.31 | 0.99 | 4.696E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 162.99 | 15. | 81.62 | 1.02 | 4.295E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.71 | 86. | 19.46 | 0.66 | 3.986E-02 | 186.21 | 3.640 | 1.611E+00 | RA226 |
| 205.04 | 23. | 49.09 | 1.06 | 3.743E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.55 | 185. | 10.54 | 0.91 | 3.369E-02 | 238.63 | 43.100 | 3.221E-01 | PB212 |
| 246.19 | 12. | 100.13 | 1.09 | 3.308E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| 295.33 | 98. | 15.77 | 0.45 | 2.871E-02 | 295.21 | 18.500 | 4.753E-01 | PB214 |
| 338.20 | 38. | 26.11 | 1.18 | 2.586E-02 | 338.40 | 12.010 | 3.380E-01 | Ra228 |
| 345.00 | 1. | 378.80 | 1.18 | 2.552E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.88 | 158. | 11.43 | 1.09 | 2.510E-02 | | | | |
| 351.88 | 158. | 11.43 | 1.09 | 2.510E-02 | 351.92 | 35.800 | 4.525E-01 | PB214 |
| 510.77 | 2. | 25.51 | 1.32 | 1.892E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.44 | 48. | 19.53 | 1.38 | 1.715E-02 | 583.14 | 86.000 | 8.909E-02 | TL208 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 609.40 | 94. | 12.92 | 1.62 | 1.661E-02 | 609.31 | 44.791 | 3.461E-01 | BI214 |
| 661.61 | 8. | 83.15 | 1.45 | 1.563E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 727.14 | 4. | 121.35 | 1.50 | 1.460E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| | | | | | 727.17 | 11.800 | PBC<MDA | BI212 |
| 733.25 | 6. | 110.97 | 1.51 | 1.451E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 761.30 | 1. | 851.95 | 1.53 | 1.409E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.23 | 12. | 47.54 | 0.45 | 1.402E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 786.13 | 9. | 77.50 | 1.55 | 1.380E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 867.66 | 3. | 232.08 | 1.61 | 1.283E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| 872.68 | 3. | 142.20 | 1.62 | 1.277E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| 911.52 | 49. | 16.66 | 1.65 | 1.238E-02 | 911.07 | 29.000 | 3.701E-01 | Ra228 |
| 949.32 | 3. | 180.56 | 1.67 | 1.201E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| 968.83 | 18. | 44.43 | 1.69 | 1.182E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 995.82 | 6. | 106.68 | 1.71 | 1.158E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1085.59 | 3. | 243.42 | 1.78 | 1.085E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1111.72 | 1. | 787.26 | 1.79 | 1.065E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1120.49 | 27. | 27.09 | 1.80 | 1.059E-02 | 1120.29 | 14.797 | 4.761E-01 | BI214 |
| 1238.68 | 6. | 76.30 | 1.88 | 9.797E-03 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1274.86 | 3. | 253.06 | 1.91 | 9.571E-03 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1461.17 | 446. | 4.74 | 1.35 | 8.553E-03 | 1460.75 | 10.700 | 1.321E+01 | K40 |
| 1765.37 | 9. | 36.33 | 2.22 | 7.232E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 108.50 | 27.21 | 30. | 25. | 0.009 | 76.32 | 0.565 | SB-125 | s |
| 309.00 | 77.32 | 193. | 70. | 0.026 | 66.18 | 0.508 | PB-212 | s |
| 1181.23 | 295.33 | 122. | 20. | 0.008 | 159.21 | 0.447 | PB-214 | sc |
| 1407.45 | 351.88 | 172. | 39. | 0.014 | 101.23 | 1.091 | PB-214 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.19 | 39.38 | 95. | 4. | 0.001 | 729.15 | 0.904s |
| EU-152 | 160.58 | 40.23 | 97. | 10. | 0.004 | 299.79 | 0.905s |
| EU-154 | 168.36 | 42.17 | 117. | 7. | 0.003 | 414.70 | 0.907s |
| EU-154 | 171.67 | 43.00 | 131. | -7. | -0.003 | 661.62 | 0.908s |

American Radiation Services Spectrum name: ARS07975.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 184.71 | 46.26 | 152. | -11. | -0.004 | 103.45 | 0.910s |
| PB-210 | 184.66 | 46.25 | 156. | -12. | -0.005 | 111.49 | 0.911s |
| EU-154 | 194.58 | 48.73 | 135. | 3. | 0.001 | 1133.95 | 0.913s |
| U-238 | 253.38 | 63.42 | 174. | 12. | 0.004 | 74.88 | 1.188s |
| U-238 | 369.24 | 92.38 | 194. | 18. | 0.007 | 122.65 | 0.954D |
| U-238 | 370.92 | 92.80 | 193. | 21. | 0.008 | 153.37 | 0.954D |
| PA-234 | 378.48 | 94.69 | 251. | -24. | -0.009 | 193.17 | 0.956s |
| PA-234 | 392.91 | 98.30 | 138. | 11. | 0.004 | 246.91 | 0.959s |
| PA-234 | 398.53 | 99.70 | 124. | 0. | 0.000 | 2000.00 | 0.960s |
| PA-234 | 445.42 | 111.42 | 120. | 15. | 0.005 | 195.49 | 0.971s |
| EU-152 | 486.91 | 121.79 | 100. | -6. | -0.002 | 461.78 | 0.981s |
| EU-154 | 492.15 | 123.10 | 136. | 0. | 0.000 | 2000.00 | 0.982s |
| PA-234 | 525.01 | 131.31 | 142. | 6. | 0.002 | 608.62 | 0.990s |
| U-235 | 574.46 | 143.67 | 147. | -16. | -0.006 | 359.87 | 1.001s |
| U-235 | 651.75 | 162.99 | 97. | 15. | 0.006 | 163.25 | 1.019s |
| RA-226 | 742.64 | 185.71 | 76. | 86. | 0.032 | 38.91 | 0.661s |
| U-235 | 820.00 | 205.04 | 56. | 23. | 0.009 | 98.17 | 1.057s |
| PA-234 | 907.33 | 226.87 | 105. | -2. | -0.001 | 1898.77 | 1.077s |
| PB-212 | 954.06 | 238.55 | 92. | 171. | 0.063 | 21.07 | 0.913 |
| PB-214 | 961.50 | 240.41 | 159. | -27. | -0.010 | 150.72 | 1.090s |
| EU-152 | 984.64 | 246.19 | 62. | 12. | 0.004 | 200.26 | 1.093s |
| EU-154 | 991.97 | 248.03 | 74. | -8. | -0.003 | 329.49 | 1.096s |
| TL-208 | 1110.19 | 277.57 | 73. | -6. | -0.002 | 462.43 | 1.122s |
| PB-214 | 1181.16 | 295.31 | 44. | 72. | 0.027 | 32.09 | 1.138s |
| PB-212 | 1198.39 | 299.62 | 52. | -3. | -0.001 | 767.01 | 1.142 |
| Ra-228 | 1352.72 | 338.20 | 47. | 38. | 0.014 | 52.22 | 1.176s |
| PB-214 | 1408.23 | 352.07 | 69. | 110. | 0.041 | 25.83 | 1.188s |
| TL-208 | 2043.11 | 510.77 | 92. | 2. | 0.001 | 51.02 | 1.324s |
| PA-234 | 2264.18 | 566.03 | 17. | -4. | -0.002 | 454.81 | 1.373s |
| TL-208 | 2333.83 | 583.44 | 46. | 48. | 0.018 | 39.05 | 1.385s |
| BI-214 | 2437.68 | 609.40 | 38. | 94. | 0.035 | 25.85 | 1.620 |
| CS-137 | 2646.54 | 661.61 | 23. | 8. | 0.003 | 166.30 | 1.449s |
| BI-212 | 2908.70 | 727.14 | 36. | 4. | 0.002 | 242.70 | 1.502s |
| PA-234 | 2933.16 | 733.25 | 26. | 6. | 0.002 | 221.94 | 1.507s |
| BI-214 | 3073.08 | 768.23 | 10. | 12. | 0.005 | 95.09 | 0.451s |
| BI-212 | 3144.68 | 786.13 | 18. | 9. | 0.003 | 155.01 | 1.548s |
| PA-234 | 3232.56 | 808.10 | 54. | 0. | 0.000 | 2000.00 | 1.566s |
| PA-234 | 3324.57 | 831.10 | 8. | 0. | 0.000 | 2000.00 | 1.584s |
| EU-152 | 3470.82 | 867.66 | 19. | 3. | 0.001 | 464.16 | 1.612s |
| EU-154 | 3490.91 | 872.68 | 15. | 3. | 0.001 | 284.41 | 1.617s |
| PA-234 | 3525.86 | 881.42 | 26. | -8. | -0.003 | 215.30 | 1.622s |
| PA-234 | 3533.14 | 883.24 | 42. | 0. | 0.000 | 2000.00 | 1.624s |
| PA-234 | 3595.03 | 898.71 | 30. | -5. | -0.002 | 404.76 | 1.636s |
| Ra-228 | 3646.28 | 911.52 | 18. | 49. | 0.018 | 33.31 | 1.646 |
| PA-234 | 3689.10 | 922.23 | 14. | -4. | -0.001 | 326.50 | 1.658s |
| PA-234 | 3797.45 | 949.32 | 24. | 3. | 0.001 | 361.12 | 1.674s |
| EU-152 | 3863.67 | 965.87 | 51. | -10. | -0.004 | 233.35 | 1.686s |
| Ra-228 | 3866.06 | 966.47 | 52. | -9. | -0.003 | 248.20 | 1.686s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Ra-228 | 3875.49 | 968.83 | 33. | 18. | 0.007 | 88.87 | 1.689s |
| EU-154 | 3983.45 | 995.82 | 21. | 6. | 0.002 | 213.36 | 1.710s |
| EU-152 | 4342.52 | 1085.59 | 22. | 3. | 0.001 | 486.84 | 1.776s |
| EU-152 | 4447.07 | 1111.72 | 30. | 1. | 0.000 | 1574.52 | 1.795s |
| BI-214 | 4482.14 | 1120.49 | 23. | 27. | 0.010 | 54.17 | 1.801s |
| CO-60 | 4690.74 | 1172.64 | 36. | -4. | -0.001 | 474.31 | 1.839s |
| BI-214 | 4954.89 | 1238.68 | 19. | 6. | 0.002 | 152.59 | 1.884s |
| EU-154 | 5099.60 | 1274.86 | 19. | 3. | 0.001 | 506.12 | 1.909s |
| BI-214 | 5508.46 | 1377.09 | 14. | -4. | -0.002 | 346.29 | 1.979s |
| PA-234 | 5576.50 | 1394.10 | 0. | 0. | 0.000 | 2000.00 | 1.990s |
| EU-152 | 5628.12 | 1407.01 | 16. | -3. | -0.001 | 607.29 | 1.999s |
| K-40 | 5844.74 | 1461.17 | 4. | 442. | 0.164 | 9.47 | 1.350s |
| BI-212 | 6482.22 | 1620.56 | 19. | 0. | 0.000 | 2000.00 | 2.135s |
| BI-214 | 7061.35 | 1765.37 | 15. | 9. | 0.003 | 72.66 | 2.222s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | |
|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | COMMENTS |
| U-235 | | 8.6374E-02 | | | | | |
| | | | 143.76 | -9.106E-02 | ?(P | 3.389E-01 1.80E+02 | G |
| | | | 205.31 | 3.607E-01 | (P | 5.838E-01 4.91E+01 | G |
| | | | 163.35 | 2.084E-01 | &(P | 6.572E-01 8.16E+01 | G |
| RA-226 | | 1.6106E+00 | | | | | |
| | | | 186.21 | 1.611E+00 | ( | 8.188E-01 1.95E+01 | G K |
| Ra-228 | | 3.6071E-01 | | | | | |
| | | | 911.07 | 3.701E-01 | (P | 1.707E-01 1.67E+01 | G |
| | | | 968.90 | 2.331E-01 | - P | 3.929E-01 4.44E+01 | G |
| | | | 338.40 | 3.380E-01 | (P | 3.053E-01 2.61E+01 | G |
| | | | 964.60 | -3.610E-01 | - | 1.533E+00 1.24E+02 | G |
| Am-241 | T | -2.7487E-03 | | | | | |
| | | | 59.54 | -2.749E-03 | &( | 1.525E-01 1.62E+03 | G K |
| PB-210 | | -3.2990E-01 | | | | | |
| | | | 46.52 | -3.299E-01 | ?(P | 1.622E+00 5.57E+01 | G |
| U-238 | | 4.0679E-01 | | | | | |
| | | | 63.29 | 2.108E-01 | (P | 1.172E+00 3.74E+01 | G |
| | | | 92.80 | 4.068E-01 | } P | 1.293E+00 7.67E+01 | G |
| | | | 92.38 | 4.068E-01 | } P | 1.516E+00 6.13E+01 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| K-40 | 1.3209E+01 | | | | | | |
| | | 1460.75 | 1.321E+01 | (P | 3.456E-01 | 4.74E+00 | G |
| PB-214 | 3.4690E-01 | | | | | | |
| | | 351.92 | 3.348E-01 | *(P | 1.259E-01 | 1.29E+01 | G |
| | | 295.21 | 3.703E-01 | (P | 1.735E-01 | 1.60E+01 | G |
| | | 241.98 | -2.968E-01 | & P | 6.713E-01 | 7.54E+01 | G |
| BI-214 | 3.8743E-01 | | | | | | |
| | | 609.31 | 3.461E-01 | (P | 1.153E-01 | 1.29E+01 | G |
| | | 1764.49 | 2.309E-01 | - P | 5.137E-01 | 3.63E+01 | G |
| | | 1120.29 | 4.761E-01 | ?(P | 4.337E-01 | 2.71E+01 | G |
| | | 1238.11 | 2.714E-01 | - P | 1.094E+00 | 7.63E+01 | G |
| | | 768.36 | 4.996E-01 | (P | 6.997E-01 | 4.75E+01 | G |
| | | 1377.67 | -3.236E-01 | - P | 1.567E+00 | 1.73E+02 | G |
| | | 934.06 | -3.376E-02 | & | 1.679E+00 | 1.34E+03 | G |
| BI-212 | 1.8451E-01 | | | | | | |
| | | 727.17 | 7.096E-02 | (P | 4.874E-01 | 1.21E+02 | G |
| | | 1620.56 | 0.000E+00 | - | 2.942E+00 | 1.00E+03 | G |
| | | 785.42 | 8.544E-01 | ( | 2.229E+00 | 7.75E+01 | G |
| PB-212 | 3.2211E-01 | | | | | | |
| | | 238.63 | 3.221E-01 | (P | 8.921E-02 | 1.05E+01 | G |
| | | 300.09 | -9.834E-02 | - P | 1.067E+00 | 3.84E+02 | G |
| TL-208 | 8.9090E-02 | | | | | | |
| | | 583.14 | 8.909E-02 | @(P | 6.340E-02 | 1.95E+01 | G |
| | | 510.72 | 1.045E-02 | - P | 3.038E-01 | 2.55E+01 | G |
| | | 860.47 | -4.392E-02 | % P | 6.506E-01 | 1.00E+03 | G |
| | | 277.36 | -7.792E-02 | - P | 5.950E-01 | 2.31E+02 | G |
| | | 763.30 | 7.068E-02 | & P | 2.928E+00 | 8.52E+02 | G |
| PA-234 | 5.1146E-02 | | | | | | |
| | | 98.44 | 2.506E-02 | &(P | 1.300E-01 | 1.23E+02 | G |
| | | 946.00 | -1.101E-02 | % P | 3.802E-01 | 1.00E+03 | G |
| | | 131.28 | 1.628E-02 | ?( | 1.696E-01 | 3.04E+02 | G |
| | | 94.67 | -8.777E-02 | + | 2.830E-01 | 9.66E+01 | G |
| | | 883.24 | 0.000E+00 | - | 5.940E-01 | 1.00E+03 | G |
| | | 926.70 | -7.255E-02 | + P | 4.152E-01 | 1.63E+02 | G |
| | | 569.26 | -6.696E-02 | + P | 3.341E-01 | 2.27E+02 | G |
| | | 111.00 | 9.688E-02 | ?(P | 3.563E-01 | 9.77E+01 | G |
| | | 733.00 | 1.220E-01 | ?(P | 5.863E-01 | 1.11E+02 | G |
| | | 949.00 | 9.718E-02 | ?(P | 7.507E-01 | 1.81E+02 | G |
| | | 880.51 | -2.524E-01 | + P | 8.746E-01 | 1.08E+02 | G |
| | | 226.87 | -1.928E-02 | - P | 6.063E-01 | 9.49E+02 | G |
| | | 831.10 | 0.000E+00 | - | 5.873E-01 | 1.00E+03 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 808.10 | 0.000E+00 | & | 1.527E+00 | 1.00E+03 | G |
| | | 99.70 | 0.000E+00 | - | 6.602E-01 | 1.00E+03 | G |
| | | 699.10 | 1.567E-03 | % P | 1.145E+00 | 2.50E+03 | G |
| | | 898.60 | -2.931E-01 | + P | 1.545E+00 | 2.02E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 5.805E-01 | 1.00E+03 | G |
| CS-137 | 1.5834E-02 | | | | | | |
| | | 661.66 | 1.583E-02 | (P | 5.120E-02 | 8.32E+01 | G |
| CO-60 | -1.0317E-02 | | | | | | |
| | | 1173.24 | -1.032E-02 | ?(P | 8.211E-02 | 2.37E+02 | K |
| | | 1332.50 | -9.510E-04 | % | 5.740E-02 | 1.59E+03 | K |
| EU-152 | 5.1215E-02 | | | | | | |
| | | 40.12 | 4.133E-02 | ?( | 2.111E-01 | 1.50E+02 | G |
| | | 121.78 | -1.217E-02 | - | 9.645E-02 | 2.31E+02 | G |
| | | 344.30 | 2.585E-03 | % P | 1.349E-01 | 3.79E+02 | G |
| | | 1408.08 | -4.078E-02 | + P | 3.144E-01 | 3.04E+02 | G |
| | | 39.52 | 3.180E-02 | &( | 4.008E-01 | 3.65E+02 | G |
| | | 964.00 | -1.597E-01 | & P | 5.705E-01 | 1.17E+02 | G |
| | | 1112.07 | 1.889E-02 | &( | 5.372E-01 | 7.87E+02 | G |
| | | 778.90 | -1.784E-02 | % P | 3.977E-01 | 1.37E+03 | G |
| | | 1085.80 | 6.198E-02 | &(P | 5.980E-01 | 2.43E+02 | G |
| | | 45.40 | -1.341E-01 | + P | 7.281E-01 | 5.17E+01 | G |
| | | 244.67 | 1.259E-01 | ?( | 4.267E-01 | 1.00E+02 | G |
| | | 867.39 | 1.389E-01 | &( | 1.164E+00 | 2.32E+02 | G |
| EU-154 | 3.7205E-02 | | | | | | |
| | | 123.10 | 0.000E+00 | &( | 8.089E-02 | 1.00E+03 | G |
| | | 1274.80 | 2.032E-02 | ?( | 1.859E-01 | 2.53E+02 | G |
| | | 723.30 | 9.283E-04 | % | 2.456E-01 | 7.20E+03 | G |
| | | 1004.80 | -1.412E-03 | % P | 3.542E-01 | 2.86E+03 | G |
| | | 43.00 | -6.532E-02 | & P | 5.043E-01 | 3.31E+02 | G |
| | | 873.20 | 5.618E-02 | &(P | 3.985E-01 | 1.42E+02 | G |
| | | 996.30 | 1.431E-01 | ?( | 5.275E-01 | 1.07E+02 | G |
| | | 42.31 | 1.234E-01 | ?( | 8.749E-01 | 2.07E+02 | G |
| | | 248.04 | -9.596E-02 | + | 5.424E-01 | 1.65E+02 | G |
| | | 591.70 | -2.634E-03 | % | 9.639E-01 | 1.00E+04 | G |
| | | 48.70 | 6.763E-02 | ?( | 1.320E+00 | 5.67E+02 | G |
| | | 756.70 | 1.443E-02 | % | 1.228E+00 | 2.32E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 8.6374E-02 | 8.6370E-02 | 8.6564E-02 | 0.339E+00 |
| RA-226 # | 1.6106E+00 | 6.2674E-01 | 6.3345E-01 | 0.819E+00 |
| Ra-228 # | 3.6071E-01 | 1.2507E-01 | 1.2711E-01 | 0.171E+00 |
| Am-241 #B | -2.7487E-03 | 8.9262E-02 | 8.9262E-02 | 0.153E+00 |
| PB-210 #A | -3.2990E-01 | 1.5918E+00 | 1.5925E+00 | 0.162E+01 |
| U-238 A | 4.0679E-01 | 4.9851E-01 | 4.9950E-01 | 0.117E+01 |
| K-40 | 1.3209E+01 | 1.2611E+00 | 1.5178E+00 | 0.346E+00 |
| PB-214 # | 3.4690E-01 | 7.7255E-02 | 8.2441E-02 | 0.126E+00 |
| BI-214 | 3.8743E-01 | 1.1345E-01 | 1.1574E-01 | 0.115E+00 |
| BI-212 #A | 1.8451E-01 | 2.8600E-01 | 2.8624E-01 | 0.487E+00 |
| PB-212 | 3.2211E-01 | 7.3399E-02 | 7.6730E-02 | 0.892E-01 |
| TL-208 # | 8.9090E-02 | 4.2147E-02 | 4.2509E-02 | 0.634E-01 |
| PA-234 #A | 5.1146E-02 | 8.9784E-02 | 8.9860E-02 | 0.130E+00 |
| CS-137 #A | 1.5834E-02 | 2.9681E-02 | 2.9687E-02 | 0.512E-01 |
| CO-60 #B | -1.0317E-02 | 5.1416E-02 | 5.1417E-02 | 0.821E-01 |
| EU-152 #A | 5.1215E-02 | 1.0257E-01 | 1.0315E-01 | 0.211E+00 |
| EU-154 #A | 3.7205E-02 | 7.9381E-02 | 7.9420E-02 | 0.809E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

American Radiation Services Spectrum name: ARS07975.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.0 to 2000.1 keV) | 1.594E+01 | pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-21 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-005 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 005 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 4.0255E-02 | pCi/g | 7.2759E-02 | 3.3900E-01 | 1.6950E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 7.3665E-01 | 1.3600E+00 | 6.8000E-01 | | | |
| **RA-228** | 4.1041E-01 | pCi/g | 1.2314E-01 | 2.2300E-01 | 1.1150E-01 | | | |
| **AM-241** | -1.6411E-02 | pCi/g | 8.1477E-02 | 1.4100E-01 | 7.0500E-02 | | | |
| **PB-210** | -1.1701E-01 | pCi/g | 9.7018E-01 | 1.4100E+00 | 7.0500E-01 | | | |
| **U-238** | 1.0956E+00 | pCi/g | 5.2164E-01 | 1.3300E+00 | 6.6500E-01 | | | |
| **K-40** | 1.3859E+01 | pCi/g | 2.1480E+00 | 1.1200E+00 | 5.6000E-01 | | | |
| **PB-214** | 4.3885E-01 | pCi/g | 1.2400E-01 | 1.3100E-01 | 6.5500E-02 | | | |
| **BI-214** | 5.1190E-01 | pCi/g | 1.4417E-01 | 1.2900E-01 | 6.4500E-02 | | | |
| **BI-212** | 3.9829E-01 | pCi/g | 2.9475E-01 | 4.4000E-01 | 2.2000E-01 | | | |
| **PB-212** | 4.3488E-01 | pCi/g | 1.0759E-01 | 1.1100E-01 | 5.5500E-02 | | | |
| **TL-208** | 1.0340E-01 | pCi/g | 5.5706E-02 | 7.2900E-02 | 3.6450E-02 | | | |
| **PA-234** | 6.5936E-02 | pCi/g | 7.6888E-02 | 1.2500E-01 | 6.2500E-02 | | | |
| **CS-137** | -5.2989E-03 | pCi/g | 4.4829E-02 | 4.3000E-02 | 2.1500E-02 | | | |
| **CO-60** | -1.7562E-02 | pCi/g | 9.6561E-02 | 1.0800E-01 | 5.4000E-02 | | | |
| **EU-152** | 8.0841E-02 | pCi/g | 9.5749E-02 | 2.3600E-01 | 1.1800E-01 | | | |
| **EU-154** | 7.5398E-02 | pCi/g | 8.7798E-02 | 7.1700E-02 | 3.5850E-02 | | | |
| **Total Gamma** | 1.7515E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 5.0277E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 12:25:38
American Radiation Services     Spectrum name: ARS05256.An1

Sample description
     Batch ID:  16-00564-21
     SDG:  ARS1-16-00671-005  Tech:  WJS

Spectrum Filename: C:\User\ARS05256.An1

Acquisition information
       Start time:                4/19/2016 11:55:36
       Live time:               1800
       Real time:               1801
       Dead time:                  0.06 %
       Detector ID:                   2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.4995E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.4995E+02) =
                                  2.8576E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 12:25:38
American Radiation Services Spectrum name: ARS05256.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1372

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.36 | 17. | 40.26 | 0.49 | 7.331E-03 | | | | |
| 40.00 | 10. | 104.12 | 0.75 | 2.213E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 6.395E-02 | EU152 |
| 40.00 | 9. | 123.67 | 0.75 | 2.259E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 5.569E-02 | EU152 |
| 42.58 | 15. | 58.12 | 0.75 | 2.481E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 1.986E-01 | EU154 |
| 42.61 | 14. | 69.87 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 1.832E-01 | EU154 |
| 46.36 | -3. | 56.60 | 0.38 | 2.755E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 49.85 | 8. | 102.12 | 0.75 | 2.876E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| 63.27 | 10. | 65.18 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.78 | 78. | 20.42 | 0.79 | 4.752E-02 | | | | |
| 77.10 | 99. | 15.41 | 0.79 | 4.852E-02 | | | | |
| 87.34 | 27. | 46.25 | 0.30 | 5.142E-02 | | | | |
| 92.62 | 68. | 22.45 | 0.83 | 5.210E-02 | 92.38 | 2.570 | 1.975E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.586E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.586E+00 | U238 |
| | | | | | 92.38 | 2.570 | 1.975E+00 | U238 |
| 98.32 | 20. | 54.98 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 122.72 | 8. | 121.50 | 0.87 | 5.064E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | 1.663E-02 | EU154 |
| 123.03 | 8. | 119.18 | 0.87 | 5.046E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 123.10 | 40.460 | 1.757E-02 | EU154 |
| 131.29 | 4. | 191.88 | 0.88 | 4.930E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| 143.98 | 5. | 175.71 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.51 | 5. | 141.07 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.72 | 22. | 90.35 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| 206.04 | 8. | 108.90 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.48 | 162. | 10.85 | 0.77 | 3.537E-02 | 238.63 | 43.100 | 4.276E-01 | PB212 |
| 242.19 | 25. | 43.64 | 0.83 | 3.505E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 247.44 | 7. | 122.50 | 1.06 | 3.450E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 12:25:38
American Radiation Services Spectrum name: ARS05256.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 248.04 | 6.600 | 1.324E-01 | EU154 |
| 247.78 | 12. | 60.27 | 1.06 | 3.480E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 248.04 | 6.600 | 2.245E-01 | EU154 |
| 277.41 | 0. | 682.52 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.24 | 56. | 17.77 | 0.40 | 3.087E-02 | 295.21 | 18.500 | 4.210E-01 | PB214 |
| 299.80 | 12. | 66.81 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.33 | 39. | 23.64 | 0.42 | 2.826E-02 | 338.40 | 12.010 | 4.960E-01 | Ra228 |
| 352.09 | 113. | 12.23 | 1.05 | 2.754E-02 | 351.92 | 35.800 | 4.545E-01 | PB214 |
| 510.87 | 48. | 14.93 | 0.58 | 2.149E-02 | 510.72 | 22.500 | 4.227E-01 | TL208 |
| 569.73 | -1. | 671.50 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.02 | 36. | 24.21 | 1.53 | 1.957E-02 | 583.14 | 86.000 | 9.292E-02 | TL208 |
| 609.52 | 106. | 12.69 | 1.06 | 1.895E-02 | 609.31 | 44.791 | 4.997E-01 | BI214 |
| 727.47 | 18. | 34.49 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 763.84 | 3. | 184.40 | 1.74 | 1.592E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 860.45 | 7. | 84.01 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 868.58 | 2. | 198.16 | 1.85 | 1.429E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| 882.28 | 3. | 184.21 | 1.86 | 1.407E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.55 | 27. | 23.86 | 1.89 | 1.368E-02 | 911.07 | 29.000 | 2.959E-01 | Ra228 |
| 934.34 | 12. | 55.74 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 964.85 | 17. | 32.06 | 1.94 | 1.298E-02 | 964.60 | 5.452 | 1.048E+00 | Ra228 |
| 969.15 | 28. | 24.25 | 1.95 | 1.292E-02 | 968.90 | 17.460 | 5.417E-01 | Ra228 |
| 1004.18 | 0. | 746.11 | 1.98 | 1.248E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1110.97 | 4. | 151.95 | 2.07 | 1.128E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1121.36 | 8. | 88.50 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1275.87 | 1. | 968.52 | 2.19 | 9.709E-03 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1378.25 | 5. | 92.30 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1461.39 | 284. | 6.28 | 1.46 | 8.224E-03 | 1460.75 | 10.700 | 1.386E+01 | K40 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 80.91 | 20.36 | 18. | 17. | 0.010 | 80.53 | 0.490 | RU-103 | s |
| 298.35 | 74.69 | 124. | 62. | 0.034 | 60.45 | 0.876 | TH-234 | s |
| 307.64 | 77.01 | 86. | 70. | 0.039 | 46.31 | 0.494 | PB-212 | s |
| 348.99 | 87.34 | 59. | 27. | 0.015 | 92.50 | 0.304 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

ORTEC g v - i (3263) Env32 G53W4.24 4/19/2016 12:25:38
American Radiation Services Spectrum name: ARS05256.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 159.50 | 40.00 | 50. | 10. | 0.006 | 208.24 | 0.750s |
| EU-152 | 159.50 | 40.00 | 55. | 9. | 0.005 | 247.33 | 0.750s |
| EU-154 | 169.94 | 42.61 | 40. | 14. | 0.008 | 139.75 | 0.750s |
| EU-154 | 169.85 | 42.58 | 31. | 15. | 0.008 | 116.25 | 0.750s |
| EU-152 | 181.13 | 45.40 | 56. | -7. | -0.004 | 309.11 | 0.750s |
| PB-210 | 184.96 | 46.36 | 52. | -3. | -0.002 | 113.19 | 0.380s |
| EU-154 | 198.93 | 49.85 | 30. | 8. | 0.004 | 204.24 | 0.750s |
| Am-241 | 240.93 | 60.34 | 79. | -5. | -0.003 | 496.44 | 0.766 |
| U-238 | 252.64 | 63.27 | 99. | 10. | 0.005 | 130.36 | 0.772s |
| U-238 | 370.14 | 92.62 | 72. | 60. | 0.033 | 42.43 | 0.820s |
| U-238 | 370.18 | 92.63 | 72. | 53. | 0.030 | 42.98 | 0.821s |
| PA-234 | 381.17 | 95.38 | 80. | -5. | -0.003 | 567.32 | 0.824s |
| PA-234 | 392.96 | 98.32 | 58. | 20. | 0.011 | 109.96 | 0.830 |
| PA-234 | 401.26 | 100.40 | 77. | -13. | -0.007 | 193.94 | 0.832s |
| PA-234 | 445.62 | 111.48 | 73. | -6. | -0.003 | 408.19 | 0.850s |
| EU-152 | 490.60 | 122.72 | 42. | 8. | 0.004 | 242.99 | 0.868s |
| EU-154 | 491.83 | 123.03 | 45. | 8. | 0.005 | 238.36 | 0.870s |
| PA-234 | 524.91 | 131.29 | 71. | 4. | 0.002 | 383.76 | 0.883s |
| U-235 | 575.71 | 143.98 | 62. | 5. | 0.003 | 351.43 | 0.903s |
| U-235 | 653.85 | 163.51 | 50. | 5. | 0.003 | 282.13 | 0.934s |
| U-235 | 742.77 | 185.72 | 76. | 22. | 0.012 | 180.71 | 0.969D |
| RA-226 | 744.73 | 186.21 | 93. | 0. | 0.000 | 2000.00 | 0.970D |
| U-235 | 824.11 | 206.04 | 47. | 8. | 0.004 | 217.81 | 1.000s |
| PB-212 | 953.93 | 238.48 | 62. | 152. | 0.084 | 21.69 | 0.771s |
| PB-214 | 968.78 | 242.19 | 41. | 25. | 0.014 | 87.27 | 0.835 |
| EU-152 | 991.17 | 247.78 | 20. | 12. | 0.007 | 120.53 | 1.060s |
| EU-154 | 989.79 | 247.44 | 34. | 7. | 0.004 | 245.01 | 1.065s |
| PB-214 | 1181.13 | 295.24 | 31. | 56. | 0.031 | 35.55 | 0.401s |
| PB-212 | 1199.38 | 299.80 | 36. | 12. | 0.007 | 133.62 | 1.142 |
| Ra-228 | 1353.62 | 338.33 | 20. | 39. | 0.022 | 47.29 | 0.415s |
| EU-152 | 1375.81 | 343.88 | 37. | -4. | -0.002 | 407.15 | 1.206s |
| PB-214 | 1408.68 | 352.09 | 35. | 104. | 0.058 | 24.46 | 1.051 |
| TL-208 | 2044.24 | 510.87 | 45. | 48. | 0.026 | 29.86 | 0.583s |
| TL-208 | 2333.04 | 583.02 | 31. | 36. | 0.020 | 48.43 | 1.526s |
| EU-154 | 2369.40 | 592.10 | 27. | -2. | -0.001 | 608.07 | 1.536s |
| BI-214 | 2439.15 | 609.52 | 24. | 99. | 0.055 | 25.37 | 1.061s |
| CS-137 | 2661.66 | 665.11 | 7. | -2. | -0.001 | 624.30 | 1.621s |
| PA-234 | 2798.55 | 699.31 | 19. | -3. | -0.002 | 382.06 | 1.664s |
| EU-154 | 2900.15 | 724.69 | 37. | -7. | -0.004 | 269.61 | 1.692s |
| BI-212 | 2911.28 | 727.47 | 14. | 18. | 0.010 | 68.97 | 1.696s |
| PA-234 | 2941.05 | 734.91 | 19. | -2. | -0.001 | 602.85 | 1.703s |
| TL-208 | 3056.84 | 763.84 | 16. | 3. | 0.002 | 368.81 | 1.737 |
| BI-214 | 3074.71 | 768.30 | 19. | -2. | -0.001 | 769.77 | 1.742s |
| EU-152 | 3117.15 | 778.90 | 26. | 0. | 0.000 | 2000.00 | 1.753s |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3232.49 | 807.71 | 23. | -4. | -0.002 | 379.08 | 1.785s |
| PA-234 | 3325.91 | 831.05 | 30. | -5. | -0.003 | 312.82 | 1.809s |
| TL-208 | 3443.57 | 860.45 | 18. | 7. | 0.004 | 168.01 | 1.839 |
| EU-152 | 3476.15 | 868.58 | 15. | 2. | 0.001 | 396.31 | 1.846s |
| PA-234 | 3530.96 | 882.28 | 13. | 3. | 0.001 | 368.43 | 1.862s |
| Ra-228 | 3648.16 | 911.55 | 15. | 27. | 0.015 | 47.71 | 1.890s |
| BI-214 | 3739.37 | 934.34 | 16. | 12. | 0.007 | 111.49 | 1.912s |
| PA-234 | 3796.46 | 948.60 | 23. | -2. | -0.001 | 856.55 | 1.923s |
| EU-152 | 3839.19 | 959.27 | 13. | -2. | -0.001 | 1231.84 | 1.940s |
| Ra-228 | 3860.51 | 964.60 | 7. | 17. | 0.010 | 64.11 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 12. | 28. | 0.016 | 48.51 | 1.945D |
| EU-154 | 3987.65 | 996.36 | 22. | -2. | -0.001 | 599.07 | 1.970s |
| EU-152 | 4350.77 | 1087.07 | 22. | -5. | -0.003 | 300.86 | 2.048s |
| EU-152 | 4446.44 | 1110.97 | 20. | 4. | 0.002 | 303.89 | 2.070s |
| BI-214 | 4488.05 | 1121.36 | 19. | 8. | 0.004 | 177.00 | 2.077s |
| CO-60 | 4693.46 | 1172.67 | 27. | -4. | -0.002 | 444.60 | 2.118s |
| EU-154 | 5106.57 | 1275.87 | 13. | 1. | 0.000 | 1937.04 | 2.192s |
| BI-214 | 5516.44 | 1378.25 | 9. | 5. | 0.003 | 184.59 | 2.259s |
| K-40 | 5849.26 | 1461.39 | 19. | 284. | 0.158 | 12.55 | 1.458s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 4.0255E-02 | | | | | | |
| | | | 185.72 | 4.026E-02 | } P | 7.861E-02 | 9.04E+01 G K | |
| | | | 143.76 | 3.944E-02 | ?(P | 3.394E-01 | 1.76E+02 G | |
| | | | 205.31 | 1.771E-01 | &(P | 8.161E-01 | 1.09E+02 G | |
| | | | 163.35 | 9.997E-02 | ?(P | 7.363E-01 | 1.41E+02 G | |
| RA-226 | | 0.0000E+00 | | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 1.361E+00 | 1.00E+03 G K | |
| Ra-228 | | 4.1041E-01 | | | | | | |
| | | | 911.07 | 2.959E-01 | ?(P | 2.226E-01 | 2.39E+01 G | |
| | | | 968.90 | 5.417E-01 | (P | 3.522E-01 | 2.43E+01 G | |
| | | | 338.40 | 4.960E-01 | (P | 2.961E-01 | 2.36E+01 G | |
| | | | 964.60 | 1.048E+00 | + | 8.965E-01 | 3.21E+01 G | |
| Am-241 | T | -1.6411E-02 | | | | | | |
| | | | 59.54 | -1.641E-02 | ?( | 1.407E-01 | 2.48E+02 G K | |

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| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-210 | -1.1701E-01 | | | | | | |
| | | 46.52 | -1.170E-01 | (P | 1.414E+00 | 5.66E+01 | G |
| U-238 | 1.0956E+00 | | | | | | |
| | | 63.29 | 2.679E-01 | ?(P | 1.332E+00 | 6.52E+01 | G |
| | | 92.80 | 1.467E+00 | *(P | 1.160E+00 | 2.15E+01 | G |
| | | 92.38 | 1.918E+00 | @(P | 1.354E+00 | 2.12E+01 | G |
| K-40 | 1.3859E+01 | | | | | | |
| | | 1460.75 | 1.386E+01 | (P | 1.116E+00 | 6.28E+00 | G |
| PB-214 | 4.3885E-01 | | | | | | |
| | | 351.92 | 4.545E-01 | (P | 1.309E-01 | 1.22E+01 | G |
| | | 295.21 | 4.210E-01 | (P | 2.152E-01 | 1.78E+01 | G |
| | | 241.98 | 4.084E-01 | (P | 5.311E-01 | 4.36E+01 | G |
| BI-214 | 5.1190E-01 | | | | | | |
| | | 609.31 | 4.997E-01 | (P | 1.294E-01 | 1.27E+01 | G |
| | | 1764.49 | -7.285E-02 | % P | 3.844E-01 | 1.00E+03 | G |
| | | 1120.29 | 1.997E-01 | - | 6.020E-01 | 8.85E+01 | G |
| | | 1238.11 | -6.855E-02 | % P | 1.927E+00 | 1.48E+03 | G |
| | | 768.36 | -1.068E-01 | - P | 1.292E+00 | 3.85E+02 | G |
| | | 1377.67 | 6.514E-01 | &( | 2.082E+00 | 9.23E+01 | G |
| | | 934.06 | 1.258E+00 | + | 2.261E+00 | 5.57E+01 | G |
| BI-212 | 3.9829E-01 | | | | | | |
| | | 727.17 | 3.983E-01 | ?(P | 4.404E-01 | 3.45E+01 | G |
| | | 1620.56 | -1.928E-02 | % P | 5.103E+00 | 1.00E+03 | G |
| | | 785.42 | -2.951E-04 | % P | 3.669E+00 | 1.00E+03 | G |
| PB-212 | 4.3488E-01 | | | | | | |
| | | 238.63 | 4.276E-01 | @(P | 1.111E-01 | 1.08E+01 | G |
| | | 300.09 | 5.314E-01 | (P | 1.323E+00 | 6.68E+01 | G |
| TL-208 | 1.0340E-01 | | | | | | |
| | | 583.14 | 9.292E-02 | ?(P | 7.290E-02 | 2.42E+01 | G |
| | | 510.72 | 4.227E-01 | + P | 3.025E-01 | 1.49E+01 | G |
| | | 860.47 | 1.785E-01 | (P | 5.527E-01 | 8.40E+01 | G |
| | | 277.36 | -4.316E-04 | % P | 6.334E-01 | 6.83E+02 | G |
| | | 763.30 | 5.100E-01 | + | 3.384E+00 | 1.84E+02 | G |
| PA-234 | 6.5936E-02 | | | | | | |
| | | 98.44 | 6.523E-02 | ?(P | 1.249E-01 | 5.50E+01 | G |
| | | 946.00 | -2.627E-02 | - | 4.085E-01 | 4.28E+02 | G |
| | | 131.28 | 1.865E-02 | & P | 1.825E-01 | 1.92E+02 | G |
| | | 94.67 | -2.396E-02 | - | 2.352E-01 | 2.84E+02 | G |
| | | 883.24 | 6.740E-02 | ?(P | 4.944E-01 | 1.84E+02 | G |

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American Radiation Services Spectrum name: ARS05256.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 926.70 | 2.533E-03 | % | 7.673E-01 | 8.26E+03 | G |
| | | 569.26 | -1.388E-02 | % P | 5.495E-01 | 6.72E+02 | G |
| | | 111.00 | -5.839E-02 | & | 4.110E-01 | 2.04E+02 | G |
| | | 733.00 | -6.510E-02 | & | 7.127E-01 | 3.01E+02 | G |
| | | 949.00 | -1.743E-02 | & P | 1.335E+00 | 1.00E+03 | G |
| | | 880.51 | -9.189E-03 | % P | 9.703E-01 | 2.90E+03 | G |
| | | 226.87 | -6.142E-03 | & P | 7.080E-01 | 1.00E+03 | G |
| | | 831.10 | -2.672E-01 | - | 1.462E+00 | 1.56E+02 | G |
| | | 808.10 | -2.156E-01 | - | 1.452E+00 | 1.90E+02 | G |
| | | 99.70 | -2.327E-01 | - | 7.604E-01 | 9.70E+01 | G |
| | | 699.10 | -1.907E-01 | - P | 1.258E+00 | 1.91E+02 | G |
| | | 898.60 | -6.168E-02 | % P | 1.876E+00 | 1.06E+04 | G |
| | | 1394.10 | -8.814E-03 | % | 1.756E+00 | 4.88E+03 | G |
| CS-137 | -5.2989E-03 | | | | | | |
| | | 661.66 | -5.299E-03 | &(P | 4.296E-02 | 3.12E+02 | G |
| CO-60 | -1.7562E-02 | | | | | | |
| | | 1173.24 | -1.756E-02 | ?(P | 1.080E-01 | 2.22E+02 | K |
| | | 1332.50 | -5.463E-03 | & P | 1.145E-01 | 1.27E+03 | K |
| EU-152 | 8.0841E-02 | | | | | | |
| | | 40.12 | 5.569E-02 | ?( | 2.355E-01 | 1.24E+02 | G |
| | | 121.78 | 2.293E-02 | ?( | 9.563E-02 | 1.21E+02 | G |
| | | 344.30 | -2.472E-02 | - | 1.766E-01 | 2.04E+02 | G |
| | | 1408.08 | 1.010E-03 | % | 3.314E-01 | 8.06E+03 | G |
| | | 39.52 | 1.224E-01 | &( | 4.332E-01 | 1.04E+02 | G |
| | | 964.00 | -3.433E-02 | - P | 4.479E-01 | 6.16E+02 | G |
| | | 1112.07 | 1.219E-01 | ?( | 6.552E-01 | 1.52E+02 | G |
| | | 778.90 | 0.000E+00 | & | 5.614E-01 | 1.00E+03 | G |
| | | 1085.80 | -1.663E-01 | + | 8.814E-01 | 1.50E+02 | G |
| | | 45.40 | -1.263E-01 | & | 6.722E-01 | 1.55E+02 | G |
| | | 244.67 | 1.929E-01 | &( | 3.798E-01 | 6.03E+01 | G |
| | | 867.39 | 1.698E-01 | &(P | 1.497E+00 | 1.98E+02 | G |
| EU-154 | 7.5398E-02 | | | | | | |
| | | 123.10 | 1.757E-02 | &( | 7.172E-02 | 1.19E+02 | G |
| | | 1274.80 | 6.659E-03 | ?( | 2.441E-01 | 9.69E+02 | G |
| | | 723.30 | -8.758E-02 | + | 4.082E-01 | 1.35E+02 | G |
| | | 1004.80 | 8.434E-03 | % P | 4.493E-01 | 7.46E+02 | G |
| | | 43.00 | 1.986E-01 | ( | 3.766E-01 | 5.81E+01 | G |
| | | 873.20 | -3.337E-02 | % P | 5.713E-01 | 1.70E+03 | G |
| | | 996.30 | -7.185E-02 | + | 7.777E-01 | 3.00E+02 | G |
| | | 42.31 | 3.359E-01 | &( | 7.796E-01 | 6.99E+01 | G |
| | | 248.04 | 1.324E-01 | ?( | 5.594E-01 | 1.23E+02 | G |
| | | 591.70 | -1.186E-01 | + | 1.293E+00 | 3.04E+02 | G |
| | | 48.70 | 2.871E-01 | ?( | 1.003E+00 | 1.02E+02 | G |
| | | 756.70 | -3.752E-02 | % P | 1.238E+00 | 1.12E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** SUMMARY OF NUCLIDES IN SAMPLE *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 4.0255E-02 | 7.2701E-02 | 7.2759E-02 | 0.339E+00 |
| RA-226 | #B | 0.0000E+00 | 7.3665E-01 | 7.3665E-01 | 0.136E+01 |
| Ra-228 | | 4.1041E-01 | 1.2015E-01 | 1.2314E-01 | 0.223E+00 |
| Am-241 | #A | -1.6411E-02 | 8.1470E-02 | 8.1477E-02 | 0.141E+00 |
| PB-210 | #A | -1.1701E-01 | 9.7011E-01 | 9.7018E-01 | 0.141E+01 |
| U-238 | #A | 1.0956E+00 | 5.1460E-01 | 5.2164E-01 | 0.133E+01 |
| K-40 | | 1.3859E+01 | 1.7919E+00 | 2.1480E+00 | 0.112E+01 |
| PB-214 | | 4.3885E-01 | 1.1610E-01 | 1.2400E-01 | 0.131E+00 |
| BI-214 | | 5.1190E-01 | 1.3924E-01 | 1.4417E-01 | 0.129E+00 |
| BI-212 | #A | 3.9829E-01 | 2.9336E-01 | 2.9475E-01 | 0.440E+00 |
| PB-212 | | 4.3488E-01 | 1.0051E-01 | 1.0759E-01 | 0.111E+00 |
| TL-208 | | 1.0340E-01 | 5.5144E-02 | 5.5706E-02 | 0.729E-01 |
| PA-234 | #A | 6.5936E-02 | 7.6731E-02 | 7.6888E-02 | 0.125E+00 |
| CS-137 | #A | -5.2989E-03 | 4.4828E-02 | 4.4829E-02 | 0.430E-01 |
| CO-60 | #B | -1.7562E-02 | 9.6558E-02 | 9.6561E-02 | 0.108E+00 |
| EU-152 | #A | 8.0841E-02 | 9.5314E-02 | 9.5749E-02 | 0.236E+00 |
| EU-154 | #C | 7.5398E-02 | 8.7649E-02 | 8.7798E-02 | 0.717E-01 |

```
     ORTEC g v - i (3263) Env32  G53W4.24  4/19/2016 12:25:38
American Radiation Services     Spectrum name: ARS05256.An1


  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity ( 1120.1 to  1998.6 keV)     1.620E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00564-22 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-006 |
| AnalysisBatch | ARS1-B16-00564 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 006 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.1910E-02 | pCi/g | 4.2071E-02 | 5.8000E-02 | 2.9000E-02 | | | |
| **RA-226** | 1.1002E+00 | pCi/g | 7.5761E-01 | 1.1100E+00 | 5.5500E-01 | | | |
| **RA-228** | 2.3210E-01 | pCi/g | 1.3517E-01 | 2.2200E-01 | 1.1100E-01 | | | |
| **AM-241** | -3.3208E-02 | pCi/g | 8.5070E-02 | 1.4400E-01 | 7.2000E-02 | | | |
| **PB-210** | 8.2972E-02 | pCi/g | 9.8664E-01 | 1.8000E+00 | 9.0000E-01 | | | |
| **U-238** | 7.6383E-01 | pCi/g | 5.4702E-01 | 1.2800E+00 | 6.4000E-01 | | | |
| **K-40** | 1.0906E+01 | pCi/g | 1.5737E+00 | 4.5300E-01 | 2.2650E-01 | | | |
| **PB-214** | 2.5738E-01 | pCi/g | 8.5824E-02 | 1.1600E-01 | 5.8000E-02 | | | |
| **BI-214** | 3.4150E-01 | pCi/g | 1.2225E-01 | 1.3800E-01 | 6.9000E-02 | | | |
| **BI-212** | 3.8455E-02 | pCi/g | 1.4969E-01 | 4.4000E-01 | 2.2000E-01 | | | |
| **PB-212** | 2.9144E-01 | pCi/g | 9.0643E-02 | 1.0900E-01 | 5.4500E-02 | | | |
| **TL-208** | 1.5604E-01 | pCi/g | 5.9085E-02 | 6.5100E-02 | 3.2550E-02 | | | |
| **PA-234** | 2.3487E-02 | pCi/g | 6.5505E-02 | 1.2700E-01 | 6.3500E-02 | | | |
| **CS-137** | -9.5220E-03 | pCi/g | 3.7925E-02 | 6.8100E-02 | 3.4050E-02 | | | |
| **CO-60** | 2.7681E-03 | pCi/g | 3.5515E-02 | 6.8300E-02 | 3.4150E-02 | | | |
| **EU-152** | 4.4952E-02 | pCi/g | 9.1500E-02 | 2.3300E-01 | 1.1650E-01 | | | |
| **EU-154** | 3.9404E-02 | pCi/g | 7.7386E-02 | 7.7300E-02 | 3.8650E-02 | | | |
| **Total Gamma** | 1.4372E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.2132E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01220.An1

Sample description
Batch ID: 16-00564-22
SDG: ARS1-16-00671-006 Tech: WJS

Spectrum Filename: C:\User\ARS01220.An1

Acquisition information
Start time: 19-Apr-2016 11:56:05
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 4.0413E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 4.0413E+02) =
2.4745E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01220.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2175

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.54 | 9. | 133.81 | 0.90 | 2.148E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| 43.23 | 8. | 141.75 | 0.90 | 2.358E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| 46.33 | 2. | 60.57 | 0.90 | 2.560E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.35 | 27. | 29.36 | 0.39 | 3.625E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 77.11 | 91. | 18.07 | 0.85 | 4.306E-02 | | | | |
| 92.42 | 19. | 76.61 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.84 | 29. | 40.83 | 0.94 | 4.684E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 119.02 | 2. | 444.21 | 0.96 | 4.659E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| 141.90 | 1. | 287.06 | 0.98 | 4.380E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.87 | 5. | 184.21 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.77 | 50. | 22.57 | 1.02 | 3.768E-02 | 185.72 | 54.000 | 9.145E-02 | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 185.93 | 39. | 23.13 | 1.01 | 3.763E-02 | 185.72 | 54.000 | PBC<MDA | U235 |
| | | | | | 186.10 | 3.500 | PBC<MDA | RA226 |
| 229.81 | 4. | 220.54 | 1.05 | 3.262E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.79 | 118. | 13.55 | 0.79 | 3.138E-02 | 238.63 | 43.100 | 2.914E-01 | PB212 |
| 277.24 | 11. | 83.56 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.57 | 43. | 23.39 | 1.10 | 2.661E-02 | 295.21 | 18.500 | 3.255E-01 | PB214 |
| 299.32 | 13. | 63.97 | 1.11 | 2.627E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.47 | 31. | 27.55 | 1.14 | 2.392E-02 | 338.40 | 12.010 | 3.984E-01 | Ra228 |
| 352.28 | 62. | 17.84 | 1.15 | 2.318E-02 | 351.92 | 35.800 | 2.571E-01 | PB214 |
| 510.94 | 33. | 21.25 | 0.80 | 1.747E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.53 | 55. | 16.86 | 1.26 | 1.583E-02 | 583.14 | 86.000 | 1.513E-01 | TL208 |
| 609.73 | 62. | 15.51 | 1.06 | 1.532E-02 | 609.31 | 44.791 | 3.363E-01 | BI214 |
| 732.70 | 3. | 186.31 | 1.43 | 1.337E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 783.99 | 1. | 723.40 | 1.47 | 1.270E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |

0.88 Spectrum name: ARS01220.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 911.65 | 19. | 30.82 | 1.56 | 1.135E-02 | 911.07 | 29.000 | PBC<MDA | Ra228 |
| 946.62 | 2. | 195.20 | 1.58 | 1.103E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 963.71 | 4. | 138.77 | 1.59 | 1.087E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| 969.45 | 8. | 64.75 | 1.60 | 1.083E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 997.84 | 2. | 296.42 | 1.62 | 1.060E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1001.89 | 4. | 98.14 | 1.62 | 1.053E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.87 | 5. | 101.62 | 1.68 | 9.900E-03 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1171.35 | 1. | 641.51 | 1.73 | 9.297E-03 | 1173.24 | 99.900 | HL>Cutoff | CO60 |
| 1377.20 | 4. | 122.51 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1461.43 | 242. | 6.40 | 1.67 | 7.690E-03 | 1460.75 | 10.700 | 1.091E+01 | K40 |
| 1621.36 | 1. | 194.60 | 2.00 | 6.976E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1765.01 | 8. | 40.02 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 307.43 | 77.11 | 78. | 91. | 0.051 | 36.14 | 0.853 | PB-212 | |
| 1408.44 | 352.28 | 75. | 8. | 0.004 | 321.88 | 1.150 | CO-57 | c |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.05 | 39.54 | 62. | 9. | 0.005 | 267.62 | 0.897s |
| EU-152 | 159.50 | 40.15 | 68. | -3. | -0.002 | 829.24 | 0.897s |
| EU-154 | 164.48 | 41.39 | 64. | -8. | -0.005 | 278.12 | 0.899s |
| EU-154 | 171.82 | 43.23 | 67. | 8. | 0.005 | 283.50 | 0.899s |
| EU-152 | 177.22 | 44.58 | 98. | -11. | -0.006 | 251.79 | 0.901s |
| PB-210 | 184.23 | 46.33 | 101. | 2. | 0.001 | 121.15 | 0.902s |
| EU-154 | 191.77 | 48.21 | 84. | -5. | -0.003 | 522.40 | 0.904s |
| Am-241 | 236.88 | 59.48 | 92. | -11. | -0.006 | 256.09 | 0.913s |
| U-238 | 252.34 | 63.35 | 97. | 27. | 0.015 | 58.71 | 0.392s |
| U-238 | 368.51 | 92.38 | 120. | 19. | 0.010 | 153.21 | 0.940D |
| U-238 | 370.20 | 92.80 | 87. | 29. | 0.016 | 81.66 | 0.941D |
| PA-234 | 376.76 | 94.44 | 127. | -14. | -0.008 | 230.54 | 0.942 |
| PA-234 | 392.23 | 98.31 | 66. | -5. | -0.003 | 634.12 | 0.945s |
| PA-234 | 401.10 | 100.52 | 74. | -8. | -0.004 | 330.35 | 0.946s |
| PA-234 | 443.02 | 111.00 | 120. | -3. | -0.002 | 1149.31 | 0.956s |

0.88 Spectrum name: ARS01220.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 475.10 | 119.02 | 30. | 2. | 0.001 | 888.42 | 0.964s |
| PA-234 | 522.39 | 130.83 | 88. | -8. | -0.004 | 384.08 | 0.972s |
| U-235 | 650.57 | 162.87 | 54. | 5. | 0.003 | 368.41 | 0.998s |
| U-235 | 742.19 | 185.77 | 39. | 50. | 0.028 | 45.15 | 1.016 |
| RA-226 | 742.84 | 185.93 | 62. | 39. | 0.022 | 46.26 | 1.014 |
| PA-234 | 918.41 | 229.81 | 32. | 4. | 0.002 | 441.08 | 1.049s |
| PB-212 | 954.34 | 238.79 | 63. | 106. | 0.059 | 27.10 | 0.787s |
| PB-214 | 971.48 | 243.07 | 58. | -4. | -0.002 | 627.87 | 1.061s |
| EU-152 | 973.61 | 243.60 | 48. | -8. | -0.004 | 271.34 | 1.064s |
| EU-154 | 990.04 | 247.71 | 38. | -7. | -0.004 | 264.31 | 1.066s |
| TL-208 | 1108.19 | 277.24 | 36. | 11. | 0.006 | 167.12 | 1.089 |
| PB-214 | 1181.54 | 295.57 | 41. | 43. | 0.024 | 46.77 | 1.104s |
| PB-212 | 1196.53 | 299.32 | 31. | 13. | 0.007 | 127.94 | 1.107 |
| Ra-228 | 1353.19 | 338.47 | 25. | 31. | 0.017 | 55.09 | 1.137s |
| PB-214 | 1408.11 | 352.20 | 25. | 50. | 0.028 | 35.88 | 1.148 |
| TL-208 | 2043.17 | 510.94 | 46. | 33. | 0.018 | 42.50 | 0.797s |
| TL-208 | 2333.55 | 583.53 | 21. | 55. | 0.031 | 33.73 | 1.256 |
| BI-214 | 2438.36 | 609.73 | 24. | 62. | 0.035 | 31.02 | 1.059 |
| CS-137 | 2642.88 | 660.86 | 18. | -3. | -0.002 | 398.26 | 1.381s |
| PA-234 | 2788.42 | 697.24 | 22. | -2. | -0.001 | 653.71 | 1.409s |
| PA-234 | 2930.26 | 732.70 | 15. | 3. | 0.002 | 372.62 | 1.433s |
| EU-154 | 3024.24 | 756.20 | 21. | -3. | -0.002 | 458.65 | 1.450s |
| BI-214 | 3071.71 | 768.07 | 18. | -4. | -0.002 | 336.99 | 1.458s |
| BI-212 | 3135.39 | 783.99 | 18. | 1. | 0.000 | 1446.79 | 1.470s |
| EU-152 | 3473.22 | 868.46 | 15. | -4. | -0.002 | 302.03 | 1.528s |
| PA-234 | 3525.22 | 881.46 | 12. | -3. | -0.001 | 501.57 | 1.537s |
| PA-234 | 3527.41 | 882.00 | 11. | -2. | -0.001 | 562.33 | 1.539s |
| Ra-228 | 3645.97 | 911.65 | 13. | 19. | 0.011 | 61.65 | 1.558s |
| PA-234 | 3785.82 | 946.62 | 9. | 2. | 0.001 | 390.39 | 1.582s |
| PA-234 | 3795.35 | 949.00 | 9. | 0. | 0.000 | 2000.00 | 1.584s |
| EU-152 | 3854.17 | 963.71 | 13. | 4. | 0.002 | 277.53 | 1.594s |
| Ra-228 | 3870.30 | 967.74 | 34. | -12. | -0.007 | 148.91 | 1.594s |
| Ra-228 | 3877.14 | 969.45 | 15. | 8. | 0.004 | 129.51 | 1.597s |
| EU-154 | 3990.65 | 997.84 | 10. | 2. | 0.001 | 592.85 | 1.616s |
| EU-154 | 4006.88 | 1001.89 | 5. | 4. | 0.002 | 196.27 | 1.621s |
| EU-152 | 4342.71 | 1085.87 | 12. | 5. | 0.003 | 203.24 | 1.675s |
| BI-214 | 4462.64 | 1115.86 | 14. | -5. | -0.003 | 294.79 | 1.698s |
| CO-60 | 4684.52 | 1171.35 | 10. | 1. | 0.000 | 1283.03 | 1.732s |
| BI-214 | 4951.14 | 1238.03 | 18. | -2. | -0.001 | 540.89 | 1.773s |
| CO-60 | 5328.88 | 1332.50 | 14. | 0. | 0.000 | 2000.00 | 1.832s |
| BI-214 | 5507.60 | 1377.20 | 11. | 4. | 0.002 | 245.02 | 1.860s |
| PA-234 | 5574.47 | 1393.93 | 13. | -2. | -0.001 | 456.44 | 1.870s |
| EU-152 | 5625.60 | 1406.72 | 15. | -3. | -0.002 | 366.24 | 1.878s |
| K-40 | 5844.36 | 1461.43 | 2. | 242. | 0.134 | 12.80 | 1.672 |
| BI-212 | 6483.69 | 1621.36 | 2. | 1. | 0.001 | 389.20 | 2.003s |
| BI-214 | 7057.92 | 1765.01 | 4. | 8. | 0.005 | 80.03 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

0.88 Spectrum name: ARS01220.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 9.1910E-02 | | | | | |
| | | | 185.72 | 9.145E-02 | ( | 5.799E-02 2.26E+01 | G |
| | | | 143.76 | 4.782E-03 | % P | 2.829E-01 2.87E+02 | G |
| | | | 205.31 | -4.228E-02 | % P | 8.775E-01 4.42E+03 | G |
| | | | 163.35 | 9.723E-02 | &(P | 7.156E-01 1.84E+02 | G |
| RA-226 | | 1.1002E+00 | | | | | |
| | | | 186.10 | 1.100E+00 | (P | 1.112E+00 2.31E+01 | G |
| Ra-228 | | 2.3210E-01 | | | | | |
| | | | 911.07 | 2.138E-01 | ?(P | 2.222E-01 3.08E+01 | G |
| | | | 968.90 | 1.481E-01 | ?(P | 4.051E-01 6.48E+01 | G |
| | | | 338.40 | 3.984E-01 | (P | 3.371E-01 2.75E+01 | G |
| | | | 964.60 | -7.485E-01 | & | 1.862E+00 7.45E+01 | G |
| Am-241 | T | -3.3208E-02 | | | | | |
| | | | 59.54 | -3.321E-02 | ?( | 1.444E-01 1.28E+02 | G K |
| PB-210 | | 8.2972E-02 | | | | | |
| | | | 46.52 | 8.297E-02 | ?(P | 1.801E+00 6.06E+01 | G |
| U-238 | | 7.6383E-01 | | | | | |
| | | | 63.29 | 7.059E-01 | (P | 1.278E+00 2.94E+01 | G |
| | | | 92.80 | 7.638E-01 | } P | 1.223E+00 4.08E+01 | G |
| | | | 92.38 | 5.833E-01 | } P | 1.663E+00 7.66E+01 | G |
| K-40 | | 1.0906E+01 | | | | | |
| | | | 1460.75 | 1.091E+01 | (P | 4.527E-01 6.40E+00 | G |
| PB-214 | | 2.5738E-01 | | | | | |
| | | | 351.92 | 2.222E-01 | (P | 1.161E-01 1.79E+01 | G |
| | | | 295.21 | 3.255E-01 | (P | 2.451E-01 2.34E+01 | G |
| | | | 241.98 | -5.619E-02 | - P | 6.084E-01 3.14E+02 | G |
| BI-214 | | 3.4150E-01 | | | | | |
| | | | 609.31 | 3.363E-01 | (P | 1.380E-01 1.55E+01 | G |
| | | | 1764.49 | 3.173E-01 | ?(P | 4.598E-01 4.00E+01 | G |
| | | | 1120.29 | -1.428E-01 | - P | 5.238E-01 1.47E+02 | G |
| | | | 1238.11 | -1.639E-01 | - | 1.610E+00 2.70E+02 | G |
| | | | 768.36 | -2.252E-01 | - | 1.353E+00 1.68E+02 | G |
| | | | 1377.67 | 4.960E-01 | ?( | 2.155E+00 1.23E+02 | G |
| | | | 934.06 | -6.910E-04 | % P | 1.828E+00 1.00E+03 | G |

0.88 Spectrum name: ARS01220.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| BI-212 | 3.8455E-02 | | | | | | |
| | | 727.17 | -2.389E-02 | %(P | 4.401E-01 | 1.30E+03 | G |
| | | 1620.56 | 2.447E-01 | &( | 1.920E+00 | 1.95E+02 | G |
| | | 785.42 | 1.227E-01 | &( | 3.287E+00 | 7.23E+02 | G |
| PB-212 | 2.9144E-01 | | | | | | |
| | | 238.63 | 2.914E-01 | (P | 1.089E-01 | 1.36E+01 | G |
| | | 300.09 | 5.626E-01 | + P | 1.247E+00 | 6.40E+01 | G |
| TL-208 | 1.5604E-01 | | | | | | |
| | | 583.14 | 1.513E-01 | (P | 6.508E-02 | 1.69E+01 | G |
| | | 510.72 | 3.118E-01 | + P | 3.245E-01 | 2.13E+01 | G |
| | | 860.47 | -1.285E-02 | & P | 5.882E-01 | 2.63E+03 | G |
| | | 277.36 | 2.187E-01 | (P | 6.294E-01 | 8.36E+01 | G |
| | | 763.30 | 8.219E-02 | % P | 3.559E+00 | 1.04E+03 | G |
| PA-234 | 2.3487E-02 | | | | | | |
| | | 98.44 | -1.542E-02 | ?(P | 1.271E-01 | 3.17E+02 | G |
| | | 946.00 | 3.043E-02 | &(P | 2.792E-01 | 1.95E+02 | G |
| | | 131.28 | -3.182E-02 | + P | 1.899E-01 | 1.92E+02 | G |
| | | 94.67 | -7.252E-02 | & | 2.819E-01 | 1.15E+02 | G |
| | | 883.24 | -4.615E-02 | + | 4.839E-01 | 2.81E+02 | G |
| | | 926.70 | -2.619E-02 | % P | 2.221E-01 | 1.00E+03 | G |
| | | 569.26 | -1.734E-02 | % P | 6.047E-01 | 1.00E+03 | G |
| | | 111.00 | -2.488E-02 | + | 4.934E-01 | 5.75E+02 | G |
| | | 733.00 | 8.983E-02 | &(P | 6.874E-01 | 1.86E+02 | G |
| | | 949.00 | 0.000E+00 | - | 7.325E-01 | 1.00E+03 | G |
| | | 880.51 | -1.268E-01 | + P | 9.325E-01 | 2.51E+02 | G |
| | | 226.87 | 6.561E-02 | ?( | 5.110E-01 | 2.21E+02 | G |
| | | 831.10 | -3.821E-02 | % P | 1.578E+00 | 1.00E+03 | G |
| | | 808.10 | -2.038E-02 | % | 1.232E+00 | 1.60E+03 | G |
| | | 99.70 | -1.259E-01 | + | 7.134E-01 | 1.65E+02 | G |
| | | 699.10 | -1.208E-01 | + | 1.430E+00 | 3.27E+02 | G |
| | | 898.60 | -2.440E-03 | % P | 5.966E-01 | 1.00E+03 | G |
| | | 1394.10 | -2.817E-01 | + | 2.352E+00 | 2.28E+02 | G |
| CS-137 | -9.5220E-03 | | | | | | |
| | | 661.66 | -9.522E-03 | ?( | 6.812E-02 | 1.99E+02 | G |
| CO-60 | 2.7681E-03 | | | | | | |
| | | 1173.24 | 2.768E-03 | ?( | 6.832E-02 | 6.42E+02 | K |
| | | 1332.50 | 0.000E+00 | & | 9.027E-02 | 1.00E+03 | K |
| EU-152 | 4.4952E-02 | | | | | | |
| | | 40.12 | -1.609E-02 | &( | 2.329E-01 | 4.15E+02 | G |
| | | 121.78 | 4.864E-03 | ?( | 7.757E-02 | 4.44E+02 | G |
| | | 344.30 | -2.201E-03 | & | 1.416E-01 | 1.74E+03 | G |

0.88 Spectrum name: ARS01220.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1408.08 | -6.966E-02 | + | 4.597E-01 | 1.83E+02 | G |
| | | 39.52 | 9.332E-02 | ?( | 4.272E-01 | 1.34E+02 | G |
| | | 964.00 | 9.316E-02 | &( | 4.607E-01 | 1.39E+02 | G |
| | | 1112.07 | 4.835E-04 | % | 6.156E-01 | 3.39E+04 | G |
| | | 778.90 | -8.550E-03 | % | 5.220E-01 | 1.65E+03 | G |
| | | 1085.80 | 1.933E-01 | ?( | 6.840E-01 | 1.02E+02 | G |
| | | 45.40 | -1.891E-01 | & | 8.073E-01 | 1.26E+02 | G |
| | | 244.67 | -1.190E-01 | + | 5.555E-01 | 1.36E+02 | G |
| | | 867.39 | -2.935E-01 | + | 1.580E+00 | 1.51E+02 | G |
| EU-154 | 3.9404E-02 | | | | | | |
| | | 123.10 | 9.157E-04 | %( | 7.731E-02 | 2.39E+03 | G |
| | | 1274.80 | -3.257E-03 | % | 2.293E-01 | 1.84E+03 | G |
| | | 723.30 | 6.447E-03 | % | 2.560E-01 | 1.04E+03 | G |
| | | 1004.80 | 7.444E-02 | ?( | 2.586E-01 | 9.81E+01 | G |
| | | 43.00 | 1.014E-01 | ?( | 4.918E-01 | 1.42E+02 | G |
| | | 873.20 | 1.293E-02 | % | 5.450E-01 | 1.11E+03 | G |
| | | 996.30 | 5.146E-02 | ?( | 5.729E-01 | 2.96E+02 | G |
| | | 42.31 | -1.847E-01 | + | 8.792E-01 | 1.39E+02 | G |
| | | 248.04 | -1.277E-01 | & | 5.824E-01 | 1.32E+02 | G |
| | | 591.70 | -1.881E-02 | % | 1.159E+00 | 1.65E+03 | G |
| | | 48.70 | -1.664E-01 | + | 1.501E+00 | 2.61E+02 | G |
| | | 756.70 | -2.046E-01 | + | 1.684E+00 | 2.29E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |

0.88 Spectrum name: ARS01220.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | # | 9.1910E-02 | 4.1494E-02 | 4.2071E-02 | 0.580E-01 |
| RA-226 | A | 1.1002E+00 | 7.5433E-01 | 7.5761E-01 | 0.111E+01 |
| Ra-228 | # | 2.3210E-01 | 1.3435E-01 | 1.3517E-01 | 0.222E+00 |
| Am-241 | #A | -3.3208E-02 | 8.5042E-02 | 8.5070E-02 | 0.144E+00 |
| PB-210 | #A | 8.2972E-02 | 9.8660E-01 | 9.8664E-01 | 0.180E+01 |
| U-238 | A | 7.6383E-01 | 5.4377E-01 | 5.4702E-01 | 0.128E+01 |
| K-40 | | 1.0906E+01 | 1.4106E+00 | 1.5737E+00 | 0.453E+00 |
| PB-214 | # | 2.5738E-01 | 8.2762E-02 | 8.5824E-02 | 0.116E+00 |
| BI-214 | | 3.4150E-01 | 1.2039E-01 | 1.2225E-01 | 0.138E+00 |
| BI-212 | #A | 3.8455E-02 | 1.4967E-01 | 1.4969E-01 | 0.440E+00 |
| PB-212 | | 2.9144E-01 | 8.7817E-02 | 9.0643E-02 | 0.109E+00 |
| TL-208 | | 1.5604E-01 | 5.8200E-02 | 5.9085E-02 | 0.651E-01 |
| PA-234 | #A | 2.3487E-02 | 6.5483E-02 | 6.5505E-02 | 0.127E+00 |
| CS-137 | #A | -9.5220E-03 | 3.7922E-02 | 3.7925E-02 | 0.681E-01 |
| CO-60 | #A | 2.7681E-03 | 3.5515E-02 | 3.5515E-02 | 0.683E-01 |
| EU-152 | #A | 4.4952E-02 | 9.1362E-02 | 9.1500E-02 | 0.233E+00 |
| EU-154 | #A | 3.9404E-02 | 7.7340E-02 | 7.7386E-02 | 0.773E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 186.0 to 2000.7 keV) 1.360E+01 pCi/g

The library has energies which are not separable.

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-08 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-007 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 007 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.6753E-03 | pCi/g | 9.1259E-02 | 3.2400E-01 | 1.6200E-01 | | | |
| **RA-226** | 1.1146E+00 | pCi/g | 5.6443E-01 | 8.5200E-01 | 4.2600E-01 | | | |
| **RA-228** | 8.7648E-01 | pCi/g | 2.0537E-01 | 1.6000E-01 | 8.0000E-02 | | | |
| **AM-241** | 1.6045E-02 | pCi/g | 9.6519E-02 | 1.4100E-01 | 7.0500E-02 | | | |
| **PB-210** | 8.4300E-01 | pCi/g | 8.2145E-01 | 1.3200E+00 | 6.6000E-01 | | | |
| **U-238** | 9.4130E-01 | pCi/g | 4.5221E-01 | 1.3200E+00 | 6.6000E-01 | | | |
| **K-40** | 1.8931E+01 | pCi/g | 1.9310E+00 | 5.8300E-01 | 2.9150E-01 | | | |
| **PB-214** | 7.5119E-01 | pCi/g | 1.3597E-01 | 1.1000E-01 | 5.5000E-02 | | | |
| **BI-214** | 7.3447E-01 | pCi/g | 1.3531E-01 | 1.0200E-01 | 5.1000E-02 | | | |
| **BI-212** | 8.1147E-02 | pCi/g | 4.1543E-01 | 5.5800E-01 | 2.7900E-01 | | | |
| **PB-212** | 7.5827E-01 | pCi/g | 1.0208E-01 | 8.5000E-02 | 4.2500E-02 | | | |
| **TL-208** | 2.9614E-01 | pCi/g | 6.0364E-02 | 5.0500E-02 | 2.5250E-02 | | | |
| **PA-234** 3.719E-02 ~~1.8384E-01~~ | | pCi/g | 9.3317E-02 | 1.3100E-01 | 6.5500E-02 | | | |
| **CS-137** | 4.6303E-02 | pCi/g | 3.6959E-02 | 4.4400E-02 | 2.2200E-02 | | | |
| **CO-60** | 1.9754E-02 | pCi/g | 2.2548E-02 | 7.4900E-02 | 3.7450E-02 | | | |
| **EU-152** | 6.5081E-02 | pCi/g | 7.6880E-02 | 2.0100E-01 | 1.0050E-01 | | | |
| **EU-154** | 7.4810E-02 | pCi/g | 1.2202E-01 | 7.6800E-02 | 3.8400E-02 | | | |
| **Total Gamma** | 2.5740E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 7.3583E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  5/5/2016 10:56:01 AM
                                Spectrum name: ARS08325.An1

Sample description
     Batch ID:  16-00698-08
     SDG:  ARS1-16-00671-007  Tech:  WJS

Spectrum Filename: C:\User\ARS08325.An1

Acquisition information
       Start time:                5/5/2016 10:10:40 AM
       Live time:               2700
       Real time:               2714
       Dead time:                  0.50 %
       Detector ID:                   9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:             Env32   G702W050
       Start channel:             100 (    25.46keV )
       Stop channel:             8000 (  1999.20keV )
       Peak rejection level:     1000.000%
       Peak search sensitivity:     1
       Sample Size:                 3.3745E+02 +/- 0.000E+00%
       Activity scaling factor:     1.0000E+06/(  1.0000E+00*  3.3745E+02) =
                                    2.9634E+03
       Detection limit method:      Reg. Guide 4.16 Method
       Random error:                1.0000000E+00
       Systematic error:            1.0000000E+00
       Fraction Limit:             60.000%
       Background width:            average of five points.
       Half lives decay limit:     12.000
```

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1631

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.67 | 27. | 58.79 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 1.012E-01 | EU152 |
| | | | | | 40.12 | 30.000 | 1.012E-01 | EU152 |
| | | | | | 39.52 | 16.000 | 1.932E-01 | EU152 |
| 43.45 | 4. | 467.24 | 0.97 | 2.866E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 3.292E-02 | EU154 |
| | | | | | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.21 | 5. | 336.21 | 0.97 | 3.056E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | PBC<MDA | EU152 |
| 45.38 | 6. | 224.70 | 0.97 | 3.037E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| 47.20 | 42. | 44.72 | 0.56 | 3.135E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 48.41 | 16. | 110.95 | 0.98 | 3.332E-02 | 48.70 | 4.200 | PBC<MDA | EU154 |
| | | | | | 48.70 | 4.200 | PBC<MDA | EU154 |
| 59.08 | 8. | 300.76 | 0.99 | 4.205E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| | | | | | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.33 | 14. | 194.92 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 73.03 | 21. | 99.47 | 1.00 | 5.041E-02 | | | | |
| 74.88 | 237. | 10.80 | 1.01 | 5.131E-02 | | | | |
| 77.19 | 292. | 9.14 | 1.01 | 5.233E-02 | | | | |
| 81.12 | 8. | 118.96 | 0.22 | 5.384E-02 | | | | |
| 87.18 | 97. | 22.16 | 0.97 | 5.570E-02 | | | | |
| 92.98 | 112. | 20.59 | 0.47 | 5.696E-02 | 92.38 | 2.570 | 2.268E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.905E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.905E+00 | U238 |
| 94.21 | 76. | 27.52 | 1.03 | 5.724E-02 | 94.67 | 15.500 | 2.536E-01 | PA234 |
| | | | | | 94.67 | 15.500 | 2.536E-01 | PA234 |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 98.94 | 18. | 121.20 | 1.03 | 5.774E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 1.981E-01 | PA234 |
| | | | | | 98.44 | 25.100 | 3.719E-02 | PA234 |
| 99.20 | 34. | 64.68 | 1.03 | 5.787E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 3.654E-01 | PA234 |
| | | | | | 99.70 | 4.700 | 3.654E-01 | PA234 |
| 102.47 | 35. | 49.00 | 0.46 | 5.809E-02 | | | | |
| 108.32 | 43. | 40.80 | 1.00 | 5.833E-02 | | | | |
| 122.85 | 18. | 116.28 | 1.06 | 5.780E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| | | | | | 123.10 | 40.460 | PBC<MDA | EU154 |
| 131.31 | 9. | 240.37 | 1.07 | 5.703E-02 | 131.28 | 20.000 | PBC<MDA | PA234 |
| | | | | | 131.28 | 20.000 | 2.340E-02 | PA234 |
| 133.35 | 13. | 109.60 | 0.46 | 5.680E-02 | | | | |
| 154.34 | 21. | 85.53 | 0.61 | 5.397E-02 | | | | |
| 169.02 | 16. | 82.92 | 0.58 | 5.174E-02 | | | | |
| 185.94 | 80. | 22.16 | 0.92 | 4.916E-02 | 185.72 | 57.200 | 8.465E-02 | U235 |
| | | | | | 186.21 | 3.640 | 1.332E+00 | RA226 |
| 205.29 | 2. | 932.17 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 209.23 | 51. | 35.30 | 0.47 | 4.581E-02 | | | | |
| 221.33 | 6. | 182.57 | 0.27 | 4.420E-02 | | | | |
| 238.53 | 464. | 5.61 | 1.18 | 4.208E-02 | 238.63 | 43.100 | 7.584E-01 | PB212 |
| 241.54 | 107. | 17.92 | 1.19 | 4.173E-02 | 241.98 | 7.500 | 1.006E+00 | PB214 |
| 244.40 | 18. | 93.10 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.648E-01 | EU152 |
| 274.67 | 23. | 51.92 | 0.41 | 3.820E-02 | | | | |
| 277.61 | 21. | 64.12 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.97 | 186. | 10.14 | 1.25 | 3.634E-02 | 295.21 | 18.500 | 8.216E-01 | PB214 |
| 299.92 | 37. | 40.44 | 0.40 | 3.592E-02 | 300.09 | 3.270 | 9.450E-01 | PB212 |
| 338.09 | 128. | 13.58 | 0.77 | 3.300E-02 | 338.40 | 12.010 | 9.588E-01 | Ra228 |
| 344.50 | 2. | 917.07 | 1.29 | 3.257E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| | | | | | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.65 | 267. | 8.29 | 1.35 | 3.209E-02 | 351.92 | 35.800 | 6.835E-01 | PB214 |
| 392.71 | 7. | 140.70 | 0.52 | 2.967E-02 | | | | |
| 429.98 | 12. | 58.38 | 0.24 | 2.783E-02 | | | | |
| 437.13 | 21. | 53.81 | 0.66 | 2.751E-02 | | | | |
| 456.63 | 11. | 70.71 | 0.68 | 2.667E-02 | | | | |
| 463.07 | 54. | 26.23 | 0.74 | 2.641E-02 | | | | |
| 510.79 | 201. | 11.49 | 0.50 | 2.466E-02 | 510.72 | 22.500 | 5.860E-01 | TL208 |
| 569.34 | 4. | 344.67 | 1.52 | 2.287E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| | | | | | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.22 | 195. | 9.66 | 1.20 | 2.248E-02 | 583.14 | 86.000 | 2.991E-01 | TL208 |
| 598.20 | 13. | 56.22 | 1.55 | 2.209E-02 | | | | |
| 600.94 | 26. | 34.91 | 1.55 | 2.202E-02 | | | | |
| 609.43 | 234. | 8.45 | 1.34 | 2.181E-02 | 609.31 | 44.791 | 7.017E-01 | BI214 |
| 628.53 | 27. | 35.54 | 0.56 | 2.134E-02 | | | | |
| 643.09 | 14. | 53.86 | 0.30 | 2.101E-02 | | | | |
| 657.22 | 17. | 39.34 | 0.61 | 2.069E-02 | | | | |
| 661.97 | 27. | 39.85 | 1.61 | 2.059E-02 | 661.66 | 85.210 | 4.630E-02 | CS137 |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 661.66 | 85.210 | 4.630E-02 | CS137 |
| 727.51 | 62. | 19.97 | 2.06 | 1.927E-02 | 727.17 | 11.800 | 8.057E-01 | BI212 |
| 732.61 | 22. | 35.21 | 1.67 | 1.917E-02 | 733.00 | 8.500 | 4.014E-01 | PA234 |
| | | | | | 733.00 | 8.500 | 4.014E-01 | PA234 |
| 746.26 | 8. | 58.41 | 0.34 | 1.893E-02 | | | | |
| 756.11 | 5. | 235.12 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 1.929E-01 | EU154 |
| 763.30 | 10. | 93.63 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.36 | 27. | 29.36 | 1.71 | 1.855E-02 | 768.36 | 4.799 | 9.123E-01 | BI214 |
| 807.48 | 11. | 72.44 | 0.67 | 1.791E-02 | 808.10 | 4.900 | 3.720E-01 | PA234 |
| | | | | | 808.10 | 4.900 | 3.720E-01 | PA234 |
| 831.12 | 25. | 43.94 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 7.497E-01 | PA234 |
| 860.41 | 31. | 41.96 | 1.79 | 1.712E-02 | 860.47 | 12.000 | 4.471E-01 | TL208 |
| 866.56 | 4. | 293.26 | 1.80 | 1.702E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | 1.878E-01 | EU152 |
| 881.17 | 3. | 374.27 | 1.81 | 1.684E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 882.84 | 21. | 51.49 | 1.81 | 1.680E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | 3.066E-01 | PA234 |
| 911.22 | 133. | 11.24 | 1.53 | 1.642E-02 | 911.07 | 29.000 | 8.263E-01 | Ra228 |
| 926.10 | 2. | 431.66 | 1.85 | 1.622E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| | | | | | 926.70 | 11.000 | PBC<MDA | PA234 |
| 933.95 | 4. | 258.84 | 1.85 | 1.613E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 946.45 | 6. | 197.93 | 1.86 | 1.598E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| | | | | | 946.00 | 20.000 | 5.877E-02 | PA234 |
| 949.21 | 11. | 118.92 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.48 | 4. | 408.52 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 964.00 | 14.580 | PBC<MDA | EU152 |
| 964.89 | 28. | 32.53 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 9.620E-01 | Ra228 |
| 969.12 | 125. | 15.31 | 1.02 | 1.570E-02 | 968.90 | 17.460 | 1.344E+00 | Ra228 |
| 991.40 | 7. | 76.87 | 0.55 | 1.544E-02 | | | | |
| 996.42 | 5. | 177.94 | 1.91 | 1.538E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| | | | | | 996.30 | 10.700 | 9.611E-02 | EU154 |
| 1039.44 | 19. | 69.92 | 0.23 | 1.491E-02 | | | | |
| 1052.57 | 4. | 71.41 | 0.28 | 1.477E-02 | | | | |
| 1120.32 | 56. | 26.69 | 0.93 | 1.408E-02 | 1120.29 | 14.797 | 7.916E-01 | BI214 |
| 1165.08 | 11. | 37.48 | 0.80 | 1.366E-02 | | | | |
| 1172.59 | 2. | 638.63 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| | | | | | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1187.16 | 15. | 43.62 | 0.52 | 1.346E-02 | | | | |
| 1237.66 | 24. | 60.84 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1274.40 | 15. | 81.48 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| | | | | | 1274.80 | 35.500 | 9.749E-02 | EU154 |
| 1332.38 | 14. | 57.04 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |

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Spectrum name: ARS08325.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 1332.50 | 99.982 | 3.469E-02 | CO60 |
| 1375.77 | 25. | 23.27 | 0.68 | 1.194E-02 | | | | |
| 1378.10 | 14. | 45.55 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.11 | 18. | 25.11 | 2.23 | 1.180E-02 | 1394.10 | 3.900 | 1.185E+00 | PA234 |
| | | | | | 1394.10 | 3.900 | 1.185E+00 | PA234 |
| 1408.46 | 7. | 113.06 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.14 | 776. | 3.84 | 1.92 | 1.134E-02 | 1460.75 | 10.700 | 1.893E+01 | K40 |
| 1619.29 | 2. | 405.28 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.56 | 50. | 14.14 | 0.48 | 9.535E-03 | 1764.49 | 15.357 | 9.914E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 179.64 | 45.16 | 103. | 6. | 2.131E+02 | 449.41 | 0.973 | BA-140 | |
| 290.19 | 73.08 | 209. | 21. | 4.178E+02 | 198.95 | 1.003 | TL-208 | |
| 297.62 | 74.94 | 208. | 237. | 4.614E+03 | 21.59 | 1.006 | TH-234 | D |
| 306.85 | 77.25 | 210. | 292. | 5.577E+03 | 18.29 | 1.008 | PB-212 | D |
| 322.55 | 81.12 | 62. | 8. | 1.579E+02 | 237.93 | 0.220 | RA-226 | c |
| 346.77 | 87.18 | 167. | 97. | 1.745E+03 | 44.33 | 0.966 | PB-212 | |
| 369.96 | 92.98 | 168. | 112. | 1.966E+03 | 41.19 | 0.467 | TH-234 | s |
| 407.93 | 102.47 | 111. | 35. | 6.094E+02 | 97.99 | 0.462 | GD-153 | s |
| 431.31 | 108.32 | 109. | 43. | 7.338E+02 | 81.59 | 0.998 | TH-234 | s |
| 531.41 | 133.35 | 95. | 13. | 2.289E+02 | 219.20 | 0.462 | CE-144 | sc |
| 615.32 | 154.34 | 123. | 21. | 3.854E+02 | 171.06 | 0.613 | ND-147 | sc |
| 674.04 | 169.02 | 80. | 16. | 3.093E+02 | 165.83 | 0.580 | NP-237 | sc |
| 834.78 | 209.23 | 117. | 60. | 1.311E+03 | 57.08 | 1.151 | AC-228 | D |
| 883.22 | 221.33 | 57. | 6. | 1.357E+02 | 365.15 | 0.273 | BR-82 | c |
| 1097.53 | 274.67 | 53. | 26. | 6.736E+02 | 89.38 | 1.220 | SR-91 | D |
| 1568.65 | 392.71 | 36. | 7. | 2.359E+02 | 281.40 | 0.523 | TB-160 | c |
| 1717.72 | 429.98 | 19. | 12. | 4.420E+02 | 116.77 | 0.245 | - | s |
| 1746.34 | 437.13 | 39. | 21. | 7.599E+02 | 107.62 | 0.656 | BA-140 | s |
| 1824.31 | 456.63 | 23. | 11. | 4.086E+02 | 141.43 | 0.678 | MO-99 | sc |
| 1850.07 | 463.07 | 40. | 54. | 2.063E+03 | 52.46 | 0.741 | AC-228 | s |
| 2390.66 | 598.27 | 22. | 13. | 6.059E+02 | 112.44 | 1.545 | SB-125 | D |
| 2401.63 | 601.01 | 27. | 26. | 1.166E+03 | 69.81 | 1.548 | RA-226 | D |
| 2512.01 | 628.53 | 21. | 27. | 1.265E+03 | 71.09 | 0.559 | - | s |
| 2570.27 | 643.09 | 18. | 14. | 6.855E+02 | 107.73 | 0.298 | J-131 | s |
| 2626.81 | 657.22 | 11. | 17. | 8.119E+02 | 78.68 | 0.612 | AS-76 | s |
| 2908.42 | 727.51 | 30. | 46. | 2.381E+03 | 44.90 | 1.668 | TE-131 | D |
| 2983.05 | 746.26 | 7. | 8. | 4.120E+02 | 116.83 | 0.339 | - | s |
| 3228.05 | 807.48 | 21. | 11. | 6.142E+02 | 144.89 | 0.669 | BI-214 | s |
| 3876.08 | 969.12 | 32. | 94. | 6.011E+03 | 26.60 | 1.885 | AC-228 | D |
| 3964.09 | 991.40 | 10. | 7. | 4.792E+02 | 153.75 | 0.550 | - | s |
| 4156.36 | 1039.44 | 35. | 19. | 1.275E+03 | 139.85 | 0.231 | - | s |

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Spectrum name: ARS08325.An1

| Channel | Energy | Background | Net area | Eff*Area | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 4208.94 | 1052.57 | 3. | 4. | 2.912E+02 | 142.83 | 0.277 | J-133 | s |
| 4659.32 | 1165.08 | 3. | 11. | 8.054E+02 | 74.97 | 0.801 | - | s |
| 4747.69 | 1187.16 | 11. | 15. | 1.100E+03 | 87.24 | 0.521 | SB-122 | s |
| 5504.58 | 1375.77 | 14. | 9. | 7.865E+02 | 128.89 | 2.216 | SB-124 | D |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.81 | 39.67 | 90. | 27. | 0.010 | 117.59 | 0.967s |
| EU-154 | 169.42 | 42.82 | 165. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 171.95 | 43.45 | 139. | 4. | 0.002 | 934.48 | 0.970s |
| EU-152 | 178.95 | 45.21 | 124. | 5. | 0.002 | 672.42 | 0.973s |
| PB-210 | 184.21 | 46.52 | 130. | 36. | 0.013 | 96.93 | 0.975D |
| EU-154 | 191.76 | 48.41 | 118. | 16. | 0.006 | 221.89 | 0.977s |
| Am-241 | 234.43 | 59.08 | 219. | 8. | 0.003 | 601.52 | 0.989s |
| U-238 | 251.40 | 63.33 | 258. | 14. | 0.005 | 389.84 | 0.993s |
| U-238 | 368.17 | 92.53 | 269. | 0. | 0.000 | 2000.00 | 1.025s |
| U-238 | 370.09 | 93.01 | 198. | 107. | 0.040 | 47.38 | 1.025s |
| PA-234 | 374.88 | 94.21 | 133. | 76. | 0.028 | 55.03 | 1.027s |
| PA-234 | 393.79 | 98.94 | 173. | 18. | 0.007 | 242.41 | 1.031s |
| PA-234 | 394.86 | 99.20 | 162. | 34. | 0.012 | 129.37 | 1.033s |
| PA-234 | 446.00 | 111.99 | 187. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 486.90 | 122.22 | 198. | -26. | -0.010 | 180.02 | 1.057s |
| EU-154 | 489.43 | 122.85 | 154. | 18. | 0.007 | 232.55 | 1.058s |
| PA-234 | 523.24 | 131.31 | 170. | 9. | 0.003 | 480.74 | 1.067s |
| U-235 | 573.53 | 143.89 | 171. | 0. | 0.000 | 2000.00 | 1.081s |
| U-235 | 651.99 | 163.51 | 187. | 0. | 0.000 | 2000.00 | 1.102s |
| U-235 | 740.82 | 185.72 | 108. | 6. | 0.002 | 1367.10 | 1.126D |
| RA-226 | 742.78 | 186.21 | 109. | 67. | 0.025 | 50.28 | 0.918D |
| U-235 | 819.16 | 205.31 | 105. | 2. | 0.001 | 1864.34 | 1.147D |
| PA-234 | 901.00 | 225.78 | 152. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 112. | 463. | 0.172 | 11.35 | 1.182D |
| PB-214 | 965.81 | 241.98 | 130. | 95. | 0.035 | 40.00 | 1.185D |
| EU-152 | 975.47 | 244.40 | 86. | 18. | 0.006 | 186.20 | 1.188s |
| EU-154 | 992.43 | 248.64 | 114. | -11. | -0.004 | 336.04 | 1.192s |
| TL-208 | 1107.30 | 277.36 | 81. | 21. | 0.008 | 128.24 | 1.223D |
| PB-214 | 1177.74 | 294.97 | 63. | 186. | 0.069 | 20.28 | 1.251s |
| PB-212 | 1197.06 | 299.81 | 112. | 25. | 0.009 | 154.34 | 1.246s |
| Ra-228 | 1350.18 | 338.09 | 58. | 128. | 0.047 | 27.15 | 0.766s |

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Spectrum name: ARS08325.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 1375.82 | 344.50 | 86. | 2. | 0.001 | 1834.14 | 1.292s |
| PB-214 | 1404.41 | 351.65 | 73. | 265. | 0.098 | 16.82 | 1.353 |
| TL-208 | 2040.99 | 510.79 | 149. | 110. | 0.041 | 46.27 | 0.496s |
| PA-234 | 2275.20 | 569.34 | 52. | 4. | 0.001 | 689.35 | 1.517s |
| TL-208 | 2330.75 | 583.22 | 42. | 195. | 0.072 | 19.31 | 1.196 |
| EU-154 | 2369.00 | 592.78 | 50. | 0. | 0.000 | 2000.00 | 1.539s |
| BI-214 | 2435.60 | 609.43 | 44. | 231. | 0.086 | 17.34 | 1.337 |
| CS-137 | 2645.79 | 661.97 | 26. | 27. | 0.010 | 79.70 | 1.606s |
| EU-154 | 2885.73 | 721.94 | 22. | -2. | -0.001 | 740.81 | 1.664s |
| BI-212 | 2906.68 | 727.17 | 74. | 4. | 0.001 | 625.45 | 1.667D |
| PA-234 | 2928.43 | 732.61 | 10. | 22. | 0.008 | 70.41 | 1.673s |
| EU-154 | 3022.49 | 756.11 | 36. | 5. | 0.002 | 470.23 | 1.695s |
| TL-208 | 3051.25 | 763.30 | 38. | 10. | 0.004 | 187.26 | 1.701D |
| BI-214 | 3071.48 | 768.36 | 19. | 27. | 0.010 | 58.72 | 1.705D |
| EU-152 | 3114.54 | 779.12 | 36. | -2. | -0.001 | 1162.76 | 1.715s |
| BI-212 | 3138.05 | 784.99 | 63. | -11. | -0.004 | 284.07 | 1.721s |
| PA-234 | 3226.95 | 807.21 | 45. | 6. | 0.002 | 437.80 | 1.742s |
| PA-234 | 3322.65 | 831.12 | 24. | 25. | 0.009 | 87.89 | 1.762s |
| TL-208 | 3439.85 | 860.41 | 35. | 31. | 0.011 | 83.92 | 1.789s |
| EU-152 | 3464.45 | 866.56 | 44. | 4. | 0.002 | 586.52 | 1.795s |
| EU-154 | 3493.56 | 873.83 | 41. | 0. | 0.000 | 2000.00 | 1.800s |
| PA-234 | 3522.92 | 881.17 | 35. | 3. | 0.001 | 748.53 | 1.807s |
| PA-234 | 3529.60 | 882.84 | 24. | 21. | 0.008 | 102.99 | 1.809s |
| PA-234 | 3592.00 | 898.43 | 64. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.17 | 911.22 | 24. | 133. | 0.049 | 22.49 | 1.534s |
| PA-234 | 3702.74 | 926.10 | 26. | 2. | 0.001 | 863.31 | 1.848s |
| BI-214 | 3734.14 | 933.95 | 30. | 4. | 0.002 | 517.68 | 1.854s |
| PA-234 | 3784.17 | 946.45 | 39. | 6. | 0.002 | 395.85 | 1.864s |
| PA-234 | 3795.23 | 949.21 | 41. | 11. | 0.004 | 237.85 | 1.867s |
| EU-152 | 3856.36 | 964.48 | 53. | 4. | 0.001 | 817.05 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 27. | 28. | 0.010 | 65.07 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 11. | 3. | 0.001 | 337.02 | 1.884D |
| EU-154 | 3984.18 | 996.42 | 21. | 5. | 0.002 | 355.89 | 1.908s |
| EU-154 | 4019.92 | 1005.35 | 42. | 0. | 0.000 | 2000.00 | 1.915s |
| EU-152 | 4338.00 | 1084.81 | 69. | 0. | 0.000 | 2000.00 | 1.984s |
| EU-152 | 4444.80 | 1111.50 | 72. | -18. | -0.007 | 195.18 | 2.006s |
| BI-214 | 4480.13 | 1120.32 | 37. | 56. | 0.021 | 53.37 | 0.926s |
| CO-60 | 4689.37 | 1172.59 | 46. | 2. | 0.001 | 1277.26 | 2.056s |
| BI-214 | 4949.88 | 1237.66 | 44. | 24. | 0.009 | 121.68 | 2.109s |
| EU-154 | 5096.95 | 1274.40 | 29. | 15. | 0.005 | 162.96 | 2.137s |
| CO-60 | 5329.10 | 1332.38 | 12. | 14. | 0.005 | 114.07 | 2.183s |
| BI-214 | 5510.44 | 1377.67 | 13. | 14. | 0.005 | 91.11 | 2.217D |
| PA-234 | 5572.26 | 1393.11 | 1. | 18. | 0.007 | 50.22 | 2.230s |
| EU-152 | 5633.75 | 1408.46 | 14. | 7. | 0.003 | 226.11 | 2.240s |
| K-40 | 5844.68 | 1461.14 | 21. | 774. | 0.287 | 7.71 | 1.919 |
| BI-212 | 6478.06 | 1619.29 | 13. | 2. | 0.001 | 810.56 | 2.394s |
| BI-214 | 7059.37 | 1764.42 | 8. | 45. | 0.017 | 39.69 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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Spectrum name: ARS08325.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 6.6753E-03 | | | | | 1.39E+09 | |
| | | | 185.72 | 6.675E-03 | } | 5.395E-02 | 6.84E+02 5.72E+01 | G K |
| | | | 143.76 | 0.000E+00 | ?(P | 3.240E-01 | 1.00E+03 1.05E+01 | G |
| | | | 205.31 | 2.159E-02 | (P | 6.883E-01 | 9.32E+02 4.70E+00 | G |
| | | | 163.35 | 0.000E+00 | & P | 7.969E-01 | 1.00E+03 4.70E+00 | G |
| RA-226 | | 1.1146E+00 | | | | | 5.84E+05 | |
| | | | | | | | Derived Ave Activity | |
| | | | 186.21 | 1.115E+00 | }( | 8.522E-01 | 2.51E+01 3.64E+00 | G K |
| Ra-228 | | 8.7648E-01 | | | | | 2.10E+03 | |
| | | | 911.07 | 8.263E-01 | ( | 1.599E-01 | 1.12E+01 2.90E+01 | G |
| | | | 968.90 | 3.366E-02 | - P | 1.957E-01 | 1.69E+02 1.75E+01 | G |
| | | | 338.40 | 9.588E-01 | ( | 2.861E-01 | 1.36E+01 1.20E+01 | G |
| | | | 964.60 | 9.620E-01 | ( | 9.319E-01 | 3.25E+01 5.45E+00 | G |
| Am-241 | T | 1.6045E-02 | | | | | 1.58E+05 | |
| | | | 59.54 | 1.604E-02 | ?(P | 1.408E-01 | 3.01E+02 3.59E+01 | G K |
| PB-210 | | 8.4300E-01 | | | | | 7.45E+03 | |
| | | | 46.52 | 8.430E-01 | (P | 1.323E+00 | 4.85E+01 4.00E+00 | G |
| U-238 | | 9.4130E-01 | | | | | 1.63E+12 | |
| | | | 63.29 | 2.338E-01 | ?(P | 1.321E+00 | 1.95E+02 3.90E+00 | G |
| | | | 92.80 | 1.861E+00 | (P | 1.186E+00 | 2.37E+01 3.00E+00 | G |
| | | | 92.38 | 0.000E+00 | & P | 1.608E+00 | 1.00E+03 2.57E+00 | G |
| K-40 | | 1.8931E+01 | | | | | 4.68E+11 | |
| | | | 1460.75 | 1.893E+01 | (P | 5.831E-01 | 3.85E+00 1.07E+01 | G |
| PB-214 | | 7.5119E-01 | | | | | 5.84E+05 | |
| | | | 351.92 | 6.835E-01 | (P | 1.102E-01 | 8.41E+00 3.58E+01 | G |
| | | | 295.21 | 8.216E-01 | ( | 1.751E-01 | 1.01E+01 1.85E+01 | G |
| | | | 241.98 | 9.008E-01 | (P | 5.302E-01 | 2.00E+01 7.50E+00 | G |
| BI-214 | | 7.3447E-01 | | | | | 5.84E+05 | |
| | | | 609.31 | 7.017E-01 | (P | 1.020E-01 | 8.67E+00 4.48E+01 | G |
| | | | 1764.49 | 9.205E-01 | + P | 3.144E-01 | 1.98E+01 1.54E+01 | G |
| | | | 1120.29 | 7.916E-01 | ( | 4.443E-01 | 2.67E+01 1.48E+01 | G |
| | | | 1238.11 | 9.335E-01 | + | 1.308E+00 | 6.08E+01 5.86E+00 | G |
| | | | 768.36 | 9.123E-01 | + | 7.604E-01 | 2.94E+01 4.80E+00 | G |
| | | | 1377.67 | 8.938E-01 | (P | 1.235E+00 | 4.56E+01 3.92E+00 | G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | | Comments |
|---|---|---|---|---|---|---|---|
| | | 934.06 | 2.585E-01 | - P | 1.707E+00 | 2.59E+02 | 3.03E+00 G |
| BI-212 | 8.1147E-02 | | | | | 2.10E+03 | |
| | | 727.17 | 5.141E-02 | ( | 5.582E-01 | 3.13E+02 | 1.18E+01 G |
| | | 1620.56 | 2.087E-01 | ?( | 2.037E+00 | 4.05E+02 | 2.75E+00 G |
| | | 785.42 | -8.933E-01 | + | 3.224E+00 | 1.42E+02 | 2.00E+00 G |
| PB-212 | 7.5827E-01 | | | | | 2.10E+03 | |
| | | 238.63 | 7.583E-01 | (P | 8.496E-02 | 5.68E+00 | 4.31E+01 G |
| | | 300.09 | 6.317E-01 | - | 1.315E+00 | 7.72E+01 | 3.27E+00 G |
| TL-208 | 2.9614E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 2.991E-01 | ( | 5.048E-02 | 9.66E+00 | 8.60E+01 G |
| | | 510.72 | 5.860E-01 | + P | 3.190E-01 | 2.31E+01 | 2.25E+01 G |
| | | 860.47 | 4.471E-01 | + P | 4.375E-01 | 4.20E+01 | 1.20E+01 G |
| | | 277.36 | 2.566E-01 | (P | 5.360E-01 | 6.41E+01 | 6.50E+00 G |
| | | 763.30 | 9.279E-01 | + | 2.947E+00 | 9.36E+01 | 1.70E+00 G |
| PA-234 | 1.8384E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 3.719E-02 | &( | 1.309E-01 | 1.21E+02 | 2.51E+01 G |
| | | 946.00 | 5.877E-02 | ?( | 2.941E-01 | 1.98E+02 | 2.00E+01 G |
| | | 131.28 | 2.340E-02 | ?( | 1.651E-01 | 2.40E+02 | 2.00E+01 G |
| | | 94.67 | 2.536E-01 | &( | 1.889E-01 | 2.75E+01 | 1.55E+01 G |
| | | 883.24 | 3.066E-01 | ?( | 3.770E-01 | 5.15E+01 | 1.20E+01 G |
| | | 926.70 | 3.891E-02 | ?(P | 4.374E-01 | 4.32E+02 | 1.10E+01 G |
| | | 569.26 | 4.949E-02 | &(P | 4.531E-01 | 3.45E+02 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | - P | 3.954E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 4.014E-01 | ?(P | 3.168E-01 | 3.52E+01 | 8.50E+00 G |
| | | 949.00 | 2.604E-01 | ?(P | 7.770E-01 | 1.19E+02 | 7.80E+00 G |
| | | 880.51 | 8.570E-02 | ?(P | 8.190E-01 | 3.74E+02 | 6.50E+00 G |
| | | 226.87 | 0.000E+00 | - P | 6.318E-01 | 1.00E+03 | 6.50E+00 G |
| | | 831.10 | 7.497E-01 | ?( | 7.734E-01 | 4.39E+01 | 5.60E+00 G |
| | | 808.10 | 2.029E-01 | ?( | 1.149E+00 | 2.19E+02 | 4.90E+00 G |
| | | 99.70 | 3.654E-01 | ( | 6.755E-01 | 6.47E+01 | 4.70E+00 G |
| | | 699.10 | -3.254E-02 | % | 9.979E-01 | 1.16E+03 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 1.789E+00 | 1.00E+03 | 4.00E+00 G |
| | | 1394.10 | 1.185E+00 | ?(P | 4.749E-01 | 2.51E+01 | 3.90E+00 G |
| CS-137 | 4.6303E-02 | | | | | 1.10E+04 | |
| | | 661.66 | 4.630E-02 | &(P | 4.444E-02 | 3.98E+01 | 8.52E+01 G |
| CO-60 | 1.9754E-02 | | | | | 1.93E+03 | |
| | | 1173.24 | 4.809E-03 | ?(P | 7.486E-02 | 6.39E+02 | 9.99E+01 K |
| | | 1332.50 | 3.469E-02 | ?( | 4.508E-02 | 5.70E+01 | 1.00E+02 K |
| EU-152 | 6.5081E-02 | | | | | 4.64E+03 | |
| | | 40.12 | 3.748E-03 | %( | 2.015E-01 | 1.73E+03 | 3.00E+01 G |
| | | 121.78 | -4.614E-02 | + | 1.197E-01 | 9.00E+01 | 2.92E+01 G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 344.30 | 6.055E-03 | ?(P | 1.551E-01 | 9.17E+02 | 2.70E+01 G |
| | | 1408.08 | 8.562E-02 | ?(P | 2.395E-01 | 1.13E+02 | 2.12E+01 G |
| | | 39.52 | 1.932E-01 | ( | 3.358E-01 | 5.88E+01 | 1.60E+01 G |
| | | 964.00 | 4.706E-02 | ?(P | 4.743E-01 | 4.09E+02 | 1.46E+01 G |
| | | 1112.07 | -2.854E-01 | & | 6.496E-01 | 9.76E+01 | 1.36E+01 G |
| | | 778.90 | -2.486E-02 | + | 3.812E-01 | 5.81E+02 | 1.30E+01 G |
| | | 1085.80 | 0.000E+00 | - P | 8.253E-01 | 1.00E+03 | 1.03E+01 G |
| | | 45.40 | 5.828E-02 | ?(P | 5.880E-01 | 3.36E+02 | 9.00E+00 G |
| | | 244.67 | 1.648E-01 | ?( | 4.313E-01 | 9.31E+01 | 7.62E+00 G |
| | | 867.39 | 1.878E-01 | ?( | 1.396E+00 | 2.93E+02 | 4.18E+00 G |
| EU-154 | 7.4810E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 2.283E-02 | ?(P | 7.679E-02 | 1.16E+02 | 4.05E+01 G |
| | | 1274.80 | 9.749E-02 | &( | 1.832E-01 | 8.15E+01 | 3.55E+01 G |
| | | 723.30 | -1.945E-02 | - | 1.931E-01 | 3.70E+02 | 1.97E+01 G |
| | | 1004.80 | 0.000E+00 | - P | 3.617E-01 | 1.00E+03 | 1.76E+01 G |
| | | 43.00 | 3.292E-02 | ?( | 4.552E-01 | 4.67E+02 | 1.31E+01 G |
| | | 873.20 | 0.000E+00 | - P | 5.070E-01 | 1.00E+03 | 1.13E+01 G |
| | | 996.30 | 9.611E-02 | ?( | 4.306E-01 | 1.78E+02 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | & P | 9.034E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | -1.206E-01 | + | 5.754E-01 | 1.68E+02 | 6.60E+00 G |
| | | 591.70 | 0.000E+00 | - P | 1.036E+00 | 1.00E+03 | 4.60E+00 G |
| | | 48.70 | 3.450E-01 | ?(P | 1.129E+00 | 1.11E+02 | 4.20E+00 G |
| | | 756.70 | 1.929E-01 | ?( | 1.183E+00 | 2.35E+02 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.67 | 90. | 27. | 0.010 | 117.59 | 1.932E-01 | |
| EU-154 | 43.45 | 139. | 4. | 0.002 | 934.48 | 3.292E-02 | |
| EU-152 | 45.21 | 124. | 5. | 0.002 | 672.42 | 5.828E-02 | P |
| EU-154 | 48.41 | 118. | 16. | 0.006 | 221.89 | 3.450E-01 | P |
| Am-241 | 59.08 | 219. | 8. | 0.003 | 601.52 | 1.604E-02 | P |
| U-238 | 63.33 | 258. | 14. | 0.005 | 389.84 | 2.338E-01 | P |
| U-238 | 93.01 | 198. | 107. | 0.040 | 47.38 | 1.861E+00 | P |
| PA-234 | 94.21 | 133. | 76. | 0.028 | 55.03 | 2.536E-01 | |
| PA-234 | 98.94 | 173. | 18. | 0.007 | 242.41 | 3.719E-02 | |
| PA-234 | 99.20 | 162. | 34. | 0.012 | 129.37 | 3.654E-01 | |
| EU-152 | 122.22 | 198. | -26. | -0.010 | 180.02 | -4.614E-02 | |
| EU-154 | 122.85 | 154. | 18. | 0.007 | 232.55 | 2.283E-02 | P |
| PA-234 | 131.31 | 170. | 9. | 0.003 | 480.74 | 2.340E-02 | |
| EU-152 | 244.40 | 86. | 18. | 0.006 | 186.20 | 1.648E-01 | |
| EU-154 | 248.64 | 114. | -11. | -0.004 | 336.04 | -1.206E-01 | |
| EU-152 | 344.50 | 86. | 2. | 0.001 | 1834.14 | 6.055E-03 | P |
| PA-234 | 569.34 | 52. | 4. | 0.001 | 689.35 | 4.949E-02 | P |
| CS-137 | 661.97 | 26. | 27. | 0.010 | 79.70 | 4.630E-02 | P |
| EU-154 | 721.94 | 22. | -2. | -0.001 | 740.81 | -1.945E-02 | |
| PA-234 | 732.61 | 10. | 22. | 0.008 | 70.41 | 4.014E-01 | P |
| EU-154 | 756.11 | 36. | 5. | 0.002 | 470.23 | 1.929E-01 | |
| EU-152 | 779.12 | 36. | -2. | -0.001 | 1162.76 | -2.486E-02 | |
| PA-234 | 807.21 | 45. | 6. | 0.002 | 437.80 | 2.029E-01 | |
| PA-234 | 831.12 | 24. | 25. | 0.009 | 87.89 | 7.497E-01 | |
| EU-152 | 866.56 | 44. | 4. | 0.002 | 586.52 | 1.878E-01 | |
| PA-234 | 881.17 | 35. | 3. | 0.001 | 748.53 | 8.570E-02 | P |
| PA-234 | 882.84 | 24. | 21. | 0.008 | 102.99 | 3.066E-01 | |
| PA-234 | 926.10 | 26. | 2. | 0.001 | 863.31 | 3.891E-02 | P |
| PA-234 | 946.45 | 39. | 6. | 0.002 | 395.85 | 5.877E-02 | |
| PA-234 | 949.21 | 41. | 11. | 0.004 | 237.85 | 2.604E-01 | P |
| EU-152 | 964.48 | 53. | 4. | 0.001 | 817.05 | 4.706E-02 | P |
| EU-154 | 996.42 | 21. | 5. | 0.002 | 355.89 | 9.611E-02 | |
| EU-152 | 1111.50 | 72. | -18. | -0.007 | 195.18 | -2.854E-01 | |
| CO-60 | 1172.59 | 46. | 2. | 0.001 | 1277.26 | 4.809E-03 | P |
| EU-154 | 1274.40 | 29. | 15. | 0.005 | 162.96 | 9.749E-02 | |
| CO-60 | 1332.38 | 12. | 14. | 0.005 | 114.07 | 3.469E-02 | |
| PA-234 | 1393.11 | 1. | 18. | 0.007 | 50.22 | 1.185E+00 | P |
| EU-152 | 1408.46 | 14. | 7. | 0.003 | 226.11 | 8.562E-02 | P |

P - Peakbackground subtraction

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 10:56:01 AM
Spectrum name: ARS08325.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 6.6753E-03 | 9.1258E-02 | 9.1259E-02 | 0.324E+00 |
| RA-226 | | 1.1146E+00 | 5.6036E-01 | 5.6443E-01 | 0.852E+00 |
| Ra-228 | | 8.7648E-01 | 1.9709E-01 | 2.0537E-01 | 0.160E+00 |
| Am-241 | #A | 1.6045E-02 | 9.6513E-02 | 9.6519E-02 | 0.141E+00 |
| PB-210 | A | 8.4300E-01 | 8.1713E-01 | 8.2145E-01 | 0.132E+01 |
| U-238 | #A | 9.4130E-01 | 4.4601E-01 | 4.5221E-01 | 0.132E+01 |
| K-40 | | 1.8931E+01 | 1.4588E+00 | 1.9310E+00 | 0.583E+00 |
| PB-214 | | 7.5119E-01 | 1.1993E-01 | 1.3597E-01 | 0.110E+00 |
| BI-214 | | 7.3447E-01 | 1.2733E-01 | 1.3531E-01 | 0.102E+00 |
| BI-212 | A | 8.1147E-02 | 4.1540E-01 | 4.1543E-01 | 0.558E+00 |
| PB-212 | | 7.5827E-01 | 8.6088E-02 | 1.0208E-01 | 0.850E-01 |
| TL-208 | | 2.9614E-01 | 5.7195E-02 | 6.0364E-02 | 0.505E-01 |
| PA-234 | #C | 1.8384E-01 | 9.2325E-02 | 9.3317E-02 | 0.131E+00 |
| CS-137 | # | 4.6303E-02 | 3.6901E-02 | 3.6959E-02 | 0.444E-01 |
| CO-60 | #A | 1.9754E-02 | 2.2533E-02 | 2.2548E-02 | 0.749E-01 |
| EU-152 | #A | 6.5081E-02 | 7.6528E-02 | 7.6880E-02 | 0.201E+00 |
| EU-154 | #A | 7.4810E-02 | 1.2191E-01 | 1.2202E-01 | 0.768E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 2.319E+01 pCi/g

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-09 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-008 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 008 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 4.6888E-02 | pCi/g | 5.4042E-02 | 6.7200E-02 | 3.3600E-02 | | | |
| **RA-226** | 3.7043E-01 | pCi/g | 6.2395E-01 | 1.0800E+00 | 5.4000E-01 | | | |
| **RA-228** | 4.2540E-01 | pCi/g | 1.2957E-01 | 1.4800E-01 | 7.4000E-02 | | | |
| **AM-241** | 3.3465E-02 | pCi/g | 5.9187E-02 | 9.9400E-02 | 4.9700E-02 | | | |
| **PB-210** | 4.0466E-01 | pCi/g | 7.2853E-01 | 1.2900E+00 | 6.4500E-01 | | | |
| **U-238** | 4.5504E-01 | pCi/g | 4.7393E-01 | 1.1200E+00 | 5.6000E-01 | | | |
| **K-40** | 1.4100E+01 | pCi/g | 1.9419E+00 | 8.6700E-01 | 4.3350E-01 | | | |
| **PB-214** | 4.2272E-01 | pCi/g | 1.1306E-01 | 1.1800E-01 | 5.9000E-02 | | | |
| **BI-214** | 4.4169E-01 | pCi/g | 1.1068E-01 | 1.0500E-01 | 5.2500E-02 | | | |
| **BI-212** | 1.0881E-01 | pCi/g | 2.2606E-01 | 5.4500E-01 | 2.7250E-01 | | | |
| **PB-212** | 3.3729E-01 | pCi/g | 8.1547E-02 | 9.0000E-02 | 4.5000E-02 | | | |
| **TL-208** | 7.0306E-02 | pCi/g | 4.0995E-02 | 5.6600E-02 | 2.8300E-02 | | | |
| **PA-234** | ~~1.0922E-01~~ 3.623E-02 | pCi/g | 1.1599E-01 | 1.0100E-01 | 5.0500E-02 | | | |
| **CS-137** | -1.3507E-02 | pCi/g | 5.4218E-02 | 6.9600E-02 | 3.4800E-02 | | | |
| **CO-60** | 1.8279E-03 | pCi/g | 4.9911E-02 | 9.1000E-02 | 4.5500E-02 | | | |
| **EU-152** | 2.9748E-02 | pCi/g | 5.9869E-02 | 2.1700E-01 | 1.0850E-01 | | | |
| **EU-154** | -3.1286E-03 | pCi/g | 1.8724E-02 | 6.9700E-02 | 3.4850E-02 | | | |
| **Total Gamma** | 1.7357E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 5.0051E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 11:06:06
American Radiation Services     Spectrum name: ARS05351.An1

Sample description
     Batch ID:  16-00698-09
     SDG:  ARS1-16-00671-008  Tech:  WJS

Spectrum Filename: C:\User\ARS05351.An1

Acquisition information
       Start time:                5/5/2016 10:21:02
       Live time:               2700
       Real time:               2702
       Dead time:                 0.07 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.1188E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.1188E+02) =
                                  3.2064E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:06:06
American Radiation Services Spectrum name: ARS05351.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1607

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.36 | 12. | 59.94 | 0.24 | 7.326E-03 | | | | |
| 32.23 | 198. | 10.35 | 0.76 | 1.650E-02 | | | | |
| 40.82 | 6. | 236.54 | 0.75 | 2.259E-02 | 40.12 | 30.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 2.668E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 5.107E-02 | EU152 |
| 46.24 | 14. | 29.45 | 0.75 | 2.755E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 60.42 | 14. | 88.37 | 0.77 | 3.751E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.12 | 12. | 53.48 | 0.77 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.81 | 57. | 28.21 | 0.79 | 4.757E-02 | | | | |
| 77.07 | 116. | 14.08 | 0.79 | 4.854E-02 | | | | |
| 92.66 | 26. | 46.64 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.71 | 28. | 35.75 | 0.82 | 5.211E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.74 | 15. | 73.93 | 0.83 | 5.238E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 1.935E-01 | PA234 |
| | | | | | 98.44 | 25.100 | PBC<MDA | PA234 |
| 98.80 | 12. | 97.92 | 0.83 | 5.239E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 1.608E-01 | PA234 |
| | | | | | 99.70 | 4.700 | 1.608E-01 | PA234 |
| 121.25 | 3. | 406.56 | 0.87 | 5.064E-02 | 121.78 | 29.240 | PBC<MDA | EU152 |
| | | | | | 121.78 | 29.240 | 5.678E-03 | EU152 |
| 145.07 | 10. | 87.44 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.41 | 11. | 78.07 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.60 | 19. | 39.75 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| 185.64 | 17. | 45.53 | 0.97 | 4.120E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | PBC<MDA | RA226 |
| 205.04 | 8. | 117.91 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.55 | 189. | 8.71 | 1.05 | 3.537E-02 | 238.63 | 43.100 | 3.668E-01 | PB212 |
| 241.93 | 60. | 21.04 | 1.06 | 3.506E-02 | 241.98 | 7.500 | 7.231E-01 | PB214 |
| 247.75 | 1. | 896.60 | 1.06 | 3.450E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 277.07 | 10. | 81.64 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| | | | | | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.98 | 89. | 18.72 | 0.93 | 3.088E-02 | 295.21 | 18.500 | 4.403E-01 | PB214 |
| 299.92 | 13. | 74.41 | 1.14 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:06:06
American Radiation Services Spectrum name: ARS05351.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 338.36 | 41. | 29.69 | 0.38 | 2.826E-02 | 338.40 | 12.010 | 3.915E-01 | Ra228 |
| 344.28 | 6. | 157.34 | 1.21 | 2.795E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| | | | | | 344.30 | 27.000 | 2.355E-02 | EU152 |
| 351.58 | 140. | 11.72 | 0.84 | 2.757E-02 | 351.92 | 35.800 | 4.136E-01 | PB214 |
| 510.56 | 31. | 17.11 | 1.43 | 2.149E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| | | | | | 510.72 | 22.500 | PBC<MDA | TL208 |
| 582.84 | 34. | 24.83 | 1.53 | 1.957E-02 | 583.14 | 86.000 | 6.441E-02 | TL208 |
| | | | | | 583.14 | 86.000 | 6.441E-02 | TL208 |
| 608.82 | 129. | 10.99 | 0.72 | 1.896E-02 | 609.31 | 44.791 | 4.473E-01 | BI214 |
| 780.07 | 1. | 589.32 | 1.75 | 1.566E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| | | | | | 778.90 | 12.990 | 1.772E-02 | EU152 |
| 808.46 | 7. | 95.28 | 1.78 | 1.519E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 3.009E-01 | PA234 |
| 862.46 | 2. | 247.47 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| | | | | | 860.47 | 12.000 | PBC<MDA | TL208 |
| 882.17 | 4. | 171.10 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 882.27 | 4. | 153.80 | 1.86 | 1.407E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | PBC<MDA | PA234 |
| 898.47 | 4. | 126.95 | 1.88 | 1.385E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| | | | | | 898.60 | 4.000 | PBC<MDA | PA234 |
| 910.75 | 55. | 15.44 | 0.42 | 1.368E-02 | 911.07 | 29.000 | 4.438E-01 | Ra228 |
| 933.77 | 3. | 305.27 | 1.91 | 1.337E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 948.48 | 4. | 150.08 | 1.93 | 1.318E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.60 | 21. | 30.65 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 9.487E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 3.372E-01 | EU152 |
| 968.90 | 29. | 26.35 | 1.94 | 1.292E-02 | 968.90 | 17.460 | 4.181E-01 | Ra228 |
| 1005.42 | 0. | 836.27 | 1.98 | 1.248E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1120.59 | 10. | 74.21 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1172.92 | 1. | 384.43 | 2.12 | 1.065E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1238.38 | 7. | 93.90 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1377.67 | 3. | 182.99 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1408.26 | 5. | 100.47 | 2.28 | 8.617E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | 8.253E-02 | EU152 |
| 1460.18 | 399. | 5.23 | 1.72 | 8.228E-03 | 1460.75 | 10.700 | 1.410E+01 | K40 |
| 1621.65 | 4. | 100.73 | 2.38 | 7.151E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 80.89 | 20.36 | 26. | 12. | 0.005 | 119.89 | 0.237 | RU-103 | s |
| 128.41 | 32.23 | 96. | 198. | 0.073 | 20.70 | 0.755 | XE-138 | |
| 298.81 | 74.80 | 118. | 50. | 0.019 | 68.58 | 0.595 | TH-234 | s |
| 307.86 | 77.06 | 92. | 97. | 0.036 | 35.30 | 0.791 | PB-212 | |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:06:06
American Radiation Services Spectrum name: ARS05351.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 149.66 | 37.54 | 39. | -3. | -0.001 | 712.98 | 0.750s |
| EU-152 | 162.81 | 40.82 | 86. | 6. | 0.002 | 473.09 | 0.750s |
| EU-154 | 168.89 | 42.34 | 88. | -7. | -0.003 | 369.97 | 0.750s |
| EU-152 | 181.88 | 45.59 | 69. | -2. | -0.001 | 1576.03 | 0.750s |
| PB-210 | 184.48 | 46.24 | 80. | 14. | 0.005 | 58.90 | 0.746 |
| EU-154 | 196.07 | 49.13 | 87. | -5. | -0.002 | 508.42 | 0.750s |
| Am-241 | 241.22 | 60.42 | 70. | 14. | 0.005 | 176.74 | 0.766s |
| U-238 | 252.06 | 63.12 | 126. | 12. | 0.004 | 106.96 | 0.772s |
| U-238 | 370.28 | 92.66 | 132. | 26. | 0.010 | 93.28 | 0.820 |
| U-238 | 370.47 | 92.71 | 114. | 28. | 0.010 | 71.51 | 0.821 |
| PA-234 | 394.64 | 98.74 | 69. | 15. | 0.005 | 147.87 | 0.830s |
| PA-234 | 394.88 | 98.80 | 67. | 12. | 0.005 | 195.85 | 0.832s |
| PA-234 | 445.98 | 111.57 | 93. | -10. | -0.004 | 282.26 | 0.850s |
| EU-152 | 484.70 | 121.25 | 55. | 3. | 0.001 | 813.13 | 0.868s |
| EU-154 | 492.48 | 123.19 | 80. | -4. | -0.002 | 598.43 | 0.870s |
| PA-234 | 523.18 | 130.86 | 101. | -12. | -0.004 | 319.49 | 0.883s |
| U-235 | 580.07 | 145.07 | 58. | 10. | 0.004 | 174.89 | 0.903s |
| U-235 | 649.49 | 162.41 | 62. | 11. | 0.004 | 156.15 | 0.934s |
| U-235 | 742.31 | 185.60 | 101. | 19. | 0.007 | 79.49 | 0.969s |
| RA-226 | 742.44 | 185.64 | 105. | 17. | 0.006 | 91.06 | 0.970s |
| U-235 | 820.09 | 205.04 | 69. | 8. | 0.003 | 235.82 | 1.000s |
| PA-234 | 905.50 | 226.38 | 77. | -10. | -0.004 | 256.11 | 1.033s |
| PB-212 | 954.12 | 238.52 | 74. | 157. | 0.058 | 20.56 | 0.885 |
| PB-214 | 967.66 | 241.90 | 58. | 54. | 0.020 | 50.80 | 0.449s |
| EU-152 | 975.12 | 243.77 | 126. | -27. | -0.010 | 122.02 | 1.060s |
| EU-154 | 991.06 | 247.75 | 72. | 1. | 0.000 | 1793.20 | 1.065s |
| TL-208 | 1108.42 | 277.07 | 40. | 10. | 0.004 | 163.29 | 1.109s |
| PB-214 | 1180.08 | 294.98 | 66. | 78. | 0.029 | 37.45 | 0.931s |
| PB-212 | 1199.88 | 299.92 | 56. | 13. | 0.005 | 148.82 | 1.142 |
| Ra-228 | 1353.75 | 338.36 | 42. | 41. | 0.015 | 59.38 | 0.384s |
| EU-152 | 1377.41 | 344.28 | 35. | 6. | 0.002 | 314.68 | 1.206s |
| PB-214 | 1406.65 | 351.58 | 52. | 127. | 0.047 | 23.44 | 0.836s |
| TL-208 | 2043.01 | 510.56 | 91. | 31. | 0.012 | 34.21 | 1.434s |
| TL-208 | 2332.34 | 582.84 | 34. | 34. | 0.013 | 49.67 | 1.526 |
| EU-154 | 2367.80 | 591.70 | 39. | 0. | 0.000 | 2000.00 | 1.536s |
| BI-214 | 2436.34 | 608.82 | 29. | 118. | 0.044 | 21.98 | 0.716s |
| CS-137 | 2650.68 | 662.37 | 42. | -6. | -0.002 | 347.11 | 1.621s |
| EU-154 | 2894.58 | 723.30 | 38. | 0. | 0.000 | 2000.00 | 1.692s |
| PA-234 | 2935.65 | 733.56 | 28. | -1. | -0.001 | 1038.27 | 1.703s |
| BI-214 | 3074.73 | 768.30 | 33. | -4. | -0.002 | 411.57 | 1.742s |
| EU-152 | 3121.84 | 780.07 | 21. | 1. | 0.000 | 1178.63 | 1.753s |
| PA-234 | 3235.46 | 808.46 | 19. | 7. | 0.003 | 190.56 | 1.785s |
| PA-234 | 3330.76 | 832.26 | 23. | -1. | 0.000 | 1280.15 | 1.809s |
| TL-208 | 3451.63 | 862.46 | 21. | 2. | 0.001 | 494.94 | 1.839s |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:06:06
American Radiation Services Spectrum name: ARS05351.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-154 | 3491.89 | 872.52 | 27. | -4. | -0.001 | 556.86 | 1.852s |
| PA-234 | 3530.52 | 882.17 | 23. | 4. | 0.002 | 342.20 | 1.860s |
| PA-234 | 3530.96 | 882.27 | 22. | 4. | 0.002 | 307.60 | 1.862s |
| PA-234 | 3595.78 | 898.47 | 23. | 4. | 0.002 | 253.89 | 1.877s |
| Ra-228 | 3644.92 | 910.75 | 11. | 55. | 0.020 | 30.87 | 0.425s |
| PA-234 | 3708.79 | 926.70 | 66. | 0. | 0.000 | 2000.00 | 1.905s |
| BI-214 | 3737.08 | 933.77 | 28. | 3. | 0.001 | 610.54 | 1.912 |
| PA-234 | 3787.15 | 946.27 | 31. | -2. | -0.001 | 647.14 | 1.923s |
| PA-234 | 3795.98 | 948.48 | 26. | 4. | 0.002 | 300.16 | 1.926s |
| Ra-228 | 3860.51 | 964.60 | 10. | 21. | 0.008 | 61.30 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 19. | 29. | 0.011 | 52.69 | 1.945D |
| EU-152 | 4351.40 | 1087.23 | 23. | -2. | -0.001 | 599.71 | 2.048s |
| EU-152 | 4455.65 | 1113.27 | 32. | -5. | -0.002 | 326.12 | 2.070s |
| BI-214 | 4484.97 | 1120.59 | 24. | 10. | 0.004 | 148.42 | 2.077s |
| BI-214 | 4956.49 | 1238.38 | 25. | 7. | 0.003 | 187.81 | 2.167s |
| EU-154 | 5106.88 | 1275.95 | 33. | -8. | -0.003 | 220.62 | 2.192s |
| CO-60 | 5332.38 | 1332.27 | 20. | -5. | -0.002 | 355.77 | 2.231s |
| BI-214 | 5514.09 | 1377.67 | 15. | 3. | 0.001 | 365.99 | 2.259s |
| EU-152 | 5636.58 | 1408.26 | 9. | 5. | 0.002 | 200.94 | 2.276s |
| K-40 | 5844.42 | 1460.18 | 20. | 387. | 0.143 | 10.45 | 1.722s |
| BI-212 | 6490.86 | 1621.65 | 8. | 4. | 0.002 | 201.47 | 2.381s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
| U-235 | | 4.6888E-02 | | | | | | |
| | | | 185.72 | 2.618E-02 | (P | 6.724E-02 | 3.97E+01 G K | |
| | | | 143.76 | 6.443E-02 | ?(P | 2.470E-01 | 8.74E+01 G | |
| | | | 205.31 | 1.347E-01 | ?(P | 7.286E-01 | 1.18E+02 G | |
| | | | 163.35 | 1.719E-01 | ?(P | 6.060E-01 | 7.81E+01 G | |
| RA-226 | | 3.7043E-01 | | | | | | |
| | | | 186.21 | 3.704E-01 | (P | 1.079E+00 | 4.55E+01 G K | |
| Ra-228 | | 4.2540E-01 | | | | | | |
| | | | 911.07 | 4.438E-01 | (P | 1.478E-01 | 1.54E+01 G | |
| | | | 968.90 | 4.181E-01 | (P | 3.245E-01 | 2.63E+01 G | |
| | | | 338.40 | 3.915E-01 | (P | 3.098E-01 | 2.97E+01 G | |
| | | | 964.60 | 9.487E-01 | + | 7.943E-01 | 3.06E+01 G | |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:06:06
American Radiation Services Spectrum name: ARS05351.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Am-241 | T | 3.3465E-02 | | | | | | |
| | | | 59.54 | 3.347E-02 | ?( | 9.935E-02 | 8.84E+01 | G K |
| PB-210 | | 4.0466E-01 | | | | | | |
| | | | 46.52 | 4.047E-01 | (P | 1.294E+00 | 2.94E+01 | G |
| U-238 | | 4.5504E-01 | | | | | | |
| | | | 63.29 | 2.439E-01 | (P | 1.120E+00 | 5.35E+01 | G |
| | | | 92.80 | 5.782E-01 | (P | 1.079E+00 | 3.58E+01 | G |
| | | | 92.38 | 6.316E-01 | (P | 1.349E+00 | 4.66E+01 | G |
| K-40 | | 1.4100E+01 | | | | | | |
| | | | 1460.75 | 1.410E+01 | (P | 8.668E-01 | 5.23E+00 | G |
| PB-214 | | 4.2272E-01 | | | | | | |
| | | | 351.92 | 4.136E-01 | *(P | 1.180E-01 | 1.17E+01 | G |
| | | | 295.21 | 4.403E-01 | *(P | 2.275E-01 | 1.87E+01 | G |
| | | | 241.98 | 6.598E-01 | + P | 4.663E-01 | 2.54E+01 | G |
| BI-214 | | 4.4169E-01 | | | | | | |
| | | | 609.31 | 4.473E-01 | @(P | 1.046E-01 | 1.10E+01 | G |
| | | | 1764.49 | -8.175E-02 | % P | 3.320E-01 | 1.00E+03 | G |
| | | | 1120.29 | 1.985E-01 | - | 4.927E-01 | 7.42E+01 | G |
| | | | 1238.11 | 3.991E-01 | ?(P | 1.416E+00 | 9.39E+01 | G |
| | | | 768.36 | -1.875E-01 | - P | 1.240E+00 | 2.06E+02 | G |
| | | | 1377.67 | 2.950E-01 | & | 1.944E+00 | 1.83E+02 | G |
| | | | 934.06 | 1.993E-01 | - | 2.176E+00 | 3.05E+02 | G |
| BI-212 | | 1.0881E-01 | | | | | | |
| | | | 727.17 | -3.036E-02 | %(P | 5.453E-01 | 1.00E+03 | G |
| | | | 1620.56 | 7.060E-01 | &(P | 2.592E+00 | 1.01E+02 | G |
| | | | 785.42 | -2.410E-02 | % P | 2.436E+00 | 2.76E+03 | G |
| PB-212 | | 3.3729E-01 | | | | | | |
| | | | 238.63 | 3.313E-01 | (P | 8.997E-02 | 1.03E+01 | G |
| | | | 300.09 | 4.166E-01 | (P | 1.212E+00 | 7.44E+01 | G |
| TL-208 | | 7.0306E-02 | | | | | | |
| | | | 583.14 | 6.441E-02 | ?(P | 5.663E-02 | 2.48E+01 | G |
| | | | 510.72 | 2.068E-01 | + P | 3.128E-01 | 1.71E+01 | G |
| | | | 860.47 | 3.528E-02 | - P | 4.499E-01 | 2.47E+02 | G |
| | | | 277.36 | 1.483E-01 | &(P | 4.974E-01 | 8.16E+01 | G |
| | | | 763.30 | -2.315E-02 | % | 3.042E+00 | 3.57E+03 | G |
| PA-234 | | 1.0922E-01 | | | | | | |
| | | | 98.44 | 3.623E-02 | &(P | 1.009E-01 | 7.39E+01 | G |
| | | | 946.00 | -3.004E-02 | - | 3.470E-01 | 3.24E+02 | G |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:06:06
American Radiation Services Spectrum name: ARS05351.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 131.28 | -3.884E-02 | - P | 1.616E-01 | 1.60E+02 | G |
| | | 94.67 | -4.252E-04 | % | 2.215E-01 | 1.50E+04 | G |
| | | 883.24 | 7.952E-02 | ?(P | 4.705E-01 | 1.54E+02 | G |
| | | 926.70 | 0.000E+00 | - | 8.802E-01 | 1.00E+03 | G |
| | | 569.26 | -4.981E-02 | % P | 4.895E-01 | 1.34E+03 | G |
| | | 111.00 | -7.195E-02 | - | 3.457E-01 | 1.41E+02 | G |
| | | 733.00 | -3.353E-02 | & | 6.284E-01 | 5.19E+02 | G |
| | | 949.00 | 1.351E-01 | &(P | 8.234E-01 | 1.50E+02 | G |
| | | 880.51 | 1.442E-01 | &(P | 8.757E-01 | 1.71E+02 | G |
| | | 226.87 | -1.414E-01 | + P | 5.883E-01 | 1.28E+02 | G |
| | | 831.10 | -4.146E-02 | - | 9.691E-01 | 6.40E+02 | G |
| | | 808.10 | 3.009E-01 | ?( | 9.838E-01 | 9.53E+01 | G |
| | | 99.70 | 1.608E-01 | ( | 5.318E-01 | 9.79E+01 | G |
| | | 699.10 | -8.315E-03 | % P | 1.569E+00 | 1.00E+03 | G |
| | | 898.60 | 2.537E-01 | &(P | 1.440E+00 | 1.27E+02 | G |
| | | 1394.10 | -8.793E-04 | % | 1.904E+00 | 5.69E+04 | G |
| CS-137 | -1.3507E-02 | | | | | | |
| | | 661.66 | -1.351E-02 | ?(P | 6.962E-02 | 1.74E+02 | G |
| CO-60 | 1.8279E-03 | | | | | | |
| | | 1173.24 | 1.828E-03 | %(P | 9.097E-02 | 3.84E+02 | K |
| | | 1332.50 | -1.618E-02 | + P | 8.266E-02 | 1.78E+02 | K |
| EU-152 | 2.9748E-02 | | | | | | |
| | | 40.12 | 2.668E-02 | ?( | 2.175E-01 | 2.37E+02 | G |
| | | 121.78 | 5.678E-03 | &( | 8.106E-02 | 4.07E+02 | G |
| | | 344.30 | 2.355E-02 | ?( | 1.291E-01 | 1.57E+02 | G |
| | | 1408.08 | 8.253E-02 | ?( | 2.903E-01 | 1.00E+02 | G |
| | | 39.52 | -2.279E-02 | + | 2.880E-01 | 3.56E+02 | G |
| | | 964.00 | -1.825E-02 | % P | 5.972E-01 | 1.88E+04 | G |
| | | 1112.07 | -1.071E-01 | & | 6.104E-01 | 1.63E+02 | G |
| | | 778.90 | 1.772E-02 | ?( | 3.823E-01 | 5.89E+02 | G |
| | | 1085.80 | -6.283E-02 | + | 6.789E-01 | 3.00E+02 | G |
| | | 45.40 | -2.010E-02 | + | 5.555E-01 | 7.88E+02 | G |
| | | 244.67 | -3.316E-01 | + | 6.658E-01 | 6.10E+01 | G |
| | | 867.39 | -3.583E-02 | % P | 1.439E+00 | 9.25E+03 | G |
| EU-154 | -3.1286E-03 | | | | | | |
| | | 123.10 | -6.725E-03 | ?( | 6.970E-02 | 2.99E+02 | G |
| | | 1274.80 | -7.276E-02 | + | 2.754E-01 | 1.10E+02 | G |
| | | 723.30 | 0.000E+00 | & | 3.086E-01 | 1.00E+03 | G |
| | | 1004.80 | 3.584E-03 | % P | 3.775E-01 | 8.36E+02 | G |
| | | 43.00 | -1.051E-02 | % | 4.691E-01 | 1.28E+03 | G |
| | | 873.20 | -8.041E-02 | + P | 5.384E-01 | 2.78E+02 | G |
| | | 996.30 | -3.009E-03 | % | 6.401E-01 | 5.81E+03 | G |
| | | 42.31 | -1.322E-01 | + | 8.386E-01 | 1.85E+02 | G |
| | | 248.04 | 1.892E-02 | ?( | 5.946E-01 | 8.97E+02 | G |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 11:06:06
American Radiation Services     Spectrum name: ARS05351.An1

Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         591.70 0.000E+00 +   1.152E+00 1.00E+03 G
                          48.70-1.400E-01 +   1.227E+00 2.54E+02 G
                         756.70-1.010E-02 % P 1.485E+00 1.53E+05 G
  ( - This peak used in the nuclide activity average.

  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
Nuclide     Activity        Counting     Total          MDA
               pCi/g          pCi/g        pCi/g          pCi/g
```

| | | | | | |
|---|---|---|---|---|---|
| U-235 | #A | 4.6888E-02 | 5.3899E-02 | 5.4042E-02 | 0.672E-01 |
| RA-226 | #A | 3.7043E-01 | 6.2336E-01 | 6.2395E-01 | 0.108E+01 |
| Ra-228 | | 4.2540E-01 | 1.2651E-01 | 1.2957E-01 | 0.148E+00 |
| Am-241 | #A | 3.3465E-02 | 5.9146E-02 | 5.9187E-02 | 0.994E-01 |
| PB-210 | A | 4.0466E-01 | 7.2743E-01 | 7.2853E-01 | 0.129E+01 |
| U-238 | #A | 4.5504E-01 | 4.7260E-01 | 4.7393E-01 | 0.112E+01 |
| K-40 | | 1.4100E+01 | 1.5229E+00 | 1.9419E+00 | 0.867E+00 |
| PB-214 | | 4.2272E-01 | 1.0499E-01 | 1.1306E-01 | 0.118E+00 |
| BI-214 | | 4.4169E-01 | 1.0587E-01 | 1.1068E-01 | 0.105E+00 |
| BI-212 | #A | 1.0881E-01 | 2.2593E-01 | 2.2606E-01 | 0.545E+00 |
| PB-212 | | 3.3729E-01 | 7.5914E-02 | 8.1547E-02 | 0.900E-01 |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 11:06:06
American Radiation Services     Spectrum name: ARS05351.An1

TL-208 #      7.0306E-02   4.0642E-02    4.0995E-02  0.566E-01
PA-234 #C     1.0922E-01   1.1570E-01    1.1599E-01  0.101E+00
CS-137 #A    -1.3507E-02   5.4213E-02    5.4218E-02  0.696E-01
CO-60  #B     1.8279E-03   4.9911E-02    4.9911E-02  0.910E-01
EU-152 #A     2.9748E-02   5.9775E-02    5.9869E-02  0.217E+00
EU-154 #A    -3.1286E-03   1.8723E-02    1.8724E-02  0.697E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity ( 1120.1 to  1998.6 keV)     1.613E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-10 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-009 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 009 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 3.0142E-02 | pCi/g | 6.5813E-02 | 3.6000E-01 | 1.8000E-01 | | | |
| **RA-226** | 0.0000E+00 | pCi/g | 6.3361E-01 | 1.1200E+00 | 5.6000E-01 | | | |
| **RA-228** | 7.3908E-01 | pCi/g | 1.9147E-01 | 2.1400E-01 | 1.0700E-01 | | | |
| **AM-241** | 0.0000E+00 | pCi/g | 6.1287E-02 | 1.4900E-01 | 7.4500E-02 | | | |
| **PB-210** | 1.5746E-01 | pCi/g | 8.9237E-01 | 1.5600E+00 | 7.8000E-01 | | | |
| **U-238** | 7.1668E-01 | pCi/g | 4.7902E-01 | 1.1600E+00 | 5.8000E-01 | | | |
| **K-40** | 1.9634E+01 | pCi/g | 2.3919E+00 | 8.6100E-01 | 4.3050E-01 | | | |
| **PB-214** | 7.1991E-01 | pCi/g | 1.4447E-01 | 1.3100E-01 | 6.5500E-02 | | | |
| **BI-214** | 6.1308E-01 | pCi/g | 1.2875E-01 | 1.1800E-01 | 5.9000E-02 | | | |
| **BI-212** | 4.3463E-01 | pCi/g | 2.8762E-01 | 4.5800E-01 | 2.2900E-01 | | | |
| **PB-212** | 8.2592E-01 | pCi/g | 1.3883E-01 | 1.2700E-01 | 6.3500E-02 | | | |
| **TL-208** | 2.9193E-01 | pCi/g | 7.2429E-02 | 6.9200E-02 | 3.4600E-02 | | | |
| **PA-234** | 3.7792E-02 | pCi/g | 5.4483E-02 | 1.2100E-01 | 6.0500E-02 | | | |
| **CS-137** | -1.8734E-03 | pCi/g | 7.4935E-02 | 6.8300E-02 | 3.4150E-02 | | | |
| **CO-60** | -1.0269E-02 | pCi/g | 1.2157E-01 | 9.2800E-02 | 4.6400E-02 | | | |
| **EU-152** | 7.4969E-02 | pCi/g | 1.4727E-01 | 2.2900E-01 | 1.1450E-01 | | | |
| **EU-154** | 8.1798E-02 | pCi/g | 1.3722E-01 | 8.2100E-02 | 4.1050E-02 | | | |
| **Total Gamma** | 2.4357E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 6.9313E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 11:53:56
American Radiation Services     Spectrum name: ARS05352.An1

Sample description
     Batch ID:  16-00698-10
     SDG:  ARS1-16-00671-009  Tech:  WJS

Spectrum Filename: C:\User\ARS05352.An1

Acquisition information
       Start time:                5/5/2016 11:08:54
       Live time:              2700
       Real time:              2702
       Dead time:                 0.08 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.5149E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.5149E+02) =
                                  2.8450E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:53:56
American Radiation Services Spectrum name: ARS05352.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 25 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1438

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.78 | 36. | 32.87 | 0.64 | 7.652E-03 | | | | |
| 39.45 | 9. | 164.27 | 0.75 | 2.213E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 3.960E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 7.580E-02 | EU152 |
| 42.22 | 12. | 121.73 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 45.51 | 17. | 99.78 | 0.75 | 2.667E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | 2.038E-01 | EU152 |
| 46.25 | 35. | 49.89 | 0.78 | 2.732E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.27 | 58. | 34.14 | 0.82 | 4.049E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.61 | 192. | 12.98 | 0.79 | 4.749E-02 | | | | |
| 77.07 | 324. | 7.72 | 0.79 | 4.854E-02 | | | | |
| 87.16 | 128. | 15.21 | 0.81 | 5.138E-02 | | | | |
| 89.82 | 88. | 20.13 | 0.82 | 5.179E-02 | | | | |
| 92.43 | 34. | 33.30 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.85 | 39. | 44.51 | 0.82 | 5.211E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 144.38 | 12. | 127.13 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 161.55 | 1. | 282.91 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.71 | 25. | 109.16 | 0.97 | 4.126E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| 186.20 | 0. | 119.91 | 0.97 | 4.120E-02 | 186.21 | 3.640 | PBC<MDA | RA226 |
| 206.88 | 5. | 208.04 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.54 | 480. | 5.49 | 1.05 | 3.538E-02 | 238.63 | 43.100 | 8.698E-01 | PB212 |
| 241.59 | 79. | 22.26 | 1.06 | 3.509E-02 | 241.98 | 7.500 | 8.445E-01 | PB214 |
| 277.57 | 18. | 72.32 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.06 | 140. | 14.91 | 0.76 | 3.088E-02 | 295.21 | 18.500 | 6.436E-01 | PB214 |
| 300.13 | 34. | 35.15 | 1.10 | 3.054E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 338.19 | 96. | 17.16 | 1.20 | 2.826E-02 | 338.40 | 12.010 | 8.076E-01 | Ra228 |
| | | | | | 338.40 | 12.010 | 8.076E-01 | Ra228 |
| 351.75 | 271. | 8.31 | 1.00 | 2.756E-02 | 351.92 | 35.800 | 7.446E-01 | PB214 |
| 510.28 | 130. | 11.30 | 1.69 | 2.149E-02 | 510.72 | 22.500 | 7.677E-01 | TL208 |
| 569.69 | 9. | 80.31 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.06 | 177. | 11.43 | 1.05 | 1.957E-02 | 583.14 | 86.000 | 2.908E-01 | TL208 |
| 592.56 | 9. | 110.25 | 1.54 | 1.936E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.25 | 177. | 9.29 | 1.31 | 1.895E-02 | 609.31 | 44.791 | 5.955E-01 | BI214 |
| 726.95 | 31. | 31.05 | 1.70 | 1.656E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 758.51 | 11. | 82.29 | 1.73 | 1.604E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:53:56
American Radiation Services Spectrum name: ARS05352.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 767.97 | 50. | 19.68 | 0.47 | 1.584E-02 | 768.36 | 4.799 | 1.858E+00 | BI214 |
| 785.98 | 3. | 250.19 | 1.76 | 1.556E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 859.75 | 20. | 43.70 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 868.25 | 9. | 90.34 | 1.85 | 1.429E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | PBC<MDA | EU152 |
| 910.83 | 103. | 11.95 | 1.89 | 1.368E-02 | 911.07 | 29.000 | 7.359E-01 | Ra228 |
| | | | | | 911.07 | 29.000 | 7.359E-01 | Ra228 |
| 947.20 | 7. | 111.69 | 1.92 | 1.322E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| 964.06 | 10. | 101.68 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| | | | | | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 964.30 | 15. | 71.53 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 6.052E-01 | Ra228 |
| 968.68 | 34. | 33.05 | 1.94 | 1.292E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| | | | | | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1081.11 | 1. | 744.43 | 2.05 | 1.156E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | 2.106E-02 | EU152 |
| 1111.78 | 5. | 182.97 | 2.07 | 1.128E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| | | | | | 1112.07 | 13.580 | 8.684E-02 | EU152 |
| 1119.90 | 42. | 24.12 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | 7.260E-01 | BI214 |
| 1238.00 | 46. | 21.22 | 0.53 | 1.004E-02 | 1238.11 | 5.859 | 2.238E+00 | BI214 |
| 1378.05 | 11. | 62.39 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1460.17 | 607. | 4.25 | 2.10 | 8.224E-03 | 1460.75 | 10.700 | 1.963E+01 | K40 |
| 1764.44 | 19. | 37.51 | 2.43 | 6.316E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 82.57 | 20.78 | 52. | 36. | 0.013 | 65.73 | 0.641 | MO-99 | |
| 298.06 | 74.62 | 264. | 185. | 0.069 | 30.41 | 0.508 | TH-234 | s |
| 307.88 | 77.07 | 196. | 283. | 0.105 | 18.61 | 0.746 | PB-212 | |
| 348.11 | 87.12 | 160. | 132. | 0.049 | 33.85 | 0.871 | TH-234 | |
| 358.74 | 89.78 | 121. | 77. | 0.029 | 47.26 | 0.579 | AC-228 | sM |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | |
|---|---|---|---|---|---|---|---|---|
| EU-152 | 157.30 | 39.45 | 115. | 9. | 0.003 | 328.55 | 0.750 | s |
| EU-152 | 160.59 | 40.27 | 124. | -9. | -0.003 | 373.06 | 0.750 | s |
| EU-154 | 168.38 | 42.22 | 93. | 12. | 0.004 | 243.47 | 0.750 | s |
| EU-154 | 172.89 | 43.34 | 112. | -11. | -0.004 | 270.64 | 0.750 | |
| EU-152 | 181.57 | 45.51 | 138. | 17. | 0.006 | 199.55 | 0.750 | s |

ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 11:53:56
American Radiation Services  Spectrum name: ARS05352.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.54 | 46.25 | 154. | 6. | 0.002 | 99.77 | 0.783s |
| EU-154 | 189.19 | 47.42 | 161. | -31. | -0.012 | 120.05 | 0.750s |
| Am-241 | 237.72 | 59.54 | 210. | 0. | 0.000 | 2000.00 | 0.766s |
| U-238 | 252.66 | 63.27 | 175. | 40. | 0.015 | 68.28 | 0.816 |
| U-238 | 369.17 | 92.38 | 223. | 34. | 0.012 | 66.60 | 0.820D |
| U-238 | 370.85 | 92.80 | 223. | 39. | 0.015 | 89.02 | 0.821D |
| PA-234 | 379.69 | 95.01 | 297. | -39. | -0.015 | 128.02 | 0.824s |
| PA-234 | 387.46 | 96.95 | 130. | -14. | -0.005 | 273.05 | 0.830s |
| PA-234 | 400.27 | 100.15 | 165. | -10. | -0.004 | 377.83 | 0.832s |
| PA-234 | 446.58 | 111.72 | 183. | -19. | -0.007 | 202.49 | 0.850s |
| EU-154 | 492.13 | 123.10 | 145. | 0. | 0.000 | 2000.00 | 0.870s |
| PA-234 | 523.22 | 130.87 | 230. | -22. | -0.008 | 232.35 | 0.883s |
| U-235 | 577.30 | 144.38 | 167. | 12. | 0.004 | 254.25 | 0.903s |
| U-235 | 742.77 | 185.72 | 149. | 25. | 0.009 | 218.31 | 0.969D |
| RA-226 | 744.73 | 186.21 | 147. | 0. | 0.000 | 239.82 | 0.970D |
| U-235 | 827.45 | 206.88 | 126. | 5. | 0.002 | 416.08 | 1.000s |
| PA-234 | 907.98 | 227.00 | 149. | -11. | -0.004 | 322.53 | 1.033s |
| PB-212 | 953.82 | 238.45 | 195. | 437. | 0.162 | 13.83 | 0.980 |
| PB-214 | 966.01 | 241.49 | 131. | 73. | 0.027 | 54.40 | 1.290s |
| EU-152 | 977.23 | 244.30 | 164. | -19. | -0.007 | 197.52 | 1.060s |
| EU-154 | 991.69 | 247.91 | 111. | -5. | -0.002 | 565.35 | 1.065s |
| TL-208 | 1110.41 | 277.57 | 100. | 18. | 0.007 | 144.63 | 1.109s |
| PB-214 | 1180.43 | 295.06 | 105. | 129. | 0.048 | 29.81 | 0.762s |
| PB-212 | 1200.71 | 300.13 | 52. | 34. | 0.012 | 70.29 | 1.100 |
| Ra-228 | 1353.05 | 338.19 | 94. | 96. | 0.036 | 34.31 | 1.198s |
| EU-152 | 1380.97 | 345.16 | 81. | -9. | -0.003 | 298.19 | 1.206 |
| PB-214 | 1407.34 | 351.75 | 84. | 258. | 0.096 | 16.62 | 1.004 |
| TL-208 | 2041.90 | 510.28 | 99. | 130. | 0.048 | 22.60 | 1.687s |
| PA-234 | 2279.68 | 569.69 | 43. | 9. | 0.003 | 160.62 | 1.509s |
| TL-208 | 2333.23 | 583.06 | 67. | 172. | 0.064 | 22.87 | 1.048s |
| EU-154 | 2371.24 | 592.56 | 45. | 9. | 0.003 | 220.50 | 1.536 |
| BI-214 | 2438.05 | 609.25 | 49. | 177. | 0.066 | 18.57 | 1.306 |
| PA-234 | 2794.85 | 698.39 | 50. | -7. | -0.002 | 320.87 | 1.664s |
| EU-154 | 2893.24 | 722.96 | 65. | -12. | -0.004 | 203.19 | 1.692s |
| BI-212 | 2909.19 | 726.95 | 38. | 31. | 0.012 | 62.11 | 1.696s |
| PA-234 | 2918.20 | 729.20 | 34. | -2. | -0.001 | 890.27 | 1.703s |
| EU-154 | 3035.53 | 758.51 | 37. | 11. | 0.004 | 164.59 | 1.729s |
| TL-208 | 3060.64 | 764.78 | 66. | -11. | -0.004 | 217.47 | 1.736s |
| BI-214 | 3073.38 | 767.97 | 13. | 50. | 0.018 | 39.35 | 0.469s |
| EU-152 | 3117.72 | 779.04 | 48. | -3. | -0.001 | 717.56 | 1.753s |
| BI-212 | 3145.51 | 785.98 | 35. | 3. | 0.001 | 500.38 | 1.761s |
| PA-234 | 3231.54 | 807.48 | 52. | -4. | -0.001 | 549.94 | 1.785s |
| PA-234 | 3329.85 | 832.04 | 45. | -6. | -0.002 | 318.53 | 1.809s |
| TL-208 | 3440.79 | 859.75 | 30. | 20. | 0.007 | 87.40 | 1.839s |
| EU-152 | 3474.82 | 868.25 | 32. | 9. | 0.003 | 180.68 | 1.846s |
| EU-154 | 3494.11 | 873.07 | 39. | -5. | -0.002 | 504.40 | 1.852s |
| PA-234 | 3506.66 | 876.21 | 16. | -1. | 0.000 | 1774.08 | 1.860s |
| PA-234 | 3595.25 | 898.34 | 34. | -4. | -0.002 | 502.87 | 1.878s |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:53:56
American Radiation Services Spectrum name: ARS05352.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Ra-228 | 3645.26 | 910.83 | 34. | 103. | 0.038 | 23.91 | 1.890 |
| PA-234 | 3790.86 | 947.20 | 27. | 7. | 0.003 | 223.38 | 1.923s |
| EU-152 | 3858.36 | 964.06 | 60. | 10. | 0.004 | 203.37 | 1.940s |
| Ra-228 | 3859.29 | 964.30 | 50. | 15. | 0.006 | 143.05 | 1.941s |
| Ra-228 | 3876.85 | 968.68 | 51. | 34. | 0.012 | 66.09 | 1.945s |
| EU-154 | 3987.10 | 996.22 | 31. | -2. | -0.001 | 1021.82 | 1.970 |
| EU-152 | 4326.89 | 1081.11 | 21. | 1. | 0.000 | 1488.87 | 2.048s |
| EU-152 | 4449.67 | 1111.78 | 34. | 5. | 0.002 | 365.93 | 2.070s |
| BI-214 | 4482.18 | 1119.90 | 31. | 42. | 0.016 | 48.24 | 2.077s |
| CO-60 | 4693.05 | 1172.57 | 47. | -4. | -0.001 | 843.80 | 2.119s |
| BI-214 | 4954.96 | 1238.00 | 12. | 46. | 0.017 | 42.45 | 0.529s |
| EU-154 | 5098.23 | 1273.79 | 36. | -6. | -0.002 | 296.61 | 2.192s |
| CO-60 | 5335.56 | 1333.07 | 24. | -5. | -0.002 | 394.98 | 2.231s |
| BI-214 | 5515.62 | 1378.05 | 16. | 11. | 0.004 | 124.78 | 2.259s |
| PA-234 | 5579.88 | 1394.10 | 32. | 0. | 0.000 | 2000.00 | 2.268s |
| EU-152 | 5643.91 | 1410.09 | 25. | -4. | -0.001 | 399.79 | 2.276s |
| K-40 | 5844.39 | 1460.17 | 26. | 607. | 0.225 | 8.50 | 2.103 |
| BI-214 | 7062.53 | 1764.44 | 24. | 19. | 0.007 | 75.02 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 3.0142E-02 | | | | | | |
| | | | 185.72 | 3.014E-02 | } P | 7.195E-02 | 1.09E+02 G K | |
| | | | 143.76 | 6.777E-02 | &(P | 3.604E-01 | 1.27E+02 G | |
| | | | 205.31 | 8.077E-02 | ?(P | 8.580E-01 | 2.08E+02 G | |
| | | | 163.35 | 1.771E-02 | % P | 6.536E-01 | 2.83E+02 G | |
| RA-226 | | 0.0000E+00 | | | | | | |
| | | | | | | | | Derived Ave Activity |
| | | | 186.21 | 0.000E+00 | } P | 1.124E+00 | 1.20E+02 G K | |
| Ra-228 | | 7.3908E-01 | | | | | | |
| | | | 911.07 | 7.359E-01 | (P | 2.136E-01 | 1.20E+01 G | |
| | | | 968.90 | 4.250E-01 | - P | 4.523E-01 | 3.30E+01 G | |
| | | | 338.40 | 8.076E-01 | (P | 4.010E-01 | 1.72E+01 G | |
| | | | 964.60 | 6.052E-01 | ?( | 1.439E+00 | 7.15E+01 G | |
| Am-241 | T | 0.0000E+00 | | | | | | |
| | | | 59.54 | 0.000E+00 | ?( | 1.487E-01 | 1.00E+03 G K | |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:53:56
American Radiation Services Spectrum name: ARS05352.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-210 | 1.5746E-01 | | | | | | |
| | | 46.52 | 1.575E-01 | *(P | 1.564E+00 | 4.99E+01 | G |
| U-238 | 7.1668E-01 | | | | | | |
| | | 63.29 | 7.262E-01 | (P | 1.159E+00 | 3.41E+01 | G |
| | | 92.80 | 7.167E-01 | } P | 1.318E+00 | 4.45E+01 | G |
| | | 92.38 | 7.167E-01 | } P | 1.539E+00 | 3.33E+01 | G |
| K-40 | 1.9634E+01 | | | | | | |
| | | 1460.75 | 1.963E+01 | (P | 8.614E-01 | 4.25E+00 | G |
| PB-214 | 7.1991E-01 | | | | | | |
| | | 351.92 | 7.446E-01 | (P | 1.312E-01 | 8.31E+00 | G |
| | | 295.21 | 6.436E-01 | (P | 2.516E-01 | 1.49E+01 | G |
| | | 241.98 | 7.902E-01 | (P | 6.074E-01 | 2.72E+01 | G |
| BI-214 | 6.1308E-01 | | | | | | |
| | | 609.31 | 5.955E-01 | (P | 1.180E-01 | 9.29E+00 | G |
| | | 1764.49 | 5.556E-01 | ?(P | 7.496E-01 | 3.75E+01 | G |
| | | 1120.29 | 7.260E-01 | ?( | 4.909E-01 | 2.41E+01 | G |
| | | 1238.11 | 2.238E+00 | + P | 9.058E-01 | 2.12E+01 | G |
| | | 768.36 | 1.858E+00 | + P | 7.410E-01 | 1.97E+01 | G |
| | | 1377.67 | 8.629E-01 | + | 1.764E+00 | 6.24E+01 | G |
| | | 934.06 | -4.260E-03 | & | 2.124E+00 | 1.38E+04 | G |
| BI-212 | 4.3463E-01 | | | | | | |
| | | 727.17 | 4.549E-01 | (P | 4.582E-01 | 3.11E+01 | G |
| | | 1620.56 | -1.920E-02 | % P | 1.067E+00 | 1.00E+03 | G |
| | | 785.42 | 3.152E-01 | &(P | 2.788E+00 | 2.50E+02 | G |
| PB-212 | 8.2592E-01 | | | | | | |
| | | 238.63 | 8.159E-01 | (P | 1.268E-01 | 6.92E+00 | G |
| | | 300.09 | 9.584E-01 | (P | 1.039E+00 | 3.51E+01 | G |
| TL-208 | 2.9193E-01 | | | | | | |
| | | 583.14 | 2.908E-01 | (P | 6.920E-02 | 1.14E+01 | G |
| | | 510.72 | 7.677E-01 | + P | 2.886E-01 | 1.13E+01 | G |
| | | 860.47 | 3.218E-01 | ?(P | 4.650E-01 | 4.37E+01 | G |
| | | 277.36 | 2.512E-01 | ?(P | 6.712E-01 | 7.23E+01 | G |
| | | 763.30 | -1.154E+00 | - | 4.256E+00 | 1.09E+02 | G |
| PA-234 | 3.7792E-02 | | | | | | |
| | | 98.44 | -2.974E-02 | ?(P | 1.208E-01 | 1.37E+02 | G |
| | | 946.00 | 7.496E-02 | ?( | 2.887E-01 | 1.12E+02 | G |
| | | 131.28 | -6.255E-02 | + P | 2.118E-01 | 1.16E+02 | G |
| | | 94.67 | -1.382E-01 | + | 2.917E-01 | 6.40E+01 | G |
| | | 883.24 | 6.070E-03 | % P | 5.113E-01 | 1.18E+03 | G |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:53:56
American Radiation Services Spectrum name: ARS05352.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 926.70 | -1.126E-02 | % | 5.149E-01 | 1.25E+03 | G |
| | | 569.26 | 1.293E-01 | ?(P | 4.571E-01 | 8.03E+01 | G |
| | | 111.00 | -1.247E-01 | + | 4.228E-01 | 1.01E+02 | G |
| | | 733.00 | -3.808E-02 | + | 6.061E-01 | 4.45E+02 | G |
| | | 949.00 | -1.735E-02 | % P | 5.108E-01 | 1.00E+03 | G |
| | | 880.51 | -2.029E-02 | + P | 6.618E-01 | 8.87E+02 | G |
| | | 226.87 | -1.369E-01 | + P | 7.163E-01 | 1.61E+02 | G |
| | | 831.10 | -2.119E-01 | + | 1.169E+00 | 1.59E+02 | G |
| | | 808.10 | -1.445E-01 | + | 1.390E+00 | 2.75E+02 | G |
| | | 99.70 | -1.129E-01 | + | 7.241E-01 | 1.89E+02 | G |
| | | 699.10 | -2.402E-01 | + P | 1.294E+00 | 1.60E+02 | G |
| | | 898.60 | -2.274E-01 | + P | 1.542E+00 | 2.51E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 2.446E+00 | 1.00E+03 | G |
| CS-137 | -1.8734E-03 | | | | | | |
| | | 661.66 | -1.873E-03 | %(P | 6.830E-02 | 1.00E+03 | G |
| CO-60 | -1.0269E-02 | | | | | | |
| | | 1173.24 | -1.027E-02 | ?(P | 9.285E-02 | 4.22E+02 | K |
| | | 1332.50 | -1.412E-02 | + P | 7.926E-02 | 1.97E+02 | K |
| EU-152 | 7.4969E-02 | | | | | | |
| | | 40.12 | -3.609E-02 | &( | 2.295E-01 | 1.87E+02 | G |
| | | 121.78 | -2.370E-03 | % | 1.074E-01 | 1.31E+03 | G |
| | | 344.30 | -3.299E-02 | + | 1.681E-01 | 1.49E+02 | G |
| | | 1408.08 | -5.748E-02 | + | 4.078E-01 | 2.00E+02 | G |
| | | 39.52 | 7.580E-02 | ?( | 4.240E-01 | 1.64E+02 | G |
| | | 964.00 | 1.525E-01 | ?(P | 5.831E-01 | 1.02E+02 | G |
| | | 1112.07 | 8.684E-02 | &( | 5.569E-01 | 1.83E+02 | G |
| | | 778.90 | -3.887E-02 | + | 4.910E-01 | 3.59E+02 | G |
| | | 1085.80 | 2.106E-02 | ?( | 5.763E-01 | 7.44E+02 | G |
| | | 45.40 | 2.038E-01 | ?( | 6.822E-01 | 9.98E+01 | G |
| | | 244.67 | -2.023E-01 | & | 6.693E-01 | 9.88E+01 | G |
| | | 867.39 | 4.156E-01 | ?(P | 1.397E+00 | 9.03E+01 | G |
| EU-154 | 8.1798E-02 | | | | | | |
| | | 123.10 | 0.000E+00 | &( | 8.210E-02 | 1.00E+03 | G |
| | | 1274.80 | -4.910E-02 | + | 2.530E-01 | 1.48E+02 | G |
| | | 723.30 | -1.021E-01 | + | 3.511E-01 | 1.02E+02 | G |
| | | 1004.80 | -7.662E-03 | % P | 4.870E-01 | 1.00E+03 | G |
| | | 43.00 | -9.916E-02 | + | 4.551E-01 | 1.35E+02 | G |
| | | 873.20 | -8.714E-02 | & P | 5.656E-01 | 2.52E+02 | G |
| | | 996.30 | -3.282E-02 | + | 6.029E-01 | 5.11E+02 | G |
| | | 42.31 | 1.856E-01 | &( | 7.658E-01 | 1.22E+02 | G |
| | | 248.04 | -6.665E-02 | & | 6.474E-01 | 2.83E+02 | G |
| | | 591.70 | 2.872E-01 | ( | 1.081E+00 | 1.10E+02 | G |
| | | 48.70 | -7.381E-01 | + | 1.457E+00 | 6.00E+01 | G |
| | | 756.70 | 4.738E-01 | ?(P | 1.339E+00 | 8.23E+01 | G |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 11:53:56
American Radiation Services Spectrum name: ARS05352.An1

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 A | 3.0142E-02 | 6.5777E-02 | 6.5813E-02 | 0.360E+00 |
| RA-226 #B | 0.0000E+00 | 6.3361E-01 | 6.3361E-01 | 0.112E+01 |
| Ra-228 # | 7.3908E-01 | 1.8520E-01 | 1.9147E-01 | 0.214E+00 |
| Am-241 #A | 0.0000E+00 | 6.1287E-02 | 6.1287E-02 | 0.149E+00 |
| PB-210 #A | 1.5746E-01 | 8.9224E-01 | 8.9237E-01 | 0.156E+01 |
| U-238 A | 7.1668E-01 | 4.7575E-01 | 4.7902E-01 | 0.116E+01 |
| K-40 | 1.9634E+01 | 1.7048E+00 | 2.3919E+00 | 0.861E+00 |
| PB-214 | 7.1991E-01 | 1.2557E-01 | 1.4447E-01 | 0.131E+00 |
| BI-214 | 6.1308E-01 | 1.2072E-01 | 1.2875E-01 | 0.118E+00 |
| BI-212 #A | 4.3463E-01 | 2.8593E-01 | 2.8762E-01 | 0.458E+00 |
| PB-212 | 8.2592E-01 | 1.1814E-01 | 1.3883E-01 | 0.127E+00 |
| TL-208 | 2.9193E-01 | 6.8913E-02 | 7.2429E-02 | 0.692E-01 |
| PA-234 #A | 3.7792E-02 | 5.4411E-02 | 5.4483E-02 | 0.121E+00 |
| CS-137 #A | -1.8734E-03 | 7.4934E-02 | 7.4935E-02 | 0.683E-01 |
| CO-60 #A | -1.0269E-02 | 1.2157E-01 | 1.2157E-01 | 0.928E-01 |
| EU-152 #A | 7.4969E-02 | 1.4703E-01 | 1.4727E-01 | 0.229E+00 |
| EU-154 A | 8.1798E-02 | 1.3711E-01 | 1.3722E-01 | 0.821E-01 |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 11:53:56
American Radiation Services     Spectrum name: ARS05352.An1


  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  205.3 to  1998.6 keV)     2.307E+01  pCi/g
```

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-11 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-010 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 010 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS01) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 9.8357E-02 | pCi/g | 4.2272E-02 | 6.2000E-02 | 3.1000E-02 | | | |
| **RA-226** | 1.2841E+00 | pCi/g | 7.1417E-01 | 1.0200E+00 | 5.1000E-01 | | | |
| **RA-228** | 6.3161E-01 | pCi/g | 1.9357E-01 | 1.9600E-01 | 9.8000E-02 | | | |
| **AM-241** | 4.3963E-02 | pCi/g | 7.6262E-02 | 1.2700E-01 | 6.3500E-02 | | | |
| **PB-210** | 6.3008E-01 | pCi/g | 7.8105E-01 | 1.3300E+00 | 6.6500E-01 | | | |
| **U-238** | 1.0662E+00 | pCi/g | 7.7672E-01 | 1.1800E+00 | 5.9000E-01 | | | |
| **K-40** | 9.7953E+00 | pCi/g | 1.2649E+00 | 5.2700E-01 | 2.6350E-01 | | | |
| **PB-214** | 6.7139E-01 | pCi/g | 1.2935E-01 | 1.1000E-01 | 5.5000E-02 | | | |
| **BI-214** | 5.4710E-01 | pCi/g | 1.1138E-01 | 1.0000E-01 | 5.0000E-02 | | | |
| **BI-212** | 2.3460E-01 | pCi/g | 3.4312E-01 | 4.4800E-01 | 2.2400E-01 | | | |
| **PB-212** | 3.8960E-01 | pCi/g | 8.7628E-02 | 1.0200E-01 | 5.1000E-02 | | | |
| **TL-208** | 1.7978E-01 | pCi/g | 4.9331E-02 | 5.0900E-02 | 2.5450E-02 | | | |
| **PA-234** | 8.1939E-02 | pCi/g | 1.3791E-01 | 1.3200E-01 | 6.6000E-02 | | | |
| **CS-137** | 1.1604E-03 | pCi/g | 3.0475E-02 | 5.5200E-02 | 2.7600E-02 | | | |
| **CO-60** | 1.9199E-04 | pCi/g | 3.8814E-02 | 7.0800E-02 | 3.5400E-02 | | | |
| **EU-152** | 1.3081E-01 | pCi/g | 6.7943E-02 | 1.8100E-01 | 9.0500E-02 | | | |
| **EU-154** | 3.5434E-02 | pCi/g | 5.5240E-02 | 7.4100E-02 | 3.7050E-02 | | | |
| **Total Gamma** | 1.5822E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.4705E+01 | pCi/g | | | | | | |
| | | | | | | | | |

0.88 Spectrum name: ARS01322.An1

Sample description
Batch ID: 16-00698-11
SDG: ARS1-16-00671-010 Tech: WJS

Spectrum Filename: C:\User\ARS01322.An1

Acquisition information
Start time: 05-May-2016 11:55:42
Live time: 3600
Real time: 3607
Dead time: 0.20 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.79keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.1740E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.1740E+02) =
3.1506E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01322.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 25 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1851

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 46.44 | 27. | 24.93 | 0.80 | 2.560E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 46.51 | 70. | 25.36 | 0.90 | 2.503E-02 | 45.40 | 9.000 | 7.347E-01 | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.64 | 23. | 64.64 | 0.30 | 3.396E-02 | 59.54 | 35.900 | 4.471E-02 | Am241 |
| 63.24 | 112. | 20.53 | 0.94 | 3.622E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.73 | 141. | 15.57 | 0.93 | 4.215E-02 | | | | |
| 77.10 | 241. | 9.80 | 0.93 | 4.308E-02 | | | | |
| 83.96 | 43. | 40.28 | 0.93 | 4.520E-02 | | | | |
| 87.29 | 95. | 19.89 | 0.94 | 4.596E-02 | | | | |
| 92.49 | 16. | 135.13 | 0.94 | 4.678E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 92.91 | 56. | 28.94 | 0.94 | 4.684E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 99.63 | 23. | 84.07 | 0.95 | 4.742E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 142.53 | 9. | 113.45 | 0.98 | 4.380E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 162.65 | 19. | 75.60 | 1.00 | 4.090E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.90 | 109. | 18.10 | 1.09 | 3.766E-02 | 185.72 | 54.000 | 1.268E-01 | U235 |
| | | | | | 186.10 | 3.500 | 1.284E+00 | RA226 |
| 205.06 | 5. | 178.05 | 1.03 | 3.512E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.88 | 264. | 7.97 | 1.06 | 3.137E-02 | 238.63 | 43.100 | 4.204E-01 | PB212 |
| 241.93 | 83. | 18.74 | 1.06 | 3.107E-02 | 241.98 | 7.500 | 8.404E-01 | PB214 |
| 249.65 | 13. | 87.37 | 1.07 | 3.048E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| 277.31 | 4. | 329.11 | 1.09 | 2.794E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.47 | 138. | 13.77 | 1.06 | 2.659E-02 | 295.21 | 18.500 | 6.238E-01 | PB214 |
| 338.33 | 67. | 23.23 | 0.38 | 2.392E-02 | 338.40 | 12.010 | 5.539E-01 | Ra228 |
| 352.26 | 250. | 8.25 | 1.43 | 2.318E-02 | 351.92 | 35.800 | 6.856E-01 | PB214 |
| 510.95 | 143. | 12.12 | 0.90 | 1.746E-02 | 510.72 | 22.500 | 5.956E-01 | TL208 |
| 568.87 | 4. | 142.58 | 1.31 | 1.611E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.46 | 103. | 11.97 | 1.40 | 1.583E-02 | 583.14 | 86.000 | 1.798E-01 | TL208 |
| 609.72 | 167. | 8.71 | 1.61 | 1.532E-02 | 609.31 | 44.791 | 5.164E-01 | BI214 |

0.88 Spectrum name: ARS01322.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 723.87 | 2. | 340.60 | 1.43 | 1.350E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| 728.14 | 12. | 66.00 | 1.43 | 1.345E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 733.16 | 1. | 366.72 | 1.43 | 1.337E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 753.13 | 4. | 163.60 | 1.45 | 1.306E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 763.09 | 3. | 221.51 | 1.45 | 1.297E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.37 | 37. | 24.41 | 0.39 | 1.291E-02 | 768.36 | 4.799 | 1.424E+00 | BI214 |
| 785.83 | 6. | 127.84 | 1.47 | 1.270E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 808.20 | 6. | 120.48 | 1.49 | 1.243E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 832.60 | 5. | 121.35 | 1.50 | 1.217E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 911.38 | 91. | 14.25 | 1.76 | 1.135E-02 | 911.07 | 29.000 | 6.543E-01 | Ra228 |
| 933.75 | 17. | 40.65 | 0.49 | 1.114E-02 | 934.06 | 3.029 | 1.219E+00 | BI214 |
| 965.00 | 17. | 51.69 | 1.59 | 1.087E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 968.90 | -1. | 372.04 | 1.60 | 1.083E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1086.03 | 4. | 143.07 | 1.68 | 9.900E-03 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.82 | 39. | 20.38 | 1.05 | 9.654E-03 | 1120.29 | 14.797 | 6.401E-01 | BI214 |
| 1274.82 | 8. | 77.87 | 1.80 | 8.672E-03 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1376.56 | 4. | 177.82 | 1.86 | 8.106E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.93 | 4. | 108.08 | 1.87 | 8.021E-03 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1461.30 | 354. | 5.42 | 1.76 | 7.688E-03 | 1460.75 | 10.700 | 1.003E+01 | K40 |
| 1764.65 | 8. | 45.52 | 2.08 | 6.410E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.08 | 74.78 | 210. | 101. | 0.028 | 46.99 | 0.617 | TH-234 | s |
| 307.58 | 77.15 | 187. | 184. | 0.051 | 25.68 | 0.715 | PB-212 | |
| 335.04 | 84.01 | 131. | 51. | 0.014 | 74.08 | 0.581 | RA-226 | s |
| 348.36 | 87.34 | 138. | 82. | 0.023 | 47.89 | 0.395 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 157.03 | 39.53 | 150. | -9. | -0.003 | 383.06 | 0.897s |
| EU-152 | 151.71 | 38.20 | 104. | -11. | -0.003 | 271.53 | 0.897s |
| EU-154 | 171.16 | 43.06 | 158. | -19. | -0.005 | 190.86 | 0.899s |
| EU-154 | 171.03 | 43.03 | 171. | -20. | -0.005 | 192.47 | 0.899s |
| EU-152 | 184.96 | 46.51 | 122. | 70. | 0.019 | 50.73 | 0.901s |

0.88 Spectrum name: ARS01322.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.68 | 46.44 | 139. | 27. | 0.008 | 49.87 | 0.795 |
| EU-154 | 189.81 | 47.72 | 198. | -36. | -0.010 | 114.37 | 0.904s |
| Am-241 | 237.84 | 59.73 | 181. | 23. | 0.006 | 173.35 | 0.913s |
| U-238 | 251.91 | 63.24 | 210. | 64. | 0.018 | 41.06 | 0.935s |
| U-238 | 368.51 | 92.38 | 256. | 16. | 0.004 | 270.26 | 0.940D |
| U-238 | 370.20 | 92.80 | 206. | 56. | 0.015 | 57.89 | 0.941D |
| PA-234 | 375.65 | 94.16 | 280. | -26. | -0.007 | 188.75 | 0.942s |
| PA-234 | 397.54 | 99.63 | 169. | 23. | 0.006 | 168.15 | 0.946s |
| PA-234 | 441.79 | 110.69 | 151. | -10. | -0.003 | 369.84 | 0.956s |
| EU-154 | 491.82 | 123.19 | 145. | -11. | -0.003 | 304.62 | 0.965s |
| PA-234 | 518.83 | 129.95 | 142. | -7. | -0.002 | 617.28 | 0.972s |
| U-235 | 569.20 | 142.53 | 133. | 9. | 0.002 | 226.89 | 0.982s |
| U-235 | 649.68 | 162.65 | 107. | 19. | 0.005 | 151.19 | 0.998s |
| U-235 | 742.65 | 185.88 | 118. | 85. | 0.024 | 42.31 | 1.016 |
| RA-226 | 742.71 | 185.90 | 134. | 72. | 0.020 | 36.21 | 1.094 |
| U-235 | 819.39 | 205.06 | 98. | 5. | 0.001 | 356.11 | 1.032s |
| PB-212 | 954.48 | 238.82 | 142. | 223. | 0.062 | 19.10 | 1.080 |
| PB-214 | 966.70 | 241.87 | 87. | 70. | 0.019 | 47.03 | 0.566s |
| EU-152 | 972.04 | 243.21 | 137. | -28. | -0.008 | 126.00 | 1.064s |
| EU-154 | 997.82 | 249.65 | 60. | 13. | 0.004 | 174.74 | 1.066s |
| TL-208 | 1108.46 | 277.31 | 96. | 4. | 0.001 | 658.22 | 1.090s |
| PB-214 | 1181.09 | 295.46 | 78. | 131. | 0.036 | 27.53 | 1.066 |
| Ra-228 | 1352.61 | 338.33 | 65. | 67. | 0.019 | 46.47 | 0.378s |
| EU-152 | 1376.59 | 344.32 | 83. | -6. | -0.002 | 423.78 | 1.142s |
| PB-214 | 1408.37 | 352.26 | 59. | 241. | 0.067 | 16.49 | 1.428s |
| TL-208 | 2043.20 | 510.95 | 89. | 99. | 0.027 | 24.24 | 0.904s |
| PA-234 | 2274.92 | 568.87 | 33. | 4. | 0.001 | 285.16 | 1.314s |
| TL-208 | 2333.28 | 583.46 | 33. | 103. | 0.029 | 23.94 | 1.405 |
| BI-214 | 2438.34 | 609.72 | 32. | 150. | 0.042 | 17.41 | 1.614s |
| PA-234 | 2798.39 | 699.74 | 34. | -4. | -0.001 | 481.12 | 1.409s |
| EU-154 | 2894.94 | 723.87 | 30. | 2. | 0.001 | 681.19 | 1.426s |
| BI-212 | 2912.00 | 728.14 | 34. | 12. | 0.003 | 132.00 | 1.429s |
| PA-234 | 2932.07 | 733.16 | 32. | 1. | 0.000 | 733.44 | 1.433s |
| EU-154 | 3011.95 | 753.13 | 16. | 4. | 0.001 | 327.20 | 1.450s |
| TL-208 | 3051.82 | 763.09 | 30. | 3. | 0.001 | 443.03 | 1.455s |
| BI-214 | 3072.93 | 768.37 | 15. | 37. | 0.010 | 48.81 | 0.387s |
| EU-152 | 3115.04 | 778.90 | 21. | 0. | 0.000 | 2000.00 | 1.466s |
| BI-212 | 3142.75 | 785.83 | 25. | 6. | 0.002 | 255.67 | 1.470s |
| PA-234 | 3232.22 | 808.20 | 23. | 6. | 0.002 | 240.96 | 1.486s |
| PA-234 | 3329.82 | 832.60 | 25. | 5. | 0.001 | 242.69 | 1.502s |
| EU-152 | 3468.96 | 867.39 | 57. | 0. | 0.000 | 2000.00 | 1.528s |
| PA-234 | 3519.49 | 880.02 | 32. | -4. | -0.001 | 651.83 | 1.537s |
| Ra-228 | 3644.89 | 911.38 | 28. | 91. | 0.025 | 28.49 | 1.764 |
| BI-214 | 3734.38 | 933.75 | 10. | 17. | 0.005 | 81.31 | 0.485s |
| PA-234 | 3794.15 | 948.70 | 30. | -1. | 0.000 | 1799.30 | 1.584s |
| EU-152 | 3847.98 | 962.16 | 28. | -4. | -0.001 | 384.13 | 1.594s |
| Ra-228 | 3859.35 | 965.00 | 30. | 17. | 0.005 | 103.38 | 1.594s |
| EU-154 | 4017.86 | 1004.64 | 25. | -3. | -0.001 | 573.26 | 1.621s |

0.88 Spectrum name: ARS01322.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| EU-152 | 4343.33 | 1086.03 | 16. | 4. | 0.001 | 286.13 | 1.675s |
| BI-214 | 4482.46 | 1120.82 | 14. | 39. | 0.011 | 40.77 | 1.049s |
| EU-154 | 5098.26 | 1274.82 | 17. | 8. | 0.002 | 155.75 | 1.796s |
| CO-60 | 5328.88 | 1332.50 | 37. | 0. | 0.000 | 2000.00 | 1.832s |
| BI-214 | 5505.04 | 1376.56 | 23. | 4. | 0.001 | 355.64 | 1.860s |
| PA-234 | 5574.49 | 1393.93 | 8. | 4. | 0.001 | 216.16 | 1.870s |
| EU-152 | 5640.97 | 1410.56 | 13. | -1. | 0.000 | 934.84 | 1.878s |
| K-40 | 5843.95 | 1461.33 | 11. | 341. | 0.095 | 11.06 | 1.750 |
| BI-214 | 7056.46 | 1764.65 | 9. | 8. | 0.002 | 91.04 | 2.083s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 9.8357E-02 | | | | | | |
| | | | 185.72 | 9.836E-02 | ( | 6.197E-02 | 2.12E+01 G | |
| | | | 143.76 | 4.566E-02 | & P | 2.900E-01 | 1.13E+02 G | |
| | | | 205.31 | 6.619E-02 | & P | 6.994E-01 | 1.78E+02 G | |
| | | | 163.35 | 2.291E-01 | & P | 6.256E-01 | 7.56E+01 G | |
| RA-226 | | 1.2841E+00 | | | | | | |
| | | | 186.10 | 1.284E+00 | (P | 1.019E+00 | 1.81E+01 G | |
| Ra-228 | | 6.3161E-01 | | | | | | |
| | | | 911.07 | 6.543E-01 | (P | 1.963E-01 | 1.42E+01 G | |
| | | | 968.90 | -1.302E-02 | % P | 3.919E-01 | 3.72E+02 G | |
| | | | 338.40 | 5.539E-01 | (P | 3.310E-01 | 2.32E+01 G | |
| | | | 964.60 | 6.822E-01 | ?( | 1.135E+00 | 5.17E+01 G | |
| Am-241 | T | 4.3963E-02 | | | | | | |
| | | | 59.54 | 4.396E-02 | ?( | 1.271E-01 | 8.67E+01 G | K |
| PB-210 | | 6.3008E-01 | | | | | | |
| | | | 46.52 | 6.301E-01 | (P | 1.330E+00 | 2.49E+01 G | |
| U-238 | | 1.0662E+00 | | | | | | |
| | | | 63.29 | 1.066E+00 | *(P | 1.176E+00 | 2.05E+01 G | |
| | | | 92.80 | 9.382E-01 | } P | 1.170E+00 | 2.89E+01 G | |
| | | | 92.38 | 3.149E-01 | } P | 1.520E+00 | 1.35E+02 G | |
| K-40 | | 9.7953E+00 | | | | | | |
| | | | 1460.75 | 9.795E+00 | (P | 5.268E-01 | 5.53E+00 G | |

0.88 Spectrum name: ARS01322.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-214 | 6.7139E-01 | | | | | | |
| | | 351.92 | 6.856E-01 | @(P | 1.099E-01 | 8.25E+00 | G |
| | | 295.21 | 6.287E-01 | (P | 2.109E-01 | 1.38E+01 | G |
| | | 241.98 | 7.088E-01 | (P | 4.693E-01 | 2.35E+01 | G |
| BI-214 | 5.4710E-01 | | | | | | |
| | | 609.31 | 5.164E-01 | (P | 1.004E-01 | 8.71E+00 | G |
| | | 1764.49 | 1.934E-01 | - P | 4.083E-01 | 4.55E+01 | G |
| | | 1120.29 | 6.401E-01 | (P | 3.371E-01 | 2.04E+01 | G |
| | | 1238.11 | 2.825E-02 | & | 1.310E+00 | 1.28E+03 | G |
| | | 768.36 | 1.424E+00 | + | 7.857E-01 | 2.44E+01 | G |
| | | 1377.67 | 2.964E-01 | - | 1.868E+00 | 1.78E+02 | G |
| | | 934.06 | 1.219E+00 | + P | 1.203E+00 | 4.07E+01 | G |
| BI-212 | 2.3460E-01 | | | | | | |
| | | 727.17 | 1.822E-01 | &(P | 4.478E-01 | 6.60E+01 | G |
| | | 1620.56 | 6.906E-03 | % | 1.918E+00 | 6.97E+03 | G |
| | | 785.42 | 5.440E-01 | ( | 2.420E+00 | 1.28E+02 | G |
| PB-212 | 3.8960E-01 | | | | | | |
| | | 238.63 | 3.896E-01 | (P | 1.019E-01 | 9.55E+00 | G |
| | | 300.09 | -3.060E-02 | % P | 1.504E+00 | 1.00E+03 | G |
| TL-208 | 1.7978E-01 | | | | | | |
| | | 583.14 | 1.798E-01 | (P | 5.090E-02 | 1.20E+01 | G |
| | | 510.72 | 5.956E-01 | + P | 2.809E-01 | 1.21E+01 | G |
| | | 860.47 | -6.383E-03 | % P | 4.081E-01 | 4.53E+03 | G |
| | | 277.36 | 4.975E-02 | - P | 6.292E-01 | 3.29E+02 | G |
| | | 763.30 | 3.714E-01 | + P | 3.007E+00 | 2.22E+02 | G |
| PA-234 | 8.1939E-02 | | | | | | |
| | | 98.44 | -4.161E-03 | %(P | 1.322E-01 | 4.01E+03 | G |
| | | 946.00 | -1.304E-02 | % P | 2.762E-01 | 1.95E+03 | G |
| | | 131.28 | -1.820E-02 | + P | 1.511E-01 | 3.09E+02 | G |
| | | 94.67 | -8.321E-02 | + | 2.618E-01 | 9.44E+01 | G |
| | | 883.24 | 4.601E-03 | & | 4.118E-01 | 2.42E+03 | G |
| | | 926.70 | -2.711E-02 | % P | 4.896E-01 | 2.06E+03 | G |
| | | 569.26 | 6.008E-02 | &(P | 4.166E-01 | 1.43E+02 | G |
| | | 111.00 | -5.576E-02 | + | 3.503E-01 | 1.85E+02 | G |
| | | 733.00 | 3.082E-02 | ?(P | 6.011E-01 | 3.67E+02 | G |
| | | 949.00 | -2.396E-02 | + | 7.798E-01 | 9.00E+02 | G |
| | | 880.51 | -1.127E-01 | + P | 9.060E-01 | 3.26E+02 | G |
| | | 226.87 | -1.006E-02 | & | 5.526E-01 | 1.58E+03 | G |
| | | 831.10 | 1.608E-01 | &(P | 9.060E-01 | 1.21E+02 | G |
| | | 808.10 | 2.314E-01 | ?( | 9.690E-01 | 1.20E+02 | G |
| | | 99.70 | 2.399E-01 | ?( | 6.722E-01 | 8.41E+01 | G |
| | | 699.10 | -1.307E-01 | + | 1.111E+00 | 2.41E+02 | G |

0.88 Spectrum name: ARS01322.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 898.60 | -3.107E-03 | & P | 1.478E+00 | 1.00E+03 | G |
| | | 1394.10 | 3.145E-01 | &( | 1.203E+00 | 1.08E+02 | G |
| CS-137 | 1.1604E-03 | | | | | | |
| | | 661.66 | 1.160E-03 | &( | 5.519E-02 | 1.31E+03 | G |
| CO-60 | 1.9199E-04 | | | | | | |
| | | 1173.24 | 1.920E-04 | %( | 7.081E-02 | 1.01E+04 | K |
| | | 1332.50 | 0.000E+00 | - | 8.802E-02 | 1.00E+03 | K |
| EU-152 | 1.3081E-01 | | | | | | |
| | | 40.12 | -3.936E-02 | &( | 1.814E-01 | 1.36E+02 | G |
| | | 121.78 | 6.540E-04 | % | 9.153E-02 | 4.03E+03 | G |
| | | 344.30 | -2.295E-02 | + | 1.674E-01 | 2.12E+02 | G |
| | | 1408.08 | -1.590E-02 | + | 2.779E-01 | 4.67E+02 | G |
| | | 39.52 | -6.326E-02 | + | 4.119E-01 | 1.92E+02 | G |
| | | 964.00 | -6.054E-02 | + | 4.105E-01 | 1.92E+02 | G |
| | | 1112.07 | 6.480E-04 | & | 4.107E-01 | 1.70E+04 | G |
| | | 778.90 | 0.000E+00 | + | 3.459E-01 | 1.00E+03 | G |
| | | 1085.80 | 9.871E-02 | ?( | 5.007E-01 | 1.43E+02 | G |
| | | 45.40 | 7.347E-01 | ?( | 5.700E-01 | 2.54E+01 | G |
| | | 244.67 | -2.775E-01 | & | 5.765E-01 | 6.30E+01 | G |
| | | 867.39 | 0.000E+00 | & | 1.814E+00 | 1.00E+03 | G |
| EU-154 | 3.5434E-02 | | | | | | |
| | | 123.10 | -1.436E-02 | ?( | 7.410E-02 | 1.52E+02 | G |
| | | 1274.80 | 6.349E-02 | ?( | 1.666E-01 | 7.79E+01 | G |
| | | 723.30 | 2.077E-02 | ?( | 2.529E-01 | 3.41E+02 | G |
| | | 1004.80 | -3.203E-02 | + | 3.297E-01 | 2.87E+02 | G |
| | | 43.00 | -1.513E-01 | + | 4.873E-01 | 9.62E+01 | G |
| | | 873.20 | -1.381E-03 | & | 5.113E-01 | 1.02E+04 | G |
| | | 996.30 | -7.874E-03 | % | 5.406E-01 | 1.87E+03 | G |
| | | 42.31 | -2.687E-01 | + | 8.582E-01 | 9.54E+01 | G |
| | | 248.04 | 1.554E-01 | ?( | 4.565E-01 | 8.74E+01 | G |
| | | 591.70 | 5.839E-04 | % | 8.345E-01 | 3.87E+04 | G |
| | | 48.70 | -7.637E-01 | + | 1.434E+00 | 5.72E+01 | G |
| | | 756.70 | 1.612E-01 | ?( | 9.431E-01 | 1.64E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

0.88 Spectrum name: ARS01322.An1

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty Counting 2 Sigma pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | # | 9.8357E-02 | 4.1614E-02 | 4.2272E-02 | 0.620E-01 |
| RA-226 | | 1.2841E+00 | 7.0942E-01 | 7.1417E-01 | 0.102E+01 |
| Ra-228 | | 6.3161E-01 | 1.8930E-01 | 1.9357E-01 | 0.196E+00 |
| Am-241 | #A | 4.3963E-02 | 7.6208E-02 | 7.6262E-02 | 0.127E+00 |
| PB-210 | A | 6.3008E-01 | 7.7857E-01 | 7.8105E-01 | 0.133E+01 |
| U-238 | A | 1.0662E+00 | 7.7226E-01 | 7.7672E-01 | 0.118E+01 |
| K-40 | | 9.7953E+00 | 1.0987E+00 | 1.2649E+00 | 0.527E+00 |
| PB-214 | | 6.7139E-01 | 1.1498E-01 | 1.2935E-01 | 0.110E+00 |
| BI-214 | | 5.4710E-01 | 1.0605E-01 | 1.1138E-01 | 0.100E+00 |
| BI-212 | #A | 2.3460E-01 | 3.4278E-01 | 3.4312E-01 | 0.448E+00 |
| PB-212 | | 3.8960E-01 | 8.2324E-02 | 8.7628E-02 | 0.102E+00 |
| TL-208 | | 1.7978E-01 | 4.7914E-02 | 4.9331E-02 | 0.509E-01 |
| PA-234 | #A | 8.1939E-02 | 1.3778E-01 | 1.3791E-01 | 0.132E+00 |
| CS-137 | #A | 1.1604E-03 | 3.0475E-02 | 3.0475E-02 | 0.552E-01 |
| CO-60 | #B | 1.9199E-04 | 3.8814E-02 | 3.8814E-02 | 0.708E-01 |
| EU-152 | #A | 1.3081E-01 | 6.6356E-02 | 6.7943E-02 | 0.181E+00 |
| EU-154 | #A | 3.5434E-02 | 5.5188E-02 | 5.5240E-02 | 0.741E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

0.88 Spectrum name: ARS01322.An1

---------- S U M M A R Y ----------

| | | |
|---|---|---|
| Total Activity ( 186.0 to 2000.7 keV) | 1.524E+01 | pCi/g |

The library has energies which are not separable.

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00565-07 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-011 |
| AnalysisBatch | ARS1-B16-00565 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 011 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| U-235 | 4.8273E-02 | pCi/g | 1.3501E-01 | 2.7000E-01 | 1.3500E-01 | | | |
| RA-226 | 0.0000E+00 | pCi/g | 4.9686E-01 | 8.7600E-01 | 4.3800E-01 | | | |
| RA-228 | 4.1167E-01 | pCi/g | 1.2638E-01 | 1.1000E-01 | 5.5000E-02 | | | |
| AM-241 | 0.0000E+00 | pCi/g | 3.5285E-02 | 1.2900E-01 | 6.4500E-02 | | | |
| PB-210 | 2.3719E-01 | pCi/g | 8.1656E-01 | 1.2200E+00 | 6.1000E-01 | | | |
| U-238 | 3.9801E-01 | pCi/g | 4.2349E-01 | 1.1500E+00 | 5.7500E-01 | | | |
| K-40 | 1.2223E+01 | pCi/g | 1.4999E+00 | 3.8100E-01 | 1.9050E-01 | | | |
| PB-214 | 3.3770E-01 | pCi/g | 1.0268E-01 | 8.9500E-02 | 4.4750E-02 | | | |
| BI-214 | 2.5133E-01 | pCi/g | 9.1162E-02 | 8.5900E-02 | 4.2950E-02 | | | |
| BI-212 | 0.0000E+00 | pCi/g | 2.1847E-01 | 4.4600E-01 | 2.2300E-01 | | | |
| PB-212 | 2.6081E-01 | pCi/g | 6.5378E-02 | 7.3700E-02 | 3.6850E-02 | | | |
| TL-208 | 1.2738E-01 | pCi/g | 4.6137E-02 | 4.0400E-02 | 2.0200E-02 | | | |
| PA-234 ~~1.5326E-01~~ 2.209E-02 | ~~1.5326E-01~~ | pCi/g | 9.3106E-02 | 1.1300E-01 | 5.6500E-02 | | | |
| CS-137 | 8.0742E-03 | pCi/g | 3.8119E-02 | 5.1900E-02 | 2.5950E-02 | | | |
| CO-60 | 8.1978E-03 | pCi/g | 2.3381E-02 | 7.6800E-02 | 3.8400E-02 | | | |
| EU-152 | 1.2106E-01 | pCi/g | 1.0743E-01 | 1.6600E-01 | 8.3000E-02 | | | |
| EU-154 0.0000E+00 | ~~8.8967E-02~~ | pCi/g | 3.6113E-02 | 6.3900E-02 | 3.1950E-02 | | | |
| Total Gamma | 1.4675E+01 | pCi/g | | | | | | |
| Total NORM Activity | 4.1898E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  4/19/2016 1:30:38 PM
                                Spectrum name: ARS08226.An1

Sample description
     Batch ID:  16-00565-07
     SDG:  ARS1-16-00671-011  Tech:  WJS

Spectrum Filename: C:\User\ARS08226.An1

Acquisition information
       Start time:                4/19/2016 1:00:22 PM
       Live time:               1800
       Real time:               1807
       Dead time:                  0.41 %
       Detector ID:                   9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:             Env32   G702W050
       Start channel:             100 (    25.46keV )
       Stop channel:             8000 (  1999.20keV )
       Peak rejection level:     1000.000%
       Peak search sensitivity:     1
       Sample Size:                 3.9862E+02 +/- 0.000E+00%
       Activity scaling factor:     1.0000E+06/(  1.0000E+00*  3.9862E+02) =
                                    2.5087E+03
       Detection limit method:      Reg. Guide 4.16 Method
       Random error:                1.0000000E+00
       Systematic error:            1.0000000E+00
       Fraction Limit:             60.000%
       Background width:            average of five points.
       Half lives decay limit:     12.000
```

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.2171

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 39.70 | 13. | 90.36 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 6.187E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 6.187E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 1.181E-01 | EU152 |
| 40.07 | 14. | 79.61 | 0.97 | 2.638E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 6.901E-02 | EU152 |
| 47.01 | 8. | 172.06 | 0.97 | 3.135E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.64 | 24. | 56.60 | 0.70 | 4.491E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | 5.212E-01 | U238 |
| 74.86 | 83. | 17.65 | 1.01 | 5.129E-02 | | | | |
| 77.28 | 129. | 12.65 | 1.01 | 5.237E-02 | | | | |
| 93.03 | 17. | 95.45 | 1.02 | 5.685E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 94.67 | 15.500 | PBC<MDA | PA234 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 93.08 | 29. | 53.05 | 1.03 | 5.693E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 94.67 | 15.500 | PBC<MDA | PA234 |
| 153.52 | 7. | 102.48 | 0.42 | 5.409E-02 | | | | |
| 163.46 | 10. | 139.80 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 168.89 | 23. | 39.56 | 0.48 | 5.176E-02 | | | | |
| 185.70 | 40. | 27.01 | 0.77 | 4.920E-02 | 185.72 | 57.200 | 5.381E-02 | U235 |
| | | | | | 186.21 | 3.640 | 8.469E-01 | RA226 |
| 209.68 | 16. | 71.91 | 0.32 | 4.575E-02 | | | | |
| 214.97 | 4. | 154.52 | 0.50 | 4.504E-02 | | | | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 227.16 | 25. | 47.43 | 1.17 | 4.350E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.42 | 124. | 14.61 | 0.68 | 4.209E-02 | 238.63 | 43.100 | 2.575E-01 | PB212 |
| 241.87 | 27. | 37.65 | 1.19 | 4.167E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 295.03 | 71. | 20.09 | 0.85 | 3.634E-02 | 295.21 | 18.500 | 3.958E-01 | PB214 |
| 338.00 | 41. | 25.12 | 0.38 | 3.297E-02 | 338.40 | 12.010 | 3.900E-01 | Ra228 |
| 351.56 | 96. | 14.24 | 1.02 | 3.209E-02 | 351.92 | 35.800 | 3.091E-01 | PB214 |
| 374.51 | 6. | 75.28 | 0.38 | 3.068E-02 | | | | |
| 418.23 | 13. | 36.89 | 0.53 | 2.838E-02 | | | | |
| 511.22 | 94. | 15.16 | 0.59 | 2.465E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| 583.48 | 62. | 17.82 | 1.20 | 2.248E-02 | 583.14 | 86.000 | 1.208E-01 | TL208 |
| 592.63 | 5. | 180.04 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.78 | 63. | 16.90 | 1.41 | 2.180E-02 | 609.31 | 44.791 | 2.328E-01 | BI214 |
| 661.65 | 4. | 236.04 | 1.61 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| | | | | | 661.66 | 85.210 | PBC<MDA | CS137 |
| 689.40 | 22. | 27.37 | 0.78 | 2.001E-02 | | | | |
| 699.68 | 3. | 338.13 | 1.64 | 1.982E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| | | | | | 699.10 | 4.600 | 1.239E-01 | PA234 |
| 722.71 | 10. | 81.16 | 1.66 | 1.935E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| | | | | | 723.30 | 19.700 | 9.386E-02 | EU154 |
| 727.42 | 26. | 23.71 | 0.34 | 1.928E-02 | 727.17 | 11.800 | 4.305E-01 | BI212 |
| 755.73 | 1. | 822.19 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 4.900E-02 | EU154 |
| 763.34 | 5. | 169.23 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 808.04 | 11. | 30.15 | 1.74 | 1.790E-02 | 808.10 | 4.900 | 4.724E-01 | PA234 |
| | | | | | 808.10 | 4.900 | 4.724E-01 | PA234 |
| 830.37 | 2. | 271.17 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 8.944E-02 | PA234 |
| 861.76 | 10. | 74.48 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 880.52 | 13. | 43.82 | 1.81 | 1.684E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.35 | 53. | 16.37 | 0.36 | 1.642E-02 | 911.07 | 29.000 | 4.207E-01 | Ra228 |
| 948.34 | 6. | 120.49 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 963.96 | 4. | 183.32 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.973E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 5.531E-02 | EU152 |
| 968.79 | 20. | 22.36 | 0.50 | 1.571E-02 | 968.90 | 17.460 | 2.697E-01 | Ra228 |
| 986.95 | 12. | 48.80 | 0.28 | 1.549E-02 | | | | |
| 1004.85 | 2. | 366.24 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| | | | | | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1068.10 | 16. | 31.25 | 0.49 | 1.460E-02 | | | | |
| 1085.44 | 11. | 54.10 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| | | | | | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.30 | 17. | 62.14 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1236.69 | 2. | 599.79 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1274.91 | 25. | 20.00 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | 2.086E-01 | EU154 |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 1274.80 | 35.500 | 2.086E-01 | EU154 |
| 1333.60 | 5. | 142.59 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| | | | | | 1332.50 | 99.982 | 1.639E-02 | CO60 |
| 1423.68 | 11. | 30.15 | 0.37 | 1.159E-02 | | | | |
| 1460.94 | 395. | 5.12 | 2.29 | 1.134E-02 | 1460.75 | 10.700 | 1.222E+01 | K40 |
| 1765.27 | 17. | 24.25 | 0.50 | 9.531E-03 | 1764.49 | 15.357 | 4.192E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 252.66 | 63.64 | 76. | 24. | 5.433E+02 | 113.20 | 0.705 | TH-234 | s |
| 297.52 | 74.91 | 67. | 83. | 1.625E+03 | 35.31 | 1.006 | TH-234 | D |
| 307.19 | 77.33 | 70. | 129. | 2.473E+03 | 25.31 | 1.008 | PB-212 | D |
| 612.04 | 153.52 | 23. | 7. | 1.257E+02 | 204.96 | 0.421 | CS-136 | c |
| 673.50 | 168.89 | 26. | 23. | 4.444E+02 | 79.13 | 0.479 | NP-237 | s |
| 836.63 | 209.68 | 44. | 16. | 3.388E+02 | 143.83 | 0.317 | NP-239 | sM |
| 857.80 | 214.97 | 18. | 4. | 8.881E+01 | 309.03 | 0.500 | TB-160 | sc |
| 1495.83 | 374.51 | 8. | 6. | 1.955E+02 | 150.55 | 0.384 | PU-239 | sc |
| 1670.74 | 418.23 | 5. | 13. | 4.581E+02 | 73.78 | 0.525 | BA-140 | s |
| 2755.55 | 689.40 | 5. | 22. | 1.119E+03 | 54.73 | 0.776 | AU-196 | s |
| 2907.66 | 727.42 | 3. | 26. | 1.349E+03 | 47.42 | 0.343 | TE-131 | l |
| 3946.27 | 986.95 | 7. | 12. | 7.810E+02 | 97.60 | 0.279 | - | s |
| 4271.09 | 1068.10 | 2. | 16. | 1.068E+03 | 62.49 | 0.493 | - | s |
| 5694.70 | 1423.68 | 0. | 11. | 9.487E+02 | 60.30 | 0.375 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

---

This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.93 | 39.70 | 50. | 13. | 0.007 | 180.73 | 0.967s |
| EU-152 | 158.40 | 40.07 | 48. | 14. | 0.008 | 159.22 | 0.967s |
| EU-154 | 162.45 | 41.08 | 75. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 173.00 | 43.72 | 74. | -16. | -0.009 | 187.00 | 0.970s |
| EU-152 | 179.45 | 45.33 | 75. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 186.18 | 47.01 | 66. | 8. | 0.004 | 344.11 | 0.974 |
| EU-154 | 191.60 | 48.37 | 80. | 0. | 0.000 | 2000.00 | 0.977s |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Am-241 | 233.75 | 58.91 | 111. | 0. | 0.000 | 2000.00 | 0.989s |
| U-238 | 253.07 | 63.74 | 116. | 9. | 0.005 | 422.22 | 0.993s |
| U-238 | 370.18 | 93.03 | 94. | 17. | 0.010 | 190.89 | 1.025s |
| U-238 | 370.39 | 93.08 | 75. | 29. | 0.016 | 106.11 | 1.025s |
| PA-234 | 371.50 | 93.36 | 113. | -12. | -0.007 | 289.33 | 1.027s |
| PA-234 | 390.29 | 98.06 | 76. | -8. | -0.005 | 345.05 | 1.031s |
| PA-234 | 442.68 | 111.16 | 77. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-154 | 488.31 | 122.57 | 63. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 526.50 | 132.12 | 88. | -10. | -0.005 | 319.64 | 1.067s |
| U-235 | 651.82 | 163.46 | 60. | 10. | 0.005 | 279.61 | 1.102s |
| U-235 | 740.82 | 185.72 | 48. | 36. | 0.020 | 279.65 | 1.126D |
| RA-226 | 742.78 | 186.21 | 70. | 0. | 0.000 | 2000.00 | 0.774D |
| U-235 | 820.60 | 205.67 | 83. | 0. | 0.000 | 2000.00 | 1.147s |
| PA-234 | 906.54 | 227.16 | 38. | 25. | 0.014 | 94.85 | 1.170s |
| PB-212 | 952.41 | 238.63 | 49. | 126. | 0.070 | 24.00 | 1.182D |
| PB-214 | 965.81 | 241.98 | 39. | 27. | 0.015 | 75.31 | 1.185D |
| EU-152 | 976.79 | 244.73 | 41. | -2. | -0.001 | 1017.69 | 1.188s |
| EU-154 | 990.81 | 248.23 | 51. | -2. | -0.001 | 1462.82 | 1.192s |
| TL-208 | 1105.00 | 276.79 | 57. | 0. | 0.000 | 2000.00 | 1.223s |
| PB-214 | 1177.96 | 295.03 | 38. | 71. | 0.039 | 40.18 | 0.849s |
| PB-212 | 1196.57 | 299.68 | 60. | -8. | -0.005 | 326.84 | 1.246s |
| Ra-228 | 1349.81 | 338.00 | 21. | 41. | 0.023 | 50.25 | 0.380s |
| EU-152 | 1380.00 | 345.54 | 57. | 0. | 0.000 | 2000.00 | 1.292s |
| PB-214 | 1404.07 | 351.56 | 28. | 94. | 0.052 | 29.18 | 1.016 |
| TL-208 | 2042.30 | 511.12 | 76. | 40. | 0.022 | 77.47 | 2.710s |
| PA-234 | 2277.25 | 569.85 | 26. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2331.77 | 583.48 | 15. | 62. | 0.034 | 35.63 | 1.196 |
| EU-154 | 2368.39 | 592.63 | 21. | 5. | 0.003 | 360.07 | 1.539s |
| BI-214 | 2436.98 | 609.78 | 18. | 60. | 0.034 | 35.73 | 1.415 |
| CS-137 | 2644.52 | 661.65 | 21. | 4. | 0.002 | 472.08 | 1.606s |
| PA-234 | 2796.70 | 699.68 | 27. | 3. | 0.002 | 676.26 | 1.641s |
| EU-154 | 2888.84 | 722.71 | 14. | 10. | 0.005 | 162.32 | 1.664s |
| BI-212 | 2907.67 | 727.42 | 27. | 0. | 0.000 | 2000.00 | 1.667s |
| PA-234 | 2931.75 | 733.44 | 28. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3020.96 | 755.73 | 18. | 1. | 0.001 | 1644.38 | 1.695s |
| TL-208 | 3051.40 | 763.34 | 18. | 5. | 0.003 | 338.47 | 1.701 |
| BI-214 | 3073.90 | 768.96 | 22. | -4. | -0.002 | 532.23 | 1.705 |
| BI-212 | 3136.00 | 784.48 | 40. | 0. | 0.000 | 2000.00 | 1.721s |
| PA-234 | 3230.27 | 808.04 | 0. | 11. | 0.006 | 60.30 | 1.742s |
| PA-234 | 3319.62 | 830.37 | 10. | 2. | 0.001 | 542.33 | 1.762s |
| TL-208 | 3445.24 | 861.76 | 10. | 10. | 0.005 | 148.95 | 1.789s |
| EU-152 | 3469.50 | 867.82 | 19. | -1. | -0.001 | 1313.96 | 1.795s |
| EU-154 | 3498.00 | 874.94 | 41. | 0. | 0.000 | 2000.00 | 1.800s |
| PA-234 | 3520.31 | 880.52 | 6. | 13. | 0.007 | 87.64 | 1.807s |
| PA-234 | 3526.82 | 882.14 | 19. | -4. | -0.002 | 412.12 | 1.809s |
| PA-234 | 3596.00 | 899.43 | 33. | 0. | 0.000 | 2000.00 | 1.823s |
| Ra-228 | 3643.71 | 911.35 | 6. | 53. | 0.030 | 32.73 | 0.361s |
| PA-234 | 3704.25 | 926.48 | 30. | 0. | 0.000 | 2000.00 | 1.848s |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 3736.50 | 934.54 | 29. | 0. | 0.000 | 2000.00 | 1.854 |
| PA-234 | 3782.67 | 946.07 | 29. | -5. | -0.003 | 434.70 | 1.864s |
| PA-234 | 3791.75 | 948.34 | 11. | 6. | 0.003 | 240.98 | 1.867s |
| EU-152 | 3853.64 | 963.80 | 42. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3854.27 | 963.96 | 16. | 4. | 0.002 | 366.63 | 1.881 |
| Ra-228 | 3873.83 | 968.85 | 11. | 11. | 0.006 | 131.97 | 1.884s |
| EU-154 | 3988.76 | 997.56 | 26. | 0. | 0.000 | 2000.00 | 1.908s |
| EU-154 | 4017.94 | 1004.85 | 16. | 2. | 0.001 | 732.48 | 1.915s |
| EU-152 | 4340.52 | 1085.44 | 6. | 11. | 0.006 | 108.20 | 1.984s |
| EU-152 | 4446.40 | 1111.90 | 33. | 0. | 0.000 | 2000.00 | 2.006s |
| BI-214 | 4480.06 | 1120.30 | 22. | 17. | 0.009 | 124.28 | 2.013s |
| CO-60 | 4685.14 | 1171.53 | 29. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4946.00 | 1236.69 | 33. | 2. | 0.001 | 1199.58 | 2.109s |
| EU-154 | 5099.00 | 1274.91 | 0. | 25. | 0.014 | 40.00 | 2.137s |
| CO-60 | 5334.00 | 1333.60 | 12. | 5. | 0.003 | 285.18 | 2.183s |
| BI-214 | 5507.13 | 1376.84 | 25. | 0. | 0.000 | 2000.00 | 2.217s |
| PA-234 | 5581.00 | 1395.29 | 18. | 0. | 0.000 | 2000.00 | 2.230s |
| EU-152 | 5629.06 | 1407.29 | 7. | 0. | 0.000 | 2000.00 | 2.240s |
| K-40 | 5843.88 | 1460.94 | 4. | 394. | 0.219 | 10.29 | 2.286 |
| BI-214 | 7062.76 | 1765.27 | 1. | 16. | 0.009 | 52.88 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 4.8273E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 4.827E-02 | } | 4.662E-02 | 1.40E+02 5.72E+01 | G K |
| | | | 143.76 | 3.200E-03 | &(P | 2.705E-01 | 2.79E+03 1.05E+01 | G |
| | | | 205.31 | 0.000E+00 | - P | 7.811E-01 | 1.00E+03 4.70E+00 | G |
| | | | 163.35 | 1.490E-01 | ?(P | 5.922E-01 | 1.40E+02 4.70E+00 | G |
| Ra-228 | | 4.1167E-01 | | | | 2.10E+03 | | |
| | | | 911.07 | 4.207E-01 | ( | 1.102E-01 | 1.64E+01 2.90E+01 | G |
| | | | 968.90 | 1.552E-01 | - P | 2.467E-01 | 6.60E+01 1.75E+01 | G |
| | | | 338.40 | 3.900E-01 | ( | 2.289E-01 | 2.51E+01 1.20E+01 | G |
| | | | 964.60 | 1.973E-01 | - | 9.233E-01 | 1.83E+02 5.45E+00 | G |
| PB-210 | | 2.3719E-01 | | | | 7.45E+03 | | |
| | | | 46.52 | 2.372E-01 | ?(P | 1.219E+00 | 1.72E+02 4.00E+00 | G |
| U-238 | | 3.9801E-01 | | | | 1.63E+12 | | |
| | | | 63.29 | 1.847E-01 | ?(P | 1.146E+00 | 2.11E+02 3.90E+00 | G |
| | | | 92.80 | 6.344E-01 | (P | 9.513E-01 | 5.31E+01 3.00E+00 | G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 92.38 | 4.458E-01 | &(P | 1.233E+00 | 9.54E+01 | 2.57E+00 G |
| K-40 | 1.2223E+01 | | | | | | 4.68E+11 |
| | | 1460.75 | 1.222E+01 | (P | 3.815E-01 | 5.15E+00 | 1.07E+01 G |
| PB-214 | 3.3770E-01 | | | | | | 5.84E+05 |
| | | 351.92 | 3.091E-01 | (P | 8.947E-02 | 1.46E+01 | 3.58E+01 G |
| | | 295.21 | 3.958E-01 | @( | 1.771E-01 | 2.01E+01 | 1.85E+01 G |
| | | 241.98 | 3.309E-01 | (P | 3.813E-01 | 3.77E+01 | 7.50E+00 G |
| BI-214 | 2.5133E-01 | | | | | | 5.84E+05 |
| | | 609.31 | 2.328E-01 | (P | 8.587E-02 | 1.79E+01 | 4.48E+01 G |
| | | 1764.49 | 4.192E-01 | + P | 1.896E-01 | 2.64E+01 | 1.54E+01 G |
| | | 1120.29 | 3.073E-01 | &( | 4.442E-01 | 6.21E+01 | 1.48E+01 G |
| | | 1238.11 | 9.878E-02 | - | 1.456E+00 | 6.00E+02 | 5.86E+00 G |
| | | 768.36 | -1.481E-01 | - | 1.050E+00 | 2.66E+02 | 4.80E+00 G |
| | | 1377.67 | 0.000E+00 | - P | 2.081E+00 | 1.00E+03 | 3.92E+00 G |
| | | 934.06 | 0.000E+00 | - P | 2.160E+00 | 1.00E+03 | 3.03E+00 G |
| PB-212 | 2.6081E-01 | | | | | | 2.10E+03 |
| | | 238.63 | 2.608E-01 | (P | 7.372E-02 | 1.20E+01 | 4.31E+01 G |
| | | 300.09 | -2.727E-01 | & | 1.240E+00 | 1.63E+02 | 3.27E+00 G |
| TL-208 | 1.2738E-01 | | | | | | 2.10E+03 |
| | | 583.14 | 1.208E-01 | ( | 4.043E-02 | 1.78E+01 | 8.60E+01 G |
| | | 510.72 | 2.748E-01 | + P | 2.933E-01 | 3.87E+01 | 2.25E+01 G |
| | | 860.47 | 1.747E-01 | ?(P | 3.262E-01 | 7.45E+01 | 1.20E+01 G |
| | | 277.36 | 0.000E+00 | & P | 5.804E-01 | 1.00E+03 | 6.50E+00 G |
| | | 763.30 | 5.945E-01 | + | 2.673E+00 | 1.69E+02 | 1.70E+00 G |
| PA-234 | 1.5326E-01 | | | | | | 1.65E+12 |
| | | 98.44 | -2.209E-02 | ?( | 1.130E-01 | 1.73E+02 | 2.51E+01 G |
| | | 946.00 | -5.892E-02 | + | 3.276E-01 | 2.17E+02 | 2.00E+01 G |
| | | 131.28 | -3.247E-02 | + | 1.532E-01 | 1.60E+02 | 2.00E+01 G |
| | | 94.67 | -5.236E-02 | + | 2.221E-01 | 1.45E+02 | 1.55E+01 G |
| | | 883.24 | -8.097E-02 | + | 4.335E-01 | 2.06E+02 | 1.20E+01 G |
| | | 926.70 | 0.000E+00 | + P | 5.958E-01 | 1.00E+03 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | & P | 4.219E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | + P | 3.287E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | + P | 6.288E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 1.733E-01 | &(P | 5.560E-01 | 1.20E+02 | 7.80E+00 G |
| | | 880.51 | 4.645E-01 | ?(P | 4.695E-01 | 4.38E+01 | 6.50E+00 G |
| | | 226.87 | 3.301E-01 | &(P | 4.199E-01 | 4.74E+01 | 6.50E+00 G |
| | | 831.10 | 8.944E-02 | ?( | 6.593E-01 | 2.71E+02 | 5.60E+00 G |
| | | 808.10 | 4.724E-01 | ?( | 3.165E-01 | 3.02E+01 | 4.90E+00 G |
| | | 99.70 | -6.925E-03 | % | 6.020E-01 | 2.88E+03 | 4.70E+00 G |
| | | 699.10 | 1.239E-01 | ?( | 1.112E+00 | 3.38E+02 | 4.60E+00 G |
| | | 898.60 | 0.000E+00 | - P | 1.675E+00 | 1.00E+03 | 4.00E+00 G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1394.10 | 0.000E+00 | - P | 1.835E+00 | 1.00E+03 | 3.90E+00 G |
| CS-137 | 8.0742E-03 | | | | | 1.10E+04 | |
| | | 661.66 | 8.074E-03 | ?(P | 5.191E-02 | 2.36E+02 | 8.52E+01 G |
| CO-60 | 8.1978E-03 | | | | | 1.93E+03 | |
| | | 1173.24 | 0.000E+00 | ?(P | 7.682E-02 | 1.00E+03 | 9.99E+01 K |
| | | 1332.50 | 1.639E-02 | ?( | 5.724E-02 | 1.43E+02 | 1.00E+02 K |
| EU-152 | 1.2106E-01 | | | | | 4.64E+03 | |
| | | 40.12 | 6.901E-02 | &( | 1.657E-01 | 7.96E+01 | 3.00E+01 G |
| | | 121.78 | 1.854E-03 | % | 8.973E-02 | 1.60E+03 | 2.92E+01 G |
| | | 344.30 | 0.000E+00 | - P | 1.629E-01 | 1.00E+03 | 2.70E+01 G |
| | | 1408.08 | 0.000E+00 | - P | 2.319E-01 | 1.00E+03 | 2.12E+01 G |
| | | 39.52 | 1.181E-01 | ?( | 3.240E-01 | 9.04E+01 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | & P | 5.421E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 0.000E+00 | & | 5.775E-01 | 1.00E+03 | 1.36E+01 G |
| | | 778.90 | -1.578E-02 | % | 4.249E-01 | 1.00E+03 | 1.30E+01 G |
| | | 1085.80 | 2.774E-01 | ?(P | 3.602E-01 | 5.41E+01 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 5.909E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | -2.591E-02 | - | 3.899E-01 | 5.09E+02 | 7.62E+00 G |
| | | 867.39 | -7.067E-02 | - | 1.230E+00 | 6.57E+02 | 4.18E+00 G |
| EU-154 | 8.8967E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | &(P | 6.394E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 2.086E-01 | ?( | 6.151E-02 | 2.00E+01 | 3.55E+01 G |
| | | 723.30 | 9.386E-02 | &( | 1.959E-01 | 8.12E+01 | 1.97E+01 G |
| | | 1004.80 | 3.143E-02 | &(P | 2.969E-01 | 3.66E+02 | 1.76E+01 G |
| | | 43.00 | -1.572E-01 | + | 4.285E-01 | 9.35E+01 | 1.31E+01 G |
| | | 873.20 | 0.000E+00 | - P | 6.372E-01 | 1.00E+03 | 1.13E+01 G |
| | | 996.30 | 0.000E+00 | - | 6.040E-01 | 1.00E+03 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | - P | 7.895E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | -2.321E-02 | + | 4.997E-01 | 7.31E+02 | 6.60E+00 G |
| | | 591.70 | 1.827E-01 | ?(P | 8.859E-01 | 1.80E+02 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | & P | 1.197E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | 4.900E-02 | ?( | 1.102E+00 | 8.22E+02 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- \- Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
- T - Thermal Neutron Activation
- F - Fast Neutron Activation
- I - Fission Product
- N - Naturally Occurring Isotope
- P - Photon Reaction
- C - Charged Particle Reaction
- M - No MDA Calculation
- R - Coincidence Corrected
- H - Halflife limit exceeded

Peak Codes:
- G - Gamma Ray
- X - X-Ray
- P - Positron Decay
- S - Single-Escape
- D - Double-Escape
- K - Key Line
- A - Not in Average
- C - Coincidence Peak

\- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*************** D I S C A R D E D I S O T O P E P E A K S ***************

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.70 | 50. | 13. | 0.007 | 180.73 | 1.181E-01 | |
| EU-152 | 40.07 | 48. | 14. | 0.008 | 159.22 | 6.901E-02 | |
| EU-154 | 43.72 | 74. | -16. | -0.009 | 187.00 | -1.572E-01 | |
| PB-210 | 47.01 | 66. | 8. | 0.004 | 344.11 | 2.372E-01 | P |
| U-238 | 63.74 | 116. | 9. | 0.005 | 422.22 | 1.847E-01 | P |
| U-238 | 93.03 | 94. | 17. | 0.010 | 190.89 | 4.458E-01 | P |
| U-238 | 93.08 | 75. | 29. | 0.016 | 106.11 | 6.344E-01 | P |
| PA-234 | 93.36 | 113. | -12. | -0.007 | 289.33 | -5.236E-02 | |
| PA-234 | 98.06 | 76. | -8. | -0.005 | 345.05 | -2.209E-02 | |
| PA-234 | 132.12 | 88. | -10. | -0.005 | 319.64 | -3.247E-02 | |
| PA-234 | 227.16 | 38. | 25. | 0.014 | 94.85 | 3.301E-01 | P |
| EU-152 | 244.73 | 41. | -2. | -0.001 | 1017.69 | -2.591E-02 | |
| EU-154 | 248.23 | 51. | -2. | -0.001 | 1462.82 | -2.321E-02 | |
| EU-154 | 592.63 | 21. | 5. | 0.003 | 360.07 | 1.827E-01 | P |
| CS-137 | 661.65 | 21. | 4. | 0.002 | 472.08 | 8.074E-03 | P |
| PA-234 | 699.68 | 27. | 3. | 0.002 | 676.26 | 1.239E-01 | |
| EU-154 | 722.71 | 14. | 10. | 0.005 | 162.32 | 9.386E-02 | |
| EU-154 | 755.73 | 18. | 1. | 0.001 | 1644.38 | 4.900E-02 | |
| PA-234 | 808.04 | 0. | 11. | 0.006 | 60.30 | 4.724E-01 | |
| PA-234 | 830.37 | 10. | 2. | 0.001 | 542.33 | 8.944E-02 | |
| EU-152 | 867.82 | 19. | -1. | -0.001 | 1313.96 | -7.067E-02 | |
| PA-234 | 880.52 | 6. | 13. | 0.007 | 87.64 | 4.645E-01 | P |
| PA-234 | 882.14 | 19. | -4. | -0.002 | 412.12 | -8.097E-02 | |
| PA-234 | 946.07 | 29. | -5. | -0.003 | 434.70 | -5.892E-02 | |
| PA-234 | 948.34 | 11. | 6. | 0.003 | 240.98 | 1.733E-01 | P |
| EU-154 | 1004.85 | 16. | 2. | 0.001 | 732.48 | 3.143E-02 | P |
| EU-152 | 1085.44 | 6. | 11. | 0.006 | 108.20 | 2.774E-01 | P |
| EU-154 | 1274.91 | 0. | 25. | 0.014 | 40.00 | 2.086E-01 | |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 1:30:38 PM
Spectrum name: ARS08226.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| CO-60 | 1333.60 | | 12. | 5. | 0.003 | 285.18 | 1.639E-02 |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 4.8273E-02 | 1.3497E-01 | 1.3501E-01 | 0.270E+00 |
| RA-226 #B | 0.0000E+00 | 4.9686E-01 | 4.9686E-01 | 0.876E+00 |
| Ra-228 | 4.1167E-01 | 1.2344E-01 | 1.2638E-01 | 0.110E+00 |
| Am-241 #A | 0.0000E+00 | 3.5285E-02 | 3.5285E-02 | 0.129E+00 |
| PB-210 #A | 2.3719E-01 | 8.1621E-01 | 8.1656E-01 | 0.122E+01 |
| U-238 #A | 3.9801E-01 | 4.2231E-01 | 4.2349E-01 | 0.115E+01 |
| K-40 | 1.2223E+01 | 1.2580E+00 | 1.4999E+00 | 0.381E+00 |
| PB-214 | 3.3770E-01 | 9.8555E-02 | 1.0268E-01 | 0.895E-01 |
| BI-214 | 2.5133E-01 | 8.9806E-02 | 9.1162E-02 | 0.859E-01 |
| BI-212 #A | 0.0000E+00 | 2.1847E-01 | 2.1847E-01 | 0.446E+00 |
| PB-212 | 2.6081E-01 | 6.2597E-02 | 6.5378E-02 | 0.737E-01 |
| TL-208 | 1.2738E-01 | 4.5384E-02 | 4.6137E-02 | 0.404E-01 |
| PA-234 #C | 1.5326E-01 | 9.2417E-02 | 9.3106E-02 | 0.113E+00 |
| CS-137 #A | 8.0742E-03 | 3.8117E-02 | 3.8119E-02 | 0.519E-01 |
| CO-60 #A | 8.1978E-03 | 2.3379E-02 | 2.3381E-02 | 0.768E-01 |
| EU-152 #A | 1.2106E-01 | 1.0655E-01 | 1.0743E-01 | 0.166E+00 |
| EU-154 #C | 8.8967E-02 | 3.5587E-02 | 3.6113E-02 | 0.639E-01 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 25.5 to 1999.2 keV) 1.361E+01 pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-12 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-012 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 012 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 7.5391E-02 | pCi/g | 1.6623E-01 | 2.7600E-01 | 1.3800E-01 | | | |
| **RA-226** | 1.2798E+00 | pCi/g | 5.8594E-01 | 7.9900E-01 | 3.9950E-01 | | | |
| **RA-228** | 4.0519E-01 | pCi/g | 1.4182E-01 | 1.5400E-01 | 7.7000E-02 | | | |
| **AM-241** | 2.1849E-02 | pCi/g | 8.9115E-02 | 1.5200E-01 | 7.6000E-02 | | | |
| **PB-210** | 4.4755E-01 | pCi/g | 8.6958E-01 | 1.5100E+00 | 7.5500E-01 | | | |
| **U-238** | 6.3744E-01 | pCi/g | 2.2257E-01 | 1.0900E+00 | 5.4500E-01 | | | |
| **K-40** | 2.2516E+01 | pCi/g | 2.1039E+00 | 6.7700E-01 | 3.3850E-01 | | | |
| **PB-214** | 6.1206E-01 | pCi/g | 1.2172E-01 | 1.0700E-01 | 5.3500E-02 | | | |
| **BI-214** | 4.8416E-01 | pCi/g | 9.6327E-02 | 8.9900E-02 | 4.4950E-02 | | | |
| **BI-212** | 2.5394E-01 | pCi/g | 3.1861E-01 | 3.8200E-01 | 1.9100E-01 | | | |
| **PB-212** | 3.7271E-01 | pCi/g | 7.9460E-02 | 8.3800E-02 | 4.1900E-02 | | | |
| **TL-208** | 1.5837E-01 | pCi/g | 5.4983E-02 | 5.8700E-02 | 2.9350E-02 | | | |
| **PA-234** | 8.6475E-02 | pCi/g | 1.0220E-01 | 1.2800E-01 | 6.4000E-02 | | | |
| **CS-137** | 6.9362E-03 | pCi/g | 2.7775E-02 | 4.8900E-02 | 2.4450E-02 | | | |
| **CO-60** | -6.7069E-04 | pCi/g | 6.3306E-02 | 7.6900E-02 | 3.8450E-02 | | | |
| **EU-152** | 3.6730E-02 | pCi/g | 8.8658E-02 | 1.9500E-01 | 9.7500E-02 | | | |
| **EU-1S4** | 1.6188E-02 | pCi/g | 4.6318E-02 | 7.5700E-02 | 3.7850E-02 | | | |
| **Total Gamma** | 2.7411E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 7.9798E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06943.An1

Sample description
Batch ID: 16-00698-12
SDG: ARS1-16-00671-012 Tech: WJS

Spectrum Filename: C:\User\ARS06943.An1

Acquisition information
Start time: 05-May-2016 11:10:29
Live time: 2700
Real time: 2703
Dead time: 0.10 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.5708E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.5708E+02) =
2.8005E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06943.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2069

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 12.94 | 4. | 238.79 | 0.00 | 6.731E-03 | | | | |
| 38.34 | 4. | 429.10 | 0.93 | 2.738E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | PBC<MDA | EU152 |
| 38.70 | -1. | 716.00 | 0.93 | 2.785E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | PBC<MDA | EU152 |
| 41.76 | 4. | 379.93 | 0.93 | 3.008E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 3.133E-02 | EU154 |
| 46.62 | 21. | 39.29 | 0.94 | 3.277E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 59.87 | 12. | 91.59 | 0.95 | 4.310E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.25 | 13. | 47.28 | 0.55 | 4.538E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.69 | 120. | 19.12 | 0.96 | 5.128E-02 | | | | |
| 77.14 | 215. | 11.44 | 0.97 | 5.234E-02 | | | | |
| 87.16 | 94. | 21.42 | 0.97 | 5.588E-02 | | | | |
| 90.04 | 66. | 27.15 | 0.98 | 5.665E-02 | | | | |
| 90.04 | 66. | 27.15 | 0.98 | 5.665E-02 | 92.38 | 2.570 | 1.055E+00 | U238 |
| 92.72 | 39. | 48.87 | 0.98 | 5.730E-02 | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.77 | 9. | 166.10 | 0.99 | 5.833E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| 100.02 | -2. | 898.50 | 0.99 | 5.851E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 103.12 | 28. | 52.25 | 0.29 | 5.892E-02 | | | | |
| 136.27 | 15. | 95.47 | 0.47 | 5.822E-02 | | | | |
| 143.90 | 15. | 77.38 | 0.59 | 5.732E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.72 | 12. | 117.03 | 1.05 | 5.452E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.69 | 105. | 18.15 | 0.71 | 5.098E-02 | 186.21 | 3.640 | 1.280E+00 | RA226 |
| 204.45 | 9. | 143.28 | 1.09 | 4.793E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.41 | 259. | 9.20 | 0.92 | 4.325E-02 | 238.63 | 43.100 | 3.727E-01 | PB212 |
| 241.93 | 74. | 26.23 | 1.11 | 4.279E-02 | 241.98 | 7.500 | 6.495E-01 | PB214 |
| 276.99 | 29. | 35.18 | 0.26 | 3.866E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.97 | 114. | 16.62 | 1.38 | 3.686E-02 | 295.21 | 18.500 | 4.688E-01 | PB214 |
| 299.34 | 9. | 149.47 | 1.18 | 3.639E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 337.98 | 76. | 21.54 | 0.47 | 3.318E-02 | 338.40 | 12.010 | 5.302E-01 | Ra228 |
| 351.57 | 259. | 8.44 | 1.08 | 3.218E-02 | 351.92 | 35.800 | 6.042E-01 | PB214 |
| 510.69 | 88. | 12.93 | 1.46 | 2.413E-02 | 510.72 | 22.500 | 4.532E-01 | TL208 |
| 570.14 | -1. | 666.37 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 582.95 | 106. | 16.04 | 1.23 | 2.185E-02 | 583.14 | 86.000 | 1.584E-01 | TL208 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 592.28 | 3. | 372.47 | 1.44 | 2.161E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.33 | 168. | 9.01 | 1.49 | 2.115E-02 | 609.31 | 44.791 | 4.964E-01 | BI214 |
| 662.52 | 4. | 200.21 | 1.51 | 1.990E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 699.70 | 6. | 127.04 | 1.54 | 1.912E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| 723.69 | 2. | 412.55 | 1.56 | 1.865E-02 | 723.30 | 19.700 | PBC<MDA | EU154 |
| 727.27 | 14. | 58.69 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 732.73 | 3. | 226.83 | 1.57 | 1.847E-02 | 733.00 | 8.500 | PBC<MDA | PA234 |
| 758.49 | 5. | 180.97 | 1.59 | 1.805E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| 768.17 | 8. | 113.01 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 778.90 | 2. | 295.78 | 1.61 | 1.767E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| 785.78 | 4. | 219.22 | 1.61 | 1.757E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 879.92 | 13. | 55.24 | 1.70 | 1.617E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.10 | 69. | 16.57 | 0.44 | 1.577E-02 | 911.07 | 29.000 | 4.216E-01 | Ra228 |
| 934.05 | 8. | 100.86 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 964.47 | 13. | 61.34 | 1.77 | 1.513E-02 | 964.60 | 5.452 | PBC<MDA | Ra228 |
| 968.77 | 30. | 27.43 | 1.77 | 1.508E-02 | 968.90 | 17.460 | 3.193E-01 | Ra228 |
| 969.16 | 5. | 156.71 | 1.77 | 1.514E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1003.10 | 2. | 307.56 | 1.80 | 1.468E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1085.94 | 3. | 298.48 | 1.87 | 1.387E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1109.46 | 7. | 120.56 | 1.89 | 1.362E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| 1119.93 | 69. | 19.07 | 1.72 | 1.355E-02 | 1120.29 | 14.797 | 9.671E-01 | BI214 |
| 1172.20 | 0. | 766.32 | 1.94 | 1.309E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1238.90 | 18. | 61.77 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1272.95 | 2. | 415.31 | 2.02 | 1.228E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| 1377.64 | 4. | 165.78 | 2.11 | 1.156E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1460.71 | 970. | 3.30 | 2.13 | 1.104E-02 | 1460.75 | 10.700 | 2.252E+01 | K40 |
| 1621.14 | 5. | 93.70 | 2.30 | 1.013E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.40 | 23. | 24.40 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | 4.516E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 51.00 | 12.94 | 46. | 4. | 0.001 | 477.59 | 0.000 | - | |
| 297.89 | 74.66 | 266. | 76. | 0.028 | 68.65 | 0.749 | TH-234 | s |
| 307.70 | 77.11 | 199. | 165. | 0.061 | 29.29 | 0.958 | PB-212 | |
| 347.82 | 87.14 | 160. | 98. | 0.036 | 44.00 | 0.448 | TH-234 | s |
| 359.03 | 90.02 | 142. | 56. | 0.021 | 65.89 | 0.978 | AC-228 | D |
| 411.74 | 103.12 | 93. | 28. | 0.010 | 104.49 | 0.292 | GD-153 | s |
| 544.39 | 136.27 | 89. | 15. | 0.006 | 190.93 | 0.469 | HF-181 | sc |
| 574.92 | 143.90 | 75. | 4. | 0.002 | 558.27 | 0.591 | U-235 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 152.58 | 38.34 | 146. | 4. | 0.001 | 858.20 | 0.929s |
| EU-154 | 166.28 | 41.76 | 138. | 4. | 0.002 | 759.85 | 0.932s |
| EU-152 | 191.03 | 47.94 | 125. | -2. | -0.001 | 1662.12 | 0.935s |
| PB-210 | 185.71 | 46.62 | 211. | 21. | 0.008 | 78.58 | 0.936 |
| EU-154 | 194.17 | 48.73 | 221. | -15. | -0.006 | 281.11 | 0.938s |
| Am-241 | 238.75 | 59.87 | 304. | 12. | 0.004 | 183.18 | 0.948s |
| U-238 | 252.24 | 63.25 | 200. | 13. | 0.005 | 94.55 | 0.547s |
| U-238 | 368.79 | 92.38 | 19. | 33. | 0.012 | 34.41 | 0.980D |
| U-238 | 370.47 | 92.80 | 200. | 39. | 0.014 | 97.74 | 0.980D |
| PA-234 | 394.37 | 98.77 | 188. | 9. | 0.003 | 332.20 | 0.986s |
| PA-234 | 441.34 | 110.51 | 183. | -10. | -0.004 | 454.44 | 0.998s |
| EU-152 | 491.78 | 123.12 | 143. | -2. | -0.001 | 1816.90 | 1.008s |
| EU-154 | 491.66 | 123.09 | 178. | -8. | -0.003 | 493.24 | 1.009s |
| U-235 | 574.01 | 143.68 | 147. | 7. | 0.003 | 316.60 | 1.029s |
| U-235 | 654.19 | 163.72 | 146. | 12. | 0.005 | 234.07 | 1.048s |
| RA-226 | 742.09 | 185.69 | 115. | 85. | 0.031 | 36.30 | 0.714s |
| U-235 | 817.16 | 204.45 | 108. | 9. | 0.003 | 286.56 | 1.087s |
| PA-234 | 909.03 | 227.41 | 131. | -11. | -0.004 | 303.01 | 1.108s |
| PB-212 | 953.02 | 238.41 | 129. | 248. | 0.092 | 18.41 | 0.920 |
| PB-214 | 967.13 | 241.93 | 115. | 74. | 0.028 | 52.45 | 1.106 |
| EU-152 | 972.05 | 243.16 | 167. | -27. | -0.010 | 138.88 | 1.124s |
| EU-154 | 992.56 | 248.29 | 111. | -14. | -0.005 | 229.69 | 1.128s |
| TL-208 | 1107.42 | 276.99 | 36. | 29. | 0.011 | 70.36 | 0.265s |
| PB-214 | 1179.34 | 294.97 | 88. | 114. | 0.042 | 33.24 | 1.384 |
| PB-212 | 1196.85 | 299.34 | 89. | 9. | 0.003 | 298.94 | 1.176s |
| Ra-228 | 1351.43 | 337.98 | 66. | 67. | 0.025 | 41.39 | 1.212s |
| EU-152 | 1382.42 | 345.72 | 67. | -6. | -0.002 | 483.80 | 1.217s |
| PB-214 | 1405.83 | 351.57 | 78. | 248. | 0.092 | 16.89 | 1.081 |
| TL-208 | 2042.58 | 510.69 | 92. | 88. | 0.033 | 25.85 | 1.462s |
| TL-208 | 2331.80 | 582.95 | 62. | 106. | 0.039 | 32.07 | 1.229 |
| EU-154 | 2369.14 | 592.28 | 42. | 3. | 0.001 | 744.94 | 1.443s |
| BI-214 | 2437.38 | 609.33 | 35. | 168. | 0.062 | 18.02 | 1.486 |
| CS-137 | 2650.29 | 662.52 | 33. | 4. | 0.002 | 400.41 | 1.505s |
| PA-234 | 2799.09 | 699.70 | 29. | 6. | 0.002 | 254.09 | 1.538s |
| EU-154 | 2895.13 | 723.69 | 41. | 2. | 0.001 | 825.09 | 1.559s |
| BI-212 | 2909.47 | 727.27 | 34. | 14. | 0.005 | 117.39 | 1.563s |
| PA-234 | 2931.33 | 732.73 | 35. | 3. | 0.001 | 453.66 | 1.568s |
| EU-154 | 3034.45 | 758.49 | 32. | 5. | 0.002 | 361.94 | 1.589s |
| BI-214 | 3073.19 | 768.17 | 39. | 8. | 0.003 | 226.03 | 1.599s |
| EU-152 | 3116.15 | 778.90 | 48. | 2. | 0.001 | 591.57 | 1.608s |
| BI-212 | 3143.68 | 785.78 | 41. | 4. | 0.002 | 438.44 | 1.614s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3233.44 | 808.20 | 49. | -3. | -0.001 | 613.19 | 1.633s |
| PA-234 | 3329.70 | 832.25 | 38. | -3. | -0.001 | 1254.16 | 1.653s |
| PA-234 | 3520.57 | 879.92 | 23. | 13. | 0.005 | 110.48 | 1.696 |
| PA-234 | 3520.27 | 879.85 | 31. | -2. | -0.001 | 995.42 | 1.698s |
| Ra-228 | 3645.38 | 911.10 | 23. | 69. | 0.025 | 33.14 | 0.441s |
| BI-214 | 3737.28 | 934.05 | 35. | 8. | 0.003 | 201.72 | 1.742 |
| PA-234 | 3787.33 | 946.55 | 53. | -6. | -0.002 | 325.41 | 1.752s |
| PA-234 | 3784.63 | 945.88 | 42. | -10. | -0.004 | 215.55 | 1.754s |
| EU-152 | 3877.83 | 969.16 | 24. | 5. | 0.002 | 313.41 | 1.767s |
| Ra-228 | 3859.59 | 964.60 | 25. | 13. | 0.005 | 122.69 | 1.768D |
| Ra-228 | 3876.80 | 968.90 | 26. | 30. | 0.011 | 54.86 | 1.771D |
| EU-154 | 3984.47 | 995.79 | 47. | -8. | -0.003 | 268.43 | 1.794s |
| EU-154 | 4013.75 | 1003.10 | 43. | 2. | 0.001 | 615.12 | 1.802s |
| EU-152 | 4345.43 | 1085.94 | 46. | 3. | 0.001 | 596.95 | 1.870s |
| EU-152 | 4439.60 | 1109.46 | 32. | 7. | 0.003 | 241.12 | 1.891s |
| BI-214 | 4481.53 | 1119.93 | 26. | 69. | 0.026 | 38.14 | 1.722s |
| BI-214 | 4957.95 | 1238.90 | 63. | 18. | 0.007 | 123.53 | 1.995 |
| EU-154 | 5094.32 | 1272.95 | 31. | 2. | 0.001 | 830.61 | 2.025s |
| CO-60 | 5329.25 | 1331.61 | 27. | -5. | -0.002 | 342.67 | 2.071s |
| BI-214 | 5513.63 | 1377.64 | 21. | 4. | 0.002 | 331.56 | 2.107s |
| PA-234 | 5576.60 | 1393.36 | 19. | -3. | -0.001 | 394.71 | 2.120s |
| EU-152 | 5627.69 | 1406.12 | 21. | -4. | -0.001 | 347.80 | 2.131s |
| K-40 | 5846.34 | 1460.71 | 31. | 948. | 0.351 | 6.59 | 2.125 |
| BI-212 | 6489.02 | 1621.14 | 8. | 5. | 0.002 | 187.39 | 2.297s |
| BI-214 | 7062.99 | 1764.40 | 8. | 23. | 0.009 | 48.79 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
| U-235 | | 7.5391E-02 | | | | | | |
| | | | 143.76 | 3.218E-02 | ?(P | 2.758E-01 | 1.58E+02 | G |
| | | | 205.31 | 1.139E-01 | ?(P | 6.368E-01 | 1.43E+02 | G |
| | | | 163.35 | 1.334E-01 | (P | 6.450E-01 | 1.17E+02 | G |
| RA-226 | | 1.2798E+00 | | | | | | |
| | | | 186.21 | 1.280E+00 | (P | 7.986E-01 | 1.82E+01 | G K |
| Ra-228 | | 4.0519E-01 | | | | | | |
| | | | 911.07 | 4.216E-01 | (P | 1.542E-01 | 1.66E+01 | G |
| | | | 968.90 | 3.193E-01 | (P | 2.818E-01 | 2.74E+01 | G |
| | | | 338.40 | 4.746E-01 | ?(P | 2.855E-01 | 2.07E+01 | G |
| | | | 964.60 | 4.399E-01 | ( | 8.848E-01 | 6.13E+01 | G |

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Am-241 | T | 2.1849E-02 | | | | | | |
| | | | 59.54 | 2.185E-02 | &(P | 1.520E-01 | 9.16E+01 | G K |
| PB-210 | | 4.4755E-01 | | | | | | |
| | | | 46.52 | 4.476E-01 | ?(P | 1.506E+00 | 3.93E+01 | G |
| U-238 | | 6.3744E-01 | | | | | | |
| | | | 63.29 | 2.066E-01 | (P | 1.087E+00 | 4.73E+01 | G |
| | | | 92.80 | 6.374E-01 | } P | 1.118E+00 | 4.89E+01 | G |
| | | | 92.38 | 6.374E-01 | } P | 4.340E-01 | 1.72E+01 | G |
| K-40 | | 2.2516E+01 | | | | | | |
| | | | 1460.75 | 2.252E+01 | (P | 6.765E-01 | 3.30E+00 | G |
| PB-214 | | 6.1206E-01 | | | | | | |
| | | | 351.92 | 6.042E-01 | (P | 1.068E-01 | 8.44E+00 | G |
| | | | 295.21 | 4.688E-01 | - P | 1.908E-01 | 1.66E+01 | G |
| | | | 241.98 | 6.495E-01 | (P | 4.595E-01 | 2.62E+01 | G |
| BI-214 | | 4.8416E-01 | | | | | | |
| | | | 609.31 | 4.964E-01 | (P | 8.990E-02 | 9.01E+00 | G |
| | | | 1764.49 | 4.516E-01 | ?(P | 3.035E-01 | 2.44E+01 | G |
| | | | 1120.29 | 9.671E-01 | + P | 3.691E-01 | 1.91E+01 | G |
| | | | 1238.11 | 6.916E-01 | + P | 1.512E+00 | 6.18E+01 | G |
| | | | 768.36 | 2.560E-01 | - P | 1.036E+00 | 1.13E+02 | G |
| | | | 1377.67 | 2.515E-01 | - | 1.478E+00 | 1.66E+02 | G |
| | | | 934.06 | 4.677E-01 | (P | 1.809E+00 | 1.01E+02 | G |
| BI-212 | | 2.5394E-01 | | | | | | |
| | | | 727.17 | 1.842E-01 | (P | 3.822E-01 | 5.87E+01 | G |
| | | | 1620.56 | 4.923E-01 | ?( | 1.604E+00 | 9.37E+01 | G |
| | | | 785.42 | 3.375E-01 | &( | 2.594E+00 | 2.19E+02 | G |
| PB-212 | | 3.7271E-01 | | | | | | |
| | | | 238.63 | 3.727E-01 | (P | 8.381E-02 | 9.20E+00 | G |
| | | | 300.09 | 2.159E-01 | - | 1.101E+00 | 1.49E+02 | G |
| TL-208 | | 1.5837E-01 | | | | | | |
| | | | 583.14 | 1.584E-01 | (P | 5.872E-02 | 1.60E+01 | G |
| | | | 510.72 | 4.532E-01 | + P | 2.451E-01 | 1.29E+01 | G |
| | | | 860.47 | -2.237E-03 | % | 3.968E-01 | 4.87E+03 | G |
| | | | 277.36 | 3.198E-01 | + P | 3.436E-01 | 3.52E+01 | G |
| | | | 763.30 | -7.231E-03 | % P | 4.547E+00 | 1.00E+03 | G |
| PA-234 | | 8.6475E-02 | | | | | | |
| | | | 98.44 | 1.683E-02 | &(P | 1.275E-01 | 1.66E+02 | G |
| | | | 946.00 | -5.935E-02 | & | 3.335E-01 | 1.63E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 131.28 | -3.447E-03 | % | 1.704E-01 | 1.45E+03 | G |
| | | 94.67 | -3.431E-04 | % | 2.380E-01 | 2.03E+04 | G |
| | | 883.24 | -2.325E-02 | + | 4.157E-01 | 4.98E+02 | G |
| | | 926.70 | -7.286E-03 | % P | 4.643E-01 | 1.33E+03 | G |
| | | 569.26 | -1.816E-02 | & P | 4.238E-01 | 6.66E+02 | G |
| | | 111.00 | -5.390E-02 | + P | 3.624E-01 | 2.27E+02 | G |
| | | 733.00 | 4.705E-02 | ?(P | 5.386E-01 | 2.27E+02 | G |
| | | 949.00 | -2.304E-01 | & P | 7.752E-01 | 1.08E+02 | G |
| | | 880.51 | 3.417E-01 | &(P | 6.629E-01 | 5.52E+01 | G |
| | | 226.87 | -1.051E-01 | + | 5.401E-01 | 1.52E+02 | G |
| | | 831.10 | -7.946E-02 | + P | 9.360E-01 | 6.27E+02 | G |
| | | 808.10 | -1.095E-01 | + | 1.178E+00 | 3.07E+02 | G |
| | | 99.70 | -1.637E-02 | % P | 7.008E-01 | 8.98E+02 | G |
| | | 699.10 | 1.786E-01 | (P | 8.823E-01 | 1.27E+02 | G |
| | | 898.60 | -7.163E-02 | % P | 1.395E+00 | 1.72E+03 | G |
| | | 1394.10 | -2.042E-01 | + | 1.445E+00 | 1.97E+02 | G |
| CS-137 | 6.9362E-03 | | | | | | |
| | | 661.66 | 6.936E-03 | ?( | 4.886E-02 | 2.00E+02 | G |
| CO-60 | -6.7069E-04 | | | | | | |
| | | 1173.24 | -6.707E-04 | &(P | 7.692E-02 | 7.66E+02 | K |
| | | 1332.50 | -1.095E-02 | + P | 6.372E-02 | 1.71E+02 | K |
| EU-152 | 3.6730E-02 | | | | | | |
| | | 40.12 | -4.558E-03 | &(P | 1.950E-01 | 7.16E+02 | G |
| | | 121.78 | -3.326E-03 | & P | 9.439E-02 | 9.08E+02 | G |
| | | 344.30 | -1.935E-02 | + P | 1.294E-01 | 2.42E+02 | G |
| | | 1408.08 | -4.655E-02 | & P | 2.781E-01 | 1.74E+02 | G |
| | | 39.52 | 2.566E-02 | ?( | 3.778E-01 | 4.29E+02 | G |
| | | 964.00 | 5.883E-02 | ?( | 3.245E-01 | 1.57E+02 | G |
| | | 1112.07 | 1.057E-01 | ?( | 4.398E-01 | 1.21E+02 | G |
| | | 778.90 | 2.717E-02 | ?(P | 4.254E-01 | 2.96E+02 | G |
| | | 1085.80 | 6.402E-02 | ?( | 6.720E-01 | 2.98E+02 | G |
| | | 45.40 | -1.975E-02 | & P | 5.339E-01 | 8.31E+02 | G |
| | | 244.67 | -2.373E-01 | & P | 5.449E-01 | 6.94E+01 | G |
| | | 867.39 | 5.294E-03 | & | 1.202E+00 | 6.26E+03 | G |
| EU-154 | 1.6188E-02 | | | | | | |
| | | 123.10 | -9.026E-03 | &( | 7.573E-02 | 2.47E+02 | G |
| | | 1274.80 | 1.226E-02 | ?(P | 1.839E-01 | 4.15E+02 | G |
| | | 723.30 | 1.706E-02 | ?( | 2.495E-01 | 4.13E+02 | G |
| | | 1004.80 | 1.909E-02 | ?(P | 3.613E-01 | 3.08E+02 | G |
| | | 43.00 | 3.133E-02 | ?( | 4.084E-01 | 3.80E+02 | G |
| | | 873.20 | -7.572E-03 | & P | 4.425E-01 | 7.22E+03 | G |
| | | 996.30 | -1.335E-01 | + | 6.161E-01 | 1.34E+02 | G |
| | | 42.31 | 4.014E-03 | % | 8.486E-01 | 6.15E+03 | G |
| | | 248.04 | -1.370E-01 | & P | 5.232E-01 | 1.15E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | Comments |
|---|---|---|---|---|---|---|
| | | 591.70 | 7.080E-02 | ?( | 9.328E-01 | 3.72E+02 G |
| | | 48.70 | -2.900E-01 | + | 1.372E+00 | 1.41E+02 G |
| | | 756.70 | 1.728E-01 | ?( | 1.098E+00 | 1.81E+02 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 7.5391E-02 | 1.6611E-01 | 1.6623E-01 | 0.276E+00 |
| RA-226 | 1.2798E+00 | 5.7569E-01 | 5.8594E-01 | 0.799E+00 |
| Ra-228 | 4.0519E-01 | 1.3919E-01 | 1.4182E-01 | 0.154E+00 |
| Am-241 #A | 2.1849E-02 | 8.9104E-02 | 8.9115E-02 | 0.152E+00 |
| PB-210 #A | 4.4755E-01 | 8.6846E-01 | 8.6958E-01 | 0.151E+01 |
| U-238 A | 6.3744E-01 | 2.1690E-01 | 2.2257E-01 | 0.109E+01 |
| K-40 | 2.2516E+01 | 1.5175E+00 | 2.1039E+00 | 0.677E+00 |
| PB-214 | 6.1206E-01 | 1.0803E-01 | 1.2172E-01 | 0.107E+00 |
| BI-214 | 4.8416E-01 | 9.1562E-02 | 9.6327E-02 | 0.899E-01 |
| BI-212 #A | 2.5394E-01 | 3.1817E-01 | 3.1861E-01 | 0.382E+00 |
| PB-212 | 3.7271E-01 | 7.1624E-02 | 7.9460E-02 | 0.838E-01 |

American Radiation Services  Spectrum name: ARS06943.An1

| | | | | |
|---|---|---|---|---|
| TL-208 | 1.5837E-01 | 5.4024E-02 | 5.4983E-02 | 0.587E-01 |
| PA-234 #A | 8.6475E-02 | 1.0200E-01 | 1.0220E-01 | 0.128E+00 |
| CS-137 #A | 6.9362E-03 | 2.7773E-02 | 2.7775E-02 | 0.489E-01 |
| CO-60 #B | -6.7069E-04 | 6.3306E-02 | 6.3306E-02 | 0.769E-01 |
| EU-152 #A | 3.6730E-02 | 8.8563E-02 | 8.8658E-02 | 0.195E+00 |
| EU-154 #A | 1.6188E-02 | 4.6302E-02 | 4.6318E-02 | 0.757E-01 |

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 1120.0 to  1998.2 keV)  2.691E+01  pCi/g

INTERNATIONAL

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-13 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-013 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 013 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.0925E-02 | pCi/g | 1.1212E-01 | 2.9000E-01 | 1.4500E-01 | | | |
| **RA-226** | 6.5572E-01 | pCi/g | 6.7925E-01 | 1.1100E+00 | 5.5500E-01 | | | |
| **RA-228** | 7.1976E-01 | pCi/g | 1.8481E-01 | 1.5700E-01 | 7.8500E-02 | | | |
| **AM-241** | 5.5224E-02 | pCi/g | 7.1991E-02 | 1.0200E-01 | 5.1000E-02 | | | |
| **PB-210** | 1.4047E-01 | pCi/g | 9.7238E-01 | 1.4400E+00 | 7.2000E-01 | | | |
| **U-238** | 1.1384E+00 | pCi/g | 6.2025E-01 | 9.3600E-01 | 4.6800E-01 | | | |
| **K-40** | 2.0275E+01 | pCi/g | 1.9786E+00 | 3.4100E-01 | 1.7050E-01 | | | |
| **PB-214** | 6.8963E-01 | pCi/g | 1.2623E-01 | 1.0500E-01 | 5.2500E-02 | | | |
| **BI-214** | 7.0031E-01 | pCi/g | 1.4023E-01 | 1.1300E-01 | 5.6500E-02 | | | |
| **BI-212** | 7.2026E-01 | pCi/g | 4.1567E-01 | 4.0600E-01 | 2.0300E-01 | | | |
| **PB-212** | 6.6698E-01 | pCi/g | 9.4185E-02 | 7.7400E-02 | 3.8700E-02 | | | |
| **TL-208** | 2.1585E-01 | pCi/g | 5.7532E-02 | 5.2900E-02 | 2.6450E-02 | | | |
| **PA-234** | 1.3814E-01 | pCi/g | 9.8629E-02 | 1.4000E-01 | 7.0000E-02 | | | |
| **CS-137** | 3.3301E-02 | pCi/g | 3.6238E-02 | 4.5100E-02 | 2.2550E-02 | | | |
| **CO-60** | 0.0000E+00 | pCi/g | 2.8089E-02 | 9.1200E-02 | 4.5600E-02 | | | |
| **EU-152** | 1.4750E-01 | pCi/g | 1.0822E-01 | 1.5100E-01 | 7.5500E-02 | | | |
| **EU-154** | 1.5036-02 ~~9.0825E-02~~ | pCi/g | 6.3569E-02 | 7.3800E-02 | 3.6900E-02 | | | |
| **Total Gamma** | 2.6448E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 7.4702E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  5/5/2016 11:59:47 AM
                                Spectrum name: ARS08327.An1

Sample description
     Batch ID:  16-00698-13
     SDG:  ARS1-16-00671-013  Tech:  WJS

Spectrum Filename: C:\User\ARS08327.An1

Acquisition information
       Start time:                5/5/2016 11:14:27 AM
       Live time:               2700
       Real time:               2713
       Dead time:                  0.47 %
       Detector ID:                   9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:             Env32   G702W050
       Start channel:             100 (    25.46keV )
       Stop channel:             8000 (  1999.20keV )
       Peak rejection level:     1000.000%
       Peak search sensitivity:     1
       Sample Size:                 3.3217E+02 +/- 0.000E+00%
       Activity scaling factor:     1.0000E+06/(  1.0000E+00*  3.3217E+02) =
                                    3.0105E+03
       Detection limit method:      Reg. Guide 4.16 Method
       Random error:                1.0000000E+00
       Systematic error:            1.0000000E+00
       Fraction Limit:             60.000%
       Background width:            average of five points.
       Half lives decay limit:     12.000
```

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1744

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 32.82 | 10. | 97.54 | 0.62 | 2.061E-02 | | | | |
| 39.67 | 5. | 327.11 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 1.904E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 1.904E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 3.635E-02 | EU152 |
| 39.96 | 38. | 36.25 | 0.97 | 2.638E-02 | 39.52 | 16.000 | 2.799E-01 | EU152 |
| | | | | | 40.12 | 30.000 | 1.466E-01 | EU152 |
| 42.84 | 4. | 429.91 | 0.97 | 2.866E-02 | 43.00 | 13.100 | PBC<MDA | EU154 |
| | | | | | 43.00 | 13.100 | 3.077E-02 | EU154 |
| | | | | | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.53 | 6. | 346.08 | 0.97 | 3.135E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| | | | | | 46.52 | 4.000 | PBC<MDA | PB210 |
| 51.14 | 25. | 59.24 | 0.98 | 3.541E-02 | | | | |
| 53.55 | 26. | 51.99 | 0.98 | 3.741E-02 | | | | |
| 57.19 | 22. | 66.31 | 0.99 | 4.030E-02 | | | | |
| 60.49 | 27. | 65.24 | 0.99 | 4.274E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| | | | | | 59.54 | 35.900 | 5.212E-02 | Am241 |
| 63.37 | 66. | 26.52 | 0.99 | 4.473E-02 | 63.29 | 3.900 | 1.138E+00 | U238 |
| 74.99 | 172. | 14.08 | 1.01 | 5.134E-02 | | | | |
| 77.29 | 281. | 9.24 | 1.01 | 5.236E-02 | | | | |
| 84.34 | 38. | 44.70 | 1.02 | 5.488E-02 | | | | |
| 87.14 | 77. | 25.97 | 1.02 | 5.567E-02 | | | | |
| 90.01 | 59. | 32.43 | 1.02 | 5.636E-02 | | | | |
| 93.07 | 72. | 26.67 | 1.03 | 5.696E-02 | 92.38 | 2.570 | 1.479E+00 | U238 |
| | | | | | 92.80 | 3.000 | 1.229E+00 | U238 |
| 94.31 | 34. | 62.43 | 1.03 | 5.724E-02 | 94.67 | 15.500 | PBC<MDA | PA234 |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 94.67 | 15.500 | 1.161E-01 | PA234 |
| 99.24 | 24. | 82.41 | 1.03 | 5.787E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 2.659E-01 | PA234 |
| 117.31 | 12. | 81.35 | 0.32 | 5.816E-02 | | | | |
| 123.34 | 22. | 68.43 | 0.40 | 5.778E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| | | | | | 123.10 | 40.460 | 2.731E-02 | EU154 |
| 131.69 | 12. | 107.34 | 0.53 | 5.699E-02 | 131.28 | 20.000 | 3.170E-02 | PA234 |
| | | | | | 131.28 | 20.000 | 3.170E-02 | PA234 |
| 144.76 | 11. | 110.19 | 0.26 | 5.535E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 163.13 | 6. | 336.89 | 1.10 | 5.261E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 181.75 | 20. | 57.45 | 0.34 | 4.979E-02 | | | | |
| 185.99 | 107. | 18.68 | 0.61 | 4.916E-02 | 185.72 | 57.200 | 1.148E-01 | U235 |
| | | | | | 186.21 | 3.640 | 1.807E+00 | RA226 |
| 200.70 | 9. | 118.08 | 0.28 | 4.701E-02 | | | | |
| 205.41 | 13. | 91.95 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 208.63 | 32. | 48.17 | 0.97 | 4.590E-02 | | | | |
| 217.82 | 24. | 69.50 | 0.48 | 4.466E-02 | | | | |
| 238.50 | 397. | 6.04 | 1.18 | 4.209E-02 | 238.63 | 43.100 | 6.602E-01 | PB212 |
| 241.62 | 113. | 15.93 | 1.19 | 4.172E-02 | 241.98 | 7.500 | 1.079E+00 | PB214 |
| 244.55 | 17. | 79.42 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.626E-01 | EU152 |
| 277.05 | 28. | 53.83 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.15 | 146. | 14.38 | 1.04 | 3.633E-02 | 295.21 | 18.500 | 6.561E-01 | PB214 |
| 299.67 | 30. | 54.38 | 1.25 | 3.590E-02 | 300.09 | 3.270 | PBC<MDA | PB212 |
| 309.57 | 16. | 88.30 | 0.29 | 3.512E-02 | | | | |
| 318.60 | 19. | 58.63 | 0.39 | 3.442E-02 | | | | |
| 323.27 | 11. | 98.88 | 1.27 | 3.406E-02 | | | | |
| 327.68 | 34. | 33.94 | 1.28 | 3.373E-02 | | | | |
| 338.24 | 135. | 14.23 | 0.98 | 3.299E-02 | 338.40 | 12.010 | 1.027E+00 | Ra228 |
| 344.26 | 2. | 732.14 | 1.29 | 3.257E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| | | | | | 344.30 | 27.000 | PBC<MDA | EU152 |
| 351.61 | 271. | 7.98 | 1.29 | 3.209E-02 | 351.92 | 35.800 | 7.069E-01 | PB214 |
| 451.94 | 28. | 36.99 | 0.50 | 2.687E-02 | | | | |
| 473.70 | 19. | 47.58 | 0.72 | 2.600E-02 | | | | |
| 500.06 | 9. | 69.90 | 0.50 | 2.503E-02 | | | | |
| 511.12 | 195. | 10.95 | 1.13 | 2.465E-02 | 510.72 | 22.500 | 5.600E-01 | TL208 |
| 583.26 | 138. | 12.92 | 1.52 | 2.248E-02 | 583.14 | 86.000 | 2.151E-01 | TL208 |
| 592.48 | 2. | 691.56 | 1.54 | 2.226E-02 | 591.70 | 4.600 | PBC<MDA | EU154 |
| | | | | | 591.70 | 4.600 | PBC<MDA | EU154 |
| 609.49 | 226. | 9.28 | 1.54 | 2.181E-02 | 609.31 | 44.791 | 6.854E-01 | BI214 |
| 625.47 | 4. | 105.82 | 0.53 | 2.142E-02 | | | | |
| 642.23 | 1. | 225.81 | 0.18 | 2.103E-02 | | | | |
| 661.84 | 26. | 42.73 | 0.49 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| 699.79 | 9. | 147.20 | 1.64 | 1.982E-02 | 699.10 | 4.600 | PBC<MDA | PA234 |
| | | | | | 699.10 | 4.600 | 2.975E-01 | PA234 |
| 727.41 | 40. | 32.90 | 1.67 | 1.928E-02 | 727.17 | 11.800 | 5.298E-01 | BI212 |
| | | | | | 727.17 | 11.800 | 5.298E-01 | BI212 |
| 733.21 | 22. | 40.56 | 1.67 | 1.917E-02 | 733.00 | 8.500 | 3.986E-01 | PA234 |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 733.00 | 8.500 | 3.986E-01 | PA234 |
| 737.15 | 26. | 30.29 | 0.59 | 1.910E-02 | | | | |
| 747.72 | 5. | 72.86 | 0.30 | 1.891E-02 | | | | |
| 762.99 | 6. | 99.86 | 1.70 | 1.864E-02 | 763.30 | 1.700 | 5.707E-01 | TL208 |
| 768.71 | 24. | 37.69 | 1.71 | 1.855E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 778.96 | 5. | 204.84 | 1.71 | 1.837E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| | | | | | 778.90 | 12.990 | 6.314E-02 | EU152 |
| 785.52 | 5. | 261.92 | 1.72 | 1.826E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| | | | | | 785.42 | 2.000 | 4.125E-01 | BI212 |
| 808.30 | 10. | 104.83 | 1.74 | 1.790E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 3.436E-01 | PA234 |
| 857.45 | 19. | 42.18 | 0.39 | 1.716E-02 | | | | |
| 860.63 | 15. | 59.34 | 1.79 | 1.712E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 867.14 | 14. | 69.05 | 1.80 | 1.702E-02 | 867.39 | 4.176 | PBC<MDA | EU152 |
| | | | | | 867.39 | 4.176 | 5.795E-01 | EU152 |
| 873.36 | 12. | 88.81 | 1.80 | 1.694E-02 | 873.20 | 11.300 | PBC<MDA | EU154 |
| | | | | | 873.20 | 11.300 | PBC<MDA | EU154 |
| 911.23 | 114. | 12.41 | 2.02 | 1.642E-02 | 911.07 | 29.000 | 7.186E-01 | Ra228 |
| 926.53 | 9. | 103.45 | 1.85 | 1.622E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| | | | | | 926.70 | 11.000 | PBC<MDA | PA234 |
| 946.71 | 10. | 110.95 | 1.86 | 1.598E-02 | 946.00 | 20.000 | PBC<MDA | PA234 |
| | | | | | 946.00 | 20.000 | 9.427E-02 | PA234 |
| 964.79 | 21. | 47.19 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 7.258E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 2.491E-01 | EU152 |
| 969.42 | 49. | 23.72 | 0.85 | 1.570E-02 | 968.90 | 17.460 | 5.280E-01 | Ra228 |
| 1111.66 | 9. | 156.43 | 2.01 | 1.416E-02 | 1112.07 | 13.580 | PBC<MDA | EU152 |
| | | | | | 1112.07 | 13.580 | 1.410E-01 | EU152 |
| 1120.74 | 44. | 24.95 | 0.69 | 1.408E-02 | 1120.29 | 14.797 | 6.436E-01 | BI214 |
| 1150.01 | 18. | 50.71 | 0.65 | 1.380E-02 | | | | |
| 1162.26 | 4. | 108.01 | 0.23 | 1.368E-02 | | | | |
| 1193.99 | 22. | 32.62 | 0.32 | 1.340E-02 | | | | |
| 1237.70 | 16. | 97.49 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1274.16 | 25. | 34.82 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | 1.691E-01 | EU154 |
| | | | | | 1274.80 | 35.500 | 1.691E-01 | EU154 |
| 1278.48 | 5. | 81.27 | 0.25 | 1.268E-02 | | | | |
| 1377.65 | 13. | 50.13 | 2.22 | 1.192E-02 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1393.78 | 6. | 136.59 | 2.23 | 1.180E-02 | 1394.10 | 3.900 | PBC<MDA | PA234 |
| | | | | | 1394.10 | 3.900 | PBC<MDA | PA234 |
| 1408.43 | 5. | 122.03 | 2.24 | 1.170E-02 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | PBC<MDA | EU152 |
| 1461.09 | 818. | 3.54 | 2.08 | 1.134E-02 | 1460.75 | 10.700 | 2.028E+01 | K40 |
| 1620.98 | 14. | 46.95 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| | | | | | 1620.56 | 2.750 | 1.537E+00 | BI212 |
| 1764.44 | 46. | 14.74 | 0.36 | 9.536E-03 | 1764.49 | 15.357 | 9.249E-01 | BI214 |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 129.42 | 32.82 | 48. | 10. | 4.998E+02 | 195.08 | 0.616 | CS-134 | |
| 202.69 | 51.12 | 95. | 25. | 6.984E+02 | 118.48 | 0.979 | U-237 | D |
| 212.33 | 53.53 | 81. | 26. | 7.043E+02 | 103.98 | 0.982 | CE-144 | D |
| 227.12 | 57.19 | 97. | 22. | 5.342E+02 | 136.70 | 0.986 | NP-237 | c |
| 240.32 | 60.49 | 139. | 27. | 6.281E+02 | 130.15 | 0.990 | EU-155 | c |
| 298.04 | 75.02 | 206. | 172. | 3.344E+03 | 28.16 | 1.006 | TH-234 | D |
| 307.25 | 77.32 | 196. | 281. | 5.363E+03 | 18.48 | 1.008 | PB-212 | D |
| 335.76 | 84.29 | 126. | 37. | 6.737E+02 | 91.95 | 1.016 | HG-203 | D |
| 346.93 | 87.08 | 162. | 79. | 1.424E+03 | 50.61 | 1.019 | TH-234 | D |
| 358.42 | 89.95 | 144. | 58. | 1.023E+03 | 64.50 | 1.022 | AC-228 | D |
| 467.26 | 117.31 | 49. | 12. | 2.063E+02 | 162.70 | 0.322 | NP-239 | c |
| 491.39 | 123.34 | 95. | 22. | 3.842E+02 | 136.85 | 0.400 | EU-154 | c |
| 524.75 | 131.69 | 81. | 12. | 2.106E+02 | 214.67 | 0.533 | LA-140 | c |
| 577.28 | 144.76 | 95. | 19. | 3.487E+02 | 149.71 | 1.082 | YB-175 | c |
| 724.95 | 181.75 | 56. | 20. | 4.017E+02 | 114.89 | 0.339 | NP-239 | sM |
| 800.70 | 200.70 | 52. | 9. | 1.872E+02 | 236.17 | 0.282 | - | sc |
| 832.81 | 208.63 | 75. | 40. | 8.699E+02 | 68.91 | 1.150 | LU-177 | D |
| 869.19 | 217.82 | 94. | 24. | 5.284E+02 | 139.00 | 0.479 | - | s |
| 1236.12 | 309.57 | 68. | 16. | 4.555E+02 | 176.60 | 0.293 | TB-160 | sc |
| 1272.24 | 318.60 | 45. | 19. | 5.579E+02 | 117.26 | 0.394 | J-131 | s |
| 1290.90 | 323.36 | 55. | 11. | 3.265E+02 | 197.75 | 1.271 | J-131 | sc |
| 1308.54 | 327.77 | 49. | 34. | 1.004E+03 | 67.87 | 1.275 | AC-228 | D |
| 1805.55 | 451.94 | 28. | 28. | 1.061E+03 | 73.98 | 0.503 | TE-131 | s |
| 1892.60 | 473.70 | 24. | 19. | 7.386E+02 | 95.16 | 0.716 | BI-212 | s |
| 1998.07 | 500.06 | 13. | 9. | 3.516E+02 | 139.81 | 0.496 | - | s |
| 2499.77 | 625.47 | 10. | 4. | 2.054E+02 | 211.64 | 0.533 | W-187 | sc |
| 2566.82 | 642.23 | 4. | 1. | 5.232E+01 | 451.63 | 0.185 | - | sc |
| 2946.61 | 737.15 | 12. | 26. | 1.388E+03 | 60.59 | 0.592 | - | s |
| 2988.89 | 747.72 | 6. | 5. | 2.856E+02 | 145.72 | 0.299 | - | sc |
| 3428.67 | 857.45 | 32. | 10. | 5.772E+02 | 173.82 | 1.786 | J-134 | sc |
| 3876.87 | 969.42 | 43. | 32. | 2.014E+03 | 68.82 | 1.885 | AC-228 | D |
| 4481.80 | 1120.74 | 22. | 44. | 3.161E+03 | 49.90 | 0.692 | SC-46 | s |
| 4598.99 | 1150.01 | 18. | 18. | 1.268E+03 | 101.42 | 0.649 | - | s |
| 4648.01 | 1162.26 | 6. | 4. | 2.631E+02 | 216.02 | 0.234 | - | sc |
| 4775.05 | 1193.99 | 11. | 22. | 1.657E+03 | 65.24 | 0.321 | PA-234M | s |
| 5113.29 | 1278.48 | 7. | 5. | 4.257E+02 | 162.54 | 0.250 | - | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 156.81 | 39.67 | 105. | 5. | 0.002 | 654.22 | 0.967s |
| EU-152 | 157.98 | 39.96 | 62. | 38. | 0.014 | 72.49 | 0.967s |
| EU-154 | 167.00 | 42.22 | 145. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 169.49 | 42.84 | 99. | 4. | 0.001 | 859.81 | 0.970s |
| EU-152 | 182.41 | 46.07 | 148. | 0. | 0.000 | 2000.00 | 0.973s |
| PB-210 | 184.24 | 46.53 | 150. | 6. | 0.002 | 692.15 | 0.974s |
| EU-154 | 192.56 | 48.61 | 166. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 236.22 | 59.53 | 108. | 28. | 0.010 | 130.19 | 0.989s |
| U-238 | 251.26 | 63.29 | 122. | 66. | 0.024 | 53.90 | 0.993D |
| U-238 | 367.58 | 92.38 | 139. | 55. | 0.020 | 54.15 | 1.025D |
| U-238 | 369.26 | 92.80 | 151. | 8. | 0.003 | 429.73 | 1.025D |
| PA-234 | 375.28 | 94.31 | 156. | 34. | 0.013 | 124.85 | 1.027s |
| PA-234 | 392.40 | 98.59 | 193. | -19. | -0.007 | 248.72 | 1.031s |
| PA-234 | 395.00 | 99.24 | 136. | 24. | 0.009 | 164.82 | 1.033s |
| EU-154 | 491.35 | 123.33 | 137. | 14. | 0.005 | 281.46 | 1.058s |
| PA-234 | 523.58 | 131.39 | 224. | -29. | -0.011 | 174.54 | 1.067s |
| U-235 | 573.03 | 143.76 | 131. | 0. | 0.000 | 2000.00 | 1.081D |
| U-235 | 650.50 | 163.13 | 133. | 6. | 0.002 | 673.78 | 1.102s |
| U-235 | 740.82 | 185.72 | 164. | 57. | 0.021 | 183.96 | 1.126D |
| RA-226 | 742.78 | 186.21 | 183. | 39. | 0.014 | 103.41 | 0.627D |
| U-235 | 819.16 | 205.31 | 67. | 13. | 0.005 | 183.89 | 1.147D |
| PA-234 | 899.00 | 225.28 | 181. | 0. | 0.000 | 2000.00 | 1.170s |
| PB-212 | 952.41 | 238.63 | 89. | 397. | 0.147 | 12.13 | 1.182D |
| PB-214 | 965.81 | 241.98 | 102. | 109. | 0.040 | 32.77 | 1.185D |
| EU-152 | 976.09 | 244.55 | 57. | 17. | 0.006 | 158.85 | 1.188s |
| EU-154 | 991.41 | 248.38 | 111. | -4. | -0.001 | 940.94 | 1.192s |
| TL-208 | 1106.05 | 277.05 | 67. | 28. | 0.010 | 107.65 | 1.223 |
| PB-214 | 1178.44 | 295.15 | 90. | 146. | 0.054 | 28.75 | 1.042 |
| PB-212 | 1196.53 | 299.67 | 74. | 30. | 0.011 | 108.76 | 1.246s |
| Ra-228 | 1350.78 | 338.24 | 65. | 135. | 0.050 | 28.46 | 0.984s |
| EU-152 | 1374.85 | 344.26 | 90. | 2. | 0.001 | 1464.28 | 1.292s |
| PB-214 | 1404.25 | 351.61 | 64. | 269. | 0.100 | 16.20 | 1.293s |
| TL-208 | 2042.32 | 511.12 | 136. | 103. | 0.038 | 46.01 | 1.126s |
| PA-234 | 2273.00 | 568.79 | 65. | 0. | 0.000 | 2000.00 | 1.517s |
| TL-208 | 2330.88 | 583.26 | 45. | 138. | 0.051 | 25.84 | 1.518 |
| EU-154 | 2367.80 | 592.48 | 46. | 2. | 0.001 | 1383.12 | 1.539s |
| BI-214 | 2435.85 | 609.49 | 53. | 222. | 0.082 | 19.03 | 1.542 |
| CS-137 | 2643.17 | 661.31 | 26. | 19. | 0.007 | 108.73 | 1.606s |
| PA-234 | 2797.13 | 699.79 | 45. | 9. | 0.003 | 294.39 | 1.641s |
| EU-154 | 2895.38 | 724.35 | 58. | -12. | -0.005 | 242.10 | 1.664s |
| BI-212 | 2907.65 | 727.41 | 36. | 40. | 0.015 | 65.80 | 1.667s |
| PA-234 | 2930.84 | 733.21 | 14. | 22. | 0.008 | 81.13 | 1.673s |
| EU-154 | 3023.56 | 756.38 | 50. | -6. | -0.002 | 423.73 | 1.695s |
| TL-208 | 3051.25 | 763.30 | 21. | 5. | 0.002 | 253.75 | 1.701D |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 3071.48 | 768.36 | 29. | 24. | 0.009 | 75.38 | 1.706D |
| EU-152 | 3113.90 | 778.96 | 27. | 5. | 0.002 | 409.68 | 1.715s |
| BI-212 | 3140.14 | 785.52 | 45. | 5. | 0.002 | 523.83 | 1.721s |
| PA-234 | 3231.31 | 808.30 | 27. | 10. | 0.004 | 209.67 | 1.742s |
| TL-208 | 3440.09 | 860.47 | 31. | 15. | 0.006 | 118.69 | 1.789D |
| EU-152 | 3466.78 | 867.14 | 19. | 14. | 0.005 | 138.11 | 1.795s |
| EU-154 | 3491.67 | 873.36 | 27. | 12. | 0.004 | 177.62 | 1.800s |
| PA-234 | 3518.39 | 880.04 | 40. | 0. | 0.000 | 2000.00 | 1.807s |
| PA-234 | 3535.86 | 884.40 | 39. | -6. | -0.002 | 441.48 | 1.809s |
| Ra-228 | 3643.22 | 911.23 | 22. | 114. | 0.042 | 24.82 | 2.016 |
| PA-234 | 3704.46 | 926.53 | 21. | 9. | 0.003 | 206.91 | 1.848s |
| BI-214 | 3735.26 | 934.23 | 44. | 0. | 0.000 | 2000.00 | 1.854s |
| PA-234 | 3785.24 | 946.71 | 29. | 10. | 0.004 | 221.90 | 1.864s |
| PA-234 | 3794.70 | 949.08 | 51. | 0. | 0.000 | 2000.00 | 1.867s |
| EU-152 | 3855.60 | 964.29 | 33. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.83 | 964.60 | 37. | 21. | 0.008 | 94.38 | 1.881D |
| Ra-228 | 3874.04 | 968.90 | 71. | 14. | 0.005 | 175.93 | 1.885D |
| EU-154 | 3984.21 | 996.43 | 26. | -4. | -0.001 | 546.58 | 1.908s |
| EU-154 | 4012.41 | 1003.47 | 26. | 0. | 0.000 | 2000.00 | 1.915s |
| EU-152 | 4346.79 | 1087.01 | 69. | 0. | 0.000 | 2000.00 | 1.984s |
| EU-152 | 4445.45 | 1111.66 | 44. | 9. | 0.003 | 312.85 | 2.006s |
| BI-214 | 4481.18 | 1120.58 | 55. | 24. | 0.009 | 134.50 | 2.013 |
| CO-60 | 4683.88 | 1171.22 | 68. | 0. | 0.000 | 2000.00 | 2.056s |
| BI-214 | 4950.04 | 1237.70 | 50. | 16. | 0.006 | 194.98 | 2.108s |
| EU-154 | 5095.99 | 1274.16 | 12. | 25. | 0.009 | 69.65 | 2.137s |
| CO-60 | 5326.70 | 1331.78 | 29. | -1. | 0.000 | 1972.67 | 2.183s |
| BI-214 | 5510.36 | 1377.65 | 8. | 13. | 0.005 | 100.25 | 2.217s |
| PA-234 | 5574.97 | 1393.78 | 12. | 6. | 0.002 | 273.17 | 2.230s |
| EU-152 | 5633.61 | 1408.43 | 8. | 5. | 0.002 | 244.06 | 2.240s |
| K-40 | 5844.50 | 1461.09 | 6. | 816. | 0.302 | 7.11 | 2.083 |
| BI-212 | 6484.83 | 1620.98 | 6. | 14. | 0.005 | 93.90 | 2.394s |
| BI-214 | 7058.46 | 1764.19 | 1. | 45. | 0.017 | 31.14 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - | | Average | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | Code | Activity pCi/g | Energy keV | Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
| U-235 | | 6.0925E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 6.093E-02 | } | 6.675E-02 | 9.20E+01 | 5.72E+01 G K |
| | | | 143.76 | 0.000E+00 | !(P | 2.899E-01 | 1.00E+03 | 1.05E+01 G |
| | | | 205.31 | 1.858E-01 | (P | 5.633E-01 | 9.19E+01 | 4.70E+00 G |
| | | | 163.35 | 7.212E-02 | &(P | 6.882E-01 | 3.37E+02 | 4.70E+00 G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| RA-226 | | 6.5572E-01 | | | | | 5.84E+05 | |
| | | | | | | | | Derived Ave Activity |
| | | | 186.21 | 6.557E-01 | }( | 1.108E+00 | 5.17E+01 | 3.64E+00 G K |
| Ra-228 | | 7.1976E-01 | | | | | 2.10E+03 | |
| | | | 911.07 | 7.186E-01 | ( | 1.567E-01 | 1.24E+01 | 2.90E+01 G |
| | | | 968.90 | 1.572E-01 | - P | 4.604E-01 | 8.80E+01 | 1.75E+01 G |
| | | | 338.40 | 1.027E+00 | + | 3.065E-01 | 1.42E+01 | 1.20E+01 G |
| | | | 964.60 | 7.258E-01 | ( | 1.094E+00 | 4.72E+01 | 5.45E+00 G |
| Am-241 | T | 5.5224E-02 | | | | | 1.58E+05 | |
| | | | 59.54 | 5.522E-02 | &(P | 1.022E-01 | 6.51E+01 | 3.59E+01 G K |
| PB-210 | | 1.4047E-01 | | | | | 7.45E+03 | |
| | | | 46.52 | 1.405E-01 | (P | 1.437E+00 | 3.46E+02 | 4.00E+00 G |
| U-238 | | 1.1384E+00 | | | | | 1.63E+12 | |
| | | | 63.29 | 1.138E+00 | (P | 9.357E-01 | 2.70E+01 | 3.90E+00 G |
| | | | 92.80 | 1.432E-01 | } P | 1.057E+00 | 2.15E+02 | 3.00E+00 G |
| | | | 92.38 | 1.138E+00 | } P | 1.190E+00 | 2.71E+01 | 2.57E+00 G |
| K-40 | | 2.0275E+01 | | | | | 4.68E+11 | |
| | | | 1460.75 | 2.028E+01 | (P | 3.409E-01 | 3.56E+00 | 1.07E+01 G |
| PB-214 | | 6.8963E-01 | | | | | 5.84E+05 | |
| | | | 351.92 | 7.069E-01 | *(P | 1.047E-01 | 8.10E+00 | 3.58E+01 G |
| | | | 295.21 | 6.561E-01 | ( | 2.101E-01 | 1.44E+01 | 1.85E+01 G |
| | | | 241.98 | 1.050E+00 | + P | 4.801E-01 | 1.64E+01 | 7.50E+00 G |
| BI-214 | | 7.0031E-01 | | | | | 5.84E+05 | |
| | | | 609.31 | 6.854E-01 | (P | 1.128E-01 | 9.51E+00 | 4.48E+01 G |
| | | | 1764.49 | 9.249E-01 | + P | 1.544E-01 | 1.56E+01 | 1.54E+01 G |
| | | | 1120.29 | 3.471E-01 | - | 5.391E-01 | 6.73E+01 | 1.48E+01 G |
| | | | 1238.11 | 6.125E-01 | ?( | 1.403E+00 | 9.75E+01 | 5.86E+00 G |
| | | | 768.36 | 8.182E-01 | ( | 9.471E-01 | 3.77E+01 | 4.80E+00 G |
| | | | 1377.67 | 8.582E-01 | ?(P | 1.008E+00 | 5.01E+01 | 3.92E+00 G |
| | | | 934.06 | 0.000E+00 | - P | 2.079E+00 | 1.00E+03 | 3.03E+00 G |
| BI-212 | | 7.2026E-01 | | | | | 2.10E+03 | |
| | | | 727.17 | 5.298E-01 | ( | 4.062E-01 | 3.29E+01 | 1.18E+01 G |
| | | | 1620.56 | 1.537E+00 | &( | 1.547E+00 | 4.70E+01 | 2.75E+00 G |
| | | | 785.42 | 4.125E-01 | & | 2.802E+00 | 2.62E+02 | 2.00E+00 G |
| PB-212 | | 6.6698E-01 | | | | | 2.10E+03 | |
| | | | 238.63 | 6.601E-01 | (P | 7.741E-02 | 6.06E+00 | 4.31E+01 G |
| | | | 300.09 | 7.572E-01 | ?( | 1.095E+00 | 5.44E+01 | 3.27E+00 G |

ORTEC g v - i (3263) Env32 G702W050 5/5/2016 11:59:47 AM
Spectrum name: ARS08327.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak MDA | | |
|---|---|---|---|---|---|---|---|
| TL-208 | 2.1585E-01 | | | | | 2.10E+03 | |
| | | 583.14 | 2.151E-01 | ( | 5.294E-02 | 1.29E+01 | 8.60E+01 G |
| | | 510.72 | 5.600E-01 | + P | 3.097E-01 | 2.30E+01 | 2.25E+01 G |
| | | 860.47 | 2.216E-01 | (P | 4.198E-01 | 5.93E+01 | 1.20E+01 G |
| | | 277.36 | 3.415E-01 | + P | 4.993E-01 | 5.38E+01 | 6.50E+00 G |
| | | 763.30 | 5.163E-01 | + | 2.289E+00 | 1.27E+02 | 1.70E+00 G |
| PA-234 | 1.3814E-01 | | | | | 1.65E+12 | |
| | | 98.44 | -3.882E-02 | &( | 1.401E-01 | 1.24E+02 | 2.51E+01 G |
| | | 946.00 | 9.427E-02 | ?( | 2.621E-01 | 1.11E+02 | 2.00E+01 G |
| | | 131.28 | -7.617E-02 | + | 1.913E-01 | 8.73E+01 | 2.00E+01 G |
| | | 94.67 | 1.161E-01 | ?( | 2.068E-01 | 6.24E+01 | 1.55E+01 G |
| | | 883.24 | -8.471E-02 | + | 4.737E-01 | 2.21E+02 | 1.20E+01 G |
| | | 926.70 | 1.549E-01 | &(P | 4.048E-01 | 1.03E+02 | 1.10E+01 G |
| | | 569.26 | 0.000E+00 | - P | 5.087E-01 | 1.00E+03 | 1.04E+01 G |
| | | 111.00 | 6.152E-03 | & P | 4.075E-01 | 2.25E+03 | 8.55E+00 G |
| | | 733.00 | 3.986E-01 | (P | 3.776E-01 | 4.06E+01 | 8.50E+00 G |
| | | 949.00 | 0.000E+00 | & P | 8.700E-01 | 1.00E+03 | 7.80E+00 G |
| | | 880.51 | 0.000E+00 | & P | 8.829E-01 | 1.00E+03 | 6.50E+00 G |
| | | 226.87 | 0.000E+00 | & P | 6.968E-01 | 1.00E+03 | 6.50E+00 G |
| | | 831.10 | -4.089E-02 | % | 1.077E+00 | 1.03E+03 | 5.60E+00 G |
| | | 808.10 | 3.436E-01 | &( | 9.250E-01 | 1.05E+02 | 4.90E+00 G |
| | | 99.70 | 2.659E-01 | ?( | 6.322E-01 | 8.24E+01 | 4.70E+00 G |
| | | 699.10 | 2.975E-01 | ?( | 1.123E+00 | 1.47E+02 | 4.60E+00 G |
| | | 898.60 | 4.821E-02 | % P | 1.460E+00 | 1.14E+03 | 4.00E+00 G |
| | | 1394.10 | 3.748E-01 | &(P | 1.246E+00 | 1.37E+02 | 3.90E+00 G |
| CS-137 | 3.3301E-02 | | | | | 1.10E+04 | |
| | | 661.66 | 3.330E-02 | ?(P | 4.515E-02 | 5.44E+01 | 8.52E+01 G |
| EU-152 | 1.4750E-01 | | | | | 4.64E+03 | |
| | | 40.12 | 1.466E-01 | ?( | 1.506E-01 | 3.62E+01 | 3.00E+01 G |
| | | 121.78 | 2.373E-03 | % | 9.744E-02 | 1.38E+03 | 2.92E+01 G |
| | | 344.30 | 7.864E-03 | - P | 1.605E-01 | 7.32E+02 | 2.70E+01 G |
| | | 1408.08 | 6.068E-02 | & P | 1.929E-01 | 1.22E+02 | 2.12E+01 G |
| | | 39.52 | 3.635E-02 | - | 3.668E-01 | 3.27E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | & P | 3.849E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 1.410E-01 | ?( | 5.269E-01 | 1.56E+02 | 1.36E+01 G |
| | | 778.90 | 6.314E-02 | - | 3.400E-01 | 2.05E+02 | 1.30E+01 G |
| | | 1085.80 | 0.000E+00 | - P | 8.384E-01 | 1.00E+03 | 1.03E+01 G |
| | | 45.40 | 0.000E+00 | - P | 6.500E-01 | 1.00E+03 | 9.00E+00 G |
| | | 244.67 | 1.626E-01 | ?( | 3.625E-01 | 7.94E+01 | 7.62E+00 G |
| | | 867.39 | 5.795E-01 | + | 9.837E-01 | 6.91E+01 | 4.18E+00 G |
| EU-154 | 9.0825E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 1.803E-02 | ?(P | 7.378E-02 | 1.41E+02 | 4.05E+01 G |
| | | 1274.80 | 1.691E-01 | &( | 1.244E-01 | 3.48E+01 | 3.55E+01 G |

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Spectrum name: ARS08327.An1

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         723.30-9.880E-02 +   3.031E-01 1.21E+02 1.97E+01 G
                        1004.80 0.000E+00 - P 2.976E-01 1.00E+03 1.76E+01 G
                          43.00 3.077E-02 &(  3.942E-01 4.30E+02 1.31E+01 G
                         873.20 1.896E-01 &(P 4.236E-01 8.88E+01 1.13E+01 G
                         996.30-7.017E-02 &   4.832E-01 2.73E+02 1.07E+01 G
                          42.31 0.000E+00 - P 8.632E-01 1.00E+03 7.30E+00 G
                         248.04-4.271E-02 -   5.768E-01 4.70E+02 6.60E+00 G
                         591.70 5.494E-02 ?(P 1.011E+00 6.92E+02 4.60E+00 G
                          48.70 0.000E+00 - P 1.350E+00 1.00E+03 4.20E+00 G
                         756.70-2.548E-01 +   1.391E+00 2.12E+02 4.10E+00 G
```

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*************** D I S C A R D E D I S O T O P E P E A K S ***************

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.67 | 105. | 5. | 0.002 | 654.22 | 3.635E-02 | |
| EU-152 | 39.96 | 62. | 38. | 0.014 | 72.49 | 1.466E-01 | |
| EU-154 | 42.84 | 99. | 4. | 0.001 | 859.81 | 3.077E-02 | |
| PB-210 | 46.53 | 150. | 6. | 0.002 | 692.15 | 1.405E-01 | P |
| Am-241 | 59.53 | 108. | 28. | 0.010 | 130.19 | 5.522E-02 | P |

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| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 94.31 | 156. | 34. | 0.013 | 124.85 | 1.161E-01 | |
| PA-234 | 98.59 | 193. | -19. | -0.007 | 248.72 | -3.882E-02 | |
| PA-234 | 99.24 | 136. | 24. | 0.009 | 164.82 | 2.659E-01 | |
| EU-154 | 123.33 | 137. | 14. | 0.005 | 281.46 | 1.803E-02 | P |
| PA-234 | 131.39 | 224. | -29. | -0.011 | 174.54 | -7.617E-02 | |
| EU-152 | 244.55 | 57. | 17. | 0.006 | 158.85 | 1.626E-01 | |
| EU-154 | 248.38 | 111. | -4. | -0.001 | 940.94 | -4.271E-02 | |
| EU-152 | 344.26 | 90. | 2. | 0.001 | 1464.28 | 7.864E-03 | P |
| EU-154 | 592.48 | 46. | 2. | 0.001 | 1383.12 | 5.494E-02 | P |
| PA-234 | 699.79 | 45. | 9. | 0.003 | 294.39 | 2.975E-01 | |
| EU-154 | 724.35 | 58. | -12. | -0.005 | 242.10 | -9.880E-02 | |
| BI-212 | 727.41 | 36. | 40. | 0.015 | 65.80 | 5.298E-01 | |
| PA-234 | 733.21 | 14. | 22. | 0.008 | 81.13 | 3.986E-01 | P |
| EU-154 | 756.38 | 50. | -6. | -0.002 | 423.73 | -2.548E-01 | |
| EU-152 | 778.96 | 27. | 5. | 0.002 | 409.68 | 6.314E-02 | |
| BI-212 | 785.52 | 45. | 5. | 0.002 | 523.83 | 4.125E-01 | |
| PA-234 | 808.30 | 27. | 10. | 0.004 | 209.67 | 3.436E-01 | |
| EU-152 | 867.14 | 19. | 14. | 0.005 | 138.11 | 5.795E-01 | |
| EU-154 | 873.36 | 27. | 12. | 0.004 | 177.62 | 1.896E-01 | P |
| PA-234 | 884.40 | 39. | -6. | -0.002 | 441.48 | -8.471E-02 | |
| PA-234 | 926.53 | 21. | 9. | 0.003 | 206.91 | 1.549E-01 | P |
| PA-234 | 946.71 | 29. | 10. | 0.004 | 221.90 | 9.427E-02 | |
| EU-154 | 996.43 | 26. | -4. | -0.001 | 546.58 | -7.017E-02 | |
| EU-152 | 1111.66 | 44. | 9. | 0.003 | 312.85 | 1.410E-01 | |
| EU-154 | 1274.16 | 12. | 25. | 0.009 | 69.65 | 1.691E-01 | |
| CO-60 | 1331.78 | 29. | -1. | 0.000 | 1972.67 | -2.868E-03 | |
| PA-234 | 1393.78 | 12. | 6. | 0.002 | 273.17 | 3.748E-01 | P |
| EU-152 | 1408.43 | 8. | 5. | 0.002 | 244.06 | 6.068E-02 | P |
| BI-212 | 1620.98 | 6. | 14. | 0.005 | 93.90 | 1.537E+00 | |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | A | 6.0925E-02 | 1.1204E-01 | 1.1212E-01 | 0.290E+00 |
| RA-226 | A | 6.5572E-01 | 6.7808E-01 | 6.7925E-01 | 0.111E+01 |
| Ra-228 | | 7.1976E-01 | 1.7863E-01 | 1.8481E-01 | 0.157E+00 |
| Am-241 | #A | 5.5224E-02 | 7.1896E-02 | 7.1991E-02 | 0.102E+00 |
| PB-210 | #A | 1.4047E-01 | 9.7228E-01 | 9.7238E-01 | 0.144E+01 |
| U-238 | | 1.1384E+00 | 6.1365E-01 | 6.2025E-01 | 0.936E+00 |
| K-40 | | 2.0275E+01 | 1.4419E+00 | 1.9786E+00 | 0.341E+00 |
| PB-214 | | 6.8963E-01 | 1.1170E-01 | 1.2623E-01 | 0.105E+00 |
| BI-214 | | 7.0031E-01 | 1.3326E-01 | 1.4023E-01 | 0.113E+00 |
| BI-212 | # | 7.2026E-01 | 4.1294E-01 | 4.1567E-01 | 0.406E+00 |
| PB-212 | | 6.6698E-01 | 8.0886E-02 | 9.4185E-02 | 0.774E-01 |

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| | | | | |
|---|---|---|---|---|
| TL-208 | 2.1585E-01 | 5.5785E-02 | 5.7532E-02 | 0.529E-01 |
| PA-234 #A | 1.3814E-01 | 9.8100E-02 | 9.8629E-02 | 0.140E+00 |
| CS-137 #A | 3.3301E-02 | 3.6208E-02 | 3.6238E-02 | 0.451E-01 |
| CO-60 #A | 0.0000E+00 | 2.8089E-02 | 2.8089E-02 | 0.912E-01 |
| EU-152 #A | 1.4750E-01 | 1.0693E-01 | 1.0822E-01 | 0.151E+00 |
| EU-154 #C | 9.0825E-02 | 6.3259E-02 | 6.3569E-02 | 0.738E-01 |

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  25.5 to  1999.2 keV)  2.510E+01  pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00565-10 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-014 |
| AnalysisBatch | ARS1-B16-00565 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI COUNT.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1.5g/ |
| Fraction | 014 |
| Run | 1 |
| Detector ID | 1 |
| Detector Name | (ARS08) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 4.8895E-02 | pCi/g | 6.7030E-02 | 5.7300E-02 | 2.8650E-02 | | | |
| **RA-226** | 6.5092E-01 | pCi/g | 5.7799E-01 | 7.7400E-01 | 3.8700E-01 | | | |
| **RA-228** | 2.9601E-01 | pCi/g | 1.5819E-01 | 1.7300E-01 | 8.6500E-02 | | | |
| **AM-241** | 1.6015E-02 | pCi/g | 7.0212E-02 | 1.0500E-01 | 5.2500E-02 | | | |
| **PB-210** | 0.0000E+00 | pCi/g | 5.3936E-01 | 1.3100E+00 | 6.5500E-01 | | | |
| **U-238** | 2.9081E-01 | pCi/g | 3.5247E-01 | 1.1700E+00 | 5.8500E-01 | | | |
| **K-40** | 7.1375E+00 | pCi/g | 1.1701E+00 | 2.9100E-01 | 1.4550E-01 | | | |
| **PB-214** | 3.6541E-01 | pCi/g | 8.8766E-02 | 5.7200E-02 | 2.8600E-02 | | | |
| **BI-214** | 2.0945E-01 | pCi/g | 1.3719E-01 | 1.4900E-01 | 7.4500E-02 | | | |
| **BI-212** | 5.1479E-01 | pCi/g | 2.8933E-01 | 3.5100E-01 | 1.7550E-01 | | | |
| **PB-212** | 2.5477E-01 | pCi/g | 6.8496E-02 | 7.2900E-02 | 3.6450E-02 | | | |
| **TL-208** | 8.4577E-02 | pCi/g | 6.3777E-02 | 6.4300E-02 | 3.2150E-02 | | | |
| **PA-234** | 1.3994E-01 | pCi/g | 1.5705E-01 | 1.0200E-01 | 5.1000E-02 | | | |
| **CS-137** | 6.1644E-03 | pCi/g | 3.1593E-02 | 4.4900E-02 | 2.2450E-02 | | | |
| **CO-60** | 2.0443E-02 | pCi/g | 5.3024E-02 | 6.6900E-02 | 3.3450E-02 | | | |
| **EU-152** | 4.8882E-02 | pCi/g | 3.7545E-02 | 2.1000E-01 | 1.0500E-01 | | | |
| **EU-154** | 7.4777E-02 | pCi/g | 5.1027E-02 | 8.1200E-02 | 4.0600E-02 | | | |
| **Total Gamma** | 1.0159E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 2.7579E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G702W050  4/19/2016 2:03:17 PM
                                Spectrum name: ARS08227.An1

Sample description
     Batch ID:  16-00565-10
     SDG:  ARS1-16-00671-014  Tech:  WJS

Spectrum Filename: C:\User\ARS08227.An1

Acquisition information
       Start time:                4/19/2016 1:33:02 PM
       Live time:               1800
       Real time:               1807
       Dead time:                 0.41 %
       Detector ID:                  9

Detector system
     (ARS08) MCB 129


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 12-12-14 POLYNOMIAL


       Energy Calibration
            Created:              12/12/2014 9:34:56 AM
            Zero offset:          0.447 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.417E-08 keV/channel^2

       Efficiency Calibration
            Created:              1/5/2015 10:02:55 AM
            Type:                 Polynomial
            Uncertainty:          1.535 %
            Coefficients:        -0.447430  -4.056056   0.358945
                                 -0.033786   0.001201  -0.000016

Library Files
       Main analysis library:     ITSI COUNT.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G702W050
       Start channel:            100 (    25.46keV )
       Stop channel:            8000 (  1999.20keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    1
       Sample Size:                3.1392E+02 +/- 0.000E+00%
       Activity scaling factor:    1.0000E+06/(  1.0000E+00*  3.1392E+02) =
                                   3.1855E+03
       Detection limit method:     Reg. Guide 4.16 Method
       Random error:               1.0000000E+00
       Systematic error:           1.0000000E+00
       Fraction Limit:            60.000%
       Background width:           average of five points.
       Half lives decay limit:    12.000
```

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Spectrum name: ARS08227.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 12/22/2014 7:44:35 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1324

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 27.31 | 10. | 96.62 | 0.54 | 1.625E-02 | | | | |
| 39.27 | 4. | 281.76 | 0.97 | 2.591E-02 | 39.52 | 16.000 | PBC<MDA | EU152 |
| | | | | | 40.12 | 30.000 | 2.115E-02 | EU152 |
| | | | | | 40.12 | 30.000 | 2.115E-02 | EU152 |
| | | | | | 39.52 | 16.000 | 4.039E-02 | EU152 |
| 45.72 | 3. | 333.20 | 0.97 | 3.056E-02 | 45.40 | 9.000 | PBC<MDA | EU152 |
| | | | | | 45.40 | 9.000 | PBC<MDA | EU152 |
| 51.88 | 6. | 96.42 | 0.36 | 3.606E-02 | | | | |
| 59.49 | 3. | 218.30 | 0.26 | 4.201E-02 | 59.54 | 35.900 | PBC<MDA | Am241 |
| 63.50 | 3. | 470.50 | 0.99 | 4.468E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| | | | | | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.83 | 37. | 33.56 | 1.01 | 5.126E-02 | | | | |
| 77.10 | 61. | 21.00 | 1.01 | 5.228E-02 | | | | |
| 79.92 | 7. | 113.83 | 1.01 | 5.341E-02 | | | | |
| 92.80 | 9. | 158.86 | 1.02 | 5.685E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| | | | | | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.81 | 20. | 60.47 | 1.03 | 5.693E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| | | | | | 92.80 | 3.000 | PBC<MDA | U238 |
| 98.82 | 2. | 465.25 | 1.03 | 5.774E-02 | 98.44 | 25.100 | PBC<MDA | PA234 |
| | | | | | 98.44 | 25.100 | 7.151E-03 | PA234 |
| 99.41 | 16. | 55.99 | 1.03 | 5.787E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| | | | | | 99.70 | 4.700 | 2.902E-01 | PA234 |
| 127.06 | 6. | 104.28 | 0.28 | 5.746E-02 | | | | |
| 135.19 | 18. | 49.00 | 0.44 | 5.659E-02 | | | | |
| 144.11 | 6. | 186.96 | 1.08 | 5.549E-02 | 143.76 | 10.500 | PBC<MDA | U235 |

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Spectrum name: ARS08227.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| | | | | | 143.76 | 10.500 | PBC<MDA | U235 |
| 164.42 | 24. | 41.30 | 0.49 | 5.244E-02 | | | | |
| 185.59 | 18. | 68.45 | 1.13 | 4.920E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 4.726E-01 | RA226 |
| | | | | | 185.72 | 57.200 | 3.003E-02 | U235 |
| | | | | | 186.21 | 3.640 | 4.726E-01 | RA226 |
| 185.79 | 24. | 44.29 | 1.13 | 4.912E-02 | 185.72 | 57.200 | PBC<MDA | U235 |
| | | | | | 186.21 | 3.640 | 6.509E-01 | RA226 |
| 204.88 | 13. | 93.33 | 1.15 | 4.636E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| | | | | | 205.31 | 4.700 | PBC<MDA | U235 |
| 212.99 | 4. | 132.02 | 0.23 | 4.530E-02 | | | | |
| 223.75 | 17. | 48.62 | 0.72 | 4.389E-02 | | | | |
| 227.11 | 5. | 211.15 | 1.17 | 4.350E-02 | 226.87 | 6.500 | PBC<MDA | PA234 |
| | | | | | 226.87 | 6.500 | PBC<MDA | PA234 |
| 238.55 | 97. | 13.20 | 1.18 | 4.205E-02 | 238.63 | 43.100 | 2.547E-01 | PB212 |
| 240.82 | 8. | 128.94 | 1.18 | 4.178E-02 | 241.98 | 7.500 | PBC<MDA | PB214 |
| 244.86 | 1. | 749.00 | 1.19 | 4.136E-02 | 244.67 | 7.616 | PBC<MDA | EU152 |
| | | | | | 244.67 | 7.616 | 1.518E-02 | EU152 |
| 248.58 | 4. | 239.52 | 1.19 | 4.098E-02 | 248.04 | 6.600 | PBC<MDA | EU154 |
| | | | | | 248.04 | 6.600 | 6.484E-02 | EU154 |
| 277.10 | 12. | 71.50 | 1.22 | 3.795E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| | | | | | 277.36 | 6.500 | PBC<MDA | TL208 |
| 295.02 | 46. | 24.21 | 0.83 | 3.634E-02 | 295.21 | 18.500 | 3.274E-01 | PB214 |
| 338.16 | 22. | 44.10 | 1.29 | 3.297E-02 | 338.40 | 12.010 | PBC<MDA | Ra228 |
| | | | | | 338.40 | 12.010 | 2.717E-01 | Ra228 |
| 344.23 | 7. | 113.38 | 1.29 | 3.257E-02 | 344.30 | 27.000 | PBC<MDA | EU152 |
| | | | | | 344.30 | 27.000 | PBC<MDA | EU152 |
| 352.01 | 94. | 11.02 | 1.52 | 3.206E-02 | 351.92 | 35.800 | 3.850E-01 | PB214 |
| 510.53 | 68. | 17.44 | 1.03 | 2.467E-02 | 510.72 | 22.500 | PBC<MDA | TL208 |
| | | | | | 510.72 | 22.500 | 6.305E-02 | TL208 |
| 569.62 | 2. | 491.24 | 1.52 | 2.287E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| | | | | | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.24 | 18. | 57.06 | 1.53 | 2.249E-02 | 583.14 | 86.000 | PBC<MDA | TL208 |
| | | | | | 583.14 | 86.000 | 4.452E-02 | TL208 |
| 609.45 | 60. | 17.37 | 1.30 | 2.181E-02 | 609.31 | 44.791 | 2.854E-01 | BI214 |
| | | | | | 609.31 | 44.791 | 2.854E-01 | BI214 |
| 661.58 | 2. | 256.25 | 1.61 | 2.059E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |
| | | | | | 661.66 | 85.210 | PBC<MDA | CS137 |
| 726.95 | 19. | 38.06 | 1.67 | 1.928E-02 | 727.17 | 11.800 | 3.994E-01 | BI212 |
| | | | | | 727.17 | 11.800 | 3.994E-01 | BI212 |
| 756.15 | 7. | 90.69 | 1.69 | 1.875E-02 | 756.70 | 4.100 | PBC<MDA | EU154 |
| | | | | | 756.70 | 4.100 | 4.355E-01 | EU154 |
| 764.12 | 10. | 65.80 | 1.70 | 1.864E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| | | | | | 763.30 | 1.700 | 1.510E+00 | TL208 |
| 777.93 | 5. | 123.77 | 1.71 | 1.837E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| | | | | | 778.90 | 12.990 | 1.002E-01 | EU152 |
| 807.32 | 8. | 59.00 | 1.74 | 1.790E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| | | | | | 808.10 | 4.900 | 4.635E-01 | PA234 |

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Spectrum name: ARS08227.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 831.49 | 6. | 104.78 | 1.76 | 1.755E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| | | | | | 831.10 | 5.600 | 3.083E-01 | PA234 |
| 872.60 | 12. | 33.94 | 1.80 | 1.694E-02 | 873.20 | 11.300 | 3.034E-01 | EU154 |
| | | | | | 873.20 | 11.300 | 3.034E-01 | EU154 |
| 879.69 | 1. | 320.26 | 1.81 | 1.684E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| | | | | | 880.51 | 6.500 | PBC<MDA | PA234 |
| 897.90 | 6. | 65.43 | 1.82 | 1.659E-02 | 898.60 | 4.000 | PBC<MDA | PA234 |
| | | | | | 898.60 | 4.000 | PBC<MDA | PA234 |
| 911.98 | 31. | 23.08 | 0.35 | 1.641E-02 | 911.07 | 29.000 | 3.153E-01 | Ra228 |
| 934.68 | 8. | 69.79 | 1.85 | 1.613E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| | | | | | 934.06 | 3.029 | PBC<MDA | BI214 |
| 949.89 | 7. | 82.89 | 1.87 | 1.595E-02 | 949.00 | 7.800 | PBC<MDA | PA234 |
| | | | | | 949.00 | 7.800 | PBC<MDA | PA234 |
| 964.61 | 4. | 183.32 | 1.88 | 1.576E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 2.506E-01 | Ra228 |
| | | | | | 964.60 | 5.452 | 2.506E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | 7.024E-02 | EU152 |
| 1004.35 | 6. | 95.82 | 1.92 | 1.529E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| | | | | | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1086.19 | 9. | 37.99 | 1.98 | 1.442E-02 | 1085.80 | 10.290 | 2.931E-01 | EU152 |
| | | | | | 1085.80 | 10.290 | 2.931E-01 | EU152 |
| 1095.06 | 3. | 161.90 | 0.00 | 1.433E-02 | | | | |
| 1120.21 | 6. | 167.17 | 2.01 | 1.408E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| | | | | | 1120.29 | 14.797 | 1.377E-01 | BI214 |
| 1173.27 | 6. | 129.67 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| | | | | | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1237.68 | 16. | 38.40 | 2.11 | 1.302E-02 | 1238.11 | 5.859 | 1.035E+00 | BI214 |
| | | | | | 1238.11 | 5.859 | 1.035E+00 | BI214 |
| 1274.61 | 3. | 224.17 | 2.14 | 1.271E-02 | 1274.80 | 35.500 | PBC<MDA | EU154 |
| | | | | | 1274.80 | 35.500 | 3.533E-02 | EU154 |
| 1461.13 | 182. | 7.41 | 1.59 | 1.134E-02 | 1460.75 | 10.700 | 7.137E+00 | K40 |
| 1621.07 | 6. | 40.82 | 2.39 | 1.033E-02 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.41 | 11. | 32.60 | 2.49 | 9.535E-03 | 1764.49 | 15.357 | 3.689E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 107.39 | 27.31 | 32. | 10. | 5.846E+02 | 193.24 | 0.542 | SN-113 | |
| 205.66 | 51.88 | 18. | 6. | 1.775E+02 | 192.84 | 0.363 | TB-160 | |
| 297.39 | 74.85 | 58. | 37. | 7.193E+02 | 67.12 | 1.005 | HG-203 | D |
| 306.48 | 77.12 | 52. | 61. | 1.170E+03 | 42.00 | 1.008 | PB-212 | D |
| 317.74 | 79.94 | 30. | 7. | 1.344E+02 | 227.67 | 1.011 | CE-144 | c |
| 506.24 | 127.06 | 16. | 6. | 1.009E+02 | 208.56 | 0.276 | - | c |
| 538.75 | 135.19 | 26. | 18. | 3.181E+02 | 98.00 | 0.439 | J-134 | s |
| 655.63 | 164.42 | 27. | 24. | 4.653E+02 | 82.60 | 0.493 | U-237 | s |

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Spectrum name: ARS08227.An1

| Channel | Energy | Background | Net area | Eff*Area | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 849.88 | 212.99 | 10. | 4. | 7.725E+01 | 264.03 | 0.234 | - | sc |
| 892.88 | 223.75 | 19. | 17. | 3.827E+02 | 97.24 | 0.717 | SB-126 | s |
| 961.75 | 241.05 | 49. | 9. | 2.107E+02 | 235.20 | 1.184 | RU-103 | sc |
| 2039.95 | 510.53 | 14. | 68. | 2.777E+03 | 34.88 | 1.034 | J-133 | s |
| 2435.66 | 609.45 | 14. | 60. | 2.774E+03 | 34.74 | 1.299 | BI-214 | s |
| 3646.24 | 911.98 | 7. | 31. | 1.913E+03 | 46.16 | 0.354 | - | s |
| 4379.00 | 1095.06 | 5. | 3. | 1.815E+02 | 323.81 | 0.000 | - | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 155.23 | 39.27 | 38. | 4. | 0.002 | 563.52 | 0.967s |
| EU-152 | 157.00 | 39.71 | 48. | -6. | -0.003 | 405.34 | 0.967s |
| EU-154 | 165.20 | 41.77 | 46. | 0. | 0.000 | 2000.00 | 0.970s |
| EU-154 | 171.07 | 43.23 | 40. | -2. | -0.001 | 1251.49 | 0.970s |
| EU-152 | 181.00 | 45.72 | 38. | 3. | 0.002 | 666.40 | 0.973s |
| PB-210 | 184.11 | 46.49 | 46. | 0. | 0.000 | 2000.00 | 0.974s |
| EU-154 | 193.83 | 48.93 | 56. | 0. | 0.000 | 2000.00 | 0.977s |
| Am-241 | 237.05 | 59.74 | 43. | 5. | 0.003 | 438.35 | 0.989s |
| U-238 | 252.11 | 63.50 | 74. | 3. | 0.002 | 941.01 | 0.993s |
| U-238 | 369.25 | 92.80 | 68. | 9. | 0.005 | 317.72 | 1.025s |
| U-238 | 369.29 | 92.81 | 47. | 20. | 0.011 | 120.95 | 1.025s |
| PA-234 | 373.21 | 93.79 | 74. | -12. | -0.006 | 248.76 | 1.027s |
| PA-234 | 393.34 | 98.82 | 37. | 2. | 0.001 | 930.51 | 1.031s |
| PA-234 | 395.69 | 99.41 | 26. | 16. | 0.009 | 111.98 | 1.033s |
| PA-234 | 438.20 | 110.04 | 63. | 0. | 0.000 | 2000.00 | 1.045s |
| EU-152 | 483.04 | 121.26 | 54. | -5. | -0.003 | 507.10 | 1.057s |
| EU-154 | 492.20 | 123.55 | 63. | 0. | 0.000 | 2000.00 | 1.058s |
| PA-234 | 524.80 | 131.70 | 51. | 0. | 0.000 | 2000.00 | 1.067s |
| U-235 | 574.41 | 144.11 | 39. | 6. | 0.003 | 373.92 | 1.081s |
| U-235 | 740.30 | 185.59 | 44. | 18. | 0.010 | 136.90 | 1.126s |
| RA-226 | 741.10 | 185.79 | 32. | 24. | 0.014 | 88.59 | 1.126s |
| U-235 | 817.42 | 204.88 | 45. | 13. | 0.007 | 186.66 | 1.147s |
| PA-234 | 906.35 | 227.11 | 35. | 5. | 0.003 | 422.30 | 1.170s |
| PB-212 | 952.41 | 238.63 | 29. | 97. | 0.054 | 25.89 | 1.182D |
| PB-214 | 965.81 | 241.98 | 39. | 2. | 0.001 | 912.00 | 1.185D |
| EU-152 | 977.33 | 244.86 | 19. | 1. | 0.001 | 1498.00 | 1.188s |
| EU-154 | 992.21 | 248.58 | 25. | 4. | 0.002 | 479.05 | 1.192s |
| TL-208 | 1106.26 | 277.10 | 23. | 12. | 0.007 | 143.00 | 1.223s |

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Spectrum name: ARS08227.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PB-214 | 1177.93 | 295.02 | 26. | 46. | 0.026 | 48.42 | 0.826s |
| PB-212 | 1195.60 | 299.44 | 42. | -3. | -0.002 | 769.42 | 1.246s |
| Ra-228 | 1350.45 | 338.16 | 24. | 22. | 0.013 | 88.20 | 1.286s |
| EU-152 | 1374.72 | 344.23 | 15. | 7. | 0.004 | 226.76 | 1.292s |
| PB-214 | 1405.85 | 352.01 | 6. | 92. | 0.051 | 22.75 | 1.519 |
| TL-208 | 2040.78 | 510.74 | 90. | 0. | 0.000 | 2000.00 | 2.710s |
| PA-234 | 2276.35 | 569.62 | 22. | 2. | 0.001 | 982.48 | 1.517s |
| TL-208 | 2330.82 | 583.24 | 25. | 18. | 0.010 | 114.13 | 1.531s |
| EU-154 | 2367.00 | 592.28 | 17. | 0. | 0.000 | 2000.00 | 1.539s |
| BI-214 | 2435.95 | 609.52 | 36. | 36. | 0.020 | 69.37 | 1.556 |
| CS-137 | 2644.22 | 661.58 | 9. | 2. | 0.001 | 512.49 | 1.606s |
| PA-234 | 2794.31 | 699.09 | 22. | 0. | 0.000 | 2000.00 | 1.641s |
| EU-154 | 2886.00 | 722.00 | 40. | 0. | 0.000 | 2000.00 | 1.664s |
| BI-212 | 2905.80 | 726.95 | 9. | 19. | 0.011 | 76.12 | 1.667s |
| PA-234 | 2929.35 | 732.84 | 23. | 0. | 0.000 | 2000.00 | 1.673s |
| EU-154 | 3022.64 | 756.15 | 9. | 7. | 0.004 | 181.38 | 1.695s |
| TL-208 | 3054.51 | 764.12 | 9. | 10. | 0.006 | 131.61 | 1.701s |
| BI-214 | 3072.29 | 768.56 | 27. | -2. | -0.001 | 1009.46 | 1.705s |
| EU-152 | 3109.77 | 777.93 | 9. | 5. | 0.003 | 247.55 | 1.715s |
| BI-212 | 3139.66 | 785.39 | 22. | -4. | -0.002 | 416.33 | 1.721s |
| PA-234 | 3227.40 | 807.32 | 4. | 8. | 0.005 | 118.00 | 1.742s |
| PA-234 | 3324.10 | 831.49 | 10. | 6. | 0.004 | 209.55 | 1.762s |
| TL-208 | 3442.31 | 861.03 | 15. | 0. | 0.000 | 2000.00 | 1.789s |
| EU-154 | 3488.64 | 872.60 | 2. | 12. | 0.007 | 67.89 | 1.800s |
| PA-234 | 3517.00 | 879.69 | 6. | 1. | 0.001 | 640.53 | 1.807s |
| PA-234 | 3528.00 | 882.44 | 10. | 0. | 0.000 | 2000.00 | 1.809s |
| PA-234 | 3589.90 | 897.90 | 4. | 6. | 0.003 | 130.86 | 1.823s |
| Ra-228 | 3645.05 | 911.68 | 10. | 31. | 0.017 | 53.03 | 1.834s |
| PA-234 | 3705.83 | 926.87 | 15. | 0. | 0.000 | 2000.00 | 1.848s |
| BI-214 | 3737.08 | 934.68 | 5. | 8. | 0.004 | 139.59 | 1.854s |
| PA-234 | 3779.80 | 945.35 | 19. | 0. | 0.000 | 2000.00 | 1.864s |
| PA-234 | 3797.95 | 949.89 | 6. | 7. | 0.004 | 165.78 | 1.867s |
| EU-152 | 3856.18 | 964.44 | 22. | 0. | 0.000 | 2000.00 | 1.880s |
| Ra-228 | 3856.85 | 964.61 | 16. | 4. | 0.002 | 366.63 | 1.881s |
| Ra-228 | 3879.21 | 970.19 | 37. | 0. | 0.000 | 2000.00 | 1.884s |
| EU-154 | 3989.50 | 997.75 | 31. | 0. | 0.000 | 2000.00 | 1.908s |
| EU-154 | 4015.94 | 1004.35 | 5. | 6. | 0.003 | 191.64 | 1.915s |
| EU-152 | 4343.50 | 1086.19 | 1. | 9. | 0.005 | 75.97 | 1.984s |
| EU-152 | 4441.77 | 1110.74 | 22. | 0. | 0.000 | 2000.00 | 2.006s |
| BI-214 | 4479.69 | 1120.21 | 22. | 6. | 0.003 | 334.33 | 2.013s |
| CO-60 | 4692.09 | 1173.27 | 12. | 6. | 0.003 | 259.35 | 2.056s |
| BI-214 | 4949.96 | 1237.68 | 6. | 16. | 0.009 | 76.80 | 2.109s |
| EU-154 | 5097.79 | 1274.61 | 12. | 3. | 0.002 | 448.33 | 2.137s |
| BI-214 | 5511.00 | 1377.81 | 7. | 0. | 0.000 | 2000.00 | 2.217s |
| PA-234 | 5578.50 | 1394.67 | 18. | 0. | 0.000 | 2000.00 | 2.229s |
| EU-152 | 5634.46 | 1408.64 | 31. | 0. | 0.000 | 2000.00 | 2.240s |
| K-40 | 5844.65 | 1461.13 | 1. | 181. | 0.101 | 14.97 | 1.588s |
| BI-212 | 6485.17 | 1621.07 | 0. | 6. | 0.003 | 81.65 | 2.394s |

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Spectrum name: ARS08227.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 7059.33 | 1764.41 | 1. | 11. | 0.006 | 65.20 | 2.492s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| U-235 | | 4.8895E-02 | | | | 1.39E+09 | | |
| | | | 185.72 | 3.003E-02 | ?( | 5.735E-02 | 6.84E+01 5.72E+01 | G K |
| | | | 143.76 | 4.648E-02 | ?(P | 2.622E-01 | 1.87E+02 1.05E+01 | G |
| | | | 205.31 | 2.839E-01 | &(P | 7.463E-01 | 9.33E+01 4.70E+00 | G |
| | | | 163.35 | 8.608E-03 | % P | 5.341E-01 | 2.08E+03 4.70E+00 | G |
| RA-226 | | 6.5092E-01 | | | | 5.84E+05 | | |
| | | | 186.21 | 6.509E-01 | ?( | 7.740E-01 | 4.43E+01 3.64E+00 | G K |
| Ra-228 | | 2.9601E-01 | | | | 2.10E+03 | | |
| | | | 911.07 | 3.146E-01 | ?( | 1.727E-01 | 2.65E+01 2.90E+01 | G |
| | | | 968.90 | 0.000E+00 | - P | 5.386E-01 | 1.00E+03 1.75E+01 | G |
| | | | 338.40 | 2.717E-01 | ?( | 3.113E-01 | 4.41E+01 1.20E+01 | G |
| | | | 964.60 | 2.506E-01 | &( | 1.172E+00 | 1.83E+02 5.45E+00 | G |
| Am-241 | T | 1.6015E-02 | | | | 1.58E+05 | | |
| | | | 59.54 | 1.602E-02 | ?(P | 1.053E-01 | 2.19E+02 3.59E+01 | G K |
| U-238 | | 2.9081E-01 | | | | 1.63E+12 | | |
| | | | 63.29 | 8.354E-02 | &(P | 1.174E+00 | 4.71E+02 3.90E+00 | G |
| | | | 92.80 | 5.629E-01 | ?(P | 9.697E-01 | 6.05E+01 3.00E+00 | G |
| | | | 92.38 | 2.878E-01 | &(P | 1.349E+00 | 1.59E+02 2.57E+00 | G |
| K-40 | | 7.1375E+00 | | | | 4.68E+11 | | |
| | | | 1460.75 | 7.137E+00 | (P | 2.905E-01 | 7.49E+00 1.07E+01 | G |
| PB-214 | | 3.6541E-01 | | | | 5.84E+05 | | |
| | | | 351.92 | 3.850E-01 | (P | 5.715E-02 | 1.14E+01 3.58E+01 | G |
| | | | 295.21 | 3.274E-01 | ( | 1.884E-01 | 2.42E+01 1.85E+01 | G |
| | | | 241.98 | 3.045E-02 | - P | 4.869E-01 | 4.56E+02 7.50E+00 | G |
| BI-214 | | 2.0945E-01 | | | | 5.84E+05 | | |
| | | | 609.31 | 1.785E-01 | ?(P | 1.493E-01 | 3.47E+01 4.48E+01 | G |
| | | | 1764.49 | 3.689E-01 | ?(P | 2.407E-01 | 3.26E+01 1.54E+01 | G |
| | | | 1120.29 | 1.377E-01 | ?( | 5.640E-01 | 1.67E+02 1.48E+01 | G |
| | | | 1238.11 | 1.035E+00 | & | 8.554E-01 | 3.84E+01 5.86E+00 | G |
| | | | 768.36 | -1.075E-01 | - | 1.447E+00 | 5.05E+02 4.80E+00 | G |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 2:03:17 PM
Spectrum name: ARS08227.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 1377.67 | 0.000E+00 | - P | 1.546E+00 | 1.00E+03 | 3.92E+00 G |
| | | 934.06 | 7.510E-01 | + P | 1.318E+00 | 6.98E+01 | 3.03E+00 G |
| BI-212 | 5.1479E-01 | | | | | 2.10E+03 | |
| | | 727.17 | 3.994E-01 | ?( | 3.509E-01 | 3.81E+01 | 1.18E+01 G |
| | | 1620.56 | 1.010E+00 | ?( | 1.240E+00 | 4.08E+01 | 2.75E+00 G |
| | | 785.42 | -5.892E-01 | - | 3.249E+00 | 2.08E+02 | 2.00E+00 G |
| PB-212 | 2.5477E-01 | | | | | 2.10E+03 | |
| | | 238.63 | 2.548E-01 | (P | 7.294E-02 | 1.29E+01 | 4.31E+01 G |
| | | 300.09 | -1.222E-01 | - | 1.341E+00 | 3.85E+02 | 3.27E+00 G |
| TL-208 | 8.4577E-02 | | | | | 2.10E+03 | |
| | | 583.14 | 4.452E-02 | ?( | 6.433E-02 | 5.71E+01 | 8.60E+01 G |
| | | 510.72 | 0.000E+00 | - P | 4.041E-01 | 1.00E+03 | 2.25E+01 G |
| | | 860.47 | 0.000E+00 | - P | 4.876E-01 | 1.00E+03 | 1.20E+01 G |
| | | 277.36 | 2.418E-01 | ?(P | 4.815E-01 | 7.15E+01 | 6.50E+00 G |
| | | 763.30 | 1.510E+00 | &( | 2.520E+00 | 6.58E+01 | 1.70E+00 G |
| PA-234 | 1.3994E-01 | | | | | 1.65E+12 | |
| | | 98.44 | 7.151E-03 | ?( | 1.023E-01 | 4.65E+02 | 2.51E+01 G |
| | | 946.00 | 0.000E+00 | - | 3.471E-01 | 1.00E+03 | 2.00E+01 G |
| | | 131.28 | 0.000E+00 | - | 1.509E-01 | 1.00E+03 | 2.00E+01 G |
| | | 94.67 | -6.290E-02 | + | 2.302E-01 | 1.24E+02 | 1.55E+01 G |
| | | 883.24 | 0.000E+00 | - | 4.081E-01 | 1.00E+03 | 1.20E+01 G |
| | | 926.70 | 0.000E+00 | - P | 5.642E-01 | 1.00E+03 | 1.10E+01 G |
| | | 569.26 | 3.644E-02 | &(P | 4.960E-01 | 4.91E+02 | 1.04E+01 G |
| | | 111.00 | 0.000E+00 | - P | 3.794E-01 | 1.00E+03 | 8.55E+00 G |
| | | 733.00 | 0.000E+00 | - P | 7.373E-01 | 1.00E+03 | 8.50E+00 G |
| | | 949.00 | 2.521E-01 | ?(P | 5.591E-01 | 8.29E+01 | 7.80E+00 G |
| | | 880.51 | 6.541E-02 | &(P | 5.962E-01 | 3.20E+02 | 6.50E+00 G |
| | | 226.87 | 8.368E-02 | ?(P | 5.126E-01 | 2.11E+02 | 6.50E+00 G |
| | | 831.10 | 3.083E-01 | ?( | 8.372E-01 | 1.05E+02 | 5.60E+00 G |
| | | 808.10 | 4.635E-01 | ?( | 6.868E-01 | 5.90E+01 | 4.90E+00 G |
| | | 99.70 | 2.902E-01 | &( | 4.615E-01 | 5.60E+01 | 4.70E+00 G |
| | | 699.10 | 0.000E+00 | - | 1.302E+00 | 1.00E+03 | 4.60E+00 G |
| | | 898.60 | 4.274E-01 | ?(P | 8.729E-01 | 6.54E+01 | 4.00E+00 G |
| | | 1394.10 | 0.000E+00 | - P | 2.330E+00 | 1.00E+03 | 3.90E+00 G |
| CS-137 | 6.1644E-03 | | | | | 1.10E+04 | |
| | | 661.66 | 6.164E-03 | &(P | 4.493E-02 | 2.56E+02 | 8.52E+01 G |
| CO-60 | 2.0443E-02 | | | | | 1.93E+03 | |
| | | 1173.24 | 2.044E-02 | ?(P | 6.692E-02 | 1.30E+02 | 9.99E+01 K |
| | | 1332.50 | -2.601E-03 | % | 7.268E-02 | 1.09E+03 | 1.00E+02 K |

ORTEC g v - i (3263) Env32 G702W050 4/19/2016 2:03:17 PM
Spectrum name: ARS08227.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| EU-152 | 4.8882E-02 | | | | | 4.64E+03 | |
| | | 40.12 | -3.324E-02 | ?( | 2.105E-01 | 2.03E+02 | 3.00E+01 G |
| | | 121.78 | -1.366E-02 | + | 1.043E-01 | 2.54E+02 | 2.92E+01 G |
| | | 344.30 | 3.551E-02 | ?(P | 1.144E-01 | 1.13E+02 | 2.70E+01 G |
| | | 1408.08 | 0.000E+00 | + P | 5.490E-01 | 1.00E+03 | 2.12E+01 G |
| | | 39.52 | 4.039E-02 | &( | 3.605E-01 | 2.82E+02 | 1.60E+01 G |
| | | 964.00 | 0.000E+00 | - P | 5.091E-01 | 1.00E+03 | 1.46E+01 G |
| | | 1112.07 | 0.000E+00 | - | 6.111E-01 | 1.00E+03 | 1.36E+01 G |
| | | 778.90 | 1.002E-01 | ?( | 3.345E-01 | 1.24E+02 | 1.30E+01 G |
| | | 1085.80 | 2.931E-01 | &(P | 2.375E-01 | 3.80E+01 | 1.03E+01 G |
| | | 45.40 | 5.299E-02 | &(P | 5.464E-01 | 3.33E+02 | 9.00E+00 G |
| | | 244.67 | 1.518E-02 | &( | 3.495E-01 | 7.49E+02 | 7.62E+00 G |
| | | 867.39 | -2.243E-02 | % | 1.561E+00 | 2.61E+03 | 4.18E+00 G |
| EU-154 | 7.4777E-02 | | | | | 3.10E+03 | |
| | | 123.10 | 0.000E+00 | ?(P | 8.119E-02 | 1.00E+03 | 4.05E+01 G |
| | | 1274.80 | 3.533E-02 | ?( | 1.974E-01 | 2.24E+02 | 3.55E+01 G |
| | | 723.30 | 0.000E+00 | - | 4.060E-01 | 1.00E+03 | 1.97E+01 G |
| | | 1004.80 | 9.916E-02 | ?(P | 2.411E-01 | 9.58E+01 | 1.76E+01 G |
| | | 43.00 | -2.123E-02 | + | 4.084E-01 | 6.26E+02 | 1.31E+01 G |
| | | 873.20 | 3.034E-01 | &(P | 2.265E-01 | 3.39E+01 | 1.13E+01 G |
| | | 996.30 | 0.000E+00 | - | 8.326E-01 | 1.00E+03 | 1.07E+01 G |
| | | 42.31 | 0.000E+00 | - P | 8.036E-01 | 1.00E+03 | 7.30E+00 G |
| | | 248.04 | 6.484E-02 | ?( | 4.627E-01 | 2.40E+02 | 6.60E+00 G |
| | | 591.70 | 0.000E+00 | - P | 1.021E+00 | 1.00E+03 | 4.60E+00 G |
| | | 48.70 | 0.000E+00 | - P | 1.287E+00 | 1.00E+03 | 4.20E+00 G |
| | | 756.70 | 4.355E-01 | ?( | 1.038E+00 | 9.07E+01 | 4.10E+00 G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
) - Peak is too close to another for the activity
to be found directly.

Nuclide Codes: Peak Codes:

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Spectrum name: ARS08227.An1

T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity | |
|---|---|---|---|---|---|---|---|
| EU-152 | 39.27 | 38. | 4. | 0.002 | 563.52 | 4.039E-02 | |
| EU-152 | 39.71 | 48. | -6. | -0.003 | 405.34 | -3.324E-02 | |
| EU-154 | 43.23 | 40. | -2. | -0.001 | 1251.49 | -2.123E-02 | |
| EU-152 | 45.72 | 38. | 3. | 0.002 | 666.40 | 5.299E-02 | P |
| U-238 | 63.50 | 74. | 3. | 0.002 | 941.01 | 8.354E-02 | P |
| U-238 | 92.80 | 68. | 9. | 0.005 | 317.72 | 2.878E-01 | P |
| U-238 | 92.81 | 47. | 20. | 0.011 | 120.95 | 5.629E-01 | P |
| PA-234 | 93.79 | 74. | -12. | -0.006 | 248.76 | -6.290E-02 | |
| PA-234 | 98.82 | 37. | 2. | 0.001 | 930.51 | 7.151E-03 | |
| PA-234 | 99.41 | 26. | 16. | 0.009 | 111.98 | 2.902E-01 | |
| EU-152 | 121.26 | 54. | -5. | -0.003 | 507.10 | -1.366E-02 | |
| U-235 | 144.11 | 39. | 6. | 0.003 | 373.92 | 4.648E-02 | P |
| U-235 | 185.59 | 44. | 18. | 0.010 | 136.90 | 3.003E-02 | |
| RA-226 | 185.79 | 32. | 24. | 0.014 | 88.59 | 6.509E-01 | |
| U-235 | 204.88 | 45. | 13. | 0.007 | 186.66 | 2.839E-01 | P |
| PA-234 | 227.11 | 35. | 5. | 0.003 | 422.30 | 8.368E-02 | P |
| EU-152 | 244.86 | 19. | 1. | 0.001 | 1498.00 | 1.518E-02 | |
| EU-154 | 248.58 | 25. | 4. | 0.002 | 479.05 | 6.484E-02 | |
| TL-208 | 277.10 | 23. | 12. | 0.007 | 143.00 | 2.418E-01 | P |
| Ra-228 | 338.16 | 24. | 22. | 0.013 | 88.20 | 2.717E-01 | |
| EU-152 | 344.23 | 15. | 7. | 0.004 | 226.76 | 3.551E-02 | P |
| PA-234 | 569.62 | 22. | 2. | 0.001 | 982.48 | 3.644E-02 | P |
| TL-208 | 583.24 | 25. | 18. | 0.010 | 114.13 | 4.452E-02 | |
| BI-214 | 609.52 | 36. | 36. | 0.020 | 69.37 | 1.785E-01 | P |
| CS-137 | 661.58 | 9. | 2. | 0.001 | 512.49 | 6.164E-03 | P |
| BI-212 | 726.95 | 9. | 19. | 0.011 | 76.12 | 3.994E-01 | |
| EU-154 | 756.15 | 9. | 7. | 0.004 | 181.38 | 4.355E-01 | |
| TL-208 | 764.12 | 9. | 10. | 0.006 | 131.61 | 1.510E+00 | |
| BI-214 | 768.56 | 27. | -2. | -0.001 | 1009.46 | -1.075E-01 | |
| EU-152 | 777.93 | 9. | 5. | 0.003 | 247.55 | 1.002E-01 | |
| BI-212 | 785.39 | 22. | -4. | -0.002 | 416.33 | -5.892E-01 | |
| PA-234 | 807.32 | 4. | 8. | 0.005 | 118.00 | 4.635E-01 | |
| PA-234 | 831.49 | 10. | 6. | 0.004 | 209.55 | 3.083E-01 | |
| EU-154 | 872.60 | 2. | 12. | 0.007 | 67.89 | 3.034E-01 | P |
| PA-234 | 879.69 | 6. | 1. | 0.001 | 640.53 | 6.541E-02 | P |
| PA-234 | 897.90 | 4. | 6. | 0.003 | 130.86 | 4.274E-01 | P |

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Spectrum name: ARS08227.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| Ra-228 | 911.68 | 10. | 31. | 0.017 | 53.03 | 3.146E-01 | |
| BI-214 | 934.68 | 5. | 8. | 0.004 | 139.59 | 7.510E-01 | P |
| PA-234 | 949.89 | 6. | 7. | 0.004 | 165.78 | 2.521E-01 | P |
| Ra-228 | 964.61 | 16. | 4. | 0.002 | 366.63 | 2.506E-01 | |
| EU-154 | 1004.35 | 5. | 6. | 0.003 | 191.64 | 9.916E-02 | P |
| EU-152 | 1086.19 | 1. | 9. | 0.005 | 75.97 | 2.931E-01 | P |
| BI-214 | 1120.21 | 22. | 6. | 0.003 | 334.33 | 1.377E-01 | |
| CO-60 | 1173.27 | 12. | 6. | 0.003 | 259.35 | 2.044E-02 | P |
| BI-214 | 1237.68 | 6. | 16. | 0.009 | 76.80 | 1.035E+00 | |
| EU-154 | 1274.61 | 12. | 3. | 0.002 | 448.33 | 3.533E-02 | |
| BI-212 | 1621.07 | 0. | 6. | 0.003 | 81.65 | 1.010E+00 | |
| BI-214 | 1764.41 | 1. | 11. | 0.006 | 65.20 | 3.689E-01 | P |

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| U-235 #A | 4.8895E-02 | 6.6936E-02 | 6.7030E-02 | 0.573E-01 |
| RA-226 #A | 6.5092E-01 | 5.7663E-01 | 5.7799E-01 | 0.774E+00 |
| Ra-228 # | 2.9601E-01 | 1.5699E-01 | 1.5819E-01 | 0.173E+00 |
| Am-241 #A | 1.6015E-02 | 7.0204E-02 | 7.0212E-02 | 0.105E+00 |
| PB-210 #A | 0.0000E+00 | 5.3936E-01 | 5.3936E-01 | 0.131E+01 |
| U-238 #A | 2.9081E-01 | 3.5172E-01 | 3.5247E-01 | 0.117E+01 |
| K-40 | 7.1375E+00 | 1.0685E+00 | 1.1701E+00 | 0.291E+00 |
| PB-214 | 3.6541E-01 | 8.3117E-02 | 8.8766E-02 | 0.572E-01 |
| BI-214 # | 2.0945E-01 | 1.3657E-01 | 1.3719E-01 | 0.149E+00 |
| BI-212 # | 5.1479E-01 | 2.8733E-01 | 2.8933E-01 | 0.351E+00 |
| PB-212 | 2.5477E-01 | 6.5970E-02 | 6.8496E-02 | 0.729E-01 |
| TL-208 # | 8.4577E-02 | 6.3538E-02 | 6.3777E-02 | 0.643E-01 |
| PA-234 #C | 1.3994E-01 | 1.5671E-01 | 1.5705E-01 | 0.102E+00 |
| CS-137 #A | 6.1644E-03 | 3.1592E-02 | 3.1593E-02 | 0.449E-01 |
| CO-60 #B | 2.0443E-02 | 5.3018E-02 | 5.3024E-02 | 0.669E-01 |
| EU-152 #A | 4.8882E-02 | 3.7137E-02 | 3.7545E-02 | 0.210E+00 |
| EU-154 #A | 7.4777E-02 | 5.0765E-02 | 5.1027E-02 | 0.812E-01 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

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Spectrum name: ARS08227.An1

---------- S U M M A R Y ----------

| | | | |
|---|---|---|---|
| Total Activity ( | 25.5 to | 1999.2 keV) | 7.758E+00 pCi/g |

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-14 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-015 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 015 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | GAMASPEC_ARS05 |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 5.9375E-02 | pCi/g | 4.3325E-02 | 3.7000E-01 | 1.8500E-01 | | | |
| **RA-226** | 3.4638E-02 | pCi/g | 6.9537E-01 | 1.2100E+00 | 6.0500E-01 | | | |
| **RA-228** | 1.0407E+00 | pCi/g | 1.7203E-01 | 1.8900E-01 | 9.4500E-02 | | | |
| **AM-241** | -1.2844E-03 | pCi/g | 8.7760E-02 | 1.5000E-01 | 7.5000E-02 | | | |
| **PB-210** | 5.0584E-01 | pCi/g | 7.9743E-01 | 1.3700E+00 | 6.8500E-01 | | | |
| **U-238** | 8.8082E-01 | pCi/g | 5.3346E-01 | 1.2100E+00 | 6.0500E-01 | | | |
| **K-40** | 1.1422E+01 | pCi/g | 1.5823E+00 | 7.1600E-01 | 3.5800E-01 | | | |
| **PB-214** | 1.0586E+00 | pCi/g | 1.6701E-01 | 1.3500E-01 | 6.7500E-02 | | | |
| **BI-214** | 9.0385E-01 | pCi/g | 1.6413E-01 | 1.2900E-01 | 6.4500E-02 | | | |
| **BI-212** | 8.5009E-01 | pCi/g | 4.1238E-01 | 4.5200E-01 | 2.2600E-01 | | | |
| **PB-212** | 9.4390E-01 | pCi/g | 1.4471E-01 | 1.2800E-01 | 6.4000E-02 | | | |
| **TL-208** | 3.6982E-01 | pCi/g | 6.9750E-02 | 5.7300E-02 | 2.8650E-02 | | | |
| **PA-234** | 6.0614E-02 | pCi/g | 6.7524E-02 | 1.1900E-01 | 5.9500E-02 | | | |
| **CS-137** | 1.1028E-03 | pCi/g | 3.3737E-02 | 6.0300E-02 | 3.0150E-02 | | | |
| **CO-60** | 2.2240E-03 | pCi/g | 8.2642E-03 | 9.3500E-02 | 4.6750E-02 | | | |
| **EU-152** | 5.9977E-02 | pCi/g | 9.0976E-02 | 2.2900E-01 | 1.1450E-01 | | | |
| **EU-154** | 5.4066E-02 | pCi/g | 5.3407E-02 | 7.2100E-02 | 3.6050E-02 | | | |
| **Total Gamma** | 1.8248E+01 | pCi/g | | | | | | |
| **Total NORM Activity** | 4.9242E+01 | pCi/g | | | | | | |
| | | | | | | | | |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 12:42:06
American Radiation Services     Spectrum name: ARS05353.An1

Sample description
     Batch ID:  16-00698-14
     SDG:  ARS1-16-00671-015  Tech:  WJS

Spectrum Filename: C:\User\ARS05353.An1

Acquisition information
       Start time:                5/5/2016 11:57:03
       Live time:              2700
       Real time:              2702
       Dead time:                 0.09 %
       Detector ID:                  2

Detector system
     GAMASPEC_ARS05 MCB 340


Calibration
       Filename:                  250mL Tuna Can 1748-90-1 calib POLY.Clb
     250mL Tuna Can 1748-90-1 POLY WJS 2-26-16


       Energy Calibration
            Created:              2/26/2016 07:19:00
            Zero offset:          0.147 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -4.502E-09 keV/channel^2

       Efficiency Calibration
            Created:              2/26/2016 07:21:00
            Type:                 Polynomial
            Uncertainty:          0.909 %
            Coefficients:        -0.806225  -3.736517   0.169918
                                 -0.005635  -0.000425   0.000016

Library Files
       Main analysis library:     ITSI.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:            10 (     2.65keV )
       Stop channel:           8000 (  1998.60keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               3.8419E+02
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  3.8419E+02) =
                                  2.6029E+03
       Detection limit method:    Reg. Guide 4.16 Method
       Random error:              1.0000000E+00
       Systematic error:          1.0000000E+00
       Fraction Limit:           60.000%
       Background width:          average of five points.
       Half lives decay limit:   12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 12:42:06
American Radiation Services Spectrum name: ARS05353.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 3/11/2016 06:43:48 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 25 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1640

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 43.86 | 9. | 171.18 | 0.75 | 2.428E-02 | 42.31 | 7.300 | PBC<MDA | EU154 |
| 46.43 | 41. | 38.95 | 0.36 | 2.746E-02 | 46.52 | 4.000 | PBC<MDA | PB210 |
| 63.47 | 47. | 35.05 | 0.53 | 4.051E-02 | 63.29 | 3.900 | PBC<MDA | U238 |
| 74.72 | 264. | 10.62 | 0.79 | 4.755E-02 | | | | |
| 77.10 | 414. | 6.95 | 0.79 | 4.857E-02 | | | | |
| 87.04 | 125. | 16.96 | 0.81 | 5.138E-02 | | | | |
| 89.90 | 90. | 23.08 | 0.82 | 5.182E-02 | | | | |
| 92.45 | 45. | 52.99 | 0.82 | 5.208E-02 | 92.38 | 2.570 | PBC<MDA | U238 |
| 92.88 | 116. | 20.16 | 0.82 | 5.213E-02 | 92.80 | 3.000 | 1.670E+00 | U238 |
| 94.74 | 16. | 126.41 | 0.82 | 5.225E-02 | 94.67 | 15.500 | PBC<MDA | PA234 |
| 99.44 | 37. | 55.58 | 0.83 | 5.239E-02 | 99.70 | 4.700 | PBC<MDA | PA234 |
| 110.69 | 2. | 778.61 | 0.85 | 5.184E-02 | 111.00 | 8.550 | PBC<MDA | PA234 |
| 124.11 | 35. | 49.27 | 0.87 | 5.046E-02 | 123.10 | 40.460 | PBC<MDA | EU154 |
| 143.91 | 11. | 153.62 | 0.90 | 4.739E-02 | 143.76 | 10.500 | PBC<MDA | U235 |
| 151.72 | 24. | 58.09 | 0.32 | 4.616E-02 | | | | |
| 163.39 | 9. | 145.21 | 0.93 | 4.440E-02 | 163.35 | 4.700 | PBC<MDA | U235 |
| 185.89 | 98. | 21.94 | 1.00 | 4.124E-02 | 185.72 | 57.200 | 9.001E-02 | U235 |
| | | | | | 186.21 | 3.640 | 1.451E+00 | RA226 |
| 205.15 | 5. | 276.28 | 1.00 | 3.884E-02 | 205.31 | 4.700 | PBC<MDA | U235 |
| 238.47 | 567. | 6.10 | 0.88 | 3.537E-02 | 238.63 | 43.100 | 9.439E-01 | PB212 |
| 241.75 | 83. | 26.37 | 0.53 | 3.505E-02 | 241.98 | 7.500 | 8.220E-01 | PB214 |
| 277.35 | 23. | 65.55 | 1.11 | 3.213E-02 | 277.36 | 6.500 | PBC<MDA | TL208 |
| 294.98 | 239. | 9.72 | 1.03 | 3.088E-02 | 295.21 | 18.500 | 1.044E+00 | PB214 |
| 300.16 | 53. | 33.70 | 1.23 | 3.054E-02 | 300.09 | 3.270 | 1.391E+00 | PB212 |
| 317.95 | 5. | 148.86 | 0.28 | 2.943E-02 | | | | |
| 338.29 | 154. | 14.22 | 0.91 | 2.827E-02 | 338.40 | 12.010 | 1.171E+00 | Ra228 |
| 351.78 | 416. | 6.65 | 1.20 | 2.756E-02 | 351.92 | 35.800 | 1.066E+00 | PB214 |
| 510.47 | 170. | 10.84 | 1.11 | 2.150E-02 | 510.72 | 22.500 | 6.760E-01 | TL208 |
| 568.97 | 8. | 98.71 | 1.51 | 1.991E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 582.89 | 244. | 8.43 | 1.39 | 1.957E-02 | 583.14 | 86.000 | 3.698E-01 | TL208 |
| 609.02 | 292. | 8.01 | 0.95 | 1.896E-02 | 609.31 | 44.791 | 8.640E-01 | BI214 |
| 663.72 | 1. | 598.86 | 1.62 | 1.782E-02 | 661.66 | 85.210 | PBC<MDA | CS137 |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 12:42:06
American Radiation Services Spectrum name: ARS05353.An1

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 726.76 | 66. | 23.34 | 0.82 | 1.656E-02 | 727.17 | 11.800 | 8.834E-01 | BI212 |
| 767.78 | 36. | 29.13 | 0.27 | 1.584E-02 | 768.36 | 4.799 | 1.247E+00 | BI214 |
| 778.41 | 4. | 205.88 | 1.75 | 1.566E-02 | 778.90 | 12.990 | PBC<MDA | EU152 |
| | | | | | 778.90 | 12.990 | 5.312E-02 | EU152 |
| 786.12 | 8. | 123.44 | 1.76 | 1.556E-02 | 785.42 | 2.000 | PBC<MDA | BI212 |
| 832.20 | 5. | 197.66 | 1.81 | 1.483E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.93 | 11. | 77.59 | 1.84 | 1.439E-02 | 860.47 | 12.000 | PBC<MDA | TL208 |
| 879.90 | 1. | 966.82 | 1.86 | 1.410E-02 | 880.51 | 6.500 | PBC<MDA | PA234 |
| 911.06 | 157. | 10.26 | 1.37 | 1.368E-02 | 911.07 | 29.000 | 1.029E+00 | Ra228 |
| 933.70 | 41. | 29.53 | 1.07 | 1.337E-02 | 934.06 | 3.029 | 2.625E+00 | BI214 |
| 964.38 | 17. | 71.38 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 6.324E-01 | Ra228 |
| | | | | | 964.00 | 14.580 | PBC<MDA | EU152 |
| 964.52 | 37. | 27.72 | 1.94 | 1.298E-02 | 964.00 | 14.580 | PBC<MDA | EU152 |
| | | | | | 964.60 | 5.452 | 1.373E+00 | Ra228 |
| 968.82 | 84. | 13.89 | 1.94 | 1.292E-02 | 968.90 | 17.460 | 9.710E-01 | Ra228 |
| 995.21 | 3. | 204.86 | 1.97 | 1.258E-02 | 996.30 | 10.700 | PBC<MDA | EU154 |
| 1004.42 | 3. | 222.95 | 1.98 | 1.248E-02 | 1004.80 | 17.600 | PBC<MDA | EU154 |
| 1119.90 | 57. | 18.12 | 2.08 | 1.119E-02 | 1120.29 | 14.797 | 9.032E-01 | BI214 |
| 1237.57 | 23. | 39.98 | 2.17 | 1.004E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1331.82 | 3. | 138.83 | 2.23 | 9.218E-03 | 1332.50 | 99.982 | PBC<MDA | CO60 |
| 1377.26 | 7. | 111.82 | 2.26 | 8.853E-03 | 1377.67 | 3.919 | PBC<MDA | BI214 |
| 1407.49 | 5. | 141.87 | 2.28 | 8.617E-03 | 1408.08 | 21.210 | PBC<MDA | EU152 |
| | | | | | 1408.08 | 21.210 | 6.803E-02 | EU152 |
| 1460.34 | 399. | 5.28 | 2.15 | 8.227E-03 | 1460.75 | 10.700 | 1.142E+01 | K40 |
| 1619.94 | 3. | 219.02 | 2.38 | 7.151E-03 | 1620.56 | 2.750 | PBC<MDA | BI212 |
| 1764.30 | 36. | 21.31 | 2.43 | 6.316E-03 | 1764.49 | 15.357 | 9.784E-01 | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 298.57 | 74.74 | 318. | 206. | 0.076 | 28.68 | 0.646 | TH-234 | |
| 308.10 | 77.12 | 305. | 351. | 0.130 | 18.20 | 0.756 | PB-212 | |
| 348.11 | 87.12 | 187. | 135. | 0.050 | 35.28 | 1.028 | TH-234 | s |
| 359.57 | 89.98 | 177. | 83. | 0.031 | 51.45 | 0.947 | AC-228 | M |
| 606.66 | 151.72 | 87. | 24. | 0.009 | 116.19 | 0.319 | GD-153 | s |
| 1272.04 | 317.95 | 28. | 5. | 0.002 | 297.72 | 0.281 | J-131 | sc |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI.Lib

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 12:42:06
American Radiation Services Spectrum name: ARS05353.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 159.20 | 39.92 | 148. | -7. | -0.003 | 481.58 | 0.750s |
| EU-152 | 160.02 | 40.13 | 149. | -7. | -0.003 | 472.27 | 0.750s |
| EU-154 | 174.96 | 43.86 | 118. | 9. | 0.003 | 342.35 | 0.750s |
| EU-154 | 170.97 | 42.86 | 157. | -12. | -0.005 | 295.97 | 0.750s |
| EU-152 | 181.44 | 45.48 | 211. | -32. | -0.012 | 133.52 | 0.750s |
| PB-210 | 185.72 | 46.55 | 140. | 21. | 0.008 | 67.45 | 0.374s |
| EU-154 | 192.83 | 48.32 | 192. | -11. | -0.004 | 359.90 | 0.750s |
| U-238 | 253.44 | 63.47 | 231. | 47. | 0.017 | 70.10 | 0.526s |
| U-238 | 369.17 | 92.38 | 283. | 45. | 0.017 | 105.97 | 0.820D |
| U-238 | 370.85 | 92.80 | 251. | 53. | 0.020 | 75.03 | 0.821D |
| PA-234 | 378.33 | 94.67 | 184. | 16. | 0.006 | 252.82 | 0.824D |
| PA-234 | 397.41 | 99.44 | 197. | 37. | 0.014 | 111.15 | 0.832 |
| PA-234 | 442.46 | 110.69 | 186. | 2. | 0.001 | 1557.23 | 0.850s |
| EU-152 | 486.75 | 121.76 | 228. | -21. | -0.008 | 211.83 | 0.868s |
| EU-154 | 496.17 | 124.11 | 133. | 35. | 0.013 | 98.55 | 0.870s |
| PA-234 | 521.73 | 130.50 | 230. | -18. | -0.007 | 281.66 | 0.883s |
| U-235 | 575.41 | 143.91 | 212. | 11. | 0.004 | 307.24 | 0.903s |
| U-235 | 653.39 | 163.39 | 155. | 9. | 0.003 | 290.43 | 0.934s |
| U-235 | 742.77 | 185.72 | 149. | 54. | 0.020 | 72.88 | 0.969D |
| U-235 | 820.55 | 205.15 | 191. | 5. | 0.002 | 552.56 | 1.000s |
| PA-234 | 906.28 | 226.57 | 148. | -9. | -0.003 | 399.68 | 1.033s |
| PB-212 | 953.91 | 238.47 | 240. | 552. | 0.204 | 12.20 | 0.879 |
| PB-214 | 967.04 | 241.75 | 161. | 83. | 0.031 | 52.74 | 0.535s |
| EU-152 | 975.29 | 243.81 | 214. | -34. | -0.013 | 124.70 | 1.060s |
| EU-154 | 991.70 | 247.91 | 125. | -12. | -0.004 | 279.22 | 1.065s |
| TL-208 | 1109.55 | 277.35 | 123. | 23. | 0.009 | 131.09 | 1.109s |
| PB-214 | 1180.12 | 294.98 | 99. | 229. | 0.085 | 19.45 | 1.029s |
| PB-212 | 1200.85 | 300.16 | 103. | 53. | 0.020 | 67.40 | 1.232 |
| Ra-228 | 1353.46 | 338.29 | 100. | 153. | 0.056 | 28.45 | 0.914 |
| EU-152 | 1375.61 | 343.82 | 96. | -4. | -0.001 | 701.02 | 1.206s |
| PB-214 | 1407.44 | 351.78 | 107. | 404. | 0.150 | 13.29 | 1.200 |
| TL-208 | 2042.66 | 510.47 | 91. | 125. | 0.046 | 21.68 | 1.109s |
| PA-234 | 2276.82 | 568.97 | 48. | 8. | 0.003 | 197.43 | 1.509s |
| TL-208 | 2332.54 | 582.89 | 54. | 239. | 0.088 | 16.85 | 1.393 |
| EU-154 | 2367.80 | 591.70 | 62. | 0. | 0.000 | 2000.00 | 1.536s |
| BI-214 | 2437.13 | 609.02 | 72. | 281. | 0.104 | 16.02 | 0.947s |
| PA-234 | 2796.56 | 698.81 | 63. | -6. | -0.002 | 372.41 | 1.664s |
| EU-154 | 2895.37 | 723.50 | 66. | -9. | -0.003 | 271.16 | 1.692s |
| BI-212 | 2908.43 | 726.76 | 45. | 66. | 0.025 | 46.67 | 0.818s |
| PA-234 | 2933.81 | 733.10 | 51. | -5. | -0.002 | 431.53 | 1.703s |
| BI-214 | 3072.64 | 767.78 | 26. | 36. | 0.013 | 58.26 | 0.266s |
| EU-152 | 3115.20 | 778.41 | 34. | 4. | 0.002 | 411.77 | 1.753s |
| BI-212 | 3146.06 | 786.12 | 43. | 8. | 0.003 | 246.89 | 1.760 |
| PA-234 | 3235.57 | 808.48 | 35. | -3. | -0.001 | 604.71 | 1.785s |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 12:42:06
American Radiation Services Spectrum name: ARS05353.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| PA-234 | 3330.50 | 832.20 | 42. | 5. | 0.002 | 395.32 | 1.809s |
| TL-208 | 3445.51 | 860.93 | 40. | 11. | 0.004 | 155.17 | 1.839s |
| EU-152 | 3467.41 | 866.40 | 39. | -5. | -0.002 | 474.04 | 1.846s |
| EU-154 | 3494.77 | 873.23 | 36. | -5. | -0.002 | 476.48 | 1.852s |
| PA-234 | 3521.47 | 879.90 | 34. | 1. | 0.000 | 1933.64 | 1.860 |
| PA-234 | 3594.07 | 898.04 | 44. | -4. | -0.002 | 592.63 | 1.878s |
| Ra-228 | 3646.16 | 911.06 | 31. | 157. | 0.058 | 20.53 | 1.372s |
| PA-234 | 3710.20 | 927.05 | 35. | -3. | -0.001 | 572.99 | 1.905s |
| BI-214 | 3736.83 | 933.70 | 22. | 41. | 0.015 | 59.06 | 1.074s |
| PA-234 | 3787.91 | 946.46 | 38. | -5. | -0.002 | 364.38 | 1.923s |
| PA-234 | 3792.48 | 947.61 | 32. | -6. | -0.002 | 283.22 | 1.926 |
| EU-152 | 3859.62 | 964.38 | 76. | 17. | 0.006 | 142.75 | 1.940s |
| Ra-228 | 3860.51 | 964.60 | 35. | 37. | 0.014 | 55.43 | 1.941D |
| Ra-228 | 3877.72 | 968.90 | 29. | 84. | 0.031 | 27.78 | 1.945D |
| EU-154 | 3983.03 | 995.21 | 22. | 3. | 0.001 | 409.72 | 1.970s |
| EU-154 | 4019.91 | 1004.42 | 29. | 3. | 0.001 | 445.91 | 1.978s |
| EU-152 | 4345.68 | 1085.80 | 17. | 0. | 0.000 | 2000.00 | 2.048s |
| BI-214 | 4482.19 | 1119.90 | 25. | 57. | 0.021 | 36.23 | 2.077 |
| BI-214 | 4953.24 | 1237.57 | 33. | 23. | 0.008 | 79.96 | 2.167s |
| EU-154 | 5111.08 | 1276.99 | 32. | -3. | -0.001 | 483.79 | 2.192s |
| CO-60 | 5330.55 | 1331.82 | 14. | 3. | 0.001 | 277.66 | 2.231s |
| BI-214 | 5512.45 | 1377.26 | 24. | 7. | 0.002 | 223.63 | 2.259s |
| PA-234 | 5579.88 | 1394.10 | 65. | 0. | 0.000 | 2000.00 | 2.268s |
| EU-152 | 5633.48 | 1407.49 | 21. | 5. | 0.002 | 283.74 | 2.276s |
| K-40 | 5845.07 | 1460.34 | 21. | 386. | 0.143 | 10.55 | 2.154s |
| BI-212 | 6484.02 | 1619.94 | 18. | 3. | 0.001 | 438.05 | 2.381s |
| BI-214 | 7061.94 | 1764.30 | 17. | 36. | 0.013 | 42.61 | 2.432s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 5.9375E-02 | | | | | |
| | | | 185.72 | 5.937E-02 | } P | 6.576E-02 | 3.64E+01 G K |
| | | | 143.76 | 5.657E-02 | ?(P | 3.698E-01 | 1.54E+02 G |
| | | | 205.31 | 6.561E-02 | ?(P | 9.570E-01 | 2.76E+02 G |
| | | | 163.35 | 1.085E-01 | &(P | 7.575E-01 | 1.45E+02 G |
| RA-226 | | 3.4638E-02 | | | | | |
| | | | | | | | Derived Ave Activity |
| | | | 186.21 | 3.464E-02 | }(P | 1.211E+00 | 1.20E+02 G K |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 12:42:06
American Radiation Services Spectrum name: ARS05353.An1

| Nuclide | | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|---|
| Ra-228 | | 1.0407E+00 | | | | | | |
| | | | 911.07 | 1.029E+00 | (P | 1.891E-01 | 1.03E+01 | G |
| | | | 968.90 | 9.710E-01 | (P | 3.206E-01 | 1.39E+01 | G |
| | | | 338.40 | 1.171E+00 | (P | 3.794E-01 | 1.42E+01 | G |
| | | | 964.60 | 1.373E+00 | + | 1.111E+00 | 2.77E+01 | G |
| Am-241 | T | -1.2844E-03 | | | | | | |
| | | | 59.54 | -1.284E-03 | &( | 1.497E-01 | 3.42E+03 | G K |
| PB-210 | | 5.0584E-01 | | | | | | |
| | | | 46.52 | 5.058E-01 | (P | 1.366E+00 | 3.37E+01 | G |
| U-238 | | 8.8082E-01 | | | | | | |
| | | | 63.29 | 7.782E-01 | (P | 1.212E+00 | 3.51E+01 | G |
| | | | 92.80 | 8.808E-01 | } P | 1.275E+00 | 3.75E+01 | G |
| | | | 92.38 | 8.808E-01 | } P | 1.579E+00 | 5.30E+01 | G |
| K-40 | | 1.1422E+01 | | | | | | |
| | | | 1460.75 | 1.142E+01 | *(P | 7.158E-01 | 5.28E+00 | G |
| PB-214 | | 1.0586E+00 | | | | | | |
| | | | 351.92 | 1.066E+00 | (P | 1.346E-01 | 6.65E+00 | G |
| | | | 295.21 | 1.044E+00 | @(P | 2.242E-01 | 9.72E+00 | G |
| | | | 241.98 | 8.220E-01 | - P | 6.131E-01 | 2.64E+01 | G |
| BI-214 | | 9.0385E-01 | | | | | | |
| | | | 609.31 | 8.640E-01 | (P | 1.293E-01 | 8.01E+00 | G |
| | | | 1764.49 | 9.784E-01 | ?(P | 5.943E-01 | 2.13E+01 | G |
| | | | 1120.29 | 9.032E-01 | ?( | 4.119E-01 | 1.81E+01 | G |
| | | | 1238.11 | 1.015E+00 | ?(P | 1.312E+00 | 4.00E+01 | G |
| | | | 768.36 | 1.247E+00 | + P | 9.013E-01 | 2.91E+01 | G |
| | | | 1377.67 | 4.944E-01 | - | 1.911E+00 | 1.12E+02 | G |
| | | | 934.06 | 2.625E+00 | + | 1.587E+00 | 2.95E+01 | G |
| BI-212 | | 8.5009E-01 | | | | | | |
| | | | 727.17 | 8.834E-01 | (P | 4.518E-01 | 2.33E+01 | G |
| | | | 1620.56 | 3.614E-01 | - P | 3.002E+00 | 2.19E+02 | G |
| | | | 785.42 | 6.535E-01 | (P | 2.772E+00 | 1.23E+02 | G |
| PB-212 | | 9.4390E-01 | | | | | | |
| | | | 238.63 | 9.439E-01 | (P | 1.280E-01 | 6.10E+00 | G |
| | | | 300.09 | 1.391E+00 | + P | 1.303E+00 | 3.37E+01 | G |
| TL-208 | | 3.6982E-01 | | | | | | |
| | | | 583.14 | 3.698E-01 | (P | 5.728E-02 | 8.43E+00 | G |
| | | | 510.72 | 6.760E-01 | + P | 2.535E-01 | 1.08E+01 | G |
| | | | 860.47 | 1.726E-01 | - P | 4.832E-01 | 7.76E+01 | G |

ORTEC g v - i (3263) Env32 G53W4.24 5/5/2016 12:42:06
American Radiation Services Spectrum name: ARS05353.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 277.36 | 2.876E-01 | - P | 6.788E-01 | 6.55E+01 | G |
| | | 763.30 | 5.212E-02 | % | 3.609E+00 | 1.95E+03 | G |
| PA-234 | 6.0614E-02 | | | | | | |
| | | 98.44 | -4.871E-03 | %(P | 1.192E-01 | 2.44E+03 | G |
| | | 946.00 | -4.881E-02 | + | 3.107E-01 | 1.82E+02 | G |
| | | 131.28 | -4.845E-02 | + P | 1.939E-01 | 1.41E+02 | G |
| | | 94.67 | 4.991E-02 | ( | 2.124E-01 | 1.26E+02 | G |
| | | 883.24 | -5.379E-03 | % P | 5.344E-01 | 1.00E+03 | G |
| | | 926.70 | -5.209E-02 | + | 5.291E-01 | 2.86E+02 | G |
| | | 569.26 | 9.608E-02 | ?(P | 4.418E-01 | 9.87E+01 | G |
| | | 111.00 | 1.461E-02 | &( | 3.895E-01 | 7.79E+02 | G |
| | | 733.00 | -8.945E-02 | + | 6.721E-01 | 2.16E+02 | G |
| | | 949.00 | -1.635E-01 | + P | 7.342E-01 | 1.42E+02 | G |
| | | 880.51 | 2.398E-02 | (P | 8.461E-01 | 9.67E+02 | G |
| | | 226.87 | -1.013E-01 | + P | 6.522E-01 | 2.00E+02 | G |
| | | 831.10 | 1.493E-01 | ?( | 1.031E+00 | 1.98E+02 | G |
| | | 808.10 | -9.889E-02 | + | 1.061E+00 | 3.02E+02 | G |
| | | 99.70 | 3.959E-01 | ( | 7.216E-01 | 5.56E+01 | G |
| | | 699.10 | -2.116E-01 | & P | 1.319E+00 | 1.86E+02 | G |
| | | 898.60 | -2.008E-01 | & P | 1.573E+00 | 2.96E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 3.079E+00 | 1.00E+03 | G |
| CS-137 | 1.1028E-03 | | | | | | |
| | | 661.66 | 1.103E-03 | %(P | 6.034E-02 | 5.99E+02 | G |
| CO-60 | 2.2240E-03 | | | | | | |
| | | 1173.24 | -3.786E-03 | %(P | 9.352E-02 | 1.00E+03 | K |
| | | 1332.50 | 8.229E-03 | ?(P | 5.635E-02 | 1.39E+02 | K |
| EU-152 | 5.9977E-02 | | | | | | |
| | | 40.12 | -2.846E-02 | ?( | 2.292E-01 | 2.36E+02 | G |
| | | 121.78 | -3.624E-02 | + | 1.285E-01 | 1.06E+02 | G |
| | | 344.30 | -1.381E-02 | + | 1.672E-01 | 3.51E+02 | G |
| | | 1408.08 | 6.803E-02 | ?( | 3.396E-01 | 1.42E+02 | G |
| | | 39.52 | -5.327E-02 | + | 4.375E-01 | 2.41E+02 | G |
| | | 964.00 | 2.363E-01 | ?(P | 5.974E-01 | 7.14E+01 | G |
| | | 1112.07 | -9.151E-03 | & | 3.867E-01 | 1.14E+03 | G |
| | | 778.90 | 5.312E-02 | &( | 3.847E-01 | 2.06E+02 | G |
| | | 1085.80 | 0.000E+00 | - | 4.822E-01 | 1.00E+03 | G |
| | | 45.40 | -3.464E-01 | + | 7.642E-01 | 6.68E+01 | G |
| | | 244.67 | -3.387E-01 | + | 6.960E-01 | 6.24E+01 | G |
| | | 867.39 | -1.979E-01 | + P | 1.391E+00 | 2.37E+02 | G |
| EU-154 | 5.4066E-02 | | | | | | |
| | | 123.10 | 4.497E-02 | &( | 7.207E-02 | 4.93E+01 | G |
| | | 1274.80 | -2.571E-02 | & | 2.202E-01 | 2.42E+02 | G |
| | | 723.30 | -6.972E-02 | - | 3.232E-01 | 1.36E+02 | G |

```
     ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 12:42:06
American Radiation Services     Spectrum name: ARS05353.An1

Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                        1004.80 3.463E-02 ?(P 3.322E-01 2.23E+02 G
                          43.00-9.794E-02 -   4.903E-01 1.48E+02 G
                         873.20-8.073E-02 - P 4.986E-01 2.38E+02 G
                         996.30 6.570E-02 ?(  4.801E-01 2.05E+02 G
                          42.31 1.343E-01 ?(  7.830E-01 1.71E+02 G
                         248.04-1.326E-01 -   6.272E-01 1.40E+02 G
                         591.70 0.000E+00 -   1.153E+00 1.00E+03 G
                          48.70-2.385E-01 &   1.452E+00 1.80E+02 G
                         756.70 3.051E-03 % P 1.037E+00 2.55E+03 G
  ( - This peak used in the nuclide activity average.

  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
Nuclide     Activity        Counting     Total         MDA
               pCi/g          pCi/g        pCi/g         pCi/g
```

| | | | | | |
|---|---|---|---|---|---|
| U-235 | A | 5.9375E-02 | 4.3113E-02 | 4.3325E-02 | 0.370E+00 |
| RA-226 | A | 3.4638E-02 | 6.9536E-01 | 6.9537E-01 | 0.121E+01 |
| Ra-228 | | 1.0407E+00 | 1.5784E-01 | 1.7203E-01 | 0.189E+00 |
| Am-241 | #B | -1.2844E-03 | 8.7760E-02 | 8.7760E-02 | 0.150E+00 |
| PB-210 | A | 5.0584E-01 | 7.9586E-01 | 7.9743E-01 | 0.137E+01 |

ORTEC g v - i (3263) Env32  G53W4.24  5/5/2016 12:42:06
American Radiation Services  Spectrum name: ARS05353.An1

| | | | | | |
|---|---|---|---|---|---|
| U-238 | A | 8.8082E-01 | 5.2902E-01 | 5.3346E-01 | 0.121E+01 |
| K-40 | # | 1.1422E+01 | 1.2453E+00 | 1.5823E+00 | 0.716E+00 |
| PB-214 | | 1.0586E+00 | 1.2984E-01 | 1.6701E-01 | 0.135E+00 |
| BI-214 | | 9.0385E-01 | 1.5027E-01 | 1.6413E-01 | 0.129E+00 |
| BI-212 | | 8.5009E-01 | 4.0784E-01 | 4.1238E-01 | 0.452E+00 |
| PB-212 | | 9.4390E-01 | 1.1830E-01 | 1.4471E-01 | 0.128E+00 |
| TL-208 | | 3.6982E-01 | 6.3777E-02 | 6.9750E-02 | 0.573E-01 |
| PA-234 | A | 6.0614E-02 | 6.7373E-02 | 6.7524E-02 | 0.119E+00 |
| CS-137 | #A | 1.1028E-03 | 3.3737E-02 | 3.3737E-02 | 0.603E-01 |
| CO-60 | #B | 2.2240E-03 | 8.2637E-03 | 8.2642E-03 | 0.935E-01 |
| EU-152 | #A | 5.9977E-02 | 9.0725E-02 | 9.0976E-02 | 0.229E+00 |
| EU-154 | #A | 5.4066E-02 | 5.3281E-02 | 5.3407E-02 | 0.721E-01 |

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 1120.1 to  1998.6 keV)  1.813E+01  pCi/g

# Ortec Gamma

| | |
|---|---|
| Batch Sample ID | ARS1-B16-00698-15 |
| Sample Setup | |
| Description | ORTEC GAMMA |
| InternalID | ARS1-16-00671-016 |
| AnalysisBatch | ARS1-B16-00698 |
| SDG | ARS1-16-00671 |
| AnalysisCode | GAM-A-025 |
| Library | ITSI.Lib |

| | |
|---|---|
| Geometry | 250mL Tuna Can 1748- |
| Fraction | 016 |
| Run | 2 |
| Detector ID | 1 |
| Detector Name | (ARS06) |

| Isotope | ACT | Units | TPU | MDA | DL | Nuclide Energy (keV) | Peak Energy (keV) | FWHM |
|---|---|---|---|---|---|---|---|---|
| **U-235** | 6.7180E-02 | pCi/g | 1.1067E-01 | 1.9700E-01 | 9.8500E-02 | | | |
| **RA-226** | 3.7107E-01 | pCi/g | 4.4858E-01 | 7.7400E-01 | 3.8700E-01 | | | |
| **RA-228** | 2.4673E-01 | pCi/g | 9.6790E-02 | 1.4800E-01 | 7.4000E-02 | | | |
| **AM-241** | -2.3584E-02 | pCi/g | 6.6535E-01 | 1.0400E-01 | 5.2000E-02 | | | |
| **PB-210** | 2.8703E-01 | pCi/g | 6.4157E-01 | 1.0700E+00 | 5.3500E-01 | | | |
| **U-238** | 1.7965E-01 | pCi/g | 2.3174E-01 | 9.8900E-01 | 4.9450E-01 | | | |
| **K-40** | 6.1891E+00 | pCi/g | 9.0942E-01 | 6.0200E-01 | 3.0100E-01 | | | |
| **PB-214** | 2.5903E-01 | pCi/g | 6.5722E-02 | 9.4800E-02 | 4.7400E-02 | | | |
| **BI-214** | 1.5409E-01 | pCi/g | 6.8533E-02 | 1.0300E-01 | 5.1500E-02 | | | |
| **BI-212** | 1.1136E-01 | pCi/g | 1.7123E-01 | 2.9100E-01 | 1.4550E-01 | | | |
| **PB-212** | 2.3888E-01 | pCi/g | 6.9300E-02 | 7.7600E-02 | 3.8800E-02 | | | |
| **TL-208** | 8.2046E-02 | pCi/g | 3.3943E-02 | 4.0100E-02 | 2.0050E-02 | | | |
| **PA-234** | 3.3326E-02 | pCi/g | 5.0306E-02 | 9.7900E-02 | 4.8950E-02 | | | |
| **CS-137** | 7.8116E-04 | pCi/g | 2.9317E-02 | 5.2800E-02 | 2.6400E-02 | | | |
| **CO-60** | -9.7700E-04 | pCi/g | 5.0542E-02 | 5.5100E-02 | 2.7550E-02 | | | |
| **EU-152** | 3.0431E-02 | pCi/g | 7.4488E-02 | 1.3100E-01 | 6.5500E-02 | | | |
| **EU-154** | 3.4486E-02 | pCi/g | 3.6969E-02 | 4.8000E-02 | 2.4000E-02 | | | |
| **Total Gamma** | 8.2852E+00 | pCi/g | | | | | | |
| **Total NORM Activity** | 2.3464E+01 | pCi/g | | | | | | |
| | | | | | | | | |

American Radiation Services Spectrum name: ARS06944.An1

Sample description
Batch ID: 16-00698-15
SDG: ARS1-16-00671-016 Tech: WJS

Spectrum Filename: C:\User\ARS06944.An1

Acquisition information
Start time: 05-May-2016 11:57:39
Live time: 2700
Real time: 2703
Dead time: 0.10 %
Detector ID: 1

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration
Created: 10-Jun-2015 12:26:28
Zero offset: 0.192 keV
Gain: 0.250 keV/channel
Quadratic: -2.864E-08 keV/channel^2

Efficiency Calibration
Created: 10-Jun-2015 12:34:11
Type: Polynomial
Uncertainty: 1.581 %
Coefficients: -0.368747 -4.257329 0.454276
-0.047622 0.001987 -0.000031

Library Files
Main analysis library: ITSI.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.69keV )
Stop channel: 8000 ( 1998.23keV )
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 3.4187E+02
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 3.4187E+02) =
2.9251E+03
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: average of five points.
Half lives decay limit: 12.000

American Radiation Services Spectrum name: ARS06944.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | NO | |
| Decay during acquisition: | YES | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc ITSI.Pbc 11-Aug-2014 08:02:01 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0707

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.34 | 99. | 15.51 | 0.45 | 7.041E-03 | | | | |
| 39.82 | 10. | 122.26 | 0.93 | 2.738E-02 | 39.52 | 16.000 | | PBC<MDA EU152 |
| 41.86 | 2. | 181.99 | 0.93 | 2.785E-02 | 40.12 | 30.000 | | PBC<MDA EU152 |
| 46.58 | 13. | 32.91 | 0.38 | 3.277E-02 | 46.52 | 4.000 | | PBC<MDA PB210 |
| 46.83 | 3. | 482.72 | 0.93 | 3.195E-02 | 45.40 | 9.000 | | PBC<MDA EU152 |
| | | | | | 46.52 | 4.000 | | PBC<MDA PB210 |
| 59.76 | -12. | 645.08 | 0.95 | 4.310E-02 | 59.54 | 35.900 | | PBC<MDA Am241 |
| 62.97 | -8. | 71.53 | 0.95 | 4.538E-02 | 63.29 | 3.900 | | PBC<MDA U238 |
| 74.66 | 91. | 18.79 | 0.96 | 5.125E-02 | | | | |
| 77.10 | 112. | 15.33 | 0.97 | 5.232E-02 | | | | |
| 92.75 | 28. | 46.57 | 0.98 | 5.721E-02 | 92.38 | 2.570 | | PBC<MDA U238 |
| | | | | | 92.80 | 3.000 | | PBC<MDA U238 |
| 92.76 | 16. | 47.37 | 0.98 | 5.730E-02 | 92.38 | 2.570 | | PBC<MDA U238 |
| | | | | | 92.80 | 3.000 | | PBC<MDA U238 |
| 99.62 | 2. | 222.03 | 0.99 | 5.851E-02 | 99.70 | 4.700 | | PBC<MDA PA234 |
| 111.02 | 7. | 169.08 | 1.00 | 5.943E-02 | 111.00 | 8.550 | | PBC<MDA PA234 |
| 123.55 | 14. | 81.86 | 1.01 | 5.928E-02 | 123.10 | 40.460 | | PBC<MDA EU154 |
| 130.70 | 7. | 165.41 | 1.02 | 5.871E-02 | 131.28 | 20.000 | | PBC<MDA PA234 |
| 143.10 | 5. | 132.31 | 1.03 | 5.734E-02 | 143.76 | 10.500 | | PBC<MDA U235 |
| 185.60 | 23. | 32.39 | 1.07 | 5.089E-02 | 186.21 | 3.640 | | PBC<MDA RA226 |
| 206.12 | 13. | 74.67 | 1.09 | 4.793E-02 | 205.31 | 4.700 | | PBC<MDA U235 |
| 226.83 | 14. | 75.39 | 1.11 | 4.480E-02 | 226.87 | 6.500 | | PBC<MDA PA234 |
| 238.56 | 160. | 12.81 | 0.94 | 4.323E-02 | 238.63 | 43.100 | 2.339E-01 | PB212 |
| 246.95 | 13. | 67.66 | 1.13 | 4.203E-02 | 248.04 | 6.600 | | PBC<MDA EU154 |
| 295.08 | 61. | 17.62 | 1.17 | 3.686E-02 | 295.21 | 18.500 | 2.604E-01 | PB214 |
| 299.63 | 12. | 74.66 | 1.18 | 3.639E-02 | 300.09 | 3.270 | | PBC<MDA PB212 |
| 338.11 | 36. | 30.55 | 1.21 | 3.315E-02 | 338.40 | 12.010 | 2.654E-01 | Ra228 |
| 343.19 | 0. | 973.32 | 1.22 | 3.271E-02 | 344.30 | 27.000 | | PBC<MDA EU152 |
| 351.53 | 112. | 12.75 | 1.03 | 3.218E-02 | | | | |
| 351.53 | 112. | 12.75 | 1.03 | 3.218E-02 | 351.92 | 35.800 | 2.564E-01 | PB214 |
| 510.59 | 62. | 12.45 | 1.45 | 2.413E-02 | 510.72 | 22.500 | 3.342E-01 | TL208 |

| pk energy | area | uncert | fwhm | corr | nuclide | brnch. | act. | nuc |
|---|---|---|---|---|---|---|---|---|
| 568.74 | 1. | 189.25 | 1.42 | 2.224E-02 | 569.26 | 10.400 | PBC<MDA | PA234 |
| 583.01 | 53. | 18.11 | 0.96 | 2.185E-02 | 583.14 | 86.000 | 8.205E-02 | TL208 |
| 609.34 | 52. | 18.98 | 1.46 | 2.115E-02 | 609.31 | 44.791 | 1.593E-01 | BI214 |
| 727.41 | 8. | 68.81 | 1.56 | 1.858E-02 | 727.17 | 11.800 | PBC<MDA | BI212 |
| 763.13 | 4. | 180.82 | 1.59 | 1.793E-02 | 763.30 | 1.700 | PBC<MDA | TL208 |
| 768.63 | 2. | 286.69 | 1.60 | 1.785E-02 | 768.36 | 4.799 | PBC<MDA | BI214 |
| 807.27 | 3. | 264.60 | 1.63 | 1.721E-02 | 808.10 | 4.900 | PBC<MDA | PA234 |
| 830.92 | 0. | 537.32 | 1.65 | 1.686E-02 | 831.10 | 5.600 | PBC<MDA | PA234 |
| 860.82 | 20. | 27.06 | 1.55 | 1.644E-02 | 860.47 | 12.000 | 3.027E-01 | TL208 |
| 882.73 | 6. | 107.27 | 1.70 | 1.613E-02 | 883.24 | 12.000 | PBC<MDA | PA234 |
| 911.32 | 37. | 21.45 | 1.72 | 1.577E-02 | 911.07 | 29.000 | 2.390E-01 | Ra228 |
| 926.94 | 1. | 361.19 | 1.74 | 1.558E-02 | 926.70 | 11.000 | PBC<MDA | PA234 |
| 934.90 | 5. | 112.73 | 1.74 | 1.549E-02 | 934.06 | 3.029 | PBC<MDA | BI214 |
| 968.86 | 12. | 51.29 | 1.77 | 1.508E-02 | 968.90 | 17.460 | PBC<MDA | Ra228 |
| 1086.62 | 2. | 244.23 | 1.87 | 1.387E-02 | 1085.80 | 10.290 | PBC<MDA | EU152 |
| 1120.66 | 8. | 69.12 | 1.90 | 1.355E-02 | 1120.29 | 14.797 | PBC<MDA | BI214 |
| 1171.58 | 0. | 550.47 | 1.94 | 1.309E-02 | 1173.24 | 99.900 | PBC<MDA | CO60 |
| 1237.96 | 4. | 122.39 | 1.99 | 1.256E-02 | 1238.11 | 5.859 | PBC<MDA | BI214 |
| 1460.62 | 250. | 6.07 | 2.36 | 1.104E-02 | 1460.75 | 10.700 | 6.189E+00 | K40 |
| 1764.08 | 8. | 46.86 | 2.41 | 9.415E-03 | 1764.49 | 15.357 | PBC<MDA | BI214 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.60 | 13.34 | 60. | 99. | 0.037 | 31.02 | 0.455 | BR-82 | s |
| 297.66 | 74.60 | 129. | 62. | 0.023 | 60.77 | 0.911 | TL-208 | |
| 307.43 | 77.04 | 102. | 73. | 0.027 | 46.65 | 0.972 | PB-212 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: ITSI.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| EU-152 | 158.53 | 39.82 | 69. | 10. | 0.004 | 244.52 | 0.929s |
| EU-152 | 166.67 | 41.86 | 55. | 2. | 0.001 | 363.98 | 0.930s |
| EU-152 | 186.55 | 46.83 | 85. | 3. | 0.001 | 965.44 | 0.935s |
| PB-210 | 185.58 | 46.58 | 93. | 13. | 0.005 | 65.81 | 0.384s |
| EU-154 | 193.47 | 48.56 | 114. | -18. | -0.007 | 175.28 | 0.938s |
| U-238 | 251.13 | 62.97 | 150. | -8. | -0.003 | 143.05 | 0.952s |

American Radiation Services Spectrum name: ARS06944.An1

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| U-238 | 370.26 | 92.75 | 155. | 28. | 0.010 | 93.14 | 0.980s |
| U-238 | 370.31 | 92.76 | 168. | 16. | 0.006 | 94.73 | 0.980s |
| PA-234 | 378.19 | 94.73 | 186. | -16. | -0.006 | 253.40 | 0.982s |
| PA-234 | 397.77 | 99.62 | 95. | 2. | 0.001 | 444.07 | 0.987s |
| PA-234 | 443.35 | 111.02 | 105. | 7. | 0.003 | 338.17 | 0.998s |
| EU-152 | 476.20 | 119.23 | 42. | -2. | -0.001 | 878.81 | 1.008s |
| EU-154 | 493.50 | 123.55 | 62. | 14. | 0.005 | 163.72 | 1.009 |
| PA-234 | 522.09 | 130.70 | 67. | 7. | 0.003 | 330.82 | 1.017s |
| U-235 | 571.72 | 143.10 | 66. | 5. | 0.002 | 264.61 | 1.029s |
| RA-226 | 741.74 | 185.60 | 99. | 23. | 0.009 | 64.78 | 1.069s |
| U-235 | 823.85 | 206.12 | 49. | 13. | 0.005 | 149.34 | 1.087s |
| PA-234 | 906.69 | 226.83 | 51. | 14. | 0.005 | 150.77 | 1.108s |
| PB-212 | 953.63 | 238.56 | 100. | 149. | 0.055 | 25.62 | 0.945 |
| PB-214 | 967.39 | 242.00 | 129. | -5. | -0.002 | 988.53 | 1.122s |
| EU-152 | 976.81 | 244.35 | 72. | -11. | -0.004 | 221.43 | 1.124s |
| EU-154 | 987.22 | 246.95 | 34. | 13. | 0.005 | 135.31 | 1.128s |
| TL-208 | 1111.04 | 277.90 | 65. | -5. | -0.002 | 638.61 | 1.155s |
| PB-214 | 1179.80 | 295.08 | 39. | 61. | 0.022 | 35.24 | 1.172s |
| PB-212 | 1197.98 | 299.63 | 37. | 12. | 0.005 | 149.32 | 1.176 |
| Ra-228 | 1351.97 | 338.11 | 45. | 36. | 0.013 | 61.10 | 1.212 |
| PB-214 | 1405.70 | 351.54 | 55. | 102. | 0.038 | 25.10 | 1.224 |
| TL-208 | 2042.18 | 510.59 | 66. | 62. | 0.023 | 24.91 | 1.446s |
| PA-234 | 2274.92 | 568.74 | 32. | 1. | 0.000 | 378.51 | 1.423s |
| TL-208 | 2332.03 | 583.01 | 24. | 53. | 0.020 | 36.22 | 0.960s |
| EU-154 | 2365.98 | 591.49 | 21. | -1. | 0.000 | 1006.83 | 1.443s |
| BI-214 | 2437.43 | 609.34 | 43. | 52. | 0.019 | 37.96 | 1.458s |
| PA-234 | 2805.58 | 701.32 | 23. | -2. | -0.001 | 1032.26 | 1.538s |
| EU-154 | 2895.01 | 723.66 | 25. | -5. | -0.002 | 326.74 | 1.559s |
| BI-212 | 2910.04 | 727.41 | 17. | 8. | 0.003 | 137.61 | 1.563s |
| TL-208 | 3053.02 | 763.13 | 24. | 4. | 0.001 | 361.63 | 1.594 |
| BI-214 | 3075.04 | 768.63 | 28. | 2. | 0.001 | 573.38 | 1.599s |
| EU-152 | 3110.09 | 777.39 | 20. | -3. | -0.001 | 847.89 | 1.608s |
| PA-234 | 3229.71 | 807.27 | 22. | 3. | 0.001 | 529.20 | 1.633s |
| TL-208 | 3444.11 | 860.82 | 4. | 20. | 0.008 | 54.13 | 1.552 |
| EU-152 | 3470.39 | 867.39 | 18. | 0. | 0.000 | 2000.00 | 1.685s |
| PA-234 | 3522.93 | 880.51 | 25. | -5. | -0.002 | 340.68 | 1.696s |
| PA-234 | 3531.81 | 882.73 | 16. | 6. | 0.002 | 214.53 | 1.698s |
| PA-234 | 3594.68 | 898.43 | 31. | -5. | -0.002 | 505.90 | 1.711s |
| Ra-228 | 3646.25 | 911.32 | 19. | 37. | 0.014 | 42.91 | 1.722s |
| PA-234 | 3708.81 | 926.94 | 19. | 1. | 0.000 | 722.38 | 1.735s |
| BI-214 | 3740.68 | 934.90 | 21. | 5. | 0.002 | 225.47 | 1.742s |
| PA-234 | 3785.12 | 946.00 | 10. | 0. | 0.000 | 2000.00 | 1.752s |
| EU-152 | 3873.54 | 968.08 | 29. | -2. | -0.001 | 804.39 | 1.767s |
| Ra-228 | 3876.63 | 968.86 | 23. | 12. | 0.005 | 102.59 | 1.771s |
| EU-154 | 3988.58 | 996.82 | 21. | -2. | -0.001 | 733.86 | 1.794s |
| EU-154 | 4018.38 | 1004.26 | 25. | -5. | -0.002 | 354.07 | 1.802s |
| EU-152 | 4348.16 | 1086.62 | 14. | 2. | 0.001 | 488.47 | 1.870s |
| EU-152 | 4428.42 | 1106.66 | 13. | -1. | 0.000 | 875.57 | 1.891s |

| Nuclide | Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM |
|---|---|---|---|---|---|---|---|
| BI-214 | 4484.46 | 1120.66 | 19. | 8. | 0.003 | 138.23 | 1.898s |
| BI-214 | 4954.19 | 1237.96 | 22. | 4. | 0.002 | 244.79 | 1.995s |
| CO-60 | 5332.17 | 1332.33 | 15. | -3. | -0.001 | 384.09 | 2.071s |
| BI-214 | 5513.74 | 1377.67 | 26. | 0. | 0.000 | 2000.00 | 2.107s |
| PA-234 | 5579.56 | 1394.10 | 16. | 0. | 0.000 | 2000.00 | 2.120s |
| K-40 | 5845.99 | 1460.62 | 21. | 250. | 0.092 | 12.15 | 2.358 |
| BI-212 | 6486.71 | 1620.56 | 38. | 0. | 0.000 | 2000.00 | 2.297s |
| BI-214 | 7061.70 | 1764.08 | 7. | 8. | 0.003 | 93.71 | 2.405s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| U-235 | | 6.7180E-02 | | | | | |
| | | | 143.76 | 2.299E-02 | ?(P | 1.973E-01 1.32E+02 | G |
| | | | 205.31 | 1.659E-01 | &(P | 4.609E-01 7.47E+01 | G |
| | | | 163.35 | -3.001E-02 | % P | 4.726E-01 4.00E+05 | G |
| RA-226 | | 3.7107E-01 | | | | | |
| | | | 186.21 | 3.711E-01 | &(P | 7.740E-01 3.24E+01 | G K |
| Ra-228 | | 2.4673E-01 | | | | | |
| | | | 911.07 | 2.390E-01 | (P | 1.478E-01 2.15E+01 | G |
| | | | 968.90 | 1.352E-01 | - P | 2.813E-01 5.13E+01 | G |
| | | | 338.40 | 2.654E-01 | ?(P | 2.510E-01 3.06E+01 | G |
| | | | 964.60 | 1.337E-02 | % | 8.358E-01 1.69E+03 | G |
| Am-241 | T | -2.3584E-02 | | | | | |
| | | | 59.54 | -2.358E-02 | %(P | 1.042E-01 6.45E+02 | G K |
| PB-210 | | 2.8703E-01 | | | | | |
| | | | 46.52 | 2.870E-01 | (P | 1.065E+00 3.29E+01 | G |
| U-238 | | 1.7965E-01 | | | | | |
| | | | 63.29 | -1.388E-01 | ?(P | 9.890E-01 7.15E+01 | G |
| | | | 92.80 | 2.688E-01 | *(P | 1.074E+00 4.74E+01 | G |
| | | | 92.38 | 5.589E-01 | &(P | 1.208E+00 4.66E+01 | G |
| K-40 | | 6.1891E+00 | | | | | |
| | | | 1460.75 | 6.189E+00 | (P | 6.020E-01 6.07E+00 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| PB-214 | 2.5903E-01 | | | | | | |
| | | 351.92 | 2.583E-01 | (P | 9.477E-02 | 1.26E+01 | G |
| | | 295.21 | 2.604E-01 | (P | 1.374E-01 | 1.76E+01 | G |
| | | 241.98 | -4.107E-02 | - P | 5.085E-01 | 4.94E+02 | G |
| BI-214 | 1.5409E-01 | | | | | | |
| | | 609.31 | 1.593E-01 | (P | 1.026E-01 | 1.90E+01 | G |
| | | 1764.49 | 1.628E-01 | &(P | 3.070E-01 | 4.69E+01 | G |
| | | 1120.29 | 1.208E-01 | ?(P | 3.330E-01 | 6.91E+01 | G |
| | | 1238.11 | 1.754E-01 | ?(P | 9.762E-01 | 1.22E+02 | G |
| | | 768.36 | 7.987E-02 | & P | 9.365E-01 | 2.87E+02 | G |
| | | 1377.67 | 0.000E+00 | - | 1.704E+00 | 1.00E+03 | G |
| | | 934.06 | 3.255E-01 | & P | 1.513E+00 | 1.13E+02 | G |
| BI-212 | 1.1136E-01 | | | | | | |
| | | 727.17 | 1.114E-01 | &(P | 2.915E-01 | 6.88E+01 | G |
| | | 1620.56 | 0.000E+00 | - | 3.297E+00 | 1.00E+03 | G |
| | | 785.42 | 2.094E-02 | % | 2.063E+00 | 2.67E+03 | G |
| PB-212 | 2.3888E-01 | | | | | | |
| | | 238.63 | 2.339E-01 | (P | 7.757E-02 | 1.28E+01 | G |
| | | 300.09 | 3.051E-01 | ( | 7.608E-01 | 7.47E+01 | G |
| TL-208 | 8.2046E-02 | | | | | | |
| | | 583.14 | 8.205E-02 | (P | 4.006E-02 | 1.81E+01 | G |
| | | 510.72 | 3.342E-01 | + P | 2.188E-01 | 1.25E+01 | G |
| | | 860.47 | 3.027E-01 | + | 1.714E-01 | 2.71E+01 | G |
| | | 277.36 | -5.630E-02 | - P | 4.706E-01 | 3.19E+02 | G |
| | | 763.30 | 3.777E-01 | + P | 2.470E+00 | 1.81E+02 | G |
| PA-234 | 3.3326E-02 | | | | | | |
| | | 98.44 | -4.609E-03 | &(P | 9.786E-02 | 2.07E+03 | G |
| | | 946.00 | 0.000E+00 | + | 1.665E-01 | 1.00E+03 | G |
| | | 131.28 | 1.789E-02 | &( | 1.018E-01 | 1.65E+02 | G |
| | | 94.67 | -5.084E-02 | + | 2.168E-01 | 1.27E+02 | G |
| | | 883.24 | 8.676E-02 | ?( | 3.235E-01 | 1.07E+02 | G |
| | | 926.70 | 1.134E-02 | ?(P | 3.913E-01 | 3.61E+02 | G |
| | | 569.26 | 1.597E-02 | ?(P | 3.698E-01 | 1.89E+02 | G |
| | | 111.00 | 4.278E-02 | ?(P | 2.914E-01 | 1.69E+02 | G |
| | | 733.00 | -3.545E-02 | % P | 4.470E-01 | 7.72E+02 | G |
| | | 949.00 | -2.283E-02 | % P | 5.901E-01 | 1.00E+03 | G |
| | | 880.51 | -1.436E-01 | + P | 7.295E-01 | 1.70E+02 | G |
| | | 226.87 | 1.442E-01 | &( | 3.627E-01 | 7.54E+01 | G |
| | | 831.10 | -9.279E-03 | & P | 6.446E-01 | 5.37E+02 | G |
| | | 808.10 | 9.036E-02 | &( | 8.600E-01 | 2.65E+02 | G |
| | | 99.70 | 2.509E-02 | ?(P | 5.119E-01 | 2.22E+02 | G |
| | | 699.10 | -6.443E-02 | + P | 8.376E-01 | 5.16E+02 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| | | 898.60 | -2.389E-01 | + P | 1.313E+00 | 2.53E+02 | G |
| | | 1394.10 | 0.000E+00 | - | 1.405E+00 | 1.00E+03 | G |
| CS-137 | 7.8116E-04 | | | | | | |
| | | 661.66 | 7.812E-04 | &( | 5.283E-02 | 1.88E+03 | G |
| CO-60 | -9.7700E-04 | | | | | | |
| | | 1173.24 | -9.770E-04 | %(P | 5.505E-02 | 5.50E+02 | K |
| | | 1332.50 | -7.809E-03 | + P | 5.144E-02 | 1.92E+02 | K |
| EU-152 | 3.0431E-02 | | | | | | |
| | | 40.12 | 7.177E-03 | &(P | 1.309E-01 | 1.82E+02 | G |
| | | 121.78 | -3.874E-03 | & P | 5.544E-02 | 4.39E+02 | G |
| | | 344.30 | -1.326E-03 | % P | 1.041E-01 | 9.73E+02 | G |
| | | 1408.08 | -1.777E-03 | % P | 1.945E-01 | 1.00E+03 | G |
| | | 39.52 | 6.633E-02 | &( | 2.762E-01 | 1.22E+02 | G |
| | | 964.00 | -2.543E-02 | + | 3.675E-01 | 4.02E+02 | G |
| | | 1112.07 | -1.853E-02 | + | 3.042E-01 | 4.38E+02 | G |
| | | 778.90 | -3.276E-02 | + P | 3.001E-01 | 4.24E+02 | G |
| | | 1085.80 | 4.589E-02 | ?( | 4.108E-01 | 2.44E+02 | G |
| | | 45.40 | 2.645E-02 | ?(P | 4.645E-01 | 4.83E+02 | G |
| | | 244.67 | -1.025E-01 | + P | 3.835E-01 | 1.11E+02 | G |
| | | 867.39 | 0.000E+00 | & | 9.636E-01 | 1.00E+03 | G |
| EU-154 | 3.4486E-02 | | | | | | |
| | | 123.10 | 1.749E-02 | &( | 4.796E-02 | 8.19E+01 | G |
| | | 1274.80 | 2.428E-03 | % P | 1.644E-01 | 1.76E+03 | G |
| | | 723.30 | -3.636E-02 | + | 2.091E-01 | 1.63E+02 | G |
| | | 1004.80 | -6.035E-02 | + P | 2.949E-01 | 1.77E+02 | G |
| | | 43.00 | -3.912E-03 | % | 3.043E-01 | 2.21E+03 | G |
| | | 873.20 | -1.165E-02 | % P | 3.446E-01 | 1.66E+03 | G |
| | | 996.30 | -3.375E-02 | & | 4.498E-01 | 3.67E+02 | G |
| | | 42.31 | -9.094E-03 | & | 5.809E-01 | 1.82E+03 | G |
| | | 248.04 | 1.387E-01 | ?(P | 3.171E-01 | 6.77E+01 | G |
| | | 591.70 | -3.879E-02 | - | 7.135E-01 | 5.03E+02 | G |
| | | 48.70 | -3.571E-01 | + | 1.047E+00 | 8.76E+01 | G |
| | | 756.70 | 4.683E-03 | % | 9.161E-01 | 5.25E+03 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | | Time of Count Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| U-235 | #A | 6.7180E-02 | 1.1053E-01 | 1.1067E-01 | 0.197E+00 |
| RA-226 | #A | 3.7107E-01 | 4.4746E-01 | 4.4858E-01 | 0.774E+00 |
| Ra-228 | # | 2.4673E-01 | 9.5363E-02 | 9.6790E-02 | 0.148E+00 |
| Am-241 | #B | -2.3584E-02 | 6.6535E-01 | 6.6535E-01 | 0.104E+00 |
| PB-210 | A | 2.8703E-01 | 6.4094E-01 | 6.4157E-01 | 0.107E+01 |
| U-238 | #A | 1.7965E-01 | 2.3132E-01 | 2.3174E-01 | 0.989E+00 |
| K-40 | | 6.1891E+00 | 8.1645E-01 | 9.0942E-01 | 0.602E+00 |
| PB-214 | # | 2.5903E-01 | 6.1287E-02 | 6.5722E-02 | 0.948E-01 |
| BI-214 | # | 1.5409E-01 | 6.7868E-02 | 6.8533E-02 | 0.103E+00 |
| BI-212 | #A | 1.1136E-01 | 1.7107E-01 | 1.7123E-01 | 0.291E+00 |
| PB-212 | | 2.3888E-01 | 6.5698E-02 | 6.9300E-02 | 0.776E-01 |
| TL-208 | | 8.2046E-02 | 3.3527E-02 | 3.3943E-02 | 0.401E-01 |
| PA-234 | #A | 3.3326E-02 | 5.0246E-02 | 5.0306E-02 | 0.979E-01 |
| CS-137 | #A | 7.8116E-04 | 2.9317E-02 | 2.9317E-02 | 0.528E-01 |
| CO-60 | #B | -9.7700E-04 | 5.0542E-02 | 5.0542E-02 | 0.551E-01 |
| EU-152 | #A | 3.0431E-02 | 7.4410E-02 | 7.4488E-02 | 0.131E+00 |
| EU-154 | #A | 3.4486E-02 | 3.6878E-02 | 3.6969E-02 | 0.480E-01 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

American Radiation Services Spectrum name: ARS06944.An1

---------- S U M M A R Y ----------

| | | | |
|---|---|---|---|
| Total Activity ( | 2.7 to 1998.2 keV) | 7.168E+00 | pCi/g |

## SDG **ARS1-16-00671**

| Fraction | Container | Client ID | Aliquot | Units | Geometry | Prep Type | Origin | Origin2 | ICOC ID |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 1 | 04-PD-STK-01-01 | 1362.0000 | g | | ORIG | SCI | | 229542 |
| 001 | 1 | 04-PD-STK-01-01 | 949.0800 | g | | DRYF | PRP | | 229635 |
| 001 | 1 | 04-PD-STK-01-01 | 358.0300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229746 |
| 001 | 1 | 04-PD-STK-01-01 | 78.5000 | g | | DRAD | ALI | Manual | 229763 |
| 002 | 1 | 04-PD-STK-01-02 | 1072.0000 | g | | ORIG | SCI | | 229543 |
| 002 | 1 | 04-PD-STK-01-02 | 643.3700 | g | | DRYF | PRP | | 229636 |
| 002 | 1 | 04-PD-STK-01-02 | 363.4900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229747 |
| 002 | 1 | 04-PD-STK-01-02 | 78.5000 | g | | DRAD | ALI | Manual | 229764 |
| 003 | 1 | 04-PD-STK-01-03 | 917.0000 | g | | ORIG | SCI | | 229544 |
| 003 | 1 | 04-PD-STK-01-03 | 686.9200 | g | | DRYF | PRP | | 229637 |
| 003 | 1 | 04-PD-STK-01-03 | 325.9500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229748 |
| 003 | 1 | 04-PD-STK-01-03 | 78.5000 | g | | DRAD | ALI | Manual | 229765 |
| 004 | 1 | 04-PD-STK-01-04 | 1056.0000 | g | | ORIG | SCI | | 229545 |
| 004 | 1 | 04-PD-STK-01-04 | 803.5900 | g | | DRYF | PRP | | 229638 |
| 004 | 1 | 04-PD-STK-01-04 | 366.2300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229749 |
| 004 | 1 | 04-PD-STK-01-04 | 78.5000 | g | | DRAD | ALI | Manual | 229766 |
| 005 | 1 | 04-PD-STK-01-05 | 957.0000 | g | | ORIG | SCI | | 229546 |
| 005 | 1 | 04-PD-STK-01-05 | 765.7100 | g | | DRYF | PRP | | 229639 |
| 005 | 1 | 04-PD-STK-01-05 | 349.9500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229750 |
| 005 | 1 | 04-PD-STK-01-05 | 78.5000 | g | | DRAD | ALI | Manual | 229767 |
| 006 | 1 | 04-PD-STK-01-06 | 1132.0000 | g | | ORIG | SCI | | 229547 |
| 006 | 1 | 04-PD-STK-01-06 | 689.5300 | g | | DRYF | PRP | | 229640 |
| 006 | 1 | 04-PD-STK-01-06 | 404.1300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229751 |
| 006 | 1 | 04-PD-STK-01-06 | 78.5000 | g | | DRAD | ALI | Manual | 229768 |
| 007 | 1 | 04-PD-STK-01-07 | 1058.0000 | g | | ORIG | SCI | | 229548 |
| 007 | 1 | 04-PD-STK-01-07 | 700.9000 | g | | DRYF | PRP | | 229641 |
| 007 | 1 | 04-PD-STK-01-07 | 337.4500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229752 |
| 007 | 1 | 04-PD-STK-01-07 | 78.5000 | g | | DRAD | ALI | Manual | 229769 |
| 008 | 1 | 04-PD-STK-01-08 | 995.0000 | g | | ORIG | SCI | | 229549 |
| 008 | 1 | 04-PD-STK-01-08 | 727.5700 | g | | DRYF | PRP | | 229642 |
| 008 | 1 | 04-PD-STK-01-08 | 311.8800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229753 |
| 008 | 1 | 04-PD-STK-01-08 | 78.5000 | g | | DRAD | ALI | Manual | 229770 |
| 009 | 1 | 04-PD-STK-01-09 | 1229.0000 | g | | ORIG | SCI | | 229550 |
| 009 | 1 | 04-PD-STK-01-09 | 724.2400 | g | | DRYF | PRP | | 229643 |
| 009 | 1 | 04-PD-STK-01-09 | 351.4900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229754 |
| 009 | 1 | 04-PD-STK-01-09 | 78.5000 | g | | DRAD | ALI | Manual | 229771 |
| 010 | 1 | 04-PD-STK-01-10 | 1182.0000 | g | | ORIG | SCI | | 229551 |
| 010 | 1 | 04-PD-STK-01-10 | 890.1000 | g | | DRYF | PRP | | 229645 |
| 010 | 1 | 04-PD-STK-01-10 | 317.4000 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229755 |
| 010 | 1 | 04-PD-STK-01-10 | 78.5000 | g | | DRAD | ALI | Manual | 229772 |
| 011 | 1 | 04-PD-STK-01-11 | 2002.0000 | g | | ORIG | SCI | | 229552 |
| 011 | 1 | 04-PD-STK-01-11 | 1916.4000 | g | | DRYF | PRP | | 229647 |
| 011 | 1 | 04-PD-STK-01-11 | 398.6200 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229756 |
| 011 | 1 | 04-PD-STK-01-11 | 397.1200 | g | 250 mL (8oz.) Tuna Can | DGAM | ALI | Manual | 229757 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 011 | 1 | 04-PD-STK-01-11 | 78.5000 | g | | DRAD | ALI | Manual | 229773 |
| 011 | 1 | 04-PD-STK-01-11 | 78.5000 | g | | DRAD | ALI | Manual | 229774 |
| 012 | 1 | 04-PD-STK-01-12 | 1109.0000 | g | | ORIG | SCI | | 229553 |
| 012 | 1 | 04-PD-STK-01-12 | 804.0200 | g | | DRYF | PRP | | 229648 |
| 012 | 1 | 04-PD-STK-01-12 | 357.0800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229758 |
| 012 | 1 | 04-PD-STK-01-12 | 78.5000 | g | | DRAD | ALI | Manual | 229775 |
| 013 | 1 | 04-PD-STK-01-13 | 1155.0000 | g | | ORIG | SCI | | 229554 |
| 013 | 1 | 04-PD-STK-01-13 | 1012.6000 | g | | DRYF | PRP | | 229649 |
| 013 | 1 | 04-PD-STK-01-13 | 332.1700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229759 |
| 013 | 1 | 04-PD-STK-01-13 | 78.5000 | g | | DRAD | ALI | Manual | 229776 |
| 014 | 1 | 04-PD-STK-01-14 | 1043.0000 | g | | ORIG | SCI | | 229555 |
| 014 | 1 | 04-PD-STK-01-14 | 872.3500 | g | | DRYF | PRP | | 229650 |
| 014 | 1 | 04-PD-STK-01-14 | 313.9200 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229760 |
| 014 | 1 | 04-PD-STK-01-14 | 78.5000 | g | | DRAD | ALI | Manual | 229777 |
| 015 | 1 | 04-PD-STK-01-15 | 1294.0000 | g | | ORIG | SCI | | 229556 |
| 015 | 1 | 04-PD-STK-01-15 | 996.0400 | g | | DRYF | PRP | | 229651 |
| 015 | 1 | 04-PD-STK-01-15 | 384.1900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229761 |
| 015 | 1 | 04-PD-STK-01-15 | 78.5000 | g | | DRAD | ALI | Manual | 229778 |
| 016 | 1 | 04-PD-STK-01-16 | 1237.0000 | g | | ORIG | SCI | | 229557 |
| 016 | 1 | 04-PD-STK-01-16 | 987.6100 | g | | DRYF | PRP | | 229652 |
| 016 | 1 | 04-PD-STK-01-16 | 341.8700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229762 |
| 016 | 1 | 04-PD-STK-01-16 | 78.5000 | g | | DRAD | ALI | Manual | 229779 |

# SDG **ARS1-16-00671**

| Fraction | Container | Client ID | Aliquot | Units | Geometry | Prep Type | Origin | Origin2 | ICOC ID |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 1 | 04-PD-STK-01-01 | 1362.0000 | g | | ORIG | SCI | | 229542 |
| 001 | 1 | 04-PD-STK-01-01 | 949.0800 | g | | DRYF | PRP | | 229635 |
| 001 | 1 | 04-PD-STK-01-01 | 358.0300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229746 |
| 001 | 1 | 04-PD-STK-01-01 | 78.5000 | g | | DRAD | ALI | Manual | 229763 |
| 001 | 1 | 04-PD-STK-01-01 | 2.1106 | g | | DRAD | PRO | ARS-032 | 230506 |
| 002 | 1 | 04-PD-STK-01-02 | 1072.0000 | g | | ORIG | SCI | | 229543 |
| 002 | 1 | 04-PD-STK-01-02 | 643.3700 | g | | DRYF | PRP | | 229636 |
| 002 | 1 | 04-PD-STK-01-02 | 363.4900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229747 |
| 002 | 1 | 04-PD-STK-01-02 | 78.5000 | g | | DRAD | ALI | Manual | 229764 |
| 003 | 1 | 04-PD-STK-01-03 | 917.0000 | g | | ORIG | SCI | | 229544 |
| 003 | 1 | 04-PD-STK-01-03 | 686.9200 | g | | DRYF | PRP | | 229637 |
| 003 | 1 | 04-PD-STK-01-03 | 325.9500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229748 |
| 003 | 1 | 04-PD-STK-01-03 | 78.5000 | g | | DRAD | ALI | Manual | 229765 |
| 004 | 1 | 04-PD-STK-01-04 | 1056.0000 | g | | ORIG | SCI | | 229545 |
| 004 | 1 | 04-PD-STK-01-04 | 803.5900 | g | | DRYF | PRP | | 229638 |
| 004 | 1 | 04-PD-STK-01-04 | 366.2300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229749 |
| 004 | 1 | 04-PD-STK-01-04 | 78.5000 | g | | DRAD | ALI | Manual | 229766 |
| 005 | 1 | 04-PD-STK-01-05 | 957.0000 | g | | ORIG | SCI | | 229546 |
| 005 | 1 | 04-PD-STK-01-05 | 765.7100 | g | | DRYF | PRP | | 229639 |
| 005 | 1 | 04-PD-STK-01-05 | 349.9500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229750 |
| 005 | 1 | 04-PD-STK-01-05 | 78.5000 | g | | DRAD | ALI | Manual | 229767 |
| 006 | 1 | 04-PD-STK-01-06 | 1132.0000 | g | | ORIG | SCI | | 229547 |
| 006 | 1 | 04-PD-STK-01-06 | 689.5300 | g | | DRYF | PRP | | 229640 |
| 006 | 1 | 04-PD-STK-01-06 | 404.1300 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229751 |
| 006 | 1 | 04-PD-STK-01-06 | 78.5000 | g | | DRAD | ALI | Manual | 229768 |
| 007 | 1 | 04-PD-STK-01-07 | 1058.0000 | g | | ORIG | SCI | | 229548 |
| 007 | 1 | 04-PD-STK-01-07 | 700.9000 | g | | DRYF | PRP | | 229641 |
| 007 | 1 | 04-PD-STK-01-07 | 337.4500 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229752 |
| 007 | 1 | 04-PD-STK-01-07 | 78.5000 | g | | DRAD | ALI | Manual | 229769 |
| 008 | 1 | 04-PD-STK-01-08 | 995.0000 | g | | ORIG | SCI | | 229549 |
| 008 | 1 | 04-PD-STK-01-08 | 727.5700 | g | | DRYF | PRP | | 229642 |
| 008 | 1 | 04-PD-STK-01-08 | 311.8800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229753 |
| 008 | 1 | 04-PD-STK-01-08 | 78.5000 | g | | DRAD | ALI | Manual | 229770 |
| 009 | 1 | 04-PD-STK-01-09 | 1229.0000 | g | | ORIG | SCI | | 229550 |
| 009 | 1 | 04-PD-STK-01-09 | 724.2400 | g | | DRYF | PRP | | 229643 |
| 009 | 1 | 04-PD-STK-01-09 | 351.4900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229754 |
| 009 | 1 | 04-PD-STK-01-09 | 78.5000 | g | | DRAD | ALI | Manual | 229771 |
| 010 | 1 | 04-PD-STK-01-10 | 1182.0000 | g | | ORIG | SCI | | 229551 |
| 010 | 1 | 04-PD-STK-01-10 | 890.1000 | g | | DRYF | PRP | | 229645 |
| 010 | 1 | 04-PD-STK-01-10 | 317.4000 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229755 |
| 010 | 1 | 04-PD-STK-01-10 | 78.5000 | g | | DRAD | ALI | Manual | 229772 |
| 011 | 1 | 04-PD-STK-01-11 | 2002.0000 | g | | ORIG | SCI | | 229552 |
| 011 | 1 | 04-PD-STK-01-11 | 1916.4000 | g | | DRYF | PRP | | 229647 |
| 011 | 1 | 04-PD-STK-01-11 | 398.6200 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229756 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 011 | 1 | 04-PD-STK-01-11 | 397.1200 | g | 250 mL (8oz.) Tuna Can | DGAM | ALI | Manual | 229757 |
| 011 | 1 | 04-PD-STK-01-11 | 78.5000 | g | | DRAD | ALI | Manual | 229773 |
| 011 | 1 | 04-PD-STK-01-11 | 78.5000 | g | | DRAD | ALI | Manual | 229774 |
| 011 | 1 | 04-PD-STK-01-11 | 2.1077 | g | | DRAD | PRO | ARS-032 | 230508 |
| 012 | 1 | 04-PD-STK-01-12 | 1109.0000 | g | | ORIG | SCI | | 229553 |
| 012 | 1 | 04-PD-STK-01-12 | 804.0200 | g | | DRYF | PRP | | 229648 |
| 012 | 1 | 04-PD-STK-01-12 | 357.0800 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229758 |
| 012 | 1 | 04-PD-STK-01-12 | 78.5000 | g | | DRAD | ALI | Manual | 229775 |
| 013 | 1 | 04-PD-STK-01-13 | 1155.0000 | g | | ORIG | SCI | | 229554 |
| 013 | 1 | 04-PD-STK-01-13 | 1012.6000 | g | | DRYF | PRP | | 229649 |
| 013 | 1 | 04-PD-STK-01-13 | 332.1700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229759 |
| 013 | 1 | 04-PD-STK-01-13 | 78.5000 | g | | DRAD | ALI | Manual | 229776 |
| 014 | 1 | 04-PD-STK-01-14 | 1043.0000 | g | | ORIG | SCI | | 229555 |
| 014 | 1 | 04-PD-STK-01-14 | 872.3500 | g | | DRYF | PRP | | 229650 |
| 014 | 1 | 04-PD-STK-01-14 | 313.9200 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229760 |
| 014 | 1 | 04-PD-STK-01-14 | 78.5000 | g | | DRAD | ALI | Manual | 229777 |
| 015 | 1 | 04-PD-STK-01-15 | 1294.0000 | g | | ORIG | SCI | | 229556 |
| 015 | 1 | 04-PD-STK-01-15 | 996.0400 | g | | DRYF | PRP | | 229651 |
| 015 | 1 | 04-PD-STK-01-15 | 384.1900 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229761 |
| 015 | 1 | 04-PD-STK-01-15 | 78.5000 | g | | DRAD | ALI | Manual | 229778 |
| 016 | 1 | 04-PD-STK-01-16 | 1237.0000 | g | | ORIG | SCI | | 229557 |
| 016 | 1 | 04-PD-STK-01-16 | 987.6100 | g | | DRYF | PRP | | 229652 |
| 016 | 1 | 04-PD-STK-01-16 | 341.8700 | g | 250 mL (8oz.) Tuna Can | DGAM | PRP | | 229762 |
| 016 | 1 | 04-PD-STK-01-16 | 78.5000 | g | | DRAD | ALI | Manual | 229779 |

# Prep Batch Report



DCN: ITSI-0808-0004-0076, 8 May 2019

**Prep Batch ID** **PB1-16-00329**
**Matrix** **SO**
**Prep Group** **SOLID**

| PBatch Sample ID | Gamma | Wet | Rad | Basis | SDG | FR | Storage | Client ID | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|
| PB1-16-00329-01 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 021 | WO4 | 04-PD-RO-09-01 | 04/22/16 |
| PB1-16-00329-02 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 022 | WO4 | 04-PD-RO-10-01 | 04/22/16 |
| PB1-16-00329-03 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 023 | WO4 | 04-PD-RO-11-01 | 04/22/16 |
| PB1-16-00329-04 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 024 | WO4 | 04-PD-RO-11-02 | 04/22/16 |
| PB1-16-00329-05 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 025 | WO4 | 04-PD-RO-11-03 | 04/22/16 |
| PB1-16-00329-06 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 026 | WO4 | 04-PD-RO-11-04 | 04/22/16 |
| PB1-16-00329-07 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 027 | WO4 | 04-PD-RO-11-05 | 04/22/16 |
| PB1-16-00329-08 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 028 | WO4 | 04-PD-RO-12-01 | 04/22/16 |
| PB1-16-00329-09 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 029 | WO4 | 04-PD-RO-13-01 | 04/22/16 |
| PB1-16-00329-10 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 030 | WO4 | 04-PD-RO-14-01 | 04/22/16 |
| PB1-16-00329-11 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 031 | WO4 | 04-PD-RO-15-01 | 04/22/16 |
| PB1-16-00329-12 | X | X | X | DGAM, DRAD | ARS1-16-00670 | 032 | WO4 | 04-PD-RO-16-01 | 04/22/16 |
| PB1-16-00329-13 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 001 | WO4 | 04-PD-STK-01-01 | 04/22/16 |
| PB1-16-00329-14 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 002 | WO4 | 04-PD-STK-01-02 | 04/22/16 |
| PB1-16-00329-15 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 003 | WO4 | 04-PD-STK-01-03 | 04/22/16 |
| PB1-16-00329-16 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 004 | WO4 | 04-PD-STK-01-04 | 04/22/16 |
| PB1-16-00329-17 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 005 | WO4 | 04-PD-STK-01-05 | 04/22/16 |
| PB1-16-00329-18 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 006 | WO4 | 04-PD-STK-01-06 | 04/22/16 |
| PB1-16-00329-19 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 007 | WO4 | 04-PD-STK-01-07 | 04/22/16 |
| PB1-16-00329-20 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 008 | WO4 | 04-PD-STK-01-08 | 04/22/16 |

DCN: ITSI-0808-0004-0076, 8 May 2019

**Prep Batch ID** PB1-16-00330

**Matrix** SO

**Prep Group** SOLID

| PBatch Sample ID | Gamma | Wet | Rad | Basis | SDG | FR | Storage | Client ID | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|
| PB1-16-00330-01 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 009 | WO4 | 04-PD-STK-01-09 | 04/22/16 |
| PB1-16-00330-02 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 010 | WO4 | 04-PD-STK-01-10 | 04/22/16 |
| PB1-16-00330-03 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 011 | WO4 | 04-PD-STK-01-11 | 04/22/16 |
| PB1-16-00330-04 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 012 | WO4 | 04-PD-STK-01-12 | 04/22/16 |
| PB1-16-00330-05 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 013 | WO4 | 04-PD-STK-01-13 | 04/22/16 |
| PB1-16-00330-06 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 014 | WO4 | 04-PD-STK-01-14 | 04/22/16 |
| PB1-16-00330-07 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 015 | WO4 | 04-PD-STK-01-15 | 04/22/16 |
| PB1-16-00330-08 | X | X | X | DGAM, DRAD | ARS1-16-00671 | 016 | WO4 | 04-PD-STK-01-16 | 04/22/16 |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Prep Batch Report - Gamma Spec Aliquot

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Type | Geometry | Tare g | Cont+Sample g | Net Sample g |
|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00329-01** | ARS1-16-00670 | 021 | 229699 | 229530 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.92 | 395.30 | 347.38 |
| **PB1-16-00329-02** | ARS1-16-00670 | 022 | 229701 | 229531 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.74 | 343.55 | 295.81 |
| **PB1-16-00329-03** | ARS1-16-00670 | 023 | 229702 | 229532 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.95 | 445.98 | 398.03 |
| **PB1-16-00329-04** | ARS1-16-00670 | 024 | 229703 | 229533 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.84 | 428.35 | 380.51 |
| **PB1-16-00329-05** | ARS1-16-00670 | 025 | 229704 | 229534 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.84 | 395.30 | 347.46 |
| **PB1-16-00329-06** | ARS1-16-00670 | 026 | 229705 | 229535 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.70 | 453.44 | 405.74 |
| **PB1-16-00329-07** | ARS1-16-00670 | 027 | 229706 | 229536 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.96 | 447.45 | 399.49 |
| **PB1-16-00329-08** | ARS1-16-00670 | 028 | 229707 | 229537 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.70 | 408.03 | 360.33 |
| **PB1-16-00329-09** | ARS1-16-00670 | 029 | 229708 | 229538 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.78 | 403.51 | 355.73 |
| **PB1-16-00329-10** | ARS1-16-00670 | 030 | 229709 | 229539 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.78 | 371.15 | 323.37 |
| **PB1-16-00329-11** | ARS1-16-00670 | 031 | 229710 | 229540 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.83 | 370.67 | 322.84 |
| **PB1-16-00329-12** | ARS1-16-00670 | 032 | 229711 | 229541 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.90 | 391.68 | 343.78 |
| **PB1-16-00329-13** | ARS1-16-00671 | 001 | 229746 | 229542 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.74 | 405.77 | 358.03 |
| **PB1-16-00329-14** | ARS1-16-00671 | 002 | 229747 | 229543 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.57 | 411.06 | 363.49 |
| **PB1-16-00329-15** | ARS1-16-00671 | 003 | 229748 | 229544 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.76 | 373.71 | 325.95 |
| **PB1-16-00329-16** | ARS1-16-00671 | 004 | 229749 | 229545 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.76 | 413.99 | 366.23 |
| **PB1-16-00329-17** | ARS1-16-00671 | 005 | 229750 | 229546 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.57 | 397.52 | 349.95 |
| **PB1-16-00329-18** | ARS1-16-00671 | 006 | 229751 | 229547 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.18 | 451.31 | 404.13 |
| **PB1-16-00329-19** | ARS1-16-00671 | 007 | 229752 | 229548 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.62 | 385.07 | 337.45 |
| **PB1-16-00329-20** | ARS1-16-00671 | 008 | 229753 | 229549 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.71 | 359.59 | 311.88 |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Prep Batch Report - Percent Moisture

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Tare g | Cont+Sample g | Net Sample g | Oven ID | Oven Temp C | Start Time | Stop Time | Cont+Sample g | Net Sample g | % Solid | % Moisure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00329-01** | ARS1-16-00670 | 021 | 229623 | 229530 | 14.21 | 1339.50 | 1325.29 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 1173.33 | 1159.12 | 87.46% | 12.54% |
| **PB1-16-00329-02** | ARS1-16-00670 | 022 | 229624 | 229531 | 6.60 | 971.04 | 964.44 | | | | | 858.45 | 851.85 | 88.33% | 11.67% |
| **PB1-16-00329-03** | ARS1-16-00670 | 023 | 229625 | 229532 | 14.23 | 1320.22 | 1305.99 | | | | | 1082.89 | 1068.66 | 81.83% | 18.17% |
| **PB1-16-00329-04** | ARS1-16-00670 | 024 | 229626 | 229533 | 6.62 | 889.55 | 882.93 | | | | | 778.44 | 771.82 | 87.42% | 12.58% |
| **PB1-16-00329-05** | ARS1-16-00670 | 025 | 229627 | 229534 | 6.65 | 1033.33 | 1026.68 | | | | | 911.67 | 905.02 | 88.15% | 11.85% |
| **PB1-16-00329-06** | ARS1-16-00670 | 026 | 229628 | 229535 | 6.65 | 1022.66 | 1016.01 | | | | | 895.82 | 889.17 | 87.52% | 12.48% |
| **PB1-16-00329-07** | ARS1-16-00670 | 027 | 229629 | 229536 | 6.67 | 1044.20 | 1037.53 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 882.47 | 875.80 | 84.41% | 15.59% |
| **PB1-16-00329-08** | ARS1-16-00670 | 028 | 229630 | 229537 | 6.67 | 862.98 | 856.31 | | | | | 804.70 | 798.03 | 93.19% | 6.81% |
| **PB1-16-00329-09** | ARS1-16-00670 | 029 | 229631 | 229538 | 6.65 | 897.25 | 890.60 | | | | | 759.18 | 752.53 | 84.50% | 15.50% |
| **PB1-16-00329-10** | ARS1-16-00670 | 030 | 229632 | 229539 | 6.64 | 1146.51 | 1139.87 | | | | | 1014.63 | 1007.99 | 88.43% | 11.57% |
| **PB1-16-00329-11** | ARS1-16-00670 | 031 | 229633 | 229540 | 6.65 | 935.75 | 929.10 | | | | | 821.18 | 814.53 | 87.67% | 12.33% |
| **PB1-16-00329-12** | ARS1-16-00670 | 032 | 229634 | 229541 | 6.65 | 969.63 | 962.98 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 846.58 | 839.93 | 87.22% | 12.78% |
| **PB1-16-00329-13** | ARS1-16-00671 | 001 | 229635 | 229542 | 6.67 | 955.75 | 949.08 | | | | | 862.03 | 855.36 | 90.13% | 9.87% |
| **PB1-16-00329-14** | ARS1-16-00671 | 002 | 229636 | 229543 | 6.64 | 650.01 | 643.37 | | | | | 593.59 | 586.95 | 91.23% | 8.77% |
| **PB1-16-00329-15** | ARS1-16-00671 | 003 | 229637 | 229544 | 6.61 | 693.53 | 686.92 | | | | | 653.42 | 646.81 | 94.16% | 5.84% |
| **PB1-16-00329-16** | ARS1-16-00671 | 004 | 229638 | 229545 | 6.63 | 810.22 | 803.59 | | | | | 726.28 | 719.65 | 89.55% | 10.45% |
| **PB1-16-00329-17** | ARS1-16-00671 | 005 | 229639 | 229546 | 6.62 | 772.33 | 765.71 | | | | | 715.54 | 708.92 | 92.58% | 7.42% |
| **PB1-16-00329-18** | ARS1-16-00671 | 006 | 229640 | 229547 | 6.65 | 696.18 | 689.53 | | | | | 659.00 | 652.35 | 94.61% | 5.39% |
| **PB1-16-00329-19** | ARS1-16-00671 | 007 | 229641 | 229548 | 6.68 | 707.58 | 700.90 | | | | | 645.52 | 638.84 | 91.15% | 8.85% |
| **PB1-16-00329-20** | ARS1-16-00671 | 008 | 229642 | 229549 | 6.69 | 734.26 | 727.57 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 654.88 | 648.19 | 89.09% | 10.91% |

DCN: ITSI-0808-0004-0076, 8 May 2019

## Prep Batch Report - Gamma Spec Aliquot

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Type | Geometry | Tare g | Cont+Sample g | Net Sample g |
|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00330-01** | ARS1-16-00671 | 009 | 229754 | 229550 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.47 | 398.96 | 351.49 |
| **PB1-16-00330-02** | ARS1-16-00671 | 010 | 229755 | 229551 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.77 | 365.17 | 317.40 |
| **PB1-16-00330-03** | ARS1-16-00671 | 011 | 229756 | 229552 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.69 | 446.31 | 398.62 |
| **PB1-16-00330-04** | ARS1-16-00671 | 012 | 229758 | 229553 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.72 | 404.80 | 357.08 |
| **PB1-16-00330-05** | ARS1-16-00671 | 013 | 229759 | 229554 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.99 | 380.16 | 332.17 |
| **PB1-16-00330-06** | ARS1-16-00671 | 014 | 229760 | 229555 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.91 | 361.83 | 313.92 |
| **PB1-16-00330-07** | ARS1-16-00671 | 015 | 229761 | 229556 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.68 | 431.87 | 384.19 |
| **PB1-16-00330-08** | ARS1-16-00671 | 016 | 229762 | 229557 | DGAM, DRAD | 250 mL (8oz.) Tuna Can | 47.62 | 389.49 | 341.87 |

DCN: ITSI-0808-0004-0076, 8 May 2019

# Prep Batch Report - Percent Moisture

| Prep Batch ID | SDG | FR | ICOC ID | Parent ID | Tare g | Cont+Sample g | Net Sample g | Oven ID | Oven Temp C | Start Time | Stop Time | Cont+Sample g | Net Sample g | % Solid | % Moisure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PB1-16-00330-01** | ARS1-16-00671 | 009 | 229643 | 229550 | 6.65 | 730.89 | 724.24 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 675.01 | 668.36 | 92.28% | 7.72% |
| **PB1-16-00330-02** | ARS1-16-00671 | 010 | 229645 | 229551 | 6.67 | 896.77 | 890.10 | | | | | 765.53 | 758.86 | 85.26% | 14.74% |
| **PB1-16-00330-03** | ARS1-16-00671 | 011 | 229647 | 229552 | 14.21 | 1930.61 | 1916.40 | | | | | 1609.25 | 1595.04 | 83.23% | 16.77% |
| **PB1-16-00330-04** | ARS1-16-00671 | 012 | 229648 | 229553 | 6.65 | 810.67 | 804.02 | | | | | 749.40 | 742.75 | 92.38% | 7.62% |
| **PB1-16-00330-05** | ARS1-16-00671 | 013 | 229649 | 229554 | 6.67 | 1019.27 | 1012.60 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 901.56 | 894.89 | 88.38% | 11.62% |
| **PB1-16-00330-06** | ARS1-16-00671 | 014 | 229650 | 229555 | 6.65 | 879.00 | 872.35 | | | | | 770.60 | 763.95 | 87.57% | 12.43% |
| **PB1-16-00330-07** | ARS1-16-00671 | 015 | 229651 | 229556 | 6.67 | 1002.71 | 996.04 | | | | | 888.05 | 881.38 | 88.49% | 11.51% |
| **PB1-16-00330-08** | ARS1-16-00671 | 016 | 229652 | 229557 | 6.68 | 994.29 | 987.61 | 3 | 125 | 3/28/2016 4:00 PM | 3/29/2016 8:00 AM | 874.42 | 867.74 | 87.86% | 12.14% |

# Preanalytical
# Sample Preparation Review Checklist

**Prep Batch/SDG:** ARS1-16-00671 **Sample Matrix:** SO

☐ Check if sample(s) are re-prepped

**SAMPLE PREPARATION**

| (All "No" Responses Require a Comment) | Prep. Tech. Review | |
|---|---|---|
| 1) Sample IDs Correspond to LIMS SDG Information? | Yes No N/A | |
| 2) Drying Oven Temperature Check is within Tolerance? | Yes No N/A | |
| 3) Balance checks are current and balance is in tolerance? | Yes No N/A | |
| 4) Cleanliness of preparation equipment has been verified? (Including grinders, mortar & pestle, spatulas, etc...) | Yes No N/A | |
| 5) Samples Dried? | Yes No N/A | |
| 6) 100% of Manual Transcriptions/Calculations Verified? | Yes No N/A | |
| 7) Samples ground/pulverized? (*if YES, a PrepBlank is required*) | Yes No N/A | |
| a) If PrepBlank Required, Enter the PrepBlank SDG Here → | ARS1- | |
| 8) Samples ground with Mortar & Pestle? (*PrepBlank is not required*) | Yes No N/A | |
| 9) Samples crushed with hammer? (*PrepBlank is not required*) | Yes No N/A | |
| 10) Visual Inspection Verifies Homogenization Method(s) Effective? | Yes No N/A | |
| 11) Preparation area is clean and decontaminated? | Yes No N/A | |

12) Sample Prep Anomaly? ☒ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

3-29-16 1236
Preanalytical Prep Technician Signature Date/Time

Lot# of sand blank (if PrepBlank required)

**BATCH QC VALIDATION** (***Section below must be completed ONLY if a PrepBlank is required***)

| (All "No" Responses Require a Comment) | Proj. Mgr. Review | QA Review |
|---|---|---|
| 1) Preparation Blank criteria met. | Yes No N/A | Yes No N/A |

2) Prep Batch Blank Anomaly? ☐ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

Project Manager Signature Date

QA Signature Date

**COMMENTS**

## ARS01 Calibration Polynomial

250 mL Thin Can

**STD#** **1748-90-1** **Cal Date** 1/19/2016

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.2133 | 213300 | 222540 | 11.49% | 9240 | 4.33% | **PASS** |
| Am241 | 0.02113 | 21130 | 22065 | 5.49% | 935 | 4.42% | **PASS** |
| Cd109 | 0.2039 | 203900 | 224130 | 10.00% | 20230 | 9.92% | **PASS** |
| Co57 | 0.007394 | 7394 | 7581.1 | 10.00% | 187.1 | 2.53% | **PASS** |
| Te123m | 0.01066 | 10660 | 11400 | 10.00% | 740 | 6.94% | **PASS** |
| Cr51 | 0.2517 | 251700 | | 10.00% | 251700 | 100.00% | **NOT MEASURED** |
| Sn113 | 0.03574 | 35740 | | 10.00% | 35740 | 100.00% | **NOT MEASURED** |
| Sr85 | 0.04568 | 45680 | 46171 | 5.49% | 491 | 1.07% | **PASS** |
| Cs137 | 0.03171 | 31710 | 32969 | 10.00% | 1259 | 3.97% | **PASS** |
| Co60 | 0.03965 | 39650 | 38797 | 5.49% | 853 | 2.15% | **PASS** |
| Y88 | 0.07337 | 73370 | 75939 | 5.49% | 2569 | 3.50% | **PASS** |

WJS 1-19-16

1-19-16

0.88 Spectrum name: ARS01751.An1

Sample description
Batch ID: CALVER
SDG: 1748-90-1 250 mL Tuna Can Polynomial Tech: WJS

Spectrum Filename: C:\User\ARS01751.An1

Acquisition information
Start time: 19-Jan-2016 08:27:55
Live time: 600
Real time: 611
Dead time: 1.82 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 0 ( 0.29keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01751.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Oct-2014 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0726

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 29.27 | 122. | 18.10 | 0.89 | 1.531E-02 | | | | |
| 32.09 | 313. | 12.24 | 0.89 | 1.701E-02 | | | | |
| 36.38 | 219. | 23.29 | 0.65 | 1.959E-02 | | | | |
| 46.44 | 4848. | 2.38 | 0.88 | 2.565E-02 | 46.52 | 4.000 | 2.225E+05 | PB210 |
| 59.46 | 6014. | 1.87 | 0.90 | 3.384E-02 | 59.54 | 36.300 | 2.206E+04 | AM241 |
| 88.00 | 3892. | 2.28 | 0.93 | 4.608E-02 | 88.03 | 3.610 | 2.241E+05 | CD109 |
| 122.05 | 2004. | 3.37 | 0.95 | 4.656E-02 | 122.07 | 85.600 | 7.581E+03 | CO57 |
| 136.22 | 319. | 15.30 | 1.01 | 4.486E-02 | | | | |
| 159.06 | 562. | 8.53 | 1.15 | 4.154E-02 | 159.00 | 83.500 | 1.140E+04 | TE123M |
| 391.76 | 727. | 8.58 | 1.08 | 2.135E-02 | 391.69 | 64.160 | 4.170E+04 | SN113 |
| 514.14 | 99. | 28.38 | 1.27 | 1.738E-02 | 513.99 | 99.280 | 4.184E+04 | SR85 |
| 661.66 | 8728. | 1.20 | 1.42 | 1.442E-02 | 661.66 | 85.210 | 3.297E+04 | CS137 |
| 736.14 | 98. | 25.33 | 0.87 | 1.332E-02 | | | | |
| 897.75 | 981. | 6.13 | 1.58 | 1.148E-02 | 898.02 | 95.000 | 8.864E+04 | Y88 |
| 1173.09 | 6726. | 1.29 | 1.69 | 9.298E-03 | 1173.24 | 99.900 | 3.870E+04 | CO60 |
| 1332.36 | 6073. | 1.31 | 1.80 | 8.348E-03 | 1332.50 | 99.982 | 3.889E+04 | CO60 |
| 1836.02 | 471. | 4.61 | 1.60 | 6.152E-03 | 1836.01 | 99.350 | 7.594E+04 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 115.98 | 29.28 | 181. | 122. | 0.203 | 36.21 | 0.888 | TE-131 | lD |
| 127.29 | 32.10 | 633. | 313. | 0.522 | 30.72 | 1.094 | XE-138 | s |
| 144.40 | 36.38 | 794. | 219. | 0.365 | 46.58 | 0.653 | CE-141 | s |
| 543.94 | 136.22 | 621. | 319. | 0.532 | 30.61 | 1.014 | HF-181 | s |
| 2943.99 | 736.14 | 134. | 98. | 0.163 | 50.66 | 0.873 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: northamericancal.Lib

**********  I D E N T I F I E D  P E A K  S U M M A R Y  **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.70 | 46.44 | 2225. | 4841. | 8.068 | 4.77 | 0.882 |
| AM-241 | 236.76 | 59.46 | 1665. | 6014. | 10.023 | 3.74 | 0.896 |
| CD-109 | 350.97 | 88.00 | 1233. | 3892. | 6.487 | 4.57 | 0.930 |
| CO-57 | 487.22 | 122.05 | 849. | 2004. | 3.340 | 6.73 | 0.953 |
| TE-123M | 635.31 | 159.06 | 547. | 562. | 0.936 | 17.06 | 1.148 |
| SN-113 | 1566.40 | 391.76 | 632. | 727. | 1.212 | 17.15 | 1.080s |
| SR-85 | 2056.71 | 514.32 | 309. | 110. | 0.183 | 56.55 | 0.835s |
| CS-137 | 2646.08 | 661.66 | 446. | 8728. | 14.546 | 2.39 | 1.417 |
| Y-88 | 3590.39 | 897.75 | 310. | 981. | 1.635 | 12.26 | 1.582s |
| CO-60 | 4691.49 | 1173.09 | 146. | 6726. | 11.210 | 2.57 | 1.687 |
| CO-60 | 5328.32 | 1332.36 | 36. | 6073. | 10.121 | 2.61 | 1.801 |
| Y-88 | 7341.72 | 1836.02 | 0. | 471. | 0.785 | 9.22 | 1.596s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

*****  S U M M A R Y  O F  L I B R A R Y  P E A K  U S A G E  *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| PB-210 | | 2.2254E+05 | | | | | | |
| | | | 46.52 | 2.225E+05 | (P | 1.023E+04 | 2.38E+00 G | |
| AM-241 | | 2.2065E+04 | | | | | | |
| | | | 59.54 | 2.206E+04 | ( | 7.076E+02 | 1.87E+00 G | |
| CD-109 | | 2.2413E+05 | | | | | | |
| | | | 88.03 | 2.241E+05 | ( | 9.579E+03 | 2.28E+00 G | |
| CO-57 | | 7.5811E+03 | | | | | | |
| | | | 122.07 | 7.581E+03 | ( | 5.239E+02 | 3.37E+00 G | |
| TE-123M | | 1.1400E+04 | | | | | | |
| | | | 159.00 | 1.140E+04 | ( | 2.268E+03 | 8.53E+00 G | |
| CR-51 | | 0.0000E+00 | | | | | | |
| | | | 320.07 | 0.000E+00 | &( | 0.000E+00 | 8.41E+02 G | |

0.88 Spectrum name: ARS01751.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| SN-113 | 4.1704E+04 | | | | | | |
| | | 391.69 | 4.170E+04 | ( | 6.876E+03 | 8.58E+00 | G |
| SR-85 | 4.6171E+04 | | | | | | |
| | | 513.99 | 4.617E+04 | ( | 3.567E+04 | 2.83E+01 | G |
| CS-137 | 3.2969E+04 | | | | | | |
| | | 661.66 | 3.297E+04 | ( | 3.822E+02 | 1.20E+00 | G |
| CO-60 | 3.8797E+04 | | | | | | |
| | | 1173.24 | 3.870E+04 | ( | 3.394E+02 | 1.29E+00 | G |
| | | 1332.50 | 3.889E+04 | ( | 1.968E+02 | 1.31E+00 | G |
| Y-88 | 7.5939E+04 | | | | | | |
| | | 1836.01 | 7.594E+04 | ( | 1.188E+03 | 4.61E+00 | G |
| | | 898.02 | 8.864E+04 | + | 7.658E+03 | 6.13E+00 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |
| C - Charged Particle Reaction | K - Key Line |
| M - No MDA Calculation | A - Not in Average |
| R - Coincidence Corrected | C - Coincidence Peak |
| H - Halflife limit exceeded | |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

0.88 Spectrum name: ARS01751.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1292E+05 | 2.2254E+05 | 1.0624E+04 | 2.4401E+04 | 1.023E+04 |
| AM-241 | 2.2019E+04 | 2.2065E+04 | 8.2608E+02 | 1.9942E+03 | 7.076E+02 |
| CD-109 | 1.0537E+05 | 2.2413E+05 | 1.0236E+04 | 2.0411E+04 | 9.579E+03 |
| CO-57 | 2.2650E+03 | 7.5811E+03 | 5.1043E+02 | 7.2396E+02 | 5.239E+02 |
| TE-123M | 7.2934E+02 | 1.1400E+04 | 1.9445E+03 | 2.1097E+03 | 2.268E+03 |
| CR-51 #A | -8.7744E+01 | >12 Halflives | 1.4764E+03 | 1.4765E+03 | 2.479E+03 |
| SN-113 # | 2.3898E+03 | 4.1704E+04 | 7.1528E+03 | 7.8421E+03 | 6.876E+03 |
| SR-85 | 2.8604E+02 | 4.6171E+04 | 2.6111E+04 | 2.6287E+04 | 3.567E+04 |
| CS-137 | 3.2000E+04 | 3.2969E+04 | 7.8893E+02 | 1.6427E+03 | 3.822E+02 |
| CO-60 | 3.2701E+04 | 3.8797E+04 | 7.1120E+02 | 1.6107E+03 | 3.394E+02 |
| Y-88 | 3.4714E+03 | 7.5939E+04 | 6.9982E+03 | 8.2911E+03 | 1.188E+03 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity ( 0.3 to 2000.7 keV) 4.141E+05 pCi/g
Total Decayed Activity ( 0.3 to 2000.7 keV) 7.2329388E+05 pCi/g

## ARS01 Calibration Verification Polynomial

250 mL Thru Gun

**STD#** **1595-98-4** **Cal Date** 1/19/2016

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.232 | 232000 | 245910 | 11.49% | 13910 | 6.00% | **PASS** |
| Am241 | 0.02273 | 22730 | 23337 | 5.49% | 607 | 2.67% | **PASS** |
| Cd109 | 0.2223 | 222300 | | 10.00% | 222300 | 100.00% | **NOT MEASURED** |
| Co57 | 0.008038 | 8038 | | 10.00% | 8038 | 100.00% | **NOT MEASURED** |
| Te123m | 0.01098 | 10980 | | 10.00% | 10980 | 100.00% | **NOT MEASURED** |
| Cr51 | 0.2766 | 276600 | | 10.00% | 276600 | 100.00% | **NOT MEASURED** |
| Sn113 | 0.04358 | 43580 | | 10.00% | 43580 | 100.00% | **NOT MEASURED** |
| Sr85 | 0.05122 | 51220 | | 5.49% | 51220 | 100.00% | **NOT MEASURED** |
| Cs137 | 0.03546 | 35460 | 35609 | 10.00% | 149 | 0.42% | **PASS** |
| Co60 | 0.04279 | 42790 | 41468 | 5.49% | 1322 | 3.09% | **PASS** |
| Y88 | 0.07866 | 78660 | | 5.49% | 78660 | 100.00% | **NOT MEASURED** |

WTS 1-19-16

0.88 Spectrum name: ARS01752.An1

Sample description
Batch ID: Calibration Verification
SDG: 1595-98-4 250 mL Tuna Can Polynomial Tech: WJS

Spectrum Filename: C:\User\ARS01752.An1

Acquisition information
Start time: 19-Jan-2016 08:41:35
Live time: 600
Real time: 610
Dead time: 1.60 %
Detector ID: 1

Detector system
(ARS01) MCB 129

Calibration
Filename: 250 Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration
Created: 19-Jan-2016 08:23:39
Zero offset: 0.290 keV
Gain: 0.250 keV/channel
Quadratic: 2.101E-08 keV/channel^2

Efficiency Calibration
Created: 19-Jan-2016 08:26:21
Type: Polynomial
Uncertainty: 1.346 %
Coefficients: -0.471012 -4.418322 0.369091
-0.030686 0.000871 -0.000008

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 0 ( 0.29keV )
Stop channel: 8000 ( 2000.73keV )
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

0.88 Spectrum name: ARS01752.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Jul-2012 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc doe.Pbc 30-Nov-2015 14:07:29 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 7 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0741

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 29.59 | 133. | 17.39 | 0.89 | 1.544E-02 | | | | |
| 32.06 | 352. | 10.20 | 0.89 | 1.693E-02 | | | | |
| 36.39 | 177. | 27.07 | 1.06 | 1.960E-02 | | | | |
| 46.44 | 4962. | 2.32 | 0.90 | 2.565E-02 | 46.52 | 4.000 | 2.459E+05 | PB210 |
| 59.44 | 6338. | 1.75 | 0.91 | 3.383E-02 | 59.54 | 36.300 | 2.334E+04 | AM241 |
| 87.92 | 1246. | 6.61 | 0.89 | 4.607E-02 | 88.03 | 3.610 | 2.652E+05 | CD109 |
| 122.11 | 284. | 21.07 | 0.95 | 4.655E-02 | 122.07 | 85.600 | 8.686E+03 | CO57 |
| 393.86 | 68. | 35.63 | 0.90 | 2.127E-02 | | | | |
| 661.66 | 8951. | 1.13 | 1.39 | 1.442E-02 | 661.66 | 85.210 | 3.561E+04 | CS137 |
| 1173.09 | 5314. | 1.47 | 1.73 | 9.298E-03 | 1173.24 | 99.900 | 4.111E+04 | CO60 |
| 1332.37 | 4859. | 1.46 | 1.70 | 8.348E-03 | 1332.50 | 99.982 | 4.183E+04 | CO60 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 117.25 | 29.50 | 200. | 133. | 0.221 | 34.78 | 0.888 | TE-131 | lD |
| 126.76 | 31.97 | 560. | 347. | 0.578 | 27.12 | 1.083 | XE-138 | s |
| 144.46 | 36.39 | 706. | 177. | 0.295 | 54.13 | 1.058 | XE-138 | |
| 1574.80 | 393.86 | 197. | 68. | 0.114 | 62.85 | 0.900 | AU-196 | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: northamericancal.Lib

0.88 Spectrum name: ARS01752.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.67 | 46.44 | 2169. | 4955. | 8.259 | 4.64 | 0.905 |
| AM-241 | 236.72 | 59.44 | 1491. | 6338. | 10.563 | 3.50 | 0.905 |
| CD-109 | 350.67 | 87.92 | 886. | 1246. | 2.078 | 13.21 | 0.894 |
| CO-57 | 487.49 | 122.11 | 788. | 284. | 0.472 | 42.14 | 0.952 |
| CS-137 | 2646.08 | 661.66 | 331. | 8951. | 14.919 | 2.26 | 1.394 |
| CO-60 | 4691.48 | 1173.09 | 110. | 5314. | 8.856 | 2.95 | 1.727 |
| CO-60 | 5328.35 | 1332.37 | 25. | 4859. | 8.098 | 2.92 | 1.696 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| Nuclide Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Code | MDA Value pCi/g | | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| PB-210 | | 2.4591E+05 | | | | | | |
| | | | 46.52 | 2.459E+05 | (P | 1.090E+04 | 2.32E+00 | G |
| AM-241 | | 2.3337E+04 | | | | | | |
| | | | 59.54 | 2.334E+04 | ( | 6.725E+02 | 1.75E+00 | G |
| CD-109 | | 2.6519E+05 | | | | | | |
| | | | 88.03 | 2.652E+05 | ( | 3.008E+04 | 6.61E+00 | G |
| CO-57 | | 8.6857E+03 | | | | | | |
| | | | 122.07 | 8.686E+03 | ( | 4.092E+03 | 2.11E+01 | G |
| TE-123M | | 6.7614E+04 | | | | | | |
| | | | 159.00 | 6.761E+04 | %( | 3.033E+05 | 1.35E+02 | G |
| CR-51 | | 0.0000E+00 | | | | | | |
| | | | 320.07 | 0.000E+00 | &( | 0.000E+00 | 2.52E+02 | G |
| SN-113 | | -1.3577E+05 | | | | | | |
| | | | 391.69 | -1.358E+05 | %( | 9.296E+05 | 2.04E+02 | G |
| SR-85 | | 0.0000E+00 | | | | | | |
| | | | 513.99 | 0.000E+00 | &( | 0.000E+00 | 2.64E+02 | G |
| CS-137 | | 3.5609E+04 | | | | | | |
| | | | 661.66 | 3.561E+04 | ( | 3.478E+02 | 1.13E+00 | G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CO-60 | 4.1468E+04 | | | | | | |
| | | 1173.24 | 4.111E+04 | ( | 3.999E+02 | 1.47E+00 | G |
| | | 1332.50 | 4.183E+04 | ( | 2.253E+02 | 1.46E+00 | G |
| Y-88 | 0.0000E+00 | | | | | | |
| | | 1836.01 | 0.000E+00 | %( | 0.000E+00 | 5.36E+01 | G |
| | | 898.02 | 0.000E+00 | % | 0.000E+00 | 4.30E+02 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1797E+05 | 2.4591E+05 | 1.1424E+04 | 2.6828E+04 | 1.090E+04 |
| AM-241 | 2.3205E+04 | 2.3337E+04 | 8.1681E+02 | 2.0863E+03 | 6.725E+02 |
| CD-109 | 3.3746E+04 | 2.6519E+05 | 3.5038E+04 | 4.0795E+04 | 3.008E+04 |
| CO-57 | 3.2043E+02 | 8.6857E+03 | 3.6606E+03 | 3.7076E+03 | 4.092E+03 |
| TE-123M#A | 3.7051E+01 | 6.7614E+04 | 1.8196E+05 | 1.8202E+05 | 3.033E+05 |
| CR-51 #A | -2.5002E+02 | >12 Halflives | 1.2580E+03 | 1.2582E+03 | 2.110E+03 |

0.88 Spectrum name: ARS01752.An1

| | | | | | | |
|---|---|---|---|---|---|---|
| SN-113 | #A | -5.5075E+01 | -1.3577E+05 | 5.5490E+05 | 5.5500E+05 | 9.296E+05 |
| SR-85 | #A | 2.5131E+01 | >12 Halflives | 1.3255E+02 | 1.3256E+02 | 2.238E+02 |
| CS-137 | | 3.2820E+04 | 3.5609E+04 | 8.0513E+02 | 1.7522E+03 | 3.478E+02 |
| CO-60 | | 2.5998E+04 | 4.1468E+04 | 8.6114E+02 | 1.7685E+03 | 3.999E+02 |
| Y-88 | #A | 6.7366E+01 | >12 Halflives | 7.2157E+01 | 7.2265E+01 | 1.135E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 0.3 to 2000.7 keV) 3.341E+05 pCi/g
Total Decayed Activity ( 0.3 to 2000.7 keV) 6.2020769E+05 pCi/g

Calibration Data from file: 250 Tuna Can 1748-90-1 calib POLY.Clb
Energy Calibration Date: 01/19/16 Time: 08:23:39
Efficiency Calibration Date: 01/19/16 Time: 08:26:21

Calibration Description:
250mL Tuna Can 1748-90-1 Polynomial WJS 1-19-16

Energy Calibration Fit
Energy = 0.2903 +0.249886*Channel +2.10078e-008*Channel**2
FWHM (ch) = 3.4569 +0.000837*Channel -2.07953e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 184.69 | 46.52 | 46.44 | 0.17% | 0.91 | 0.90 | 1.27% |
| 236.77 | 59.54 | 59.46 | 0.14% | 0.91 | 0.91 | 0.15% |
| 350.97 | 88.03 | 88.00 | 0.04% | 0.93 | 0.94 | -0.30% |
| 487.27 | 122.07 | 122.06 | 0.01% | 0.98 | 0.96 | 1.28% |
| 635.18 | 159.00 | 159.02 | -0.01% | 0.96 | 0.99 | -3.30% |
| 1566.83 | 391.69 | 391.87 | -0.05% | 1.13 | 1.18 | -4.68% |
| 2056.17 | 513.99 | 514.19 | -0.04% | 1.34 | 1.27 | 4.81% |
| 2646.09 | 661.66 | 661.66 | 0.00% | 1.40 | 1.38 | 1.15% |
| 3591.31 | 898.02 | 897.98 | 0.00% | 1.56 | 1.55 | 0.87% |
| 4691.54 | 1173.24 | 1173.10 | 0.01% | 1.70 | 1.73 | -1.67% |
| 5328.39 | 1332.50 | 1332.38 | 0.01% | 1.82 | 1.83 | -0.85% |
| 7342.10 | 1836.01 | 1836.11 | -0.01% | 2.13 | 2.12 | 0.56% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.3461 %
Coefficients:
-0.471012 -4.418322 0.369091 -0.030686 0.000871 -0.000008

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.5701E-002 | 2.5602E-002 | 0.38% |
| 59.54 | 3.3547E-002 | 3.3893E-002 | -1.03% |
| 88.03 | 4.7257E-002 | 4.6090E-002 | 2.47% |
| 122.07 | 4.6407E-002 | 4.6558E-002 | -0.32% |
| 159.00 | 4.0136E-002 | 4.1547E-002 | -3.52% |
| 391.69 | 2.2020E-002 | 2.1358E-002 | 3.01% |
| 661.66 | 1.4958E-002 | 1.4418E-002 | 3.61% |
| 898.02 | 1.1325E-002 | 1.1480E-002 | -1.37% |
| 1173.24 | 8.9467E-003 | 9.2967E-003 | -3.91% |
| 1332.50 | 8.1109E-003 | 8.3468E-003 | -2.91% |
| 1836.01 | 6.3719E-003 | 6.1516E-003 | 3.46% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/01/14 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/01/14 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/01/14 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/01/14 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/01/14 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/01/14 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/01/14 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/01/14 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/01/14 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/01/14 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/01/14 14:00:00 |

## ARS05 Polynomial ✓

**STD#** **1748-90-1** **Cal Date** 11/25/2014

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.2133 | 213300 | 222590 | 11.49% | 9290 | 4.36% | **PASS** |
| Am241 | 0.02113 | 21130 | 21512 | 5.49% | 382 | 1.81% | **PASS** |
| Cd109 | 0.2039 | 203900 | 206210 | 10.00% | 2310 | 1.13% | **PASS** |
| Co57 | 0.007394 | 7394 | 7441.8 | 10.00% | 47.8 | 0.65% | **PASS** |
| Te123m | 0.01066 | 10660 | 9919.7 | 10.00% | 740.3 | 6.94% | **PASS** |
| Cr51 | 0.2517 | 251700 | 243540 | 10.00% | 8160 | 3.24% | **PASS** |
| Sn113 | 0.03574 | 35740 | 36409 | 10.00% | 669 | 1.87% | **PASS** |
| Sr85 | 0.04568 | 45680 | 46133 | 5.49% | 453 | 0.99% | **PASS** |
| Cs137 | 0.03171 | 31710 | 33908 | 10.00% | 2198 | 6.93% | **PASS** |
| Co60 | 0.03965 | 39650 | 39140 | 5.49% | 510 | 1.29% | **PASS** |
| Y88 | 0.07337 | 73370 | 74234 | 5.49% | 864 | 1.18% | **PASS** |

WJS 6-10-15

250 mL Tuna Can

6/10-15

Calibration Data from file: 250mL Tuna Can ITSI.Clb
Energy Calibration Date: 11/25/2014 Time: 08:56:23
Efficiency Calibration Date: 11/25/2014 Time: 10:50:52

Calibration Description:
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 11-25-14

Energy Calibration Fit
Energy = 0.2556 +0.249791*Channel -1.33478e-009*Channel**2
FWHM (ch) = 2.9125 +0.001134*Channel -3.2178e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.16 | 46.52 | 46.51 | 0.03% | 0.78 | 0.78 | -0.31% |
| 237.33 | 59.54 | 59.54 | 0.00% | 0.79 | 0.79 | -1.02% |
| 351.46 | 88.03 | 88.05 | -0.01% | 0.83 | 0.83 | 0.85% |
| 487.76 | 122.07 | 122.09 | -0.02% | 0.85 | 0.86 | -1.73% |
| 635.50 | 159.00 | 159.00 | 0.00% | 0.93 | 0.90 | 2.41% |
| 1280.35 | 320.07 | 320.07 | -0.00% | 1.11 | 1.08 | 2.57% |
| 1567.04 | 391.69 | 391.68 | 0.00% | 1.14 | 1.15 | -1.22% |
| 2056.57 | 513.99 | 513.96 | 0.01% | 1.26 | 1.28 | -0.96% |
| 2647.79 | 661.66 | 661.64 | 0.00% | 1.41 | 1.42 | -0.77% |
| 3594.27 | 898.02 | 898.05 | -0.00% | 1.62 | 1.64 | -1.41% |
| 4696.02 | 1173.24 | 1173.25 | -0.00% | 1.89 | 1.88 | 0.48% |
| 5333.58 | 1332.50 | 1332.50 | 0.00% | 2.04 | 2.01 | 1.46% |
| 7349.45 | 1836.01 | 1836.01 | 0.00% | 2.36 | 2.38 | -0.50% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.5201 %
Coefficients:
-0.306766 -4.512900 0.474502 -0.050620 0.002132 -0.000033

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.7277E-002 | 2.7230E-002 | 0.17% |
| 59.54 | 3.4153E-002 | 3.4317E-002 | -0.48% |
| 88.03 | 4.5357E-002 | 4.4717E-002 | 1.41% |
| 122.07 | 4.7290E-002 | 4.7970E-002 | -1.44% |
| 320.07 | 2.8227E-002 | 2.8415E-002 | -0.66% |
| 391.69 | 2.4573E-002 | 2.4295E-002 | 1.13% |
| 513.99 | 1.9414E-002 | 1.9766E-002 | -1.81% |
| 661.66 | 1.7460E-002 | 1.6454E-002 | 5.76% |
| 898.02 | 1.2982E-002 | 1.3302E-002 | -2.46% |
| 1173.24 | 1.0871E-002 | 1.1066E-002 | -1.80% |
| 1332.50 | 9.9745E-003 | 1.0121E-002 | -1.46% |
| 1836.01 | 8.1120E-003 | 7.9677E-003 | 1.78% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/1/2014 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/1/2014 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/1/2014 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/1/2014 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/1/2014 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/1/2014 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/1/2014 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/1/2014 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/1/2014 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/1/2014 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/1/2014 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/1/2014 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/1/2014 14:00:00 |

```
     ORTEC g v - i (3263) Env32  G53W4.24  6/9/2015 11:19:37
American Radiation Services     Spectrum name: ARS05302.An1

Sample description
     250mL Tuna Can 1748-90-1


Spectrum Filename: C:\User\ARCHIVES\4-21-14 TO 1-2-15\ARS05302.An1

Acquisition information
       Start time:                11/25/2014 12:06:19
       Live time:                600
       Real time:                618
       Dead time:                  2.84 %
       Detector ID:                   37

Detector system
     (ARS05) MCB 338


Calibration
       Filename:                  250mL Tuna Can ITSI.Clb
     250mL Tuna Can 1.5g/cc  1748-90-1 BZF 11-25-14


       Energy Calibration
            Created:              11/25/2014 08:56:23
            Zero offset:          0.256 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -1.335E-09 keV/channel^2

       Efficiency Calibration
            Created:              11/25/2014 10:50:52
            Type:                 Polynomial
            Uncertainty:          1.520 %
            Coefficients:        -0.306766  -4.512900   0.474502
                                 -0.050620   0.002132  -0.000033

Library Files
       Main analysis library:     northamericancal.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.24
       Start channel:             0 (     0.26keV )
       Stop channel:             8000 (  1998.49keV )
       Peak rejection level:       40.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+06/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+06
       Detection limit method:     Reg. Guide 4.16 Method
       Random error:               1.0000000E+00
       Systematic error:           1.0000000E+00
       Fraction Limit:            60.000%
       Background width:           best method (based on spectrum).
       Half lives decay limit:    12.000
```

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 10/1/2014 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc northamericancal.Pbc 11/25/2014 07:43:45 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0192

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 20.57 | 400. | 7.97 | 0.75 | 1.354E-02 | | | | |
| 22.16 | 1224. | 4.32 | 0.75 | 1.438E-02 | | | | |
| 24.89 | 936. | 6.28 | 0.76 | 1.583E-02 | | | | |
| 27.55 | 401. | 12.74 | 0.76 | 1.723E-02 | | | | |
| 31.82 | 248. | 27.73 | 0.63 | 1.951E-02 | | | | |
| 46.49 | 5368. | 2.29 | 0.76 | 2.726E-02 | 46.52 | 4.000 | 2.226E+05 | PB210 |
| 59.52 | 5948. | 2.21 | 0.75 | 3.431E-02 | 59.54 | 36.300 | 2.151E+04 | AM241 |
| 88.04 | 6773. | 1.96 | 0.81 | 4.472E-02 | 88.03 | 3.610 | 2.062E+05 | CD109 |
| 122.10 | 5899. | 2.41 | 0.86 | 4.797E-02 | 122.07 | 85.600 | 7.442E+03 | CO57 |
| 136.51 | 741. | 11.36 | 0.97 | 4.725E-02 | | | | |
| 158.99 | 6021. | 2.14 | 0.92 | 4.500E-02 | 159.00 | 83.500 | 9.920E+03 | TE123M |
| 184.88 | 179. | 39.49 | 0.52 | 4.180E-02 | | | | |
| 255.21 | 486. | 15.75 | 1.24 | 3.375E-02 | | | | |
| 320.10 | 3810. | 3.03 | 1.10 | 2.841E-02 | 320.07 | 9.830 | 2.429E+05 | CR51 |
| 391.70 | 9051. | 1.31 | 1.12 | 2.429E-02 | 391.69 | 64.160 | 3.641E+04 | SN113 |
| 513.98 | 11162. | 1.22 | 1.23 | 1.977E-02 | 513.99 | 99.280 | 4.613E+04 | SR85 |
| 519.30 | 152. | 25.40 | 0.38 | 1.962E-02 | | | | |
| 661.67 | 10518. | 1.16 | 1.39 | 1.645E-02 | 661.66 | 85.210 | 3.391E+04 | CS137 |
| 898.09 | 14005. | 0.96 | 1.63 | 1.330E-02 | 898.02 | 95.000 | 7.133E+04 | Y88 |
| 1173.26 | 9482. | 1.16 | 1.92 | 1.107E-02 | 1173.24 | 99.900 | 3.941E+04 | CO60 |
| 1332.54 | 8562. | 1.29 | 2.01 | 1.012E-02 | 1332.50 | 99.982 | 3.887E+04 | CO60 |
| 1836.03 | 9130. | 1.07 | 2.56 | 7.968E-03 | 1836.01 | 99.350 | 7.423E+04 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 81.26 | 20.52 | 406. | 304. | 0.507 | 21.94 | 0.750 | MO-99 | D |
| 87.61 | 22.10 | 1061. | 950. | 1.584 | 11.66 | 0.752 | RH-106 | D |
| 98.41 | 24.84 | 1743. | 945. | 1.575 | 17.39 | 1.344 | AG-110M | s |
| 109.05 | 27.50 | 1160. | 350. | 0.583 | 33.53 | 0.655 | SB-124 | |
| 126.36 | 31.82 | 1494. | 248. | 0.413 | 55.46 | 0.628 | XE-138 | s |
| 545.46 | 136.51 | 2004. | 741. | 1.235 | 22.73 | 0.970 | CO-57 | |
| 739.12 | 184.88 | 1606. | 179. | 0.298 | 78.98 | 0.521 | TH-234 | s |

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

| Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | Suspected | |
|---|---|---|---|---|---|---|---|---|
| 1020.68 | 255.21 | 1532. | 486. | 0.809 | 31.51 | 1.243 | SN-113 | s |
| 2077.94 | 519.30 | 424. | 152. | 0.254 | 50.80 | 0.383 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.10 | 46.49 | 2778. | 5355. | 8.925 | 4.57 | 0.760s |
| AM-241 | 237.24 | 59.52 | 2972. | 5948. | 9.913 | 4.43 | 0.748 |
| CD-109 | 351.44 | 88.04 | 2937. | 6772. | 11.287 | 3.91 | 0.811 |
| CO-57 | 487.80 | 122.10 | 3320. | 5899. | 9.832 | 4.83 | 0.862 |
| TE-123M | 635.47 | 158.99 | 2640. | 6021. | 10.035 | 4.28 | 0.916 |
| CR-51 | 1280.47 | 320.10 | 2132. | 3821. | 6.368 | 6.22 | 1.102 |
| SN-113 | 1567.12 | 391.70 | 1287. | 9051. | 15.085 | 2.62 | 1.121 |
| SR-85 | 2056.63 | 513.98 | 1588. | 11162. | 18.603 | 2.44 | 1.229 |
| CS-137 | 2647.90 | 661.67 | 1061. | 10518. | 17.530 | 2.32 | 1.393 |
| Y-88 | 3594.41 | 898.09 | 819. | 14004. | 23.341 | 1.92 | 1.631 |
| CO-60 | 4696.06 | 1173.26 | 533. | 9482. | 15.803 | 2.33 | 1.918 |
| CO-60 | 5333.77 | 1332.54 | 425. | 8562. | 14.269 | 2.57 | 2.011 |
| Y-88 | 7349.55 | 1836.03 | 51. | 9130. | 15.216 | 2.14 | 2.560 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| PB-210 | | 2.2259E+05 | | | | | |
| | | | 46.52 | 2.226E+05 | @(P | 1.032E+04 2.29E+00 | G |
| AM-241 | | 2.1512E+04 | | | | | |
| | | | 59.54 | 2.151E+04 | (P | 9.287E+02 2.21E+00 | G |
| CD-109 | | 2.0621E+05 | | | | | |
| | | | 88.03 | 2.062E+05 | (P | 7.772E+03 1.96E+00 | G |

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| CO-57 | 7.4418E+03 | | | | | | |
| | | 122.07 | 7.442E+03 | (P | 3.421E+02 | 2.41E+00 | G |
| TE-123M | 9.9197E+03 | | | | | | |
| | | 159.00 | 9.920E+03 | (P | 3.990E+02 | 2.14E+00 | G |
| CR-51 | 2.4354E+05 | | | | | | |
| | | 320.07 | 2.435E+05 | (P | 1.389E+04 | 3.11E+00 | G |
| SN-113 | 3.6409E+04 | | | | | | |
| | | 391.69 | 3.641E+04 | ( | 6.835E+02 | 1.31E+00 | G |
| SR-85 | 4.6133E+04 | | | | | | |
| | | 513.99 | 4.613E+04 | ( | 7.788E+02 | 1.22E+00 | G |
| CS-137 | 3.3908E+04 | | | | | | |
| | | 661.66 | 3.391E+04 | (P | 4.981E+02 | 1.16E+00 | G |
| CO-60 | 3.9140E+04 | | | | | | |
| | | 1173.24 | 3.941E+04 | (P | 4.585E+02 | 1.16E+00 | G |
| | | 1332.50 | 3.887E+04 | ( | 4.487E+02 | 1.29E+00 | G |
| Y-88 | 7.4234E+04 | | | | | | |
| | | 1836.01 | 7.423E+04 | (P | 2.937E+02 | 1.07E+00 | G |
| | | 898.02 | 7.133E+04 | - P | 6.930E+02 | 9.58E-01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

ORTEC g v - i (3263) Env32 G53W4.24 6/9/2015 11:19:37
American Radiation Services Spectrum name: ARS05302.An1

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 # | 2.2145E+05 | 2.2259E+05 | 1.0197E+04 | 2.4221E+04 | 1.032E+04 |
| AM-241 | 2.1506E+04 | 2.1512E+04 | 9.5257E+02 | 2.0080E+03 | 9.287E+02 |
| CD-109 | 1.8897E+05 | 2.0621E+05 | 8.0651E+03 | 1.7904E+04 | 7.772E+03 |
| CO-57 | 6.4712E+03 | 7.4418E+03 | 3.5935E+02 | 6.4654E+02 | 3.421E+02 |
| TE-123M | 7.2174E+03 | 9.9197E+03 | 4.2431E+02 | 8.7406E+02 | 3.990E+02 |
| CR-51 | 6.1619E+04 | 2.4354E+05 | 1.5151E+04 | 2.2584E+04 | 1.389E+04 |
| SN-113 | 2.6155E+04 | 3.6409E+04 | 9.5328E+02 | 2.8215E+03 | 6.835E+02 |
| SR-85 | 2.5621E+04 | 4.6133E+04 | 1.1245E+03 | 3.0677E+03 | 7.788E+02 |
| CS-137 | 3.3791E+04 | 3.3908E+04 | 7.8689E+02 | 1.5809E+03 | 4.981E+02 |
| CO-60 | 3.8373E+04 | 3.9140E+04 | 6.7889E+02 | 1.6118E+03 | 4.585E+02 |
| Y-88 | 5.1951E+04 | 7.4234E+04 | 1.5898E+03 | 4.6469E+03 | 2.937E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 24.7 to 1998.5 keV) 6.831E+05 pCi/g
Total Decayed Activity ( 24.7 to 1998.5 keV) 9.4103131E+05 pCi/g

## ARS06 Polynomial

| STD# | 1748-90-1 | | | Cal Date | 6/10/2015 | | |
|---|---|---|---|---|---|---|---|
| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
| Pb210 | 0.2133 | 213300 | 211350 | 11.49% | 1950 | 0.91% | **PASS** |
| Am241 | 0.02113 | 21130 | 20195 | 5.49% | 935 | 4.42% | **PASS** |
| Cd109 | 0.2039 | 203900 | 196910 | 10.00% | 6990 | 3.43% | **PASS** |
| Co57 | 0.007394 | 7394 | 7116 | 10.00% | 278 | 3.76% | **PASS** |
| Te123m | 0.01066 | 10660 | 10475 | 10.00% | 185 | 1.74% | **PASS** |
| Cr51 | 0.2517 | 251700 | | 10.00% | 251700 | 100.00% | **NOT MEASURED** |
| Sn113 | 0.03574 | 35740 | 34470 | 10.00% | 1270 | 3.55% | **PASS** |
| Sr85 | 0.04568 | 45680 | | 5.49% | 45680 | 100.00% | **NOT MEASURED** |
| Cs137 | 0.03171 | 31710 | 32434 | 10.00% | 724 | 2.28% | **PASS** |
| Co60 | 0.03965 | 39650 | 38408 | 5.49% | 1242 | 3.13% | **PASS** |
| Y88 | 0.07337 | 73370 | 75865 | 5.49% | 2495 | 3.40% | **PASS** |

250 mL Tuna Can

WJS 6-10-15

6-10-15

Calibration Data from file: 250mL Tuna Can 1748-90-1 calib poly.Clb
Energy Calibration Date: 06/10/15 Time: 12:26:28
Efficiency Calibration Date: 06/10/15 Time: 12:34:11

Calibration Description:
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration Fit
Energy = 0.1924 +0.249984*Channel -2.86432e-008*Channel**2
FWHM (ch) = 3.5645 +0.000971*Channel -1.57333e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.55 | 46.52 | 46.58 | -0.12% | 0.92 | 0.94 | -2.16% |
| 237.55 | 59.54 | 59.57 | -0.06% | 0.95 | 0.95 | -0.06% |
| 351.53 | 88.03 | 88.07 | -0.04% | 1.00 | 0.98 | 1.96% |
| 487.63 | 122.07 | 122.08 | -0.01% | 1.00 | 1.01 | -0.72% |
| 635.30 | 159.00 | 159.00 | 0.00% | 1.07 | 1.04 | 2.11% |
| 1565.65 | 391.69 | 391.51 | 0.05% | 1.27 | 1.26 | 0.91% |
| 2055.47 | 513.99 | 513.91 | 0.02% | 1.33 | 1.37 | -2.94% |
| 2646.92 | 661.66 | 661.68 | -0.00% | 1.50 | 1.51 | -0.63% |
| 3593.17 | 898.02 | 898.06 | -0.00% | 1.73 | 1.71 | 1.24% |
| 4695.26 | 1173.24 | 1173.30 | -0.01% | 1.94 | 1.94 | 0.11% |
| 5333.13 | 1332.50 | 1332.57 | -0.01% | 2.07 | 2.07 | 0.13% |
| 7349.69 | 1836.01 | 1835.95 | 0.00% | 2.45 | 2.46 | -0.16% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.5812 %
Coefficients:
-0.368747 -4.257329 0.454276 -0.047622 0.001987 -0.000031

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 3.2817E-002 | 3.2771E-002 | 0.14% |
| 59.54 | 4.2932E-002 | 4.3099E-002 | -0.39% |
| 88.03 | 5.6756E-002 | 5.6130E-002 | 1.10% |
| 122.07 | 5.8706E-002 | 5.9331E-002 | -1.06% |
| 391.69 | 2.9253E-002 | 2.9580E-002 | -1.12% |
| 513.99 | 2.4000E-002 | 2.4014E-002 | -0.06% |
| 661.66 | 2.0913E-002 | 1.9904E-002 | 4.82% |
| 1173.24 | 1.2688E-002 | 1.3087E-002 | -3.14% |
| 1332.50 | 1.1566E-002 | 1.1870E-002 | -2.63% |
| 1836.01 | 9.3161E-003 | 9.0886E-003 | 2.44% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/01/14 14:00:00 |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/01/14 14:00:00 |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/01/14 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/01/14 14:00:00 |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/01/14 14:00:00 |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/01/14 14:00:00 |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/01/14 14:00:00 |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/01/14 14:00:00 |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/01/14 14:00:00 |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/01/14 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/01/14 14:00:00 |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/01/14 14:00:00 |

American Radiation Services Spectrum name: ARS06665.An1

Sample description
Batch ID: 250 mL Tuna Can Polynomial CalVer
SDG: 1748-90-1 Tech: WJS

Spectrum Filename: C:\User\ARS06665.An1

Acquisition information

| | |
|---|---|
| Start time: | 10-Jun-2015 12:36:35 |
| Live time: | 600 |
| Real time: | 618 |
| Dead time: | 2.94 % |
| Detector ID: | 1 |

Detector system
(ARS06) MCB 130

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib poly.Clb
250mL Tuna Can 1748-90-1 Polynomial WJS 6-10-15

Energy Calibration

| | |
|---|---|
| Created: | 10-Jun-2015 12:26:28 |
| Zero offset: | 0.192 keV |
| Gain: | 0.250 keV/channel |
| Quadratic: | -2.864E-08 keV/channel^2 |

Efficiency Calibration

| | |
|---|---|
| Created: | 10-Jun-2015 12:34:11 |
| Type: | Polynomial |
| Uncertainty: | 1.581 % |
| Coefficients: | -0.368747 -4.257329 0.454276 |
| | -0.047622 0.001987 -0.000031 |

Library Files

| | |
|---|---|
| Main analysis library: | northamericancal.Lib |
| Library Match Width: | 0.500 |
| Peak stripping: | Library based |

Analysis parameters

| | |
|---|---|
| Analysis engine: | Env32 G53W4.22 |
| Start channel: | 10 ( 2.69keV ) |
| Stop channel: | 8000 ( 1998.23keV ) |
| Peak rejection level: | 40.000% |
| Peak search sensitivity: | 3 |
| Sample Size: | 1.0000E+00 |
| Activity scaling factor: | 1.0000E+06/( 1.0000E+00* 1.0000E+00) = 1.0000E+06 |
| Detection limit method: | Reg. Guide 4.16 Method |
| Random error: | 1.0000000E+00 |
| Systematic error: | 1.0000000E+00 |
| Fraction Limit: | 60.000% |
| Background width: | best method (based on spectrum). |
| Half lives decay limit: | 12.000 |

American Radiation Services Spectrum name: ARS06665.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Oct-2014 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc DOE.Pbc 11-Aug-2014 08:00:33 |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0427

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 13.32 | 219. | 15.97 | 0.96 | 7.026E-03 | | | | |
| 22.23 | 665. | 7.23 | 0.91 | 1.392E-02 | | | | |
| 25.03 | 666. | 7.60 | 0.92 | 1.610E-02 | | | | |
| 32.12 | 427. | 15.77 | 1.22 | 2.163E-02 | | | | |
| 36.53 | 268. | 25.92 | 1.17 | 2.505E-02 | | | | |
| 46.58 | 6015. | 2.03 | 0.92 | 3.284E-02 | 46.52 | 4.000 | 2.113E+05 | PB210 |
| 59.59 | 7010. | 2.16 | 0.95 | 4.313E-02 | 59.54 | 36.300 | 2.020E+04 | AM241 |
| 88.05 | 5934. | 2.14 | 0.98 | 5.613E-02 | 88.03 | 3.610 | 1.969E+05 | CD109 |
| 122.05 | 4226. | 2.44 | 1.04 | 5.933E-02 | 122.07 | 85.600 | 7.116E+03 | CO57 |
| 136.55 | 610. | 11.08 | 1.08 | 5.819E-02 | | | | |
| 159.00 | 2491. | 3.57 | 1.01 | 5.519E-02 | 159.00 | 83.500 | 1.048E+04 | TE123M |
| 254.62 | 184. | 31.51 | 0.81 | 4.123E-02 | | | | |
| 391.43 | 3185. | 3.11 | 1.34 | 2.960E-02 | 391.69 | 64.160 | 3.447E+04 | SN113 |
| 514.01 | 1478. | 5.26 | 1.46 | 2.401E-02 | 513.99 | 99.280 | 4.146E+04 | SR85 |
| 527.26 | 133. | 30.35 | 0.75 | 2.356E-02 | | | | |
| 583.20 | 66. | 35.65 | 1.07 | 2.185E-02 | | | | |
| 622.46 | 111. | 37.66 | 0.53 | 2.082E-02 | | | | |
| 661.68 | 12020. | 1.14 | 1.50 | 1.990E-02 | 661.66 | 85.210 | 3.243E+04 | CS137 |
| 898.08 | 4708. | 2.28 | 1.69 | 1.594E-02 | 898.02 | 95.000 | 7.200E+04 | Y88 |
| 1173.26 | 10239. | 1.14 | 1.94 | 1.309E-02 | 1173.24 | 99.900 | 3.863E+04 | CO60 |
| 1332.59 | 9189. | 1.13 | 2.03 | 1.187E-02 | 1332.50 | 99.982 | 3.819E+04 | CO60 |
| 1835.93 | 2927. | 2.00 | 2.53 | 9.089E-03 | 1836.01 | 99.350 | 7.507E+04 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 52.52 | 13.32 | 356. | 219. | 0.366 | 31.94 | 0.957 | SE-75 | |
| 88.01 | 22.19 | 842. | 641. | 1.068 | 17.56 | 0.888 | RH-106 | |
| 99.24 | 25.00 | 947. | 752. | 1.254 | 16.28 | 1.048 | RH-106 | s |
| 127.71 | 32.12 | 1120. | 427. | 0.712 | 31.54 | 1.220 | J-131 | s |
| 145.36 | 36.53 | 1308. | 268. | 0.447 | 51.85 | 1.165 | XE-138 | s |
| 545.50 | 136.55 | 1132. | 610. | 1.018 | 22.16 | 1.083 | CO-57 | |
| 1017.90 | 254.62 | 902. | 184. | 0.306 | 63.01 | 0.814 | TH-227 | s |
| 2108.93 | 527.26 | 315. | 133. | 0.222 | 60.70 | 0.748 | - | s |
| 2332.79 | 583.20 | 195. | 66. | 0.110 | 71.29 | 1.070 | TL-208 | s |

| Channel | Energy | Background | Net area | Cnts/sec | Uncert | FWHM | Suspected |
|---|---|---|---|---|---|---|---|
| 2489.95 | 622.46 | 325. | 111. | 0.184 | 75.33 | 0.528 | RH-106 s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

---

This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.57 | 46.58 | 2857. | 6008. | 10.013 | 4.06 | 0.925 |
| AM-241 | 237.61 | 59.59 | 2784. | 7006. | 11.677 | 4.33 | 0.946 |
| CD-109 | 351.47 | 88.05 | 2438. | 5934. | 9.891 | 4.28 | 0.979 |
| CO-57 | 487.47 | 122.05 | 1661. | 4226. | 7.043 | 4.87 | 1.040 |
| TE-123M | 635.31 | 159.00 | 1300. | 2491. | 4.152 | 7.14 | 1.007 |
| SN-113 | 1565.34 | 391.43 | 1240. | 3185. | 5.308 | 6.22 | 1.339 |
| SR-85 | 2055.87 | 514.01 | 912. | 1478. | 2.463 | 10.51 | 1.463 |
| CS-137 | 2646.93 | 661.68 | 1027. | 12020. | 20.034 | 2.29 | 1.498 |
| Y-88 | 3593.24 | 898.08 | 887. | 4708. | 7.846 | 4.56 | 1.692 |
| CO-60 | 4695.10 | 1173.26 | 392. | 10239. | 17.065 | 2.29 | 1.939 |
| CO-60 | 5333.18 | 1332.59 | 205. | 9189. | 15.315 | 2.26 | 2.034 |
| Y-88 | 7349.53 | 1835.91 | 54. | 2958. | 4.930 | 4.00 | 2.537 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| PB-210 | | 2.1135E+05 | | | | | |
| | | | 46.52 | 2.113E+05 | (P | 8.858E+03 2.03E+00 | G |
| AM-241 | | 2.0195E+04 | | | | | |
| | | | 59.54 | 2.020E+04 | (P | 7.165E+02 2.16E+00 | G |
| CD-109 | | 1.9691E+05 | | | | | |
| | | | 88.03 | 1.969E+05 | ( | 7.724E+03 2.14E+00 | G |
| CO-57 | | 7.1160E+03 | | | | | |
| | | | 122.07 | 7.116E+03 | (P | 3.244E+02 2.44E+00 | G |

American Radiation Services Spectrum name: ARS06665.An1

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| TE-123M | 1.0475E+04 | | | | | | |
| | | 159.00 | 1.048E+04 | ( | 7.177E+02 | 3.57E+00 | G |
| CR-51 | 1.6155E+05 | | | | | | |
| | | 320.07 | 1.615E+05 | %(P | 1.234E+06 | 2.28E+02 | G |
| SN-113 | 3.4470E+04 | | | | | | |
| | | 391.69 | 3.447E+04 | ( | 1.806E+03 | 3.11E+00 | G |
| SR-85 | 4.1463E+04 | | | | | | |
| | | 513.99 | 4.146E+04 | ( | 4.024E+03 | 5.26E+00 | G |
| CS-137 | 3.2434E+04 | | | | | | |
| | | 661.66 | 3.243E+04 | ( | 4.102E+02 | 1.14E+00 | G |
| CO-60 | 3.8408E+04 | | | | | | |
| | | 1173.24 | 3.863E+04 | (P | 3.583E+02 | 1.14E+00 | G |
| | | 1332.50 | 3.819E+04 | (P | 2.886E+02 | 1.13E+00 | G |
| Y-88 | 7.5865E+04 | | | | | | |
| | | 1836.01 | 7.586E+04 | (P | 9.480E+02 | 2.00E+00 | G |
| | | 898.02 | 7.200E+04 | - P | 2.164E+03 | 2.28E+00 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** SUMMARY OF NUCLIDES IN SAMPLE *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.0645E+05 | 2.1135E+05 | 8.5945E+03 | 2.2564E+04 | 8.858E+03 |
| AM-241 | 2.0173E+04 | 2.0195E+04 | 8.7421E+02 | 1.8778E+03 | 7.165E+02 |
| CD-109 | 1.3192E+05 | 1.9691E+05 | 8.4182E+03 | 1.7703E+04 | 7.724E+03 |
| CO-57 | 3.7481E+03 | 7.1160E+03 | 3.4662E+02 | 6.3628E+02 | 3.244E+02 |
| TE-123M | 2.4353E+03 | 1.0475E+04 | 7.4772E+02 | 1.1946E+03 | 7.177E+02 |
| CR-51 #A | 2.9533E+02 | 1.6155E+05 | 7.4048E+05 | 7.4059E+05 | 1.234E+06 |
| SN-113 | 7.5589E+03 | 3.4470E+04 | 2.1428E+03 | 3.4517E+03 | 1.806E+03 |
| SR-85 | 2.7925E+03 | 4.1463E+04 | 4.3598E+03 | 5.1155E+03 | 4.024E+03 |
| CS-137 | 3.1925E+04 | 3.2434E+04 | 7.4124E+02 | 1.6159E+03 | 4.102E+02 |
| CO-60 | 3.5078E+04 | 3.8408E+04 | 6.1754E+02 | 1.7161E+03 | 3.583E+02 |
| Y-88 | 1.4756E+04 | 7.5865E+04 | 3.0338E+03 | 5.4257E+03 | 9.480E+02 |

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- SUMMARY ----------

Total Activity ( 2.7 to 1998.2 keV) 4.568E+05 pCi/g
Total Decayed Activity ( 2.7 to 1998.2 keV) 6.6868012E+05 pCi/g

## ARS07 Polynomial

| STD# | 1559-72-6 | | | Cal Date | 1/7/2014 | | |
|---|---|---|---|---|---|---|---|
| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
| Pb210 | 0.5834 | 583400 | 619070 | 11.49% | 35670 | 6.11% | **PASS** |
| Am241 | 0.05866 | 58660 | 56345 | 5.49% | 2315 | 3.95% | **PASS** |
| Cd109 | 0.5346 | 534600 | 523300 | 10.00% | 11300 | 2.11% | **PASS** |
| Co57 | 0.02013 | 20130 | 20176 | 10.00% | 46 | 0.23% | **PASS** |
| Te123m | 0.02758 | 27580 | 26545 | 10.00% | 1035 | 3.75% | **PASS** |
| Cr51 | 0.6881 | 688100 | 669880 | 10.00% | 18220 | 2.65% | **PASS** |
| Sn113 | 0.1048 | 104800 | 106150 | 10.00% | 1350 | 1.29% | **PASS** |
| Sr85 | 0.1282 | 128200 | 127610 | 5.49% | 590 | 0.46% | **PASS** |
| Cs137 | 0.08881 | 88810 | 90439 | 10.00% | 1629 | 1.83% | **PASS** |
| Co60 | 0.1077 | 107700 | 105220 | 5.49% | 2480 | 2.30% | **PASS** |
| Y88 | 0.2068 | 206800 | 215320 | 5.49% | 8520 | 4.12% | **PASS** |

WJS 6-10-15
250 mL Tuna Can

6-10-15

Calibration Data from file: POLYTuna Can 250mL 1559-72-6 calib.Clb
Energy Calibration Date: 3-12-2012 Time: 13:33:38
Efficiency Calibration Date: 1-7-2014 Time: 11:11:14

Calibration Description:
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration Fit
Energy = 0.0938 +0.249931*Channel +8.60329e-009*Channel**2
FWHM (ch) = 3.4696 +0.000947*Channel -2.53949e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 185.68 | 46.52 | 46.50 | 0.04% | 0.87 | 0.91 | -4.86% |
| 237.66 | 59.54 | 59.49 | 0.08% | 0.92 | 0.92 | -0.56% |
| 351.80 | 88.03 | 88.02 | 0.02% | 0.93 | 0.95 | -1.94% |
| 488.36 | 122.07 | 122.15 | -0.07% | 0.99 | 0.98 | 0.70% |
| 635.73 | 159.00 | 158.99 | 0.01% | 1.05 | 1.02 | 3.01% |
| 1280.24 | 320.07 | 320.08 | -0.00% | 1.20 | 1.16 | 3.72% |
| 1566.84 | 391.69 | 391.72 | -0.01% | 1.21 | 1.22 | -0.93% |
| 2055.94 | 513.99 | 513.97 | 0.00% | 1.33 | 1.33 | 0.09% |
| 2646.75 | 661.66 | 661.66 | 0.00% | 1.48 | 1.45 | 1.86% |
| 3592.32 | 898.02 | 898.04 | -0.00% | 1.62 | 1.64 | -1.07% |
| 4693.06 | 1173.24 | 1173.22 | 0.00% | 1.86 | 1.84 | 1.26% |
| 5330.04 | 1332.50 | 1332.48 | 0.00% | 1.88 | 1.95 | -3.49% |
| 7344.09 | 1836.06 | 1836.07 | -0.00% | 2.29 | 2.26 | 1.07% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.3972 %
Coefficients:
-0.410791 -4.427717 0.416964 -0.041400 0.001670 -0.000026

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 2.5942E-002 | 2.5694E-002 | 0.96% |
| 59.54 | 3.6012E-002 | 3.6299E-002 | -0.80% |
| 88.03 | 4.7581E-002 | 4.6824E-002 | 1.59% |
| 122.07 | 4.8791E-002 | 4.7773E-002 | 2.09% |
| 159.00 | 4.1160E-002 | 4.3538E-002 | -5.78% |
| 320.07 | 2.7927E-002 | 2.6993E-002 | 3.34% |
| 391.69 | 2.3263E-002 | 2.3115E-002 | 0.63% |
| 513.99 | 1.8747E-002 | 1.8828E-002 | -0.43% |
| 661.66 | 1.6136E-002 | 1.5634E-002 | 3.11% |
| 898.02 | 1.2269E-002 | 1.2508E-002 | -1.95% |
| 1173.24 | 9.9659E-003 | 1.0221E-002 | -2.56% |
| 1332.50 | 9.0123E-003 | 9.2346E-003 | -2.47% |
| 1836.01 | 7.1689E-003 | 6.9651E-003 | 2.84% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.18 | 8.14E+003 | 0.58 | 902.29 | 7.00% | 2-1-2012 14:00:00 |
| Am-241 | 59.54 | 36.00 | 1.58E+005 | 0.06 | 781.35 | 3.00% | 2-1-2012 14:00:00 |
| Cd-109 | 88.03 | 3.63 | 4.63E+002 | 0.53 | 717.89 | 3.10% | 2-1-2012 14:00:00 |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.02 | 637.56 | 3.10% | 2-1-2012 14:00:00 |
| Te-123M | 159.00 | 84.00 | 1.20E+002 | 0.03 | 857.19 | 3.00% | 2-1-2012 14:00:00 |
| Cr-51 | 320.07 | 9.86 | 2.71E+001 | 0.69 | 2510.33 | 3.00% | 2-1-2012 14:00:00 |
| Sn-113 | 391.69 | 64.90 | 1.15E+002 | 0.10 | 2516.56 | 3.00% | 2-1-2012 14:00:00 |
| Sr-85 | 513.99 | 98.40 | 6.48E+001 | 0.13 | 4667.51 | 3.00% | 2-1-2012 14:00:00 |
| Cs-137 | 661.66 | 85.10 | 1.10E+004 | 0.09 | 2796.36 | 3.00% | 2-1-2012 14:00:00 |
| Y-88 | 898.02 | 94.00 | 1.07E+002 | 0.21 | 7192.50 | 3.00% | 2-1-2012 14:00:00 |
| Co-60 | 1173.24 | 99.86 | 1.92E+003 | 0.11 | 3979.32 | 3.00% | 2-1-2012 14:00:00 |
| Co-60 | 1332.50 | 99.98 | 1.92E+003 | 0.11 | 3984.10 | 3.00% | 2-1-2012 14:00:00 |
| Y-88 | 1836.01 | 99.40 | 1.07E+002 | 0.21 | 7605.69 | 3.00% | 2-1-2012 14:00:00 |

American Radiation Services Spectrum name: ARS07834.An1

Sample description
Batch ID: Calibration Verification
SDG: 1559-72-6 Tech: WWW

Spectrum Filename: C:\User\ARS07834.An1

Acquisition information
Start time: 12-Mar-2012 13:41:08
Live time: 600
Real time: 669
Dead time: 10.28 %
Detector ID: 1

Detector system
(ARS07) MCB 337

Calibration
Filename: POLYTuna Can 250mL 1559-72-6 calib.Clb
tuna can solid, 250 mL, 1.5 g/cc 1559-72-6, cal date 3/12/2012 W
WW

Energy Calibration
Created: 12-Mar-2012 13:33:38
Zero offset: 0.094 keV
Gain: 0.250 keV/channel
Quadratic: 8.603E-09 keV/channel^2

Efficiency Calibration
Created: 07-Jan-2014 11:11:14
Type: Polynomial
Uncertainty: 1.397 %
Coefficients: -0.410791 -4.427717 0.416964
-0.041400 0.001670 -0.000026

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 10 ( 2.59keV )
Stop channel: 8000 ( 2000.09keV )
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 60.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 01-Feb-2012 14:00:00 |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | NO | |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0117

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 38.43 | 225. | 27.27 | 0.91 | 1.968E-02 | | | | |
| 46.48 | 14073. | 1.65 | 0.93 | 2.591E-02 | 46.52 | 4.000 | 6.191E+05 | PB210 |
| 59.52 | 16479. | 1.62 | 0.93 | 3.629E-02 | 59.54 | 36.300 | 5.635E+04 | AM241 |
| 88.03 | 18428. | 1.67 | 0.96 | 4.682E-02 | 88.03 | 3.610 | 5.233E+05 | CD109 |
| 122.04 | 16545. | 1.51 | 0.99 | 4.778E-02 | 122.07 | 85.600 | 2.018E+04 | CO57 |
| 136.52 | 2173. | 8.21 | 1.01 | 4.639E-02 | | | | |
| 158.99 | 16996. | 1.44 | 1.02 | 4.354E-02 | 159.00 | 83.500 | 2.655E+04 | TE123M |
| 208.16 | 324. | 36.69 | 1.00 | 3.709E-02 | | | | |
| 255.16 | 1312. | 11.81 | 1.10 | 3.206E-02 | | | | |
| 320.08 | 14508. | 1.29 | 1.21 | 2.699E-02 | 320.07 | 9.830 | 6.699E+05 | CR51 |
| 391.71 | 27468. | 0.99 | 1.23 | 2.311E-02 | 391.69 | 64.160 | 1.061E+05 | SN113 |
| 513.97 | 34509. | 0.76 | 1.33 | 1.883E-02 | 513.99 | 99.280 | 1.276E+05 | SR85 |
| 661.65 | 26680. | 0.85 | 1.46 | 1.563E-02 | 661.66 | 85.210 | 9.044E+04 | CS137 |
| 744.36 | 168. | 36.95 | 0.43 | 1.435E-02 | | | | |
| 814.13 | 585. | 17.35 | 1.25 | 1.344E-02 | | | | |
| 898.03 | 40206. | 0.60 | 1.63 | 1.251E-02 | 898.02 | 95.000 | 1.976E+05 | Y88 |
| 1173.22 | 23611. | 0.79 | 1.81 | 1.022E-02 | 1173.24 | 99.900 | 1.057E+05 | CO60 |
| 1332.49 | 21167. | 0.82 | 1.95 | 9.235E-03 | 1332.50 | 99.982 | 1.048E+05 | CO60 |
| 1836.00 | 25508. | 0.66 | 2.26 | 6.965E-03 | 1836.01 | 99.350 | 2.153E+05 | Y88 |

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Centroid Channel | Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 153.38 | 38.43 | 1637. | 225. | 0.375 | 54.55 | 0.905 | BA-139 | s |
| 545.85 | 136.52 | 8099. | 2173. | 3.622 | 16.43 | 1.014 | CO-57 | s |
| 832.49 | 208.16 | 4873. | 324. | 0.540 | 73.38 | 1.002 | SB-125 | |
| 1020.52 | 255.16 | 5922. | 1312. | 2.187 | 23.62 | 1.097 | SN-113 | |
| 2977.60 | 744.36 | 1103. | 168. | 0.280 | 73.91 | 0.432 | AG-110M | s |
| 3256.69 | 814.13 | 1879. | 585. | 0.975 | 34.70 | 1.249 | PR-144 | |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 185.60 | 46.48 | 10398. | 14073. | 23.454 | 3.30 | 0.925s |
| AM-241 | 237.76 | 59.52 | 12257. | 16479. | 27.465 | 3.25 | 0.929 |
| CD-109 | 351.84 | 88.03 | 12633. | 18428. | 30.713 | 3.33 | 0.959 |
| CO-57 | 487.90 | 122.04 | 12332. | 16545. | 27.574 | 3.03 | 0.992 |
| TE-123M | 635.75 | 158.99 | 11441. | 16996. | 28.326 | 2.88 | 1.025 |
| CR-51 | 1280.24 | 320.08 | 6373. | 14508. | 24.179 | 2.58 | 1.208 |
| SN-113 | 1566.81 | 391.71 | 5650. | 27468. | 45.780 | 1.98 | 1.225 |
| SR-85 | 2055.94 | 513.97 | 5415. | 34509. | 57.516 | 1.51 | 1.333 |
| CS-137 | 2646.73 | 661.65 | 4240. | 26680. | 44.467 | 1.70 | 1.459 |
| Y-88 | 3592.30 | 898.03 | 3216. | 40206. | 67.010 | 1.20 | 1.626 |
| CO-60 | 4693.03 | 1173.22 | 1585. | 23611. | 39.352 | 1.58 | 1.812 |
| CO-60 | 5330.08 | 1332.49 | 1230. | 21167. | 35.278 | 1.63 | 1.948 |
| Y-88 | 7343.82 | 1836.00 | 392. | 25508. | 42.514 | 1.32 | 2.259 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | Peak Code | Peak MDA Value pCi/g | COMMENTS |
|---|---|---|---|---|---|---|---|
| PB-210 | | 6.1907E+05 | | | | | |
| | | | 46.52 | 6.191E+05 | @( | 2.102E+04 | 1.65E+00 G |
| AM-241 | | 5.6345E+04 | | | | | |
| | | | 59.54 | 5.635E+04 | ( | 1.773E+03 | 1.62E+00 G |
| CD-109 | | 5.2330E+05 | | | | | |
| | | | 88.03 | 5.233E+05 | ( | 1.495E+04 | 1.67E+00 G |
| CO-57 | | 2.0176E+04 | | | | | |
| | | | 122.07 | 2.018E+04 | ( | 6.344E+02 | 1.51E+00 G |

| Nuclide | Ave activity | Energy | Activity | Code | Peak | MDA | Comments |
|---|---|---|---|---|---|---|---|
| TE-123M | 2.6545E+04 | | | | | | |
| | | 159.00 | 2.655E+04 | ( | 7.828E+02 | 1.44E+00 | G |
| CR-51 | 6.6988E+05 | | | | | | |
| | | 320.07 | 6.699E+05 | ( | 1.730E+04 | 1.29E+00 | G |
| SN-113 | 1.0615E+05 | | | | | | |
| | | 391.69 | 1.061E+05 | ( | 1.364E+03 | 9.91E-01 | G |
| SR-85 | 1.2761E+05 | | | | | | |
| | | 513.99 | 1.276E+05 | ( | 1.278E+03 | 7.55E-01 | G |
| CS-137 | 9.0439E+04 | | | | | | |
| | | 661.66 | 9.044E+04 | ( | 1.038E+03 | 8.50E-01 | G |
| CO-60 | 1.0522E+05 | | | | | | |
| | | 1173.24 | 1.057E+05 | ( | 8.424E+02 | 7.92E-01 | G |
| | | 1332.50 | 1.048E+05 | ( | 8.223E+02 | 8.15E-01 | G |
| Y-88 | 2.1532E+05 | | | | | | |
| | | 1836.01 | 2.153E+05 | ( | 8.014E+02 | 6.60E-01 | G |
| | | 898.02 | 1.976E+05 | - | 1.312E+03 | 5.98E-01 | G |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

| Nuclide Codes: | Peak Codes: |
|---|---|
| T - Thermal Neutron Activation | G - Gamma Ray |
| F - Fast Neutron Activation | X - X-Ray |
| I - Fission Product | P - Positron Decay |
| N - Naturally Occurring Isotope | S - Single-Escape |
| P - Photon Reaction | D - Double-Escape |

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty 2 Sigma Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 # | 6.1677E+05 | 6.1907E+05 | 2.0433E+04 | 9.5050E+04 | 2.102E+04 |
| AM-241 | 5.6335E+04 | 5.6345E+04 | 1.8303E+03 | 4.9011E+03 | 1.773E+03 |
| CD-109 | 4.9107E+05 | 5.2330E+05 | 1.7434E+04 | 4.4113E+04 | 1.495E+04 |
| CO-57 | 1.8224E+04 | 2.0176E+04 | 6.1116E+02 | 1.4902E+03 | 6.344E+02 |
| TE-123M | 2.1058E+04 | 2.6545E+04 | 7.6453E+02 | 1.9631E+03 | 7.828E+02 |
| CR-51 | 2.4629E+05 | 6.6988E+05 | 1.7253E+04 | 4.7004E+04 | 1.730E+04 |
| SN-113 | 8.3428E+04 | 1.0615E+05 | 2.1036E+03 | 7.9025E+03 | 1.364E+03 |
| SR-85 | 8.3161E+04 | 1.2761E+05 | 1.9271E+03 | 8.1123E+03 | 1.278E+03 |
| CS-137 | 9.0212E+04 | 9.0439E+04 | 1.5372E+03 | 3.9206E+03 | 1.038E+03 |
| CO-60 | 1.0372E+05 | 1.0522E+05 | 1.1959E+03 | 4.0196E+03 | 8.424E+02 |
| Y-88 | 1.6605E+05 | 2.1532E+05 | 2.8425E+03 | 1.2798E+04 | 8.014E+02 |

# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity ( 2.6 to 2000.1 keV) 1.976E+06 pCi/g
Total Decayed Activity ( 2.6 to 2000.1 keV) 2.5600600E+06 pCi/g

## ARS08 Polynomial ✓

**STD#** **1748-90-1** **Cal Date** 1/5/2015

| Nuclide | uCi | pCi | Meas | Criteria | Dif | %dif | |
|---|---|---|---|---|---|---|---|
| Pb210 | 0.2133 | 213300 | 215390 | 11.49% | 2090 | 0.98% | **PASS** |
| Am241 | 0.02113 | 21130 | 21657 | 5.49% | 527 | 2.49% | **PASS** |
| Cd109 | 0.2039 | 203900 | 213680 | 10.00% | 9780 | 4.80% | **PASS** |
| Co57 | 0.007394 | 7394 | 7847.9 | 10.00% | 453.9 | 6.14% | **PASS** |
| Te123m | 0.01066 | 10660 | 10499 | 10.00% | 161 | 1.51% | **PASS** |
| Cr51 | 0.2517 | 251700 | 249420 | 10.00% | 2280 | 0.91% | **PASS** |
| Sn113 | 0.03574 | 35740 | 36693 | 10.00% | 953 | 2.67% | **PASS** |
| Sr85 | 0.04568 | 45680 | 46388 | 5.49% | 708 | 1.55% | **PASS** |
| Cs137 | 0.03171 | 31710 | 33132 | 10.00% | 1422 | 4.48% | **PASS** |
| Co60 | 0.03965 | 39650 | 40518 | 5.49% | 868 | 2.19% | **PASS** |
| Y88 | 0.07337 | 73370 | 79548 | 5.49% | 6178 | 8.42% | **FAIL** |

6-10-15

WJS 6-10-15

250 mL Tuna Can

Calibration Data from file: 250mL Tuna Can 1748-90-1 calib POLY.Clb
Energy Calibration Date: 12/12/2014 Time: 9:34:56 AM
Efficiency Calibration Date: 1/5/2015 Time: 10:02:55 AM

Calibration Description:
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration Fit
Energy = 0.4474 +0.250118*Channel -3.41661e-008*Channel**2
FWHM (ch) = 3.6903 +0.001119*Channel -3.2281e-008*Channel**2

Energy/FWHM Table

| Channel | Energy(keV) | Fit(keV) | Delta | FWHM(keV) | Fit(keV) | Delta |
|---|---|---|---|---|---|---|
| 184.55 | 46.52 | 46.60 | -0.18% | 0.97 | 0.97 | -0.91% |
| 236.51 | 59.54 | 59.60 | -0.10% | 0.96 | 0.99 | -2.52% |
| 350.47 | 88.03 | 88.10 | -0.08% | 1.02 | 1.02 | -0.36% |
| 486.49 | 122.07 | 122.12 | -0.04% | 1.05 | 1.06 | -0.62% |
| 633.95 | 159.00 | 159.00 | 0.00% | 1.10 | 1.10 | 0.27% |
| 1277.18 | 320.07 | 319.84 | 0.07% | 1.32 | 1.27 | 3.79% |
| 1563.84 | 391.69 | 391.51 | 0.05% | 1.35 | 1.34 | 0.96% |
| 2053.61 | 513.99 | 513.95 | 0.01% | 1.45 | 1.46 | -0.63% |
| 2644.77 | 661.66 | 661.71 | -0.01% | 1.62 | 1.61 | 0.90% |
| 3590.58 | 898.02 | 898.07 | -0.01% | 1.82 | 1.82 | -0.12% |
| 4692.32 | 1173.24 | 1173.33 | -0.01% | 2.02 | 2.06 | -1.94% |
| 5329.92 | 1332.50 | 1332.58 | -0.01% | 2.18 | 2.18 | -0.00% |
| 7345.84 | 1836.01 | 1835.93 | 0.00% | 2.55 | 2.54 | 0.52% |

Efficiency Calibration Fit
Polynomial Uncertainty = 1.5350 %
Coefficients:
-0.447430 -4.056056 0.358945 -0.033786 0.001201 -0.000016

Efficiency Table

| Energy | Efficiency | Fit | Delta |
|---|---|---|---|
| 46.52 | 3.1443E-002 | 3.1354E-002 | 0.28% |
| 59.54 | 4.1739E-002 | 4.2053E-002 | -0.75% |
| 88.03 | 5.6876E-002 | 5.5915E-002 | 1.69% |
| 122.07 | 5.8546E-002 | 5.7878E-002 | 1.14% |
| 159.00 | 5.0933E-002 | 5.3270E-002 | -4.59% |
| 320.07 | 3.5084E-002 | 3.4304E-002 | 2.22% |
| 391.69 | 3.0162E-002 | 2.9723E-002 | 1.45% |
| 513.99 | 2.4362E-002 | 2.4552E-002 | -0.78% |
| 661.66 | 2.1528E-002 | 2.0595E-002 | 4.34% |
| 898.02 | 1.6102E-002 | 1.6599E-002 | -3.08% |
| 1173.24 | 1.3562E-002 | 1.3584E-002 | -0.16% |
| 1332.50 | 1.1773E-002 | 1.2260E-002 | -4.14% |
| 1836.01 | 9.4403E-003 | 9.1695E-003 | 2.87% |

Calibration Certificate Table

| Isotope | Energy | Pct | Halflife | Activity | GPS | Error | Date & Time |
|---|---|---|---|---|---|---|---|
| Pb-210 | 46.52 | 4.00 | 7.45E+003 | 0.21 | 315.68 | 4.10% | 10/1/2014 2:00:00 PM |
| Am-241 | 59.54 | 36.30 | 1.58E+005 | 0.02 | 283.80 | 3.10% | 10/1/2014 2:00:00 PM |
| Cd-109 | 88.03 | 3.61 | 4.36E+002 | 0.20 | 272.35 | 3.10% | 10/1/2014 2:00:00 PM |
| Co-57 | 122.07 | 85.60 | 2.72E+002 | 0.01 | 234.18 | 3.10% | 10/1/2014 2:00:00 PM |
| Te-123M | 159.00 | 83.50 | 1.20E+002 | 0.01 | 329.34 | 3.10% | 10/1/2014 2:00:00 PM |
| Cr-51 | 320.07 | 9.83 | 2.77E+001 | 0.25 | 915.46 | 3.00% | 10/1/2014 2:00:00 PM |
| Sn-113 | 391.69 | 64.16 | 1.15E+002 | 0.04 | 848.44 | 3.00% | 10/1/2014 2:00:00 PM |
| Sr-85 | 513.99 | 99.28 | 6.47E+001 | 0.05 | 1677.99 | 3.00% | 10/1/2014 2:00:00 PM |
| Cs-137 | 661.66 | 85.21 | 1.10E+004 | 0.03 | 999.74 | 3.10% | 10/1/2014 2:00:00 PM |
| Y-88 | 898.02 | 95.00 | 1.07E+002 | 0.07 | 2578.96 | 3.00% | 10/1/2014 2:00:00 PM |
| Co-60 | 1173.24 | 99.90 | 1.93E+003 | 0.04 | 1465.58 | 3.00% | 10/1/2014 2:00:00 PM |
| Co-60 | 1332.50 | 99.98 | 1.93E+003 | 0.04 | 1466.79 | 3.00% | 10/1/2014 2:00:00 PM |
| Y-88 | 1836.01 | 99.35 | 1.07E+002 | 0.07 | 2697.04 | 3.00% | 10/1/2014 2:00:00 PM |

ORTEC g v - i (3263) Env32 G702W050 6/9/2015 10:35:59 AM
American Radiation Services Spectrum name: ARS08001.An1

Sample description
Batch ID: CALVERIFICATION
SDG: 1748-90-1 Tech: BZF

Spectrum Filename: C:\User\Archive\12-15-14 TO\ARS08001.An1

Acquisition information
Start time: 12/15/2014 1:59:23 PM
Live time: 600
Real time: 622
Dead time: 3.59 %
Detector ID: 8

Detector system
(ARS08) MCB 129

Calibration
Filename: 250mL Tuna Can 1748-90-1 calib POLY.Clb
250mL Tuna Can 1.5g/cc 1748-90-1 BZF 12-12-14 POLYNOMIAL

Energy Calibration
Created: 12/12/2014 9:34:56 AM
Zero offset: 0.447 keV
Gain: 0.250 keV/channel
Quadratic: -3.417E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2015 10:02:55 AM
Type: Polynomial
Uncertainty: 1.535 %
Coefficients: -0.447430 -4.056056 0.358945
-0.033786 0.001201 -0.000016

Library Files
Main analysis library: northamericancal.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G702W050
Start channel: 120 ( 30.46keV )
Stop channel: 8144 ( 2035.14keV )
Peak rejection level: 30.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/( 1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 0.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

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| | |
|---|---|
| Activity range factor: | 2.000 |
| Min. step backg. energy | 0.000 |
| Multiplet shift channel | 2.000 |

| Corrections | Status | Comments |
|---|---|---|
| Decay correct to date: | YES | 10/1/2014 2:00:00 PM |
| Decay during acquisition: | NO | |
| Decay during collection: | NO | |
| True coincidence correction: | NO | |
| Peaked background correction: | YES | pbc NORM.Pbc 12/22/2014 7:46:07 AM |
| Absorption (Internal): | NO | |
| Geometry correction: | NO | |
| Random summing: | NO | |

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.0644

***** S U M M A R Y O F P E A K S I N R A N G E *****

| Peak Energy | Area | Uncert | FWHM | Corrctn Factor | Nuclide Energy | Brnch. Ratio | Act. pCi/g | Nuc |
|---|---|---|---|---|---|---|---|---|
| 32.10 | 497. | 17.99 | 0.92 | 2.004E-02 | | | | |
| 46.64 | 5956. | 1.82 | 0.97 | 3.140E-02 | 46.52 | 4.000 | 2.154E+05 | PB210 |
| 59.62 | 7337. | 1.99 | 0.98 | 4.211E-02 | 59.54 | 36.300 | 2.166E+04 | AM241 |
| 84.76 | 264. | 29.18 | 1.02 | 5.500E-02 | | | | |
| 88.12 | 8499. | 1.36 | 1.02 | 5.593E-02 | 88.03 | 3.610 | 2.137E+05 | CD109 |
| 122.09 | 7132. | 2.06 | 1.05 | 5.788E-02 | 122.07 | 85.600 | 7.848E+03 | CO57 |
| 136.60 | 848. | 8.66 | 1.07 | 5.643E-02 | | | | |
| 159.01 | 6715. | 1.56 | 1.10 | 5.328E-02 | 159.00 | 83.500 | 1.050E+04 | TE123M |
| 254.85 | 490. | 16.58 | 0.96 | 4.023E-02 | | | | |
| 319.86 | 2858. | 3.55 | 1.18 | 3.432E-02 | 320.07 | 9.830 | 2.494E+05 | CR51 |
| 391.54 | 9889. | 1.13 | 1.34 | 2.974E-02 | 391.69 | 64.160 | 3.669E+04 | SN113 |
| 513.95 | 11244. | 1.25 | 1.44 | 2.455E-02 | 513.99 | 99.280 | 4.639E+04 | SR85 |
| 661.79 | 12847. | 0.96 | 1.61 | 2.059E-02 | 661.66 | 85.210 | 3.313E+04 | CS137 |
| 813.53 | 254. | 22.46 | 0.44 | 1.782E-02 | | | | |
| 898.09 | 15345. | 0.97 | 1.82 | 1.660E-02 | 898.02 | 95.000 | 7.136E+04 | Y88 |
| 1113.78 | 246. | 19.54 | 0.57 | 1.414E-02 | | | | |
| 1173.33 | 11881. | 1.10 | 2.06 | 1.358E-02 | 1173.24 | 99.900 | 4.052E+04 | CO60 |
| 1325.03 | 153. | 22.25 | 2.18 | 1.232E-02 | | | | |
| 1332.77 | 10012. | 1.07 | 2.18 | 1.226E-02 | 1332.50 | 99.982 | 3.780E+04 | CO60 |
| 1646.75 | 123. | 27.47 | 0.33 | 1.018E-02 | | | | |
| 1835.84 | 9882. | 1.11 | 2.48 | 9.170E-03 | 1836.01 | 99.350 | 7.955E+04 | Y88 |
| 1882.06 | 33. | 27.52 | 0.53 | 8.944E-03 | | | | |

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American Radiation Services Spectrum name: ARS08001.An1

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

| Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Efficiency * Area | Uncert 2 Sigma % | FWHM keV | Suspected Nuclide | |
|---|---|---|---|---|---|---|---|---|
| 126.54 | 32.10 | 1958. | 497. | 2.481E+04 | 35.99 | 0.916 | XE-138 | s |
| 337.10 | 84.67 | 2838. | 264. | 4.802E+03 | 58.36 | 1.016 | TA-182 | D |
| 544.40 | 136.53 | 2274. | 848. | 1.504E+04 | 17.31 | 1.073 | CO-57 | D |
| 1017.26 | 254.85 | 1742. | 490. | 1.217E+04 | 33.16 | 0.955 | TH-227 | |
| 3252.24 | 813.53 | 500. | 254. | 1.426E+04 | 44.92 | 0.441 | PR-144 | s |
| 4453.96 | 1113.78 | 428. | 246. | 1.741E+04 | 39.08 | 0.567 | XE-138 | s |
| 5299.66 | 1324.70 | 502. | 153. | 1.241E+04 | 44.51 | 2.177 | KR-89 | D |
| 6588.04 | 1646.75 | 179. | 123. | 1.206E+04 | 54.95 | 0.328 | - | s |
| 7530.66 | 1882.06 | 9. | 33. | 3.690E+03 | 55.05 | 0.533 | - | s |

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: northamericancal.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

| Nuclide | Peak Channel | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | FWHM keV |
|---|---|---|---|---|---|---|---|
| PB-210 | 184.21 | 46.52 | 2921. | 5955. | 9.925 | 3.65 | 0.974D |
| AM-241 | 236.57 | 59.62 | 3507. | 7337. | 12.228 | 3.98 | 0.984 |
| CD-109 | 350.20 | 88.03 | 2462. | 8499. | 14.165 | 2.73 | 1.020D |
| CO-57 | 486.37 | 122.09 | 3350. | 7132. | 11.887 | 4.13 | 1.053 |
| TE-123M | 633.97 | 159.00 | 2152. | 6715. | 11.192 | 3.13 | 1.097D |
| CR-51 | 1277.27 | 319.86 | 2050. | 2858. | 4.764 | 7.10 | 1.184 |
| SN-113 | 1564.56 | 391.69 | 1266. | 9889. | 16.481 | 2.25 | 1.341D |
| SR-85 | 2053.61 | 513.95 | 2016. | 11244. | 18.740 | 2.50 | 1.441 |
| CS-137 | 2644.56 | 661.66 | 1303. | 12847. | 21.412 | 1.94 | 1.606D |
| Y-88 | 3590.63 | 898.09 | 1388. | 15345. | 25.575 | 1.95 | 1.823 |
| CO-60 | 4692.32 | 1173.33 | 746. | 11881. | 19.802 | 2.20 | 2.061 |
| CO-60 | 5329.59 | 1332.50 | 750. | 10012. | 16.686 | 2.14 | 2.183D |
| Y-88 | 7345.50 | 1835.84 | 206. | 9882. | 16.469 | 2.23 | 2.482 |

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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American Radiation Services Spectrum name: ARS08001.An1

***** SUMMARY OF LIBRARY PEAK USAGE *****

| - Nuclide - Name | Code | Average Activity pCi/g | Peak Energy keV | Peak Activity pCi/g | | Peak MDA Value pCi/g | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| PB-210 | | 2.1539E+05 | | | | | | | | 7.45E+03 |
| | | | 46.52 | 2.154E+05 | (P | 9.207E+03 | 1.82E+00 | 4.00E+00 | G | |
| AM-241 | | 2.1657E+04 | | | | | | | | 1.58E+05 |
| | | | 59.54 | 2.166E+04 | ( | 8.226E+02 | 1.99E+00 | 3.63E+01 | G | |
| CD-109 | | 2.1368E+05 | | | | | | | | 4.36E+02 |
| | | | 88.03 | 2.137E+05 | ( | 5.882E+03 | 1.36E+00 | 3.61E+00 | G | |
| CO-57 | | 7.8479E+03 | | | | | | | | 2.72E+02 |
| | | | 122.07 | 7.848E+03 | ( | 2.998E+02 | 2.06E+00 | 8.56E+01 | G | |
| TE-123M | | 1.0499E+04 | | | | | | | | 1.20E+02 |
| | | | 159.00 | 1.050E+04 | ( | 3.422E+02 | 1.56E+00 | 8.35E+01 | G | |
| CR-51 | | 2.4942E+05 | | | | | | | | 2.77E+01 |
| | | | 320.07 | 2.494E+05 | ( | 1.865E+04 | 3.55E+00 | 9.83E+00 | G | |
| SN-113 | | 3.6693E+04 | | | | | | | | 1.15E+02 |
| | | | 391.69 | 3.669E+04 | ( | 6.254E+02 | 1.13E+00 | 6.42E+01 | G | |
| SR-85 | | 4.6388E+04 | | | | | | | | 6.47E+01 |
| | | | 513.99 | 4.639E+04 | ( | 8.744E+02 | 1.25E+00 | 9.93E+01 | G | |
| CS-137 | | 3.3132E+04 | | | | | | | | 1.10E+04 |
| | | | 661.66 | 3.313E+04 | ( | 4.408E+02 | 9.68E-01 | 8.52E+01 | G | |
| CO-60 | | 4.0518E+04 | | | | | | | | 1.93E+03 |
| | | | 1173.24 | 4.052E+04 | ( | 4.432E+02 | 1.10E+00 | 9.99E+01 | G | |
| | | | 1332.50 | 3.780E+04 | - | 4.921E+02 | 1.07E+00 | 1.00E+02 | G | |
| Y-88 | | 7.9548E+04 | | | | | | | | 1.07E+02 |
| | | | 1836.01 | 7.955E+04 | ( | 5.609E+02 | 1.11E+00 | 9.93E+01 | G | |
| | | | 898.02 | 7.136E+04 | - | 8.200E+02 | 9.73E-01 | 9.50E+01 | G | |

( - This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

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American Radiation Services Spectrum name: ARS08001.An1

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

********** D I S C A R D E D I S O T O P E P E A K S **********

| Nuclide | Centroid Energy | Background Counts | Net Area Counts | Intensity Cts/Sec | Uncert 2 Sigma % | Activity |
|---|---|---|---|---|---|---|

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

| Nuclide | Time of Count Activity pCi/g | Time Corrected Activity pCi/g | Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| PB-210 | 2.1389E+05 | 2.1539E+05 | 7.8569E+03 | 2.2662E+04 | 9.207E+03 |
| AM-241 | 2.1650E+04 | 2.1657E+04 | 8.6292E+02 | 1.9761E+03 | 8.226E+02 |
| CD-109 | 1.8966E+05 | 2.1368E+05 | 5.8257E+03 | 1.7539E+04 | 5.882E+03 |
| CO-57 | 6.4845E+03 | 7.8479E+03 | 3.2381E+02 | 6.2110E+02 | 2.998E+02 |
| TE-123M | 6.8004E+03 | 1.0499E+04 | 3.2824E+02 | 7.9015E+02 | 3.422E+02 |
| CR-51 | 3.8184E+04 | 2.4942E+05 | 1.7702E+04 | 2.4072E+04 | 1.865E+04 |
| SN-113 | 2.3357E+04 | 3.6693E+04 | 8.2712E+02 | 2.7625E+03 | 6.254E+02 |
| SR-85 | 2.0779E+04 | 4.6388E+04 | 1.1584E+03 | 3.0935E+03 | 8.744E+02 |
| CS-137 | 3.2976E+04 | 3.3132E+04 | 6.4119E+02 | 1.4743E+03 | 4.408E+02 |
| CO-60 | 3.9439E+04 | 4.0518E+04 | 8.9190E+02 | 1.7298E+03 | 4.432E+02 |
| Y-88 | 4.8860E+04 | 7.9548E+04 | 1.7724E+03 | 4.9427E+03 | 5.609E+02 |

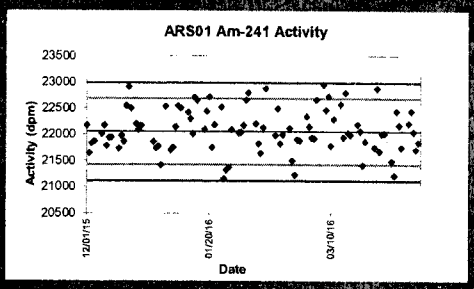
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

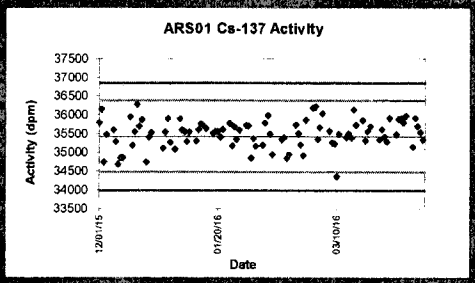
ORTEC g v - i (3263) Env32  G702W050  6/9/2015 10:35:59 AM
American Radiation Services  Spectrum name: ARS08001.An1

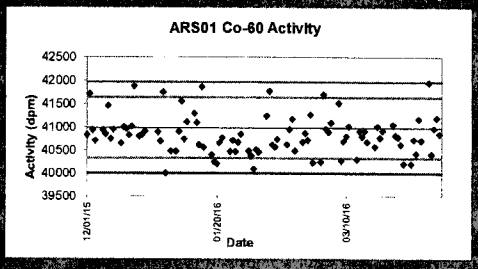
---------- S U M M A R Y ----------

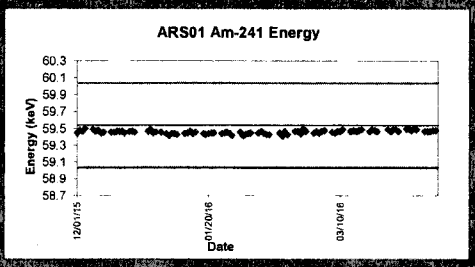
| | | |
|---|---|---|
| Total Activity ( 30.5 to 2035.1 keV) | 6.421E+05 | pCi/g |
| Total Decayed Activity ( 30.5 to 2035.1 keV) | 9.5476956E+05 | pCi/g |

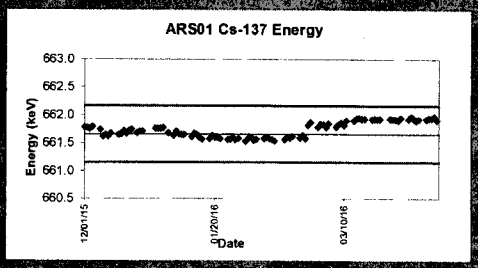
## ARS01 GAMMA SPECTROMETER CONTROL CHARTS

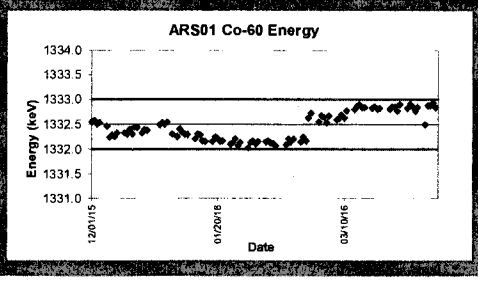


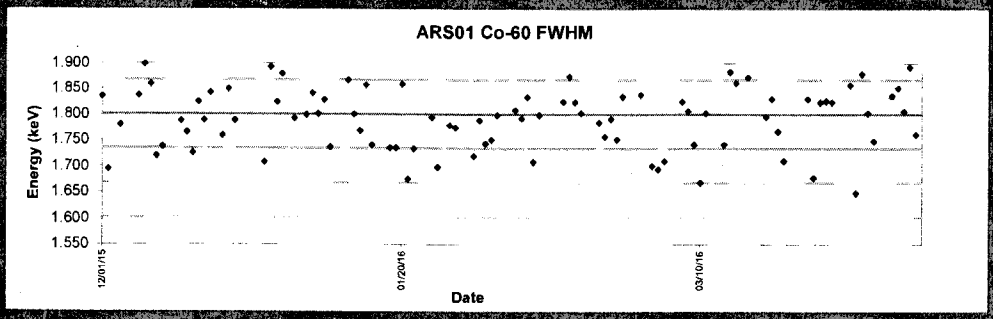



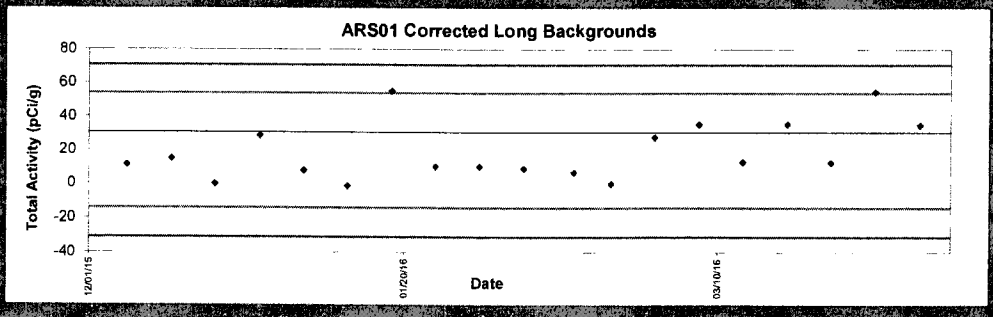



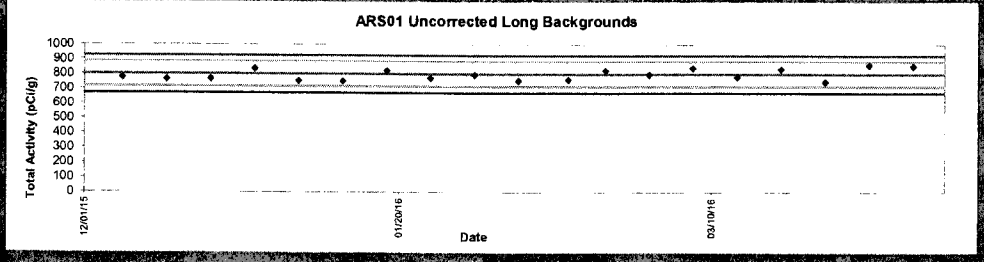



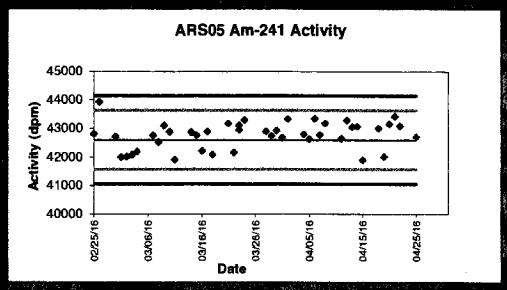



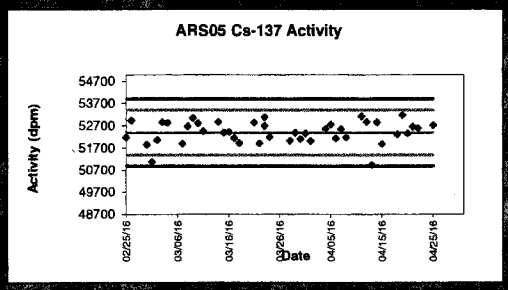



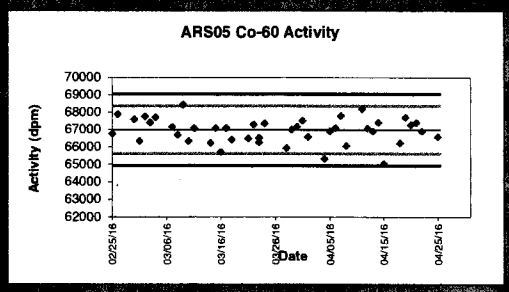



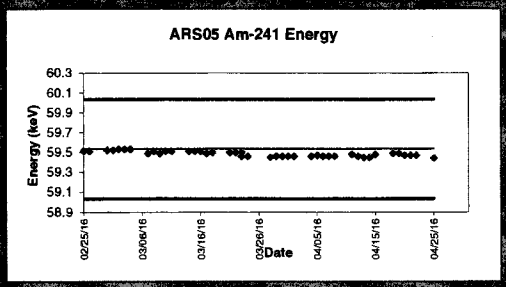



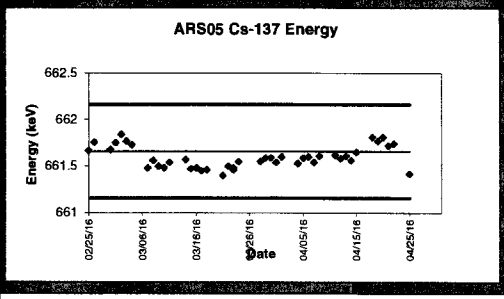
# ARS05 GAMMA SPECTROMETER CONTROL CHARTS

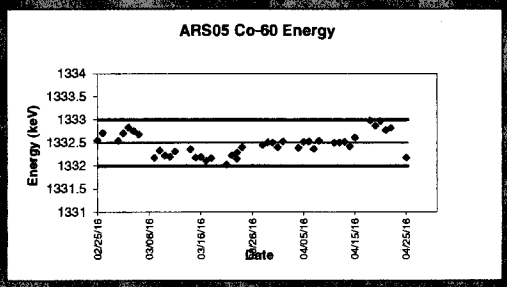


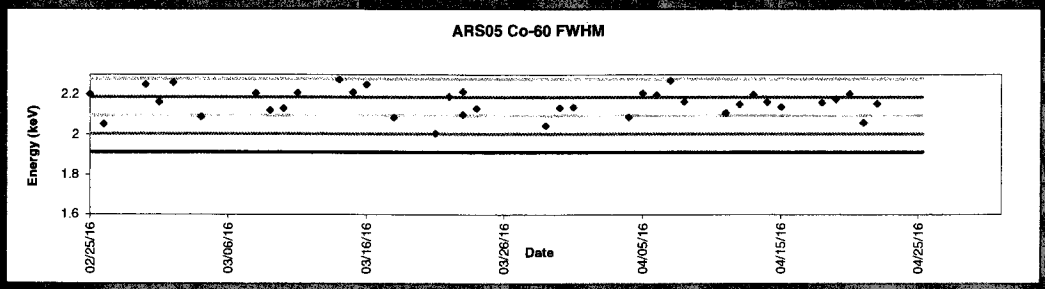



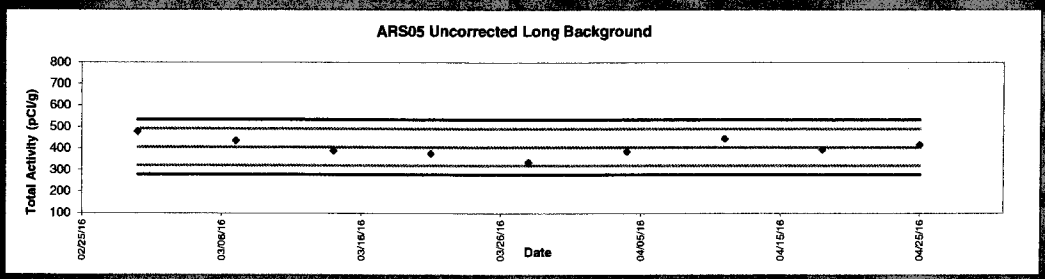



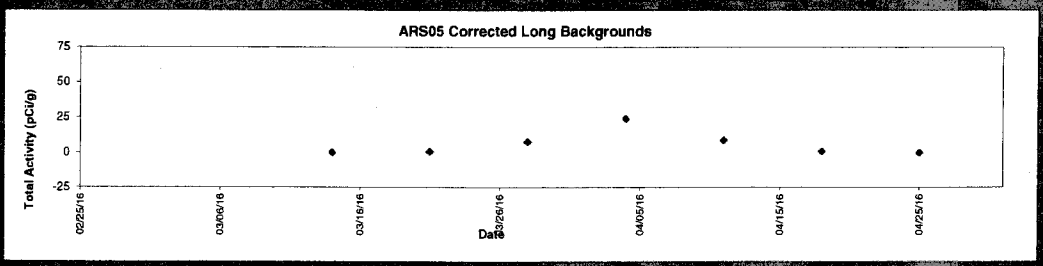



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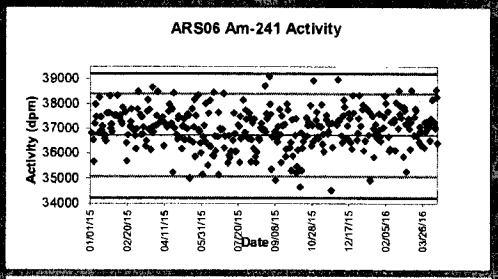
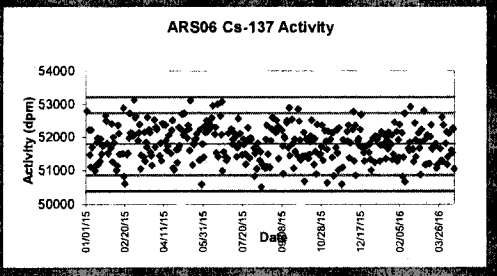
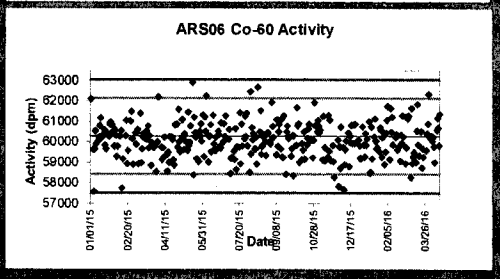
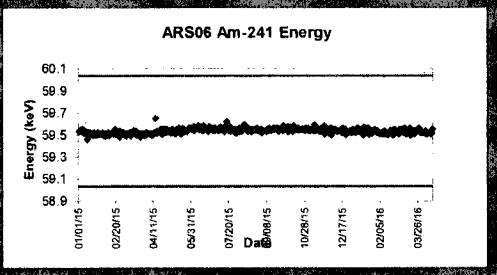
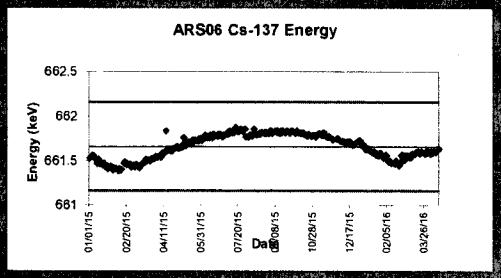
# ARS06 GAMMA SPECTROMETER CONTROL CHARTS

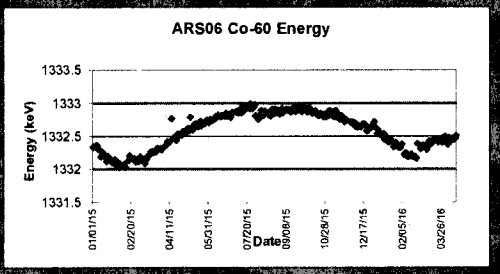


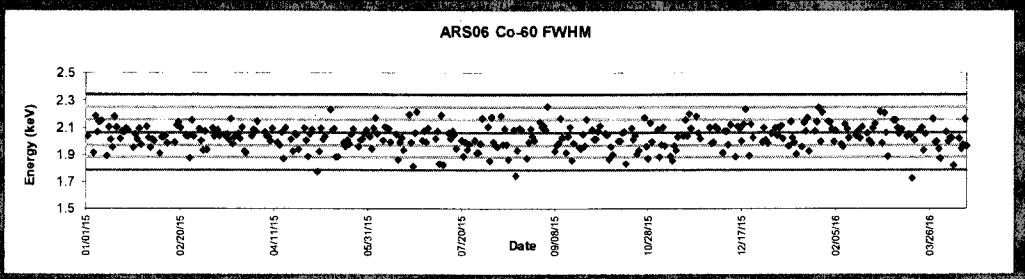



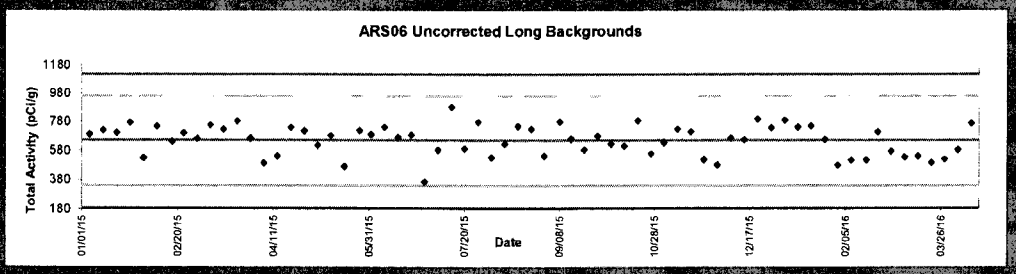



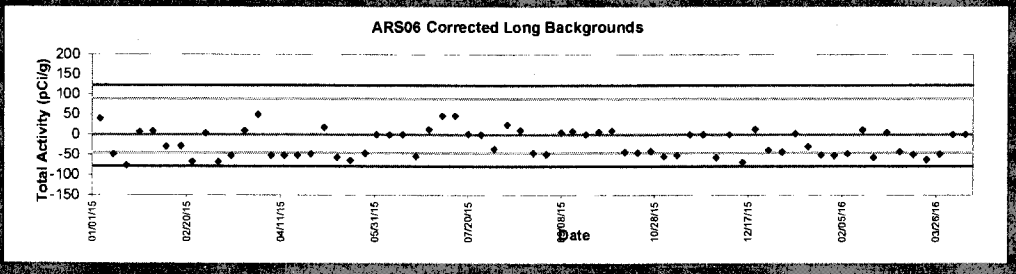



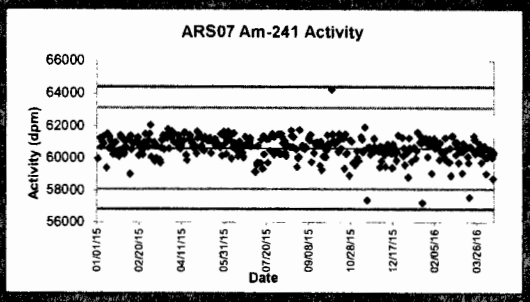



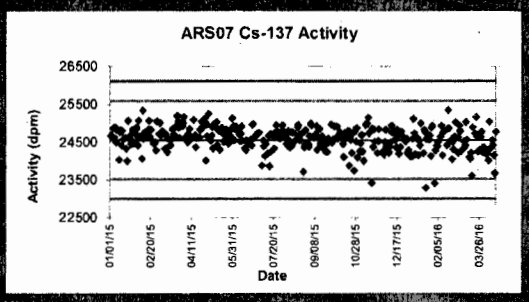



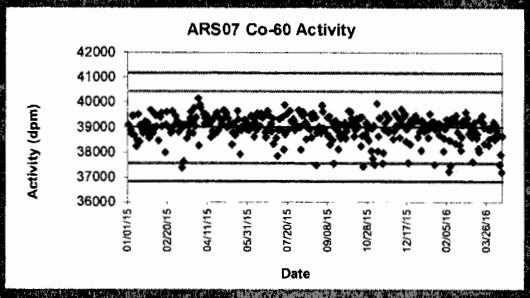



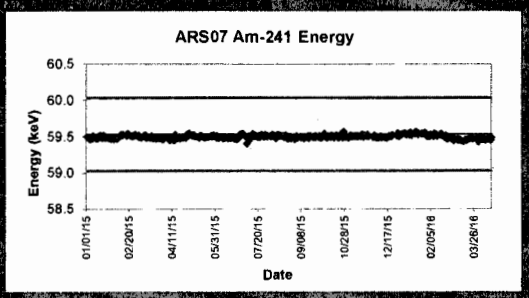



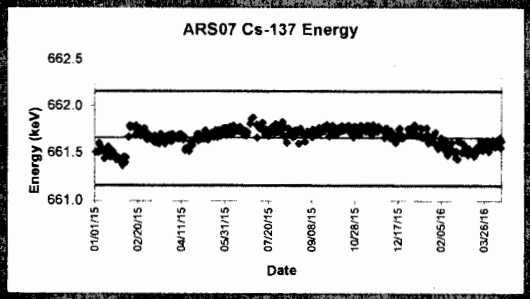
# ARS07 GAMMA SPECTROMETER CONTROL CHARTS

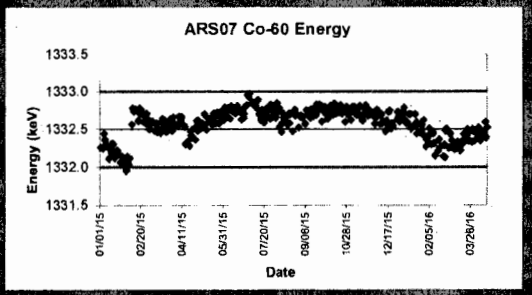


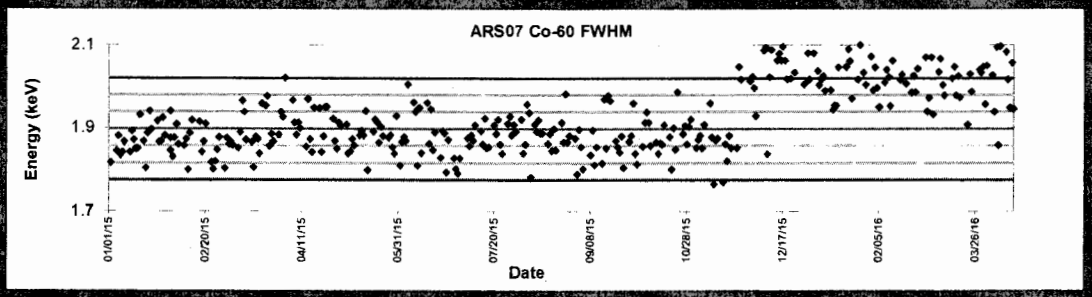



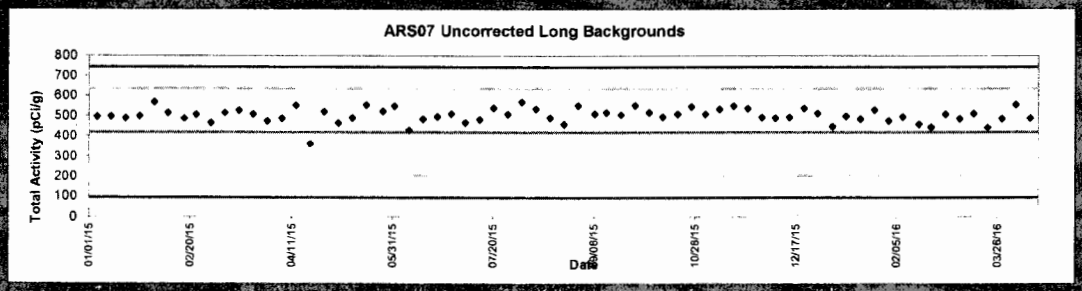



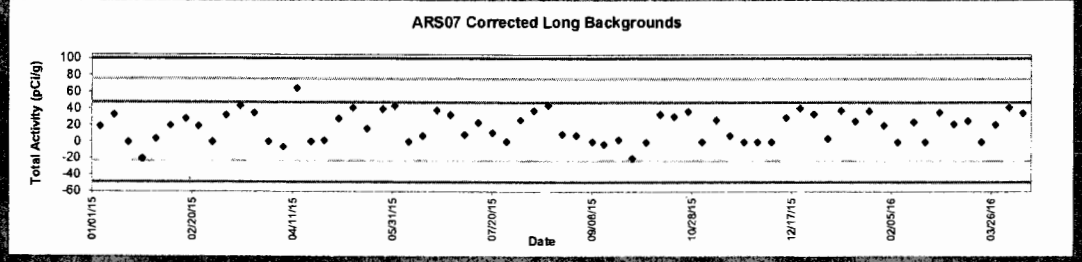



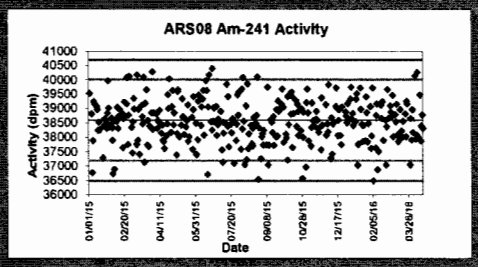



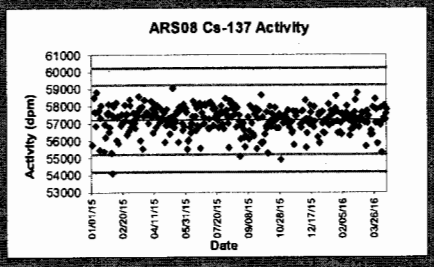



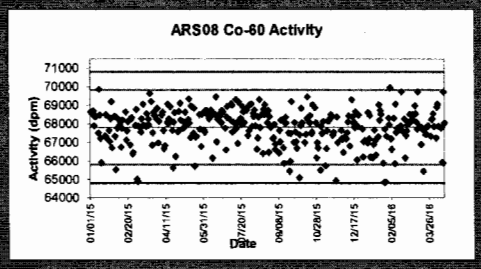



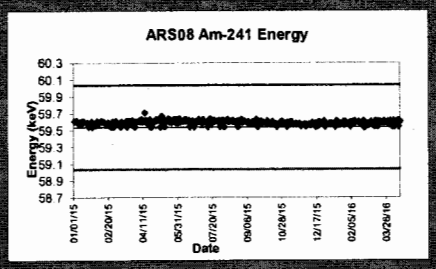



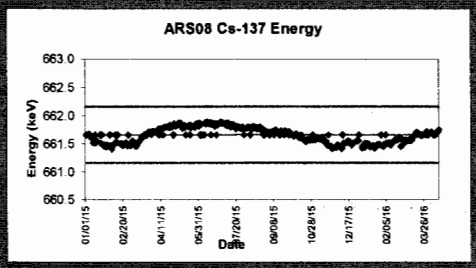
# ARS08 GAMMA SPECTROMETER CONTROL CHARTS

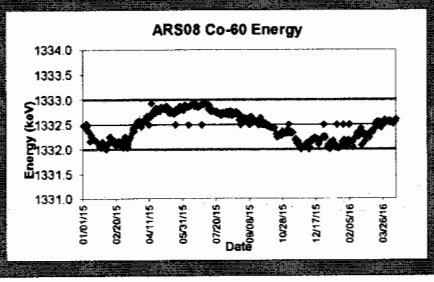


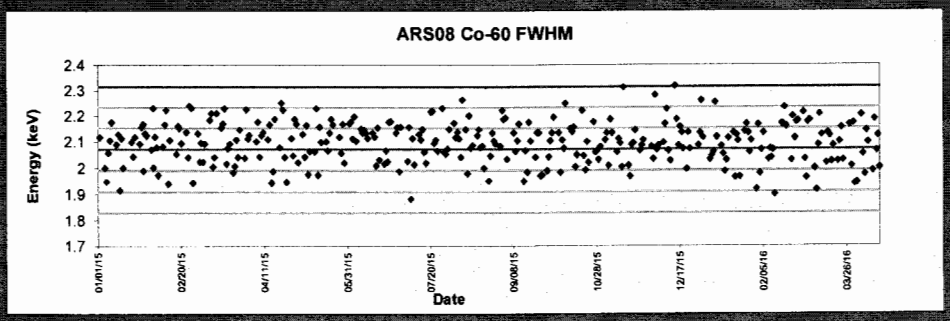



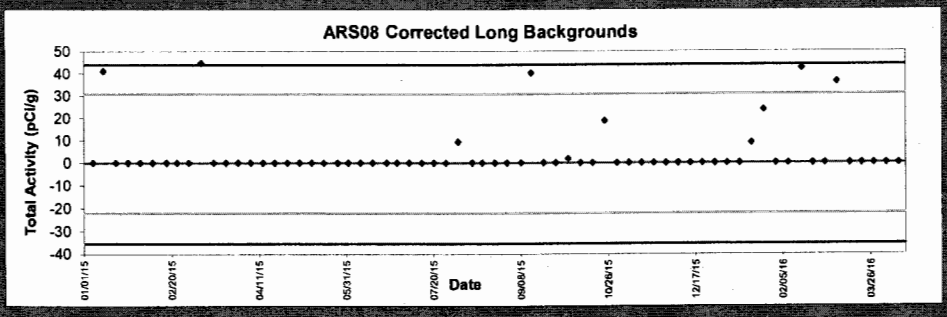



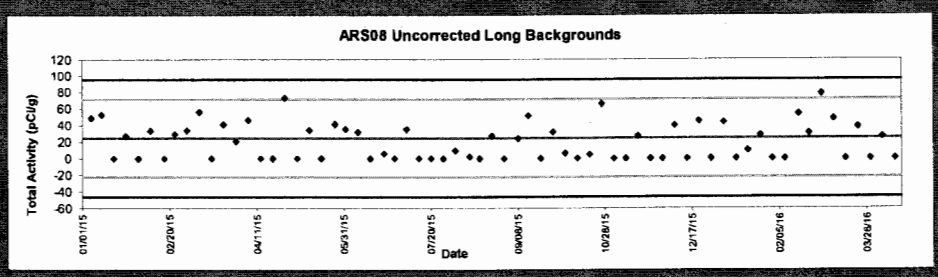



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# Radiological Analysis

## EPA 905.0/SRW-01

***SDG# ARS1-16-00671***

***COC# HPSD1-285***

# Analytical Batch Report



DCN: ITSI-0808-0004-0076, 8 May 2019



**Analysis Batch ID** **ARS1-B16-00514**

| Method | ARS-032 | Analysis | GPC-A-012 | Matrix | SO |
|---|---|---|---|---|---|

**Description** **Strontium-90 (Soil, Sludge, Biota, Sediment)**

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | LCS | B-21091 | | | | | | | | |
| ARS1-B16-00514-02 | LCSD | B-21092 | | | | | | | | |
| ARS1-B16-00514-03 | MBL | | | | | | | | | |
| ARS1-B16-00514-04 | DUP | | | | | | | | | |
| ARS1-B16-00514-05 | DO | | | | **ARS1-16-00645** | 021 | 1 | 07-PE-0068-21 | STD | 04/17/16 |
| ARS1-B16-00514-06 | TRG | | | | **ARS1-16-00645** | 022 | 1 | 07-PE-0068-22 | STD | 04/17/16 |
| ARS1-B16-00514-07 | TRG | | | | **ARS1-16-00645** | 023 | 1 | 07-PE-0068-23 | STD | 04/17/16 |
| ARS1-B16-00514-08 | TRG | | | | **ARS1-16-00646** | 001 | 1 | 07-E2-T5EX1-598 | STD | 04/17/16 |
| ARS1-B16-00514-09 | TRG | | | | **ARS1-16-00646** | 002 | 1 | 07-E2-T5EX1-599 | STD | 04/17/16 |
| ARS1-B16-00514-10 | TRG | | | | **ARS1-16-00646** | 003 | 1 | 07-E2-T5EX1-600 | STD | 04/17/16 |
| ARS1-B16-00514-11 | TRG | | | | **ARS1-16-00646** | 004 | 1 | 07-E2-T5EX1-601 | STD | 04/17/16 |
| ARS1-B16-00514-12 | TRG | | | | **ARS1-16-00670** | 001 | 1 | 04-PD-RO-01-01 | STD | 04/22/16 |
| ARS1-B16-00514-13 | TRG | | | | **ARS1-16-00670** | 003 | 1 | 04-PD-RO-03-01 | STD | 04/22/16 |
| ARS1-B16-00514-14 | TRG | | | | **ARS1-16-00670** | 016 | 1 | 04-PD-RO-08-01 | STD | 04/22/16 |
| ARS1-B16-00514-15 | TRG | | | | **ARS1-16-00670** | 031 | 1 | 04-PD-RO-15-01 | STD | 04/22/16 |
| ARS1-B16-00514-16 | TRG | | | | **ARS1-16-00671** | 001 | 1 | 04-PD-STK-01-01 | STD | 04/22/16 |
| ARS1-B16-00514-17 | TRG | | | | **ARS1-16-00671** | 011 | 1 | 04-PD-STK-01-11 | STD | 04/22/16 |
| ARS1-B16-00514-18 | TRG | | | | **ARS1-16-00749** | 001 | 1 | 07-PE-0069-01 | STD | 05/03/16 |
| ARS1-B16-00514-19 | TRG | | | | **ARS1-16-00749** | 002 | 1 | 07-PE-0069-02 | STD | 05/03/16 |
| ARS1-B16-00514-20 | TRG | | | | **ARS1-16-00749** | 003 | 1 | 07-PE-0069-03 | STD | 05/03/16 |
| ARS1-B16-00514-21 | TRG | | | | **ARS1-16-00749** | 004 | 1 | 07-PE-0069-04 | STD | 05/03/16 |
| ARS1-B16-00514-22 | TRG | | | | **ARS1-16-00749** | 005 | 1 | 07-PE-0069-05 | STD | 05/03/16 |
| ARS1-B16-00514-23 | TRG | | | | **ARS1-16-00749** | 006 | 1 | 07-PE-0069-06 | STD | 05/03/16 |
| ARS1-B16-00514-24 | TRG | | | | **ARS1-16-00749** | 007 | 1 | 07-PE-0069-07 | STD | 05/03/16 |

N-1054

DCN: ITSI-0808-00004-0076, 8 May 2019



# Analytical Batch Report

**Analysis Batch ID** **ARS1-B16-00514**

**Method** ARS-032 **Analysis** GPC-A-012 **Matrix** SO

**Description** Strontium-90 (Soil, Sludge, Biota, Sediment)

| ABatch Sample ID | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Group Name | Lab Deadline |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | LCS | B-21091 | | | | | | | | |
| ARS1-B16-00514-02 | LCSD | B-21092 | | | | | | | | |
| ARS1-B16-00514-03 | MBL | | | | | | | | | |
| ARS1-B16-00514-04 | DUP | | | | | | | | | |
| ARS1-B16-00514-05 | DO | | | | **ARS1-16-00645** | 021 | 1 | 07-PE-0068-21 | STD | 04/17/16 |
| ARS1-B16-00514-06 | TRG | | | | **ARS1-16-00645** | 022 | 1 | 07-PE-0068-22 | STD | 04/17/16 |
| ARS1-B16-00514-07 | TRG | | | | **ARS1-16-00645** | 023 | 1 | 07-PE-0068-23 | STD | 04/17/16 |
| ARS1-B16-00514-08 | TRG | | | | **ARS1-16-00646** | 001 | 1 | 07-E2-T5EX1-598 | STD | 04/17/16 |
| ARS1-B16-00514-09 | TRG | | | | **ARS1-16-00646** | 002 | 1 | 07-E2-T5EX1-599 | STD | 04/17/16 |
| ARS1-B16-00514-10 | TRG | | | | **ARS1-16-00646** | 003 | 1 | 07-E2-T5EX1-600 | STD | 04/17/16 |
| ARS1-B16-00514-11 | TRG | | | | **ARS1-16-00646** | 004 | 1 | 07-E2-T5EX1-601 | STD | 04/17/16 |
| ARS1-B16-00514-12 | TRG | | | | **ARS1-16-00670** | 001 | 1 | 04-PD-RO-01-01 | STD | 04/22/16 |
| ARS1-B16-00514-13 | TRG | | | | **ARS1-16-00670** | 003 | 1 | 04-PD-RO-03-01 | STD | 04/22/16 |
| ARS1-B16-00514-14 | TRG | | | | **ARS1-16-00670** | 016 | 1 | 04-PD-RO-08-01 | STD | 04/22/16 |
| ARS1-B16-00514-15 | TRG | | | | **ARS1-16-00670** | 031 | 1 | 04-PD-RO-15-01 | STD | 04/22/16 |
| ARS1-B16-00514-16 | TRG | | | | **ARS1-16-00671** | 001 | 1 | 04-PD-STK-01-01 | STD | 04/22/16 |
| ARS1-B16-00514-17 | TRG | | | | **ARS1-16-00671** | 011 | 1 | 04-PD-STK-01-11 | STD | 04/22/16 |
| ARS1-B16-00514-18 | TRG | | | | **ARS1-16-00749** | 001 | 1 | 07-PE-0069-01 | STD | 05/03/16 |
| ARS1-B16-00514-19 | TRG | | | | **ARS1-16-00749** | 002 | 1 | 07-PE-0069-02 | STD | 05/03/16 |
| ARS1-B16-00514-20 | TRG | | | | **ARS1-16-00749** | 003 | 1 | 07-PE-0069-03 | STD | 05/03/16 |
| ARS1-B16-00514-21 | TRG | | | | **ARS1-16-00749** | 004 | 1 | 07-PE-0069-04 | STD | 05/03/16 |
| ARS1-B16-00514-22 | TRG | | | | **ARS1-16-00749** | 005 | 1 | 07-PE-0069-05 | STD | 05/03/16 |
| ARS1-B16-00514-23 | TRG | | | | **ARS1-16-00749** | 006 | 1 | 07-PE-0069-06 | STD | 05/03/16 |
| ARS1-B16-00514-24 | TRG | | | | **ARS1-16-00749** | 007 | 1 | 07-PE-0069-07 | STD | 05/03/16 |

N-1055

# Total Strontium (Sr-90) EPA 905.0



*Procedures* ARS-060 ARS-032

*ARS File ID Number* ARS1-16-00645; 646; 670; 671 & 749

*ARS Batch Number* ARS1-B16-00514

| | |
|---|---|
| Carrier ID | R15-00145 |
| Carrier Concentration (mg Sr/mL) | 5 |
| Carrier volume (mL) | 1 |
| Carrier added (mg) | 5 |
| grav. Factor (mg Sr / mg Sr(NO3)2 | 0.4141 |
| Carrier expected mass (mg) | 12.07 |

| | |
|---|---|
| *systematic error* | 7.43% |
| *CF* | 2 |

Instrument Used: A

| | ID | Aliquot | Aliquot Units | Desired reporting units | Start of Y-90 ingrowth | Planchet tare (g) | Planchet + ppt (g) | net mass of Sr(NO3)2 (mg) | chemical yield | Chemical Yield for calculations | Beta Gross (counts) | Count duration (min) | Beta Bkg counts | Beta bkg count duration (min) | Count Finish Date and Time | Det. ID | Total Sr (Sr/Y-90) Beta Efficiency | Activity | Counting Uncert. (2s) | CSU (2s) | MDA | Lc | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B16-00514-01 | 1 | g | pCi | 4/13/2016 17:24 | 7.8606 | 7.8724 | 11.8 | 98% | 98% | 2733 | 120 | 1176 | 900 | 4/14/2016 13:36 | A2 | 0.3615 | 23.045 | 0.939 | 3.551 | 0.417 | 0.196 | pCi/g |
| 2 | | # | g | pCi | M/DD/YYYY HH:MM | | | #VALUE! | #VALUE! | #VALUE! | | 120 | | 900 | | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 3 | B16-00514-03 | 1 | g | pCi | 4/13/2016 17:24 | 7.8577 | 7.8695 | 11.8 | 98% | 98% | 129 | 120 | 958 | 900 | 4/14/2016 13:36 | A3 | 0.3382 | 0.012 | 0.231 | 0.231 | 0.404 | 0.189 | pCi/g |
| 4 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 5 | B16-00514-05 | 2.1095 | g | pCi | 4/13/2016 17:22 | 7.8479 | 7.8599 | 12.0 | 99% | 99% | 120 | 120 | 1021 | 900 | 4/14/2016 13:36 | A4 | 0.3482 | -0.070 | 0.102 | 0.102 | 0.189 | 0.088 | pCi/g |
| 6 | B16-00514-06 | 2.106 | g | pCi | 4/13/2016 17:24 | 7.8789 | 7.8904 | 11.5 | 95% | 95% | 95 | 120 | 745 | 900 | 4/14/2016 13:36 | B1 | 0.3467 | -0.020 | 0.095 | 0.095 | 0.171 | 0.079 | pCi/g |
| 7 | B16-00514-07 | 2.1022 | g | pCi | 4/13/2016 17:26 | 7.7860 | 7.7980 | 12.0 | 99% | 99% | 82 | 120 | 703 | 900 | 4/14/2016 13:36 | B2 | 0.3640 | -0.049 | 0.081 | 0.081 | 0.152 | 0.070 | pCi/g |
| 8 | B16-00514-08 | 2.1086 | g | pCi | 4/13/2016 17:27 | 7.8351 | 7.8472 | 12.1 | 100% | 100% | 114 | 120 | 751 | 900 | 4/14/2016 13:36 | B3 | 0.3324 | 0.063 | 0.102 | 0.102 | 0.170 | 0.079 | pCi/g |
| 9 | B16-00514-09 | 2.1055 | g | pCi | 4/13/2016 17:44 | 7.8208 | 7.8334 | 12.6 | 104% | 100% | 120 | 120 | 879 | 900 | 4/14/2016 13:36 | B4 | 0.3475 | 0.012 | 0.101 | 0.101 | 0.176 | 0.082 | pCi/g |
| 10 | B16-00514-10 | 2.1042 | g | pCi | 4/13/2016 17:25 | 7.7793 | 7.7909 | 11.6 | 96% | 96% | 107 | 120 | 803 | 900 | 4/14/2016 13:36 | C1 | 0.3575 | 0.000 | 0.096 | 0.096 | 0.170 | 0.079 | pCi/g |
| 11 | B16-00514-11 | 2.1048 | g | pCi | 4/13/2016 17:25 | 7.8388 | 7.8507 | 11.9 | 99% | 99% | 123 | 120 | 806 | 900 | 4/14/2016 13:36 | C2 | 0.3563 | 0.066 | 0.100 | 0.101 | 0.167 | 0.078 | pCi/g |
| 12 | B16-00514-12 | 2.1048 | g | pCi | 4/13/2016 17:27 | 7.8522 | 7.8640 | 11.8 | 98% | 98% | 103 | 120 | 688 | 900 | 4/14/2016 13:36 | C4 | 0.3503 | 0.049 | 0.094 | 0.094 | 0.159 | 0.074 | pCi/g |
| 13 | B16-00514-13 | 2.1043 | g | pCi | 4/13/2016 17:23 | 7.7873 | 7.7981 | 10.8 | 89% | 89% | 122 | 120 | 754 | 900 | 4/14/2016 13:36 | D1 | 0.3267 | 0.110 | 0.120 | 0.121 | 0.194 | 0.090 | pCi/g |
| 14 | B16-00514-14 | 2.103 | g | pCi | 4/13/2016 17:28 | 7.8364 | 7.8484 | 12.0 | 99% | 99% | 106 | 120 | 746 | 900 | 4/14/2016 13:36 | D3 | 0.3466 | 0.029 | 0.095 | 0.095 | 0.164 | 0.076 | pCi/g |
| 15 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 16 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 17 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 18 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | pCi/g |
| 19 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 20 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 21 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 22 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 23 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |
| 24 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | | | | M/DD/YYYY HH:MM | | #N/A | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #DIV/0! | pCi/g |

# Total Strontium (Sr-90) EPA 905.0

*Procedures* ARS-060 ARS-032

*ARS File ID Number* ARS1-16-00645; 646; 670; 671; 749

*ARS Batch Number* ARS1-B16-00514

| | |
|---|---|
| Carrier ID | R15-00145 |
| Carrier Concentration (mg Sr/mL) | 5 |
| Carrier volume (mL) | 1 |
| Carrier added (mg) | 5 |
| grav. Factor (mg Sr / mg Sr(NO3)2 | 0.4141 |
| Carrier expected mass (mg) | 12.07 |

| | |
|---|---|
| *systematic error* | 7.43% |
| *CF* | 2 |

Instrument Used: C

| | ID | Aliquot | Aliquot Units | Desired reporting units | Start of Y-90 ingrowth | Planchet tare (g) | Planchet + ppt (g) | net mass of Sr(NO3)2 (mg) | chemical yield | Chemical Yield for calculations | Beta Gross (counts) | Count duration (min) | Beta Bkg counts | Beta bkg count duration (min) | Count Finish Date and Time | Det. ID | Total Sr (Sr/Y-90) Beta Efficiency | Activity | Counting Uncert. (2s) | CSU (2s) | MDA | Lc | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 2 | B16-00514-02 | 1 | g | pCi | 4/13/2016 17:23 | 7.8401 | 7.8519 | 11.8 | 98% | 98% | 2796 | 120 | 852 | 900 | 4/14/2016 13:38 | A1 | 0.3695 | 23.470 | 0.928 | 3.609 | 0.350 | 0.163 | pCi/g |
| 3 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 4 | B16-00514-04 | 2.1029 | g | pCi | 4/13/2016 17:25 | 7.8389 | 7.8508 | 11.9 | 99% | 99% | 119 | 120 | 854 | 900 | 4/14/2016 13:38 | A2 | 0.3454 | 0.023 | 0.102 | 0.102 | 0.177 | 0.082 | pCi/g |
| 5 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 6 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 7 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 8 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 9 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 10 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 11 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 12 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 13 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 14 | | # | g | pCi | M/DD/YYYY HH:MM | | | 0.0 | 0% | 0% | | 120 | | 900 | M/DD/YYYY HH:MM | | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | pCi/g |
| 15 | B16-00514-15 | 2.102 | g | pCi | 4/13/2016 17:23 | 7.8239 | 7.8354 | 11.5 | 95% | 95% | 90 | 120 | 750 | 900 | 4/14/2016 13:38 | A3 | 0.3702 | -0.043 | 0.087 | 0.087 | 0.161 | 0.075 | pCi/g |
| 16 | B16-00514-16 | 2.1106 | g | pCi | 4/13/2016 17:33 | 7.8047 | 7.8161 | 11.4 | 94% | 94% | 106 | 120 | 869 | 900 | 4/14/2016 13:38 | A4 | 0.3447 | -0.045 | 0.101 | 0.102 | 0.186 | 0.087 | pCi/g |
| 17 | B16-00514-17 | 2.1077 | g | pCi | 4/13/2016 17:24 | 7.8464 | 7.8562 | 11.8 | 98% | 98% | 97 | 120 | 673 | 900 | 4/14/2016 13:38 | B1 | 0.3680 | 0.030 | 0.087 | 0.087 | 0.150 | 0.069 | pCi/g |
| 18 | B16-00514-18 | 2.1089 | g | pCi | 4/13/2016 17:22 | 7.8748 | 7.8867 | 11.9 | 99% | 99% | 105 | 120 | 751 | 900 | 4/14/2016 13:38 | B2 | 0.3376 | 0.022 | 0.098 | 0.098 | 0.170 | 0.079 | pCi/g |
| 19 | B16-00514-19 | 2.105 | g | pCi | 4/13/2016 17:22 | 7.8243 | 7.8364 | 12.1 | 100% | 100% | 94 | 120 | 741 | 900 | 4/14/2016 13:38 | B4 | 0.3389 | -0.021 | 0.092 | 0.092 | 0.166 | 0.077 | pCi/g |
| 20 | B16-00514-20 | 2.1063 | g | pCi | 4/13/2016 17:26 | 7.7830 | 7.7952 | 12.2 | 101% | 100% | 118 | 120 | 760 | 900 | 4/14/2016 13:38 | C1 | 0.3652 | 0.068 | 0.094 | 0.095 | 0.156 | 0.072 | pCi/g |
| 21 | B16-00514-21 | 2.1069 | g | pCi | 4/13/2016 17:23 | 7.8288 | 7.8413 | 12.5 | 104% | 100% | 105 | 120 | 1258 | 900 | 4/14/2016 13:38 | C2 | 0.3385 | -0.278 | 0.100 | 0.108 | 0.213 | 0.100 | pCi/g |
| 22 | B16-00514-22 | 2.1066 | g | pCi | 4/13/2016 17:23 | 7.8352 | 7.8472 | 12.0 | 99% | 99% | 105 | 120 | 783 | 900 | 4/14/2016 13:38 | C3 | 0.3649 | 0.002 | 0.090 | 0.090 | 0.159 | 0.074 | pCi/g |
| 23 | B16-00514-23 | 2.1068 | g | pCi | 4/13/2016 17:26 | 7.8541 | 7.8654 | 11.3 | 94% | 94% | 118 | 120 | 946 | 900 | 4/14/2016 13:38 | C4 | 0.3434 | -0.038 | 0.108 | 0.109 | 0.196 | 0.092 | pCi/g |
| 24 | B16-00514-24 | 2.1054 | g | pCi | 4/13/2016 17:23 | 7.7827 | 7.7943 | 11.6 | 96% | 96% | 98 | 120 | 711 | 900 | 4/14/2016 13:38 | D1 | 0.3667 | 0.014 | 0.090 | 0.090 | 0.157 | 0.073 | pCi/g |

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | 16-00514-10 | 15 | 107 | 120 | 1402.5 | 4/14/16 13:36 |
| C2 | 16-00514-11 | 13 | 123 | 120 | 1402.5 | 4/14/16 13:36 |
| C4 | 16-00514-12 | 11 | 103 | 120 | 1402.5 | 4/14/16 13:36 |
| A2 | 16-00514-01 | 19 | 2733 | 120 | 1402.5 | 4/14/16 13:36 |
| A3 | 16-00514-03 | 9 | 129 | 120 | 1402.5 | 4/14/16 13:36 |
| D1 | 16-00514-13 | 6 | 122 | 120 | 1402.5 | 4/14/16 13:36 |
| A4 | 16-00514-05 | 5 | 120 | 120 | 1402.5 | 4/14/16 13:36 |
| D3 | 16-00514-14 | 6 | 106 | 120 | 1402.5 | 4/14/16 13:36 |
| B1 | 16-00514-06 | 4 | 95 | 120 | 1402.5 | 4/14/16 13:36 |
| B2 | 16-00514-07 | 6 | 82 | 120 | 1402.5 | 4/14/16 13:36 |
| B3 | 16-00514-08 | 8 | 114 | 120 | 1402.5 | 4/14/16 13:36 |
| B4 | 16-00514-09 | 24 | 120 | 120 | 1402.5 | 4/14/16 13:36 |

N-1058

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | 16-00514-20 | 6 | 118 | 120 | 1410 | 4/14/16 13:38 |
| C2 | 16-00514-21 | 6 | 105 | 120 | 1410 | 4/14/16 13:38 |
| C3 | 16-00514-22 | 9 | 105 | 120 | 1410 | 4/14/16 13:38 |
| A1 | 16-00514-02 | 10 | 2796 | 120 | 1410 | 4/14/16 13:38 |
| C4 | 16-00514-23 | 15 | 118 | 120 | 1410 | 4/14/16 13:38 |
| A2 | 16-00514-04 | 3 | 119 | 120 | 1410 | 4/14/16 13:38 |
| A3 | 16-00514-15 | 5 | 90 | 120 | 1410 | 4/14/16 13:38 |
| A4 | 16-00514-16 | 4 | 106 | 120 | 1410 | 4/14/16 13:38 |
| D1 | 16-00514-24 | 5 | 98 | 120 | 1410 | 4/14/16 13:38 |
| B1 | 16-00514-17 | 4 | 97 | 120 | 1410 | 4/14/16 13:38 |
| B2 | 16-00514-18 | 6 | 105 | 120 | 1410 | 4/14/16 13:38 |
| B4 | 16-00514-19 | 6 | 94 | 120 | 1410 | 4/14/16 13:38 |

N-1059

GEN 155
A 35723
LONG BKG
WJS

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 83 | 1310 | 900 | 1402.5 | 4/9/16 6:00 |
| A2 | A2-01 | 128 | 1176 | 900 | 1402.5 | 4/9/16 6:00 |
| A3 | A3-01 | 105 | 958 | 900 | 1402.5 | 4/9/16 6:00 |
| A4 | A4-01 | 107 | 1021 | 900 | 1402.5 | 4/9/16 6:00 |
| C1 | C1-01 | 79 | 803 | 900 | 1402.5 | 4/9/16 6:00 |
| C2 | C2-01 | 132 | 806 | 900 | 1402.5 | 4/9/16 6:00 |
| C3 | C3-01 | 31 | 1074 | 900 | 1402.5 | 4/9/16 6:00 |
| C4 | C4-01 | 65 | 688 | 900 | 1402.5 | 4/9/16 6:00 |
| B1 | B1-01 | 45 | 745 | 900 | 1402.5 | 4/9/16 6:01 |
| B2 | B2-01 | 43 | 703 | 900 | 1402.5 | 4/9/16 6:01 |
| B3 | B3-01 | 82 | 751 | 900 | 1402.5 | 4/9/16 6:01 |
| B4 | B4-01 | 115 | 879 | 900 | 1402.5 | 4/9/16 6:01 |
| D1 | D1-01 | 41 | 754 | 900 | 1402.5 | 4/9/16 6:01 |
| D2 | D2-01 | 59 | 1340 | 900 | 1402.5 | 4/9/16 6:01 |
| D3 | D3-01 | 41 | 746 | 900 | 1402.5 | 4/9/16 6:01 |
| D4 | D4-01 | 56 | 1354 | 900 | 1402.5 | 4/9/16 6:01 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-1060

GEN 945
C 11160
LONG BKG
WJS

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 78 | 852 | 900 | 1410 | 4/9/16 6:03 |
| A2 | A2-01 | 49 | 854 | 900 | 1410 | 4/9/16 6:03 |
| A3 | A3-01 | 42 | 750 | 900 | 1410 | 4/9/16 6:03 |
| A4 | A4-01 | 66 | 869 | 900 | 1410 | 4/9/16 6:03 |
| C1 | C1-01 | 73 | 760 | 900 | 1410 | 4/9/16 6:04 |
| C2 | C2-01 | 119 | 1258 | 900 | 1410 | 4/9/16 6:04 |
| C3 | C3-01 | 117 | 783 | 900 | 1410 | 4/9/16 6:04 |
| C4 | C4-01 | 90 | 946 | 900 | 1410 | 4/9/16 6:04 |
| D1 | D1-01 | 46 | 711 | 900 | 1410 | 4/9/16 6:04 |
| D2 | D2-01 | 50 | 799 | 900 | 1410 | 4/9/16 6:04 |
| D3 | D3-01 | 34 | 689 | 900 | 1410 | 4/9/16 6:04 |
| D4 | D4-01 | 42 | 737 | 900 | 1410 | 4/9/16 6:04 |
| B1 | B1-01 | 50 | 673 | 900 | 1410 | 4/9/16 6:04 |
| B2 | B2-01 | 48 | 751 | 900 | 1410 | 4/9/16 6:04 |
| B3 | B3-01 | 47 | 3374 | 900 | 1410 | 4/9/16 6:04 |
| B4 | B4-01 | 54 | 741 | 900 | 1410 | 4/9/16 6:04 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-1061

DCN: ITSL-0808-0004-0076, 8 May 2019



## Reagent Amounts

| ABatch Sample ID | Client ID | 14.1.4 - Add Carrier 1 - Strontium Carrier 5mg/mL (mL) | 14.3.1 - Select Sr column - SR Resin (SR-R50-S) 2 mL Cartridges (mL) | 14.3.4 - Pre-load rinse - Nitric Acid 8N (mL) | 14.4.1 - Dissolve PPT - Nitric Acid 8N (mL) | 14.4.3 - Beaker rinse - Nitric Acid 8N (mL) | 14.4.4 - Interferent Rinse 1 - Nitric Acid Oxalic Acid 3M/0.05M (mL) | 14.4.5 - Rinse of Interferent Rinse 1 - Nitric Acid 8N (mL) | 14.4.8 - Elute Sr - Nitric Acid 0.05N (mL) | 14.6.6 - Elution vessel rinse - Nitric Acid 0.05N (mL) | User ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-02 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-03 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-04 | | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-05 | 07-PE-0068-21 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-06 | 07-PE-0068-22 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-07 | 07-PE-0068-23 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-08 | 07-E2-T5EX1-598 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-09 | 07-E2-T5EX1-599 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-10 | 07-E2-T5EX1-600 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-11 | 07-E2-T5EX1-601 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-12 | 04-PD-RO-01-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-13 | 04-PD-RO-03-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-14 | 04-PD-RO-08-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-15 | 04-PD-RO-15-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-16 | 04-PD-STK-01-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-17 | 04-PD-STK-01-11 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-18 | 07-PE-0069-01 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-19 | 07-PE-0069-02 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-20 | 07-PE-0069-03 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-21 | 07-PE-0069-04 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-22 | 07-PE-0069-05 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-23 | 07-PE-0069-06 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |
| ARS1-B16-00514-24 | 07-PE-0069-07 | 1.00 | 2.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 | 10.00 | 2.00 | ANABATILAN |

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## Reagent Tracking

| Procedure Section | Reagent ID |
|---|---|
| 14.1.4 - Add Carrier 1 | R15-00145 |
| 14.3.1 - Select Sr column | R15-00877 |
| 14.3.4 - Pre-load rinse | R15-00700 |
| 14.4.1 - Dissolve PPT | R15-00700 |
| 14.4.3 - Beaker rinse | R15-00700 |
| 14.4.4 - Interferent Rinse 1 | R15-00974 |
| 14.4.5 - Rinse of Interferent Rinse 1 | R15-00700 |
| 14.4.8 - Elute Sr | R15-00949 |
| 14.6.6 - Elution vessel rinse | R15-00949 |

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## Procedure Data

| ABatch Sample ID | Client ID | ICOC ID | Aliquot Vol/Wt | Aliquot Units | Strontium Carrier (5mg/ml) | Y Ingrowth Date 1 | Disk Wt (g) | Disk Wt 2 (g) | Y Ingrowth Date 2 | User ID |
|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-01 | | | 1.0000 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8606 | 7.8724 | | ANABATILAN |
| ARS1-B16-00514-02 | | | 1.0000 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8401 | 7.8519 | | ANABATILAN |
| ARS1-B16-00514-03 | | | 1.0000 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8577 | 7.8695 | | ANABATILAN |
| ARS1-B16-00514-04 | | | 2.1029 | g | R15-00145 | 4/13/2016 5:25:00 PM | 7.8389 | 7.8508 | | ANABATILAN |
| ARS1-B16-00514-05 | 07-PE-0068-21 | 230486 | 2.1095 | g | R15-00145 | 4/13/2016 5:22:00 PM | 7.8479 | 7.8599 | | ANABATILAN |
| ARS1-B16-00514-06 | 07-PE-0068-22 | 230488 | 2.1060 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8789 | 7.8904 | | ANABATILAN |
| ARS1-B16-00514-07 | 07-PE-0068-23 | 230487 | 2.1022 | g | R15-00145 | 4/13/2016 5:26:00 PM | 7.786 | 7.798 | | ANABATILAN |
| ARS1-B16-00514-08 | 07-E2-T5EX1-598 | 230501 | 2.1086 | g | R15-00145 | 4/13/2016 5:27:00 PM | 7.8351 | 7.8472 | | ANABATILAN |
| ARS1-B16-00514-09 | 07-E2-T5EX1-599 | 230502 | 2.1055 | g | R15-00145 | 4/13/2016 5:44:00 PM | 7.8208 | 7.8334 | | ANABATILAN |
| ARS1-B16-00514-10 | 07-E2-T5EX1-600 | 230503 | 2.1042 | g | R15-00145 | 4/13/2016 5:25:00 PM | 7.7793 | 7.7909 | | ANABATILAN |
| ARS1-B16-00514-11 | 07-E2-T5EX1-601 | 230505 | 2.1048 | g | R15-00145 | 4/13/2016 5:25:00 PM | 7.8388 | 7.8507 | | ANABATILAN |
| ARS1-B16-00514-12 | 04-PD-RO-01-01 | 230512 | 2.1048 | g | R15-00145 | 4/13/2016 5:27:00 PM | 7.8522 | 7.864 | | ANABATILAN |
| ARS1-B16-00514-13 | 04-PD-RO-03-01 | 230514 | 2.1043 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.7873 | 7.7981 | | ANABATILAN |
| ARS1-B16-00514-14 | 04-PD-RO-08-01 | 230515 | 2.1030 | g | R15-00145 | 4/13/2016 5:28:00 PM | 7.8364 | 7.8484 | | ANABATILAN |
| ARS1-B16-00514-15 | 04-PD-RO-15-01 | 230516 | 2.1020 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8239 | 7.8354 | | ANABATILAN |
| ARS1-B16-00514-16 | 04-PD-STK-01-01 | 230506 | 2.1106 | g | R15-00145 | 4/13/2016 5:33:00 PM | 7.8047 | 7.8161 | | ANABATILAN |
| ARS1-B16-00514-17 | 04-PD-STK-01-11 | 230508 | 2.1077 | g | R15-00145 | 4/13/2016 5:24:00 PM | 7.8464 | 7.8582 | | ANABATILAN |
| ARS1-B16-00514-18 | 07-PE-0069-01 | 230517 | 2.1089 | g | R15-00145 | 4/13/2016 5:22:00 PM | 7.8748 | 7.8867 | | ANABATILAN |
| ARS1-B16-00514-19 | 07-PE-0069-02 | 230518 | 2.1050 | g | R15-00145 | 4/13/2016 5:22:00 PM | 7.8243 | 7.8364 | | ANABATILAN |
| ARS1-B16-00514-20 | 07-PE-0069-03 | 230519 | 2.1063 | g | R15-00145 | 4/13/2016 5:26:00 PM | 7.783 | 7.7952 | | ANABATILAN |
| ARS1-B16-00514-21 | 07-PE-0069-04 | 230520 | 2.1069 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8288 | 7.8413 | | ANABATILAN |
| ARS1-B16-00514-22 | 07-PE-0069-05 | 230521 | 2.1066 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.8352 | 7.8472 | | ANABATILAN |
| ARS1-B16-00514-23 | 07-PE-0069-06 | 230523 | 2.1068 | g | R15-00145 | 4/13/2016 5:26:00 PM | 7.8541 | 7.8654 | | ANABATILAN |
| ARS1-B16-00514-24 | 07-PE-0069-07 | 230524 | 2.1054 | g | R15-00145 | 4/13/2016 5:23:00 PM | 7.7827 | 7.7943 | | ANABATILAN |

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Sr Yield Calculation Sheet
B16-00514

| | Empty | Filled | Yield(mg) | |
|---|---|---|---|---|
| 1 | 7.8606 | 7.8724 | 11.8 | Pass |
| 2 | 7.8401 | 7.8519 | 11.8 | Pass |
| 3 | 7.8577 | 7.8695 | 11.8 | Pass |
| 4 | 7.8389 | 7.8508 | 11.9 | Pass |
| 5 | 7.8479 | 7.8599 | 12 | Pass |
| 6 | 7.8789 | 7.8904 | 11.5 | Pass |
| 7 | 7.786 | 7.798 | 12 | Pass |
| 8 | 7.8351 | 7.8472 | 12.1 | Pass |
| 9 | 7.8208 | 7.8334 | 12.6 | Pass |
| 10 | 7.7793 | 7.7909 | 11.6 | Pass |
| 11 | 7.8388 | 7.8507 | 11.9 | Pass |
| 12 | 7.8522 | 7.864 | 11.8 | Pass |
| 13 | 7.7873 | 7.7981 | 10.8 | Pass |
| 14 | 7.8364 | 7.8484 | 12 | Pass |
| 15 | 7.8239 | 7.8354 | 11.5 | Pass |
| 16 | 7.8047 | 7.8161 | 11.4 | Pass |
| 17 | 7.8464 | 7.8582 | 11.8 | Pass |
| 18 | 7.8748 | 7.8867 | 11.9 | Pass |
| 19 | 7.8243 | 7.8364 | 12.1 | Pass |
| 20 | 7.783 | 7.7952 | 12.2 | Pass |
| 21 | 7.8288 | 7.8413 | 12.5 | Pass |
| 22 | 7.8352 | 7.8472 | 12 | Pass |
| 23 | 7.8541 | 7.8654 | 11.3 | Pass |
| 24 | 7.7827 | 7.7943 | 11.6 | Pass |

# LCS Report
## Analytical Batch: ARS1-B16-00514



DCN: ITSI-0808-0004-0076, 8 May 2019

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| Blind ID | ABatch Sample ID | Blind Group | Std ID | Isotope | Exp Addition | Expected Value | Empty Wt | Gross Wt | Net Wt | Expected Value CT | Mid Point Count Date | Known Value | User ID | Mod Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B-21091 | ARS1-B16-00514-01 | B-Sr90 | S-0300 | Sr-90 | 1 | 21.05020 | 17.36 | 18.3604 | 1.0004 | | | | AMRAD\JBYRD | 03/30/2016 |
| B-21092 | ARS1-B16-00514-02 | B-Sr90 | S-0300 | Sr-90 | 1 | 21.05020 | 17.3561 | 18.3595 | 1.0034 | | | | AMRAD\JBYRD | 03/30/2016 |

DCN: ITSI-0808-0004-0076, 8 May 2019



# LB4100-A

\\lb4100\LB4100\LB4100\ORANGE\DATA\GENER167.XLD

| Batch Sample ID | Samples Transferred | Samples Eligible To Save |
|---|---|---|
| ARS1-B16-00514 | 12 | 12 |

| LIMS Batch Sample ID | Detector ID | LB4110 Sample ID | Alpha Counts | Beta Counts | Count Mins | LB4110 Voltage | LB4110 Count Date | Analysis Batch | LIMS SDG | LIMS Run | LIMS Fraction | LIMS Analysis |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARS1-B16-00514-10 | C1 | 16-00514-10 | 15.00 | 107.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 003 | GPC-A-012 |
| ARS1-B16-00514-11 | C2 | 16-00514-11 | 13.00 | 123.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 004 | GPC-A-012 |
| ARS1-B16-00514-12 | C4 | 16-00514-12 | 11.00 | 103.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-01 | A2 | 16-00514-01 | 19.00 | 2733.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-03 | A3 | 16-00514-03 | 9.00 | 129.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-13 | D1 | 16-00514-13 | 6.00 | 122.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 003 | GPC-A-012 |
| ARS1-B16-00514-05 | A4 | 16-00514-05 | 5.00 | 120.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00645 | 1 | 021 | GPC-A-012 |
| ARS1-B16-00514-14 | D3 | 16-00514-14 | 6.00 | 106.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 016 | GPC-A-012 |
| ARS1-B16-00514-06 | B1 | 16-00514-06 | 4.00 | 95.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00645 | 1 | 022 | GPC-A-012 |
| ARS1-B16-00514-07 | B2 | 16-00514-07 | 6.00 | 82.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00645 | 1 | 023 | GPC-A-012 |
| ARS1-B16-00514-08 | B3 | 16-00514-08 | 8.00 | 114.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-09 | B4 | 16-00514-09 | 24.00 | 120.00 | 120.00 | 1402.50 | 04/14/16 13:36 | ARS1-B16-00514 | ARS1-16-00646 | 1 | 002 | GPC-A-012 |

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DCN: ITSI-0808-0004-0076, 8 May 2019



| INTERNATIONAL | LB4100-C | | | | | \\Ars-f52mv91\LB4100\LB4100\GRAY\DATA\GENER957.XLD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Batch Sample ID | | | | | Samples Transferred | | | Samples Eligible To Save | | |
| | ARS1-B16-00514 | | | | | 12 | | | 12 | | |
| LIMS Batch Sample ID | Detector ID | LB4110 Sample ID | Alpha Counts | Beta Counts | Count Mins | LB4110 Voltage | LB4110 Count Date | Analysis Batch | LIMS SDG | LIMS Run | LIMS Fraction | LIMS Analysis |
| ARS1-B16-00514-20 | C1 | 16-00514-20 | 6.00 | 118.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 003 | GPC-A-012 |
| ARS1-B16-00514-21 | C2 | 16-00514-21 | 6.00 | 105.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 004 | GPC-A-012 |
| ARS1-B16-00514-22 | C3 | 16-00514-22 | 9.00 | 105.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 005 | GPC-A-012 |
| ARS1-B16-00514-02 | A1 | 16-00514-02 | 10.00 | 2796.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-23 | C4 | 16-00514-23 | 15.00 | 118.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 006 | GPC-A-012 |
| ARS1-B16-00514-04 | A2 | 16-00514-04 | 3.00 | 119.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | | | | |
| ARS1-B16-00514-15 | A3 | 16-00514-15 | 5.00 | 90.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00670 | 1 | 031 | GPC-A-012 |
| ARS1-B16-00514-16 | A4 | 16-00514-16 | 4.00 | 106.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00671 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-24 | D1 | 16-00514-24 | 5.00 | 98.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 007 | GPC-A-012 |
| ARS1-B16-00514-17 | B1 | 16-00514-17 | 4.00 | 97.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00671 | 1 | 011 | GPC-A-012 |
| ARS1-B16-00514-18 | B2 | 16-00514-18 | 6.00 | 105.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 001 | GPC-A-012 |
| ARS1-B16-00514-19 | B4 | 16-00514-19 | 6.00 | 94.00 | 120.00 | 1410.00 | 04/14/16 13:38 | ARS1-B16-00514 | ARS1-16-00749 | 1 | 002 | GPC-A-012 |

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# Carrier Pipette Verification

Chemist: Arielle Nabatilan

Date/Time: 4/12/2016

Batch: B16-00514

| Balance ID | Balance Calibration Date | Pipette ID | Nominal Weight (gms) | Measurement 1 (gms) | Measurement 2 (gms) | Measurement 3 (gms) | MEAN | Acceptance Limits ±2% Mean | STDEV | RSD% | Acceptance Limits <3% RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12332539 | 6/9/15 | FJ15820 | 1.00 | 0.993 | 0.992 | 0.994 | 0.99 | Pass | 0.001 | 0.097 | Pass |

# LB4100-A - Alpha Daily BKG Check



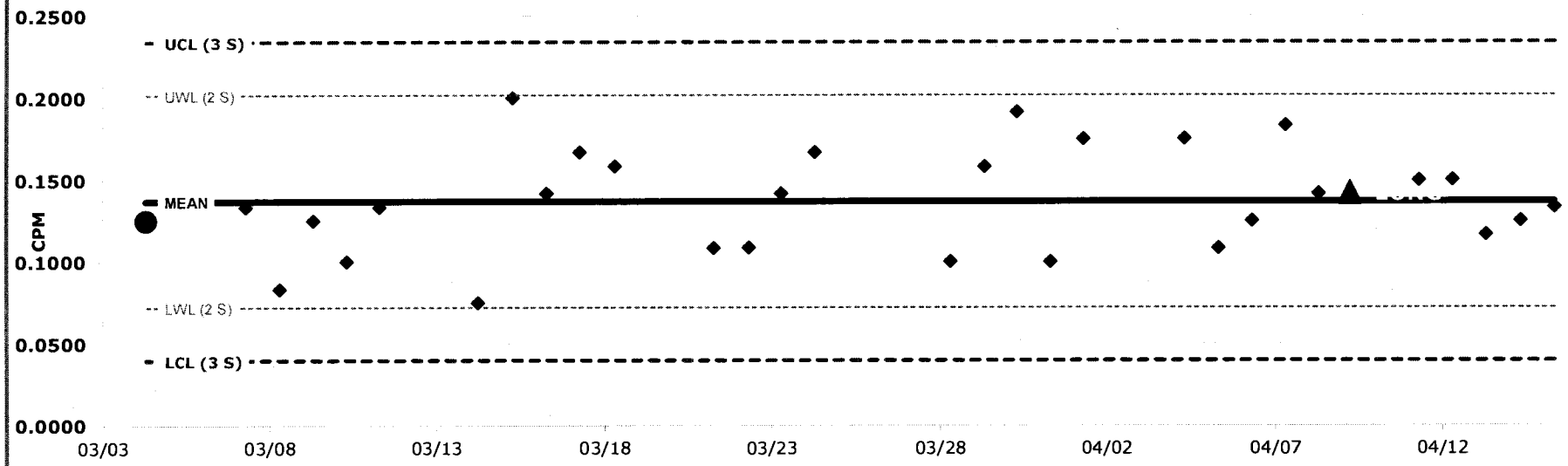
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK |
|---|---|---|---|
| Population Size | 29 | DER | 0.2495 |
| | | Long B Date | 04/09/16 |
| Average | 0.1368 | Long B CPM | 0.1422 |
| Standard Deviation | 0.0324 | Count Mins | 900.00 |
| + 3-sigma value | 0.2340 | Date | 04/15/16 |
| - 3-sigma value | 0.0396 | CPM | 0.1333 |
| | | Count Mins | 120.00 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

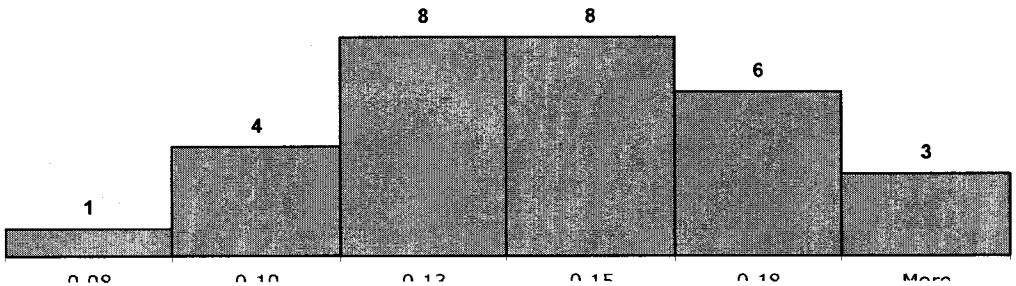



INTERNATIONAL

Statistical Process Control

| Bin | Frequency |
|---|---|
| 0.08 | 1 |
| 0.10 | 4 |
| 0.13 | 8 |
| 0.15 | 8 |
| 0.18 | 6 |
| More | 3 |

Population Frequency Distribution (Histogram)



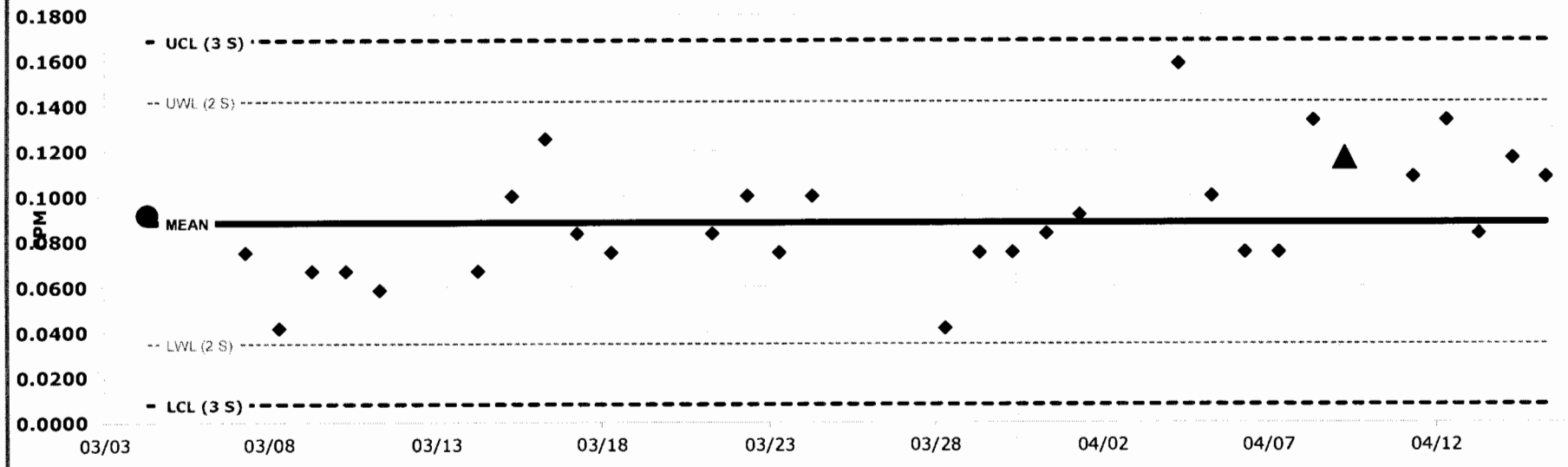
# LB4100-A - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.2594 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0882 | Long B CPM | 0.1167 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0268 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1685 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.0079 | CPM | 0.1083 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA BACKGROUND - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

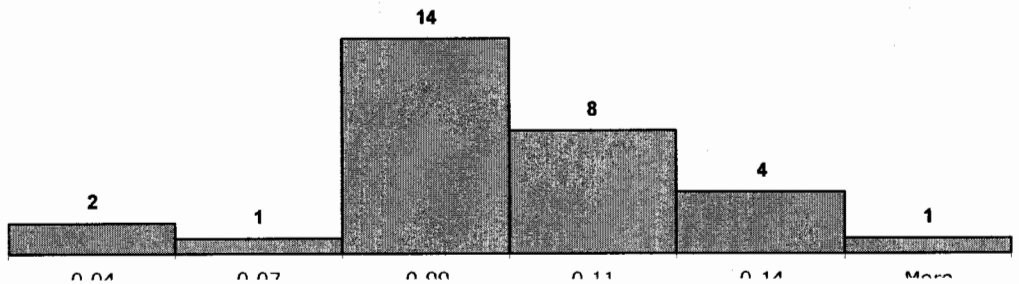



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 2 |
| 0.07 | 1 |
| 0.09 | 14 |
| 0.11 | 8 |
| 0.14 | 4 |
| More | 1 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis



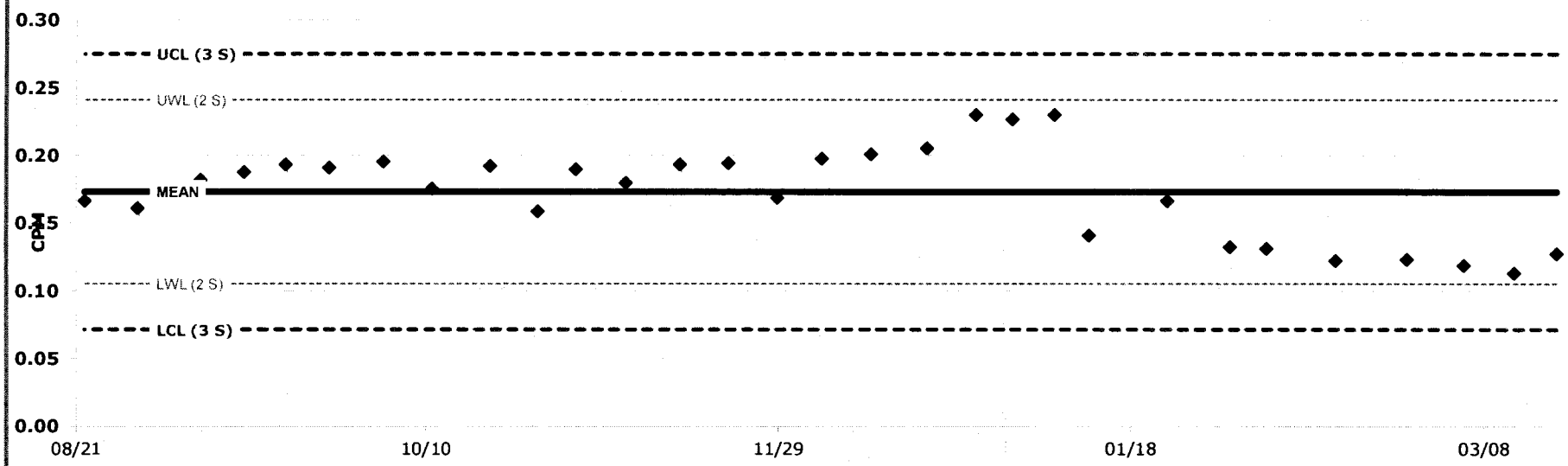
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1733 |
| Standard Deviation | 0.0340 |
| + 3-sigma value | 0.2752 |
| - 3-sigma value | 0.0714 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | INVESTIGATE |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR A2

Process Date Range: 08/22/15 - 03/18/16

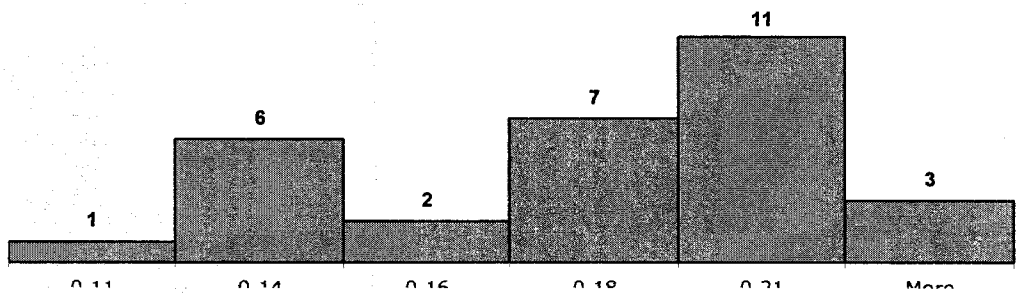



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.11 | 1 |
| 0.14 | 6 |
| 0.16 | 2 |
| 0.18 | 7 |
| 0.21 | 11 |
| More | 3 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis



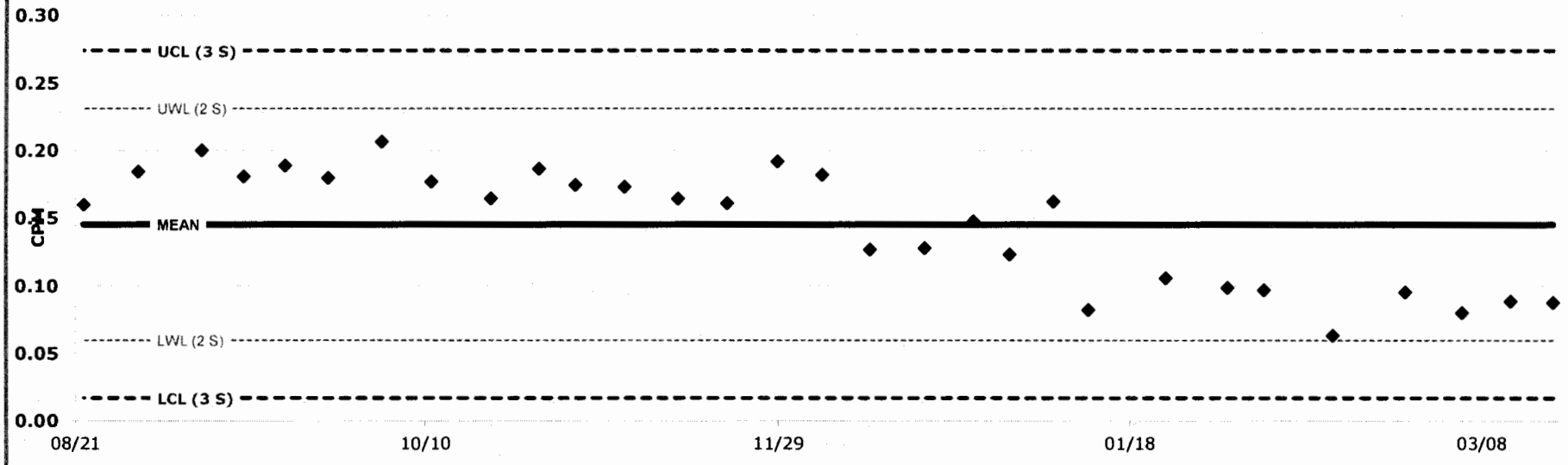
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1454 |
| Standard Deviation | 0.0428 |
| + 3-sigma value | 0.2740 |
| - 3-sigma value | 0.0169 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | INVESTIGATE |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA LONG BACKGROUND - DETECTOR A3

Process Date Range: 08/22/15 - 03/18/16

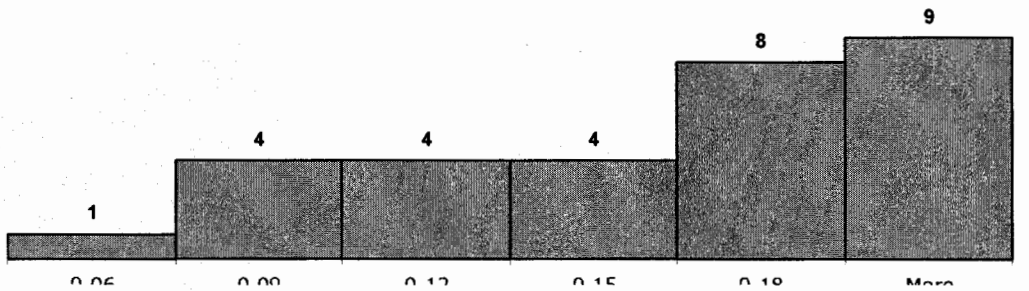



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.06 | 1 |
| 0.09 | 4 |
| 0.12 | 4 |
| 0.15 | 4 |
| 0.18 | 8 |
| More | 9 |

**Population Frequency Distribution (Histogram)**



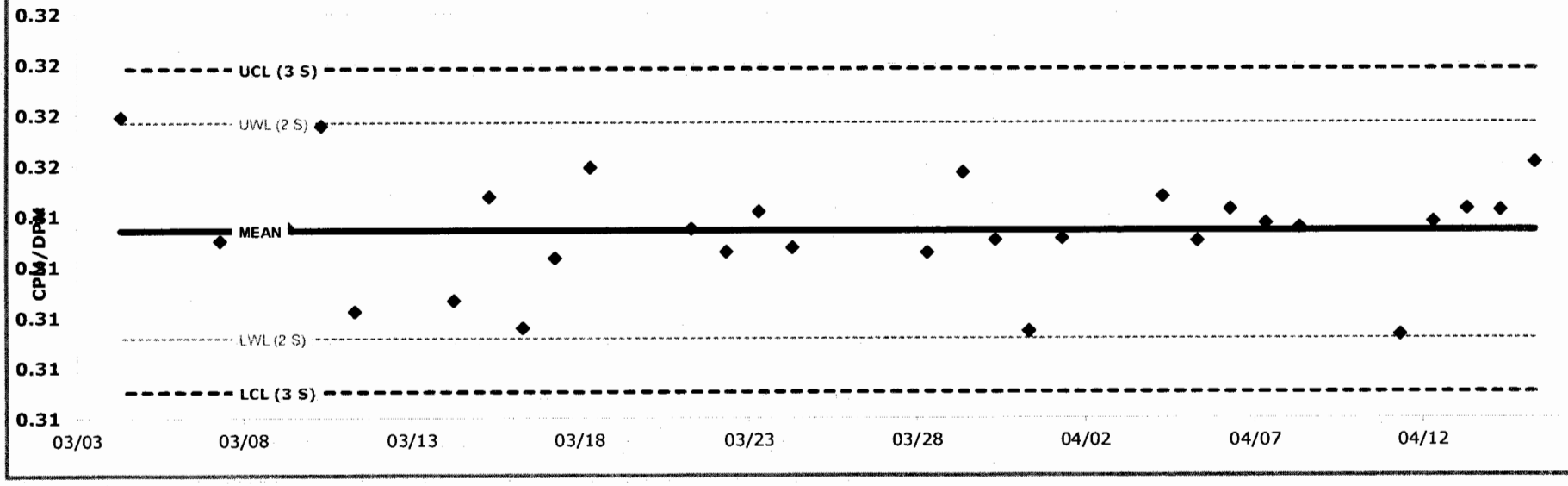
# LB4100-A - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3134 | CPM/DPM | 0.3161 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0021 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3198 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3070 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

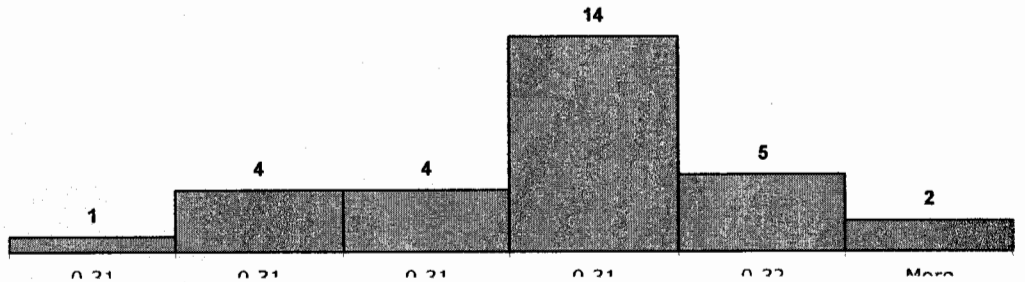



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.31 | 1 |
| 0.31 | 4 |
| 0.31 | 4 |
| 0.31 | 14 |
| 0.32 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-A - ALPHA EFFICIENCY

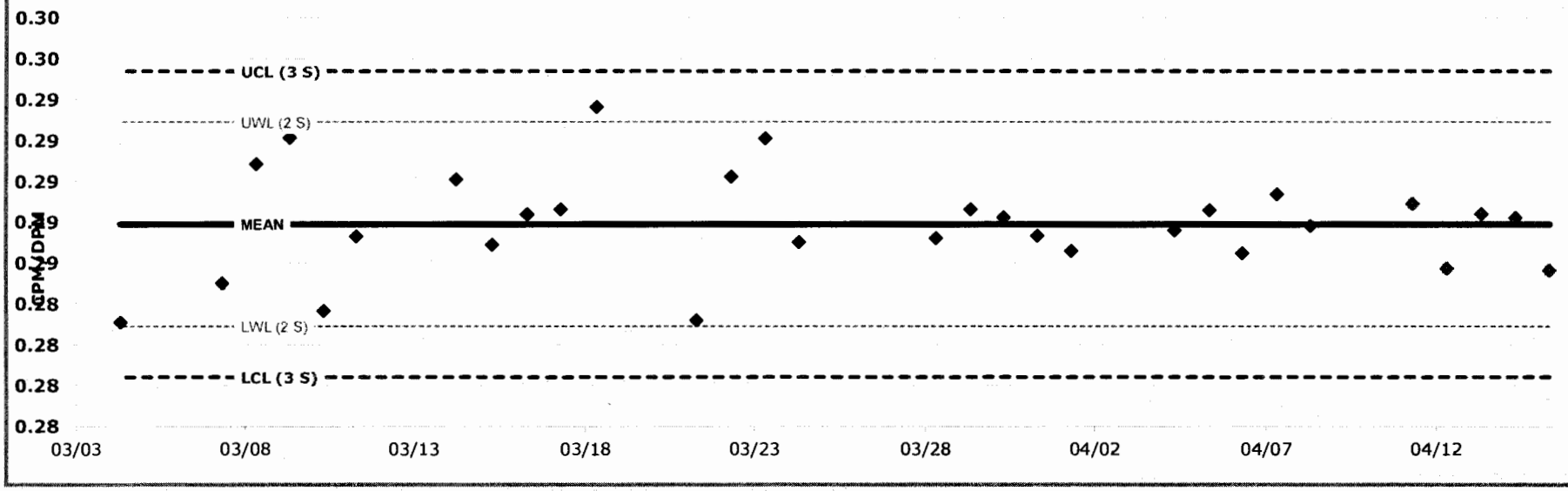


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2879 | CPM/DPM | 0.2856 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0025 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2954 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2804 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - ALPHA EFFICIENCY - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

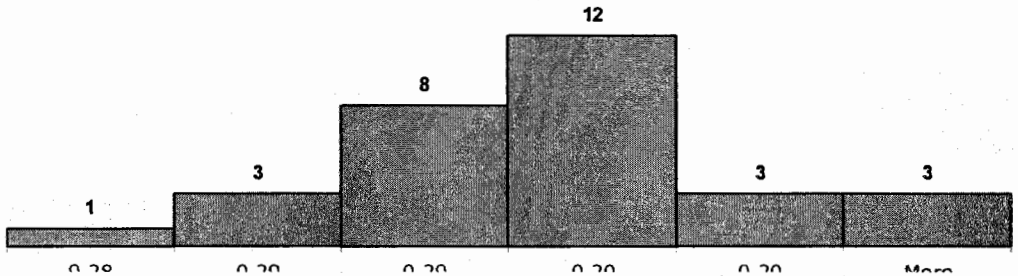



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.28 | 1 |
| 0.29 | 3 |
| 0.29 | 8 |
| 0.29 | 12 |
| 0.29 | 3 |
| More | 3 |

**Population Frequency Distribution (Histogram)**



# LB4100-C - Alpha Daily BKG Check

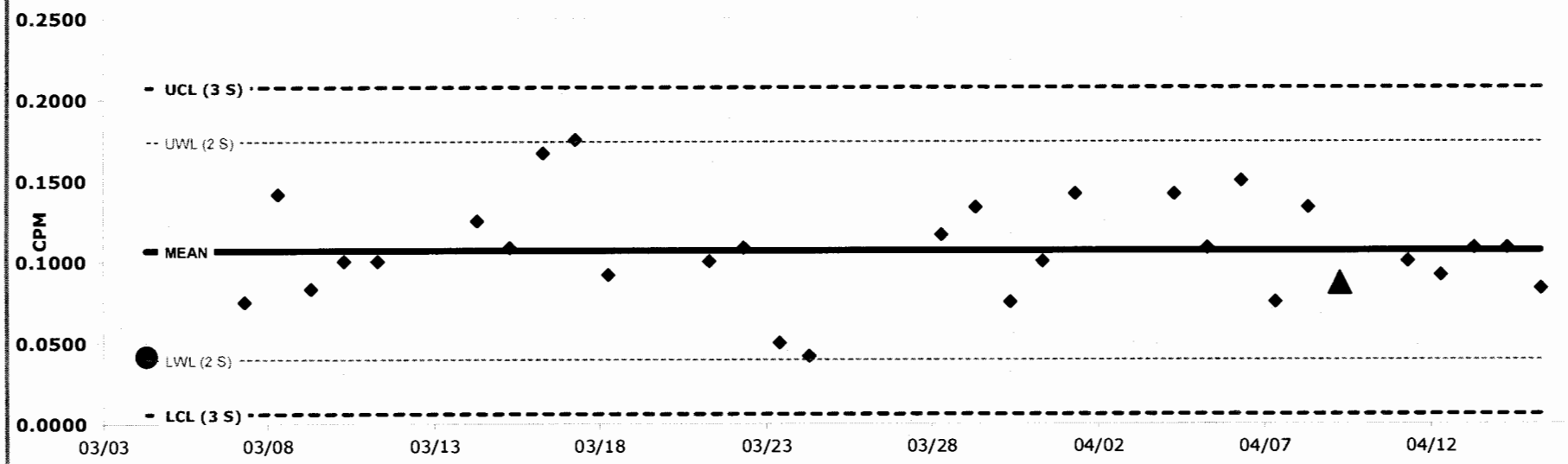


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.1185 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.1066 | Long B CPM | 0.0867 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0336 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2074 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.0059 | CPM | 0.0833 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

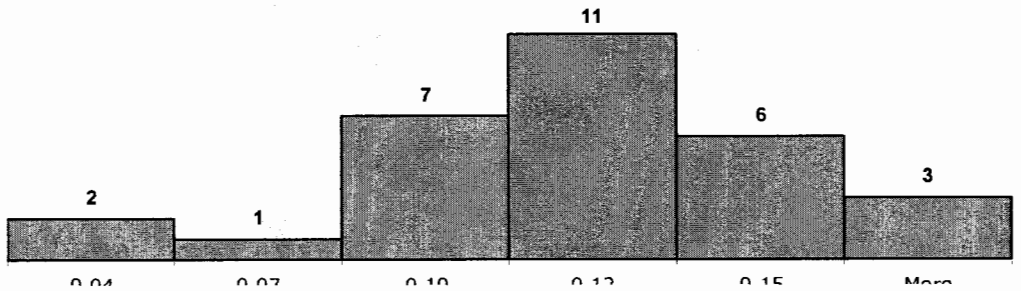



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 2 |
| 0.07 | 1 |
| 0.10 | 7 |
| 0.12 | 11 |
| 0.15 | 6 |
| More | 3 |

**Population Frequency Distribution (Histogram)**



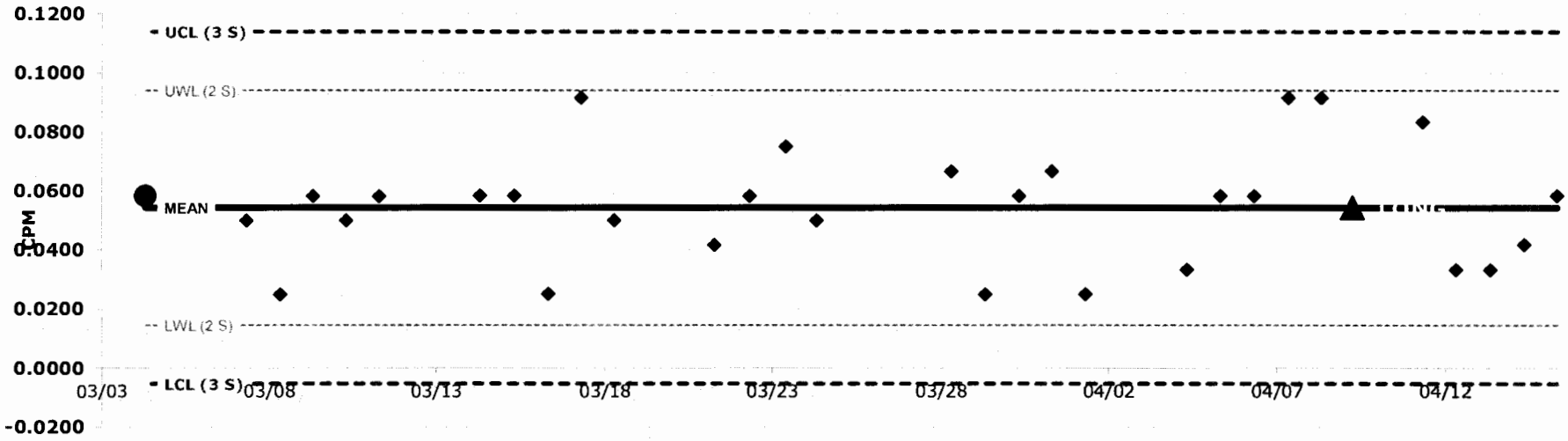
# LB4100-C - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.1663 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0543 | Long B CPM | 0.0544 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0199 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1139 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0053 | CPM | 0.0583 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

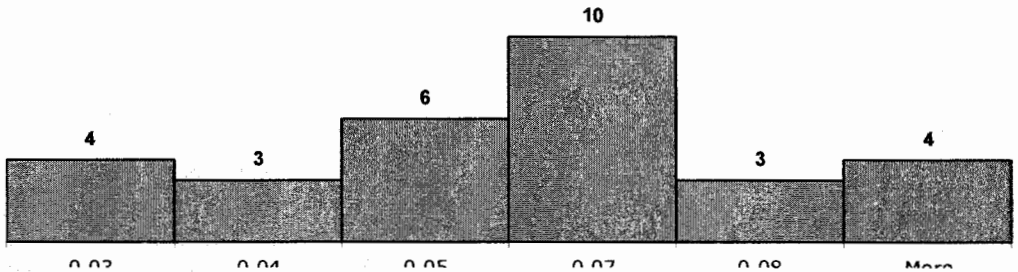



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.03 | 4 |
| 0.04 | 3 |
| 0.05 | 6 |
| 0.07 | 10 |
| 0.08 | 3 |
| More | 4 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

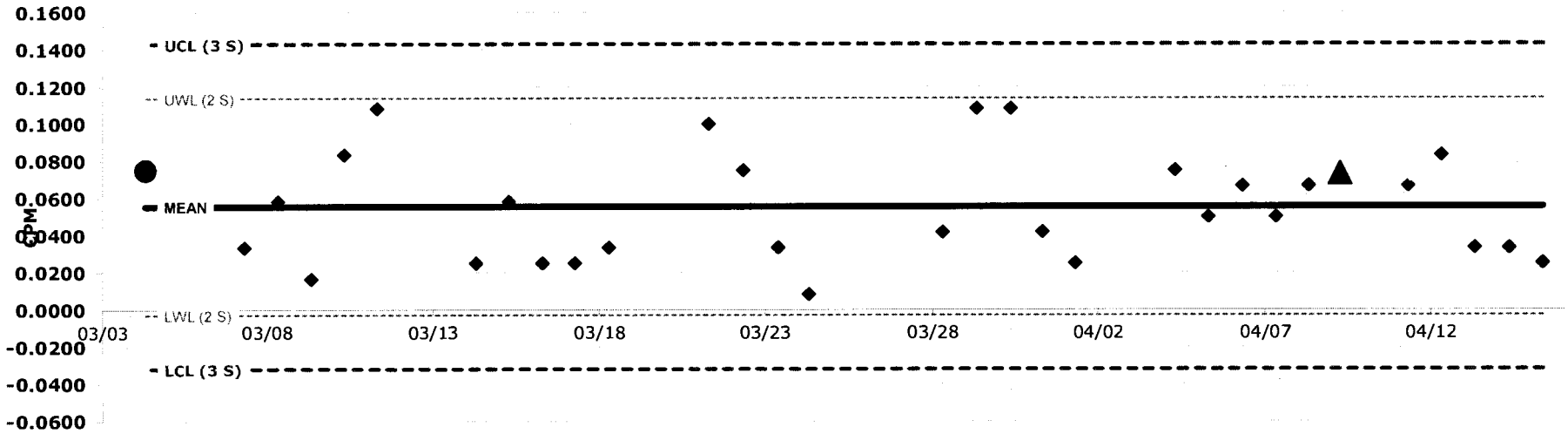
# LB4100-C - Alpha Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 2.8391 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0555 | Long B CPM | 0.0733 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0291 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1429 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0320 | CPM | 0.0250 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR A4

Process Date Range: 03/04/16 - 04/15/16

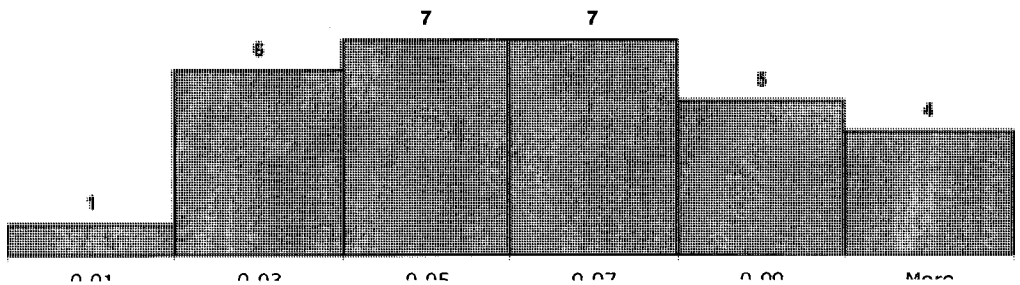



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.01 | 1 |
| 0.03 | 6 |
| 0.05 | 7 |
| 0.07 | 7 |
| 0.09 | 5 |
| More | 4 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - Alpha Daily BKG Check

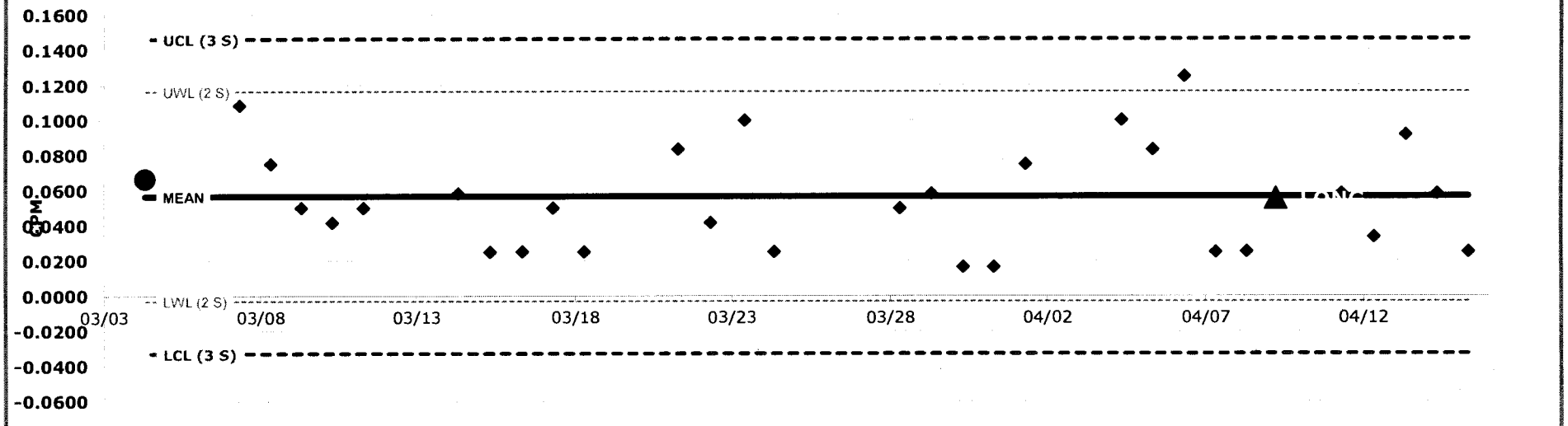


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 1.8593 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.0566 | Long B CPM | 0.0556 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0298 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.1461 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | -0.0329 | CPM | 0.0250 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA BACKGROUND - DETECTOR B1

Process Date Range: 03/04/16 - 04/15/16

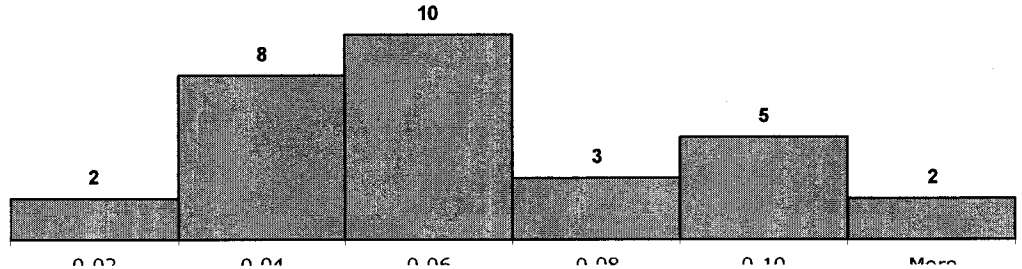



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.02 | 2 |
| 0.04 | 8 |
| 0.06 | 10 |
| 0.08 | 3 |
| 0.10 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis



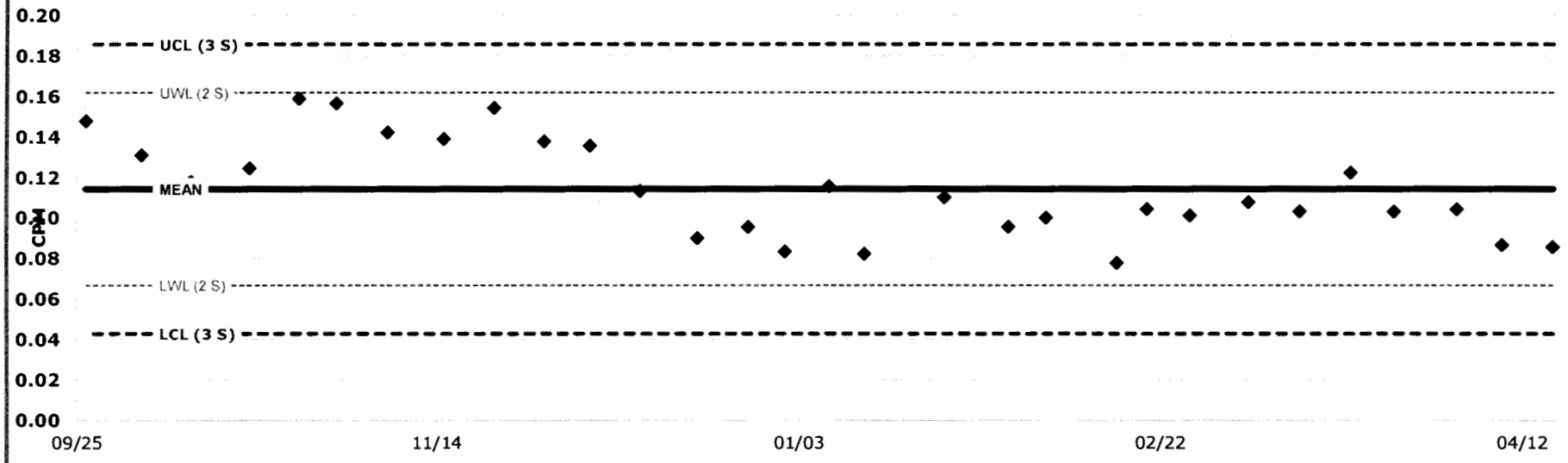
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.1143 |
| Standard Deviation | 0.0238 |
| + 3-sigma value | 0.1857 |
| - 3-sigma value | 0.0428 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR A1

Process Date Range: 09/26/15 - 04/16/16

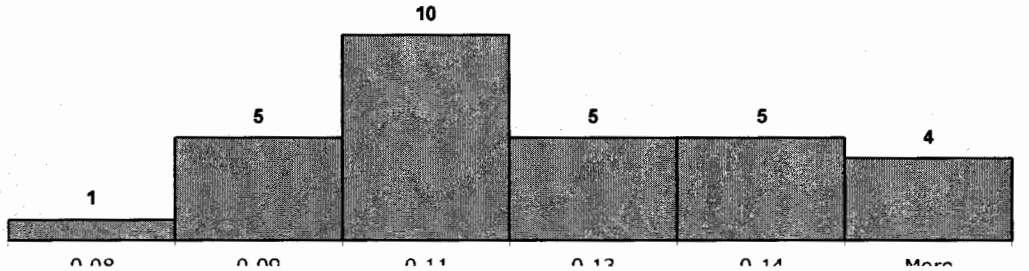



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.08 | 1 |
| 0.09 | 5 |
| 0.11 | 10 |
| 0.13 | 5 |
| 0.14 | 5 |
| More | 4 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis

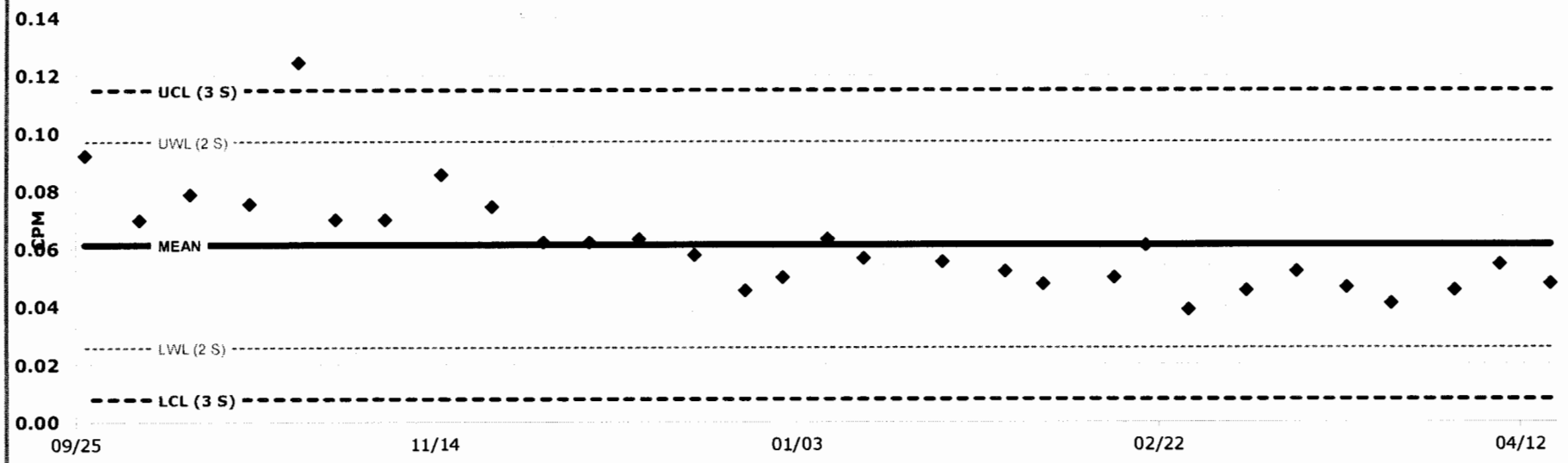


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.0614 |
| Standard Deviation | 0.0178 |
| + 3-sigma value | 0.1149 |
| - 3-sigma value | 0.0079 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR A2

Process Date Range: 09/26/15 - 04/16/16

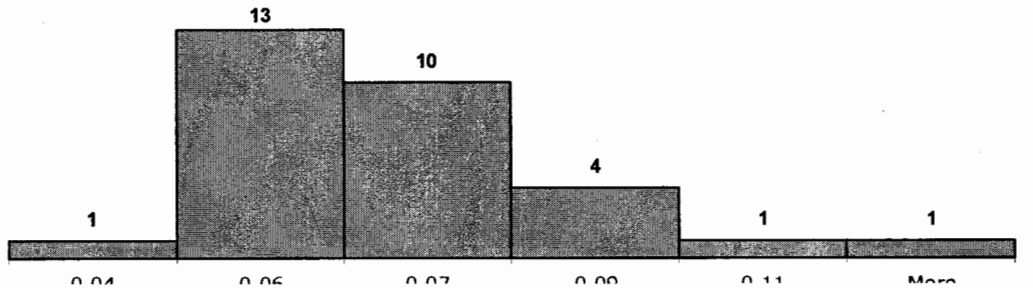



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.04 | 1 |
| 0.06 | 13 |
| 0.07 | 10 |
| 0.09 | 4 |
| 0.11 | 1 |
| More | 1 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

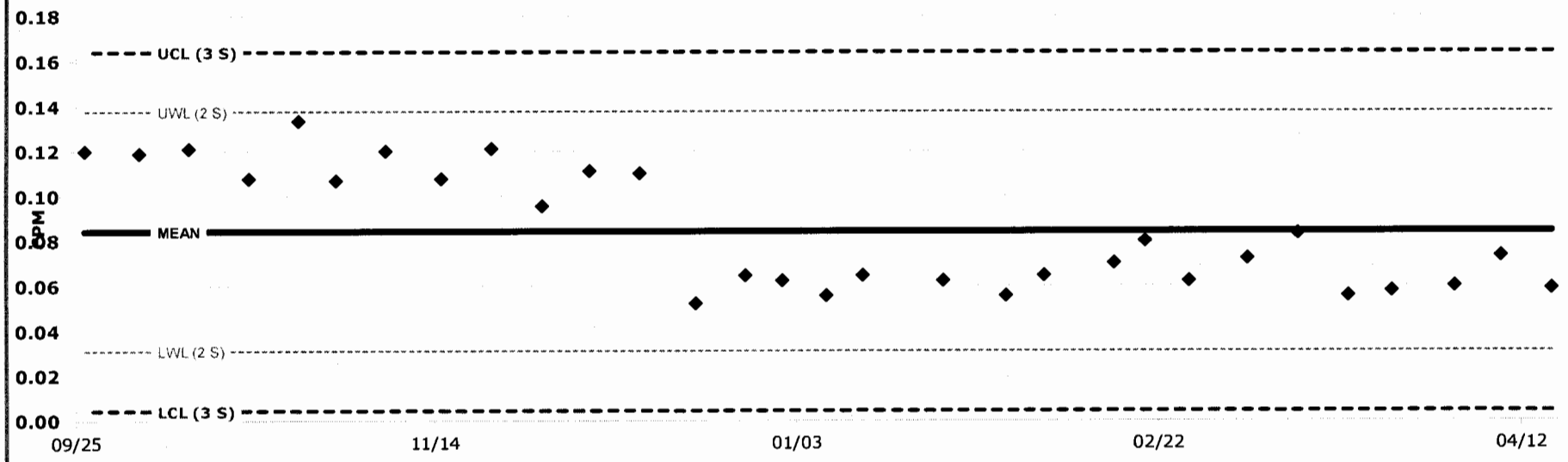


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.0843 |
| Standard Deviation | 0.0266 |
| + 3-sigma value | 0.1641 |
| - 3-sigma value | 0.0044 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR A4

Process Date Range: 09/26/15 - 04/16/16

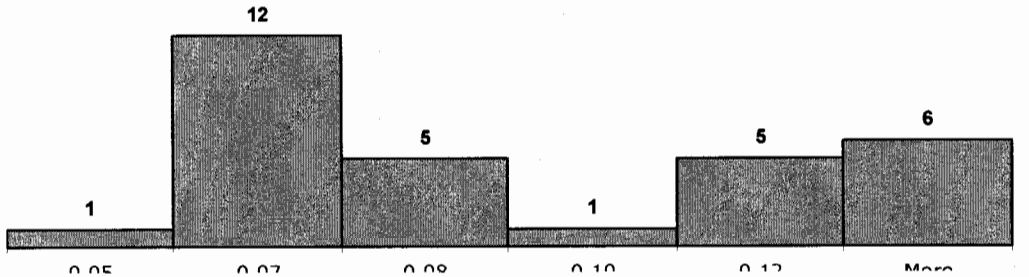



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.05 | 1 |
| 0.07 | 12 |
| 0.08 | 5 |
| 0.10 | 1 |
| 0.12 | 5 |
| More | 6 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis



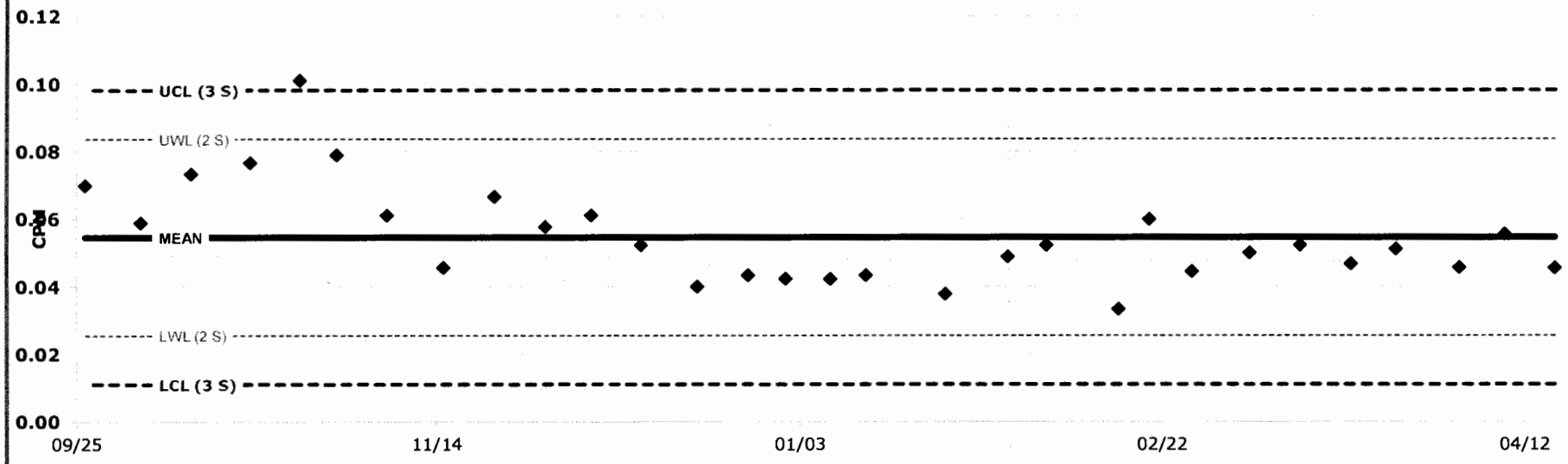
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.0546 |
| Standard Deviation | 0.0145 |
| + 3-sigma value | 0.0982 |
| - 3-sigma value | 0.0110 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA LONG BACKGROUND - DETECTOR B1

Process Date Range: 09/26/15 - 04/16/16

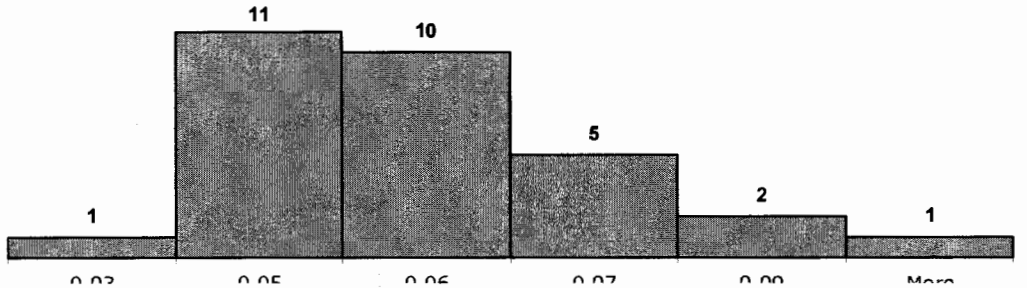



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.03 | 1 |
| 0.05 | 11 |
| 0.06 | 10 |
| 0.07 | 5 |
| 0.09 | 2 |
| More | 1 |

**Population Frequency Distribution (Histogram)**



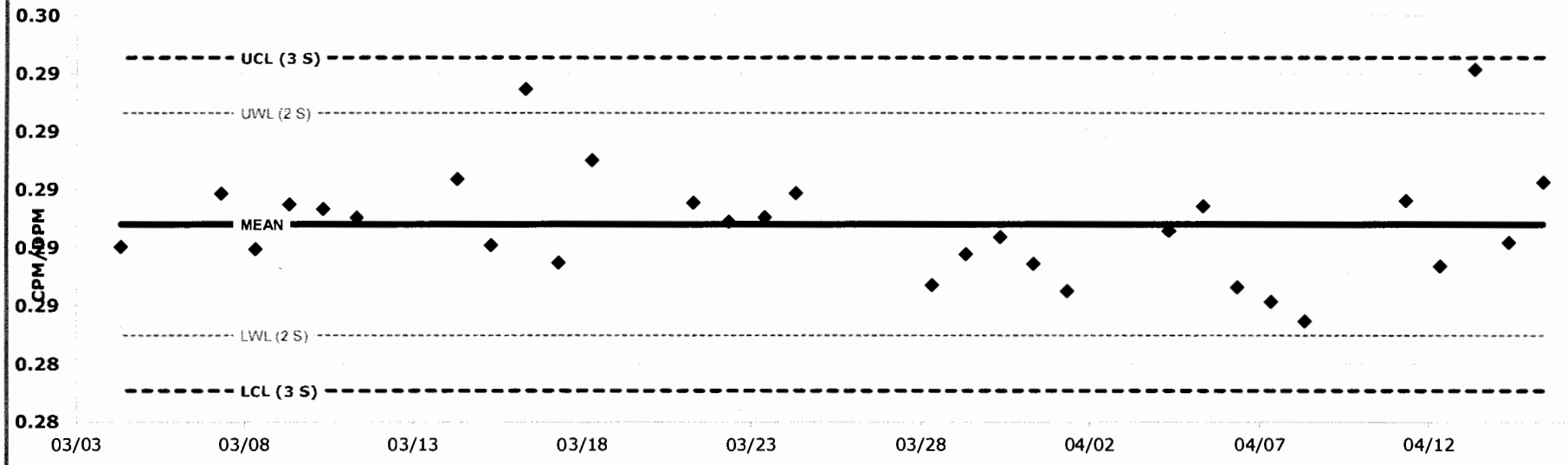
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2888 | CPM/DPM | 0.2903 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0019 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2946 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2831 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

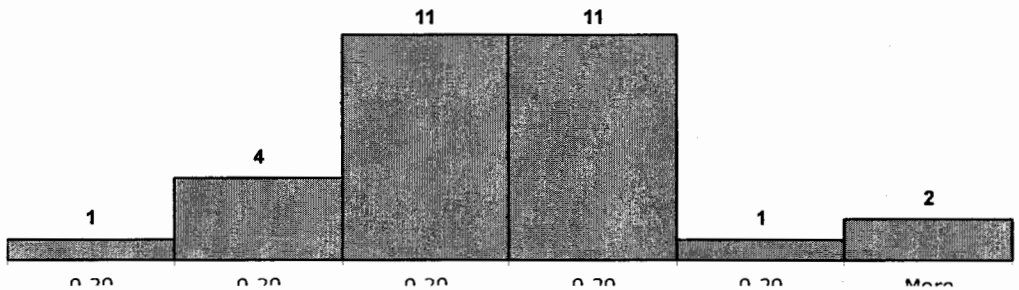



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.29 | 1 |
| 0.29 | 4 |
| 0.29 | 11 |
| 0.29 | 11 |
| 0.29 | 1 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

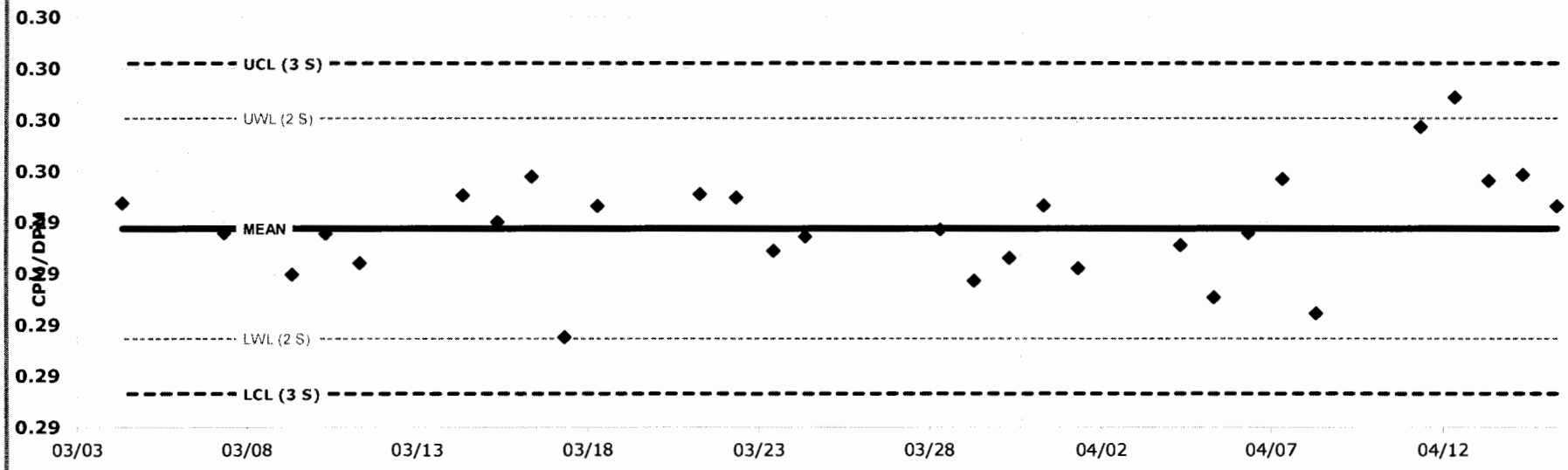
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2938 | CPM/DPM | 0.2946 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0021 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3002 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2873 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

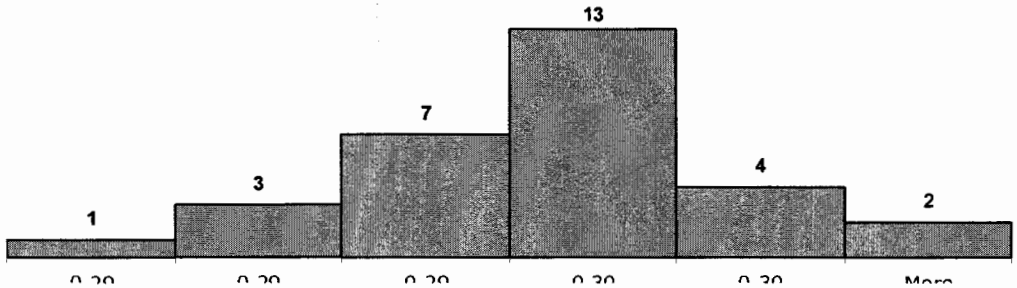



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.29 | 1 |
| 0.29 | 3 |
| 0.29 | 7 |
| 0.30 | 13 |
| 0.30 | 4 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

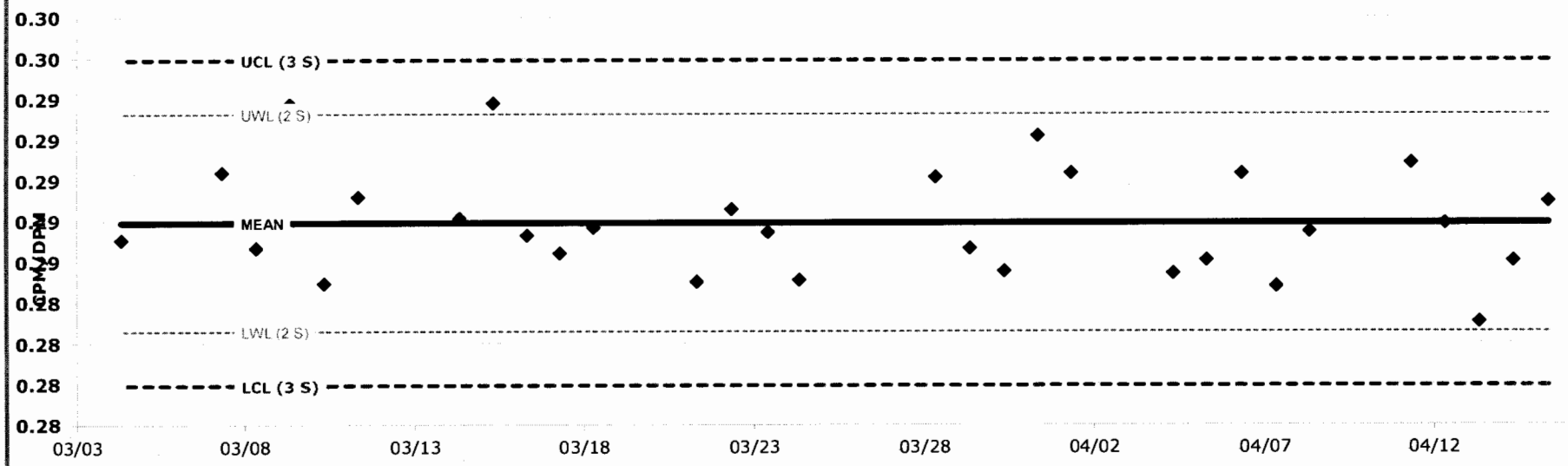
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.2879 | CPM/DPM | 0.2890 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0027 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.2959 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.2799 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR A4

Process Date Range: 03/04/16 - 04/15/16

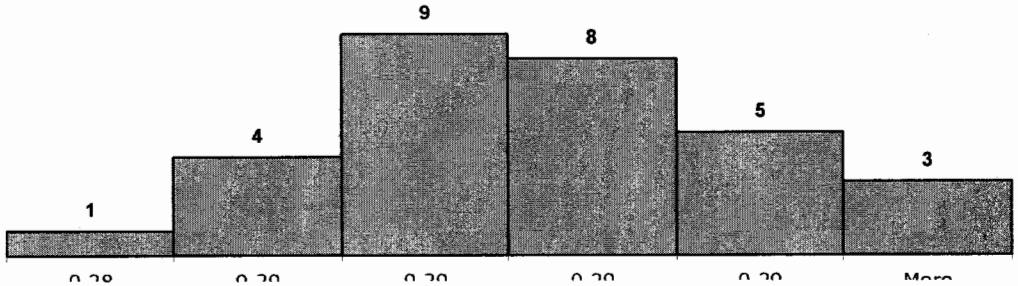



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.28 | 1 |
| 0.29 | 4 |
| 0.29 | 9 |
| 0.29 | 8 |
| 0.29 | 5 |
| More | 3 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

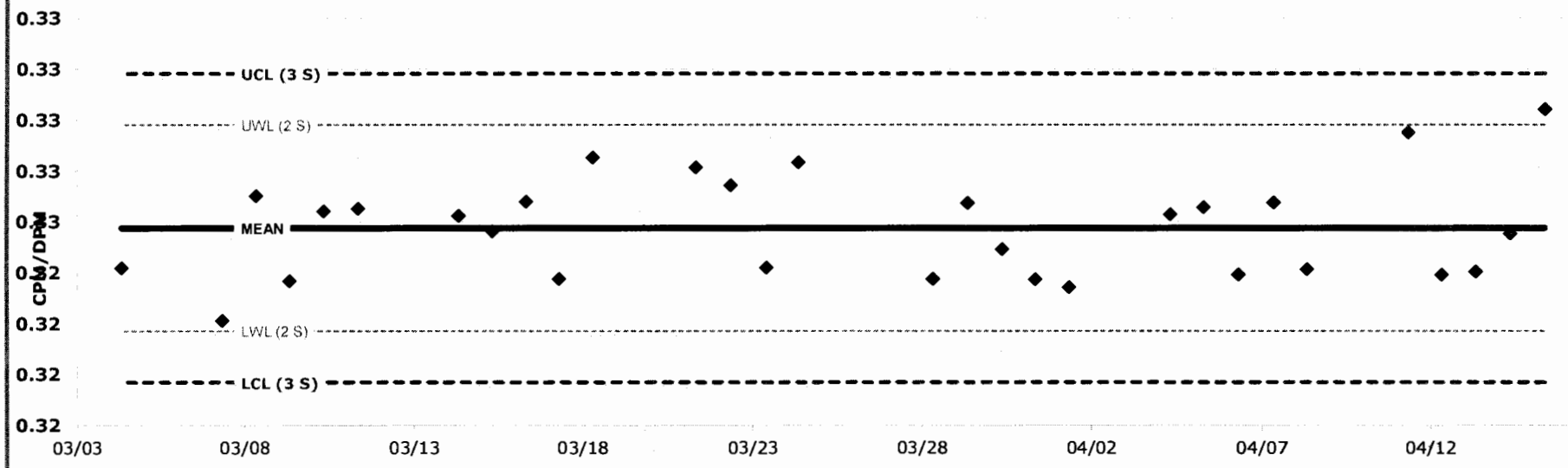
# LB4100-C - ALPHA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.3258 | CPM/DPM | 0.3304 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0020 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.3318 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.3197 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - ALPHA EFFICIENCY - DETECTOR B1

Process Date Range: 03/04/16 - 04/15/16

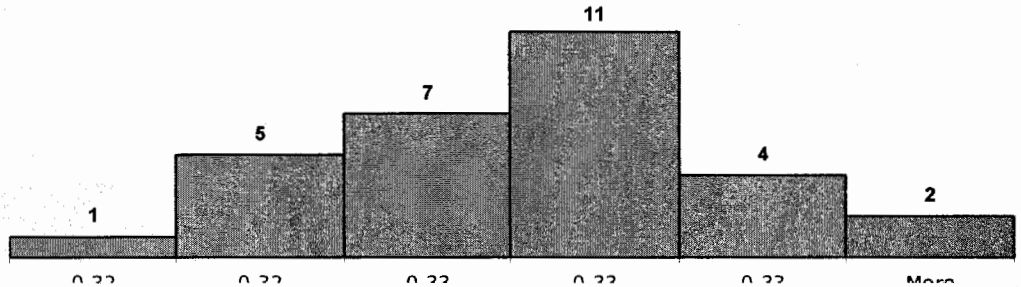



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.32 | 1 |
| 0.32 | 5 |
| 0.33 | 7 |
| 0.33 | 11 |
| 0.33 | 4 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

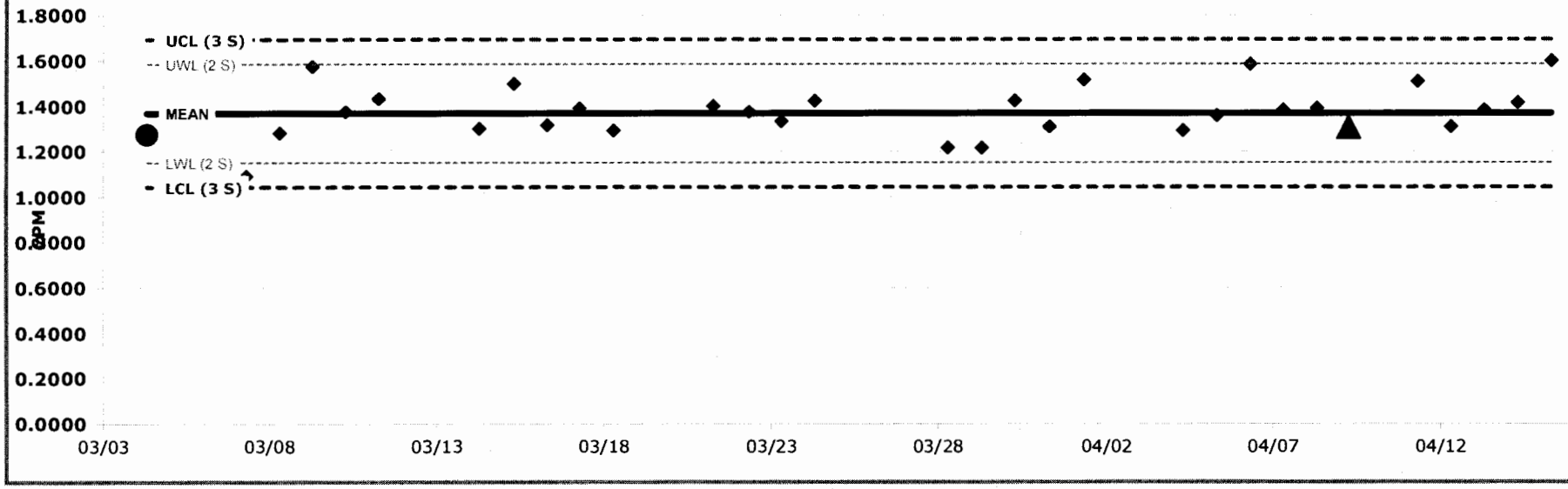
# LB4100-A - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 2.4124 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 1.3681 | Long B CPM | 1.3067 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.1085 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.6936 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 1.0426 | CPM | 1.6000 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA BACKGROUND - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

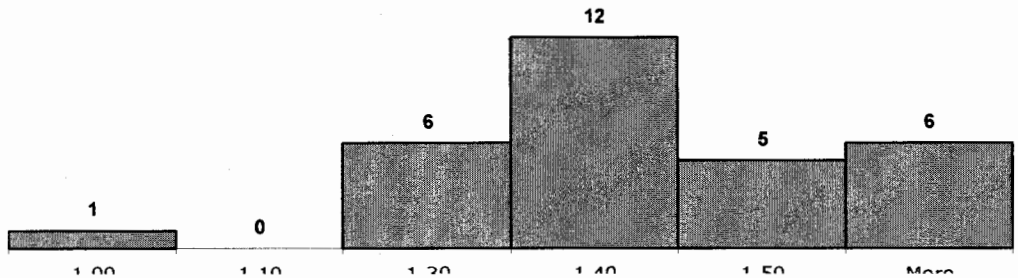



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 1.09 | 1 |
| 1.19 | 0 |
| 1.30 | 6 |
| 1.40 | 12 |
| 1.50 | 5 |
| More | 6 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-A - Beta Daily BKG Check

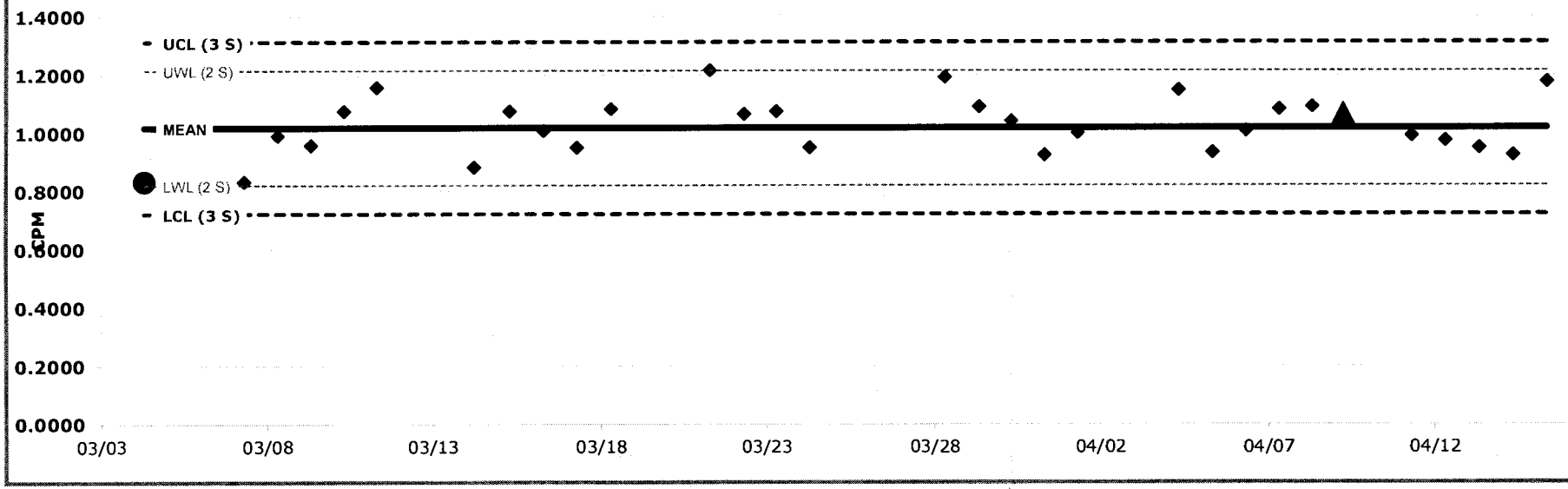


| Population Statistics | | DER Analysis | OK |
|---|---|---|---|
| Population Size | 29 | DER | 1.0553 |
| | | Long B Date | 04/09/16 |
| Average | 1.0178 | Long B CPM | 1.0644 |
| Standard Deviation | 0.0983 | Count Mins | 900.00 |
| + 3-sigma value | 1.3128 | Date | 04/15/16 |
| - 3-sigma value | 0.7228 | CPM | 1.1750 |
| | | Count Mins | 120.00 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA BACKGROUND - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

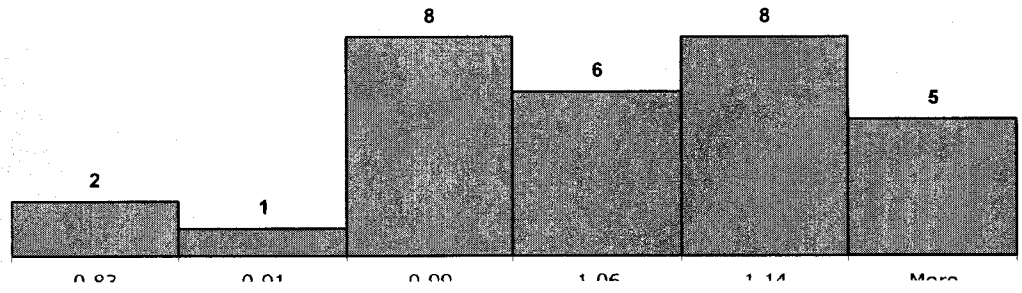



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.83 | 2 |
| 0.91 | 1 |
| 0.99 | 8 |
| 1.06 | 6 |
| 1.14 | 8 |
| More | 5 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis



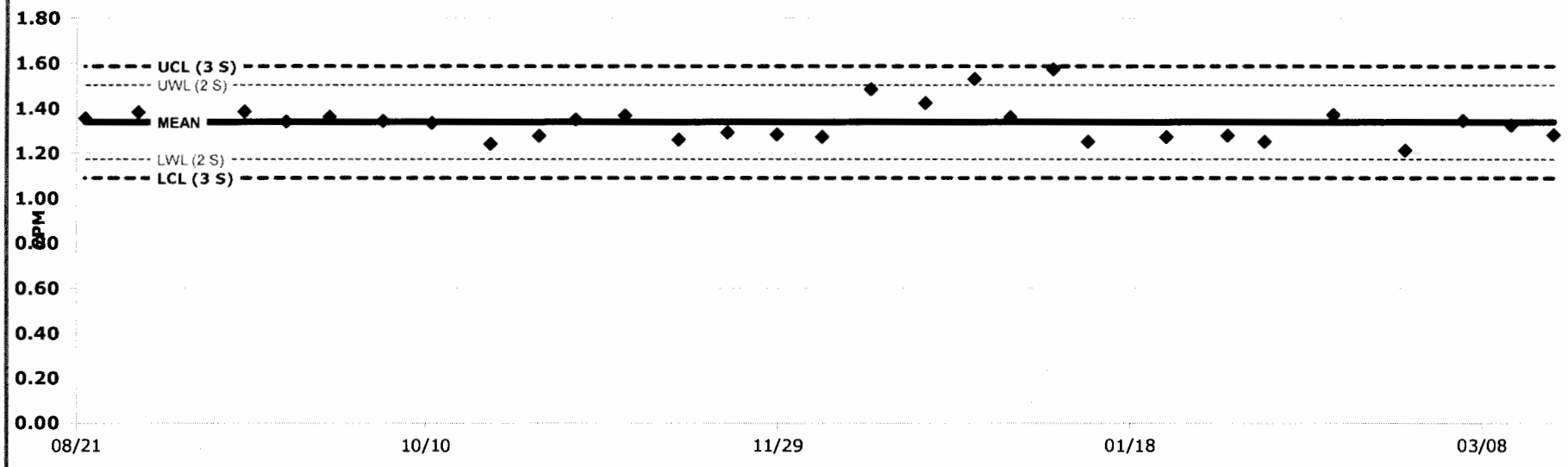
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 1.3381 |
| Standard Deviation | 0.0828 |
| + 3-sigma value | 1.5866 |
| - 3-sigma value | 1.0896 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR A2

Process Date Range: 08/22/15 - 03/18/16

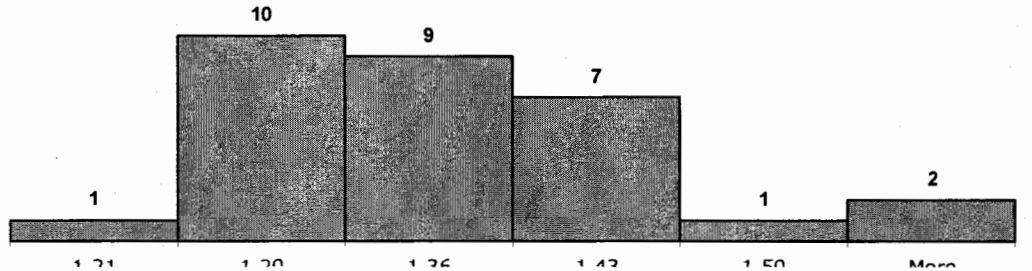



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 1.21 | 1 |
| 1.29 | 10 |
| 1.36 | 9 |
| 1.43 | 7 |
| 1.50 | 1 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis

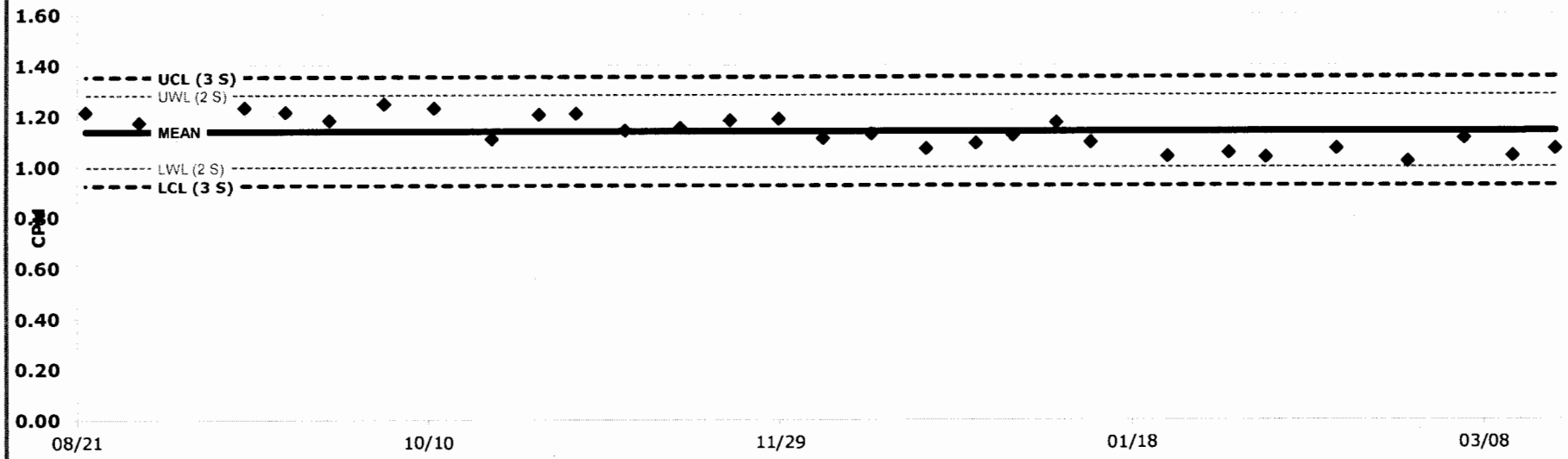


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 1.1391 |
| Standard Deviation | 0.0714 |
| + 3-sigma value | 1.3534 |
| - 3-sigma value | 0.9249 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | INVESTIGATE |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA LONG BACKGROUND - DETECTOR A3

Process Date Range: 08/22/15 - 03/18/16

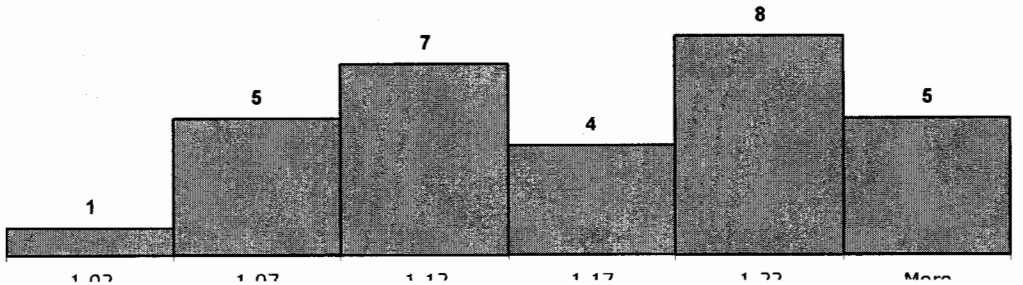



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 1.02 | 1 |
| 1.07 | 5 |
| 1.12 | 7 |
| 1.17 | 4 |
| 1.22 | 8 |
| More | 5 |

**Population Frequency Distribution (Histogram)**

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# LB4100-A - BETA EFFICIENCY

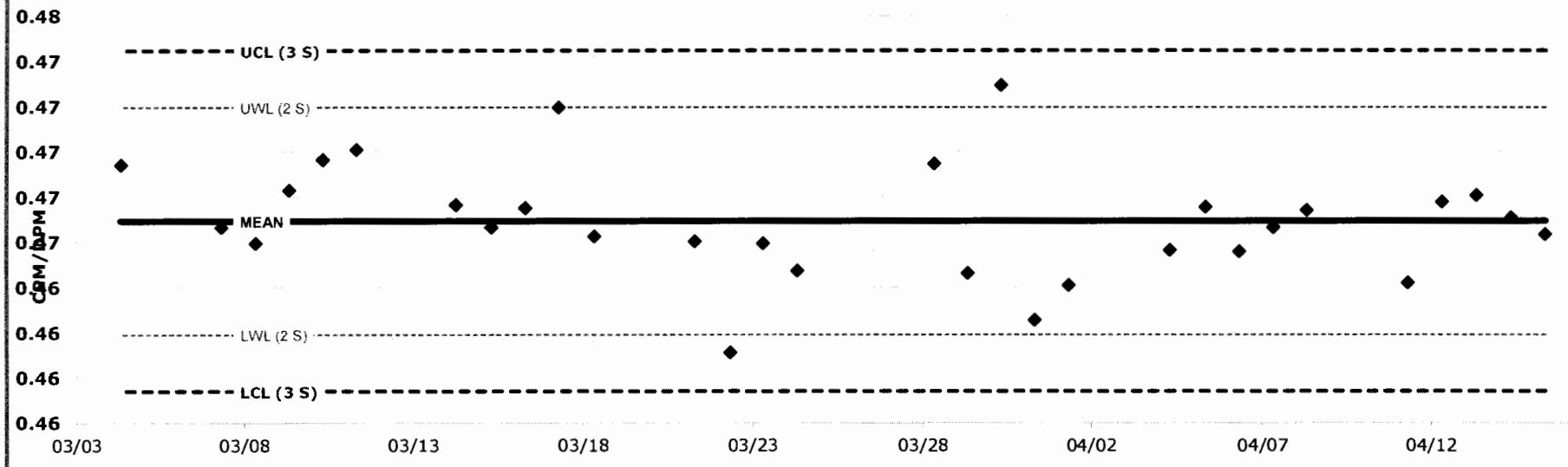


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4669 | CPM/DPM | 0.4663 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0025 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4745 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4594 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

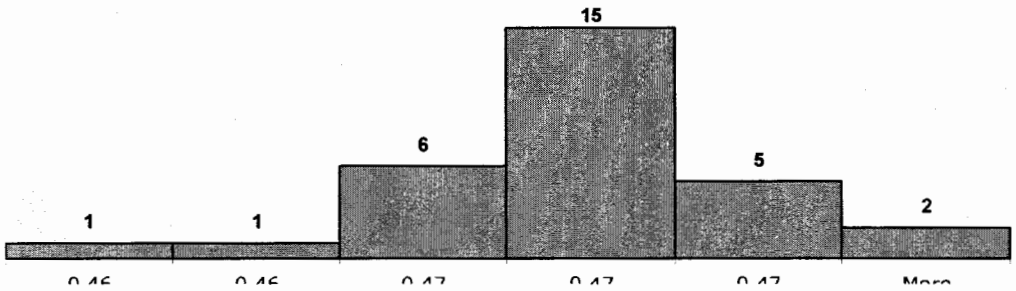



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.46 | 1 |
| 0.46 | 1 |
| 0.47 | 6 |
| 0.47 | 15 |
| 0.47 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



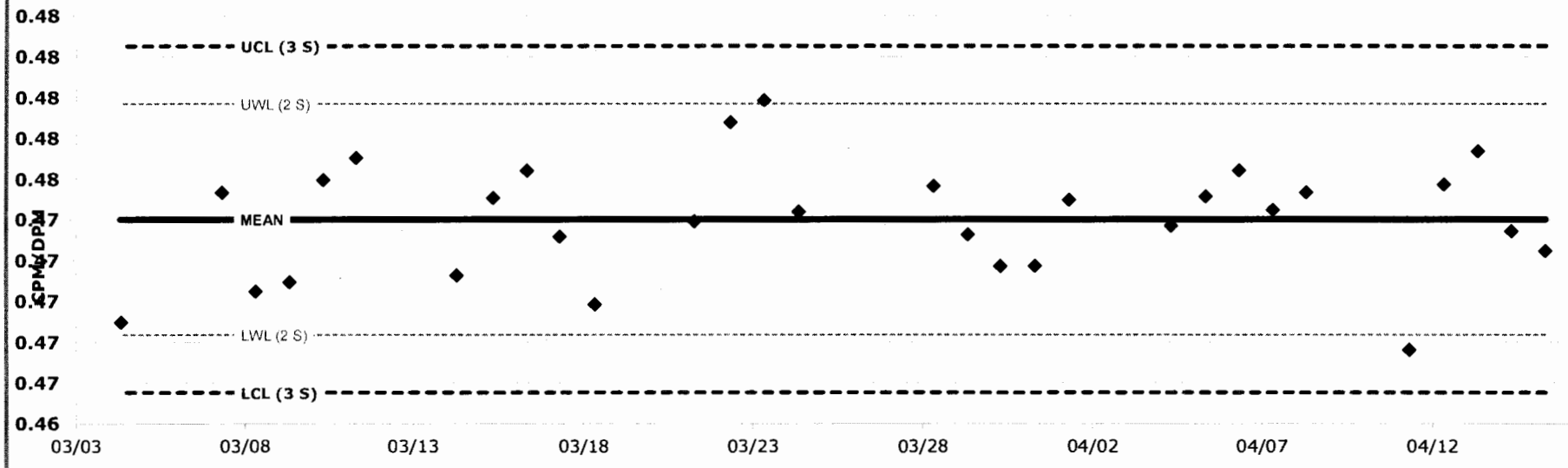
# LB4100-A - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4740 | CPM/DPM | 0.4725 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0028 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4825 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4655 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-A - BETA EFFICIENCY - DETECTOR A3

Process Date Range: 03/04/16 - 04/15/16

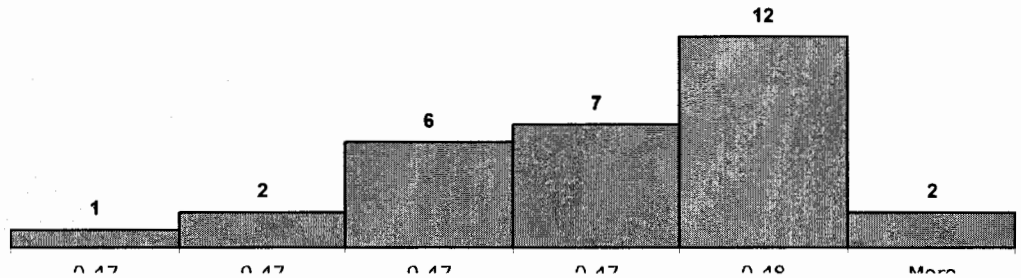



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.47 | 2 |
| 0.47 | 6 |
| 0.47 | 7 |
| 0.48 | 12 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

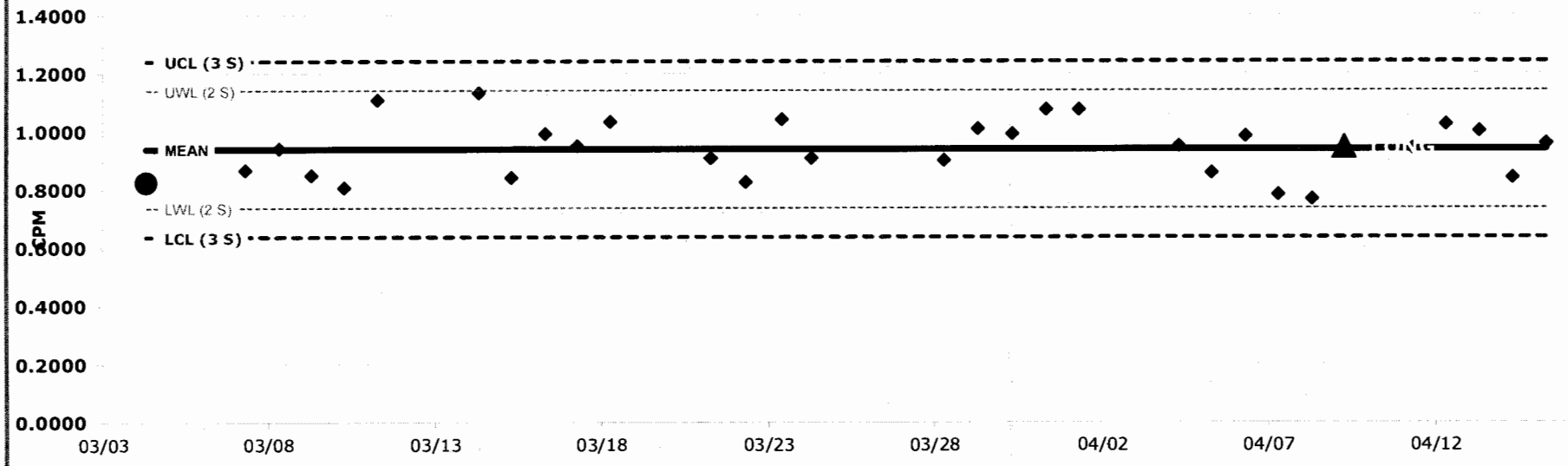
# LB4100-C - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.1227 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.9391 | Long B CPM | 0.9467 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.1010 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.2420 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6361 | CPM | 0.9583 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

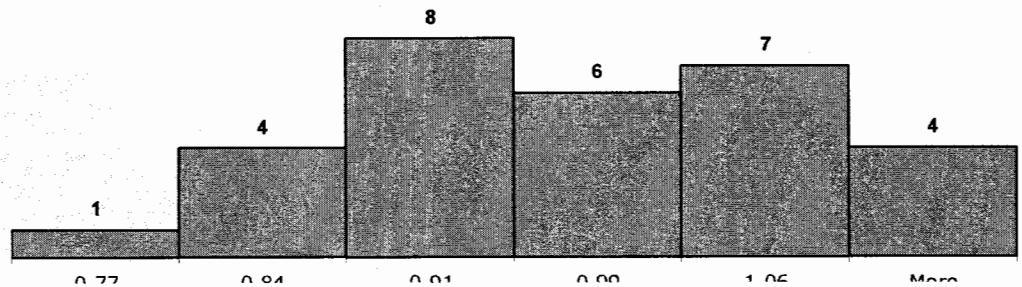



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.77 | 1 |
| 0.84 | 4 |
| 0.91 | 8 |
| 0.99 | 6 |
| 1.06 | 7 |
| More | 4 |

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# LB4100-C - Beta Daily BKG Check

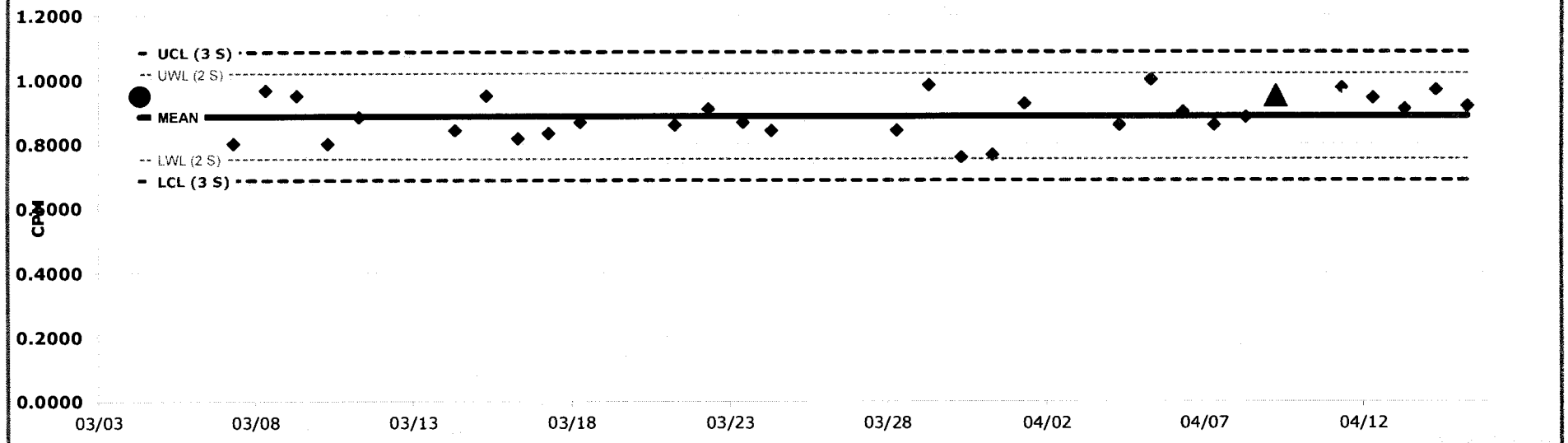


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.3456 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.8862 | Long B CPM | 0.9489 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0664 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.0853 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6871 | CPM | 0.9167 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR A2

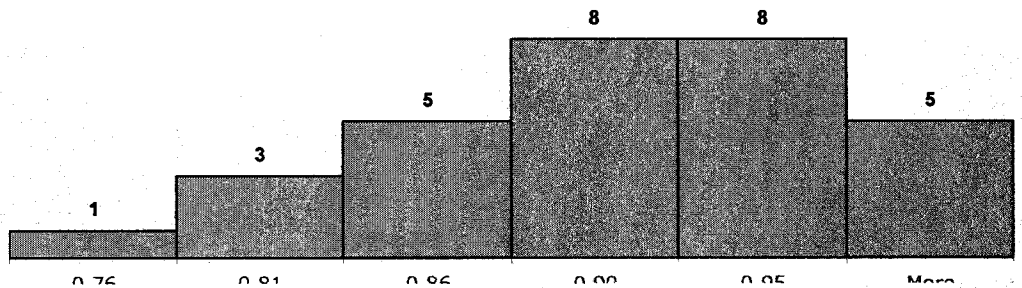
Process Date Range: 03/04/16 - 04/15/16



**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.76 | 1 |
| 0.81 | 3 |
| 0.86 | 5 |
| 0.90 | 8 |
| 0.95 | 8 |
| More | 5 |



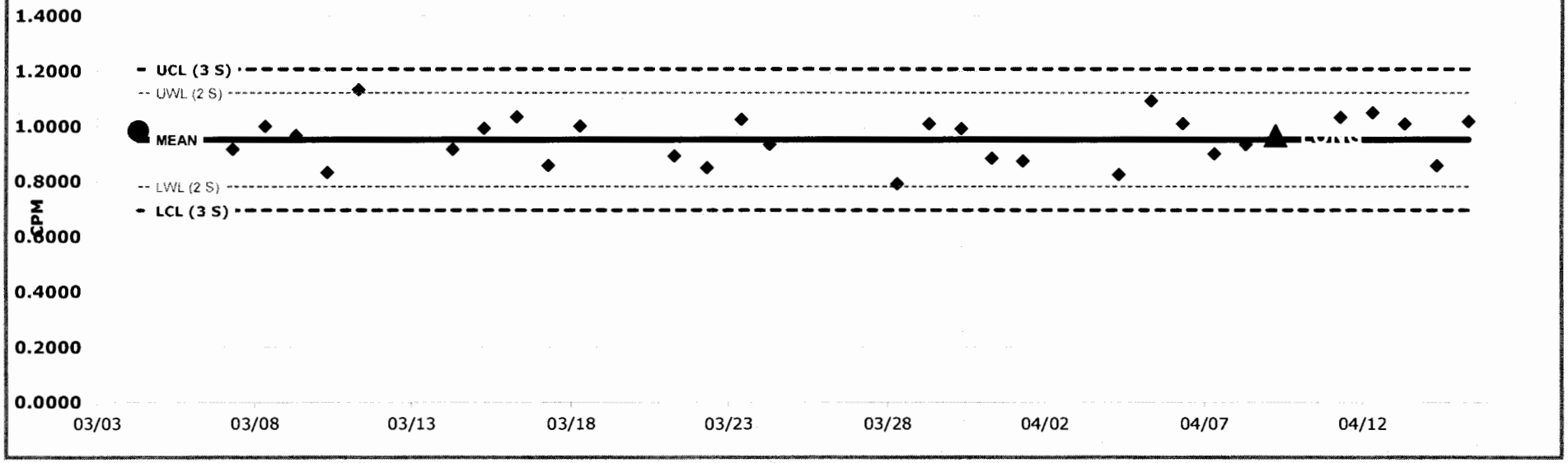
# LB4100-C - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.5231 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.9514 | Long B CPM | 0.9656 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0852 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.2069 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.6960 | CPM | 1.0167 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR A4

Process Date Range: 03/04/16 - 04/15/16

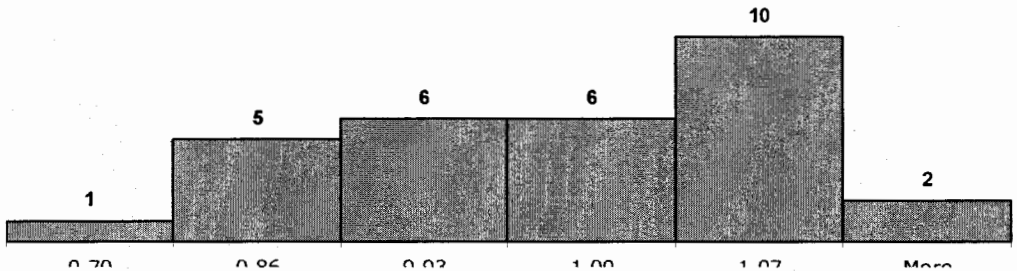



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.79 | 1 |
| 0.86 | 5 |
| 0.93 | 6 |
| 1.00 | 6 |
| 1.07 | 10 |
| More | 2 |




DCN: ITSI-0808-0004-0076, 8 May 2019

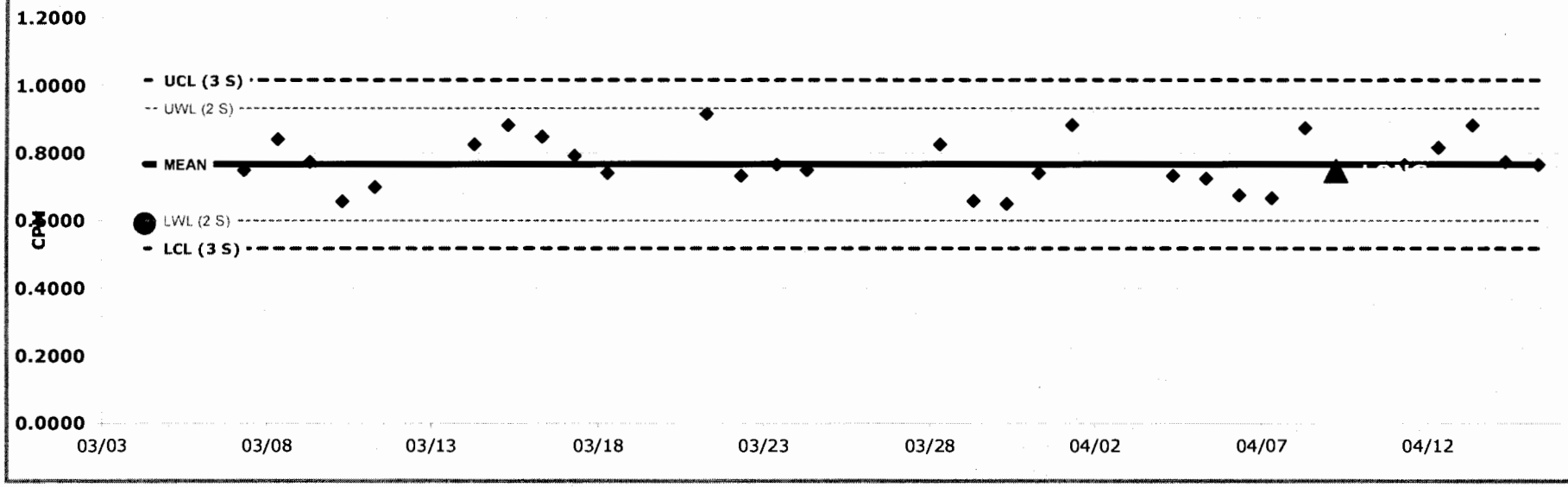
# LB4100-C - Beta Daily BKG Check



| Population Statistics | | DER Analysis | OK | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 29 | DER | 0.2223 | Most recent point outside of the 3-sigma values. | OK |
| | | Long B Date | 04/09/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.7672 | Long B CPM | 0.7478 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0832 | Count Mins | 900.00 | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 1.0170 | Date | 04/15/16 | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.5175 | CPM | 0.7667 | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | 120.00 | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA BACKGROUND - DETECTOR B1

Process Date Range: 03/04/16 - 04/15/16

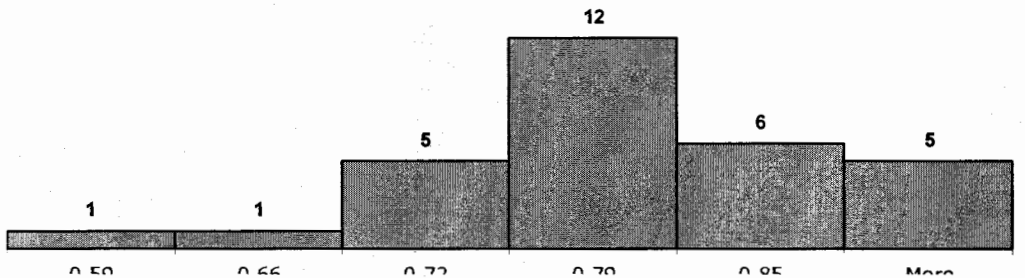



INTERNATIONAL

**Statistical Process Control**

**Population Frequency Distribution (Histogram)**

| Bin | Frequency |
|---|---|
| 0.59 | 1 |
| 0.66 | 1 |
| 0.72 | 5 |
| 0.79 | 12 |
| 0.85 | 6 |
| More | 5 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

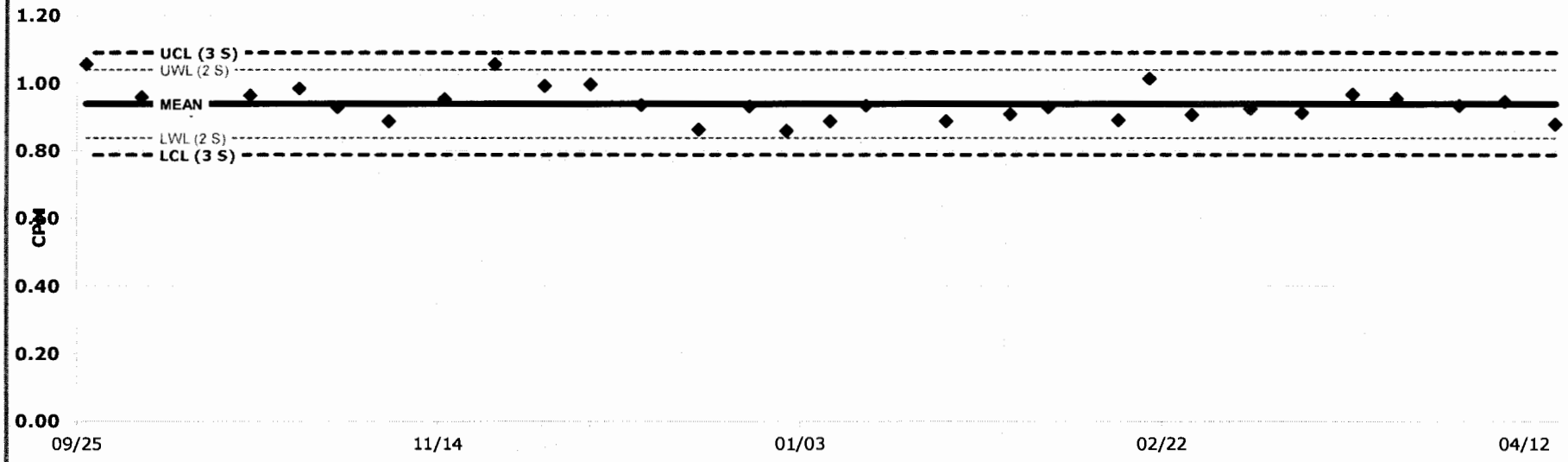


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.9388 |
| Standard Deviation | 0.0504 |
| + 3-sigma value | 1.0900 |
| - 3-sigma value | 0.7876 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR A1

Process Date Range: 09/26/15 - 04/16/16

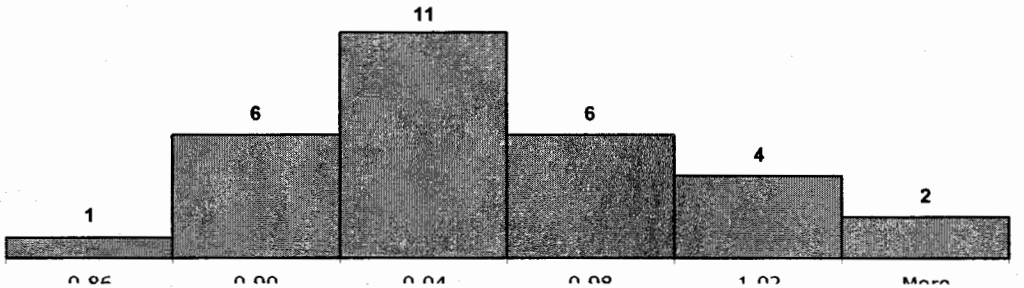



INTERNATIONAL

**Statistical Process Control**

### Population Frequency Distribution (Histogram)

| Bin | Frequency |
|---|---|
| 0.86 | 1 |
| 0.90 | 6 |
| 0.94 | 11 |
| 0.98 | 6 |
| 1.02 | 4 |
| More | 2 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis



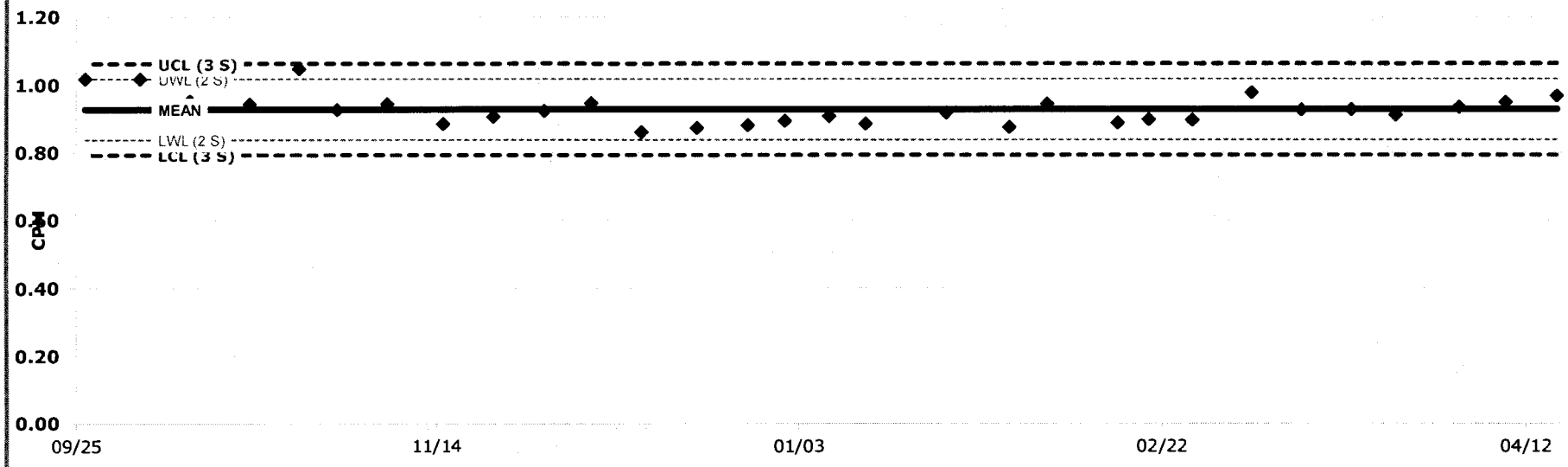
DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.9275 |
| Standard Deviation | 0.0450 |
| + 3-sigma value | 1.0626 |
| - 3-sigma value | 0.7924 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR A2

Process Date Range: 09/26/15 - 04/16/16

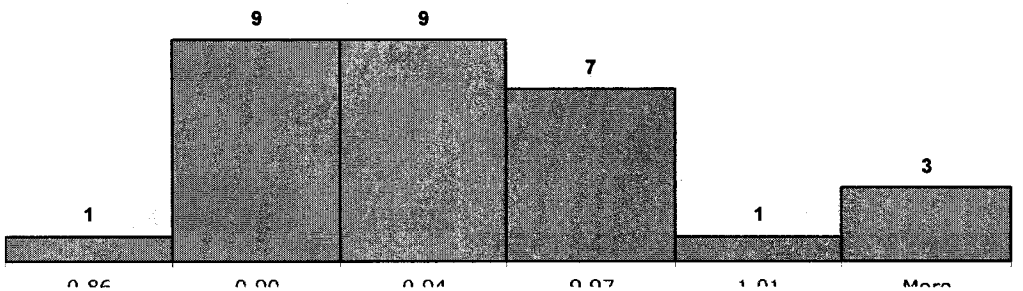



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.86 | 1 |
| 0.90 | 9 |
| 0.94 | 9 |
| 0.97 | 7 |
| 1.01 | 1 |
| More | 3 |

**Population Frequency Distribution (Histogram)**



# Instrument Background Analysis

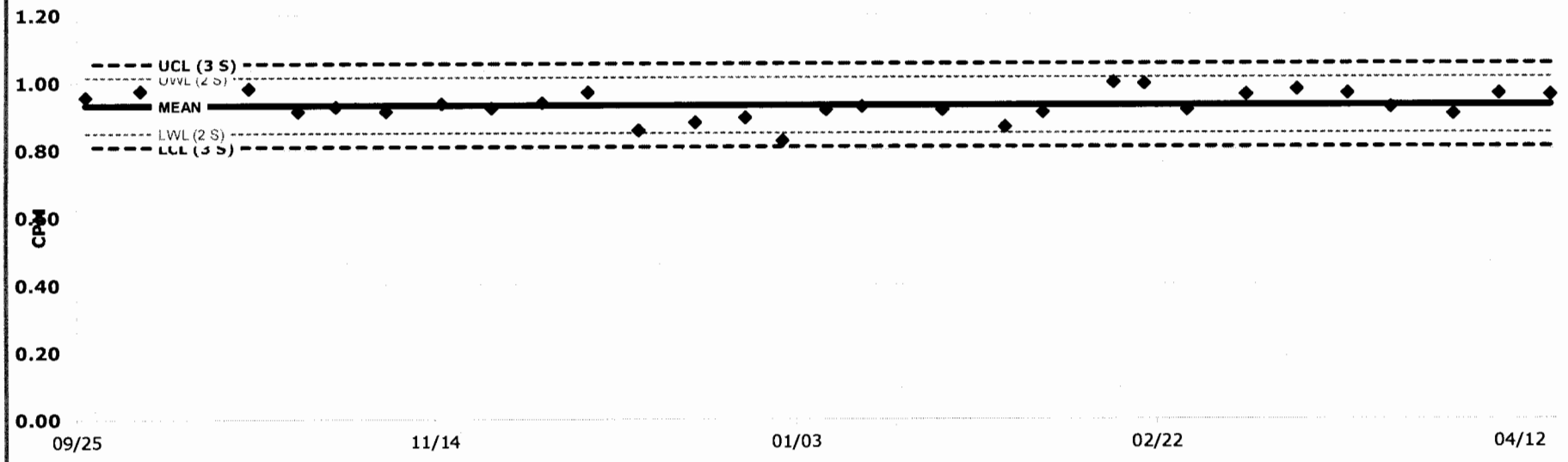


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.9316 |
| Standard Deviation | 0.0412 |
| + 3-sigma value | 1.0552 |
| - 3-sigma value | 0.8080 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR A4

Process Date Range: 09/26/15 - 04/16/16

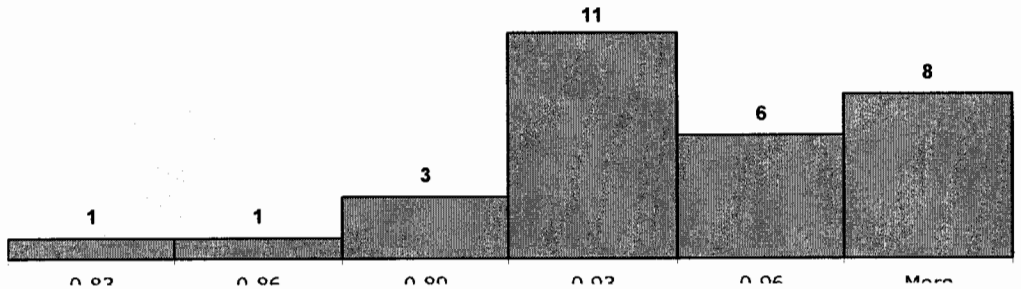



INTERNATIONAL

**Statistical Process Control**

### Population Frequency Distribution (Histogram)

| Bin | Frequency |
|---|---|
| 0.83 | 1 |
| 0.86 | 1 |
| 0.89 | 3 |
| 0.93 | 11 |
| 0.96 | 6 |
| More | 8 |




DCN: ITSI-0808-0004-0076, 8 May 2019

# Instrument Background Analysis

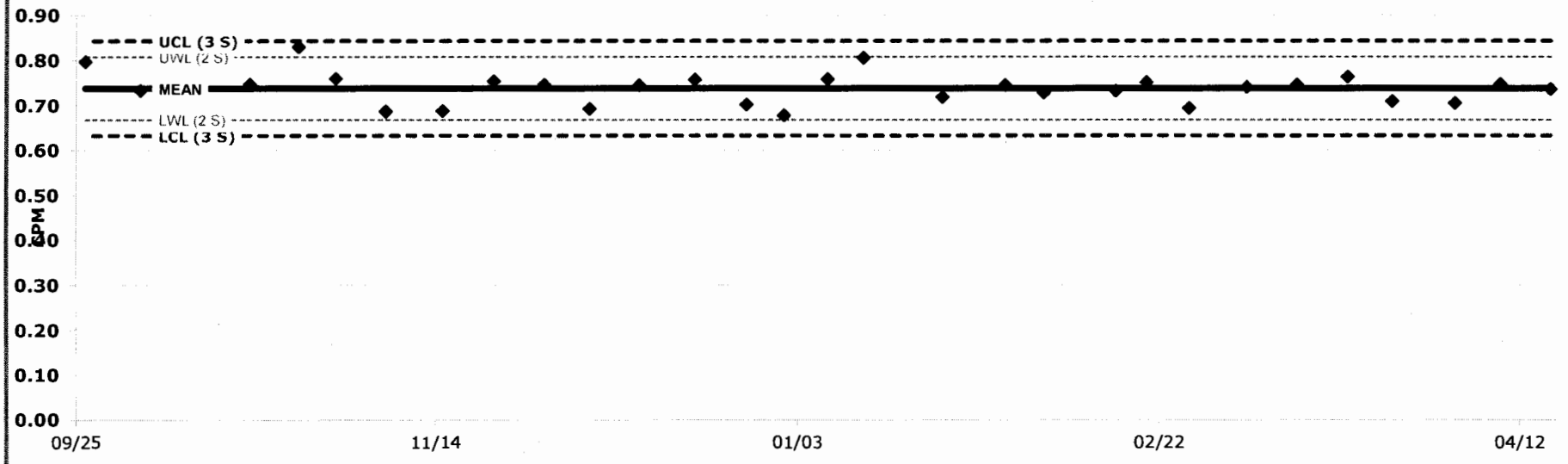


| Population Statistics | |
|---|---|
| Population Size | 30 |
| Average | 0.7378 |
| Standard Deviation | 0.0352 |
| + 3-sigma value | 0.8433 |
| - 3-sigma value | 0.6322 |
| | 30.0000 |

| Trending Analysis | |
|---|---|
| Most recent point outside of the 3-sigma values. | OK |
| 8 consecutive most recent points on one side of the mean. | OK |
| 2 of 3 most recent points above 2 sigma. | OK |
| 4 of 5 most recents points beyond the 1-sigma. | OK |
| 7 trending most recent points in a row. | OK |
| 15 most recent points inside 1 sigma. | OK |
| 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA LONG BACKGROUND - DETECTOR B1

Process Date Range: 09/26/15 - 04/16/16

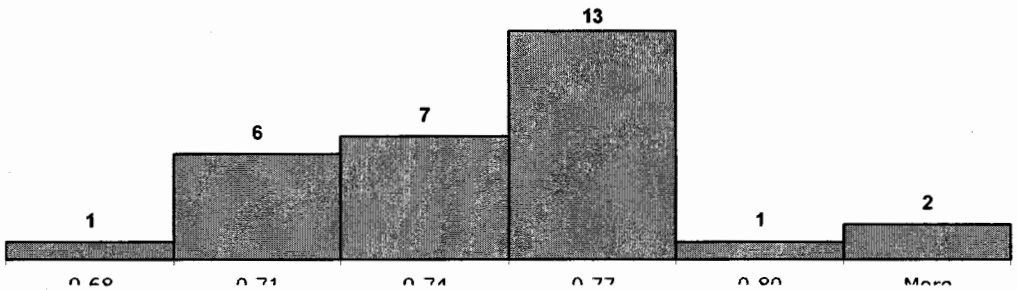



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.68 | 1 |
| 0.71 | 6 |
| 0.74 | 7 |
| 0.77 | 13 |
| 0.80 | 1 |
| More | 2 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

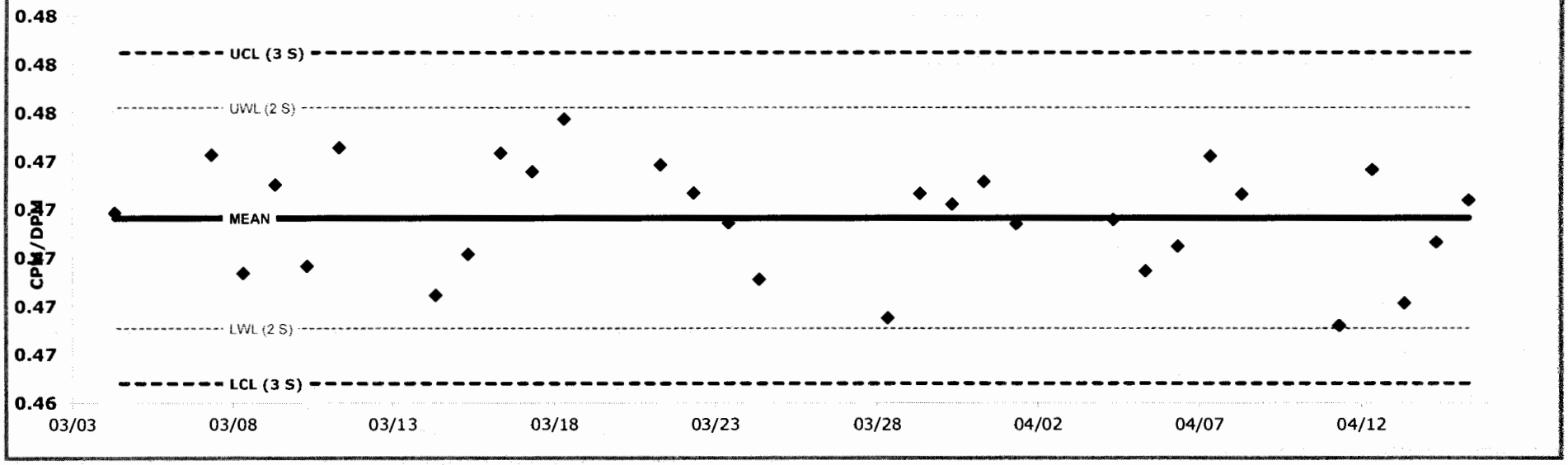
# LB4100-C - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4716 | CPM/DPM | 0.4724 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0023 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4785 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4648 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR A1

Process Date Range: 03/04/16 - 04/15/16

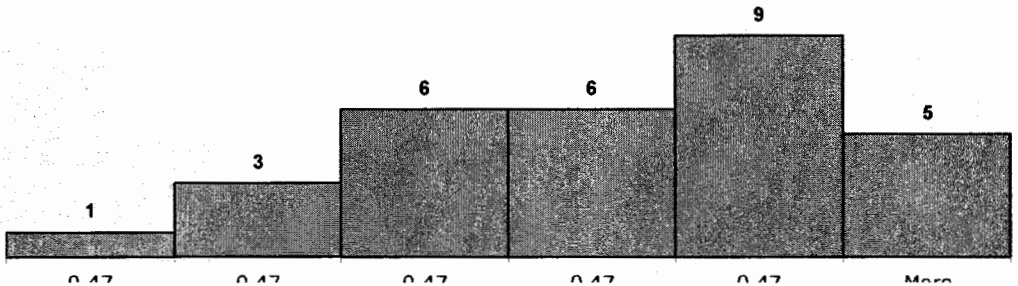



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.47 | 3 |
| 0.47 | 6 |
| 0.47 | 6 |
| 0.47 | 9 |
| More | 5 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

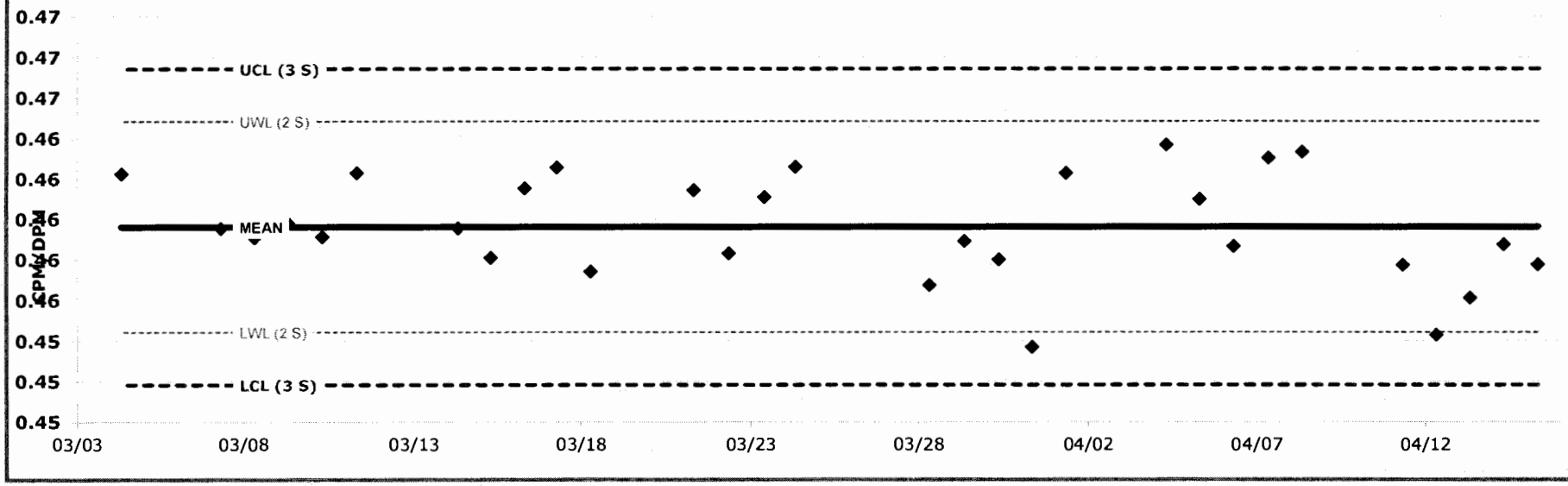
# LB4100-C - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4596 | CPM/DPM | 0.4578 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0026 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4674 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4518 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR A2

Process Date Range: 03/04/16 - 04/15/16

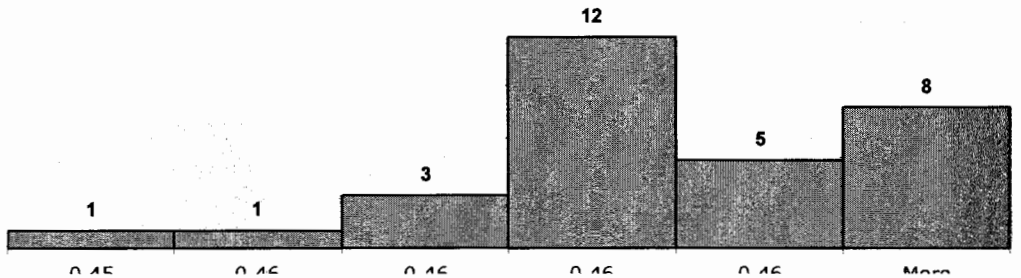



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.45 | 1 |
| 0.46 | 1 |
| 0.46 | 3 |
| 0.46 | 12 |
| 0.46 | 5 |
| More | 8 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C - BETA EFFICIENCY

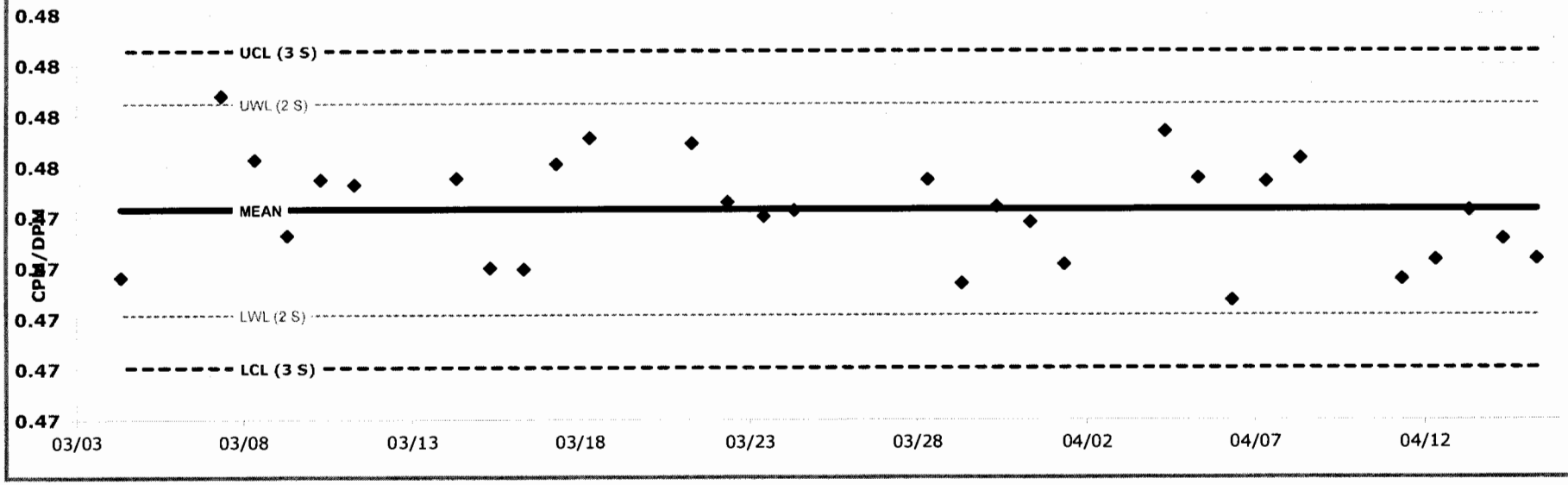


DCN: ITSI-0808-0004-0076, 8 May 2019

| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4743 | CPM/DPM | 0.4723 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0021 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4806 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4681 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR A4

Process Date Range: 03/04/16 - 04/15/16

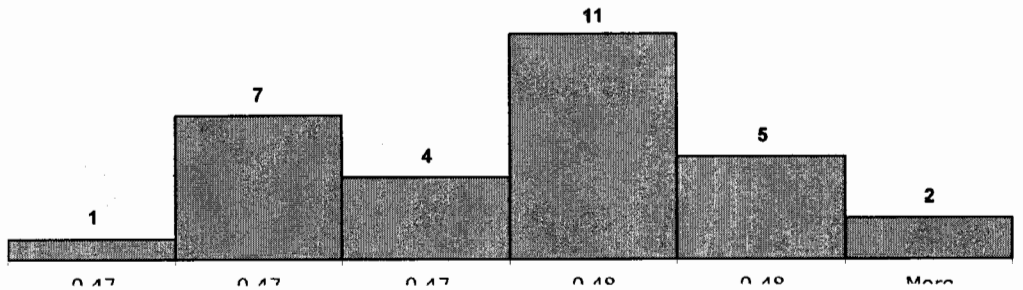



INTERNATIONAL

**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.47 | 1 |
| 0.47 | 7 |
| 0.47 | 4 |
| 0.48 | 11 |
| 0.48 | 5 |
| More | 2 |

**Population Frequency Distribution (Histogram)**



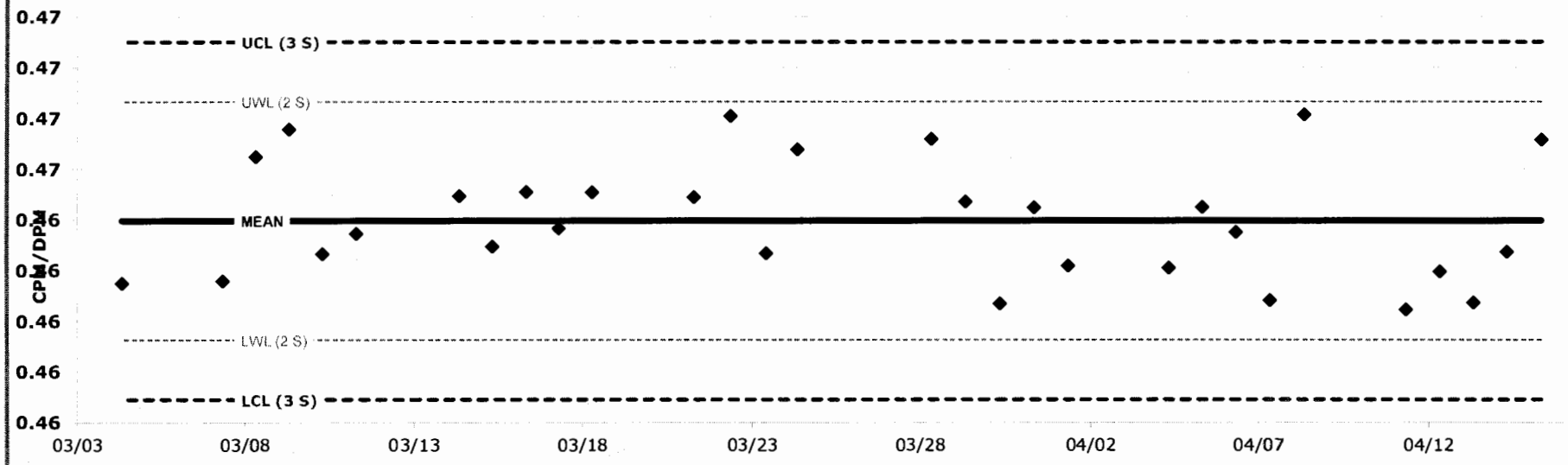
# LB4100-C - BETA EFFICIENCY



| Population Statistics | | | | Trending Analysis | |
|---|---|---|---|---|---|
| Population Size | 30 | | | Most recent point outside of the 3-sigma values. | OK |
| | | Date | 04/15/16 | 8 consecutive most recent points on one side of the mean. | OK |
| Average | 0.4640 | CPM/DPM | 0.4672 | 2 of 3 most recent points above 2 sigma. | OK |
| Standard Deviation | 0.0024 | | | 4 of 5 most recents points beyond the 1-sigma. | OK |
| + 3-sigma value | 0.4710 | Date | | 7 trending most recent points in a row. | OK |
| - 3-sigma value | 0.4569 | CPM | | 15 most recent points inside 1 sigma. | OK |
| | | Count Mins | | 8 most recent points outside 1 sigma. | OK |

## LB4100-C - BETA EFFICIENCY - DETECTOR B1

Process Date Range: 03/04/16 - 04/15/16

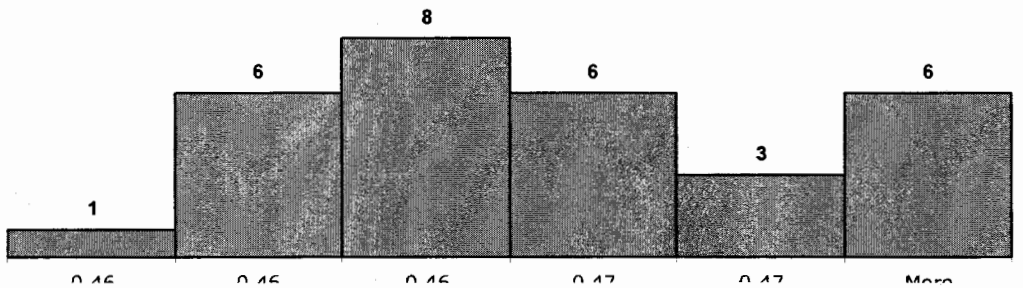



INTERNATIONAL

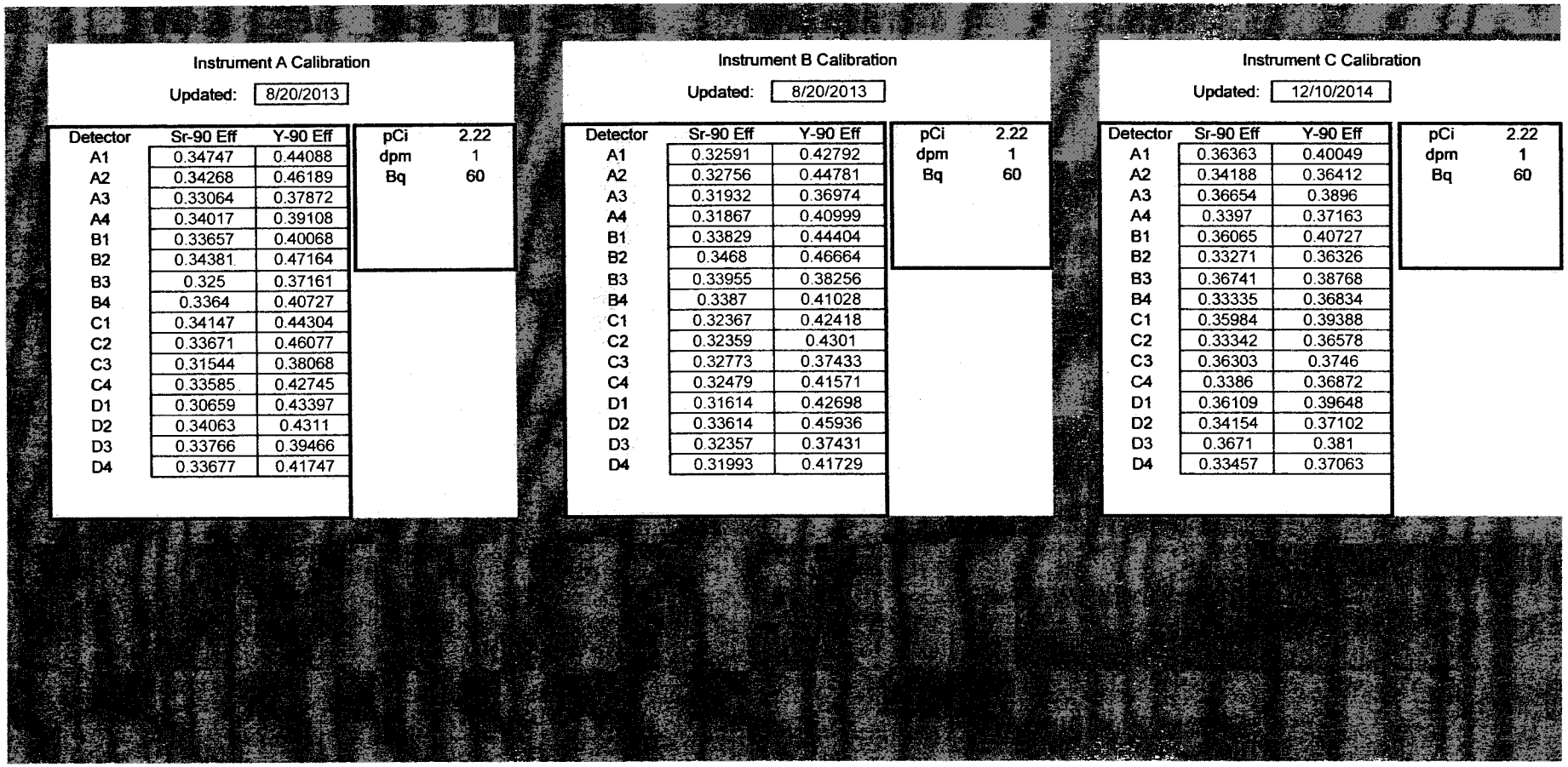
**Statistical Process Control**

| Bin | Frequency |
|---|---|
| 0.46 | 1 |
| 0.46 | 6 |
| 0.46 | 8 |
| 0.47 | 6 |
| 0.47 | 3 |
| More | 6 |

**Population Frequency Distribution (Histogram)**




DCN: ITSI-0808-0004-0076, 8 May 2019



### Instrument A Calibration

Updated: 8/20/2013

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.34747 | 0.44088 |
| A2 | 0.34268 | 0.46189 |
| A3 | 0.33064 | 0.37872 |
| A4 | 0.34017 | 0.39108 |
| B1 | 0.33657 | 0.40068 |
| B2 | 0.34381 | 0.47164 |
| B3 | 0.325 | 0.37161 |
| B4 | 0.3364 | 0.40727 |
| C1 | 0.34147 | 0.44304 |
| C2 | 0.33671 | 0.46077 |
| C3 | 0.31544 | 0.38068 |
| C4 | 0.33585 | 0.42745 |
| D1 | 0.30659 | 0.43397 |
| D2 | 0.34063 | 0.4311 |
| D3 | 0.33766 | 0.39466 |
| D4 | 0.33677 | 0.41747 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

### Instrument B Calibration

Updated: 8/20/2013

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.32591 | 0.42792 |
| A2 | 0.32756 | 0.44781 |
| A3 | 0.31932 | 0.36974 |
| A4 | 0.31867 | 0.40999 |
| B1 | 0.33829 | 0.44404 |
| B2 | 0.3468 | 0.46664 |
| B3 | 0.33955 | 0.38256 |
| B4 | 0.3387 | 0.41028 |
| C1 | 0.32367 | 0.42418 |
| C2 | 0.32359 | 0.4301 |
| C3 | 0.32773 | 0.37433 |
| C4 | 0.32479 | 0.41571 |
| D1 | 0.31614 | 0.42698 |
| D2 | 0.33614 | 0.45936 |
| D3 | 0.32357 | 0.37431 |
| D4 | 0.31993 | 0.41729 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

### Instrument C Calibration

Updated: 12/10/2014

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.36363 | 0.40049 |
| A2 | 0.34188 | 0.36412 |
| A3 | 0.36654 | 0.3896 |
| A4 | 0.3397 | 0.37163 |
| B1 | 0.36065 | 0.40727 |
| B2 | 0.33271 | 0.36326 |
| B3 | 0.36741 | 0.38768 |
| B4 | 0.33335 | 0.36834 |
| C1 | 0.35984 | 0.39388 |
| C2 | 0.33342 | 0.36578 |
| C3 | 0.36303 | 0.3746 |
| C4 | 0.3386 | 0.36872 |
| D1 | 0.36109 | 0.39648 |
| D2 | 0.34154 | 0.37102 |
| D3 | 0.3671 | 0.381 |
| D4 | 0.33457 | 0.37063 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

## Sr-90 (Sr-90, Y-90) Calibration Verification

**Sr-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | reference date | Mass added (g) | Total Activtiy Added (Sr 90 in DPM) on reference date | carrier added (mg as Sr) | g SrNO3/ g Sr | carrier expected (mg SrNO3) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Chemical Yield | separation date/time | count date/time | count midpoint | Sr-90 half-life days | Sr-90 decay days to count midpoint | Sr decay correction to count midpoint |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 13:44 | 8/19/13 1:46 PM | 10515.51 | 2698.57 | 0.83704 |
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 13:51 | 8/19/13 1:53 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 13:58 | 8/19/13 2:00 PM | 10515.51 | 2698.58 | 0.83704 |
| Sr Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0111 | 11407.12 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| Sr Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0117 | 11413.89 | 5.0000 | 2.4153 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| Sr Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0068 | 11358.61 | 5.0000 | 2.4153 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| Sr Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0046 | 11333.79 | 5.0000 | 2.4153 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:04 | 8/19/13 2:06 PM | 10515.51 | 2698.59 | 0.83704 |
| | | | | | 11333.79 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 | 0.00 | 1.00000 |
| | | | | | 11333.79 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 | 0.00 | 1.00000 |

**Y-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | collection date | Mass added (g) | Total Activtiy Added (Sr 90 in DPM) | carrier added (mg) | g SrNO3/ g Sr | carrier expected (mg) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Yield | separation date | count date | Sr-90 half-life days | Sr-90 decay days | Sr decay correction to separation | count midpoint |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.4153 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:43 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:45 PM |
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.415 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:49 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:51 PM |
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.415 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 14:56 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 2:58 PM |
| Y Cal 1A | S-0121 | 11281.89593 | 3/31/2006 | 1.0167 | 11470.3 | 5.0000 | 2.415 | 12.077 | 7.6373 | 7.6259 | 11.4 | 0.9440 | 8/19/2013 10:14 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |
| Y Cal 2A | S-0121 | 11281.89593 | 3/31/2006 | 1.0061 | 11350.72 | 5.0000 | 2.415 | 12.077 | 7.5910 | 7.5800 | 11.0 | 0.9109 | 8/19/2013 10:14 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |
| Y Cal 3A | S-0121 | 11281.89593 | 3/31/2006 | 1.0074 | 11365.38 | 5.0000 | 2.415 | 12.077 | 7.6081 | 7.5961 | 12.0 | 0.9937 | 8/19/2013 10:14 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |
| Y Cal 5A | S-0121 | 11281.89593 | 3/31/2006 | 1.0086 | 11378.92 | 5.0000 | 2.415 | 12.077 | 7.6606 | 7.6487 | 11.9 | 0.9854 | 8/19/2013 10:18 | 8/19/13 15:02 | 10515.51 | 2698.43 | 0.83705 | 8/19/13 3:04 PM |

## Sr-90 (Sr-

### Sr-90

| ID | Sr-90 activtiy at count midpoint (DPM) | Y-90 half-life days | Y-90 ingrowth days to count midpoint | Y-90 ingrowth | Y-90 Eff (from below) | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Sr-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1A | 9013.3 | 2.667 | 0.1476 | 0.03763 | 0.44088 | 16417 | 5.0 | 1065 | 900.0 | 3282.2167 | A1 | 0.34747 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1476 | 0.03763 | 0.46189 | 15668 | 5.0 | 1019 | 900.0 | 3132.4678 | A2 | 0.34268 |
| Sr Cal 3A | 9447.4 | 2.667 | 0.1476 | 0.03763 | 0.37872 | 16297 | 5.0 | 895 | 900.0 | 3258.4056 | A3 | 0.33064 |
| Sr Cal 5A | 9348.2 | 2.667 | 0.1448 | 0.03694 | 0.39108 | 16583 | 5.0 | 990 | 900.0 | 3315.5000 | A4 | 0.34017 |
| Sr Cal 1A | 9013.3 | 2.667 | 0.1524 | 0.03885 | 0.40068 | 15904 | 5.0 | 974 | 900.0 | 3179.7178 | B1 | 0.33657 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1524 | 0.03885 | 0.47164 | 15795 | 5.0 | 938 | 900.0 | 3157.9578 | B2 | 0.34381 |
| Sr Cal 3A | 9447.4 | 2.667 | 0.1524 | 0.03885 | 0.37161 | 15981 | 5.0 | 821 | 900.0 | 3195.2878 | B3 | 0.32500 |
| Sr Cal 5A | 9348.2 | 2.667 | 0.1497 | 0.03815 | 0.40727 | 16402 | 5.0 | 1100 | 900.0 | 3279.1778 | B4 | 0.33640 |
| Sr Cal 1A | 9013.3 | 2.667 | 0.1573 | 0.04006 | 0.44304 | 16232 | 5.0 | 763 | 900.0 | 3245.5522 | C1 | 0.34147 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1573 | 0.04006 | 0.46077 | 15521 | 5.0 | 760 | 900.0 | 3103.3556 | C2 | 0.33671 |
| Sr Cal 3A | 9447.3 | 2.667 | 0.1573 | 0.04006 | 0.38068 | 15615 | 5.0 | 3858 | 900.0 | 3118.3133 | C3 | 0.31544 |
| Sr Cal 5A | 9348.1 | 2.667 | 0.1545 | 0.03937 | 0.42745 | 16430 | 5.0 | 700 | 900.0 | 3285.2222 | C4 | 0.33585 |
| Sr Cal 1A | 9013.3 | 2.667 | 0.1615 | 0.04110 | 0.43397 | 14664 | 5.0 | 706 | 900.0 | 2932.0156 | D1 | 0.30659 |
| Sr Cal 2A | 8702.2 | 2.667 | 0.1615 | 0.04110 | 0.43110 | 15667 | 5.0 | 2550 | 900.0 | 3130.5667 | D2 | 0.34063 |
| Sr Cal 3A | 9447.3 | 2.667 | 0.1615 | 0.04110 | 0.39466 | 16691 | 5.0 | 1118 | 900.0 | 3336.9578 | D3 | 0.33766 |
| Sr Cal 5A | 9348.1 | 2.667 | 0.1587 | 0.04041 | 0.41747 | 16475 | 5.0 | 782 | 900.0 | 3294.1311 | D4 | 0.33677 |
| | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.39466 | | | | | #DIV/0! | | #DIV/0! |
| | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.41747 | | | | | #DIV/0! | | #DIV/0! |

### Y-90

| ID | Sr-90 activtiy at count separation (DPM) | Y-90 decay days | Y-90 half-life days | Y-90 Decay | Y-90 Activity | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Y-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1A | 9063.3 | 0.1885 | 2.667 | 0.952174 | 10309.852 | 22733 | 5.0 | 1065 | 900.0 | 4545.4167 | A1 | 0.44088 |
| Y Cal 2A | 8654.1 | 0.1885 | 2.667 | 0.952174 | 9844.385 | 22741 | 5.0 | 1019 | 900.0 | 4547.0678 | A2 | 0.46189 |
| Y Cal 3A | 9453.1 | 0.1885 | 2.667 | 0.952174 | 10753.205 | 20367 | 5.0 | 895 | 900.0 | 4072.4056 | A3 | 0.37872 |
| Y Cal 5A | 9385.5 | 0.1858 | 2.667 | 0.952862 | 10684.009 | 20897 | 5.0 | 990 | 900.0 | 4178.3000 | A4 | 0.39108 |
| Y Cal 1A | 9063.3 | 0.1927 | 2.667 | 0.951143 | 10298.692 | 20638 | 5.0 | 974 | 900.0 | 4126.5178 | B1 | 0.40068 |
| Y Cal 2A | 8654.1 | 0.1927 | 2.667 | 0.951143 | 9833.729 | 23195 | 5.0 | 938 | 900.0 | 4637.9578 | B2 | 0.47164 |
| Y Cal 3A | 9453.1 | 0.1927 | 2.667 | 0.951143 | 10741.566 | 19963 | 5.0 | 821 | 900.0 | 3991.6878 | B3 | 0.37161 |
| Y Cal 5A | 9385.5 | 0.1899 | 2.667 | 0.951830 | 10672.444 | 21739 | 5.0 | 1100 | 900.0 | 4346.5778 | B4 | 0.40727 |
| Y Cal 1A | 9063.3 | 0.1976 | 2.667 | 0.949942 | 10285.687 | 22789 | 5.0 | 763 | 900.0 | 4556.9522 | C1 | 0.44304 |
| Y Cal 2A | 8654.1 | 0.1976 | 2.667 | 0.949942 | 9821.311 | 22631 | 5.0 | 760 | 900.0 | 4525.3556 | C2 | 0.46077 |
| Y Cal 3A | 9453.1 | 0.1976 | 2.667 | 0.949942 | 10728.002 | 20441 | 5.0 | 3858 | 900.0 | 4083.9133 | C3 | 0.38068 |
| Y Cal 5A | 9385.5 | 0.1948 | 2.667 | 0.950628 | 10658.967 | 22785 | 5.0 | 700 | 900.0 | 4556.2222 | C4 | 0.42745 |
| Y Cal 1A | 9063.3 | 0.2017 | 2.667 | 0.948914 | 10274.553 | 22298 | 5.0 | 706 | 900.0 | 4458.8156 | D1 | 0.43397 |
| Y Cal 2A | 8654.1 | 0.2017 | 2.667 | 0.948914 | 9810.680 | 21161 | 5.0 | 2550 | 900.0 | 4229.3667 | D2 | 0.43110 |
| Y Cal 3A | 9453.1 | 0.2017 | 2.667 | 0.948914 | 10716.389 | 21153 | 5.0 | 1118 | 900.0 | 4229.3578 | D3 | 0.39466 |
| Y Cal 5A | 9385.5 | 0.1990 | 2.667 | 0.949599 | 10647.430 | 22229 | 5.0 | 782 | 900.0 | 4444.9311 | D4 | 0.41747 |

Sr-90/Y90 Efficiency Calibrations 8/19/2013

Tech: B Steffens
Pipet # FJ40469
Scale ID H113112173560P
Standard # S-0121

| Sample ID | Std weight g. | Sep. Date: 8/19/13 |
|---|---|---|
| Sr_Y_Cal_1A | 1.0111 | 10:14 |
| Sr_Y_Cal_2A | 1.0117 | 10:14 |
| Sr_Y_Cal_3A | 1.0068 | 10:14 |
| * Sr_Y_Cal_4A | 1.0077 | 10:14 |
| Sr_Y_Cal_5A | 1.0046 | 10:18 |

Performed By: B Steffens

| Sr. Planchett Weigts | Empty | Full |
|---|---|---|
| Sr_Cal_1A | 7.6259 | 7.6373 |
| Sr_Cal_2A | 7.58 | 7.591 |
| Sr_Cal_3A | 7.5961 | 7.6081 |
| Sr_Cal_4A | 7.6157 | 7.6276 |
| Sr_Cal_5A | 7.6487 | 7.6606 |

Not used JK 8-19-13

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | Sr-Cal-1A | 2 | 16417 | 5 | 1402.5 | 8/19/13 13:44 |
| A2 | Sr-Cal-2A | 4 | 15668 | 5 | 1402.5 | 8/19/13 13:44 |
| A3 | Sr-Cal-3A | 20 | 16297 | 5 | 1402.5 | 8/19/13 13:44 |
| A4 | Sr-Cal-5A | 5 | 16583 | 5 | 1402.5 | 8/19/13 13:44 |

N-1110

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | Sr-Cal-1A | 0 | 15904 | 5 | 1402.5 | 8/19/13 13:51 |
| B2 | Sr-Cal-2A | 30 | 15795 | 5 | 1402.5 | 8/19/13 13:51 |
| B3 | Sr-Cal-3A | 87 | 15981 | 5 | 1402.5 | 8/19/13 13:51 |
| B4 | Sr-Cal-5A | 8 | 16402 | 5 | 1402.5 | 8/19/13 13:51 |



N-1111

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | Sr-Cal-1A | 12 | 16232 | 5 | 1402.5 | 8/19/13 13:58 |
| C2 | Sr-Cal-2A | 59 | 15521 | 5 | 1402.5 | 8/19/13 13:58 |
| C3 | Sr-Cal-3A | 48 | 15613 | 5 | 1402.5 | 8/19/13 13:58 |
| C4 | Sr-Cal-5A | 50 | 16430 | 5 | 1402.5 | 8/19/13 13:58 |



N-1112

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | Sr-Cal-1A | 114 | 14664 | 5 | 1402.5 | 8/19/13 14:04 |
| D2 | Sr-Cal-2A | 16 | 15667 | 5 | 1402.5 | 8/19/13 14:04 |
| D3 | Sr-Cal-3A | 38 | 16691 | 5 | 1402.5 | 8/19/13 14:04 |
| D4 | Sr-Cal-5A | 18 | 16475 | 5 | 1402.5 | 8/19/13 14:04 |



N-1113

GEN 770
A 35723
Y Cal
BZF



| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | Y-Cal-1A | 1 | 22733 | 5 | 1402.5 | 8/19/13 14:43 |
| A2 | Y-Cal-2A | 10 | 22741 | 5 | 1402.5 | 8/19/13 14:43 |
| A3 | Y-Cal-3A | 20 | 20367 | 5 | 1402.5 | 8/19/13 14:43 |
| A4 | Y-Cal-5A | 4 | 20897 | 5 | 1402.5 | 8/19/13 14:43 |



DCN: ITSI-0808-0004-0076, 8 May 2019

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | Y-Cal-1A | 0 | 20638 | 5 | 1402.5 | 8/19/13 14:49 |
| B2 | Y-Cal-2A | 19 | 23195 | 5 | 1402.5 | 8/19/13 14:49 |
| B3 | Y-Cal-3A | 40 | 19963 | 5 | 1402.5 | 8/19/13 14:49 |
| B4 | Y-Cal-5A | 5 | 21739 | 5 | 1402.5 | 8/19/13 14:49 |



N-1115

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | Y-Cal-1A | 20 | 22789 | 5 | 1402.5 | 8/19/13 14:56 |
| C2 | Y-Cal-2A | 28 | 22631 | 5 | 1402.5 | 8/19/13 14:56 |
| C3 | Y-Cal-3A | 19 | 20441 | 5 | 1402.5 | 8/19/13 14:56 |
| C4 | Y-Cal-5A | 32 | 22785 | 5 | 1402.5 | 8/19/13 14:56 |



N-1116

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | Y-Cal-1A | 67 | 22298 | 5 | 1402.5 | 8/19/13 15:02 |
| D2 | Y-Cal-2A | 6 | 21161 | 5 | 1402.5 | 8/19/13 15:02 |
| D3 | Y-Cal-3A | 20 | 21153 | 5 | 1402.5 | 8/19/13 15:02 |
| D4 | Y-Cal-5A | 18 | 22229 | 5 | 1402.5 | 8/19/13 15:02 |



N-1117

GEN 763
A 35723
LONG BKG
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 138 | 1065 | 900 | 1402.5 | 8/17/13 5:31 |
| A2 | A2-01 | 90 | 1019 | 900 | 1402.5 | 8/17/13 5:31 |
| A3 | A3-01 | 92 | 895 | 900 | 1402.5 | 8/17/13 5:31 |
| A4 | A4-01 | 114 | 990 | 900 | 1402.5 | 8/17/13 5:31 |
| C1 | C1-01 | 106 | 763 | 900 | 1402.5 | 8/17/13 5:31 |
| C2 | C2-01 | 95 | 760 | 900 | 1402.5 | 8/17/13 5:31 |
| C3 | C3-01 | 73 | 3858 | 900 | 1402.5 | 8/17/13 5:31 |
| C4 | C4-01 | 82 | 700 | 900 | 1402.5 | 8/17/13 5:31 |
| B1 | B1-01 | 65 | 974 | 900 | 1402.5 | 8/17/13 5:31 |
| B2 | B2-01 | 92 | 938 | 900 | 1402.5 | 8/17/13 5:31 |
| B3 | B3-01 | 145 | 821 | 900 | 1402.5 | 8/17/13 5:31 |
| B4 | B4-01 | 126 | 1100 | 900 | 1402.5 | 8/17/13 5:31 |
| D1 | D1-01 | 53 | 706 | 900 | 1402.5 | 8/17/13 5:32 |
| D2 | D2-01 | 87 | 2550 | 900 | 1402.5 | 8/17/13 5:32 |
| D3 | D3-01 | 61 | 1118 | 900 | 1402.5 | 8/17/13 5:32 |
| D4 | D4-01 | 60 | 782 | 900 | 1402.5 | 8/17/13 5:32 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-1118

C 11160

Sr-90/Y90 Efficiency Calibrations 12/8/14

Tech: B Steffens
Pipet # FJ40469
Scale ID H113112173560P
Standard # S-0121

| Sample ID | Std weight g. | Sep. Date: 12/8/14 |
|---|---|---|
| Sr_Y_Cal_1B | 1.0114 | 12:12 |
| Sr_Y_Cal_2B | 1.0121 | 12:19 |
| Sr_Y_Cal_3B | 1.0063 | 12:17 |
| Sr_Y_Cal_4B | 1.0122 | 12:12 |
| Sr_Y_Cal_5B | 1.0127 | 12:16 |

Performed By: B Steffens

| Sr. Planchett Weigts | Empty | Full |
|---|---|---|
| Sr_Cal_1B | 7.591 | 7.603 |
| Sr_Cal_2B | 7.592 | 7.604 |
| Sr_Cal_3B | 7.594 | 7.606 |
| Sr_Cal_4B | 7.603 | 7.615 |
| Sr_Cal_5B | 7.599 | 7.611 |

Approved
JDT 12-10-14

Calibration

Updated: 12/10/2014

| Detector | Sr-90 Eff | Y-90 Eff |
|---|---|---|
| A1 | 0.36363 | 0.40049 |
| A2 | 0.34188 | 0.36412 |
| A3 | 0.36654 | 0.3896 |
| A4 | 0.3397 | 0.37163 |
| B1 | 0.36065 | 0.40727 |
| B2 | 0.33271 | 0.36326 |
| B3 | 0.36741 | 0.38768 |
| B4 | 0.33335 | 0.36834 |
| C1 | 0.35984 | 0.39388 |
| C2 | 0.33342 | 0.36578 |
| C3 | 0.36303 | 0.3746 |
| C4 | 0.3386 | 0.36872 |
| D1 | 0.36109 | 0.39648 |
| D2 | 0.34154 | 0.37102 |
| D3 | 0.3671 | 0.381 |
| D4 | 0.33457 | 0.37063 |

| | |
|---|---|
| pCi | 2.22 |
| dpm | 1 |
| Bq | 60 |

C1160 Calibrations





**Sr-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | reference date | Mass added (g) | Total Activtiy Added (Sr-90 in DPM) on reference date | carrier added (mg as Sr) | g SrNO3/ g Sr | carrier expected (mg SrNO3) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Chemical Yield | separation date/time | count date/time | count midpoint | Sr-90 half-life days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:02 | 12/8/14 2:04 PM | 10515.51 |
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:09 | 12/8/14 2:11 PM | 10515.51 |
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:18 | 12/8/14 2:20 PM | 10515.51 |
| Sr Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.4153 | 12.077 | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| Sr Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.4153 | 12.077 | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| Sr Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.4153 | 12.077 | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| Sr Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.4153 | 12.077 | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 14:25 | 12/8/14 2:27 PM | 10515.51 |
| | | | | | 11425.18 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 |
| | | | | | 11425.18 | | | 0.000 | | | 0.0 | #DIV/0! | | | 1/0/00 12:00 AM | 10515.51 |

**Sr-90**

| ID | Sr-90 decay days to count midpoint | Sr decay correction to count midpoint | Sr-90 activtiy at count midpoint (DPM) | Y-90 half-life days | Y-90 ingrowth days to count midpoint | Y-90 ingrowth | Y-90 Eff (from below) | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Sr-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr Cal 1B | 3174.59 | 0.81119 | 9197.4 | 2.667 | 0.0781 | 0.02010 | 0.40049 | 17097 | 5.0 | 826 | 900.0 | 3418.4822 | A1 | 0.36363 |
| Sr Cal 2B | 3174.59 | 0.81119 | 9203.7 | 2.667 | 0.0733 | 0.01886 | 0.36412 | 16054 | 5.0 | 889 | 900.0 | 3209.8122 | A2 | 0.34188 |
| Sr Cal 4B | 3174.59 | 0.81119 | 9204.6 | 2.667 | 0.0781 | 0.02010 | 0.38960 | 17234 | 5.0 | 748 | 900.0 | 3445.9689 | A3 | 0.36654 |
| Sr Cal 5B | 3174.59 | 0.81119 | 9209.2 | 2.667 | 0.0753 | 0.01939 | 0.37163 | 15979 | 5.0 | 952 | 900.0 | 3194.7422 | A4 | 0.33970 |
| Sr Cal 1B | 3174.59 | 0.81119 | 9197.4 | 2.667 | 0.0830 | 0.02134 | 0.40727 | 16989 | 5.0 | 664 | 900.0 | 3397.0622 | B1 | 0.36065 |
| Sr Cal 2B | 3174.59 | 0.81119 | 9203.7 | 2.667 | 0.0781 | 0.02010 | 0.36326 | 15651 | 5.0 | 755 | 900.0 | 3129.3611 | B2 | 0.33271 |
| Sr Cal 4B | 3174.59 | 0.81119 | 9204.6 | 2.667 | 0.0830 | 0.02134 | 0.38768 | 17309 | 5.0 | 3442 | 900.0 | 3457.9756 | B3 | 0.36741 |
| Sr Cal 5B | 3174.59 | 0.81119 | 9209.2 | 2.667 | 0.0802 | 0.02063 | 0.36834 | 15703 | 5.0 | 713 | 900.0 | 3139.8078 | B4 | 0.33335 |
| Sr Cal 1B | 3174.60 | 0.81119 | 9197.4 | 2.667 | 0.0892 | 0.02293 | 0.39388 | 16968 | 5.0 | 833 | 900.0 | 3392.6744 | C1 | 0.35984 |
| Sr Cal 2B | 3174.60 | 0.81119 | 9203.7 | 2.667 | 0.0844 | 0.02169 | 0.36578 | 15714 | 5.0 | 922 | 900.0 | 3141.7756 | C2 | 0.33342 |
| Sr Cal 4B | 3174.60 | 0.81119 | 9204.6 | 2.667 | 0.0892 | 0.02293 | 0.37460 | 17107 | 5.0 | 793 | 900.0 | 3420.5189 | C3 | 0.36303 |
| Sr Cal 5B | 3174.60 | 0.81119 | 9209.2 | 2.667 | 0.0865 | 0.02222 | 0.36872 | 15973 | 5.0 | 852 | 900.0 | 3193.6533 | C4 | 0.33860 |
| Sr Cal 1B | 3174.60 | 0.81118 | 9197.3 | 2.667 | 0.0941 | 0.02416 | 0.39648 | 17050 | 5.0 | 703 | 900.0 | 3409.2189 | D1 | 0.36109 |
| Sr Cal 2B | 3174.60 | 0.81118 | 9203.7 | 2.667 | 0.0892 | 0.02293 | 0.37102 | 16113 | 5.0 | 715 | 900.0 | 3221.8056 | D2 | 0.34154 |
| Sr Cal 4B | 3174.60 | 0.81118 | 9204.6 | 2.667 | 0.0941 | 0.02416 | 0.38100 | 17322 | 5.0 | 647 | 900.0 | 3463.6811 | D3 | 0.36710 |
| Sr Cal 5B | 3174.60 | 0.81118 | 9209.2 | 2.667 | 0.0913 | 0.02346 | 0.37063 | 15810 | 5.0 | 780 | 900.0 | 3161.1333 | D4 | 0.33457 |
| | 0.00 | 1.00000 | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.38100 | | | | | #DIV/0! | | #DIV/0! |
| | 0.00 | 1.00000 | #DIV/0! | 2.667 | 0.0000 | 0.00000 | 0.37063 | | | | | #DIV/0! | | #DIV/0! |

**Sr-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | reference date | Mass added (g) | Total Activtiy Added (Sr-90 in DPM) on reference date | carrier added (mg as Sr) | g SrNO3/ g Sr | carrier expected (mg SrNO3) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Chemical Yield | separation date/time | count date/time | count midpoint | Sr-90 half-life days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Y-90**

| ID | Standard ID | Standard Specific Activity (dpm/g) | collection date | Mass added (g) | Total Activtiy Added (Sr-90 in DPM) | carrier added (mg) | g SrNO3/ g Sr | carrier expected (mg) | planchet gross (g) | planchet tare (g) | planchet net (mg) | Yield | separation date | count date | Sr-90 half-life days | Sr-90 decay days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | **5.0000** | **2.4153** | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:13 | 10515.51 | 3174.51 |
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.415 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:19 | 10515.51 | 3174.51 |
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.415 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:29 | 10515.51 | 3174.51 |
| Y Cal 1B | S-0121 | 11281.89593 | 3/31/2006 | 1.0114 | 11410.51 | 5.0000 | 2.415 | **12.077** | 7.6030 | 7.5910 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:35 | 10515.51 | 3174.51 |
| Y Cal 2B | S-0121 | 11281.89593 | 3/31/2006 | 1.0121 | 11418.41 | 5.0000 | 2.415 | **12.077** | 7.6040 | 7.5920 | 12.0 | 0.9937 | 12/8/2014 12:19 | 12/8/14 15:35 | 10515.51 | 3174.51 |
| Y Cal 4B | S-0121 | 11281.89593 | 3/31/2006 | 1.0122 | 11419.54 | 5.0000 | 2.415 | **12.077** | 7.6150 | 7.6030 | 12.0 | 0.9937 | 12/8/2014 12:12 | 12/8/14 15:35 | 10515.51 | 3174.51 |
| Y Cal 5B | S-0121 | 11281.89593 | 3/31/2006 | 1.0127 | 11425.18 | 5.0000 | 2.415 | **12.077** | 7.6110 | 7.5990 | 12.0 | 0.9937 | 12/8/2014 12:16 | 12/8/14 15:35 | 10515.51 | 3174.51 |

**Sr-90**

| ID | Sr-90 decay days to count midpoint | Sr decay correction to count midpoint | Sr-90 activtiy at count midpoint (DPM) | Y-90 half-life days | Y-90 ingrowth days to count midpoint | Y-90 ingrowth | Y-90 Eff (from below) | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Sr-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Y-90**

| ID | Sr decay correction to separation | count midpoint | Sr-90 activtiy at count separation (DPM) | Y-90 decay days | Y-90 half-life days | Y-90 Decay | Y-90 Activity | sample counts | sample time | bkg counts | bkg time min | net CPM | Detector | Y-90 Eff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y Cal 1B | 0.81119 | 12/8/14 3:15 PM | 9197.4 | 0.1274 | 2.667 | 0.967420 | 10968.760 | 21969 | 5.0 | 826 | 900.0 | 4392.8822 | A1 | 0.40049 |
| Y Cal 2B | 0.81119 | 12/8/14 3:15 PM | 9203.8 | 0.1226 | 2.667 | 0.968643 | 10990.230 | 20014 | 5.0 | 889 | 900.0 | 4001.8122 | A2 | 0.36412 |
| Y Cal 4B | 0.81119 | 12/8/14 3:15 PM | 9204.7 | 0.1274 | 2.667 | 0.967420 | 10977.437 | 21388 | 5.0 | 748 | 900.0 | 4276.7689 | A3 | 0.38960 |
| Y Cal 5B | 0.81119 | 12/8/14 3:15 PM | 9209.2 | 0.1247 | 2.667 | 0.968118 | 10990.792 | 20428 | 5.0 | 952 | 900.0 | 4084.5422 | A4 | 0.37163 |
| Y Cal 1B | 0.81119 | 12/8/14 3:21 PM | 9197.4 | 0.1316 | 2.667 | 0.966372 | 10956.887 | 22316 | 5.0 | 664 | 900.0 | 4462.4622 | B1 | 0.40727 |
| Y Cal 2B | 0.81119 | 12/8/14 3:21 PM | 9203.8 | 0.1267 | 2.667 | 0.967594 | 10978.333 | 19944 | 5.0 | 755 | 900.0 | 3987.9611 | B2 | 0.36326 |
| Y Cal 4B | 0.81119 | 12/8/14 3:21 PM | 9204.7 | 0.1316 | 2.667 | 0.966372 | 10965.554 | 21275 | 5.0 | 3442 | 900.0 | 4251.1756 | B3 | 0.38768 |
| Y Cal 5B | 0.81119 | 12/8/14 3:21 PM | 9209.2 | 0.1288 | 2.667 | 0.967070 | 10978.895 | 20224 | 5.0 | 713 | 900.0 | 4044.0078 | B4 | 0.36834 |
| Y Cal 1B | 0.81119 | 12/8/14 3:31 PM | 9197.4 | 0.1385 | 2.667 | 0.964630 | 10937.127 | 21544 | 5.0 | 833 | 900.0 | 4307.8744 | C1 | 0.39388 |
| Y Cal 2B | 0.81119 | 12/8/14 3:31 PM | 9203.8 | 0.1337 | 2.667 | 0.965849 | 10958.535 | 20047 | 5.0 | 922 | 900.0 | 4008.3756 | C2 | 0.36578 |
| Y Cal 4B | 0.81119 | 12/8/14 3:31 PM | 9204.7 | 0.1385 | 2.667 | 0.964630 | 10945.778 | 20506 | 5.0 | 793 | 900.0 | 4100.3189 | C3 | 0.37460 |
| Y Cal 5B | 0.81119 | 12/8/14 3:31 PM | 9209.2 | 0.1358 | 2.667 | 0.965326 | 10959.095 | 20209 | 5.0 | 852 | 900.0 | 4040.8533 | C4 | 0.36872 |
| Y Cal 1B | 0.81119 | 12/8/14 3:37 PM | 9197.4 | 0.1427 | 2.667 | 0.963585 | 10925.288 | 21662 | 5.0 | 703 | 900.0 | 4331.6189 | D1 | 0.39648 |
| Y Cal 2B | 0.81119 | 12/8/14 3:37 PM | 9203.8 | 0.1378 | 2.667 | 0.964804 | 10946.673 | 20311 | 5.0 | 715 | 900.0 | 4061.4056 | D2 | 0.37102 |
| Y Cal 4B | 0.81119 | 12/8/14 3:37 PM | 9204.7 | 0.1427 | 2.667 | 0.963585 | 10933.930 | 20833 | 5.0 | 647 | 900.0 | 4165.8811 | D3 | 0.38100 |
| Y Cal 5B | 0.81119 | 12/8/14 3:37 PM | 9209.2 | 0.1399 | 2.667 | 0.964281 | 10947.232 | 20291 | 5.0 | 780 | 900.0 | 4057.3333 | D4 | 0.37063 |

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | SR_CAL_1B | 2 | 17097 | 5 | 1410 | 12/8/14 14:02 |
| A2 | SR_CAL_2B | 3 | 16054 | 5 | 1410 | 12/8/14 14:02 |
| A3 | SR_CAL_4B | 4 | 17234 | 5 | 1410 | 12/8/14 14:02 |
| A4 | SR_CAL_5B | 6 | 15979 | 5 | 1410 | 12/8/14 14:02 |

N-1125

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | SR_CAL_1B | 18 | 16989 | 5 | 1410 | 12/8/14 14:09 |
| B2 | SR_CAL_2B | 13 | 15651 | 5 | 1410 | 12/8/14 14:09 |
| B3 | SR_CAL_4B | 9 | 17309 | 5 | 1410 | 12/8/14 14:09 |
| B4 | SR_CAL_5B | 10 | 15703 | 5 | 1410 | 12/8/14 14:09 |

N-1126

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | SR_CAL_1B | 4 | 16968 | 5 | 1410 | 12/8/14 14:18 |
| C2 | SR_CAL_2B | 8 | 15714 | 5 | 1410 | 12/8/14 14:18 |
| C3 | SR_CAL_4B | 5 | 17107 | 5 | 1410 | 12/8/14 14:18 |
| C4 | SR_CAL_5B | 3 | 15973 | 5 | 1410 | 12/8/14 14:18 |

N-1127

GEN 689
C 11160
Sr
BZF



| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | SR_CAL_1B | 4 | 17050 | 5 | 1410 | 12/8/14 14:25 |
| D2 | SR_CAL_2B | 8 | 16113 | 5 | 1410 | 12/8/14 14:25 |
| D3 | SR_CAL_4B | 5 | 17322 | 5 | 1410 | 12/8/14 14:25 |
| D4 | SR_CAL_5B | 8 | 15810 | 5 | 1410 | 12/8/14 14:25 |

GEN 690
C 11160
Y
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | Y_CAL_1B | 2 | 21969 | 5 | 1410 | 12/8/14 15:13 |
| A2 | Y_CAL_2B | 3 | 20014 | 5 | 1410 | 12/8/14 15:13 |
| A3 | Y_CAL_4B | 4 | 21388 | 5 | 1410 | 12/8/14 15:13 |
| A4 | Y_CAL_5B | 5 | 20428 | 5 | 1410 | 12/8/14 15:13 |



DCN: ITSI-0808-0004-0076, 8 May 2019

N-1129

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| B1 | Y_CAL_1B | 9 | 22316 | 5 | 1410 | 12/8/14 15:19 |
| B2 | Y_CAL_2B | 5 | 19944 | 5 | 1410 | 12/8/14 15:19 |
| B3 | Y_CAL_4B | 3 | 21275 | 5 | 1410 | 12/8/14 15:19 |
| B4 | Y_CAL_5B | 6 | 20224 | 5 | 1410 | 12/8/14 15:19 |

N-1130

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | Y_CAL_1B | 4 | 21544 | 5 | 1410 | 12/8/14 15:29 |
| C2 | Y_CAL_2B | 1 | 20047 | 5 | 1410 | 12/8/14 15:29 |
| C3 | Y_CAL_4B | 2 | 20506 | 5 | 1410 | 12/8/14 15:29 |
| C4 | Y_CAL_5B | 4 | 20209 | 5 | 1410 | 12/8/14 15:29 |

N-1131

DCN: ITSI-0808-0004-0076, 8 May 2019

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| D1 | Y_CAL_1B | 3 | 21662 | 5 | 1410 | 12/8/14 15:35 |
| D2 | Y_CAL_2B | 4 | 20311 | 5 | 1410 | 12/8/14 15:35 |
| D3 | Y_CAL_4B | 2 | 20833 | 5 | 1410 | 12/8/14 15:35 |
| D4 | Y_CAL_5B | 5 | 20291 | 5 | 1410 | 12/8/14 15:35 |

N-1132

GEN 683
C 11160
LONG BKG
BZF

| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| A1 | A1-01 | 135 | 826 | 900 | 1410 | 12/6/14 7:15 |
| A2 | A2-01 | 116 | 889 | 900 | 1410 | 12/6/14 7:15 |
| A3 | A3-01 | 60 | 748 | 900 | 1410 | 12/6/14 7:15 |
| A4 | A4-01 | 126 | 952 | 900 | 1410 | 12/6/14 7:15 |
| C1 | C1-01 | 93 | 833 | 900 | 1410 | 12/6/14 7:15 |
| C2 | C2-01 | 123 | 922 | 900 | 1410 | 12/6/14 7:15 |
| C3 | C3-01 | 126 | 793 | 900 | 1410 | 12/6/14 7:15 |
| C4 | C4-01 | 182 | 852 | 900 | 1410 | 12/6/14 7:15 |
| D1 | D1-01 | 55 | 703 | 900 | 1410 | 12/6/14 7:15 |
| D2 | D2-01 | 59 | 715 | 900 | 1410 | 12/6/14 7:15 |
| D3 | D3-01 | 53 | 647 | 900 | 1410 | 12/6/14 7:15 |
| D4 | D4-01 | 63 | 780 | 900 | 1410 | 12/6/14 7:15 |
| B1 | B1-01 | 55 | 664 | 900 | 1410 | 12/6/14 7:16 |
| B2 | B2-01 | 63 | 755 | 900 | 1410 | 12/6/14 7:16 |
| B3 | B3-01 | 82 | 3442 | 900 | 1410 | 12/6/14 7:16 |
| B4 | B4-01 | 61 | 713 | 900 | 1410 | 12/6/14 7:16 |

Sr-90/Y90 Efficiency Calibrations

Tech: B Steffens
Pipet # FJ40469
Scale ID H113112173560P
Standard # S-0121

| Sample ID | Std weight g. | Sep. Date: 12-8-14 |
|---|---|---|
| Sr_Y_Cal_1B | 1.0114 | 12:12 |
| Sr_Y_Cal_2B | 1.0121 | 12:19 |
| Sr_Y_Cal_3B | 1.0063 | 12:17 |
| Sr_Y_Cal_4B | 1.0122 | 12:12 |
| Sr_Y_Cal_5B | 1.0127 | 12:16 |

Performed By: B Steffens

| Sr. Planchett Weigts | Empty | Full |
|---|---|---|
| Sr_Cal_1B | 7.591g | 7.603 |
| Sr_Cal_2B | 7.592g | 7.604 |
| Sr_Cal_3B | 7.594g | 7.606 |
| Sr_Cal_4B | 7.603g | 7.615 |
| Sr_Cal_5B | 7.599g | 7.611 |

ARS INTERNATIONAL

# Carrier Pipette Calibration Sheet

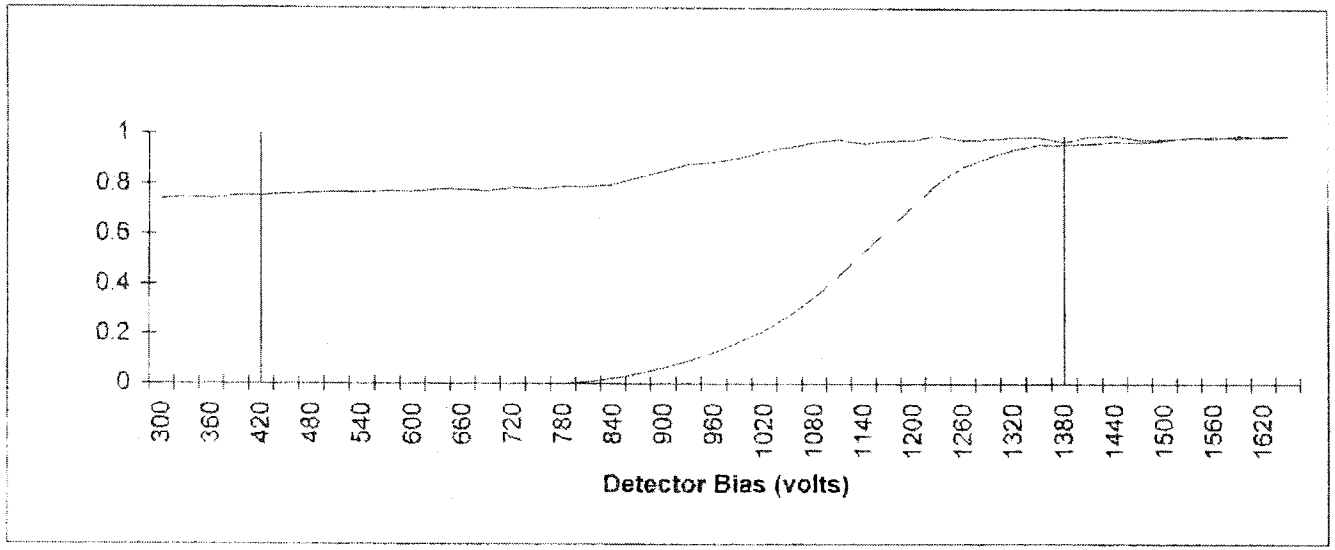
Chemist: Van Vu

Date/Time: 12-8-14 9:00

| Balance ID | Balance Calibration Date | Pipette ID | Nominal Weight | Weight #1 | Weight#2 | Weight#3 | MEAN | Acceptance Limits ±2% Mean | STDEV | RSD% | Acceptance Limits <1% RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12332539 | 6/2/14 | FJ40469 | 1.00 | 1.000 | 1.004 | 1.007 | 1.00 | Pass | 0.004 | 0.350 | Pass |

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

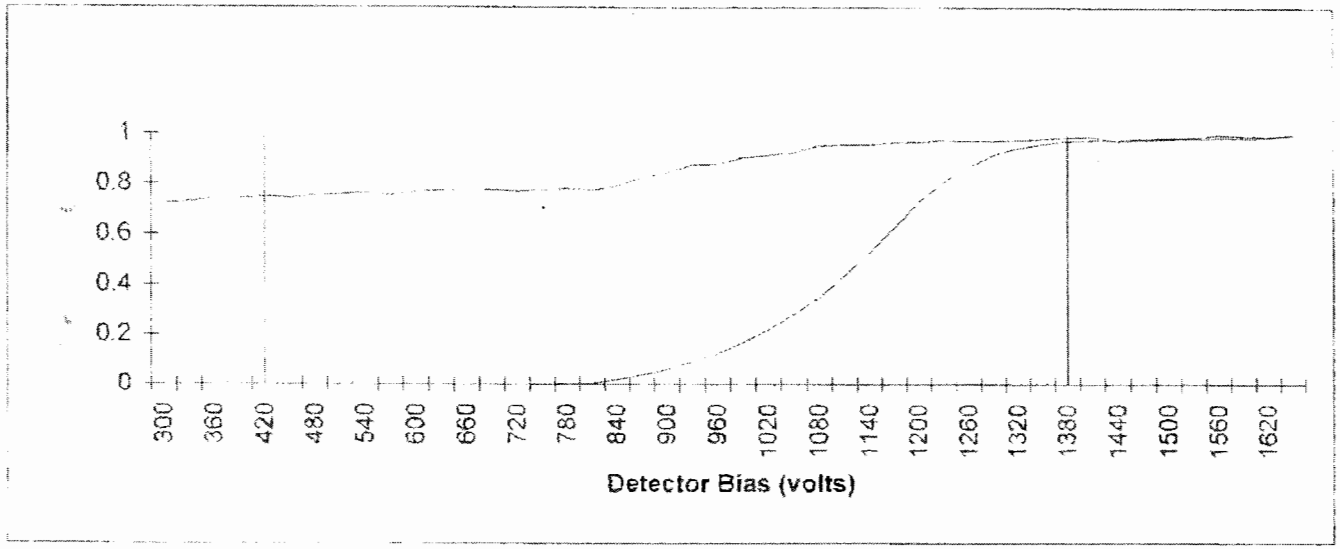
**Optimum alpha only operating voltage: 420**

| | A1 |
|---|---|
| **Beta slope at beta voltage** | **1.59%** |
| **Alpha slope at beta voltage** | **0.37%** |
| **Alpha slope at alpha voltage** | **1.35%** |

Printed 12/30/2011 09:35

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

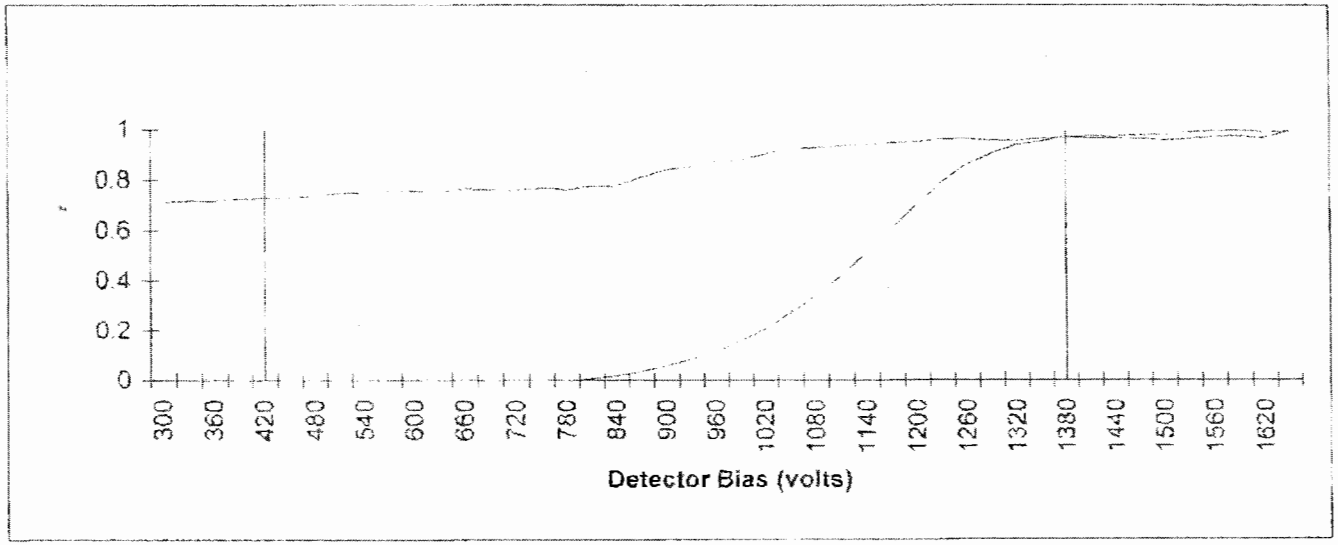
| | A2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

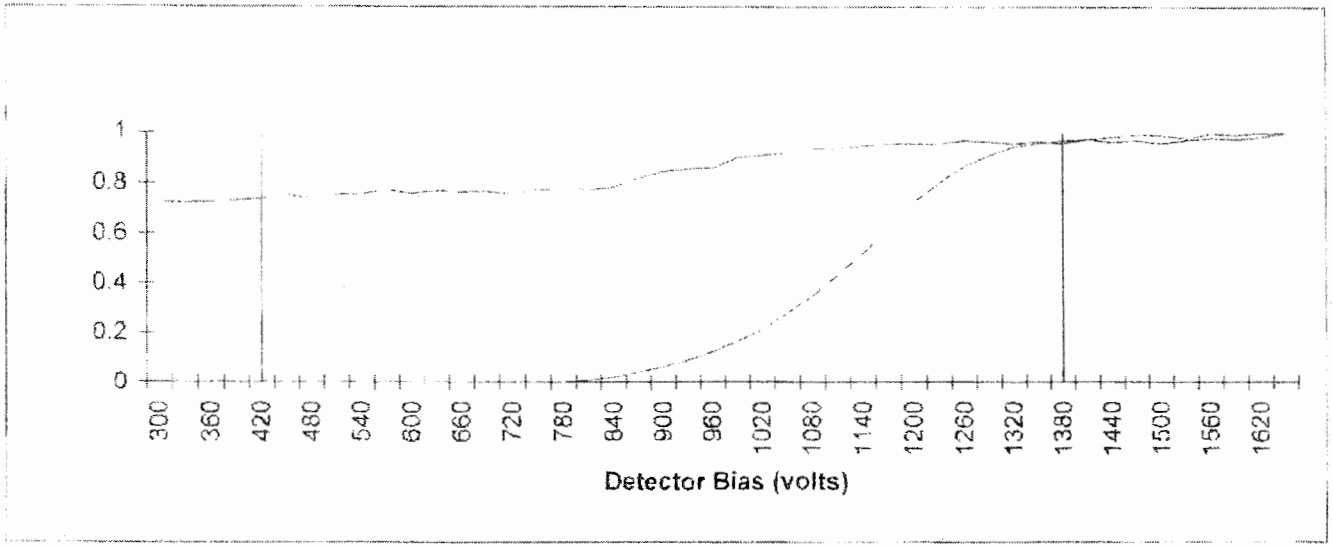
**Optimum alpha only operating voltage: 420**

| | A3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

Printed 12/30/2011 09:35

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

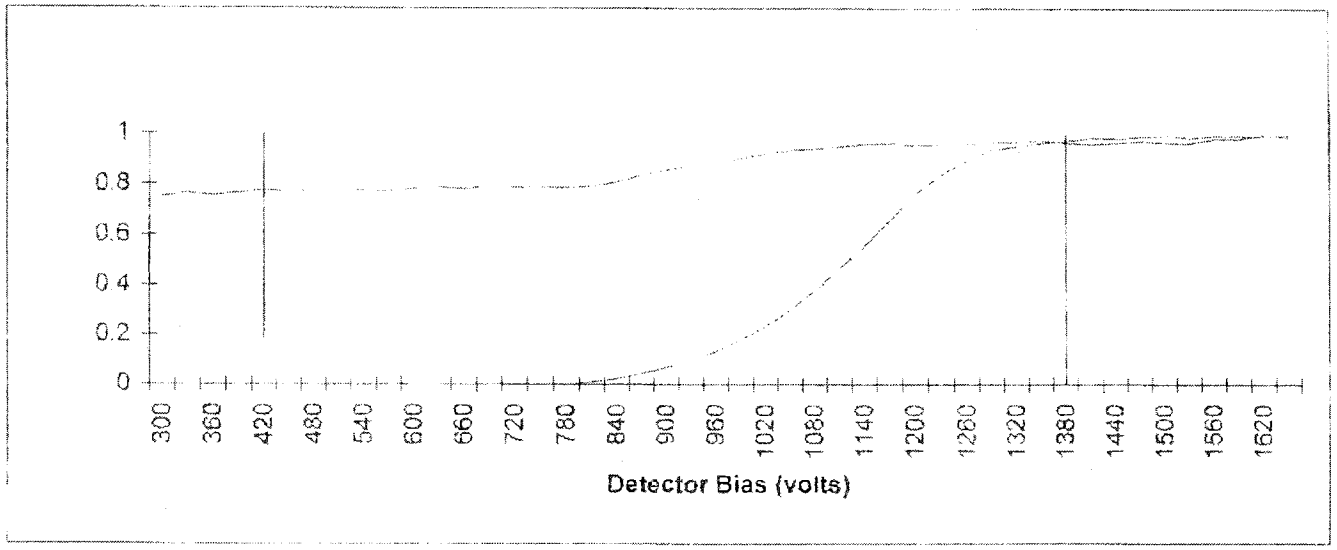
**Optimum alpha only operating voltage: 420**

| | A4 |
|---|---|
| **Beta slope at beta voltage** | **3.25%** |
| **Alpha slope at beta voltage** | **1.19%** |
| **Alpha slope at alpha voltage** | **0.55%** |

Printed 12/30/2011 09:35

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

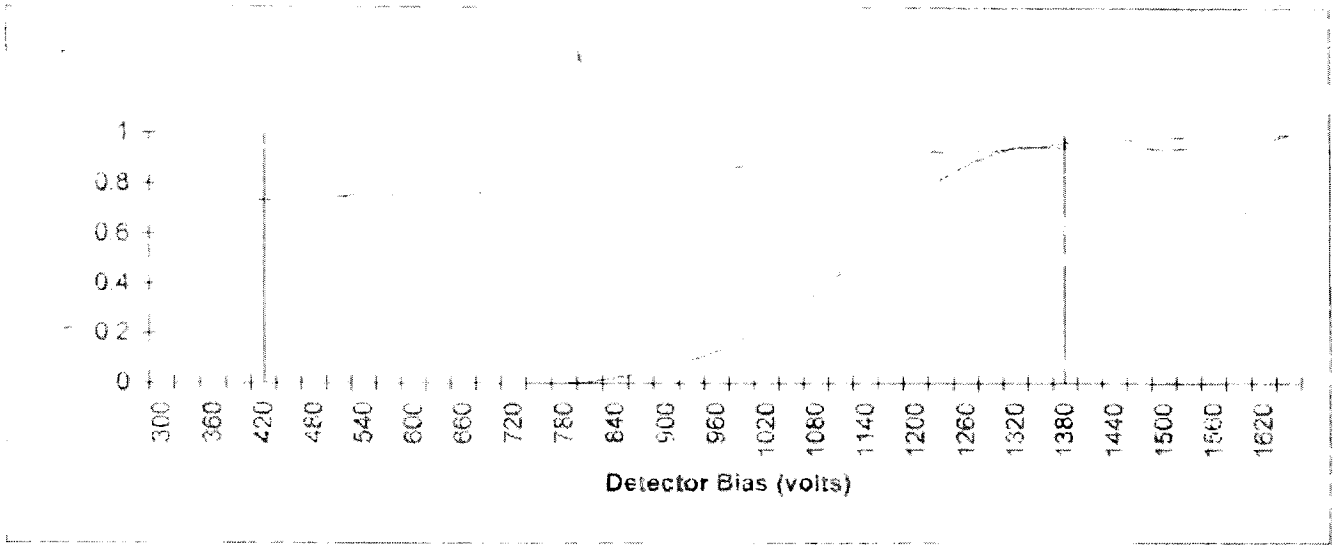
| | B1 |
|---|---|
| **Beta slope at beta voltage** | **1.59%** |
| **Alpha slope at beta voltage** | **0.37%** |
| **Alpha slope at alpha voltage** | **1.35%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

| | B2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

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**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
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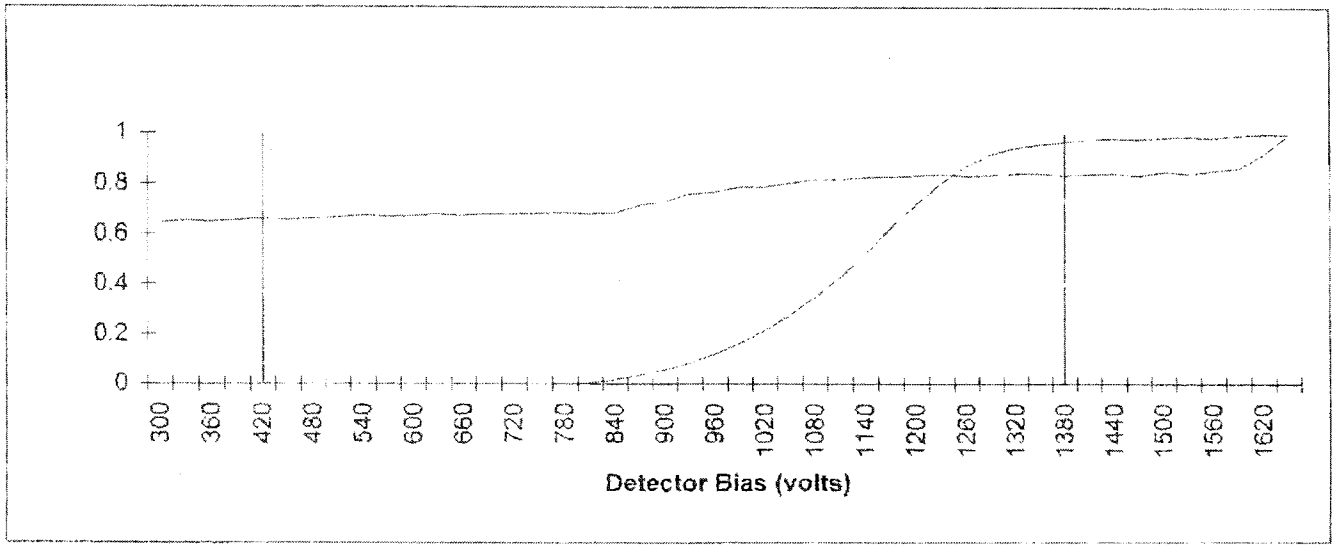


**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

| | B3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

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**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
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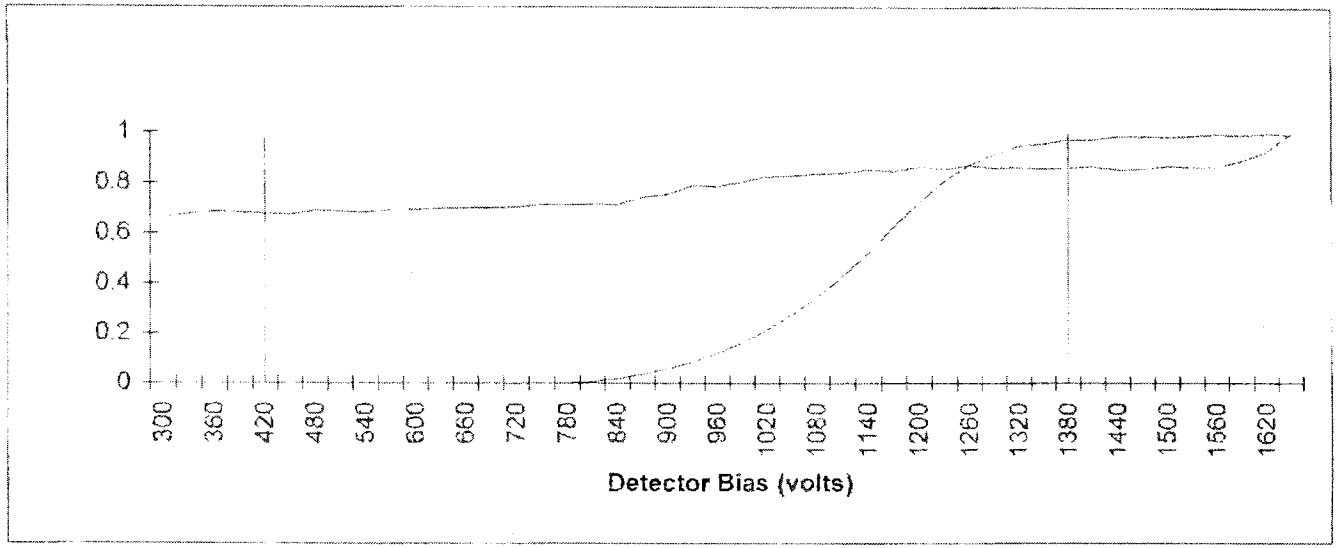



**Optimum alpha beta simultaneous operating voltage: 1380**

**Optimum alpha only operating voltage: 420**

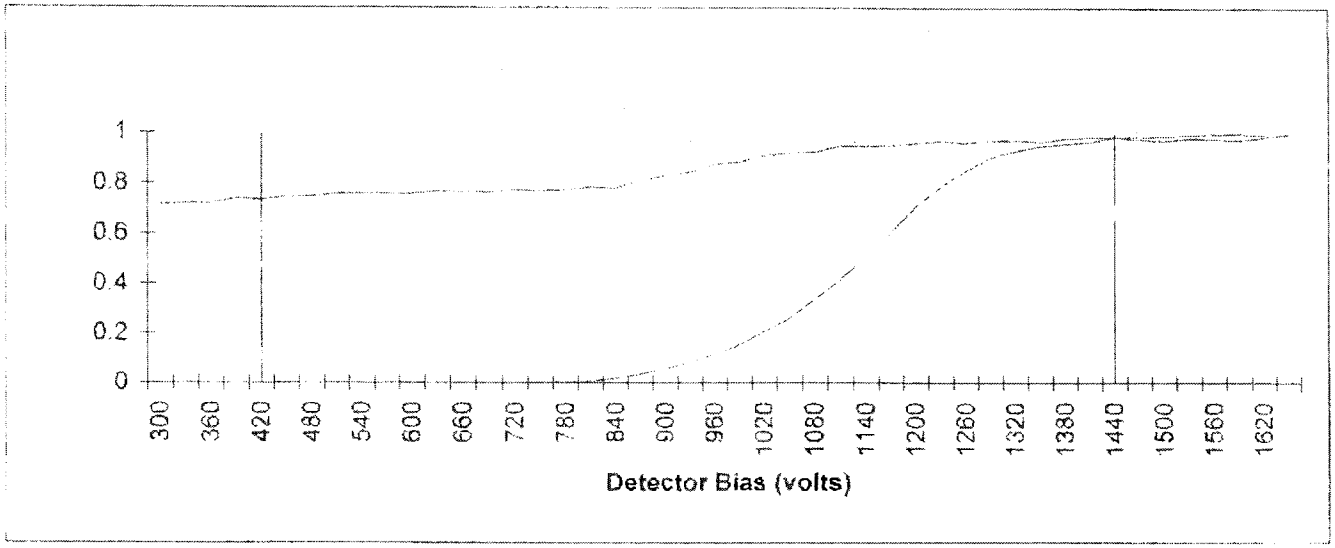
| | B4 |
|---|---|
| **Beta slope at beta voltage** | **3.25%** |
| **Alpha slope at beta voltage** | **1.19%** |
| **Alpha slope at alpha voltage** | **0.55%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

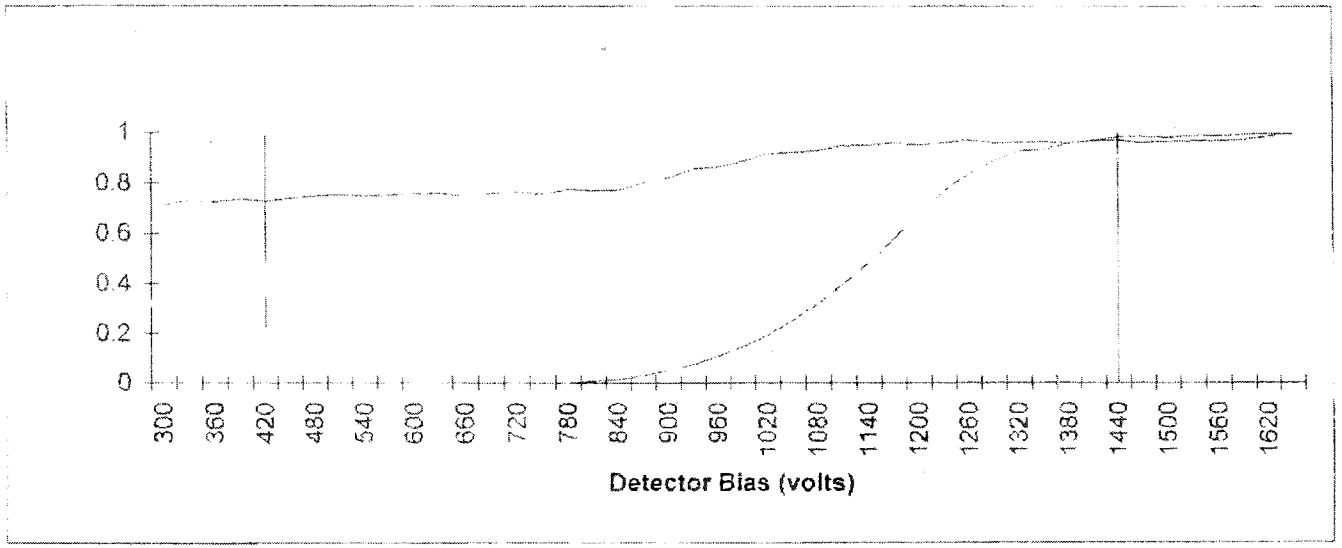
**Optimum alpha only operating voltage: 420**

| | C1 |
|---|---|
| **Beta slope at beta voltage** | **1.59%** |
| **Alpha slope at beta voltage** | **0.37%** |
| **Alpha slope at alpha voltage** | **1.35%** |

Printed 12/30/2011 09:35

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

**Optimum alpha only operating voltage: 420**

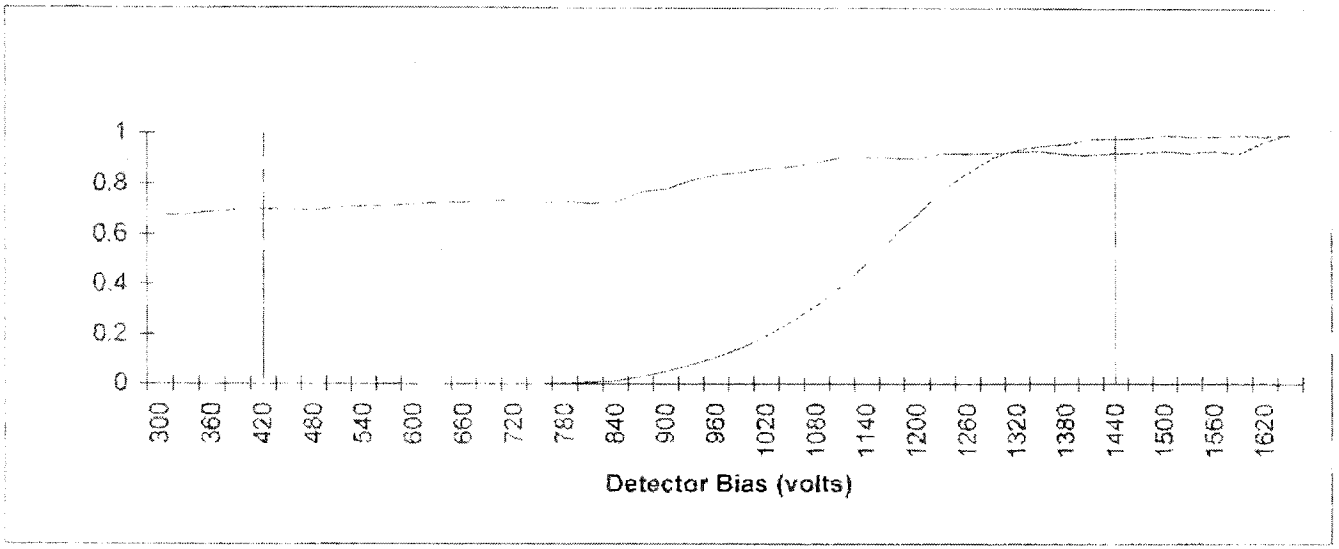
| | C2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1440**

**Optimum alpha only operating voltage: 420**

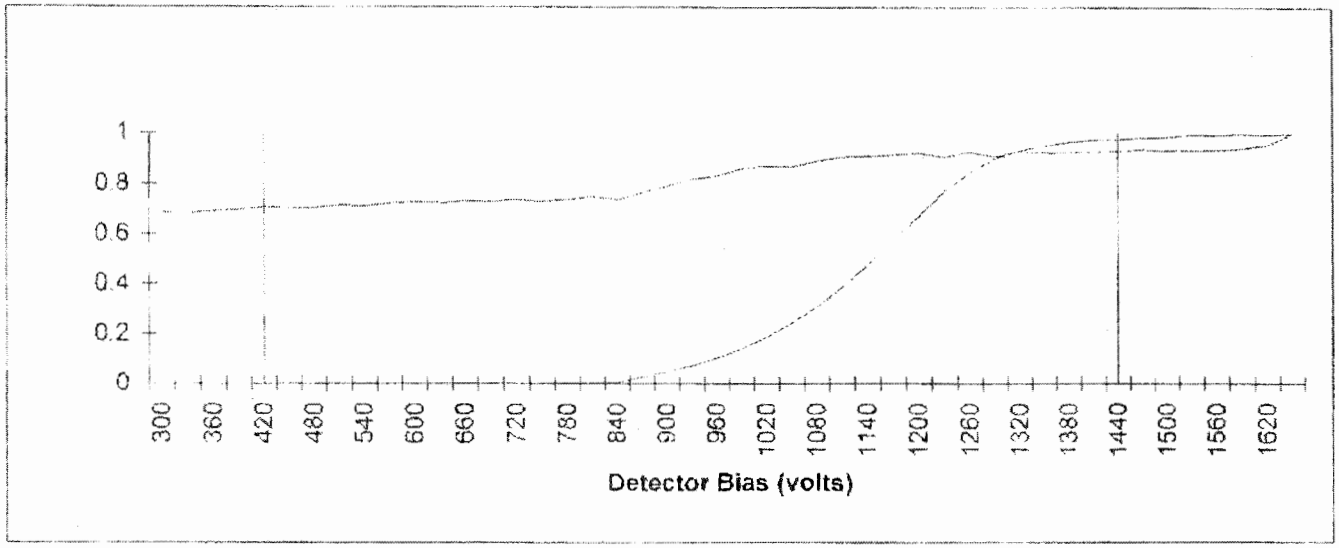
| | C3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 12/28/11 16:59
**FileName:** PLAT008
**Batch ID:**

**Unit Id:** Gray
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1440

**Optimum alpha only operating voltage:** 420

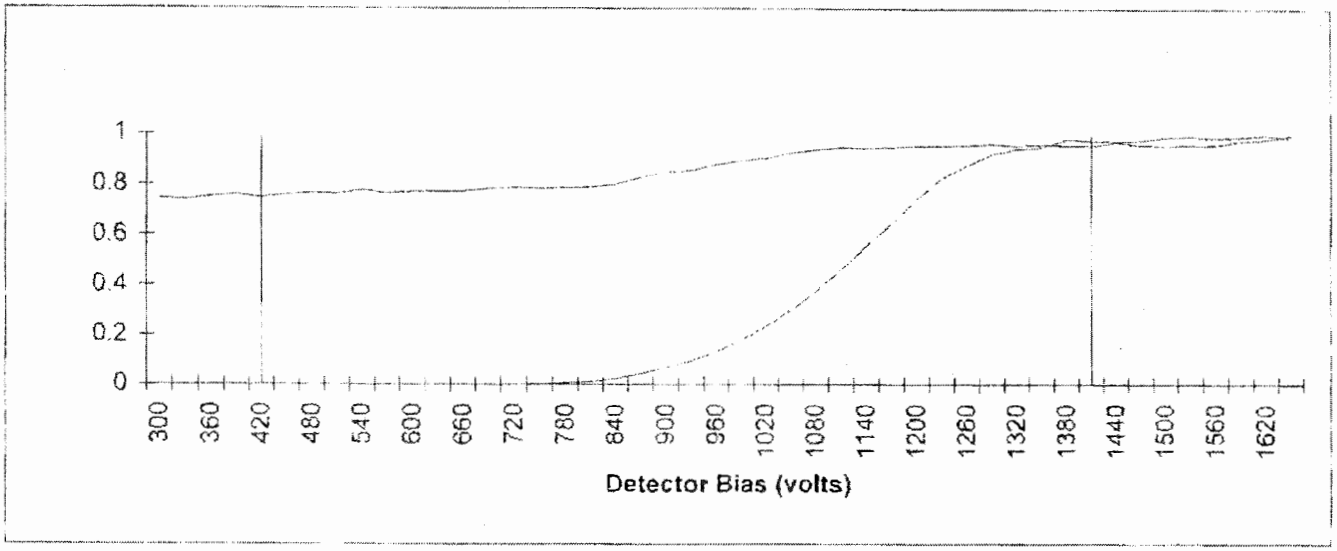
| | C4 |
|---|---|
| Beta slope at beta voltage | 3.25% |
| Alpha slope at beta voltage | 1.19% |
| Alpha slope at alpha voltage | 0.55% |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

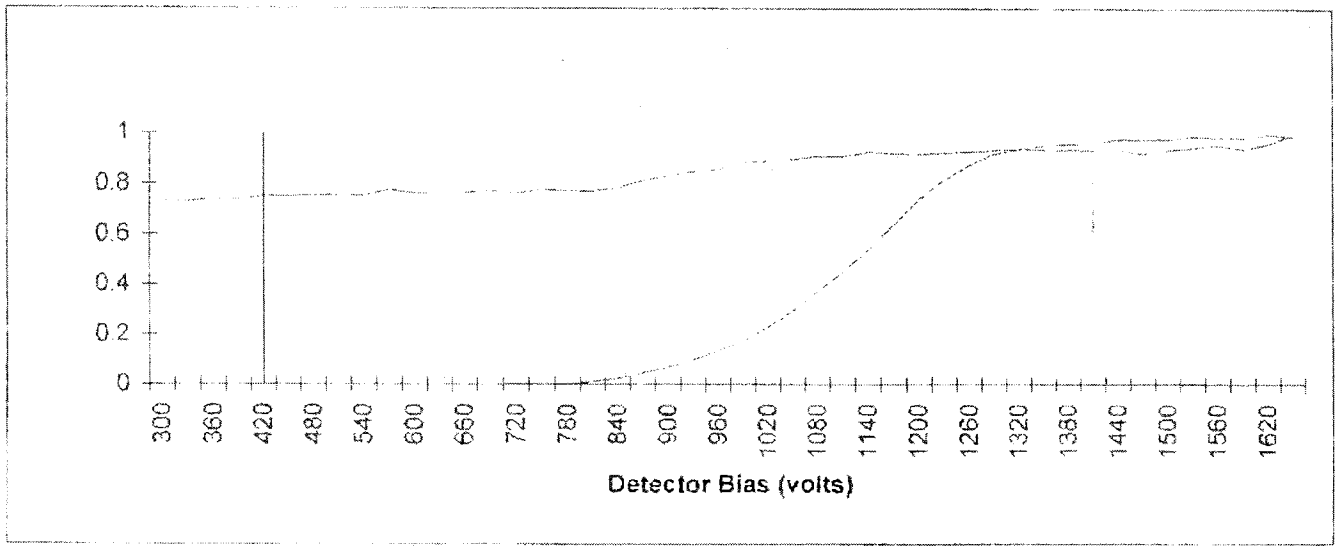
**Optimum alpha only operating voltage: 420**

| | D1 |
|---|---|
| **Beta slope at beta voltage** | **1.59%** |
| **Alpha slope at beta voltage** | **0.37%** |
| **Alpha slope at alpha voltage** | **1.35%** |

Printed 12/30/2011 09:35

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

**Optimum alpha only operating voltage: 420**

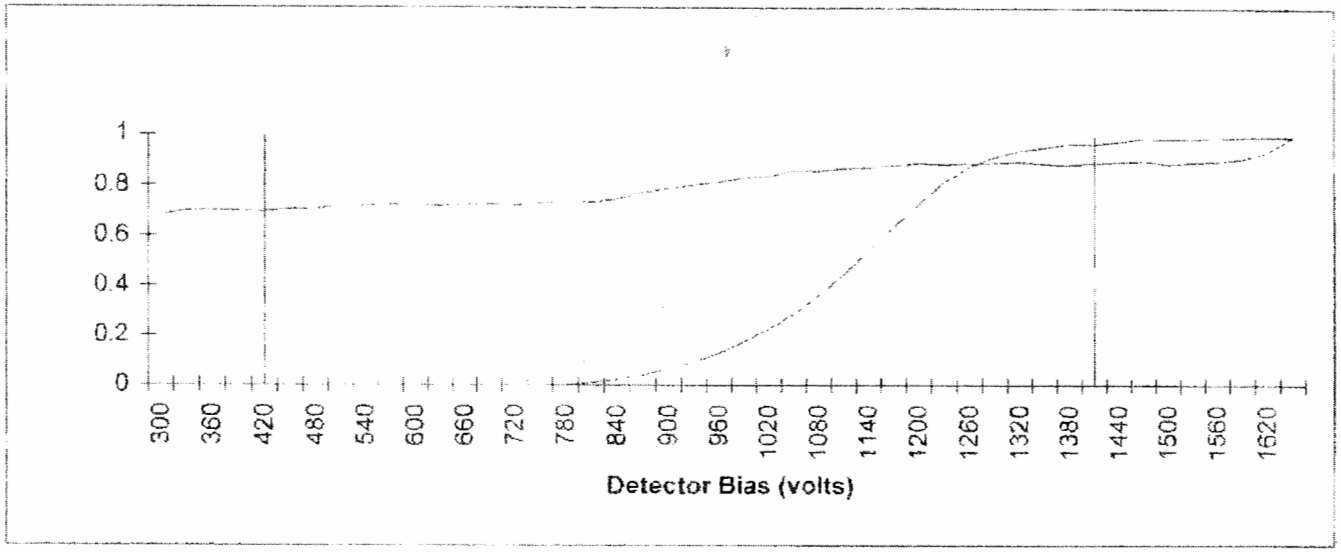
| | D2 |
|---|---|
| **Beta slope at beta voltage** | **2.37%** |
| **Alpha slope at beta voltage** | **-0.90%** |
| **Alpha slope at alpha voltage** | **1.90%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

**Optimum alpha only operating voltage: 420**

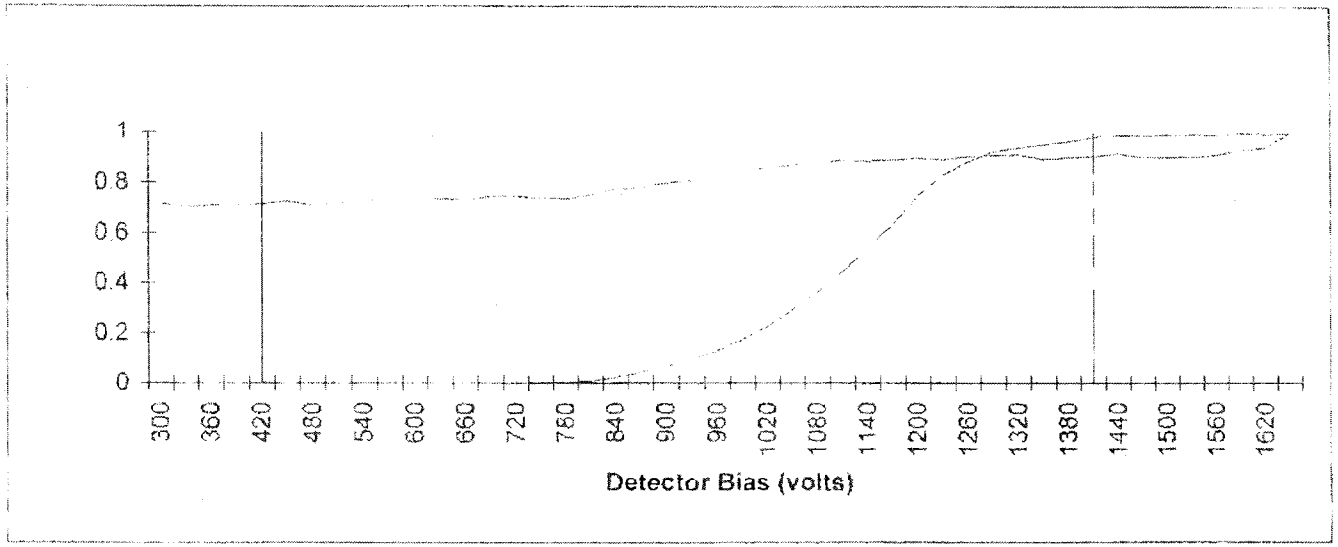
| | D3 |
|---|---|
| **Beta slope at beta voltage** | **2.85%** |
| **Alpha slope at beta voltage** | **1.23%** |
| **Alpha slope at alpha voltage** | **0.98%** |

Printed 12/30/2011 09:35

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type: LB4100/W**
**Date Performed: 12/28/11 16:59**
**FileName: PLAT008**
**Batch ID:**

**Unit Id: Gray**
**Application Revision: 2**
**Application Version: Standard**




**Optimum alpha beta simultaneous operating voltage: 1410**

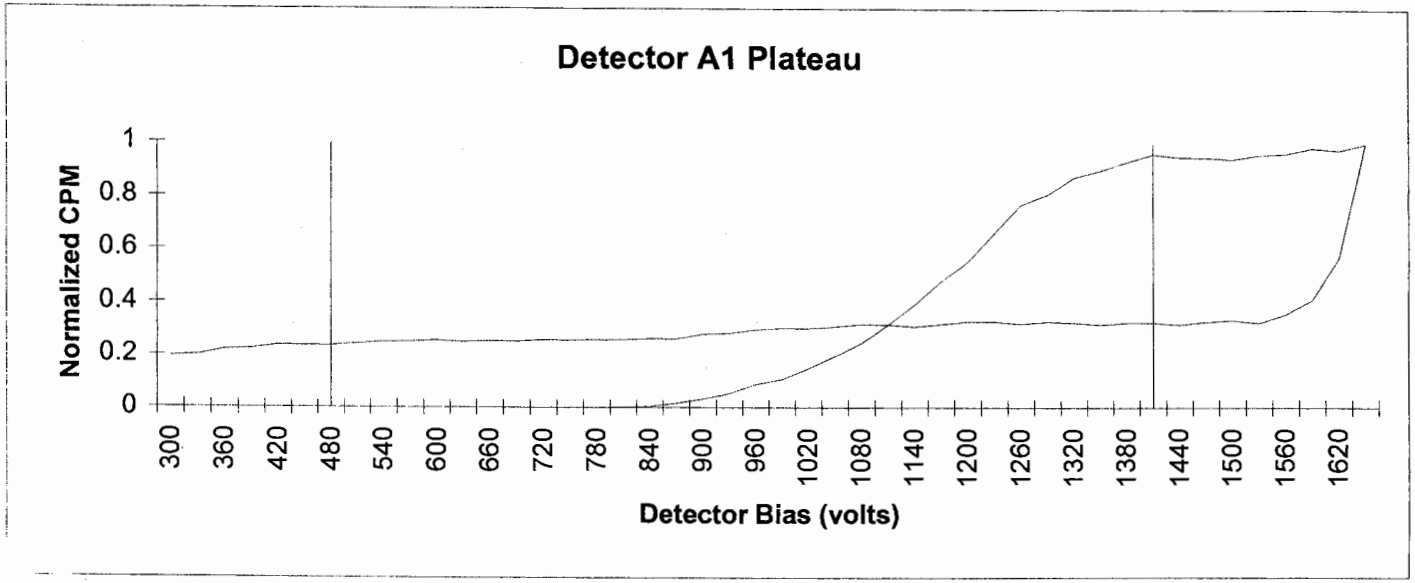
**Optimum alpha only operating voltage: 420**

| | D4 |
|---|---|
| **Beta slope at beta voltage** | **3.25%** |
| **Alpha slope at beta voltage** | **1.19%** |
| **Alpha slope at alpha voltage** | **0.55%** |

Printed 12/30/2011 09:35

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

| | A1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

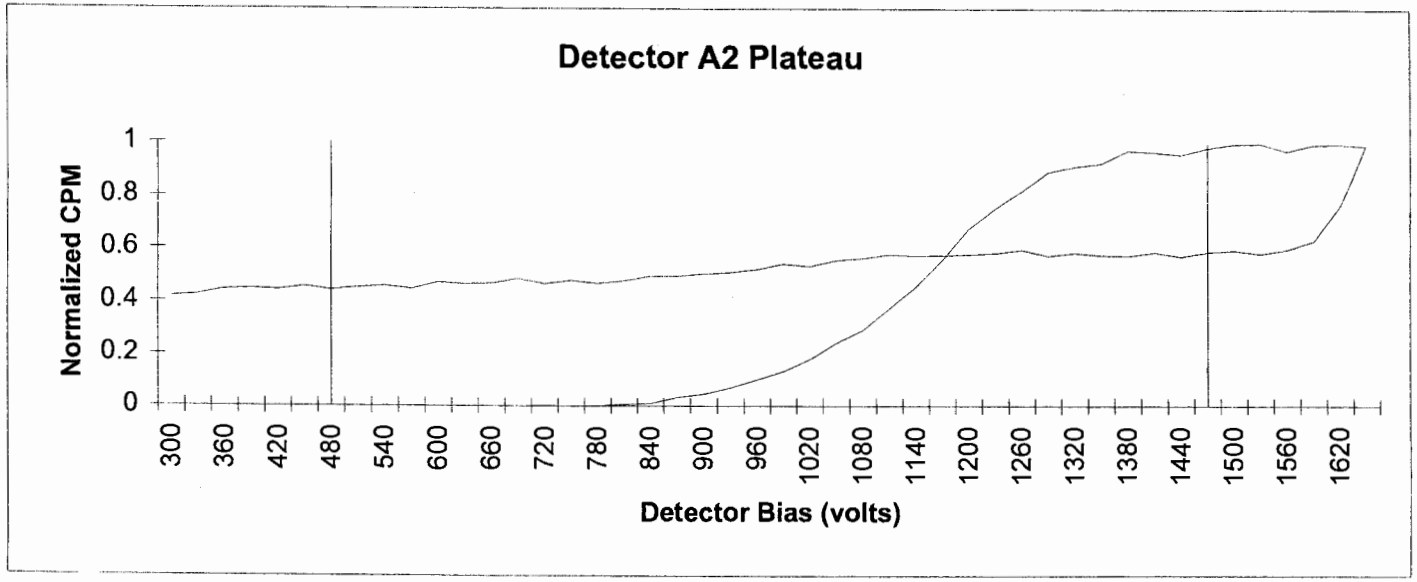
Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

N-1152

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

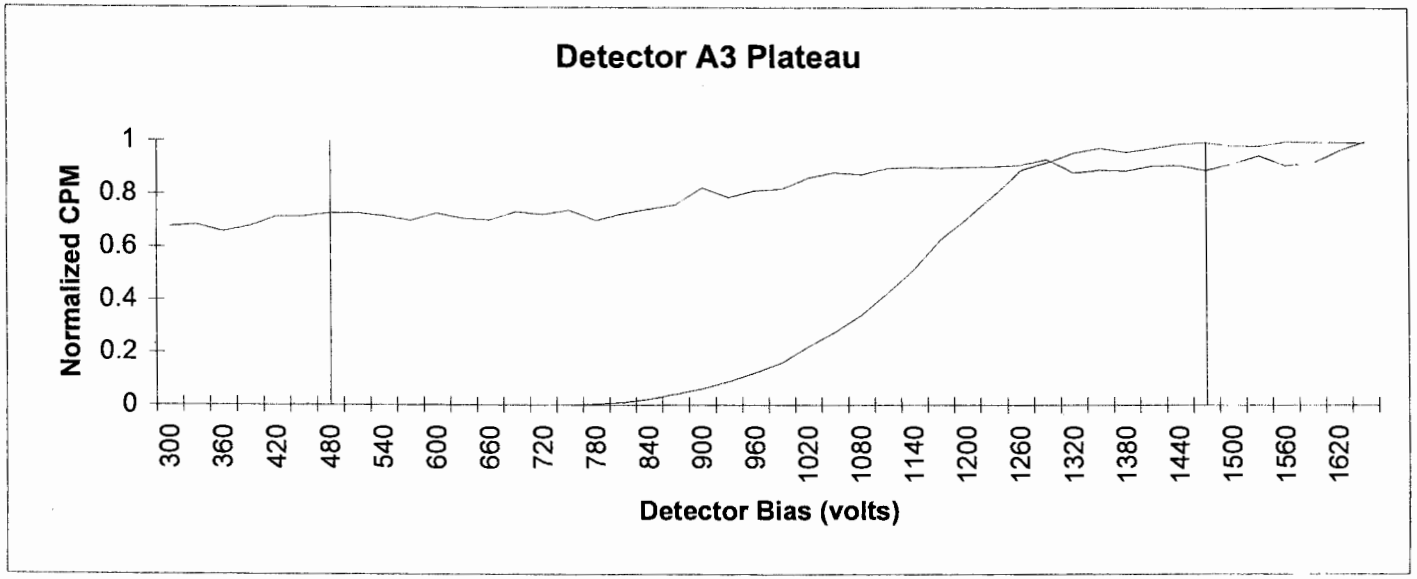
| | A2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

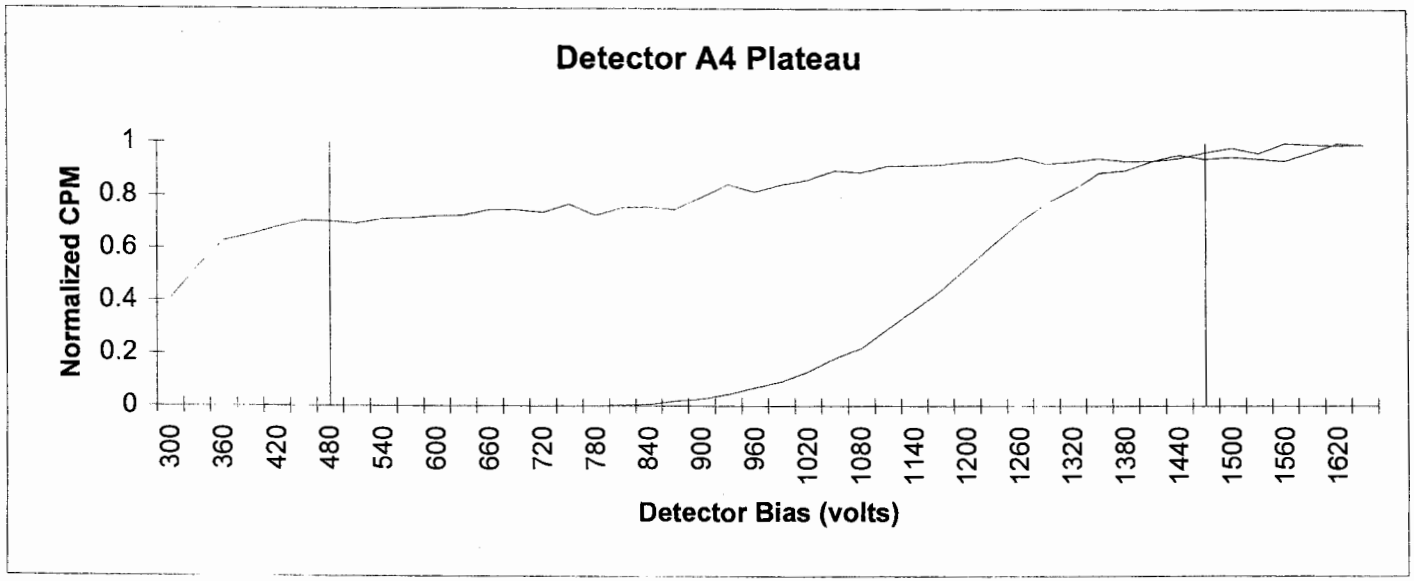
| | A3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

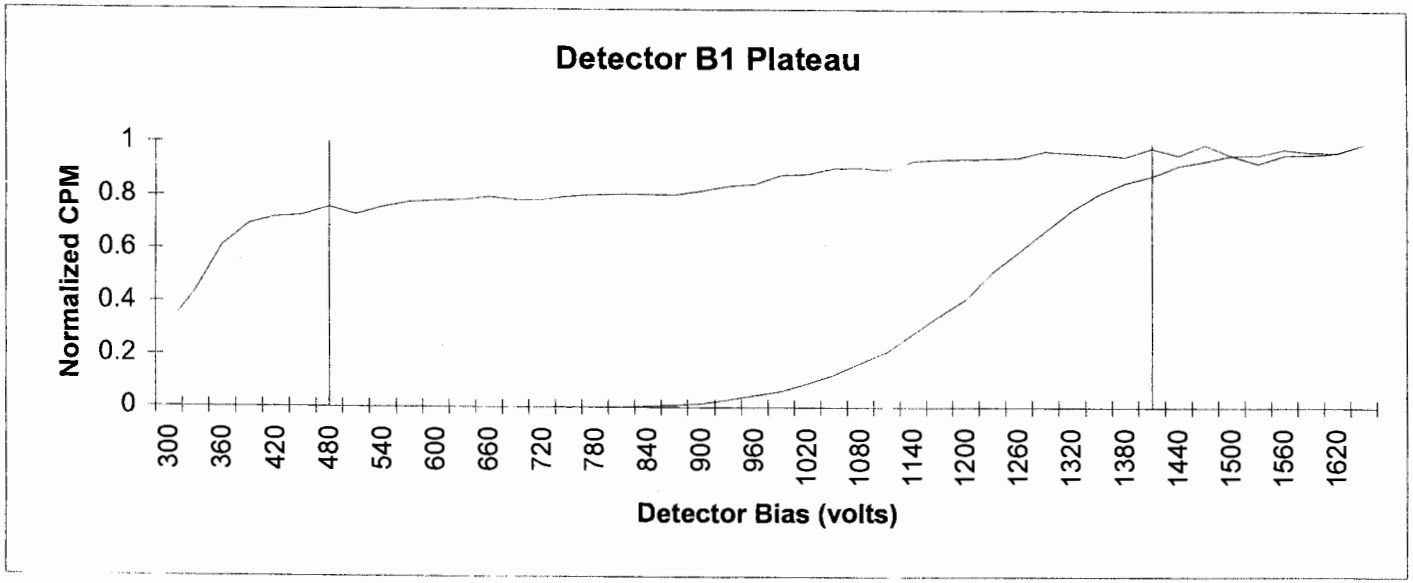
| | A4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

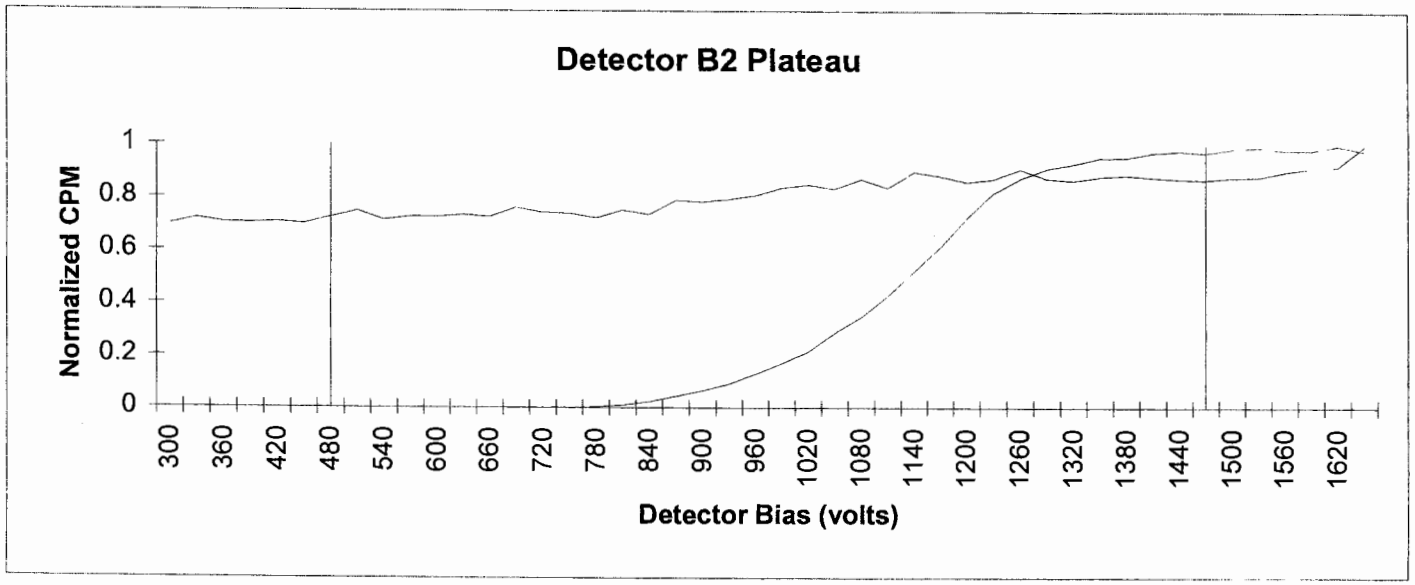
| | B1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 480

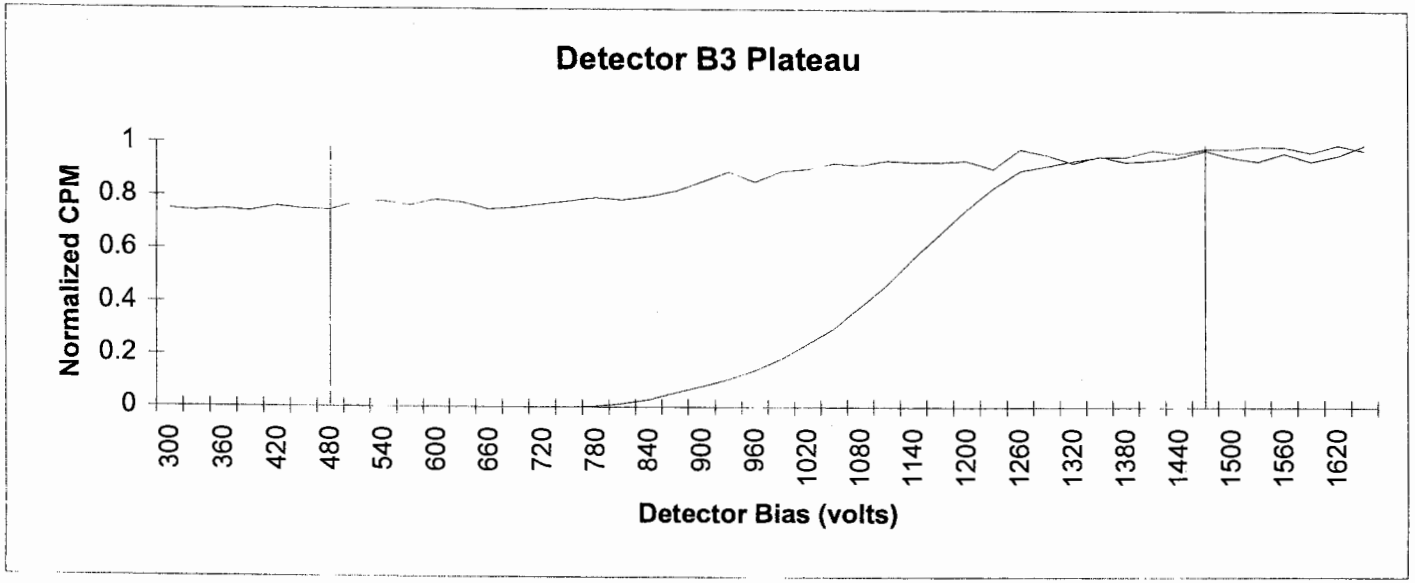
| | B2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard



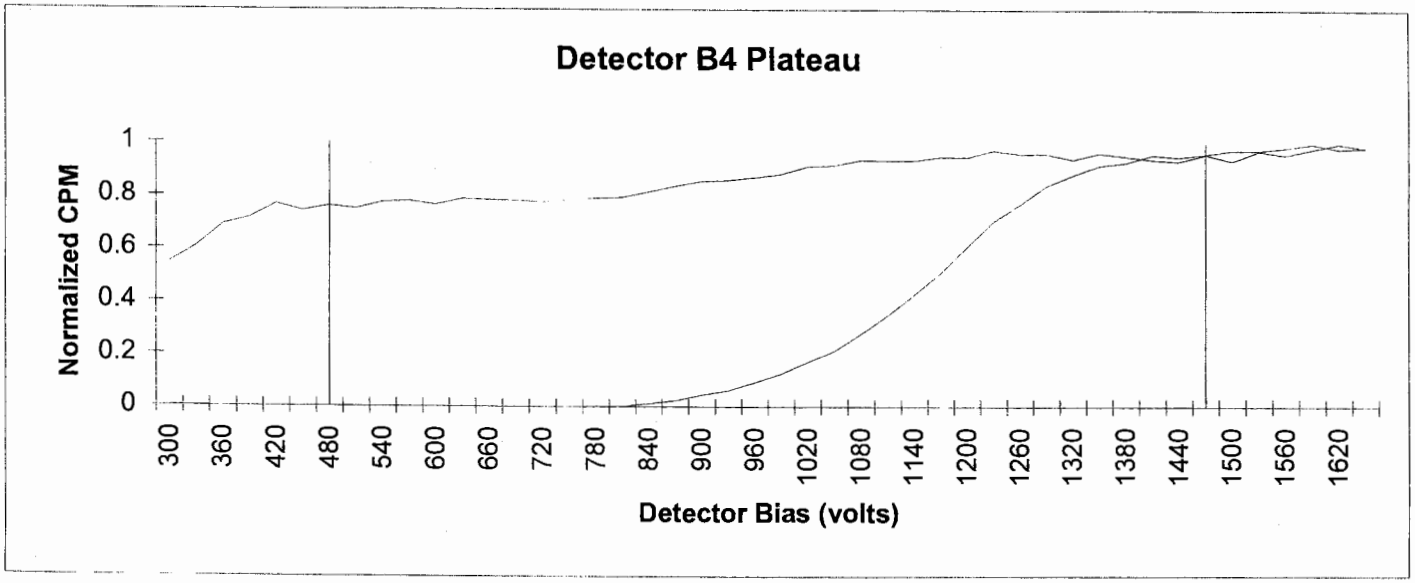

**Optimum alpha beta simultaneous operating voltage:** 1402.5

**Optimum alpha only operating voltage:** 480

| | B3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard



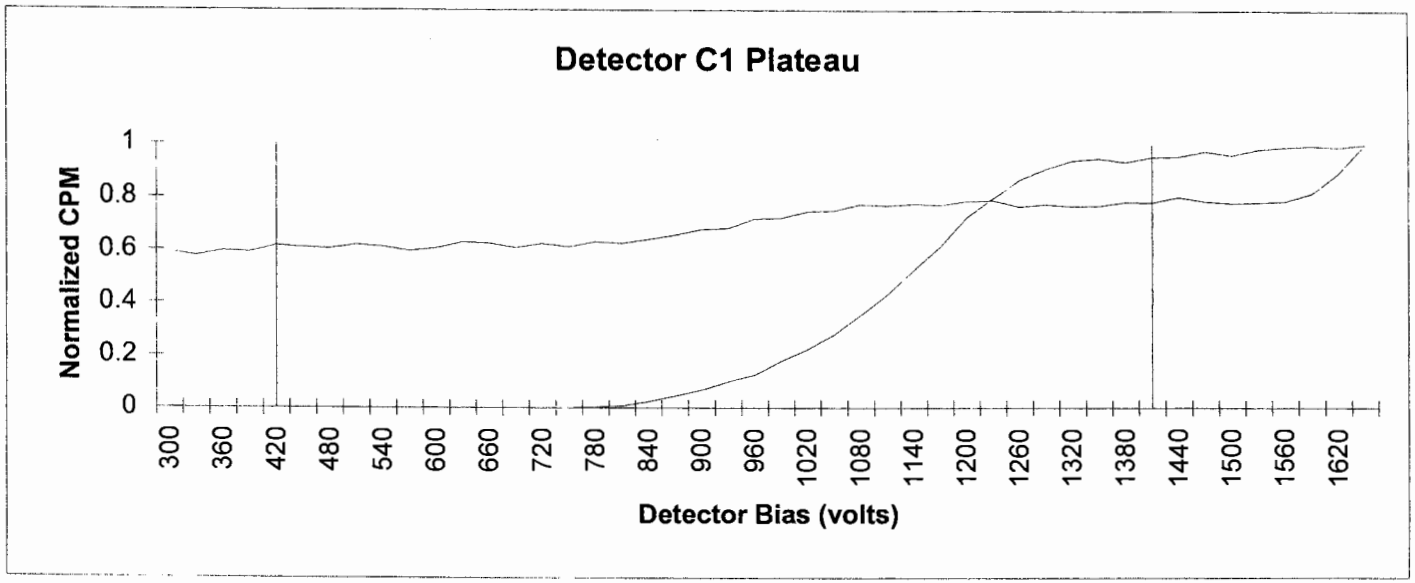

**Optimum alpha beta simultaneous operating voltage:** 1402.5

**Optimum alpha only operating voltage:** 480

| | B4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 420

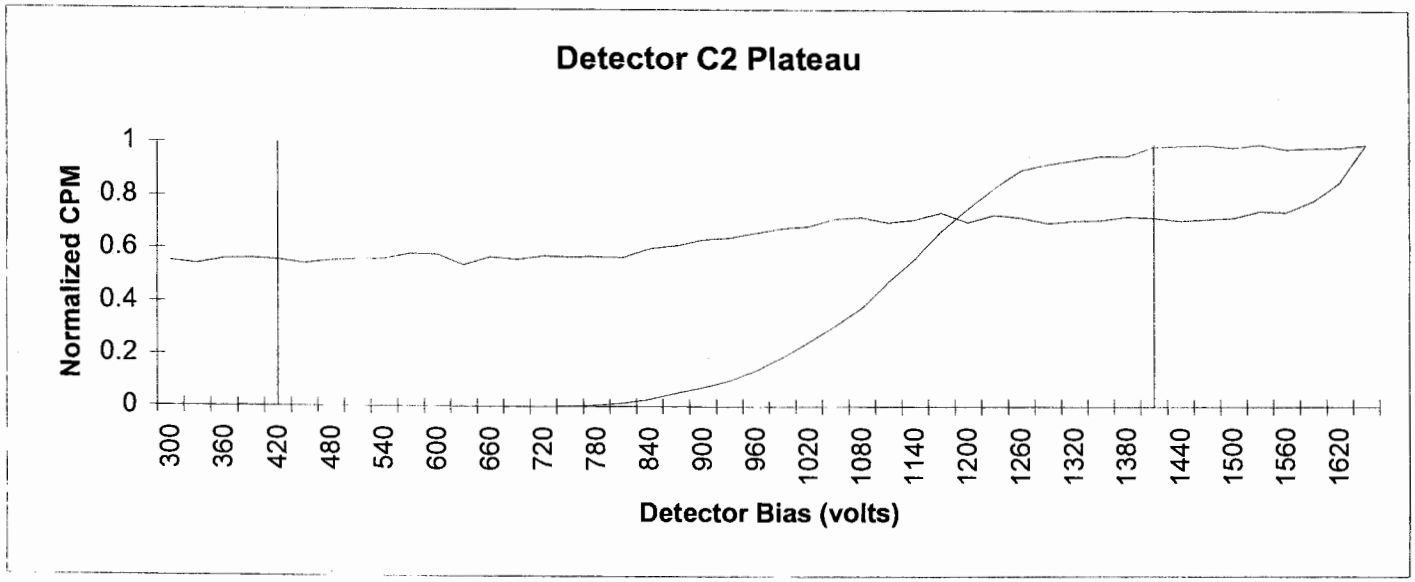
| | C1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

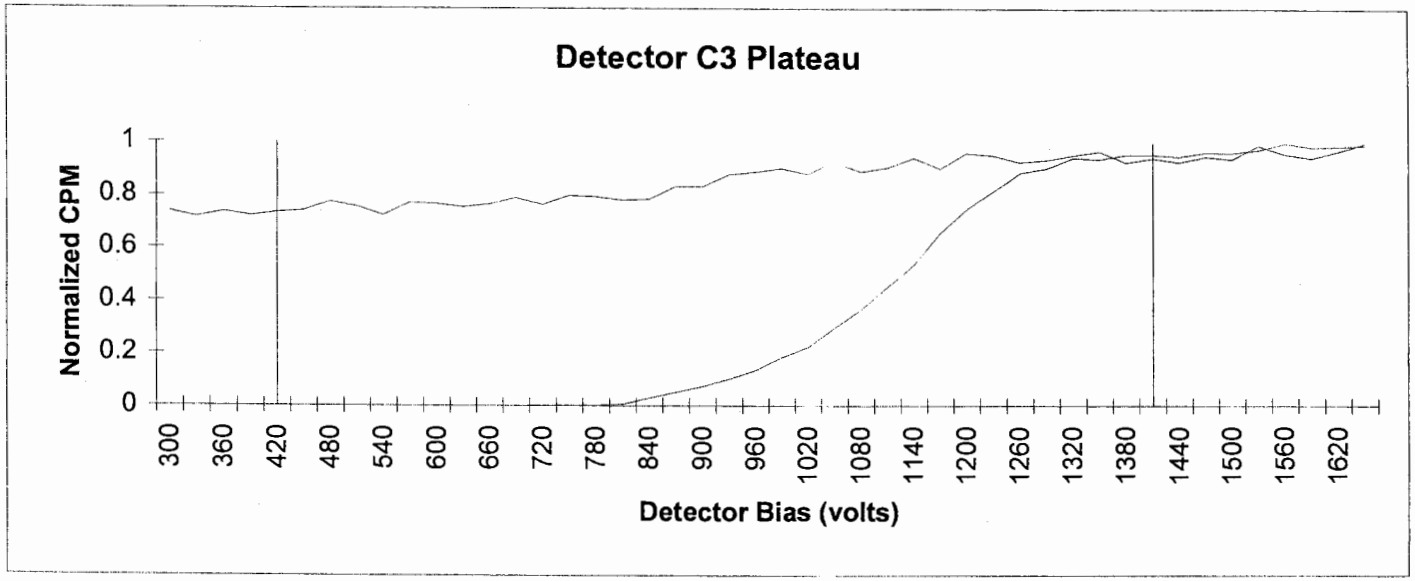
Optimum alpha only operating voltage: 420

| | C2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

Printed 05/21/13 09:40

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 420

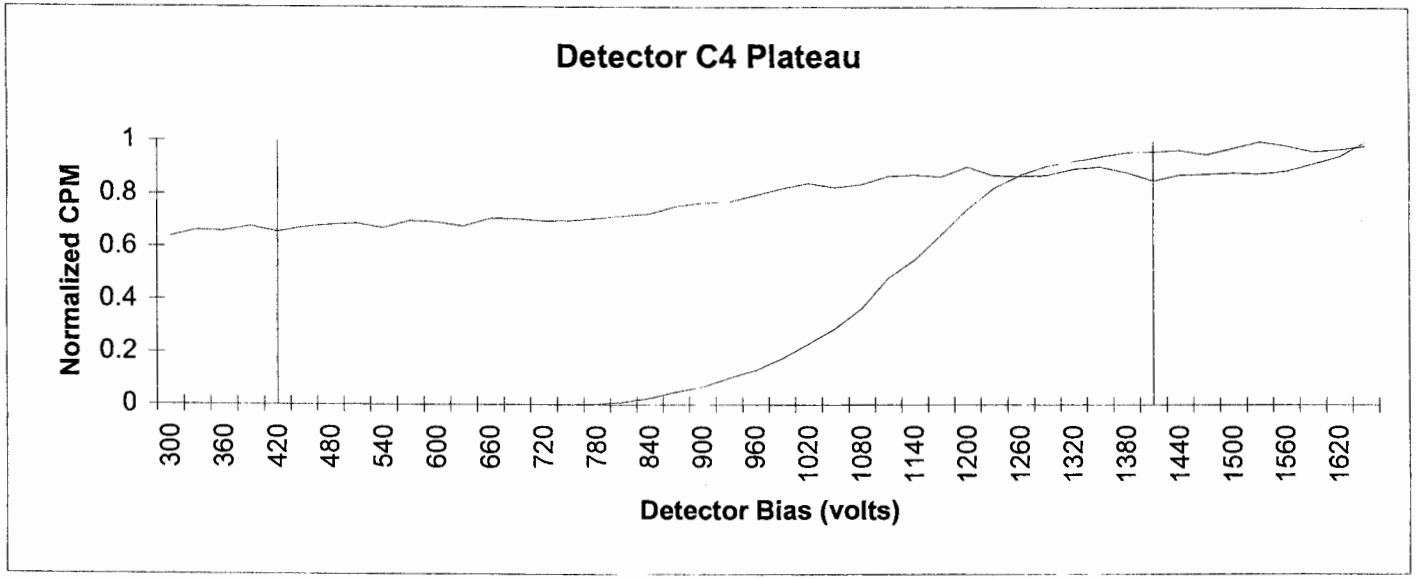
| | C3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1402.5

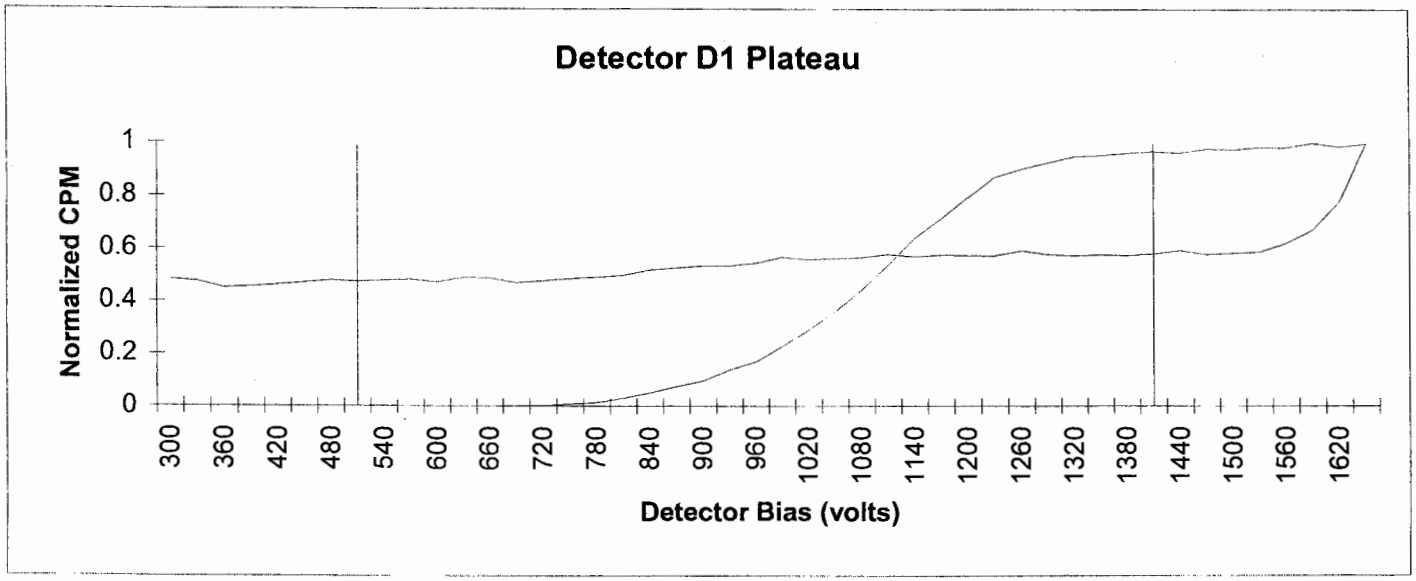
**Optimum alpha only operating voltage:** 420

| | C4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

Printed 05/21/13 09:40

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 510

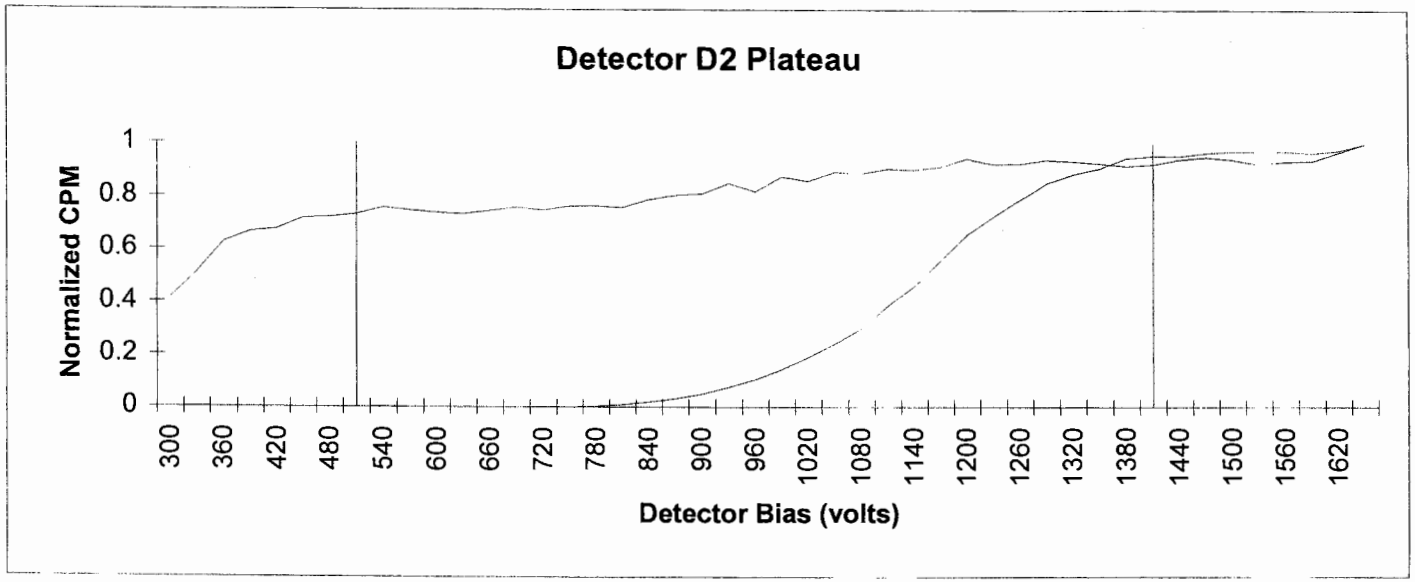
| | D1 |
|---|---|
| Beta slope at beta voltage | 1.76% |
| Alpha slope at beta voltage | 1.32% |
| Alpha slope at alpha voltage | 1.69% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

**Unit Type:** LB4100/W
**Date Performed:** 5/20/13 16:28
**FileName:** PLAT087
**Batch ID:**

**Unit Id:** Orange
**Application Revision:** 2
**Application Version:** Standard




**Optimum alpha beta simultaneous operating voltage:** 1402.5

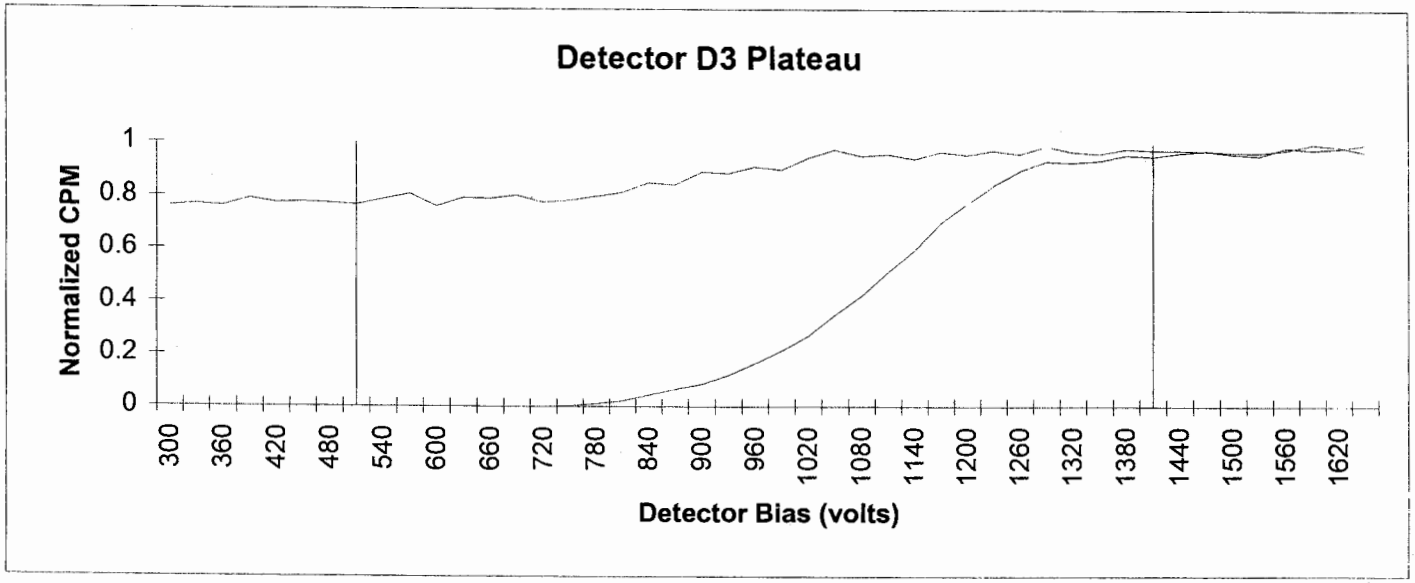
**Optimum alpha only operating voltage:** 510

| | D2 |
|---|---|
| Beta slope at beta voltage | 4.37% |
| Alpha slope at beta voltage | 2.55% |
| Alpha slope at alpha voltage | 4.45% |

Printed 05/21/13 09:40

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 510

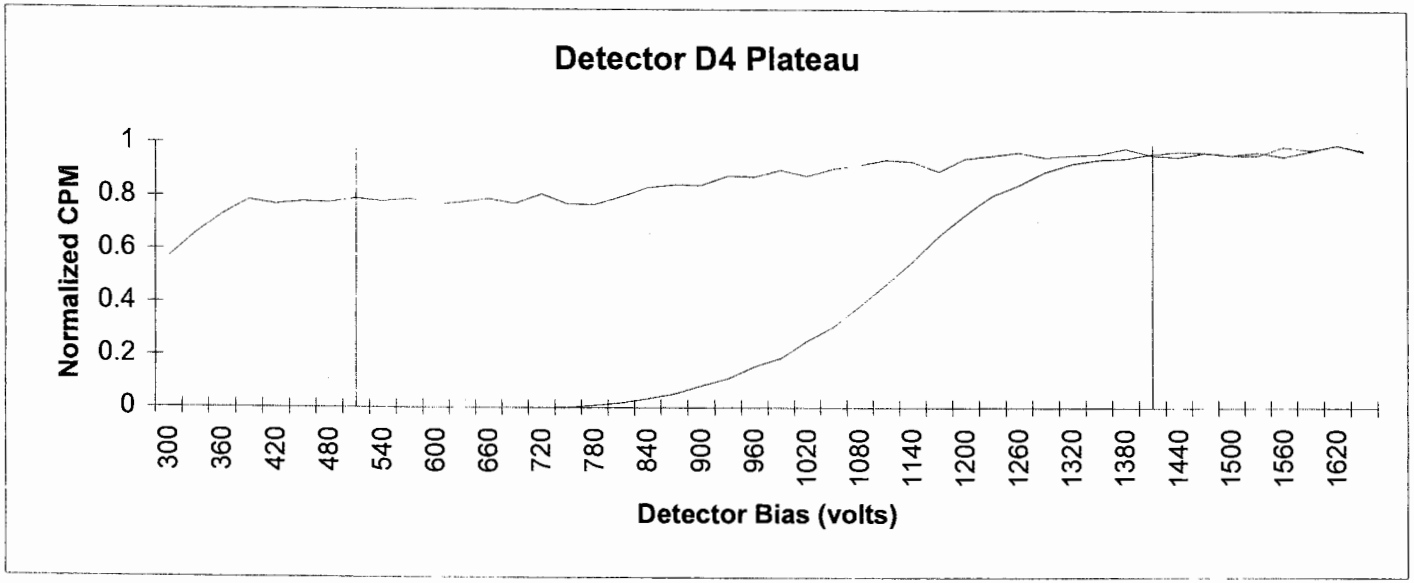
| | D3 |
|---|---|
| Beta slope at beta voltage | 2.93% |
| Alpha slope at beta voltage | 0.56% |
| Alpha slope at alpha voltage | 3.34% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

Unit Type: LB4100/W
Date Performed: 5/20/13 16:28
FileName: PLAT087
Batch ID:

Unit Id: Orange
Application Revision: 2
Application Version: Standard




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 510

| | D4 |
|---|---|
| Beta slope at beta voltage | 3.06% |
| Alpha slope at beta voltage | -0.68% |
| Alpha slope at alpha voltage | 1.12% |

Printed 05/21/13 09:40

DCN: ITSI-0808-0004-0076, 8 May 2019

ARS INTERNATIONAL

## QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

# ANNUAL ACTIVITY VERIFICATION

VERIFICATION DATE: 1/5/2016 16:31 *date counted*
STANDARD REFERENCE #: S-0300

| Principal Radionuclide | | Half Life, Years | | Half Life, Days |
|---|---|---|---|---|
| Sr-90 | *ENTER -->* | 2.880E+01 | *OR -->* | 1.0520E+04 |
| | | 2.880E+01 | | 1.0520E+04 |

Radionuclide: Sr-90 Dilution Reference Date: 12/11/2014 12:05

| | | | |
|---|---|---|---|
| Dilution Activity | 21.73 | pCi per gram ===> dpm/g | 48.23 |
| Verif. Date Decay Corrected | 21.18 | pCi per gram ===> dpm/g | 47.01 |

*Minimum of 3 Required*

| Trial ID | Sample Counts | Count Time (min) | Detector | Efficiency | Bkg. (cpm) | Net Weight | Decay Corrected Activity Result (dpm/g) | Decay Corrected Activity Result (pCi/g) |
|---|---|---|---|---|---|---|---|---|
| S-0300-V1A | 2534.50 | 120 | B1 | 0.4103 | 0.68 | 1.023 | 48.68 | 21.93 |
| S-0300-V2A | 2411.50 | 120 | B2 | 0.4015 | 0.78 | 0.994 | 48.41 | 21.81 |
| S-0300-V3A | 2451.00 | 120 | B4 | 0.4004 | 0.79 | 1.001 | 49.00 | 22.07 |
| S-0300-V4A | 2469.50 | 120 | C1 | 0.4068 | 0.87 | 1.005 | 48.23 | 21.72 |
| S-0300-V5A | 2442.00 | 120 | C2 | 0.4025 | 1.32 | 1.012 | 46.73 | 21.05 |

| | | | |
|---|---|---|---|
| | Average | 48.21 | 21.72 |
| | Two Sigma Uncertainty | 1.72 | 0.77 |
| *10% Max* *PASS* | Standard Deviation percent of known concentration | 1.86% | 1.86% |
| | Target Activity | 47.01 | 21.18 |
| *5% Max* *PASS* | % Diff | 2.55% | 2.55% |

**Verification Expiration Date:** January 4, 2017

Prepared & Counted By: _____ Date: 1/5/2016 16:31

Verified & Approved By: _____ Date: 1-6-16

QC Approval: _____ Date: 1-6-16

| | |
|---|---|
| **S-0300** | |
| **Sr-90** | Verified 1/5/16 |
| SL | **Expires** **1/5/17** |
| **Manufactuer** | **Analytics** |
| **Sol Matrix** | .1M HCL with 30 ug/g |
| **Ref No** | 75186-526 |
| **Tech** | BSteffens |
| **Parent ID** | S-0160 |

ARS INTERNATIONAL
RADIOACTIVE STANDARDS – BATON ROUGE LABORATORY

S:\QA\Brian\1-QA_Files\New Reference Standards 10-2005\Sr-90\S-0300 verification data 1-5-16 ARS-038

Sr-90 Verification 1/5/2016

Tech: J Byrd
Pipet # MU02055
Scale ID 12332539
Standard # S-0300

| Sample ID | Std weight g. |
|---|---|
| S-0300-V1A | 1.0234 |
| S-0300-V2A | 0.9938 |
| S-0300-V3A | 1.0008 |
| S-0300-V4A | 1.0046 |
| S-0300-V5A | 1.0117 |

Performed By: J Byrd

Sr-90 Verification 1/5/2016

Tech: JPB JB ~~B Steffens~~ 1-5-16
Pipet # MU02055
Scale ID 12332539
Standard # S-0300

| Sample ID | Std weight g. |
|---|---|
| S-0300-V1A | 1.0234g |
| S-0300-V2A | 0.9938g |
| S-0300-V3A | 1.0008g |
| S-0300-V4A | 1.0046g |
| S-0300-V5A | 1.0117g |

Performed By: ~~B Steffens~~
J. Byrd JB 1-5-16

GEN 710
C 11160
Sr
WJS



| | Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|---|
| 2469.5 | C1 | S-0300-V4A | 9 | 4939 | 120 | 1410 | 1/5/16 16:31 |
| 2442 | C2 | S-0300-V5A | 13 | 4884 | 120 | 1410 | 1/5/16 16:31 |
| 2534.5 | B1 | S-0300-V1A | 8 | 5069 | 120 | 1410 | 1/5/16 16:34 |
| 2411.5 | B2 | S-0300-V2A | 12 | 4823 | 120 | 1410 | 1/5/16 16:34 |
| 2451 | B4 | S-0300-V3A | 9 | 4902 | 120 | 1410 | 1/5/16 16:34 |



DCN: ITSI-0808-0004-0076, 8 May 2019

GEN 704
C 11160
LONG BKG
WJS



| Detector ID | Sample ID | Alpha | Beta | Count Time | Voltage | TOD |
|---|---|---|---|---|---|---|
| C1 | C1-01 | 68 | 784 .87 | 900 | 1410 | 1/1/16 4:03 |
| C2 | C2-01 | 85 | 1191.32 | 900 | 1410 | 1/1/16 4:03 |
| C3 | C3-01 | 78 | 788 | 900 | 1410 | 1/1/16 4:03 |
| C4 | C4-01 | 99 | 902 | 900 | 1410 | 1/1/16 4:03 |
| D1 | D1-01 | 47 | 690 | 900 | 1410 | 1/1/16 4:03 |
| D2 | D2-01 | 43 | 747 | 900 | 1410 | 1/1/16 4:03 |
| D3 | D3-01 | 7 | 689 | 900 | 1410 | 1/1/16 4:03 |
| D4 | D4-01 | 29 | 725 | 900 | 1410 | 1/1/16 4:03 |
| A1 | A1-01 | 75 | 773 | 900 | 1410 | 1/1/16 4:06 |
| A2 | A2-01 | 45 | 804 | 900 | 1410 | 1/1/16 4:06 |
| A3 | A3-01 | 38 | 707 | 900 | 1410 | 1/1/16 4:06 |
| A4 | A4-01 | 56 | 743 | 900 | 1410 | 1/1/16 4:06 |
| B1 | B1-01 | 38 | 610 .68 | 900 | 1410 | 1/1/16 4:06 |
| B2 | B2-01 | 30 | 705 .78 | 900 | 1410 | 1/1/16 4:06 |
| B3 | B3-01 | 49 | 3102 | 900 | 1410 | 1/1/16 4:06 |
| B4 | B4-01 | 29 | 713 .79 | 900 | 1410 | 1/1/16 4:06 |



DCN: ITSI-0808-0004-0076, 8 May 2019

# LB4100-C Instrument EFF



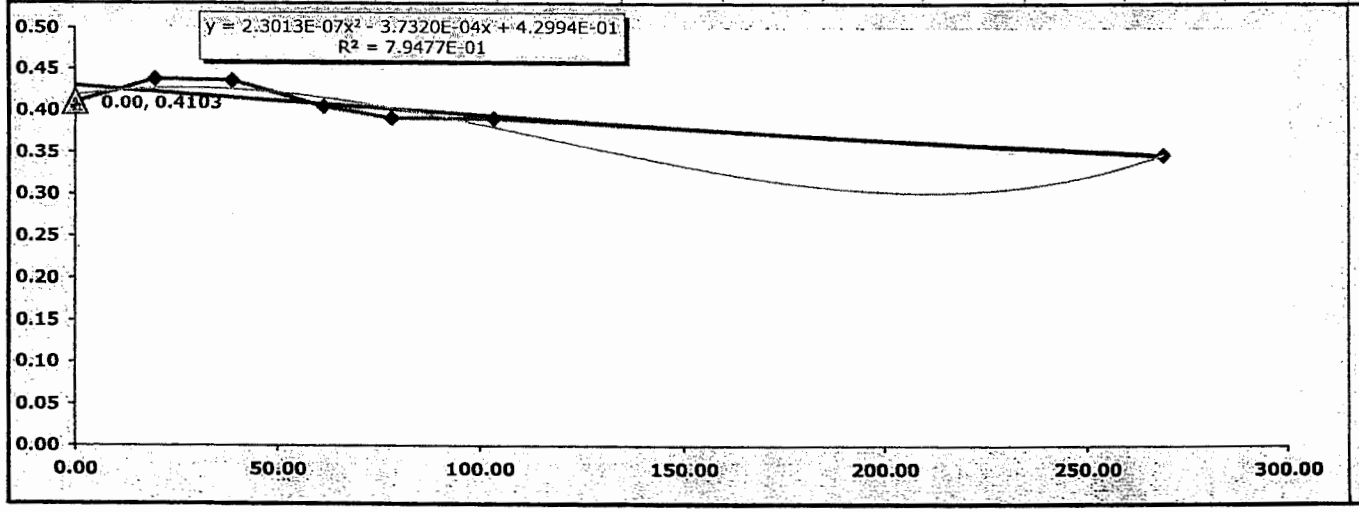
DCN: ITSI-0808-0004-0076, 8 May 2019

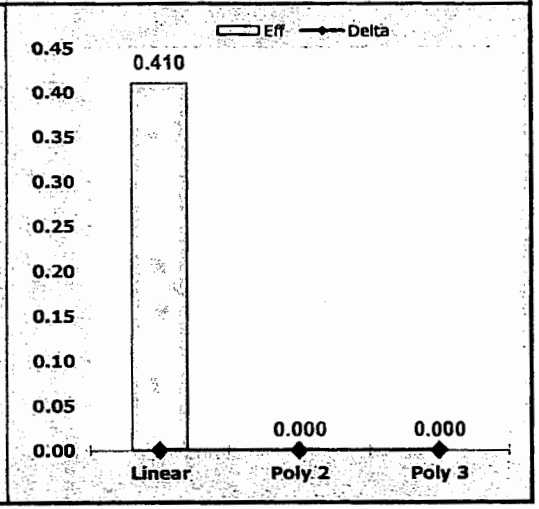
INTERNATIONAL

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Instrument | LB4100-C | Detector | B1 |
| | | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | | Intercept | | Eff | 0.4103 |
| | | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 31 | 51 | 59642 | 853 | 5.00 | 900 | 5963.73 | 12/30/2014 | 14534.81 | **0.4103** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 46 | 51 | 71138 | 853 | 5.00 | 900 | 7113.33 | 12/30/2014 | 16237.50 | **0.4381** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 36 | 51 | 66836 | 853 | 5.00 | 900 | 6683.13 | 12/30/2014 | 15320.03 | **0.4362** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 26 | 51 | 59885 | 853 | 5.00 | 900 | 5988.03 | 12/30/2014 | 14795.17 | **0.4047** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 43 | 51 | 64332 | 853 | 5.00 | 900 | 6432.73 | 12/30/2014 | 16452.40 | **0.3910** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 31 | 51 | 62242 | 853 | 5.00 | 900 | 6223.73 | 12/30/2014 | 15931.67 | **0.3907** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 25 | 51 | 53692 | 853 | 5.00 | 900 | 5368.73 | 12/30/2014 | 15460.54 | **0.3473** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-1173

# LB4100-C Instrument EFF



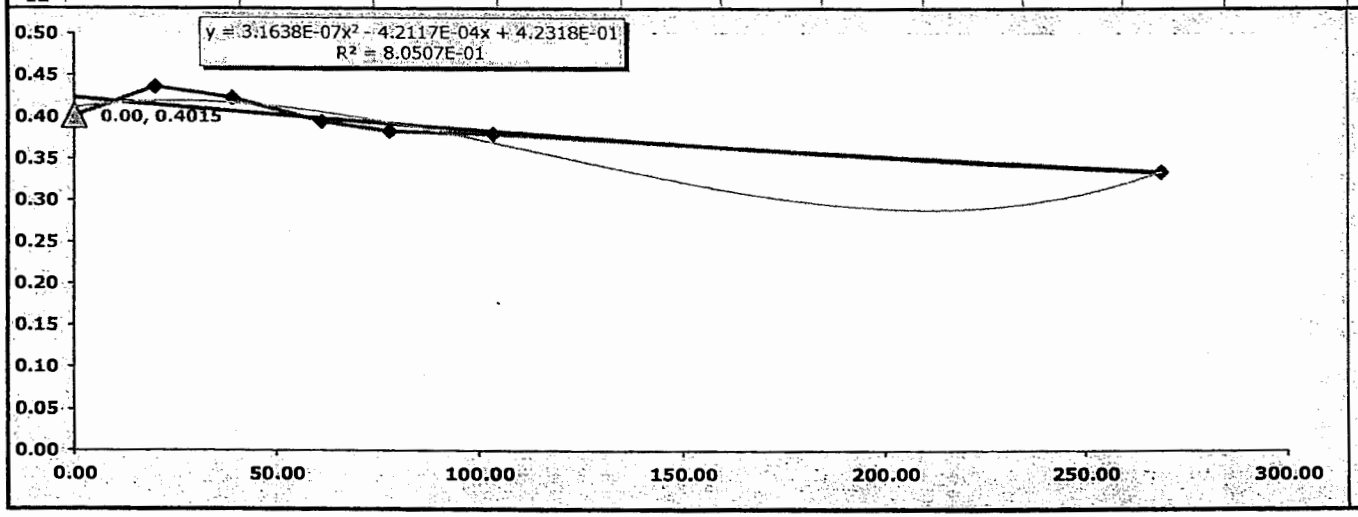
DCN: ITSI-0808-0004-0076, 8 May 2019

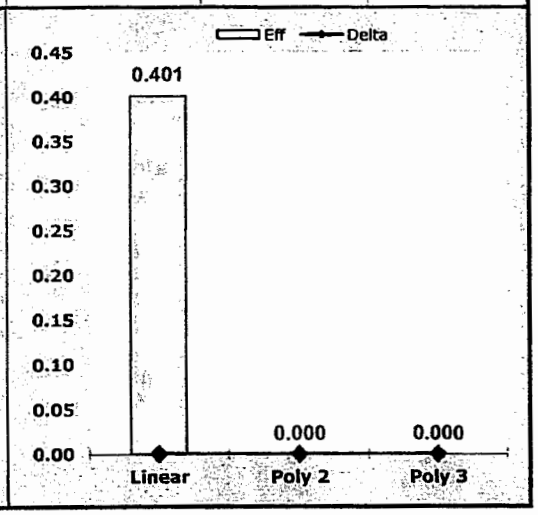
INTERNATIONAL

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Instrument | LB4100-C | Detector | B2 |
| | | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | | Intercept | | Eff | 0.4015 |
| | | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 21 | 68 | 58361 | 732 | 5.00 | 900 | 5835.69 | 12/30/2014 | 14534.81 | **0.4015** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 25 | 68 | 70834 | 732 | 5.00 | 900 | 7082.99 | 12/30/2014 | 16237.50 | **0.4362** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 18 | 68 | 64854 | 732 | 5.00 | 900 | 6484.99 | 12/30/2014 | 15320.03 | **0.4233** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 16 | 68 | 58370 | 732 | 5.00 | 900 | 5836.59 | 12/30/2014 | 14795.17 | **0.3945** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 29 | 68 | 62994 | 732 | 5.00 | 900 | 6298.99 | 12/30/2014 | 16452.40 | **0.3829** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 26 | 68 | 60466 | 732 | 5.00 | 900 | 6046.19 | 12/30/2014 | 15931.67 | **0.3795** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 18 | 68 | 51616 | 732 | 5.00 | 900 | 5161.19 | 12/30/2014 | 15460.54 | **0.3338** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |



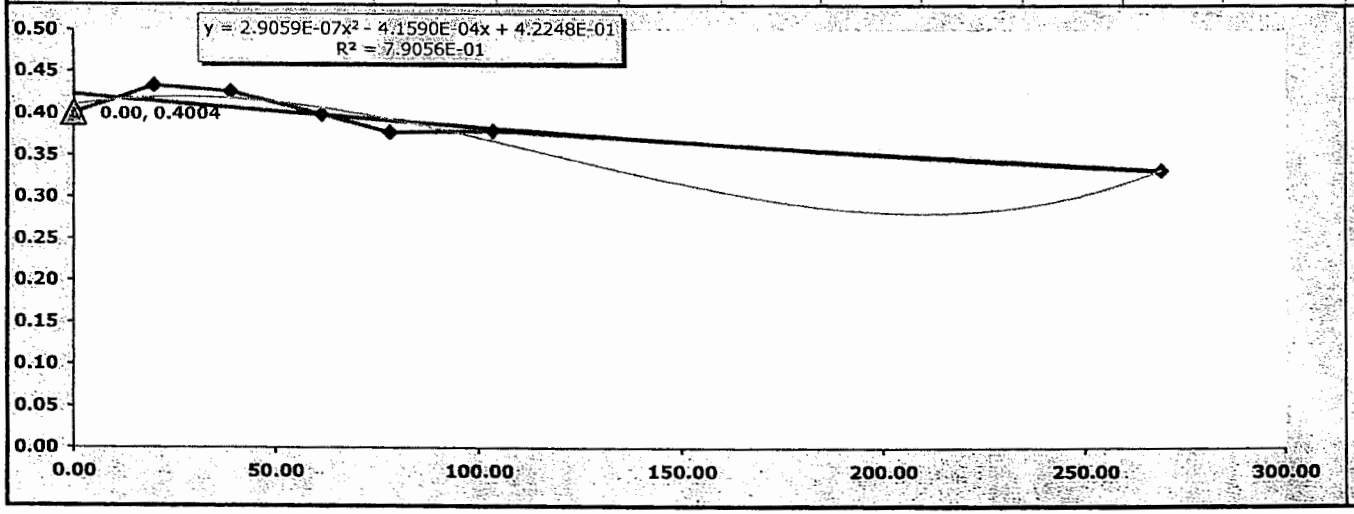
DCN: ITSI-0808-0004-0076, 8 May 2019

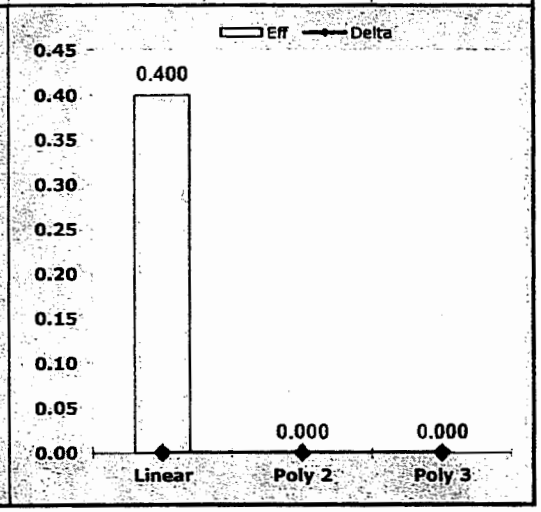


**LB Eff Calculation Report**

# SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Instrument | LB4100-C | Detector | B4 |
| | | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | | Intercept | | Eff | 0.4004 |
| | | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 26 | 58 | 58199 | 791 | 5.00 | 900 | 5819.46 | 12/30/2014 | 14534.81 | 0.4004 |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 26 | 58 | 70333 | 791 | 5.00 | 900 | 7032.86 | 12/30/2014 | 16237.50 | 0.4331 |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 19 | 58 | 65271 | 791 | 5.00 | 900 | 6526.66 | 12/30/2014 | 15320.03 | 0.4260 |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 25 | 58 | 58965 | 791 | 5.00 | 900 | 5896.06 | 12/30/2014 | 14795.17 | 0.3985 |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 26 | 58 | 62087 | 791 | 5.00 | 900 | 6208.26 | 12/30/2014 | 16452.40 | 0.3773 |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 21 | 58 | 60410 | 791 | 5.00 | 900 | 6040.56 | 12/30/2014 | 15931.67 | 0.3792 |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 9 | 58 | 51458 | 791 | 5.00 | 900 | 5145.36 | 12/30/2014 | 15460.54 | 0.3328 |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |



# LB4100-C Instrument EFF



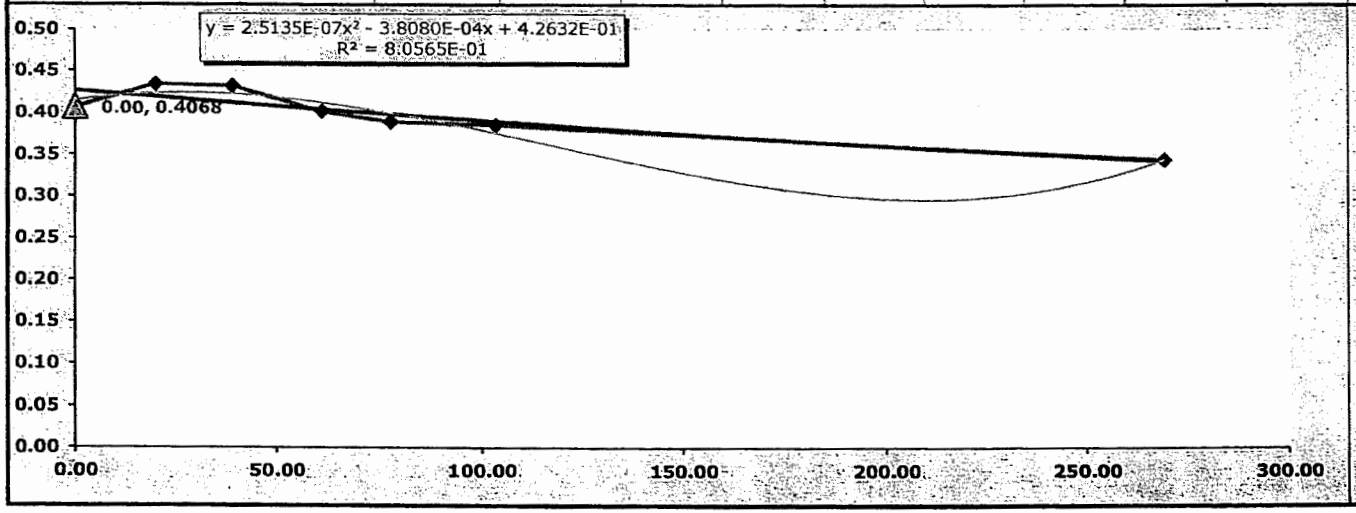
DCN: ITSI-0808-0004-0076, 8 May 2019

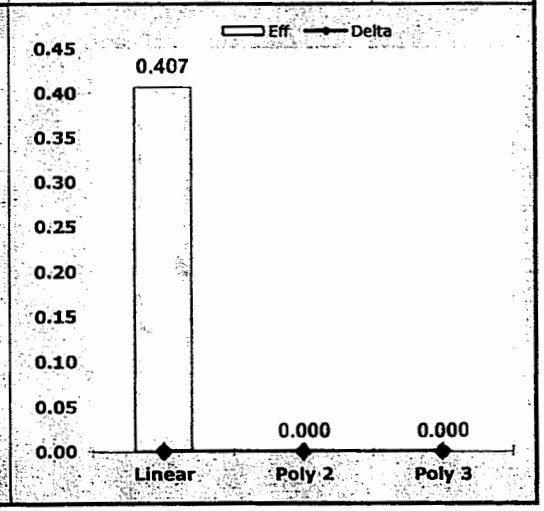
INTERNATIONAL

## LB Eff Calculation Report

## SR-90

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Instrument | LB4100-C | Detector | C1 |
| | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | Intercept | | Eff | 0.4068 |
| | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 24 | 85 | 59129 | 938 | 5.00 | 900 | 5912.38 | 12/30/2014 | 14534.81 | **0.4068** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 21 | 85 | 70471 | 938 | 5.00 | 900 | 7046.58 | 12/30/2014 | 16237.50 | **0.4340** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 25 | 85 | 66149 | 938 | 5.00 | 900 | 6614.38 | 12/30/2014 | 15320.03 | **0.4317** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 16 | 85 | 59377 | 938 | 5.00 | 900 | 5937.18 | 12/30/2014 | 14795.17 | **0.4013** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 23 | 85 | 63951 | 938 | 5.00 | 900 | 6394.58 | 12/30/2014 | 16452.40 | **0.3887** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 16 | 85 | 61329 | 938 | 5.00 | 900 | 6132.38 | 12/30/2014 | 15931.67 | **0.3849** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 15 | 85 | 53064 | 938 | 5.00 | 900 | 5305.88 | 12/30/2014 | 15460.54 | **0.3432** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-1176

# LB4100-C Instrument EFF

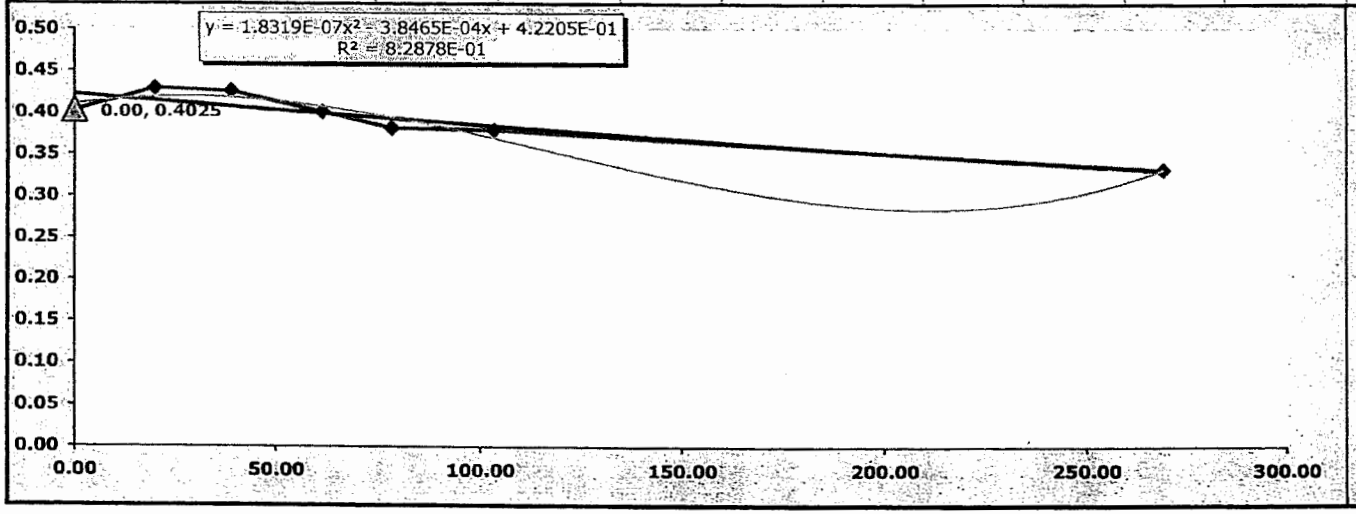


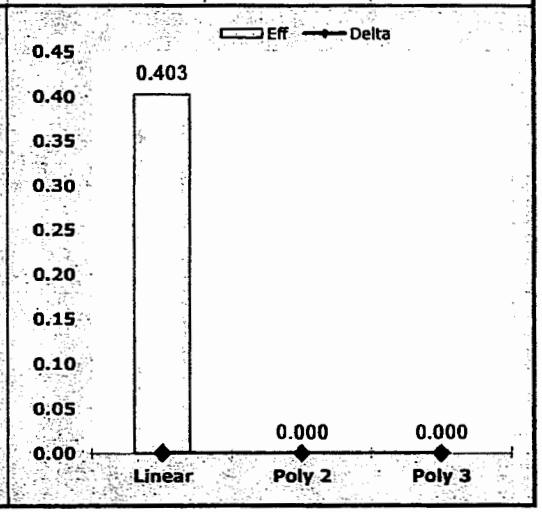
DCN: ITSI-0808-0004-0076, 8 May 2019

## LB Eff Calculation Report

## SR-90

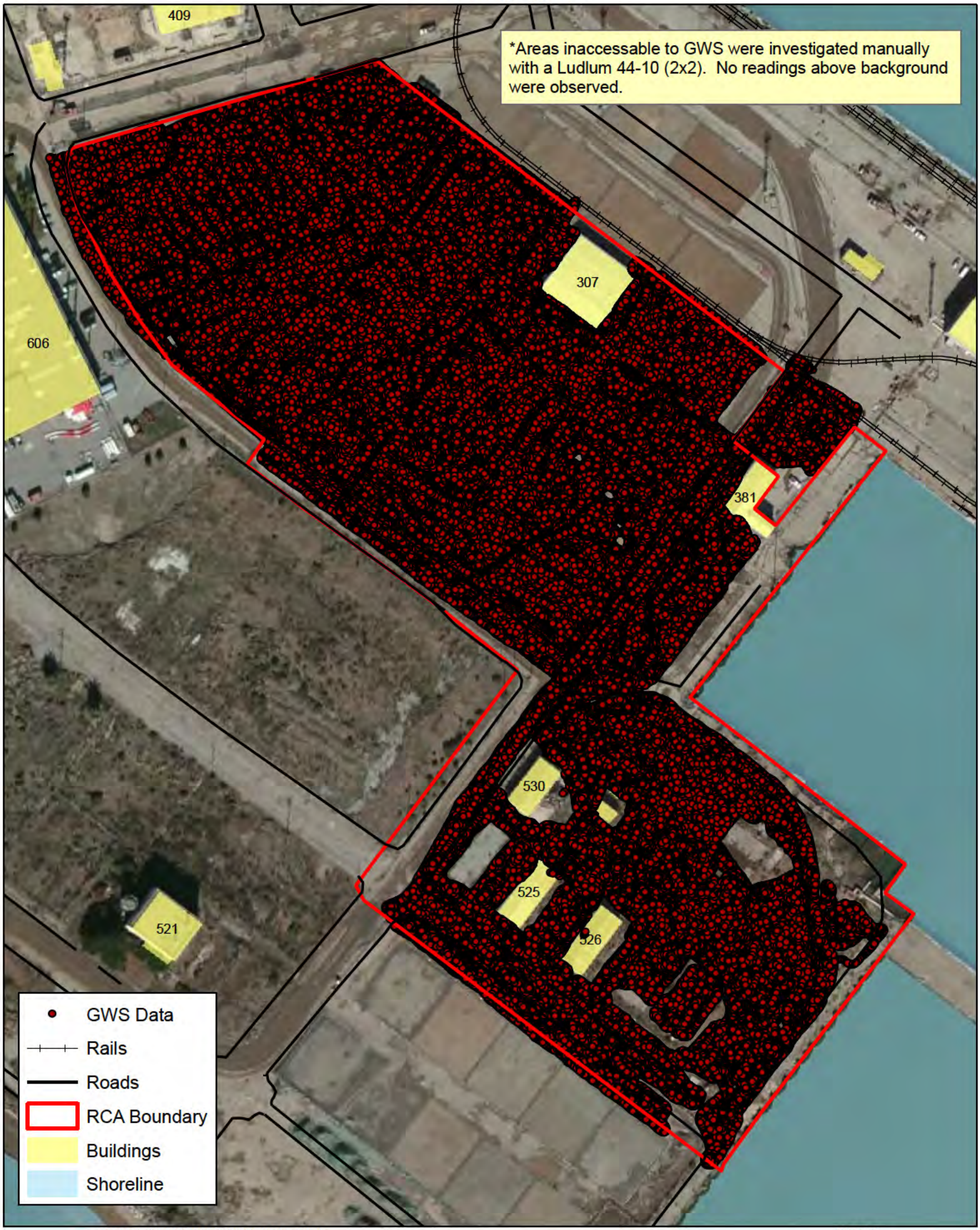
| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Instrument | LB4100-C | Detector | C2 |
| | | | | | | | | | | | | Slope | | Current Wt. | |
| | | | | | | | | | | | | Intercept | | Eff | 0.4025 |
| | | | | | | | | | | | | Eff Poly 2nd | | Δ 2 | |
| | | | | | | | | | | | | Eff Poly 3rd | | Δ 3 | |
| Point | Source ID | Certified DPM | Reference Date | mg | Alpha Counts | Alpha BKG | Beta Counts | Beta BKG | Count Dur | BKG Dur | Measured CPM | Count Date | Decay Corr DPM | Instrument Eff |
| 1 | J589 | 21102.00 | 9/1/1999 | 0.10 | 16 | 121 | 58511 | 890 | 5.00 | 900 | 5850.61 | 12/30/2014 | 14534.81 | **0.4025** |
| 2 | J590 | 23574.00 | 9/1/1999 | 19.90 | 18 | 121 | 69706 | 890 | 5.00 | 900 | 6970.11 | 12/30/2014 | 16237.50 | **0.4293** |
| 3 | J591 | 22242.00 | 9/1/1999 | 39.00 | 9 | 121 | 65244 | 890 | 5.00 | 900 | 6523.91 | 12/30/2014 | 15320.03 | **0.4258** |
| 4 | J592 | 21480.00 | 9/1/1999 | 61.40 | 8 | 121 | 59320 | 890 | 5.00 | 900 | 5931.51 | 12/30/2014 | 14795.17 | **0.4009** |
| 5 | J593 | 23886.00 | 9/1/1999 | 78.20 | 13 | 121 | 62756 | 890 | 5.00 | 900 | 6275.11 | 12/30/2014 | 16452.40 | **0.3814** |
| 6 | J594 | 23130.00 | 9/1/1999 | 103.60 | 12 | 121 | 60398 | 890 | 5.00 | 900 | 6039.31 | 12/30/2014 | 15931.67 | **0.3791** |
| 7 | J595 | 22446.00 | 9/1/1999 | 269.00 | 10 | 121 | 51491 | 890 | 5.00 | 900 | 5148.61 | 12/30/2014 | 15460.54 | **0.3330** |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |




N-1177

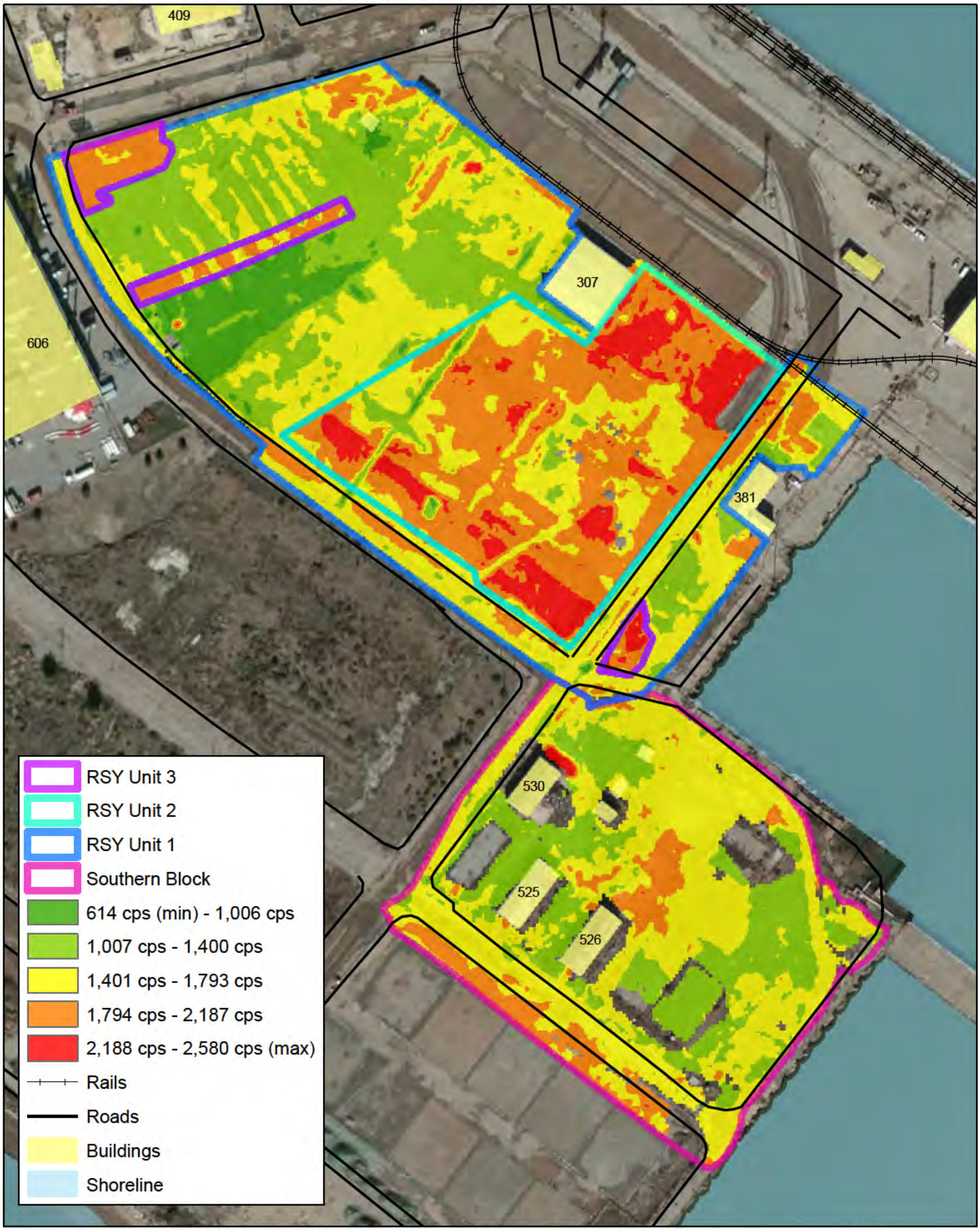
HPNS Parcel D1 Device Removal & Investigation Excvations
GWS Coverage Area




DCN: ITSI-0808-0004-0076, 8 May 2019

N-1178

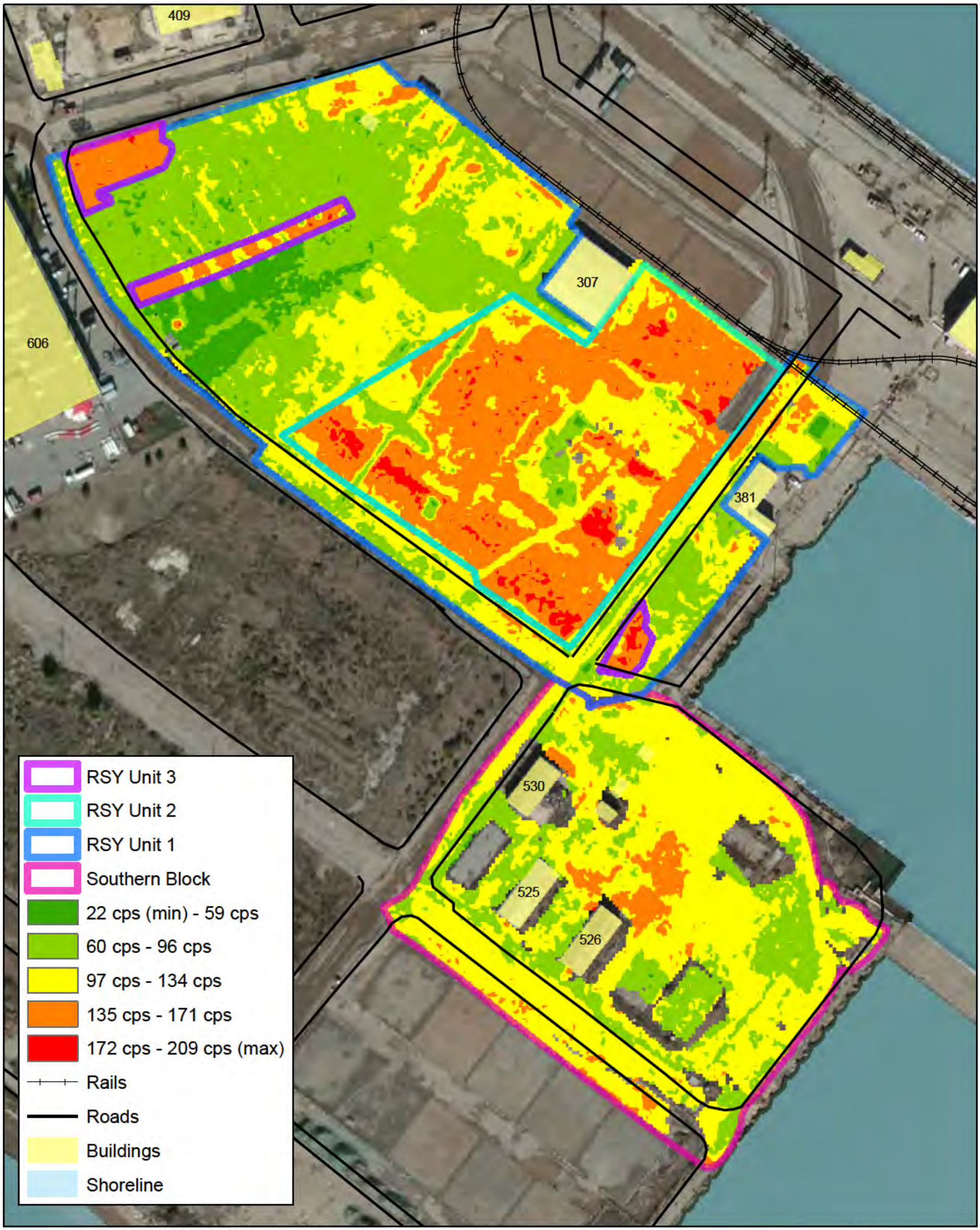
HPNS Parcel D1 Device Removal & Investigation Excvations
GWS Total Gamma (Combined) / Investigation Units




DCN: ITSI-0808-0004-0076, 8 May 2019

N-1179

HPNS Parcel D1 Device Removal & Investigation Excvations
GWS Potassium (Combined) / Investigation Units



# APPENDIX O

# WASTE TRANSFER AND DISPOSAL DOCUMENTATION

# (Available Electronically)

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Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

**UNIFORM HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: CA0001019694
2. Page 1 of: 1
3. Emergency Response Phone: (510) 904-3929
4. Manifest Tracking Number: 010189790 JJK

**GENERATOR**

5. Generator's Name and Mailing Address
US Navy BRAC PMO-W (HPS)
1 Avenue of the Palms, Suite 161, San Francisco CA. 94130-1807
Generator's Phone: (510) 772-8832

Generator's Site Address (if different than mailing address)
Hunters Point Shipyard 322 Innes Ave., San Francisco CA
Project # 13-0216

6. Transporter 1 Company Name: Bluewater Environmental Serv
U.S. EPA ID Number: CAR000192229

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Altamont Landfill
10840 Altamont Pass Road, Livermore CA. 94551
Facility's Phone: (925) 455-7300
U.S. EPA ID Number: CAD981382732

| 9a. HM | 9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | 13. Waste Codes |
|---|---|---|---|---|---|---|
| | 1. R.Q. NA2212, Asbestos, 9, PGIII | 102 | BA | 3570 | P | 151 |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |

14. Special Handling Instructions and Additional Information
9B1) PROFILE # 551085OO
Box 3: Tony Gama (Bluewater) (510) 904-3929
WEAR APPROPRIATE PPE WHEN HANDLING
TRANSPORTER & BILL TO:
BLUEWATERENVIRONMENTAL SVS, INC.
2075 WILLIAMS ST., SAN LEANDRO, CA 94577
BAAQMD 939 Ellis st, San Francisco TRACK# H-1537

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Douglas DeLong
Signature: [signature] on behalf
Month: 07 Day: 29 Year: 14

**INTL**

18. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

**TRANSPORTER**

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Hugo Chavarria
Signature: Hugo Chavarria
Month: 07 Day: 29 Year: 14

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

**DESIGNATED FACILITY**

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

| 1. | 2. | 3. | 4. |
|---|---|---|---|
| | | | |

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in item 18a

Printed/Typed Name:
Signature:
Month: Day: Year:

**BLUEWATER**
**ENVIRONMENTAL SERVICES**

The waste identified on manifest number 010189790 JJK, and bearing the California Waste Code 151 is subject to land and disposal restrictions contained in article 40, Title 22, California Code of Regulations. The waste meets the definition of a treated hazardous waste pursuant to Health and Safety Code (H&SC) Section 25179.6 (Waste Analysis is attached for these waste, where available).

As required by Article 40, Title 22, California Code of Regulations, the following certification is made on behalf of the below named generator whose name appears on the above-listed manifest, for these restricted wastes:

**I WARRANT THAT I AM AN AUTHORIZED REPRESENTATIVE OF THE BELOW-NAMED GENERATOR. I CERTIFY UNDER PENALTY OF LAW THAT THE WASTE IS CONSIDERED TREATED IN ACCORDANCE WITH H&SC SECTION 25179.3 (1)(2) AND COMPLIES WITH ALI APPLICABLE PROHIBITIONS SET FORTH IN H&SC SECTION 25179.6. I BELIEVE THAT THI INFORMATION I SUBMITTED IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING A FALSE CERTIFICATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.**

GENERATOR US Navy BRAC PMO-W (HPS)

ADDRESS: 1 Avenue of the Palms, Suite 161
San Francisco, CA. 94130-1807

PHONE: (510) 772-8832

Douglas DeLong
Print Name

Signature

Environ. Coord. Mgr.
Title

07/29/14
Date

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU-001153IXI |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On site location(s) staged: |
| 12-31-2014 | 7-14-2014 | 49,700 | D1, STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin | 9) Waste Type | 10) Volume (CY): | 11) (a) or (-) | 12) Sr HP Tech |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 70% | a) | JEW |
| b) CONCRETE | b) DEBRIS | b) 5% | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 20% | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 5% | | | | JEW |

**RAD TECH INSU**

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | SR-90, Cs-137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: JMALE Sign: Date: 7/14/14 OK to relinquish? ☒ YES ☐ NO |

**TES**

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma (c) other. TES HP Tech RKallpach (print) (sign) |

**GILBANE TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign | Date/Time: 7/14/14 1415 | 20) Received by (TES Rep): Print & Sign | Date/Time: 7-14-14/1430 ☑ Final transfer ☐ other (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: 7/21/14 Gilbane Project RSO initial & date)



DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☒ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLUbd173 X1 |
| 3) Generator/Contractor: | ☒ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12-17-2013 | 5) Date Completed: 7-14-2014 | 6) Weight (committed to Gilbane by TES): 47,680 | 7) On site location(s) staged: D1, STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (Cy): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 80 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 10 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 8 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2 % | | | | JEW |

RCT & HP SUB

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | JEW 7-14-14 7 ☒ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, CS 137, RB-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: Tarick Sign: [signature] Date 7/14/14 Oil to relinquish? ☒ YES ☐ NO |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma 7 mrhr. TES HP Tech [signature] (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/15/14 10:15 | 20) Received by (TES Rep): Print & Sign [signature] | Date/Time: ☒ initial transfer 7/15/14 @ 1035. ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

1) Type: ☒ Bin ☐ 55-gallon Drum ☐ Other: _____ 2) Container Identification: GFLU001122X1

3) Generator/Contractor: ☒ Gilbane ☐ other N/A

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane or TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 12/12/2013 | 7-14-2014 | 47,680 | D1 STORAGE NEXT TO BLDG 370 |

**History of Contents**

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 75 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 5 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 12 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/ | WOOD | 8 % | | |

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 5 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs-137, Ra-226 Other: Th-232

16) Estimated curie content: 2.3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: tmock Sign: [signature] Date 7/14/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): 2220 dpm/100cm² alpha 22200 dpm/100cm² beta/gamma 6 meter.

TES HP Tech R Ballard (print) [signature] (sign)

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print & Sign: JAMES WELLS [signature] | Date/Time: 7/15/14 0840 | 20) Received by (TES Rep): Print & Sign: R Ballard [signature] | Date/Time: ☒ Initial transfer 7/15/14 0900 ☐ Other _____ (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 7/31/14 Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RAPWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU-001178 X1 |
| 3) Generator/Contractor: | ☒ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12-31-13 | 5) Date Completed: 7-14-2014 | 6) Weight (confirmed to Gilbane by TES): 48 680 | 7) On site location(s) staged: D1, STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CF): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 80 % | a) | JEW |
| b) SOIL FROM D-1 | b) SOIL | b) 18 % | b) | JEW |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2 % (IR-17, IR-53) JEW

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, CS137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | L3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: T Mock Sign: [signature] Date: 7/14/14 OK to relinquish? ☒ YES ☐ NO |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | L220 dpm/100cm² alpha L2200 dpm/100cm² beta/gamma 6 meter<br>TES HP Tech [signature] (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/15/14 0740 | 20) Received by (TES Rep): Print [signature] & Sign [signature] | Date/Time: ☒ Initial transfer ☐ other 7/15/14 @ 0800 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/31/14 Gilbane Project RSO initial & date)

MIXED WASTE

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

1) Type: ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A

2) Container Identification: GFLU001164X1

3) Generator/Contractor: ☑ Gilbane ☐ other N/A

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed at Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 12-17-2013 | 7/15/2014 | 33,380 | D-1 STORAGE NEXT TO BLDG 370 |

***** History of Contents *****

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 70 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 20 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 8 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% JEW | | ZONE P IR SITE (IR-10) | | JEW |

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES INELLS (printed name)

15) Potential ROCs: Sr90, Cs137, Ra-226 Other: Th232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: JMach Sign: Date: 7/16/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): <2220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma

TES HP Tech RPhilpot (print) (sign)

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print & Sign: JAMES WELLS | Date/Time: 7/16/14 1350 | 20) Received by (TES Rep): Print & Sign: RPhilpot | Date/Time: ☒ Initial transfer 7/16/14@1400 ☐ other (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign: | Date/Time: | 22) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign: | Date/Time: | 24) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: 7/31/14 Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU-001067X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 11/7/2013 | 5) Date Completed: 7/15/2014 | 6) Weight (confirmed to Gilbane by TES): 47,380 | 7) On site location(s) staged: D-1 STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin | 9) Waste Type | 10) Volume (CY) | 11) (+) or (-) | 12) Sr HP Tech |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 60 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 8 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 30 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% | | | | JEW |

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☒ uR/hr ☐ mR/hr Gilbane HP Tech JW (initials) James Wells (printed name) |
| 15) Potential ROCs: | Sr-90, Cs 137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | <3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: J Mock Sign: [signature] Date: 7/15/14 OK to relinquish? ☒ YES ☐ NO |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | L220 dpm/100cm² alpha L2200 dpm/100cm² beta/gamma<br>TES HP Tech R Kellpatch (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/16/14 1430 | 20) Received by (TES Rep): Print R Kellpatch & Sign [signature] | Date/Time: ☒ Initial transfer 7/16/14@ 1435 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | MHFU001646X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12/4/2013 | 5) Date Completed: 7/15/2014 | 6) Weight (confirmed to Gilbane by TES): 50,120 | 7) On site location(s) staged: STORAGE NEXT TO BLDG 370 D-1 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (±) of (: | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 40 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 50 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 9 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | 1 % | | | JEW |

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr90, Cs137, Ra226 Other: Th232 |
| 16) Estimated curie content: | L 3E -4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: Tmoh Sign: [signature] Date 7/15/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | L220 dpm/100cm² alpha L2200 dpm/100cm² beta/gamma<br>TES HP Tech [signature] (print) [signature] (sign). |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign [signature] | Date/Time: 7/16/2014 1310 | 20) Received by (TES Rep): Print [signature] & Sign [signature] | Date/Time: ☒ Initial transfer ☐ other 7/16/14 @ 1326. (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU001024X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12/12/2013 | 5) Date Completed: 7/15/2014 | 6) Weight (confirmed to Gilbane by TES): 48,740 | 7) On site location(s) staged: D-1 STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-): | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 70 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 20 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 8 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | | 2 % | | JEW |

POT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROC: | Sr90, Cs137, Ra226 Other: Th-232 |
| 16) Estimated curie content: | <3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMOIL Sign: [signature] Date 7/15/14 OK to relinquish? ☒ YES ☐ NO |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta gamma<br>TES HP Tech R Kellpirch (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/16/2014 10:50 | 20) Received by (TES Rep): Print R Kellpirch & Sign [signature] | Date/Time: ☒ Initial transfer ☐ other 7/16/14 @ 1110 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments. TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point, Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU 002143 X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12-17-2013 | 5) Date Completed: 7/15/2014 | 6) Weight (Confirmed to Gilbane by TES): 45,660 | 7) On site location(s) staged: D-1 STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (Cy): | 11) (+) or (-): | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 80 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 10 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 8 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% | | | | JEW |

RCS & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | <3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMock Sign: [signature] Date 7/15/14 OK to relinquish? ☒ YES ☐ NO |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma<br>TES HP Tech [signature] (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign [signature] | Date/Time: 7/16/2014 11:30 | 20) Received by (TES Rep): Print [signature] & Sign [signature] | Date/Time: ☒ Initial transfer ☐ other 7/16/14 @ 1150 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☒ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU002068X1 |
| 3) Generator/Contractor: | ☒ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12-4-2013 | 5) Date Completed: 7/16/2014 | 6) Weight (confirmed to Gilbane by TES): 49,280 | 7) On site location(s) staged: D1, STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 10 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 60 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 28 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | | 2 % | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 9 ☒ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs-137, Ra-226 Other: TR-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print Mark Sign. Date 7/16/14 OK to relinquish? ☒ YES ☐ NO |

**TES**

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | 220 dpm/100cm² alpha 2200 dpm/100cm² beta /gamma<br>TES HP Tech S. Whatley (print) S. Whatley (sign) 7/16/14 |

**GILBANE & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/17/14 11:10 | 20) Received by (TES Rep): Print S. Whatley & Sign S. Whatley | Date/Time: 7/17/14 1125 ☒ Final transfer ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____ 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

**Container Specifics**

| | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container identification | GFLJ002036X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 12/12/2013 | 5) Date Completed: 7/15/2014 | 6) Weight (confirmed to Gilbane by TES): 51,580 | 7) On site location(s) staged: D1 STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | a) SOIL | a) 98% | a) | NEW |
| b) | N/A | b) | b) | b) | |
| c) | N/A | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% JEW

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs137, Ra-226 Other: Th-232

16) Estimated curie content: 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print A Mode Sign [signature] Date 7/16/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): 220 dpm/100cm² alpha 2200 dpm/100cm² beta /gamma

TES HP Tech J. Whatley (print) J. Whatley (sign) 7/16/14

**GILBANE & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign [signature] | Date/Time: 7/17/2014 0905 | 20) Received by (TES Rep): Print M Jacobs & Sign [signature] | Date/Time: 7-17-14 / 0918 ☒ Initial transfer ☐ Other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 7/17/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | BFLV000235X/ |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date initiated: 12/17/2013 | 5) Date Completed: 7/14 2014 | 6) Weight (completed to Gilbane by TES): 49,500 | 7) Onsite location(s) staged: D1- STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 55 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 10 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 30 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | | 5% ~~7%~~ IR70 | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, CS-137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMock Sign: Date: 7/16/14 OK to relinquish? ☑ YES ☐ NO |

**TES**

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | 220 dpm/100cm² alpha 2200 dpm/100cm² beta /gamma<br>TES HP Tech J. Whatley (print) (sign) 7uR/hr |

**GENERAL & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign | Date/Time: 7/17/14 0945 | 20) Received by (TES Rep): Print Jeremy Whatley & Sign | Date/Time: 7/17/14 1015 ☑ Initial transfer ☐ other (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | BFLU000163X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 1/8/2014 | 7/17/2014 | 50 420 | D1, STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 20 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 65 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 13 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% | | IR 17 | | JEW |

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra 226 Other: Th232 |
| 16) Estimated curie content: | < E3-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: t mock Sign: [signature] Date 7/17/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | 220 dpm/100cm² alpha 2200 dpm/100cm² beta /gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 7 uR/hr |

GILBANE & TES

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): | Date/Time: | 20) Received by (TES Rep): | Date/Time: |
|---|---|---|---|
| Print JAMES WELLS & Sign James Wells | 7/17/14 1350 | Print [signature] & Sign [signature] | ☒ Initial transfer ☐ other ___ (specify) 7-17-14 |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

**Container Specifics**

1) Type: ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A

2) Container identification: GFLU002190 X1

3) Generator/Contractor: ☑ Gilbane ☐ other N/A

| 4) Date initiated: | 5) Date Completed: | 6) Weight (confirmed at Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 12-17-13 | 7/16/2014 | 51,500 | D1 - STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 10 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 45 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 40 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | | 5 % | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs137, Ra-226 Other: Th-232

16) Estimated curie content: <3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: T Mock Sign: [signature] Date 7/16/14 OK to relinquish? ☑ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): 220 dpm/100cm² alpha 2200 dpm/100cm² beta/gamma

TES HP Tech J. Whatley (print) J. Whatley (sign) 7 µR/hr

**GB & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by: Print: JAMES WELLS & Sign: [signature] | Date/Time: 7/17/14 1300 | 20) Received by (TES Rep): Print: WELLS & Sign: [signature] | Date/Time: ☑ Initial transfer 7-17-14 / 1315 ☐ other _____ (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU001115X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On site location(s) staged: |
| 12-16-2013 | 7/16/2014 | 52,300 | D1 STORAGE NEXT TO BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 70 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 20 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 8 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% | | | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90 Cs137, Ra226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print TMOK Sign: [signature] Date 7/16/14 OK to relinquish? ☒ YES ☐ NO |

**TES**

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | 220 dpm/100cm² alpha 2200 dpm/100cm² beta /gamma<br>TES HP Tech S. Whatley (print) [signature] (sign) 7/16/14 |

**GILBANE & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign [signature] | Date/Time: 7/17/14 10:30 | 20) Received by (TES Rep): Print S Whatley & Sign [signature] | Date/Time: ☑ Initial transfer 7/17/14 1100 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| | | | |
|---|---|---|---|
| **Container Specifics** 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | BFLU000190X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On site location(s) staged: |
| 12-4-2013 | 7-17-2014 | 50,340 | D-1 YARD NEAR BLDG 370 |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 60 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 30 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 8 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2 % | | | | JEW |

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 10 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs-137-Ra-226 Other: Th 232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: Thoch Sign: [signature] Date 7/17/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma<br>TES HP Tech RKillpack (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/22/14 1340 | 20) Received by (TES Rep): Print RKillpack & Sign [signature] | Date/Time: ☒ Initial transfer ☐ other 7/22/14 @ 1358 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

**Container Specifics**

| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU001170X1 |
|---|---|---|---|
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed @ Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 12/12/2013 | 7/17/2014 | 49,900 | D1 - STORAGE NEXT TO PUMP HOUSE |

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|---|
| a) | CONCRETE FROM MANHOLE | a) DEBRIS | a) 80 % | a) | JEW |
| b) | SOIL FROM D-1 | b) SOIL | b) 18 % | b) | JEW |
| c) | N/A | c) | c) | c) | |
| 13) Other (Specify): | PAPER/PLASTIC/PPE/WOOD | 2% | IR-17 | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

| 14) Maximum identified dose rate (exterior): | 1 ☑ µR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
|---|---|
| 15) Potential ROCs: | Sr-90, Cs-137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: Sign: Date 7/17/14 OK to relinquish? ☒ YES ☐ NO |

**TES**

| 18) Radioactive contaminants (exterior surface check): | < 220 dpm/100cm² alpha < 2200 dpm/100cm² Beta/gamma |
|---|---|
| | TES HP Tech (print) |

**GILBANE & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign | Date/Time: 7/22/14 1430 | 20) Received by (TES Rep): Print & Sign | Date/Time: ☒ Initial transfer 7/22/14 @ 1440 ☐ other (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU001161X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 11/14/13 | 5) Date Completed: 7/21/14 | 6) Weight (confirmed to Gilbane by TES): 41,920 | 7) On site location(s) staged: D1- SOUTH CORNER NEAR PUMP HOUSE |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 10 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 60 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 28 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | 2% | IR-17 | | JEW |

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: [signature] Sign: [signature] Date 7/21/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | L220 dpm/100cm² alpha L2200 dpm/100cm² beta/gamma<br>TES HP Tech [signature] (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/23/14 0845 | 20) Received by (TES Rep): Print [signature] & Sign [signature] | Date/Time: 7-23-14/0902 ☒ initial transfer ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container identification | GFLU001235X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On site location(s) staged: |
| 10/18/13 | 7/21/14 | 46,600 | D-1 SOUTH CORNER NEAR PUMP HOUSE |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 20 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 40 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 38 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% | | | | JEW |

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | SR-90, CS 137, Ra-226 Other: Th 232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: [signature] Sign: [signature] Date 7/21/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | L220 dpm/100cm² alpha L2200 dpm/100cm² beta/gamma TES HP Tech RKillpack (print) [signature] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/23/14 10:45 | 20) Received by (TES Rep): Print MARCUS WELLS & Sign [signature] | Date/Time: ☒ Initial transfer 7-23-14/1108 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**WASTE COORDINATOR**

**Container Specifics**

| 1) Type: | ☒ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU001130X1 |
|---|---|---|---|
| 3) Generator/Contractor: | ☒ Gilbane ☐ other N/A | | |

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed @ Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 11/4/13 | 7/21/2014 | 46,500 | D1-SOUTH CORNER NEAR PUMP HOUSE |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr. HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 10 % | a) | JEW |
| b) CONCRETE FROM MAN HOLE | b) DEBRIS | b) 70 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 18 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% | | | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

| 14) Maximum identified dose rate (exterior): | 8 ☒ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
|---|---|
| 15) Potential ROCs: | Sr90, Cs 137, Ra 226 Other: Th 232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: Sign: Date 7/21/14 OK to relinquish? ☒ YES ☐ NO |

**TES**

| 18) Radioactive contaminants (exterior surface check): | LLLO dpm/100cm² alpha LLLOO dpm/100cm² beta / gamma |
|---|---|
| | TES HP Tech (print) (sign) |

**GUARDS & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print & Sign: James Wells | Date/Time: 7/23/14 0930 | 20) Received by (TES Rep): Print & Sign: | Date/Time: ☒ Initial transfer 7-23-14 / 0947 ☐ other (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign: | Date/Time: | 22) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign: | Date/Time: | 24) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU001194X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: 7/24/14 | 6) Weight (confirmed to Gilbane by TES): 42,240 | 7) On site location(s) staged: D-1 ON RSY PAD |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 98% | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 2% JEW

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra226 Other: Th232 |
| 16) Estimated curie content: | <3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: [illegible] Sign: [illegible] Date 7/24/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma Fundr. TES HP Tech [illegible] (print) [illegible] (sign) |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print & Sign JAMES WELLS [illegible] | Date/Time: 7/28/14 10:00 | 20) Received by (TES Rep): Print & Sign [illegible] | Date/Time: ☒ initial transfer ☐ other ___ (specify) 7-28-14 / 1023 |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [illegible] / 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

* GFLU011168X1

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

**Container Specifics**

| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU00 1168X1 |
|---|---|---|---|
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (Committed to Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 10/25/13 | 7/23/14 | 50,800 | D-1 RSY PAD |

***** History of Contents *****

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr. HP Tech: |
|---|---|---|---|---|
| a) PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 10 % | a) | JEW |
| b) CONCRETE FROM MANHOLE | b) DEBRIS | b) 60 % | b) | JEW |
| c) SOIL FROM D-1 | c) SOIL | c) 20 % | c) | JEW |
| 13) Other (Specify): PAPER/PLASTIC/PPE/WOOD | | 10 % | | JEW |

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
|---|---|
| 15) Potential ROCs: | Sr-90 · Cs137 - Ra226 Other: TH232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMOU Sign: Date 7/23/14 OK to relinquish? ☑ YES ☐ NO |

**TES**

| 18) Radioactive contaminants (exterior surface check): | 2220 dpm/100cm² alpha 22200 dpm/100cm² beta /gamma 7 uR/hr. |
|---|---|
| | TES HP Tech (print) (sign) |

**GILBANE & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign | Date/Time: 7/28/14 0920 | 20) Received by (TES Rep): Print & Sign | Date/Time: ☑ Initial transfer 7-28-14 / 0935 ☐ other (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: / 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

| | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container identification | ~~BFLU00152XT~~ BFLU00152XT AKW 7/28/14 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date initiated: 10/22/13 | 5) Date Completed: 7/24/14 | 6) Weight (confirmed to Gilbane by TES): ~6,740 | 7) On site location(s) staged: D-1 ON RSY PAD |

**RADWASTE COORDINATOR**

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|---|
| a) | PIPING DEBRIS (CLAY/METAL) | a) DEBRIS | a) 10 % | a) | JEW |
| b) | CONCRETE FROM MANHOLE | b) DEBRIS | b) 40 % | b) | JEW |
| c) | SOIL FROM D-1 | c) SOIL | c) 48 % | c) | JEW |
| 13) Other (Specify): | PAPER/PLASTIC/PPE/WOOD | | 2 % | | JEW |

**RCT & HP SU**

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra226 Other: Th 232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print Frank Sign [signature] Date 7/24/14 OK to relinquish? ☒ YES ☐ NO |

**TES**

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma Frank. TES HP Tech R Hollyfield (print) [signature] (sign) |

**GILBANE & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/28/14 11:00 | 20) Received by (TES Rep): Print M Hollyfield & Sign [signature] | Date/Time: ☑ Initial transfer 7-28-14/1115 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 7/28/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU 001015T5 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: 7/24/14 | 6) Weight (confirmed to Gilbane by TES): 52,880 | 7) On site location(s) staged: |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-): | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 60 % | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/PPE/WOOD 40 % JEW

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90 Cs137, Ra226 Other: Th-232 |
| 16) Estimated curie content: | <3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMoch Sign: [signature] Date 7/24/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | L220 dpm/100cm² alpha L2200 dpm/100cm² beta/gamma<br>TES HP Tech [signature] (print) [signature] (sign) 7 [signature] |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/28/14 11:55 | 20) Received by (TES Rep): Print MA Rodgers & Sign [signature] | Date/Time: ☒ Initial transfer ☐ other _____ (specify) 7-28-14/1208 |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 7/21/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

RADWASTE COORDINATOR

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container identification | GFLU001278X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |

| 4) Date initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On site location(s) staged: |
|---|---|---|---|
| 7/28/14 | 7/29/14 | 45,960 | D-1 ON RSY PAD |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 99% | a) | |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/WOOD 1%

RCT & HP SUP

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90-Cs137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMOG Sign: [signature] Date 7/29/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |

TES

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6/uR/hr |

GILBANE & TES

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 7/30/14 0830 | 20) Received by (TES Rep): Print MARK WELLS & Sign [signature] | Date/Time: 7-30-14/0845 ☒ initial transfer ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU-002107X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/28/14 | 5) Date Completed: 7/29/14 | 6) Weight (confirmed to Gilbane by TES): 48,100 | 7) On site location(s) staged: D-1 ON RSY PAD |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 99% | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |
| 13) Other (Specify): PAPER/PLASTIC/WOOD | 1% | | | JEW |

**RCT & HP STATUS**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs137, Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: TMOE Sign: [signature] Date 7/29/14 OK to relinquish? ☑ YES ☐ NO

**TESTING**

18) Radioactive contaminants (exterior surface check): < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma

TES HP Tech J. Whatley (print) J. Whatley (sign) 6 mR/hr

**GILBANE & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign [signature] | Date/Time: 7/30/14 1340 | 20) Received by (TES): Print MARCUS FULTON & Sign [signature] | Date/Time: 7-30-14/1406 ☒ Initial transfer ☐ other _____ (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU 00 11 46 X2 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: | 5) Date Completed: | 6) Weight (committed to Gilbane by TES): | 7) On site location(s) staged: |
| 7/28/14 | 7/29/14 | 44840 | D-1 ON RSY PAD |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY) | 11) (+) or (-) | 12) Sr HP Tech |
|---|---|---|---|---|
| a) SOIL | a) SOIL | a) 85 % | a) | JEW |
| b) ASPHALT | b) DEBRIS | b) 14 % | b) | JEW |
| c) | c) | c) | c) | |
| 13) Other (Specify): PAPER/PLASTIC/WOOD | | 1 % | | JEW |

**RCT HP SUP**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 8 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs-137, Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: TMark Sign: Date 7/29/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta/gamma 6 uR/hr

TES HP Tech J. Whatley (print) J. Whatley (sign)

**GILBANE & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print & Sign: JAMES WELLS James Wells | Date/Time: 7/30/14 0920 | 20) Received by (TES Rep): Print & Sign: MARCUS JONES | Date/Time: ☒ Initial transfer ☐ other _____ (specify) 7-30-14/0937 |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign: | Date/Time: | 22) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign: | Date/Time: | 24) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey perfonned using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____ 7/31/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU 00 215482 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/29/14 | 5) Date Completed: 7/29/14 | 6) Weight (Confirmed to Gilbane by TES): 49,620 | 7) On site location(s) staged: D-1 RSY PAD |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) ASPHALT FROM D-1 | a) DEBRIS | a) 90 % | a) | JEW |
| b) SOIL FROM D1 | b) SOIL | b) 9 % | b) | JEW |
| c) | c) | c) | c) | |
| 13) Other (Specify): PAPER/PLASTIC/WOOD 1 % | | | | JEW |

**RCT & HPSU**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential RDCs: Sr-90 Cs137 Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: T Mork Sign: [signature] Date: 7/21/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma

TES HP Tech J. Whatley (print) J. Whatley (sign) 7-24-14

**GILBANE & TES**

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print & Sign: JAMES WELLS | Date/Time: 7/30/14 11:30 | 20) Received by (TES rep): Print & Sign: | Date/Time: ☑ Initial transfer 7-30-14/1145 ☐ other (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print & Sign: | Date/Time: | 22) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign: | Date/Time: | 24) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: 7/21/14 / 7/21/14 Gilbane Project RSO Initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

1) Type: ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A

2) Container Identification: GFLU001139 X2

3) Generator/Contractor: ☑ Gilbane ☐ other N/A

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed at Gilbane or TES): | 7) Job Site Location(s) stored: |
|---|---|---|---|
| 7/31/14 | 7/31/14 | 44,240 lbs | D-1 SB-29N |

**Log History of Contents**

| Work Area Origin | Material Type | Percentage (%) | 11) Cyl. or (I) | 12) SF HP Tech |
|---|---|---|---|---|
| a) SOIL FROM D1 | a) SOIL | a) 96 % | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/WOOD 4 % JEW

**Radiological Status of Transfer Container/Package**

14) Maximum detected dose rate (criteria): 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90 Cs-137, Ra-226 Other: TH-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: Thall Sign: Date 8/4/14 OK to relinquish? ☑ YES ☐ NO

18) Radioactive contamination (dpm/100 sq cm): < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma

TES HP Tech S. Whatley (print) S. Whatley (sign) 6 uR/hr

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS Sign | Date/Time: 8/5/14 10:30 | 20) Received by (TES Rep): Print & Sign RONALD WILCOX | Date/Time: ☐ Initial transfer ☐ other 8/5/14 1112 (specify) |
|---|---|---|---|
| 21) Relinquished by (2nd Attempt): Print Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____/_____ Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

| | | | |
|---|---|---|---|
| Container Specifics<br>1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU00 1014X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 8-4-14 | 5) Date Completed: 8-4-14 | 6) Weight (combined to Gilbane or TES): 50,400 lbs | 7) On-site location(s): D-1 SB 29N |

*** History of Contents ***

| 8) Work Area Origin | 9) Waste Type | 10) Volume(s) | 11) HP Tech |
|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 98% | a) JEW |
| b) | b) | b) | b) |
| c) | c) | c) | c) |

13) Other (Specify): PAPER/PLASTIC/WOOD 2% JEW

Radiological Status of Transfer Container/Package

| | |
|---|---|
| 14) Maximum identified dose rate (contact): | 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential RCRs: | Sr-90, Cs-137-Ra-226 Other: Th-232 |
| 16) Estimated core content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: J Mock Sign: [signature] Date 8/4/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |
| 18) Radioactive contaminants (external surface dose): | < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta/gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6 uR/hr |

Completion of Container/Package Transfer

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/5/14 0925 | 20) Received by (TES Rep): Print RONALD WILCOX & Sign [signature] | Date/Time: ☐ initial transfer ☐ other 8/5/14 1000 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____ / _____ Gilbane Project RSO initial & date)

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

1) Type: ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A

2) Container Identification: GFLU00 2015X1

3) Generator/Contractor: ☑ Gilbane ☐ other N/A

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (estimated or shipping by TES): | 7) On-site location (staged): |
|---|---|---|---|
| 7/29/14 | 7/30/14 | 41,100 lbs | D-1 RSY PAD |

***** History of Contents *****

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (%): | 11) +/or (-) | 12) S HP Tech: |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | SOIL | 98% | | JEW |
| b) | | | | | |
| c) | | | | | |
| 13) Other (specify): | PAPER/PLASTIC/WOOD | | 2% | | JEW |

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs-137, Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: TMode Sign: [signature] Date 7/30/14 Ok to relinquish? ☒ YES ☐ NO

18) Radioactive contamination (exterior surface check): 2220 dpm/100cm² alpha 22200 dpm/100cm² beta/gamma

TES HP Tech J. Whatley (print) J. Whatley (sign) GME Tech

**Completion of Container/Package Transfer**

| 19) Relinquished by (Gilbane Rep): | Date/Time: | 20) Received by (TES Rep): | Date/Time: |
|---|---|---|---|
| Print: JAMES WELLS Sign: [signature] | 8/5/14 0755 | Print: RONALD WILCOX Sign: [signature] | ☑ Initial transfer ☐ other: 8/5/14 0847 (specify) |
| 21) Relinquished by (2nd Attempt): Print: Sign: | Date/Time: | 22) Received by: Print: Sign: | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print: Sign: | Date/Time: | 24) Received by: Print: Sign: | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____/_____ Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU 000 192 X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/29/14 | 5) Date Completed: 7/30/14 | 6) Weight Confirmed to Gilbane by TES: 47,600 lbs | 7) On site location(s) staged: D-1 ON RSY PAD |

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | a) SOIL | a) 99% | a) | JEW |
| b) | | b) | b) | b) | |
| c) | | c) | c) | c) | |

13) Other (Specify): PLASTIC/PAPER/WOOD 1% JEW

**RCT & HP SUP**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 6 ☐ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs-137, Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: TMod Sign: Date 7/30/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): <2200 dpm/100cm² alpha <2200 dpm/100cm² beta /gamma

TES HP Tech J. Whatley (print) (sign) 14uR/hr

**GILBANE & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/4/14 1350 | 20) Received by (TES Rep): Print & Sign | Date/Time: 1405/8-4-14 ☒ Initial Transfer ☐ other (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____/_____ Gilbane Project RSO initial & date)

# Hunters Point: Field Content Sheet & Transfer Document

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container identification | GFLU002137X2 |
| 3) Generator/Contractor | ☑ Gilbane ☐ other N/A | | |
| 4) Date initiated: 7/30/14 | 5) Date Completed: 7/30/14 | 6) Weight (committed to Gilbane by TES): 45,900 lbs | 7) On site location(s) staged: D-1 SB29 |

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr. HP Tech |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | a) SOIL | a) 98% | a) | JEW |
| b) | | b) | b) | b) | |
| c) | | c) | c) | c) | |
| 13) Other (Specify): PAPER/PLASTIC/WOOD 2% | | | | | JEW |

## Radiological Status of Transfer Container/Package

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential RDCs: | Sr-90, Cs-137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMOH Sign: [signature] Date 7/30/14 OK to relinquish? ☑ YES ☐ NO |
| 18) Radioactive contaminants (exterior surface check): | < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6 mg/hr |

## Completion of Container / Package Transfer

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/4/14 0955 | 20) Received by (TAI Rep): Print [illegible] & Sign [signature] | Date/Time: ☑ Initial transfer 1008 / 8-4-14 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____/_____ Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU001212X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/29/14 | 5) Date Completed: 7/30/14 | 6) Weight (confirmed to Gilbane by TES): 42,420 lbs | 7) On site location(s) staged: SB 29 D-1 |

*** History of Contents ***

| 8) Work Area Origin | 9) Waste Type | 10) Volume (CY) | 11) (+) or (-) | 12) Sr HP Tech |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 98 % | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |
| 13) Other (Specify): PAPER/PLASTIC/WOOD | 2 % | | | JEW |

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ dR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMoll Sign: [signature] Date: 7/30/14 OK to relinquish? ☒ YES ☐ NO |
| 18) Radioactive contaminants (exterior surface wheels): | < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6 mR/hr |

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/4/14 0840 | 20) Received by (TES): Print [signature] & Sign [signature] | Date/Time: 8-4-14/0855 ☒ initial transfer ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____/_____ Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

| | | | |
|---|---|---|---|
| **Container Specifics** 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLW001117781 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/30/14 | 5) Date Completed: 7/30/14 | 6) Weight (confirmed to shipper by TES): 40,540/65 | 7) On site location(s) staged: D-1 SB29 |

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-) | 12) Sr HP Tech: |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | SOIL | 98% | | JEW |
| b) | | | | | |
| c) | | | | | |
| 13) Other (specify): PAPER/PLASTIC/WOOD | | 2% | | | JEW |

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 5 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90 Cs137 RA-226 Other: Th-232 |
| 16) Estimated curie content: | <3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMoh Sign: Date: 7/30/14 OK to relinquish? ☒ YES ☐ NO |
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta /gamma TES HP Tech J. Whatley (print) J. Whatley (sign) 8/4/14 |

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS Sign | Date/Time: 8/4/14 11:30 | 20) Received by (TES Rep): Print & Sign | Date/Time: ☒ Initial transfer 8/4/14 @ 1200 ☐ other (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____/_____ Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

1) Type: ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A

2) Container Identification: GFLU001139 X2

3) Generator/Contractor: ☑ Gilbane ☐ other N/A

| 4) Date Initiated: | 5) Date Completed: | 6) Weight Determined at Gilbane by (TES) | 7) On-site location(s) stored: |
|---|---|---|---|
| 7/31/14 | 7/31/14 | 44,240 lbs | D-1 SB-29N |

***** History of Contents *****

| Work Area Origin | 9) Matrix (ies) | 10) Volume (%) | 11) Media | 12) SHP Tech |
|---|---|---|---|---|
| a) SOIL FROM D1 | a) SOIL | a) 96 % | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/WOOD 4 % JEW

**Radiological Profile of Transfer Container / Package**

14) Maximum identified dose rate (exterior): 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential RCOs: Sr-90 Cs-137, Ra-226 Other: TA-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) TES viewed by: Print: Thall Sign: Date 8/4/14 OK to relinquish? ☑ YES ☐ NO

18) Radiological contaminants (removable surface): < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma

TES HP Tech S. Whatley (print) S. Whatley (sign) 6 uR/hr

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): | Date/Time: | 20) Received by (TES rep): | Date/Time: |
|---|---|---|---|
| Print: JAMES WELLS<br>Sign: James Wells | 8/5/14 10:30 | Print: RONALD WILCOX<br>Sign: Ronald Wilcox | ☐ initial transfer<br>☐ other 8/5/14 1112 (specify) |
| 21) Relinquished by (2nd Attempt):<br>Print<br>Sign | Date/Time: | 22) Received by:<br>Print<br>Sign | Date/Time:<br>Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt):<br>Print<br>Sign | Date/Time: | 24) Received by:<br>Print<br>Sign | Date/Time:<br>Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____ / 8/6/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU00 1014X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 8-4-14 | 5) Date Completed: 8-4-14 | 6) Weight (Confirmed on Gilbane by TES): 50,400 lbs | 7) On-site location(s): D-1 SB 29N |

*** History of Contents ***

| 8) Work Area Origin | 9) Waste Type | 10) Volume (%) | 11) | 12) HP Tech |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 98% | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/WOOD 2% JEW

Radiological Status of Transfer Container/Package

| | |
|---|---|
| 14) Maximum identified dose rate (exterior) | 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs-137- Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: T Mock Sign: [signature] Date 8/4/14 OK to relinquish? ☒ YES ☐ NO |
| 18) Radioactive contamination (Exterior surface area) | < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6 uR/hr |

Completion of Container / Package Transfer

| 19) Relinquished by (Gilbane Rep): | Date/Time: | 20) Received by (TES Rep): | Date/Time: |
|---|---|---|---|
| Print JAMES WELLS<br>& Sign James Wells | 8/5/14<br>0925 | Print RONALD WILCOX<br>& Sign Ronald Wilcox | ☐ initial transfer<br>☐ other 8/5/14 1000 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 8/6/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

| | | | |
|---|---|---|---|
| Container Specifics<br>1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU002015X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/29/14 | 5) Date Completed: 7/30/14 | 6) Weight (confirmed to Gilbane by TES): 41,100 lbs | 7) On-site location(s) staged: D-1 RSY PAD |

*** History of Contents ***

| 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-): | 12) Sr HP Tech: |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 98 % | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |
| 13) Other (Specify): PAPER/PLASTIC/WOOD | | 2 % | | JEW |

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs-137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMock Sign: [signature] Date 7/30/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6 uR/hr |

**Completion of Container/Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/5/14 0755 | 20) Received by (TES Rep): Print RONALD WILCOX & Sign Ronald Wilcox | Date/Time: ☒ Initial transfer ☐ other 8/5/14 0847 (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 8/6/14 Gilbane Project RSO initial & date)

# Hunters Point: Field Content Sheet & Transfer Document

**RADWASTE COORDINATOR**

| Container Specifics | | | |
|---|---|---|---|
| 1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLU 000 192 X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/29/14 | 5) Date Completed: 7/30/14 | 6) Weight (Confirmed at Gilbane by TES): 47,600 lbs | 7) On site location(s) staged: D-1 ON RSY PAD |

*** History of Contents ***

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (+) or (-): | 12) Sr HP Tech: |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | a) SOIL | a) 99% | a) | JEW |
| b) | | b) | b) | b) | |
| c) | | c) | c) | c) | |
| 13) Other (Specify): PLASTIC/PAPER/WOOD 1% | | | | | JEW |

**RCT & HP SURVEY**

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 6 ☐ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs-137, Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 Ci See lab analysis data report (attached)

17) Reviewed by: Print: YMod Sign: [signature] Date 7/30/14 OK to relinquish? ☒ YES ☐ NO

**TES**

18) Radioactive contaminants (exterior surface check): <2200 dpm/100cm² alpha <2200 dpm/100cm² beta /gamma

TES HP Tech J. Whatley (print) [signature] (sign) 6 uR/hr

**GILBANE & TES**

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/4/14 1350 | 20) Received by (TES Rep): Print & Sign [signature] | Date/Time: 1405/8-4-14 ☒ Initial transfer ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 8/6/14 Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

# Hunters Point: Field Content Sheet & Transfer Document

**Container Specifics**

1) Type: ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A

2) Container Identification: GFLU002137X2

3) Generator / Contractor: ☑ Gilbane ☐ other N/A

| 4) Date Initiated: | 5) Date Completed: | 6) Weight (confirmed to Gilbane by TES): | 7) On-site location(s) staged: |
|---|---|---|---|
| 7/30/14 | 7/30/14 | 45,900 lbs | D-1 SB29 |

***** History of Contents *****

| | 8) Work Area Origin: | 9) Waste Type: | 10) Volume (CY): | 11) (if any): | 12) Sr. HP Tech: |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | a) SOIL | a) 98% | a) | JEW |
| b) | | b) | b) | b) | |
| c) | | c) | c) | c) | |

13) Other (specify): PAPER/PLASTIC/WOOD 2% JEW

**Radiological Status of Transfer Container/Package**

14) Maximum identified dose rate (exterior): 6 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name)

15) Potential ROCs: Sr-90, Cs-137, Ra-226 Other: Th-232

16) Estimated curie content: < 3E-4 ci See lab analysis data report (attached)

17) Reviewed by: Print: TMOCK Sign: [signature] Date: 7/30/14 OK to relinquish? ☑ YES ☐ NO

18) Radioactive contaminants (exterior surface check): < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma

TES HP Tech J. Whatley (print) J. Whatley (sign) 6 mg/hr

**Completion of Container / Package Transfer**

| 19) Relinquished by (Gilbane Rep): | Date/Time: | 20) Received by: | Date/Time: |
|---|---|---|---|
| Print: JAMES WELLS & Sign: James Wells | 8/4/14 0855 | From: WM Peabody & Sons Print & Sign: W Mark Peabody | ☑ Initial transfer 1008 / 8-4-14 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign: | Date/Time: | 22) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign: | Date/Time: | 24) Received by: Print & Sign: | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] 8/6/14 Gilbane Project RSO initial & date)

DCN: ITSI-0808-0004-0076, 8 May 2019

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

| | | | |
|---|---|---|---|
| Container Specifics<br>1) Type: | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification: | GFLU001212X1 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/29/14 | 5) Date Completed: 7/30/14 | 6) Weight (confirmed to Gilbane by TES): 42,420 lbs | 7) On site location(s) staged: SB 29 D-1 |

*** History of Contents ***

| 8) Work Area Origin | 9) Waste Type | 10) Volume (CY) | 11) (+) or (-) | 12) Sr HP Tech |
|---|---|---|---|---|
| a) SOIL FROM D-1 | a) SOIL | a) 98 % | a) | JEW |
| b) | b) | b) | b) | |
| c) | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/WOOD 2 % JEW

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior): | 7 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90, Cs137, Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMOH Sign: [signature] Date 7/30/14 OK to relinquish? ☒ YES ___ ☐ NO ___ |
| 18) Radioactive contaminants (exterior surface check): | <220 dpm/100cm² alpha <2200 dpm/100cm² beta/gamma<br>TES HP Tech J. Whatley (print) J. Whatley (sign) 6 AR/hr |

**Completion of Container/Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign James Wells | Date/Time: 8/4/14 0840 | 20) Received by (TES rep): Print [illegible] & Sign [illegible] | Date/Time: 8-4-14/0855 ☒ initial transfer ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: [signature] / 8/6/14 Gilbane Project RSO initial & date)

Attachment 4

# Hunters Point: Field Content Sheet & Transfer Document

**Container/Specifics**

| | | | |
|---|---|---|---|
| 1) Type | ☑ Bin ☐ 55-gallon Drum ☐ Other: N/A | 2) Container Identification | GFLW001/17781 |
| 3) Generator/Contractor: | ☑ Gilbane ☐ other N/A | | |
| 4) Date Initiated: 7/30/14 | 5) Date Completed: 7/30/14 | 6) Weight (confirmed to Gilbane by TES): 40,540/65 | 7) On site location(s) staged: D-1 SB29 |

***** History of Contents *****

| | 8) Work Area Origin | 9) Waste Type | 10) Volume (CY) | 11) % or [ ] | 12) Sr HP Tech |
|---|---|---|---|---|---|
| a) | SOIL FROM D-1 | a) SOIL | a) 98% | a) | JEW |
| b) | | b) | b) | b) | |
| c) | | c) | c) | c) | |

13) Other (Specify): PAPER/PLASTIC/WOOD 2% JEW

**Radiological Status of Transfer Container/Package**

| | |
|---|---|
| 14) Maximum identified dose rate (exterior) | 5 ☑ uR/hr ☐ mR/hr Gilbane HP Tech JEW (initials) JAMES WELLS (printed name) |
| 15) Potential ROCs: | Sr-90 Cs137 Ra-226 Other: Th-232 |
| 16) Estimated curie content: | < 3E-4 Ci See lab analysis data report (attached) |
| 17) Reviewed by: | Print: TMoh Sign: Date: 7/30/14 OK to relinquish? ☑ YES ☐ NO |

| | |
|---|---|
| 18) Radioactive contaminants (exterior surface check): | < 220 dpm/100cm² alpha < 2200 dpm/100cm² beta /gamma |
| | TES HP Tech J. Whatley (print) J. Whatley (sign) |

**Completion of Container / Package Transfer**

| | | | |
|---|---|---|---|
| 19) Relinquished by (Gilbane Rep): Print JAMES WELLS & Sign: James Wells | Date/Time: 8/4/14 11:30 | 20) Received by (TES Rep): Print & Sign: J. Whatley | Date/Time: ☑ Initial transfer 8/4/14 @ 1200 ☐ other _____ (specify) |
| 21) Relinquished by (2nd Attempt): Print & Sign | Date/Time: | 22) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |
| 23) Relinquished by (3rd Attempt): Print & Sign | Date/Time: | 24) Received by: Print & Sign | Date/Time: Reason for repeat of prior attempt: |

Comments: TES incoming survey performed using a Ludlum 2360 with a 43-89 probe using a Large Area Swipe (LAS) for 2 minute static count as per DOT release limits in 49 CFR 173.443 for Contamination Control.

Note: TES to furnish a copy of completed form to Gilbane RSOR for inclusion in project MOU archives. (Received by: _____ / 8/6/14 Gilbane Project RSO initial & date)



DCN: ITSI-0808-0004-0076, 8 May 2019

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565

L2RSOLDOAH 000003

GILBANE FEDERAL
2730 SHADELANDS DRIVE
WALNUT CREEK, CA 94598

# INVOICE

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 1 of 16
**Due Date** [redacted]

| Current Charges | Total Amount Due |
|---|---|
| [redacted] | |

**Please Pay Total Amount Due**

Billing Questions? Call 925-232-2940

**For all account inquiries, please call (925) 232-2940**
**Accounts with balances over 30 days past due will incur a 1.5% late fee charge.**

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 01/01 | | Balance Forward | | | [redacted] |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984859 | 9.28 | |
| 11/11 | VS | Reference: 1925392 | | | |
| 11/11 | VS | Vehicle: JGT05 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84718 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84719 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984864 | 10.10 | |
| 11/11 | VS | Reference: 1925394 | | | |
| 11/11 | VS | Vehicle: CT2 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |

**ACCOUNT STATUS**

| Current | 31-60 Days | 61-90 Days | Over 90 Days | Total Amount Due |
|---|---|---|---|---|
| [redacted] | | | | |

L2RSOLDOAH 000003 1NNNNNNNN NNN NN 001 008 000053 11037385.1

↓ ↓ Please return this portion below with your payment. Do not attach check to stub. ↓ ↓

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565

Invoice Date
Invoice No.
Customer No. [redacted]

Current Charges: [redacted]
**Total Amount Due:**
Amount Paid: _____

☐ Please check if address has changed, and indicate change(s) on reverse side or call phone number above.

**Please write your account number on your check and make payable to:**

Keller Canyon Landfill Company
**Please Return** File # 70055
**Payment To:** Los Angeles, CA 90074-0055

GILBANE FEDERAL
2730 SHADELANDS DRIVE
WALNUT CREEK, CA 94598

4421206750660000000022035010150848010150848 6

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84720 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84721 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984874 | 14.44 | |
| 11/11 | VS | Reference: 1925393 | | | |
| 11/11 | VS | Vehicle: NT03 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84722 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84723 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984880 | 11.09 | |
| 11/11 | VS | Reference: 19253 | | | |
| 11/11 | VS | Vehicle: TDT001 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84730 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84731 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984893 | 16.13 | |
| 11/11 | VS | Reference: 1925397 | | | |
| 11/11 | VS | Vehicle: WT769 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84740 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84741 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984895 | 2.51 | |
| 11/11 | VS | Reference: 1925396 | | | |
| 11/11 | VS | Vehicle: R86 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |

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IF ANY OF THE FOLLOWING HAS CHANGED SINCE YOUR LAST STATEMENT, PLEASE INDICATE....

Your Name _____

Street _____ Home Phone _____

City _____ State _____ Zip _____

Other Information _____

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 3 of 16
**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84744 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84745 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984910 | 13.54 | |
| 11/11 | VS | Reference: 1925398 | | | |
| 11/11 | VS | Vehicle: MICHELLE09 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84748 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84749 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984914 | 12.26 | |
| 11/11 | VS | Reference: 1925400 | | | |
| 11/11 | VS | Vehicle: JST411 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84750 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84751 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984927 | 15.48 | |
| 11/11 | VS | Reference: 1925402 | | | |
| 11/11 | VS | Vehicle: RENTERIA10 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84752 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84753 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984930 | 21.42 | |
| 11/11 | VS | Reference: 1925403 | | | |
| 11/11 | VS | Vehicle: FT77 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84754 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84755 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984932 | 14.70 | |
| 11/11 | VS | Reference: 1925401 | | | |
| 11/11 | VS | Vehicle: JHT002 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84756 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84757 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984954 | 16.96 | |
| 11/11 | VS | Reference: 1925404 | | | |
| 11/11 | VS | Vehicle: G3 | | | |

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| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84776 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84777 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984963 | 14.27 | |
| 11/11 | VS | Reference: 1925405 | | | |
| 11/11 | VS | Vehicle: RGT38154 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84782 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84783 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984967 | 11.07 | |
| 11/11 | VS | Reference: 1925406 | | | |
| 11/11 | VS | Vehicle: NST38203 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84786 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84787 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984968 | 24.58 | |
| 11/11 | VS | Reference: 1925408 | | | |
| 11/11 | VS | Vehicle: JGT05 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84788 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84789 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984971 | 15.50 | |
| 11/11 | VS | Reference: 1925407 | | | |
| 11/11 | VS | Vehicle: MT35047 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84790 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84791 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984983 | 21.24 | |
| 11/11 | VS | Reference: 1925411 | | | |
| 11/11 | VS | Vehicle: NT03 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84802 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84803 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 984995 | 19.49 | |
| 11/11 | VS | Reference: 1925412 | | | |
| 11/11 | VS | Vehicle: CT2 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84806 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84807 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |

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**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 5 of 16
**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985000 | 15.04 | [redacted] |
| 11/11 | VS | Reference: 1925414 | | | |
| 11/11 | VS | Vehicle: WT769 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84808 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84809 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985001 | 12.53 | |
| 11/11 | VS | Reference: 1925409 | | | |
| 11/11 | VS | Vehicle: BT10 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84810 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84811 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985003 | 18.89 | |
| 11/11 | VS | Reference: 1925410 | | | |
| 11/11 | VS | Vehicle: BT2027 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84814 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84815 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985005 | 13.07 | |
| 11/11 | VS | Reference: 1925415 | | | |
| 11/11 | VS | Vehicle: R86 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84816 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84817 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985011 | 13.37 | |
| 11/11 | VS | Reference: 1925413 | | | |
| 11/11 | VS | Vehicle: TDT001 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84820 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84821 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985022 | 12.58 | |
| 11/11 | VS | Reference: 1925416 | | | |
| 11/11 | VS | Vehicle: MICHELLE09 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84830 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84831 | 1.00 | |

L2RSOLDDAH 000003 1NNNNNNNNN NNN NN 003 008 000057 11037386.1

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985027 | 11.06 | |
| 11/11 | VS | Reference: 1925417 | | | |
| 11/11 | VS | Vehicle: JST411 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84836 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84837 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985029 | 13.22 | |
| 11/11 | VS | Reference: 1925418 | | | |
| 11/11 | VS | Vehicle: JHT002 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84840 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84841 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985038 | 16.77 | |
| 11/11 | VS | Reference: 1925419 | | | |
| 11/11 | VS | Vehicle: RENTERIA10 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84846 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84847 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985056 | 15.78 | |
| 11/11 | VS | Reference: 1925420 | | | |
| 11/11 | VS | Vehicle: RGT38154 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84858 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84859 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985058 | 11.31 | |
| 11/11 | VS | Reference: 1925421 | | | |
| 11/11 | VS | Vehicle: NST38203 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84860 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84861 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985060 | 16.49 | |
| 11/11 | VS | Reference: 1925423 | | | |
| 11/11 | VS | Vehicle: JGT05 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84864 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84865 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/11 | VS | SW-TIMBER/TREATED/OLD | 01 985063 | 18.52 | |
| 11/11 | VS | Reference: 1925422 | | | |
| 11/11 | VS | Vehicle: MT35047 | | | |
| 11/11 | VS | Contract: 42121411574 | | | |
| 11/11 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |

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**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 7 of 16
**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/11 | {1 | ENVIRONMENTAL FEE 1 | SC84866 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/11 | }1 | FUEL RECOVERY FEE | SC84867 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985105 | 19.85 | |
| 11/12 | VS | Reference: 1925424 | | | |
| 11/12 | VS | Vehicle: JGT05 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84888 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84889 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985122 | 27.51 | |
| 11/12 | VS | Reference: 1925426 | | | |
| 11/12 | VS | Vehicle: R86 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84901 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84902 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985123 | 26.19 | |
| 11/12 | VS | Reference: 1925427 | | | |
| 11/12 | VS | Vehicle: NT03 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84903 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84904 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985127 | 16.77 | |
| 11/12 | VS | Reference: 1925428 | | | |
| 11/12 | VS | Vehicle: WT769 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84905 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84906 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985128 | 17.00 | |
| 11/12 | VS | Reference: 1925425 | | | |
| 11/12 | VS | Vehicle: HJT07 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84907 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84908 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985134 | 20.65 | |
| 11/12 | VS | Reference: 1925429 | | | |
| 11/12 | VS | Vehicle: TDT001 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |

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| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84912 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84913 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985143 | 18.15 | |
| 11/12 | VS | Reference: 1925430 | | | |
| 11/12 | VS | Vehicle: MICHELLE09 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84918 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84919 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985161 | 15.43 | |
| 11/12 | VS | Reference: 1925432 | | | |
| 11/12 | VS | Vehicle: JST411 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84925 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84926 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985164 | 15.67 | |
| 11/12 | VS | Reference: 1925433 | | | |
| 11/12 | VS | Vehicle: JHT002 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84929 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84930 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985173 | 16.40 | |
| 11/12 | VS | Reference: 1925434 | | | |
| 11/12 | VS | Vehicle: MT35047 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84937 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84938 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985185 | 17.75 | |
| 11/12 | VS | Reference: 1925431 | | | |
| 11/12 | VS | Vehicle: ACT39 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84943 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84944 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985195 | 9.88 | |
| 11/12 | VS | Reference: 1925438 | | | |
| 11/12 | VS | Vehicle: JGT05 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84958 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84959 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985197 | 19.33 | |

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**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
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**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/12 | VS | Reference: 1925436 | | | |
| 11/12 | VS | Vehicle: BMAS20 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84960 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84961 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985198 | 10.80 | |
| 11/12 | VS | Reference: 1925435 | | | |
| 11/12 | VS | Vehicle: BT2027 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84962 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84963 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985200 | 14.64 | |
| 11/12 | VS | Reference: 1925437 | | | |
| 11/12 | VS | Vehicle: WT6 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84964 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84965 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985213 | 12.74 | |
| 11/12 | VS | Reference: 1925439 | | | |
| 11/12 | VS | Vehicle: BT10 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84979 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84980 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985214 | 12.41 | |
| 11/12 | VS | Reference: 1925440 | | | |
| 11/12 | VS | Vehicle: R86 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84981 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84982 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985218 | 19.22 | |
| 11/12 | VS | Reference: 1925441 | | | |
| 11/12 | VS | Vehicle: NT03 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84985 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84986 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |

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| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985221 | 15.28 | [redacted] |
| 11/12 | VS | Reference: 1925442 | | | |
| 11/12 | VS | Vehicle: WT769 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84989 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84990 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985233 | 14.87 | |
| 11/12 | VS | Reference: 1925443 | | | |
| 11/12 | VS | Vehicle: TDT001 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84991 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84992 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985238 | 12.12 | |
| 11/12 | VS | Reference: 1925444 | | | |
| 11/12 | VS | Vehicle: MICHELLE09 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC84998 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC84999 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985248 | 14.09 | |
| 11/12 | VS | Reference: 1925445 | | | |
| 11/12 | VS | Vehicle: JST411 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85002 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85003 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985254 | 15.40 | |
| 11/12 | VS | Reference: 1925446 | | | |
| 11/12 | VS | Vehicle: MT35047 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85008 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85009 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985271 | 20.85 | |
| 11/12 | VS | Reference: 1925447 | | | |
| 11/12 | VS | Vehicle: ACT39 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85020 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85021 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985277 | 9.86 | |
| 11/12 | VS | Reference: 1925448 | | | |
| 11/12 | VS | Vehicle: JGT05 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85024 | 1.00 | |

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**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
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**Customer No**

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**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85025 | 1.00 | [redacted] |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985289 | 10.62 | |
| 11/12 | VS | Reference: 1925449 | | | |
| 11/12 | VS | Vehicle: R86 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85032 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85033 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985290 | 13.10 | |
| 11/12 | VS | Reference: 1925450 | | | |
| 11/12 | VS | Vehicle: NT03 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85034 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85035 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/12 | VS | SW-TIMBER/TREATED/OLD | 01 985292 | 9.57 | |
| 11/12 | VS | Reference: 1925451 | | | |
| 11/12 | VS | Vehicle: WT769 | | | |
| 11/12 | VS | Contract: 42121411574 | | | |
| 11/12 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/12 | {1 | ENVIRONMENTAL FEE 1 | SC85038 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/12 | }1 | FUEL RECOVERY FEE | SC85039 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985335 | 7.79 | |
| 11/13 | VS | Reference: 1925452 | | | |
| 11/13 | VS | Vehicle: JGT05 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85062 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85063 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985344 | 9.85 | |
| 11/13 | VS | Reference: 1925453 | | | |
| 11/13 | VS | Vehicle: R86 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85068 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85069 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985349 | 16.23 | |
| 11/13 | VS | Reference: 1925454 | | | |
| 11/13 | VS | Vehicle: NT03 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |

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| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85072 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85073 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985350 | 10.97 | |
| 11/13 | VS | Reference: 1925455 | | | |
| 11/13 | VS | Vehicle: WT769 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85074 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85075 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985353 | 13.47 | |
| 11/13 | VS | Reference: 1925456 | | | |
| 11/13 | VS | Vehicle: CT2 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85076 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85077 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985357 | 16.75 | |
| 11/13 | VS | Reference: 1925457 | | | |
| 11/13 | VS | Vehicle: MICHELLE09 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85083 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85084 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985363 | 13.37 | |
| 11/13 | VS | Reference: 1925458 | | | |
| 11/13 | VS | Vehicle: JST411 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85087 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85088 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985366 | 14.54 | |
| 11/13 | VS | Reference: 1925459 | | | |
| 11/13 | VS | Vehicle: JHT002 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85093 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85094 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985378 | 10.83 | |
| 11/13 | VS | Reference: 1925460 | | | |
| 11/13 | VS | Vehicle: RGT38154 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85097 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85098 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985387 | 13.14 | |
| 11/13 | VS | Reference: 1925462 | | | |

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 13 of 16
**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/13 | VS | Vehicle: ACT39 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85105 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85106 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985394 | 14.06 | |
| 11/13 | VS | Reference: 1925463 | | | |
| 11/13 | VS | Vehicle: BMAS20 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85109 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85110 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985395 | 11.45 | |
| 11/13 | VS | Reference: 1925465 | | | |
| 11/13 | VS | Vehicle: BT2027 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85111 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85112 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985398 | 13.98 | |
| 11/13 | VS | Reference: 1925465 | | | |
| 11/13 | VS | Vehicle: HJT07 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85115 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85116 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985399 | 13.25 | |
| 11/13 | VS | Reference: 1925466 | | | |
| 11/13 | VS | Vehicle: MT35047 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85117 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85118 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985403 | 11.86 | |
| 11/13 | VS | Reference: 1925461 | | | |
| 11/13 | VS | Vehicle: NSBT38203 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85121 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85122 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985416 | 17.26 | |

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| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/13 | VS | Reference: 1925468 | | | |
| 11/13 | VS | Vehicle: JB99 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85133 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85134 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985419 | 14.71 | |
| 11/13 | VS | Reference: 1925470 | | | |
| 11/13 | VS | Vehicle: TDT001 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85135 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85136 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985421 | 12.21 | |
| 11/13 | VS | Reference: 1925469 | | | |
| 11/13 | VS | Vehicle: LEE101 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85139 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85140 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985431 | 10.39 | |
| 11/13 | VS | Reference: 1925472 | | | |
| 11/13 | VS | Vehicle: JGT05 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85147 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85148 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985433 | 15.90 | |
| 11/13 | VS | Reference: 1925474 | | | |
| 11/13 | VS | Vehicle: WT769 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85149 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85150 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985437 | 13.94 | |
| 11/13 | VS | Reference: 1925475 | | | |
| 11/13 | VS | Vehicle: NT03 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85151 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85152 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985438 | 13.89 | |
| 11/13 | VS | Reference: 1925467 | | | |
| 11/13 | VS | Vehicle: B45 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85153 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |

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**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

**INVOICE (cont.)**

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 15 of 16
**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/13 | )1 | FUEL RECOVERY FEE | SC85154 | 1.00 | [redacted] |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985442 | 16.82 | |
| 11/13 | VS | Reference: 1925476 | | | |
| 11/13 | VS | Vehicle: CT2 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85155 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | )1 | FUEL RECOVERY FEE | SC85156 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985446 | 13.19 | |
| 11/13 | VS | Reference: 1925477 | | | |
| 11/13 | VS | Vehicle: MICHELLE09 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85157 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | )1 | FUEL RECOVERY FEE | SC85158 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985459 | 10.68 | |
| 11/13 | VS | Reference: 1925471 | | | |
| 11/13 | VS | Vehicle: JLT1 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85163 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | )1 | FUEL RECOVERY FEE | SC85164 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985464 | 11.20 | |
| 11/13 | VS | Reference: 1925473 | | | |
| 11/13 | VS | Vehicle: R86 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85167 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | )1 | FUEL RECOVERY FEE | SC85168 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985469 | 18.05 | |
| 11/13 | VS | Reference: 1925478 | | | |
| 11/13 | VS | Vehicle: RENTERIA10 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85169 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | )1 | FUEL RECOVERY FEE | SC85170 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985472 | 15.16 | |
| 11/13 | VS | Reference: 1925479 | | | |
| 11/13 | VS | Vehicle: JHT002 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85171 | 1.00 | |

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| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85172 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985473 | 15.36 | |
| 11/13 | VS | Reference: 1925480 | | | |
| 11/13 | VS | Vehicle: ACT39 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85173 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85174 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985474 | 12.48 | |
| 11/13 | VS | Reference: 1925481 | | | |
| 11/13 | VS | Vehicle: AVILA37 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85175 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85176 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/13 | VS | SW-TIMBER/TREATED/OLD | 01 985475 | 17.14 | |
| 11/13 | VS | Reference: 1925482 | | | |
| 11/13 | VS | Vehicle: BMAS20 | | | |
| 11/13 | VS | Contract: 42121411574 | | | |
| 11/13 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/13 | {1 | ENVIRONMENTAL FEE 1 | SC85177 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/13 | }1 | FUEL RECOVERY FEE | SC85178 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/15 | Z8 | ADMINISTRATION FEE | SC85463 | 1.00 | |
| | | --------- Material Summary --------- | | | |
| | | SW-TIMBER/TREATED/OLD | | 1318.76 | |
| | | | | Total Current Charges ==========> | [redacted] |

000068

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565

L2RSMLDTAN 000037

GILBANE FEDERAL
2730 SHADELANDS DRIVE
WALNUT CREEK, CA 94598

# INVOICE

**Invoice Date** [redacted]
**Invoice No** [redacted]
**Customer No**

**Page No** 1 of 4
**Due Date** [redacted]

[redacted]

**Please Pay Total Amount Due**

Billing Questions? Call 925-232-2940

**For all account inquiries, please call (925) 232-2940**
**Accounts with balances over 30 days past due will incur a 1.5% late fee charge.**

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/15 | | Balance Forward | | | [redacted] |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985788 | 12.55 | |
| 11/17 | VS | Reference: 1925483 | | | |
| 11/17 | VS | Vehicle: HJT07 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85329 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85330 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985793 | 16.58 | |
| 11/17 | VS | Reference: 1925484 | | | |
| 11/17 | VS | Vehicle: NT03 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |

**ACCOUNT STATUS**

| Current | 31-60 Days | 61-90 Days | Over 90 Days | Total Amount Due |
|---|---|---|---|---|
| [redacted] | | | | |

L2RSMLDTAN 000037 1NNNNNNNN NNN NN 001 002 000173 11051225.1

↓ ↓ Please return this portion below with your payment. Do not attach check to stub. ↓ ↓

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565

Invoice Date [redacted]
Invoice No.
Customer No.

Current Charges:
**Total Amount Due:** [redacted]
Amount Paid: _____

☐ Please check if address has changed, and indicate change(s) on reverse side or call phone number above.

**Please write your account number on your check and make payable to:**

Keller Canyon Landfill Company
**Please Return** File # 70055
**Payment To:** Los Angeles, CA 90074-0055

GILBANE FEDERAL
2730 SHADELANDS DRIVE
WALNUT CREEK, CA 94598

4421206750660000000022106001107183011258O312

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85331 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85332 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985796 | 15.57 | |
| 11/17 | VS | Reference: 1925485 | | | |
| 11/17 | VS | Vehicle: CT2 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85335 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85336 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985802 | 11.35 | |
| 11/17 | VS | Reference: 1925486 | | | |
| 11/17 | VS | Vehicle: R86 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85339 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85340 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985804 | 9.91 | |
| 11/17 | VS | Reference: 1925487 | | | |
| 11/17 | VS | Vehicle: WT769 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85341 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85342 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985815 | 13.37 | |
| 11/17 | VS | Reference: 1925489 | | | |
| 11/17 | VS | Vehicle: MT35047 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |

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IF ANY OF THE FOLLOWING HAS CHANGED SINCE YOUR LAST STATEMENT, PLEASE INDICATE....

Your Name _____

Street _____ Home Phone _____

City _____ State _____ Zip _____

Other Information _____

**Keller Canyon Landfill Company**
901 Bailey Road
Pittsburg, CA 94565
GILBANE FEDERAL

# INVOICE (cont.)

**Invoice Date** [redacted]
**Invoice No**
**Customer No**

**Page No** 3 of 4
**Due Date** [redacted]

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85347 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85348 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985819 | 11.68 | |
| 11/17 | VS | Reference: 1925490 | | | |
| 11/17 | VS | Vehicle: TDT001 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85349 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85350 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985831 | 11.12 | |
| 11/17 | VS | Reference: 1925488 | | | |
| 11/17 | VS | Vehicle: MGT7 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85353 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85354 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985832 | 10.74 | |
| 11/17 | VS | Reference: 1925491 | | | |
| 11/17 | VS | Vehicle: MICHELLE09 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85355 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85356 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985835 | 10.10 | |
| 11/17 | VS | Reference: 1925492 | | | |
| 11/17 | VS | Vehicle: BMAS20 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85359 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85360 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985847 | 8.82 | |
| 11/17 | VS | Reference: 1985423 | | | |
| 11/17 | VS | Vehicle: RGT38154 | | | |
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85367 | 1.00 | |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85368 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/17 | VS | SW-TIMBER/TREATED/OLD | 01 985848 | 11.64 | |
| 11/17 | VS | Reference: 1985433 | | | |
| 11/17 | VS | Vehicle: NSBT38203 | | | |

L2RSMLDTAN 000037 1NNNNNNNN NNN NN 002 002 000175 11051225.1

| Date | Code | Description | Reference | Quantity | Amount |
|---|---|---|---|---|---|
| 11/17 | VS | Contract: 42121411574 | | | |
| 11/17 | VS | Generator Name: US NAVY BRAC PMO-WEST (HPNS) | | | |
| 11/17 | {1 | ENVIRONMENTAL FEE 1 | SC85369 | 1.00 | [redacted] |
| | | ( 13.00 / Ticket ) ENVIRONMENTAL FEE 1 | | | |
| 11/17 | }1 | FUEL RECOVERY FEE | SC85370 | 1.00 | |
| | | ( 8.69% / Ticket ) FUEL RECOVERY FEE | | | |
| 11/30 | Z8 | ADMINISTRATION FEE | SC86397 | 1.00 | |
| | | --------- Material Summary --------- | | | |
| | | SW-TIMBER/TREATED/OLD | | 143.43 | [redacted] |
| | | | | Total Current Charges ----------> | [redacted] |

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# APPENDIX P

# RADIOACTIVE OBJECT DATA

# (Available Electronically)

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Gilbane

# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 01 | 29.4 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

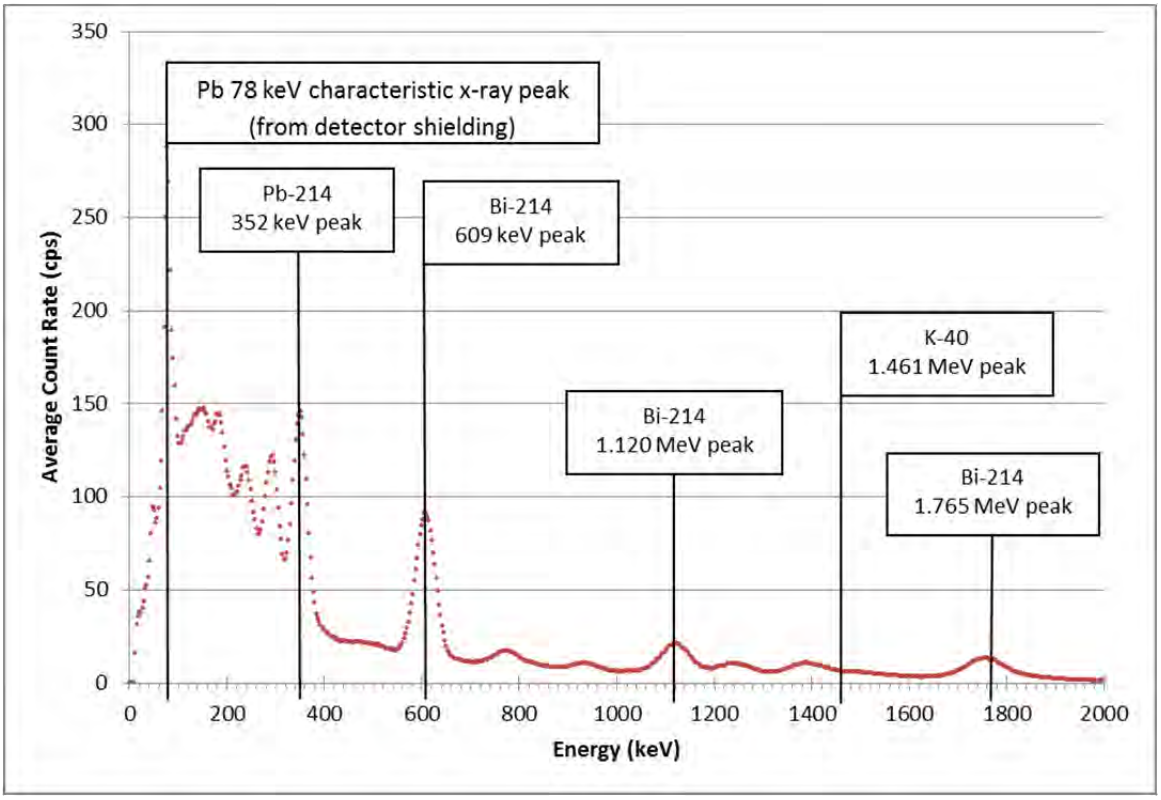
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 3.2 mR/Hr | Object Dose rate at 10 cm: 1.4 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.240 mR/Hr @ 30cm |

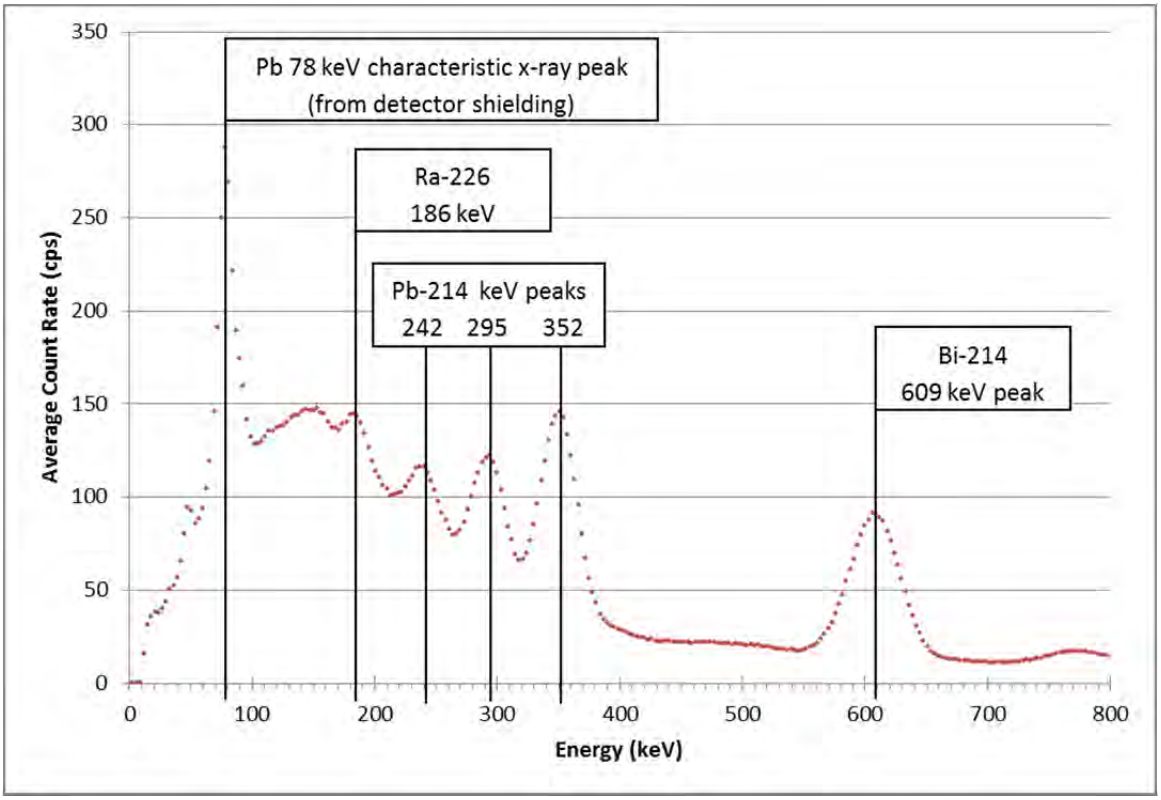
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.240 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 29.4 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-01 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



DCN: ITSI-0808-0004-0076, 8 May 2019

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Gilbane

# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 02 | 1.0 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

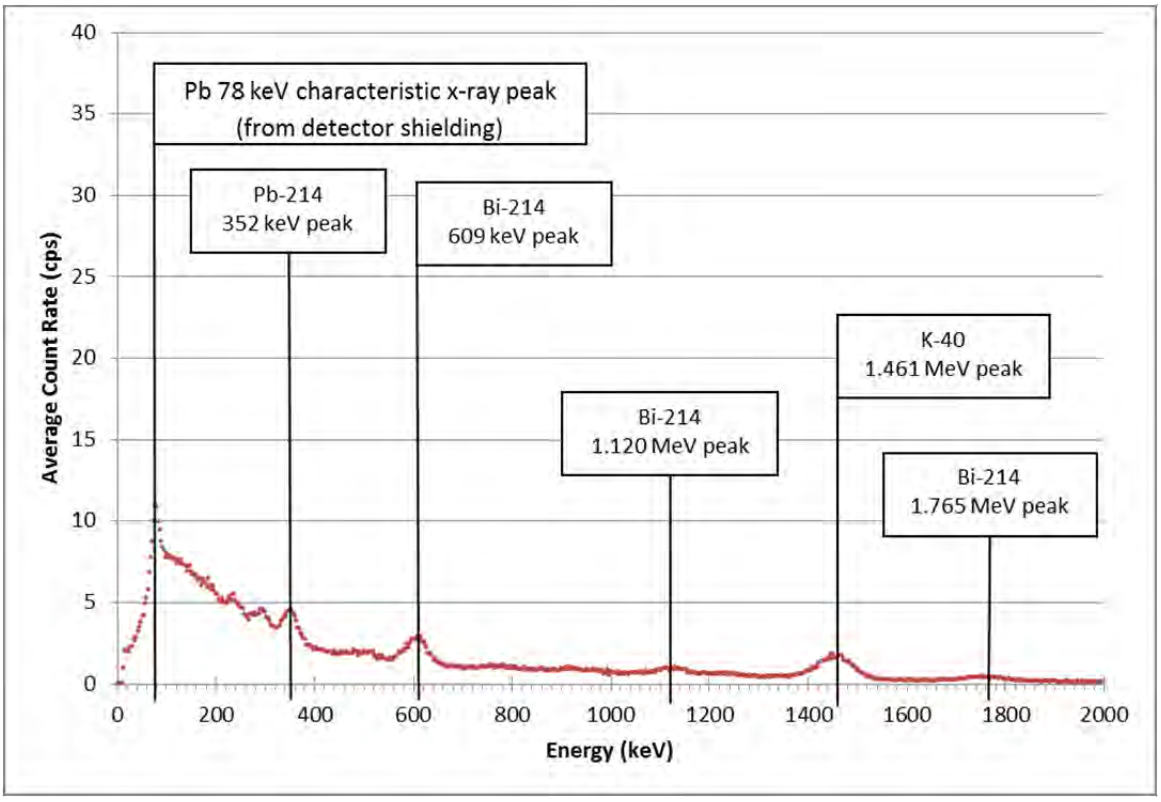
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.023 mR/Hr | Object Dose rate at 10 cm: 0.014 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.008 mR/Hr @ 13cm |

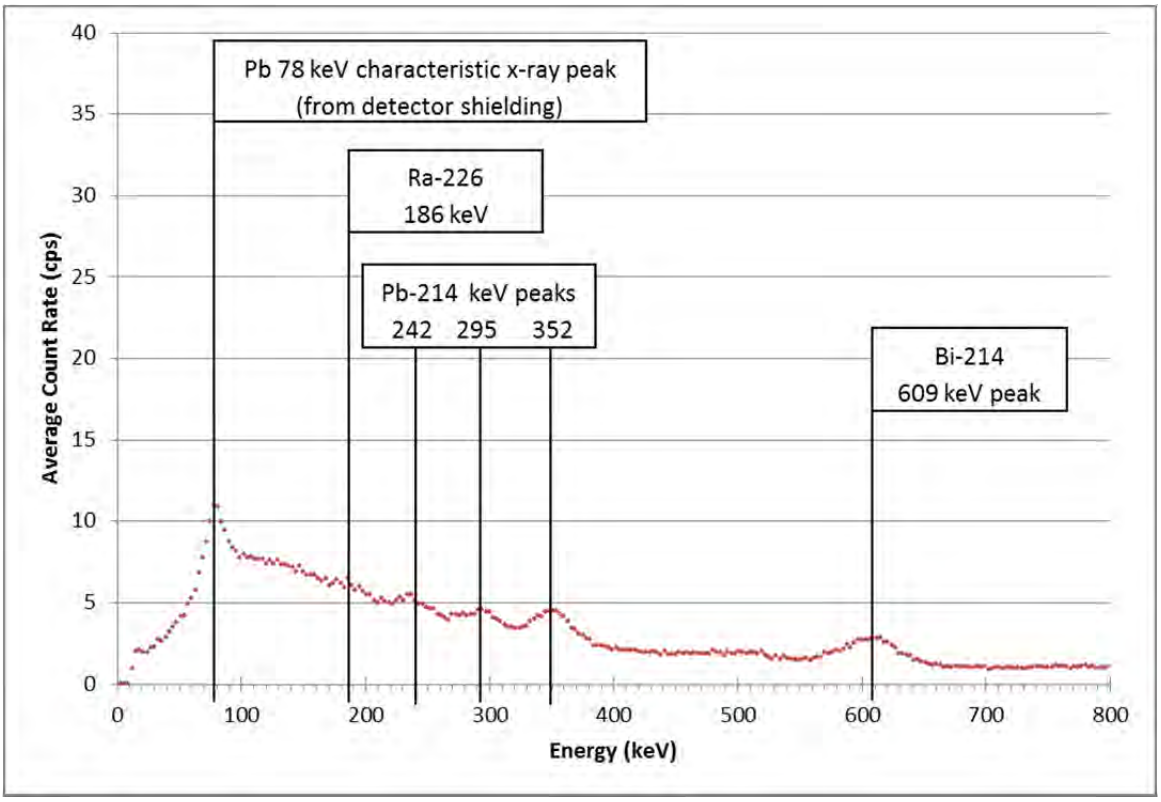
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.008 mR/Hr | Distance from Object: 13 cm | Calculated Activity: 1.0 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-02 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 03 | 12.2 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

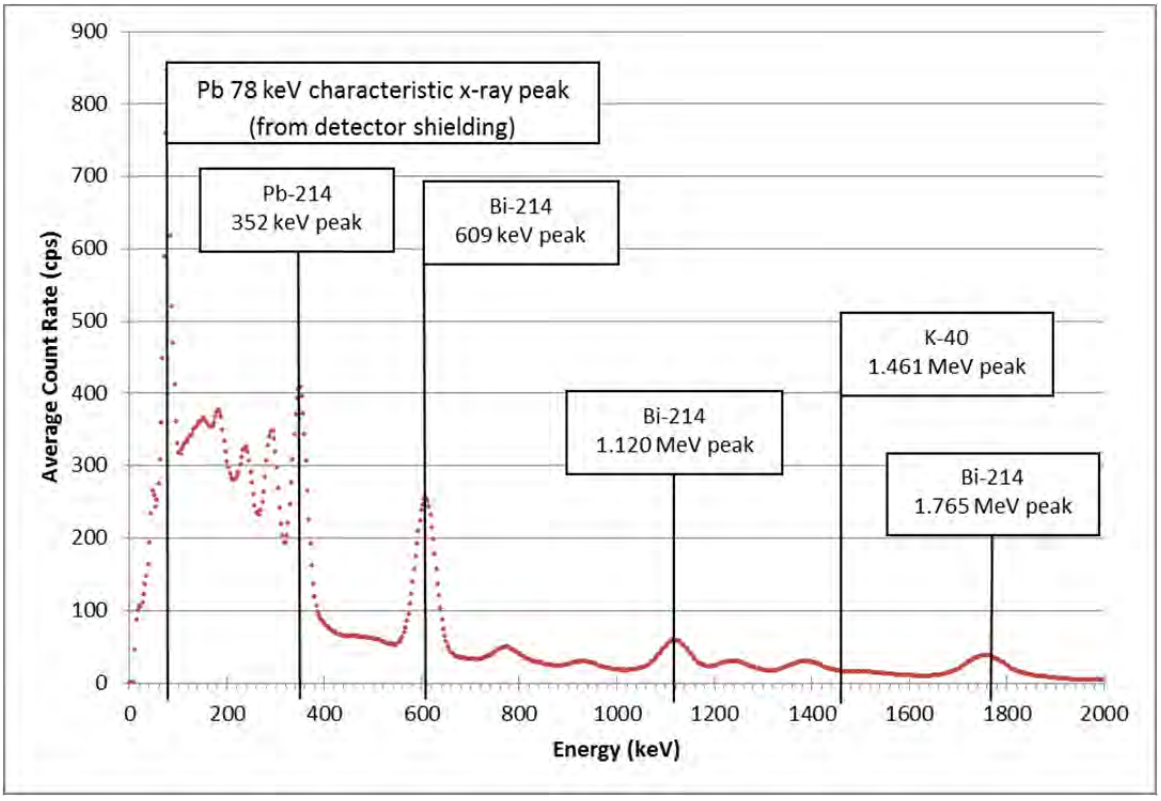
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 4.6 mR/Hr | Object Dose rate at 10 cm: 0.380 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.100 mR/Hr @ 30cm |

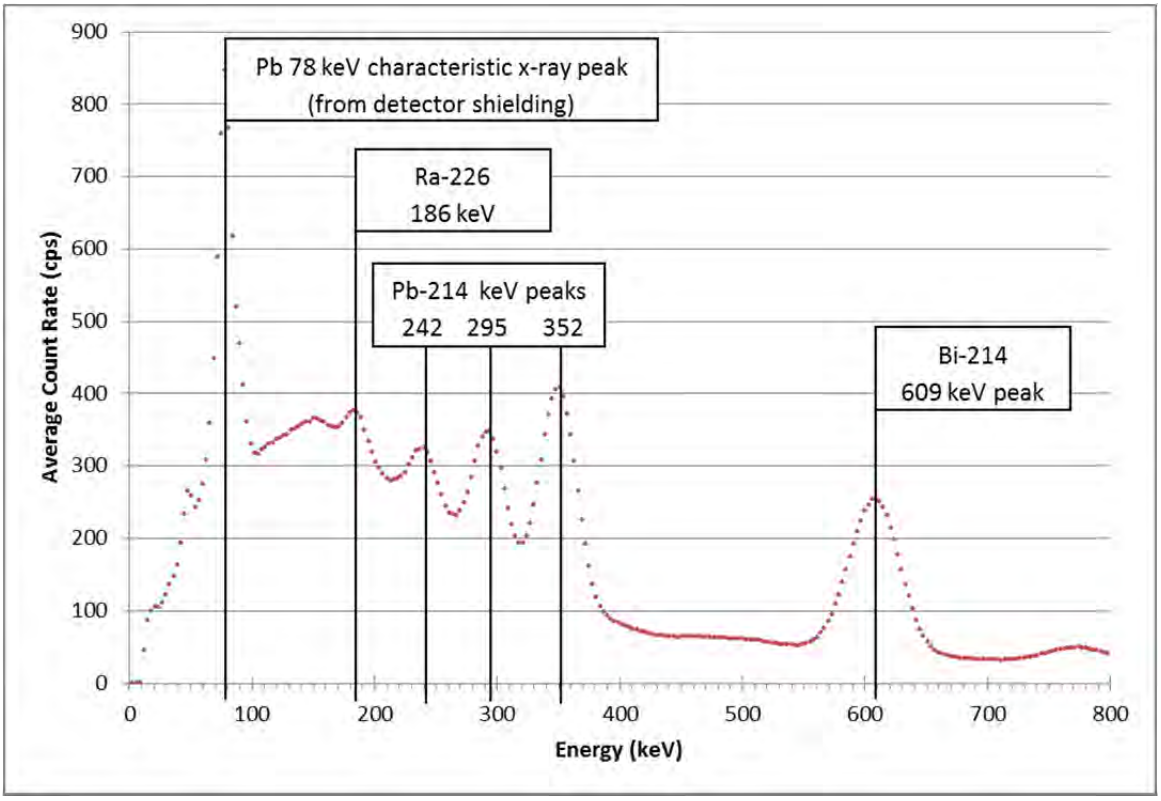
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.100 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 12.2 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-03 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 04 | 50.2 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

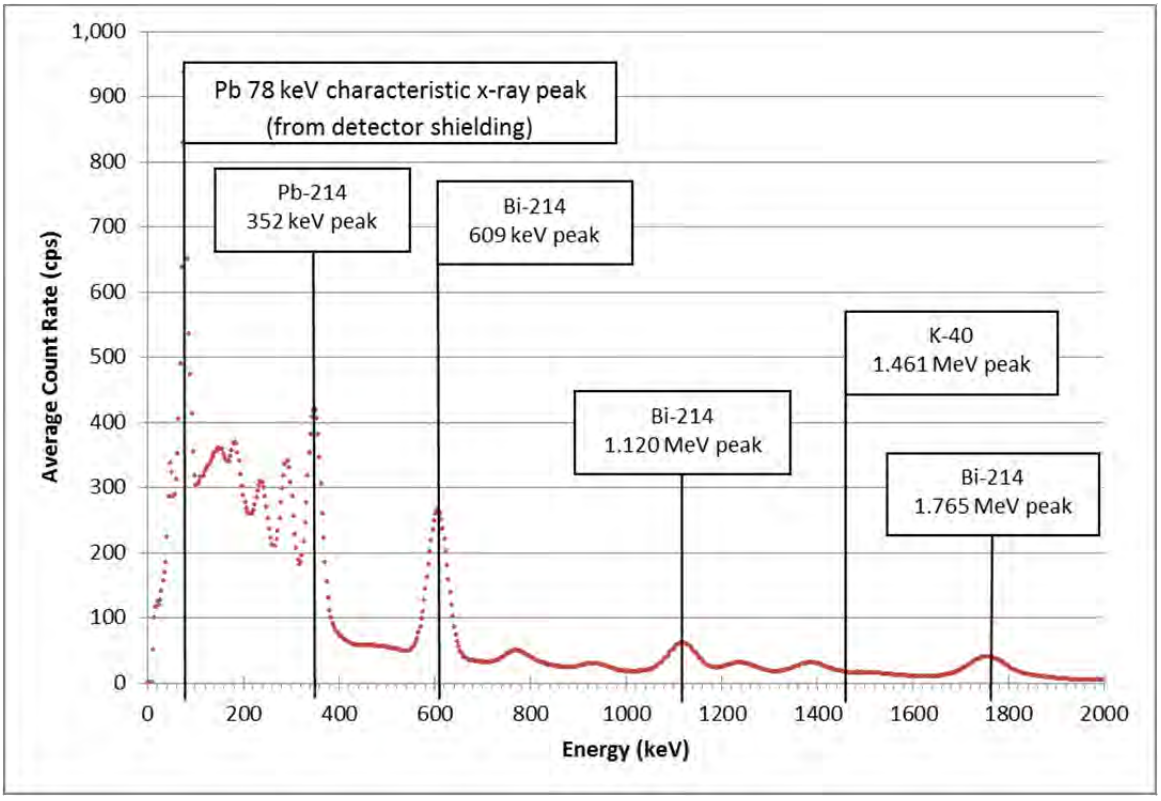
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 4.9 mR/Hr | Object Dose rate at 10 cm: 0.750 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.410 mR/Hr @ 30cm |

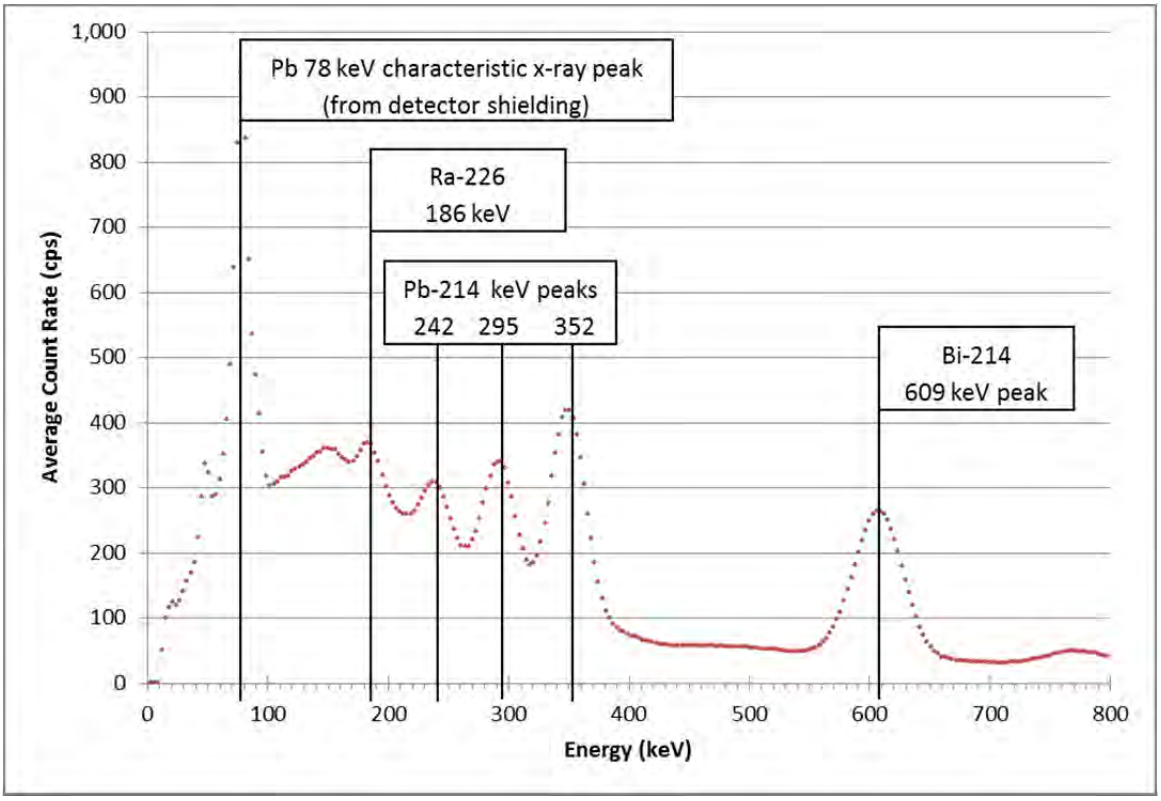
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.410 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 50.2 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: Jerry C Cooper | Date: 14 Mar 2016 |

**RO-04 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 05 | 7.3 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

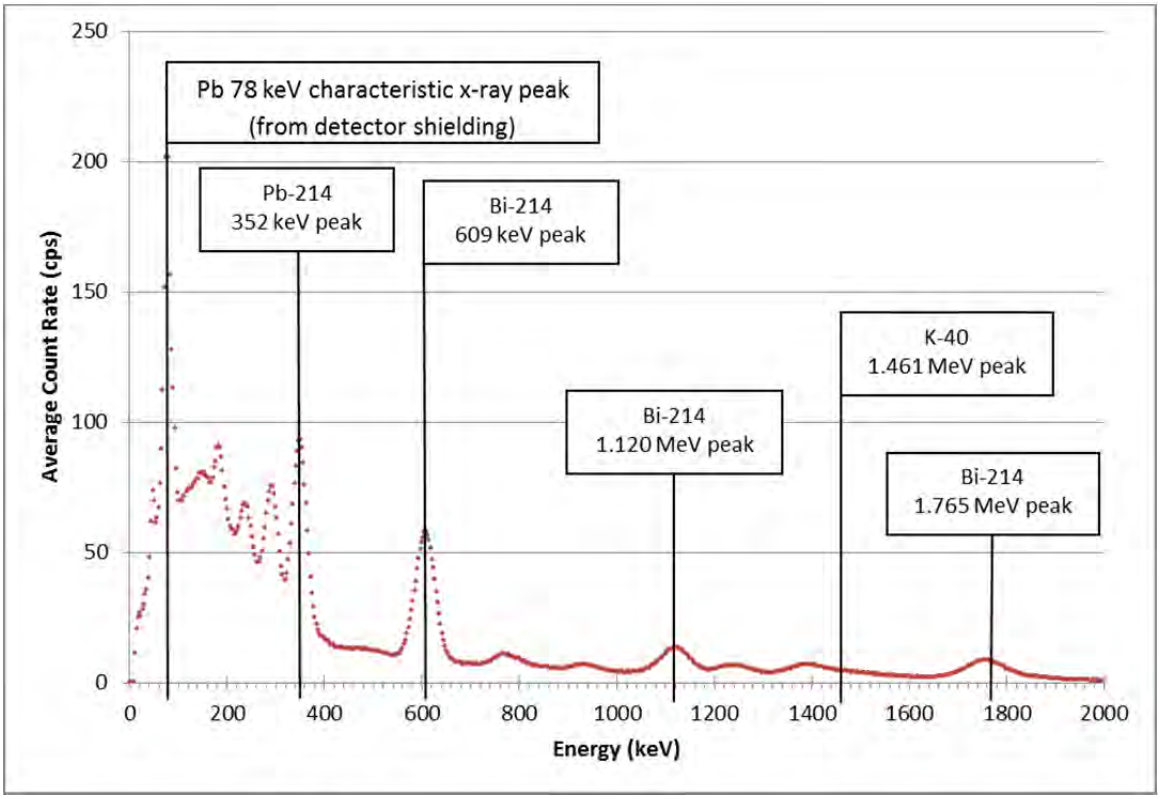
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 1.5 mR/Hr | Object Dose rate at 10 cm: 0.800 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.060 mR/Hr @ 30cm |

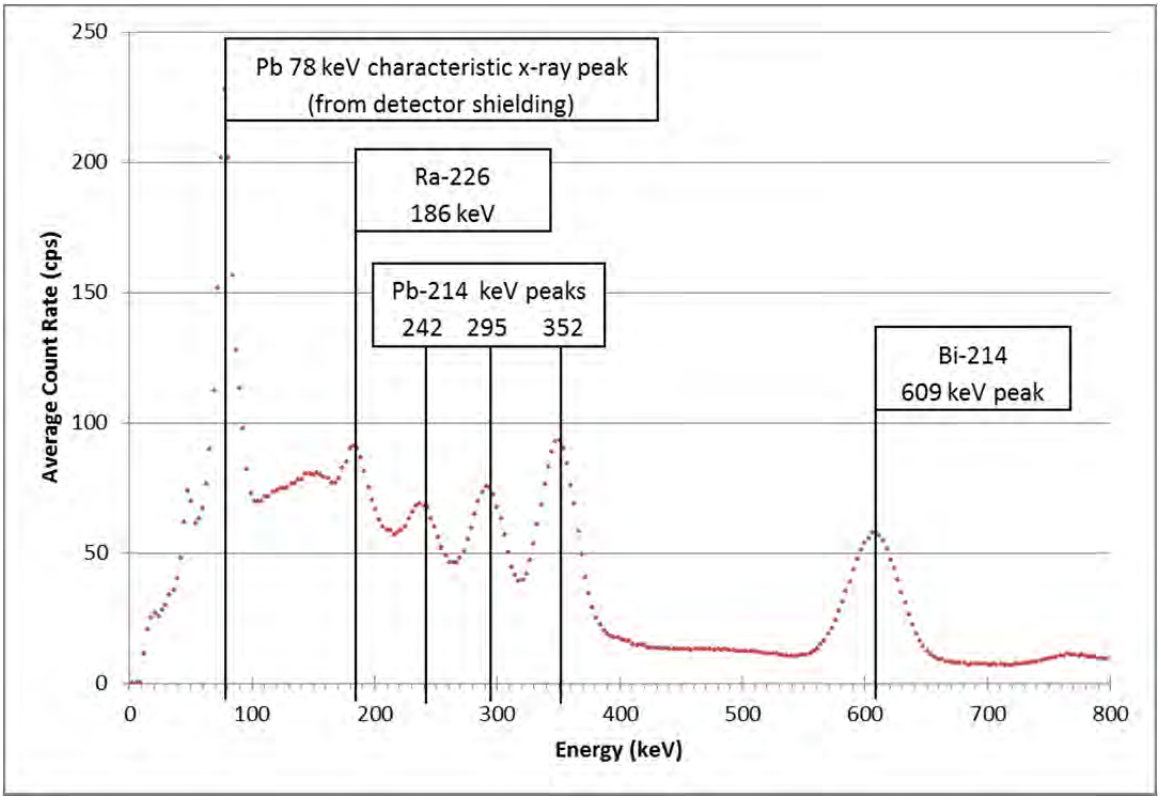
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.060 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 7.3 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-05 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 06 | 1.0 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

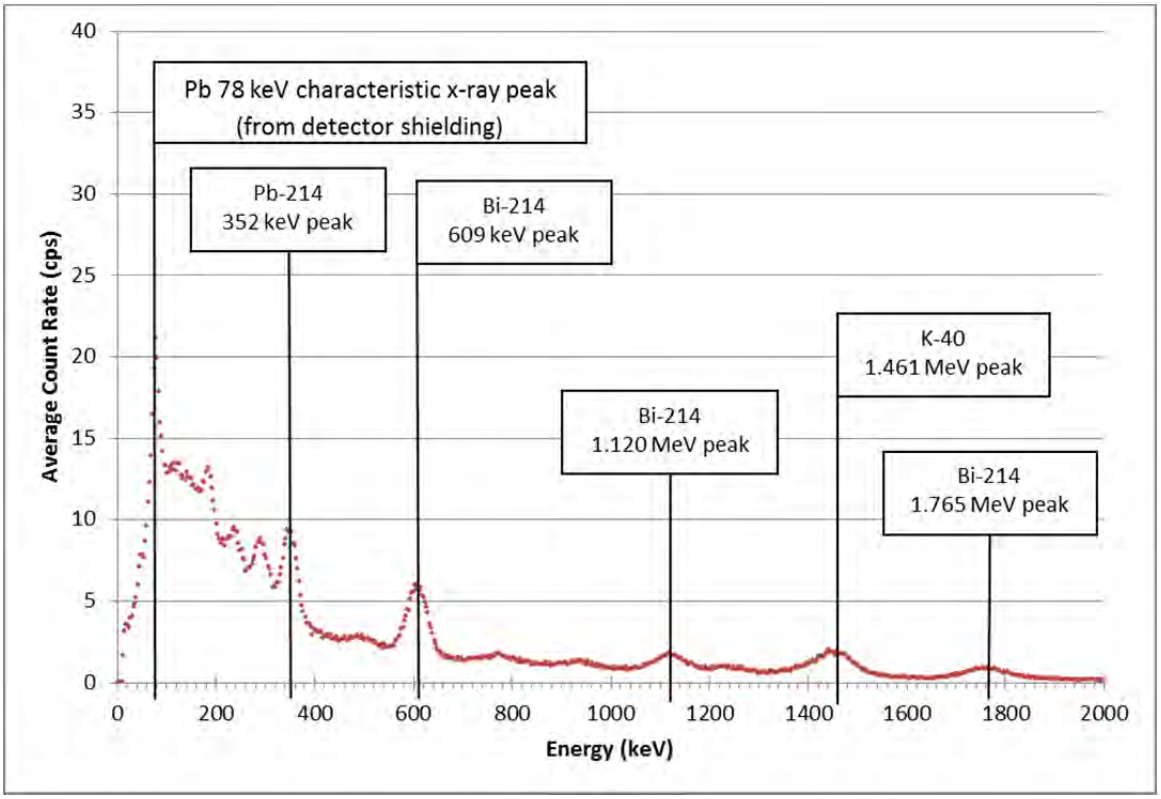
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.480 mR/Hr | Object Dose rate at 10 cm: 0.140 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.008 mR/Hr @ 13cm |

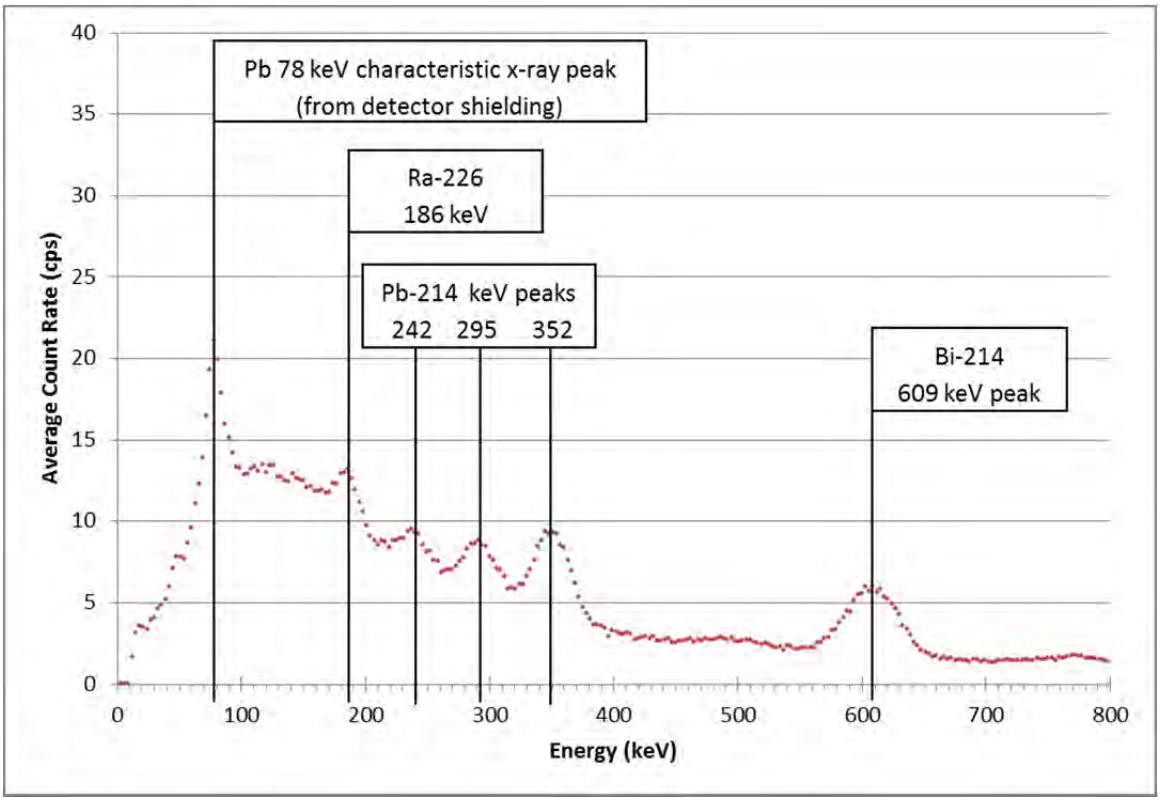
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.008 mR/Hr | Distance from Object: 13 cm | Calculated Activity: 1.0 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-06 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 07 | 0.2 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

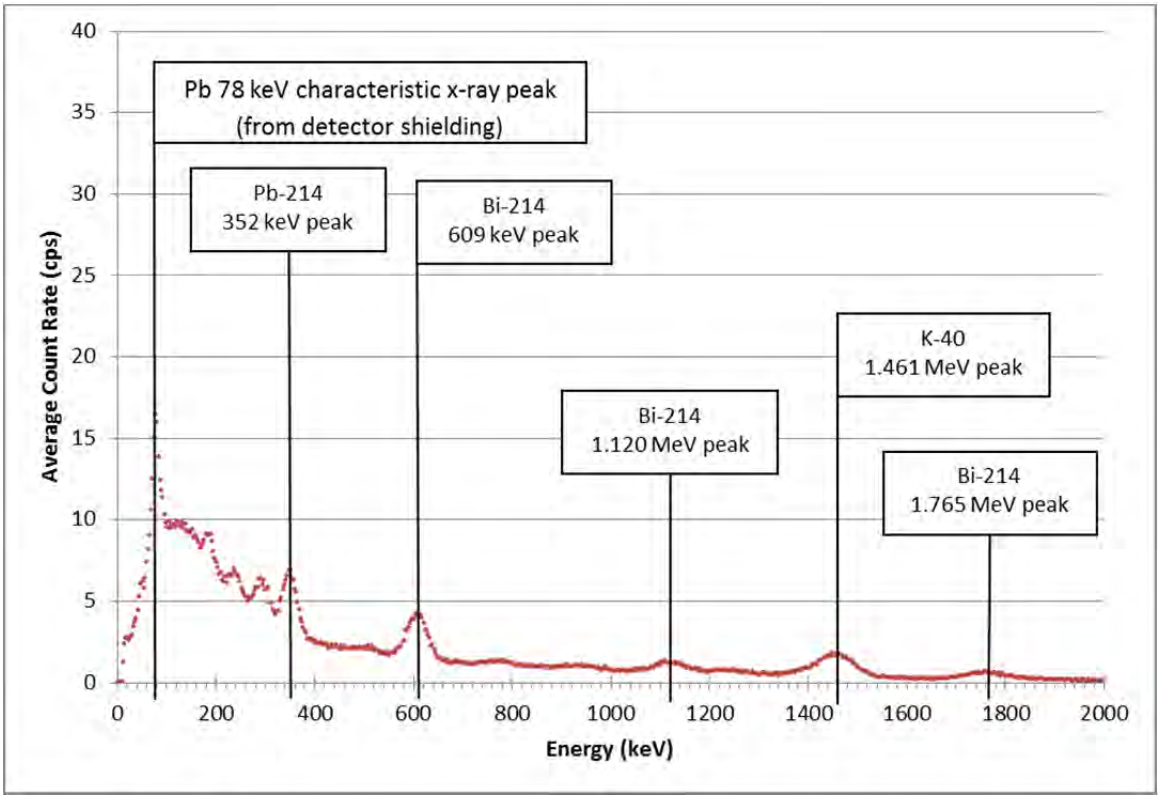
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.060 mR/Hr | Object Dose rate at 10 cm: 0.016 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.008 mR/Hr @ 13cm |

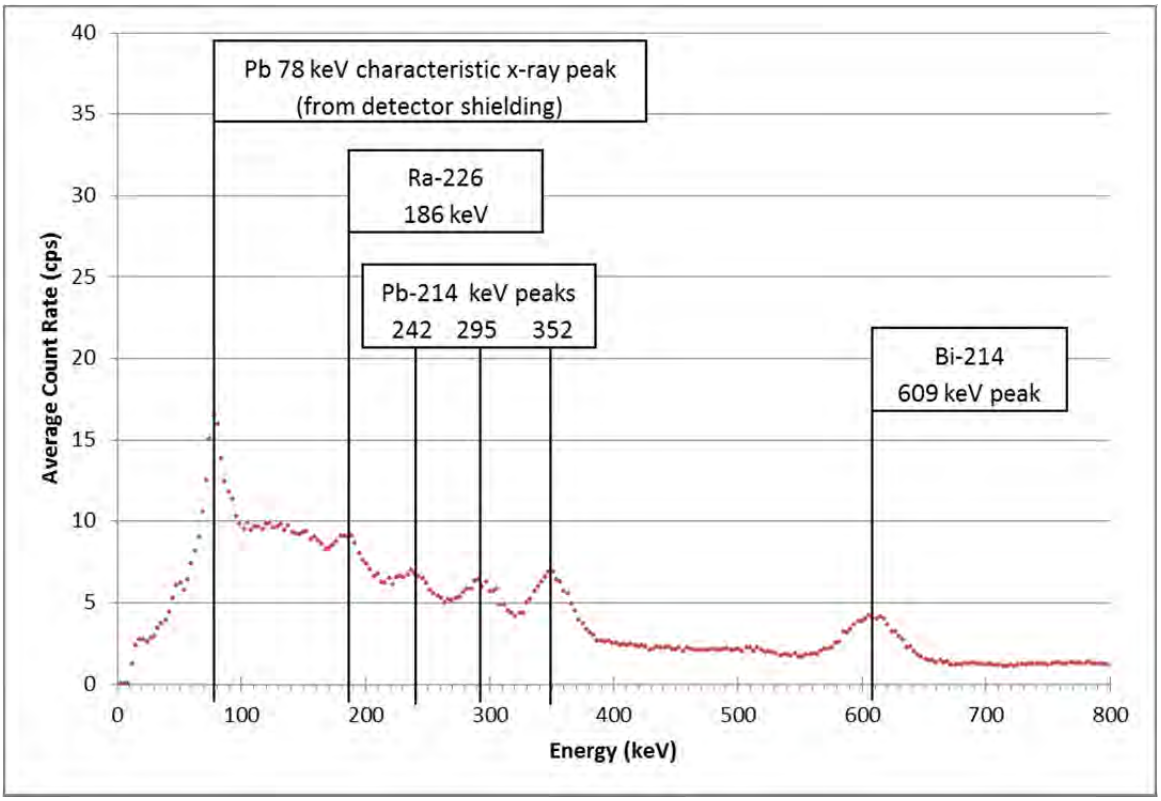
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.008 mR/Hr | Distance from Object: 13 cm | Calculated Activity: 0.2 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-07 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 08 | 9.8 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

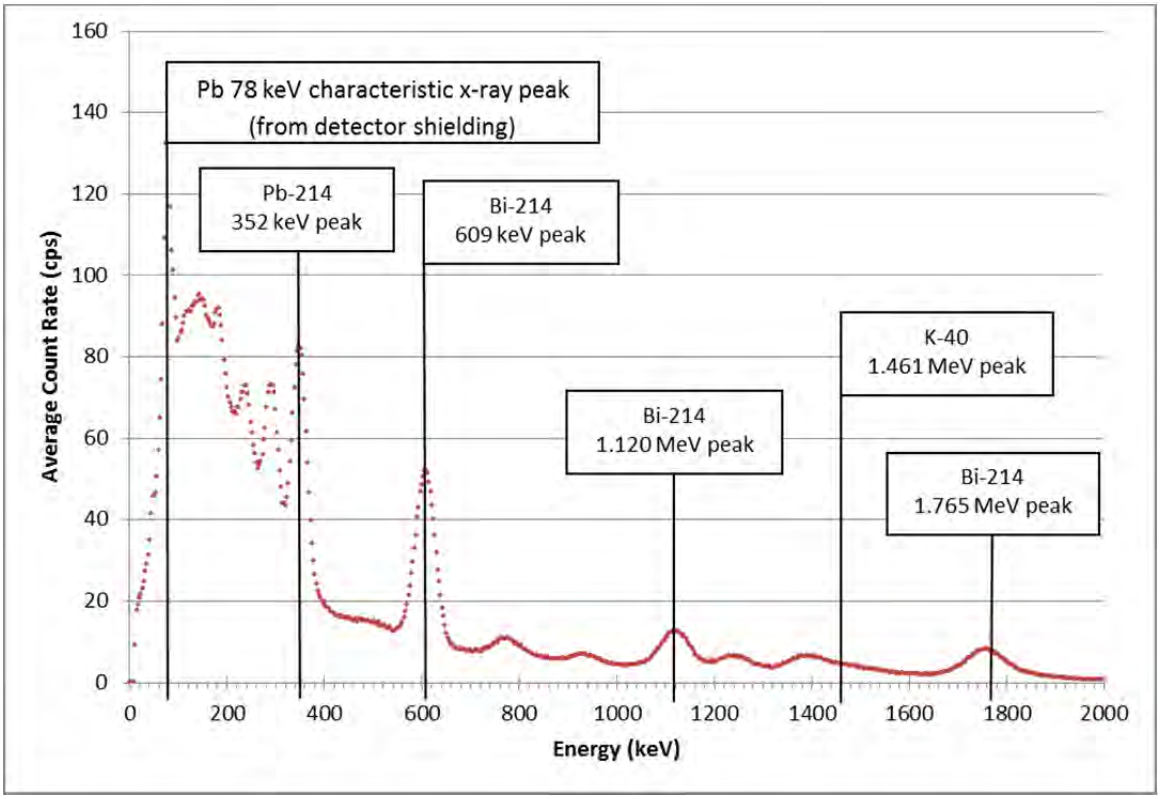
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.500 mR/Hr | Object Dose rate at 10 cm: 0.210 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.080 mR/Hr @ 30cm |

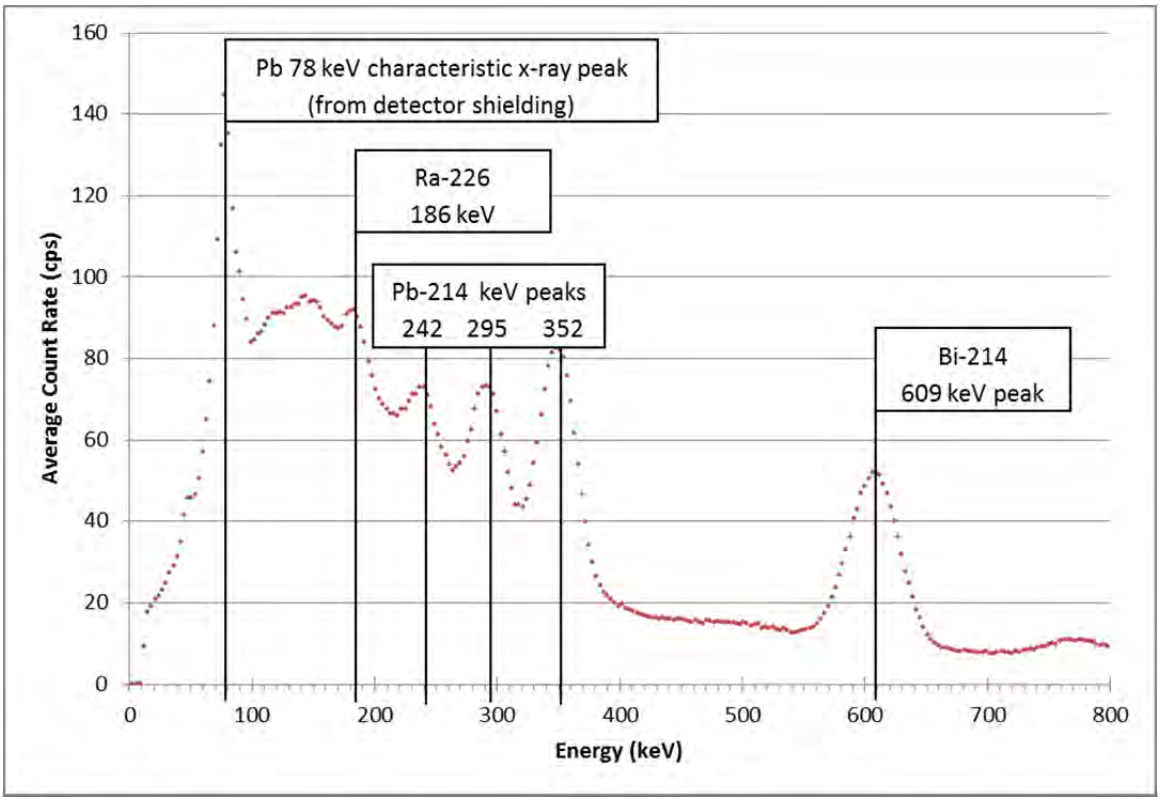
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.080 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 9.8 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-08 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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DCN: ITSI-0808-0004-0076, 8 May 2019

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# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 09 | 1.2 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.460 mR/Hr | Object Dose rate at 10 cm: 0.030 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.010 mR/Hr @ 30cm |

| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.010 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 1.2 µCi |

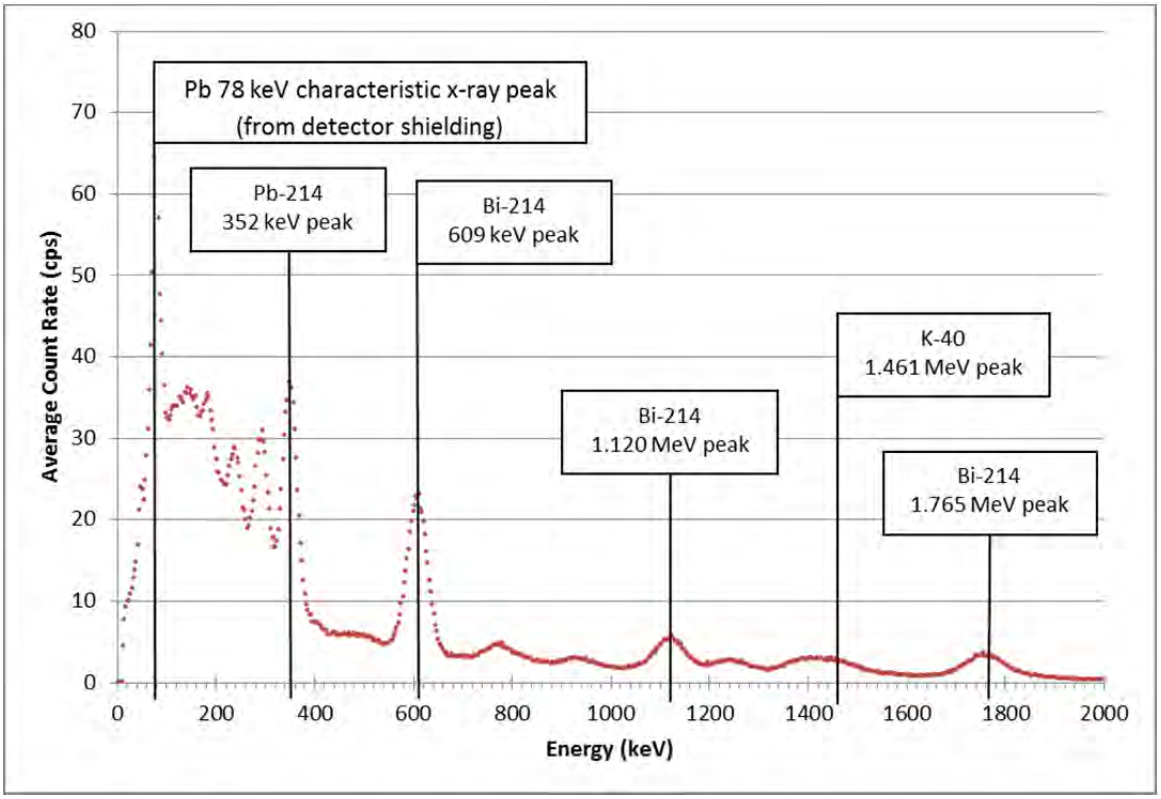
Comments/Additional Information:

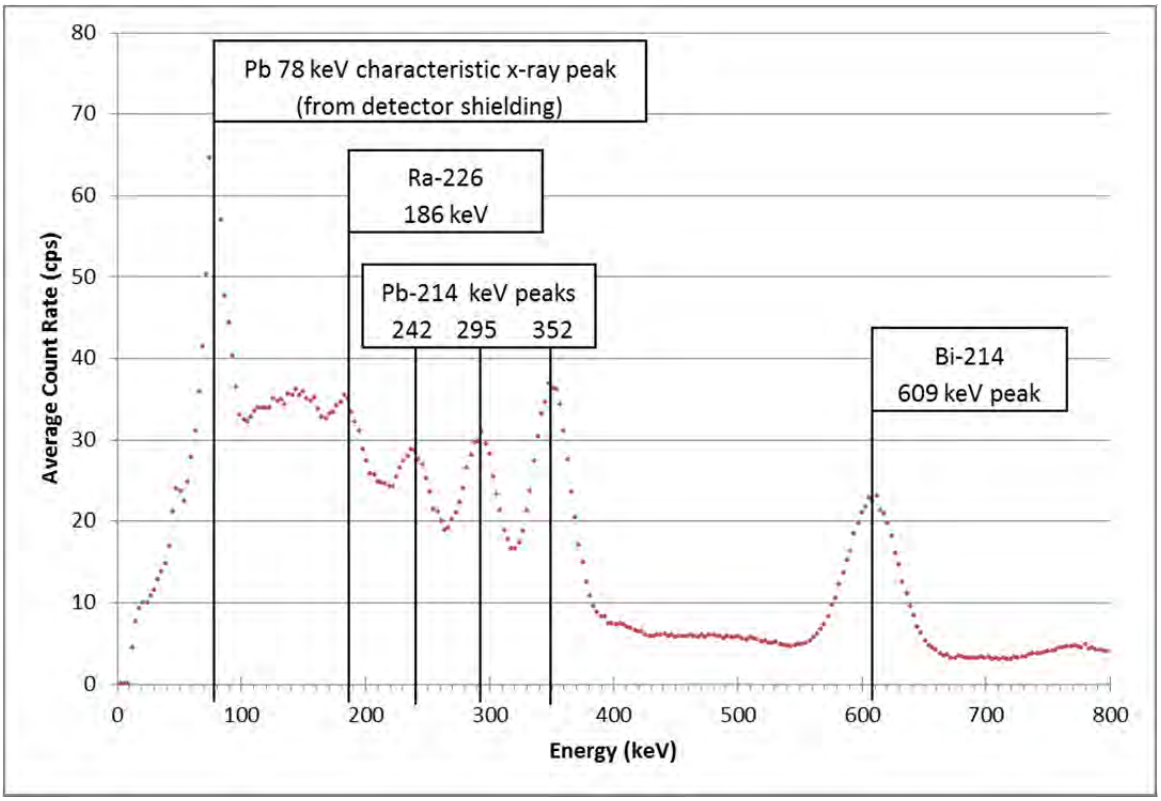
*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx)

| Completed by: | Title: | Signature: | Date: |
|---|---|---|---|
| Jerry C Cooper | Project CHP | Jerry C Cooper | 14 Mar 2016 |

**RO-09 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



DEVICE
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Office DEPOT

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DCN: ITSI-0808-0004-0076, 8 May 2019

Gilbane

# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 10 | 1.4 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

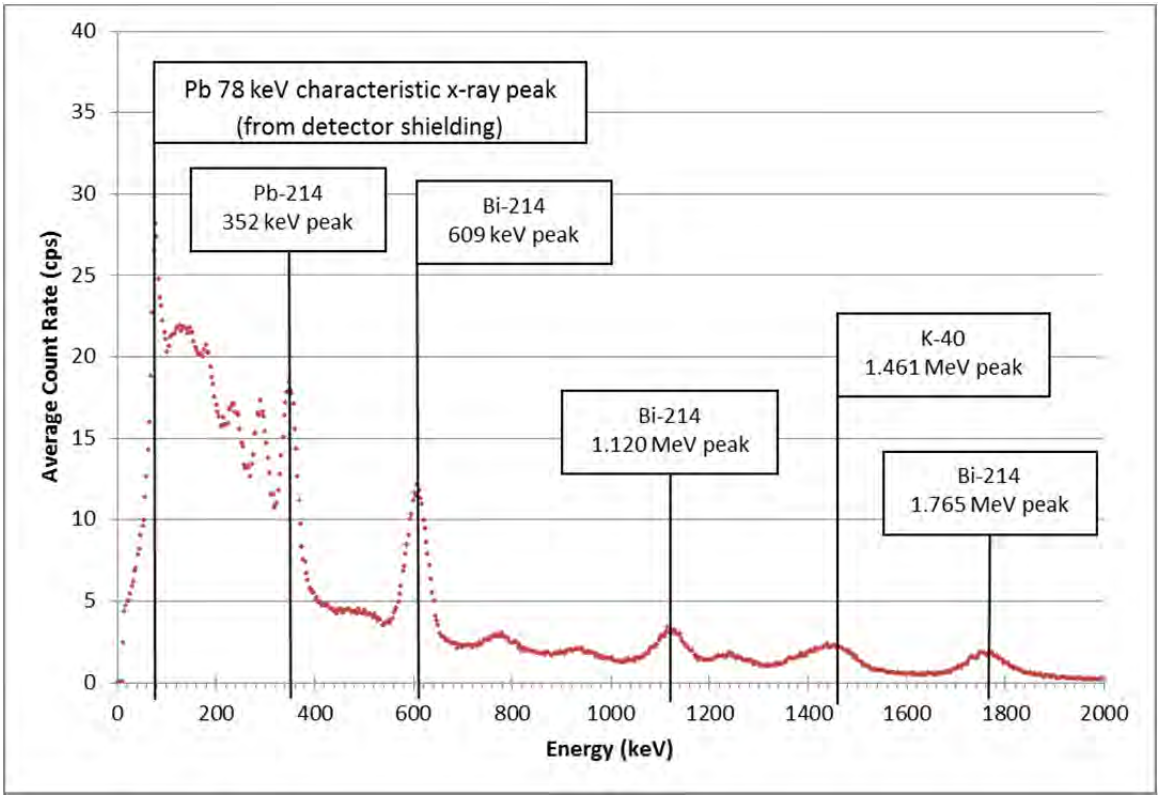
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.420 mR/Hr | Object Dose rate at 10 cm: 0.026 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.011 mR/Hr @ 30cm |

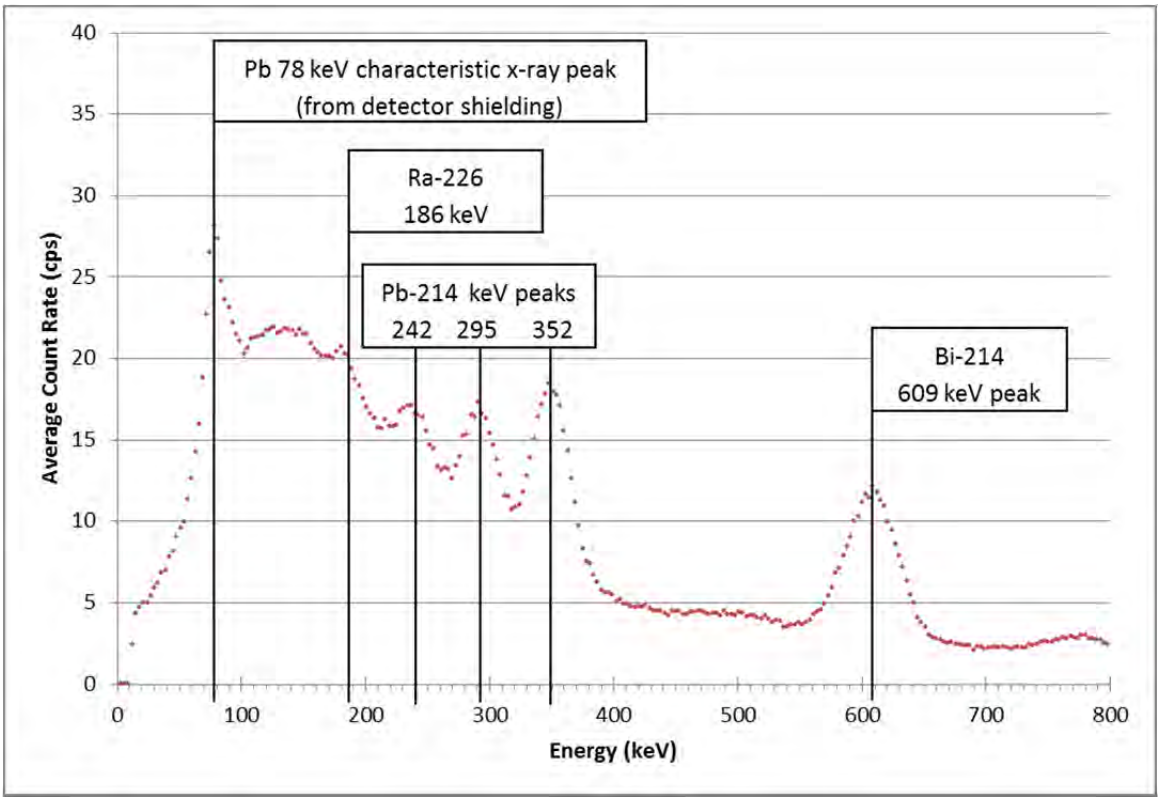
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.011 mR/Hr | Distance from Object: 30 cm | Calculated Activity: 1.4 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: Jerry C Cooper | Date: 14 Mar 2016 |

**RO-10 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



DEVICE
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Gilbane

# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 11 | 0.2 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

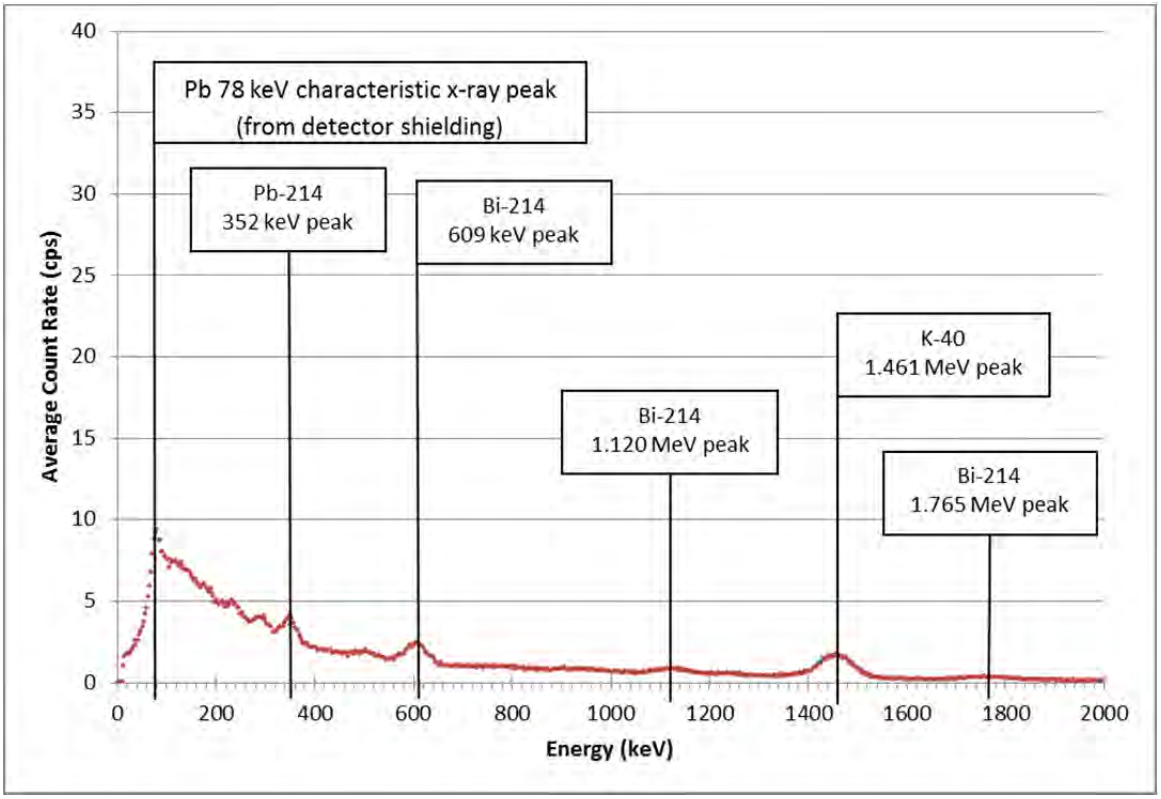
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.025 mR/Hr | Object Dose rate at 10 cm: 0.012 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.008 mR/Hr @ 13cm |

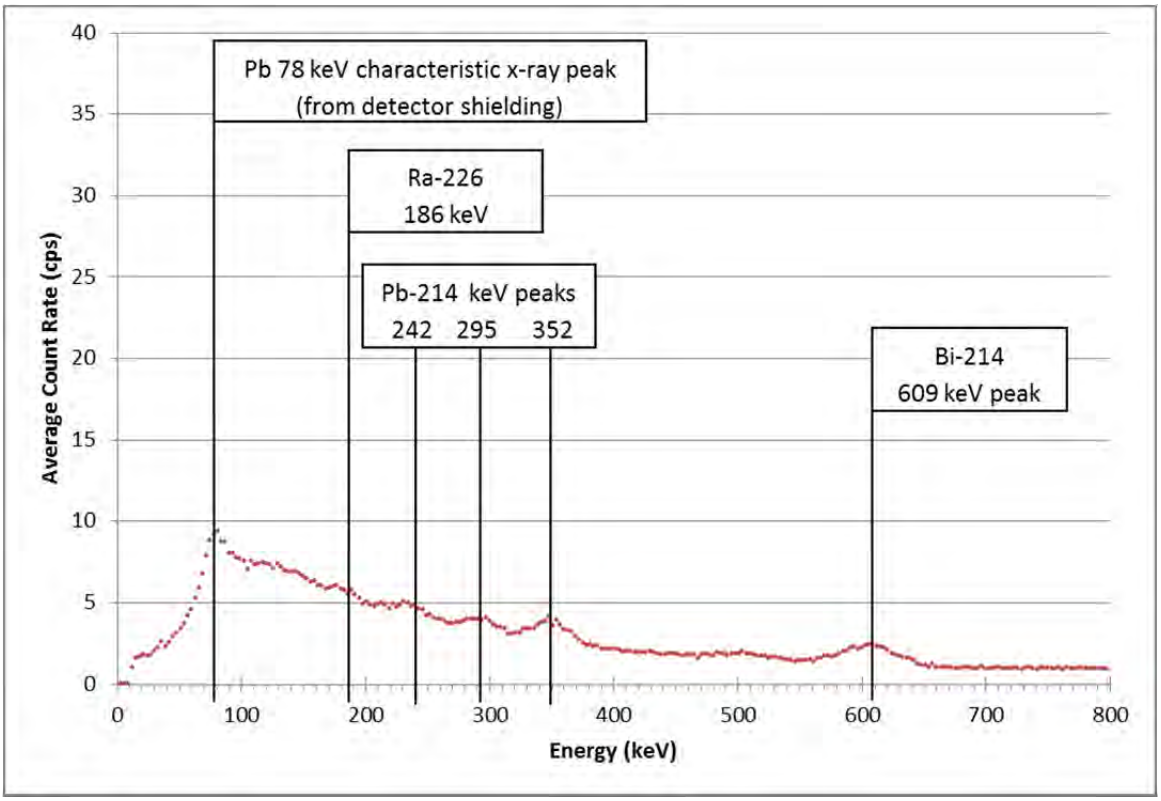
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.008 mR/Hr | Distance from Object: 13 cm | Calculated Activity: 0.2 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-11 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



DEVICE #11

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Gilbane

# RADIOACTIVE OBJECT DATA SHEET

| Object ID: | Estimated Activity*: |
|---|---|
| RO - 12 | 0.2 µCi |

| General Information | | |
|---|---|---|
| Contract Number / Task Order Number: N62473-10-D-0808 / 0004 | Project Title / Location: Parcel D1 Phase II / Hunters Point Naval Shipyard | Gilbane Project Number: J204000400 |
| Date/Time Recovered: | Location Where The Object Was Discovered: Parcel D1 *See Attached Map* | Survey Number: |
| Object Description:<br>Photo of object taken? ☒ Yes ☐ No | | |

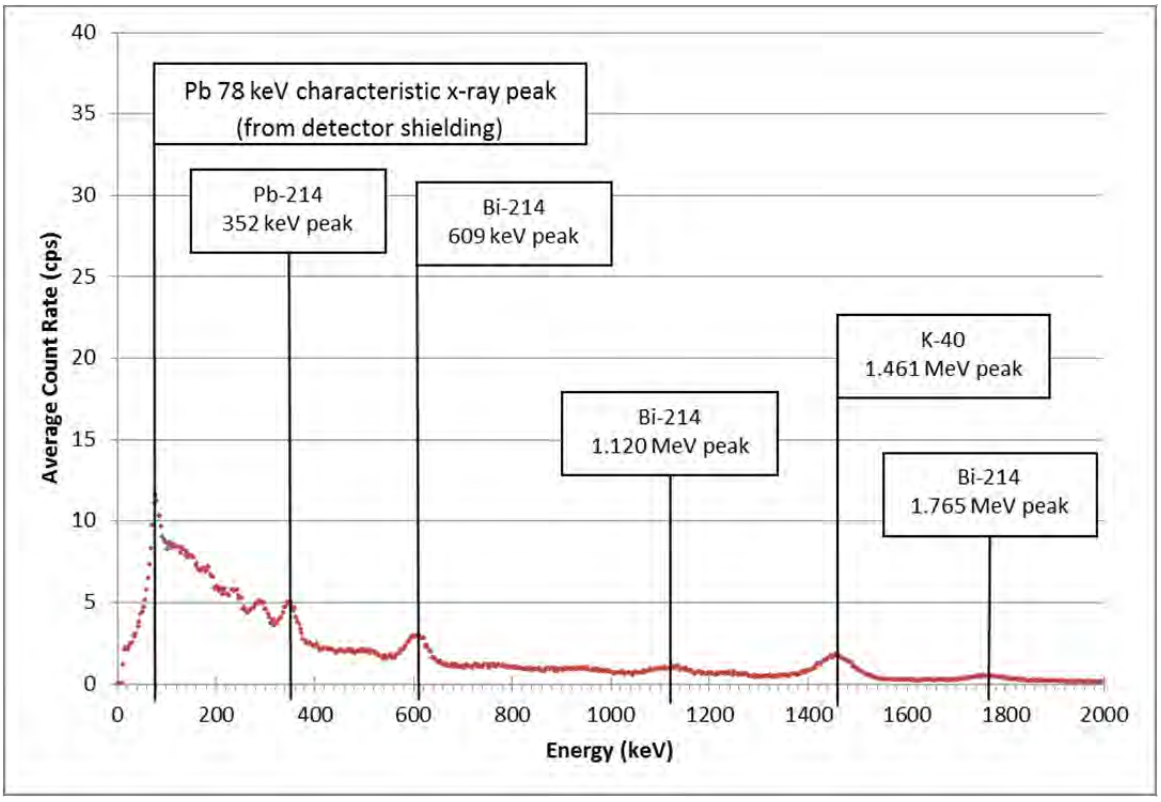
| Object Exposure Rates (mR/hr) | | |
|---|---|---|
| Object Dose rate on contact: 0.033 mR/Hr | Object Dose rate at 10 cm: 0.010 mR/Hr | Object Dose rate (>BKG) at greatest distance up to 30 cm: 0.008 mR/Hr @ 13cm |

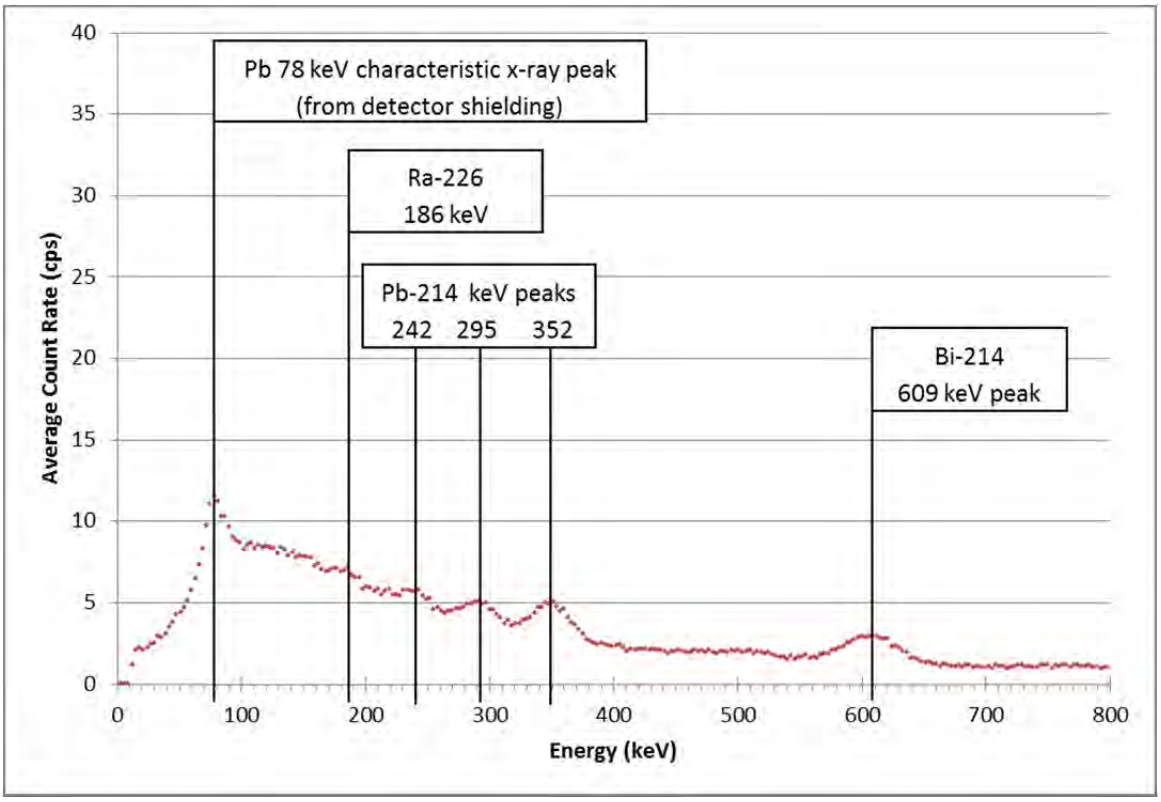
| Instrumentation | | |
|---|---|---|
| **Exposure Rate Meter** | | |
| ☒ Ludlum Model 19<br>☐ Other: | Serial Number: 314382<br>Date Calibrated: 7/9/2015 | Comments:<br>Depth: |

| Activity Calculation* | | | |
|---|---|---|---|
| Radionuclide: Ra-226 ☒<br>Sr-90 ☐ | Dose Rate: 0.008 mR/Hr | Distance from Object: 13 cm | Calculated Activity: 0.2 µCi |
| Comments/Additional Information:<br>*calculated using Rad Pro Calculator's dose-rate to activity calculator (http://www.radprocalculator.com/gamma.aspx) | | | |
| Completed by: Jerry C Cooper | Title: Project CHP | Signature: | Date: 14 Mar 2016 |

**RO-12 RS-700 Gamma Spectral Data Analysis**

Conclusion: object contains Ra-226



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# APPENDIX Q

# MAXIMUM RESRAD DOSE AND RISK W/INGESTION PATHWAYS OFF

# (Available Electronically)

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Summary : Survey Unit 04-PD-SB-14S (with Ingestion Pathways turned off)
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\SITE1.RAD

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: DCFPAK3.02 (Adult)

| Menu | Parameter | Current Value# | Base Case* | Parameter Name |
|---|---|---|---|---|
| A-1 | DCF's for external ground radiation, (mrem/yr)/(pCi/g) | | | |
| A-1 | At-218 (Source: DCFPAK3.02) | 5.567E-05 | 5.567E-05 | DCF1( 1) |
| A-1 | Ba-137m (Source: DCFPAK3.02) | 3.381E+00 | 3.381E+00 | DCF1( 2) |
| A-1 | Bi-210 (Source: DCFPAK3.02) | 5.473E-03 | 5.473E-03 | DCF1( 3) |
| A-1 | Bi-214 (Source: DCFPAK3.02) | 9.135E+00 | 9.135E+00 | DCF1( 4) |
| A-1 | Cs-137 (Source: DCFPAK3.02) | 8.686E-04 | 8.686E-04 | DCF1( 5) |
| A-1 | Hg-206 (Source: DCFPAK3.02) | 6.127E-01 | 6.127E-01 | DCF1( 6) |
| A-1 | Pb-210 (Source: DCFPAK3.02) | 2.092E-03 | 2.092E-03 | DCF1( 7) |
| A-1 | Pb-214 (Source: DCFPAK3.02) | 1.257E+00 | 1.257E+00 | DCF1( 8) |
| A-1 | Po-210 (Source: DCFPAK3.02) | 5.641E-05 | 5.641E-05 | DCF1( 9) |
| A-1 | Po-214 (Source: DCFPAK3.02) | 4.801E-04 | 4.801E-04 | DCF1( 10) |
| A-1 | Po-218 (Source: DCFPAK3.02) | 9.228E-09 | 9.228E-09 | DCF1( 11) |
| A-1 | Ra-226 (Source: DCFPAK3.02) | 3.176E-02 | 3.176E-02 | DCF1( 12) |
| A-1 | Rn-218 (Source: DCFPAK3.02) | 4.259E-03 | 4.259E-03 | DCF1( 13) |
| A-1 | Rn-222 (Source: DCFPAK3.02) | 2.130E-03 | 2.130E-03 | DCF1( 14) |
| A-1 | Sr-90 (Source: DCFPAK3.02) | 6.463E-04 | 6.463E-04 | DCF1( 15) |
| A-1 | Tl-206 (Source: DCFPAK3.02) | 1.278E-02 | 1.278E-02 | DCF1( 16) |
| A-1 | Tl-210 (Source: DCFPAK3.02) | 1.677E+01 | 1.677E+01 | DCF1( 17) |
| A-1 | Y-90 (Source: DCFPAK3.02) | 4.016E-02 | 4.016E-02 | DCF1( 18) |
| B-1 | Dose conversion factors for inhalation, mrem/pCi: | | | |
| B-1 | Cs-137+D | 1.457E-04 | 1.457E-04 | DCF2( 1) |
| B-1 | Pb-210+D | 3.708E-02 | 2.077E-02 | DCF2( 2) |
| B-1 | Ra-226+D | 3.528E-02 | 3.517E-02 | DCF2( 3) |
| B-1 | Sr-90+D | 5.841E-04 | 5.786E-04 | DCF2( 4) |
| D-1 | Dose conversion factors for ingestion, mrem/pCi: | | | |
| D-1 | Cs-137+D | 5.032E-05 | 5.032E-05 | DCF3( 1) |
| D-1 | Pb-210+D | 7.057E-03 | 2.575E-03 | DCF3( 2) |
| D-1 | Ra-226+D | 1.037E-03 | 1.036E-03 | DCF3( 3) |
| D-1 | Sr-90+D | 1.120E-04 | 1.021E-04 | DCF3( 4) |
| D-34 | Food transfer factors: | | | |
| D-34 | Cs-137+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF( 1,1) |
| D-34 | Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF( 1,2) |
| D-34 | Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF( 1,3) |
| D-34 | | | | |
| D-34 | Pb-210+D , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF( 2,1) |
| D-34 | Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-04 | 8.000E-04 | RTF( 2,2) |
| D-34 | Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF( 2,3) |
| D-34 | | | | |
| D-34 | Ra-226+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF( 3,1) |
| D-34 | Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF( 3,2) |
| D-34 | Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF( 3,3) |
| D-34 | | | | |
| D-34 | Sr-90+D , plant/soil concentration ratio, dimensionless | 3.000E-01 | 3.000E-01 | RTF( 4,1) |
| D-34 | Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF( 4,2) |
| D-34 | Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF( 4,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: DCFPAK3.02 (Adult)

| Menu | Parameter | Current Value# | Base Case* | Parameter Name |
|---|---|---|---|---|
| D-5 | Bioaccumulation factors, fresh water, L/kg: | | | |
| D-5 | Cs-137+D , fish | 2.000E+03 | 2.000E+03 | BIOFAC( 1,1) |
| D-5 | Cs-137+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC( 1,2) |
| D-5 | | | | |
| D-5 | Pb-210+D , fish | 3.000E+02 | 3.000E+02 | BIOFAC( 2,1) |
| D-5 | Pb-210+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC( 2,2) |
| D-5 | | | | |
| D-5 | Ra-226+D , fish | 5.000E+01 | 5.000E+01 | BIOFAC( 3,1) |
| D-5 | Ra-226+D , crustacea and mollusks | 2.500E+02 | 2.500E+02 | BIOFAC( 3,2) |
| D-5 | | | | |
| D-5 | Sr-90+D , fish | 6.000E+01 | 6.000E+01 | BIOFAC( 4,1) |
| D-5 | Sr-90+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC( 4,2) |

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R011 | Area of contaminated zone (m**2) | 1.000E+03 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | 2.000E+00 | 2.000E+00 | --- | THICK0 |
| R011 | Fraction of contamination that is submerged | 0.000E+00 | 0.000E+00 | --- | SUBMFRACT |
| R011 | Length parallel to aquifer flow (m) | not used | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | 2.500E+01 | 3.000E+01 | --- | BRDL |
| R011 | Time since placement of material (yr) | 0.000E+00 | 0.000E+00 | --- | TI |
| R011 | Times for calculations (yr) | 1.000E+00 | 1.000E+00 | --- | T( 2) |
| R011 | Times for calculations (yr) | 3.000E+00 | 3.000E+00 | --- | T( 3) |
| R011 | Times for calculations (yr) | 1.000E+01 | 1.000E+01 | --- | T( 4) |
| R011 | Times for calculations (yr) | 3.000E+01 | 3.000E+01 | --- | T( 5) |
| R011 | Times for calculations (yr) | 1.000E+02 | 1.000E+02 | --- | T( 6) |
| R011 | Times for calculations (yr) | 3.000E+02 | 3.000E+02 | --- | T( 7) |
| R011 | Times for calculations (yr) | 1.000E+03 | 1.000E+03 | --- | T( 8) |
| R011 | Times for calculations (yr) | not used | 0.000E+00 | --- | T( 9) |
| R011 | Times for calculations (yr) | not used | 0.000E+00 | --- | T(10) |
| R012 | Initial principal radionuclide (pCi/g): Cs-137 | 5.900E-02 | 0.000E+00 | --- | S1(1) |
| R012 | Initial principal radionuclide (pCi/g): Ra-226 | 9.400E-02 | 0.000E+00 | --- | S1(3) |
| R012 | Initial principal radionuclide (pCi/g): Sr-90 | 1.330E-01 | 0.000E+00 | --- | S1(4) |
| R012 | Concentration in groundwater (pCi/L): Cs-137 | not used | 0.000E+00 | --- | W1( 1) |
| R012 | Concentration in groundwater (pCi/L): Ra-226 | not used | 0.000E+00 | --- | W1( 3) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W1( 4) |
| R013 | Cover depth (m) | 0.000E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | not used | 1.500E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | not used | 1.000E-03 | --- | VCV |
| R013 | Density of contaminated zone (g/cm**3) | 1.500E+00 | 1.500E+00 | --- | DENSCZ |
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone field capacity | 2.000E-01 | 2.000E-01 | --- | FCCZ |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 1.000E+01 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 5.300E+00 | 5.300E+00 | --- | BCZ |
| R013 | Average annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R013 | Humidity in air (g/m**3) | not used | 8.000E+00 | --- | HUMID |
| R013 | Evapotranspiration coefficient | 5.000E-01 | 5.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| R013 | Irrigation (m/yr) | 2.000E-01 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| R013 | Watershed area for nearby stream or pond (m**2) | not used | 1.000E+06 | --- | WAREA |
| R013 | Accuracy for water/soil computations | not used | 1.000E-03 | --- | EPS |
| R014 | Density of saturated zone (g/cm**3) | not used | 1.500E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | not used | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | not used | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone field capacity | not used | 2.000E-01 | --- | FCSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | not used | 1.000E+02 | --- | HCSZ |
| R014 | Saturated zone hydraulic gradient | not used | 2.000E-02 | --- | HGWT |
| R014 | Saturated zone b parameter | not used | 5.300E+00 | --- | BSZ |
| R014 | Water table drop rate (m/yr) | not used | 1.000E-03 | --- | VWT |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R014 | Well pump intake depth (m below water table) | not used | 1.000E+01 | --- | DWIBWT |
| R014 | Model: Nondispersion (ND) or Mass-Balance (MB) | not used | ND | --- | MODEL |
| R014 | Well pumping rate (m**3/yr) | not used | 2.500E+02 | --- | UW |
| | | | | | |
| R015 | Number of unsaturated zone strata | not used | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | not used | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | not used | 1.500E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | not used | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | not used | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, field capacity | not used | 2.000E-01 | --- | FCUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | not used | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | not used | 1.000E+01 | --- | HCUZ(1) |
| | | | | | |
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.600E+03 | 4.600E+03 | --- | DCNUCC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | not used | 4.600E+03 | --- | DCNUCU( 1,1) |
| R016 | Saturated zone (cm**3/g) | not used | 4.600E+03 | --- | DCNUCS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.623E-05 | ALEACH( 1) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 1) |
| | | | | | |
| R016 | Distribution coefficients for Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCNUCC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | not used | 7.000E+01 | --- | DCNUCU( 3,1) |
| R016 | Saturated zone (cm**3/g) | not used | 7.000E+01 | --- | DCNUCS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.374E-03 | ALEACH( 3) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 3) |
| | | | | | |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCNUCC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | not used | 3.000E+01 | --- | DCNUCU( 4,1) |
| R016 | Saturated zone (cm**3/g) | not used | 3.000E+01 | --- | DCNUCS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.516E-03 | ALEACH( 4) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 4) |
| | | | | | |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCNUCC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | not used | 1.000E+02 | --- | DCNUCU( 2,1) |
| R016 | Saturated zone (cm**3/g) | not used | 1.000E+02 | --- | DCNUCS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.663E-03 | ALEACH( 2) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 2) |
| | | | | | |
| R017 | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| R017 | Mass loading for inhalation (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLINH |
| R017 | Exposure duration | 3.000E+01 | 3.000E+01 | --- | ED |
| R017 | Shielding factor, inhalation | 4.000E-01 | 4.000E-01 | --- | SHF3 |
| R017 | Shielding factor, external gamma | 7.000E-01 | 7.000E-01 | --- | SHF1 |
| R017 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R017 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R017 | Shape factor flag, external gamma | 1.000E+00 | 1.000E+00 | >0 shows circular AREA. | FS |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R017 | Radii of shape factor array (used if FS = -1): | | | | |
| R017 | Outer annular radius (m), ring 1: | not used | 5.000E+01 | --- | RAD_SHAPE( 1) |
| R017 | Outer annular radius (m), ring 2: | not used | 7.071E+01 | --- | RAD_SHAPE( 2) |
| R017 | Outer annular radius (m), ring 3: | not used | 0.000E+00 | --- | RAD_SHAPE( 3) |
| R017 | Outer annular radius (m), ring 4: | not used | 0.000E+00 | --- | RAD_SHAPE( 4) |
| R017 | Outer annular radius (m), ring 5: | not used | 0.000E+00 | --- | RAD_SHAPE( 5) |
| R017 | Outer annular radius (m), ring 6: | not used | 0.000E+00 | --- | RAD_SHAPE( 6) |
| R017 | Outer annular radius (m), ring 7: | not used | 0.000E+00 | --- | RAD_SHAPE( 7) |
| R017 | Outer annular radius (m), ring 8: | not used | 0.000E+00 | --- | RAD_SHAPE( 8) |
| R017 | Outer annular radius (m), ring 9: | not used | 0.000E+00 | --- | RAD_SHAPE( 9) |
| R017 | Outer annular radius (m), ring 10: | not used | 0.000E+00 | --- | RAD_SHAPE(10) |
| R017 | Outer annular radius (m), ring 11: | not used | 0.000E+00 | --- | RAD_SHAPE(11) |
| R017 | Outer annular radius (m), ring 12: | not used | 0.000E+00 | --- | RAD_SHAPE(12) |
| R017 | Fractions of annular areas within AREA: | | | | |
| R017 | Ring 1 | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Ring 2 | not used | 2.732E-01 | --- | FRACA( 2) |
| R017 | Ring 3 | not used | 0.000E+00 | --- | FRACA( 3) |
| R017 | Ring 4 | not used | 0.000E+00 | --- | FRACA( 4) |
| R017 | Ring 5 | not used | 0.000E+00 | --- | FRACA( 5) |
| R017 | Ring 6 | not used | 0.000E+00 | --- | FRACA( 6) |
| R017 | Ring 7 | not used | 0.000E+00 | --- | FRACA( 7) |
| R017 | Ring 8 | not used | 0.000E+00 | --- | FRACA( 8) |
| R017 | Ring 9 | not used | 0.000E+00 | --- | FRACA( 9) |
| R017 | Ring 10 | not used | 0.000E+00 | --- | FRACA(10) |
| R017 | Ring 11 | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Ring 12 | not used | 0.000E+00 | --- | FRACA(12) |
| R018 | Fruits, vegetables and grain consumption (kg/yr) | not used | 1.600E+02 | --- | DIET(1) |
| R018 | Leafy vegetable consumption (kg/yr) | not used | 1.400E+01 | --- | DIET(2) |
| R018 | Milk consumption (L/yr) | not used | 9.200E+01 | --- | DIET(3) |
| R018 | Meat and poultry consumption (kg/yr) | not used | 6.300E+01 | --- | DIET(4) |
| R018 | Fish consumption (kg/yr) | not used | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | not used | 9.000E-01 | --- | DIET(6) |
| R018 | Soil ingestion rate (g/yr) | 3.650E+01 | 3.650E+01 | --- | SOIL |
| R018 | Drinking water intake (L/yr) | not used | 5.100E+02 | --- | DWI |
| R018 | Contamination fraction of drinking water | not used | 1.000E+00 | --- | FDW |
| R018 | Contamination fraction of household water | not used | 1.000E+00 | --- | FHHW |
| R018 | Contamination fraction of livestock water | not used | 1.000E+00 | --- | FLW |
| R018 | Contamination fraction of irrigation water | not used | 1.000E+00 | --- | FIRW |
| R018 | Contamination fraction of aquatic food | not used | 5.000E-01 | --- | FR9 |
| R018 | Contamination fraction of plant food | not used | -1 | --- | FPLANT |
| R018 | Contamination fraction of meat | not used | -1 | --- | FMEAT |
| R018 | Contamination fraction of milk | not used | -1 | --- | FMILK |
| R019 | Livestock fodder intake for meat (kg/day) | not used | 6.800E+01 | --- | LFI5 |
| R019 | Livestock fodder intake for milk (kg/day) | not used | 5.500E+01 | --- | LFI6 |
| R019 | Livestock water intake for meat (L/day) | not used | 5.000E+01 | --- | LWI5 |
| R019 | Livestock water intake for milk (L/day) | not used | 1.600E+02 | --- | LWI6 |
| R019 | Livestock soil intake (kg/day) | not used | 5.000E-01 | --- | LSI |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R019 | Mass loading for foliar deposition (g/m**3) | not used | 1.000E-04 | --- | MLFD |
| R019 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| R019 | Depth of roots (m) | not used | 9.000E-01 | --- | DROOT |
| R019 | Drinking water fraction from ground water | not used | 1.000E+00 | --- | FGWDW |
| R019 | Household water fraction from ground water | not used | 1.000E+00 | --- | FGWHH |
| R019 | Livestock water fraction from ground water | not used | 1.000E+00 | --- | FGWLW |
| R019 | Irrigation fraction from ground water | not used | 1.000E+00 | --- | FGWIR |
| | | | | | |
| R19B | Wet weight crop yield for Non-Leafy (kg/m**2) | not used | 7.000E-01 | --- | YV(1) |
| R19B | Wet weight crop yield for Leafy (kg/m**2) | not used | 1.500E+00 | --- | YV(2) |
| R19B | Wet weight crop yield for Fodder (kg/m**2) | not used | 1.100E+00 | --- | YV(3) |
| R19B | Growing Season for Non-Leafy (years) | not used | 1.700E-01 | --- | TE(1) |
| R19B | Growing Season for Leafy (years) | not used | 2.500E-01 | --- | TE(2) |
| R19B | Growing Season for Fodder (years) | not used | 8.000E-02 | --- | TE(3) |
| R19B | Translocation Factor for Non-Leafy | not used | 1.000E-01 | --- | TIV(1) |
| R19B | Translocation Factor for Leafy | not used | 1.000E+00 | --- | TIV(2) |
| R19B | Translocation Factor for Fodder | not used | 1.000E+00 | --- | TIV(3) |
| R19B | Dry Foliar Interception Fraction for Non-Leafy | not used | 2.500E-01 | --- | RDRY(1) |
| R19B | Dry Foliar Interception Fraction for Leafy | not used | 2.500E-01 | --- | RDRY(2) |
| R19B | Dry Foliar Interception Fraction for Fodder | not used | 2.500E-01 | --- | RDRY(3) |
| R19B | Wet Foliar Interception Fraction for Non-Leafy | not used | 2.500E-01 | --- | RWET(1) |
| R19B | Wet Foliar Interception Fraction for Leafy | not used | 2.500E-01 | --- | RWET(2) |
| R19B | Wet Foliar Interception Fraction for Fodder | not used | 2.500E-01 | --- | RWET(3) |
| R19B | Weathering Removal Constant for Vegetation | not used | 2.000E+01 | --- | WLAM |
| | | | | | |
| C14 | C-12 concentration in water (g/cm**3) | not used | 2.000E-05 | --- | C12WTR |
| C14 | C-12 concentration in contaminated soil (g/g) | not used | 3.000E-02 | --- | C12CZ |
| C14 | Fraction of vegetation carbon from soil | not used | 2.000E-02 | --- | CSOIL |
| C14 | Fraction of vegetation carbon from air | not used | 9.800E-01 | --- | CAIR |
| C14 | C-14 evasion layer thickness in soil (m) | not used | 3.000E-01 | --- | DMC |
| C14 | C-14 evasion flux rate from soil (1/sec) | not used | 7.000E-07 | --- | EVSN |
| C14 | C-12 evasion flux rate from soil (1/sec) | not used | 1.000E-10 | --- | REVSN |
| C14 | Fraction of grain in beef cattle feed | not used | 8.000E-01 | --- | AVFG4 |
| C14 | Fraction of grain in milk cow feed | not used | 2.000E-01 | --- | AVFG5 |
| | | | | | |
| STOR | Storage times of contaminated foodstuffs (days): | | | | |
| STOR | Fruits, non-leafy vegetables, and grain | 1.400E+01 | 1.400E+01 | --- | STOR_T(1) |
| STOR | Leafy vegetables | 1.000E+00 | 1.000E+00 | --- | STOR_T(2) |
| STOR | Milk | 1.000E+00 | 1.000E+00 | --- | STOR_T(3) |
| STOR | Meat and poultry | 2.000E+01 | 2.000E+01 | --- | STOR_T(4) |
| STOR | Fish | 7.000E+00 | 7.000E+00 | --- | STOR_T(5) |
| STOR | Crustacea and mollusks | 7.000E+00 | 7.000E+00 | --- | STOR_T(6) |
| STOR | Well water | 1.000E+00 | 1.000E+00 | --- | STOR_T(7) |
| STOR | Surface water | 1.000E+00 | 1.000E+00 | --- | STOR_T(8) |
| STOR | Livestock fodder | 4.500E+01 | 4.500E+01 | --- | STOR_T(9) |
| | | | | | |
| R021 | Thickness of building foundation (m) | not used | 1.500E-01 | --- | FLOOR1 |
| R021 | Bulk density of building foundation (g/cm**3) | not used | 2.400E+00 | --- | DENSFL |
| R021 | Total porosity of the cover material | not used | 4.000E-01 | --- | TPCV |
| R021 | Total porosity of the building foundation | not used | 1.000E-01 | --- | TPFL |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R021 | Volumetric water content of the cover material | not used | 5.000E-02 | --- | PH2OCV |
| R021 | Volumetric water content of the foundation | not used | 3.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | not used | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | not used | 3.000E-07 | --- | DIFFL |
| R021 | in contaminated zone soil | not used | 2.000E-06 | --- | DIFCZ |
| R021 | Radon vertical dimension of mixing (m) | not used | 2.000E+00 | --- | HMIX |
| R021 | Average building air exchange rate (1/hr) | not used | 5.000E-01 | --- | REXG |
| R021 | Height of the building (room) (m) | not used | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | not used | 0.000E+00 | --- | FAI |
| R021 | Building depth below ground surface (m) | not used | -1.000E+00 | --- | DMFL |
| R021 | Emanating power of Rn-222 gas | not used | 2.500E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | not used | 1.500E-01 | --- | EMANA(2) |
| TITL | Number of graphical time points | 32 | --- | --- | NPTS |
| TITL | Maximum number of integration points for dose | 17 | --- | --- | LYMAX |
| TITL | Maximum number of integration points for risk | 257 | --- | --- | KYMAX |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation (w/o radon) | active |
| 3 -- plant ingestion | suppressed |
| 4 -- meat ingestion | suppressed |
| 5 -- milk ingestion | suppressed |
| 6 -- aquatic foods | suppressed |
| 7 -- drinking water | suppressed |
| 8 -- soil ingestion | active |
| 9 -- radon | suppressed |
| Find peak pathway doses | suppressed |

Summary : Survey Unit 04-PD-SB-14S (with Ingestion Pathways turned off)
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\SITE1.RAD

| Contaminated Zone Dimensions | | Initial Soil Concentrations, pCi/g | |
|---|---|---|---|
| Area: | 1000.00 square meters | Cs-137 | 5.900E-02 |
| Thickness: | 2.00 meters | Ra-226 | 9.400E-02 |
| Cover Depth: | 0.00 meters | Sr-90 | 1.330E-01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

| t (years): | 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| TDOSE(t): | 6.325E-01 | 6.292E-01 | 6.228E-01 | 6.014E-01 | 5.487E-01 | 4.241E-01 | 2.367E-01 | 3.316E-02 |
| M(t): | 2.530E-02 | 2.517E-02 | 2.491E-02 | 2.406E-02 | 2.195E-02 | 1.697E-02 | 9.467E-03 | 1.327E-03 |

Maximum TDOSE(t): 6.325E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 9.910E-02 | 0.1567 | 4.283E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.035E-05 | 0.0001 |
| Ra-226 | 5.269E-01 | 0.8331 | 1.696E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.945E-03 | 0.0047 |
| Sr-90 | 2.866E-03 | 0.0045 | 3.858E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.019E-04 | 0.0006 |
| Total | 6.289E-01 | 0.9943 | 1.739E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.427E-03 | 0.0054 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.918E-02 | 0.1568 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.300E-01 | 0.8380 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.272E-03 | 0.0052 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.325E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 9.685E-02 | 0.1539 | 4.186E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.852E-05 | 0.0001 |
| Ra-226 | 5.254E-01 | 0.8351 | 1.745E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.484E-03 | 0.0055 |
| Sr-90 | 2.783E-03 | 0.0044 | 3.746E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.902E-04 | 0.0006 |
| Total | 6.251E-01 | 0.9934 | 1.786E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.953E-03 | 0.0063 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.693E-02 | 0.1540 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.291E-01 | 0.8409 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.177E-03 | 0.0050 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.292E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 9.249E-02 | 0.1485 | 3.998E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.499E-05 | 0.0001 |
| Ra-226 | 5.225E-01 | 0.8390 | 1.836E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.507E-03 | 0.0072 |
| Sr-90 | 2.623E-03 | 0.0042 | 3.531E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.678E-04 | 0.0006 |
| Total | 6.176E-01 | 0.9918 | 1.875E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.949E-03 | 0.0079 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.257E-02 | 0.1486 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.272E-01 | 0.8466 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.994E-03 | 0.0048 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.228E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 7.873E-02 | 0.1309 | 3.403E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.383E-05 | 0.0001 |
| Ra-226 | 5.124E-01 | 0.8520 | 2.103E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.547E-03 | 0.0125 |
| Sr-90 | 2.132E-03 | 0.0035 | 2.870E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.990E-04 | 0.0005 |
| Total | 5.933E-01 | 0.9865 | 2.135E-04 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.910E-03 | 0.0132 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.879E-02 | 0.1310 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.202E-01 | 0.8649 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.434E-03 | 0.0040 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.014E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 4.969E-02 | 0.0905 | 2.148E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.028E-05 | 0.0001 |
| Ra-226 | 4.846E-01 | 0.8831 | 2.540E-04 | 0.0005 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.284E-02 | 0.0234 |
| Sr-90 | 1.180E-03 | 0.0021 | 1.588E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.654E-04 | 0.0003 |
| Total | 5.354E-01 | 0.9758 | 2.558E-04 | 0.0005 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.304E-02 | 0.0238 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.973E-02 | 0.0906 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.977E-01 | 0.9069 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.347E-03 | 0.0025 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.487E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 9.923E-03 | 0.0234 | 4.289E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.045E-06 | 0.0000 |
| Ra-226 | 3.982E-01 | 0.9389 | 2.569E-04 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.554E-02 | 0.0366 |
| Sr-90 | 1.487E-04 | 0.0004 | 2.001E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.084E-05 | 0.0000 |
| Total | 4.083E-01 | 0.9627 | 2.572E-04 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.557E-02 | 0.0367 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.931E-03 | 0.0234 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.140E-01 | 0.9762 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.697E-04 | 0.0004 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.241E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 9.948E-05 | 0.0004 | 4.300E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.065E-08 | 0.0000 |
| Ra-226 | 2.272E-01 | 0.9598 | 1.504E-04 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.256E-03 | 0.0391 |
| Sr-90 | 3.998E-07 | 0.0000 | 5.381E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.606E-08 | 0.0000 |
| Total | 2.273E-01 | 0.9603 | 1.504E-04 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.257E-03 | 0.0391 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.956E-05 | 0.0004 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.366E-01 | 0.9996 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.564E-07 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.367E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 1.004E-11 | 0.0000 | 4.338E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.137E-15 | 0.0000 |
| Ra-226 | 3.184E-02 | 0.9602 | 2.108E-05 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.298E-03 | 0.0391 |
| Sr-90 | 4.033E-16 | 0.0000 | 5.429E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.655E-17 | 0.0000 |
| Total | 3.184E-02 | 0.9602 | 2.108E-05 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.298E-03 | 0.0391 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.004E-11 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.316E-02 | 1.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.604E-16 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.316E-02 | 1.0000 |

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

| Parent (i) | Product (j) | Thread Fraction | DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cs-137+D | Cs-137+D | 1.000E+00 | 1.681E+00 | 1.643E+00 | 1.569E+00 | 1.335E+00 | 8.428E-01 | 1.683E-01 | 1.687E-03 | 1.703E-10 |
| Ra-226+D | Ra-226+D | 1.000E+00 | 5.635E+00 | 5.620E+00 | 5.588E+00 | 5.479E+00 | 5.180E+00 | 4.256E+00 | 2.428E+00 | 3.403E-01 |
| Ra-226+D | Pb-210+D | 1.000E+00 | 3.075E-03 | 9.079E-03 | 2.046E-02 | 5.439E-02 | 1.140E-01 | 1.484E-01 | 8.899E-02 | 1.248E-02 |
| Ra-226+D | ∑DSR(j) | | 5.639E+00 | 5.629E+00 | 5.609E+00 | 5.534E+00 | 5.294E+00 | 4.405E+00 | 2.517E+00 | 3.528E-01 |
| Sr-90+D | Sr-90+D | 1.000E+00 | 2.460E-02 | 2.389E-02 | 2.251E-02 | 1.830E-02 | 1.013E-02 | 1.276E-03 | 3.431E-06 | 3.462E-15 |

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

| Nuclide (i) | t= 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Cs-137 | 1.487E+01 | 1.522E+01 | 1.593E+01 | 1.872E+01 | 2.966E+01 | 1.485E+02 | 1.482E+04 | 1.468E+11 |
| Ra-226 | 4.434E+00 | 4.441E+00 | 4.457E+00 | 4.518E+00 | 4.722E+00 | 5.676E+00 | 9.933E+00 | 7.086E+01 |
| Sr-90 | 1.016E+03 | 1.047E+03 | 1.110E+03 | 1.366E+03 | 2.469E+03 | 1.959E+04 | 7.286E+06 | *1.366E+14 |

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

| Nuclide (i) | Initial (pCi/g) | tmin (years) | DSR(i,tmin) (pCi/g) | G(i,tmin) (pCi/g) | DSR(i,tmax) (pCi/g) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Cs-137 | 5.900E-02 | 0.000E+00 | 1.681E+00 | 1.487E+01 | 1.681E+00 | 1.487E+01 |
| Ra-226 | 9.400E-02 | 0.000E+00 | 5.639E+00 | 4.434E+00 | 5.639E+00 | 4.434E+00 |
| Sr-90 | 1.330E-01 | 0.000E+00 | 2.460E-02 | 1.016E+03 | 2.460E-02 | 1.016E+03 |

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

| Nuclide (j) | Parent (i) | THF(i) | DOSE(j,t), mrem/yr | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | t= | 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Cs-137 | Cs-137 | 1.000E+00 | 9.918E-02 | 9.693E-02 | 9.257E-02 | 7.879E-02 | 4.973E-02 | 9.931E-03 | 9.956E-05 | 1.004E-11 |
| Ra-226 | Ra-226 | 1.000E+00 | 5.297E-01 | 5.282E-01 | 5.253E-01 | 5.151E-01 | 4.870E-01 | 4.001E-01 | 2.282E-01 | 3.199E-02 |
| Pb-210 | Ra-226 | 1.000E+00 | 2.890E-04 | 8.535E-04 | 1.923E-03 | 5.113E-03 | 1.072E-02 | 1.395E-02 | 8.365E-03 | 1.173E-03 |
| Sr-90 | Sr-90 | 1.000E+00 | 3.272E-03 | 3.177E-03 | 2.994E-03 | 2.434E-03 | 1.347E-03 | 1.697E-04 | 4.564E-07 | 4.604E-16 |

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

| Nuclide (j) | Parent (i) | THF(i) | S(j,t), pCi/g | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | t= | 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Cs-137 | Cs-137 | 1.000E+00 | 5.900E-02 | 5.766E-02 | 5.506E-02 | 4.687E-02 | 2.958E-02 | 5.907E-03 | 5.923E-05 | 5.975E-12 |
| Ra-226 | Ra-226 | 1.000E+00 | 9.400E-02 | 9.374E-02 | 9.321E-02 | 9.140E-02 | 8.641E-02 | 7.099E-02 | 4.050E-02 | 5.677E-03 |
| Pb-210 | Ra-226 | 1.000E+00 | 0.000E+00 | 2.883E-03 | 8.349E-03 | 2.465E-02 | 5.331E-02 | 7.005E-02 | 4.203E-02 | 5.893E-03 |
| Sr-90 | Sr-90 | 1.000E+00 | 1.330E-01 | 1.291E-01 | 1.217E-01 | 9.893E-02 | 5.474E-02 | 6.897E-03 | 1.855E-05 | 1.871E-14 |

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 1.53 seconds

Intrisk : Survey Unit 04-PD-SB-14S (with Ingestion Pathways turned off)
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\SITE1.RAD

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Cancer Risk Slope Factors Summary Table
Risk Library: DCFPAK3.02 Morbidity

| Menu | Parameter | Current Value | Base Case* | Parameter Name |
|---|---|---|---|---|
| Sf-1 | Ground external radiation slope factors, 1/yr per (pCi/g): | | | |
| Sf-1 | Cs-137+D | 2.54E-06 | 5.52E-10 | SLPF( 1,1) |
| Sf-1 | Pb-210+D | 4.30E-09 | 1.48E-09 | SLPF( 2,1) |
| Sf-1 | Ra-226+D | 8.37E-06 | 2.50E-08 | SLPF( 3,1) |
| Sf-1 | Sr-90+D | 1.95E-08 | 4.83E-10 | SLPF( 4,1) |
| | | | | |
| Sf-2 | Inhalation, slope factors, 1/(pCi): | | | |
| Sf-2 | Cs-137+D | 1.13E-10 | 1.13E-10 | SLPF( 1,2) |
| Sf-2 | Pb-210+D | 3.08E-08 | 1.59E-08 | SLPF( 2,2) |
| Sf-2 | Ra-226+D | 2.82E-08 | 2.81E-08 | SLPF( 3,2) |
| Sf-2 | Sr-90+D | 4.34E-10 | 4.25E-10 | SLPF( 4,2) |
| | | | | |
| Sf-3 | Food ingestion, slope factors, 1/(pCi): | | | |
| Sf-3 | Cs-137+D | 3.74E-11 | 3.74E-11 | SLPF( 1,3) |
| Sf-3 | Pb-210+D | 3.44E-09 | 1.18E-09 | SLPF( 2,3) |
| Sf-3 | Ra-226+D | 5.15E-10 | 5.14E-10 | SLPF( 3,3) |
| Sf-3 | Sr-90+D | 9.53E-11 | 6.88E-11 | SLPF( 4,3) |
| | | | | |
| Sf-3 | Water ingestion, slope factors, 1/(pCi): | | | |
| Sf-3 | Cs-137+D | 3.05E-11 | 3.05E-11 | SLPF( 1,4) |
| Sf-3 | Pb-210+D | 2.67E-09 | 8.84E-10 | SLPF( 2,4) |
| Sf-3 | Ra-226+D | 3.85E-10 | 3.85E-10 | SLPF( 3,4) |
| Sf-3 | Sr-90+D | 7.39E-11 | 5.59E-11 | SLPF( 4,4) |
| | | | | |
| Sf-3 | Soil ingestion, slope factors, 1/(pCi): | | | |
| Sf-3 | Cs-137+D | 3.74E-11 | 3.74E-11 | SLPF( 1,5) |
| Sf-3 | Pb-210+D | 3.44E-09 | 1.18E-09 | SLPF( 2,5) |
| Sf-3 | Ra-226+D | 5.15E-10 | 5.14E-10 | SLPF( 3,5) |
| Sf-3 | Sr-90+D | 9.53E-11 | 6.88E-11 | SLPF( 4,5) |
| | | | | |
| Sf-Rn | Radon Inhalation slope factors, 1/(pCi): | | | |
| Sf-Rn | Rn-222 | 1.80E-12 | 1.80E-12 | SLPFRN(1,1) |
| Sf-Rn | Po-218 | 3.70E-12 | 3.70E-12 | SLPFRN(1,2) |
| Sf-Rn | Pb-214 | 6.20E-12 | 6.20E-12 | SLPFRN(1,3) |
| Sf-Rn | Bi-214 | 1.50E-11 | 1.50E-11 | SLPFRN(1,4) |
| | | | | |
| Sf-Rn | Radon K factors, (mrem/WLM): | | | |
| Sf-Rn | Rn-222 Indoor | 3.88E+02 | 3.88E+02 | KFACTR(1,1) |
| Sf-Rn | Rn-222 Outdoor | 3.88E+02 | 3.88E+02 | KFACTR(1,2) |

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

| Nuclide (i) | Slope(i)* t= | ETFG(i,t) At Time in Years (dimensionless) 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|---|
| At-218 | 2.740E-11 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 |
| Ba-137m | 2.690E-06 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 |
| Bi-210 | 2.770E-09 | 5.406E-01 | 5.406E-01 | 5.406E-01 | 5.406E-01 | 5.406E-01 | 5.406E-01 | 5.406E-01 | 5.406E-01 |
| Bi-214 | 7.340E-06 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 | 5.370E-01 |
| Cs-137 | 5.520E-10 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 |
| Hg-206 | 4.830E-07 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 |
| Pb-210 | 1.480E-09 | 5.994E-01 | 5.994E-01 | 5.994E-01 | 5.994E-01 | 5.994E-01 | 5.994E-01 | 5.994E-01 | 5.994E-01 |
| Pb-214 | 9.940E-07 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 | 5.466E-01 |
| Po-210 | 4.510E-11 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 |
| Po-214 | 3.850E-10 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 |
| Po-218 | 6.840E-15 | 5.514E-01 | 5.514E-01 | 5.514E-01 | 5.514E-01 | 5.514E-01 | 5.514E-01 | 5.514E-01 | 5.514E-01 |
| Ra-226 | 2.500E-08 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 |
| Rn-218 | 3.390E-09 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 | 5.322E-01 |
| Rn-222 | 1.690E-09 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 |
| Sr-90 | 4.830E-10 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 | 5.490E-01 |
| Tl-206 | 6.110E-09 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 | 5.328E-01 |
| Tl-210 | 1.340E-05 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 |
| Y-90 | 1.900E-08 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 | 5.358E-01 |

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

| Radio- | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | Ingestion* |
| Cs-137 | 2.974E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.615E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.615E+00 |
| Pb-210 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ra-226 | 4.738E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.573E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.573E+00 |
| Sr-90 | 6.704E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.641E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.641E+00 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.728E-06 | 0.1228 | 7.249E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.308E-09 | 0.0001 |
| Pb-210 | 2.280E-09 | 0.0002 | 1.471E-09 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.919E-08 | 0.0063 |
| Ra-226 | 1.217E-05 | 0.8651 | 3.847E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.813E-08 | 0.0027 |
| Sr-90 | 2.762E-08 | 0.0020 | 5.784E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.897E-09 | 0.0005 |
| Total | 1.393E-05 | 0.9900 | 5.383E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.355E-07 | 0.0096 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.729E-06 | 0.1229 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.294E-08 | 0.0066 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.222E-05 | 0.8680 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.458E-08 | 0.0025 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.407E-05 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.728E-06 | 0.1228 | 7.249E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.308E-09 | 0.0001 |
| Ra-226 | 1.218E-05 | 0.8652 | 5.318E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.273E-07 | 0.0090 |
| Sr-90 | 2.762E-08 | 0.0020 | 5.784E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.897E-09 | 0.0005 |
| Total | 1.393E-05 | 0.9900 | 5.383E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.355E-07 | 0.0096 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.729E-06 | 0.1229 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.231E-05 | 0.8747 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.458E-08 | 0.0025 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.407E-05 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

| Radio-Nuclide | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total Ingestion* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | |
| Cs-137 | 2.906E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.578E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.578E+00 |
| Pb-210 | 1.453E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 7.893E-02 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 7.893E-02 |
| Ra-226 | 4.725E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.566E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.566E+00 |
| Sr-90 | 6.508E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.535E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.535E+00 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

| Radon Pathway | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio-Nuclide | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.689E-06 | 0.1206 | 7.084E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.278E-09 | 0.0001 |
| Pb-210 | 2.406E-09 | 0.0002 | 1.552E-09 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.412E-08 | 0.0067 |
| Ra-226 | 1.214E-05 | 0.8669 | 3.836E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.802E-08 | 0.0027 |
| Sr-90 | 2.682E-08 | 0.0019 | 5.615E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.696E-09 | 0.0005 |
| Total | 1.386E-05 | 0.9896 | 5.451E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.401E-07 | 0.0100 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.690E-06 | 0.1207 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.808E-08 | 0.0070 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.218E-05 | 0.8699 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.357E-08 | 0.0024 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.400E-05 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.689E-06 | 0.1206 | 7.084E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.278E-09 | 0.0001 |
| Ra-226 | 1.214E-05 | 0.8671 | 5.388E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.321E-07 | 0.0094 |
| Sr-90 | 2.682E-08 | 0.0019 | 5.615E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.696E-09 | 0.0005 |
| Total | 1.386E-05 | 0.9896 | 5.451E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.401E-07 | 0.0100 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.690E-06 | 0.1207 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.228E-05 | 0.8769 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.357E-08 | 0.0024 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.400E-05 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

| Radio-Nuclide | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total Ingestion* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | |
| Cs-137 | 2.775E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.507E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.507E+00 |
| Pb-210 | 4.208E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.285E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.285E-01 |
| Ra-226 | 4.698E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.552E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.552E+00 |
| Sr-90 | 6.134E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.332E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.332E+00 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

| Radon Pathway | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio-Nuclide | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.613E-06 | 0.1163 | 6.765E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.221E-09 | 0.0001 |
| Pb-210 | 2.644E-09 | 0.0002 | 1.706E-09 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.034E-07 | 0.0075 |
| Ra-226 | 1.207E-05 | 0.8705 | 3.815E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.781E-08 | 0.0027 |
| Sr-90 | 2.528E-08 | 0.0018 | 5.292E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.311E-09 | 0.0005 |
| Total | 1.371E-05 | 0.9889 | 5.580E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.488E-07 | 0.0107 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.614E-06 | 0.1164 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.078E-07 | 0.0078 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.211E-05 | 0.8736 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.164E-08 | 0.0023 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.387E-05 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.613E-06 | 0.1163 | 6.765E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.221E-09 | 0.0001 |
| Ra-226 | 1.207E-05 | 0.8707 | 5.520E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.412E-07 | 0.0102 |
| Sr-90 | 2.528E-08 | 0.0018 | 5.292E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.311E-09 | 0.0005 |
| Total | 1.371E-05 | 0.9889 | 5.580E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.488E-07 | 0.0107 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.614E-06 | 0.1164 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.222E-05 | 0.8813 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.164E-08 | 0.0023 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.387E-05 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

| Radio-Nuclide | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total Ingestion* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | |
| Cs-137 | 2.362E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.283E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.283E+00 |
| Pb-210 | 1.242E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 6.747E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 6.747E-01 |
| Ra-226 | 4.607E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.502E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.502E+00 |
| Sr-90 | 4.986E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.708E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.708E+00 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

| Radon Pathway | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

| Radio-Nuclide | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.373E-06 | 0.1023 | 5.758E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.039E-09 | 0.0001 |
| Pb-210 | 3.349E-09 | 0.0002 | 2.160E-09 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.310E-07 | 0.0098 |
| Ra-226 | 1.184E-05 | 0.8824 | 3.740E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.707E-08 | 0.0028 |
| Sr-90 | 2.055E-08 | 0.0015 | 4.302E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.130E-09 | 0.0004 |
| Total | 1.323E-05 | 0.9866 | 5.949E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.742E-07 | 0.0130 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.374E-06 | 0.1024 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.365E-07 | 0.0102 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.188E-05 | 0.8855 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.572E-08 | 0.0019 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.341E-05 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.373E-06 | 0.1023 | 5.758E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.039E-09 | 0.0001 |
| Ra-226 | 1.184E-05 | 0.8827 | 5.901E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.681E-07 | 0.0125 |
| Sr-90 | 2.055E-08 | 0.0015 | 4.302E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.130E-09 | 0.0004 |
| Total | 1.323E-05 | 0.9866 | 5.949E-09 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.742E-07 | 0.0130 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.374E-06 | 0.1024 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.201E-05 | 0.8957 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.572E-08 | 0.0019 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.341E-05 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

| Radio-Nuclide | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total Ingestion* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | |
| Cs-137 | 1.491E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 8.098E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 8.098E-01 |
| Pb-210 | 2.687E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.459E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.459E+00 |
| Ra-226 | 4.355E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.365E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.365E+00 |
| Sr-90 | 2.759E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.498E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.498E+00 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

| Radon Pathway | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

| Radio-Nuclide | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 8.664E-07 | 0.0705 | 3.634E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.557E-10 | 0.0001 |
| Pb-210 | 4.545E-09 | 0.0004 | 2.931E-09 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.778E-07 | 0.0145 |
| Ra-226 | 1.119E-05 | 0.9101 | 3.536E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.505E-08 | 0.0029 |
| Sr-90 | 1.137E-08 | 0.0009 | 2.380E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.838E-09 | 0.0002 |
| Total | 1.207E-05 | 0.9819 | 6.495E-09 | 0.0005 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.163E-07 | 0.0176 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.670E-07 | 0.0705 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.853E-07 | 0.0151 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.123E-05 | 0.9133 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.423E-08 | 0.0012 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.230E-05 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 8.664E-07 | 0.0705 | 3.634E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.557E-10 | 0.0001 |
| Ra-226 | 1.119E-05 | 0.9105 | 6.468E-09 | 0.0005 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.128E-07 | 0.0173 |
| Sr-90 | 1.137E-08 | 0.0009 | 2.380E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.838E-09 | 0.0002 |
| Total | 1.207E-05 | 0.9819 | 6.495E-09 | 0.0005 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.163E-07 | 0.0176 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.670E-07 | 0.0705 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.141E-05 | 0.9283 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.423E-08 | 0.0012 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.230E-05 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

| Radio-Nuclide | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total Ingestion* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | |
| Cs-137 | 2.978E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.617E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.617E-01 |
| Pb-210 | 3.531E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.918E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.918E+00 |
| Ra-226 | 3.578E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.943E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.943E+00 |
| Sr-90 | 3.476E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.888E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.888E-01 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

| Radon Pathway | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

| Radio-Nuclide | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.730E-07 | 0.0180 | 7.258E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.309E-10 | 0.0000 |
| Pb-210 | 4.940E-09 | 0.0005 | 3.186E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.932E-07 | 0.0201 |
| Ra-226 | 9.194E-06 | 0.9575 | 2.905E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.879E-08 | 0.0030 |
| Sr-90 | 1.433E-09 | 0.0001 | 2.999E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.577E-10 | 0.0000 |
| Total | 9.374E-06 | 0.9762 | 6.096E-09 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.225E-07 | 0.0232 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.732E-07 | 0.0180 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.014E-07 | 0.0210 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.226E-06 | 0.9608 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.793E-09 | 0.0002 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.602E-06 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.730E-07 | 0.0180 | 7.258E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.309E-10 | 0.0000 |
| Ra-226 | 9.199E-06 | 0.9580 | 6.092E-09 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.220E-07 | 0.0231 |
| Sr-90 | 1.433E-09 | 0.0001 | 2.999E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.577E-10 | 0.0000 |
| Total | 9.374E-06 | 0.9762 | 6.096E-09 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.225E-07 | 0.0232 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.732E-07 | 0.0180 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.427E-06 | 0.9818 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.793E-09 | 0.0002 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.602E-06 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

| Radio-Nuclide | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total Ingestion* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | |
| Cs-137 | 2.985E-06 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.621E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.621E-03 |
| Pb-210 | 2.118E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.151E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.151E+00 |
| Ra-226 | 2.041E-03 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.109E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.109E+00 |
| Sr-90 | 9.349E-07 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.078E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.078E-04 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

| Radon Pathway | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

| Radio-Nuclide | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.735E-09 | 0.0003 | 7.276E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.313E-12 | 0.0000 |
| Pb-210 | 2.913E-09 | 0.0005 | 1.879E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.140E-07 | 0.0212 |
| Ra-226 | 5.245E-06 | 0.9743 | 1.657E-09 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.642E-08 | 0.0031 |
| Sr-90 | 3.853E-12 | 0.0000 | 8.067E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.619E-13 | 0.0000 |
| Total | 5.249E-06 | 0.9751 | 3.536E-09 | 0.0007 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.304E-07 | 0.0242 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.736E-09 | 0.0003 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.187E-07 | 0.0221 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.263E-06 | 0.9776 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.823E-12 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.383E-06 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.735E-09 | 0.0003 | 7.276E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.313E-12 | 0.0000 |
| Ra-226 | 5.247E-06 | 0.9748 | 3.536E-09 | 0.0007 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.304E-07 | 0.0242 |
| Sr-90 | 3.853E-12 | 0.0000 | 8.067E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.619E-13 | 0.0000 |
| Total | 5.249E-06 | 0.9751 | 3.536E-09 | 0.0007 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.304E-07 | 0.0242 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.736E-09 | 0.0003 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.381E-06 | 0.9997 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.823E-12 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.383E-06 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

| Radio- | Water Independent Pathways (Inhalation w/o radon) | | | | | Water Dependent Pathways | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | Inhalation | Plant | Meat | Milk | Soil | Water | Fish | Plant | Meat | Milk | Ingestion* |
| Cs-137 | 3.012E-13 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.636E-10 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.636E-10 |
| Pb-210 | 2.970E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.613E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.613E-01 |
| Ra-226 | 2.861E-04 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.554E-01 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.554E-01 |
| Sr-90 | 9.431E-16 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.123E-13 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.123E-13 |

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.750E-16 | 0.0000 | 7.341E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.324E-19 | 0.0000 |
| Pb-210 | 4.084E-10 | 0.0005 | 2.634E-10 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.597E-08 | 0.0212 |
| Ra-226 | 7.352E-07 | 0.9746 | 2.323E-10 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.302E-09 | 0.0031 |
| Sr-90 | 3.887E-21 | 0.0000 | 8.137E-24 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.703E-22 | 0.0000 |
| Total | 7.356E-07 | 0.9751 | 4.957E-10 | 0.0007 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.828E-08 | 0.0242 |

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Plant | | Meat | | Milk | | All Pathways** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.751E-16 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.665E-08 | 0.0221 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.377E-07 | 0.9779 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.865E-21 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.543E-07 | 1.0000 |

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

| Radon | Radionuclides | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pathway | Rn-222 | Po-218 | Pb-214 | Bi-214 | Rn-220 | Po-216 | Pb-212 | Bi-212 |
| Water-ind. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Water-dep. | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Total | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

Water-ind. == Water-independent  Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

| Radio- | Ground | | Inhalation | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 1.750E-16 | 0.0000 | 7.341E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.324E-19 | 0.0000 |
| Ra-226 | 7.356E-07 | 0.9751 | 4.957E-10 | 0.0007 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.828E-08 | 0.0242 |
| Sr-90 | 3.887E-21 | 0.0000 | 8.137E-24 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.703E-22 | 0.0000 |
| Total | 7.356E-07 | 0.9751 | 4.957E-10 | 0.0007 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.828E-08 | 0.0242 |

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All pathways | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. | risk | fract. |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.751E-16 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.543E-07 | 1.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.865E-21 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.543E-07 | 1.0000 |

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

# APPENDIX R

# RESPONSE TO COMMENTS

# (Available Electronically)

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| Response to Document Review Comments | | | |
|---|---|---|---|
| **Document Reviewed:** | ***Removal Action Completion Report Parcel D-1 Phase II Radiological Remediation and Support***, Hunters Point Naval Shipyard, San Francisco, California. | **Date of Document:** | DRAFT Aug 2017<br>DRAFT FINAL Jan 2017 |
| **Project Site:** | Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California | | |

| **Reviewer:** | Department of Toxic Substances Control (DTSC) Comments from Ms. Juanita Bacey, Project Manager Brownfields and Environmental Restoration Program | **Date of Comments** | Email correspondence dated 13 Nov 2017 |
|---|---|---|---|

| Item | Review Comment | Navy Response |
|---|---|---|
| 1 | (***DTSC General Comment #1***) The RACR indicates that sampling and surveys were limited to a depth of 2 ft bgs and that there is a potential for radiological objects to be present in material below 2 ft bgs. Therefore, an unrestricted free release is not possible for this parcel and a Covenant to Restrict the Use of Property (CRUP) will be required. The Conclusion section of the first two documents (are) above recommend unrestricted release. Please revise. | The Final Status Survey (FSS) reports for the former NRDL site and the ship berths have been modified to no longer recommend release to unrestricted use. The two FSS reports are revised to remove the unrestricted release recommendation. They now state that the surface soil and structures meet the Navy's cleanup goals as a result of the MARSSIM based investigation; however, the potential for radiological objects (RO) below 2 feet bgs remains. A LUC/RD addendum will be prepared to address the potential for ROs in subsurface below 2 feet bgs only within the 1946 shoreline expansion area and a buffer that encompasses all recovered ROs at Parcel D-1. |

| **Reviewer:** | **California Department of Public Health (CDPH) Comments** from Mr. Roger Lupo, via email to Ms. Juanita Bacey, Project Manager, Brownfields & Environmental Restoration, Department of Toxic Substances Control (DTSC) *(This review was performed in support of the Interagency Agreement between DTSC and CDPH.)* | **Date of Comments** | Email correspondence dated 14 Nov 2017 |
|---|---|---|---|

| Item | Review Comment | Navy Response |
|---|---|---|
| 2 | (***CDPH General Comment #1 from R. Lupo***) In the executive summary on page viii, the text talks of the potential for radioactive objects (RO) below two foot of the ground surface, this will require a land use covenant detailing the need for protective measures in the advent of future soil excavation. Measures to include notification of public of the potential for finding RO's during excavation, notification of the workers | Comment is noted. Discussion regarding suitability for unrestricted release has been removed. A LUC/RD addendum will be prepared spelling out any particular additional or different specific requirements/conditions/ notifications for implementing the institutional controls (ICs) appropriately to address the potential for ROs |

| Response to Document Review Comments | | | |
|---|---|---|---|
| **Document Reviewed:** | ***Removal Action Completion Report Parcel D-1 Phase II Radiological Remediation and Support***, Hunters Point Naval Shipyard, San Francisco, California. | **Date of Document:** | DRAFT Aug 2017<br>DRAFT FINAL Jan 2017 |
| **Project Site:** | Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California | | |

| Item | Review Comment | Navy Response |
|---|---|---|
| | of the potential for finding RO's, the need to have Health Physics support during excavation for the protection of the workers and of the public. Measures to include engineered barriers and administrative protective actions to protect the health and safety of the site workers and the public. I am probably getting ahead of the process in mentioning a LUC at this time, but thought I would get the idea started. | below 2 feet bgs within the 1946 shoreline expansion area. |

| Reviewer: | **California Department of Public Health (CDPH) Comments** from Dr. Sheetal Singh, PhD, Sr Health Physicist, Environmental Management Branch (EMS) via letter addressed to Ms. Juanita Bacey of DTSC *(This review was performed in support of the Interagency Agreement between DTSC and CDPH.)* | **Date of Comments** | 15 Nov 2017 |
|---|---|---|---|

| Item | Review Comment | Navy Response |
|---|---|---|
| 3 | ***(CDPH General Comment #1)*** The cover page of this work plan does not have appropriate signatures by technical lead and project manager for this project. Please include appropriate signatures in the revised version of the document. | Signatures will be added to the final report. |
| 4 | ***(CDPH General Comment #2)*** It is EMB's understanding that the Navy is requesting radiological unrestricted release recommendation (RURR) from CDPH for the first two feet of soil below the ground surface and the soil below the two feet require institutional controls for the following:<br>• Remaining sanitary sewer and storm drain line (SSSD) (Work Packages 108, 109, 110 and 111)<br>• Former Naval Radiological Defense Laboratory (NRDL Site),<br>• Ship Berths 14, 21, 22 and 29 | The comment is noted. The FSS reports for the former NRDL site and ship berths have been modified to no longer recommend release to unrestricted use for the surface soil and structures due to the potential that remains for ROs below 2 feet bgs. Unrestricted release request and no further action recommendation for removed SSSD lines are warranted except for those SSSD trenches located within the 1946 shoreline expansion area and a buffer around the 1946 shoreline |

| Response to Document Review Comments | | | |
|---|---|---|---|
| **Document Reviewed:** | ***Removal Action Completion Report Parcel D-1 Phase II Radiological Remediation and Support***, Hunters Point Naval Shipyard, San Francisco, California. | **Date of Document:** | DRAFT Aug 2017<br>DRAFT FINAL Jan 2017 |
| **Project Site:** | Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California | | |

| Item | Review Comment | Navy Response |
|---|---|---|
| | • Railroad tie stockpiles<br>Please note that CDPH-EMB cannot approve RURR for the first two feet of all areas of Parcel D-1 Phase II as in these designated areas discrete radiological objects exist below 2 feet. If the Navy plans to implement land use controls and activity restrictions below the two feet of soil, the Radiological Health Branch has to approve this Removal Action Completion Report. | expansion area and a buffer that encompasses all recovered ROs at Parcel D-1 although a couple of ROs,. Although a couple of ROs recovered outside of the 1946 shoreline expansion area within the trench excavation zones and four just outside of the expansion area located within the Southwest Block are incidental and the likelihood of ROs outside that area is considered incidental and of low probability.<br><br>The railroad tie stockpiles no longer are present in Parcel D-1. They were radiologically surveyed, released from radiological controls, and disposed as non-low level radioactive waste. |

| **Reviewer:** | **US Environmental Protection Agency (EPA) Comments** from Ms. Lily Lee, Remedial Project Manager | **Date of Comments** | 17 November 2017 |
|---|---|---|---|

| Item | Review Comment | Navy Response |
|---|---|---|
| 5 | (***EPA General Comment #1***) This review does not include comments on Section 5.0, Former NRDL Site Final Status Survey, and Section 6.0, Ship Berths 14, 21, 22, and 29 Final Status Survey, which will be provided on the related Final Status Survey Reports, which are also under review separately. Changes made in response to those comments should be made to Sections 5.0 and 6.0 of the Draft Radiological Removal Action Completion Report Radiological Remediation and Support, Parcel D-1 Phase II (the Draft RACR), as applicable. | The comment is noted. There are no changes to the FSS reports for the former NRDL site or Ship Berths 14, 21, 22, and 29 that require modifications to Sections 5.0 and 6.0. |
| 6 | (***EPA General Comment #2***) Section 1.4.5 (Work Variances) of the Draft RACR includes four Field Change Requests (FCRs) that require further | Please refer to the responses to EPA General Comment 2a through 2d below. |

| Item | Review Comment | Navy Response |
|---|---|---|
| | explanation to fully understand the scope of the activity and approval process for these changes, as follows: | |
| 6a | (***EPA General Comment #2a***) FCR Number 001 states that the Sampling and Analysis Plan (SAP) specified a five-day in-growth period for preliminary screening analysis but that a decision was made in the field that no in-growth was needed. Also, it is unclear whether this screening analysis was for measurements in a field laboratory or a more permanent on-site laboratory. In addition, the text does not state to which analysis or radionuclide this FCR applies. Presumably, this FCR is in reference to the radium 226 (Ra-226) analysis, but this should be confirmed. Please explain why an approved SAP requirement was changed in the field and how it was determined that providing an analysis with no in-growth time would provide usable screening data and specify the radionuclide(s) to which this FCR applies. Please revise the text to include these details and to include information about which oversight and/or Quality Assurance (QA) management approvals were obtained for this change. Finally, please also include information about where the change request and approvals are documented. | The wording in Exhibit 1-3 for FCR No. 001 was modified to clarify that the FCR was prepared in the nature of a correction. The SAP specified a 5-day in-growth period for screening samples by gamma spectroscopy but, as noted in the FCR, the gamma screening method requires no in-growth period and the definitive data method requires a 21-day (minimum) in-growth period, which is part of the laboratory analytical protocol. The in-growth period is necessary to accommodate Ra-226 secular equilibrium and is applied to samples analyzed by gamma spectroscopy where the Ra-226 concentration is to be inferred based on the concentration of its progeny Bi-214. The FCR was prepared by the project chemist, reviewed by the technical director, and approved by the project manager. |
| 6b | (***EPA General Comment #2b***) FCR Number 003 states that the SAP specified sampling every three meters and conditional Strontium-90 (Sr-90) analysis if pipe segment samples exceeded the Cesium-137 (Cs-137) release criterion. Exhibit 1-3 states that per an agreement with the Navy's Radiological Affairs Support Office (RASO), only ten percent of pipe sediment samples exceeding the Cs-137 release criteria would undergo Sr-90 analysis and confirmation samples for pipe segments | The wording in Exhibit 1-3 for FCR No. 003 was modified to better explain the solution. The number of samples collected of pipe sediment by rule was found to be excessive and impacting the project schedule. The reduction in number was determined by the Navy to continue to meet the purpose for which the sampling was being performed, i.e., characterizing the sediment |

| Item | Review Comment | Navy Response |
|---|---|---|
| | would be collected every twenty meters. However, the text does not state why it was considered acceptable to only analyze ten percent of samples exceeding the Cs-137 release criteria for Sr-90 or why the sampling frequency was decreased from the original requirements in the SAP. Please revise the Draft RACR to address these concerns and to also include information about the specific oversight management and/or QA management approvals that were obtained for these changes and how/where the approvals are documented. | itself for waste disposal as well as informing excavation activities regarding possible contamination due to leakage. The number of confirmation samples collected from the trenches post-excavation and the types of analyses performed based on the rules were not changed. The rule for analyzing for total Sr based on a Cs-137 exceedance was limited in its application to confirmation samples and was not applied to samples collected for characterizing pipe sediment for waste disposal as well as for informing excavation activities regarding possible contamination due to leakage. The FCR was prepared by the project chemist, reviewed by the technical director, and approved by the project manager. |
| 6c | (***EPA General Comment #2c***) FCR Number 007 states that the analytical method specified for manganese in the SAP was changed to the same method as that specified for lead. While this may be acceptable, the RACR should specify the actual analytical methods and whether the analytical method change for manganese still met the required detection limit requirement. Please revise the Draft RACR to include this information and to state who was responsible for the approval of this change and how/where the approvals are documented. | An incorrect version of FCR No. 007 was inadvertently attached to the Draft RACR and has been replaced with the correct approved version. In addition, the wording in Exhibit 1-3 for FCR No. 007 was modified to clarify change was in accordance with the SAP. |
| 6d | (***EPA General Comment #2d***) FCR Number 008 states that the RS-700 system work instruction specified a three hundred second count time for quality control checks but a field change was made to only require a one hundred eighty second count time. Please revise the text to | The wording in Exhibit 1-3 for FCR No. 008 was modified to better explain the FCR was prepared in the nature of a correction of a typographical error. The documents that the work instruction was patterned after call for a |

| Response to Document Review Comments | | | |
|---|---|---|---|
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| **Project Site:** | Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California | | |

| Item | Review Comment | Navy Response |
|---|---|---|
| | explain how it was determined that the one hundred eighty second count time was sufficient for the purpose of counting quality control check standards and which management or QA staff approved this change and how/where the approvals are documented. | 180-sec QC check. |
| 7 | (***EPA General Comment #3***) Section 3.3 (Sampling and Analysis) states the laboratories are accredited under the Department of Defense (DoD) and State of California accreditation programs; however the text does not specify if all three of the listed laboratories have both accreditations, and if the accreditations are applicable to radiological analyses. Please revise this text to include this information. | A sentence was added to Section 3.3, 2nd paragraph: "*The certifications for the matrices and methods held by each laboratory are listed in the SAP (Worksheet #23)*." |
| 8 | (***EPA General Comment #4***) The third paragraph of Section 3.3.1 (Radiological Analyses) states that if sample results were greater than or equal to the Cs-137 or Sr-90 release criteria, they were analyzed by alpha spectroscopy for Plutonium-239 (Pu-239). While it is understood that Cs-137 and Sr-90 are fission products associated with the fission of Pu-239, the Historical Radiological Assessment (HRA) indicates that Pu-239 was also obtained in pure form as sources that were used in the Naval Radiological Defense Laboratory (NRDL), yet the text does not indicate whether any samples were analyzed by alpha spectroscopy for Pu-239 without finding exceedances of Cs-137 or Sr-90. Please revise the Draft RACR to address this concern. | The HRA (Section 6.1.2) reports that, "*Radioactive sources, including radiography devices, were found to leak radioactivity occasionally*." The leaking source was returned to the manufacturer or disposed by regulated means. The HRA continues, "*There is historic evidence of sources being repaired, resurveyed, and placed back into service….It is reasonable to assume that any needed clean-up was performed if the leaking source caused radioactive contamination to spread beyond the source container because this was a common practice and necessary to eliminate future problems*." A sentence was added to Section 3.3.1, last paragraph, stating, "*No samples were analyzed for Pu-239 where there was not an exceedance for either Cs-137 or Sr-90*." |

| Response to Document Review Comments | | | |
|---|---|---|---|
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| Item | Review Comment | Navy Response |
|---|---|---|
| 9 | (***EPA General Comment #5***) The summary of results should include the associated counting or total propagated uncertainty. Exhibit 4-4, Summary of Radiological Screening Yards (RSY) Sample Results; Exhibit 4-6 Summary of Trench Sample Results; Exhibit 5-2, Summary of NRDL Sampling Results; and Exhibit 6-1, Summary of Ship Berth Sample Results list the maximum concentration of radionuclides of concern (ROCs) detected, as well as any noted release criteria exceedances. However, the results are not reported with the associated counting or total propagated uncertainty, and the text does not state whether any of the maximum results or those that showed an exceedance had any associated qualifiers from the data validation. For completeness and clarity, please revise the tables to include the uncertainty and the text to discuss whether any of the maximum results or those that showed an exceedance had any associated qualifiers from the data validation. | The uncertainties and data qualifiers associated with the sample results are included in the laboratory analytical results contained in the referenced reports supporting the RACR. For brevity they are not included in the summary table exhibits in the RACR body. Section 3.3.3 summarizes data quality issues that were identified with the data themselves. |
| 10 | (***EPA General Comment #6***) Section 4.7 (Trench Survey and Sampling) states on page 29 that dose and risk modeling of the trench surfaces was performed in RESRAD using analytical results, but does not state which sample results were used in the modeling. For example, it is unclear if all data points were entered into RESRAD, if only the maximum results were used, if results that showed exceedances of a release criterion were used, or if only post-remediation sample results were included in the RESRAD model. Please revise the RACR to clarify the results that were input into RESRAD. | Section 2.5, Dose and Risk Modeling, specifically the last bullet of the first paragraph, was clarified to state, "*The average radionuclide concentration was used, with the net average concentration above background used for radionuclides present in background (e.g., Ra-226)*." |
| 11 | (***EPA General Comment #7***) Section 4.9 (Backfill, Compaction, and Testing of Excavated Trenches, Page 31) of the Draft RACR states that imported backfill material from the "Jericho" soil stockpile underwent | The Jericho soil stockpile, also known as Decker Island aggregate material, consisted of clean (i.e., radiologically non-impacted) offsite fill material brought |

| Response to Document Review Comments | | | |
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| | appropriate screening and Navy approval in Section; however, Attachment 1 (Jericho Soil Stockpile Radiological Screening Data) does not present results for Sr-90 or Pu-239, which are radionuclides of concern at Parcel D-1. It is uncertain if soil was tested for these radionuclides prior to using the Jericho soil stockpile as backfill material. Parcel D-1 should not be approved for unrestricted use until the fill material is tested for all radionuclides of concern. Please explain why the Jericho soil backfill material was not tested for all radionuclides of concern, notably Sr-90 and Pu-239. Alternatively, please sample the Jericho soil backfill to analyze for Sr-90 and Pu-39 and present results prior to finalization of the RACR to ensure removal action goals were met. | onsite. The purpose of the sampling was to verify that the material did not contain NORM in concentrations above the release criteria. Attachment 1 was replaced with the complete borrow source assessment, which includes geotechnical, chemical, and radiological test data results. |
| 12 | (***EPA General Comment #8***) The draft describes unexpected radiological objects found in sediment used as fill. Though beyond the scope of these comments, this finding raises the question of potential similar situations elsewhere on the Shipyard where sediment could also have been used as fill and where Tetra Tech EC's practices may have always followed Workplan requirements. We can revisit this question separately later. | The comment is noted. |
| 13 | (***EPA Specific Comment #1)*** - **Section 4.4, Trench Excavation, Page 24**: The third paragraph states that abandoned steam piping wrapped in asbestos-containing material was found and an asbestos contractor was brought in to monitor the air; however, the results of this air monitoring are not presented in this section or referenced. If the results are available, please reference the appropriate section or appendix in the Draft RACR. | Section 4.4, last paragraph, was modified to clarify that air monitoring for asbestos was not initiated, but continued. The air sample results for asbestos are found in Appendix E. |

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| 14 | (***EPA Specific Comment #2***) - **Section 4.5, Radiological Screening Yard Operations, Page 27**: Section 4.5 states that samples of soil excavated from installation restoration (IR) sites were analyzed for re-use as backfill or waste characterization but does not discuss what constituents were detected above chemical clean-up goals or how much soil was disposed. As Appendix K, IR Site Chemistry Sampling Results only contains laboratory data, a summary of chemical exceedances that resulted in the off-site disposal of soil should be provided. Please revise the Draft RACR to include a discussion of constituents found above clean-up goals in excavated soil and an associated summary table. | Exhibit 4-2 was modified to include the volume of screened soil disposed as hazardous waste (63 $m^3$). Section 4.5, next to last paragraph, was modified to discuss the specifics of the sample exceedance: "*Only one sample exceeded the IR Program site chemical clean-up goal. The sample exceedance was for benzo(a)pyrene in IR 70, which is associated with Zone P. The exceedance resulted in the excavated soil, approximately 63 $m^3$, being disposed as hazardous waste*." |
| 15 | (***EPA Specific Comment #3***) – **Section 4.6, Removal of Piping and System Components, Pgs 27 through 28:** Section 4.6 indicates that non-soil material was characterized, handled, and properly disposed of; however, the volume of non-soil disposed of and the landfill to which it was sent to is not discussed. Additionally, while Section 9.0, Waste Management (Pages 54 through 55), briefly discusses waste management practices, the volume of non-soil disposed off-site is unclear. Please revise the Draft RACR to include additional detail regarding the volume and disposal of non-soil material removed. | A sentence was added to Section 4.6, 1st paragraph, stating: "*Approximately 1,642 linear m of piping were removed*." As noted in Section 4.8, 2nd paragraph, piping and non-soil material that exceeded the clean-up goals were turned over to the Navy's LLRW waste contractor. A sentence was also added to Section 9.0 explaining, "*Since the waste was aggregated with that generated by other HPNS projects, no specific volumes for this project are available*." Lastly, a sentence was added to Section 9.1 stating, "*The LLRW was shipped for disposal to the US Ecology Idaho facility in Grand View, Idaho*.". |
| 16 | (***EPA Minor Comment #1***) – **Appendix H, Daily Activity Reports, PDF Page 2370 and PDF Page 2467:** Several pages within Appendix H are out of order, including the Daily Activity Report dated 9/18/17 on PDF Page 2370 and Field Activity Report for 11-26-13 on PDF Page 2467. | The order of pages in Appendix H will be corrected in the final report. |

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| | Please ensure all daily reports are in chronological order. | |

| **Reviewer:** | **City and County of San Francisco, Department of Public Health, Environmental Health (SFDPH) Comments** from Ms. Amy Brownell, P.E., Environmental Engineer | **Date of Comments** | 22 November 2017 |
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| 17 | (***SFDPH General Comment #1***) The subject report describes buried radiological objects (or rusted particles that appear to have come from objects) identified and removed at Parcel D-1 during implementation of Phase II Radiological Removal Actions. The objects were in discrete locations in the top two feet of particular, mostly shoreline, areas of Parcel D-1. Based on the wording in this document, it seems that these objects were not part of the original conceptual site model and that the new theory to account for the objects found and the possibility that other objects may be buried deeper than two feet includes the approximate 1946 shoreline and other details on Exhibit 8-8. The conclusion of this report then attempts to wrap this new conceptual site model into the existing land use and activity restrictions framework that was developed during the CERCLA process for all the other parcels at HPNS. It is also not clear what specific area would be subject to this new conceptual site model. It does not appear that the Navy is proposing that all of the D-1 Phase II Areas or other non-Phase II areas should be subject to this greater than two feet concern. We are not in favor of restrictions being added to areas of Parcel D-1 where there is no evidence to support the need for such restrictions. | Section 2.2 addresses the conceptual site model for Hunters Point. Section 2.2.1 includes, as a known and potential source of contamination, the "*burial along with excavated fill materials while increasing the footprint of HPNS*." This identified source would include dredge material containing radioactive debris that was used to build up the shoreline post-WWII to its present state. Section 8.3 was modified to better explain and provide definition to the Navy's understanding regarding the area impacted by dredge material used to expand the land to its current state: "*Based on the Navy's understanding of how shoreline expansion occurred, that potential [for ROs to be present in material below 2-ft bgs in Parcel D-1 Phase II areas] is largely limited to areas east of the 1946 shoreline. The likelihood of ROs outside that area is considered incidental and of low probability*." |

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| | Parcel D-1, unlike Parcel E-2, Parcel E shoreline and what is now referred to as Lot 2 on IR 7/18, does not include specific restriction language in prior documents for Areas Requiring Institutional Controls for Radionuclides. It is not clear if the Navy wishes to add that type of wording to the documents for Parcel D-1. Or is the Navy proposing a new restriction or new RMP language for this undefined area? Based on our understanding during years of discussion about the framework for the general land use and activity restrictions language that applies to all areas requiring Durable Covers at HPNS, we are not clear that this new conceptual site model can be easily accommodated under the existing restricted activities framework. We would like to discuss this issue and the Navy's proposal, including the aerial extent, to address this new conceptual site model and agree on language to describe this issue in this document. The current language and exhibits do not appear to provide enough detail. | The Navy agrees that areas without potential for ROs should not be restricted. The document has been changed to be consistent with restrictions at Parcels E, E-2, and 7/18. |
| 18 | (***SFDPH Specific Comment #2***) - **Executive Summary, Page viii, last paragraph; and Section 8.3, Assessment of Results, page 53, last paragraph; and Section 13.1, Action Memorandum Release Criteria, Page 62**: Please see General Comment #1 and please plan on discussing with us how the current framework of activity restrictions will address these concerns. | Information on land use controls will be addressed separate from the RACR. |
| 19 | (***SFDPH Specific Comment #3***) - **Section 1.3, Current and Future Reuse, Page 5:** Parcel D-1 includes a portion of the Shipyard South Multi-Use district (includes residential) in addition to HPS Shoreline Open Space area. Please revise the planned use description for Parcel D-1 to: "The future planned use for Parcel D-1 is mixed use residential and shoreline | Section 1.3 revised as recommended. |

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| | open space as described by the Hunters Point Shipyard Redevelopment Plan (San Francisco Redevelopment Agency, 2010)." | |
| 20 | (***SFDPH Specific Comment #4***) - **Section 3.0, Field Activities Overview**: Section 3.0 states "Gilbane coordinated license responsibilities and management of radioactive material, including waste, with the Navy and other HPNS contractors…" Please identify the contractors referred to by this statement. | Parties to the MOU as of October 2016 were added to Section 3.0. The parties included TetraTech EC, Inc.; B & B Environmental Safety, Inc.; Chicago Bridge & Iron (CB&I); and Gilbane. |
| 21 | (***SFDPH Specific Comment #5***) - **Section 3.3.1, Radiological Analyses, page 17, paragraph 2:** This section states that "samples for which gamma spectroscopy results indicated the presence of Cs-137 above its release criterion were also analyzed for total strontium." Should Field Variance No 003 be identified as an exception? The variance states 10% for pipe sediment samples exceeding the Cs-137 release criterion were selected for conditional Sr-90 analysis. | Section 3.3.1, 2nd paragraph, was modified to clarify the samples analyzed for total Sr: "*In addition, with the exception of waste characterization samples (e.g., samples collected of sediment in SSSD piping), samples for which gamma spectroscopy results indicated the presence of Cs-137 above its clean-up goal were also analyzed for total strontium*." The rule for analyzing for total Sr based on a Cs-137 exceedance was limited in its application to confirmation samples and was not applied to samples collected for characterizing pipe sediment for waste disposal as well as for informing excavation activities regarding possible contamination due to leakage. |
| 22 | (***SFDPH Specific Comment #6***) - **Section 3.3.2, Chemical Analyses, page 17, and Sections 9.2 and 9.3, Hazardous Waste and Non-Hazardous Waste, Page 55**: Please summarize the results of the chemical analyses. Please identify comparison criteria and any compounds detected in soil above those levels. Were any chemicals present above | The chemical sampling results of excavated soil are discussed in Section 4.5, including the number of samples exceeding chemical clean-up goals (one sample), the chemical (benzo(a)pyrene), and the resulting volume of excavated soil disposed as |

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| | the remediation goals established for Parcel D-1? Section 9.2 implies some excavated soil may have been classified as hazardous waste, but does not identify quantity, origin or final disposition. Please clarify and provide these additional details if applicable. | hazardous waste (63 $m^3$). See response to Item 14. A reference to Section 4.5 was added to Section 3.3.2.<br><br>A second paragraph has been added to Section 3.3.2: " Chemical samples were screened against the remediation goals (RG) for IR Sites presented in the ROD: 11.1 mg/kg for arsenic, 0.33 mg/kg for benzo(a)pyrene, 1.76 mg/kg for benzo(b)fluoranthene, and 6,889 mg/kg for manganese. There were no exceedances, with the exception of sample 04-PD-IR70-003 which exceeded the RG for benzo(a)pyrene at 340 J mg/kg. The associated soil, originating in IR-70, was disposed of as hazardous waste as described further in Section 9.2." |
| 23 | (***SFDPH Specific Comment #7***) - **Section 3.2, Gamma Walkover Survey, page 15**: Please define the criteria used to identify "potential for elevated residual radioactivity" during gamma walkover surveys. | The sentence was modified to state, "*A gamma walkover survey (GWS) was performed prior to sampling to identify locations with the highest potential for elevated residual radioactivity based on their measured levels of gamma radiation*." |
| 24 | (***SFDPH Specific Comment #8***) - **Section 3.3.3, Data Assessment, page 17**: Please identify entity or entities performing data quality assessment and verification. Please summarize the results of data quality verification activities. For example, please provide a summary of the results of the gamma walkover survey verification activities. Does evaluation of the position-correlated measurement data confirm adequate coverage and adherence to set speeds? In regards to | Information was added to Section 3.3.3 that describe the entities who performed the data assessment activities: "*A combination of project team members from Gilbane and two of its subcontractors, Envirachem and timmy's Team, including the Project Manager, Data Manager, Project Chemist, and Certified Health Physicist, performed the data assessment of the GWS* |

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| | laboratory data, please provide a summary of key findings of the quality control summary reports. | *data. The data assessment activities are summarized in Section 3.2 and presented in the respective project reports (Gilbane, 2016a through e, and 2017a and 2017b). An independent third-party validation company, Environmental Synectics, Inc. (Synectics) of Sacramento, California, performed a manual EPA Level III review on approximately 80 percent of the sampling events, and an EPA Level IV data validation on the remaining 20 percent of the results...*"<br><br>An extensive summary of key findings of the quality control summary reports was added to Section 3.3.3. In addition, a discussion of GWS data verification activities was added to Section 3.2: "*Collected data were retrieved from the RS-700 and processed using numerical and graphical methods. First, the data were plotted to ensure adequate scan coverage. A tractor speed histogram was developed using the position-correlated data as a quality control check to verify the proper speed of the detector over the ground. The data were checked for errors as well as examined for potential outliers and other anomalous features. Descriptive statistics (e.g., range, median, mean, and standard deviation) were used to assess the data set. The data were graphed on a cumulative frequency diagram to test departure from normality and to reveal characteristics of the data distribution such as dissimilar populations and data set outliers that may not be apparent otherwise*." |

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| 25 | (***SFDPH Specific Comment #9***) - **Section 4.5, Radiological Screening Yard Operations, page 25, third paragraph:** Please define point source. | To improve clarity, the term '*point sources'* was replaced with '*discrete radioactive objects*.' |
| 26 | (***SFDPH Specific Comment #10***) - **Section 4.6, Removal of Piping and System Components, pages 27 and 28:** The last sentence of page 27 indicates that non-soil material encountered during excavation "such as radioactively contaminated sand blast grit; fire brick; and drums, bottles, jars, and small containers with unknown content" were not sent to the radiological screening yard. Please confirm whether these items were in fact identified. If so, please identify the objects' origins, characterization, and final disposition (e.g., off-site disposal as LLRW). | A sentence was added to Section 4.6 stating, "*Material that was identified as radioactive waste was handled as described in Section 9.1*." Since only a general inventory of items other than discrete radioactive objects was maintained, the specific items that were identified and disposed of as LLRW cannot be confirmed. The listed examples of specific non-soil material (i.e., radioactively contaminated sandblast grit; firebrick; and drums, bottles, jars, and small containers with unknown contents) was deleted. |
| 27 | (***SFDPH Specific Comment #11***) - **Section 4.10, Site Restoration, page 31, last sentence**: Please include a reference to Section 8.0. Also, please describe the final disposition of the RSY soil that was "scooped up". | A reference to Section 8.0 was added. In addition, the following description was added to Section 4.10, 2nd paragraph: "*The RSY pads were surveyed and sampled, then scooped up. Once determined to be non-LLRW, the pad material was removed and transferred to the Navy's basewide hazardous waste contractor for waste characterization and appropriate disposal*." |
| 28 | (***SFDPH Specific Comment #12***) - **Section 5.5, Results and Analysis, Page 35, last paragraph and Section 6.4, Results and Analysis, Page 39, last paragraph**: See General Comment #1. Referenced Section 8.3 needs to better describe the aerial [areal] extent and the exact details of the Navy's proposal. | Section 8.3 was modified to better explain and provide definition to the Navy's understanding regarding the area impacted by dredge material used to expand the land to its current state: "*Based on the Navy's understanding of how shoreline expansion occurred, that potential [for ROs to be present in material below 2-* |

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| | | *ft bgs in Parcel D-1 Phase II areas] is largely limited to areas east of the 1946 shoreline. The likelihood of ROs outside that area is considered incidental and of low probability*." Exhibit 8-8 was revised accordingly. Information on land use controls will be presented separate from the RACR. |
| 29 | (***SFDPH Specific Comment #13***) - **Section 7.0, Railroad Tie Survey and Disposal, page 40**: Please provide a "Description and Background" section similar to that provided for the other Phase II investigation areas. It is unclear why railroad ties were investigated as potentially radiologically impacted. | A new Section 7.1 was added: "*Salvaged creosote railroad ties collected over time from various areas across HPNS were stockpiled in two locations in Parcel D-1: (1) the southern portion of Parcel D-1 near Ship Berths 22 and 29, and (2) at the head of Gun Mole Pier adjacent to Berth 14, as shown in Exhibit 1-2. The estimated 12,000 used railroad ties existed in various deteriorated states. Since they were considered radiologically impacted, the railroad ties required some form of radiological survey and sampling in order to achieve the Navy's goal of releasing them from radiological controls and disposing them as non-LLRW*." |
| 30 | (***SFDPH Specific Comment #14***) - **Exhibit 8-8, Locations where Discrete Radioactive Objects were Recovered, page 52 and Section 8.3, Assessment of Results, page 53**: The last paragraph states "…there is the potential for ROs to be present in material below 2 ft bgs in Parcel D-1 Phase II areas where shoreline expansion occurred in Parcel D-1 since 1946 (i.e., where dredge material from the Bay was used to create the present shoreline)." Please clearly identify this area on Exhibit 8-8 and label as "Area with Potential for Buried ROs." Was | Dredge spoils were used to expand the land present in 1946 to its current state in Parcel D-1. The ROs found inside of the 1946 shoreline are consistent with the conceptual site model of dredge spoils. Section 8.3 was modified to better explain and provide definition to the Navy's understanding regarding the area impacted by dredge material used to expand the land to its current state as follows: "*Based on the Navy's understanding of* |

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| | dredge material used elsewhere in Parcel D-1/other parcels inland of the 1946 shoreline? We note that Exhibit 8-8 shows ROs inland of the historic shoreline. Exhibit 8-8 needs to be revised or a new figure needs to be created to address the concerns in Comment #1. | *how shoreline expansion occurred, that potential [for ROs to be present in material below 2-ft bgs in Parcel D-1 Phase II areas] is largely limited to areas east of the 1946 shoreline. The likelihood of ROs outside that area is considered incidental and of low probability* ". Exhibit 8-8 was revised accordingly. Information. Information on land use controls will be presented separate from the RACR. |
| 31 | (***SFDPH Specific Comment #15***) - **Section 13.2, Dose and Risk Modeling, Page 63, last paragraph**: See Comment #1. It is not clear how the existing restricted activity framework will address the concepts described in this paragraph. | Information on land use controls will be presented separate from the RACR. |

| **Reviewer:** | **City and County of San Francisco, Department of Public Health, Environmental Health (SFDPH) Comments** from Ms. Amy Brownell, P.E., Environmental Engineer | **Date of Comments** | 6 February 2018 |
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| 32 | (***SFDPH Comment #1 - Response to General Comment 1 and Modifications Requested based on review of the Draft Final Document***): For SFDPH General Comment #1 and Specific Comments #2, #14 and #15, your response has referenced information on land use controls that will be presented separate from the RACR. We appreciate that the Navy has held additional discussions with us about the 1946 shoreline in this area. We understand that the Navy attributes the presence of radiological objects (ROs) in fill material below two feet to the post-WWII placement of dredge material containing radioactive | Section 13.3, last paragraph, was modified to state, "*Land use and activity restrictions that are currently in place prohibit land-disturbing activities throughout Parcel D-1 in the interim until the LUC RD (ChaduxTt, 2011) is amended to appropriately mitigate any risk to human health relating to the potential presence of ROs in material below 2 ft bgs*." |

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| | debris. This information is important and explains the discovery of discrete ROs around the 1946 shoreline. As you have explained, the potential presence of ROs near the 1946 shoreline on Parcel D-1 will result in a subsequent document with an opportunity for review and comment (e.g. possibly a Memo to File) that will define required activity restrictions based on the possibility of buried radioactive objects below two feet. Since activity restrictions are part of Institutional Controls which are part of the remedy, it seems that the FFA Signatories cannot approve that this Remedial Action and RACR are complete, unlike all prior parcels where the Institutional Control framework was complete and agreed to by all parties prior to final RACR approval.<br><br>We request that the area requiring institutional controls/land use controls be clearly shown on a figure in this document and then further defined in the referenced future document and that the future document acknowledge uncertainties related to placement of dredge material containing radiological debris. Should the area be slightly larger than the 1946 shoreline and extend to cover to the southwest where ROs have been found or possibly extend to the Parcel D-1/Parcel E boundary? As we stated in previous comments, we are not in favor of a restriction over a wide area solely based on the lack of information. But in this case, there is uncertainty in the exact areal extent of the concern even with the information available. Specifically, the following uncertainties may be helpful in evaluating an appropriate boundary for the ARIC: (1) The Navy has not provided enough supporting information to define the fill placement depth pre- vs. post-use of ROs. Fill is present up to 34 feet thick at IR-53 around Buildings | Exhibit 8-8 was modified to show the area requiring institutional controls (ARIC). The area is slightly larger than the 1946 shoreline approximation and includes the southwest area where ROs were found. Additional information regarding the basis for the ARIC was added as Section 8.3.2. |

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| | 525 and 530 (near RO-01, -02, and -09) as provided in the Parcel D Remedial Investigation Report and the depth at which ROs may be present is uncertain. This RACR states that "HPNS began using radioactive materials in shipyard operations and NRDL research projects in the early 1940s" and that the "surface of Parcel D-1 is fill and was constructed between approximately 1942 and 1947"; did the material placed pre-1946 include material other than dredge material?; (2) The radiological objects found land-ward of the approximate 1946 shoreline are not only found on the surface (i.e., < 0.5 feet bgs). Rather, the ROs are found up to 2 to 3 feet bgs, which is comparable in depth to those objects found bay-ward of the 1946 shoreline; (3) The accuracy of the approximate 1946 shoreline may vary based on the quality of the referenced aerials; and (4) The Navy cites grading of dredge material as "a ready explanation for the discovery of ROs outside of, but adjacent to, the 1946 shoreline."<br><br>In support of drawing the restriction line close to but not exactly on your currently presented 1946 shoreline, we recommend the following revisions to the Navy's proposed text: "Based on the Navy's understanding of how shoreline expansion occurred, ~~that~~ [the] potential for ROs to be present in material below 2-ft bgs in Parcel D-1 Phase II areas is largely limited to areas ~~east of~~ [around] the 1946 shoreline. The likelihood of ROs ~~outside that area~~ [moving away from the 1946 shoreline] is considered incidental and of low probability." | The text, now found in Section 8.3.1, 4th paragraph, was modified as recommended. Similar text found in the Executive Summary and in Section 13.3 was also modified as recommended. |
| 33 | (***SFDPH Comment #2 – Request for Regulatory Agencies)*** We urge the FFA Signatories to provide conditional approval of this RACR, once their concerns have been addressed, pending the subsequent document | Noted. Section 13.3, last paragraph, was modified to state, "*Land use and activity restrictions that are currently in place prohibit land-disturbing activities* |

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| | that will finalize the needed activity restrictions (i.e., the RACR is automatically deemed approved once the subsequent document is approved). In our opinion, the remedy isn't complete until all aspects, including activity restrictions, are defined and the framework for implementation is complete. | *throughout Parcel D-1 in the interim until the LUC RD (ChaduxTt, 2011) is amended to appropriately mitigate any risk to human health relating to the potential presence of ROs in material below 2 ft bgs*." |
| 34 | (***SFDPH Comment #3 – Response to Specific Comment #6, Section 3.3.2, Chemical Analyses, page 17, and Sections 9.2 and 9.3, Hazardous Waste and Non-Hazardous Waste, Page 55)*** The Navy's Response addresses specific comment #6; however, given the detection of benzo(a)pyrene at 340 J mg/kg, we are curious if the Navy confirmed the origin of the soil and whether the area is already being addressed under a chemical remedial action or a petroleum program remedial action? | The Navy has done hot spot removals in the past as remedial action in Parcel G. The exceedance identified in IR-70 was based on three samples collected with results for benzo(a)pyrene reported as 0.26, 0.28, and 0.34 mg/kg. The soil was disposed as hazardous waste and clean fill brought in has backfill, which effectively served as a remedial action in response to the elevated chemical of concern. |
| 35 | (***SFDPH Comment #4 – Section 3.2, Gamma Walkover Survey, page 15)*** The Navy's response is adequate to explain the purpose of the survey but it doesn't address our comment. Our comment is asking what measurement (i.e. what number) the Navy uses as the comparison criteria "to identify locations with the highest potential for elevated residual radioactivity"? | A sentence was added to Section 3.2, 2nd paragraph stating, "*Locations with measurements greater than three standard deviations above the data set mean were routinely selected for biased sampling*." |
| 36 | (***SFDPH Comment #5 – Section 8.3 Assessment of Results, Exhibit 8-8, Page 55)*** Please label the fuchsia dotted line as the 1946 shoreline. | Exhibit 8-8 was modified to label the fuchsia dotted line as the 1946 shoreline approximation. |
| 37 | (***SFDPH Comment #6 – Section 13.3, Discrete Radioactive Objects, page 67)*** Section 13.3 states "Implementation of land use and activity restrictions as prescribed by the ROD (Navy, 2009) and further detailed | Section 13.3, last paragraph, was modified to state, "*Land use and activity restrictions that are currently in place prohibit land-disturbing activities throughout* |

| Item | Review Comment | Navy Response |
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| | by the Land Use Controls Remedial Design in the Final Design Basis Report For Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California (ChaduxTt, 2011), which prohibit land-disturbing activities throughout Parcel D-1, will appropriately mitigate any risk to human health relating to the potential presence of ROs in material below 2 ft bgs." Please see comment 1 and please either delete this statement or modify this statement to reference a subsequent document that will define required activity restrictions based on the possibility of buried ROs below two feet.<br><br>As written, the Navy's statement is referencing an activity restriction that is only one tiny piece of the framework that allows for redevelopment to happen while "appropriately mitigat[ing] any risk to human health". The referenced activity restriction is part of a framework, that includes a Risk Management Plan, that requires no extra soil handling procedures other than those listed in the Risk Management Plan which are similar to normal construction soil handling protocols. There are no handling protocols in that framework to "address the potential for ROs in subsurface below 2 feet" as stated in your RTCs. If you want to reference this particular activity restriction then you must also reference the future activity restrictions that your Response to Comments says you are going to present separate from this RACR because those are going to be the activity restrictions, based on your RTC's, that will apply to this area bayward of the 1946 shoreline. | *Parcel D-1 in the interim until the LUC RD (ChaduxTt, 2011) is amended to appropriately mitigate any risk to human health relating to the potential presence of ROs in material below 2 ft bgs*."<br><br>See response to first part of comment above. |
| 38 | (***SFDPH Minor Comment #1 – Section 1.2, Scope of Work, Page 5)*** Please delete the end of this sentence as follows: "This radiological | Section 1.2, last paragraph, was modified as recommended. |

| Response to Document Review Comments | | | |
|---|---|---|---|
| **Document Reviewed:** | ***Removal Action Completion Report Parcel D-1 Phase II Radiological Remediation and Support***, Hunters Point Naval Shipyard, San Francisco, California. | **Date of Document:** | DRAFT Aug 2017<br>DRAFT FINAL Jan 2017 |
| **Project Site:** | Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California | | |

| Item | Review Comment | Navy Response |
|---|---|---|
| | RACR does not address chemical contamination~~ and does not include or affected any other designated HPNS parcels~~." | |

| **Reviewer:** | **California Department of Toxic Substances Control (DTSC) Comments** from Ms. Juanita Bacey, Project Manager, Brownfields & Environmental Restoration | **Date of Comments** | Email correspondence dated 8 February 2018 |
|---|---|---|---|

| | | |
|---|---|---|
| 39 | Please note that CDPH EMB previously indicated that a recommendation for unrestricted release (RURR) will not be provided to those areas along the shoreline where soils below a depth of 2 feet were not investigated for ROCs (NRDL Area and Ship Berths 14, 21, 22, 29). Currently, the Executive Summary and Sections 8.3 and 13.3 of the Draft RACR indicate that land use and activity restrictions as indicated in the 2009 ROD or that are already in place will mitigate any risk to human health and prohibit land disturbing activities. The ROD land use restrictions are to address COCs left in place throughout the base, not ROCs. DTSC recommends revising these sections to indicate that additional restrictions to address ROCs in soil below 2 feet will be added to the land use restrictions already prescribed in the ROD (similar to those for IR07/18). | The wording in the cited sections was modified to read as follows: "*Land use and activity restrictions that are currently in place prohibit land-disturbing activities throughout Parcel D-1 in the interim until the Land Use Controls Remedial Design in the Final Design Basis Report For Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California (ChaduxTt, 2011) is amended to appropriately mitigate any risk to human health relating to the potential presence of ROs in material below 2 ft bgs*." |

| **Reviewer:** | **US Environmental Protection Agency (EPA) Comments** from Ms. Lily Lee, Remedial Project Manager | **Date of Comments** | Email correspondence dated 9 February 2018 |
|---|---|---|---|

| | | |
|---|---|---|
| 40 | ***(Evaluation of the Response to Item 10, EPA General Comment #6)*** The response partially addresses the comment. Specifically, the proposed revised text does not clarify which sample results were averaged. For example, it is unclear if only post-remediation confirmation samples were averaged for inclusion in the RESRAD dose and risk modeling or if bias sample results were included as well. | Section 4.7, 5th paragraph, 1st sentence was modified to state, "*Dose and risk modeling of the trench surfaces was performed in RESRAD using the analytical results of samples collected from both systematically-spaced and biased locations representing post-remediation or 'as-left' trench surfaces*." |

| Response to Document Review Comments | | | |
|---|---|---|---|
| **Document Reviewed:** | ***Removal Action Completion Report Parcel D-1 Phase II Radiological Remediation and Support***, Hunters Point Naval Shipyard, San Francisco, California. | **Date of Document:** | DRAFT Aug 2017<br>DRAFT FINAL Jan 2017 |
| **Project Site:** | Parcel D-1, Hunters Point Naval Shipyard, San Francisco, California | | |

| | | |
|---|---|---|
| | Please revise the proposed text to specify the sample results that were averaged for the RESRAD dose and risk modeling. | |

| **Reviewer:** | **California Department of Public Health (CDPH) Comments** via email from Ms. Juanita Bacey of DTSC (This review was performed in support of the Interagency Agreement between DTSC and CDPH.) | **Date of Comments** | Email correspondence dated 26 April 2018 |
|---|---|---|---|
| 41 | **(CDPH Specific Comment #1) – in reference to Navy response to Item #4:** Navy Response, Review Comment, Item number four, sentence number three; "Unrestricted release request and no further action recommendation for removed SSSD lines are warranted, because none of the SSSD trenches were located within the 1946 shoreline expansion area as potential for RO is limited only within the 1946 shoreline." An overlay of Exhibit 1-2, "Parcel D-1 Site Features Involving Phase II Removal Actions", on top of Exhibit 8-8, "Locations where Discrete Radioactive Objects were Removed", apparently shows multiple Sanitary Sewer and Storm Drains (SSSD) located whole and in part in the area labeled as, "Historical 1946 Shoreline". Please explain. | Exhibit 8-8 was modified to show the location of SSSD trenches within the 1946 shoreline area and the response to Item #4 was modified to read, "*Unrestricted release request and no further action recommendation for removed SSSD lines are warranted except for those SSSD trenches located within the 1946 shoreline expansion area*." | |
| 42 | **(CDPH Specific Comment #2) – Exhibit 8-8:** It is not clear to the reader if the blue hatched area marked as, "Restriction related to radioisotopes", on Exhibit 8-8, "Locations where Discrete Radioactive Objects were Removed"; is the same area(s) as the, "buffer zone", referred to in page 57, paragraph one, sentence five. Please clarify. | The legend in Exhibit 8-8 was modified to call the cross-hatching the '*Area Requiring Institutional Controls*.' A sentence was included in the new Section 8.3.2 that states, "*Therefore, a buffer zone extending beyond the 1946 shoreline approximation is included with the 2 ft bgs restriction for Parcel D-1 Phase II, which is referred to as the area requiring institutional controls (see Exhibit 8-8).*" | |
| 43 | **(CDPH Specific Comment #3) – in reference to Navy response to Item #4:** Navy Response, Review Comment, Item number four, sentence | | |

| | | |
|---|---|---|
| | number four: "A couple of ROs recovered outside of the 1946 shoreline expansion area within the trench excavation zones are incidental and the likelihood of ROs outside that area is considered incidental and of low probability." | |
| | a. Please note that the sentence number three states, "...as potential for RO is limited only within the 1946 shoreline." Please resolve apparent contradiction. | Sentences were modified to read, "…*the potential is largely limited to areas around the 1946 shoreline (Exhibit 8-8). The likelihood of ROs moving away from the 1946 shoreline is considered incidental and of low probability*." |
| | b. Of particular concern are RO-03 and RO-04; which according to Exhibit 8-7, "Recovered Radioactive Objects Data", page 54, are deck markers recovered from Trenches #04-PD-015, Zone O, and #04-PD-016, Zone P, respectively. These ROs are solid deck markers; and therefore cannot be considered effusions from the SSSD line which was removed. Please present a Conceptual Site Model (CSM) which explains the presence of solid deck markers ROs outside the Historical 1946 Shoreline. | A new Section 8.3.2, entitled, '*Conceptual Site Model*,' was added to explain the presence of ROs outside the historical 1946 shoreline approximation. |
| | c. A review of, "Exhibit 8-8, "Locations where Discrete Radioactive Objects were Removed", shows that seven Radiological Objects (ROs) were located inside of the "Historical 1946 Shoreline", while six ROs were located outside of the "Historical 1946 Shoreline". This may be more accurately stated as a rough equivalency of 54 percent to 46 percent. Please present a Conceptual Site Model (CSM) which explains the presence of ROs outside the Historical 1946 Shoreline. | A new Section 8.3.2, entitled, '*Conceptual Site Model*,' was added to explain the presence of ROs both inside and outside the historical 1946 shoreline approximation. |

# ATTACHMENTS

## (Available Electronically)

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# ATTACHMENT 1

# JERICHO IMPORT MATERIAL ACCEPTANCE DATA

# (Available Electronically)

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# Borrow Source Assessment

| *Contract No.* N62473-06-D-2608 | *CTO No:* 004 | *Borrow Source ID:* BS-DIA |
|---|---|---|

| | |
|---|---|
| *Preparer:* William Schmidt | *Date:* 10/26/2010 |
| *Planned Backfill Usage:* Soil Cover | |
| *Source of Material:* Decker Island Aggregates | |
| *Location of Borrow Source:* The Decker Island Aggregates borrow source is located on Mare Island next to Vallejo, CA in Western Solano County. The approximation address of the location is 680 Nimitz Ave, Vallejo, CA 94592. | |
| *Estimated Quantity of Borrow Available:* 51,000 tons | |

| | *Geotechnical* | *Chemistry* | *Radiological* |
|---|---|---|---|
| *Sample I.D.:* | BS-DIA-05 F 11/4/10 | BS-DIA-01 through -04 | ERA-DIA-001 through -005 |

ATTACHMENTS

| | *Attached* | *Not Applicable* | *Specify* |
|---|---|---|---|
| *Work Plan Section/Tables for geotechnical:* | X | | Final Design Basis Report, Specifications Section 31 00 00 Earthwork, Paragraph 2.1.1 |
| *Geotechnical Data:* | X | BS-DIA-05 S 11/9/10 | ~~BS-DD-01~~ Geotechnical Lab Data & Geotechnical Data Summary and Comparison Table |
| *Logs of Subsurface Explorations:* | | X | |
| *SAP Section/Tables for Analytical:* | X | | Remedial Action Work Plan, Appendix B Sampling and Analysis Plan, Worksheet 15.1-15.7 |
| *Chemistry Data:* | X | | BS-DIA-01 through -04 Chemistry Lab Data & Chemistry Data Summary and PAL Comparison Table |
| *SAP Section/Tables for Radiological:* | X | | Remedial Action Work Plan, Appendix B Sampling and Analysis Plan, Worksheet 15.8 |
| *Radiological Data (onsite):* | X | | ERA-DIA-001 through -005 Radiological Lab Data & TtEC Acceptance E-mail |
| *Radiological Data (offsite):* | | X | |
| *Other:* | | | |

GEOTECHNICAL DATA EVALUATION

| Class 1 Results are below established standards | Class 3 One or more results exceeded established standards |
|---|---|
| [X] | [ ] |

*Explanation for Class 3 (Attach additional sheet if necessary):*
NA

| *Engineer Signature* | *Date* 11/2/2010 |
|---|---|



ERRG

# Borrow Source Assessment

| *Contract No.* N62473-06-D-2608 | *CTO No:* 004 | *Borrow Source ID:* BS-DIA |
|---|---|---|

## CHEMISTRY DATA EVALUATION

| Class 1 | Class 2 | Class 3 |
|---|---|---|
| Analytes are below established criteria<br><br>**AND**<br><br>Analytes without established standards are not detected<br><br>[ X ] | Non-metal analytes are below the PALs<br><br>**AND**<br><br>Metal analytes are below the PALs<br><br>**AND**<br><br>Detected analytes without an established PAL are deemed 'acceptable' by the Chemist<br><br>[ ] | One or more non-metal analytes exceeds the PALs<br><br>**OR**<br><br>One or more metal analytes exceeds the PALs<br><br>**OR**<br><br>Detected analytes without an established PAL are deemed "not acceptable" by the Chemist<br>[ ] |

*Explanation for Class 2 or 3: (Attach additional sheet if necessary):*
NA

| *Chemist Signature:* Mary K Holland | *Date:* 11/2/2010 |
|---|---|

## RADIOLOGICAL DATA EVALUATION

| Class 1 | Class 3 |
|---|---|
| Results are below established standards<br><br>[ X ] | One or more results exceeded established standards<br><br>[ ] |

*Explanation for Class 3 (Attach additional sheet if necessary)*
See Tetra-tech acceptance for radionuclides of concern.

| *RSO Signature:* Erik J. Albrecht | *Date:* 11/2/2010 |
|---|---|

## APPROVAL

| *Project QC Manager Signature:* | *Date:* 11/2/2010 |
|---|---|
| *Project Manager Signature:* | *Date:* 11/2/2010 |
| *DON Representative Signature:* | *Date:* 11/8/2010 |

| | |
|---|---|
| **From:** | Slack, Matthew L CIV SEA 04 04N |
| **To:** | John Sourial; |
| **cc:** | Urizar, Lara L CIV NAVFAC SW, PACO; Montgomery, Shanti; Abkemeier, Erik; Elizabeth Binning; |
| **Subject:** | RE: Borrow Source Concurrence |
| **Date:** | Tuesday, November 30, 2010 8:59:10 AM |

John,
I have reviewed the data for the two backfill sources and concur with use of these sites for fill at IR Site 7 and 18.

Matt

-----Original Message-----
From: John Sourial [mailto:john.sourial@errg.com]
Sent: Monday, November 29, 2010 12:15
To: Slack, Matthew L CIV SEA 04 04N
Cc: Urizar, Lara L CIV NAVFAC SW, PACO; Montgomery, Shanti; Abkemeier, Erik; Elizabeth Binning
Subject: RE: Borrow Source Concurrence
Importance: High

Hi Matt,

We haven't received a response from you regarding concurrence to use these two backfill sources (see email below dated November 10, including original attachment). Our plan is to start importing material one week from today, so our hope is to receive concurrence from RASO as soon as possible. Thanks.

--John Sourial, P.E., C.Q.E.

ERRG | Engineering/Remediation Resources, Inc.
Mobile: 415.559.8232 | Direct: 415.848.7103

From: Elizabeth Binning
Sent: Wednesday, November 10, 2010 10:17 AM
To: 'Matt Slack (Matthew.slack@navy.mil)'

Cc: Urizar, Lara L CIV NAVFAC SW <lara.urizar@navy.mil> (lara.urizar@navy.mil); John Sourial; Montgomery, Shanti; Abkemeier, Erik
Subject: Borrow Source Concurrence

Matt -

ERRG is requesting RASO concurrence on borrow sources BS-DIA and BS-DD. The radiological data has already been reviewed by Erik Abkemeier, TtEC's RSO, for compliance with the established radiological standards. I have attached the borrow source assessment reports that I submitted to the ROICC for your reference. The pertinent radiological data is included on pages 129-138 for BS-DIA and pages 315-321 for BS-DD. Please let me know if you have any questions or require any further information. Thanks.

Liz Binning, PE, LEED AP

Project Engineer

Engineering/Remediation Resources Group (ERRG), Inc.

115 Sansome Street, Suite 200 | San Francisco, CA 94104

Main: (415) 395-9974 | Fax: (415) 395-9983 | Cell: (925) 383-3407

elizabeth.binning@errg.com

**Final Design Basis Report,**
**Specifications Section 31 00 00 Earthwork, Paragraph 2.1.1**

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 EQUIPMENT

Equipment used to place the select fill layers shall be as described in the approved Materials Handling Plan. Equipment shall not accelerate or brake suddenly, turn sharply, or be operated at speeds exceeding 5.0 miles per hour.

PART 2 PRODUCTS

2.1 COMPACTED COVER MATERIAL AND EROSION RESISTANT LAYER MATERIAL

Imported material used in the soil cover shall conform to specifications of 2.1.1 of this section. The soil shall be free of debris, roots, wood, scrap metal, vegetation, refuse, soft unsound particles, and deleterious or objectionable materials.

2.1.1 Soil Classification

The soil cover below 12 inches depth shall be ASTM D 2487-06e1, classification SM, SC, CL, or ML, with a maximum liquid limit of 45 percent and a maximum plasticity index of 25 percent per ASTM D 4318-05. The maximum particle size shall be 3 inches in its largest dimension with at least 90 percent passing a ¾-inch sieve, and at least 60 percent passing the No. 4 sieve, and not more than 60% passing a No. 200 sieve.

The soil in the upper 12 inches of the soil cover shall be ASTM D 2487-06e1, classification SM or SC, with a maximum liquid limit of 35 percent and a maximum plasticity index of 15 percent per ASTM D 4318-05. The maximum particle size shall be 3 inches in its largest dimension with at least 90 percent passing a ¾-inch sieve, at least 60 percent passing the No. 4 sieve, and not more than 30 percent passing a No. 200 sieve.

Refer to Section 35 31 19 Coastal Protection for fill material to be used under the revetment and below the high water elevation.

2.2 COMPOSITE TURF REINFORCED MATTING (CTRM)

The composite turf reinforcement mat (CTRM) shall be a machine-produced mat of 100 percent natural fiber matrix incorporated into a permanent three-dimensional netting structure. The matrix shall be stitch bonded between a heavy duty ultraviolet (UV) stabilized bottom net, crimped intermediate netting, and a heavy-duty, UV-stabilized top net. The crimped netting shall form prominent, closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together with UV-stabilized polypropylene thread to form a permanent three-dimensional structure. Matting shall be three-dimensional geomatrix of heavy nylon monofilaments fused at their intersections. Ninety percent of the geomatrix shall be open space available for soil and root interaction with filaments. Matting shall have three-dimensional strength without laminated or stitched layers. The matting shall be a minimum weight of 8 ounces per square yard with a minimum thickness of 0.4 inches. In accordance with ASTM D 5034, the matting shall have a minimum tensile strength of 85 pounds per foot in each direction. The matting shall be for permanent service.

**BS-DIA-01 Geotechnical Lab Data &**
**Geotechnical Data Summary and Comparison Table**

(b) (4)

(b) (4)

(b) (4)

(b) (4)

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**Remedial Action Work Plan,**
**Appendix B Sampling and Analysis Plan, Worksheet 15.1-15.7**

DCN: ITSI-0808-0004-0076, 8 May 2019

## SAP WORKSHEET #15.1 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Soil

**Analytical Group:** VOCs and TPH-g

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[g] | Method Detection Limit (µg/kg) |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | 2,000 | EPA RSL[b] | 1,000 | 5 | 0.41 |
| 1,1,1-Trichloroethane | 71-55-6 | 9,000,000 | EPA RSL[b] | 4,500,000 | 5 | 0.36 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 590 | EPA RSL[b] | 295 | 5 | 0.68 |
| 1,1,2-Trichloroethane | 79-00-5 | 1,100 | EPA RSL[b] | 550 | 5 | 0.44 |
| 1,1-Dichloroethane | 75-34-3 | 3,400 | EPA RSL[b] | 1,700 | 5 | 0.29 |
| 1,1-Dichloroethene | 75-35-4 | 250,000 | EPA RSL[b] | 125,000 | 5 | 0.26 |
| 1,1-Dichloropropene | 563-58-6 | -- | None | -- | 5 | 0.37 |
| 1,2,3-Trichlorobenzene | 87-61-6 | -- | None | -- | 5 | 0.75 |
| 1,2,3-Trichloropropane | 96-18-4 | 18 | EPA RSL[b] | 9 | 5 | 0.76 |
| 1,2,4-Trichlorobenzene | 120-82-1 | 87,000 | EPA RSL[b] | 43,500 | 5 | 0.75 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 67,000 | EPA RSL[b] | 33,500 | 5 | 0.51 |
| 1,2-Dibromo-3-chloropropane (DBCP) | 96-12-8 | 5.6 | EPA RSL[b] | 2.8 | 10 | 0.88 |
| 1,2-Dibromoethane (EDB) | 106-93-4 | 34 | EPA RSL[b] | 17 | 10 | 0.27 |
| 1,2-Dichlorobenzene | 95-50-1 | 2,000,000 | EPA RSL[b] | 1,000,000 | 5 | 0.64 |
| 1,2-Dichloroethane | 107-06-2 | 450 | EPA RSL[b] | 225 | 5 | 0.73 |
| 1,2-Dichloropropane | 78-87-5 | 930 | EPA RSL[b] | 465 | 5 | 0.6 |
| 1,3,5-Trimethylbenzene | 108-67-8 | 47,000 | EPA RSL[b] | 23,500 | 5 | 0.35 |
| 1,3-Dichlorobenzene | 541-73-1 | -- | None | -- | 5 | 0.3 |
| 1,3-Dichloropropane | 142-28-9 | 1,600,000 | EPA RSL[b] | 800,000 | 5 | 0.57 |
| 1,4-Dichlorobenzene | 106-46-7 | 2,600 | EPA RSL[b] | 1,300 | 5 | 0.78 |

Att 1-14

DCN: ITSI-0808-0004-0076, 8 May 2019

## SAP WORKSHEET #15.1 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** VOCs and TPH-g

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[g] | Method Detection Limit (µg/kg) |
| 2,2-Dichloropropane | 594-20-7 | -- | None | -- | 5 | 0.38 |
| 2-Butanone (MEK) | 78-93-3 | 28,000,000 | EPA RSL[b] | 14,000,000 | 10 | 1.4 |
| 2-Chlorotoluene | 95-49-8 | 1,600,000 | EPA RSL[b] | 800,000 | 5 | 0.62 |
| 2-Hexanone | 591-78-6 | -- | None | -- | 10 | 0.74 |
| 4-Chlorotoluene | 106-43-4 | 5,500,000 | EPA RSL[b] | 2,750,000 | 5 | 0.86 |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | 5,300,000 | EPA RSL[b] | 2,650,000 | 10 | 0.92 |
| Acetone | 67-64-1 | 61,000,000 | EPA RSL[b] | 30,500,000 | 20 | 1.4 |
| Benzene | 71-43-2 | 1,100 | EPA RSL[b] | 550 | 5 | 0.26 |
| Bromobenzene | 108-86-1 | 94,000 | EPA RSL[b] | 47,000 | 5 | 0.52 |
| Bromochloromethane | 74-97-5 | -- | None | -- | 5 | 0.94 |
| Bromodichloromethane | 75-27-4 | 280 | EPA RSL[b] | 140 | 5 | 0.53 |
| Bromoform | 75-25-2 | 61,000 | EPA RSL[b] | 30,500 | 5 | 0.4 |
| Bromomethane | 74-83-9 | 7,900 | EPA RSL[b] | 3,950 | 5 | 0.86 |
| Carbon disulfide | 75-15-0 | 670,000 | EPA RSL[b] | 335,000 | 10 | 0.49 |
| Carbon tetrachloride | 56-23-5 | 250 | EPA RSL[b] | 125 | 5 | 0.53 |
| Chlorobenzene | 108-90-7 | 310,000 | EPA RSL[b] | 155,000 | 5 | 0.29 |
| Chloroethane | 75-00-3 | 15,000,000 | EPA RSL[b] | 7,500,000 | 5 | 0.45 |
| Chloroform | 67-66-3 | 300 | EPA RSL[b] | 150 | 5 | 0.26 |
| Chloromethane | 74-97-3 | 120,000 | EPA RSL[b] | 60,000 | 5 | 0.5 |

Att 1-15

## SAP WORKSHEET #15.1 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** VOCs and TPH-g

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[g] | Method Detection Limit (µg/kg) |
| Cis-1,2-Dichloroethene | 156-59-2 | -- | None | -- | 5 | 0.89 |
| cis-1,3-Dichloropropene | 10061-01-5 | 170 | EPA RSL[b] | 85 | 5 | 0.64 |
| Dibromochloromethane | 124-48-1 | 700 | EPA RSL[b] | 350 | 5 | 0.21 |
| Dibromomethane | 74-95-3 | 780,000 | EPA RSL[b] | 390,000 | 5 | 0.58 |
| Dichlorodifluoromethane (Freon 12) | 75-71-8 | 190,000 | EPA RSL[b] | 95,000 | 5 | 0.89 |
| Ethylbenzene | 100-41-4 | 5,400 | EPA RSL[b] | 2,700 | 5 | 0.34 |
| Hexachlorobutadiene | 87-68-3 | 6,200 | EPA RSL[b] | 3,100 | 5 | 0.33 |
| Isopropylbenzene | 98-82-8 | 2,200,000 | EPA RSL[b] | 1,100,000 | 5 | 0.52 |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 39,000 | EPA RSL[b] | 19,500 | 10 | 0.6 |
| Methylene chloride | 75-09-2 | 11,000 | EPA RSL[b] | 5,500 | 5 | 0.84 |
| m-Xylene & p-Xylene | 136777-61-2 | 9,200 | EPA RSL[b] | 4,600 | 5 | 0.81 |
| Naphthalene | 91-20-3 | 1,700 | Parcel B ROD[c] | 850 | 5 | 0.63 |
| n-Butylbenzene | 104-51-8 | -- | None | -- | 5 | 0.66 |
| n-Propylbenzene | 103-65-1 | -- | None | -- | 5 | 0.29 |
| o-Xylene | 95-47-6 | 5,300,000 | EPA RSL[b] | 2,650,000 | 5 | 0.33 |
| p-Isopropyltoluene | 99-87-6 | -- | None | -- | 5 | 0.63 |
| sec-Butylbenzene | 135-98-8 | -- | None | -- | 5 | 0.75 |
| Styrene | 100-42-5 | 6,500,000 | EPA RSL[b] | 3,250,000 | 5 | 0.31 |
| tert-Butylbenzene | 98-06-6 | -- | None | -- | 5 | 0.54 |
| Tetrachloroethene | 127-18-4 | 480[h]<br>550[i] | Parcel B ROD[c]<br>EPA RSL[b] | 240 | 5 | 0.61 |

## SAP WORKSHEET #15.1 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** VOCs and TPH-g

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[g] | Method Detection Limit (µg/kg) |
| Toluene | 108-88-3 | 5,000,000 | EPA RSL[b] | 2,500,000 | 5 | 0.61 |
| trans-1,2-Dichloroethene | 156-60-5 | 110,000 | EPA RSL[b] | 55,000 | 5 | 0.38 |
| trans-1,3-Dichloropropene | 10061-02-6 | 1,700 | EPA RSL[b] | 850 | 5 | 0.75 |
| Trichloroethene | 79-01-6 | 2,900[h]<br>2,800[i] | Parcel B ROD[c]<br>EPA RSL[b] | 1,450 | 5 | 0.6 |
| Trichlorofluoromethane (Freon 11) | 75-69-4 | 800,000 | EPA RSL[b] | 400,000 | 10 | 0.34 |
| TPH as gasoline-range organics[d] | -3524 | 2,060[e] | Petroleum Hydrocarbons Corrective Action Plan, Parcel E[f] | 1,030[e] | 500[e] | 50[e] |
| Vinyl chloride | 75-01-4 | 60 | EPA RSL[b] | 30 | 5 | 0.36 |

Notes:

a. If an analyte does not have a PAL and is detected, the Navy and the regulatory agencies will discuss the analyte to determine an acceptable value for comparison.
b. EPA Region 9 RSL for residential soil (EPA, 2010).
c. Remedial goal from the Parcel B ROD (DON, 2009a)
d. No chemical abstracts service numbers are assigned for multicomponent TPH mixtures; however, the listed numbers are from the NIRIS EDD specifications lookup values for Analyte_ID located on NIRIS.
e. Values for TPH as gasoline-range organics reported in mg/kg
f. Screening criteria for shallow soil, residential reuse, from the Petroleum Hydrocarbons Correction Action Plan for Parcel E (Shaw, 2009)
g For those analytes where the quantitation limit exceeds the PAL, the laboratory will report detections to the method detection limit.
h. Pertains to Parcel B samples, only.
i. Pertains to Parcels G and D-1/UC-1 samples, only.

-- = not applicable
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

DCN: ITSI-0808-0004-0076, 8 May 2019

## SAP WORKSHEET #15.2 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Soil

**Analytical Group:** SVOCs

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[d] | Method Detection Limit (µg/kg) |
| 1,2,4-Trichlorobenzene | 120-82-1 | 87,000 | EPA RSL[b] | 43,500 | 330 | 83 |
| 1,2-Dichlorobenzene | 95-50-1 | 2,000,000 | EPA RSL[b] | 1,000,000 | 330 | 75 |
| 1,3-Dichlorobenzene | 541-73-1 | -- | None | -- | 330 | 78 |
| 1,4-Dichlorobenzene | 106-46-7 | 2,600 | EPA RSL[b] | 1,300 | 330 | 77 |
| 2,4,5-Trichlorophenol | 95-95-4 | 6,100,000 | EPA RSL[b] | 3,050,000 | 330 | 83 |
| 2,4,6-Trichlorophenol | 88-06-2 | 44,000 | EPA RSL[b] | 22,000 | 330 | 84 |
| 2,4-Dichlorophenol | 120-83-2 | 180,000 | EPA RSL[b] | 90,000 | 330 | 89 |
| 2,4-Dimethylphenol | 105-67-9 | 1,200,000 | EPA RSL[b] | 600,000 | 500 | 167 |
| 2,4-Dinitrophenol | 51-28-5 | 120,000 | EPA RSL[b] | 60,000 | 2000 | 214 |
| 2,4-Dinitrotoluene | 121-14-2 | 1,600 | EPA RSL[b] | 800 | 330 | 89 |
| 2,6-Dinitrophenol | 87-65-0 | -- | None | -- | 500 | 165 |
| 2,6-Dinitrotoluene | 606-20-2 | 61,000 | EPA RSL[b] | 30,500 | 330 | 99 |
| 2-Chloronaphthalene | 91-58-7 | 6,300,000 | EPA RSL[b] | 3,150,000 | 330 | 81 |
| 2-Chlorophenol | 95-57-8 | 390,000 | EPA RSL[b] | 195,000 | 330 | 88 |
| 2-Methylnaphthalene | 91-57-6 | 310,000 | EPA RSL[b] | 155,000 | 330 | 85 |
| 2-Methylphenol | 95-48-7 | 3,100,000 | EPA RSL[b] | 1,550,000 | 330 | 58 |
| 2-Nitroaniline | 88-74-4 | 180,000 | EPA RSL[b] | 90,000 | 1600 | 84 |
| 2-Nitrophenol | 88-75-5 | -- | None | -- | 330 | 82 |
| 3,3'-Dichlorobenzidine | 91-94-1 | 1,100 | EPA RSL[b] | 550 | 1600 | 94 |
| 3-Methylphenol and 4-Methylphenol | 65794-96-9 | -- | None | -- | 1000 | 330 |
| 3-Nitroaniline | 99-09-2 | -- | None | -- | 1600 | 167 |

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## SAP WORKSHEET #15.2 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** SVOCs

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[d] | Method Detection Limit (µg/kg) |
| 4,5-Dinitro-2-methylphenol | 534-52-1 | 6,100 | EPA RSL[b] | 3,050 | 2000 | 81 |
| 4-Bromophenyl phenyl ether | 101-55-3 | -- | None | -- | 330 | 85 |
| 4-Chloro-3-methylphenol | 59-50-7 | -- | None | -- | 330 | 92 |
| 4-Chloroaniline | 106-47-8 | 2,400 | EPA RSL[b] | 1,200 | 330 | 58 |
| 4-Chlorophenyl phenyl ether | 7005-72-3 | -- | None | -- | 330 | 93 |
| 4-Nitroaniline | 100-01-6 | 24,000 | EPA RSL[b] | 12,000 | 1600 | 88 |
| 4-Nitrophenol | 100-02-7 | -- | None | -- | 2000 | 280 |
| Acenaphthene | 83-32-9 | 3,400,000 | EPA RSL[b] | 1,700,000 | 330 | 83 |
| Acenaphthylene | 208-96-8 | -- | None | -- | 330 | 85 |
| Anthracene | 120-12-7 | 17,000,000 | EPA RSL[b] | 8,500,000 | 330 | 86 |
| Azobenzene | 103-33-3 | -- | None | -- | 330 | 92 |
| Benzo(a)anthracene | 56-55-3 | 370[e]<br>150[f] | Parcel B ROD[c]<br>EPA RSL[b] | 185 | 330 | 92 |
| Benzo(a)pyrene | 50-32-8 | 330[e]<br>150[f] | Parcel B ROD[c]<br>EPA RSL[b] | 165 | 330 | 94 |
| Benzo(b)fluoranthene | 205-99-2 | 340[e]<br>150[f] | Parcel B ROD[c]<br>EPA RSL[b] | 170 | 330 | 95 |
| Benzo(g,h,i)perylene | 191-24-2 | -- | None | -- | 330 | 110 |
| Benzo(k)fluoranthene | 207-08-9 | 340[e]<br>1,500[f] | Parcel B ROD[c]<br>EPA RSL[b] | 170 | 330 | 113 |
| Benzoic acid | 65-85-0 | 240,000,000 | EPA RSL[b] | 120,000,000 | 1600 | 289 |

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## SAP WORKSHEET #15.2 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** SVOCs

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[d] | Method Detection Limit (µg/kg) |
| Benzyl alcohol | 100-51-6 | 31,000,000 | EPA RSL[b] | 15,500,000 | 510 | 170 |
| Bis(2-chloroethoxy)methane | 111-91-1 | 180,000 | EPA RSL[b] | 90,000 | 330 | 88 |
| Bis(2-chloroethyl)ether | 111-44-4 | 190 | EPA RSL[b] | 95 | 330 | 81 |
| Bis(2-chloroisopropyl)ether | 108-60-1 | 3,500 | EPA RSL[b] | 1,750 | 330 | 79 |
| Bis(2-ethylhexyl)phthalate | 117-81-7 | 1,100[e]<br>35,000[f] | Parcel B ROD[c]<br>EPA RSL[b] | 550 | 330 | 98 |
| Butylbenzylphthalate | 85-68-7 | 260,000 | EPA RSL[b] | 130,000 | 330 | 95 |
| Carbazole | 86-74-8 | -- | None | -- | 330 | 95 |
| Chrysene | 218-01-9 | 15,000 | EPA RSL[b] | 7,500 | 330 | 84 |
| Dibenz(a,h)anthracene | 53-70-3 | 330[e]<br>150[f] | Parcel B ROD[c]<br>EPA RSL[b] | 165 | 330 | 102 |
| Dibenzofuran | 132-64-9 | -- | None | -- | 330 | 86 |
| Diethylphthalate | 84-66-2 | 49,000,000 | EPA RSL[b] | 24,500,000 | 330 | 90 |
| Dimethylphthalate | 131-11-3 | -- | None | -- | 330 | 87 |
| Di-n-butylphthalate | 84-74-2 | 6,100,000 | EPA RSL[b] | 3,050,000 | 330 | 97 |
| Di-n-octylphthalate | 117-84-0 | -- | None | -- | 330 | 97 |
| Fluoranthene | 206-44-0 | 2,300,000 | EPA RSL[b] | 1,150,000 | 330 | 95 |
| Fluorene | 86-73-7 | 2,300,000 | EPA RSL[b] | 1,150,000 | 330 | 92 |
| Hexachlorobenzene | 118-74-1 | 300 | EPA RSL[b] | 150 | 330 | 89 |
| Hexachlorobutadiene | 87-68-3 | 6,200 | EPA RSL[b] | 3,100 | 330 | 82 |
| Hexachloroethane | 67-72-1 | 35,000 | EPA RSL[b] | 17,500 | 330 | 81 |

## SAP WORKSHEET #15.2 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** SVOCs

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg)[d] | Method Detection Limit (µg/kg) |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 350<br>150[f] | Parcel B ROD[c]<br>EPA RSL[b] | 175 | 330 | 96 |
| Isophorone | 78-59-1 | 510,000 | EPA RSL[b] | 255,000 | 330 | 93 |
| Naphthalene | 91-20-3 | 1,700[e]<br>3,600[f] | Parcel B ROD[c]<br>EPA RSL[b] | 850 | 330 | 82 |
| Nitrobenzene | 98-95-3 | 4,400 | EPA RSL[b] | 2,200 | 330 | 76 |
| n-Nitrosodiphenylamine | 86-30-6 | 99,000 | EPA RSL[b] | 49,500 | 330 | 86 |
| n-Nitrosopyrrolidine | 930-55-2 | 230 | EPA RSL[b] | 115 | 500 | 165 |
| Pentachlorophenol | 87-86-5 | 3,000 | EPA RSL[b] | 1,500 | 330 | 51 |
| Phenanthrene | 85-01-8 | -- | None | -- | 330 | 94 |
| Phenol | 108-95-2 | 18,000,000 | EPA RSL[b] | 9,000,000 | 330 | 83 |
| Pyrene | 129-00-0 | 1,700,000 | EPA RSL[b] | 850,000 | 330 | 94 |

Notes:

a. If an analyte does not have a PAL and is detected, the Navy and the regulatory agencies will discuss the analyte to determine an acceptable value for comparison.
b. EPA Region 9 RSL for residential soil (EPA, 2010).
c. Remedial goal from the Parcel B ROD (DON, 2009a)
d. For those analytes where the quantitation limit exceeds the PAL, the laboratory will report detections to the method detection limit.
e. Pertains to Parcel B samples, only.
f. Pertains to Parcels G and D-1/UC-1 samples, only.

-- = not applicable
µg/kg = micrograms per kilogram

## SAP WORKSHEET #15.3 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Soil

**Analytical Group:** PCBs

| Analyte | Chemical Abstracts Service Number | PAL (µg/kg) | PAL Reference | Project Quantitation Limit Goal (µg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (µg/kg) | Method Detection Limit (µg/kg) |
| Aroclor-1016 | 12674-11-2 | 3,900 | EPA RSL[a] | 1,700 | 33 | 8.3 |
| Aroclor-1221 | 11104-28-2 | 170 | EPA RSL[a] | 85 | 33 | 11 |
| Aroclor-1232 | 11141-16-5 | 170 | EPA RSL[a] | 85 | 33 | 8.3 |
| Aroclor-1242 | 53469-21-9 | 220 | EPA RSL[a] | 90 | 33 | 8.3 |
| Aroclor-1248 | 12672-29-6 | 220 | EPA RSL[a] | 100 | 33 | 8.3 |
| Aroclor-1254 | 11097-69-1 | 93[c]<br>220[d] | Parcel B ROD[b]<br>EPA RSL[a] | 46 | 33 | 8.3 |
| Aroclor-1260 | 11096-82-5 | 210[c]<br>220[d] | Parcel B ROD[b]<br>EPA RSL[a] | 105 | 33 | 8.3 |

Notes:

a. EPA Region 9 RSL for residential soil (EPA, 2010).
b. Remedial goal from the Parcel B ROD (DON, 2009a)
c. Pertains to Parcel B samples, only.
d Pertains to Parcels G and D-1/UC-1 samples, only.

µg/kg = micrograms per kilogram

## SAP WORKSHEET #15.4 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Soil

**Analytical Group:** TPH-d

| Analyte | Chemical Abstracts Service Number | PAL (mg/kg) | PAL Reference[a] | Project Quantitation Limit Goal (mg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (mg/kg) | Method Detection Limit (mg/kg) |
| TPH-d | -3527[b] | 2,760 | Petroleum Hydrocarbons Corrective Action Plan, Parcel E | 1,380 | 1,000 | 300 |

Notes:

a. Petroleum Hydrocarbons Correction Action Plan, Parcel E, Screening Criteria for Shallow Soil, Residential Reuse (Shaw, 2009)

b. No chemical abstracts service numbers are assigned for multicomponent TPH mixtures; however, the listed numbers are from the NIRIS EDD specifications lookup values for Analyte_ID located on NIRIS.

mg/kg = milligrams per kilogram

DCN: ITSI-0808-0004-0076, 8 May 2019

## SAP WORKSHEET #15.5 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Soil

**Analytical Group:** Metals

| Analyte | Chemical Abstracts Service Number | PAL (mg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (mg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (mg/kg) | Method Detection Limit (mg/kg) |
| Aluminum | 7429-90-5 | 77,000 | EPA RSL[b] | 38,000 | 20 | 5.6 |
| Antimony | 7440-36-0 | 10 | Parcel B ROD[c] | 5 | 3 | 0.94 |
| Arsenic | 7440-38-2 | 11.1 | Parcel B ROD[c] | 5 | 4 | 1.3 |
| Barium | 7440-39-3 | 15,000 | EPA RSL[b] | 7,500 | 2 | 0.4 |
| Beryllium | 7440-41-7 | 160 | EPA RSL[b] | 80 | 0.3 | 0.1 |
| Cadmium | 7440-43-9 | 3.5 | Parcel B ROD[c] | 1 | 0.3 | 0.1 |
| Calcium | 7440-70-2 | -- | None | -- | 100 | 25 |
| Chromium | 7440-47-3 | 280 | EPA RSL[b] | 140 | 1 | 0.33 |
| Cobalt | 7440-48-4 | 370 | EPA RSL[b] | 180 | 0.6 | 0.25 |
| Copper | 7440-50-8 | 159 | Parcel B ROD[c] | 1,500 | 2.5 | 0.5 |
| Iron | 7439-89-6 | 58,000 | Parcel B ROD[c] | 29,000 | 10 | 3.1 |
| Lead | 7439-92-1 | 155 | Parcel B ROD[c] | 77 | 1 | 0.33 |
| Magnesium | 7439-95-4 | -- | None | -- | 50 | 7.5 |
| Manganese | 7439-96-5 | 1,431 | ROD[d] | 900 | 1 | 0.33 |
| Mercury | 7439-97-6 | 2.3 | Parcel B ROD[c] | 1 | 0.04 | 0.0086 |
| Molybdenum | 7439-98-7 | 390 | EPA RSL[b] | 200 | 3 | 1 |
| Nickel | 7440-02-0 | 13,000 | EPA RSL[b] | 6,500 | 1 | 0.3 |
| Potassium | 7440-09-7 | -- | None | 3,424 | 100 | 25 |
| Selenium | 7782-49-2 | 390 | EPA RSL[b] | 200 | 3 | 1.4 |

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## SAP WORKSHEET #15.5 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** Metals

| Analyte | Chemical Abstracts Service Number | PAL (mg/kg)[a] | PAL Reference | Project Quantitation Limit Goal (mg/kg) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (mg/kg) | Method Detection Limit (mg/kg) |
| Silver | 7440-22-4 | 390 | EPA RSL[b] | 200 | 0.5 | 0.1 |
| Sodium | 7440-23-5 | -- | None | -- | 500 | 25 |
| Thallium | 7440-28-0 | 5.1 | EPA RSL[b] | 2.6 | 3 | 0.84 |
| Vanadium | 7440-62-2 | 117 | Parcel B ROD[c] | 58 | 2 | 0.3 |
| Zinc | 7440-66-6 | 373 | Parcel B ROD[c] | 186 | 3 | 0.6 |

Notes:

a. If an analyte does not have a PAL and is detected, the Navy and the regulatory agencies will discuss the analyte to determine an acceptable value for comparison.
b. EPA Region 9 RSL for residential soil (EPA, 2010).
c. Remedial goal from the Parcel B ROD (DON, 2009a)
d. Remedial goal from the Parcel B ROD (DON, 2009a), Parcel G ROD (DON, 2009b), and Parcels D-1 and UC-1 ROD (DON, 2009c)

-- = not applicable
mg/kg = milligrams per kilogram

## SAP WORKSHEET #15.6 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Backfill

**Analytical Group:** Asbestos

| Analyte | Chemical Abstracts Service Number | PAL (%) | PAL Reference | Project Quantitation Limit Goal (%) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (%) | Method Detection Limit (no. fibers) |
| Asbestos | -- | 0.25[a] | DTSC[b] | 0.25 | 0.25 | 1 |

Notes:

a. Assumes analysis will be performed by Polarized Light Microscopy (PLM) with a 400-point count. If results of PLM are nondetect, transmission electron microscopy will be performed with a detection limit of 0.0005% by weight.

b. DTSC, 2004

-- = not applicable

## SAP WORKSHEET #15.7 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Backfill

**Analytical Group:** pH

| Analyte | Chemical Abstracts Service Number | PAL (SU) | PAL Reference | Project Quantitation Limit Goal (SU) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Quantitation Limit (SU) | Method Detection Limit (SU) |
| pH | -- | pH < 6.5<br>pH > 8.5 | SFRWQCB[a] | -- | 0.1 | 0.1 |

Notes:

a. Water Quality Objectives for Surface Waters (SFRWQCB, 2007)

-- = not applicable

SU = standard unit

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**BS-DIA-01 through -04 Chemistry Lab Data &**
**Chemistry Data Summary and PAL Comparison Table**

# SAMPLE SUMMARY

**G0G290461**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| L4T8K | 001 | BS-DIA-01 | 07/28/10 | 10:00 |
| L4T9Q | 002 | BS-DIA-02 | 07/28/10 | 10:05 |
| L4T9W | 003 | BS-DIA-03 | 07/28/10 | 10:10 |
| L4T96 | 004 | BS-DIA-04 | 07/28/10 | 10:20 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**ERRG**

**Client Sample ID: BS-DIA-01**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K1CF **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1.18
**% Moisture.....:** 7.2 **Method.....:** SW846 8260B

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 4-Isopropyltoluene | ND | 6.4 | ug/kg | 0.80 |
| Acetone | ND | 30 | ug/kg | 1.8 |
| Benzene | ND | 7.5 | ug/kg | 0.33 |
| Bromobenzene | ND | 7.5 | ug/kg | 0.66 |
| Bromochloromethane | ND | 7.5 | ug/kg | 1.2 |
| Bromodichloromethane | ND | 7.5 | ug/kg | 0.67 |
| Bromoform | ND | 7.5 | ug/kg | 0.51 |
| Bromomethane | ND | 7.5 | ug/kg | 1.1 |
| 2-Butanone (MEK) | ND | 15 | ug/kg | 1.8 |
| n-Butylbenzene | ND | 7.5 | ug/kg | 0.84 |
| sec-Butylbenzene | ND | 7.5 | ug/kg | 0.95 |
| tert-Butylbenzene | ND | 7.5 | ug/kg | 0.69 |
| Carbon disulfide | ND | 15 | ug/kg | 0.62 |
| Carbon tetrachloride | ND | 7.5 | ug/kg | 0.67 |
| Chlorobenzene | ND | 7.5 | ug/kg | 0.37 |
| Dibromochloromethane | ND | 7.5 | ug/kg | 0.27 |
| Chloroethane | ND | 7.5 | ug/kg | 0.57 |
| Chloroform | ND | 7.5 | ug/kg | 0.33 |
| Chloromethane | ND | 7.5 | ug/kg | 0.64 |
| 2-Chlorotoluene | ND | 7.5 | ug/kg | 0.79 |
| 4-Chlorotoluene | ND | 7.5 | ug/kg | 1.1 |
| 1,2-Dibromo-3-chloropropane (DBCP) | ND | 15 | ug/kg | 1.1 |
| 1,2-Dibromoethane (EDB) | ND | 15 | ug/kg | 0.34 |
| Dibromomethane | ND | 7.5 | ug/kg | 0.74 |
| 1,2-Dichlorobenzene | ND | 7.5 | ug/kg | 0.81 |
| 1,3-Dichlorobenzene | ND | 7.5 | ug/kg | 0.38 |
| 1,4-Dichlorobenzene | ND | 7.5 | ug/kg | 0.99 |
| Dichlorodifluoromethane (Freon 12) | ND | 7.5 | ug/kg | 1.1 |
| 1,1-Dichloroethane | ND | 7.5 | ug/kg | 0.37 |
| 1,2-Dichloroethane | ND | 7.5 | ug/kg | 0.93 |
| cis-1,2-Dichloroethene | ND | 7.5 | ug/kg | 1.1 |
| trans-1,2-Dichloroethene | ND | 7.5 | ug/kg | 0.48 |
| 1,1-Dichloroethene | ND | 7.5 | ug/kg | 0.33 |
| 1,2-Dichloropropane | ND | 7.5 | ug/kg | 0.76 |
| 1,3-Dichloropropane | ND | 7.5 | ug/kg | 0.72 |
| 2,2-Dichloropropane | ND | 7.5 | ug/kg | 0.48 |

(Continued on next page)

**ERRG**

**Client Sample ID: BS-DIA-01**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K1CF **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| cis-1,3-Dichloropropene | ND | 7.5 | ug/kg | 0.81 |
| trans-1,3-Dichloropropene | ND | 7.5 | ug/kg | 0.95 |
| 1,1-Dichloropropene | ND | 7.5 | ug/kg | 0.47 |
| Ethylbenzene | ND | 7.5 | ug/kg | 0.43 |
| Hexachlorobutadiene | ND | 7.5 | ug/kg | 0.42 |
| 2-Hexanone | ND | 15 | ug/kg | 0.94 |
| Isopropylbenzene | ND | 7.5 | ug/kg | 0.66 |
| Methylene chloride | ND | 7.5 | ug/kg | 1.1 |
| 4-Methyl-2-pentanone (MIBK) | ND | 15 | ug/kg | 1.2 |
| Methyl tert-butyl ether (MTBE) | ND | 7.5 | ug/kg | 0.76 |
| Naphthalene | ND | 7.5 | ug/kg | 0.80 |
| n-Propylbenzene | ND | 7.5 | ug/kg | 0.37 |
| Styrene | ND | 7.5 | ug/kg | 0.39 |
| 1,1,1,2-Tetrachloroethane | ND | 7.5 | ug/kg | 0.52 |
| Tetrachloroethene | ND | 7.5 | ug/kg | 0.78 |
| Toluene | ND | 7.5 | ug/kg | 0.78 |
| 1,2,3-Trichlorobenzene | ND | 7.5 | ug/kg | 0.95 |
| 1,2,4-Trichloro-benzene | ND | 7.5 | ug/kg | 0.95 |
| 1,1,1-Trichloroethane | ND | 7.5 | ug/kg | 0.46 |
| 1,1,2-Trichloroethane | ND | 7.5 | ug/kg | 0.56 |
| Trichloroethene | ND | 7.5 | ug/kg | 0.76 |
| Trichlorofluoromethane (Freon 11) | ND | 15 | ug/kg | 0.43 |
| 1,2,3-Trichloropropane | ND | 7.5 | ug/kg | 0.97 |
| 1,2,4-Trimethylbenzene | ND | 7.5 | ug/kg | 0.65 |
| 1,3,5-Trimethylbenzene | ND | 7.5 | ug/kg | 0.44 |
| Vinyl chloride | ND | 7.5 | ug/kg | 0.46 |
| m-Xylene & p-Xylene | ND | 7.5 | ug/kg | 1.0 |
| o-Xylene | ND | 7.5 | ug/kg | 0.42 |
| 1,1,2,2-Tetrachloroethane | ND | 6.4 | ug/kg | 0.86 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 95 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 90 | (59 - 130) |
| Toluene-d8 | 102 | (85 - 115) |
| 4-Bromofluorobenzene | 100 | (85 - 120) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-02**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q1CC **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1.16
**% Moisture.....:** 22 **Method.....:** SW846 8260B

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 4-Isopropyltoluene | ND | 7.4 | ug/kg | 0.94 |
| Acetone | ND | 34 | ug/kg | 2.1 |
| Benzene | ND | 8.6 | ug/kg | 0.39 |
| Bromobenzene | ND | 8.6 | ug/kg | 0.77 |
| Bromochloromethane | ND | 8.6 | ug/kg | 1.4 |
| Bromodichloromethane | ND | 8.6 | ug/kg | 0.79 |
| Bromoform | ND | 8.6 | ug/kg | 0.59 |
| Bromomethane | ND | 8.6 | ug/kg | 1.3 |
| 2-Butanone (MEK) | ND | 17 | ug/kg | 2.1 |
| n-Butylbenzene | ND | 8.6 | ug/kg | 0.98 |
| sec-Butylbenzene | ND | 8.6 | ug/kg | 1.1 |
| tert-Butylbenzene | ND | 8.6 | ug/kg | 0.80 |
| Carbon disulfide | ND | 17 | ug/kg | 0.73 |
| Carbon tetrachloride | ND | 8.6 | ug/kg | 0.79 |
| Chlorobenzene | ND | 8.6 | ug/kg | 0.43 |
| Dibromochloromethane | ND | 8.6 | ug/kg | 0.31 |
| Chloroethane | ND | 8.6 | ug/kg | 0.67 |
| Chloroform | ND | 8.6 | ug/kg | 0.39 |
| Chloromethane | ND | 8.6 | ug/kg | 0.74 |
| 2-Chlorotoluene | ND | 8.6 | ug/kg | 0.92 |
| 4-Chlorotoluene | ND | 8.6 | ug/kg | 1.3 |
| 1,2-Dibromo-3-chloropropane (DBCP) | ND | 17 | ug/kg | 1.3 |
| 1,2-Dibromoethane (EDB) | ND | 17 | ug/kg | 0.40 |
| Dibromomethane | ND | 8.6 | ug/kg | 0.86 |
| 1,2-Dichlorobenzene | ND | 8.6 | ug/kg | 0.95 |
| 1,3-Dichlorobenzene | ND | 8.6 | ug/kg | 0.45 |
| 1,4-Dichlorobenzene | ND | 8.6 | ug/kg | 1.2 |
| Dichlorodifluoromethane (Freon 12) | ND | 8.6 | ug/kg | 1.3 |
| 1,1-Dichloroethane | ND | 8.6 | ug/kg | 0.43 |
| 1,2-Dichloroethane | ND | 8.6 | ug/kg | 1.1 |
| cis-1,2-Dichloroethene | ND | 8.6 | ug/kg | 1.3 |
| trans-1,2-Dichloroethene | ND | 8.6 | ug/kg | 0.56 |
| 1,1-Dichloroethene | ND | 8.6 | ug/kg | 0.39 |
| 1,2-Dichloropropane | ND | 8.6 | ug/kg | 0.89 |
| 1,3-Dichloropropane | ND | 8.6 | ug/kg | 0.85 |
| 2,2-Dichloropropane | ND | 8.6 | ug/kg | 0.56 |

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**ERRG**

**Client Sample ID: BS-DIA-02**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q1CC **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| cis-1,3-Dichloropropene | ND | 8.6 | ug/kg | 0.95 |
| trans-1,3-Dichloropropene | ND | 8.6 | ug/kg | 1.1 |
| 1,1-Dichloropropene | ND | 8.6 | ug/kg | 0.55 |
| Ethylbenzene | ND | 8.6 | ug/kg | 0.51 |
| Hexachlorobutadiene | ND | 8.6 | ug/kg | 0.49 |
| 2-Hexanone | ND | 17 | ug/kg | 1.1 |
| Isopropylbenzene | ND | 8.6 | ug/kg | 0.77 |
| Methylene chloride | ND | 8.6 | ug/kg | 1.2 |
| 4-Methyl-2-pentanone (MIBK) | ND | 17 | ug/kg | 1.4 |
| Methyl tert-butyl ether (MTBE) | ND | 8.6 | ug/kg | 0.89 |
| Naphthalene | ND | 8.6 | ug/kg | 0.94 |
| n-Propylbenzene | ND | 8.6 | ug/kg | 0.43 |
| Styrene | ND | 8.6 | ug/kg | 0.46 |
| 1,1,1,2-Tetrachloroethane | ND | 8.6 | ug/kg | 0.61 |
| Tetrachloroethene | ND | 8.6 | ug/kg | 0.91 |
| Toluene | ND | 8.6 | ug/kg | 0.91 |
| 1,2,3-Trichlorobenzene | ND | 8.6 | ug/kg | 1.1 |
| 1,2,4-Trichloro-benzene | ND | 8.6 | ug/kg | 1.1 |
| 1,1,1-Trichloroethane | ND | 8.6 | ug/kg | 0.53 |
| 1,1,2-Trichloroethane | ND | 8.6 | ug/kg | 0.65 |
| Trichloroethene | ND | 8.6 | ug/kg | 0.89 |
| Trichlorofluoromethane (Freon 11) | ND | 17 | ug/kg | 0.51 |
| 1,2,3-Trichloropropane | ND | 8.6 | ug/kg | 1.1 |
| 1,2,4-Trimethylbenzene | ND | 8.6 | ug/kg | 0.76 |
| 1,3,5-Trimethylbenzene | ND | 8.6 | ug/kg | 0.52 |
| Vinyl chloride | ND | 8.6 | ug/kg | 0.53 |
| m-Xylene & p-Xylene | ND | 8.6 | ug/kg | 1.2 |
| o-Xylene | ND | 8.6 | ug/kg | 0.49 |
| 1,1,2,2-Tetrachloroethane | ND | 7.4 | ug/kg | 1.0 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 96 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 94 | (59 - 130) |
| Toluene-d8 | 104 | (85 - 115) |
| 4-Bromofluorobenzene | 103 | (85 - 120) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-03**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W1CC **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1.13
**% Moisture.....:** 8.4 **Method.....:** SW846 8260B

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 4-Isopropyltoluene | ND | 6.2 | ug/kg | 0.78 |
| Acetone | ND | 28 | ug/kg | 1.7 |
| Benzene | ND | 7.0 | ug/kg | 0.32 |
| Bromobenzene | ND | 7.0 | ug/kg | 0.64 |
| Bromochloromethane | ND | 7.0 | ug/kg | 1.2 |
| Bromodichloromethane | ND | 7.0 | ug/kg | 0.65 |
| Bromoform | ND | 7.0 | ug/kg | 0.49 |
| Bromomethane | ND | 7.0 | ug/kg | 1.1 |
| 2-Butanone (MEK) | ND | 14 | ug/kg | 1.7 |
| n-Butylbenzene | ND | 7.0 | ug/kg | 0.81 |
| sec-Butylbenzene | ND | 7.0 | ug/kg | 0.92 |
| tert-Butylbenzene | ND | 7.0 | ug/kg | 0.67 |
| Carbon disulfide | ND | 14 | ug/kg | 0.60 |
| Carbon tetrachloride | ND | 7.0 | ug/kg | 0.65 |
| Chlorobenzene | ND | 7.0 | ug/kg | 0.36 |
| Dibromochloromethane | ND | 7.0 | ug/kg | 0.26 |
| Chloroethane | ND | 7.0 | ug/kg | 0.55 |
| Chloroform | ND | 7.0 | ug/kg | 0.32 |
| Chloromethane | ND | 7.0 | ug/kg | 0.62 |
| 2-Chlorotoluene | ND | 7.0 | ug/kg | 0.76 |
| 4-Chlorotoluene | ND | 7.0 | ug/kg | 1.1 |
| 1,2-Dibromo-3-chloropropane (DBCP) | ND | 14 | ug/kg | 1.1 |
| 1,2-Dibromoethane (EDB) | ND | 14 | ug/kg | 0.33 |
| Dibromomethane | ND | 7.0 | ug/kg | 0.72 |
| 1,2-Dichlorobenzene | ND | 7.0 | ug/kg | 0.79 |
| 1,3-Dichlorobenzene | ND | 7.0 | ug/kg | 0.37 |
| 1,4-Dichlorobenzene | ND | 7.0 | ug/kg | 0.96 |
| Dichlorodifluoromethane (Freon 12) | ND | 7.0 | ug/kg | 1.1 |
| 1,1-Dichloroethane | ND | 7.0 | ug/kg | 0.36 |
| 1,2-Dichloroethane | ND | 7.0 | ug/kg | 0.90 |
| cis-1,2-Dichloroethene | ND | 7.0 | ug/kg | 1.1 |
| trans-1,2-Dichloroethene | ND | 7.0 | ug/kg | 0.47 |
| 1,1-Dichloroethene | ND | 7.0 | ug/kg | 0.32 |
| 1,2-Dichloropropane | ND | 7.0 | ug/kg | 0.74 |
| 1,3-Dichloropropane | ND | 7.0 | ug/kg | 0.70 |
| 2,2-Dichloropropane | ND | 7.0 | ug/kg | 0.47 |

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**ERRG**

**Client Sample ID: BS-DIA-03**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W1CC **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| cis-1,3-Dichloropropene | ND | 7.0 | ug/kg | 0.79 |
| trans-1,3-Dichloropropene | ND | 7.0 | ug/kg | 0.92 |
| 1,1-Dichloropropene | ND | 7.0 | ug/kg | 0.46 |
| Ethylbenzene | ND | 7.0 | ug/kg | 0.42 |
| Hexachlorobutadiene | ND | 7.0 | ug/kg | 0.41 |
| 2-Hexanone | ND | 14 | ug/kg | 0.91 |
| Isopropylbenzene | ND | 7.0 | ug/kg | 0.64 |
| Methylene chloride | ND | 7.0 | ug/kg | 1.0 |
| 4-Methyl-2-pentanone (MIBK) | ND | 14 | ug/kg | 1.1 |
| Methyl tert-butyl ether (MTBE) | ND | 7.0 | ug/kg | 0.74 |
| Naphthalene | ND | 7.0 | ug/kg | 0.78 |
| n-Propylbenzene | ND | 7.0 | ug/kg | 0.36 |
| Styrene | ND | 7.0 | ug/kg | 0.38 |
| 1,1,1,2-Tetrachloroethane | ND | 7.0 | ug/kg | 0.51 |
| Tetrachloroethene | ND | 7.0 | ug/kg | 0.75 |
| Toluene | ND | 7.0 | ug/kg | 0.75 |
| 1,2,3-Trichlorobenzene | ND | 7.0 | ug/kg | 0.92 |
| 1,2,4-Trichloro-benzene | ND | 7.0 | ug/kg | 0.92 |
| 1,1,1-Trichloroethane | ND | 7.0 | ug/kg | 0.44 |
| 1,1,2-Trichloroethane | ND | 7.0 | ug/kg | 0.54 |
| Trichloroethene | ND | 7.0 | ug/kg | 0.74 |
| Trichlorofluoromethane (Freon 11) | ND | 14 | ug/kg | 0.42 |
| 1,2,3-Trichloropropane | ND | 7.0 | ug/kg | 0.94 |
| 1,2,4-Trimethylbenzene | ND | 7.0 | ug/kg | 0.63 |
| 1,3,5-Trimethylbenzene | ND | 7.0 | ug/kg | 0.43 |
| Vinyl chloride | ND | 7.0 | ug/kg | 0.44 |
| m-Xylene & p-Xylene | ND | 7.0 | ug/kg | 1.0 |
| o-Xylene | ND | 7.0 | ug/kg | 0.41 |
| 1,1,2,2-Tetrachloroethane | ND | 6.2 | ug/kg | 0.84 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 98 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 92 | (59 - 130) |
| Toluene-d8 | 100 | (85 - 115) |
| 4-Bromofluorobenzene | 102 | (85 - 120) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-04**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T961D4 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1.43
**% Moisture.....:** 8.8 **Method.....:** SW846 8260B

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 4-Isopropyltoluene | ND | 7.8 | ug/kg | 0.99 |
| Acetone | ND | 45 | ug/kg | 2.2 |
| Benzene | ND | 11 | ug/kg | 0.41 |
| Bromobenzene | ND | 11 | ug/kg | 0.82 |
| Bromochloromethane | ND | 11 | ug/kg | 1.5 |
| Bromodichloromethane | ND | 11 | ug/kg | 0.83 |
| Bromoform | ND | 11 | ug/kg | 0.63 |
| Bromomethane | ND | 11 | ug/kg | 1.3 |
| 2-Butanone (MEK) | ND | 22 | ug/kg | 2.2 |
| n-Butylbenzene | ND | 11 | ug/kg | 1.0 |
| sec-Butylbenzene | ND | 11 | ug/kg | 1.2 |
| tert-Butylbenzene | ND | 11 | ug/kg | 0.85 |
| Carbon disulfide | ND | 22 | ug/kg | 0.77 |
| Carbon tetrachloride | ND | 11 | ug/kg | 0.83 |
| Chlorobenzene | ND | 11 | ug/kg | 0.45 |
| Dibromochloromethane | ND | 11 | ug/kg | 0.33 |
| Chloroethane | ND | 11 | ug/kg | 0.71 |
| Chloroform | ND | 11 | ug/kg | 0.41 |
| Chloromethane | ND | 11 | ug/kg | 0.78 |
| 2-Chlorotoluene | ND | 11 | ug/kg | 0.97 |
| 4-Chlorotoluene | ND | 11 | ug/kg | 1.3 |
| 1,2-Dibromo-3-chloropropane (DBCP) | ND | 22 | ug/kg | 1.4 |
| 1,2-Dibromoethane (EDB) | ND | 22 | ug/kg | 0.42 |
| Dibromomethane | ND | 11 | ug/kg | 0.91 |
| 1,2-Dichlorobenzene | ND | 11 | ug/kg | 1.0 |
| 1,3-Dichlorobenzene | ND | 11 | ug/kg | 0.47 |
| 1,4-Dichlorobenzene | ND | 11 | ug/kg | 1.2 |
| Dichlorodifluoromethane (Freon 12) | ND | 11 | ug/kg | 1.4 |
| 1,1-Dichloroethane | ND | 11 | ug/kg | 0.45 |
| 1,2-Dichloroethane | ND | 11 | ug/kg | 1.1 |
| cis-1,2-Dichloroethene | ND | 11 | ug/kg | 1.4 |
| trans-1,2-Dichloroethene | ND | 11 | ug/kg | 0.60 |
| 1,1-Dichloroethene | ND | 11 | ug/kg | 0.41 |
| 1,2-Dichloropropane | ND | 11 | ug/kg | 0.94 |
| 1,3-Dichloropropane | ND | 11 | ug/kg | 0.89 |
| 2,2-Dichloropropane | ND | 11 | ug/kg | 0.60 |

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**ERRG**

**Client Sample ID: BS-DIA-04**

**GC/MS Volatiles**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T961D4 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| cis-1,3-Dichloropropene | ND | 11 | ug/kg | 1.0 |
| trans-1,3-Dichloropropene | ND | 11 | ug/kg | 1.2 |
| 1,1-Dichloropropene | ND | 11 | ug/kg | 0.58 |
| Ethylbenzene | ND | 11 | ug/kg | 0.53 |
| Hexachlorobutadiene | ND | 11 | ug/kg | 0.52 |
| 2-Hexanone | ND | 22 | ug/kg | 1.2 |
| Isopropylbenzene | ND | 11 | ug/kg | 0.82 |
| Methylene chloride | ND | 11 | ug/kg | 1.3 |
| 4-Methyl-2-pentanone (MIBK) | ND | 22 | ug/kg | 1.4 |
| Methyl tert-butyl ether (MTBE) | ND | 11 | ug/kg | 0.94 |
| Naphthalene | ND | 11 | ug/kg | 0.99 |
| n-Propylbenzene | ND | 11 | ug/kg | 0.45 |
| Styrene | ND | 11 | ug/kg | 0.49 |
| 1,1,1,2-Tetrachloroethane | ND | 11 | ug/kg | 0.64 |
| Tetrachloroethene | ND | 11 | ug/kg | 0.96 |
| Toluene | ND | 11 | ug/kg | 0.96 |
| 1,2,3-Trichlorobenzene | ND | 11 | ug/kg | 1.2 |
| 1,2,4-Trichloro-benzene | ND | 11 | ug/kg | 1.2 |
| 1,1,1-Trichloroethane | ND | 11 | ug/kg | 0.56 |
| 1,1,2-Trichloroethane | ND | 11 | ug/kg | 0.69 |
| Trichloroethene | ND | 11 | ug/kg | 0.94 |
| Trichlorofluoromethane (Freon 11) | ND | 22 | ug/kg | 0.53 |
| 1,2,3-Trichloropropane | ND | 11 | ug/kg | 1.2 |
| 1,2,4-Trimethylbenzene | ND | 11 | ug/kg | 0.80 |
| 1,3,5-Trimethylbenzene | ND | 11 | ug/kg | 0.55 |
| Vinyl chloride | ND | 11 | ug/kg | 0.56 |
| m-Xylene & p-Xylene | ND | 11 | ug/kg | 1.3 |
| o-Xylene | ND | 11 | ug/kg | 0.52 |
| Vinyl acetate | ND | 7.8 | ug/kg | 1.1 |
| 1,1,2-Trichloro-1,2,2-tri fluoroethane (Freon 113) | ND | 7.8 | ug/kg | 1.3 |
| 1,1,2,2-Tetrachloroethane | ND | 11 | ug/kg | 1.1 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 98 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 94 | (59 - 130) |
| Toluene-d8 | 101 | (85 - 115) |
| 4-Bromofluorobenzene | 103 | (85 - 120) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-01**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K1AE **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 0.99
**% Moisture.....:** 7.2 **Method.....:** SW846 8270C

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| N-Nitrosopyrrolidine | ND | 530 | ug/kg | 180 |
| Acenaphthene | ND | 350 | ug/kg | 89 |
| Acenaphthylene | ND | 350 | ug/kg | 91 |
| Anthracene | ND | 350 | ug/kg | 92 |
| Azobenzene | ND | 350 | ug/kg | 98 |
| Benz(a)anthracene | ND | 350 | ug/kg | 98 |
| Benzo(b)fluoranthene | ND | 350 | ug/kg | 100 |
| Benzo(k)fluoranthene | ND | 350 | ug/kg | 120 |
| Benzoic acid | ND | 1700 | ug/kg | 310 |
| Benzo(ghi)perylene | ND | 350 | ug/kg | 120 |
| Benzo(a)pyrene | ND | 350 | ug/kg | 100 |
| Benzyl alcohol | ND | 540 | ug/kg | 180 |
| bis(2-Chloroethoxy) methane | ND | 350 | ug/kg | 94 |
| bis(2-Chloroethyl)-ether | ND | 350 | ug/kg | 86 |
| bis(2-Chloroisopropyl) ether | ND | 350 | ug/kg | 84 |
| bis(2-Ethylhexyl) phthalate | ND | 350 | ug/kg | 100 |
| 4-Bromophenyl phenyl ether | ND | 350 | ug/kg | 91 |
| Butyl benzyl phthalate | ND | 350 | ug/kg | 100 |
| Carbazole | ND | 350 | ug/kg | 100 |
| 4-Chloroaniline | ND | 350 | ug/kg | 62 |
| 4-Chloro-3-methylphenol | ND | 350 | ug/kg | 98 |
| 2-Chloronaphthalene | ND | 350 | ug/kg | 86 |
| 2-Chlorophenol | ND | 350 | ug/kg | 94 |
| 4-Chlorophenyl phenyl ether | ND | 350 | ug/kg | 99 |
| Chrysene | ND | 350 | ug/kg | 90 |
| Dibenz(a,h)anthracene | ND | 350 | ug/kg | 110 |
| Dibenzofuran | ND | 350 | ug/kg | 92 |
| Di-n-butyl phthalate | ND | 350 | ug/kg | 100 |
| 1,2-Dichlorobenzene | ND | 350 | ug/kg | 80 |
| 1,3-Dichlorobenzene | ND | 350 | ug/kg | 83 |
| 1,4-Dichlorobenzene | ND | 350 | ug/kg | 82 |
| 3,3'-Dichlorobenzidine | ND | 1700 | ug/kg | 100 |

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**ERRG**

**Client Sample ID: BS-DIA-01**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K1AE **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 2,4-Dichlorophenol | ND | 350 | ug/kg | 95 |
| 2,6-Dichlorophenol | ND | 530 | ug/kg | 180 |
| Diethyl phthalate | ND | 350 | ug/kg | 96 |
| 2,4-Dimethylphenol | ND | 530 | ug/kg | 180 |
| Dimethyl phthalate | ND | 350 | ug/kg | 93 |
| 4,6-Dinitro-2-methylphenol | ND | 2100 | ug/kg | 86 |
| 2,4-Dinitrophenol | ND | 2100 | ug/kg | 230 |
| 2,4-Dinitrotoluene | ND | 350 | ug/kg | 95 |
| 2,6-Dinitrotoluene | ND | 350 | ug/kg | 110 |
| Di-n-octyl phthalate | ND | 350 | ug/kg | 100 |
| Fluoranthene | ND | 350 | ug/kg | 100 |
| Fluorene | ND | 350 | ug/kg | 98 |
| Hexachlorobenzene | ND | 350 | ug/kg | 95 |
| Hexachlorobutadiene | ND | 350 | ug/kg | 87 |
| Hexachloroethane | ND | 350 | ug/kg | 86 |
| Indeno(1,2,3-cd)pyrene | ND | 350 | ug/kg | 100 |
| Isophorone | ND | 350 | ug/kg | 99 |
| 2-Methylnaphthalene | ND | 350 | ug/kg | 91 |
| 2-Methylphenol | ND | 350 | ug/kg | 62 |
| 3-Methylphenol & 4-Methylphenol | ND | 1100 | ug/kg | 350 |
| Naphthalene | ND | 350 | ug/kg | 87 |
| 2-Nitroaniline | ND | 1700 | ug/kg | 90 |
| 3-Nitroaniline | ND | 1700 | ug/kg | 180 |
| 4-Nitroaniline | ND | 1700 | ug/kg | 94 |
| Nitrobenzene | ND | 350 | ug/kg | 81 |
| 2-Nitrophenol | ND | 350 | ug/kg | 87 |
| 4-Nitrophenol | ND | 2100 | ug/kg | 300 |
| N-Nitrosodiphenylamine | ND | 350 | ug/kg | 92 |
| Pentachlorophenol | ND | 1700 | ug/kg | 54 |
| Phenanthrene | ND | 350 | ug/kg | 100 |
| Phenol | ND | 350 | ug/kg | 89 |
| Pyrene | ND | 350 | ug/kg | 100 |
| 1,2,4-Trichlorobenzene | ND | 350 | ug/kg | 89 |
| 2,4,5-Trichlorophenol | ND | 350 | ug/kg | 89 |
| 2,4,6-Trichlorophenol | ND | 350 | ug/kg | 90 |

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**ERRG**

**Client Sample ID: BS-DIA-01**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K1AE **Matrix.....:** SOLID

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 79 | (45 - 105) |
| 2-Fluorophenol | 82 | (35 - 105) |
| Nitrobenzene-d5 | 81 | (35 - 100) |
| Phenol-d5 | 83 | (40 - 100) |
| Terphenyl-d14 | 107 | (30 - 125) |
| 2,4,6-Tribromophenol | 100 | (35 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-02**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q1AQ **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/03/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 1
**% Moisture.....:** 22 **Method.....:** SW846 8270C

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| N-Nitrosopyrrolidine | ND | 640 | ug/kg | 210 |
| Acenaphthene | ND | 420 | ug/kg | 110 |
| Acenaphthylene | ND | 420 | ug/kg | 110 |
| Anthracene | ND | 420 | ug/kg | 110 |
| Azobenzene | ND | 420 | ug/kg | 120 |
| Benz(a)anthracene | ND | 420 | ug/kg | 120 |
| Benzo(b)fluoranthene | ND | 420 | ug/kg | 120 |
| Benzo(k)fluoranthene | ND | 420 | ug/kg | 140 |
| Benzoic acid | ND | 2000 | ug/kg | 370 |
| Benzo(ghi)perylene | ND | 420 | ug/kg | 140 |
| Benzo(a)pyrene | ND | 420 | ug/kg | 120 |
| Benzyl alcohol | ND | 650 | ug/kg | 220 |
| bis(2-Chloroethoxy) methane | ND | 420 | ug/kg | 110 |
| bis(2-Chloroethyl)-ether | ND | 420 | ug/kg | 100 |
| bis(2-Chloroisopropyl) ether | ND | 420 | ug/kg | 100 |
| bis(2-Ethylhexyl) phthalate | ND | 420 | ug/kg | 130 |
| 4-Bromophenyl phenyl ether | ND | 420 | ug/kg | 110 |
| Butyl benzyl phthalate | ND | 420 | ug/kg | 120 |
| Carbazole | ND | 420 | ug/kg | 120 |
| 4-Chloroaniline | ND | 420 | ug/kg | 74 |
| 4-Chloro-3-methylphenol | ND | 420 | ug/kg | 120 |
| 2-Chloronaphthalene | ND | 420 | ug/kg | 100 |
| 2-Chlorophenol | ND | 420 | ug/kg | 110 |
| 4-Chlorophenyl phenyl ether | ND | 420 | ug/kg | 120 |
| Chrysene | ND | 420 | ug/kg | 110 |
| Dibenz(a,h)anthracene | ND | 420 | ug/kg | 130 |
| Dibenzofuran | ND | 420 | ug/kg | 110 |
| Di-n-butyl phthalate | ND | 420 | ug/kg | 120 |
| 1,2-Dichlorobenzene | ND | 420 | ug/kg | 96 |
| 1,3-Dichlorobenzene | ND | 420 | ug/kg | 100 |
| 1,4-Dichlorobenzene | ND | 420 | ug/kg | 99 |
| 3,3'-Dichlorobenzidine | ND | 2000 | ug/kg | 120 |

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**ERRG**

**Client Sample ID: BS-DIA-02**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q1AQ **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 2,4-Dichlorophenol | ND | 420 | ug/kg | 110 |
| 2,6-Dichlorophenol | ND | 640 | ug/kg | 210 |
| Diethyl phthalate | ND | 420 | ug/kg | 120 |
| 2,4-Dimethylphenol | ND | 640 | ug/kg | 210 |
| Dimethyl phthalate | ND | 420 | ug/kg | 110 |
| 4,6-Dinitro-2-methylphenol | ND | 2600 | ug/kg | 100 |
| 2,4-Dinitrophenol | ND | 2600 | ug/kg | 270 |
| 2,4-Dinitrotoluene | ND | 420 | ug/kg | 110 |
| 2,6-Dinitrotoluene | ND | 420 | ug/kg | 130 |
| Di-n-octyl phthalate | ND | 420 | ug/kg | 120 |
| Fluoranthene | ND | 420 | ug/kg | 120 |
| Fluorene | ND | 420 | ug/kg | 120 |
| Hexachlorobenzene | ND | 420 | ug/kg | 110 |
| Hexachlorobutadiene | ND | 420 | ug/kg | 110 |
| Hexachloroethane | ND | 420 | ug/kg | 100 |
| Indeno(1,2,3-cd)pyrene | ND | 420 | ug/kg | 120 |
| Isophorone | ND | 420 | ug/kg | 120 |
| 2-Methylnaphthalene | ND | 420 | ug/kg | 110 |
| 2-Methylphenol | ND | 420 | ug/kg | 74 |
| 3-Methylphenol & 4-Methylphenol | ND | 1300 | ug/kg | 420 |
| Naphthalene | ND | 420 | ug/kg | 110 |
| 2-Nitroaniline | ND | 2000 | ug/kg | 110 |
| 3-Nitroaniline | ND | 2000 | ug/kg | 210 |
| 4-Nitroaniline | ND | 2000 | ug/kg | 110 |
| Nitrobenzene | ND | 420 | ug/kg | 97 |
| 2-Nitrophenol | ND | 420 | ug/kg | 110 |
| 4-Nitrophenol | ND | 2600 | ug/kg | 360 |
| N-Nitrosodiphenylamine | ND | 420 | ug/kg | 110 |
| Pentachlorophenol | ND | 2000 | ug/kg | 65 |
| Phenanthrene | ND | 420 | ug/kg | 120 |
| Phenol | ND | 420 | ug/kg | 110 |
| Pyrene | ND | 420 | ug/kg | 120 |
| 1,2,4-Trichlorobenzene | ND | 420 | ug/kg | 110 |
| 2,4,5-Trichlorophenol | ND | 420 | ug/kg | 110 |
| 2,4,6-Trichlorophenol | ND | 420 | ug/kg | 110 |

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**ERRG**

**Client Sample ID: BS-DIA-02**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q1AQ **Matrix.....:** SOLID

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 76 | (45 - 105) |
| 2-Fluorophenol | 77 | (35 - 105) |
| Nitrobenzene-d5 | 79 | (35 - 100) |
| Phenol-d5 | 77 | (40 - 100) |
| Terphenyl-d14 | 106 | (30 - 125) |
| 2,4,6-Tribromophenol | 89 | (35 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-03**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W1AQ **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/03/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 1.01
**% Moisture.....:** 8.4 **Method.....:** SW846 8270C

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| N-Nitrosopyrrolidine | ND | 550 | ug/kg | 180 |
| Acenaphthene | ND | 360 | ug/kg | 91 |
| Acenaphthylene | ND | 360 | ug/kg | 94 |
| Anthracene | ND | 360 | ug/kg | 95 |
| Azobenzene | ND | 360 | ug/kg | 100 |
| Benz(a)anthracene | ND | 360 | ug/kg | 100 |
| Benzo(b)fluoranthene | ND | 360 | ug/kg | 100 |
| Benzo(k)fluoranthene | ND | 360 | ug/kg | 120 |
| Benzoic acid | ND | 1800 | ug/kg | 320 |
| Benzo(ghi)perylene | ND | 360 | ug/kg | 120 |
| Benzo(a)pyrene | ND | 360 | ug/kg | 100 |
| Benzyl alcohol | ND | 560 | ug/kg | 190 |
| bis(2-Chloroethoxy) methane | ND | 360 | ug/kg | 97 |
| bis(2-Chloroethyl)-ether | ND | 360 | ug/kg | 89 |
| bis(2-Chloroisopropyl) ether | ND | 360 | ug/kg | 87 |
| bis(2-Ethylhexyl) phthalate | ND | 360 | ug/kg | 110 |
| 4-Bromophenyl phenyl ether | ND | 360 | ug/kg | 94 |
| Butyl benzyl phthalate | ND | 360 | ug/kg | 100 |
| Carbazole | ND | 360 | ug/kg | 100 |
| 4-Chloroaniline | ND | 360 | ug/kg | 64 |
| 4-Chloro-3-methylphenol | ND | 360 | ug/kg | 100 |
| 2-Chloronaphthalene | ND | 360 | ug/kg | 89 |
| 2-Chlorophenol | ND | 360 | ug/kg | 97 |
| 4-Chlorophenyl phenyl ether | ND | 360 | ug/kg | 100 |
| Chrysene | ND | 360 | ug/kg | 93 |
| Dibenz(a,h)anthracene | ND | 360 | ug/kg | 110 |
| Dibenzofuran | ND | 360 | ug/kg | 95 |
| Di-n-butyl phthalate | ND | 360 | ug/kg | 110 |
| 1,2-Dichlorobenzene | ND | 360 | ug/kg | 83 |
| 1,3-Dichlorobenzene | ND | 360 | ug/kg | 86 |
| 1,4-Dichlorobenzene | ND | 360 | ug/kg | 85 |
| 3,3'-Dichlorobenzidine | ND | 1800 | ug/kg | 100 |

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**ERRG**

**Client Sample ID: BS-DIA-03**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W1AQ **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 2,4-Dichlorophenol | ND | 360 | ug/kg | 98 |
| 2,6-Dichlorophenol | ND | 550 | ug/kg | 180 |
| Diethyl phthalate | ND | 360 | ug/kg | 99 |
| 2,4-Dimethylphenol | ND | 550 | ug/kg | 180 |
| Dimethyl phthalate | ND | 360 | ug/kg | 96 |
| 4,6-Dinitro-2-methylphenol | ND | 2200 | ug/kg | 89 |
| 2,4-Dinitrophenol | ND | 2200 | ug/kg | 240 |
| 2,4-Dinitrotoluene | ND | 360 | ug/kg | 98 |
| 2,6-Dinitrotoluene | ND | 360 | ug/kg | 110 |
| Di-n-octyl phthalate | ND | 360 | ug/kg | 110 |
| Fluoranthene | ND | 360 | ug/kg | 100 |
| Fluorene | ND | 360 | ug/kg | 100 |
| Hexachlorobenzene | ND | 360 | ug/kg | 98 |
| Hexachlorobutadiene | ND | 360 | ug/kg | 90 |
| Hexachloroethane | ND | 360 | ug/kg | 89 |
| Indeno(1,2,3-cd)pyrene | ND | 360 | ug/kg | 110 |
| Isophorone | ND | 360 | ug/kg | 100 |
| 2-Methylnaphthalene | ND | 360 | ug/kg | 94 |
| 2-Methylphenol | ND | 360 | ug/kg | 64 |
| 3-Methylphenol & 4-Methylphenol | ND | 1100 | ug/kg | 360 |
| Naphthalene | ND | 360 | ug/kg | 90 |
| 2-Nitroaniline | ND | 1800 | ug/kg | 93 |
| 3-Nitroaniline | ND | 1800 | ug/kg | 180 |
| 4-Nitroaniline | ND | 1800 | ug/kg | 97 |
| Nitrobenzene | ND | 360 | ug/kg | 84 |
| 2-Nitrophenol | ND | 360 | ug/kg | 90 |
| 4-Nitrophenol | ND | 2200 | ug/kg | 310 |
| N-Nitrosodiphenylamine | ND | 360 | ug/kg | 95 |
| Pentachlorophenol | ND | 1800 | ug/kg | 56 |
| Phenanthrene | ND | 360 | ug/kg | 100 |
| Phenol | ND | 360 | ug/kg | 91 |
| Pyrene | ND | 360 | ug/kg | 100 |
| 1,2,4-Trichlorobenzene | ND | 360 | ug/kg | 91 |
| 2,4,5-Trichlorophenol | ND | 360 | ug/kg | 91 |
| 2,4,6-Trichlorophenol | ND | 360 | ug/kg | 93 |

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**ERRG**

**Client Sample ID: BS-DIA-03**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W1AQ **Matrix.....:** SOLID

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 77 | (45 - 105) |
| 2-Fluorophenol | 78 | (35 - 105) |
| Nitrobenzene-d5 | 80 | (35 - 100) |
| Phenol-d5 | 79 | (40 - 100) |
| Terphenyl-d14 | 104 | (30 - 125) |
| 2,4,6-Tribromophenol | 70 | (35 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-04**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T961AQ **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/03/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 0.98
**% Moisture.....:** 8.8 **Method.....:** SW846 8270C

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| N-Nitrosopyrrolidine | ND | 540 | ug/kg | 180 |
| Acenaphthene | ND | 350 | ug/kg | 89 |
| Acenaphthylene | ND | 350 | ug/kg | 91 |
| Anthracene | ND | 350 | ug/kg | 92 |
| Azobenzene | ND | 350 | ug/kg | 99 |
| Benz(a)anthracene | ND | 350 | ug/kg | 99 |
| Benzo(b)fluoranthene | ND | 350 | ug/kg | 100 |
| Benzo(k)fluoranthene | ND | 350 | ug/kg | 120 |
| Benzoic acid | ND | 1700 | ug/kg | 310 |
| Benzo(ghi)perylene | ND | 350 | ug/kg | 120 |
| Benzo(a)pyrene | ND | 350 | ug/kg | 100 |
| Benzyl alcohol | ND | 550 | ug/kg | 180 |
| bis(2-Chloroethoxy) methane | ND | 350 | ug/kg | 95 |
| bis(2-Chloroethyl)-ether | ND | 350 | ug/kg | 87 |
| bis(2-Chloroisopropyl) ether | ND | 350 | ug/kg | 85 |
| bis(2-Ethylhexyl) phthalate | ND | 350 | ug/kg | 110 |
| 4-Bromophenyl phenyl ether | ND | 350 | ug/kg | 91 |
| Butyl benzyl phthalate | ND | 350 | ug/kg | 100 |
| Carbazole | ND | 350 | ug/kg | 100 |
| 4-Chloroaniline | ND | 350 | ug/kg | 62 |
| 4-Chloro-3-methylphenol | ND | 350 | ug/kg | 99 |
| 2-Chloronaphthalene | ND | 350 | ug/kg | 87 |
| 2-Chlorophenol | ND | 350 | ug/kg | 95 |
| 4-Chlorophenyl phenyl ether | ND | 350 | ug/kg | 100 |
| Chrysene | ND | 350 | ug/kg | 90 |
| Dibenz(a,h)anthracene | ND | 350 | ug/kg | 110 |
| Dibenzofuran | ND | 350 | ug/kg | 92 |
| Di-n-butyl phthalate | ND | 350 | ug/kg | 100 |
| 1,2-Dichlorobenzene | ND | 350 | ug/kg | 81 |
| 1,3-Dichlorobenzene | ND | 350 | ug/kg | 84 |
| 1,4-Dichlorobenzene | ND | 350 | ug/kg | 83 |
| 3,3'-Dichlorobenzidine | ND | 1700 | ug/kg | 100 |

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**ERRG**

**Client Sample ID: BS-DIA-04**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T961AQ **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| 2,4-Dichlorophenol | ND | 350 | ug/kg | 96 |
| 2,6-Dichlorophenol | ND | 540 | ug/kg | 180 |
| Diethyl phthalate | ND | 350 | ug/kg | 97 |
| 2,4-Dimethylphenol | ND | 540 | ug/kg | 180 |
| Dimethyl phthalate | ND | 350 | ug/kg | 93 |
| 4,6-Dinitro-2-methylphenol | ND | 2100 | ug/kg | 87 |
| 2,4-Dinitrophenol | ND | 2100 | ug/kg | 230 |
| 2,4-Dinitrotoluene | ND | 350 | ug/kg | 96 |
| 2,6-Dinitrotoluene | ND | 350 | ug/kg | 110 |
| Di-n-octyl phthalate | ND | 350 | ug/kg | 100 |
| Fluoranthene | ND | 350 | ug/kg | 100 |
| Fluorene | ND | 350 | ug/kg | 99 |
| Hexachlorobenzene | ND | 350 | ug/kg | 96 |
| Hexachlorobutadiene | ND | 350 | ug/kg | 88 |
| Hexachloroethane | ND | 350 | ug/kg | 87 |
| Indeno(1,2,3-cd)pyrene | ND | 350 | ug/kg | 100 |
| Isophorone | ND | 350 | ug/kg | 100 |
| 2-Methylnaphthalene | ND | 350 | ug/kg | 91 |
| 2-Methylphenol | ND | 350 | ug/kg | 62 |
| 3-Methylphenol & 4-Methylphenol | ND | 1100 | ug/kg | 350 |
| Naphthalene | ND | 350 | ug/kg | 88 |
| 2-Nitroaniline | ND | 1700 | ug/kg | 90 |
| 3-Nitroaniline | ND | 1700 | ug/kg | 180 |
| 4-Nitroaniline | ND | 1700 | ug/kg | 95 |
| Nitrobenzene | ND | 350 | ug/kg | 82 |
| 2-Nitrophenol | ND | 350 | ug/kg | 88 |
| 4-Nitrophenol | ND | 2100 | ug/kg | 300 |
| N-Nitrosodiphenylamine | ND | 350 | ug/kg | 92 |
| Pentachlorophenol | ND | 1700 | ug/kg | 55 |
| Phenanthrene | ND | 350 | ug/kg | 100 |
| Phenol | ND | 350 | ug/kg | 89 |
| Pyrene | ND | 350 | ug/kg | 100 |
| 1,2,4-Trichlorobenzene | ND | 350 | ug/kg | 89 |
| 2,4,5-Trichlorophenol | ND | 350 | ug/kg | 89 |
| 2,4,6-Trichlorophenol | ND | 350 | ug/kg | 90 |

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**ERRG**

**Client Sample ID: BS-DIA-04**

**GC/MS Semivolatiles**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T961AQ **Matrix.....:** SOLID

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 86 | (45 - 105) |
| 2-Fluorophenol | 79 | (35 - 105) |
| Nitrobenzene-d5 | 81 | (35 - 100) |
| Phenol-d5 | 79 | (40 - 100) |
| Terphenyl-d14 | 105 | (30 - 125) |
| 2,4,6-Tribromophenol | 75 | (35 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-01**

**GC Semivolatiles**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K1A8 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 0.99
**% Moisture.....:** 7.2 **Method.....:** SW846 8082

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Aroclor 1016 | ND | 35 | ug/kg | 8.9 |
| Aroclor 1221 | ND | 35 | ug/kg | 12 |
| Aroclor 1232 | ND | 35 | ug/kg | 8.9 |
| Aroclor 1242 | ND | 35 | ug/kg | 8.9 |
| Aroclor 1248 | ND | 35 | ug/kg | 8.9 |
| Aroclor 1254 | ND | 35 | ug/kg | 8.9 |
| Aroclor 1260 | ND | 35 | ug/kg | 8.9 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 100 | (60 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-02**

**GC Semivolatiles**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q1AK **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 0.99
**% Moisture.....:** 22 **Method.....:** SW846 8082

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Aroclor 1016 | ND | 42 | ug/kg | 11 |
| Aroclor 1221 | ND | 42 | ug/kg | 14 |
| Aroclor 1232 | ND | 42 | ug/kg | 11 |
| Aroclor 1242 | ND | 42 | ug/kg | 11 |
| Aroclor 1248 | ND | 42 | ug/kg | 11 |
| Aroclor 1254 | ND | 42 | ug/kg | 11 |
| Aroclor 1260 | ND | 42 | ug/kg | 11 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 97 | (60 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-03**

**GC Semivolatiles**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W1AK **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 1.01
**% Moisture.....:** 8.4 **Method.....:** SW846 8082

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Aroclor 1016 | ND | 36 | ug/kg | 9.1 |
| Aroclor 1221 | ND | 36 | ug/kg | 12 |
| Aroclor 1232 | ND | 36 | ug/kg | 9.1 |
| Aroclor 1242 | ND | 36 | ug/kg | 9.1 |
| Aroclor 1248 | ND | 36 | ug/kg | 9.1 |
| Aroclor 1254 | ND | 36 | ug/kg | 9.1 |
| Aroclor 1260 | ND | 36 | ug/kg | 9.1 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 97 | (60 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-04**

**GC Semivolatiles**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T961AK **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 1.01
**% Moisture.....:** 8.8 **Method.....:** SW846 8082

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Aroclor 1016 | ND | 37 | ug/kg | 9.2 |
| Aroclor 1221 | ND | 37 | ug/kg | 12 |
| Aroclor 1232 | ND | 37 | ug/kg | 9.2 |
| Aroclor 1242 | ND | 37 | ug/kg | 9.2 |
| Aroclor 1248 | ND | 37 | ug/kg | 9.2 |
| Aroclor 1254 | ND | 37 | ug/kg | 9.2 |
| Aroclor 1260 | ND | 37 | ug/kg | 9.2 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 99 | (60 - 125) |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

**ERRG**

**Client Sample ID: BS-DIA-01**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-001 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 7.2

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **Prep Batch #...:** 0211087 | | | | | | |
| **Aluminum** | **7400** | **21.5** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AF** |
| | | Dilution Factor: 1 | | MDL.....: 6.0 | | |
| Antimony | ND | 3.2 | mg/kg | SW846 6010B | 07/30/10 | L4T8K1AG |
| | | Dilution Factor: 1 | | MDL.....: 1.0 | | |
| **Arsenic** | **3.8 J** | **4.3** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AH** |
| | | Dilution Factor: 1 | | MDL.....: 1.4 | | |
| **Barium** | **61.2** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AJ** |
| | | Dilution Factor: 1 | | MDL.....: 0.13 | | |
| **Beryllium** | **0.15 J** | **0.32** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AK** |
| | | Dilution Factor: 1 | | MDL.....: 0.032 | | |
| **Cadmium** | **0.046 J** | **0.32** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AL** |
| | | Dilution Factor: 1 | | MDL.....: 0.032 | | |
| **Calcium** | **2160** | **53.9** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AM** |
| | | Dilution Factor: 1 | | MDL.....: 4.8 | | |
| **Chromium** | **36.4** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AN** |
| | | Dilution Factor: 1 | | MDL.....: 0.15 | | |
| **Cobalt** | **10.2** | **0.65** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AP** |
| | | Dilution Factor: 1 | | MDL.....: 0.27 | | |
| **Copper** | **10.4** | **1.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AQ** |
| | | Dilution Factor: 1 | | MDL.....: 0.24 | | |
| **Iron** | **14900** | **10.8** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AR** |
| | | Dilution Factor: 1 | | MDL.....: 1.2 | | |
| **Lead** | **3.3** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AT** |
| | | Dilution Factor: 1 | | MDL.....: 0.28 | | |
| **Magnesium** | **6040** | **53.9** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AU** |
| | | Dilution Factor: 1 | | MDL.....: 4.8 | | |
| **Manganese** | **208** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AV** |
| | | Dilution Factor: 1 | | MDL.....: 0.27 | | |

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**ERRG**

**Client Sample ID: BS-DIA-01**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-001 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Molybdenum | ND | 2.2 | mg/kg | SW846 6010B | 07/30/10 | L4T8K1AW |
| | | Dilution Factor: 1 | | MDL.....: 0.81 | | |
| **Nickel** | **53.8** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1AX** |
| | | Dilution Factor: 1 | | MDL.....: 0.26 | | |
| **Potassium** | **702** | **108** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1A0** |
| | | Dilution Factor: 1 | | MDL.....: 10.8 | | |
| Selenium | ND | 3.2 | mg/kg | SW846 6010B | 07/30/10 | L4T8K1A1 |
| | | Dilution Factor: 1 | | MDL.....: 1.5 | | |
| **Silver** | **0.19 J** | **0.54** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1A2** |
| | | Dilution Factor: 1 | | MDL.....: 0.097 | | |
| **Sodium** | **193** | **108** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1A3** |
| | | Dilution Factor: 1 | | MDL.....: 11.8 | | |
| Thallium | ND | 3.2 | mg/kg | SW846 6010B | 07/30/10 | L4T8K1A4 |
| | | Dilution Factor: 1 | | MDL.....: 0.90 | | |
| **Vanadium** | **31.6** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1A5** |
| | | Dilution Factor: 1 | | MDL.....: 0.20 | | |
| **Zinc** | **41.1** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T8K1A6** |
| | | Dilution Factor: 1 | | MDL.....: 0.20 | | |

**Prep Batch #...:** 0214118

| | | | | | | |
|---|---|---|---|---|---|---|
| **Mercury** | **0.055** | **0.043** | **mg/kg** | **SW846 7471A** | **08/02/10** | **L4T8K1CE** |
| | | Dilution Factor: 1 | | MDL.....: 0.0092 | | |

**NOTE(S):**

Results and repor ing limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

**ERRG**

**Client Sample ID: BS-DIA-02**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-002 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 22

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **Prep Batch #...:** 0211087 | | | | | | |
| **Aluminum** | **8770** | **25.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AR** |
| | | Dilution Factor: 1 | | MDL.....: 7.2 | | |
| Antimony | ND | 3.8 | mg/kg | SW846 6010B | 07/30/10 | L4T9Q1AT |
| | | Dilution Factor: 1 | | MDL.....: 1.2 | | |
| **Arsenic** | **4.1 J** | **5.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AU** |
| | | Dilution Factor: 1 | | MDL.....: 1.7 | | |
| **Barium** | **65.9** | **2.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AV** |
| | | Dilution Factor: 1 | | MDL.....: 0.15 | | |
| **Beryllium** | **0.18 J** | **0.38** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AW** |
| | | Dilution Factor: 1 | | MDL.....: 0.038 | | |
| **Cadmium** | **0.056 J** | **0.38** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AX** |
| | | Dilution Factor: 1 | | MDL.....: 0.038 | | |
| **Calcium** | **2650** | **64.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A0** |
| | | Dilution Factor: 1 | | MDL.....: 5.8 | | |
| **Chromium** | **42.9** | **1.3** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A1** |
| | | Dilution Factor: 1 | | MDL.....: 0.18 | | |
| **Cobalt** | **12.2** | **0.77** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A2** |
| | | Dilution Factor: 1 | | MDL.....: 0.32 | | |
| **Copper** | **12.2** | **1.9** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A3** |
| | | Dilution Factor: 1 | | MDL.....: 0.28 | | |
| **Iron** | **17600** | **12.8** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A4** |
| | | Dilution Factor: 1 | | MDL.....: 1.4 | | |
| **Lead** | **4.1** | **1.3** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A5** |
| | | Dilution Factor: 1 | | MDL.....: 0.33 | | |
| **Magnesium** | **7040** | **64.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A6** |
| | | Dilution Factor: 1 | | MDL.....: 5.8 | | |
| **Manganese** | **247** | **1.3** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A7** |
| | | Dilution Factor: 1 | | MDL.....: 0.32 | | |

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**ERRG**

**Client Sample ID: BS-DIA-02**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-002 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Molybdenum | ND | 2.6 | mg/kg | SW846 6010B | 07/30/10 | L4T9Q1A8 |
| | | Dilution Factor: 1 | | MDL.....: 0.96 | | |
| **Nickel** | **64.4** | **1.3** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1A9** |
| | | Dilution Factor: 1 | | MDL.....: 0.31 | | |
| **Potassium** | **819** | **128** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AA** |
| | | Dilution Factor: 1 | | MDL.....: 12.8 | | |
| Selenium | ND | 3.8 | mg/kg | SW846 6010B | 07/30/10 | L4T9Q1AC |
| | | Dilution Factor: 1 | | MDL.....: 1.8 | | |
| **Silver** | **0.20 J** | **0.64** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AD** |
| | | Dilution Factor: 1 | | MDL.....: 0.12 | | |
| **Sodium** | **243** | **128** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AE** |
| | | Dilution Factor: 1 | | MDL.....: 14.1 | | |
| Thallium | ND | 3.8 | mg/kg | SW846 6010B | 07/30/10 | L4T9Q1AF |
| | | Dilution Factor: 1 | | MDL.....: 1.1 | | |
| **Vanadium** | **36.4** | **2.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AG** |
| | | Dilution Factor: 1 | | MDL.....: 0.24 | | |
| **Zinc** | **48.9** | **2.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9Q1AH** |
| | | Dilution Factor: 1 | | MDL.....: 0.24 | | |

**Prep Batch #...:** 0214118

| | | | | | | |
|---|---|---|---|---|---|---|
| **Mercury** | **0.019 J** | **0.051** | **mg/kg** | **SW846 7471A** | **08/02/10** | **L4T9Q1CA** |
| | | Dilution Factor: 1 | | MDL.....: 0.011 | | |

**NOTE(S):**

Results and repor ing limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

**ERRG**

**Client Sample ID: BS-DIA-03**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-003 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 8.4

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **Prep Batch #...:** 0211087 | | | | | | |
| **Aluminum** | **7750** | **21.8** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AR** |
| | | Dilution Factor: 1 | | MDL.....: 6.1 | | |
| Antimony | ND | 3.3 | mg/kg | SW846 6010B | 07/30/10 | L4T9W1AT |
| | | Dilution Factor: 1 | | MDL.....: 1.0 | | |
| **Arsenic** | **4.3 J** | **4.4** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AU** |
| | | Dilution Factor: 1 | | MDL.....: 1.4 | | |
| **Barium** | **58.0** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AV** |
| | | Dilution Factor: 1 | | MDL.....: 0.13 | | |
| **Beryllium** | **0.15 J** | **0.33** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AW** |
| | | Dilution Factor: 1 | | MDL.....: 0.033 | | |
| **Cadmium** | **0.064 J** | **0.33** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AX** |
| | | Dilution Factor: 1 | | MDL.....: 0.033 | | |
| **Calcium** | **2280** | **54.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A0** |
| | | Dilution Factor: 1 | | MDL.....: 4.9 | | |
| **Chromium** | **43.5** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A1** |
| | | Dilution Factor: 1 | | MDL.....: 0.15 | | |
| **Cobalt** | **10.7** | **0.65** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A2** |
| | | Dilution Factor: 1 | | MDL.....: 0.27 | | |
| **Copper** | **11.0** | **1.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A3** |
| | | Dilution Factor: 1 | | MDL.....: 0.24 | | |
| **Iron** | **15600** | **10.9** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A4** |
| | | Dilution Factor: 1 | | MDL.....: 1.2 | | |
| **Lead** | **3.6** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A5** |
| | | Dilution Factor: 1 | | MDL.....: 0.28 | | |
| **Magnesium** | **6300** | **54.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A6** |
| | | Dilution Factor: 1 | | MDL.....: 4.9 | | |
| **Manganese** | **216** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A7** |
| | | Dilution Factor: 1 | | MDL.....: 0.27 | | |

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**ERRG**

**Client Sample ID: BS-DIA-03**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-003 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Molybdenum | ND | 2.2 | mg/kg | SW846 6010B | 07/30/10 | L4T9W1A8 |
| | | Dilution Factor: 1 | | MDL.....: 0.82 | | |
| **Nickel** | **56.5** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1A9** |
| | | Dilution Factor: 1 | | MDL.....: 0.26 | | |
| **Potassium** | **772** | **109** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AA** |
| | | Dilution Factor: 1 | | MDL.....: 10.9 | | |
| Selenium | ND | 3.3 | mg/kg | SW846 6010B | 07/30/10 | L4T9W1AC |
| | | Dilution Factor: 1 | | MDL.....: 1.5 | | |
| **Silver** | **0.19 J** | **0.55** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AD** |
| | | Dilution Factor: 1 | | MDL.....: 0.098 | | |
| **Sodium** | **201** | **109** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AE** |
| | | Dilution Factor: 1 | | MDL.....: 12.0 | | |
| Thallium | ND | 3.3 | mg/kg | SW846 6010B | 07/30/10 | L4T9W1AF |
| | | Dilution Factor: 1 | | MDL.....: 0.92 | | |
| **Vanadium** | **32.9** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AG** |
| | | Dilution Factor: 1 | | MDL.....: 0.21 | | |
| **Zinc** | **42.7** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T9W1AH** |
| | | Dilution Factor: 1 | | MDL.....: 0.21 | | |
| **Prep Batch #...:** 0214118 | | | | | | |
| Mercury | ND | 0.044 | mg/kg | SW846 7471A | 08/02/10 | L4T9W1CA |
| | | Dilution Factor: 1 | | MDL.....: 0.0094 | | |

**NOTE(S):**

Results and repor ing limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

**ERRG**

**Client Sample ID: BS-DIA-04**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-004 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 8.8

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **Prep Batch #...:** 0211087 | | | | | | |
| **Aluminum** | **8260** | **21.9** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AR** |
| | | Dilution Factor: 1 | | MDL.....: 6.1 | | |
| Antimony | ND | 3.3 | mg/kg | SW846 6010B | 07/30/10 | L4T961AT |
| | | Dilution Factor: 1 | | MDL.....: 1.0 | | |
| **Arsenic** | **3.9 J** | **4.4** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AU** |
| | | Dilution Factor: 1 | | MDL.....: 1.4 | | |
| **Barium** | **55.5** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AV** |
| | | Dilution Factor: 1 | | MDL.....: 0.13 | | |
| **Beryllium** | **0.15 J** | **0.33** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AW** |
| | | Dilution Factor: 1 | | MDL.....: 0.033 | | |
| **Cadmium** | **0.056 J** | **0.33** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AX** |
| | | Dilution Factor: 1 | | MDL.....: 0.033 | | |
| **Calcium** | **2550** | **54.8** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A0** |
| | | Dilution Factor: 1 | | MDL.....: 4.9 | | |
| **Chromium** | **39.2** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A1** |
| | | Dilution Factor: 1 | | MDL.....: 0.15 | | |
| **Cobalt** | **10.9** | **0.66** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A2** |
| | | Dilution Factor: 1 | | MDL.....: 0.27 | | |
| **Copper** | **11.0** | **1.6** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A3** |
| | | Dilution Factor: 1 | | MDL.....: 0.24 | | |
| **Iron** | **15900** | **11.0** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A4** |
| | | Dilution Factor: 1 | | MDL.....: 1.2 | | |
| **Lead** | **3.9** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A5** |
| | | Dilution Factor: 1 | | MDL.....: 0.29 | | |
| **Magnesium** | **6390** | **54.8** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A6** |
| | | Dilution Factor: 1 | | MDL.....: 4.9 | | |
| **Manganese** | **220** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A7** |
| | | Dilution Factor: 1 | | MDL.....: 0.27 | | |

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**ERRG**

**Client Sample ID: BS-DIA-04**

**TOTAL Metals**

**Lot-Sample #...:** G0G290461-004 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Molybdenum | ND | 2.2 | mg/kg | SW846 6010B | 07/30/10 | L4T961A8 |
| | | Dilution Factor: 1 | | MDL.....: 0.82 | | |
| **Nickel** | **55.3** | **1.1** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961A9** |
| | | Dilution Factor: 1 | | MDL.....: 0.26 | | |
| **Potassium** | **724** | **110** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AA** |
| | | Dilution Factor: 1 | | MDL.....: 11.0 | | |
| Selenium | ND | 3.3 | mg/kg | SW846 6010B | 07/30/10 | L4T961AC |
| | | Dilution Factor: 1 | | MDL.....: 1.5 | | |
| **Silver** | **0.20 J** | **0.55** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AD** |
| | | Dilution Factor: 1 | | MDL.....: 0.099 | | |
| **Sodium** | **225** | **110** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AE** |
| | | Dilution Factor: 1 | | MDL.....: 12.1 | | |
| Thallium | ND | 3.3 | mg/kg | SW846 6010B | 07/30/10 | L4T961AF |
| | | Dilution Factor: 1 | | MDL.....: 0.92 | | |
| **Vanadium** | **33.2** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AG** |
| | | Dilution Factor: 1 | | MDL.....: 0.21 | | |
| **Zinc** | **43.7** | **2.2** | **mg/kg** | **SW846 6010B** | **07/30/10** | **L4T961AH** |
| | | Dilution Factor: 1 | | MDL.....: 0.21 | | |

**Prep Batch #...:** 0214118

| | | | | | | |
|---|---|---|---|---|---|---|
| **Mercury** | **0.021 J** | **0.044** | **mg/kg** | **SW846 7471A** | **08/02/10** | **L4T961CA** |
| | | Dilution Factor: 1 | | MDL.....: 0.0094 | | |

**NOTE(S):**

Results and repor ing limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

**ERRG**

**Client Sample ID: BS-DIA-01**

**General Chemistry**

**Lot-Sample #...:** G0G290461-001 **Work Order #...:** L4T8K **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 7.2

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| **pH** | **7.3** | **0.10** | **--** | **SW846 9045C** | **08/02/10** | **0215214** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |
| **Percent Moisture** | **7.2** | **0.10** | **%** | **ASTM D 2216-90** | **07/29-07/30/10** | **0210340** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |

**ERRG**

**Client Sample ID: BS-DIA-02**

**General Chemistry**

**Lot-Sample #...:** G0G290461-002 **Work Order #...:** L4T9Q **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 22

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| **pH** | **7.2** | **0.10** | **--** | **SW846 9045C** | **08/02/10** | **0215214** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |
| **Percent Moisture** | **21.9** | **0.10** | **%** | **ASTM D 2216-90** | **07/29-07/30/10** | **0210340** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |

**ERRG**

**Client Sample ID: BS-DIA-03**

**General Chemistry**

**Lot-Sample #...:** G0G290461-003 **Work Order #...:** L4T9W **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 8.4

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| **pH** | **7.3** | **0.10** | **--** | **SW846 9045C** | **08/02/10** | **0215214** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |
| **Percent Moisture** | **8.4** | **0.10** | **%** | **ASTM D 2216-90** | **07/29-07/30/10** | **0210340** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |

**ERRG**

**Client Sample ID: BS-DIA-04**

**General Chemistry**

**Lot-Sample #...:** G0G290461-004 **Work Order #...:** L4T96 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 8.8

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| **pH** | **7.1** | **0.10** | **--** | **SW846 9045C** | **08/02/10** | **0215214** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |
| **Percent Moisture** | **8.8** | **0.10** | **%** | **ASTM D 2216-90** | **07/29-07/30/10** | **0210340** |
| | | Dilution Factor: 1 | | MDL.....: 0.10 | | |

# QC DATA ASSOCIATION SUMMARY

**G0G290461**

Sample Preparation and Analysis Control Numbers

| SAMPLE# | MATRIX | ANALYTICAL METHOD | LEACH BATCH # | PREP BATCH # | MS RUN# |
|---|---|---|---|---|---|
| 001 | SOLID | ASTM D 2216-90 | | 0210340 | 0210182 |
| | SOLID | SW846 9045C | | 0215214 | 0215123 |
| | SOLID | SW846 7471A | | 0214118 | 0214059 |
| | SOLID | SW846 8082 | | 0210337 | 0210179 |
| | SOLID | SW846 8260B | | 0214294 | 0217158 |
| | SOLID | SW846 8270C | | 0211261 | 0211129 |
| | SOLID | SW846 6010B | | 0211087 | 0211043 |
| 002 | SOLID | ASTM D 2216-90 | | 0210340 | 0210182 |
| | SOLID | SW846 9045C | | 0215214 | 0215123 |
| | SOLID | SW846 7471A | | 0214118 | 0214059 |
| | SOLID | SW846 8082 | | 0210337 | 0210179 |
| | SOLID | SW846 8260B | | 0214294 | 0217158 |
| | SOLID | SW846 8270C | | 0211261 | 0211129 |
| | SOLID | SW846 6010B | | 0211087 | 0211043 |
| 003 | SOLID | ASTM D 2216-90 | | 0210340 | 0210182 |
| | SOLID | SW846 9045C | | 0215214 | 0215123 |
| | SOLID | SW846 7471A | | 0214118 | 0214059 |
| | SOLID | SW846 8082 | | 0210337 | 0210179 |
| | SOLID | SW846 8260B | | 0214294 | 0217158 |
| | SOLID | SW846 8270C | | 0211261 | 0211129 |
| | SOLID | SW846 6010B | | 0211087 | 0211043 |
| 004 | SOLID | ASTM D 2216-90 | | 0210340 | 0210182 |
| | SOLID | SW846 9045C | | 0215214 | 0215123 |
| | SOLID | SW846 7471A | | 0214118 | 0214059 |
| | SOLID | SW846 8082 | | 0210337 | 0210179 |
| | SOLID | SW846 8260B | | 0214294 | 0217158 |
| | SOLID | SW846 8270C | | 0211261 | 0211129 |
| | SOLID | SW846 6010B | | 0211087 | 0211043 |

**METHOD BLANK REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AA **Matrix.....:** SOLID
**MB Lot-Sample #:** G0H020000-294

**Prep Date.....:** 07/29/10
**Analysis Date..:** 07/29/10 **Prep Batch #...:** 0214294
**Dilution Factor:** 1

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 4-Isopropyltoluene | ND | 5.0 | ug/kg | SW846 8260B |
| Acetone | ND | 23 | ug/kg | SW846 8260B |
| Benzene | ND | 5.6 | ug/kg | SW846 8260B |
| Bromobenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Bromochloromethane | ND | 5.6 | ug/kg | SW846 8260B |
| Bromodichloromethane | ND | 5.6 | ug/kg | SW846 8260B |
| Bromoform | ND | 5.6 | ug/kg | SW846 8260B |
| Bromomethane | ND | 5.6 | ug/kg | SW846 8260B |
| 2-Butanone (MEK) | ND | 11 | ug/kg | SW846 8260B |
| n-Butylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| sec-Butylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| tert-Butylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Carbon disulfide | ND | 11 | ug/kg | SW846 8260B |
| Carbon tetrachloride | ND | 5.6 | ug/kg | SW846 8260B |
| Chlorobenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Dibromochloromethane | ND | 5.6 | ug/kg | SW846 8260B |
| Chloroethane | ND | 5.6 | ug/kg | SW846 8260B |
| Chloroform | ND | 5.6 | ug/kg | SW846 8260B |
| Chloromethane | ND | 5.6 | ug/kg | SW846 8260B |
| 2-Chlorotoluene | ND | 5.6 | ug/kg | SW846 8260B |
| 4-Chlorotoluene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2-Dibromo-3-chloropropane (DBCP) | ND | 11 | ug/kg | SW846 8260B |
| 1,2-Dibromoethane (EDB) | ND | 11 | ug/kg | SW846 8260B |
| Dibromomethane | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2-Dichlorobenzene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,3-Dichlorobenzene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,4-Dichlorobenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Dichlorodifluoromethane (Freon 12) | ND | 5.6 | ug/kg | SW846 8260B |
| 1,1-Dichloroethane | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2-Dichloroethane | ND | 5.6 | ug/kg | SW846 8260B |
| cis-1,2-Dichloroethene | ND | 5.6 | ug/kg | SW846 8260B |
| trans-1,2-Dichloroethene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,1-Dichloroethene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2-Dichloropropane | ND | 5.6 | ug/kg | SW846 8260B |
| 1,3-Dichloropropane | ND | 5.6 | ug/kg | SW846 8260B |
| 2,2-Dichloropropane | ND | 5.6 | ug/kg | SW846 8260B |
| cis-1,3-Dichloropropene | ND | 5.6 | ug/kg | SW846 8260B |
| trans-1,3-Dichloropropene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,1-Dichloropropene | ND | 5.6 | ug/kg | SW846 8260B |

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**METHOD BLANK REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AA **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| Ethylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Hexachlorobutadiene | ND | 5.6 | ug/kg | SW846 8260B |
| 2-Hexanone | ND | 11 | ug/kg | SW846 8260B |
| Isopropylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Methylene chloride | ND | 5.6 | ug/kg | SW846 8260B |
| 4-Methyl-2-pentanone (MIBK) | ND | 11 | ug/kg | SW846 8260B |
| Methyl tert-butyl ether (MTBE) | ND | 5.6 | ug/kg | SW846 8260B |
| Naphthalene | ND | 5.6 | ug/kg | SW846 8260B |
| n-Propylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Styrene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | ND | 5.6 | ug/kg | SW846 8260B |
| Tetrachloroethene | ND | 5.6 | ug/kg | SW846 8260B |
| Toluene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2,3-Trichlorobenzene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2,4-Trichloro-benzene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,1,1-Trichloroethane | ND | 5.6 | ug/kg | SW846 8260B |
| 1,1,2-Trichloroethane | ND | 5.6 | ug/kg | SW846 8260B |
| Trichloroethene | ND | 5.6 | ug/kg | SW846 8260B |
| Trichlorofluoromethane (Freon 11) | ND | 11 | ug/kg | SW846 8260B |
| 1,2,3-Trichloropropane | ND | 5.6 | ug/kg | SW846 8260B |
| 1,2,4-Trimethylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| 1,3,5-Trimethylbenzene | ND | 5.6 | ug/kg | SW846 8260B |
| Vinyl chloride | ND | 5.6 | ug/kg | SW846 8260B |
| m-Xylene & p-Xylene | ND | 5.6 | ug/kg | SW846 8260B |
| o-Xylene | ND | 5.6 | ug/kg | SW846 8260B |
| Vinyl acetate | ND | | ug/kg | SW846 8260B |
| 1,1,2-Trichloro-1,2,2-tri fluoroethane (Freon 113) | ND | | ug/kg | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | ug/kg | SW846 8260B |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 88 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 90 | (59 - 130) |
| Toluene-d8 | 98 | (85 - 115) |
| 4-Bromofluorobenzene | 102 | (85 - 120) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### GC/MS Volatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0H020000-294
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| 4-Isopropyltoluene | 107 | (75 - 135) | SW846 8260B |
| Acetone | 81 | (20 - 160) | SW846 8260B |
| Benzene | 95 | (75 - 125) | SW846 8260B |
| Bromobenzene | 102 | (65 - 120) | SW846 8260B |
| Bromochloromethane | 92 | (70 - 125) | SW846 8260B |
| Bromodichloromethane | 97 | (70 - 130) | SW846 8260B |
| Bromoform | 99 | (55 - 135) | SW846 8260B |
| Bromomethane | 98 | (30 - 160) | SW846 8260B |
| 2-Butanone (MEK) | 88 | (30 - 160) | SW846 8260B |
| n-Butylbenzene | 100 | (65 - 140) | SW846 8260B |
| sec-Butylbenzene | 108 | (65 - 130) | SW846 8260B |
| tert-Butylbenzene | 105 | (65 - 130) | SW846 8260B |
| Carbon disulfide | 84 | (45 - 160) | SW846 8260B |
| Carbon tetrachloride | 97 | (65 - 135) | SW846 8260B |
| Chlorobenzene | 97 | (75 - 125) | SW846 8260B |
| Dibromochloromethane | 101 | (65 - 130) | SW846 8260B |
| Chloroethane | 84 | (40 - 155) | SW846 8260B |
| Chloroform | 91 | (70 - 125) | SW846 8260B |
| Chloromethane | 81 | (50 - 130) | SW846 8260B |
| 2-Chlorotoluene | 104 | (70 - 130) | SW846 8260B |
| 4-Chlorotoluene | 101 | (75 - 125) | SW846 8260B |
| 1,2-Dibromo-3-chloropropane (DBCP) | 92 | (40 - 135) | SW846 8260B |
| 1,2-Dibromoethane (EDB) | 98 | (70 - 125) | SW846 8260B |
| Dibromomethane | 89 | (75 - 130) | SW846 8260B |
| 1,2-Dichlorobenzene | 96 | (75 - 120) | SW846 8260B |
| 1,3-Dichlorobenzene | 98 | (70 - 125) | SW846 8260B |
| 1,4-Dichlorobenzene | 96 | (70 - 125) | SW846 8260B |
| Dichlorodifluoromethane (Freon 12) | 70 | (35 - 135) | SW846 8260B |
| 1,1-Dichloroethane | 93 | (75 - 125) | SW846 8260B |
| 1,2-Dichloroethane | 90 | (70 - 135) | SW846 8260B |
| cis-1,2-Dichloroethene | 94 | (65 - 125) | SW846 8260B |
| trans-1,2-Dichloroethene | 94 | (65 - 135) | SW846 8260B |

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**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0H020000-294

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| **1,1-Dichloroethene** | **92** | **(65 - 135)** | **SW846 8260B** |
| **1,2-Dichloropropane** | **96** | **(70 - 120)** | **SW846 8260B** |
| **1,3-Dichloropropane** | **96** | **(75 - 125)** | **SW846 8260B** |
| **2,2-Dichloropropane** | **109** | **(65 - 135)** | **SW846 8260B** |
| **cis-1,3-Dichloropropene** | **102** | **(70 - 125)** | **SW846 8260B** |
| **trans-1,3-Dichloropropene** | **110** | **(65 - 125)** | **SW846 8260B** |
| **1,1-Dichloropropene** | **96** | **(70 - 135)** | **SW846 8260B** |
| **Ethylbenzene** | **102** | **(75 - 125)** | **SW846 8260B** |
| **Hexachlorobutadiene** | **106** | **(55 - 140)** | **SW846 8260B** |
| **2-Hexanone** | **97** | **(45 - 145)** | **SW846 8260B** |
| **Isopropylbenzene** | **110** | **(75 - 130)** | **SW846 8260B** |
| **Methylene chloride** | **93** | **(55 - 140)** | **SW846 8260B** |
| **4-Methyl-2-pentanone (MIBK)** | **97** | **(45 - 145)** | **SW846 8260B** |
| **Methyl tert-butyl ether (MTBE)** | **95** | **(66 - 146)** | **SW846 8260B** |
| **Naphthalene** | **115** | **(40 - 125)** | **SW846 8260B** |
| **n-Propylbenzene** | **106** | **(65 - 135)** | **SW846 8260B** |
| **Styrene** | **111** | **(75 - 125)** | **SW846 8260B** |
| **1,1,1,2-Tetrachloroethane** | **101** | **(75 - 125)** | **SW846 8260B** |
| **Tetrachloroethene** | **101** | **(65 - 140)** | **SW846 8260B** |
| **Toluene** | **101** | **(70 - 125)** | **SW846 8260B** |
| **1,2,3-Trichlorobenzene** | **111** | **(60 - 135)** | **SW846 8260B** |
| **1,2,4-Trichloro-benzene** | **112** | **(65 - 130)** | **SW846 8260B** |
| **1,1,1-Trichloroethane** | **100** | **(70 - 135)** | **SW846 8260B** |
| **1,1,2-Trichloroethane** | **94** | **(60 - 125)** | **SW846 8260B** |
| **Trichloroethene** | **95** | **(75 - 125)** | **SW846 8260B** |
| **Trichlorofluoromethane (Freon 11)** | **90** | **(25 - 185)** | **SW846 8260B** |
| **1,2,3-Trichloropropane** | **97** | **(65 - 130)** | **SW846 8260B** |
| **1,2,4-Trimethylbenzene** | **106** | **(65 - 135)** | **SW846 8260B** |
| **1,3,5-Trimethylbenzene** | **105** | **(65 - 135)** | **SW846 8260B** |
| **Vinyl chloride** | **86** | **(60 - 125)** | **SW846 8260B** |
| **m-Xylene & p-Xylene** | **101** | **(80 - 125)** | **SW846 8260B** |
| **o-Xylene** | **107** | **(75 - 125)** | **SW846 8260B** |
| Vinyl acetate | 96 | (39 - 160) | SW846 8260B |

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## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### GC/MS Volatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0H020000-294

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| **1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)** | **87** | **(62 - 138)** | **SW846 8260B** |
| **1,1,2,2-Tetrachloroethane** | **96** | **(55 - 130)** | **SW846 8260B** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 88 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 81 | (59 - 130) |
| Toluene-d8 | 100 | (85 - 115) |
| 4-Bromofluorobenzene | 100 | (85 - 120) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

## LABORATORY CONTROL SAMPLE DATA REPORT

### GC/MS Volatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0H020000-294
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| 4-Isopropyltoluene | 100 | 107 | ug/kg | 107 | SW846 8260B |
| Acetone | 100 | 81.0 | ug/kg | 81 | SW846 8260B |
| Benzene | 100 | 94.6 | ug/kg | 95 | SW846 8260B |
| Bromobenzene | 100 | 102 | ug/kg | 102 | SW846 8260B |
| Bromochloromethane | 100 | 91.6 | ug/kg | 92 | SW846 8260B |
| Bromodichloromethane | 100 | 97.2 | ug/kg | 97 | SW846 8260B |
| Bromoform | 100 | 99.1 | ug/kg | 99 | SW846 8260B |
| Bromomethane | 100 | 98.0 | ug/kg | 98 | SW846 8260B |
| 2-Butanone (MEK) | 100 | 87.5 | ug/kg | 88 | SW846 8260B |
| n-Butylbenzene | 100 | 99.6 | ug/kg | 100 | SW846 8260B |
| sec-Butylbenzene | 100 | 108 | ug/kg | 108 | SW846 8260B |
| tert-Butylbenzene | 100 | 105 | ug/kg | 105 | SW846 8260B |
| Carbon disulfide | 100 | 84.3 | ug/kg | 84 | SW846 8260B |
| Carbon tetrachloride | 100 | 97.5 | ug/kg | 97 | SW846 8260B |
| Chlorobenzene | 100 | 97.4 | ug/kg | 97 | SW846 8260B |
| Dibromochloromethane | 100 | 101 | ug/kg | 101 | SW846 8260B |
| Chloroethane | 100 | 83.6 | ug/kg | 84 | SW846 8260B |
| Chloroform | 100 | 91.3 | ug/kg | 91 | SW846 8260B |
| Chloromethane | 100 | 80.7 | ug/kg | 81 | SW846 8260B |
| 2-Chlorotoluene | 100 | 104 | ug/kg | 104 | SW846 8260B |
| 4-Chlorotoluene | 100 | 101 | ug/kg | 101 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane (DBCP) | 100 | 92.2 | ug/kg | 92 | SW846 8260B |
| 1,2-Dibromoethane (EDB) | 100 | 98.0 | ug/kg | 98 | SW846 8260B |
| Dibromomethane | 100 | 88.6 | ug/kg | 89 | SW846 8260B |
| 1,2-Dichlorobenzene | 100 | 96.2 | ug/kg | 96 | SW846 8260B |
| 1,3-Dichlorobenzene | 100 | 97.8 | ug/kg | 98 | SW846 8260B |
| 1,4-Dichlorobenzene | 100 | 95.6 | ug/kg | 96 | SW846 8260B |
| Dichlorodifluoromethane (Freon 12) | 100 | 69.8 | ug/kg | 70 | SW846 8260B |
| 1,1-Dichloroethane | 100 | 92.8 | ug/kg | 93 | SW846 8260B |
| 1,2-Dichloroethane | 100 | 89.6 | ug/kg | 90 | SW846 8260B |
| cis-1,2-Dichloroethene | 100 | 94.4 | ug/kg | 94 | SW846 8260B |
| trans-1,2-Dichloroethene | 100 | 94.0 | ug/kg | 94 | SW846 8260B |

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**LABORATORY CONTROL SAMPLE DATA REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0H020000-294

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| **1,1-Dichloroethene** | **100** | **91.9** | **ug/kg** | **92** | **SW846 8260B** |
| **1,2-Dichloropropane** | **100** | **96.5** | **ug/kg** | **96** | **SW846 8260B** |
| **1,3-Dichloropropane** | **100** | **96.4** | **ug/kg** | **96** | **SW846 8260B** |
| **2,2-Dichloropropane** | **100** | **109** | **ug/kg** | **109** | **SW846 8260B** |
| **cis-1,3-Dichloropropene** | **100** | **102** | **ug/kg** | **102** | **SW846 8260B** |
| **trans-1,3-Dichloropropene** | **100** | **110** | **ug/kg** | **110** | **SW846 8260B** |
| **1,1-Dichloropropene** | **100** | **95.5** | **ug/kg** | **96** | **SW846 8260B** |
| **Ethylbenzene** | **100** | **102** | **ug/kg** | **102** | **SW846 8260B** |
| **Hexachlorobutadiene** | **100** | **106** | **ug/kg** | **106** | **SW846 8260B** |
| **2-Hexanone** | **100** | **97.0** | **ug/kg** | **97** | **SW846 8260B** |
| **Isopropylbenzene** | **100** | **110** | **ug/kg** | **110** | **SW846 8260B** |
| **Methylene chloride** | **100** | **92.5** | **ug/kg** | **93** | **SW846 8260B** |
| **4-Methyl-2-pentanone (MIBK)** | **100** | **96.5** | **ug/kg** | **97** | **SW846 8260B** |
| **Methyl tert-butyl ether (MTBE)** | **100** | **95.3** | **ug/kg** | **95** | **SW846 8260B** |
| **Naphthalene** | **100** | **115** | **ug/kg** | **115** | **SW846 8260B** |
| **n-Propylbenzene** | **100** | **106** | **ug/kg** | **106** | **SW846 8260B** |
| **Styrene** | **100** | **111** | **ug/kg** | **111** | **SW846 8260B** |
| **1,1,1,2-Tetrachloroethane** | **100** | **101** | **ug/kg** | **101** | **SW846 8260B** |
| **Tetrachloroethene** | **100** | **101** | **ug/kg** | **101** | **SW846 8260B** |
| **Toluene** | **100** | **101** | **ug/kg** | **101** | **SW846 8260B** |
| **1,2,3-Trichlorobenzene** | **100** | **111** | **ug/kg** | **111** | **SW846 8260B** |
| **1,2,4-Trichloro-benzene** | **100** | **112** | **ug/kg** | **112** | **SW846 8260B** |
| **1,1,1-Trichloroethane** | **100** | **100** | **ug/kg** | **100** | **SW846 8260B** |
| **1,1,2-Trichloroethane** | **100** | **94.2** | **ug/kg** | **94** | **SW846 8260B** |
| **Trichloroethene** | **100** | **95.0** | **ug/kg** | **95** | **SW846 8260B** |
| **Trichlorofluoromethane (Freon 11)** | **100** | **89.7** | **ug/kg** | **90** | **SW846 8260B** |
| **1,2,3-Trichloropropane** | **100** | **97.2** | **ug/kg** | **97** | **SW846 8260B** |
| **1,2,4-Trimethylbenzene** | **100** | **106** | **ug/kg** | **106** | **SW846 8260B** |
| **1,3,5-Trimethylbenzene** | **100** | **105** | **ug/kg** | **105** | **SW846 8260B** |
| **Vinyl chloride** | **100** | **85.6** | **ug/kg** | **86** | **SW846 8260B** |
| **m-Xylene & p-Xylene** | **200** | **203** | **ug/kg** | **101** | **SW846 8260B** |
| **o-Xylene** | **100** | **107** | **ug/kg** | **107** | **SW846 8260B** |
| Vinyl acetate | 100 | 95.6 | ug/kg | 96 | SW846 8260B |

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**LABORATORY CONTROL SAMPLE DATA REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L406P1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0H020000-294

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| **1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)** | **100** | **87.1** | **ug/kg** | **87** | **SW846 8260B** |
| **1,1,2,2-Tetrachloroethane** | **100** | **96.1** | **ug/kg** | **96** | **SW846 8260B** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 88 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 81 | (59 - 130) |
| Toluene-d8 | 100 | (85 - 115) |
| 4-Bromofluorobenzene | 100 | (85 - 120) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1.24 **% Moisture.....:** 8.8

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| 4-Isopropyltoluene | 91 | (75 - 135) | | | SW846 8260B |
| | 108 p | (75 - 135) | 42 | (0-30) | SW846 8260B |
| Acetone | 68 | (20 - 160) | | | SW846 8260B |
| | 66 | (20 - 160) | 24 | (0-30) | SW846 8260B |
| Benzene | 91 | (75 - 125) | | | SW846 8260B |
| | 100 p | (75 - 125) | 35 | (0-30) | SW846 8260B |
| Bromobenzene | 87 | (65 - 120) | | | SW846 8260B |
| | 95 p | (65 - 120) | 34 | (0-30) | SW846 8260B |
| Bromochloromethane | 83 | (70 - 125) | | | SW846 8260B |
| | 90 p | (70 - 125) | 33 | (0-30) | SW846 8260B |
| Bromodichloromethane | 87 | (70 - 130) | | | SW846 8260B |
| | 92 p | (70 - 130) | 31 | (0-30) | SW846 8260B |
| Bromoform | 77 | (55 - 135) | | | SW846 8260B |
| | 85 p | (55 - 135) | 36 | (0-30) | SW846 8260B |
| Bromomethane | 88 | (30 - 160) | | | SW846 8260B |
| | 88 | (30 - 160) | 26 | (0-30) | SW846 8260B |
| 2-Butanone (MEK) | 67 | (30 - 160) | | | SW846 8260B |
| | 65 | (30 - 160) | 23 | (0-30) | SW846 8260B |
| n-Butylbenzene | 84 | (65 - 140) | | | SW846 8260B |
| | 103 p | (65 - 140) | 46 | (0-30) | SW846 8260B |
| sec-Butylbenzene | 92 | (65 - 130) | | | SW846 8260B |
| | 109 p | (65 - 130) | 42 | (0-30) | SW846 8260B |
| tert-Butylbenzene | 89 | (65 - 130) | | | SW846 8260B |
| | 105 p | (65 - 130) | 42 | (0-30) | SW846 8260B |
| Carbon disulfide | 86 | (45 - 160) | | | SW846 8260B |
| | 92 p | (45 - 160) | 32 | (0-30) | SW846 8260B |
| Carbon tetrachloride | 90 | (65 - 135) | | | SW846 8260B |
| | 103 p | (65 - 135) | 38 | (0-30) | SW846 8260B |
| Chlorobenzene | 87 | (75 - 125) | | | SW846 8260B |
| | 95 p | (75 - 125) | 35 | (0-30) | SW846 8260B |
| Dibromochloromethane | 88 | (65 - 130) | | | SW846 8260B |
| | 91 | (65 - 130) | 29 | (0-30) | SW846 8260B |
| Chloroethane | 86 | (40 - 155) | | | SW846 8260B |
| | 89 | (40 - 155) | 28 | (0-30) | SW846 8260B |
| Chloroform | 90 | (70 - 125) | | | SW846 8260B |
| | 98 p | (70 - 125) | 34 | (0-30) | SW846 8260B |
| Chloromethane | 85 | (50 - 130) | | | SW846 8260B |
| | 89 | (50 - 130) | 30 | (0-30) | SW846 8260B |
| 2-Chlorotoluene | 89 | (70 - 130) | | | SW846 8260B |
| | 99 p | (70 - 130) | 36 | (0-30) | SW846 8260B |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **4-Chlorotoluene** | **86** | **(75 - 125)** | | | **SW846 8260B** |
| | **98 p** | **(75 - 125)** | **38** | **(0-30)** | **SW846 8260B** |
| **1,2-Dibromo-3-** chloropropane (DBCP) | **65** | **(40 - 135)** | | | **SW846 8260B** |
| | **65** | **(40 - 135)** | **25** | **(0-30)** | **SW846 8260B** |
| **1,2-Dibromoethane (EDB)** | **80** | **(70 - 125)** | | | **SW846 8260B** |
| | **83** | **(70 - 125)** | **29** | **(0-30)** | **SW846 8260B** |
| **Dibromomethane** | **77** | **(75 - 130)** | | | **SW846 8260B** |
| | **78** | **(75 - 130)** | **28** | **(0-30)** | **SW846 8260B** |
| **1,2-Dichlorobenzene** | **81** | **(75 - 120)** | | | **SW846 8260B** |
| | **90 p** | **(75 - 120)** | **36** | **(0-30)** | **SW846 8260B** |
| **1,3-Dichlorobenzene** | **83** | **(70 - 125)** | | | **SW846 8260B** |
| | **96 p** | **(70 - 125)** | **40** | **(0-30)** | **SW846 8260B** |
| **1,4-Dichlorobenzene** | **80** | **(70 - 125)** | | | **SW846 8260B** |
| | **92 p** | **(70 - 125)** | **39** | **(0-30)** | **SW846 8260B** |
| **Dichlorodifluoromethane** (Freon 12) | **79** | **(35 - 135)** | | | **SW846 8260B** |
| | **82** | **(35 - 135)** | **30** | **(0-30)** | **SW846 8260B** |
| **1,1-Dichloroethane** | **92** | **(75 - 125)** | | | **SW846 8260B** |
| | **99 p** | **(75 - 125)** | **33** | **(0-30)** | **SW846 8260B** |
| **1,2-Dichloroethane** | **80** | **(70 - 135)** | | | **SW846 8260B** |
| | **84** | **(70 - 135)** | **30** | **(0-30)** | **SW846 8260B** |
| **cis-1,2-Dichloroethene** | **92** | **(65 - 125)** | | | **SW846 8260B** |
| | **101 p** | **(65 - 125)** | **35** | **(0-30)** | **SW846 8260B** |
| **trans-1,2-Dichloroethene** | **91** | **(65 - 135)** | | | **SW846 8260B** |
| | **99 p** | **(65 - 135)** | **34** | **(0-30)** | **SW846 8260B** |
| **1,1-Dichloroethene** | **92** | **(65 - 135)** | | | **SW846 8260B** |
| | **101 p** | **(65 - 135)** | **35** | **(0-30)** | **SW846 8260B** |
| **1,2-Dichloropropane** | **90** | **(70 - 120)** | | | **SW846 8260B** |
| | **94** | **(70 - 120)** | **29** | **(0-30)** | **SW846 8260B** |
| **1,3-Dichloropropane** | **83** | **(75 - 125)** | | | **SW846 8260B** |
| | **84** | **(75 - 125)** | **26** | **(0-30)** | **SW846 8260B** |
| **2,2-Dichloropropane** | **102** | **(65 - 135)** | | | **SW846 8260B** |
| | **113 p** | **(65 - 135)** | **36** | **(0-30)** | **SW846 8260B** |
| **cis-1,3-Dichloropropene** | **90** | **(70 - 125)** | | | **SW846 8260B** |
| | **89** | **(70 - 125)** | **25** | **(0-30)** | **SW846 8260B** |
| **trans-1,3-Dichloropropene** | **92** | **(65 - 125)** | | | **SW846 8260B** |
| | **88** | **(65 - 125)** | **22** | **(0-30)** | **SW846 8260B** |
| **1,1-Dichloropropene** | **89** | **(70 - 135)** | | | **SW846 8260B** |
| | **100 p** | **(70 - 135)** | **38** | **(0-30)** | **SW846 8260B** |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **Ethylbenzene** | **90** | **(75 - 125)** | | | **SW846 8260B** |
| | **102 p** | **(75 - 125)** | **38** | **(0-30)** | **SW846 8260B** |
| **Hexachlorobutadiene** | **74** | **(55 - 140)** | | | **SW846 8260B** |
| | **92 p** | **(55 - 140)** | **48** | **(0-30)** | **SW846 8260B** |
| **2-Hexanone** | **76** | **(45 - 145)** | | | **SW846 8260B** |
| | **72** | **(45 - 145)** | **21** | **(0-30)** | **SW846 8260B** |
| **Isopropylbenzene** | **90** | **(75 - 130)** | | | **SW846 8260B** |
| | **111 p** | **(75 - 130)** | **46** | **(0-30)** | **SW846 8260B** |
| **Methylene chloride** | **88** | **(55 - 140)** | | | **SW846 8260B** |
| | **95 p** | **(55 - 140)** | **33** | **(0-30)** | **SW846 8260B** |
| **4-Methyl-2-pentanone** (MIBK) | **77** | **(45 - 145)** | | | **SW846 8260B** |
| | **71** | **(45 - 145)** | **19** | **(0-30)** | **SW846 8260B** |
| **Methyl tert-butyl ether** (MTBE) | **81** | **(66 - 146)** | | | **SW846 8260B** |
| | **83** | **(66 - 146)** | **29** | **(0-30)** | **SW846 8260B** |
| **Naphthalene** | **73** | **(40 - 125)** | | | **SW846 8260B** |
| | **79 p** | **(40 - 125)** | **34** | **(0-30)** | **SW846 8260B** |
| **n-Propylbenzene** | **90** | **(65 - 135)** | | | **SW846 8260B** |
| | **103 p** | **(65 - 135)** | **39** | **(0-30)** | **SW846 8260B** |
| **Styrene** | **93** | **(75 - 125)** | | | **SW846 8260B** |
| | **108 p** | **(75 - 125)** | **40** | **(0-30)** | **SW846 8260B** |
| **1,1,1,2-Tetrachloroethane** | **89** | **(75 - 125)** | | | **SW846 8260B** |
| | **100 p** | **(75 - 125)** | **37** | **(0-30)** | **SW846 8260B** |
| **Tetrachloroethene** | **90** | **(65 - 140)** | | | **SW846 8260B** |
| | **100 p** | **(65 - 140)** | **36** | **(0-30)** | **SW846 8260B** |
| **Toluene** | **92** | **(70 - 125)** | | | **SW846 8260B** |
| | **96 p** | **(70 - 125)** | **31** | **(0-30)** | **SW846 8260B** |
| **1,2,3-Trichlorobenzene** | **74** | **(60 - 135)** | | | **SW846 8260B** |
| | **86 p** | **(60 - 135)** | **40** | **(0-30)** | **SW846 8260B** |
| **1,2,4-Trichloro-** benzene | **76** | **(65 - 130)** | | | **SW846 8260B** |
| | **90 p** | **(65 - 130)** | **42** | **(0-30)** | **SW846 8260B** |
| **1,1,1-Trichloroethane** | **94** | **(70 - 135)** | | | **SW846 8260B** |
| | **104 p** | **(70 - 135)** | **35** | **(0-30)** | **SW846 8260B** |
| **1,1,2-Trichloroethane** | **79** | **(60 - 125)** | | | **SW846 8260B** |
| | **77** | **(60 - 125)** | **23** | **(0-30)** | **SW846 8260B** |
| **Trichloroethene** | **87** | **(75 - 125)** | | | **SW846 8260B** |
| | **97 p** | **(75 - 125)** | **36** | **(0-30)** | **SW846 8260B** |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **Trichlorofluoromethane (Freon 11)** | **97** | **(25 - 185)** | | | **SW846 8260B** |
| | **100** | **(25 - 185)** | **28** | **(0-30)** | **SW846 8260B** |
| **1,2,3-Trichloropropane** | **75** | **(65 - 130)** | | | **SW846 8260B** |
| | **73** | **(65 - 130)** | **23** | **(0-30)** | **SW846 8260B** |
| **1,2,4-Trimethylbenzene** | **91** | **(65 - 135)** | | | **SW846 8260B** |
| | **104 p** | **(65 - 135)** | **39** | **(0-30)** | **SW846 8260B** |
| **1,3,5-Trimethylbenzene** | **90** | **(65 - 135)** | | | **SW846 8260B** |
| | **103 p** | **(65 - 135)** | **39** | **(0-30)** | **SW846 8260B** |
| **Vinyl chloride** | **96** | **(60 - 125)** | | | **SW846 8260B** |
| | **100** | **(60 - 125)** | **30** | **(0-30)** | **SW846 8260B** |
| **m-Xylene & p-Xylene** | **87** | **(80 - 125)** | | | **SW846 8260B** |
| | **100 p** | **(80 - 125)** | **39** | **(0-30)** | **SW846 8260B** |
| **o-Xylene** | **90** | **(75 - 125)** | | | **SW846 8260B** |
| | **104 p** | **(75 - 125)** | **39** | **(0-30)** | **SW846 8260B** |
| Vinyl acetate | 53 | (39 - 160) | | | SW846 8260B |
| | 54 | (39 - 160) | 29 | (0-30) | SW846 8260B |
| **1,1,2-Trichloro-1,2,2-tri fluoroethane (Freon 113)** | **90** | **(62 - 138)** | | | **SW846 8260B** |
| | **96 p** | **(62 - 138)** | **33** | **(0-30)** | **SW846 8260B** |
| **1,1,2,2-Tetrachloroethane** | **78** | **(55 - 130)** | | | **SW846 8260B** |
| | **77** | **(55 - 130)** | **25** | **(0-30)** | **SW846 8260B** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 86 | (68 - 116) |
| | 90 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 75 | (59 - 130) |
| | 75 | (59 - 130) |
| Toluene-d8 | 102 | (85 - 115) |
| | 97 | (85 - 115) |
| 4-Bromofluorobenzene | 96 | (85 - 120) |
| | 103 | (85 - 120) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

p Relative percent difference (RPD) is outside stated control limits.

Results and repor ing limits have been adjusted for dry weight.

## MATRIX SPIKE SAMPLE DATA REPORT

### GC/MS Volatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 07/29/10
**Prep Batch #...:** 0214294
**Dilution Factor:** 1.24 **% Moisture.....:** 8.8

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **4-Isopropyltoluene** | **ND** | **136** | **124** | **ug/kg** | **91** | | **SW846 8260B** |
| | **ND** | **176** | **190** | **ug/kg** | **108 p** | **42** | **SW846 8260B** |
| **Acetone** | **ND** | **136** | **92.0** | **ug/kg** | **68** | | **SW846 8260B** |
| | **ND** | **176** | **117** | **ug/kg** | **66** | **24** | **SW846 8260B** |
| **Benzene** | **ND** | **136** | **124** | **ug/kg** | **91** | | **SW846 8260B** |
| | **ND** | **176** | **176** | **ug/kg** | **100 p** | **35** | **SW846 8260B** |
| **Bromobenzene** | **ND** | **136** | **118** | **ug/kg** | **87** | | **SW846 8260B** |
| | **ND** | **176** | **167** | **ug/kg** | **95 p** | **34** | **SW846 8260B** |
| **Bromochloromethane** | **ND** | **136** | **113** | **ug/kg** | **83** | | **SW846 8260B** |
| | **ND** | **176** | **158** | **ug/kg** | **90 p** | **33** | **SW846 8260B** |
| **Bromodichloromethane** | **ND** | **136** | **119** | **ug/kg** | **87** | | **SW846 8260B** |
| | **ND** | **176** | **162** | **ug/kg** | **92 p** | **31** | **SW846 8260B** |
| **Bromoform** | **ND** | **136** | **105** | **ug/kg** | **77** | | **SW846 8260B** |
| | **ND** | **176** | **150** | **ug/kg** | **85 p** | **36** | **SW846 8260B** |
| **Bromomethane** | **ND** | **136** | **120** | **ug/kg** | **88** | | **SW846 8260B** |
| | **ND** | **176** | **155** | **ug/kg** | **88** | **26** | **SW846 8260B** |
| **2-Butanone (MEK)** | **ND** | **136** | **91.1** | **ug/kg** | **67** | | **SW846 8260B** |
| | **ND** | **176** | **114** | **ug/kg** | **65** | **23** | **SW846 8260B** |
| **n-Butylbenzene** | **ND** | **136** | **114** | **ug/kg** | **84** | | **SW846 8260B** |
| | **ND** | **176** | **181** | **ug/kg** | **103 p** | **46** | **SW846 8260B** |
| **sec-Butylbenzene** | **ND** | **136** | **125** | **ug/kg** | **92** | | **SW846 8260B** |
| | **ND** | **176** | **191** | **ug/kg** | **109 p** | **42** | **SW846 8260B** |
| **tert-Butylbenzene** | **ND** | **136** | **121** | **ug/kg** | **89** | | **SW846 8260B** |
| | **ND** | **176** | **185** | **ug/kg** | **105 p** | **42** | **SW846 8260B** |
| **Carbon disulfide** | **ND** | **136** | **118** | **ug/kg** | **86** | | **SW846 8260B** |
| | **ND** | **176** | **162** | **ug/kg** | **92 p** | **32** | **SW846 8260B** |
| **Carbon tetrachloride** | **ND** | **136** | **123** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **181** | **ug/kg** | **103 p** | **38** | **SW846 8260B** |
| **Chlorobenzene** | **ND** | **136** | **119** | **ug/kg** | **87** | | **SW846 8260B** |
| | **ND** | **176** | **168** | **ug/kg** | **95 p** | **35** | **SW846 8260B** |
| **Dibromochloromethane** | **ND** | **136** | **120** | **ug/kg** | **88** | | **SW846 8260B** |
| | **ND** | **176** | **160** | **ug/kg** | **91** | **29** | **SW846 8260B** |
| **Chloroethane** | **ND** | **136** | **118** | **ug/kg** | **86** | | **SW846 8260B** |
| | **ND** | **176** | **156** | **ug/kg** | **89** | **28** | **SW846 8260B** |
| **Chloroform** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **172** | **ug/kg** | **98 p** | **34** | **SW846 8260B** |
| **Chloromethane** | **ND** | **136** | **116** | **ug/kg** | **85** | | **SW846 8260B** |
| | **ND** | **176** | **157** | **ug/kg** | **89** | **30** | **SW846 8260B** |
| **2-Chlorotoluene** | **ND** | **136** | **122** | **ug/kg** | **89** | | **SW846 8260B** |
| | **ND** | **176** | **175** | **ug/kg** | **99 p** | **36** | **SW846 8260B** |

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**MATRIX SPIKE SAMPLE DATA REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **4-Chlorotoluene** | **ND** | **136** | **117** | **ug/kg** | **86** | | **SW846 8260B** |
| | **ND** | **176** | **173** | **ug/kg** | **98 p** | **38** | **SW846 8260B** |
| **1,2-Dibromo-3-** chloropropane (DBCP) | **ND** | **136** | **88.7** | **ug/kg** | **65** | | **SW846 8260B** |
| | **ND** | **176** | **114** | **ug/kg** | **65** | **25** | **SW846 8260B** |
| **1,2-Dibromoethane (EDB)** | **ND** | **136** | **108** | **ug/kg** | **80** | | **SW846 8260B** |
| | **ND** | **176** | **145** | **ug/kg** | **83** | **29** | **SW846 8260B** |
| **Dibromomethane** | **ND** | **136** | **104** | **ug/kg** | **77** | | **SW846 8260B** |
| | **ND** | **176** | **138** | **ug/kg** | **78** | **28** | **SW846 8260B** |
| **1,2-Dichlorobenzene** | **ND** | **136** | **110** | **ug/kg** | **81** | | **SW846 8260B** |
| | **ND** | **176** | **159** | **ug/kg** | **90 p** | **36** | **SW846 8260B** |
| **1,3-Dichlorobenzene** | **ND** | **136** | **113** | **ug/kg** | **83** | | **SW846 8260B** |
| | **ND** | **176** | **168** | **ug/kg** | **96 p** | **40** | **SW846 8260B** |
| **1,4-Dichlorobenzene** | **ND** | **136** | **109** | **ug/kg** | **80** | | **SW846 8260B** |
| | **ND** | **176** | **162** | **ug/kg** | **92 p** | **39** | **SW846 8260B** |
| **Dichlorodifluoromethane** (Freon 12) | **ND** | **136** | **107** | **ug/kg** | **79** | | **SW846 8260B** |
| | **ND** | **176** | **145** | **ug/kg** | **82** | **30** | **SW846 8260B** |
| **1,1-Dichloroethane** | **ND** | **136** | **126** | **ug/kg** | **92** | | **SW846 8260B** |
| | **ND** | **176** | **175** | **ug/kg** | **99 p** | **33** | **SW846 8260B** |
| **1,2-Dichloroethane** | **ND** | **136** | **109** | **ug/kg** | **80** | | **SW846 8260B** |
| | **ND** | **176** | **148** | **ug/kg** | **84** | **30** | **SW846 8260B** |
| **cis-1,2-Dichloroethene** | **ND** | **136** | **125** | **ug/kg** | **92** | | **SW846 8260B** |
| | **ND** | **176** | **179** | **ug/kg** | **101 p** | **35** | **SW846 8260B** |
| **trans-1,2-Dichloroethene** | **ND** | **136** | **124** | **ug/kg** | **91** | | **SW846 8260B** |
| | **ND** | **176** | **175** | **ug/kg** | **99 p** | **34** | **SW846 8260B** |
| **1,1-Dichloroethene** | **ND** | **136** | **125** | **ug/kg** | **92** | | **SW846 8260B** |
| | **ND** | **176** | **178** | **ug/kg** | **101 p** | **35** | **SW846 8260B** |
| **1,2-Dichloropropane** | **ND** | **136** | **123** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **165** | **ug/kg** | **94** | **29** | **SW846 8260B** |
| **1,3-Dichloropropane** | **ND** | **136** | **114** | **ug/kg** | **83** | | **SW846 8260B** |
| | **ND** | **176** | **148** | **ug/kg** | **84** | **26** | **SW846 8260B** |
| **2,2-Dichloropropane** | **ND** | **136** | **138** | **ug/kg** | **102** | | **SW846 8260B** |
| | **ND** | **176** | **199** | **ug/kg** | **113 p** | **36** | **SW846 8260B** |
| **cis-1,3-Dichloropropene** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **158** | **ug/kg** | **89** | **25** | **SW846 8260B** |
| **trans-1,3-Dichloropropene** | **ND** | **136** | **125** | **ug/kg** | **92** | | **SW846 8260B** |
| | **ND** | **176** | **155** | **ug/kg** | **88** | **22** | **SW846 8260B** |
| **1,1-Dichloropropene** | **ND** | **136** | **121** | **ug/kg** | **89** | | **SW846 8260B** |
| | **ND** | **176** | **176** | **ug/kg** | **100 p** | **38** | **SW846 8260B** |

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**MATRIX SPIKE SAMPLE DATA REPORT**

**GC/MS Volatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **Ethylbenzene** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **179** | **ug/kg** | **102 p** | **38** | **SW846 8260B** |
| **Hexachlorobutadiene** | **ND** | **136** | **100** | **ug/kg** | **74** | | **SW846 8260B** |
| | **ND** | **176** | **163** | **ug/kg** | **92 p** | **48** | **SW846 8260B** |
| **2-Hexanone** | **ND** | **136** | **103** | **ug/kg** | **76** | | **SW846 8260B** |
| | **ND** | **176** | **128** | **ug/kg** | **72** | **21** | **SW846 8260B** |
| **Isopropylbenzene** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **195** | **ug/kg** | **111 p** | **46** | **SW846 8260B** |
| **Methylene chloride** | **ND** | **136** | **120** | **ug/kg** | **88** | | **SW846 8260B** |
| | **ND** | **176** | **167** | **ug/kg** | **95 p** | **33** | **SW846 8260B** |
| **4-Methyl-2-pentanone** (MIBK) | **ND** | **136** | **104** | **ug/kg** | **77** | | **SW846 8260B** |
| | **ND** | **176** | **126** | **ug/kg** | **71** | **19** | **SW846 8260B** |
| **Methyl tert-butyl ether** (MTBE) | **ND** | **136** | **110** | **ug/kg** | **81** | | **SW846 8260B** |
| | **ND** | **176** | **146** | **ug/kg** | **83** | **29** | **SW846 8260B** |
| **Naphthalene** | **ND** | **136** | **98.8** | **ug/kg** | **73** | | **SW846 8260B** |
| | **ND** | **176** | **140** | **ug/kg** | **79 p** | **34** | **SW846 8260B** |
| **n-Propylbenzene** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **182** | **ug/kg** | **103 p** | **39** | **SW846 8260B** |
| **Styrene** | **ND** | **136** | **127** | **ug/kg** | **93** | | **SW846 8260B** |
| | **ND** | **176** | **191** | **ug/kg** | **108 p** | **40** | **SW846 8260B** |
| **1,1,1,2-Tetrachloroethane** | **ND** | **136** | **121** | **ug/kg** | **89** | | **SW846 8260B** |
| | **ND** | **176** | **176** | **ug/kg** | **100 p** | **37** | **SW846 8260B** |
| **Tetrachloroethene** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **176** | **ug/kg** | **100 p** | **36** | **SW846 8260B** |
| **Toluene** | **ND** | **136** | **125** | **ug/kg** | **92** | | **SW846 8260B** |
| | **ND** | **176** | **169** | **ug/kg** | **96 p** | **31** | **SW846 8260B** |
| **1,2,3-Trichlorobenzene** | **ND** | **136** | **101** | **ug/kg** | **74** | | **SW846 8260B** |
| | **ND** | **176** | **151** | **ug/kg** | **86 p** | **40** | **SW846 8260B** |
| **1,2,4-Trichloro-** benzene | **ND** | **136** | **103** | **ug/kg** | **76** | | **SW846 8260B** |
| | **ND** | **176** | **158** | **ug/kg** | **90 p** | **42** | **SW846 8260B** |
| **1,1,1-Trichloroethane** | **ND** | **136** | **128** | **ug/kg** | **94** | | **SW846 8260B** |
| | **ND** | **176** | **183** | **ug/kg** | **104 p** | **35** | **SW846 8260B** |
| **1,1,2-Trichloroethane** | **ND** | **136** | **108** | **ug/kg** | **79** | | **SW846 8260B** |
| | **ND** | **176** | **136** | **ug/kg** | **77** | **23** | **SW846 8260B** |
| **Trichloroethene** | **ND** | **136** | **119** | **ug/kg** | **87** | | **SW846 8260B** |
| | **ND** | **176** | **171** | **ug/kg** | **97 p** | **36** | **SW846 8260B** |

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## MATRIX SPIKE SAMPLE DATA REPORT

### GC/MS Volatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961D5-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961D6-MSD

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **Trichlorofluoromethane (Freon 11)** | **ND** | **136** | **132** | **ug/kg** | **97** | | **SW846 8260B** |
| | **ND** | **176** | **175** | **ug/kg** | **100** | **28** | **SW846 8260B** |
| **1,2,3-Trichloropropane** | **ND** | **136** | **102** | **ug/kg** | **75** | | **SW846 8260B** |
| | **ND** | **176** | **130** | **ug/kg** | **73** | **23** | **SW846 8260B** |
| **1,2,4-Trimethylbenzene** | **ND** | **136** | **123** | **ug/kg** | **91** | | **SW846 8260B** |
| | **ND** | **176** | **183** | **ug/kg** | **104 p** | **39** | **SW846 8260B** |
| **1,3,5-Trimethylbenzene** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **181** | **ug/kg** | **103 p** | **39** | **SW846 8260B** |
| **Vinyl chloride** | **ND** | **136** | **130** | **ug/kg** | **96** | | **SW846 8260B** |
| | **ND** | **176** | **177** | **ug/kg** | **100** | **30** | **SW846 8260B** |
| **m-Xylene & p-Xylene** | **ND** | **272** | **238** | **ug/kg** | **87** | | **SW846 8260B** |
| | **ND** | **353** | **353** | **ug/kg** | **100 p** | **39** | **SW846 8260B** |
| **o-Xylene** | **ND** | **136** | **123** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **183** | **ug/kg** | **104 p** | **39** | **SW846 8260B** |
| Vinyl acetate | ND | 136 | 71.6 | ug/kg | 53 | | SW846 8260B |
| | ND | 176 | 95.9 | ug/kg | 54 | 29 | SW846 8260B |
| **1,1,2-Trichloro-1,2,2-tri fluoroethane (Freon 113)** | **ND** | **136** | **122** | **ug/kg** | **90** | | **SW846 8260B** |
| | **ND** | **176** | **170** | **ug/kg** | **96 p** | **33** | **SW846 8260B** |
| **1,1,2,2-Tetrachloroethane** | **ND** | **136** | **106** | **ug/kg** | **78** | | **SW846 8260B** |
| | **ND** | **176** | **136** | **ug/kg** | **77** | **25** | **SW846 8260B** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Dibromofluoromethane | 86 | (68 - 116) |
| | 90 | (68 - 116) |
| 1,2-Dichloroethane-d4 | 75 | (59 - 130) |
| | 75 | (59 - 130) |
| Toluene-d8 | 102 | (85 - 115) |
| | 97 | (85 - 115) |
| 4-Bromofluorobenzene | 96 | (85 - 120) |
| | 103 | (85 - 120) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

p Relative percent difference (RPD) is outside stated control limits.

Results and repor ing limits have been adjusted for dry weight.

**METHOD BLANK REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AA **Matrix.....:** SOLID
**MB Lot-Sample #:** G0G300000-261

**Prep Date.....:** 07/30/10
**Analysis Date..:** 08/02/10 **Prep Batch #...:** 0211261
**Dilution Factor:** 1

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| Acenaphthene | ND | 330 | ug/kg | SW846 8270C |
| Acenaphthylene | ND | 330 | ug/kg | SW846 8270C |
| Anthracene | ND | 330 | ug/kg | SW846 8270C |
| Azobenzene | ND | 330 | ug/kg | SW846 8270C |
| Benz(a)anthracene | ND | 330 | ug/kg | SW846 8270C |
| Benzo(b)fluoranthene | ND | 330 | ug/kg | SW846 8270C |
| Benzo(k)fluoranthene | ND | 330 | ug/kg | SW846 8270C |
| Benzoic acid | ND | 1600 | ug/kg | SW846 8270C |
| Benzo(ghi)perylene | ND | 330 | ug/kg | SW846 8270C |
| Benzo(a)pyrene | ND | 330 | ug/kg | SW846 8270C |
| Benzyl alcohol | ND | 510 | ug/kg | SW846 8270C |
| bis(2-Chloroethoxy) methane | ND | 330 | ug/kg | SW846 8270C |
| bis(2-Chloroethyl)- ether | ND | 330 | ug/kg | SW846 8270C |
| bis(2-Chloroisopropyl) ether | ND | 330 | ug/kg | SW846 8270C |
| bis(2-Ethylhexyl) phthalate | ND | 330 | ug/kg | SW846 8270C |
| 4-Bromophenyl phenyl ether | ND | 330 | ug/kg | SW846 8270C |
| Butyl benzyl phthalate | ND | 330 | ug/kg | SW846 8270C |
| Carbazole | ND | 330 | ug/kg | SW846 8270C |
| 4-Chloroaniline | ND | 330 | ug/kg | SW846 8270C |
| 4-Chloro-3-methylphenol | ND | 330 | ug/kg | SW846 8270C |
| 2-Chloronaphthalene | ND | 330 | ug/kg | SW846 8270C |
| 2-Chlorophenol | ND | 330 | ug/kg | SW846 8270C |
| 4-Chlorophenyl phenyl ether | ND | 330 | ug/kg | SW846 8270C |
| Chrysene | ND | 330 | ug/kg | SW846 8270C |
| Dibenz(a,h)anthracene | ND | 330 | ug/kg | SW846 8270C |
| Dibenzofuran | ND | 330 | ug/kg | SW846 8270C |
| Di-n-butyl phthalate | ND | 330 | ug/kg | SW846 8270C |
| 1,2-Dichlorobenzene | ND | 330 | ug/kg | SW846 8270C |
| 1,3-Dichlorobenzene | ND | 330 | ug/kg | SW846 8270C |
| 1,4-Dichlorobenzene | ND | 330 | ug/kg | SW846 8270C |
| 3,3'-Dichlorobenzidine | ND | 1600 | ug/kg | SW846 8270C |
| 2,4-Dichlorophenol | ND | 330 | ug/kg | SW846 8270C |
| Diethyl phthalate | ND | 330 | ug/kg | SW846 8270C |
| 2,4-Dimethylphenol | ND | 500 | ug/kg | SW846 8270C |
| Dimethyl phthalate | ND | 330 | ug/kg | SW846 8270C |

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**METHOD BLANK REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AA **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 4,6-Dinitro-2-methylphenol | ND | 2000 | ug/kg | SW846 8270C |
| 2,4-Dinitrophenol | ND | 2000 | ug/kg | SW846 8270C |
| 2,4-Dinitrotoluene | ND | 330 | ug/kg | SW846 8270C |
| 2,6-Dinitrotoluene | ND | 330 | ug/kg | SW846 8270C |
| Di-n-octyl phthalate | ND | 330 | ug/kg | SW846 8270C |
| Fluoranthene | ND | 330 | ug/kg | SW846 8270C |
| Fluorene | ND | 330 | ug/kg | SW846 8270C |
| Hexachlorobenzene | ND | 330 | ug/kg | SW846 8270C |
| Hexachlorobutadiene | ND | 330 | ug/kg | SW846 8270C |
| Hexachloroethane | ND | 330 | ug/kg | SW846 8270C |
| Indeno(1,2,3-cd)pyrene | ND | 330 | ug/kg | SW846 8270C |
| Isophorone | ND | 330 | ug/kg | SW846 8270C |
| 2-Methylnaphthalene | ND | 330 | ug/kg | SW846 8270C |
| 2-Methylphenol | ND | 330 | ug/kg | SW846 8270C |
| 3-Methylphenol & 4-Methylphenol | ND | 1000 | ug/kg | SW846 8270C |
| Naphthalene | ND | 330 | ug/kg | SW846 8270C |
| 2-Nitroaniline | ND | 1600 | ug/kg | SW846 8270C |
| 3-Nitroaniline | ND | 1600 | ug/kg | SW846 8270C |
| 4-Nitroaniline | ND | 1600 | ug/kg | SW846 8270C |
| Nitrobenzene | ND | 330 | ug/kg | SW846 8270C |
| 2-Nitrophenol | ND | 330 | ug/kg | SW846 8270C |
| 4-Nitrophenol | ND | 2000 | ug/kg | SW846 8270C |
| N-Nitrosodiphenylamine | ND | 330 | ug/kg | SW846 8270C |
| Pentachlorophenol | ND | 1600 | ug/kg | SW846 8270C |
| Phenanthrene | ND | 330 | ug/kg | SW846 8270C |
| Phenol | ND | 330 | ug/kg | SW846 8270C |
| Pyrene | ND | 330 | ug/kg | SW846 8270C |
| 1,2,4-Trichloro-benzene | ND | 330 | ug/kg | SW846 8270C |
| 2,4,5-Trichloro-phenol | ND | 330 | ug/kg | SW846 8270C |
| 2,4,6-Trichloro-phenol | ND | 330 | ug/kg | SW846 8270C |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 85 | (45 - 105) |
| 2-Fluorophenol | 84 | (35 - 105) |
| Nitrobenzene-d5 | 82 | (35 - 100) |
| Phenol-d5 | 86 | (40 - 100) |
| Terphenyl-d14 | 107 | (30 - 125) |
| 2,4,6-Tribromophenol | 73 | (35 - 125) |

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**METHOD BLANK REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AA **Matrix.....:** SOLID

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G300000-261
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 1

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| **Acenaphthene** | **82** | **(45 - 110)** | **SW846 8270C** |
| **Acenaphthylene** | **85** | **(45 - 105)** | **SW846 8270C** |
| **Anthracene** | **92** | **(55 - 105)** | **SW846 8270C** |
| Azobenzene | 95 | (67 - 109) | SW846 8270C |
| **Benz(a)anthracene** | **97** | **(50 - 110)** | **SW846 8270C** |
| **Benzo(b)fluoranthene** | **102** | **(45 - 115)** | **SW846 8270C** |
| **Benzo(k)fluoranthene** | **99** | **(45 - 125)** | **SW846 8270C** |
| Benzoic acid | 29 | (0.0- 110) | SW846 8270C |
| **Benzo(ghi)perylene** | **101** | **(40 - 125)** | **SW846 8270C** |
| **Benzo(a)pyrene** | **82** | **(50 - 110)** | **SW846 8270C** |
| **Benzyl alcohol** | **74** | **(20 - 125)** | **SW846 8270C** |
| **bis(2-Chloroethoxy) methane** | **72** | **(45 - 110)** | **SW846 8270C** |
| **bis(2-Chloroethyl)- ether** | **67** | **(40 - 105)** | **SW846 8270C** |
| **bis(2-Chloroisopropyl) ether** | **65** | **(20 - 115)** | **SW846 8270C** |
| **bis(2-Ethylhexyl) phthalate** | **96** | **(45 - 125)** | **SW846 8270C** |
| **4-Bromophenyl phenyl ether** | **91** | **(45 - 115)** | **SW846 8270C** |
| **Butyl benzyl phthalate** | **93** | **(50 - 125)** | **SW846 8270C** |
| **Carbazole** | **94** | **(45 - 115)** | **SW846 8270C** |
| **4-Chloroaniline** | **70** | **(10 - 95)** | **SW846 8270C** |
| **4-Chloro-3-methylphenol** | **95** | **(45 - 115)** | **SW846 8270C** |
| **2-Chloronaphthalene** | **77** | **(45 - 105)** | **SW846 8270C** |
| **2-Chlorophenol** | **71** | **(45 - 105)** | **SW846 8270C** |
| **4-Chlorophenyl phenyl ether** | **91** | **(45 - 110)** | **SW846 8270C** |
| **Chrysene** | **93** | **(55 - 110)** | **SW846 8270C** |
| **Dibenz(a,h)anthracene** | **96** | **(40 - 125)** | **SW846 8270C** |
| **Dibenzofuran** | **88** | **(50 - 105)** | **SW846 8270C** |
| **Di-n-butyl phthalate** | **99** | **(55 - 110)** | **SW846 8270C** |
| **1,2-Dichlorobenzene** | **65** | **(45 - 95)** | **SW846 8270C** |

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**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G300000-261

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| **1,3-Dichlorobenzene** | **62** | **(40 - 100)** | **SW846 8270C** |
| **1,4-Dichlorobenzene** | **63** | **(35 - 105)** | **SW846 8270C** |
| 3,3'-Dichlorobenzidine | 83 | (10 - 130) | SW846 8270C |
| **2,4-Dichlorophenol** | **81** | **(45 - 110)** | **SW846 8270C** |
| **Diethyl phthalate** | **98** | **(50 - 115)** | **SW846 8270C** |
| **2,4-Dimethylphenol** | **72** | **(30 - 105)** | **SW846 8270C** |
| **Dimethyl phthalate** | **94** | **(50 - 110)** | **SW846 8270C** |
| **4,6-Dinitro-2-methylphenol** | **59** | **(30 - 135)** | **SW846 8270C** |
| **2,4-Dinitrophenol** | **35** | **(15 - 130)** | **SW846 8270C** |
| **2,4-Dinitrotoluene** | **107** | **(50 - 115)** | **SW846 8270C** |
| **2,6-Dinitrotoluene** | **101** | **(50 - 110)** | **SW846 8270C** |
| **Di-n-octyl phthalate** | **86** | **(40 - 130)** | **SW846 8270C** |
| **Fluoranthene** | **104** | **(55 - 115)** | **SW846 8270C** |
| **Fluorene** | **92** | **(50 - 110)** | **SW846 8270C** |
| **Hexachlorobenzene** | **92** | **(45 - 120)** | **SW846 8270C** |
| **Hexachlorobutadiene** | **70** | **(40 - 115)** | **SW846 8270C** |
| **Hexachloroethane** | **60** | **(35 - 110)** | **SW846 8270C** |
| **Indeno(1,2,3-cd)pyrene** | **94** | **(40 - 120)** | **SW846 8270C** |
| **Isophorone** | **79** | **(45 - 110)** | **SW846 8270C** |
| **2-Methylnaphthalene** | **74** | **(45 - 105)** | **SW846 8270C** |
| **2-Methylphenol** | **74** | **(40 - 105)** | **SW846 8270C** |
| **3-Methylphenol & 4-Methylphenol** | **75** | **(40 - 105)** | **SW846 8270C** |
| **Naphthalene** | **68** | **(40 - 105)** | **SW846 8270C** |
| **2-Nitroaniline** | **98** | **(45 - 120)** | **SW846 8270C** |
| **3-Nitroaniline** | **94** | **(25 - 110)** | **SW846 8270C** |
| **4-Nitroaniline** | **97** | **(35 - 115)** | **SW846 8270C** |
| **Nitrobenzene** | **70** | **(40 - 115)** | **SW846 8270C** |
| **2-Nitrophenol** | **72** | **(40 - 110)** | **SW846 8270C** |
| **4-Nitrophenol** | **102** | **(15 - 140)** | **SW846 8270C** |
| **N-Nitrosodiphenylamine** | **93** | **(50 - 115)** | **SW846 8270C** |
| **Pentachlorophenol** | **88** | **(25 - 120)** | **SW846 8270C** |
| **Phenanthrene** | **92** | **(50 - 110)** | **SW846 8270C** |
| **Phenol** | **76** | **(40 - 100)** | **SW846 8270C** |
| **Pyrene** | **92** | **(45 - 125)** | **SW846 8270C** |
| **1,2,4-Trichloro-benzene** | **68** | **(45 - 110)** | **SW846 8270C** |

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## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### GC/MS Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G300000-261

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| **2,4,5-Trichlorophenol** | **96** | **(50 - 110)** | **SW846 8270C** |
| **2,4,6-Trichlorophenol** | **92** | **(45 - 110)** | **SW846 8270C** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 81 | (45 - 105) |
| 2-Fluorophenol | 76 | (35 - 105) |
| Nitrobenzene-d5 | 74 | (35 - 100) |
| Phenol-d5 | 76 | (40 - 100) |
| Terphenyl-d14 | 96 | (30 - 125) |
| 2,4,6-Tribromophenol | 99 | (35 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

**LABORATORY CONTROL SAMPLE DATA REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G300000-261
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 1

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| **Acenaphthene** | **3330** | **2750** | **ug/kg** | **82** | **SW846 8270C** |
| **Acenaphthylene** | **3330** | **2840** | **ug/kg** | **85** | **SW846 8270C** |
| **Anthracene** | **3330** | **3080** | **ug/kg** | **92** | **SW846 8270C** |
| Azobenzene | 3330 | 3170 | ug/kg | 95 | SW846 8270C |
| **Benz(a)anthracene** | **3330** | **3220** | **ug/kg** | **97** | **SW846 8270C** |
| **Benzo(b)fluoranthene** | **3330** | **3400** | **ug/kg** | **102** | **SW846 8270C** |
| **Benzo(k)fluoranthene** | **3330** | **3300** | **ug/kg** | **99** | **SW846 8270C** |
| Benzoic acid | 3330 | 976 | ug/kg | 29 | SW846 8270C |
| **Benzo(ghi)perylene** | **3330** | **3380** | **ug/kg** | **101** | **SW846 8270C** |
| **Benzo(a)pyrene** | **3330** | **2730** | **ug/kg** | **82** | **SW846 8270C** |
| **Benzyl alcohol** | **3330** | **2460** | **ug/kg** | **74** | **SW846 8270C** |
| **bis(2-Chloroethoxy) methane** | **3330** | **2390** | **ug/kg** | **72** | **SW846 8270C** |
| **bis(2-Chloroethyl)-ether** | **3330** | **2230** | **ug/kg** | **67** | **SW846 8270C** |
| **bis(2-Chloroisopropyl) ether** | **3330** | **2170** | **ug/kg** | **65** | **SW846 8270C** |
| **bis(2-Ethylhexyl) phthalate** | **3330** | **3190** | **ug/kg** | **96** | **SW846 8270C** |
| **4-Bromophenyl phenyl ether** | **3330** | **3030** | **ug/kg** | **91** | **SW846 8270C** |
| **Butyl benzyl phthalate** | **3330** | **3090** | **ug/kg** | **93** | **SW846 8270C** |
| **Carbazole** | **3330** | **3130** | **ug/kg** | **94** | **SW846 8270C** |
| **4-Chloroaniline** | **3330** | **2330** | **ug/kg** | **70** | **SW846 8270C** |
| **4-Chloro-3-methylphenol** | **3330** | **3150** | **ug/kg** | **95** | **SW846 8270C** |
| **2-Chloronaphthalene** | **3330** | **2570** | **ug/kg** | **77** | **SW846 8270C** |
| **2-Chlorophenol** | **3330** | **2360** | **ug/kg** | **71** | **SW846 8270C** |
| **4-Chlorophenyl phenyl ether** | **3330** | **3020** | **ug/kg** | **91** | **SW846 8270C** |
| **Chrysene** | **3330** | **3110** | **ug/kg** | **93** | **SW846 8270C** |
| **Dibenz(a,h)anthracene** | **3330** | **3200** | **ug/kg** | **96** | **SW846 8270C** |
| **Dibenzofuran** | **3330** | **2930** | **ug/kg** | **88** | **SW846 8270C** |
| **Di-n-butyl phthalate** | **3330** | **3300** | **ug/kg** | **99** | **SW846 8270C** |
| **1,2-Dichlorobenzene** | **3330** | **2160** | **ug/kg** | **65** | **SW846 8270C** |

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**LABORATORY CONTROL SAMPLE DATA REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G300000-261

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| **1,3-Dichlorobenzene** | **3330** | **2050** | **ug/kg** | **62** | **SW846 8270C** |
| **1,4-Dichlorobenzene** | **3330** | **2110** | **ug/kg** | **63** | **SW846 8270C** |
| 3,3'-Dichlorobenzidine | 3330 | 2770 | ug/kg | 83 | SW846 8270C |
| **2,4-Dichlorophenol** | **3330** | **2710** | **ug/kg** | **81** | **SW846 8270C** |
| **Diethyl phthalate** | **3330** | **3260** | **ug/kg** | **98** | **SW846 8270C** |
| **2,4-Dimethylphenol** | **3330** | **2390** | **ug/kg** | **72** | **SW846 8270C** |
| **Dimethyl phthalate** | **3330** | **3120** | **ug/kg** | **94** | **SW846 8270C** |
| **4,6-Dinitro-2-methylphenol** | **3330** | **1960** | **ug/kg** | **59** | **SW846 8270C** |
| **2,4-Dinitrophenol** | **3330** | **1180** | **ug/kg** | **35** | **SW846 8270C** |
| **2,4-Dinitrotoluene** | **3330** | **3580** | **ug/kg** | **107** | **SW846 8270C** |
| **2,6-Dinitrotoluene** | **3330** | **3350** | **ug/kg** | **101** | **SW846 8270C** |
| **Di-n-octyl phthalate** | **3330** | **2870** | **ug/kg** | **86** | **SW846 8270C** |
| **Fluoranthene** | **3330** | **3460** | **ug/kg** | **104** | **SW846 8270C** |
| **Fluorene** | **3330** | **3070** | **ug/kg** | **92** | **SW846 8270C** |
| **Hexachlorobenzene** | **3330** | **3070** | **ug/kg** | **92** | **SW846 8270C** |
| **Hexachlorobutadiene** | **3330** | **2340** | **ug/kg** | **70** | **SW846 8270C** |
| **Hexachloroethane** | **3330** | **1990** | **ug/kg** | **60** | **SW846 8270C** |
| **Indeno(1,2,3-cd)pyrene** | **3330** | **3140** | **ug/kg** | **94** | **SW846 8270C** |
| **Isophorone** | **3330** | **2630** | **ug/kg** | **79** | **SW846 8270C** |
| **2-Methylnaphthalene** | **3330** | **2460** | **ug/kg** | **74** | **SW846 8270C** |
| **2-Methylphenol** | **3330** | **2460** | **ug/kg** | **74** | **SW846 8270C** |
| **3-Methylphenol & 4-Methylphenol** | **6670** | **5000** | **ug/kg** | **75** | **SW846 8270C** |
| **Naphthalene** | **3330** | **2250** | **ug/kg** | **68** | **SW846 8270C** |
| **2-Nitroaniline** | **3330** | **3260** | **ug/kg** | **98** | **SW846 8270C** |
| **3-Nitroaniline** | **3330** | **3130** | **ug/kg** | **94** | **SW846 8270C** |
| **4-Nitroaniline** | **3330** | **3220** | **ug/kg** | **97** | **SW846 8270C** |
| **Nitrobenzene** | **3330** | **2340** | **ug/kg** | **70** | **SW846 8270C** |
| **2-Nitrophenol** | **3330** | **2410** | **ug/kg** | **72** | **SW846 8270C** |
| **4-Nitrophenol** | **3330** | **3400** | **ug/kg** | **102** | **SW846 8270C** |
| **N-Nitrosodiphenylamine** | **3330** | **3100** | **ug/kg** | **93** | **SW846 8270C** |
| **Pentachlorophenol** | **3330** | **2940** | **ug/kg** | **88** | **SW846 8270C** |
| **Phenanthrene** | **3330** | **3070** | **ug/kg** | **92** | **SW846 8270C** |
| **Phenol** | **3330** | **2520** | **ug/kg** | **76** | **SW846 8270C** |
| **Pyrene** | **3330** | **3080** | **ug/kg** | **92** | **SW846 8270C** |
| **1,2,4-Trichlorobenzene** | **3330** | **2280** | **ug/kg** | **68** | **SW846 8270C** |

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## LABORATORY CONTROL SAMPLE DATA REPORT

### GC/MS Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4XHM1AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G300000-261

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| **2,4,5-Trichloro-phenol** | **3330** | **3200** | **ug/kg** | **96** | **SW846 8270C** |
| **2,4,6-Trichloro-phenol** | **3330** | **3070** | **ug/kg** | **92** | **SW846 8270C** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 81 | (45 - 105) |
| 2-Fluorophenol | 76 | (35 - 105) |
| Nitrobenzene-d5 | 74 | (35 - 100) |
| Phenol-d5 | 76 | (40 - 100) |
| Terphenyl-d14 | 96 | (30 - 125) |
| 2,4,6-Tribromophenol | 99 | (35 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 0.98 **% Moisture.....:** 8.8

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **Acenaphthene** | **79** | **(45 - 110)** | | | **SW846 8270C** |
| | **87** | **(45 - 110)** | **10** | **(0-30)** | **SW846 8270C** |
| **Acenaphthylene** | **81** | **(45 - 105)** | | | **SW846 8270C** |
| | **91** | **(45 - 105)** | **11** | **(0-30)** | **SW846 8270C** |
| **Anthracene** | **84** | **(55 - 105)** | | | **SW846 8270C** |
| | **92** | **(55 - 105)** | **9.3** | **(0-30)** | **SW846 8270C** |
| Azobenzene | 87 | (67 - 109) | | | SW846 8270C |
| | 95 | (67 - 109) | 9.1 | (0-30) | SW846 8270C |
| **Benz(a)anthracene** | **89** | **(50 - 110)** | | | **SW846 8270C** |
| | **95** | **(50 - 110)** | **7.1** | **(0-30)** | **SW846 8270C** |
| **Benzo(b)fluoranthene** | **93** | **(45 - 115)** | | | **SW846 8270C** |
| | **103** | **(45 - 115)** | **11** | **(0-30)** | **SW846 8270C** |
| **Benzo(k)fluoranthene** | **89** | **(45 - 125)** | | | **SW846 8270C** |
| | **100** | **(45 - 125)** | **12** | **(0-30)** | **SW846 8270C** |
| Benzoic acid | 80 | (0.0- 110) | | | SW846 8270C |
| | 87 | (0.0- 110) | 9.1 | (0-30) | SW846 8270C |
| **Benzo(ghi)perylene** | **91** | **(40 - 125)** | | | **SW846 8270C** |
| | **101** | **(40 - 125)** | **11** | **(0-30)** | **SW846 8270C** |
| **Benzo(a)pyrene** | **76** | **(50 - 110)** | | | **SW846 8270C** |
| | **83** | **(50 - 110)** | **9.6** | **(0-30)** | **SW846 8270C** |
| **Benzyl alcohol** | **68** | **(20 - 125)** | | | **SW846 8270C** |
| | **85** | **(20 - 125)** | **24** | **(0-30)** | **SW846 8270C** |
| **bis(2-Chloroethoxy)** methane | **70** | **(45 - 110)** | | | **SW846 8270C** |
| | **82** | **(45 - 110)** | **17** | **(0-30)** | **SW846 8270C** |
| **bis(2-Chloroethyl)-** ether | **64** | **(40 - 105)** | | | **SW846 8270C** |
| | **77** | **(40 - 105)** | **19** | **(0-30)** | **SW846 8270C** |
| **bis(2-Chloroisopropyl)** ether | **62** | **(20 - 115)** | | | **SW846 8270C** |
| | **74** | **(20 - 115)** | **18** | **(0-30)** | **SW846 8270C** |
| **bis(2-Ethylhexyl)** phthalate | **94** | **(45 - 125)** | | | **SW846 8270C** |
| | **100** | **(45 - 125)** | **7.4** | **(0-30)** | **SW846 8270C** |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **4-Bromophenyl phenyl ether** | **82** | **(45 - 115)** | | | **SW846 8270C** |
| | **89** | **(45 - 115)** | **9.0** | **(0-30)** | **SW846 8270C** |
| **Butyl benzyl phthalate** | **89** | **(50 - 125)** | | | **SW846 8270C** |
| | **97** | **(50 - 125)** | **9.1** | **(0-30)** | **SW846 8270C** |
| **Carbazole** | **89** | **(45 - 115)** | | | **SW846 8270C** |
| | **95** | **(45 - 115)** | **7.5** | **(0-30)** | **SW846 8270C** |
| **4-Chloroaniline** | **65** | **(10 - 95)** | | | **SW846 8270C** |
| | **75** | **(10 - 95)** | **15** | **(0-30)** | **SW846 8270C** |
| **4-Chloro-3-methylphenol** | **87** | **(45 - 115)** | | | **SW846 8270C** |
| | **97** | **(45 - 115)** | **11** | **(0-30)** | **SW846 8270C** |
| **2-Chloronaphthalene** | **79** | **(45 - 105)** | | | **SW846 8270C** |
| | **89** | **(45 - 105)** | **13** | **(0-30)** | **SW846 8270C** |
| **2-Chlorophenol** | **67** | **(45 - 105)** | | | **SW846 8270C** |
| | **82** | **(45 - 105)** | **22** | **(0-30)** | **SW846 8270C** |
| **4-Chlorophenyl phenyl ether** | **86** | **(45 - 110)** | | | **SW846 8270C** |
| | **92** | **(45 - 110)** | **7.2** | **(0-30)** | **SW846 8270C** |
| **Chrysene** | **87** | **(55 - 110)** | | | **SW846 8270C** |
| | **93** | **(55 - 110)** | **7.4** | **(0-30)** | **SW846 8270C** |
| **Dibenz(a,h)anthracene** | **89** | **(40 - 125)** | | | **SW846 8270C** |
| | **99** | **(40 - 125)** | **11** | **(0-30)** | **SW846 8270C** |
| **Dibenzofuran** | **84** | **(50 - 105)** | | | **SW846 8270C** |
| | **93** | **(50 - 105)** | **10** | **(0-30)** | **SW846 8270C** |
| **Di-n-butyl phthalate** | **93** | **(55 - 110)** | | | **SW846 8270C** |
| | **100** | **(55 - 110)** | **8.2** | **(0-30)** | **SW846 8270C** |
| **1,2-Dichlorobenzene** | **63** | **(45 - 95)** | | | **SW846 8270C** |
| | **76** | **(45 - 95)** | **20** | **(0-30)** | **SW846 8270C** |
| **1,3-Dichlorobenzene** | **62** | **(40 - 100)** | | | **SW846 8270C** |
| | **71** | **(40 - 100)** | **15** | **(0-30)** | **SW846 8270C** |
| **1,4-Dichlorobenzene** | **61** | **(35 - 105)** | | | **SW846 8270C** |
| | **73** | **(35 - 105)** | **18** | **(0-30)** | **SW846 8270C** |
| 3,3'-Dichlorobenzidine | 75 | (10 - 130) | | | SW846 8270C |
| | 83 | (10 - 130) | 11 | (0-30) | SW846 8270C |
| **2,4-Dichlorophenol** | **79** | **(45 - 110)** | | | **SW846 8270C** |
| | **93** | **(45 - 110)** | **16** | **(0-30)** | **SW846 8270C** |
| **Diethyl phthalate** | **91** | **(50 - 115)** | | | **SW846 8270C** |
| | **99** | **(50 - 115)** | **9.0** | **(0-30)** | **SW846 8270C** |
| **2,4-Dimethylphenol** | **74** | **(30 - 105)** | | | **SW846 8270C** |
| | **82** | **(30 - 105)** | **11** | **(0-30)** | **SW846 8270C** |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **Dimethyl phthalate** | **86** | **(50 - 110)** | | | **SW846 8270C** |
| | **96** | **(50 - 110)** | **11** | **(0-30)** | **SW846 8270C** |
| **4,6-Dinitro-2-methylphenol** | **88** | **(30 - 135)** | | | **SW846 8270C** |
| | **88** | **(30 - 135)** | **0.34** | **(0-30)** | **SW846 8270C** |
| **2,4-Dinitrophenol** | **67** | **(15 - 130)** | | | **SW846 8270C** |
| | **67** | **(15 - 130)** | **0.45** | **(0-30)** | **SW846 8270C** |
| **2,4-Dinitrotoluene** | **100** | **(50 - 115)** | | | **SW846 8270C** |
| | **107** | **(50 - 115)** | **7.8** | **(0-30)** | **SW846 8270C** |
| **2,6-Dinitrotoluene** | **94** | **(50 - 110)** | | | **SW846 8270C** |
| | **104** | **(50 - 110)** | **10** | **(0-30)** | **SW846 8270C** |
| **Di-n-octyl phthalate** | **85** | **(40 - 130)** | | | **SW846 8270C** |
| | **90** | **(40 - 130)** | **6.5** | **(0-30)** | **SW846 8270C** |
| **Fluoranthene** | **101** | **(55 - 115)** | | | **SW846 8270C** |
| | **105** | **(55 - 115)** | **4.0** | **(0-30)** | **SW846 8270C** |
| **Fluorene** | **87** | **(50 - 110)** | | | **SW846 8270C** |
| | **94** | **(50 - 110)** | **8.7** | **(0-30)** | **SW846 8270C** |
| **Hexachlorobenzene** | **85** | **(45 - 120)** | | | **SW846 8270C** |
| | **93** | **(45 - 120)** | **9.1** | **(0-30)** | **SW846 8270C** |
| **Hexachlorobutadiene** | **71** | **(40 - 115)** | | | **SW846 8270C** |
| | **82** | **(40 - 115)** | **15** | **(0-30)** | **SW846 8270C** |
| **Hexachloroethane** | **62** | **(35 - 110)** | | | **SW846 8270C** |
| | **73** | **(35 - 110)** | **17** | **(0-30)** | **SW846 8270C** |
| **Indeno(1,2,3-cd)pyrene** | **86** | **(40 - 120)** | | | **SW846 8270C** |
| | **96** | **(40 - 120)** | **11** | **(0-30)** | **SW846 8270C** |
| **Isophorone** | **75** | **(45 - 110)** | | | **SW846 8270C** |
| | **86** | **(45 - 110)** | **14** | **(0-30)** | **SW846 8270C** |
| **2-Methylnaphthalene** | **73** | **(45 - 105)** | | | **SW846 8270C** |
| | **86** | **(45 - 105)** | **17** | **(0-30)** | **SW846 8270C** |
| **2-Methylphenol** | **68** | **(40 - 105)** | | | **SW846 8270C** |
| | **83** | **(40 - 105)** | **20** | **(0-30)** | **SW846 8270C** |
| **3-Methylphenol & 4-Methylphenol** | **69** | **(40 - 105)** | | | **SW846 8270C** |
| | **84** | **(40 - 105)** | **19** | **(0-30)** | **SW846 8270C** |
| **Naphthalene** | **66** | **(40 - 105)** | | | **SW846 8270C** |
| | **77** | **(40 - 105)** | **17** | **(0-30)** | **SW846 8270C** |
| **2-Nitroaniline** | **94** | **(45 - 120)** | | | **SW846 8270C** |
| | **104** | **(45 - 120)** | **10** | **(0-30)** | **SW846 8270C** |
| **3-Nitroaniline** | **86** | **(25 - 110)** | | | **SW846 8270C** |
| | **96** | **(25 - 110)** | **11** | **(0-30)** | **SW846 8270C** |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **4-Nitroaniline** | **90** | **(35 - 115)** | | | **SW846 8270C** |
| | **98** | **(35 - 115)** | **9.4** | **(0-30)** | **SW846 8270C** |
| **Nitrobenzene** | **71** | **(40 - 115)** | | | **SW846 8270C** |
| | **82** | **(40 - 115)** | **15** | **(0-30)** | **SW846 8270C** |
| **2-Nitrophenol** | **72** | **(40 - 110)** | | | **SW846 8270C** |
| | **84** | **(40 - 110)** | **17** | **(0-30)** | **SW846 8270C** |
| **4-Nitrophenol** | **99** | **(15 - 140)** | | | **SW846 8270C** |
| | **108** | **(15 - 140)** | **9.9** | **(0-30)** | **SW846 8270C** |
| **N-Nitrosodiphenylamine** | **82** | **(50 - 115)** | | | **SW846 8270C** |
| | **89** | **(50 - 115)** | **8.4** | **(0-30)** | **SW846 8270C** |
| **Pentachlorophenol** | **94** | **(25 - 120)** | | | **SW846 8270C** |
| | **98** | **(25 - 120)** | **5.1** | **(0-30)** | **SW846 8270C** |
| **Phenanthrene** | **85** | **(50 - 110)** | | | **SW846 8270C** |
| | **92** | **(50 - 110)** | **8.5** | **(0-30)** | **SW846 8270C** |
| **Phenol** | **71** | **(40 - 100)** | | | **SW846 8270C** |
| | **86** | **(40 - 100)** | **21** | **(0-30)** | **SW846 8270C** |
| **Pyrene** | **81** | **(45 - 125)** | | | **SW846 8270C** |
| | **92** | **(45 - 125)** | **12** | **(0-30)** | **SW846 8270C** |
| **1,2,4-Trichloro-** benzene | **67** | **(45 - 110)** | | | **SW846 8270C** |
| | **78** | **(45 - 110)** | **15** | **(0-30)** | **SW846 8270C** |
| **2,4,5-Trichloro-** phenol | **89** | **(50 - 110)** | | | **SW846 8270C** |
| | **98** | **(50 - 110)** | **9.8** | **(0-30)** | **SW846 8270C** |
| **2,4,6-Trichloro-** phenol | **89** | **(45 - 110)** | | | **SW846 8270C** |
| | **100** | **(45 - 110)** | **12** | **(0-30)** | **SW846 8270C** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 84 | (45 - 105) |
| | 92 | (45 - 105) |
| 2-Fluorophenol | 74 | (35 - 105) |
| | 87 | (35 - 105) |
| Nitrobenzene-d5 | 77 | (35 - 100) |
| | 86 | (35 - 100) |
| Phenol-d5 | 75 | (40 - 100) |
| | 89 | (40 - 100) |

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## MATRIX SPIKE SAMPLE EVALUATION REPORT

### GC/MS Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Terphenyl-d14 | 91 | (30 - 125) |
| | 97 | (30 - 125) |
| 2,4,6-Tribromophenol | 99 | (35 - 125) |
| | 98 | (35 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and repor ing limits have been adjusted for dry weight.

**MATRIX SPIKE SAMPLE DATA REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/30/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0211261
**Dilution Factor:** 0.98 **% Moisture.....:** 8.8

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **Acenaphthene** | **ND** | **3600** | **2860** | **ug/kg** | **79** | | **SW846 8270C** |
| | **ND** | **3620** | **3170** | **ug/kg** | **87** | **10** | **SW846 8270C** |
| **Acenaphthylene** | **ND** | **3600** | **2930** | **ug/kg** | **81** | | **SW846 8270C** |
| | **ND** | **3620** | **3290** | **ug/kg** | **91** | **11** | **SW846 8270C** |
| **Anthracene** | **ND** | **3600** | **3020** | **ug/kg** | **84** | | **SW846 8270C** |
| | **ND** | **3620** | **3320** | **ug/kg** | **92** | **9.3** | **SW846 8270C** |
| Azobenzene | ND | 3600 | 3150 | ug/kg | 87 | | SW846 8270C |
| | ND | 3620 | 3450 | ug/kg | 95 | 9.1 | SW846 8270C |
| **Benz(a)anthracene** | **ND** | **3600** | **3210** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3450** | **ug/kg** | **95** | **7.1** | **SW846 8270C** |
| **Benzo(b)fluoranthene** | **ND** | **3600** | **3360** | **ug/kg** | **93** | | **SW846 8270C** |
| | **ND** | **3620** | **3730** | **ug/kg** | **103** | **11** | **SW846 8270C** |
| **Benzo(k)fluoranthene** | **ND** | **3600** | **3220** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3640** | **ug/kg** | **100** | **12** | **SW846 8270C** |
| Benzoic acid | ND | 3600 | 2870 | ug/kg | 80 | | SW846 8270C |
| | ND | 3620 | 3140 | ug/kg | 87 | 9.1 | SW846 8270C |
| **Benzo(ghi)perylene** | **ND** | **3600** | **3300** | **ug/kg** | **91** | | **SW846 8270C** |
| | **ND** | **3620** | **3680** | **ug/kg** | **101** | **11** | **SW846 8270C** |
| **Benzo(a)pyrene** | **ND** | **3600** | **2730** | **ug/kg** | **76** | | **SW846 8270C** |
| | **ND** | **3620** | **3010** | **ug/kg** | **83** | **9.6** | **SW846 8270C** |
| **Benzyl alcohol** | **ND** | **3600** | **2430** | **ug/kg** | **68** | | **SW846 8270C** |
| | **ND** | **3620** | **3090** | **ug/kg** | **85** | **24** | **SW846 8270C** |
| **bis(2-Chloroethoxy)** methane | **ND** | **3600** | **2530** | **ug/kg** | **70** | | **SW846 8270C** |
| | **ND** | **3620** | **2990** | **ug/kg** | **82** | **17** | **SW846 8270C** |
| **bis(2-Chloroethyl)-** ether | **ND** | **3600** | **2320** | **ug/kg** | **64** | | **SW846 8270C** |
| | **ND** | **3620** | **2810** | **ug/kg** | **77** | **19** | **SW846 8270C** |
| **bis(2-Chloroisopropyl)** ether | **ND** | **3600** | **2240** | **ug/kg** | **62** | | **SW846 8270C** |
| | **ND** | **3620** | **2680** | **ug/kg** | **74** | **18** | **SW846 8270C** |
| **bis(2-Ethylhexyl)** phthalate | **ND** | **3600** | **3370** | **ug/kg** | **94** | | **SW846 8270C** |
| | **ND** | **3620** | **3630** | **ug/kg** | **100** | **7.4** | **SW846 8270C** |

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**MATRIX SPIKE SAMPLE DATA REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **4-Bromophenyl phenyl ether** | **ND** | **3600** | **2950** | **ug/kg** | **82** | | **SW846 8270C** |
| | **ND** | **3620** | **3230** | **ug/kg** | **89** | **9.0** | **SW846 8270C** |
| **Butyl benzyl phthalate** | **ND** | **3600** | **3200** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3500** | **ug/kg** | **97** | **9.1** | **SW846 8270C** |
| **Carbazole** | **ND** | **3600** | **3200** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3440** | **ug/kg** | **95** | **7.5** | **SW846 8270C** |
| **4-Chloroaniline** | **ND** | **3600** | **2350** | **ug/kg** | **65** | | **SW846 8270C** |
| | **ND** | **3620** | **2720** | **ug/kg** | **75** | **15** | **SW846 8270C** |
| **4-Chloro-3-methylphenol** | **ND** | **3600** | **3140** | **ug/kg** | **87** | | **SW846 8270C** |
| | **ND** | **3620** | **3500** | **ug/kg** | **97** | **11** | **SW846 8270C** |
| **2-Chloronaphthalene** | **ND** | **3600** | **2840** | **ug/kg** | **79** | | **SW846 8270C** |
| | **ND** | **3620** | **3230** | **ug/kg** | **89** | **13** | **SW846 8270C** |
| **2-Chlorophenol** | **ND** | **3600** | **2400** | **ug/kg** | **67** | | **SW846 8270C** |
| | **ND** | **3620** | **2980** | **ug/kg** | **82** | **22** | **SW846 8270C** |
| **4-Chlorophenyl phenyl ether** | **ND** | **3600** | **3100** | **ug/kg** | **86** | | **SW846 8270C** |
| | **ND** | **3620** | **3330** | **ug/kg** | **92** | **7.2** | **SW846 8270C** |
| **Chrysene** | **ND** | **3600** | **3140** | **ug/kg** | **87** | | **SW846 8270C** |
| | **ND** | **3620** | **3380** | **ug/kg** | **93** | **7.4** | **SW846 8270C** |
| **Dibenz(a,h)anthracene** | **ND** | **3600** | **3200** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3580** | **ug/kg** | **99** | **11** | **SW846 8270C** |
| **Dibenzofuran** | **ND** | **3600** | **3030** | **ug/kg** | **84** | | **SW846 8270C** |
| | **ND** | **3620** | **3360** | **ug/kg** | **93** | **10** | **SW846 8270C** |
| **Di-n-butyl phthalate** | **ND** | **3600** | **3340** | **ug/kg** | **93** | | **SW846 8270C** |
| | **ND** | **3620** | **3630** | **ug/kg** | **100** | **8.2** | **SW846 8270C** |
| **1,2-Dichlorobenzene** | **ND** | **3600** | **2250** | **ug/kg** | **63** | | **SW846 8270C** |
| | **ND** | **3620** | **2760** | **ug/kg** | **76** | **20** | **SW846 8270C** |
| **1,3-Dichlorobenzene** | **ND** | **3600** | **2230** | **ug/kg** | **62** | | **SW846 8270C** |
| | **ND** | **3620** | **2570** | **ug/kg** | **71** | **15** | **SW846 8270C** |
| **1,4-Dichlorobenzene** | **ND** | **3600** | **2210** | **ug/kg** | **61** | | **SW846 8270C** |
| | **ND** | **3620** | **2630** | **ug/kg** | **73** | **18** | **SW846 8270C** |
| 3,3'-Dichlorobenzidine | ND | 3600 | 2710 | ug/kg | 75 | | SW846 8270C |
| | ND | 3620 | 3010 | ug/kg | 83 | 11 | SW846 8270C |
| **2,4-Dichlorophenol** | **ND** | **3600** | **2860** | **ug/kg** | **79** | | **SW846 8270C** |
| | **ND** | **3620** | **3360** | **ug/kg** | **93** | **16** | **SW846 8270C** |
| **Diethyl phthalate** | **ND** | **3600** | **3270** | **ug/kg** | **91** | | **SW846 8270C** |
| | **ND** | **3620** | **3580** | **ug/kg** | **99** | **9.0** | **SW846 8270C** |
| **2,4-Dimethylphenol** | **ND** | **3600** | **2660** | **ug/kg** | **74** | | **SW846 8270C** |
| | **ND** | **3620** | **2970** | **ug/kg** | **82** | **11** | **SW846 8270C** |

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**MATRIX SPIKE SAMPLE DATA REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **Dimethyl phthalate** | **ND** | **3600** | **3110** | **ug/kg** | **86** | | **SW846 8270C** |
| | **ND** | **3620** | **3490** | **ug/kg** | **96** | **11** | **SW846 8270C** |
| **4,6-Dinitro-2-methylphenol** | **ND** | **3600** | **3170** | **ug/kg** | **88** | | **SW846 8270C** |
| | **ND** | **3620** | **3180** | **ug/kg** | **88** | **0.34** | **SW846 8270C** |
| **2,4-Dinitrophenol** | **ND** | **3600** | **2430** | **ug/kg** | **67** | | **SW846 8270C** |
| | **ND** | **3620** | **2420** | **ug/kg** | **67** | **0.45** | **SW846 8270C** |
| **2,4-Dinitrotoluene** | **ND** | **3600** | **3600** | **ug/kg** | **100** | | **SW846 8270C** |
| | **ND** | **3620** | **3890** | **ug/kg** | **107** | **7.8** | **SW846 8270C** |
| **2,6-Dinitrotoluene** | **ND** | **3600** | **3390** | **ug/kg** | **94** | | **SW846 8270C** |
| | **ND** | **3620** | **3760** | **ug/kg** | **104** | **10** | **SW846 8270C** |
| **Di-n-octyl phthalate** | **ND** | **3600** | **3070** | **ug/kg** | **85** | | **SW846 8270C** |
| | **ND** | **3620** | **3280** | **ug/kg** | **90** | **6.5** | **SW846 8270C** |
| **Fluoranthene** | **ND** | **3600** | **3640** | **ug/kg** | **101** | | **SW846 8270C** |
| | **ND** | **3620** | **3790** | **ug/kg** | **105** | **4.0** | **SW846 8270C** |
| **Fluorene** | **ND** | **3600** | **3130** | **ug/kg** | **87** | | **SW846 8270C** |
| | **ND** | **3620** | **3410** | **ug/kg** | **94** | **8.7** | **SW846 8270C** |
| **Hexachlorobenzene** | **ND** | **3600** | **3080** | **ug/kg** | **85** | | **SW846 8270C** |
| | **ND** | **3620** | **3370** | **ug/kg** | **93** | **9.1** | **SW846 8270C** |
| **Hexachlorobutadiene** | **ND** | **3600** | **2550** | **ug/kg** | **71** | | **SW846 8270C** |
| | **ND** | **3620** | **2960** | **ug/kg** | **82** | **15** | **SW846 8270C** |
| **Hexachloroethane** | **ND** | **3600** | **2220** | **ug/kg** | **62** | | **SW846 8270C** |
| | **ND** | **3620** | **2630** | **ug/kg** | **73** | **17** | **SW846 8270C** |
| **Indeno(1,2,3-cd)pyrene** | **ND** | **3600** | **3110** | **ug/kg** | **86** | | **SW846 8270C** |
| | **ND** | **3620** | **3490** | **ug/kg** | **96** | **11** | **SW846 8270C** |
| **Isophorone** | **ND** | **3600** | **2710** | **ug/kg** | **75** | | **SW846 8270C** |
| | **ND** | **3620** | **3130** | **ug/kg** | **86** | **14** | **SW846 8270C** |
| **2-Methylnaphthalene** | **ND** | **3600** | **2630** | **ug/kg** | **73** | | **SW846 8270C** |
| | **ND** | **3620** | **3120** | **ug/kg** | **86** | **17** | **SW846 8270C** |
| **2-Methylphenol** | **ND** | **3600** | **2450** | **ug/kg** | **68** | | **SW846 8270C** |
| | **ND** | **3620** | **3000** | **ug/kg** | **83** | **20** | **SW846 8270C** |
| **3-Methylphenol & 4-Methylphenol** | **ND** | **7210** | **4990** | **ug/kg** | **69** | | **SW846 8270C** |
| | **ND** | **7250** | **6070** | **ug/kg** | **84** | **19** | **SW846 8270C** |
| **Naphthalene** | **ND** | **3600** | **2380** | **ug/kg** | **66** | | **SW846 8270C** |
| | **ND** | **3620** | **2810** | **ug/kg** | **77** | **17** | **SW846 8270C** |
| **2-Nitroaniline** | **ND** | **3600** | **3380** | **ug/kg** | **94** | | **SW846 8270C** |
| | **ND** | **3620** | **3750** | **ug/kg** | **104** | **10** | **SW846 8270C** |
| **3-Nitroaniline** | **ND** | **3600** | **3110** | **ug/kg** | **86** | | **SW846 8270C** |
| | **ND** | **3620** | **3480** | **ug/kg** | **96** | **11** | **SW846 8270C** |

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**MATRIX SPIKE SAMPLE DATA REPORT**

**GC/MS Semivolatiles**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **4-Nitroaniline** | **ND** | **3600** | **3250** | **ug/kg** | **90** | | **SW846 8270C** |
| | **ND** | **3620** | **3570** | **ug/kg** | **98** | **9.4** | **SW846 8270C** |
| **Nitrobenzene** | **ND** | **3600** | **2570** | **ug/kg** | **71** | | **SW846 8270C** |
| | **ND** | **3620** | **2980** | **ug/kg** | **82** | **15** | **SW846 8270C** |
| **2-Nitrophenol** | **ND** | **3600** | **2580** | **ug/kg** | **72** | | **SW846 8270C** |
| | **ND** | **3620** | **3050** | **ug/kg** | **84** | **17** | **SW846 8270C** |
| **4-Nitrophenol** | **ND** | **3600** | **3560** | **ug/kg** | **99** | | **SW846 8270C** |
| | **ND** | **3620** | **3930** | **ug/kg** | **108** | **9.9** | **SW846 8270C** |
| **N-Nitrosodiphenylamine** | **ND** | **3600** | **2950** | **ug/kg** | **82** | | **SW846 8270C** |
| | **ND** | **3620** | **3210** | **ug/kg** | **89** | **8.4** | **SW846 8270C** |
| **Pentachlorophenol** | **ND** | **3600** | **3390** | **ug/kg** | **94** | | **SW846 8270C** |
| | **ND** | **3620** | **3570** | **ug/kg** | **98** | **5.1** | **SW846 8270C** |
| **Phenanthrene** | **ND** | **3600** | **3070** | **ug/kg** | **85** | | **SW846 8270C** |
| | **ND** | **3620** | **3350** | **ug/kg** | **92** | **8.5** | **SW846 8270C** |
| **Phenol** | **ND** | **3600** | **2550** | **ug/kg** | **71** | | **SW846 8270C** |
| | **ND** | **3620** | **3130** | **ug/kg** | **86** | **21** | **SW846 8270C** |
| **Pyrene** | **ND** | **3600** | **2930** | **ug/kg** | **81** | | **SW846 8270C** |
| | **ND** | **3620** | **3320** | **ug/kg** | **92** | **12** | **SW846 8270C** |
| **1,2,4-Trichloro-** benzene | **ND** | **3600** | **2410** | **ug/kg** | **67** | | **SW846 8270C** |
| | **ND** | **3620** | **2810** | **ug/kg** | **78** | **15** | **SW846 8270C** |
| **2,4,5-Trichloro-** phenol | **ND** | **3600** | **3210** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3540** | **ug/kg** | **98** | **9.8** | **SW846 8270C** |
| **2,4,6-Trichloro-** phenol | **ND** | **3600** | **3220** | **ug/kg** | **89** | | **SW846 8270C** |
| | **ND** | **3620** | **3640** | **ug/kg** | **100** | **12** | **SW846 8270C** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 2-Fluorobiphenyl | 84 | (45 - 105) |
| | 92 | (45 - 105) |
| 2-Fluorophenol | 74 | (35 - 105) |
| | 87 | (35 - 105) |
| Nitrobenzene-d5 | 77 | (35 - 100) |
| | 86 | (35 - 100) |
| Phenol-d5 | 75 | (40 - 100) |
| | 89 | (40 - 100) |

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## MATRIX SPIKE SAMPLE DATA REPORT

### GC/MS Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4T961DJ-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-004 L4T961DK-MSD

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Terphenyl-d14 | 91 | (30 - 125) |
| | 97 | (30 - 125) |
| 2,4,6-Tribromophenol | 99 | (35 - 125) |
| | 98 | (35 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and repor ing limits have been adjusted for dry weight.

## METHOD BLANK REPORT

## GC Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4VQ41AA **Matrix.....:** SOLID
**MB Lot-Sample #:** G0G290000-337
**Prep Date.....:** 07/29/10
**Analysis Date..:** 08/02/10 **Prep Batch #...:** 0210337
**Dilution Factor:** 1

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| Aroclor 1016 | ND | 33 | ug/kg | SW846 8082 |
| Aroclor 1221 | ND | 33 | ug/kg | SW846 8082 |
| Aroclor 1232 | ND | 33 | ug/kg | SW846 8082 |
| Aroclor 1242 | ND | 33 | ug/kg | SW846 8082 |
| Aroclor 1248 | ND | 33 | ug/kg | SW846 8082 |
| Aroclor 1254 | ND | 33 | ug/kg | SW846 8082 |
| Aroclor 1260 | ND | 33 | ug/kg | SW846 8082 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 95 | (60 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### GC Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4VQ41AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G290000-337
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 1

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| **Aroclor 1016** | **93** | **(40 - 140)** | **SW846 8082** |
| **Aroclor 1260** | **106** | **(60 - 130)** | **SW846 8082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 95 | (60 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

## LABORATORY CONTROL SAMPLE DATA REPORT

### GC Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4VQ41AC **Matrix.....:** SOLID
**LCS Lot-Sample#:** G0G290000-337
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 1

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| **Aroclor 1016** | **66.7** | **62.3** | **ug/kg** | **93** | **SW846 8082** |
| **Aroclor 1260** | **66.7** | **70.4** | **ug/kg** | **106** | **SW846 8082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 95 | (60 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

## MATRIX SPIKE SAMPLE EVALUATION REPORT

### GC Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4T8K1CA-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-001 L4T8K1CC-MSD
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 0.99 **% Moisture.....:** 7.2

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| **Aroclor 1016** | **95** | **(40 - 140)** | | | **SW846 8082** |
| | **98** | **(40 - 140)** | **4.1** | **(0-30)** | **SW846 8082** |
| **Aroclor 1260** | **104** | **(60 - 130)** | | | **SW846 8082** |
| | **111** | **(60 - 130)** | **7.4** | **(0-30)** | **SW846 8082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 93 | (60 - 125) |
| | 100 | (60 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and repor ing limits have been adjusted for dry weight.

## MATRIX SPIKE SAMPLE DATA REPORT

### GC Semivolatiles

**Client Lot #...:** G0G290461 **Work Order #...:** L4T8K1CA-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** G0G290461-001 L4T8K1CC-MSD
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**Prep Date.....:** 07/29/10 **Analysis Date..:** 08/02/10
**Prep Batch #...:** 0210337
**Dilution Factor:** 0.99 **% Moisture.....:** 7.2

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| **Aroclor 1016** | **ND** | **71.3** | **67.4** | **ug/kg** | **95** | | **SW846 8082** |
| | **ND** | **71.9** | **70.3** | **ug/kg** | **98** | **4.1** | **SW846 8082** |
| **Aroclor 1260** | **ND** | **71.3** | **74.2** | **ug/kg** | **104** | | **SW846 8082** |
| | **ND** | **71.9** | **79.9** | **ug/kg** | **111** | **7.4** | **SW846 8082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| Decachlorobiphenyl | 93 | (60 - 125) |
| | 100 | (60 - 125) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and repor ing limits have been adjusted for dry weight.

**METHOD BLANK REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **MB Lot-Sample #:** G0G300000-087 **Prep Batch #...:** 0211087 | | | | | | |
| Aluminum | ND | 20.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AA |
| | | Dilution Factor: 1 | | | | |
| Antimony | ND | 3.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AC |
| | | Dilution Factor: 1 | | | | |
| Arsenic | ND | 4.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AD |
| | | Dilution Factor: 1 | | | | |
| Barium | ND | 2.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AE |
| | | Dilution Factor: 1 | | | | |
| Beryllium | ND | 0.30 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AF |
| | | Dilution Factor: 1 | | | | |
| Cadmium | ND | 0.30 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AG |
| | | Dilution Factor: 1 | | | | |
| Calcium | ND | 50.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AH |
| | | Dilution Factor: 1 | | | | |
| Chromium | ND | 1.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AJ |
| | | Dilution Factor: 1 | | | | |
| Cobalt | ND | 0.60 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AK |
| | | Dilution Factor: 1 | | | | |
| Copper | ND | 1.5 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AL |
| | | Dilution Factor: 1 | | | | |
| Iron | ND | 10.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AM |
| | | Dilution Factor: 1 | | | | |
| Lead | ND | 1.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AN |
| | | Dilution Factor: 1 | | | | |
| Magnesium | ND | 50.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AP |
| | | Dilution Factor: 1 | | | | |
| Manganese | ND | 1.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AQ |
| | | Dilution Factor: 1 | | | | |
| Molybdenum | ND | 2.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AR |
| | | Dilution Factor: 1 | | | | |

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**METHOD BLANK REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Nickel | ND | 1.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AT |
| | | Dilution Factor: 1 | | | | |
| Potassium | ND | 100 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AU |
| | | Dilution Factor: 1 | | | | |
| Selenium | ND | 3.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AV |
| | | Dilution Factor: 1 | | | | |
| Silver | ND | 0.50 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AW |
| | | Dilution Factor: 1 | | | | |
| Sodium | ND | 100 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1AX |
| | | Dilution Factor: 1 | | | | |
| Thallium | ND | 3.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1A0 |
| | | Dilution Factor: 1 | | | | |
| Vanadium | ND | 2.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1A1 |
| | | Dilution Factor: 1 | | | | |
| Zinc | ND | 2.0 | mg/kg | SW846 6010B | 07/30/10 | L4WHP1A2 |
| | | Dilution Factor: 1 | | | | |

**MB Lot-Sample #:** G0H020000-118 **Prep Batch #...:** 0214118

| | | | | | | |
|---|---|---|---|---|---|---|
| Mercury | ND | 0.040 | mg/kg | SW846 7471A | 08/02/10 | L40PN1AA |
| | | Dilution Factor: 1 | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

**LCS Lot-Sample#:** G0G300000-087 **Prep Batch #...:** 0211087

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|
| Aluminum | 98 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A3 |
| Antimony | 95 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A4 |
| Arsenic | 95 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A5 |
| Barium | 97 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A6 |
| Beryllium | 99 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A7 |
| Cadmium | 100 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A8 |
| Calcium | 102 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1A9 |
| Chromium | 93 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CA |
| Cobalt | 96 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CC |
| Copper | 94 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CD |
| Iron | 101 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CE |
| Lead | 93 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CF |
| Magnesium | 96 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CG |
| Manganese | 102 | (80 - 120) | SW846 6010B<br>Dilution Factor: 1 | 07/30/10 | L4WHP1CH |

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## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### TOTAL Metals

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|
| Molybdenum | 98 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CJ |
| | | Dilution Factor: 1 | | | |
| Nickel | 97 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CK |
| | | Dilution Factor: 1 | | | |
| Potassium | 93 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CL |
| | | Dilution Factor: 1 | | | |
| Selenium | 88 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CM |
| | | Dilution Factor: 1 | | | |
| Silver | 92 | (75 - 120) | SW846 6010B | 07/30/10 | L4WHP1CN |
| | | Dilution Factor: 1 | | | |
| Sodium | 94 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CP |
| | | Dilution Factor: 1 | | | |
| Thallium | 99 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CQ |
| | | Dilution Factor: 1 | | | |
| Vanadium | 98 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CR |
| | | Dilution Factor: 1 | | | |
| Zinc | 98 | (80 - 120) | SW846 6010B | 07/30/10 | L4WHP1CT |
| | | Dilution Factor: 1 | | | |
| **LCS Lot-Sample#:** G0H020000-118 | | **Prep Batch #...:** 0214118 | | | |
| Mercury | 96 | (80 - 120) | SW846 7471A | 08/02/10 | L40PN1AC |
| | | Dilution Factor: 1 | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

**LABORATORY CONTROL SAMPLE DATA REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCNT RECVRY | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| **LCS Lot-Sample#:** G0G300000-087 **Prep Batch #...:** 0211087 | | | | | | | |
| Aluminum | 200 | 196 | mg/kg | 98 | SW846 6010B | 07/30/10 | L4WHP1A3 |
| | | | Dilution Factor: 1 | | | | |
| Antimony | 50.0 | 47.3 | mg/kg | 95 | SW846 6010B | 07/30/10 | L4WHP1A4 |
| | | | Dilution Factor: 1 | | | | |
| Arsenic | 200 | 189 | mg/kg | 95 | SW846 6010B | 07/30/10 | L4WHP1A5 |
| | | | Dilution Factor: 1 | | | | |
| Barium | 200 | 194 | mg/kg | 97 | SW846 6010B | 07/30/10 | L4WHP1A6 |
| | | | Dilution Factor: 1 | | | | |
| Beryllium | 5.00 | 4.94 | mg/kg | 99 | SW846 6010B | 07/30/10 | L4WHP1A7 |
| | | | Dilution Factor: 1 | | | | |
| Cadmium | 5.00 | 5.02 | mg/kg | 100 | SW846 6010B | 07/30/10 | L4WHP1A8 |
| | | | Dilution Factor: 1 | | | | |
| Calcium | 5000 | 5080 | mg/kg | 102 | SW846 6010B | 07/30/10 | L4WHP1A9 |
| | | | Dilution Factor: 1 | | | | |
| Chromium | 20.0 | 18.6 | mg/kg | 93 | SW846 6010B | 07/30/10 | L4WHP1CA |
| | | | Dilution Factor: 1 | | | | |
| Cobalt | 50.0 | 48.2 | mg/kg | 96 | SW846 6010B | 07/30/10 | L4WHP1CC |
| | | | Dilution Factor: 1 | | | | |
| Copper | 25.0 | 23.5 | mg/kg | 94 | SW846 6010B | 07/30/10 | L4WHP1CD |
| | | | Dilution Factor: 1 | | | | |
| Iron | 100 | 101 | mg/kg | 101 | SW846 6010B | 07/30/10 | L4WHP1CE |
| | | | Dilution Factor: 1 | | | | |
| Lead | 50.0 | 46.6 | mg/kg | 93 | SW846 6010B | 07/30/10 | L4WHP1CF |
| | | | Dilution Factor: 1 | | | | |
| Magnesium | 5000 | 4800 | mg/kg | 96 | SW846 6010B | 07/30/10 | L4WHP1CG |
| | | | Dilution Factor: 1 | | | | |
| Manganese | 50.0 | 51.0 | mg/kg | 102 | SW846 6010B | 07/30/10 | L4WHP1CH |
| | | | Dilution Factor: 1 | | | | |

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## LABORATORY CONTROL SAMPLE DATA REPORT

### TOTAL Metals

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCNT RECVRY | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| Molybdenum | 100 | 98.2 | mg/kg | 98 | SW846 6010B | 07/30/10 | L4WHP1CJ |
| | | | Dilution Factor: 1 | | | | |
| Nickel | 50.0 | 48.4 | mg/kg | 97 | SW846 6010B | 07/30/10 | L4WHP1CK |
| | | | Dilution Factor: 1 | | | | |
| Potassium | 5000 | 4640 | mg/kg | 93 | SW846 6010B | 07/30/10 | L4WHP1CL |
| | | | Dilution Factor: 1 | | | | |
| Selenium | 200 | 177 | mg/kg | 88 | SW846 6010B | 07/30/10 | L4WHP1CM |
| | | | Dilution Factor: 1 | | | | |
| Silver | 5.00 | 4.61 | mg/kg | 92 | SW846 6010B | 07/30/10 | L4WHP1CN |
| | | | Dilution Factor: 1 | | | | |
| Sodium | 5000 | 4680 | mg/kg | 94 | SW846 6010B | 07/30/10 | L4WHP1CP |
| | | | Dilution Factor: 1 | | | | |
| Thallium | 200 | 198 | mg/kg | 99 | SW846 6010B | 07/30/10 | L4WHP1CQ |
| | | | Dilution Factor: 1 | | | | |
| Vanadium | 50.0 | 48.8 | mg/kg | 98 | SW846 6010B | 07/30/10 | L4WHP1CR |
| | | | Dilution Factor: 1 | | | | |
| Zinc | 50.0 | 48.8 | mg/kg | 98 | SW846 6010B | 07/30/10 | L4WHP1CT |
| | | | Dilution Factor: 1 | | | | |

**LCS Lot-Sample#:** G0H020000-118 **Prep Batch #...:** 0214118

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mercury | 0.0833 | 0.0799 | mg/kg | 96 | SW846 7471A | 08/02/10 | L40PN1AC |
| | | | Dilution Factor: 1 | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| **MS Lot-Sample #:** G0G290461-004 **Prep Batch #...:** 0211087 | | | | | | | |
| | | | | | | **% Moisture.....:** 8.8 | |
| Aluminum | 1090 N | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DL |
| | 1080 N | (80 - 120) | 0.38 | (0-20) | SW846 6010B | 07/30/10 | L4T961DM |
| | | Dilution Factor: 1 | | | | | |
| Antimony | 54 N | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DN |
| | 52 N | (80 - 120) | 3.2 | (0-20) | SW846 6010B | 07/30/10 | L4T961DP |
| | | Dilution Factor: 1 | | | | | |
| Arsenic | 90 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DQ |
| | 89 | (80 - 120) | 2.1 | (0-20) | SW846 6010B | 07/30/10 | L4T961DR |
| | | Dilution Factor: 1 | | | | | |
| Barium | 95 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DT |
| | 91 | (80 - 120) | 4.0 | (0-20) | SW846 6010B | 07/30/10 | L4T961DU |
| | | Dilution Factor: 1 | | | | | |
| Beryllium | 93 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DV |
| | 95 | (80 - 120) | 1.1 | (0-20) | SW846 6010B | 07/30/10 | L4T961DW |
| | | Dilution Factor: 1 | | | | | |
| Cadmium | 94 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DX |
| | 95 | (80 - 120) | 0.56 | (0-20) | SW846 6010B | 07/30/10 | L4T961D0 |
| | | Dilution Factor: 1 | | | | | |
| Calcium | 102 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CC |
| | 101 | (80 - 120) | 1.5 | (0-20) | SW846 6010B | 07/30/10 | L4T961CD |
| | | Dilution Factor: 1 | | | | | |
| Chromium | 103 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CE |
| | 96 | (80 - 120) | 2.9 | (0-20) | SW846 6010B | 07/30/10 | L4T961CF |
| | | Dilution Factor: 1 | | | | | |
| Cobalt | 91 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CG |
| | 93 | (80 - 120) | 0.83 | (0-20) | SW846 6010B | 07/30/10 | L4T961CH |
| | | Dilution Factor: 1 | | | | | |
| Copper | 95 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CJ |
| | 94 | (80 - 120) | 1.6 | (0-20) | SW846 6010B | 07/30/10 | L4T961CK |
| | | Dilution Factor: 1 | | | | | |

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**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| Iron | 354 N | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CL |
| | 0.0 N | (80 - 120) | 0.0 | (0-20) | SW846 6010B | 07/30/10 | L4T961CM |
| | | Dilution Factor: 1 | | | | | |
| Lead | 87 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CN |
| | 89 | (80 - 120) | 1.8 | (0-20) | SW846 6010B | 07/30/10 | L4T961CP |
| | | Dilution Factor: 1 | | | | | |
| Magnesium | 97 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CQ |
| | 91 | (80 - 120) | 3.5 | (0-20) | SW846 6010B | 07/30/10 | L4T961CR |
| | | Dilution Factor: 1 | | | | | |
| Manganese | 103 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CT |
| | 101 | (80 - 120) | 0.58 | (0-20) | SW846 6010B | 07/30/10 | L4T961CU |
| | | Dilution Factor: 1 | | | | | |
| Molybdenum | 91 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CV |
| | 91 | (80 - 120) | 0.48 | (0-20) | SW846 6010B | 07/30/10 | L4T961CW |
| | | Dilution Factor: 1 | | | | | |
| Nickel | 97 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961CX |
| | 91 | (80 - 120) | 3.4 | (0-20) | SW846 6010B | 07/30/10 | L4T961C0 |
| | | Dilution Factor: 1 | | | | | |
| Potassium | 91 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961C1 |
| | 91 | (80 - 120) | 0.64 | (0-20) | SW846 6010B | 07/30/10 | L4T961C2 |
| | | Dilution Factor: 1 | | | | | |
| Selenium | 87 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961C3 |
| | 85 | (80 - 120) | 2.7 | (0-20) | SW846 6010B | 07/30/10 | L4T961C4 |
| | | Dilution Factor: 1 | | | | | |
| Silver | 91 | (75 - 120) | | | SW846 6010B | 07/30/10 | L4T961C5 |
| | 90 | (75 - 120) | 1.6 | (0-20) | SW846 6010B | 07/30/10 | L4T961C6 |
| | | Dilution Factor: 1 | | | | | |
| Sodium | 92 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961C7 |
| | 91 | (80 - 120) | 1.8 | (0-20) | SW846 6010B | 07/30/10 | L4T961C8 |
| | | Dilution Factor: 1 | | | | | |
| Thallium | 92 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961C9 |
| | 94 | (80 - 120) | 0.72 | (0-20) | SW846 6010B | 07/30/10 | L4T961DA |
| | | Dilution Factor: 1 | | | | | |

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## MATRIX SPIKE SAMPLE EVALUATION REPORT

### TOTAL Metals

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| Vanadium | 98 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DC |
| | 96 | (80 - 120) | 1.9 | (0-20) | SW846 6010B | 07/30/10 | L4T961DD |
| | | Dilution Factor: 1 | | | | | |
| Zinc | 93 | (80 - 120) | | | SW846 6010B | 07/30/10 | L4T961DE |
| | 93 | (80 - 120) | 0.61 | (0-20) | SW846 6010B | 07/30/10 | L4T961DF |
| | | Dilution Factor: 1 | | | | | |

**MS Lot-Sample #:** G0G290461-004 **Prep Batch #...:** 0214118
**% Moisture.....:** 8.8

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mercury | 96 | (80 - 120) | | | SW846 7471A | 08/02/10 | L4T961D1 |
| | 96 | (80 - 120) | 1.4 | (0-20) | SW846 7471A | 08/02/10 | L4T961D2 |
| | | Dilution Factor: 1 | | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and repor ing limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

**MATRIX SPIKE SAMPLE DATA REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10

**MS Lot-Sample #:** G0G290461-004 **Prep Batch #...:** 0211087
**% Moisture.....:** 8.8

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | | | | | | | | | |
| | 8260 | 222 | 10700 N | mg/kg | 1090 | | SW846 6010B | 07/30/10 | L4T961DL |
| | 8260 | 219 | 10600 N | mg/kg | 1080 | 0.38 | SW846 6010B | 07/30/10 | L4T961DM |
| | | | Dilution Factor: 1 | | | | | | |
| Antimony | | | | | | | | | |
| | ND | 55.4 | 30.4 N | mg/kg | 54 | | SW846 6010B | 07/30/10 | L4T961DN |
| | ND | 54.8 | 29.4 N | mg/kg | 52 | 3.2 | SW846 6010B | 07/30/10 | L4T961DP |
| | | | Dilution Factor: 1 | | | | | | |
| Arsenic | | | | | | | | | |
| | 3.9 | 222 | 203 | mg/kg | 90 | | SW846 6010B | 07/30/10 | L4T961DQ |
| | 3.9 | 219 | 199 | mg/kg | 89 | 2.1 | SW846 6010B | 07/30/10 | L4T961DR |
| | | | Dilution Factor: 1 | | | | | | |
| Barium | | | | | | | | | |
| | 55.5 | 222 | 265 | mg/kg | 95 | | SW846 6010B | 07/30/10 | L4T961DT |
| | 55.5 | 219 | 255 | mg/kg | 91 | 4.0 | SW846 6010B | 07/30/10 | L4T961DU |
| | | | Dilution Factor: 1 | | | | | | |
| Beryllium | | | | | | | | | |
| | 0.15 | 5.54 | 5.31 | mg/kg | 93 | | SW846 6010B | 07/30/10 | L4T961DV |
| | 0.15 | 5.48 | 5.37 | mg/kg | 95 | 1.1 | SW846 6010B | 07/30/10 | L4T961DW |
| | | | Dilution Factor: 1 | | | | | | |
| Cadmium | | | | | | | | | |
| | 0.056 | 5.54 | 5.28 | mg/kg | 94 | | SW846 6010B | 07/30/10 | L4T961DX |
| | 0.056 | 5.48 | 5.25 | mg/kg | 95 | 0.56 | SW846 6010B | 07/30/10 | L4T961D0 |
| | | | Dilution Factor: 1 | | | | | | |
| Calcium | | | | | | | | | |
| | 2550 | 5540 | 8220 | mg/kg | 102 | | SW846 6010B | 07/30/10 | L4T961CC |
| | 2550 | 5480 | 8100 | mg/kg | 101 | 1.5 | SW846 6010B | 07/30/10 | L4T961CD |
| | | | Dilution Factor: 1 | | | | | | |
| Chromium | | | | | | | | | |
| | 39.2 | 22.2 | 62.0 | mg/kg | 103 | | SW846 6010B | 07/30/10 | L4T961CE |
| | 39.2 | 21.9 | 60.2 | mg/kg | 96 | 2.9 | SW846 6010B | 07/30/10 | L4T961CF |
| | | | Dilution Factor: 1 | | | | | | |

(Continued on next page)

**MATRIX SPIKE SAMPLE DATA REPORT**

**TOTAL Metals**

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|---|---|
| Cobalt | | | | | | | | | |
| | 10.9 | 55.4 | 61.2 | mg/kg | 91 | | SW846 6010B | 07/30/10 | L4T961CG |
| | 10.9 | 54.8 | 61.8 | mg/kg | 93 | 0.83 | SW846 6010B | 07/30/10 | L4T961CH |
| | | | Dilution Factor: 1 | | | | | | |
| Copper | | | | | | | | | |
| | 11.0 | 27.7 | 37.4 | mg/kg | 95 | | SW846 6010B | 07/30/10 | L4T961CJ |
| | 11.0 | 27.4 | 36.8 | mg/kg | 94 | 1.6 | SW846 6010B | 07/30/10 | L4T961CK |
| | | | Dilution Factor: 1 | | | | | | |
| Iron | | | | | | | | | |
| | 15900 | 111 | 16300 N | mg/kg | 354 | | SW846 6010B | 07/30/10 | L4T961CL |
| | 15900 | 110 | 15900 N | mg/kg | 0.0 | 0.0 | SW846 6010B | 07/30/10 | L4T961CM |
| | | | Dilution Factor: 1 | | | | | | |
| Lead | | | | | | | | | |
| | 3.9 | 55.4 | 51.8 | mg/kg | 87 | | SW846 6010B | 07/30/10 | L4T961CN |
| | 3.9 | 54.8 | 52.8 | mg/kg | 89 | 1.8 | SW846 6010B | 07/30/10 | L4T961CP |
| | | | Dilution Factor: 1 | | | | | | |
| Magnesium | | | | | | | | | |
| | 6390 | 5540 | 11800 | mg/kg | 97 | | SW846 6010B | 07/30/10 | L4T961CQ |
| | 6390 | 5480 | 11400 | mg/kg | 91 | 3.5 | SW846 6010B | 07/30/10 | L4T961CR |
| | | | Dilution Factor: 1 | | | | | | |
| Manganese | | | | | | | | | |
| | 220 | 55.4 | 277 | mg/kg | 103 | | SW846 6010B | 07/30/10 | L4T961CT |
| | 220 | 54.8 | 275 | mg/kg | 101 | 0.58 | SW846 6010B | 07/30/10 | L4T961CU |
| | | | Dilution Factor: 1 | | | | | | |
| Molybdenum | | | | | | | | | |
| | ND | 111 | 101 | mg/kg | 91 | | SW846 6010B | 07/30/10 | L4T961CV |
| | ND | 110 | 100 | mg/kg | 91 | 0.48 | SW846 6010B | 07/30/10 | L4T961CW |
| | | | Dilution Factor: 1 | | | | | | |
| Nickel | | | | | | | | | |
| | 55.3 | 55.4 | 109 | mg/kg | 97 | | SW846 6010B | 07/30/10 | L4T961CX |
| | 55.3 | 54.8 | 105 | mg/kg | 91 | 3.4 | SW846 6010B | 07/30/10 | L4T961C0 |
| | | | Dilution Factor: 1 | | | | | | |
| Potassium | | | | | | | | | |
| | 724 | 5540 | 5760 | mg/kg | 91 | | SW846 6010B | 07/30/10 | L4T961C1 |
| | 724 | 5480 | 5730 | mg/kg | 91 | 0.64 | SW846 6010B | 07/30/10 | L4T961C2 |
| | | | Dilution Factor: 1 | | | | | | |

(Continued on next page)

## MATRIX SPIKE SAMPLE DATA REPORT

### TOTAL Metals

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCNT RECVRY | RPD | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|---|---|
| Selenium | | | | | | | | | |
| | ND | 222 | 192 | mg/kg | 87 | | SW846 6010B | 07/30/10 | L4T961C3 |
| | ND | 219 | 187 | mg/kg | 85 | 2.7 | SW846 6010B | 07/30/10 | L4T961C4 |
| | | | Dilution Factor: 1 | | | | | | |
| Silver | | | | | | | | | |
| | 0.20 | 5.54 | 5.22 | mg/kg | 91 | | SW846 6010B | 07/30/10 | L4T961C5 |
| | 0.20 | 5.48 | 5.14 | mg/kg | 90 | 1.6 | SW846 6010B | 07/30/10 | L4T961C6 |
| | | | Dilution Factor: 1 | | | | | | |
| Sodium | | | | | | | | | |
| | 225 | 5540 | 5300 | mg/kg | 92 | | SW846 6010B | 07/30/10 | L4T961C7 |
| | 225 | 5480 | 5210 | mg/kg | 91 | 1.8 | SW846 6010B | 07/30/10 | L4T961C8 |
| | | | Dilution Factor: 1 | | | | | | |
| Thallium | | | | | | | | | |
| | ND | 222 | 205 | mg/kg | 92 | | SW846 6010B | 07/30/10 | L4T961C9 |
| | ND | 219 | 206 | mg/kg | 94 | 0.72 | SW846 6010B | 07/30/10 | L4T961DA |
| | | | Dilution Factor: 1 | | | | | | |
| Vanadium | | | | | | | | | |
| | 33.2 | 55.4 | 87.3 | mg/kg | 98 | | SW846 6010B | 07/30/10 | L4T961DC |
| | 33.2 | 54.8 | 85.7 | mg/kg | 96 | 1.9 | SW846 6010B | 07/30/10 | L4T961DD |
| | | | Dilution Factor: 1 | | | | | | |
| Zinc | | | | | | | | | |
| | 43.7 | 55.4 | 95.0 | mg/kg | 93 | | SW846 6010B | 07/30/10 | L4T961DE |
| | 43.7 | 54.8 | 94.4 | mg/kg | 93 | 0.61 | SW846 6010B | 07/30/10 | L4T961DF |
| | | | Dilution Factor: 1 | | | | | | |

**MS Lot-Sample #:** G0G290461-004 **Prep Batch #...:** 0214118
**% Moisture.....:** 8.8

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | | | | | | | | | |
| | 0.021 | 0.284 | 0.293 | mg/kg | 96 | | SW846 7471A | 08/02/10 | L4T961D1 |
| | 0.021 | 0.289 | 0.297 | mg/kg | 96 | 1.4 | SW846 7471A | 08/02/10 | L4T961D2 |
| | | | Dilution Factor: 1 | | | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and repor ing limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### General Chemistry

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|
| pH | | Work Order #: L41461AA | LCS Lot-Sample#: G0H030000-214 | | |
| | 100 | (98 - 102) | SW846 9045C | 08/02/10 | 0215214 |
| | | Dilution Factor: 1 | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE DATA REPORT

### General Chemistry

**Client Lot #...:** G0G290461 **Matrix.....:** SOLID

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCNT RECVRY | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|---|
| pH | | Work Order #: L41461AA | | LCS Lot-Sample#: G0H030000-214 | | | |
| | 8.00 | 8.04 | -- | 100 | SW846 9045C | 08/02/10 | 0215214 |
| | | Dilution Factor: 1 | | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

**SAMPLE DUPLICATE EVALUATION REPORT**

**General Chemistry**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T8K-SMP **Matrix.....:** SOLID
L4T8K-DUP
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 7.2

| PARAM | RESULT | DUPLICATE RESULT | UNITS | RPD | RPD LIMIT | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|---|---|
| Percent Moisture | | | | | | SD Lot-Sample #: G0G290461-001 | | |
| | 7.2 | 6.9 | % | 3.4 | (0-20) | ASTM D 2216-90 | 07/29-07/30/10 | 0210340 |

Dilution Factor: 1

**SAMPLE DUPLICATE EVALUATION REPORT**

**General Chemistry**

**Client Lot #...:** G0G290461 **Work Order #...:** L4T96-SMP **Matrix.....:** SOLID
L4T96-DUP
**Date Sampled...:** 07/28/10 **Date Received..:** 07/29/10
**% Moisture.....:** 8.8

| PARAM | RESULT | DUPLICATE RESULT | UNITS | RPD | RPD LIMIT | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|---|---|
| pH | | | | | | SD Lot-Sample #: G0G290461-004 | | |
| | 7.1 | 7.1 | -- | 0.14 | (0-20) | SW846 9045C | 08/02/10 | 0215214 |

Dilution Factor: 1

**EMLab P&K**

Report for:

**Ms. Linda Laver**
**TestAmerica-West Sacramento**
880 Riverside Parkway
West Sacramento, CA 95605

Regarding: Project: G0G290461; ERRG, Hunters Point
EML ID: 685062

Approved by:

Lab Manager
Dr. Kamashwaran Ramanathan

Dates of Analysis:
Asbestos-CARB 435: 08-10-2010

Service SOPs: Asbestos-CARB 435 (01265)

For clarity, we report the number of significant digits as calculated; but, due to the nature of this type of biological data, the number of significant digits that is used for interpretation should generally be one or two. All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank corrections of results is not a standard practice. The results relate only to the items tested.

EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

Document Number: 200091 - Revision Number: 5

**EMLab P&K**
1150 Bayhill Drive, Suite 100, San Bruno, CA 94066
(866) 888-6653 Fax (650) 829-5852 www.emlab.com

Client: TestAmerica-West Sacramento
C/O: Ms. Linda Laver
Re: G0G290461; ERRG, Hunters Point

Date of Sampling: 07-28-2010
Date of Receipt: 07-30-2010
Date of Report: 08-10-2010

## ASBESTOS POINT COUNT REPORT: CARB METHOD 435

| Location: | BS-DIA-01, G0G290461-01 | | |
|---|---|---|---|
| Total Points Counted: | 400 | | |
| Lab ID-Version‡: | 3039006-1 | | |
| **Sample Layers** | **Asbestos Type** | **Asbestos Points Counted** | **Asbestos Concentration (%)** |
| Brown Soil | - | - | ND |
| **Layer Totals:** | | - | - |

**Comments:** Point counting as stated under "Total Points Counted" was not performed as no asbestos fibers were detected.

| Location: | BS-DIA-02, G0G290461-02 | | |
|---|---|---|---|
| Total Points Counted: | 400 | | |
| Lab ID-Version‡: | 3039007-1 | | |
| **Sample Layers** | **Asbestos Type** | **Asbestos Points Counted** | **Asbestos Concentration (%)** |
| Brown Soil | - | - | ND |
| **Layer Totals:** | | - | - |

**Comments:** Point counting as stated under "Total Points Counted" was not performed as no asbestos fibers were detected.

| Location: | BS-DIA-03, G0G290461-03 | | |
|---|---|---|---|
| Total Points Counted: | 400 | | |
| Lab ID-Version‡: | 3039008-1 | | |
| **Sample Layers** | **Asbestos Type** | **Asbestos Points Counted** | **Asbestos Concentration (%)** |
| Brown Soil | - | - | ND |
| **Layer Totals:** | | - | - |

**Comments:** Point counting as stated under "Total Points Counted" was not performed as no asbestos fibers were detected.

| Location: | BS-DIA-04, G0G290461-04 | | |
|---|---|---|---|
| Total Points Counted: | 400 | | |
| Lab ID-Version‡: | 3039009-1 | | |
| **Sample Layers** | **Asbestos Type** | **Asbestos Points Counted** | **Asbestos Concentration (%)** |
| Brown Soil | - | - | ND |
| **Layer Totals:** | | - | - |

**Comments:** Point counting as stated under "Total Points Counted" was not performed as no asbestos fibers were detected.

The results relate only to the items tested. Interpretation is left to the company and/or persons who conducted the field work. The test report shall not be reproduced except in full, without written approval of the laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

All samples were received in acceptable condition unless otherwise noted. EMLab P&K reserves the right to dispose of all samples after a period of thirty (30) days, according to all state and federal guidelines, unless otherwise specified.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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## Chemistry Data Summary and PAL Comparison Table

| | Column Labels | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BS-DIA-01 | | BS-DIA-02 | | BS-DIA-03 | | BS-DIA-04 | | | BS-DIA-01 | BS-DIA-02 | BS-DIA-03 | BS-DIA-04 |
| **Row Labels** | **Result** | **RL** | **Result** | **RL** | **Result** | **RL** | **Result** | **RL** | PAL (mg/kg) | Check | Check | Check | Check |
| **8082** | | | | | | | | | | | | | |
| Aroclor 1016 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 3.9 | OK! | OK! | OK! | OK! |
| Aroclor 1221 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 0.17 | OK! | OK! | OK! | OK! |
| Aroclor 1232 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 0.17 | OK! | OK! | OK! | OK! |
| Aroclor 1242 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 0.22 | OK! | OK! | OK! | OK! |
| Aroclor 1248 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 0.22 | OK! | OK! | OK! | OK! |
| Aroclor 1254 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 0.093 | OK! | OK! | OK! | OK! |
| Aroclor 1260 | ND | 35 | ND | 42 | ND | 36 | ND | 37 | 0.21 | OK! | OK! | OK! | OK! |
| **6010B** | | | | | | | | | | | | | |
| Aluminum | 7,400 | 21.5 | 8,770 | 25.6 | 7,750 | 21.8 | 8,260 | 21.9 | 77,000 | OK! | OK! | OK! | OK! |
| Antimony | ND | 3.2 | ND | 3.8 | ND | 3.3 | ND | 3.3 | 10 | OK! | OK! | OK! | OK! |
| Arsenic | 4 | 4.3 | 4 | 5.1 | 4 | 4.4 | 4 | 4.4 | 11.1 | OK! | OK! | OK! | OK! |
| Barium | 61 | 2.2 | 66 | 2.6 | 58 | 2.2 | 56 | 2.2 | 15,000 | OK! | OK! | OK! | OK! |
| Beryllium | 0 | 0.32 | 0 | 0.38 | 0 | 0.33 | 0 | 0.33 | 160 | OK! | OK! | OK! | OK! |
| Cadmium | 0 | 0.32 | 0 | 0.38 | 0 | 0.33 | 0 | 0.33 | 3.5 | OK! | OK! | OK! | OK! |
| Calcium | 2,160 | 53.9 | 2,650 | 64.1 | 2,280 | 54.6 | 2,550 | 54.8 | -- | OK! | OK! | OK! | OK! |
| Chromium | 36 | 1.1 | 43 | 1.3 | 44 | 1.1 | 39 | 1.1 | 280 | OK! | OK! | OK! | OK! |
| Cobalt | 10 | 0.65 | 12 | 0.77 | 11 | 0.65 | 11 | 0.66 | 370 | OK! | OK! | OK! | OK! |
| Copper | 10 | 1.6 | 12 | 1.9 | 11 | 1.6 | 11 | 1.6 | 159 | OK! | OK! | OK! | OK! |
| Iron | 14,900 | 10.8 | 17,600 | 12.8 | 15,600 | 10.9 | 15,900 | 11 | 58,000 | OK! | OK! | OK! | OK! |
| Lead | 3 | 1.1 | 4 | 1.3 | 4 | 1.1 | 4 | 1.1 | 155 | OK! | OK! | OK! | OK! |
| Magnesium | 6,040 | 53.9 | 7,040 | 64.1 | 6,300 | 54.6 | 6,390 | 54.8 | -- | OK! | OK! | OK! | OK! |
| Manganese | 208 | 1.1 | 247 | 1.3 | 216 | 1.1 | 220 | 1.1 | 1,431 | OK! | OK! | OK! | OK! |
| Molybdenum | ND | 2.2 | ND | 2.6 | ND | 2.2 | ND | 2.2 | 390 | OK! | OK! | OK! | OK! |
| Nickel | 54 | 1.1 | 64 | 1.3 | 57 | 1.1 | 55 | 1.1 | 13,000 | OK! | OK! | OK! | OK! |
| Potassium | 702 | 108 | 819 | 128 | 772 | 109 | 724 | 110 | -- | OK! | OK! | OK! | OK! |
| Selenium | ND | 3.2 | ND | 3.8 | ND | 3.3 | ND | 3.3 | 390 | OK! | OK! | OK! | OK! |
| Silver | 0 | 0.54 | 0 | 0.64 | 0 | 0.55 | 0 | 0.55 | 390 | OK! | OK! | OK! | OK! |
| Sodium | 193 | 108 | 243 | 128 | 201 | 109 | 225 | 110 | -- | OK! | OK! | OK! | OK! |
| Thallium | ND | 3.2 | ND | 3.8 | ND | 3.3 | ND | 3.3 | 5.1 | OK! | OK! | OK! | OK! |
| Vanadium | 32 | 2.2 | 36 | 2.6 | 33 | 2.2 | 33 | 2.2 | 117 | OK! | OK! | OK! | OK! |
| Zinc | 41 | 2.2 | 49 | 2.6 | 43 | 2.2 | 44 | 2.2 | 373 | OK! | OK! | OK! | OK! |
| **7471A** | | | | | | | | | | | | | |
| Mercury | 0 | 0.043 | 0 | 0.051 | ND | 0.044 | 0 | 0.044 | 2.3 | OK! | OK! | OK! | OK! |
| **8260B** | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 2 | OK! | OK! | OK! | OK! |
| 1,1,1-Trichloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 9000 | OK! | OK! | OK! | OK! |
| 1,1,2,2-Tetrachloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 11 | 0.59 | OK! | OK! | OK! | OK! |
| 1,1,2-Trichloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 1.1 | OK! | OK! | OK! | OK! |
| 1,1-Dichloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 3.4 | OK! | OK! | OK! | OK! |
| 1,1-Dichloroethene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 250 | OK! | OK! | OK! | OK! |
| 1,1-Dichloropropene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| 1,2,3-Trichlorobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| 1,2,3-Trichloropropane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.018 | OK! | OK! | OK! | OK! |
| 1,2,4-Trichlorobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 87 | OK! | OK! | OK! | OK! |

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## Chemistry Data Summary and PAL Comparison Table

| | Column Labels | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BS-DIA-01 | | BS-DIA-02 | | BS-DIA-03 | | BS-DIA-04 | | | BS-DIA-01 | BS-DIA-02 | BS-DIA-03 | BS-DIA-04 |
| Row Labels | Result | RL | Result | RL | Result | RL | Result | RL | PAL (mg/kg) | Check | Check | Check | Check |
| 1,2,4-Trimethylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 67 | OK! | OK! | OK! | OK! |
| 1,2-Dibromo-3-chloropropane (DBCP) | ND | 13 | ND | 15 | ND | 12 | ND | 16 | 0.0056 | OK! | OK! | OK! | OK! |
| 1,2-Dibromoethane (EDB) | ND | 13 | ND | 15 | ND | 12 | ND | 16 | 0.034 | OK! | OK! | OK! | OK! |
| 1,2-Dichlorobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 2000 | OK! | OK! | OK! | OK! |
| 1,2-Dichloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.45 | OK! | OK! | OK! | OK! |
| 1,2-Dichloropropane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.93 | OK! | OK! | OK! | OK! |
| 1,3,5-Trimethylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 47 | OK! | OK! | OK! | OK! |
| 1,3-Dichlorobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| 1,3-Dichloropropane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 1600 | OK! | OK! | OK! | OK! |
| 1,4-Dichlorobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 2.6 | OK! | OK! | OK! | OK! |
| 2,2-Dichloropropane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| 2-Butanone (MEK) | ND | 13 | ND | 15 | ND | 12 | ND | 16 | 28000 | OK! | OK! | OK! | OK! |
| 2-Chlorotoluene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 1600 | OK! | OK! | OK! | OK! |
| 2-Hexanone | ND | 13 | ND | 15 | ND | 12 | ND | 16 | -- | OK! | OK! | OK! | OK! |
| 4-Chlorotoluene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 5500 | OK! | OK! | OK! | OK! |
| 4-Methyl-2-pentanone (MIBK) | ND | 13 | ND | 15 | ND | 12 | ND | 16 | 5300 | OK! | OK! | OK! | OK! |
| Acetone | ND | 25 | ND | 30 | ND | 25 | ND | 31 | 61000 | OK! | OK! | OK! | OK! |
| Benzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 1.1 | OK! | OK! | OK! | OK! |
| Bromobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 94 | OK! | OK! | OK! | OK! |
| Bromochloromethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| Bromodichloromethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.28 | OK! | OK! | OK! | OK! |
| Bromoform | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 61 | OK! | OK! | OK! | OK! |
| Bromomethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 7.9 | OK! | OK! | OK! | OK! |
| Carbon disulfide | ND | 13 | ND | 15 | ND | 12 | ND | 16 | 670 | OK! | OK! | OK! | OK! |
| Carbon tetrachloride | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.25 | OK! | OK! | OK! | OK! |
| Chlorobenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 310 | OK! | OK! | OK! | OK! |
| Chloroethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 15000 | OK! | OK! | OK! | OK! |
| Chloroform | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.3 | OK! | OK! | OK! | OK! |
| Chloromethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 120 | OK! | OK! | OK! | OK! |
| cis-1,2-Dichloroethene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| cis-1,3-Dichloropropene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.17 | OK! | OK! | OK! | OK! |
| Dibromochloromethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.7 | OK! | OK! | OK! | OK! |
| Dibromomethane | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 780 | OK! | OK! | OK! | OK! |
| Dichlorodifluoromethane (Freon 12) | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 190 | OK! | OK! | OK! | OK! |
| Ethylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 5.4 | OK! | OK! | OK! | OK! |
| Hexachlorobutadiene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 6.2 | OK! | OK! | OK! | OK! |
| Isopropylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 2200 | OK! | OK! | OK! | OK! |
| Methyl tert-butyl ether (MTBE) | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 39 | OK! | OK! | OK! | OK! |
| Methylene chloride | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 11 | OK! | OK! | OK! | OK! |
| m-Xylene & p-Xylene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 9.2 | OK! | OK! | OK! | OK! |
| Naphthalene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 1.7 | OK! | OK! | OK! | OK! |
| n-Butylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| n-Propylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| o-Xylene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 5300 | OK! | OK! | OK! | OK! |
| p-Isopropyltoluene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |

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## Chemistry Data Summary and PAL Comparison Table

| | Column Labels | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BS-DIA-01 | | BS-DIA-02 | | BS-DIA-03 | | BS-DIA-04 | | | BS-DIA-01 | BS-DIA-02 | BS-DIA-03 | BS-DIA-04 |
| **Row Labels** | **Result** | **RL** | **Result** | **RL** | **Result** | **RL** | **Result** | **RL** | PAL (mg/kg) | Check | Check | Check | Check |
| sec-Butylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| Styrene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 6500 | OK! | OK! | OK! | OK! |
| tert-Butylbenzene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| Tetrachloroethene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | -- | OK! | OK! | OK! | OK! |
| Toluene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 5000 | OK! | OK! | OK! | OK! |
| trans-1,2-Dichloroethene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 110 | OK! | OK! | OK! | OK! |
| trans-1,3-Dichloropropene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 1.7 | OK! | OK! | OK! | OK! |
| Trichloroethene | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 2.8 | OK! | OK! | OK! | OK! |
| Trichlorofluoromethane (Freon 11) | ND | 13 | ND | 15 | ND | 12 | ND | 16 | 800 | OK! | OK! | OK! | OK! |
| Vinyl chloride | ND | 6.4 | ND | 7.4 | ND | 6.2 | ND | 7.8 | 0.06 | OK! | OK! | OK! | OK! |
| **8270C** | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 87 | OK! | OK! | OK! | OK! |
| 1,2-Dichlorobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 2000 | OK! | OK! | OK! | OK! |
| 1,3-Dichlorobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| 1,4-Dichlorobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 2.6 | OK! | OK! | OK! | OK! |
| 2,4,5-Trichlorophenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 6100 | OK! | OK! | OK! | OK! |
| 2,4,6-Trichlorophenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 44 | OK! | OK! | OK! | OK! |
| 2,4-Dichlorophenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 180 | OK! | OK! | OK! | OK! |
| 2,4-Dimethylphenol | ND | 530 | ND | 640 | ND | 550 | ND | 540 | 1200 | OK! | OK! | OK! | OK! |
| 2,4-Dinitrophenol | ND | 2100 | ND | 2600 | ND | 2200 | ND | 2100 | 120 | OK! | OK! | OK! | OK! |
| 2,4-Dinitrotoluene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| 2,6-Dichlorophenol | ND | 530 | ND | 640 | ND | 550 | ND | 540 | -- | OK! | OK! | OK! | OK! |
| 2,6-Dinitrotoluene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 61 | OK! | OK! | OK! | OK! |
| 2-Chloronaphthalene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 6300 | OK! | OK! | OK! | OK! |
| 2-Chlorophenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 390 | OK! | OK! | OK! | OK! |
| 2-Methylnaphthalene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 310 | OK! | OK! | OK! | OK! |
| 2-Methylphenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 3100 | OK! | OK! | OK! | OK! |
| 2-Nitroaniline | ND | 1700 | ND | 2000 | ND | 1800 | ND | 1700 | 180 | OK! | OK! | OK! | OK! |
| 2-Nitrophenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| 3,3'-Dichlorobenzidine | ND | 1700 | ND | 2000 | ND | 1800 | ND | 1700 | 1.1 | OK! | OK! | OK! | OK! |
| 3-Methylphenol & 4-Methylphenol | ND | 1100 | ND | 1300 | ND | 1100 | ND | 1100 | -- | OK! | OK! | OK! | OK! |
| 3-Nitroaniline | ND | 1700 | ND | 2000 | ND | 1800 | ND | 1700 | -- | OK! | OK! | OK! | OK! |
| 4,6-Dinitro-2-methylphenol | ND | 2100 | ND | 2600 | ND | 2200 | ND | 2100 | 6.1 | OK! | OK! | OK! | OK! |
| 4-Bromophenyl phenyl ether | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| 4-Chloro-3-methylphenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| 4-Chloroaniline | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 2.4 | OK! | OK! | OK! | OK! |
| 4-Chlorophenyl phenyl ether | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| 4-Nitroaniline | ND | 1700 | ND | 2000 | ND | 1800 | ND | 1700 | 24 | OK! | OK! | OK! | OK! |
| 4-Nitrophenol | ND | 2100 | ND | 2600 | ND | 2200 | ND | 2100 | -- | OK! | OK! | OK! | OK! |
| Acenaphthene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 3400 | OK! | OK! | OK! | OK! |
| Acenaphthylene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Anthracene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 17000 | OK! | OK! | OK! | OK! |
| Azobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Benz(a)anthracene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.15 | OK! | OK! | OK! | OK! |
| Benzo(a)pyrene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.15 | OK! | OK! | OK! | OK! |

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## Chemistry Data Summary and PAL Comparison Table

| | Column Labels | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BS-DIA-01 | | BS-DIA-02 | | BS-DIA-03 | | BS-DIA-04 | | | BS-DIA-01 | BS-DIA-02 | BS-DIA-03 | BS-DIA-04 |
| Row Labels | Result | RL | Result | RL | Result | RL | Result | RL | PAL (mg/kg) | Check | Check | Check | Check |
| Benzo(b)fluoranthene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.15 | OK! | OK! | OK! | OK! |
| Benzo(ghi)perylene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Benzo(k)fluoranthene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.15 | OK! | OK! | OK! | OK! |
| Benzoic acid | ND | 1700 | ND | 2000 | ND | 1800 | ND | 1700 | 240000 | OK! | OK! | OK! | OK! |
| Benzyl alcohol | ND | 540 | ND | 650 | ND | 560 | ND | 550 | 31000 | OK! | OK! | OK! | OK! |
| bis(2-Chloroethoxy)methane | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 180 | OK! | OK! | OK! | OK! |
| bis(2-Chloroethyl) ether | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.19 | OK! | OK! | OK! | OK! |
| bis(2-Chloroisopropyl) ether | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 3.5 | OK! | OK! | OK! | OK! |
| bis(2-Ethylhexyl) phthalate | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 1.1 | OK! | OK! | OK! | OK! |
| Butyl benzyl phthalate | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 260 | OK! | OK! | OK! | OK! |
| Carbazole | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Chrysene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 15 | OK! | OK! | OK! | OK! |
| Dibenz(a,h)anthracene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.15 | OK! | OK! | OK! | OK! |
| Dibenzofuran | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Diethyl phthalate | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 49000 | OK! | OK! | OK! | OK! |
| Dimethyl phthalate | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Di-n-butyl phthalate | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 6100 | OK! | OK! | OK! | OK! |
| Di-n-octyl phthalate | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Fluoranthene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 2300 | OK! | OK! | OK! | OK! |
| Fluorene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 2300 | OK! | OK! | OK! | OK! |
| Hexachlorobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.3 | OK! | OK! | OK! | OK! |
| Hexachlorobutadiene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 6.2 | OK! | OK! | OK! | OK! |
| Hexachloroethane | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 35 | OK! | OK! | OK! | OK! |
| Indeno(1,2,3-cd)pyrene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 0.15 | OK! | OK! | OK! | OK! |
| Isophorone | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 510 | OK! | OK! | OK! | OK! |
| Naphthalene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 1.7 | OK! | OK! | OK! | OK! |
| Nitrobenzene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 4.4 | OK! | OK! | OK! | OK! |
| N-Nitrosodiphenylamine | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 99 | OK! | OK! | OK! | OK! |
| N-Nitrosopyrrolidine | ND | 530 | ND | 640 | ND | 550 | ND | 540 | 0.23 | OK! | OK! | OK! | OK! |
| Pentachlorophenol | ND | 1700 | ND | 2000 | ND | 1800 | ND | 1700 | 3 | OK! | OK! | OK! | OK! |
| Phenanthrene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | -- | OK! | OK! | OK! | OK! |
| Phenol | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 18000 | OK! | OK! | OK! | OK! |
| Pyrene | ND | 350 | ND | 420 | ND | 360 | ND | 350 | 1700 | OK! | OK! | OK! | OK! |
| Asbestos/CARB 435 | | | | | | | | | | | | | |
| Asbestos | ND | | ND | | ND | | ND | | 0.25 | OK! | OK! | OK! | OK! |

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**Remedial Action Work Plan,**
**Appendix B Sampling and Analysis Plan, Worksheet 15.8**

## SAP WORKSHEET #15.8 – REFERENCE LIMITS AND EVALUATION TABLE

**Matrix:** Soil

**Analytical Group:** Gamma Spectroscopy (on-site laboratory)

| Analyte | Chemical Abstracts Service Number | PAL (pCi/g)[a] | PAL Reference | Project Minimum Detectable Activity (pCi/g) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Minimum Detectable Activity (pCi/g) | Method Detection Limit (pCi/g) |
| Actinium-228 | 14331-83-0 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Americium-241 | 86954-36-1 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Bismuth-212 | 14913-49-6 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Bismuth-214 | 14733-03-0 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Cesium-137 | 10045-97-3 | 0.113 | ROD[c] | 0.07 | 0.07 | Not applicable |
| Cobalt-60 | 10198-40-0 | 0.0361 | ROD[c] | Not applicable | Not applicable[b] | Not applicable |
| Europium-152 | 14683-23-9 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Europium-154 | 15585-10-1 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Lead-210 | 14255-04-0 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Lead-212 | 15092-94-1 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Lead-214 | 15067-28-4 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Potassium-40 | 13966-00-2 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Protactinium-234m | 378783-76-7 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Radium-226 | 13982-63-3 | 1.0 above background | ROD[c] | 1.4 | 1.4 | Not applicable |
| Thallium-208 | 14913-50-9 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Thorium-232 | 7440-29-1 | 1.69 | ROD-2[d] | Not applicable | Not applicable[b] | Not applicable |

## SAP WORKSHEET #15.8 – REFERENCE LIMITS AND EVALUATION TABLE *(continued)*

**Matrix:** Soil

**Analytical Group:** Gamma Spectroscopy (on-site laboratory)

| Analyte | Chemical Abstracts Service Number | PAL (pCi/g)[a] | PAL Reference | Project Minimum Detectable Activity (pCi/g) | Laboratory-Specific | |
|---|---|---|---|---|---|---|
| | | | | | Minimum Detectable Activity (pCi/g) | Method Detection Limit (pCi/g) |
| Thorium-234 | 15065-10-8 | None established | Not applicable | Not applicable | Not applicable[b] | Not applicable |
| Uranium-235 + daughters | 15117-96-1 | 0.195 | ROD-2[d] | Not applicable | Not applicable[b] | Not applicable |

Notes:

a. If an analyte does not have a PAL and is detected, the Navy and the regulatory agencies will discuss the analyte to determine an acceptable value for comparison.

b. Minimum detectable activity is determined based on background count, sample size, and counting time. A longer counting time will achieve a lower minimum detectable activity. For analytes with no PAL, the minimum detectable activity is not applicable.

c. Remedial goal from the Parcel B ROD (DON, 2009a), Parcel G ROD (DON, 2009b), and Parcels D-1 and UC-1 ROD (DON, 2009c)

d. Remedial goal from the Parcel G ROD (DON, 2009b), and Parcels D-1 and UC-1 ROD (DON, 2009c)

PAL = project action limit

pCi/g = picocuries per gram

RRO = radiological remedial objective (TtECI, 2009)

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**ERA-DIA-001 through -005 Radiological Lab Data**
**& TtEC Acceptance E-mail**

ORTEC g v - i (3263) Npp32  G53W3.10  29-JUL-2010 09:34:16
New World Technology  Spectrum name: 4N000374.An1

Sample description
Parcel B ERA-DIA-001 356g
7/28/10 10:00

Acquisition information
Start time:  29-Jul-2010 08:33:58
Live time:  2700
Real time:  2703

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***** S U M M A R Y  O F  N U C L I D E S  I N  S A M P L E *****

| Nuclide | | Activity pCi/g | Time of Count Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| Ac-228 | | 4.6551E-01 | 1.8761E-01 | 1.9035E-01 | 0.948E-01 |
| AM-241 | #A | 2.1648E-01 | 5.8785E-01 | 5.8817E-01 | 0.473E+00 |
| Bi-212 | A | 2.3588E-01 | 4.1615E-01 | 4.1646E-01 | 0.317E+00 |
| BI-214 | | 3.2938E-01 | 1.4283E-01 | 1.4450E-01 | 0.931E-01 |
| CO-60 | #A | -3.4833E-02 | 5.7782E-01 | 5.7783E-01 | 0.309E-01 |
| CS-137 | A | 2.4130E-02 | 3.6809E-02 | 3.6844E-02 | 0.287E-01 |
| EU-152 | A | -4.9336E-02 | 4.4128E-02 | 4.4326E-02 | 0.134E+00 |
| EU-154 | C | 7.5989E-02 | 1.1006E-01 | 1.1025E-01 | 0.700E-01 |
| K-40 | | 1.2140E+01 | 1.5843E+00 | 1.7954E+00 | 0.214E+00 |
| Pa-234 | #C | 1.4958E-01 | 1.4670E-01 | 1.4728E-01 | 0.127E+00 |
| Pb-210 | # | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.000E+00 |
| Pb-212 | | 3.9087E-01 | 1.1325E-01 | 1.1709E-01 | 0.778E-01 |
| Pb-214 | | 3.1428E-01 | 1.3954E-01 | 1.4135E-01 | 0.753E-01 |
| RA-226 | A | 4.3760E-01 | 9.3301E-01 | 9.3359E-01 | 0.765E+00 |
| Th-230 | A | 1.0873E+00 | 4.6536E+01 | 4.6537E+01 | 0.393E+02 |
| Th-234 | #A | -5.2475E+00 | 8.0544E+01 | 8.0545E+01 | 0.212E+01 |
| Tl-208 | | 2.3462E-01 | 8.7135E-02 | 9.6864E-02 | 0.189E-01 |
| U-235 | #A | 4.2336E-02 | 4.6743E-02 | 4.6853E-02 | 0.670E-01 |

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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  50.9 to  3247.4 keV)  1.387E+01  pCi/g

Laboratory:  New World Technology

ORTEC g v - i (3263) Npp32  G53W3.10  29-JUL-2010 09:34:46
New World Technology  Spectrum name: 5N000425.An1

Sample description
Parcel B ERA-DIA-002 362g
7/28/10 10:01

Acquisition information
Start time:  29-Jul-2010 08:35:18
Live time:  2700
Real time:  2702

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***** S U M M A R Y  O F  N U C L I D E S  I N  S A M P L E *****

| Nuclide | | Activity pCi/g | Time of Count Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| Ac-228 | | 5.0354E-01 | 1.7393E-01 | 1.7738E-01 | 0.105E+00 |
| AM-241 | A | 3.8918E-02 | 7.5097E-02 | 7.5177E-02 | 0.600E-01 |
| Bi-212 | | 4.6530E-01 | 3.2879E-01 | 3.3031E-01 | 0.226E+00 |
| BI-214 | | 4.0954E-01 | 1.5163E-01 | 1.5406E-01 | 0.672E-01 |
| CO-60 | #A | 3.9699E-04 | 2.8495E-02 | 2.8495E-02 | 0.243E-01 |
| CS-137 | | 5.1111E-02 | 5.0788E-02 | 5.0904E-02 | 0.373E-01 |
| EU-152 | #A | 8.0108E-02 | 7.2403E-02 | 7.2721E-02 | 0.861E-01 |
| EU-154 | C | 1.2625E-01 | 5.4563E-02 | 5.5601E-02 | 0.514E-01 |
| K-40 | | 1.0062E+01 | 1.5651E+00 | 1.7145E+00 | 0.901E+00 |
| Pa-234 | #A | 6.3783E-02 | 8.2889E-02 | 8.3077E-02 | 0.678E-01 |
| Pb-210 | | 7.3703E-01 | 8.2541E-01 | 8.2744E-01 | 0.624E+00 |
| Pb-212 | | 3.2779E-01 | 9.4262E-02 | 9.7510E-02 | 0.651E-01 |
| Pb-214 | | 3.1279E-01 | 1.0876E-01 | 1.1106E-01 | 0.663E-01 |
| RA-226 | A | 5.5357E-01 | 8.3052E-01 | 8.3157E-01 | 0.654E+00 |
| Th-230 | #A | -2.6459E-01 | 5.4702E+00 | 5.4702E+00 | 0.547E+00 |
| Th-234 | #A | -7.9512E-01 | 1.8543E+00 | 1.8559E+00 | 0.107E+01 |
| Tl-208 | C | 6.6524E-02 | 3.6965E-02 | 3.8863E-02 | 0.544E-01 |
| U-235 | C | 5.6999E-02 | 7.5972E-02 | 7.6094E-02 | 0.484E-01 |

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B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  37.9 to  3020.7 keV)  1.213E+01  pCi/g

Laboratory:  New World Technology

ORTEC g v - i (3263) Npp32  G53W3.10  29-JUL-2010 09:21:24
New World Technology  Spectrum name: 1N000939.An1

Sample description
Parcel B ERA-DIA-003 355g
7/28/10 10:02

Acquisition information
Start time:  29-Jul-2010 08:34:10
Live time:  2700
Real time:  2701

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***** S U M M A R Y  O F  N U C L I D E S  I N  S A M P L E *****

| Nuclide | | Activity pCi/g | Time of Count Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| Ac-228 | | 5.4088E-01 | 2.0121E-01 | 2.0466E-01 | 0.745E-01 |
| AM-241 | A | 8.8316E-03 | 7.5356E-02 | 7.5360E-02 | 0.620E-01 |
| Bi-212 | #A | 6.4853E-02 | 1.3699E-01 | 1.3706E-01 | 0.230E+00 |
| BI-214 | # | 1.6263E-01 | 9.5067E-02 | 9.5680E-02 | 0.507E-01 |
| CO-60 | #A | -1.1849E-02 | 1.7590E-02 | 1.7608E-02 | 0.291E-01 |
| CS-137 | #A | -2.1667E-03 | 2.3533E-02 | 2.3533E-02 | 0.156E-01 |
| EU-152 | A | -1.4542E-01 | 1.8774E-01 | 1.8814E-01 | 0.805E-01 |
| EU-154 | C | 1.1586E-01 | 6.2545E-02 | 6.3310E-02 | 0.359E-01 |
| K-40 | | 1.0589E+01 | 1.3765E+00 | 1.5613E+00 | 0.133E+00 |
| Pa-234 | | 8.8478E-02 | 8.0506E-02 | 8.0878E-02 | 0.524E-01 |
| Pb-210 | | 7.2477E-01 | 8.2521E-01 | 8.2718E-01 | 0.569E+00 |
| Pb-212 | | 3.4962E-01 | 8.3401E-02 | 8.7546E-02 | 0.498E-01 |
| Pb-214 | | 2.4255E-01 | 9.2851E-02 | 9.4472E-02 | 0.811E-01 |
| RA-226 | A | 4.0250E-01 | 8.2283E-01 | 8.2340E-01 | 0.672E+00 |
| Th-230 | #A | -5.7390E-01 | 4.6179E+00 | 4.6179E+00 | 0.814E+00 |
| Th-234 | #A | 7.6649E-01 | 1.2160E+00 | 1.2182E+00 | 0.993E+00 |
| Tl-208 | #C | 4.8330E-02 | 3.3064E-02 | 3.4194E-02 | 0.171E-01 |
| U-235 | A | 3.9996E-02 | 4.0630E-02 | 4.0742E-02 | 0.474E-01 |

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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  36.6 to  2885.2 keV)  1.197E+01  pCi/g

Laboratory:  New World Technology

ORTEC g v - i (3263) Npp32  G53W3.10  29-JUL-2010 10:58:47
New World Technology  Spectrum name: 1N000940.An1

Sample description
Parcel B ERA-DIA-004 366g
7/28/10 10:03

Acquisition information
Start time:  29-Jul-2010 10:11:37
Live time:  2700
Real time:  2701

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***** S U M M A R Y  O F  N U C L I D E S  I N  S A M P L E *****

| Nuclide | Activity pCi/g | Time of Count Uncertainty Counting pCi/g | 2 Sigma Total pCi/g | MDA pCi/g |
|---|---|---|---|---|
| Ac-228 | 4.2300E-01 | 1.8217E-01 | 1.8450E-01 | 0.842E-01 |
| AM-241 #A | 3.9460E-02 | 7.8575E-02 | 7.8653E-02 | 0.544E-01 |
| Bi-212 | 4.5853E-01 | 3.2373E-01 | 3.2523E-01 | 0.241E+00 |
| BI-214 # | 3.2841E-01 | 1.4517E-01 | 1.4680E-01 | 0.682E-01 |
| CO-60 #A | -3.3321E-02 | 1.4117E-01 | 1.4119E-01 | 0.282E-01 |
| CS-137 #A | 1.1709E-02 | 3.7815E-02 | 3.7823E-02 | 0.263E-01 |
| EU-152 #A | -2.2407E-01 | 7.0263E-01 | 7.0289E-01 | 0.844E-01 |
| EU-154 C | 5.4125E-02 | 4.6359E-02 | 4.6585E-02 | 0.375E-01 |
| K-40 | 8.5585E+00 | 1.3728E+00 | 1.4964E+00 | 0.535E+00 |
| Pa-234 #A | 3.3521E-02 | 7.6482E-02 | 7.6539E-02 | 0.752E-01 |
| Pb-210 A | 4.6819E-01 | 7.7517E-01 | 7.7604E-01 | 0.576E+00 |
| Pb-212 | 3.1138E-01 | 7.8787E-02 | 8.2277E-02 | 0.490E-01 |
| Pb-214 | 3.1850E-01 | 9.5281E-02 | 9.7990E-02 | 0.486E-01 |
| RA-226 A | 1.2480E-01 | 7.7858E-01 | 7.7864E-01 | 0.651E+00 |
| Th-230 # | 6.4118E+00 | 6.4301E+00 | 6.5212E+00 | 0.416E+01 |
| Th-234 #A | 7.0504E-01 | 1.2578E+00 | 1.2596E+00 | 0.985E+00 |
| Tl-208 #C | 9.1194E-02 | 3.4561E-02 | 3.8274E-02 | 0.166E-01 |
| U-235 C | 7.7804E-02 | 6.4090E-02 | 6.4360E-02 | 0.438E-01 |

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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  36.6 to  2885.2 keV)  1.040E+01  pCi/g

Laboratory:  New World Technology

ORTEC g v - i (3263) Npp32  G53W3.10  29-JUL-2010 11:10:29
New World Technology  Spectrum name: 4N000375.An1

Sample description
Parcel B ERA-DIA-005 360g
7/28/10 10:04

Acquisition information
Start time:  29-Jul-2010 10:19:19
Live time:  2700
Real time:  2702

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***** S U M M A R Y  O F  N U C L I D E S  I N  S A M P L E *****

| Nuclide | | Activity pCi/g | Uncertainty (2 Sigma) Counting pCi/g | Total pCi/g | MDA pCi/g |
|---|---|---|---|---|---|
| Ac-228 | | 3.4333E-01 | 1.6226E-01 | 1.6398E-01 | 0.951E-01 |
| AM-241 | #A | 3.8688E-02 | 2.4272E-01 | 2.4274E-01 | 0.244E+00 |
| Bi-212 | | 5.1253E-01 | 4.1003E-01 | 4.1152E-01 | 0.278E+00 |
| BI-214 | | 4.2412E-01 | 1.2989E-01 | 1.3292E-01 | 0.561E-01 |
| CO-60 | #A | 2.9826E-03 | 4.2070E-03 | 4.2118E-03 | 0.293E-01 |
| CS-137 | A | 1.7813E-03 | 4.0411E-02 | 4.0411E-02 | 0.350E-01 |
| EU-152 | A | 5.9605E-03 | 4.8667E-03 | 4.8929E-03 | 0.150E+00 |
| EU-154 | C | 2.0403E-01 | 1.3767E-01 | 1.3875E-01 | 0.819E-01 |
| K-40 | | 1.2274E+01 | 1.5342E+00 | 1.7558E+00 | 0.112E+00 |
| Pa-234 | # | 1.7436E-01 | 1.3727E-01 | 1.3811E-01 | 0.138E+00 |
| Pb-210 | # | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.000E+00 |
| Pb-212 | | 2.8847E-01 | 1.1008E-01 | 1.1225E-01 | 0.807E-01 |
| Pb-214 | | 4.5504E-01 | 1.8631E-01 | 1.8915E-01 | 0.940E-01 |
| RA-226 | | 1.1710E+00 | 1.1417E+00 | 1.1451E+00 | 0.900E+00 |
| Th-230 | #A | 2.8200E-01 | 3.8056E+01 | 3.8056E+01 | 0.313E+02 |
| Th-234 | #A | -3.2339E+00 | 8.2863E+00 | 8.2920E+00 | 0.193E+01 |
| Tl-208 | # | 2.3201E-01 | 8.6167E-02 | 9.5788E-02 | 0.186E-01 |
| U-235 | #A | 1.0197E-03 | 1.3685E-03 | 1.3707E-03 | 0.713E-01 |

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F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (  50.9 to  3247.4 keV)  1.570E+01  pCi/g

Laboratory:  New World Technology

**From:** Montgomery, Shanti [mailto:Shanti.Montgomery@tetratech.com]
**Sent:** Wednesday, August 04, 2010 6:10 AM
**To:** John Sourial
**Subject:** FW: ERRG Sampling Results

Rad data for second potential source of import material. This data meets the project action levels established in the
SAP.

**Shanti Montgomery** | **Project Manager**
Direct: 415.216.2772 | Main: 415.671.1990 | Fax: 415.671.1995 | Cell: 360.320.8519
shanti.montgomery@tetratech.com
**Tetra Tech EC, Inc. | Hunter's Point Shipyard**
200 Fisher Avenue | San Francisco, CA 94124 | www.tetratech.com
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the sender by replying to this message and then delete it from your system.

**Think Green - Not every email needs to be printed.**

**From:** Chiu, George
**Sent:** Friday, July 30, 2010 10:16 AM
**To:** Montgomery, Shanti
**Cc:** Abkemeier, Erik; Berry, Adam; Bowers, Bert; Bray, Jeff; DeLong, Daryl; Dougherty, Christine; Henderson, Brian;
Hubbard, Justin; Kanaya, Rich; Miller, Thorpe; paulw@newworld.org; philips@newworld.org; robinf@newworld.org;
Sindelar, Terry; Spencer, Jenny; Taylor, Jane; Weingarz, Richard; White, Bryan
**Subject:** ERRG Sampling Results

Attached for your review are the ERRG sampling results which did not indicate any radionuclides of concern above the
release criteria.

**George Chiu** | **Associate Health Physicist**
Direct: 415.216.2745 | Cell: 714.270.4009
george.chiu@tetratech.com
**Radiological Survey & Remedial Services**
200 South Virginia St 8th Floor | Reno, NV 89501 | www.radsvcs.com
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